2026 REGION C WATER PLAN

Volume II. Appendices

Freese and Nichols, Inc.

Plummer Associates, Inc.

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2026 REGION C WATER PLAN

October 2025

Prepared for the Region C Water Planning Group

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List of Acronyms

ACRONYM	DESCRIPTION
AMI	Advanced Metering Infrastructure
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
BEG	Bureau of Economic Geology
BMP	Best Management Practices
CFS	Cubic Feet per Second
CGMA	Collin-Grayson Municipal Alliance
CRU	Collective Reporting Units
DB22	TWDB's Regional Water Planning Database
DBP	Disinfection Byproduct
DCP	Drought Contingency Plan
DFC	Desired Future Conditions
DOR	Drought of Record
DPR	Direct Potable Reuse
EA	Executive Administrator of the TWDB
EPA	Environmental Protection Agency
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
GPCD	Gallons per Capita per Day
GPF	Gallons per Flush

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ACRONYM	DESCRIPTION
GPM	Gallons per minute
HOA	Homeowners Association
IBT	Interbasin Transfer
ICI	Industrial, Commercial, Institutional
IPP	Initially Prepared Plan
IWA	International Water Association
LLC	Limited Liability Company
MAG	Modeled Available Groundwater
MGD	Million Gallons per Day
MSL	Mean Sea Level
MWP	Major Water Provider
NRCS	Natural Resources Conservation Service (formerly the Soil Conservation Service)
NRNWR	Neches River National Wildlife Refuge
OCR	Off Channel Reservoir
PDSI	Palmer Drought Severity Index
RO	Reverse Osmosis
RWP	Regional Water Plan
RWPA	Regional Water Planning Area
RWPG	Regional Water Planning Group
SB1	Senate Bill One
SB2	Senate Bill Two
SB3	Senate Bill Three
SDWA	Safe Drinking Water Act
SEP	Steam Electric Power
SUD	Special Utility District
SWCQP	Statewide Water Conservation Quantification Project
SWIFT	State Water Implementation Fund
SWIRFT	State Water Implementation Revenue Fund
SWP	State Water Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TNRIS	Texas Natural Resources Information System
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
UCM	Uniform Costing Model
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
WAM	Water Availability Model
WCAC	Water Conservation Advisory Council
WCCAP	Water Conservation and Condition Assessment Program
WCP	Water Conservation Plan
WIF	Water Infrastructure Fund
WMS	Water Management Strategy
WMSP	Water Management Strategy Project

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ACRONYM	DESCRIPTION
WSC	Water Supply Corporation
WSD	Water Supply District
WTP	Water Treatment Plant
WUG	Water User Group
WWP	Wholesale Water Provider
WWTP	Wastewater Treatment Plant
Water Providers	
ANRA	Angelina and Neches River Authority
BRA	Brazos River Authority
DWU	Dallas Water Utilities
GTUA	Greater Texoma Utility Authority
NTMWD	North Texas Municipal Water District
RRA	Red River Authority
SRA	Sabine River Authority
SRBA	Sulphur River Basin Authority
SRMWD	Sulphur River Municipal Water District
TRWD	Tarrant Regional Water District
TRA	Trinity River Authority
UNRMWA	Upper Neches River Municipal Water Authority
UTRWD	Upper Trinity Regional Water District

Glossary of Terms

TERM	MEANING
Aquifer Storage and Recovery	Aquifer storage and recovery (ASR) is the storage of water in a suitable aquifer through a well during times when water is available, and the recovery of water from the same aquifer during times when it is needed.
Best Management Practice	Best Management Practices (BMPs) are a menu of options for which entities within a water use sector can choose to implement in order to achieve benchmarks and goals through water conservation. Best management practices are voluntary efficiency measures that are intended to save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe.
Desired Future Condition	Criteria which is used to define the amount of available groundwater from an aquifer.
Drought of Record	A drought of record is the worst recorded drought since the compliation of meterologic and hydrologic data began.
First-Tier Needs	The resulting needs after existing supplies.
Groundwater Availability Model	Numerical groundwater flow model. GAMs are used to determine the aquifer response to pumping scenarios. These are the preferred models to assess groundwater availability.
Groundwater Conservation District	Generic term for all or individual state recognized Districts that oversee the groundwater resources within a specified political boundary.

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TERM	MEANING
Groundwater Management Area	Sixteen GMAs in Texas. Tasked by the Legislature to define the desired future conditions for major and minor aquifers within the GMA.
Gallons per capita per day	Unit of measure that accounts for water use in the number of gallons a person uses each day.
Interbasin Transfer	In an interbasin water transfer, surface water is taken from one river basin and conveyed into another river basin for use there.
Modeled Available Groundwater	The MAG is the amount of groundwater that can be permitted by a GCD on an annual basis. It is determined by the TWDB based on the DFC approved by the GMA. Once the MAG is established, this value must be used as the available groundwater in regional water planning.
Major Water Provider	A water user group or a wholesale water provider of particular significance to the region's water supply as determined by the regional water planning group.
Palmer Drought Severity Index	A measure of dryness based on precipitation, temperature, soil moisture and other factors.
Regional Water Planning Group	The generic term for the planning groups that oversee the regional water plan development in each respective region in the State of Texas
Second-Tier Needs	The resulting needs after recommened conservation and direct reuse WMSs are implemented.
Senate Bill One	Legislation passed by the 75th Texas Legislature that is the basis for the current regional water planning process.
Texas Commission on Environmental Quality	Agency charged with oversight of Texas surface water rights and WAM program.
Total Dissolved Solids	A measure of the combined total organic and ingorganic substances contained in the water.
Total Maximum Daily Load	A Total Maximum Daily Load (TMDL) is a regulatory term in the U.S. Clean Water Act, describing a plan for restoring impaired waters that identifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.
Texas Water Development Board	Texas Agency charged with oversight of regional water plan development and oversight of GCDs
Water Availability Model	Computer model of a river watershed that evaluates surface water availability based on Texas water rights.
Water Management Strategy	Strategies available to RWPG to meet water needs identified in the regional water plan.
Water User Group	A group that uses water. Six major types of WUGs: municipal, manufacturing, mining, steam electric power, irrigation and livestock.
Wholesale Water Provider	Entity that has or is expected to have contracts to sell 1,000 ac-ft./yr. or more of wholesale water.

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Appendix A

Consistency with TWDB Rules

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Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
Guidance Principles		
31 TAC §358.3		
358.3 (1)	The state water plan shall provide for the preparation for and response to drought conditions.	Chapters 2, 3, 5, 7
(2)	The RWP and SWP shall serve as water supply plans under drought of record conditions. RWPGs may, at their discretion, plan for drought conditions worse than the drought of record.	Chapters 2, 3, 5, 7
(3)	Consideration shall be given to the construction and improvement of surface water resources and the application of principles that result in voluntary redistribution of water resources.	Chapter 5
(4)	RWP shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions so that sufficient water will be available at a reasonable cost to satisfy a reasonable projected use of water to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the affected regional water planning areas and the state.	Chapters 5, 6, and 7
(5)	RWP shall include identification of those policies and action that may be needed to meet Texas' water supply needs and prepare for and respond to drought conditions.	Chapters 5 and 7
(6)	RWPG decision-making shall be open to and accountable to the public with decisions based on accurate, objective and reliable information with full dissemination of planning results except for those matters made confidential by law.	Chapter 10
(7)	The RWPG shall establish terms of participation in water planning efforts that shall be equitable and shall not unduly hinder participation.	Chapter 10
(8)	Consideration of the effect of policies or water management strategies on the public interest of the state, water supply, and those entities involved in providing this supply throughout the entire state.	Chapter 8
(9)	Consideration of all water management strategies the regional water plan determines to be potentially feasible when developing plans to meet future water needs and to respond to drought so that cost effective water management strategies which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are considered and approved.	Chapters 5 and 6
(10)	Consideration of opportunities that encourage and result in voluntary transfers of water resources, including but not limited to regional water banks, sales, leases, options, subordination agreements, and financing agreements.	Chapter 5
(11)	Consideration of a balance of economic, social, aesthetic, and ecological viability.	Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation), and Appendix J
(12)	For regional water planning areas without approved regional water plans or water providers for which revised plans are not developed through the regional water planning process, the use of information from the adopted state water plan and other completed studies that are sufficient for water planning shall represent the water supply plan for that area or water provider.	N/A
(13)	All surface waters are held in trust by the state, their use is subject to rights granted and administered by the Commission, and the use of surface water is governed by the prior appropriation doctrine, unless adjudicated otherwise.	Chapter 3 and Appendix E
(14)	Existing water rights, water contracts, and option agreements shall be protected. However, potential amendments of water rights, contracts and agreements may be considered and evaluated. Any amendments will require the eventual consent of the owner.	Chapters 3 and 5
(15)	The production and use of groundwater in Texas is governed by the rule of capture doctrine unless and to the extent that such production and use is regulated by a groundwater conservation district as codified by the legislature at Texas Water Code §36.002 (relating to Ownership of Groundwater).	Chapter 3
(16)	Consideration of recommendations of river and stream segments of unique ecological value to the legislature for potential protection.	Chapter 8
(17)	Consideration of recommendation of sites of unique value for the construction of reservoirs to the legislature for potential protection.	Chapter 8
(18)	Consideration of water planning and management activities of local, regional, state, and federal agencies, along with existing local, regional, and state water plans and information and existing state and federal programs and goals.	Chapters 1 and 5
(19)	Designated water quality and related water uses as shown in the state water quality management plan shall be improved or maintained.	Chapter 6
(20)	RWPGs shall actively coordinate water planning and management activities to identify common needs, issues, and opportunities for interregional water management strategies and water management strategy projects to achieve efficient use of water supplies. The Board will support RWPGs coordination to identify common needs, issues, and opportunities while working with RWPGs to resolve conflicts in a fair, equitable, and efficient manner.	Chapter 10

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Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(21)	The water management strategies identified in approved RWPs to meet needs shall be described in sufficient detail to allow a state agency making a financial or regulatory decision to determine if a proposed action before the state agency is consistent with an approved RWP.	Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation); Appendix I (Water Conservation Savings); Appendix J (Updated Quantification of Impacts of Marvin Nichols)
(22)	The evaluation of water management strategies shall use environmental information in accordance with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards for Surface Water) where applicable or, in basins where standards are not available or have not been adopted, information from existing site-specific studies or state consensus environmental planning criteria.	Chapter 5; Evaluation of strategies involving new reservoir include environmental flow standards as appropriate; Appendix G
(23)	Consideration of environmental water needs including instream flows and bay and estuary inflows, including adjustments by the RWPGs to water management strategies to provide for environmental water needs including instream flows and bay and estuary needs. Consideration shall be consistent with the Commission's adopted environmental flow standards under 30 TAC Chapter 298 in basins where standards have been adopted.	Chapter 5; Appendix G
(24)	Planning shall be consistent with all laws applicable to water use for the state and regional water planning area.	Entire RWP
(25)	The inclusion of ongoing water development projects that have been permitted by the Commission or a predecessor agency.	Chapter 5
(26)	Specific recommendations of water management strategies shall be based upon identification, analysis, and comparison of all water management strategies the RWPG determines to be potentially feasible so that the cost effective water management strategies which are environmentally sensitive are considered and adopted unless the RWPG demonstrates that adoption of such strategies is not appropriate. To determine cost-effectiveness, the RWPGs will use the process described in §357.34(d)(3)(A) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies)and, to determine environmental sensitivity, the RWPGs shall use the process described in §357.34(d)(3)(B) of this title	Chapter 5, Appendix G
(27)	RWPGs shall conduct their planning to achieve efficient use of existing water supplies, explore opportunities for and the benefits of developing regional water supply facilities or providing regional management of water facilities, coordinate the actions of local and regional water resource management agencies, provide substantial involvement by the public in the decision-making process, and provide full dissemination of planning results.	Chapters 5 and 10
(28)	RWPGs must consider existing regional water planning efforts when developing their plans.	Chapters 1, 5, and 10
Chapter One Description of the Regional Water Planning Area		
31 TAC §357.30		
	RWPGs shall describe their regional water planning area including the following:	
357.3 (1)	Social and economic aspects of a region such as information on current population, economic activity and economic sectors heavily dependent on water resources	Section 1.1
(2)	Current water use and major water demand centers	Section 1.3
(3)	Current groundwater, surface water, and reuse supplies including major springs that are important for water supply or protection of natural resources	Section 1.4
(4)	Wholesale water providers	Section 1.5
(5)	Agricultural and natural resources	Section 1.10
(6)	Identified water quality problems	Section 1.12.2
(7)	Identified threats to agricultural and natural resources due to water quantity problems or water quality problems related to water supply	Section 1.12
(8)	Summary of existing local and regional water plans	Section 1.6
(9)	The identified historic drought(s) of record within the planning area	Section 1.7, Chapter 7, and Appendix E
(10)	Current preparations for drought within the RWPA	Section 1.7 and Chapter 7
(11)	Information compiled by the Board from water loss audits (see also Texas Administrative Code §358.6)	Section 1.9; Appendix B (Water Audit Data)
(12)	An identification of each threat to agricultural and natural resources and a discussion of how that threat will be addressed or affected by the water management strategies evaluated in the plan.	Section 1.10, Chapter 6, Appendix G, Appendix J
Chapter Two Projected Non-Municipal, Municipal and Population Water Demands		
31 TAC §357.31		

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Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
357.31 (a)	RWPs shall present projected population and Water Demands by WUG as defined in §357.10 of this title (relating to Definitions and Acronyms). If a WUG lies in one or more counties or RWPA or river basins, data shall be reported for each river basin, RWPA, and county split.	Sections 2.2 and 2.3, Chapter 2 Attachments 1-4, Appendix D (DB27 Reports)
(b)	RWPs shall present projected Water Demands associated with MWPs by category of water use, including municipal, manufacturing, irrigation, steam electric power generation, mining, and livestock for the RWPA.	Chapter 2 Attachment 5
(c)	RWPs shall evaluate the current contractual obligations of WUGs and WWPs to supply water in addition to any demands projected for the WUG or WWP. Information regarding obligations to supply water to other users must also be incorporated into the water supply analysis in §357.32 of this title (relating to Water Supply Analysis) in order to determine net existing water supplies available for each WUG's own use. The evaluation of contractual obligations under this subsection is limited to determining the amount of water secured by the contract and the duration of the contract.	Chapter 3 - Where a seller/buyer relationships existed, calculations of existing supplies for each buyer considered and evaluated the contractual obligations of the seller
(d)	Municipal demands shall be adjusted to reflect water savings due to plumbing fixture requirements identified in the Texas Health and Safety Code, Chapter 372. RWPGs shall report how changes in plumbing fixtures would affect projected municipal Water Demands using projections with plumbing code savings provided by the Board or by methods approved by the EA.	Section 2.3.1
(e)	Source of population and Water Demands. In developing RWPs, RWPGs shall use:	
(e) (1)	Population and water demand projections developed by the EA that will be contained in the next state water plan and adopted by the Board after consultation with the RWPGs, Commission, Texas Department of Agriculture, and the Texas Parks and Wildlife Department.	Sections 2.2 and 2.3
(e) (2)	RWPGs may request revisions of Board adopted population or Water Demand projections if the request demonstrates that population or Water Demand projections no longer represents a reasonable estimate of anticipated conditions based on changed conditions and or new information. Before requesting a revision to population and Water Demand projections, the RWPG shall discuss the proposed revisions at a public meeting for which notice has been posted in accordance with §357.21(c) of this title (relating to Notice and Public Participation). The RWPG shall summarize public comments received on the proposed request for projection revisions. The EA shall consult with the requesting RWPG and respond to their request within 45 days after receipt of a request from an RWPG for revision of population or Water Demand projections.	Sections 2.2.1 and 2.3.1; Appendix C (Adjustments to Projections)
(f)	Population and Water Demand projections shall be presented for each Planning Decade for WUGs and MWPs.	Sections 2.2 and 2.3; Chapter 2 Attachments 1-5
Chapter Three Water Supply Analysis		
31 TAC §357.32		
357.32 (a)	RWPGs shall evaluate:	
(a) (1)	Source water availability during drought of record conditions.	Chapter 3, Appendix E
(a) (2)	Existing water supplies that are legally and physically available to WUGs and wholesale water suppliers within the RWPA for use during the drought of record.	Chapter 3; Appendix D (DB27 Reports); Appendix E (Existing Supply Available)
(b)	Consider surface water and groundwater data from the State Water Plan, existing water rights, contracts and option agreements relating to water rights, other planning and water supply studies, and analysis of water supplies existing in and available to the RWPA during Drought of Record Conditions.	Chapter 3; Appendix E (Existing Supply Available)
(c)	For surface water supply analyses, RWPGs shall use most current Water Availability Models from the Commission to evaluate the adequacy of surface water supplies. As the default approach for evaluating existing supplies, RWPGs shall assume full utilization of existing water rights and no return flows when using Water Availability Models. RWPGs may use better, more representative, water availability modeling assumptions or better site-specific information with written approval from the EA. Information available from the Commission shall be incorporated by RWPGs unless better site-specific information is available and approved in writing by the EA.	Section 3.2; Appendix E (Existing Supply Available)
(c) (1)	Evaluation of existing stored surface water available during Drought of Record conditions shall be based on Firm Yield as defined in §357.10. The analysis may be based on justified operational procedures other than Firm Yield. The EA shall consider a written request from an RWPG to use procedures other than Firm Yield.	Chapter 3 and Appendix E
(c) (2)	Evaluation of existing run of river surface water available for municipal WUGs during Drought of Record conditions shall be based on the minimum monthly diversion amounts that are available 100 percent of the time, if those run of river supplies are the only supply for the municipal WUG.	Chapter 3 and Appendix E
(d)	Use modeled available groundwater volumes for groundwater Availability, as issued by the EA, and incorporate such information in its RWP unless no modeled available groundwater volumes are provided. Groundwater Availability used in the RWP must be consistent with the desired future conditions as of the most recent deadline for the Board to adopt the State Water Plan or, at the discretion of the RWPG, established subsequent to the adoption of the most recent State Water Plan.	Section 3.3
(d) (1)	Consistent with a desired future condition if the groundwater Availability amount in the RWP and on which an Existing Water Supply or recommended WMS relies does not exceed the modeled available groundwater amount associated with the desired future condition for the relevant aquifers.	Chapter 3 and Chapter 5

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Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(d) (2)	If no groundwater conservation district exists within the RWPA, then the RWPG shall determine the Availability of groundwater for regional planning purposes.	N/A
(d) (3)	In RWPAs that have at least one groundwater conservation district, the EA shall consider a written request from an RWPG to apply a MAG Peak Factor in the form of a percentage (e.g., greater than 100 percent) applied to the modeled available groundwater value of any particular aquifer-region-county-basin split within the jurisdiction of a groundwater conservation district, or groundwater management area if no groundwater conservation district exists, to allow temporary increases in annual availability for planning purposes. The request must:	N/A
(d) (3) (A)	Include written approval from the groundwater conservation district, if a groundwater conservation district exists in the particular aquifer-region-county-basin split, and from representatives of the groundwater management area;	N/A
(d) (3) (B)	Provide the technical basis for the request in sufficient detail to support groundwater conservation district, groundwater management area, and EA evaluation; and	N/A
(d) (3) (C)	Document the basis for how the temporary availability increase will not prevent the groundwater conservation district from managing groundwater resources to achieve the desired future condition.	N/A
(e)	Evaluate the existing water supplies for each WUG and WWP	Sections 3.5 and 3.6, Appendix D (DB27 reports)
(f)	Water supplies based on contracted agreements will be based on the terms of the contract, which may be assumed to renew upon contract termination if the contract contemplates renewal or extensions.	3.5, 3.6, where a seller/buyer relationships existed, calculations of existing supplies for each buyer considered and evaluated the contractual obligations of the seller
(g)	Evaluation results shall be reported by WUG in accordance with §357.31(a) of this title (relating to Projected Population and Water Demands) and WWPs in accordance with §357.31(b) of this title	Chapters 3, 5D, 5E, Appendix D (DB27 Reports); Appendix E (Existing Supply Available)
Contract Exhibit C, Section 2.3.1	The methodology used for calculating anticipated sedimentation rate and revising the area-capacity rating curve must be described in the IPP and final adopted RWP.	Appendix E, Section E.1
Contract Exhibit C, Section 2.3.4.2	For groundwater sources where no DFC exists, RWPGs may determine the groundwater availability for planning purposes. These RWPG-estimated groundwater availabilities may be determined by using availability values presented in the local GCD management plan, TWDB GAMs, if available, or other means. RWPGs must include a table documenting the method(s) used for estimating RWPG-estimated groundwater availability in the Technical Memorandum, IPP, and final adopted RWP. This table should include the aquifer, county, and methodology description(s).	Section 3.3.3
Contract Exhibit C, Section 2.3.3	Reuse availability should be presented as a separate subsection within Chapter 3 of the IPP and final RWP. The subsection must describe the data sources and methodology used to calculate reuse availability.	Section 3.2.3
Contract Exhibit C, Section 2.3.3	RWPGs must classify reuse availability as either direct or indirect.	Appendix D (DB27 Reports), Appendix E, Chapter 5B
Contract Exhibit C, Section 2.3.6	For indirect reuse [existing supplies], RWPGs must base their drought of record existing indirect reuse analyses on currently installed wastewater treatment infrastructure; currently permitted wastewater discharge amounts; and the amount of wastewater anticipated to be treated at the WWTP, based on associated decade populations/demands. These amounts may not exceed the amounts of water available to utilities generating the wastewater.	Section 3.2.3
Contract Exhibit C, Section 2.3.6	[The following items must also be presented in the IPP and final adopted RWP:] Water rights which are the basis for surface water existing supply volumes. RWPGs must also submit water rights data to the TWDB electronically using a TWDB provided spreadsheet.	Appendix E, Electronic Workbook submittal
Contract Exhibit C, Section 2.3.6	[The following items must also be presented in the IPP and final adopted RWP:] For local supplies, the plan must acknowledge whether the RWPG can confirm if the local supplies are firm. For any local supplies that cannot be confirmed as 'firm' under DOR, the RWP must include a summary of the number of WUGs for which this is true and the total associated volume of water associated with this uncertainty.	Section 3.2.2
Chapter Four Identification of Water Needs		
31 TAC §357.33		
357.33 (a)	RWPs shall include comparisons of existing water supplies and projected Water Demands to identify Water Needs.	Chapter 4
(b)	RWPGs shall compare projected Water Demands, developed in accordance with §357.31 of this title (relating to Projected Population and Water Demands), with existing water supplies available to WUGs and WWPs in a planning area, as developed in accordance with §357.32 of this title (relating to Water Supply Analysis), to determine whether WUGs will experience water surpluses or needs for additional supplies.	Chapter 4, Appendix D

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REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(c)	Results of evaluations will be reported by WUG in accordance with §357.31(a) of this title and MWPs in accordance with §357.31(b) of this title.	Section 4.2, Section 5D, Section 5E, Appendix D (DB27 Reports)
(d)	RWPGs shall perform a secondary water needs analysis for all WUGs and WWPs for which conservation WMSs or direct Reuse WMSs are recommended. This secondary water needs analysis shall calculate the Water Needs that would remain after assuming all recommended conservation and direct Reuse WMSs are fully implemented. The resulting secondary water needs volumes shall be presented in the RWP by WUG and MWP and decade.	Section 4.5, Appendix D (DB27 Reports)
Chapter Five Identification and Evaluation of Potentially Feasible Water Management Strategies		
31 TAC §357.34		
357.34 (a)	RWPGs shall identify and evaluate potentially feasible WMSs and the WMSPs required to implement those strategies for all WUGs and WWPs with identified Water Needs.	All of Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation)
(b)	RWPGs shall identify potentially feasible WMSs to meet water supply needs identified in §357.33 of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands) in accordance with the process in §357.12(b) of this title (relating to General Regional Water Planning Group Responsibilities and Procedures). Strategies shall be developed for WUGs and WWPs. WMS and WMSPs shall be developed for WUGs and WWPs that would provide water to meet water supply needs during Drought of Record conditions.	All of Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation)
(c)	Potential Feasible Water Management Strategies should include, but are not limited to:	
(c) (1)	Expanded use of existing supplies including system optimization and conjunctive use of water resources, reallocation of reservoir storage to new uses, voluntary redistribution of water resources including contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements, subordination of existing water rights through voluntary agreements, enhancements of yields of existing sources, and improvement of water quality including control of naturally occurring chlorides.	Chapter 5, Appendix G
(c) (2)	New supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, seawater desalination, brackish groundwater desalination, water supply that could be made available by cancellation of water rights based on data provided by the Commission, rainwater harvesting, and aquifer storage and recovery.	Chapter 5, Appendix G
(c) (3)	Conservation and drought management measures including demand management.	Section 5B
(c) (4)	Reuse of wastewater.	Section 5B
(c) (5)	Interbasin transfers of surface water.	Chapter 5
(c) (6)	Emergency transfers of surface water including a determination of the part of each water right for non-municipal use in the RWPA that may be transferred without causing unreasonable damage to the property of the non-municipal water rights holder in accordance with Texas Water Code §11.139 (relating to Emergency Authorizations).	Section 5A, Chapter 7
(d)	All recommended WMSs and WMSPs that are entered into the State Water Planning Database and prioritized by RWPGs shall be designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one planning decade such that additional water is available during Drought of Record conditions. Any other RWPG recommendations regarding permit modifications, operational changes, and/or other infrastructure that are not designed to reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or develop, deliver or treat additional water supply volumes to WUGs or WWPs in at least one Planning Decade such that additional water is available during Drought of Record conditions shall be indicated as such and presented separately in the RWP and shall not be eligible for funding from the State Water Implementation Fund for Texas.	Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (Water Management Strategy Evaluation)
(e)	Evaluations of potentially feasible WMSs and associated WMSPs shall include the following analyses:	
(e) (1)	For the purpose of evaluating potentially feasible WMSs, the Commission's most current Water Availability Model with assumptions of no return flows and full utilization of senior water rights, is to be used. Alternative assumptions may be used with written approval from the EA who shall consider a written request from an RWPG to use assumptions other than no return flows and full utilization of senior water rights.	Appendix E (Water Supply Available)
(e) (2)	An equitable comparison between and consistent evaluation and application of all water management strategies the RWPGs determine to be potentially feasible for each water supply need.	Chapter 5, Appendix G (Water Management Strategy Evaluation)
(e) (3) (A)	A quantitative reporting of the net quantity, reliability, and cost of water delivered and treated for the end user's requirements during drought of record conditions, taking into account and reporting anticipated strategy water losses, incorporating factors used calculating infrastructure debt payments and may include present costs and discounted present value costs. Costs do not include distribution of water within a WUG after treatment.	Chapter 5, Appendix G (Water Management Strategy Evaluation); Appendix H (Cost Estimates)

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REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(e) (3) (B)	A quantitative reporting of the environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effect of upstream development on bays, estuaries, and arms of the Gulf of Mexico. Evaluations of effects on environmental flows shall include consideration of the Commission's adopted environmental flow standards under 30 Texas Administrative Code Chapter 298 (relating to Environmental Flow Standards for Surface Water). If environmental flow standards have not been established, then environmental information from existing site-specific studies, or in the absence of such information, state environmental planning criteria adopted by the Board for inclusion in the State Water Plan after coordinating with staff of the Commission and the Texas Parks and Wildlife Department to ensure that WMSs are adjusted to provide for environmental water needs including instream flows and bays and estuaries inflows.	Appendix G (Water Management Strategy Evaluation); Appendix H (Cost Estimates); Appendix J (2020 Quantitative Analysis of the Impact of Marvin Nichols Reservoir)
(e) (3) (C)	A quantitative reporting of the impacts to agricultural resources.	Appendix G (Water Management Strategy Evaluation); Appendix J (2020 Quantitative Analysis of the Impact of Marvin Nichols Reservoir); Chapter 6
(e) (4)	Discussion of the plan's impact on other water resources of the state including other water management strategies and groundwater and surface water interrelationships.	Appendix G, Section 6.2
(e) (5)	Discussion of each threat to agricultural or natural resources identified pursuant to §357.30(7) of this title (relating to Description of the Regional Water Planning Area) including how that threat will be addressed or affected by the water management strategies evaluated	Appendix G, Section 6.2
(e) (6)	If applicable, consideration and discussion of the provisions in Texas Water Code §11.085(k)(1) for interbasin transfers of surface water. At minimum, this consideration will include a summation of water needs in the basin of origin and in the receiving basin.	Section 6.2.5; Table 6.2
(e) (7)	Consideration of third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas.	Section 6.2
(e) (8)	A description of the major impacts of recommended water management strategies on key parameters of water quality identified by RWPGs as important to the use of a water resource and comparing conditions with the recommended water management strategies to current conditions using best available data.	Section 6.1; Appendix K (Key Water Quality Parameters)
(e) (9)	Other factors as deemed relevant by the RWPG including recreational impacts.	Section 6.2.4
(f)	RWPGs shall evaluate and present potentially feasible WMSs and WMSPs with sufficient specificity to allow state agencies to make financial or regulatory decisions to determine consistency of the proposed action before the state agency with an approved RWP.	Chapter 5; Appendix G (Water Management Strategy Evaluation); Appendix H (Cost Estimates)
(g)	Implementation of large recommended WMSs and associated WMSPs.	Chapter 5, Appendix G, Appendix N
(g) (1)	For large recommended WMSs and associated WMSPs, RWPGs must include the following information:	
(g) (1) (A)	Expenditures of sponsor money	Appendix N
(g) (1) (B)	Permit applications, including the status of a permit application	Chapter 5F, Appendix N
(g) (1) (C)	Status updates on the phase of construction of a project	Chapter 5F, Appendix N
(g) (2)	The implementation status must be provided for the following types of recommended WMSs with any online decade:	
(g) (2) (A)	All reservoir strategies (including major and minor reservoirs)	Chapter 5F, Appendix N
(g) (2) (B)	All seawater desalination strategies	N/A
(g) (2) (C)	Direct potable reuse strategies that provide greater than 5,000 acre-feet per year (AFY) of supply in any planning decade	N/A
(g) (2) (D)	Brackish groundwater strategies that provide greater than 10,000 AFY of supply in any planning decade	N/A
(g) (2) (E)	Aquifer storage and recovery strategies that provide greater than 10,000 AFY in any decade	N/A
(g) (2) (F)	All water transfers from out of state	N/A
(g) (2) (G)	Any other innovative technology projects the RWPG considers appropriate.	Chapter 5F, Appendix N
(h)	If an RWPG does not recommend aquifer storage and recovery strategies, seawater desalination strategies, or brackish groundwater desalination strategies it must document the reason(s) in the RWP.	Chapter 5
(i)	In instances where an RWPG has determined there are significant identified Water Needs in the RWPA, the RWP shall include an assessment of the potential for aquifer storage and recovery to meet those Water Needs. Each RWPG shall define the threshold to determine whether it has significant identified Water Needs. Each RWP shall include, at a minimum, a description of the methodology used to determine the threshold of significant needs. If a specific assessment is conducted, the assessment may be based on information from existing studies and shall include minimum parameters as defined in contract guidance.	Chapter 5, Appendix G

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REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(j)	Conservation, Drought Management Measures, and Drought Contingency Plans shall be considered by RWPGs when developing the regional plans, particularly during the process of identifying, evaluating, and recommending WMSs. RWPs shall incorporate water conservation planning and drought contingency planning in the RWPA.	Chapter 5B, Appendix I (Water Conservation Savings)
(j) (1)	Drought Management Measures including water demand management. RWPGs shall consider Drought Management Measures for each need identified in §357.33 of this title and shall include such measures for each user group to which Texas Water Code §11.1272 (relating to Drought Contingency Plans for Certain Applicants and Water Right Holders) applies. Impacts of the Drought Management Measures on Water Needs must be consistent with guidance provided by the Commission in its administrative rules implementing Texas Water Code §11.1272. If an RWPG does not adopt a drought management strategy for a need it must document the reason in the RWP. Nothing in this paragraph shall be construed as limiting the use of voluntary arrangements by water users to forgo water usage during drought periods.	Section 5A.1.2, Section 6.2
(j) (2)	Water conservation practices. RWPGs must consider water conservation practices, including potentially applicable best management practices, for each identified Water Need.	Section 5A.1.1, Chapter 5B
(j) (2) (A)	RWPGs shall include water conservation practices for each user group to which Texas Water Code §11.1271 and §13.146 (relating to Water Conservation Plans) apply. The impact of these water conservation practices on Water Needs must be consistent with requirements in appropriate Commission administrative rules related to Texas Water Code §11.1271 and §13.146.	Section 5A.1.1, Chapter 5B
(j) (2) (B)	RWPGs shall consider water conservation practices for each WUG beyond the minimum requirements of subparagraph (A) of this paragraph, whether or not the WUG is subject to Texas Water Code §11.1271 and §13.146. If RWPGs do not adopt a Water Conservation Strategy to meet an identified need, they shall document the reason in the RWP.	Chapter 5B
(j) (2) (C)	For each WUG or WWP that is to obtain water from a proposed interbasin transfer to which Texas Water Code §11.085 (relating to Interbasin Transfers) applies, RWPGs shall include a Water Conservation Strategy, pursuant to Texas Water Code §11.085(l), that will result in the highest practicable level of water conservation and efficiency achievable. For these strategies, RWPGs shall determine, and report projected water use savings in gallons per capita per day based on its determination of the highest practicable level of water conservation and efficiency achievable. RWPGs shall develop conservation strategies based on this determination. In preparing this evaluation, RWPGs shall seek the input of WUGs and WWPs as to what is the highest practicable level of conservation and efficiency achievable, in their opinion, and take that input into consideration. RWPGs shall develop water conservation strategies consistent with guidance provided by the Commission in its administrative rules that implement Texas Water Code §11.085. When developing water conservation strategies, the RWPGs must consider potentially applicable best management practices. Strategy evaluation in accordance with this section shall include a quantitative description of the quantity, cost, and reliability of the water estimated to be conserved under the highest practicable level of water conservation and efficiency achievable.	Chapter 5B
(j) (2) (D)	RWPGs shall consider strategies to address any issues identified in the information compiled by the Board from the water loss audits performed by Retail Public Utilities pursuant to §358.6 of this title (relating to Water Loss Audits).	Chapter 5B, Appendix B
(j) (3)	RWPGs shall recommend Gallons Per Capita Per Day goal(s) for each municipal WUG or specified groupings of municipal WUGs. Goals must be recommended for each planning decade and may be a specific goal or a range of values. At a minimum, the RWPs shall include Gallons Per Capita Per Day goals based on drought conditions to align with guidance principles in §358.3 of this title (relating to Guidance Principles).	Appendix I
(k)	RWPs shall include a subchapter consolidating the RWPG's recommendations regarding water conservation. RWPGs shall include in the RWPs model Water Conservation Plans pursuant to Texas Water Code §11.1271.	Chapter 5B
Exhibit C, Section 2.5.1	The IPP and final adopted RWP must include a list or table of all identified WMSs that were considered potentially feasible, to date, for meeting a need in the region per 31 TAC § 357.12(b). RWPGs must consider the potentially feasible WMSs listed in Exhibit C, Section 2.5.1.	Chapter 5A, Appendix F
Exhibit C, Section 2.5.1	Identify those potentially feasible WMSs, if any, that, in addition to providing water supply, could potentially provide non-trivial flood mitigation benefits or that might be the best potential candidates for exploring ways that they might be combined with flood mitigation features to leverage planning efforts to achieve potential cost savings or other combined water supply and flood mitigation benefits. The work required to identify these WMSs will be based entirely on a high-level, qualitative assessment and should not require modeling or other additional technical analyses.	Section 5F.1.2
Exhibit C, Section 2.5.2.7	Documentation of the implementation status addressing rule 357.34(g), must be included in a separate Chapter 5 subsection. The subsection must include 1) the implementation status in table format, using the TWDB provided table template, and 2) a simple, graphic, showing the full planning horizon, and displaying separate timeline/schedules for each project in accordance with Exhibit C, Section 2.5.2.7. Planning groups are required to use the TWDB table template in the 2026 RWP Exhibit C Tables Excel file for this subsection.	Section 5F.2
Exhibit C, Section 2.5.2.5-6	Aquifer storage and recovery WMS evaluations must report the expected percent of recovery for the ASR projects and must present that expected, lesser volume as the net water supply yield for the project.	Appendix G
Exhibit C, Section 2.5.2.14	If the distribution line replacement for the water conservation strategy is subject to adopted utility standard minimum size requirements that exceed two standard pipe diameters, the water management strategy evaluation must note the specific utility standard and include 1) a map of the proposed line replacement; and 2) detailed water loss calculations before and after the proposed line replacement.	Appendix I

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Exhibit C, Section 2.5.2.12	At a minimum, annual costs should be presented by debt service, operation and maintenance cost as a percentage of total construction cost, power costs, and cost of purchasing water (if applicable). If precise information on the cost of purchasing water is not available, the plan should include a best estimate (e.g., as a percent markup) or an estimated range of the raw or treated water cost and the water management strategy evaluation can state the average cost is an estimate.	Appendix H
Exhibit C, Section 2.5.2	[Related to technical evaluations:] WMS and WMSP documentation must include a strategy description, discussion of associated facilities, project map, and technical evaluation addressing all considerations and factors required under 31 TAC §357.34(e)-(i) and §357.35. If an identified potentially feasible WMS is, at any point, determined to be not potentially feasible by the planning group and therefore not evaluated, the plan must provide documentation of why the WMS was not evaluated.	Chapter 5, Appendix G, Appendix H
Exhibit C, Section 2.5.4	[If applicable] Alternative water management strategies must be fully evaluated in accordance with 31 TAC §357.34(e)-(i). Technical evaluations of alternative WMSs must be included in the plans and the data associated with alternative WMS must be entered into DB27. Technical evaluations of each alternative WMS must have a generally defined delivery point for the water.	Chapter 5, Appendix G, Appendix H
Exhibit C, Section 2.5.4.1	RWPGs must provide an explanation for any predetermined management supply factors and may present these factors based, for example, on sizes of water users, types of water use, water availability conditions, types of WMSs, or any other factors the RWPG considers relevant at the project or water user level.	Chapter 5D
Exhibit C, Section 2.5.3	For any recommended water management strategies where the strategy supply volume remains 100 percent unallocated to water user groups, the RWPG must explain in the RWP why the strategy is recommended but not assigned to any beneficiaries.	N/A
31 TAC §357.35		
357.35 (a)	RWPGs shall recommend WMSs and the WMSPs required to implement those WMSs to be used during a Drought of Record based on the potentially feasible WMSs evaluated under §357.34 of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies and Water Management Strategy Projects).	All of Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation)
(b)	RWPGs shall recommend specific WMSs and WMSPs based upon the identification, analysis, and comparison of WMSs by the RWPG that the RWPG determines are potentially feasible so that the cost effective WMSs that are environmentally sensitive are considered and adopted unless an RWPG demonstrates that adoption of such WMSs is inappropriate. To determine cost-effectiveness and environmental sensitivity, RWPGs shall follow processes described in §357.34 of this title. The RWP may include Alternative WMSs evaluated by the processes described in §357.34 of this title.	All of Chapter 5; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation); Appendix H (Cost Estimates)
(c)	Strategies will be selected by the RWPGs so that cost effective water management strategies, which are consistent with long-term protection of the state's water resources, agricultural resources, and natural resources are adopted.	All of Chapter 5; Chapter 6; Appendix F (Potentially Feasible WMSs); Appendix G (WMS Strategy Evaluation); Appendix H (Cost Estimates)
(d)	RWPGs shall identify and recommend WMSs for all WUGs and WWPs with identified Water Needs and that meet all Water Needs during the Drought of Record except in cases where:	
(d) (1)	No WMS is feasible. In such cases, RWPGs must explain why no WMSs are feasible; or	Section 6.5.1
(d) (2)	A Political Subdivision that provides water supply other than water supply corporations, counties, or river authorities explicitly does not participate in the regional water planning process for needs located within its boundaries or extraterritorial jurisdiction.	N/A
(e)	Specific recommendations of water management strategies to meet an identified need will not be shown as meeting a need for a political subdivision if the political subdivision in question objects to inclusion of the strategy for the political subdivision and specifies its reasons for such objection. This does not prevent the inclusion of the strategy to meet other needs.	This was considered for all water purchases. If a seller did not agree to the sale, it was not included as a WMS.
(f)	Recommended strategies shall protect existing water rights, water contracts, and option agreements, but may consider potential amendments of water rights, contracts and agreements, which would require the eventual consent of the owner.	Chapter 3; Appendix E (Water Supply Available), Chapter 5, Appendix G
(g)	RWPGs shall report the following:	
(g) (1)	Recommended WMSs, recommended WMSPs, and the associated results of all the potentially feasible WMS evaluations by WUG and MWP. If a WUG lies in one or more counties or RWPAs or river basins, data shall be reported for each river basin, RWPA, and county.	Chapter 5; Appendices D, F, G, H
(g) (2)	Calculated planning management supply factors for each WUG and MWP included in the RWP assuming all recommended WMSs are implemented. This calculation shall be based on the sum of: the total existing water supplies, plus all water supplies from recommended WMSs for each entity; divided by that entity's total projected Water Demand, within the Planning Decade. The resulting calculated management supply factor shall be presented in the plan by entity and decade for every WUG and MWP. Calculating planning management supply factors is for reporting purposes only.	Chapter 5D, Appendix D (DB27 Reports)
(g) (3)	Fully evaluated Alternative WMSs and associated WMSPs included in the adopted RWP shall be presented together in one place in the RWP.	Chapter 5C, 5D, 5E; Appendices F, G, H

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HB807, TWC 16.053 (e)(11)	Set one or more specific goals for gallons of water use per capita per day in each decade of the period covered by the plan for the municipal water user groups in the RWPA.	Chapter 5B, Appendix I (Water Conservation Savings)
HB807, TWC 16.053 (e)(10)	Specific assessment of Aquifer Storage and Recovery (ASR) potential if significant identified needs.	Chapter 5A, Chapter 5C
Chapter Six Impacts of Regional Water Plan and Consistency with Protection of Water Resources, Agricultural Resources, and Natural Resources		
31 TAC §357.40		
357.40(a)	RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified Water Needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).	Section 6.5.2, Appendix L (Socio-Economic Impacts)
(b)	RWPs shall include a description of the impacts of the RWP regarding:	
(b) (1)	Agricultural resources pursuant to §357.34(e)(3)(C) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies);	Section 6.2, 6.4, Appendix G, Appendix J
(b) (2)	Other water resources of the state including other WMSs and groundwater and surface water interrelationships pursuant to §357.34(e)(4) of this title;	Section 6.2, 6.4, Appendix G
(b) (3)	Threats to agricultural and natural resources identified pursuant to §357.34(e)(5) of this title;	Chapter 6
(b) (4)	Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas pursuant to §357.34(e)(7) of this title;	Section 6.2
(b) (5)	Major impacts of recommended WMSs on key parameters of water quality pursuant to §357.34(e)(8) of this title; and	Section 6.1; Appendix K (Key Water Quality Parameters)
(b) (6)	Effects on navigation	Section 6.4.4
(c)	RWPs shall include a summary of the identified Water Needs that remain unmet by the RWP.	Section 6.5.1
31 TAC §357.41		
357.41	RWPGs shall describe how RWPs are consistent with the long-term protection of the state's water resources, agricultural resources, and natural resources as embodied in the guidance principles in §358.3(4) and (8) of this title (relating to Guidance Principles).	Section 6.4
Chapter Seven Drought Response Information, Activities, and Recommendations		
31 TAC §357.42		
357.42 (a)	RWPs shall consolidate and present information on current and planned preparations for, and responses to, drought conditions in the region including, but not limited to, drought of record conditions based on the following subsections.	Section 7.1; Section 7.2; Appendix M (Summary of Drought Reponses)
(b)	RWPGs shall conduct an assessment of current preparations for drought within the RWPA. This may include information from local Drought Contingency Plans. The assessment shall include	Section 7.1; Section 7.2; Appendix M (Summary of Drought Reponses)
(b) (1)	A description of how water suppliers in the RWPA identify and respond to the onset of drought.	Chapter 7
(b) (2)	Identification of unnecessary or counterproductive variations in drought response strategies among water suppliers that may confuse the public or impede drought response efforts. At a minimum, RWPGs shall review and summarize drought response efforts for neighboring communities including the differences in the implementation of outdoor watering restrictions.	Section 7.3.7
(c)	RWPGs shall develop drought response recommendations regarding the management of existing groundwater and surface water sources in the RWPA designated in accordance with §357.32 of this title (relating to Water Supply Analysis), including:	
(c) (1)	Factors specific to each source of water supply to be considered in determining whether to initiate a drought response for each water source including specific recommended drought response triggers (See also §357.32 of Regional Planning Guidelines)	Section 7.1; Section 7.2; Appendix M (Summary of Drought Reponses)
(c) (2)	Actions to be taken as part of the drought response by the manager of each water source and the entities relying on each source, including the number of drought stages; and	Section 7.1; Section 7.2; Appendix M (Summary of Drought Reponses)
(c) (3)	Triggers and actions developed in paragraphs (1) and (2) of this subsection may consider existing triggers and actions associated with existing drought contingency plans.	Section 7.5
(d)	RWPGs shall collect information on existing major water infrastructure facilities that may be used for interconnections in event of an emergency shortage of water. In accordance with Texas Water Code §16.053(r), this information is CONFIDENTIAL INFORMATION and cannot be disseminated to the public. The associated information is to be collected by a subgroup of RWPG members in a closed meeting and submitted separately to the EA in accordance with guidance to be provided by EA.	Section 7.3; Section 7.4
(e)	RWPGs shall provide general descriptions of local drought contingency plans that involve making emergency connections between water systems or WWP systems that do not include locations or descriptions of facilities that are disallowed under subsection (d) of this section.	Section 7.3; Section 7.4
(f)	RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP including:	

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(f) (1)	List and description of the recommended drought management water management strategies and associated WUGs and WWPs, if any, that are recommended by the RWPG. Information to include associated triggers to initiate each of the recommended drought management water management strategies	N/A
(f) (2)	List and description of alternative drought management water management strategies and associated WUGs and WWPs, if any, that are included in the plan. Information to include associated triggers to initiate each of the alternative drought management water management strategies	N/A
(f) (3)	List of all potentially feasible drought management water management strategies that were considered or evaluated by the RWPG but not recommended; and	N/A
(f) (4)	List and summary of any other recommended drought management measures, if any, that are included in the RWP, including associated triggers if applicable	N/A
(g)	The RWPGs shall evaluate potential emergency responses to local drought conditions or loss of existing water supplies; the evaluation shall include identification of potential alternative water sources that may be considered for temporary emergency use by WUGs and WWPs in the event that the Existing Water Supply sources become temporarily unavailable to the WUGs and WWPs due to unforeseeable hydrologic conditions such as emergency water right curtailment, unanticipated loss of reservoir conservation storage, or other localized drought impacts. RWPGs shall evaluate, at a minimum, municipal WUGs that:	
(g) (1)	Have existing populations less than 7,500;	Section 7.3; Appendix M (Summary of Drought Reponses)
(g) (2)	Rely on a sole source for its water supply regardless of whether the water is provided by a WWP; and	
(g) (3)	All County-Other WUGs.	
(h)	RWPGs shall consider any relevant recommendations from the Drought Preparedness Council.	Section 7.7.1
(i)	RWPGs shall make drought preparation and response recommendations regarding:	
(i) (1)	Development of, content contained within, and implementation of local drought contingency plans required by the Commission	Section 7.5; Section 7.7.2
(i) (2)	Current drought management preparations in the RWPA including:	
(i) (2) (A)	Drought response triggers; and	Section 7.5
(i) (2) (B)	Responses to drought conditions;	Section 7.5
(i) (3)	The Drought Preparedness Council and the State Drought Preparedness Plan; and	Section 7.5
(i) (4)	Any other general recommendations regarding drought management in the region or state	Section 7.5
(j)	The RWPGs shall develop region-specific model Drought Contingency Plans.	Section 7.5.4
HB807, TWC 16.053 (e)(3)(E)	Identify unnecessary or counterproductive variations in specific drought response strategies, including outdoor watering restrictions, among user groups in the regional water planning area that may confuse the public or otherwise impede drought response efforts	Section 7.7.3
Exhibit C, Section 2.7.2	Include a separate Chapter 7 subsection that provides documentation of how the planning group addressed uncertainties in the RWP (if applicable), how the planning group addressed a drought worse than the DOR in the RWP (if applicable), and potential measures and responses that would likely be available to users in the region, in the event of a drought worse than the DOR.	Section 7.2
Exhibit C, Section 2.7.2	Summarize, in general, how the region incorporated planning for uncertainty in its RWP and the region's basis, or policy, for inclusion. This could include general discussion on planning factors, any drivers of uncertainty associated with those factors, and how the RWPG made planning decisions to acknowledge or address that uncertainty. If the RWP does not include any measures to address uncertainty, this subsection must include a statement to that effect.	Section 7.2.1
Exhibit C, Section 2.7.2	Summarize, in general, the key assumptions, analyses, strategies, and projects that are already included in the 2026 RWP calculations and recommendations (if applicable) that go beyond just meeting identified water needs anticipated under a DOR (i.e., those things that will provide some additional measure of protection to withstand a DWDOR such as use of safe-yield or inclusion of strategies that provide water volumes in excess of the identified water need, such as management supply factor, etc.). The summary should include describing which water users in the region, in general, are associated with those additional measures of protection (e.g., list of WUGs and WWPs and their associated water supplies to which these assumptions apply). If the RWP does not include any planning measures to address a DWDOR, this subsection must include a statement to that effect.	Section 7.5
Exhibit C, Section 2.7.2	Summarize, in general, the potential additional types of measures and responses, that are not part of the recommendations in the 2026 RWP, but that would likely be available to certain water providers/users in the event of the near-term onset of a DWDOR and that would be capable of providing additional, potential capacity for those water providers and users to withstand a DWDOR (i.e., additional or deeper drought management measures - if not a recommended WMS - that could be employed). The summary should include describing which water providers/users in the region, in general, the additional measures and responses would be associated with (e.g., list of WUGs and WWPs and their associated water supplies to which these assumptions apply). This information may be presented at a high-level as provided in the examples in the 2026 RWP Exhibit C Tables Excel file.	Section 7.5
Chapter Eight Policy Recommendations and Unique Sites		
31 TAC §357.43		
357.43 (a)	The RWPs shall contain any regulatory, administrative, or legislative recommendations developed by the RWPGs	Section 8.4

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(b)	Ecologically Unique River and Stream Segments. RWPGs may include in adopted RWPs recommendations for all or parts of river and stream segments of unique ecological value located within the RWPA by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment and a site characterization of the stream segment documented by supporting literature and data. The recommendation package shall address each of the criteria for designation of river and stream segments of ecological value found in this subsection. The RWPG shall forward the recommendation package to the Texas Parks and Wildlife Department and allow the Texas Parks and Wildlife Department 30 days for its written evaluation of the recommendation. The adopted RWP shall include, if available, Texas Parks and Wildlife Department's written evaluation of each river and stream segment recommended as a river or stream segment of unique ecological value	Section 8.2
(b) (1)	An RWPG may recommend a river or stream segment as being of unique ecological value based upon the criteria set forth in §358.2 of this title (relating to Definitions)	Section 8.2
(b) (2)	For every river and stream segment that has been designated as a unique river or stream segment by the legislature, during a session that ends not less than one year before the required date of submittal of an adopted RWP to the Board, or recommended as a unique river or stream segment in the RWP, the RWPG shall assess the impact of the RWP on these segments. The assessment shall be a quantitative analysis of the impact of the plan on the flows important to the river or stream segment, as determined by the RWPG, comparing current conditions to conditions with implementation of all recommended water management strategies. The assessment shall also describe the impact of the plan on the unique features cited in the region's recommendation of that segment	Chapter 6, Section 8.2
(c)	Unique Sites for Reservoir Construction. An RWPG may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation and expected beneficiaries of the water supply to be developed at the site. The criteria at §358.2 of this title shall be used to determine if a site is unique for reservoir construction.	Section 8.3
(d)	Any other recommendations that the RWPG believes are needed and desirable to achieve the stated goals of state and regional water planning including to facilitate the orderly development, management, and conservation of water resources and prepare for and respond to drought conditions.	Section 8.4
(e)	RWPGs may develop information as to the potential impacts of any proposed changes in law prior to or after changes are enacted.	Section 8.4
(f)	RWPGs should consider making legislative recommendations to facilitate more voluntary water transfers in the region.	Section 8.4
HB807, TWC 16.053(i)	RWPG should make legislative recommendations "for any other changes that the members of the planning group believe would improve the water planning process	Included in Existing Scope; Chapter 8, Section 8.4
Exhibit C, Section 2.8.1	An updated Texas Parks and Wildlife Department evaluation must be included in each RWP, even for those stream segments that have been recommended in previous plans but not designated by the Legislature.	Section 8.2
Exhibit C, Section 2.8.1	If a river or stream segment has been recommended in a previous plan, the planning group may incorporate references of supporting materials developed for the previous plan into the current plan. References must be precise and include a summary of the information presented in the previous plan.	Section 8.2
Exhibit C, Section 2.8.1	Recommendations regarding unique river or stream segments presented in the RWPs must be specific as to a) which unique river or stream segments have been previously designated by the legislature and b) which are being recommended for designation by the planning group.	Section 8.2
Exhibit C, Section 2.8.2	For recommendations regarding unique reservoir sites, the RWP must be specific as to a) which unique reservoir sites have been previously designated by the legislature; b) which are being recommended for designation by the RWPG; and c) whether the RWPG is recommending that the legislature re-designate a previously designated unique reservoir site.	Section 8.3
Chapter Nine Implementation and Comparison to the Previous Regional Water Plan		
31 TAC §357.45		
357.45 (a)	RWPGs shall describe the level of implementation of previously recommended WMSs and associated impediments to implementation in accordance with guidance provided by the board. Information on the progress of implementation of all WMSs that were recommended in the previous RWP, including conservation and Drought Management WMSs; and the implementation of WMSPs that have affected progress in meeting the state's future water needs.	Chapter 9, Appendix N
(b)	RWPGs shall assess the progress of the RWPA in encouraging cooperation between WUGs for the purpose of achieving economies of scale and otherwise incentivizing WMSs that benefit the entire RWPA. This assessment of regionalization shall include:	
(b) (1)	The number of recommended WMSs in the previously adopted and current RWPs that serve more than one WUG;	Section 9.3
(b) (2)	The number of recommended WMSs in the previously adopted RWP that serve more than one WUG and have been implemented since the previously adopted RWP; and	Section 9.3
(b) (3)	A description of efforts the RWPG has made to encourage WMSs and WMSPs that serve more than one WUG, and that benefit the entire region.	Section 9.3
(b) (4)	Recommended and Alternative WMSs and WMSPs.	Chapter 5, Section 9.3, Appendix G
HB807, TWC 16.053 (e)(12)	Assess progress of "regionalization"	Section 9.3

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Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
Chapter Ten Public Participation and Plan Adoption		
31 TAC §357.21		
357.21 (a)	Each RWPG and any committee or subcommittee of an RWPG are subject to Chapters 551 and 552, Government Code. A copy of all materials presented or discussed at an open meeting shall be made available for public inspection prior to and following the meetings and shall meet the additional notice requirements when specifically referenced as required under other subsections. In addition to the notice requirements of Chapter 551, Government Code, the following requirements apply to RWPGs.	Section 10.4
(b-h)	All public notices required by the TWDB by the RWPG shall comply with 31 TAC §357.21 and shall meet the requirements specified therein.	Section 10.4
Exhibit C, Section 2.8.3	Receive and consider recommendations from the Interregional Planning Council to the RWPGs.	Section 8.4.6, Section 10.5
Exhibit C, Section 2.13.2	In the 2026 RWPs, the required DB27 data reports must be included in the IPP and final RWP via reference to the TWDB Database Reports application in lieu of including electronic versions of the reports as an appendix to the plan. Each Executive Summary of the IPP and RWP must include a section that lists the DB27 reports that will be available through the TWDB Database Reports application and instructions on how the public can access the reports, including a direct hyperlink to the TWDB Database Reports application. The DB27 reports that will be accessible in the application are listed in Contract Exhibit C, Table 3. Section 2.13.2 of Exhibit C lists the required instructions to include in the IPP and final plans.	Executive Summary, Throughout Plan (Attachments, Section 5F.3, etc.)
Exhibit C, Section 2.10	Conduct and/or enhance existing outreach specifically to rural entities in the planning area to collect and evaluate information to support plan development, including keeping track of which rural entities were contacted by the RWPG/Consultant, which entities were not responsive to RWPG contact efforts, and including a summary of the region's rural outreach efforts in Chapter 10 of the IPP and final RWP.	Chapter 10, Appendix O
31 TAC §357.50		
357.5 (a)	Submit their adopted RWPs to the Board every five years on a date to be disseminated by the EA, as modified by subsection (e)(2) of this section, for approval and inclusion in the state water plan.	Entire final RWP Document; cover/transmittal letter
(b)	Prior to the adoption of the RWP, the RWPGs shall submit concurrently to the EA and the public an IPP. The IPP submitted to the EA must be in the electronic and paper format specified by the EA. Each RWPG must certify that the IPP is complete and adopted by the RWPG. In the instance of a recommended WMS proposed to be supplied from a different RWPA, the RWPG recommending such strategy shall submit, concurrently with the submission of the IPP to the EA, a copy of the IPP, or a letter identifying the WMS in the other region along with an internet link to the IPP, to the RWPG associated with the location of such strategy.	Entire IPP Document; cover/transmittal letter; Interregional letters
(c)	The RWPGs shall distribute the IPP in accordance with §357.21(d)(4) of this title (relating to Notice and Public Participation).	Section 10.4
(d)	Within 60 days of the submission of IPPs to the EA, the RWPGs shall submit to the EA, and the other affected RWPG, in writing, the identification of potential Interregional Conflicts by:	
(d) (1)	identifying the specific recommended WMS from another RWPG's IPP;	Appendix P
(d) (2)	providing a statement of why the RWPG considers there to be an Interregional Conflict; and	
(d) (3)	providing any other information available to the RWPG that is relevant to the Board's decision.	
(e)	The RWPGs shall seek to resolve conflicts with other RWPGs and shall promptly and actively participate in any Board sponsored efforts to resolve Interregional Conflicts.	Section 10.5
(f)	The RWPGs shall solicit, and consider the following comments when adopting an RWP:	
(f) (1)	the EA's written comments, which shall be provided to the RWPG within 120 days of receipt of the IPP;	Appendix Q
(f) (2)	Any written or oral comments received from any federal agency, Texas state agency, or the public after the first public hearing notice is published until at least 60 days after the public hearing is held pursuant to §357.21(h) of this title.	Appendix Q
(f) (3)	The RWPGs shall revise their IPPs to incorporate negotiated resolutions or Board resolutions of any Interregional Conflicts into their final adopted RWPs.	Executive Summary; Chapters 5C, 5D, 5E, 5F, 6, 8, 9, 10; and Appendices G, H, N, P, Q
(f) (4)	In the event that the Board has not resolved an Interregional Conflict sufficiently early to allow an involved RWPG to modify and adopt its final RWP by the statutory deadline, all RWPGs involved in the conflict shall proceed with adoption of their RWP by excluding the relevant recommended WMS and all language relevant to the conflict and include language in the RWP explaining the unresolved Interregional Conflict and acknowledging that the RWPG may be required to revise or amend its RWP in accordance with a negotiated or Board resolution of an Interregional Conflict.	The Final RWP was revised to reflect the Mediated Agreement.
(g)	Submittal of RWPs. RWPGs shall submit the IPP and the adopted RWPs and amendments to approved RWPs to the EA in conformance with this section.	
(g) (1)	RWPs shall include:	
(g) (1) (A)	The technical report and data prepared in accordance with this chapter and the EA's specifications;	All chapters and appendices
(g) (1) (B)	An executive summary that documents key RWP findings and recommendations;	Executive Summary
(g) (1) (C)	Documentation of the RWPG's interregional coordination efforts; and	Section 10.5
(g) (1) (D)	A copy of the EA's comments on the IPP and summaries of all written and oral comments received pursuant to subsection (f) of this section, with a response by the RWPG explaining how the plan was revised or why changes were not warranted in response to written comments received under subsection (f) of this section.	Appendix Q

Appendix A
Consistency with TWDB Rules

REGULATORY CITATION OR CONTRACT EXHIBIT	SUMMARY OF REQUIREMENT	LOCATION(S) IN REGIONAL PLAN AND/OR COMMENTARY
(g) (2)	RWPGs shall submit RWPs to the EA according to the following schedule:	
(g) (2) (A)	IPPs are due every five years on a date disseminated by the EA unless an extension is approved, in writing, by the EA.	IPP will be submitted by March 3, 2025 IPP deadline
(g) (2) (B)	Prior to submission of the IPP, the RWPGs shall upload all required data, metadata and all other relevant digital information supporting the plan to the Board's State Water Planning Database. All changes and corrections to this information must be entered into the Board's State Water Planning Database prior to submittal of a final adopted plan.	All metadata and digital information will be uploaded prior to the March 3, 2025 IPP deadline.
(g) (2) (C)	The RWPG shall transfer copies of all data, models, and reports generated by the planning process and used in developing the RWP to the EA. To the maximum extent possible, data shall be transferred in digital form according to specifications provided by the EA. One copy of all reports prepared by the RWPG shall be provided in digital format according to specifications provided by the EA. All digital mapping shall use a geographic information system according to specifications provided by the EA. The EA shall seek the input from the State Geographic Information Officer regarding specifications mentioned in this section.	All data, models, and reports will be submitted with the Final RWP submittal prior to October 20, 2025 deadline.
(g) (2) (D)	Adopted RWPs are due to the EA every five years on a date disseminated by the EA unless, at the discretion of the EA, a time extension is granted consistent with the timelines in Texas Water Code §16.053(i).	
(g) (2) (E)	Once approved by the Board, RWPs shall be made available on the Board website.	
(h)	Upon receipt of an RWP adopted by the RWPG, the Board shall consider approval of such plan based on the following criteria:	
(h) (1)	verified adoption of the RWP by the RWPG; and	
(h) (2)	verified incorporation of any negotiated resolution or Board resolution of any Interregional Conflicts, or in the event that an Interregional Conflict is not yet resolved, verified exclusion of the relevant recommended WMS and all language relevant to the conflict.	Executive Summary; Chapters 5C, 5D, 5E, 5F, 6, 8, 9, 10; and Appendices G, H, N, P, Q
(i)	Approval of RWPs by the Board. The Board may approve an RWP only after it has determined that the RWP complies with statute and rules.	
(j)	The Board shall consider approval of an RWP that includes unmet municipal Water Needs provided that the RWPG includes adequate justification, including that the RWP:	
(j) (1)	documents that the RWPG considered all potentially feasible WMSs, including Drought Management WMSs and contains an explanation why additional conservation and/or Drought Management WMSs were not recommended to address the need;	Section 5A and Section 6.5.1
(j) (2)	describes how, in the event of a repeat of the Drought of Record, the municipal WUGs associated with the unmet need shall ensure the public health, safety, and welfare in each Planning Decade that has an unmet need; and	Section 6.5.1
(j) (3)	explains whether there may be occasion, prior to development of the next IPP, to amend the RWP to address all or a portion of the unmet need.	Section 6.5.1
(k)	Board Adoption of State Water Plan. RWPs approved by the Board pursuant to this chapter shall be incorporated into the State Water Plan as outlined in §358.4 of this title (relating to Guidelines).	

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Appendix B

Water Loss Audit Data

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APPENDIX B

TOTAL WATER LOSS BY WUGS IN GALLONS PER CONNECTION PER DAY

WUG	2018	2019	2020	2021	2022	AVERAGE
Ables Springs SUD	N/A	N/A	14	17	24	18
Addison	52	59	89	41	64	61
Aledo	8	10	16	67	60	32
Allen	37	41	N/A	36	54	42
Alvord	N/A	N/A	N/A	53	N/A	53
Anna	93	70	45	56	53	63
Annetta	N/A	N/A	6	N/A	N/A	6
Arledge Ridge WSC	N/A	N/A	87	N/A	N/A	87
Arlington	32	35	42	57	61	46
Athens	N/A	N/A	20	N/A	71	45
Avalon Water Supply & Sewer Service	N/A	N/A	100	N/A	N/A	100
Azle	N/A	N/A	N/A	30	N/A	30
Balch Springs	N/A	16	16	20	31	21
Bear Creek SUD	9	14	18	30	N/A	18
Bedford	N/A	N/A	18	N/A	25	21
Bells	N/A	53	42	45	33	43
Benbrook Water Authority	39	44	43	46	42	43
Bethel Ash WSC	N/A	N/A	22	N/A	N/A	22
Black Rock WSC	N/A	N/A	39	N/A	N/A	39
Blackland WSC	N/A	N/A	N/A	71	N/A	71
Blue Mound	N/A	N/A	N/A	20	N/A	20
Blue Ridge	N/A	69	N/A	N/A	N/A	69
Bois D Arc MUD	41	119	45	46	29	56
Bolivar WSC	86	96	120	132	82	103
Bonham	62	66	N/A	104	65	74
Boyd	N/A	45	59	15	N/A	40
Bridgeport	N/A	N/A	N/A	20	N/A	20
Buena Vista-Bethel SUD	N/A	N/A	154	N/A	N/A	154
Butler WSC	87	N/A	N/A	N/A	N/A	87
Carrollton	26	22	N/A	36	46	32
Cedar Hill	70	59	53	44	97	65
Celina	81	54	33	89	N/A	64
Chatfield WSC	N/A	N/A	26	N/A	N/A	26
Chico	N/A	N/A	43	N/A	N/A	43
Cockrell Hill	147	244	87	N/A	N/A	160
Colleyville	27	38	53	48	64	46
Collinsville	N/A	N/A	11	N/A	N/A	11
Community WSC	N/A	N/A	107	N/A	N/A	107
Coppell	N/A	N/A	43	51	43	45
Corbet WSC	15	N/A	19	N/A	35	23
Corinth	N/A	N/A	N/A	38	N/A	38
Corsicana	54	43	53	45	37	47
Crandall	N/A	N/A	22	N/A	N/A	22
Crescent Heights WSC	N/A	20	22	N/A	31	24
Cross Timbers WSC	N/A	N/A	17	N/A	30	24
Crowley	51	N/A	27	19	N/A	32

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APPENDIX B

TOTAL WATER LOSS BY WUGS IN GALLONS PER CONNECTION PER DAY

WUG	2018	2019	2020	2021	2022	AVERAGE
Dallas	133	N/A	72	78	N/A	94
Dalworthington Gardens	N/A	N/A	23	22	36	27
Dawson	N/A	6	9	N/A	46	20
Denison	76	34	56	67	17	50
Denton	43	54	47	46	61	50
Denton County FWSD 10	N/A	12	75	41	16	36
Desert WSC	131	N/A	171	167	102	143
Desoto	60	55	N/A	N/A	N/A	57
Dorchester	N/A	N/A	155	N/A	155	155
Duncanville	N/A	N/A	28	33	69	43
East Cedar Creek FWSD	N/A	14	31	62	40	37
East Fork SUD	N/A	N/A	N/A	17	N/A	17
East Garrett WSC	N/A	N/A	142	N/A	N/A	142
Elmo WSC	N/A	N/A	83	N/A	20	51
Ennis	38	65	53	79	N/A	59
Everman	29	33	22	40	21	29
Fairview	85	62	N/A	N/A	91	80
Farmers Branch	N/A	N/A	76	73	57	69
Farmersville	114	N/A	N/A	N/A	40	77
Fate	31	N/A	29	N/A	20	27
Ferris	N/A	N/A	69	242	N/A	156
Flower Mound	N/A	N/A	44	59	47	50
Forest Hill	N/A	N/A	22	N/A	N/A	22
Forney	45	26	46	N/A	N/A	39
Forney Lake WSC	N/A	N/A	31	N/A	N/A	31
Fort Worth	86	91	94	78	56	81
Frisco	44	32	43	49	N/A	42
Frognot WSC	N/A	53	40	38	N/A	43
Gainesville	19	17	36	38	N/A	27
Garland	58	68	70	41	N/A	59
Glenn Heights	N/A	92	82	83	78	84
Grand Prairie	61	51	51	N/A	N/A	55
Grapevine	N/A	15	31	26	71	36
Gunter	14	36	6	28	N/A	21
Haslet	N/A	N/A	55	N/A	N/A	55
Heath	N/A	51	88	89	72	75
High Point WSC	N/A	N/A	N/A	21	N/A	21
Highland Park	17	23	N/A	N/A	N/A	20
Highland Village	N/A	30	N/A	43	47	40
Hilco United Services	N/A	N/A	90	N/A	N/A	90
Honey Grove	32	43	52	102	151	76
Howe	N/A	N/A	84	103	N/A	93
Hurst	18	N/A	17	18	19	18
Hutchins	N/A	69	N/A	N/A	N/A	69
Irving	26	32	35	34	32	32
Jacksboro	N/A	N/A	N/A	136	183	160

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TOTAL WATER LOSS BY WUGS IN GALLONS PER CONNECTION PER DAY

WUG	2018	2019	2020	2021	2022	AVERAGE
Josephine	N/A	13	N/A	N/A	N/A	13
Justin	102	87	51	50	56	69
Kaufman	19	N/A	N/A	19	N/A	19
Kaufman County Development District 1	N/A	N/A	92	N/A	N/A	92
Keller	22	40	55	61	52	46
Kemp	N/A	24	43	N/A	31	33
Kennedale	54	38	36	25	38	38
Krum	N/A	6	35	53	71	41
Ladonia	308	74	136	N/A	N/A	172
Lake Cities Municipal Utility Authority	N/A	18	N/A	22	24	21
Lake Kiowa SUD	N/A	N/A	N/A	N/A	12	12
Lake Worth	17	21	40	29	9	23
Lancaster	19	24	20	58	N/A	30
Lancaster MUD 1	N/A	N/A	8	N/A	N/A	8
Leonard	N/A	205	98	140	96	135
Lewisville	34	N/A	77	91	117	80
Lindsay	N/A	N/A	N/A	N/A	37	37
Little Elm	N/A	N/A	N/A	42	N/A	42
Lucas	N/A	N/A	N/A	41	N/A	41
Luella SUD	N/A	N/A	25	N/A	N/A	25
Mabank	N/A	39	56	82	N/A	59
Malakoff	14	13	13	55	54	30
Mansfield	27	61	59	49	N/A	49
McKinney	90	73	61	43	46	63
Melissa	N/A	N/A	N/A	N/A	31	31
Mesquite	N/A	41	N/A	34	81	52
Midlothian	33	67	63	106	60	66
Mountain Peak SUD	146	125	102	130	105	122
Muenster	N/A	N/A	N/A	56	N/A	56
Mustang SUD	75	35	39	37	34	44
NA	87	102	N/A	N/A	N/A	95
Navarro Mills WSC	N/A	N/A	58	N/A	N/A	58
Nevada SUD	10	10	6	8	17	10
Newark	N/A	43	65	N/A	25	44
North Collin SUD	N/A	71	N/A	N/A	N/A	71
North Kaufman WSC	N/A	3	N/A	N/A	78	41
North Richland Hills	N/A	23	38	35	48	36
Northlake	N/A	N/A	N/A	39	N/A	39
Oak Ridge South Gale WSC	36	30	18	18	N/A	25
Ovilla	N/A	N/A	60	N/A	N/A	60
Paloma Creek North	N/A	16	32	N/A	N/A	24
Paloma Creek South	N/A	N/A	74	N/A	N/A	74
Pantego	9	12	9	19	23	14
Parker County SUD	15	11	13	17	50	21
Pelican Bay	N/A	N/A	7	N/A	N/A	7
Pilot Point	N/A	N/A	22	N/A	N/A	22

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APPENDIX B

TOTAL WATER LOSS BY WUGS IN GALLONS PER CONNECTION PER DAY

WUG	2018	2019	2020	2021	2022	AVERAGE
Pink Hill WSC	25	36	29	N/A	N/A	30
Plano	110	106	98	114	107	107
Poetry WSC	31	24	24	28	45	30
Pottsboro	10	N/A	N/A	5	N/A	8
Prosper	40	50	N/A	25	36	38
Providence Village WCID	N/A	N/A	10	N/A	N/A	10
R C H WSC	N/A	N/A	N/A	24	N/A	24
Red Oak	N/A	35	N/A	26	17	26
Red River Authority of Texas	N/A	N/A	84	N/A	N/A	84
Reno (Parker)	N/A	10	N/A	N/A	N/A	10
Richardson	108	102	N/A	110	N/A	107
Richland Hills	14	19	20	22	28	21
River Oaks	8	19	13	26	14	16
Rockett SUD	50	63	50	60	80	61
Rockwall	93	58	58	74	54	67
Rose Hill SUD	N/A	N/A	14	N/A	N/A	14
Rowlett	26	32	22	27	31	28
Royse City	35	23	N/A	N/A	N/A	29
Runaway Bay	N/A	N/A	27	N/A	N/A	27
Sachse	14	19	18	22	25	20
Saginaw	26	N/A	N/A	N/A	N/A	26
Sardis Lone Elm WSC	106	75	47	46	29	60
Seagoville	N/A	37	N/A	N/A	N/A	37
Seis Lagos UD	20	14	N/A	N/A	39	25
Sherman	99	48	94	93	116	90
South Freestone County WSC	59	66	69	51	40	57
Southlake	N/A	31	34	48	80	48
Southmayd	N/A	N/A	N/A	N/A	80	80
Southwest Fannin County SUD	N/A	N/A	43	N/A	N/A	43
Springtown	84	14	60	40	69	53
Starr WSC	N/A	31	31	N/A	N/A	31
Talty SUD	N/A	N/A	29	25	26	27
Teague	24	51	18	120	N/A	53
Terrell	26	N/A	112	N/A	N/A	69
The Colony	29	39	57	33	N/A	40
Tioga	21	23	8	31	39	24
Tom Bean	66	47	52	28	52	49
Trinidad	68	26	N/A	149	N/A	81
Trophy Club MUD 1	206	63	N/A	100	101	117
University Park	19	25	N/A	61	20	31
Van Alstyne	64	28	N/A	N/A	N/A	46
Verona SUD	N/A	N/A	N/A	37	32	34
Watauga	N/A	75	48	N/A	N/A	61
Waxahachie	31	56	64	36	51	47
Weatherford	18	25	29	29	29	26
West Leonard WSC	N/A	N/A	16	N/A	N/A	16

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APPENDIX B

TOTAL WATER LOSS BY WUGS IN GALLONS PER CONNECTION PER DAY

WUG	2018	2019	2020	2021	2022	AVERAGE
West Wise SUD	73	76	50	45	56	60
Westlake	137	35	N/A	25	N/A	66
Westminster SUD	N/A	N/A	113	N/A	N/A	113
Westover Hills	N/A	N/A	72	N/A	N/A	72
Westworth Village	N/A	25	12	N/A	N/A	19
White Settlement	63	N/A	53	52	65	58
White Shed WSC	N/A	N/A	36	N/A	N/A	36
Whitesboro	14	17	18	6	N/A	14
Whitewright	57	52	51	22	26	42
Willow Park	N/A	N/A	93	70	25	63
Wilmer	N/A	N/A	N/A	190	80	135
Woodbine WSC	N/A	N/A	42	N/A	N/A	42
Wortham	14	11	19	49	43	27
Wylie	19	N/A	N/A	N/A	N/A	19
Wylie Northeast SUD	N/A	N/A	39	N/A	N/A	39

Source: TWDB Water Loss Audit data downloaded in October 2024.

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Appendix C

Adjustments to Projections

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APPENDIX C ADJUSTMENTS TO PROJECTIONS

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C-6	Table – Projected Savings Due to Plumbing Code for Municipal WUGs	C-105

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Attachment C-1

WUGs Removed, Added, and Renamed Since the 2021 Region C Water Plan

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WUGs Removed Since the 2021 Region C Water Plan

Removed WUGs	
Marilee SUD	

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WUGs Added Since the 2021 Region C Water Plan

Added WUGs	
AMC Creekside	Kaufman County MUD 14
City of Blue Mound	Lancaster MUD 1
City of Log Cabin	Nash Forreston WSC
City of Savoy	Southern Oaks Water Supply
Denton County FWSD 11-C	Terrra Southwest

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WUGs Renamed Since the 2021 Region C Water Plan

Renamed WUGs	
2021 Region C Plan Name	**2026 Region C Plan Name**
Ables Springs WSC	Ables Springs SUD
College Mound WSC	College Mound SUD
Copeville SUD	Copeville WSC
Westminster WSC	Westminster SUD

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Attachment C-2

Example of Population and Demand Survey Email to WUGs

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Dear «WUG_Primarily_Region_C»,

The Texas Water Development Board (TWDB), which is responsible for developing the State Water Plan, has begun a new cycle of regional/state water planning. I am part of the consultant team developing the *2026 Region C Water Plan*. Region C includes a 16 county-area in and around the DFW Metroplex.

We are seeking your input on data necessary to prepare the plan and comply with Legislative requirements. The first step in developing a regional water plan is confirming the **population and demand projections** reflect your growth**.** TWDB has released their draft population and demand projections for the 2026 regional plans. These projections are based on the 2020 Census data and historical water use data. We are now asking you to provide input on your population and demand projections. The projections are shown in the tables below. After reviewing the draft GPCDs, the consultants are recommending changes to the projections which are also shown below. If you do not agree with the projections, we have provided a blank table for you to enter your own projections.

As you review the population and demand projections, please keep in mind the following:

- **Population** is for your RETAIL service area only, which may differ from your city limits (for cities) or other political boundaries.
- **Demands** are for drought year (dry year) conditions and are in acre-feet per year. *Note: 1 million gallons/day (MGD) is equivalent to 1,120 acre-feet per year.*
- The projections do not include your wholesale customers' population or demand.
- The projections do not include the demand for any major industrial/manufacturing customers. Those are included in a separate demand category by county.
- The TWDB has placed restrictions on changes to the regional population. We may not be able to satisfy all the revision requests submitted by water suppliers, but we will do our best to incorporate your requested changes.

If you agree with the information below, please simply reply to this email stating your agreement.

If you do not agree, please reply to this email by explaining what data needs revisions and filling in your suggested projections or corrected data below. If available, please include any supporting information for your changes. Supporting information can include evidence regarding population growth rates over the last 5 years, maps of changed service areas, historical residential connections from 2000 to present, or other data.

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TWDB DRAFT PROJECTIONS

	Historical	TWDB DRAFT Projections for *2026 Region C Plan*					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Population	«Historic_Pop_2020»	«Draft_Pop_2030»	«Draft_Pop_2040»	«Draft_Pop_2050»	«Draft_Pop_2060»	«Draft_Pop_2070»	«Draft_Pop_2080»
GPCD	«Historic_GPCD_2020»	«Draft_GPCD_2030»	«Draft_GPCD_2040»	«Draft_GPCD_2050»	«Draft_GPCD_2060»	«Draft_GPCD_2070»	«Draft_GPCD_2080»
Demand (ac-ft/yr)	«Historic_Demand_2020»	«Draft_Demand_2030»	«Draft_Demand_2040»	«Draft_Demand_2050»	«Draft_Demand_2060»	«Draft_Demand_2070»	«Draft_Demand_2080»

CONSULTANT REVISED PROJECTIONS

	Historical	Consultant's Revised projections for *2026 Region C Plan*					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Population	«Historic_Pop_2020»	«Revised_Pop_2030»	«Revised_Pop_2040»	«Revised_Pop_2050»	«Revised_Pop_2060»	«Revised_Pop_2070»	«Revised_Pop_2080»
GPCD	«Historic_GPCD_2020»	«Revised_GPCD_2030»	«Revised_GPCD_2040»	«Revised_GPCD_2050»	«Revised_GPCD_2060»	«Revised_GPCD_2070»	«Revised_GPCD_2080»
Demand (ac-ft/yr)	«Historic_Demand_2020»	«Revised_Demand_2030»	«Revised_Demand_2040»	«Revised_Demand_2050»	«Revised_Demand_2060»	«Revised_Demand_2070»	«Revised_Demand_2080»

YOUR REVISED PROJECTIONS

	YOUR REVISED Projections** for *2026 Region C Plan*					
	2030	**2040**	**2050**	**2060**	**2070**	**2080**
Population						
GPCD						
Demand (ac-ft/yr)						

**Please provide alternate projections if you do not agree with the projections above.

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In addition to the population and demand projections, please comment in the text box below if there have been any changes to your existing water supply sources or the status of your planned water management strategies. If you had a strategy recommended in the 2021 Plan that was projected to be online in 2020 and included capital costs, we will follow up to see if that strategy has been implemented. The 2021 Region C Regional Water Plan is available online here.

Thank you for your time and participation. If you have any questions, please don't hesitate to contact me.

Thank you,

Christina Gildea, EIT

Water Resources Planning

Freese and Nichols, Inc.

682-386-1626

Christina.Gildea@Freese.com

www.freese.com

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Attachment C-3

Memorandum on Draft 2026 Region C Population Projections

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MEMORANDUM

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

801 Cherry Street, Suite 2800 + Fort Worth, Texas 76102 + 817-735-7300 + FAX 817-735-7491

www.freese.com

TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft 2026 Region C Population Projections

DATE: 8/11/2023

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft population projections in January 2023. The review process of these projections includes review by the individual planning groups, with recommended changes provided to the TWDB by August 11, 2023. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the TWDB and incorporated into the 2027 State Water Plan (SWP). The purpose of this technical memorandum is to document information related to historical population and provide information supporting recommended modifications, if needed, to the draft population projections. Population projections include permanent residential population, including 'group quarter' population residing in institutional facilities (military, prisons, schools, or nursing homes) who are served by municipal WUGs or rely on their own water sources. Seasonal population, including tourists or seasonal workers, are not included in the draft projections although the associated seasonal water use is necessarily reflected in the per capita water use rates.

Some key points regarding the draft population projections include:

- Draft population projections are based on county-level projections from the Texas Demographic Center (TDC), which used migration rates between the 2010 and 2020 decennial Census to project future growth.
- The Texas Water Development Board (TWDB) drafted WUG-level population and water demand projections using the TDC's full-migration scenario (1.0) projections and provided the half-migration scenario (0.5) projections by Region-County for the planning groups' consideration. The region can choose to use either the full migration or half migration scenario by county. Region C chose to use the full migration rate for all counties in the region.
- Previous TWDB population projections for the regional and state water plans have relied, initially, on county-level population projections from the TDC using the half migration rate. In the past, the TWDB had altered the resulting regional plan population projections in counties with declining population– by holding them flat into future periods – which obscured projected population decline, a trend for some areas that continued in the 2020 Census. For the 2026

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Regional Water Plans (RWPs), these draft county population projections being provided to the RWPGs followed the trends, without adjustment, as projected by the TDC, including population declines.

- The 2026 population projections differ from the 2021 projections due to changes in migration rates, use of the full migration rate rather than half migration rate, and associated updates in the TDC cohort model to reflect updated birth and mortality rates. While the migration rates commonly drive long-term population trends, declines in the birth rates for the 2026 assessment also affected the draft projections.

1.1 Regional-level Population Projections

In accordance with the TWDB Guidance, adjustment to net regional-total population projections may be considered based on the criteria below. The net cumulative sub-regional requested changes may not exceed the maximum region-wide population that is provided by the TWDB.

Criteria for adjustment:
One or more of the following criteria must be verified by the RWPG and the Executive Administrator for consideration of revising the regional-level population projections:

1. A possible Census undercount took place in a county located within the region and action is currently being pursued to request a U.S. Census Bureau correction.
2. The most recent population growth rate (2015 – 2020) for the whole region is significantly different than the draft regional projections.

Data requirements:
The RWPG must provide the following data to the Executive Administrator associated with the identified criteria for justifying any adjustments to the regional-level population projections.

1. Documentation of an action requesting the U.S. Census Bureau correct an undercount of population within a county located in the region.
2. Historical regional-total population estimates from the Texas Demographic Center or the U.S. Census Bureau.
3. Other data and evidence that the RWPG believes provides a reasonable basis for justifying changes to the net total regional-level population projection.

Recommendation:
Region C consists of the Metroplex and surrounding counties. Most of the population is centered in the Metroplex, but current trends show fast growing areas in the surrounding counties. Collin, Rockwall and Kaufman counties in the eastern part of the region are some of the fastest growing areas in the state. Parker and Wise counties are also showing high growth rates in the western part of the region. As the Metroplex grows, the population could settle nearly anywhere within the region and not be contained in specific counties. This trend has become pronounced considering changing work requirements that support remote work. As such, we have focused our initial assessment at the regional level.

A review of the adopted population projections from the 2021 Region C Plan to the draft 2026 projections (with full migration) shows Region C has a higher population in 2020 than projected in the

2021 Plan. By 2040, the draft 2026 projections are less than estimated for the 2021 Plan. By 2070, the draft 2026 projections are nearly one million people less than shown in the 2021 plan (7%). This is difficult to explain since the full migration rate is used for the 2026 projections and the half migration rate was used for the 2021 plan. The most likely reasons for this change are 1) the lower birth rates that can affect long-term growth patterns and 2) lower growth projected for some of the more rural counties. Both Jack and Freestone counties are the only counties that show population declines.

Table 1 summarizes the difference between the 2026 TWDB Draft projections and the final 2021 Region C Regional Plan projections.

Table 1: 2026 TWDB Draft Projections Compared to 2021 Region C Regional Water Plan Projections

	2020	2030	2040	2050	2060	2070	2080
2026 TWDB Draft	7,709,193[1]	8,866,884	10,093,722	11,297,108	12,440,777	13,700,226	15,087,176
2021 Region C Plan	7,621,230	8,840,050	10,130,718	11,512,888	13,029,984	14,661,858	-
Difference	***87,963***	***26,834***	***(36,996)***	***(215,780)***	***(589,207)***	***(961,632)***	**-**

[1]*2020 Census population for Region C*

The first criterion for adjustment is a possible Census undercount. The 2020 Census had several unique challenges to overcome. The nation was not only in the midst of a pandemic, but there was limited funding made available to allow for canvassing and outreach efforts. It was reported that towards the end, the self-response rate for Texas households was barely at 60%. The U.S. Census Bureau released the 2020 Census estimated undercount and overcount rates by state from the Post-Enumeration Survey (PES). It is estimated that Texas had an undercount of ~1.92%. ***It is recommended that the Region C 2020 Census total be adjusted to capture the ramifications of this undercount***. **Table 2** summarizes the population projections for Region C if the 2020 Census is increased by 1.92% and the trendline for growth between 2010 and 2020 is extended to 2080.

Table 2: 2010 – 2010 Census Adjusted with Undercount Trendline

	2010	2020	2030	2040	2050	2060	2070	2080
2026 TWDB Draft	6,456,749	7,709,193	8,866,884	10,093,722	11,297,108	12,440,777	13,700,226	15,087,176
Adjusted Undercount Trendline	6,456,749	7,857,210[1]	9,257,670	10,658,131	12,058,591	13,459,052	14,859,512	16,259,973
Difference	**-**	***(148,017)***	***(390,786)***	***(564,409)***	***(761,483)***	***(1,018,275)***	***(1,159,286)***	***(1,172,797)***

[1]*2020 Census population for Region C adjusted by 1.92% undercount*

The second criterion for adjustment is that the most recent growth rate (2015 – 2020) for the whole region is significantly different than the draft regional projections. **Table 3** shows the compound annual growth rate (CAGR) based on the historical census estimates for Region C in each year from 2010 to 2022. The average growth rate for this time period is 1.77%. This includes the lowest growth rate of 1.15% from 2019 to 2020 that is heavily influenced by the undercounted census. The average growth rate for the 2015 – 2020 timeframe is 1.66%.

Table 3: Historical Census Estimates for Region C and CAGR

	Historical Census Estimate[1]	Annual Growth Rate	5-Year Average	10-Year Average
2010	6,503,203	-	-	-
2011	6,621,057	1.81%	-	-
2012	6,753,968	2.01%	-	-
2013	6,861,506	1.59%	-	-
2014	6,996,147	1.96%	-	-
2015	7,148,153	2.17%	1.91%	-
2016	7,298,592	2.10%	1.97%	-
2017	7,439,843	1.94%	1.95%	-
2018	7,557,758	1.58%	1.95%	-
2019	7,673,210	1.53%	1.86%	-
2020	7,761,468	1.15%	1.66%	1.78%
2021	7,866,782	1.36%	1.51%	1.74%
2022	8,031,222	2.09%	1.54%	1.75%

[1]*The historical census estimate includes the total population of Henderson County. This is the only county that is split with another region (Region I) and represents a relatively small portion of the total Region C population.*

This supports the request to increase the Region C regional total to better reflect what has been historically observed. Additionally, the growth rate from 2021 to 2022 is one of the higher growth rates observed indicating that growth within Region C is actually increasing post the 2020 timeframe.

Table 4 summarizes the regional annual growth rates as well as the recommendation for a regional total increase. The cumulative requested revisions received through the planning group's own targeted canvassing efforts were lower than the 2070 – 2080 trendline predictions.

Table 4: Regional Annual Growth Rates and Population Projections

	2030[1]	2040	2050	2060	2070	2080
2026 TWDB Draft	**8,866,884**	**10,093,722**	**11,297,108**	**12,440,777**	**13,700,226**	**15,087,176**
CAGR	*1.22%*	*1.30%*	*1.13%*	*0.97%*	*0.97%*	*0.97%*
Cumulative Requested Revisions	**9,437,646**	**11,223,475**	**12,520,592**	**13,795,145**	**14,800,793**	**15,801,688**
Increase from TWDB Draft	*570,762*	*1,129,753*	*1,223,484*	*1,354,368*	*1,100,567*	*714,512*
CAGR	*1.85%*	*1.75%*	*1.10%*	*0.97%*	*0.71%*	*0.66%*
Adjusted Undercount Trendline	**9,257,670**	**10,658,131**	**12,058,591**	**13,459,052**	**14,859,512**	**16,259,973**
Increase from TWDB Draft	*390,786*	*564,409*	*761,483*	*1,018,275*	*1,159,286*	*1,172,797*
CAGR	*1.65%*	*1.42%*	*1.24%*	*1.10%*	*0.99%*	*0.90%*
Recommended	***9,257,670***	***10,658,131***	***12,058,591***	***13,459,052***	***14,800,793***	***15,801,688***
CAGR	***1.65%***	***1.42%***	***1.24%***	***1.10%***	***0.95%***	***0.66%***

[1]*Compound Annual Growth Rate (CAGR) from 2020 – 2030 is based on the adjusted 2020 Region C Census total population of 7,857,210.*

It is recommended that the trendline projections be used from 2030 – 2060 and the cumulative requested revisions be used from 2070 – 2080. This growth rate better reflects the recent population trends observed within Region C. The growth rates proposed for the 2026 Region C Regional Water Plan

projections are both lower than the 5-Year average from 2015 – 2020 (1.66%) as well as the 10-Year average from 2010 – 2020 (1.78%). It is also lower than the growth rate observed in the most recent census estimate from 2021 to 2022 (2.09%).

As a region that is heavily influenced by municipal use, it is imperative that Region C's population projections reflect the best available data to date. Implementation of this recommendation will not be able to accommodate all of the requested revisions that were received from individual WUGs and WWPs. Therefore, for 2030 – 2060, the increase above the 2026 TWDB draft projections requested by the WUGs were adjusted by the same percentages to match the adjusted undercount trendline. **To meet this regional total, requested increases had to be decreased from 13 - 34% between 2030 – 2060.** All requested revisions were incorporated into the 2070 – 2080 projections with no reductions.

1.2 County-Level Population Projections

County-level projections were developed considering requested changes at the sub-county WUG level, historical county growth rates, known new developments and industries. Any net adjustments to a county-level population projection requires a redistribution of the projected counties populations within the same region so that the net, summed regional total, as recommended in ***Section 1.1***, remains unchanged.

Recommendation:
It is recommended that the increase to the Region C regional total be distributed among the 16 counties based upon historical data, requested revisions as well as other data and evidence, such as more detailed studies. **Table 5** shows the historical census estimates for each of the 16 individual counties located within Region C. **Table 6** and **Table 7** summarize the 2026 TWDB draft projections and the recommended county total revisions.

- **Collin –** Collin County is one of the more densely populated counties within Region C. While the population is still increasing, the historical annual growth rate has stayed consistently around 3% in recent years. From 2021 – 2022 the growth rate increased to almost 4%. ***It is recommended to increase the county total in 2030 – 2060 and decrease the county total in 2070 – 2080*** as some WUGs begin to reach buildout. Both the 5 (3.28%) and 10-year (3.17%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (2.15%).
- **Cooke –** Region C only received two revision requests from WUGs within Cooke County. ***It is recommended to increase the county total***. Both the 5 (1.28%) and 10-year (0.82%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (0.38%).
- **Dallas –** Dallas is currently the most populous county in Region C with an estimate of approximately 2.6 million people in 2022. Because Dallas County is so densely populated several WUGs are projected to be at or near buildout within the planning horizon. Of the 16 counties in Region C, Dallas is the only county that had a negative growth rate from 2020 – 2021. ***It is recommended to decrease the county total in 2030 – 2040 and increase the county total in 2050 – 2080.*** The 5-year average annual historic growth rate (0.40%) and most recent year

(0.50%) growth rate is lower than the highest annual growth rate used in the projections (0.54%).

- **Denton –** Currently Denton has over 1 million people living within the county. ***It is recommended to increase the county total in 2030 - 2060 and decrease the county total in 2070 - 2080.*** Both the 5 (3.24%) and 10-year (3.21%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (2.27%).
- **Ellis –** ***It is recommended to increase the county total in all decades***. Both the 5 (3.54%) and 10-year (2.60%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (1.78%).
- **Fannin –** ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (1.33%) is higher than the highest annual growth rate that was used in the draft projections (0.41%). The two most recent years 2020 – 2021 (2.56%) and 2021 – 2022 (1.11%) are higher as well. Also, with the completion of Bois d'Arc Lake and the construction of Lake Ralph Hall, it is expected that this county will experience future growth at higher rates than shown in the past. This is based on economic studies conducted for these reservoirs and active development.
- **Freestone** - ***The only county that it is not recommended to make any changes to the county total***. Of the ten WUGs within the county, Region C only received one response to the survey and that response agreed with the draft projections.
- **Grayson** – ***It is recommended to increase the county total in all decades***. Both the 5 (1.61%) and 10-year (1.18%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (0.81%).
- **Henderson –** Henderson County is the only county in Region C that is split with another region. Although we use the river basin as a divide in regional planning, we looked at the growth within the entire county as a means for comparison. ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (0.72%) is higher than the highest annual growth rate that was used in the draft projections (0.46%). The two most recent years 2020 – 2021 (1.45%) and 2021 – 2022 (1.10%) are higher as well.
- **Jack –** Jack is the least populated county in Region C and one of the only two counties that are projected to decrease over the planning horizon. ***It is recommended to increase the county total in all decades, however the decreasing total trend will remain the same for the majority of the planning horizon.*** Both the 5 (-0.91%) and 10-year (-0.59%) average annual historical growth rate show a decreasing trend, however the two most recent years 2020 -2021 (2.73%) and 2021 – 2022 (2.34%) show an increase in growth. The largest reported decrease in growth is shown between 2019 – 2020 (-5.03%) which is not surprising considering the obstacles the census encountered particularly in the less urban counties.
- **Kaufman** - Kaufman is the county with the largest historical growth rate in recent years within Region C. The two largest WUGs in this county are currently Forney and Terrell. ***It is recommended to increase the county total in all decades***. Both the 5 (5.22%) and 10-year (3.54%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (2.69%). The most recent years 2020 – 2021 (7.54%) and 2021 – 2022 (8.94%) continue this trend.

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- **Navarro –** Only one WUG requested an increase in projections within Navarro County. ***It is recommended to accommodate this request by increasing the county total in all decades.*** This is a minimal change, and an increase is supported by historical growth. Both the 5 (0.87%) and 10-year (1.17%) average annual historical growth rate is higher than the highest annual growth rate that was used in the draft projections (0.57%).
- **Parker –** Parker county has had consistently high growth throughout recent years. ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (3.55%) is higher than the highest annual growth rate that was used in the draft projections (1.85%). The two most recent years 2020 – 2021 (4.96%) and 2021 – 2022 (5.65%) are higher as well. The majority of the increase is attributed to county-other as this county becomes more urbanized. This is supported by a recent study that considered the new planned developments and significant increase in groundwater permits for domestic use.
- **Rockwall –** ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (3.89%) is higher than the highest annual growth rate that was used in the draft projections (2.29%). The two most recent years 2020 – 2021 (6.79%) and 2021 – 2022 (5.71%) are higher as well.
- **Tarrant –** Tarrant is the second largest county in Region C with over 2.1 million people in 2022. ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (1.28%) is higher than the highest annual growth rate that was used in the draft projections (0.92%). The most recent year 2021 – 2022 (1.18%) is higher as well.
- **Wise -** ***It is recommended to increase the county total in all decades***. The 5-year average annual historical growth rate (1.87%) is higher than the highest annual growth rate that was used in the draft projections (0.92%). The two most recent years 2020 – 2021 (4.27%) and 2021 – 2022 (4.18%) are significantly higher as well. Most of the increase is attributed to county-other as this county becomes more urbanized.

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Table 5: Historical Census Estimates and Annual Growth Rates for Region C Counties

County	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Population													
Collin	787,614	812,540	835,230	856,398	884,688	915,243	943,742	971,864	1,004,307	1,034,730	1,075,654	1,114,450	1,158,696
Cooke	38,472	38,443	38,717	38,456	38,764	39,170	39,343	39,932	40,504	41,257	41,744	42,408	43,050
Dallas	2,372,993	2,408,697	2,455,930	2,484,486	2,519,410	2,557,830	2,591,488	2,620,154	2,629,350	2,635,516	2,609,966	2,587,954	2,600,840
Denton	666,760	685,740	707,892	728,624	753,188	779,584	808,212	835,364	858,741	887,207	914,324	943,857	977,281
Ellis	150,367	152,373	153,739	155,928	159,204	163,292	168,332	173,405	179,006	184,826	194,295	203,107	212,182
Fannin	33,920	33,878	33,601	33,510	33,593	33,502	33,933	34,550	35,185	35,514	35,798	36,716	37,125
Freestone	19,803	19,602	19,484	19,597	19,677	19,746	19,669	19,649	19,789	19,717	19,445	19,784	19,950
Grayson	121,034	121,430	121,854	122,362	123,599	125,628	128,291	131,152	133,787	136,212	136,100	139,561	143,131
Henderson	78,665	78,837	78,992	78,669	79,324	79,492	80,062	80,954	82,103	82,737	82,394	83,590	84,511
Jack	9,004	9,030	8,992	8,951	8,880	8,883	8,789	8,828	8,825	8,935	8,486	8,718	8,922
Kaufman	103,872	105,199	106,553	108,248	110,872	114,055	117,904	122,628	128,279	136,154	147,126	158,216	172,366
Navarro	47,869	48,074	48,163	48,036	47,913	48,181	48,405	48,739	49,536	50,113	52,828	53,616	54,636
Parker	117,316	118,320	119,482	119,785	122,147	125,640	128,967	133,501	138,070	142,878	149,547	156,966	165,834
Rockwall	78,919	81,045	82,710	84,670	87,064	90,170	93,421	96,824	100,546	104,915	109,136	116,549	123,208
Tarrant	1,817,480	1,847,882	1,882,205	1,912,767	1,946,122	1,984,880	2,023,556	2,056,451	2,081,446	2,102,515	2,115,682	2,129,402	2,154,595
Wise	59,115	59,967	60,424	61,019	61,702	62,857	64,478	65,848	68,284	69,984	68,943	71,888	74,895
Annual Growth Rate													
Collin	-	3.16%	2.79%	2.53%	3.30%	3.45%	3.11%	2.98%	3.34%	3.03%	3.96%	3.61%	3.97%
Cooke	-	-0.08%	0.71%	-0.67%	0.80%	1.05%	0.44%	1.50%	1.43%	1.86%	1.18%	1.59%	1.51%
Dallas	-	1.50%	1.96%	1.16%	1.41%	1.52%	1.32%	1.11%	0.35%	0.23%	-0.97%	-0.84%	0.50%
Denton	-	2.85%	3.23%	2.93%	3.37%	3.50%	3.67%	3.36%	2.80%	3.31%	3.06%	3.23%	3.54%
Ellis	-	1.33%	0.90%	1.42%	2.10%	2.57%	3.09%	3.01%	3.23%	3.25%	5.12%	4.54%	4.47%
Fannin	-	-0.12%	-0.82%	-0.27%	0.25%	-0.27%	1.29%	1.82%	1.84%	0.94%	0.80%	2.56%	1.11%
Freestone	-	-1.01%	-0.60%	0.58%	0.41%	0.35%	-0.39%	-0.10%	0.71%	-0.36%	-1.38%	1.74%	0.84%
Grayson	-	0.33%	0.35%	0.42%	1.01%	1.64%	2.12%	2.23%	2.01%	1.81%	-0.08%	2.54%	2.56%
Henderson	-	0.22%	0.20%	-0.41%	0.83%	0.21%	0.72%	1.11%	1.42%	0.77%	-0.41%	1.45%	1.10%
Jack	-	0.29%	-0.42%	-0.46%	-0.79%	0.03%	-1.06%	0.44%	-0.03%	1.25%	-5.03%	2.73%	2.34%
Kaufman	-	1.28%	1.29%	1.59%	2.42%	2.87%	3.37%	4.01%	4.61%	6.14%	8.06%	7.54%	8.94%
Navarro	-	0.43%	0.19%	-0.26%	-0.26%	0.56%	0.46%	0.69%	1.64%	1.16%	5.42%	1.49%	1.90%
Parker	-	0.86%	0.98%	0.25%	1.97%	2.86%	2.65%	3.52%	3.42%	3.48%	4.67%	4.96%	5.65%
Rockwall	-	2.69%	2.05%	2.37%	2.83%	3.57%	3.61%	3.64%	3.84%	4.35%	4.02%	6.79%	5.71%
Tarrant	-	1.67%	1.86%	1.62%	1.74%	1.99%	1.95%	1.63%	1.22%	1.01%	0.63%	0.65%	1.18%
Wise	-	1.44%	0.76%	0.98%	1.12%	1.87%	2.58%	2.12%	3.70%	2.49%	-1.49%	4.27%	4.18%

Table 6: 2026 Draft Projections for 2026 Region C Regional Plan Compared to Historical Census Estimate Annual Growth Rates

County Name	Draft Projections for 2026 RWP (ac-ft/yr)							CAGR for Draft Projections						Historical Census Estimate Annual Growth Rates			
	2020[1]	2030	2040	2050	2060	2070	2080	2020-2030	2030-2040	2040-2050	2050-2060	2060-2070	2070-2080	5-Year Average (2015-2020)	10-Year Average (2010 – 2020)	2020 -2021	2021 - 2022
Collin	1,084,903	1,341,877	1,676,287	2,056,270	2,438,008	2,858,391	3,321,332	2.15%	2.25%	2.06%	1.72%	1.60%	1.51%	3.28%	3.17%	3.61%	3.97%
Cooke	42,468	44,096	45,641	46,337	46,490	46,658	46,843	0.38%	0.34%	0.15%	0.03%	0.04%	0.04%	1.28%	0.82%	1.59%	1.51%
Dallas	2,663,719	2,811,320	2,954,449	3,029,940	3,072,924	3,120,260	3,172,388	0.54%	0.50%	0.25%	0.14%	0.15%	0.17%	0.40%	0.96%	-0.84%	0.50%
Denton	923,825	1,156,452	1,449,394	1,757,793	2,071,337	2,416,623	2,796,864	2.27%	2.28%	1.95%	1.65%	1.55%	1.47%	3.24%	3.21%	3.23%	3.54%
Ellis	196,150	234,017	280,510	331,033	381,817	437,742	499,329	1.78%	1.83%	1.67%	1.44%	1.38%	1.33%	3.54%	2.60%	4.54%	4.47%
Fannin	36,347	37,851	39,584	40,629	41,251	41,936	42,690	0.41%	0.45%	0.26%	0.15%	0.16%	0.18%	1.33%	0.54%	2.56%	1.11%
Freestone	19,808	19,057	18,648	18,067	17,514	16,905	16,234	-0.39%	-0.22%	-0.32%	-0.31%	-0.35%	-0.40%	-0.31%	-0.18%	1.74%	0.84%
Grayson	138,145	149,694	163,010	174,122	183,924	194,718	206,605	0.81%	0.86%	0.66%	0.55%	0.57%	0.59%	1.61%	1.18%	2.54%	2.56%
Henderson	59,404	62,219	64,490	65,745	67,173	68,746	70,478	0.46%	0.36%	0.19%	0.22%	0.23%	0.25%	0.72%	0.46%	1.45%	1.10%
Jack	8,635	8,002	7,522	7,004	6,525	5,998	5,418	-0.76%	-0.62%	-0.71%	-0.71%	-0.84%	-1.01%	-0.91%	-0.59%	2.73%	2.34%
Kaufman	148,100	193,144	253,897	331,393	419,515	516,558	623,425	2.69%	2.77%	2.70%	2.39%	2.10%	1.90%	5.22%	3.54%	7.54%	8.94%
Navarro	53,634	56,773	60,865	64,251	67,193	70,433	74,001	0.57%	0.70%	0.54%	0.45%	0.47%	0.50%	1.86%	0.99%	1.49%	1.90%
Parker	151,068	181,391	217,135	257,508	299,924	346,634	398,073	1.85%	1.81%	1.72%	1.54%	1.46%	1.39%	3.55%	2.46%	4.96%	5.65%
Rockwall	109,889	137,756	173,604	216,829	262,120	311,996	366,921	2.29%	2.34%	2.25%	1.92%	1.76%	1.63%	3.89%	3.29%	6.79%	5.71%
Tarrant	2,151,164	2,356,541	2,604,655	2,809,558	2,969,443	3,145,514	3,339,410	0.92%	1.01%	0.76%	0.56%	0.58%	0.60%	1.28%	1.53%	0.65%	1.18%
Wise	69,950	76,694	84,031	90,629	95,619	101,114	107,165	0.92%	0.92%	0.76%	0.54%	0.56%	0.58%	1.87%	1.55%	4.27%	4.18%
Total	***7,857,210***	***8,866,884***	***10,093,722***	***11,297,108***	***12,440,777***	***13,700,226***	***15,087,176***	***1.22%***	***1.30%***	***1.13%***	***0.97%***	***0.97%***	***0.97%***	***1.66%***	***1.78%***	***1.36%***	***2.09%***

[1]2020 Census adjusted with 1.92% Undercount.

Table 7: Summary of Requested County Revisions for 2026 Regional Water Plan

County Name	Recommended Revisions for 2026 RWP (ac-ft/yr)						Recommended Revisions for 2026 RWP (ac-ft/yr)						Difference between TWDB Draft and Recommended Revisions					
	2030	2040	2050	2060	2070	2080	2020-2030	2030-2040	2040-2050	2050-2060	2060-2070	2070-2080	2030	2040	2050	2060	2070	2080
Collin	1,468,213	1,837,437	2,238,263	2,549,561	2,745,531	2,819,635	3.07%	2.27%	1.99%	1.31%	0.74%	0.27%	126,336	161,150	181,993	111,553	-112,860	-501,697
Cooke	44,200	45,693	46,466	47,694	49,742	51,732	0.40%	0.33%	0.17%	0.26%	0.42%	0.39%	104	52	129	1,204	3,084	4,889
Dallas	2,755,692	2,912,542	3,084,325	3,280,733	3,471,445	3,609,214	0.34%	0.56%	0.57%	0.62%	0.57%	0.39%	-55,628	-41,907	54,385	207,809	351,185	436,826
Denton	1,281,602	1,549,219	1,843,067	2,088,668	2,352,849	2,574,400	3.33%	1.91%	1.75%	1.26%	1.20%	0.90%	125,150	99,825	85,274	17,331	-63,774	-222,464
Ellis	241,748	290,487	346,553	399,928	459,484	521,412	2.11%	1.85%	1.78%	1.44%	1.40%	1.27%	7,731	9,977	15,520	18,111	21,742	22,083
Fannin	40,070	44,955	53,396	62,520	74,244	84,502	0.98%	1.16%	1.74%	1.59%	1.73%	1.30%	2,219	5,371	12,767	21,269	32,308	41,812
Freestone	19,057	18,648	18,067	17,514	16,905	16,234	-0.39%	-0.22%	-0.32%	-0.31%	-0.35%	-0.40%	0	0	0	0	0	0
Grayson	173,423	207,085	242,522	271,463	310,612	338,984	2.30%	1.79%	1.59%	1.13%	1.36%	0.88%	23,729	44,075	68,400	87,539	115,894	132,379
Henderson	69,434	76,356	91,680	103,715	120,956	132,472	1.57%	0.95%	1.85%	1.24%	1.55%	0.91%	7,215	11,866	25,935	36,542	52,210	61,994
Jack	8,214	7,957	7,770	7,740	7,859	7,787	-0.50%	-0.32%	-0.24%	-0.04%	0.15%	-0.09%	212	435	766	1,215	1,861	2,369
Kaufman	209,309	257,499	335,063	431,671	542,246	627,644	3.52%	2.09%	2.67%	2.57%	2.31%	1.47%	16,165	3,602	3,670	12,156	25,688	4,219
Navarro	57,263	61,718	65,956	70,147	75,206	80,385	0.66%	0.75%	0.67%	0.62%	0.70%	0.67%	490	853	1,705	2,954	4,773	6,384
Parker	193,243	256,164	342,606	444,891	569,928	679,642	2.49%	2.86%	2.95%	2.65%	2.51%	1.78%	11,852	39,029	85,098	144,967	223,294	281,569
Rockwall	155,987	214,364	282,069	346,714	392,548	422,765	3.57%	3.23%	2.78%	2.08%	1.25%	0.74%	18,231	40,760	65,240	84,594	80,552	55,844
Tarrant	2,446,040	2,749,017	2,878,997	3,093,387	3,287,331	3,449,671	1.29%	1.17%	0.46%	0.72%	0.61%	0.48%	89,499	144,362	69,439	123,944	141,817	110,261
Wise	94,175	128,991	181,789	242,706	323,907	385,209	3.02%	3.20%	3.49%	2.93%	2.93%	1.75%	17,481	44,960	91,160	147,087	222,793	278,044
Total	***9,257,670***	***10,658,131***	***12,058,591***	***13,459,052***	***14,800,793***	***15,801,688***	***1.65%***	***1.42%***	***1.24%***	***1.10%***	***0.95%***	***0.66%***	***390,786***	***564,409***	***761,483***	***1,018,275***	***1,100,567***	***714,512***

1.3 WUG (entity) Population Projections

The projected population growth throughout the planning period for the utilities and rural area (county-other) within a county is a function of a number of factors, including the WUG's estimated share of the county's population or growth between 2010 and 2020, as well as local information provided by RWPGs.

Recommendation:
Individual WUG projection adjustments were made as needed based on currently available information. Where possible, adjustments between WUG population projections were made within the same county. A summary of the total WUG revised population is attached in ***Attachment A***, including the portion of WUG population in other regions.

There are several WUGs in Region C that are shared with adjoining regions. The TWDB designates a primary region to plan for these split entities. The focus of the recommended changes in this section is on WUGs that Region C is designated as the primary region. For WUGs that are planned for by other regions, we have adopted those recommended revisions, if available. If not available, Region C will defer to the primary planning region for changes to other shared WUGs. For split WUGs where Region C is the designated primary region, the split of the recommended population across counties is shown in ***Attachment B***.

Sources for Projection Adjustments:
In the case of Region C, new data sources since the 2021 Region C Water Plan (RCRWP) have been considered and changes to both the regional and county totals are warranted.

The consultant's population revisions are based on a review of the following data:

- **Water User Group Survey** – In March, FNI sent a survey to each municipal water user group with their draft projections and asked for input on the projections. To date, we have had a 32% response rate, half of which have requested changes.
- **Input from Wholesale Water Providers (WWPs)** – In March, an email survey was sent out to all WWPS. In May, FNI met with five major water providers and two regional water providers to get input on their customer's population and demand projections.
- **Texas Demographic Center Estimates –** The TDC releases annual population estimates by place. FNI reviewed these estimates of observed historical growth and compared it to the projected growth from 2030-2080. This was done for individual entities and for county totals. If an entity has grown much faster or slower than originally projected, adjustments were made.
- **North Central Texas Council of Government (NCTCOG) Estimated –** NCTCOG population estimates were reviewed and compared to the 2020 Census and TWDB projected growth.
- **Individual Plans and/or Reports** – If population projections were available from a recently updated plan and/or report that was available to FNI, the projections were compared to the other available data and projections were updated for the time period in which they overlapped. Specifically, these included long-range water supply plans, water and wastewater master plans, impact fee reports, and comprehensive plans. If projections from a plan and/or report was used to revise projections for a WUG it is noted in ***Attachment A.***

DRAFT

ATTACHMENT A

WUG Revision Recommendations for Population Projections

DRAFT

WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections						Comment
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
ABLES SPRINGS SUD	3,675	4,329	5,141	6,039	7,029	8,118	8,670	9,045	10,488	11,760	13,253	13,915	4,995	4,716	5,347	5,721	6,224	5,797	Survey Revision Request and Region D Request
ADDISON	20,465	23,069	24,456	25,276	26,179	27,173	20,465	23,069	24,456	25,276	26,179	27,173	0	0	0	0	0	0	
ALEDO	4,538	5,449	6,480	7,563	8,755	10,069	7,847	8,462	10,380	11,847	13,500	14,500	3,309	3,013	3,900	4,284	4,745	4,431	UTGCD Regional Water Supply Planning Study
ALLEN	133,789	167,216	205,200	243,358	285,379	331,654	125,000	140,000	140,000	140,000	140,000	140,000	(8,789)	(27,216)	(65,200)	(103,358)	(145,379)	(191,654)	Survey Revision Request
ALVORD	3,020	3,736	4,375	4,888	5,453	6,073	3,020	3,736	4,375	4,888	5,453	6,073	0	0	0	0	0	0	
AMC CREEKSIDE	2,684	3,359	4,003	4,628	5,318	6,078	2,684	3,359	4,003	4,628	5,318	6,078	0	0	0	0	0	0	
ANNA	24,021	33,433	44,157	54,891	66,728	79,774	42,924	69,571	88,103	104,876	121,250	130,000	18,903	36,138	43,946	49,985	54,522	50,226	NTMWD Long Range Water Supply Plan
ANNETTA	5,531	7,356	9,417	11,622	14,041	16,697	3,180	3,810	4,439	5,068	5,698	6,327	(2,351)	(3,546)	(4,978)	(6,554)	(8,343)	(10,370)	Survey Revision Request; Comprehensive Plan Projections
ARGYLE WSC	9,608	13,402	18,694	22,005	22,005	22,005	13,736	17,803	23,593	29,159	33,250	36,250	4,128	4,401	4,899	7,154	11,245	14,245	Ongoing UTRWD Study
ARLEDGE RIDGE WSC	1,364	1,474	1,531	1,578	1,629	1,684	1,364	1,474	1,531	1,578	1,629	1,684	0	0	0	0	0	0	
ARLINGTON	416,797	423,084	423,084	423,084	423,084	423,084	443,307	482,455	513,986	539,421	574,231	591,297	26,510	59,371	90,902	116,337	151,147	168,213	TRWD Demand Study
ATHENS	12,949	13,322	13,645	13,918	14,218	14,547	18,337	22,108	29,040	30,876	33,463	33,463	5,388	8,786	15,395	16,958	19,245	18,916	Survey Revision Request; Land Use Data
AUBREY	4,303	5,402	6,559	7,735	9,030	10,457	8,276	14,448	24,810	33,745	40,586	40,586	3,973	9,046	18,251	26,010	31,556	30,129	Ongoing UTRWD Study
AVALON WATER SUPPLY & SEWER SERVICE	992	1,109	1,236	1,360	1,498	1,650	992	1,109	1,236	1,360	1,498	1,650	0	0	0	0	0	0	
AZLE	16,328	18,775	21,074	23,169	25,472	28,005	16,328	18,775	21,074	23,169	25,472	28,005	0	0	0	0	0	0	Agreed with Draft Projections
B AND B WSC	1,871	2,060	2,217	2,364	2,525	2,701	1,871	2,060	2,217	2,364	2,525	2,701	0	0	0	0	0	0	
B B S WSC	1,081	1,078	1,065	1,052	1,038	1,025	1,081	1,078	1,065	1,052	1,038	1,025	0	0	0	0	0	0	
BALCH SPRINGS	26,209	28,020	28,979	29,535	30,146	30,819	28,412	30,394	33,234	36,214	40,018	42,000	2,203	2,374	4,255	6,679	9,872	11,181	DWU Survey Revision Request
BEAR CREEK SUD	10,185	13,887	18,118	22,368	27,052	32,214	27,781	48,717	55,704	60,660	66,501	66,501	17,596	34,830	37,586	38,292	39,449	34,287	Survey Revision Request
BECKER JIBA WSC	3,608	4,259	5,085	6,007	7,030	8,160	4,425	6,986	9,459	10,420	14,800	17,113	817	2,727	4,374	4,413	7,770	8,953	Survey Revision Request; Growth Analysis
BEDFORD	53,705	59,337	60,166	60,166	60,166	60,166	52,345	56,345	57,255	60,166	60,166	60,166	(1,360)	(2,992)	(2,911)	0	0	0	Survey Revision Request
BELLS	1,743	1,900	2,031	2,147	2,275	2,416	1,743	1,900	2,031	2,147	2,275	2,416	0	0	0	0	0	0	
BENBROOK WATER AUTHORITY	27,061	29,909	32,288	34,213	34,213	34,213	27,156	29,353	31,526	33,698	35,871	38,044	95	(556)	(762)	(515)	1,658	3,831	Survey Revision Request; 2021 Master Plan Update
BETHEL ASH WSC	7,511	7,855	8,164	8,454	8,754	9,064	7,511	7,855	8,164	8,454	8,754	9,064	0	0	0	0	0	0	
BETHESDA WSC	35,167	40,663	46,170	51,154	56,749	63,032	35,167	40,663	46,170	51,154	56,749	63,032	0	0	0	0	0	0	
BLACK ROCK WSC	1,560	1,959	2,377	2,804	3,274	3,791	1,560	1,959	2,377	2,804	3,274	3,791	0	0	0	0	0	0	
BLACKLAND WSC	6,440	8,044	9,977	12,000	14,228	16,683	4,634	4,824	5,199	6,029	6,491	6,988	(1,806)	(3,220)	(4,778)	(5,971)	(7,737)	(9,695)	NTMWD Long Range Water Supply Plan
BLOOMING GROVE	828	890	940	985	1,033	1,087	1,038	1,078	1,168	1,251	1,355	1,465	210	188	228	266	322	378	Survey Revision Request
BLUE MOUND	2,690	2,976	3,213	3,398	3,602	3,826	2,690	2,976	3,213	3,398	3,602	3,826	0	0	0	0	0	0	
BLUE RIDGE	1,653	2,162	2,740	3,320	3,959	4,664	2,585	7,240	12,808	26,469	35,000	43,000	932	5,078	10,068	23,149	31,041	38,336	Survey Revision Request
BOIS D ARC MUD	3,047	3,196	3,285	3,341	3,402	3,469	3,047	3,196	3,285	3,341	3,402	3,469	0	0	0	0	0	0	
BOLIVAR WSC	12,220	14,878	17,544	20,208	23,992	28,800	12,220	14,878	17,544	20,208	23,992	28,800	0	0	0	0	0	0	Agreed with Draft Projections
BONHAM	11,132	11,547	11,815	11,949	12,098	12,263	12,465	15,204	21,585	28,467	37,686	45,834	1,333	3,657	9,770	16,518	25,588	33,571	NTMWD Long Range Water Supply Plan
BOYD	1,477	1,641	1,788	1,901	2,026	2,162	1,477	1,879	2,574	3,202	3,800	4,200	0	238	786	1,301	1,774	2,038	UTGCD Regional Water Supply Planning Study
BRANDON IRENE WSC	1,999	2,069	2,118	2,168	2,222	2,286	1,999	2,069	2,118	2,168	2,222	2,286	0	0	0	0	0	0	
BRIDGEPORT	5,814	5,958	6,093	6,165	6,246	6,337	5,814	5,958	6,093	6,165	6,246	6,337	0	0	0	0	0	0	Agreed with Draft Projections
BRUSHY CREEK WSC	3,493	3,510	3,490	3,469	3,451	3,434	3,493	3,510	3,490	3,469	3,451	3,434	0	0	0	0	0	0	
BUENA VISTA-BETHEL SUD	7,152	8,701	10,384	12,081	13,948	16,004	7,152	8,701	10,384	12,081	13,948	16,004	0	0	0	0	0	0	
BURLESON	51,966	60,546	68,952	76,495	84,944	94,407	51,966	60,546	68,952	76,495	84,944	94,407	0	0	0	0	0	0	
BUTLER WSC	838	830	818	794	767	737	838	830	818	794	767	737	0	0	0	0	0	0	Agreed with Draft Projections
CADDO BASIN SUD	15,886	19,589	23,280	26,882	30,699	34,750	18,175	26,075	35,538	38,969	41,334	43,698	2,289	6,486	12,258	12,087	10,635	8,948	NTMWD Long Range Water Supply Plan/Region D Request
CALLISBURG WSC	1,614	1,686	1,717	1,728	1,740	1,752	1,614	1,686	1,717	1,728	1,740	1,752	0	0	0	0	0	0	Agreed with Draft Projections
CARROLLTON	133,138	133,138	133,138	133,138	133,138	133,138	144,953	154,693	172,183	192,193	219,000	236,700	11,815	21,555	39,045	59,055	85,862	103,562	DWU Survey Revision Request
CASH SUD	22,234	25,203	27,991	30,651	33,412	36,283	23,510	27,288	34,167	42,044	50,195	59,926	1,276	2,085	6,176	11,393	16,783	23,643	NTMWD Long Range Water Supply Plan/Region D Request
CEDAR HILL	44,678	46,970	48,179	48,868	49,627	50,462	65,229	78,887	101,875	127,940	162,800	185,500	20,551	31,917	53,696	79,072	113,173	135,038	DWU Survey Revision Request
CELINA	34,358	50,886	69,716	88,545	109,316	132,216	66,668	116,498	194,231	263,340	330,000	350,000	32,310	65,612	124,515	174,795	220,684	217,784	Survey Revision Request; Ongoing Study
CHATFIELD WSC	3,318	3,572	3,782	3,967	4,172	4,396	3,318	3,572	3,782	3,967	4,172	4,396	0	0	0	0	0	0	
CHICO	2,054	2,054	2,054	2,054	2,054	2,054	2,647	3,210	4,420	5,825	8,000	9,600	593	1,156	2,366	3,771	5,946	7,546	UTGCD Regional Water Supply Planning Study
COCKRELL HILL	3,610	3,380	3,255	3,176	3,089	2,993	4,812	4,948	5,678	6,494	14,000	15,000	1,202	1,568	2,423	3,318	10,911	12,007	DWU Survey Revision Request
COLLEGE MOUND SUD	8,873	10,427	12,398	14,597	17,035	19,730	12,664	14,078	19,045	29,451	40,174	50,886	3,791	3,651	6,647	14,854	23,139	31,156	NTMWD Long Range Water Supply Plan
COLLEYVILLE	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	0	0	0	0	0	0	
COLLINSVILLE	2,641	2,907	3,129	3,331	3,552	3,794	2,641	2,907	3,129	3,331	3,552	3,794	0	0	0	0	0	0	Agreed with Draft Projections
COMBINE WSC	3,604	4,094	4,678	5,309	6,009	6,784	3,604	4,094	4,678	5,309	6,009	6,784	0	0	0	0	0	0	
COMMUNITY WSC	4,123	4,630	5,054	5,396	5,773	6,186	4,123	4,630	5,054	5,396	5,773	6,186	0	0	0	0	0	0	
COPEVILLE SUD	4,697	5,939	7,350	8,766	10,327	12,046	14,741	23,307	34,259	37,592	41,989	41,989	10,044	17,368	26,909	28,826	31,662	29,943	Survey Revision Request; Comprehensive Plan Projections
COPPELL	42,913	42,913	42,913	42,913	42,913	42,913	43,777	43,633	43,757	43,856	44,000	44,000	864	720	844	943	1,087	1,087	DWU Survey Revision Request
CORBET WSC	2,465	2,647	2,797	2,928	3,072	3,232	2,465	2,647	2,797	2,928	3,072	3,232	0	0	0	0	0	0	
CORINTH	29,073	29,520	29,520	29,520	29,520	29,520	29,174	31,493	39,215	40,348	42,000	42,000	101	1,973	9,695	10,828	12,480	12,480	Ongoing UTRWD Study
CORSICANA	27,916	29,886	31,517	32,925	34,477	36,187	27,916	29,886	31,517	32,925	34,477	36,187	0	0	0	0	0	0	Agreed with Draft Projections

WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections						Comment
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
COUNTY-OTHER, COLLIN	3,794	7,605	9,769	10,346	9,123	5,415	3,794	5,035	6,276	7,518	8,759	10,000	0	(2,570)	(3,493)	(2,828)	(364)	4,585	
COUNTY-OTHER, COOKE	5,882	6,135	6,253	6,272	6,296	6,319	5,976	6,178	6,367	6,557	6,800	7,000	94	43	114	285	504	681	
COUNTY-OTHER, DALLAS	43,170	46,746	56,051	58,742	56,780	54,021	1,000	1,400	1,800	2,200	2,600	3,000	(42,170)	(45,346)	(54,251)	(56,542)	(54,180)	(51,021)	
COUNTY-OTHER, DENTON	51,205	104,950	179,574	262,889	352,402	427,254	51,205	80,964	110,723	140,482	185,121	214,880	0	(23,986)	(68,851)	(122,407)	(167,281)	(212,374)	Ongoing UTRWD Study
COUNTY-OTHER, ELLIS	8,881	8,302	7,671	7,960	7,379	6,796	6,500	6,960	7,420	7,880	8,340	8,800	(2,381)	(1,342)	(251)	(80)	961	2,004	
COUNTY-OTHER, FANNIN	3,862	3,441	3,335	3,108	2,856	2,577	3,800	3,838	4,069	4,333	4,760	5,000	(62)	397	734	1,225	1,904	2,423	
COUNTY-OTHER, FREESTONE	3,337	3,063	2,622	2,661	2,675	2,657	3,337	3,063	2,622	2,661	2,675	2,657	0	0	0	0	0	0	
COUNTY-OTHER, GRAYSON	7,888	7,139	6,509	5,649	4,745	3,784	11,157	10,489	11,085	11,680	12,800	13,000	3,269	3,350	4,576	6,031	8,055	9,216	
COUNTY-OTHER, HENDERSON	14,502	15,266	15,390	15,772	16,193	16,662	5,000	6,000	7,000	8,000	9,000	10,000	(9,502)	(9,266)	(8,390)	(7,772)	(7,193)	(6,662)	
COUNTY-OTHER, JACK	4,565	4,337	4,088	3,867	3,625	3,362	4,500	4,300	4,000	3,800	3,600	3,400	(65)	(37)	(88)	(67)	(25)	38	
COUNTY-OTHER, KAUFMAN	17,341	22,239	28,466	36,164	45,550	55,894	17,341	22,239	30,435	36,164	45,000	55,894	0	0	1,969	0	(550)	0	
COUNTY-OTHER, NAVARRO	6,648	6,596	6,298	5,703	4,949	3,994	6,928	7,261	7,776	8,390	9,400	10,000	280	665	1,478	2,687	4,451	6,006	
COUNTY-OTHER, PARKER	67,251	79,740	93,855	109,450	126,692	145,699	69,436	111,025	163,883	223,591	298,000	355,000	2,185	31,285	70,028	114,141	171,308	209,301	UTGCD Regional Water Supply Planning Study
COUNTY-OTHER, ROCKWALL	3,015	3,675	4,390	4,879	5,145	5,080	3,242	3,337	3,269	3,768	5,843	7,294	227	(338)	(1,121)	(1,111)	698	2,214	NTMWD Long Range Water Supply Plan
COUNTY-OTHER, TARRANT	65,604	122,842	179,060	218,141	262,363	309,421	30,000	44,000	58,000	72,000	86,000	100,000	(35,604)	(78,842)	(121,060)	(146,141)	(176,363)	(209,421)	
COUNTY-OTHER, WISE	41,986	45,709	48,781	50,632	52,558	54,544	52,332	80,325	120,420	166,350	227,000	270,000	10,346	34,616	71,639	115,718	174,442	215,456	UTGCD Regional Water Supply Planning Study
CRANDALL	4,813	5,816	7,106	7,920	7,920	7,920	10,785	23,128	38,693	56,201	79,364	95,162	5,972	17,312	31,587	48,281	71,444	87,242	Survey Revision Request
CRESCENT HEIGHTS WSC	1,622	1,640	1,702	1,731	1,762	1,796	1,932	1,992	2,214	2,804	3,770	4,000	310	352	512	1,073	2,008	2,204	Survey Revision Request
CROSS TIMBERS WSC	9,808	12,310	14,944	17,622	20,802	25,403	9,808	12,310	14,944	17,622	20,802	25,403	0	0	0	0	0	0	Agreed with Draft Projections
CROWLEY	22,370	26,626	30,175	33,053	36,216	39,691	22,372	26,629	30,180	33,059	36,223	39,700	2	3	5	6	7	9	Region G Request
CULLEOKA WSC	6,985	8,735	10,723	12,719	14,919	17,341	45,646	52,348	63,130	71,557	80,531	80,531	38,661	43,613	52,407	58,838	65,612	63,190	NTMWD Long Range Water Supply Plan
DALLAS	1,372,734	1,447,053	1,494,277	1,529,969	1,573,879	1,622,202	1,342,289	1,391,906	1,472,336	1,543,577	1,620,364	1,692,302	(30,445)	(55,147)	(21,941)	13,608	46,485	70,100	Ongoing DWU LRWSP
DALWORTHINGTON GARDENS	2,303	2,326	2,343	2,344	2,348	2,352	2,303	2,326	2,343	2,344	2,348	2,352	0	0	0	0	0	0	Agreed with Draft Projections
DAWSON	825	834	842	839	837	835	825	834	842	839	837	835	0	0	0	0	0	0	
DECATUR	7,291	7,976	8,591	9,057	9,568	10,132	10,796	12,824	17,299	21,328	27,000	31,300	3,505	4,848	8,708	12,271	17,432	21,168	UTGCD Regional Water Supply Planning Study
DELTA COUNTY MUD	1,973	2,011	2,043	2,075	2,108	2,142	1,973	2,011	2,043	2,075	2,108	2,142	0	0	0	0	0	0	
DENISON	30,631	33,349	35,617	37,617	39,819	42,245	45,619	58,130	69,278	80,563	95,278	103,443	14,988	24,781	33,661	42,946	55,459	61,198	Survey Revision Request
DENTON	183,086	227,946	275,173	323,187	379,613	460,476	227,455	275,540	341,191	405,432	485,078	562,953	44,369	47,594	66,018	82,245	105,465	102,477	Survey Revision Request; Ongoing Study
DENTON COUNTY FWSD 10	18,887	19,770	19,770	19,770	19,770	19,770	6,246	6,246	6,246	6,246	6,246	6,246	(12,641)	(13,524)	(13,524)	(13,524)	(13,524)	(13,524)	Ongoing UTRWD Study
DENTON COUNTY FWSD 11-C	5,406	8,467	11,690	14,965	18,573	22,547	5,406	8,467	11,690	14,965	18,573	22,547	0	0	0	0	0	0	
DENTON COUNTY FWSD 1-A	22,382	30,000	30,000	30,000	30,000	30,000	23,532	31,738	33,928	34,388	35,057	35,057	1,150	1,738	3,928	4,388	5,057	5,057	Survey Revision Request; Annexed by Lewisville
DENTON COUNTY FWSD 7	9,981	13,500	13,500	13,500	13,500	13,500	12,779	13,500	13,500	13,500	13,500	13,500	2,798	0	0	0	0	0	Ongoing UTRWD Study
DESERT WSC	1,864	2,071	2,215	2,350	2,498	2,663	1,864	2,071	2,215	2,350	2,498	2,663	0	0	0	0	0	0	
DESOTO	59,901	63,934	66,069	67,304	68,664	70,162	59,901	63,934	66,069	67,304	68,664	70,162	0	0	0	0	0	0	
DOGWOOD ESTATES WATER	1,179	1,154	1,226	1,239	1,253	1,267	1,179	1,154	1,226	1,239	1,253	1,267	0	0	0	0	0	0	
DORCHESTER	1,287	1,322	1,350	1,361	1,376	1,394	1,287	1,322	1,350	1,361	1,376	1,394	0	0	0	0	0	0	
DUNCANVILLE	43,672	45,939	47,157	47,307	47,307	47,307	43,672	45,939	47,157	47,307	47,307	47,307	0	0	0	0	0	0	Agreed with Draft Projections
EAST CEDAR CREEK FWSD	11,866	12,479	12,591	12,900	13,243	13,622	21,917	23,331	29,504	37,351	49,109	58,704	10,051	10,852	16,913	24,451	35,866	45,082	Survey Revision Request; Master Plan
EAST FORK SUD	21,352	28,061	36,878	48,466	63,694	83,708	24,737	29,515	35,021	39,846	44,015	48,621	3,385	1,454	(1,857)	(8,620)	(19,679)	(35,087)	NTMWD Long Range Water Supply Plan
EAST GARRETT WSC	1,806	2,295	2,825	3,363	3,954	4,605	1,806	2,295	2,825	3,363	3,954	4,605	0	0	0	0	0	0	
EDGECLIFF	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761	0	0	0	0	0	0	Agreed with Draft Projections
ELMO WSC	2,332	2,733	3,243	3,810	4,440	5,137	2,332	2,733	3,243	3,810	4,440	5,137	0	0	0	0	0	0	Agreed with Draft Projections
ENNIS	20,220	21,227	22,316	23,303	24,413	25,655	20,220	21,227	22,316	23,303	24,413	25,655	0	0	0	0	0	0	
EULESS	60,820	60,820	60,820	60,820	60,820	60,820	60,820	60,820	60,820	60,820	60,820	60,820	0	0	0	0	0	0	
EUSTACE	3,105	3,399	3,333	3,441	3,562	3,696	3,105	3,399	3,333	3,441	3,562	3,696	0	0	0	0	0	0	
EVERMAN	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	6,600	0	0	0	0	0	0	Agreed with Draft Projections
FAIRFIELD	4,932	4,782	4,639	4,338	4,039	3,742	4,932	4,782	4,639	4,338	4,039	3,742	0	0	0	0	0	0	
FAIRVIEW	13,152	16,629	20,418	20,418	20,418	20,418	13,152	16,629	20,418	20,418	20,418	20,418	0	0	0	0	0	0	Agreed with Draft Projections
FARMERS BRANCH	36,454	39,795	41,570	42,609	43,754	45,014	36,454	39,795	41,570	42,609	43,754	45,014	0	0	0	0	0	0	Agreed with Draft Projections
FARMERSVILLE	5,700	7,115	8,723	10,338	12,118	14,077	13,965	34,480	68,317	77,722	88,000	88,000	8,265	27,365	59,594	67,384	75,882	73,923	NTMWD Long Range Water Supply Plan
FATE	25,597	36,969	50,748	65,318	81,326	98,927	25,597	36,969	50,748	65,318	81,326	98,927	0	0	0	0	0	0	Agreed with Draft Projections
FERRIS	2,455	2,602	2,761	2,907	3,072	3,256	2,455	2,602	2,761	2,907	3,072	3,256	0	0	0	0	0	0	
FILES VALLEY WSC	3,342	3,592	3,830	4,071	4,338	4,634	3,342	3,592	3,830	4,071	4,338	4,634	0	0	0	0	0	0	
FLO COMMUNITY WSC	3,159	2,951	2,745	2,555	2,344	2,106	3,159	2,951	2,745	2,555	2,344	2,106	0	0	0	0	0	0	
FLOWER MOUND	95,740	120,016	145,555	171,507	200,084	231,556	95,690	119,876	145,420	145,481	145,555	145,555	(50)	(140)	(135)	(26,026)	(54,529)	(86,001)	Ongoing UTRWD Study
FOREST HILL	15,535	17,189	18,556	19,624	20,798	22,093	15,535	17,189	18,556	19,624	20,798	22,093	0	0	0	0	0	0	
FORNEY	27,431	36,654	48,424	61,829	76,582	92,825	32,901	42,290	52,366	61,829	61,829	61,829	5,470	5,636	3,942	0	(14,753)	(30,996)	Survey Revision Request
FORNEY LAKE WSC	14,953	22,347	31,804	42,648	54,555	67,646	19,207	22,100	23,000	25,000	25,500	26,000	4,254	(247)	(8,804)	(17,648)	(29,055)	(41,646)	Survey Revision Request
FORT WORTH	1,088,987	1,239,211	1,371,239	1,477,653	1,593,371	1,718,478	1,124,516	1,333,700	1,371,311	1,477,768	1,593,514	1,718,619	35,529	94,489	72	115	143	141	Survey Revision Request (2022 Impact Fee Study) and Region G Request
FRISCO	284,501	383,861	493,210	603,456	724,940	858,774	320,025	387,697	389,656	389,656	389,656	389,656	35,524	3,836	(103,554)	(213,800)	(335,284)	(469,118)	Survey Revision Request; Ongoing Study
FROGNOT WSC	2,130	2,664	3,263	3,865	4,527	5,256	2,130	2,664	3,263	3,865	4,527	5,257	0	0	0	0	0	1	Region D Request
GAINESVILLE	19,705	20,309	20,590	20,630	20,676	20,727	19,705	20,309	20,590	21,533	23,237	24,916	0	0	0	903	2,561	4,189	Survey Revision Request; New MUD Annexation

WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections						Comment
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
GARLAND	264,943	278,533	285,702	289,787	294,284	299,237	259,490	280,255	292,596	301,612	303,416	303,416	(5,453)	1,722	6,894	11,825	9,132	4,179	NTMWD Long Range Water Supply Plan
GASTONIA SCURRY SUD	12,814	16,869	22,040	27,922	34,398	41,530	12,512	14,583	19,563	32,939	52,565	65,808	(302)	(2,286)	(2,477)	5,017	18,167	24,278	NTMWD Long Range Water Supply Plan
GLENN HEIGHTS	22,178	25,909	29,228	32,297	35,668	39,377	22,178	25,909	29,228	32,297	35,668	39,377	0	0	0	0	0	0	
GRAND PRAIRIE	204,821	211,690	215,314	217,378	219,651	222,154	223,551	250,447	281,413	289,414	300,401	300,401	18,730	38,757	66,099	72,036	80,750	78,247	Survey Revision Request; Ongoing Study
GRAPEVINE	54,037	54,037	54,037	54,037	54,037	54,037	54,037	54,037	54,037	54,037	54,037	54,037	0	0	0	0	0	0	
GUNTER	1,940	2,258	2,523	2,782	3,064	3,371	1,940	2,258	2,523	2,782	3,064	3,371	0	0	0	0	0	0	
HACKBERRY	5,999	8,480	11,092	13,748	16,673	19,894	2,309	2,840	3,682	4,642	5,612	6,173	(3,690)	(5,640)	(7,410)	(9,106)	(11,061)	(13,721)	NTMWD Long Range Water Supply Plan
HALTOM CITY	50,298	55,645	60,061	63,509	67,306	71,487	50,000	50,000	50,000	50,000	50,000	50,000	(298)	(5,645)	(10,061)	(13,509)	(17,306)	(21,487)	Survey Revision Request
HASLET	2,584	3,277	4,156	5,271	6,686	8,480	6,540	8,959	11,803	12,845	14,000	14,000	3,956	5,682	7,647	7,574	7,314	5,520	Fort Worth Impact Fee
HEATH	12,307	15,369	19,062	22,935	27,201	31,899	11,828	15,718	20,850	21,363	21,363	21,363	(479)	349	1,788	(1,572)	(5,838)	(10,536)	Survey Revision Request; 2018 Comprehensive Plan
HICKORY CREEK SUD	3,827	4,340	4,946	5,631	6,415	7,315	3,827	4,340	4,946	5,631	6,415	7,315	0	0	0	0	0	0	
HIGH POINT WSC	21,311	32,764	47,362	64,034	82,333	102,444	5,798	6,796	8,849	13,759	17,816	20,290	(15,513)	(25,968)	(38,513)	(50,275)	(64,517)	(82,154)	NTMWD Long Range Water Supply Plan
HIGHLAND PARK	9,311	9,311	9,311	9,311	9,311	9,311	9,311	9,311	9,311	9,311	9,311	9,311	0	0	0	0	0	0	
HIGHLAND VILLAGE	16,656	17,822	18,020	18,020	18,020	18,020	16,656	17,822	18,020	18,020	18,020	18,020	0	0	0	0	0	0	Agreed with Draft Projections
HILCO UNITED SERVICES	6,489	6,767	7,005	7,253	7,526	7,826	6,489	6,767	7,005	7,253	7,526	7,826	0	0	0	0	0	0	
HONEY GROVE	1,782	1,828	1,828	1,828	1,828	1,828	1,782	1,828	1,828	1,828	1,828	1,828	0	0	0	0	0	0	
HORSESHOE BEND WATER SYSTEM	1,118	1,340	1,591	1,854	2,144	2,464	1,304	1,474	1,864	2,452	3,334	4,367	186	134	273	598	1,190	1,903	UTGCD Regional Water Supply Planning Study
HOWE	4,785	5,735	6,531	7,320	8,178	9,111	4,785	5,735	6,531	7,320	8,178	9,111	0	0	0	0	0	0	Agreed with Draft Projections
HUDSON OAKS	5,679	5,679	5,679	5,679	5,679	5,679	5,500	5,693	5,851	6,044	6,300	6,500	(179)	14	172	365	621	821	UTGCD Regional Water Supply Planning Study
HURST	40,367	40,367	40,367	40,367	40,367	40,367	40,912	40,821	40,900	40,962	41,053	41,053	545	454	533	595	686	686	Fort Worth Impact Fee
HUTCHINS	8,346	9,300	9,808	10,107	10,436	10,799	8,346	9,300	9,808	10,107	10,436	10,799	0	0	0	0	0	0	
IRVING	286,398	301,541	301,541	301,541	301,541	301,541	282,300	302,931	294,200	346,711	377,300	401,000	(4,098)	1,390	(7,341)	45,170	75,759	99,459	DWU Survey Revision Request
ITALY	1,939	1,942	1,944	1,933	1,923	1,915	1,939	1,942	1,944	1,933	1,923	1,915	0	0	0	0	0	0	
JACKSBORO	3,437	3,185	2,916	2,658	2,373	2,056	3,714	3,657	3,770	3,940	4,259	4,387	277	472	854	1,282	1,886	2,331	Survey Revision Request
JOHNSON COUNTY SUD	51,219	57,510	63,810	69,436	75,756	82,856	72,538	91,442	101,701	110,847	121,131	132,694	21,319	33,932	37,891	41,411	45,375	49,838	Region G Request
JOSEPHINE	4,505	4,530	4,553	4,574	4,594	4,615	5,544	12,169	17,628	19,716	22,045	22,067	1,039	7,639	13,075	15,142	17,451	17,452	NTMWD Long Range Water Supply Plan and Reigon D Request
JUSTIN	5,812	7,705	10,214	13,540	17,950	23,796	11,924	16,903	25,351	34,423	37,608	37,608	6,112	9,198	15,137	20,883	19,658	13,812	Ongoing UTRWD Study
KAUFMAN	8,074	9,443	11,178	13,112	15,256	17,628	7,626	8,606	12,368	15,632	18,682	21,791	(448)	(837)	1,190	2,520	3,426	4,163	NTMWD Long Range Water Supply Plan
KAUFMAN COUNTY DEVELOPMENT DISTRICT 1	1,052	1,467	1,997	2,603	3,270	4,003	3,842	4,083	6,318	9,791	14,527	16,798	2,790	2,616	4,321	7,188	11,257	12,795	NTMWD Long Range Water Supply Plan
KAUFMAN COUNTY MUD 11	5,635	7,900	10,792	14,097	17,731	21,729	4,340	5,159	6,629	8,374	10,269	11,378	(1,295)	(2,741)	(4,163)	(5,723)	(7,462)	(10,351)	NTMWD Long Range Water Supply Plan
KAUFMAN COUNTY MUD 14	7,221	11,836	17,743	24,540	31,995	40,186	6,300	6,300	6,300	6,300	6,300	6,300	(921)	(5,536)	(11,443)	(18,240)	(25,695)	(33,886)	Survey Revision Request
KELLER	51,130	51,974	51,974	51,974	51,974	51,974	51,130	51,974	51,974	51,974	51,974	51,974	0	0	0	0	0	0	Agreed with Draft Projections
KEMP	1,611	1,671	1,745	1,813	1,894	1,987	1,611	1,671	1,745	1,813	1,894	1,987	0	0	0	0	0	0	
KENNEDALE	10,296	13,100	16,667	21,206	26,981	34,329	10,713	14,532	19,028	23,760	28,592	33,035	417	1,432	2,361	2,554	1,611	(1,294)	Survey Revision Request; 2021 Impact Fee
KENTUCKYTOWN WSC	2,863	3,139	3,368	3,574	3,801	4,050	2,863	3,139	3,368	3,574	3,801	4,050	0	0	0	0	0	0	
KERENS	1,469	1,359	1,257	1,163	1,076	995	1,469	1,359	1,257	1,163	1,076	995	0	0	0	0	0	0	
KRUM	7,146	9,532	12,715	16,961	22,625	30,180	7,146	9,532	12,715	16,961	22,625	30,180	0	0	0	0	0	0	Agreed with Draft Projections
LADONIA	606	578	573	554	535	514	774	953	1,373	2,026	2,500	2,500	168	375	800	1,472	1,965	1,986	Ongoing UTRWD Study
LAKE CITIES MUNICIPAL UTILITY AUTHORITY	16,486	18,770	21,178	21,810	21,810	21,810	17,721	21,502	22,513	22,753	22,897	22,897	1,235	2,732	1,335	943	1,087	1,087	Ongoing UTRWD Study
LAKE KIOWA SUD	2,346	2,477	2,532	2,555	2,581	2,609	2,346	2,477	2,532	2,555	2,581	2,609	0	0	0	0	0	0	Agreed with Draft Projections
LAKE WORTH	5,483	6,060	6,536	6,907	7,316	7,767	5,861	6,414	6,809	7,145	7,474	7,767	378	354	273	238	158	0	Fort Worth Impact Fee
LAKESIDE	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	0	0	0	0	0	0	
LANCASTER	44,667	47,419	48,875	49,713	50,637	51,653	44,667	47,419	48,875	49,713	50,637	51,653	0	0	0	0	0	0	
LANCASTER MUD 1	2,286	2,844	3,142	3,321	3,517	3,734	2,286	2,844	3,142	3,321	3,517	3,734	0	0	0	0	0	0	
LEONARD	2,020	2,077	2,117	2,132	2,149	2,168	2,799	3,019	3,580	4,187	5,000	6,000	779	942	1,463	2,055	2,851	3,832	Survey Revision Request
LEWISVILLE	109,624	109,624	109,624	109,624	109,624	109,624	115,256	115,977	123,981	125,659	128,105	128,105	5,632	6,353	14,357	16,035	18,481	18,481	Survey Revision Request; Annexed DCFWSD 1-A
LINDSAY	1,718	1,758	1,777	1,777	1,776	1,776	1,718	1,758	1,777	1,777	1,776	1,776	0	0	0	0	0	0	
LITTLE ELM	38,253	38,253	38,253	38,253	38,253	38,253	44,322	42,372	44,739	46,710	48,000	48,000	6,069	4,119	6,486	8,457	9,747	9,747	NTMWD Long Range Water Supply Plan
LOG CABIN	671	671	702	712	723	735	671	671	702	712	723	735	0	0	0	0	0	0	
LUCAS	9,825	12,494	15,330	15,330	15,330	15,330	11,475	13,122	13,442	13,442	13,442	13,442	1,650	628	(1,888)	(1,888)	(1,888)	(1,888)	Survey Revision Request
LUELLA SUD	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	2,717	0	0	0	0	0	0	
M E N WSC	3,732	4,307	4,782	5,255	5,771	6,334	3,732	4,307	4,782	5,255	5,771	6,334	0	0	0	0	0	0	
MABANK	10,137	10,592	10,605	10,778	10,992	11,241	10,137	10,592	10,605	10,778	10,992	11,241	0	0	0	0	0	0	
MACBEE SUD	8,904	10,951	13,480	16,595	20,435	25,172	8,904	10,951	13,480	16,595	20,435	25,172	0	0	0	0	0	0	
MALAKOFF	1,782	1,775	1,863	1,889	1,916	1,946	2,750	2,917	3,368	3,721	4,200	4,400	968	1,142	1,505	1,832	2,284	2,454	Survey Revision Request
MANSFIELD	61,722	70,344	77,997	84,447	91,597	99,523	109,714	118,153	144,087	200,885	218,645	218,645	47,992	47,809	66,090	116,438	127,048	119,122	Ongoing 2040 Mansfield Comprehensive Report
MARKOUT WSC	3,921	5,648	7,856	10,384	13,161	16,214	2,958	3,514	4,903	7,062	9,422	12,571	(963)	(2,134)	(2,953)	(3,322)	(3,739)	(3,643)	NTMWD Long Range Water Supply Plan
MCKINNEY	258,054	340,062	434,174	531,763	639,339	760,430	227,593	269,464	344,909	433,869	433,869	433,869	(30,461)	(70,598)	(89,265)	(97,894)	(205,470)	(326,561)	NTMWD Long Range Water Supply Plan
MELISSA	26,317	39,105	53,689	68,267	84,350	102,082	43,840	65,280	87,678	108,878	119,072	119,072	17,523	26,175	33,989	40,611	34,722	16,990	NTMWD Long Range Water Supply Plan
MESQUITE	161,746	170,046	174,424	176,918	179,664	182,689	166,080	173,044	192,008	216,237	243,324	266,415	4,334	2,998	17,584	39,319	63,660	83,726	NTMWD Long Range Water Supply Plan
MIDLOTHIAN	23,665	29,642	36,138	42,714	49,945	57,900	33,669	38,530	45,987	52,996	60,311	66,058	10,004	8,888	9,849	10,282	10,366	8,158	Survey Revision Request; 2021 Water Supply Plan Update

WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections						Comment
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
MILLIGAN WSC	2,894	3,091	3,310	3,536	3,783	4,053	3,352	3,525	4,137	4,824	5,593	6,231	458	434	827	1,288	1,810	2,178	NTMWD Long Range Water Supply Plan
MINERAL WELLS	14,993	15,021	14,887	14,825	14,755	14,674	18,727	19,763	20,794	21,836	21,836	21,836	3,734	4,742	5,907	7,011	7,081	7,162	UTGCD Regional Water Supply Planning Study and Region G Request
MOUNT ZION WSC	2,079	2,148	2,226	2,294	2,373	2,462	2,836	3,099	4,011	5,154	6,542	6,542	757	951	1,785	2,860	4,169	4,080	NTMWD Long Range Water Supply Plan
MOUNTAIN PEAK SUD	25,731	33,919	42,997	52,557	63,308	75,434	25,798	34,002	43,100	52,686	63,468	75,633	67	83	103	129	160	199	Region G Request
MOUNTAIN SPRINGS WSC	2,001	2,028	2,055	2,062	2,069	2,077	2,001	2,028	2,055	2,062	2,069	2,077	0	0	0	0	0	0	
MUENSTER	2,139	2,139	2,139	2,139	2,139	2,139	2,139	2,139	2,139	2,139	2,139	2,139	0	0	0	0	0	0	
MURPHY	20,850	20,850	20,850	20,850	20,850	20,850	21,373	21,822	24,104	26,718	29,564	31,653	523	972	3,254	5,868	8,714	10,803	NTMWD Long Range Water Supply Plan
MUSTANG SUD	88,989	132,593	178,432	224,995	276,279	332,757	110,907	157,621	210,314	262,568	304,419	340,419	21,918	25,028	31,882	37,573	28,140	7,662	Ongoing UTRWD Study
NASH FORRESTON WSC	2,095	2,514	2,970	3,428	3,933	4,489	2,095	2,514	2,970	3,428	3,933	4,489	0	0	0	0	0	0	Agreed with Draft Projections
NAVARRO MILLS WSC	2,831	3,040	3,211	3,362	3,526	3,709	2,831	3,040	3,211	3,362	3,526	3,709	0	0	0	0	0	0	Agreed with Draft Projections
NEVADA SUD	4,223	5,453	6,856	8,268	9,822	11,534	5,806	7,363	10,958	23,128	41,290	55,490	1,583	1,910	4,102	14,860	31,468	43,956	NTMWD Long Range Water Supply Plan
NEWARK	1,227	1,346	1,453	1,533	1,622	1,721	2,080	2,640	3,820	5,582	8,300	10,600	853	1,294	2,367	4,049	6,678	8,879	UTGCD Regional Water Supply Planning Study
NORTH COLLIN SUD	18,047	25,235	33,426	41,622	50,661	60,624	7,544	8,523	10,409	12,496	14,565	16,977	(10,503)	(16,712)	(23,017)	(29,126)	(36,096)	(43,647)	NTMWD Long Range Water Supply Plan
NORTH FARMERSVILLE WSC	585	629	680	731	787	849	465	550	715	834	942	992	(120)	(79)	35	103	155	143	NTMWD Long Range Water Supply Plan
NORTH HUNT SUD	2,630	2,591	2,560	2,496	2,431	2,369	2,630	2,591	2,560	2,496	2,431	2,369	0	0	0	0	0	0	
NORTH KAUFMAN WSC	3,448	4,535	5,920	7,495	9,231	11,141	3,448	4,535	5,920	7,495	9,231	11,141	0	0	0	0	0	0	Agreed with Draft Projections
NORTH RICHLAND HILLS	77,480	77,480	77,480	77,480	77,480	77,480	80,119	85,636	87,051	88,170	89,800	89,800	2,639	8,156	9,571	10,690	12,320	12,320	Fort Worth Impact Fee
NORTH RURAL WSC	3,027	3,322	3,636	3,976	4,349	4,761	3,027	3,322	3,636	3,976	4,349	4,761	0	0	0	0	0	0	
NORTHLAKE	12,164	18,423	25,012	31,711	39,091	47,219	26,264	29,172	36,205	42,530	48,940	53,700	14,100	10,749	11,193	10,819	9,849	6,481	Survey Revision Request; Impact Fee
NORTHWEST GRAYSON COUNTY WCID 1	2,032	2,265	2,459	2,640	2,838	3,054	2,032	2,265	2,459	2,640	2,838	3,054	0	0	0	0	0	0	
OAK RIDGE SOUTH GALE WSC	2,811	2,875	2,927	2,942	2,962	2,988	2,811	2,875	2,927	2,942	2,962	2,988	0	0	0	0	0	0	Agreed with Draft Projections
OVILLA	5,438	6,827	8,337	9,871	11,556	13,411	5,438	6,827	8,337	9,871	11,556	13,411	0	0	0	0	0	0	Agreed with Draft Projections
PALMER	2,543	3,053	3,606	4,162	4,775	5,449	2,543	3,053	3,606	4,162	4,775	5,449	0	0	0	0	0	0	
PALOMA CREEK NORTH	12,101	12,101	12,101	12,101	12,101	12,101	5,853	5,853	5,853	5,853	5,853	5,853	(6,248)	(6,248)	(6,248)	(6,248)	(6,248)	(6,248)	Ongoing UTRWD Study
PALOMA CREEK SOUTH	9,088	9,088	9,088	9,088	9,088	9,088	9,088	9,088	9,088	9,088	9,088	9,088	0	0	0	0	0	0	
PANTEGO	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653	2,653	0	0	0	0	0	0	Agreed with Draft Projections
PARKER	8,096	10,382	12,982	15,590	18,465	21,631	6,878	8,782	12,121	14,089	14,089	14,089	(1,218)	(1,600)	(861)	(1,501)	(4,376)	(7,542)	NTMWD Long Range Water Supply Plan
PARKER COUNTY SUD	10,512	13,725	17,355	21,229	25,480	30,150	9,100	12,400	16,800	22,592	30,900	41,800	(1,412)	(1,325)	(555)	1,363	5,420	11,650	UTGCD Regional Water Supply Planning Study
PELICAN BAY	2,958	3,967	5,320	7,134	9,567	12,830	2,958	3,967	5,320	7,134	9,567	12,830	0	0	0	0	0	0	
PILOT POINT	5,501	6,854	8,279	9,727	11,321	13,076	6,354	8,200	14,137	20,282	21,892	21,892	853	1,346	5,858	10,555	10,571	8,816	Ongoing UTRWD Study
PINK HILL WSC	2,210	2,449	2,648	2,832	3,033	3,253	2,210	2,449	2,648	2,832	3,033	3,253	0	0	0	0	0	0	Agreed with Draft Projections
PLANO	314,299	354,971	401,499	451,952	507,362	570,820	286,224	288,115	317,280	326,800	326,800	326,800	(28,075)	(66,856)	(84,219)	(125,152)	(180,562)	(244,020)	NTMWD Long Range Water Supply Plan
PLEASANT GROVE WSC	1,445	1,560	1,711	1,674	1,633	1,588	1,445	1,560	1,711	1,674	1,633	1,588	0	0	0	0	0	0	Agreed with Draft Projections
POETRY WSC	3,166	3,723	4,392	5,120	5,914	6,782	3,867	4,698	6,403	8,868	11,937	13,865	701	975	2,011	3,748	6,023	7,083	NTMWD Long Range Water Supply Plan/Region D Request
POINT ENTERPRISE WSC	1,295	1,262	1,219	1,188	1,152	1,113	1,311	1,289	1,258	1,241	1,223	1,203	16	27	39	53	71	90	Region G Request
PONDER	4,798	6,403	8,093	9,811	11,703	13,786	4,798	6,403	8,093	9,811	11,703	13,786	0	0	0	0	0	0	Agreed with Draft Projections
POST OAK SUD	1,495	1,481	1,462	1,433	1,401	1,371	1,495	1,481	1,462	1,433	1,401	1,371	0	0	0	0	0	0	
POTTSBORO	3,613	3,938	4,210	4,450	4,715	5,007	3,613	3,938	4,210	4,450	4,715	5,007	0	0	0	0	0	0	
PRINCETON	27,577	39,276	52,611	65,952	80,665	91,789	48,722	103,793	140,731	157,121	171,027	171,027	21,145	64,517	88,120	91,169	90,362	79,238	NTMWD Long Range Water Supply Plan
PROSPER	47,211	51,000	51,000	51,000	51,000	51,000	55,275	65,097	77,748	80,875	85,432	85,432	8,064	14,097	26,748	29,875	34,432	34,432	Survey Revision Request; Ongoing Study
PROVIDENCE VILLAGE WCID	7,235	7,235	7,235	7,235	7,235	7,235	7,235	7,235	7,235	7,235	7,235	7,235	0	0	0	0	0	0	
R C H WSC	11,581	16,495	22,447	28,737	35,649	43,250	5,684	6,457	8,240	10,994	13,407	16,350	(5,897)	(10,038)	(14,207)	(17,743)	(22,242)	(26,900)	NTMWD Long Range Water Supply Plan
RED OAK	12,039	15,009	18,237	21,502	25,093	29,044	12,039	15,009	18,237	21,502	25,093	29,044	0	0	0	0	0	0	Agreed with Draft Projections
RED RIVER AUTHORITY OF TEXAS	7,908	7,707	7,574	7,496	7,439	7,403	7,908	7,707	7,574	7,496	7,439	7,403	0	0	0	0	0	0	
RENO (PARKER)	4,273	5,195	6,233	7,327	8,530	9,854	4,273	5,195	6,233	7,327	8,530	9,854	0	0	0	0	0	0	
RHOME	1,567	1,852	2,189	2,587	3,057	3,613	2,945	3,804	5,616	8,151	12,000	16,000	1,378	1,952	3,427	5,564	8,943	12,387	UTGCD Regional Water Supply Planning Study
RICE WATER SUPPLY AND SEWER SERVICE	9,518	11,375	13,469	15,738	18,327	21,287	9,518	11,375	13,469	15,738	18,327	21,287	0	0	0	0	0	0	
RICHARDSON	135,150	151,181	166,848	181,636	197,918	215,845	117,515	122,836	131,067	135,000	135,000	135,000	(17,635)	(28,345)	(35,781)	(46,636)	(62,918)	(80,845)	NTMWD Long Range Water Supply Plan
RICHLAND HILLS	9,616	10,622	11,452	12,911	14,217	15,655	9,616	10,622	11,452	12,911	14,217	15,655	0	0	0	0	0	0	Agreed with Draft Projections
RIVER OAKS	7,746	7,746	7,746	7,746	7,746	7,746	8,077	8,053	8,106	8,149	8,210	8,210	331	307	360	403	464	464	Fort Worth Impact Fee
ROANOKE	11,961	11,961	11,961	11,961	11,961	11,961	13,999	13,658	13,952	14,185	14,524	14,524	2,038	1,697	1,991	2,224	2,563	2,563	Fort Worth Impact Fee
ROCKETT SUD	38,261	43,299	48,748	57,135	68,836	81,687	38,371	45,774	54,771	65,159	78,881	93,733	110	2,475	6,023	8,024	10,045	12,046	Survey Revision Request; Comprehensive Plan
ROCKWALL	53,377	63,929	76,604	89,790	104,338	120,377	55,075	67,561	89,991	120,077	124,696	124,696	1,698	3,632	13,387	30,287	20,358	4,319	NTMWD Long Range Water Supply Plan
ROSE HILL SUD	4,699	5,634	6,822	8,154	9,628	11,255	4,968	6,001	7,087	8,151	9,005	9,948	269	367	265	(3)	(623)	(1,307)	NTMWD Long Range Water Supply Plan
ROWLETT	64,753	68,743	71,325	73,173	75,220	77,480	77,875	81,935	95,181	100,870	105,095	105,095	13,122	13,192	23,856	27,697	29,875	27,615	NTMWD Long Range Water Supply Plan
ROYSE CITY	14,632	17,715	20,758	23,755	26,928	30,293	39,473	74,453	98,371	107,833	120,640	120,640	24,841	56,738	77,613	84,078	93,712	90,347	NTMWD Long Range Water Supply Plan and Region D Request
RUNAWAY BAY	1,878	2,304	2,826	3,467	4,253	5,217	1,878	2,304	2,826	3,467	4,253	5,217	0	0	0	0	0	0	
SACHSE	29,635	30,558	30,558	30,558	30,558	30,558	29,507	31,598	35,828	37,416	38,462	38,462	(128)	1,040	5,270	6,858	7,904	7,904	NTMWD Long Range Water Supply Plan
SAGINAW	29,238	31,218	31,218	31,218	31,218	31,218	29,916	32,879	33,167	33,395	33,727	33,727	678	1,661	1,949	2,177	2,509	2,509	Fort Worth Impact Fee
SANGER	11,153	14,002	17,000	22,119	27,933	35,269	11,153	14,002	17,000	22,119	27,933	35,269	0	0	0	0	0	0	Agreed with Draft Projections

WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections						Comment
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
SANSOM PARK	6,087	6,736	7,272	7,690	8,152	8,659	6,087	6,736	7,272	7,690	8,152	8,659	0	0	0	0	0	0	
SANTO SUD	2,137	2,166	2,178	2,203	2,231	2,259	2,137	2,166	2,178	2,203	2,231	2,259	0	0	0	0	0	0	
SARDIS LONE ELM WSC	20,865	25,783	31,135	32,524	32,524	32,524	20,865	25,783	31,135	32,524	32,524	32,524	0	0	0	0	0	0	
SAVOY	711	704	706	698	689	678	711	704	706	698	689	678	0	0	0	0	0	0	
SEAGOVILLE	20,875	22,892	23,964	24,593	25,285	26,047	20,875	22,892	23,964	24,593	25,285	26,047	0	0	0	0	0	0	
SEIS LAGOS UD	2,148	2,148	2,148	2,148	2,148	2,148	2,348	2,270	2,383	2,479	2,535	2,541	200	122	235	331	387	393	NTMWD Long Range Water Supply Plan
SHERMAN	46,811	50,903	54,318	57,317	60,622	64,264	46,811	50,903	54,318	57,317	60,622	64,264	0	0	0	0	0	0	
SOUTH ELLIS COUNTY WSC	1,526	1,833	2,161	2,492	2,855	3,256	1,526	1,833	2,161	2,492	2,855	3,256	0	0	0	0	0	0	
SOUTH FREESTONE COUNTY WSC	2,598	2,720	2,880	2,799	2,708	2,608	2,598	2,720	2,880	2,799	2,708	2,608	0	0	0	0	0	0	
SOUTH GRAYSON SUD	5,303	6,167	7,010	7,826	8,723	9,710	5,303	6,167	7,010	7,826	8,723	9,710	0	0	0	0	0	0	
SOUTHERN OAKS WATER SUPPLY	838	1,077	1,368	1,393	1,418	1,444	838	1,077	1,368	1,393	1,418	1,444	0	0	0	0	0	0	
SOUTHLAKE	34,941	38,688	41,773	44,175	46,820	49,732	35,815	40,119	42,781	45,144	47,511	49,732	874	1,431	1,008	969	691	0	Fort Worth Impact Fee
SOUTHMAYD	964	992	1,015	1,026	1,039	1,055	964	992	1,015	1,026	1,039	1,055	0	0	0	0	0	0	
SOUTHWEST FANNIN COUNTY SUD	8,413	9,279	9,755	10,180	10,646	11,157	8,413	9,279	9,755	10,180	10,646	11,157	0	0	0	0	0	0	Agreed with Draft Projections
SPRINGTOWN	3,832	4,590	5,445	5,484	5,484	5,484	5,436	7,245	10,032	12,960	16,850	19,600	1,604	2,655	4,587	7,476	11,366	14,116	Survey Revision Request
STARR WSC	2,325	2,533	2,708	2,862	3,032	3,219	2,325	2,533	2,708	2,862	3,032	3,219	0	0	0	0	0	0	Agreed with Draft Projections
STURDIVANT PROGRESS WSC	2,282	2,283	2,257	2,242	2,225	2,207	2,282	2,283	2,257	2,242	2,225	2,207	0	0	0	0	0	0	
SUNNYVALE	9,834	11,408	12,247	12,746	13,295	13,900	9,064	11,417	13,548	14,129	14,340	14,340	(770)	9	1,301	1,383	1,045	440	NTMWD Long Range Water Supply Plan
TALTY SUD	13,312	18,056	24,112	31,018	38,615	46,977	12,151	13,567	20,000	28,710	39,600	46,568	(1,161)	(4,489)	(4,112)	(2,308)	985	(409)	NTMWD Long Range Water Supply Plan
TEAGUE	3,437	3,142	2,738	2,646	2,545	2,435	3,437	3,142	2,738	2,646	2,545	2,435	0	0	0	0	0	0	
TERRA SOUTHWEST	3,143	3,996	4,895	5,808	6,814	7,922	3,143	3,996	4,895	5,808	6,814	7,922	0	0	0	0	0	0	
TERRELL	18,329	20,344	22,881	25,638	28,724	32,152	24,866	28,404	34,827	40,479	47,940	53,769	6,537	8,060	11,946	14,841	19,216	21,617	NTMWD Long Range Water Supply Plan
THE COLONY	51,496	60,502	67,600	67,600	67,600	67,600	51,496	60,502	67,600	67,600	67,600	67,600	0	0	0	0	0	0	Agreed with Draft Projections
TIOGA	1,773	2,106	2,386	2,662	2,961	3,288	1,773	2,106	2,386	2,662	2,961	3,288	0	0	0	0	0	0	
TOM BEAN	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	1,113	0	0	0	0	0	0	
TRENTON	798	857	889	913	940	970	798	857	889	913	940	970	0	0	0	0	0	0	
TRINIDAD	1,134	1,152	1,191	1,213	1,236	1,261	1,134	1,152	1,191	1,213	1,236	1,261	0	0	0	0	0	0	
TROPHY CLUB MUD 1	14,247	14,534	14,773	14,969	15,185	15,421	14,247	14,534	14,773	14,969	15,185	15,421	0	0	0	0	0	0	Agreed with Draft Projections
TWO WAY SUD	4,636	5,053	5,400	5,707	6,044	6,417	6,047	6,400	7,619	8,326	9,241	9,811	1,411	1,347	2,219	2,619	3,197	3,394	Survey Revision Request
UNIVERSITY PARK	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	25,656	0	0	0	0	0	0	
VAN ALSTYNE	5,999	7,189	8,186	9,175	10,250	11,420	12,042	23,349	37,173	45,638	59,800	70,300	6,043	16,160	28,987	36,463	49,550	58,880	Survey Revision Request
VERONA SUD	3,345	4,217	5,210	6,206	7,303	8,512	3,345	4,217	5,210	6,206	7,303	8,512	0	0	0	0	0	0	
VIRGINIA HILL WSC	3,240	3,346	3,421	3,494	3,569	3,647	3,240	3,346	3,421	3,494	3,569	3,647	0	0	0	0	0	0	
WALNUT CREEK SUD	19,469	23,145	27,222	31,425	36,053	41,147	24,634	26,796	37,217	55,767	77,781	99,566	5,165	3,651	9,995	24,342	41,728	58,419	UTGCD Regional Water Supply Planning Study
WATAUGA	24,525	24,525	24,525	24,525	24,525	24,525	24,525	24,525	24,525	24,525	24,525	24,525	0	0	0	0	0	0	
WAXAHACHIE	48,394	59,800	72,197	84,724	98,504	113,667	48,394	59,800	72,197	84,724	98,504	113,667	0	0	0	0	0	0	
WEATHERFORD	45,410	54,197	64,123	74,543	86,019	98,660	45,410	54,197	64,123	74,543	86,019	98,660	0	0	0	0	0	0	Agreed with Draft Projections
WEST CEDAR CREEK MUD	5,074	4,777	5,308	5,383	5,461	5,543	5,074	4,777	5,308	5,383	5,461	5,543	0	0	0	0	0	0	
WEST LEONARD WSC	2,287	2,764	3,042	3,326	3,637	3,978	2,287	2,764	3,042	3,327	3,638	3,979	0	0	0	1	1	1	Region D Request
WEST WISE SUD	4,047	4,438	4,789	5,056	5,349	5,672	4,047	4,438	4,789	5,056	5,349	5,672	0	0	0	0	0	0	Agreed with Draft Projections
WESTLAKE	3,052	4,001	4,791	5,441	6,152	6,933	3,052	4,001	4,791	5,441	6,152	6,933	0	0	0	0	0	0	
WESTMINSTER SUD	2,168	2,710	3,324	3,940	4,620	5,367	2,168	2,710	3,324	3,940	4,620	5,367	0	0	0	0	0	0	
WESTOVER HILLS	655	657	659	661	663	665	676	674	677	679	682	682	21	17	18	18	19	17	Fort Worth Impact Fee
WESTWORTH VILLAGE	2,751	3,043	3,285	3,474	3,682	3,912	3,129	3,203	3,406	3,582	3,755	3,912	378	160	121	108	73	0	Fort Worth Impact Fee
WHITE SETTLEMENT	20,351	22,469	24,218	25,582	27,083	28,738	20,351	22,469	24,218	25,582	27,083	28,738	0	0	0	0	0	0	
WHITE SHED WSC	2,344	2,460	2,528	2,571	2,618	2,670	2,344	2,460	2,528	2,571	2,618	2,670	0	0	0	0	0	0	
WHITESBORO	4,847	5,280	5,642	5,960	6,311	6,699	4,847	5,280	5,642	5,960	6,311	6,699	0	0	0	0	0	0	Agreed with Draft Projections
WHITEWRIGHT	2,298	2,519	2,695	2,854	3,026	3,218	2,298	2,519	2,695	2,854	3,026	3,218	0	0	0	0	0	0	
WILLOW PARK	8,080	9,714	11,560	13,501	15,638	17,991	10,401	11,491	13,297	14,971	16,593	17,991	2,321	1,777	1,737	1,470	955	0	Fort Worth Impact Fee
WILMER	5,902	6,672	7,081	7,324	7,591	7,885	5,902	6,672	7,081	7,324	7,591	7,885	0	0	0	0	0	0	
WOLFE CITY	1,638	1,657	1,677	1,681	1,685	1,692	1,638	1,657	1,677	1,681	1,685	1,692	0	0	0	0	0	0	
WOODBINE WSC	6,944	7,212	7,333	7,370	7,409	7,453	6,944	7,212	7,333	7,370	7,409	7,453	0	0	0	0	0	0	
WORTHAM	925	841	724	700	673	644	925	841	724	700	673	644	0	0	0	0	0	0	
WYLIE	53,618	66,995	82,196	97,466	114,282	132,801	47,379	46,874	49,115	50,589	50,589	50,589	(6,239)	(20,121)	(33,081)	(46,877)	(63,693)	(82,212)	NTMWD Long Range Water Supply Plan
WYLIE NORTHEAST SUD	9,693	13,264	17,332	21,405	25,896	30,844	15,891	19,669	24,240	25,954	26,648	26,648	6,198	6,405	6,908	4,549	752	(4,196)	Survey Revision Request

ATTACHMENT B

Split WUG Revision Recommendations

DRAFT

Split Region	County	Region C Primary WUG	Draft 2026 TWDB Projections						Recommended Population Projection Revisions						Changes from Draft and Proposed Revised Projections					
			2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
C	KAUFMAN	ABLES SPRINGS SUD	3,029	3,631	4,396	5,254	6,203	7,252	8,016	8,338	9,734	10,965	12,417	13,039	4,987	4,707	5,338	5,711	6,214	5,787
D	HUNT	ABLES SPRINGS SUD	611	661	706	743	782	820	619	670	715	753	792	830	8	9	9	10	10	10
D	VAN ZANDT	ABLES SPRINGS SUD	35	37	39	42	44	46	35	37	39	42	44	46	0	0	0	0	0	0
		ABLES SPRINGS SUD TOTAL	3,675	4,329	5,141	6,039	7,029	8,118	8,670	9,045	10,488	11,760	13,253	13,915	4,995	4,716	5,347	5,721	6,224	5,797
C	HENDERSON	ATHENS	12,739	13,109	13,434	13,707	14,007	14,336	18,127	21,895	28,829	30,665	33,252	33,252	5,388	8,786	15,395	16,958	19,245	18,916
I	HENDERSON	ATHENS	210	213	211	211	211	211	210	213	211	211	211	211	0	0	0	0	0	0
		ATHENS TOTAL	12,949	13,322	13,645	13,918	14,218	14,547	18,337	22,108	29,040	30,876	33,463	33,463	5,388	8,786	15,395	16,958	19,245	18,916
C	FANNIN	BOIS D ARC MUD	3,031	3,180	3,269	3,325	3,386	3,453	3,031	3,180	3,269	3,325	3,386	3,453	0	0	0	0	0	0
D	LAMAR	BOIS D ARC MUD	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0
		BOIS D ARC MUD TOTAL	3,047	3,196	3,285	3,341	3,402	3,469	3,047	3,196	3,285	3,341	3,402	3,469	0	0	0	0	0	0
C	TARRANT	CROWLEY	22,194	26,367	29,831	32,630	35,703	39,078	22,194	26,367	29,831	32,630	35,703	39,078	0	0	0	0	0	0
G	JOHNSON	CROWLEY	176	259	344	423	513	613	178	262	349	429	520	622	2	3	5	6	7	9
		CROWLEY TOTAL	22,370	26,626	30,175	33,053	36,216	39,691	22,372	26,629	30,180	33,059	36,223	39,700	2	3	5	6	7	9
C	DENTON	FORT WORTH	25,471	36,605	48,326	60,243	73,369	87,826	26,302	39,396	48,326	60,243	73,369	87,826	831	2,791	0	0	0	0
G	JOHNSON	FORT WORTH	-	-	5,009	7,951	9,858	9,776	-	-	5,081	8,066	10,001	9,917	0	0	72	115	143	141
C	PARKER	FORT WORTH	3,633	4,015	4,438	4,856	5,321	5,835	3,751	4,321	4,438	4,856	5,321	5,835	118	306	0	0	0	0
C	TARRANT	FORT WORTH	1,057,482	1,195,932	1,310,518	1,401,360	1,501,256	1,611,117	1,091,983	1,287,121	1,310,518	1,401,360	1,501,256	1,611,117	34,501	91,189	0	0	0	0
C	WISE	FORT WORTH	2,401	2,659	2,948	3,243	3,567	3,924	2,480	2,862	2,948	3,243	3,567	3,924	79	203	0	0	0	0
		FORT WORTH TOTAL	1,088,987	1,239,211	1,371,239	1,477,653	1,593,371	1,718,478	1,124,516	1,333,700	1,371,311	1,477,768	1,593,514	1,718,619	35,529	94,489	72	115	143	141
C	COLLIN	FROGNOT WSC	2,077	2,593	3,181	3,772	4,422	5,138	2,077	2,593	3,181	3,772	4,422	5,138	0	0	0	0	0	0
C	FANNIN	FROGNOT WSC	30	42	48	53	60	67	30	42	48	53	60	67	0	0	0	0	0	0
D	HUNT	FROGNOT WSC	23	29	34	40	45	51	23	29	34	40	45	52	0	0	0	0	0	1
		FROGNOT WSC TOTAL	2,130	2,664	3,263	3,865	4,527	5,256	2,130	2,664	3,263	3,865	4,527	5,257	0	0	0	0	0	1
C	COLLIN	JOSEPHINE	4,352	4,352	4,352	4,352	4,352	4,352	5,389	11,989	17,424	19,491	21,800	21,800	1,037	7,637	13,072	15,139	17,448	17,448
D	HUNT	JOSEPHINE	153	178	201	222	242	263	155	180	204	225	245	267	2	2	3	3	3	4
		JOSEPHINE TOTAL	4,505	4,530	4,553	4,574	4,594	4,615	5,544	12,169	17,628	19,716	22,045	22,067	1,039	7,639	13,075	15,142	17,451	17,452
C	HENDERSON	MABANK	3,474	3,826	3,737	3,863	4,004	4,161	3,474	3,826	3,737	3,863	4,004	4,161	0	0	0	0	0	0
C	KAUFMAN	MABANK	6,335	6,398	6,461	6,467	6,498	6,549	6,335	6,398	6,461	6,467	6,498	6,549	0	0	0	0	0	0
D	VAN ZANDT	MABANK	328	368	407	448	490	531	328	368	407	448	490	531	0	0	0	0	0	0
		MABANK TOTAL	10,137	10,592	10,605	10,778	10,992	11,241	10,137	10,592	10,605	10,778	10,992	11,241	0	0	0	0	0	0
C	ELLIS	MANSFIELD	581	698	824	951	1,091	1,245	581	698	824	951	1,091	1,245	0	0	0	0	0	0
C	TARRANT	MANSFIELD	54,629	60,388	65,144	68,856	72,943	77,443	102,621	108,197	131,234	185,294	199,991	196,565	47,992	47,809	66,090	116,438	127,048	119,122
G	JOHNSON	MANSFIELD	6,512	9,258	12,029	14,640	17,563	20,835	6,512	9,258	12,029	14,640	17,563	20,835	0	0	0	0	0	0
		MANSFIELD TOTAL	61,722	70,344	77,997	84,447	91,597	99,523	109,714	118,153	144,087	200,885	218,645	218,645	47,992	47,809	66,090	116,438	127,048	119,122
C	ELLIS	MOUNTAIN PEAK SUD	21,088	28,150	35,829	43,651	52,242	61,684	21,088	28,150	35,829	43,651	52,242	61,684	0	0	0	0	0	0
G	JOHNSON	MOUNTAIN PEAK SUD	4,643	5,769	7,168	8,906	11,066	13,750	4,710	5,852	7,271	9,035	11,226	13,949	67	83	103	129	160	199
		MOUNTAIN PEAK SUD TOTAL	25,731	33,919	42,997	52,557	63,308	75,434	25,798	34,002	43,100	52,686	63,468	75,633	67	83	103	129	160	199
C	NAVARRO	NAVARRO MILLS WSC	2,814	3,021	3,193	3,343	3,507	3,689	2,814	3,021	3,193	3,343	3,507	3,689	0	0	0	0	0	0
G	Hill	NAVARRO MILLS WSC	17	19	18	19	19	20	17	19	18	19	19	20	0	0	0	0	0	0
		NAVARRO MILLS WSC TOTAL	2,831	3,040	3,211	3,362	3,526	3,709	2,831	3,040	3,211	3,362	3,526	3,709	0	0	0	0	0	0
C	FREESTONE	POINT ENTERPRISE WSC	842	834	823	823	823	823	842	834	823	823	823	823	0	0	0	0	0	0
G	LIMESTONE	POINT ENTERPRISE WSC	453	428	396	365	329	290	469	455	435	418	400	380	16	27	39	53	71	90
		POINT ENTERPRISE WSC TOTAL	1,295	1,262	1,219	1,188	1,152	1,113	1,311	1,289	1,258	1,241	1,223	1,203	16	27	39	53	71	90
C	COLLIN	ROYSE CITY	1,835	2,697	3,679	4,661	5,744	6,938	8,394	15,496	22,376	24,692	27,747	27,747	6,559	12,799	18,697	20,031	22,003	20,809
C	ROCKWALL	ROYSE CITY	8,714	9,184	9,724	10,241	10,823	11,475	26,943	53,046	68,545	74,175	82,398	80,859	18,229	43,862	58,821	63,934	71,575	69,384
D	HUNT	ROYSE CITY	4,083	5,834	7,355	8,853	10,361	11,880	4,136	5,910	7,450	8,967	10,495	12,034	53	76	95	114	134	154
		ROYSE CITY TOTAL	14,632	17,715	20,758	23,755	26,928	30,293	39,473	74,453	98,371	107,833	120,640	120,640	24,841	56,738	77,613	84,078	93,712	90,347
C	HENDERSON	VIRGINIA HILL WSC	1,547	1,594	1,633	1,667	1,704	1,744	1,547	1,594	1,633	1,667	1,704	1,744	0	0	0	0	0	0
I	HENDERSON	VIRGINIA HILL WSC	1,693	1,752	1,788	1,827	1,865	1,903	1,693	1,752	1,788	1,827	1,865	1,903	0	0	0	0	0	0
		VIRGINIA HILL WSC TOTAL	3,240	3,346	3,421	3,494	3,569	3,647	3,240	3,346	3,421	3,494	3,569	3,647	0	0	0	0	0	0
C	COLLIN	WEST LEONARD WSC	337	422	518	614	720	837	337	422	518	614	720	837	0	0	0	0	0	0
C	FANNIN	WEST LEONARD WSC	1,914	2,301	2,478	2,661	2,862	3,082	1,914	2,301	2,478	2,661	2,862	3,082	0	0	0	0	0	0
D	HUNT	WEST LEONARD WSC	36	41	46	51	55	59	36	41	46	52	56	60	0	0	0	1	1	1
		WEST LEONARD WSC TOTAL	2,287	2,764	3,042	3,326	3,637	3,978	2,287	2,764	3,042	3,327	3,638	3,979	0	0	0	1	1	1

Attachment C-4

Memorandum on Comparison of Historical GPCDs for Region C; Requested GPCD Changes

DRAFT

MEMORANDUM

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

801 Cherry Street, Suite 2800 + Fort Worth, Texas 76102 + 817-735-7300 + FAX 817-735-7491 www.freese.com

TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Comparison of Historical GPCDs for Region C; Requested GPCD Changes

DATE: 8/11/2023

PROJECT: TRA21862

1.0 BACKGROUND

The purpose of this memorandum is to summarize the conclusions from a quantitative assessment of the draft base dry year Gallons Per Capita Day (GPCD) estimates to be used in the ***2026 Region C Water Plan***. The TWDB provided updated estimates of 2010-2020 GPCDs in March 2022.

According to the General Guidelines for the Sixth Cycle of Regional Water Plan Development, one or more of the following criteria must be met to qualify for an adjustment.

1) Evidence that per capita water use from a more recent year (2015-2019) would be more appropriate because that year was more representative of dry-year conditions.
2) Evidence of errors identified in the historical water use for a utility or public water system, including evidence that volumes of reuse (treated effluent) water or brackish groundwater used for municipal purposes should be included in the draft projections.
3) Evidence that the dry year water use was abnormal due to temporary infrastructure constraints.
4) Trends indicating that per capita water use for a utility or rural area of a county have changed substantially since 2011 and evidence that these trends will continue to rise in the short-term future.
5) Evidence that the water efficiency and conservation savings that have been implemented are not reflected in the baseline GPCD.
6) Evidence that the number of installations of water-efficient fixtures and appliances between 2010 and 2020 is substantially different than the TWDB estimate.
7) Evidence that future water efficiency savings are projected much higher than the draft projections.

2.0 Methodology

To review this data, we compared the draft baseline dry year GPCDs against the maximum historical GPCD from 2015 – 2019.

1. Any WUGs that had a recent year of at least 20 GPCD higher than the proposed draft baseline GPCD were identified.

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2. If the max GPCD was over 100 GPCD higher than the draft baseline, the other years were also analyzed.
3. If the max GPCD was significantly higher than all other the other annual historical data, then it was marked as an outlier.
4. If that max GPCD was consistent with the other historical data, the WUG was marked as requiring further analysis to determine if a revision to the base GPCD was needed.

Based on our review, we believe that several of the Region C WUGs meet one or more of the required criteria for a GPCD adjustment and are recommended to be revised. ***Attachment A*** summarizes the requested GPCD revisions as well as the required TWDB criteria code(s) that they fulfill. The maximum GPCDs from 2015 – 2019 are highlighted in green. The revised GPCD utilizes the maximum historical GPCD with the 2010 -2020 plumbing code per year savings applied. If the historical maximum GPCD was in 2020, the plumbing code per year savings was not applied. For new WUGs that do not have 2010 - 2020 plumbing code savings, an annual savings of 0.9 gallons was used. Additionally, several WUGs responded to the survey requesting revisions to their GPCDs based on more recent use. These revisions are recommended as well and are included in the request for revisions included in ***Attachment A***.

Due to the nature of county-other, there is less historical data available for the 16 county-other WUGs included in Region C. It is recommended to keep the TWDB baseline GPCDs for these WUGs. ***Table 1*** summarizes the baseline GPCDs for the 16 county-other WUGs.

Table 1: Region C County Other GPCDs

WUG	Baseline GPCD	Plumbing Code Savings					
		2030	2040	2050	2060	2070	2080
County-Other, Collin	**141**	6.53	7.39	7.39	7.39	7.39	7.39
County-Other, Cooke	**119**	4.99	5.63	5.63	5.63	5.63	5.63
County-Other, Dallas	**1,822**[1]	3.40	4.29	4.29	4.29	4.29	4.29
County-Other, Denton	**112**	5.32	5.70	5.70	5.70	5.70	5.70
County-Other, Ellis	**110**	3.91	4.48	4.48	4.48	4.48	4.48
County-Other, Fannin	**100**	5.13	5.61	5.61	5.61	5.61	5.61
County-Other, Freestone	**93**	5.76	6.53	6.53	6.53	6.53	6.53
County-Other, Grayson	**114**	4.25	4.87	4.87	4.87	4.87	4.87
County-Other, Henderson	**83**	4.98	5.44	5.44	5.44	5.44	5.44
County-Other, Jack	**101**	4.67	5.26	5.26	5.26	5.26	5.26
County-Other, Kaufman	**99**	4.16	4.57	4.57	4.57	4.57	4.57
County-Other, Navarro	**102**	4.63	5.22	5.22	5.22	5.22	5.22
County-Other, Parker	**117**	4.26	4.77	4.77	4.77	4.77	4.77
County-Other, Rockwall	**144**	4.07	4.64	4.64	4.64	4.64	4.64
County-Other, Tarrant	**206**	4.85	5.38	5.38	5.38	5.38	5.38
County-Other, Wise	**108**	4.37	4.93	4.93	4.93	4.93	4.93

[1]*Water use for Dallas County-Other includes DFW Airport and surrounding commercial areas that have no permanent population.*

ATTACHMENT A

WUG Revision Recommendations for Demand Projections

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Region C Requested GPCD Changes				2011	2015	2016	2017	2018	2019	2020		
Entity Name	Draft Baseline GPCD	2010-2020 PC Per Year Savings	Revised GPCD	GPCD Estimates (provided by TWDB)							TWDB Criteria Code (1-7)*	Additional Comments
ABLES SPRINGS SUD	60	0.3		90	70	70	69	69	69	74		
ADDISON	369	1.0		371	329	320	308	292	273	262		
ALEDO	139	1.0	**165**	118	170	153	140	136	122	155	1	Max historical GPCD minus PC per year savings
ALLEN	187	0.7		191	143	152	151	150	143	151		
ALVORD	126	0.5		102	70	55	53	50	47	62		
AMC CREEKSIDE	60	0.0		54	48	47	46	56	53	52		
ANNA	142	0.6		148	126	117	134	137	135	136		
ANNETTA	104	1.0	**129**	113	121	119	125	123	74	82	4	Updated based on WUG Survey Revision Request
ARGYLE WSC	178	1.3		200	163	177	168	197	184	193		
ARLEDGE RIDGE WSC	105	1.0	**155**	115	138	135	126	136	156	145	1	Max historical GPCD minus PC per year savings
ARLINGTON	155	0.9		167	142	141	133	135	128	124		
ATHENS	183	1.0		203	172	156	157	152	132	133		
AUBREY	107	1.0		109	96	94	83	90	90	88		
AVALON WATER SUPPLY & SEWER SERVICE	114	0.9		149	113	126	118	113	113	110		
AZLE	141	0.9		140	109	118	124	124	119	123		
B AND B WSC	124	1.0	**151**	151	104	105	118	93	152	137	1	Max historical GPCD minus PC per year savings
BALCH SPRINGS	94	0.9		89	87	100	101	98	90	84		
BEAR CREEK SUD	107	1.3		136	108	111	101	117	107	105		
BECKER JIBA WSC	83	1.0		88	69	63	61	62	65	64		
BEDFORD	171	0.9		186	148	149	153	148	143	137		
BELLS	96	0.9		62	91	85	91	108	101	95		
BENBROOK WATER AUTHORITY	207	0.9		222	164	151	153	157	158	152		
BLACK ROCK WSC	169	0.7	**219**	176	222	182	216	191	140	148	1	Max historical GPCD minus PC per year savings
BLACKLAND WSC	181	0.9		169	107	102	107	98	101	109		
BLOOMING GROVE	151	1.0		151	108	122	115	115	115	103		
BLUE MOUND	69	0.0		68	63	64	65	69	63	59		
BLUE RIDGE	154	0.9		87	93	83	78	79	84	77		
BOIS D ARC MUD	105	1.0		88	75	103	94	87	109	98		
BOLIVAR WSC	81	0.9	**127**	116	121	84	120	117	113	127	1	Max historical GPCD
BONHAM	144	1.0		146	126	129	123	124	124	145		
BOYD	150	0.9		176	143	115	164	157	127	120		
BRIDGEPORT	156	0.9		136	129	119	102	121	126	143		
BUENA VISTA-BETHEL SUD	249	0.7		175	169	165	159	166	157	156		
BUTLER WSC	138	1.0	**196**	246	143	173	199	163	162	156	1	Max historical GPCD minus PC per year savings
CALLISBURG WSC	82	0.9		102	77	76	75	74	74	96		
CARROLLTON	167	0.9		176	152	151	144	146	141	145		
CEDAR HILL	180	0.8		221	152	151	145	158	147	138		
CELINA	187	0.9	**211**	125	128	114	123	133	130	140	4	Updated based on WUG Survey Revision Request
CHATFIELD WSC	97	1.0		136	112	100	107	110	112	105		
CHICO	177	0.9		91	55	60	65	67	64	63		
COCKRELL HILL	79	1.0	**134**	90	103	119	137	102	94	89	1	Max historical GPCD minus PC per year savings
COLLEGE MOUND SUD	61	1.1	**92**	94	97	86	89	87	86	86	1	Max historical GPCD minus PC per year savings
COLLEYVILLE	348	0.8		343	262	251	264	260	257	282		
COLLINSVILLE	99	1.0		94	87	107	96	96	79	49		
COMBINE WSC	86	0.9		108	80	78	86	89	83	88		
COMMUNITY WSC	89	1.1	**136**	106	97	96	94	90	116	136	1	Max historical GPCD
COPEVILLE SUD	75	1.0	**112**	92	76	79	80	89	97	112	1	Max historical GPCD
COPPELL	237	0.8		258	233	224	213	226	209	200		
CORBET WSC	81	0.9		95	99	84	82	100	91	84		
CORINTH	154	0.7		166	134	133	138	142	127	130		
CORSICANA	205	1.0		212	175	164	200	215	165	169		
CRANDALL	163	1.1		164	150	127	121	114	118	122		
CRESCENT HEIGHTS WSC	79	0.9		88	61	69	66	70	68	66		
CROSS TIMBERS WSC	196	0.7		203	158	147	168	162	160	174		
CROWLEY	133	0.9		136	107	111	125	121	96	100		
CULLEOKA WSC	98	1.0		107	90	94	94	94	99	104		
DALLAS	202	0.9		205	212	191	182	168	176	149		
DALWORTHINGTON GARDENS	354	0.9		369	358	358	274	265	267	253		
DAWSON	150	1.0		151	113	118	137	121	124	123		
DECATUR	244	1.1		238	189	195	221	204	189	204		
DENISON	237	1.0		265	159	154	139	145	131	134		

Region C Requested GPCD Changes				2011	2015	2016	2017	2018	2019	2020		
Entity Name	Draft Baseline GPCD	2010-2020 PC Per Year Savings	Revised GPCD	GPCD Estimates (provided by TWDB)							TWDB Criteria Code (1-7)*	Additional Comments
DENTON	162	1.0		165	130	121	111	152	164	125		
DENTON COUNTY FWSD 10	169	0.6		12	129	181	147	179	162	144		
DENTON COUNTY FWSD 11-C	60	0.0		0	47	75	58	45	60	63		
DENTON COUNTY FWSD 1-A	234	0.7	**155**	213	207	211	216	230	235	236	4	Updated based on WUG Survey Revision Request
DENTON COUNTY FWSD 7	227	0.6		445	325	303	334	300	286	299		
DESERT WSC	113	0.8	**148**	121	126	114	116	137	149	139	1	Max historical GPCD minus PC per year savings
DESOTO	155	0.9		165	139	132	144	135	135	163		
DOGWOOD ESTATES WATER	137	0.9		130	131	107	96	101	105	102		
DORCHESTER	68	0.9	**159**	97	142	136	139	161	159	160	1	Max historical GPCD minus PC per year savings
DUNCANVILLE	128	1.0		138	133	94	96	102	96	99		
EAST CEDAR CREEK FWSD	61	0.5	**136**	123	119	120	110	120	115	135	4	Updated based on WUG Survey Revision Request
EAST FORK SUD	110	1.2		115	83	87	89	98	94	102		
EAST GARRETT WSC	148	0.9		193	131	98	95	91	159	129		
EDGECLIFF	155	0.9		162	106	117	124	108	93	111		
ELMO WSC	77	1.0		106	82	86	70	77	70	84		
ENNIS	169	1.0		186	138	115	136	96	90	110		
EULESS	149	0.9		159	93	96	95	98	99	102		
EUSTACE	97	0.9		64	66	64	50	61	49	44		
EVERMAN	78	0.9		94	81	94	79	75	73	74		
FAIRFIELD	187	1.0		180	152	132	134	143	152	151		
FAIRVIEW	320	0.8		336	233	231	232	247	235	225		
FARMERS BRANCH	265	0.9		268	272	259	236	257	250	229		
FARMERSVILLE	108	1.4		102	80	77	70	94	98	105		
FATE	158	0.6		153	100	99	106	107	94	108		
FERRIS	141	1.0	**177**	157	136	90	96	95	120	177	1	Max historical GPCD
FLOWER MOUND	226	0.8		235	167	192	186	182	183	192		
FOREST HILL	96	0.9		105	83	80	83	88	84	81		
FORNEY	130	0.8	**134**	127	124	106	99	116	107	114	4	Updated based on WUG Survey Revision Request
FORNEY LAKE WSC	146	0.7		159	108	103	112	110	85	128		
FORT WORTH	177	0.9		173	143	139	136	140	120	134		
FRISCO	217	0.6		223	1	159	155	160	154	163		
FROGNOT WSC	94	0.8		102	93	86	87	105	108	107		
GAINESVILLE	129	1.0		130	114	115	112	113	113	141		
GARLAND	145	0.9		153	0	115	111	114	119	125		
GASTONIA SCURRY SUD	61	1.0	**103**	75	91	88	102	104	104	96	1	Max historical GPCD minus PC per year savings
GLENN HEIGHTS	100	0.9		106	90	87	85	83	108	120		
GRAND PRAIRIE	145	0.9		141	120	123	124	122	120	120		
GRAPEVINE	315	0.9		343	280	267	245	251	226	231		
GUNTER	145	1.0		161	109	118	137	132	126	136		
HACKBERRY	217	0.7		0	0	196	207	207	174	181		
HALTOM CITY	108	0.9	**100**	120	96	90	87	90	83	85	4	Updated based on WUG Survey Revision Request
HASLET	292	0.8	**357**	277	275	258	286	295	357	357	1	Max historical GPCD minus PC per year savings
HEATH	292	0.9		224	173	171	171	193	242	250		
HIGH POINT WSC	82	1.2		71	55	77	78	79	71	76		
HIGHLAND PARK	402	1.0		411	336	336	321	317	307	300		
HIGHLAND VILLAGE	201	0.9		216	181	171	168	162	163	175		
HONEY GROVE	144	1.0		157	105	91	88	95	121	108		
HORSESHOE BEND WATER SYSTEM	86	0.9	**127**	135	131	113	83	95	94	98	1	Max historical GPCD minus PC per year savings
HOWE	86	1.0		88	54	69	69	56	92	82		
HUDSON OAKS	308	1.1		151	132	159	153	138	140	123		
HURST	153	1.0		155	134	128	133	129	127	126		
HUTCHINS	202	1.0		110	142	137	148	147	157	140		
IRVING	193	1.0		163	153	151	151	149	142	138		
ITALY	119	1.2		131	112	111	103	113	112	106		
JACKSBORO	127	0.9	**195**	152	134	143	163	197	190	192	1	Max historical GPCD minus PC per year savings
JOSEPHINE	192	1.2		119	71	80	68	77	92	127		
JUSTIN	134	0.9	**158**	130	162	85	118	120	128	154	1	Max historical GPCD minus PC per year savings
KAUFMAN	151	1.1		123	131	135	123	123	114	124		
KAUFMAN COUNTY DEVELOPMENT DISTRICT 1	214	1.0		1,064	882	907	1,023	945	1,045	1,292		
KAUFMAN COUNTY MUD 11	152	1.0		0	92	101	96	87	77	84		
KAUFMAN COUNTY MUD 14	148	0.9	**246**	0	0	0	0	148	136	0	4	Updated based on WUG Survey Revision Request

Region C Requested GPCD Changes				2011	2015	2016	2017	2018	2019	2020	TWDB Criteria Code (1-7)*	Additional Comments
Entity Name	Draft Baseline GPCD	2010-2020 PC Per Year Savings	Revised GPCD	GPCD Estimates (provided by TWDB)								
KELLER	229	0.8		242	179	177	185	178	174	191		
KEMP	160	1.3		174	149	163	151	170	159	150		
KENNEDALE	159	0.9		173	146	136	136	135	123	135		
KENTUCKYTOWN WSC	112	1.0		142	122	130	91	131	129	128		
KERENS	107	1.0		109	89	95	75	85	79	82		
KRUM	199	0.8		109	87	86	89	93	87	97		
LADONIA	140	1.5		154	336	317	340	372	112	169		
LAKE CITIES MUNICIPAL UTILITY AUTHORITY	126	0.7		133	101	101	104	107	100	107		
LAKE KIOWA SUD	363	1.2		465	294	262	291	302	271	284		
LAKE WORTH	197	1.0		206	169	163	153	154	149	154		
LAKESIDE	247	0.8		130	133	106	109	129	111	106		
LANCASTER	153	0.9		163	114	119	135	138	149	137		
LANCASTER MUD 1	75	0.9	**111**	0	70	114	81	75	90	95	1	Max historical GPCD minus PC per year savings
LEONARD	134	1.0	**127**	139	139	137	119	140	150	127	4	Updated based on WUG Survey Revision Request
LEWISVILLE	168	0.8	**155**	184	130	139	149	138	128	134	4	Updated based on WUG Survey Revision Request
LINDSAY	117	0.9		90	70	60	67	70	61	72		
LITTLE ELM	123	0.5		129	0	103	103	105	97	104		
LOG CABIN	121	0.0	**157**	99	99	100	108	121	157	133	1	Max historical GPCD minus PC per year savings
LUCAS	265	0.9	**255**	295	222	214	211	221	212	203	4	Updated based on WUG Survey Revision Request
LUELLA SUD	95	0.9		128	99	93	93	98	98	105		
M E N WSC	127	0.8		167	111	117	120	126	119	108		
MABANK	178	0.9		107	89	96	98	109	102	98		
MALAKOFF	102	0.9	**105**	134	108	114	109	117	113	119	4	Updated based on WUG Survey Revision Request
MANSFIELD	245	0.7		255	207	183	198	196	207	207		
MARKOUT WSC	156	1.0		165	97	97	112	129	118	124		
MCKINNEY	196	0.7		201	165	164	160	153	151	155		
MELISSA	197	0.7		169	118	174	185	178	142	109		
MESQUITE	134	0.9		128	0	103	97	94	103	105		
MIDLOTHIAN	208	0.6		168	171	147	155	152	163	163		
MILLIGAN WSC	108	0.8		142	95	100	79	106	113	98		
MOUNT ZION WSC	178	1.1		208	136	132	118	127	133	143		
MOUNTAIN PEAK SUD	281	1.0		144	123	131	142	150	145	148		
MOUNTAIN SPRINGS WSC	151	0.8		204	166	148	142	159	148	163		
MUENSTER	154	0.9		118	102	98	102	107	101	116		
MURPHY	206	0.6		208	170	177	177	200	198	187		
MUSTANG SUD	135	0.8		138	100	95	126	151	119	120		
NASH FORRESTON WSC	70	0.0	**102**	0	51	70	68	70	68	102	1	Max historical GPCD
NAVARRO MILLS WSC	96	0.9		111	81	54	87	83	76	98		
NEVADA SUD	90	0.8		84	96	91	94	95	89	85		
NEWARK	99	1.2		110	84	84	86	94	88	73		
NORTH COLLIN SUD	132	0.9		137	109	101	91	99	87	86		
NORTH FARMERSVILLE WSC	195	0.8		186	108	122	140	163	168	161		
NORTH KAUFMAN WSC	62	1.0		71	64	69	57	63	62	63		
NORTH RICHLAND HILLS	160	0.9		179	133	133	127	124	116	129		
NORTHLAKE	182	0.8		160	235	266	296	324	249	266		
NORTHWEST GRAYSON COUNTY WCID 1	92	0.9		111	76	88	90	103	92	100		
OAK RIDGE SOUTH GALE WSC	79	0.9		77	60	66	69	70	65	60		
OVILLA	214	1.0		200	166	153	132	138	140	129		
PALMER	101	1.1		107	91	87	86	90	81	80		
PALOMA CREEK NORTH	186	0.6		79	95	103	112	127	108	96		
PALOMA CREEK SOUTH	184	0.7		118	114	105	91	100	81	100		
PANTEGO	232	0.9		244	207	193	195	199	191	188		
PARKER	382	0.8		283	254	245	236	223	255	237		
PARKER COUNTY SUD	96	0.8		81	54	76	70	89	71	77		
PELICAN BAY	60	0.2		62	47	45	47	46	58	64		
PILOT POINT	123	1.2		147	118	109	111	125	116	117		
PINK HILL WSC	104	0.9		117	103	90	98	82	81	81		
PLANO	231	0.8		248	207	220	206	207	194	196		
PLEASANT GROVE WSC	90	1.0		99	90	80	86	96	98	86		
POINT ENTERPRISE WSC	98	1.0	**128**	123	110	104	106	130	128	127	1	Max historical GPCD minus PC per year savings
PONDER	111	0.8	**133**	129	112	104	118	135	132	102	1	Max historical GPCD minus PC per year savings

Region C Requested GPCD Changes				2011	2015	2016	2017	2018	2019	2020		
Entity Name	Draft Baseline GPCD	2010-2020 PC Per Year Savings	Revised GPCD	GPCD Estimates (provided by TWDB)							TWDB Criteria Code (1-7)*	Additional Comments
POTTSBORO	152	1.0		99	77	81	77	82	83	83		
PRINCETON	97	0.8		86	59	61	58	62	64	77		
PROSPER	230	0.7	**235**	213	0	208	207	212	203	218	4	Updated based on WUG Survey Revision Request
PROVIDENCE VILLAGE WCID	116	0.5		121	108	112	100	124	103	112		
R C H WSC	189	0.9		197	148	145	148	153	141	120		
RED OAK	134	0.7		115	114	123	115	126	114	126		
RENO (PARKER)	60	0.0		58	44	52	55	62	64	55		
RHOME	155	0.8		179	101	149	104	76	108	118		
RICE WATER SUPPLY AND SEWER SERVICE	108	0.9		116	101	105	102	108	111	97		
RICHARDSON	225	0.9		226	191	179	169	170	172	164		
RICHLAND HILLS	123	1.0		126	116	114	109	110	105	103		
RIVER OAKS	102	0.9		112	76	82	84	73	80	80		
ROANOKE	254	0.8		261	220	220	238	230	204	199		
ROCKETT SUD	103	1.0	**106**	126	108	93	105	110	114	114	4	Updated based on WUG Survey Revision Request
ROCKWALL	168	0.7		161	128	125	135	169	164	172		
ROSE HILL SUD	78	1.1		105	80	72	77	87	84	79		
ROWLETT	137	0.8		154	118	116	106	106	108	121		
ROYSE CITY	104	0.7	**138**	126	0	105	103	110	113	138	1	Max historical GPCD
RUNAWAY BAY	326	0.9		266	192	170	138	150	147	166		
SACHSE	163	0.8		177	129	117	105	106	106	111		
SAGINAW	123	0.8		132	110	103	100	100	104	111		
SANGER	125	0.9		130	90	92	97	99	89	90		
SANSOM PARK	99	0.9		107	93	102	93	85	85	94		
SARDIS LONE ELM WSC	241	1.1		253	184	177	168	194	179	181		
SAVOY	123	0.9		97	111	110	112	123	125	126		
SEAGOVILLE	99	0.9		71	101	99	97	87	90	85		
SEIS LAGOS UD	253	1.0		259	223	201	182	217	211	185		
SHERMAN	220	1.0		233	179	155	108	175	160	166		
SOUTH ELLIS COUNTY WSC	232	0.9	**336**	167	237	216	304	338	299	297	1	Max historical GPCD minus PC per year savings
SOUTH FREESTONE COUNTY WSC	90	1.0		100	85	81	84	94	92	97		
SOUTH GRAYSON SUD	110	0.7		123	75	80	74	107	130	129		
SOUTHERN OAKS WATER SUPPLY	131	0.9	**165**	175	169	145	135	131	127	124	1	Max historical GPCD minus PC per year savings
SOUTHLAKE	370	0.7		378	298	291	316	286	277	265		
SOUTHMAYD	101	0.9		144	94	70	70	64	98	97		
SOUTHWEST FANNIN COUNTY SUD	91	0.9		86	78	71	72	87	88	82		
SPRINGTOWN	199	1.1		141	110	105	99	99	125	114		
STARR WSC	93	0.9		117	87	81	78	84	83	85		
SUNNYVALE	301	0.8		306	246	212	199	226	242	228		
TALTY SUD	147	0.7		162	129	109	110	131	125	140		
TEAGUE	154	1.0		99	100	97	88	99	98	100		
TERRA SOUTHWEST	71	0.9		99	68	66	74	71	79	76		
TERRELL	153	1.1		152	124	121	140	131	125	124		
THE COLONY	137	1.0		136	123	122	123	130	124	133		
TIOGA	123	0.9		88	93	105	112	117	75	82		
TOM BEAN	169	1.0		148	106	101	101	93	83	100		
TRENTON	166	1.0		201	145	132	130	123	125	124		
TRINIDAD	92	1.0	**130**	93	130	134	109	99	90	131	1	Max historical GPCD minus PC per year savings
TROPHY CLUB MUD 1	341	0.7		310	196	192	204	233	191	187		
TWO WAY SUD	100	0.9	**121**	135	107	107	107	111	108	121	1	Max historical GPCD
UNIVERSITY PARK	266	1.0		278	221	209	212	221	207	206		
VAN ALSTYNE	124	1.0	**105**	130	176	79	98	101	100	97	4	Updated based on WUG Survey Revision Request
VERONA SUD	90	0.8	**122**	98	106	103	105	114	108	122	1	Max historical GPCD
VIRGINIA HILL WSC	87	1.0	**111**	119	116	94	90	102	102	98	1	Max historical GPCD minus PC per year savings
WALNUT CREEK SUD	68	0.8	**142**	107	114	113	108	122	131	142	1	Max historical GPCD
WATAUGA	104	0.9		111	94	86	78	79	99	92		
WAXAHACHIE	164	0.9		171	138	148	158	165	166	161		
WEATHERFORD	158	0.9	**166**	144	126	120	118	122	110	116	4	Updated based on WUG Survey Revision Request
WEST CEDAR CREEK MUD	60	0.3	**191**	179	193	185	188	182	184	187	1	Max historical GPCD minus PC per year savings
WEST LEONARD WSC	120	1.0		128	84	97	87	79	90	123		
WEST WISE SUD	111	1.0		118	89	90	89	91	85	78		
WESTLAKE	1,033	0.6		1,010	768	798	780	783	512	639		
WESTMINSTER SUD	121	0.8	**173**	129	128	143	154	164	174	144	1	Max historical GPCD minus PC per year savings

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Region C Requested GPCD Changes				2011	2015	2016	2017	2018	2019	2020		
Entity Name	Draft Baseline GPCD	2010-2020 PC Per Year Savings	Revised GPCD	GPCD Estimates (provided by TWDB)							TWDB Criteria Code (1-7)*	Additional Comments
WESTOVER HILLS	1,218	0.9		1,316	729	754	824	836	753	845		
WESTWORTH VILLAGE	131	1.0		128	119	121	111	114	115	145		
WHITE SETTLEMENT	110	0.9		114	108	108	100	103	93	95		
WHITE SHED WSC	98	1.0		112	90	84	82	96	92	87		
WHITESBORO	110	0.9		116	102	92	94	98	95	90		
WHITEWRIGHT	124	0.9	**165**	133	146	164	133	154	166	146	1	Max historical GPCD minus PC per year savings
WILLOW PARK	140	0.9		127	109	108	104	112	113	117		
WILMER	93	0.9	**128**	89	99	120	121	100	113	128	1	Max historical GPCD
WOODBINE WSC	96	0.9		98	81	79	83	93	85	95		
WORTHAM	128	1.0		124	99	100	93	82	77	88		
WYLIE	135	0.6		127	118	127	118	119	116	119		
WYLIE NORTHEAST SUD	122	0.8	**108**	132	106	116	120	109	106	130	4	Updated based on WUG Survey Revision Request

***TWDB Criteria for Adjustment**

1) Evidence that per capita water use from a more recent year (2015-2019) would be more appropriate because that year was more representative of dry-year conditions.
2) Evidence of errors identified in the historical water use for a utility or public water system, including evidence that volumes of reuse (treated effluent) water or brackish groundwater used for municipal purposes should be included in the draft projections.
3) Evidence that the dry year water use was abnormal due to temporary infrastructure constraints.
4) Trends indicating that per capita water use for a utility or rural area of a county have changed substantially since 2011 and evidence that these trends will continue to rise in the short-term future.
5) Evidence that the water efficiency and conservation savings that have been implemented are not reflected in the baseline GPCD.
6) Evidence that the number of installations of water-efficient fixtures and appliances between 2010 and 2020 is substantially different than the TWDB estimate.
7) Evidence that future water efficiency savings are projected much higher than the draft projections.

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Attachment C-5

Memorandums on Non-Municipal Demand Projection: Irrigation, Manufacturing, Steam Electric Power, Livestock, and Mining

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801 Cherry Street, Suite 2800 + Fort Worth, Texas 76102 + 817-735-7300 + FAX 817-735-7491 www.freese.com

TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft Irrigation Water Use Projections

DATE: 11/2/2022

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft irrigation demand projections in August of 2022. The draft projections will be reviewed by the individual planning groups and recommendations will be provided to the TWDB to be considered. The final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2027 State Water Plan (SWP). The purpose of this technical memorandum is to document information related to historical irrigation usage and provide information supporting recommended modifications to the draft irrigation demands.

Irrigation water use is defined by the TWDB as irrigation of agricultural crops and golf courses. Historically, irrigation has accounted for approximately 27 percent of all non-municipal water use in Region C[1]. According to the *Region C Regional Water Plan*, the irrigation water use in Region C primarily represents the use of raw water for golf courses[2].

1.1 Historical Irrigation Water Use Estimates

As of August 2022, historical data estimates are available through the year 2019. The historical 2015-2019 use estimates are based on crops, acreage, climatic conditions, observations by local agricultural representatives, historical irrigation water right diversions, and data provided by irrigation and groundwater districts. Irrigation water use for golf courses that are not supplied by municipalities are also considered in the irrigation water estimates. If a golf course is supplied by municipal water, this use is incorporated into the municipality's gpcd and included as municipal water use. Since 2015, the region-wide irrigation water use estimates have ranged from 27,983 to 36,753 acre-feet per year (Figure 1).

[1] Based on historical water use estimates from the TWDB.

[2] https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/index.asp#region-c

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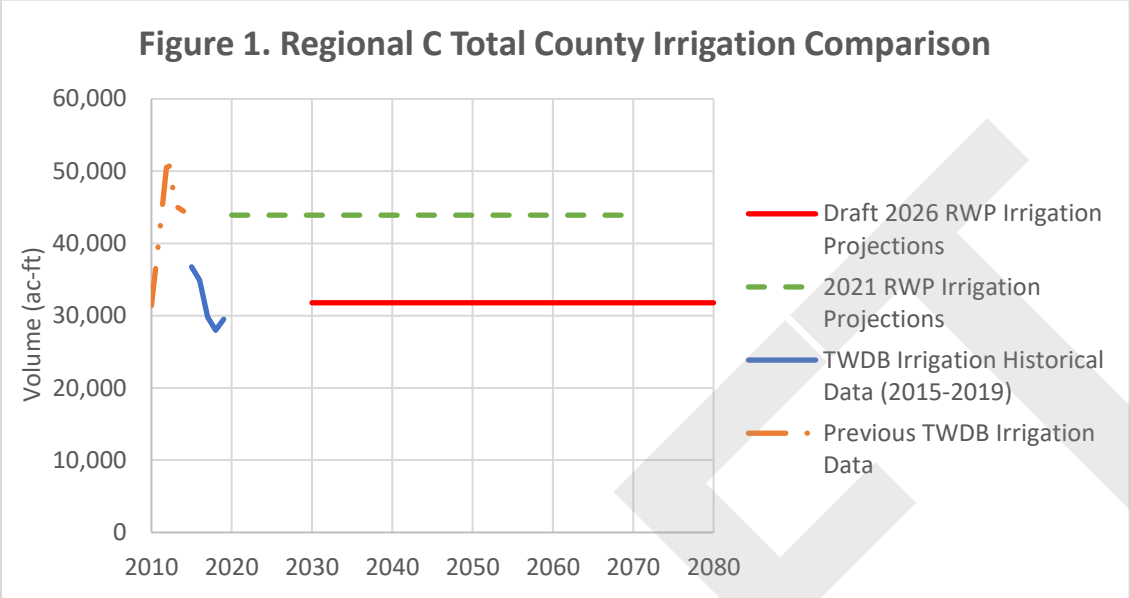

1.2 TWDB Draft Irrigation Water Demand Projections

TWDB's draft non-municipal irrigation demand projections for the 2027 State Water Plan utilize an average of the 2015-2019 irrigation water use estimates and are either:

- held constant between 2030 and 2080 or
- in counties where the total groundwater availability over the planning period is projected to be less than the groundwater-portion of the baseline water demand projections, the irrigation water demand projections are held constant for 10 years beyond the point that the groundwater availability falls below the baseline demand after projected demands will begin to decline, depending on and corresponding with the groundwater availability.

1.3 Criteria for Revising the Draft Irrigation Water Demand Projections

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the irrigation water demand projections:

- Evidence that irrigation water use estimates for a county from another information source or more recent modeled available groundwater volumes are more accurate than those used in the draft projections.
- Evidence that recent (10 years or less) irrigation trends are more indicative of future trends than the draft groundwater resource-constrained water demand projections.
- Evidence that the baseline projection is more likely as a future demand than the draft groundwater resource-constrained water demand projections.
- Region or county-specific studies that have developed water demand projections or trends for the planning period, or part of the planning period, and are deemed more accurate than the draft projections.
- Evidence of errors identified in historical water use, including volumes of reuse (treated effluent) or brackish groundwater that were not included in the draft projections.

During the review process, the TWDB also imposed one other restriction on revisions of the draft irrigation water demand projections: Projections for all counties must have the same basis. For example, if the Planning Group recommends using the average of the 2010-2019 irrigation water use estimates to project future water demand, then it must recommend this basis for all counties.
The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any adjustments to the irrigation water demand projections:
Historical water use, diversion, or pumpage volumes for irrigation by county.

Acreage and water use data for irrigated crops grown in a region as published by the Texas Agricultural Statistics Service, the Texas Agricultural Extension Service, the Farm Service Agency or other sources.
Available economic, technical, and/or water supply-related evidence that may provide a basis for adjustments in the default baseline projection and/or the future rate of change in irrigation water demand.

Alternative projected water availability volumes that may constrain water demand projections.
Other data that the RWPG considers adequate to justify an adjustment to the irrigation water demand projections.

1.4 Data Used in the Evaluation of Draft Irrigation Demands

Data used to evaluate the draft irrigation demands were obtained from the following sources:

- NOAH historical rainfall at DFW airport (surrogate for regional precipitation)
- TWDB historical irrigation water use, 2010-2019
- 2021 Regional Water Plan Water Demand Projections by County for 2020-2070
- Projected total groundwater availability volumes based on the available MAG and non-MAG values as of July 2022.

2.0 RCWPG RECOMMENDED REVISIONS TO DRAFT WATER DEMAND PROJECTIONS

As noted above, the TWDB irrigation water use methodology utilizes estimates of crop acreages, crop types and climatic conditions. Irrigation use does vary considerably with climatic conditions. The TWDB uses the average of the historical water use over the period of 2015 through 2019. These years represent an above average rainfall period. Figure 2 shows the historical irrigation water use and the annual precipitation at DFW airport from 2010 through 2019. To confirm this pattern as it pertains to irrigation, the total precipitation during the growing season (defined as from April to October) is also shown as a gray line. Based on this graphic, it is clear there was higher irrigation water use from 2010 through 2014 then the latter five-year interval for the region as a whole.

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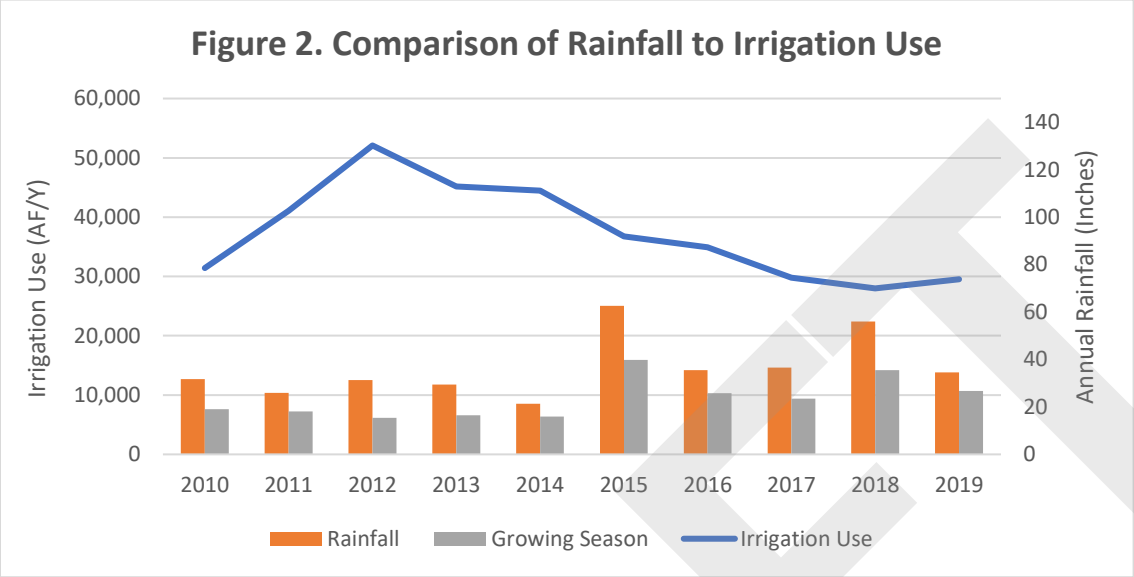

A comparison of the draft projections for the 2026 RWP (provided by TWDB) with the final 2021 RWP projections shows a 27 percent decrease in projected irrigation use for the region. This is most likely due to using the average historical water use during a wet period as the basis for future demands. Since the regional water plans are to consider water use during drought of record conditions, this approach is not appropriate. Another concern is the use of the average water use rather than the highest water use. There can be justification for using the average water use, but this should be considered during a dry period. It is uncertain whether the future irrigation use will remain constant over the next 50 years. As the region continues to grow it is likely that current irrigated acreage will transition to other uses. However, the demand for additional golf courses will increase, but it is uncertain whether these golf courses will be self-supplied or provided water from municipalities. Due to this uncertainty, having the irrigation demand remain constant may be a conservative estimate.

Considering the TWDB methodology for irrigation demands and the unique aspects for Region C, it is recommended that the 2026 projected irrigation demands be based on the maximum amount between the TWDB draft irrigation projections and the average historical water use during the dry period from 2010 through 2014. Taking the maximum amount accounts for any additional acreage that was added since the last plan. A comparison of the draft projections for the 2026 RWP (provided by TWDB), the final 2021 RWP projections, and the proposed RCWPG revisions to the 2026 SWP projections is presented in Table 1 and Figure 3.

Table 1. Comparison of Region C Irrigation Demand Projections

County Name	2021 RWP Projections (ac-ft/yr)						Draft Projections for 2026 RWP (ac-ft/yr)						Recommended RWPG Revisions (ac-ft/yr)					
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
Collin	3,340	3,340	3,340	3,340	3,340	3,340	2,445	2,445	2,445	2,445	2,445	2,445	2,811	2,811	2,811	2,811	2,811	2,811
Cooke	1,100	1,100	1,100	1,100	1,100	1,100	635	635	635	635	635	635	1,038	1,038	1,038	1,038	1,038	1,038
Dallas	10,122	10,122	10,122	10,122	10,122	10,122	7,428	7,428	7,428	7,428	7,428	7,428	10,468	10,468	10,468	10,468	10,468	10,468
Denton	3,003	3,003	3,003	3,003	3,003	3,003	2,593	2,593	2,593	2,593	2,593	2,593	2,973	2,973	2,973	2,973	2,973	2,973
Ellis	1,367	1,367	1,367	1,367	1,367	1,367	2,725	2,725	2,725	2,725	2,725	2,725	2,725	2,725	2,725	2,725	2,725	2,725
Fannin	11,553	11,553	11,553	11,553	11,553	11,553	5,598	5,598	5,598	5,598	5,598	5,598	11,186	11,186	11,186	11,186	11,186	11,186
Freestone	569	569	569	569	569	569	448	448	448	448	448	448	565	565	565	565	565	565
Grayson	4,477	4,477	4,477	4,477	4,477	4,477	1,998	1,998	1,998	1,998	1,998	1,998	4,450	4,450	4,450	4,450	4,450	4,450
Henderson	582	582	582	582	582	582	743	743	743	743	743	743	743	743	743	743	743	743
Jack	98	98	98	98	98	98	67	67	67	67	67	67	84	84	84	84	84	84
Kaufman	285	285	285	285	285	285	353	353	353	353	353	353	353	353	353	353	353	353
Navarro	75	75	75	75	75	75	447	447	447	447	447	447	447	447	447	447	447	447
Parker	773	773	773	773	773	773	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136
Rockwall	234	234	234	234	234	234	36	36	36	36	36	36	201	201	201	201	201	201
Tarrant	4,926	4,926	4,926	4,926	4,926	4,926	3,735	3,735	3,735	3,735	3,735	3,735	4,964	4,964	4,964	4,964	4,964	4,964
Wise	1,406	1,406	1,406	1,406	1,406	1,406	1,402	1,402	1,402	1,402	1,402	1,402	1,440	1,440	1,440	1,440	1,440	1,440
Total	**43,910**	**43,910**	**43,910**	**43,910**	**43,910**	**43,910**	**31,789**	**31,789**	**31,789**	**31,789**	**31,789**	**31,789**	**45,583**	**45,583**	**45,583**	**45,583**	**45,583**	**45,583**

Grey text indicates that the was no change from the TWDB Draft projections.

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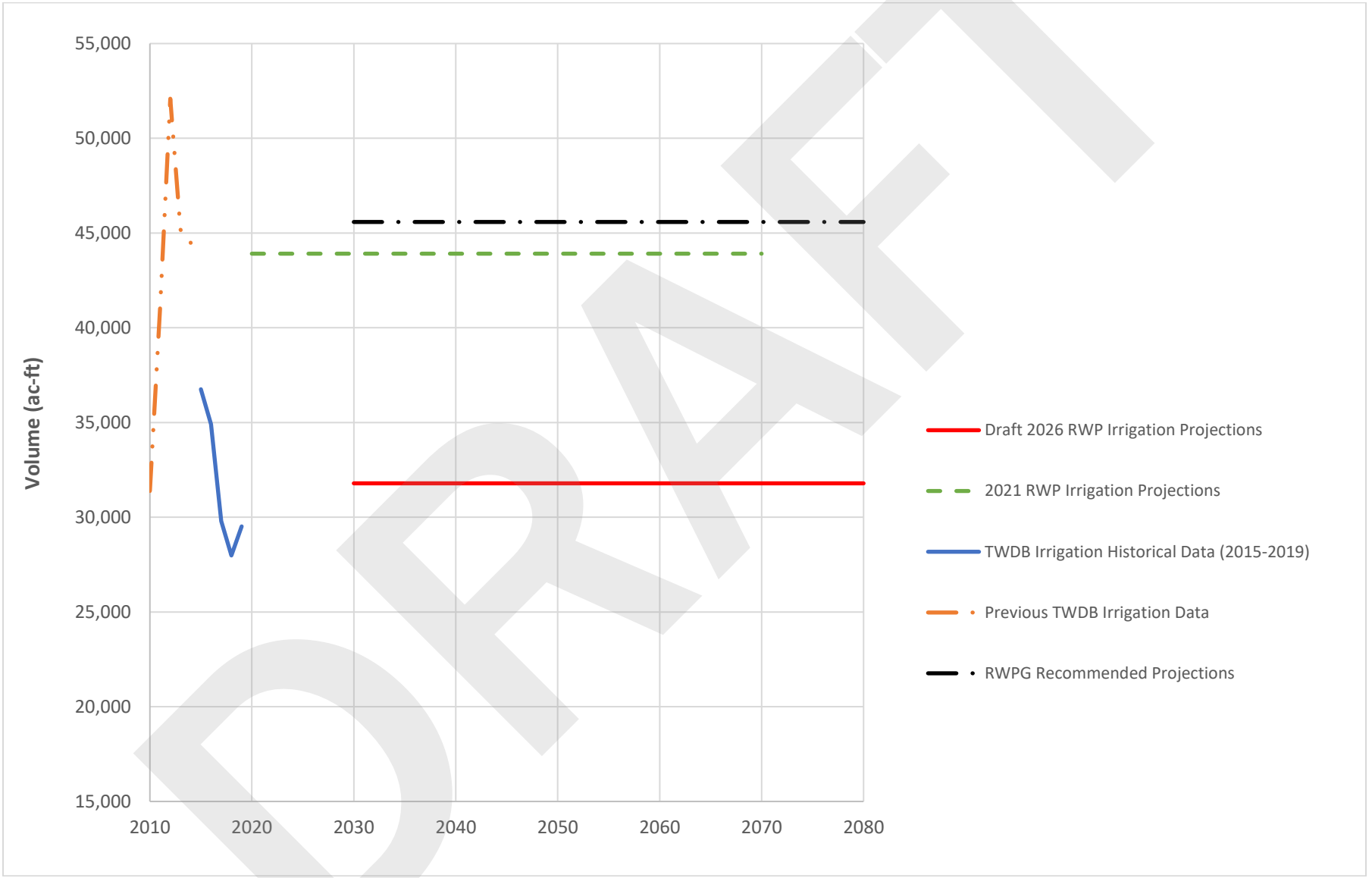
Figure 3. Region C Irrigation – Comparison of Water Use Estimates, 2021 Region C Water Plan Projection, Proposed Projections, and Revised Projections



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Attachment A
Irrigation Demand by County
Historical Usage and Projections

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Figure 1A. Collin County Irrigation Comparison

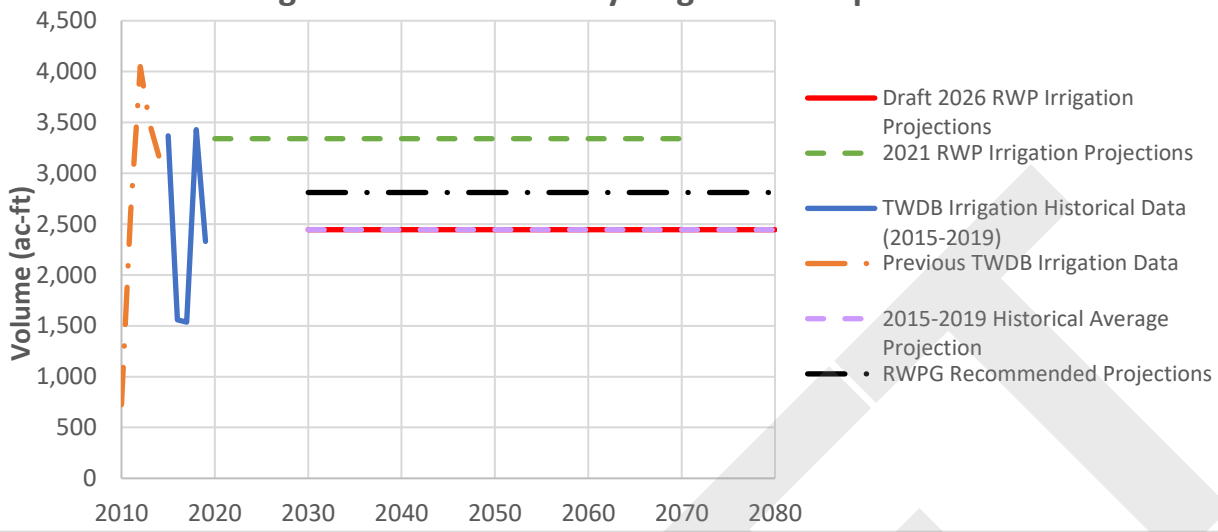

Figure 2A. Cooke County Irrigation Comparison

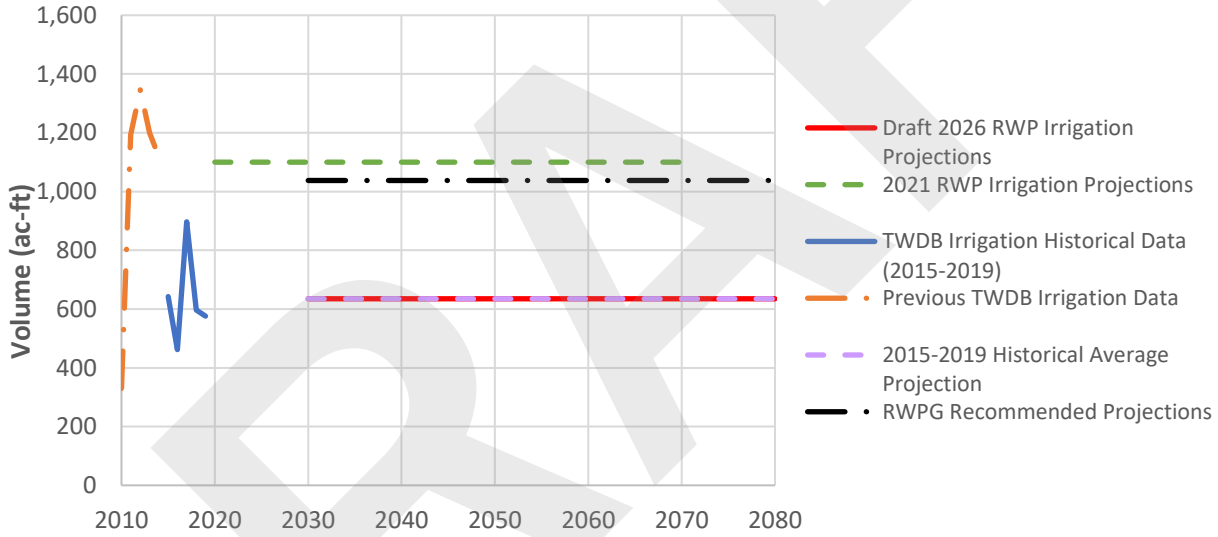

Figure 3A. Dallas County Irrigation Comparison

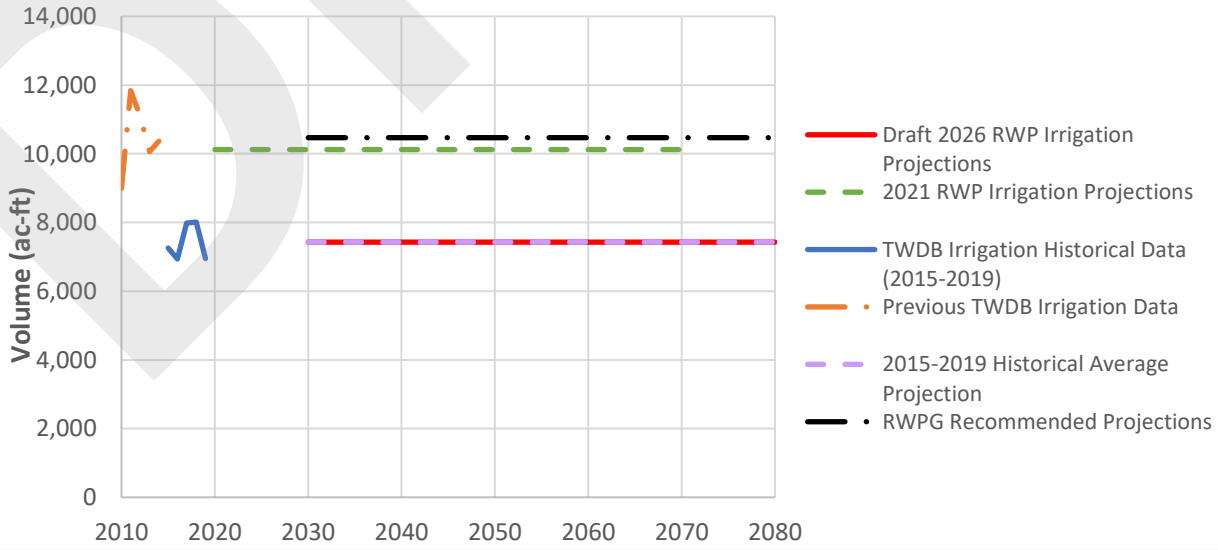

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Figure 4A. Denton County Irrigation Comparison

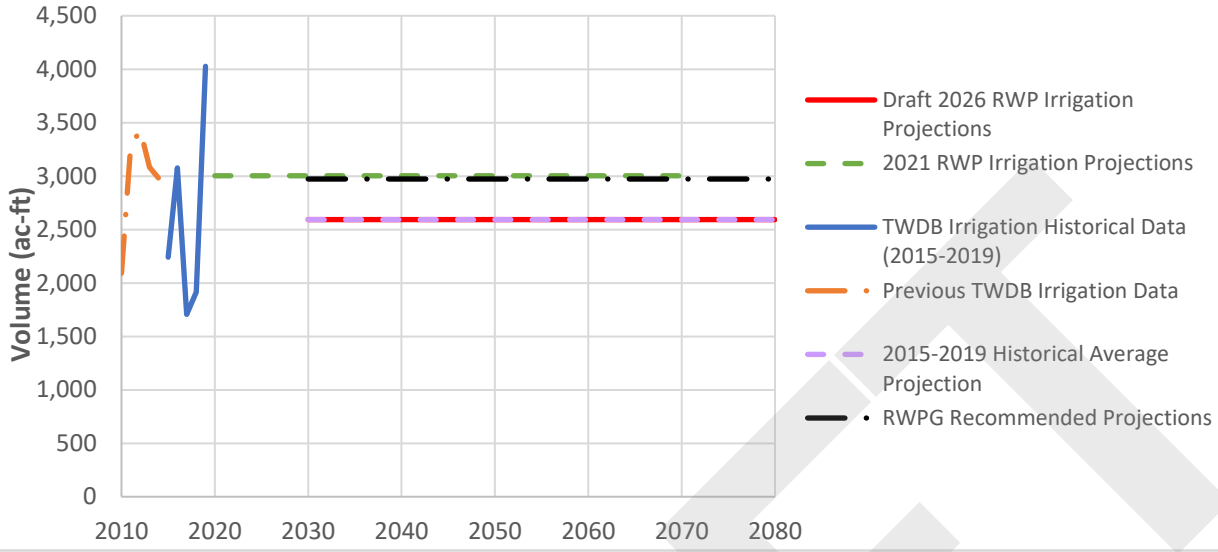

Figure 5A. Ellis County Irrigation Comparison

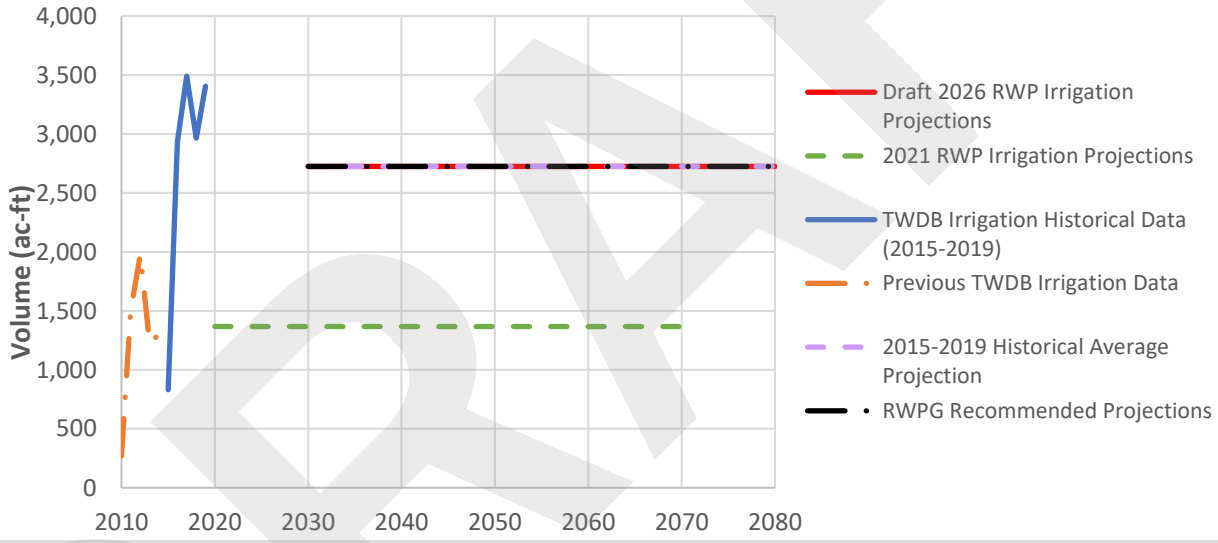

Figure 6A. Fannin County Irrigation Comparison

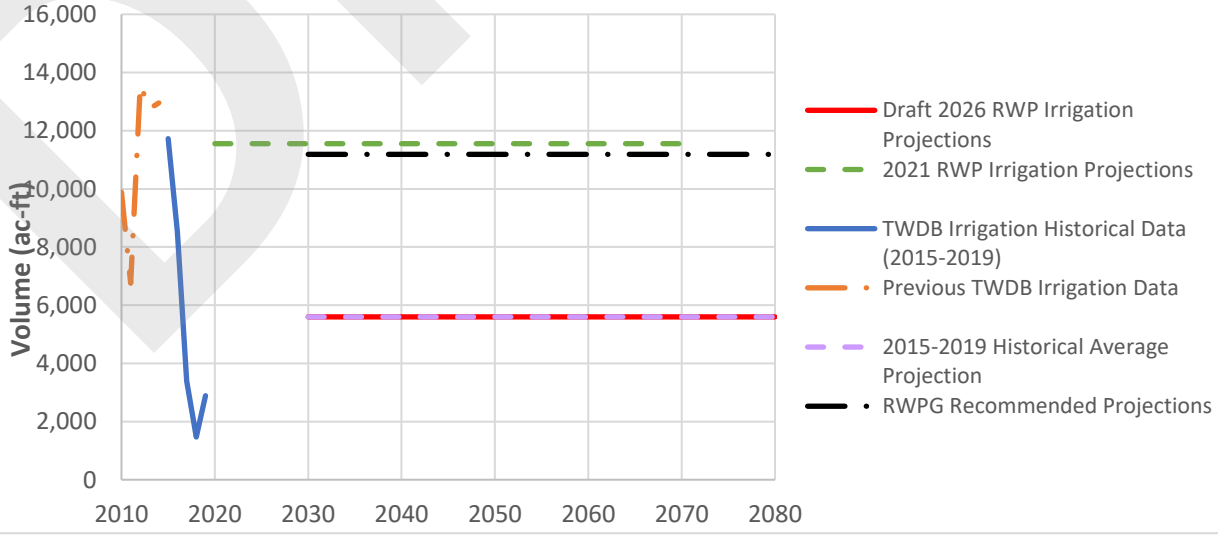

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Figure 7A. Freestone County Irrigation Comparison

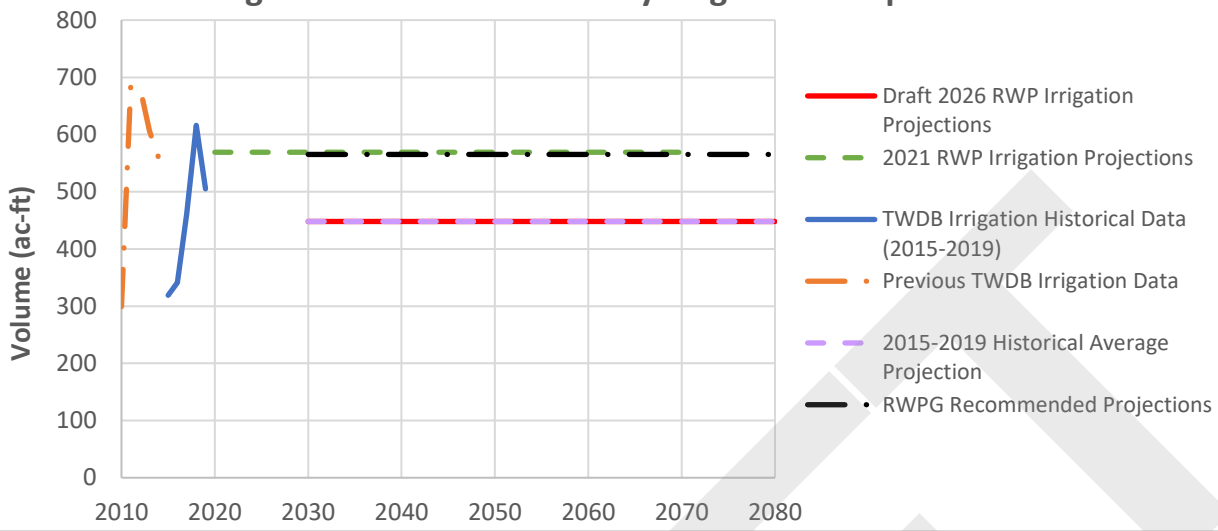

Figure 8A. Grayson County Irrigation Comparison

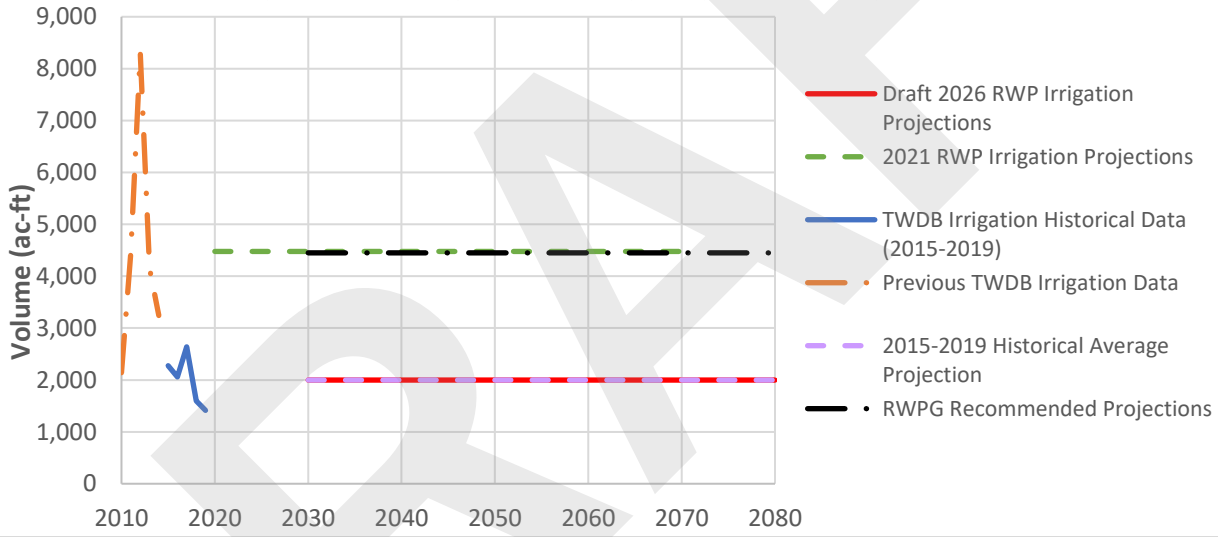

Figure 9A. Henderson County Irrigation Comparison

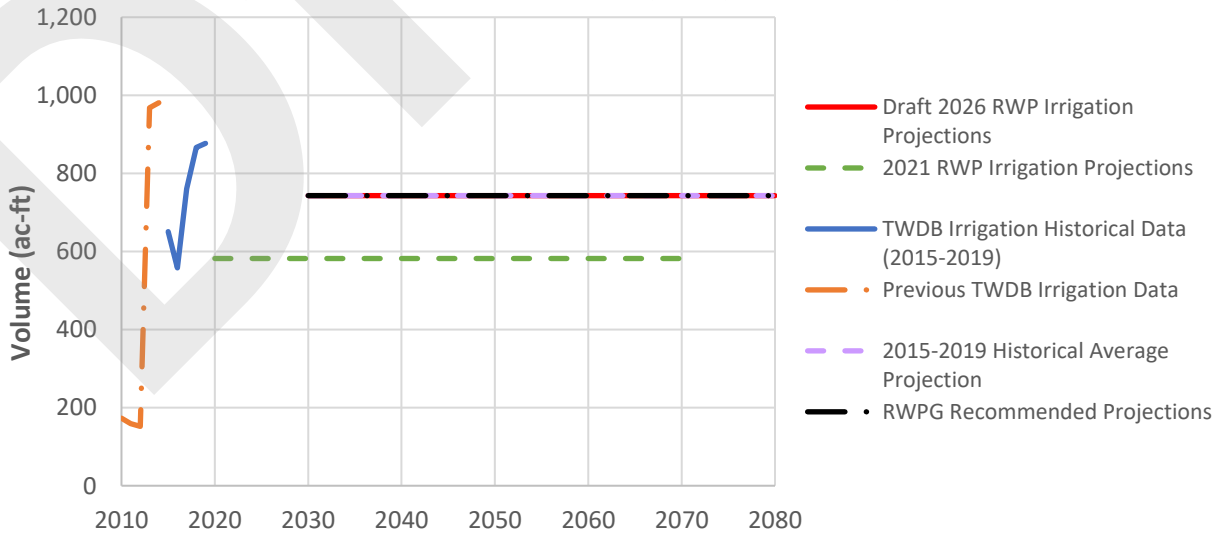

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Figure 10A. Jack County Irrigation Comparison

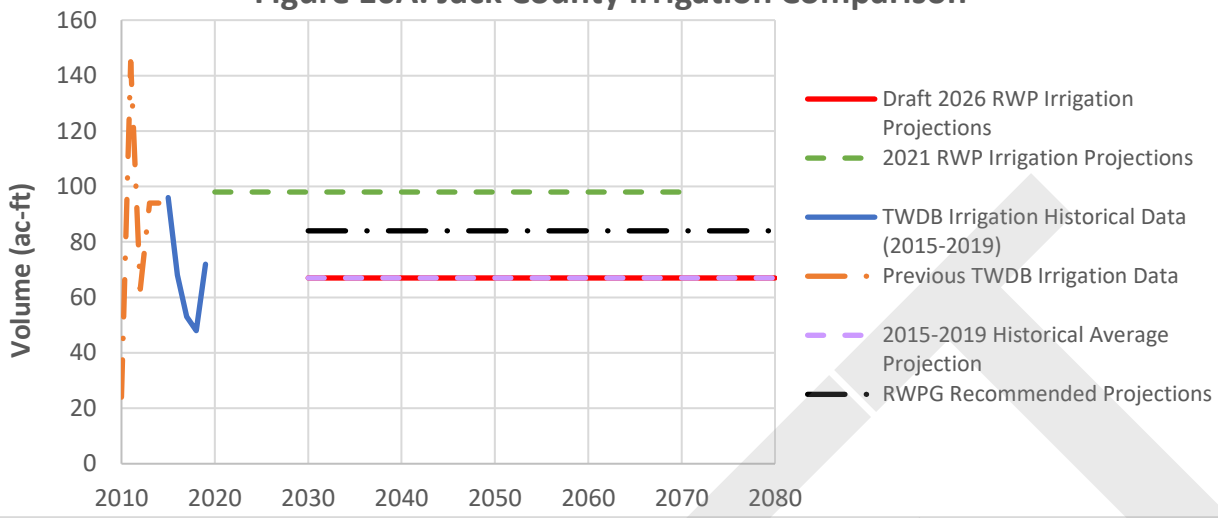

Figure 11A. Kaufman County Irrigation Comparison

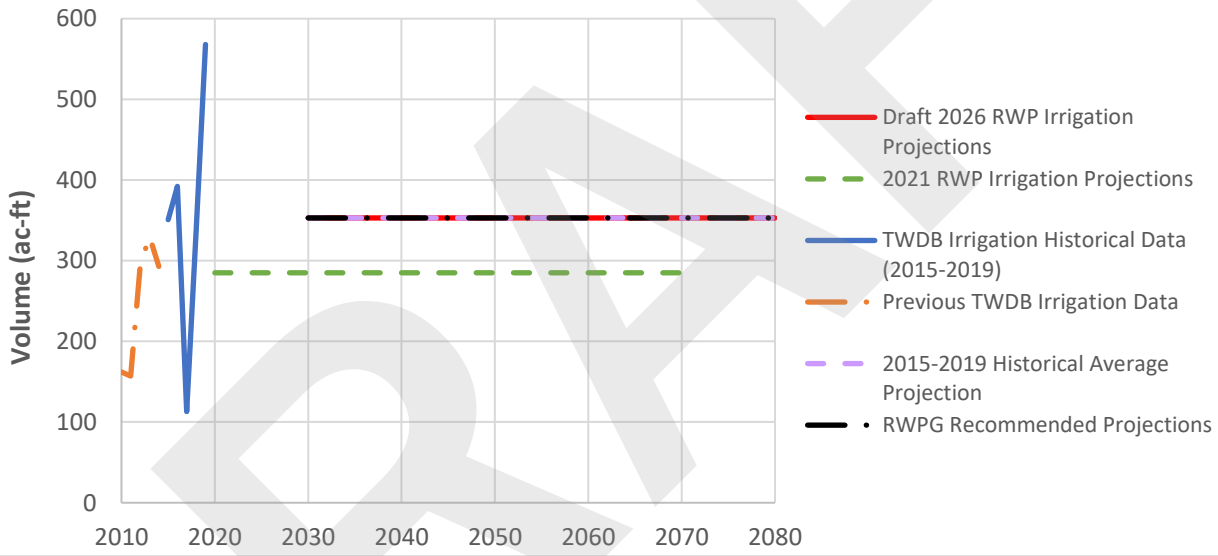

Figure 12A. Navarro County Irrigation Comparison

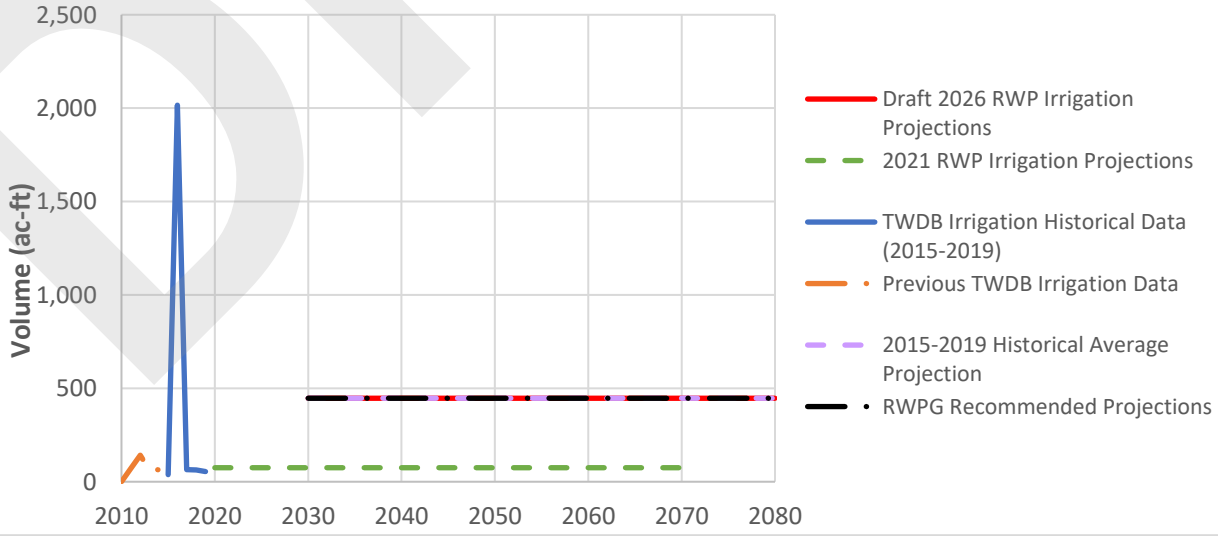

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Figure 13A. Parker County Irrigation Comparison

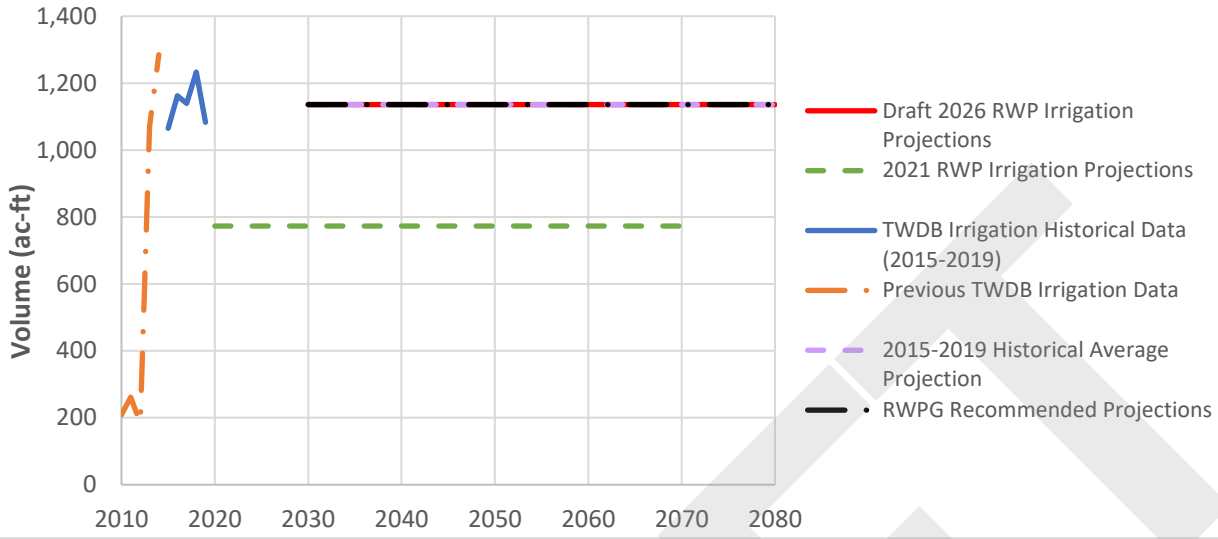


Figure 14A. Rockwall County Irrigation Comparison

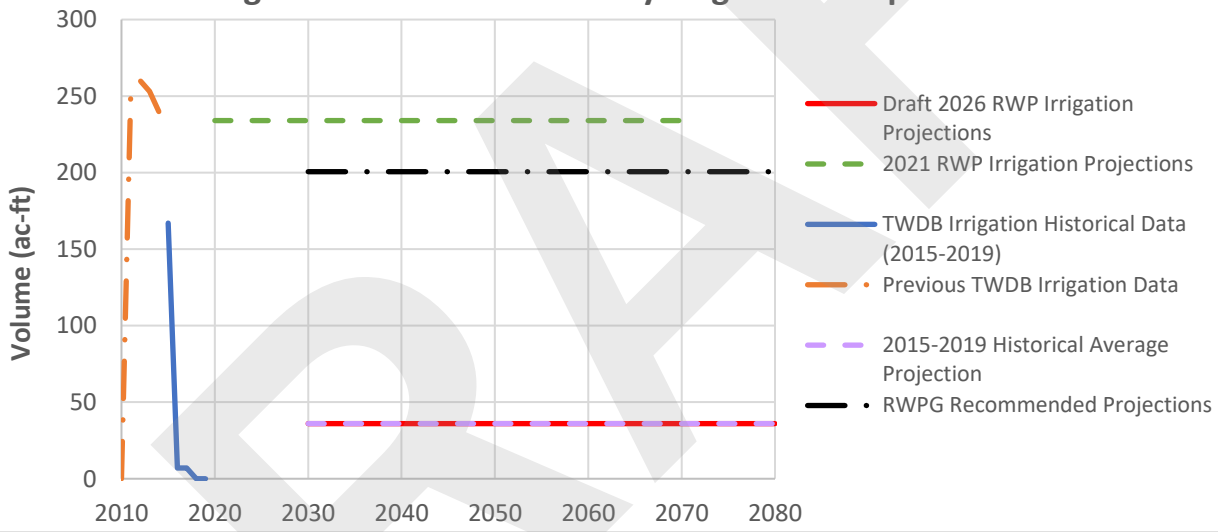
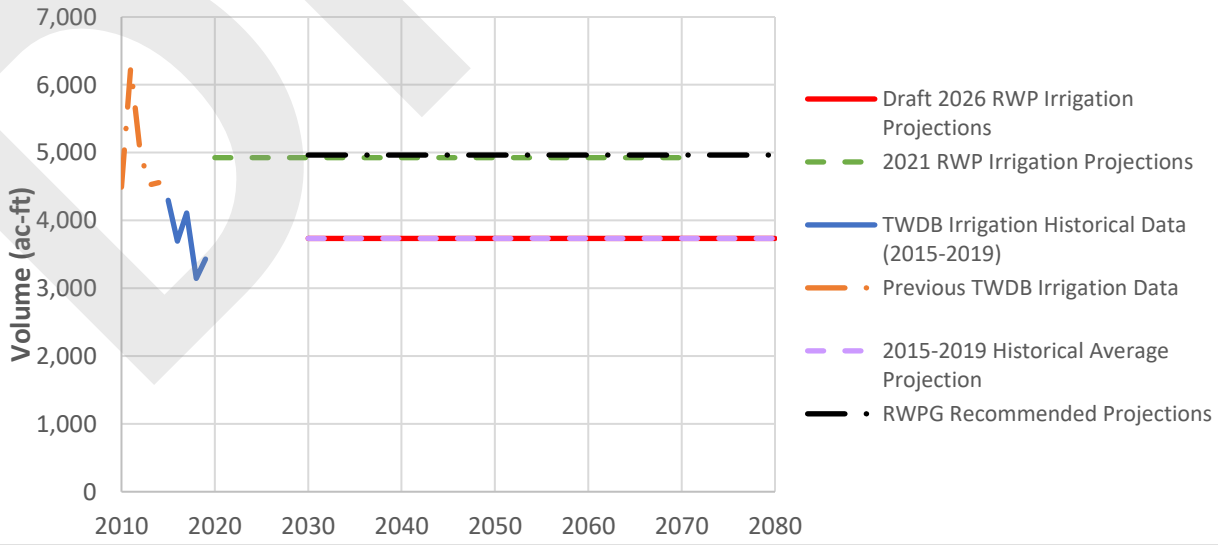


Figure 15A. Tarrant County Irrigation Comparison



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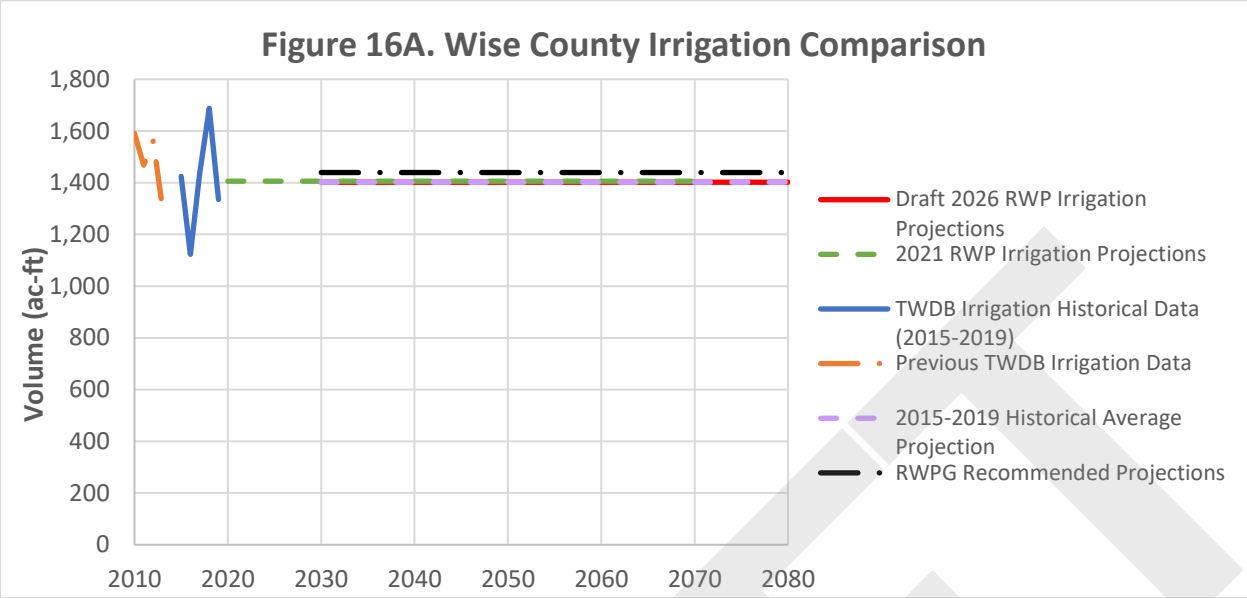
Figure 16A. Wise County Irrigation Comparison
Volume (ac-ft)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2010
2020
2030
2040
2050
2060
2070
2080
Draft 2026 RWP Irrigation Projections
2021 RWP Irrigation Projections
TWDB Irrigation Historical Data (2015-2019)
Previous TWDB Irrigation Data
2015-2019 Historical Average Projection
RWPG Recommended Projections

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MEMORANDUM

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801 Cherry Street, Suite 2800 + Fort Worth, Texas 76102 + 817-735-7300 + FAX 817-735-7491 www.freese.com

TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft Manufacturing Water Use Projections

DATE: 7/5/2023

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft manufacturing demand projections in January of 2022. The draft projections will be reviewed by the individual planning groups and recommendations will be provided to the TWDB to be considered. The final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2027 State Water Plan (SWP). The purpose of this technical memorandum is to document information related to historical manufacturing usage and provide information supporting recommended modifications to the draft manufacturing demands.

Manufacturing water use is defined by the TWDB as water used in the production process of manufactured products, including water used by employees for drinking and sanitation purposes. The manufacturing water use category does not include water use by all manufacturers, as described in the following section. Manufacturing demands in Region C include larger manufacturing facilities, food processing operations, defense industry operations, and others. Historically, manufacturing has accounted for approximately 30 percent of all non-municipal water use in Region C[1].

1.1 Historical Manufacturing Water Use Estimates

The TWDB's manufacturing water use estimates are obtained from manufacturing facilities that complete TWDB Water Use Surveys and from manufacturing use volumes reported by surveyed municipal water sellers. The TWDB historical manufacturing water use estimates focus on facilities that use large amounts of water and/or are self-supplied by groundwater or surface water. Facilities with smaller uses that are supplied by public utilities and cannot easily be tracked separately are included in municipal water demands.

As of January 2022, historical data estimates are available through the year 2019. Since 2015, the region-wide manufacturing water use estimates have ranged from 39,519 to 40,850 acre-feet per year (Figure 1). This represents approximately 3.6% of the total state manufacturing water use.

[1] Based on historical water use estimates from the TWDB.

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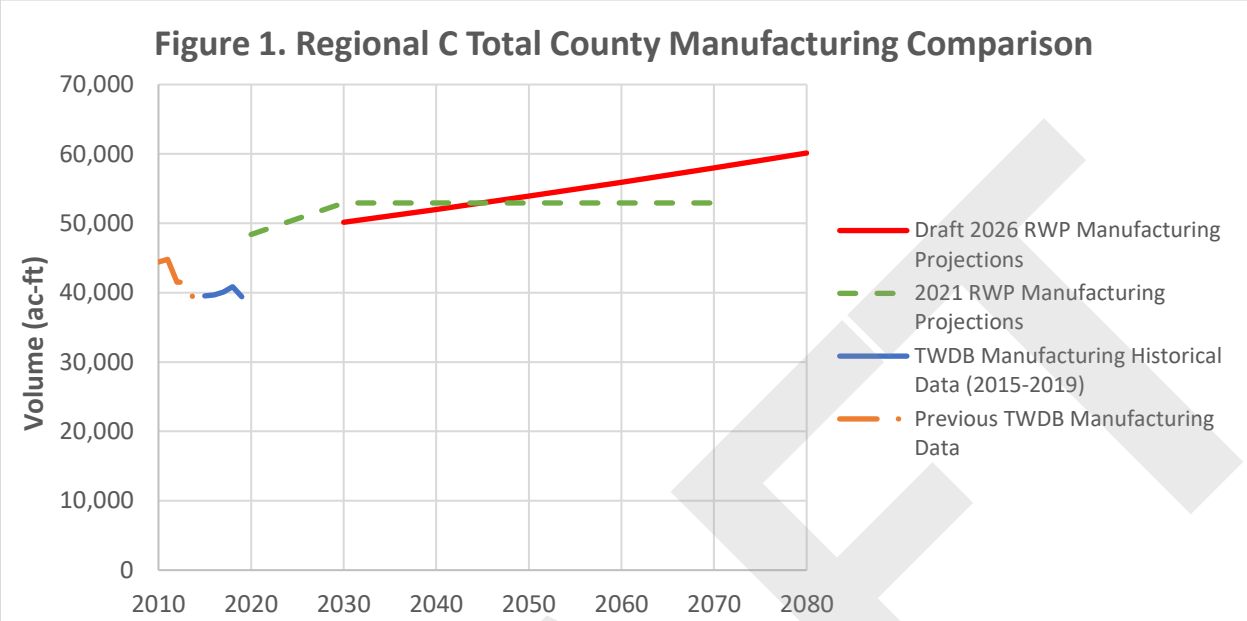

1.2 TWDB Draft Manufacturing Water Demand Projections

TWDB's draft 2026 manufacturing demand projections are based on the maximum annual manufacturing water use that occurred in each county during 2015-2019 plus an estimate of the non-surveyed water use. Non-surveyed water use was determined using the U.S. Census Bureau's Business Patterns (CBP)[2] and an inventory of the industries from the Water Use Survey.

To obtain the 2030 demand projections, the 2020 demand projections were multiplied by the statewide annual historic water use rate of change from 2010-2019, which was determined to be 0.96%. This was to account for potential changes in production and water use that may occur between the baseline water use values and the first projected decade. For each planning decade after 2030, a statewide manufacturing growth proxy of 0.37% was applied annually to project increases in manufacturing water demands. This growth proxy was based on the CBP historical number of establishments in the manufacturing sector from 2010-2019. Both of these growth factors (0.96% and 0.37%) were applied equally by county across the state.

The draft projected manufacturing water demands for the 2026 Region C Plan by county and the decadal increases are shown in Table 1.

[2] U.S. Census Bureau, *CBP Datasets*. URL: https://www.census.gov/programs-surveys/cbp/data/datasets.html, accessed January 2022.

Table 1. TWDB Draft Manufacturing Water Demands

County Name	Draft Manufacturing Demands (ac-ft/yr)							Increase from Baseline (ac-ft/yr)				
	Baseline	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070
Collin	4,518	4,952	5,135	5,325	5,522	5,726	5,938	434	617	807	1,004	1,208
Cooke	127	139	144	149	155	161	167	12	17	22	28	34
Dallas	18,436	20,206	20,954	21,729	22,533	23,367	24,232	1,770	2,518	3,293	4,097	4,931
Denton	552	605	627	650	674	699	725	53	75	98	122	147
Ellis	5,164	5,660	5,869	6,086	6,311	6,545	6,787	496	705	922	1,147	1,381
Fannin	5	5	5	5	5	5	5	0	0	0	0	0
Freestone	50	55	57	59	61	63	65	5	7	9	11	13
Grayson	2,501	2,741	2,842	2,947	3,056	3,169	3,286	240	341	446	555	668
Henderson	1,158	1,269	1,316	1,365	1,416	1,468	1,522	111	158	207	258	310
Jack	0	0	0	0	0	0	0	0	0	0	0	0
Kaufman	1,074	1,177	1,221	1,266	1,313	1,362	1,412	103	147	192	239	288
Navarro	991	1,086	1,126	1,168	1,211	1,256	1,302	95	135	177	220	265
Parker	78	85	88	91	94	97	101	7	10	13	16	19
Rockwall	6	7	7	7	7	7	7	1	1	1	1	1
Tarrant	10,858	11,900	12,340	12,797	13,270	13,761	14,270	1,042	1,482	1,939	2,412	2,903
Wise	232	254	263	273	283	293	304	22	31	41	51	61
TOTAL	**45,750**	**50,141**	**51,994**	**53,917**	**55,911**	**57,979**	**60,123**	**4,391**	**6,244**	**8,167**	**10,161**	**12,229**

1.3 Criteria for Revising the Draft Manufacturing Water Demand Projections

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the manufacturing water demand projections:

- A new or existing facility that has not been included in the TWDB water use survey.
- An industrial facility has recently closed its operation in a county.
- Plans for new construction or expansion of an existing industrial facility in a county at some future date.
- Evidence of a long-term projected water demand of a facility or industry within a county that is substantially different than the draft projections.
- Evidence of errors identified in historical water use, including volumes of reuse (treated effluent) or brackish groundwater that were not included in the draft projections.

The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any adjustments to the manufacturing water demand projections:

- Historical water use data and the 6-digit North American Industrial Classification System (NAICS) code of a manufacturing facility. The NAICS code classifies establishments by type of activity in which they are engaged as defined by the U.S. Office of Management and Budget and is a successor of the Standard Industrial Classification (SIC).
- Documentation and analysis that justify that the new manufacturing facility not included in the Water Use Survey database will increase the future manufacturing water demand for the county above the draft projections.
- The 6-digit NAICS code of the industrial facility that has recently located in a county and annual water use volume.

- Documentation of plans for a manufacturing facility to locate in a county at some future date will include the following data:
    - The quantity of water required by the planned facility on an annual basis.
    - The proposed construction schedule for the facility including the date the facility will become operational.
    - The 6-digit NAICS code for the planned facility.
- Other data that the RWPG considers adequate to justify an adjustment to the manufacturing water demand projections.

2.0 RCWPG RECOMMENDED REVISIONS TO DRAFT MANUFACTURING WATER DEMAND PROJECTIONS

Manufacturing water use is a small fraction of Region C's total water use, but it is an important component especially in the more rural counties. The North Texas area is a prime area to attract new businesses, including manufacturing in the electronic and high-tech sectors. There have been at least 12 new manufacturing facilities announced within the last one to two years within the region. Many are in the computer and electronics field. A facility currently under design is the Texas Instruments Semiconductor facility in Sherman (Grayson County). This is just one of several water manufacturing facilities locating to Grayson County. Another facility, Global Wafer, is expected to be online by 2026. Its production is planned to double by 2031 with the potential to double again during the planning period. This increase in water use is not reflected in the draft projections provided by the TWDB.

A list of new facilities in Region C announced by the Office of the Texas Governor[3] and those included in local publications is included in Table 2. This list does not necessarily represent all the expected new facilities in Region C in the next few years.

Table 2. List of Newly Announced Manufacturing Facilities in Region C

Facility	County	Process Type	NAICS	Expected Water Use[1] (ac-ft/yr)
TI Semiconductor Plant (new)	Grayson	Electronics	334	8,968
TI Semiconductor Plant (expansion)	Collin	Electronics	334	3,000
Global Wafer	Grayson	Electronics	334	6,722
Finisar	Grayson	Electronics	334	560
GAF Roofing Materials	Navarro	Recycling	327	500
Delta Electronics	Collin	Electronics	334	200
Mouser Electronics	Tarrant	Electronics	334	200
Chewters Chocolates	Rockwall	Food	311	400
Clevon (automotives)	Tarrant	Automotives	336	200
Niagara Bottling Plant	Dallas	Beverage	312	1,128
Raytheon	Collin	Electronics	334	150
Pratt Industries	Dallas	Packaging	322	50

1. Expected water use is based on data provided by the water provider or estimated based on similar facilities.

[3] Recent Project Announcements | Texas Economic Development | Office of the Texas Governor | Greg Abbott

The assumption of a state-wide average growth applied uniformly across the state does not accurately capture the manufacturing growth in North Texas. It also does not accurately capture the projected water use. This is demonstrated through the projected manufacturing water use in Grayson County. Water use by facility can vary significantly and projecting which industries may locate in specific counties is difficult at best. Without more specific data, an estimated growth approach seems reasonable. However, this growth should reflect current trends within the region.

To better capture current and future manufacturing growth Region C requests to increase the water demands for counties with known new facilities expected to be operating within the next two to five years. This includes known projected expansions of these facilities. The state-wide growth rate (0.96%) for 2030 would be applied to the new baseline. For subsequent decades, the state-wide manufacturing growth proxy (0.37%) would be applied. For Grayson County, the growth factors are applied to the TWDB baseline, and the demands are adjusted to incorporate the projected demand for the new facilities in Sherman, Texas, because the state-wide growth rates do not accurately reflect the planned expansions for these facilities.

A comparison of the draft projections for the 2026 RWP (provided by TWDB), the final 2021 RWP projections, and the proposed RCWPG revisions to the 2026 RWP projections is presented in Table 3 and Figure 2.

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Table 3. Comparison of Region C Manufacturing Demand Projections

County Name	2021 RWP Projections (ac-ft/yr)						Draft Projections for 2026 RWP (ac-ft/yr)						Recommended RWPG Revisions (ac-ft/yr)					
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
Collin	2,246	2,602	2,602	2,602	2,602	2,602	4,952	5,135	5,325	5,522	5,726	5,938	8,623	8,942	9,273	9,616	9,972	10,341
Cooke	116	128	128	128	128	128	139	144	149	155	161	167	139	144	149	155	161	167
Dallas	21,834	23,073	23,073	23,073	23,073	23,073	20,206	20,954	21,729	22,533	23,367	24,232	21,497	22,292	23,117	23,972	24,859	25,779
Denton	374	440	440	440	440	440	605	627	650	674	699	725	605	627	650	674	699	725
Ellis	5,414	6,549	6,549	6,549	6,549	6,549	5,660	5,869	6,086	6,311	6,545	6,787	5,660	5,869	6,086	6,311	6,545	6,787
Fannin	12	12	12	12	12	12	5	5	5	5	5	5	5	5	5	5	5	5
Freestone	19	19	19	19	19	19	55	57	59	61	63	65	55	57	59	61	63	65
Grayson	2,951	3,009	3,009	3,009	3,009	3,009	2,741	2,842	2,947	3,056	3,169	3,286	11,148	19,092	19,197	19,306	19,419	19,536
Henderson	806	985	985	985	985	985	1,269	1,316	1,365	1,416	1,468	1,522	1,269	1,316	1,365	1,416	1,468	1,522
Jack	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Kaufman	946	1,109	1,109	1,109	1,109	1,109	1,177	1,221	1,266	1,313	1,362	1,412	1,177	1,221	1,266	1,313	1,362	1,412
Navarro	894	1,062	1,062	1,062	1,062	1,062	1,086	1,126	1,168	1,211	1,256	1,302	1,634	1,694	1,757	1,822	1,889	1,959
Parker	87	103	103	103	103	103	85	88	91	94	97	101	85	88	91	94	97	101
Rockwall	31	36	36	36	36	36	7	7	7	7	7	7	445	461	478	496	514	533
Tarrant	12,197	13,301	13,301	13,301	13,301	13,301	11,900	12,340	12,797	13,270	13,761	14,270	12,339	12,796	13,269	13,760	14,269	14,797
Wise	454	501	501	501	501	501	254	263	273	283	293	304	254	263	273	283	293	304
Total	**48,382**	**52,930**	**52,930**	**52,930**	**52,930**	**52,930**	**50,141**	**51,994**	**53,917**	**55,911**	**57,979**	**60,123**	**64,935**	**74,867**	**77,035**	**79,284**	**81,615**	**84,033**

Grey text indicates that the was no change from the TWDB Draft projections.

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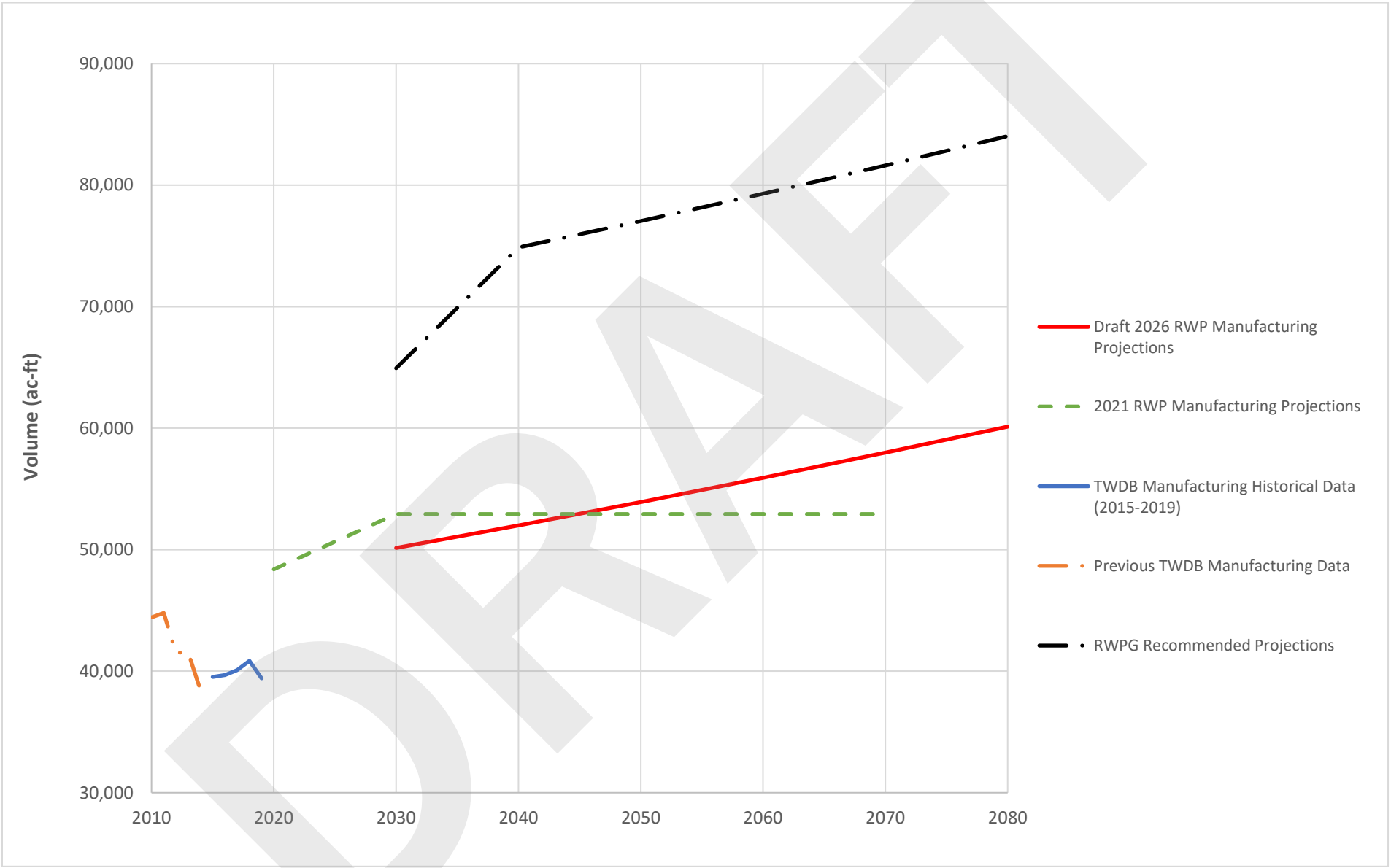
Figure 2. Region C Manufacturing – Comparison of Water Use Estimates, 2021 Region C Water Plan Projection, Proposed Projections, and Revised Projections



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Attachment A
Manufacturing Demand by County Historical Usage and Projections

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Figure 1A. Collin County Manufacturing Comparison

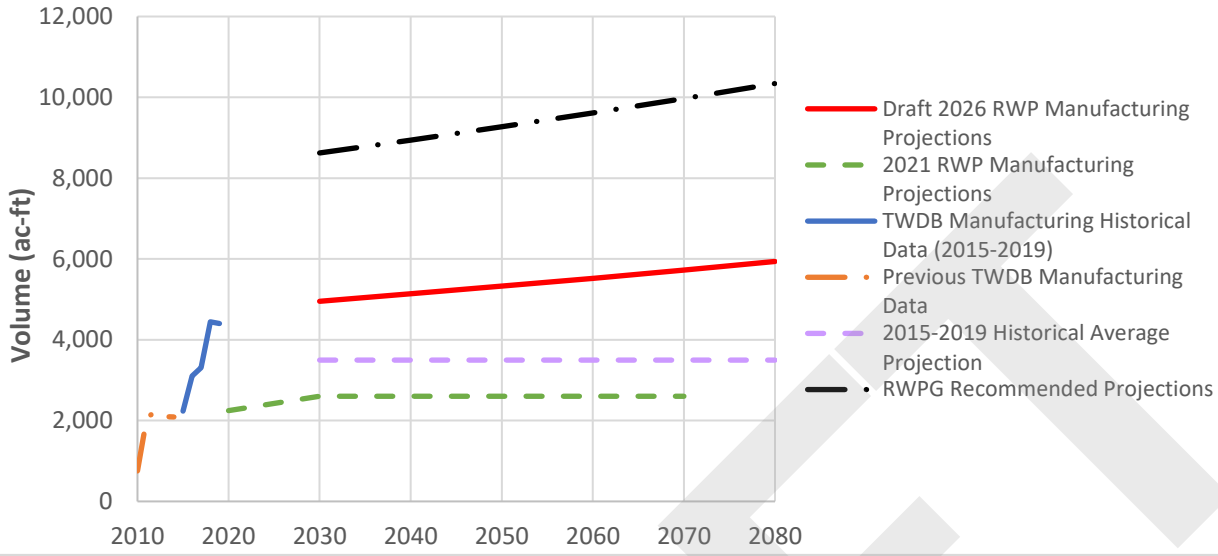

Figure 2A. Cooke County Manufacturing Comparison

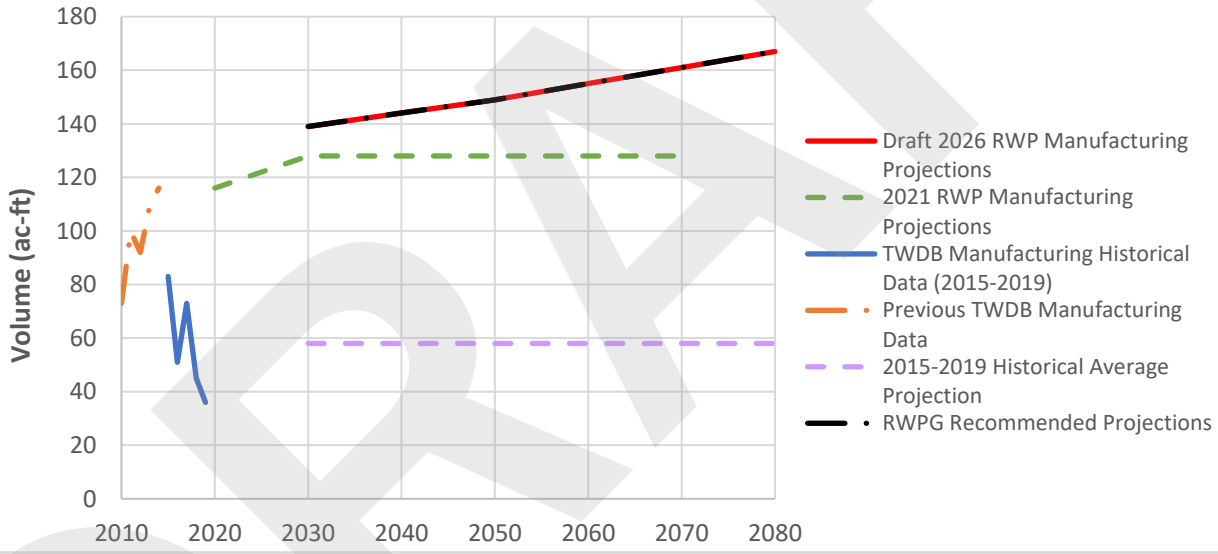

Figure 3A. Dallas County Manufacturing Comparison

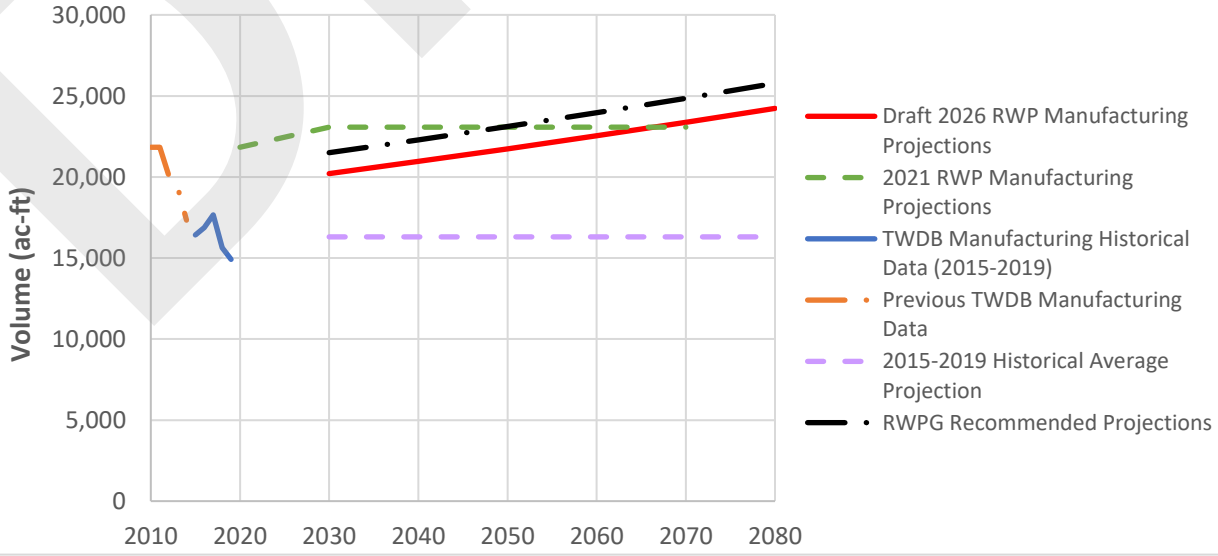

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Figure 4A. Denton County Manufacturing Comparison

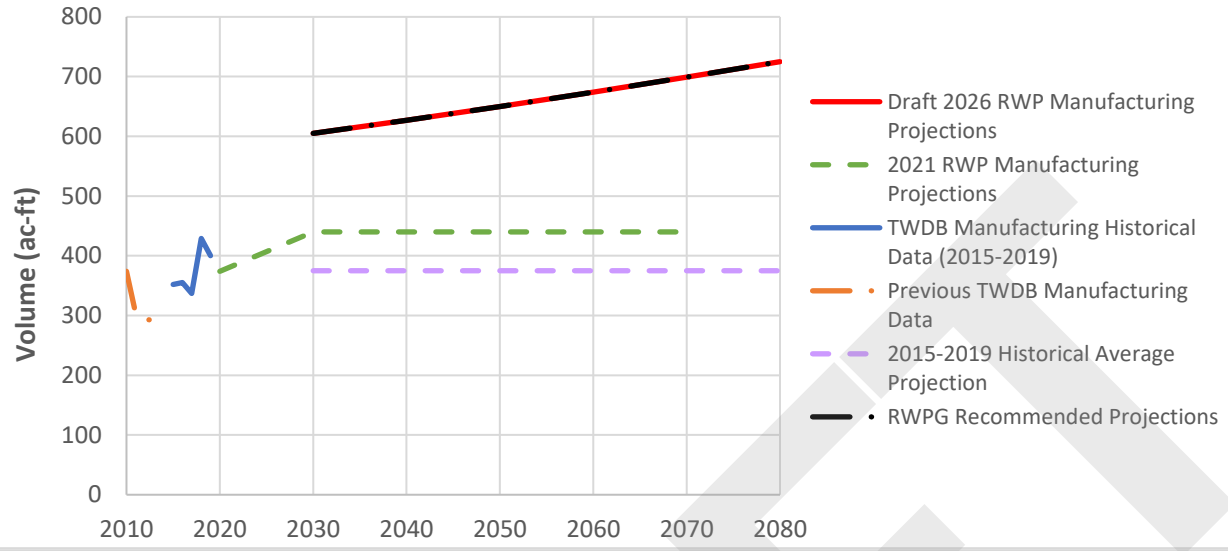

Figure 5A. Ellis County Manufacturing Comparison

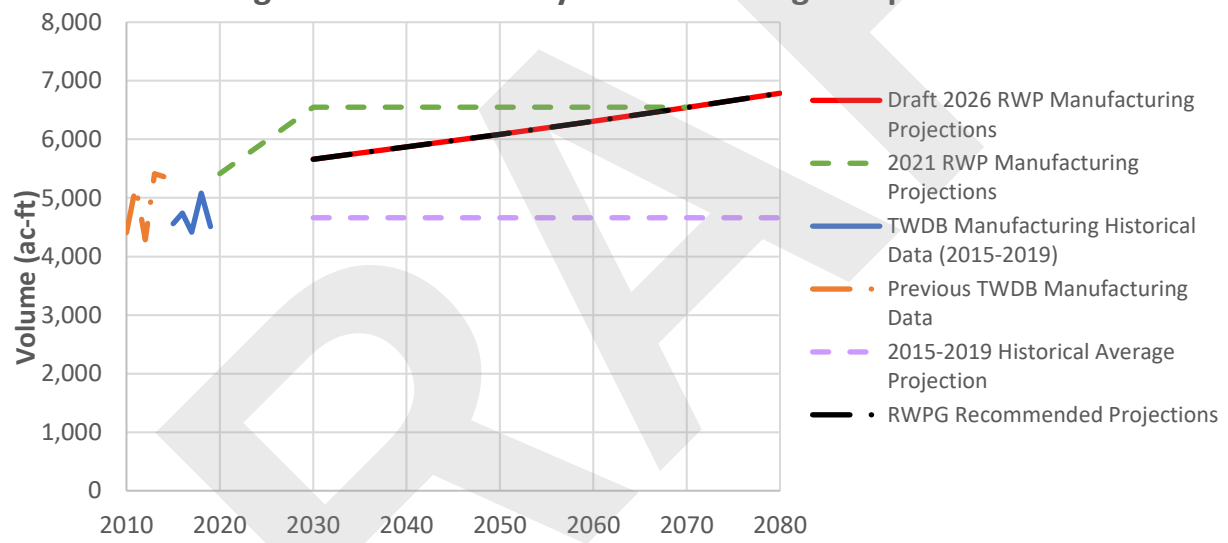

Figure 6A. Fannin County Manufacturing Comparison

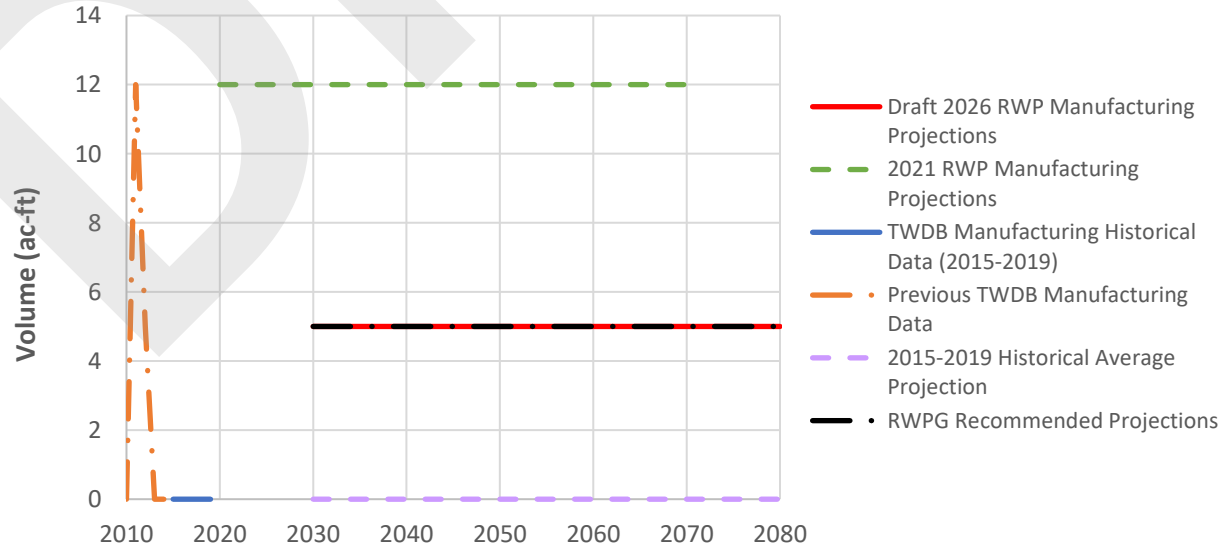

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Figure 7A. Freestone County Manufacturing Comparison

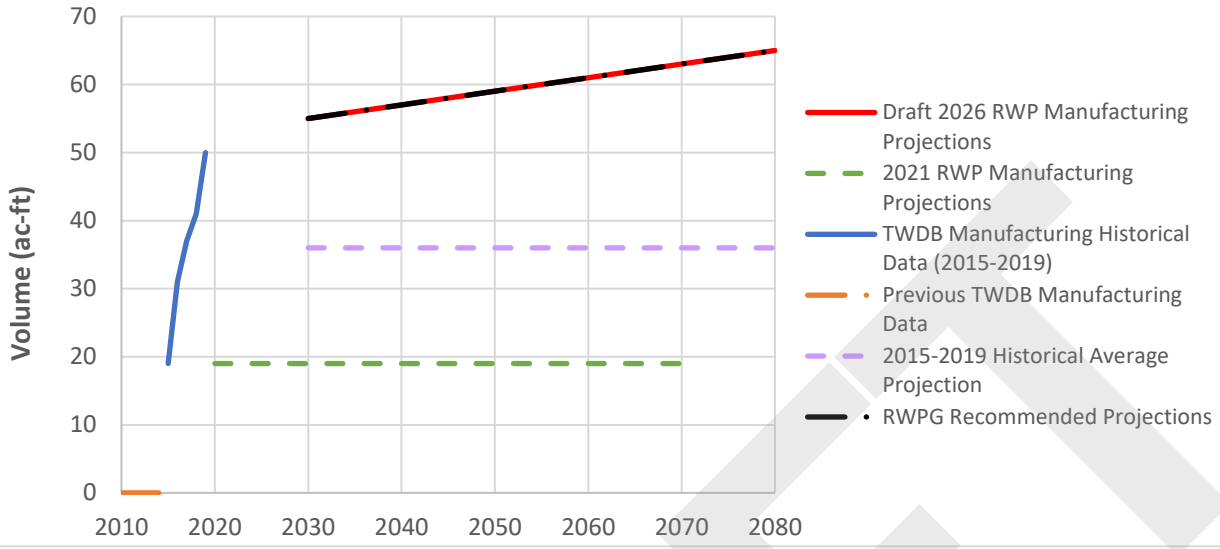

Figure 8A. Grayson County Manufacturing Comparison

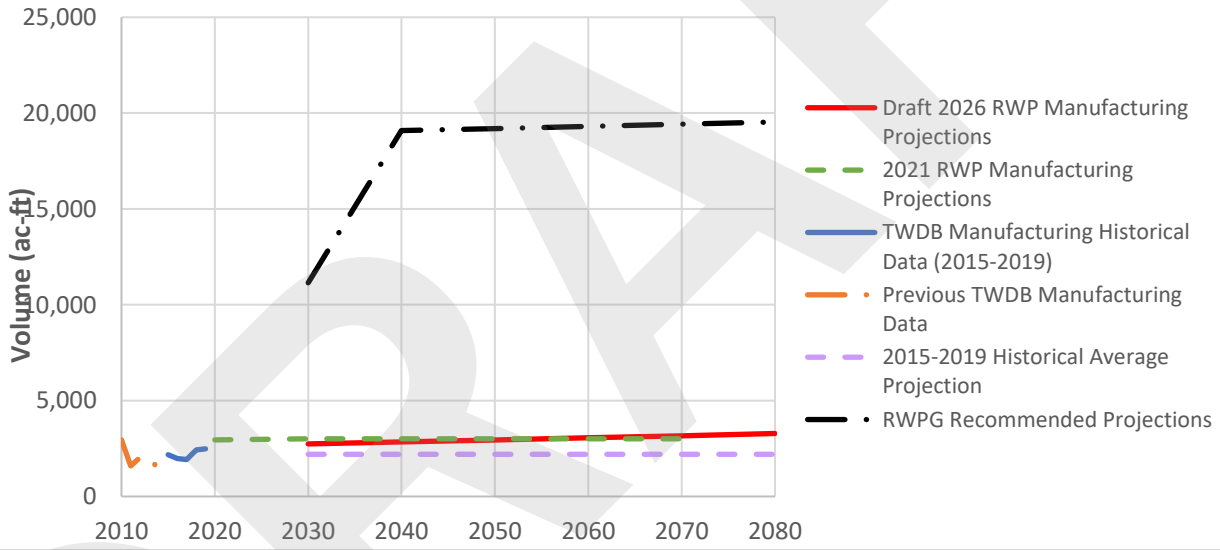

Figure 9A. Henderson County Manufacturing Comparison

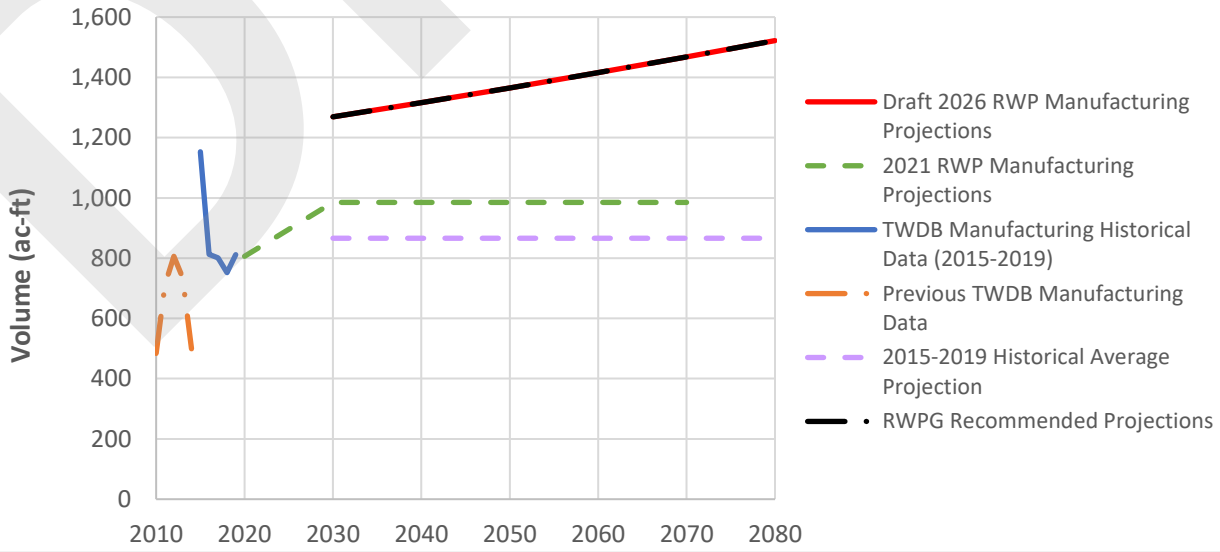

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Figure 10A. Jack County Manufacturing Comparison

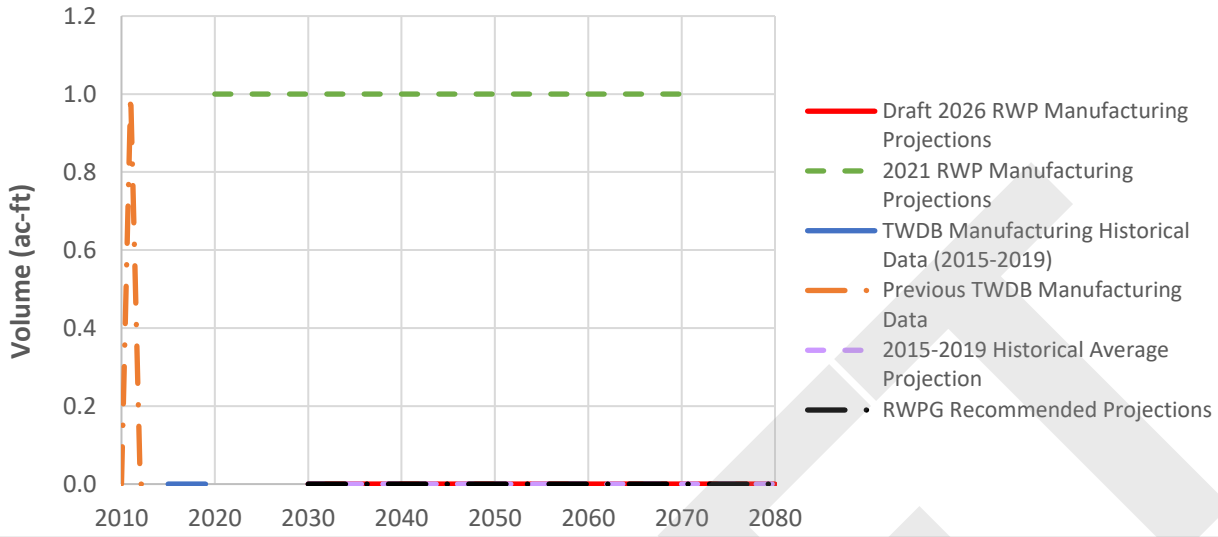

Figure 11A. Kaufman County Manufacturing Comparison

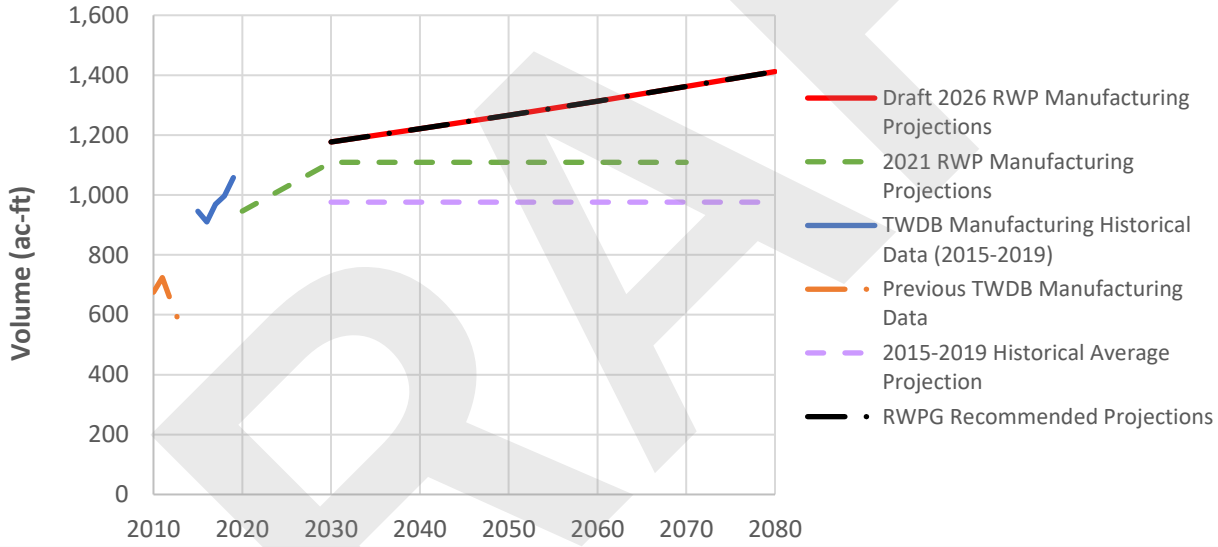

Figure 12A. Navarro County Manufacturing Comparison

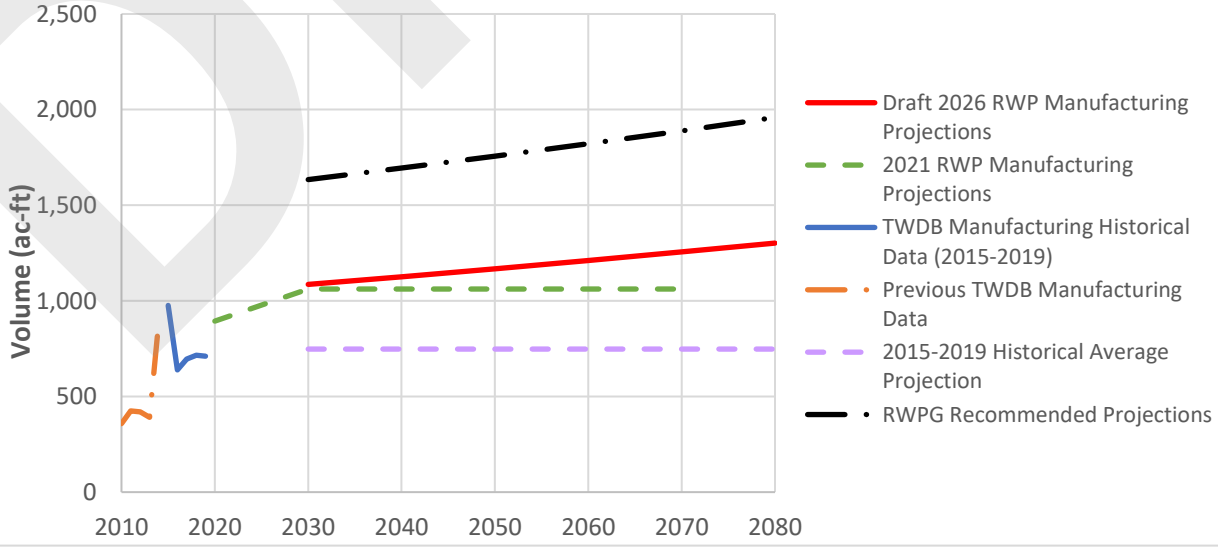

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Figure 13A. Parker County Manufacturing Comparison

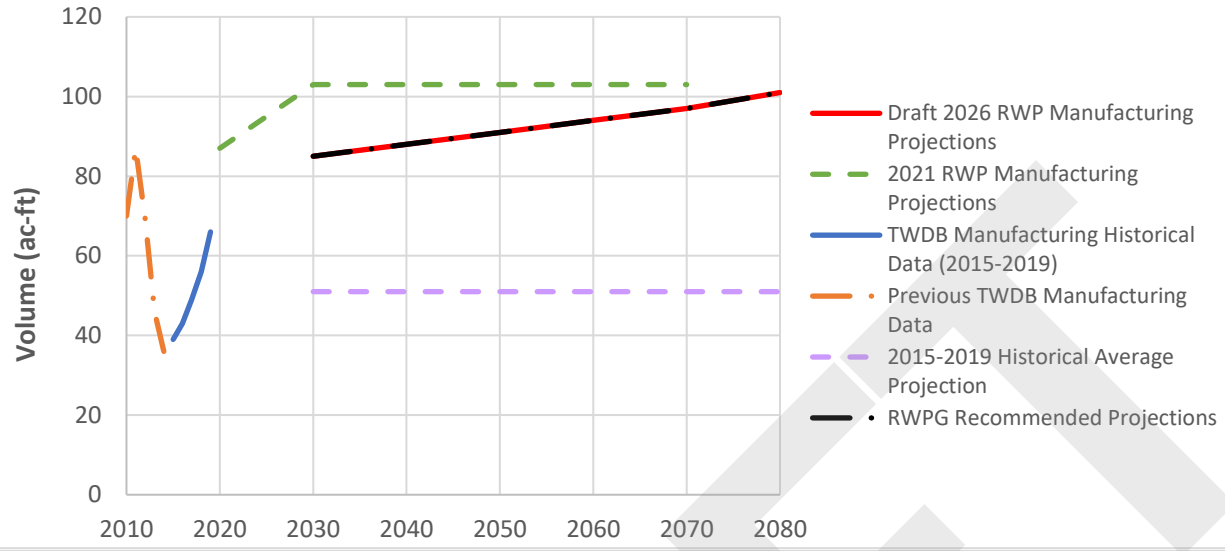


Figure 14A. Rockwall County Manufacturing Comparison

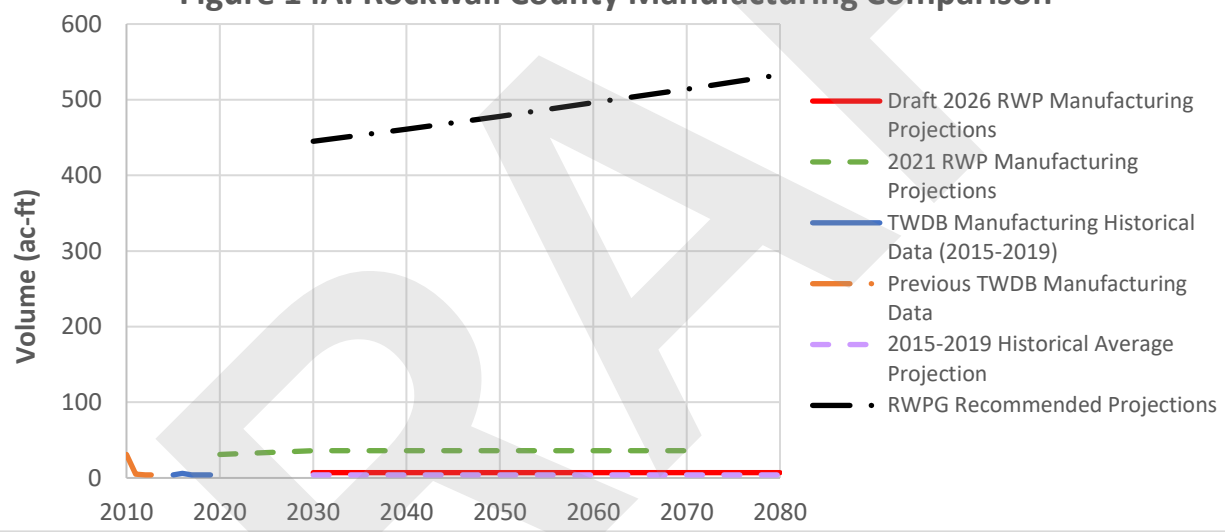
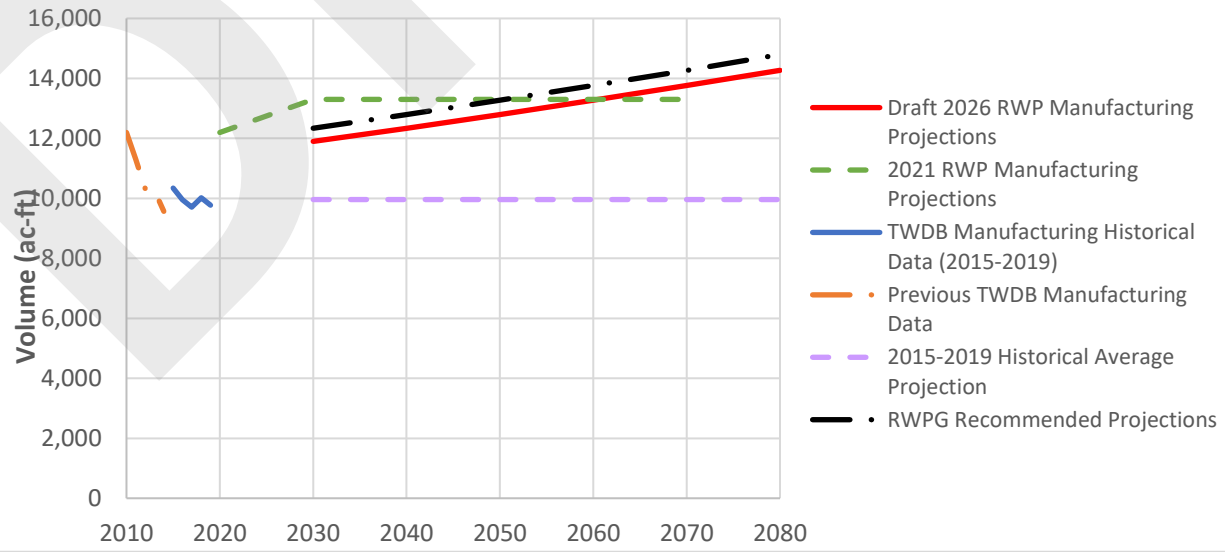


Figure 15A. Tarrant County Manufacturing Comparison



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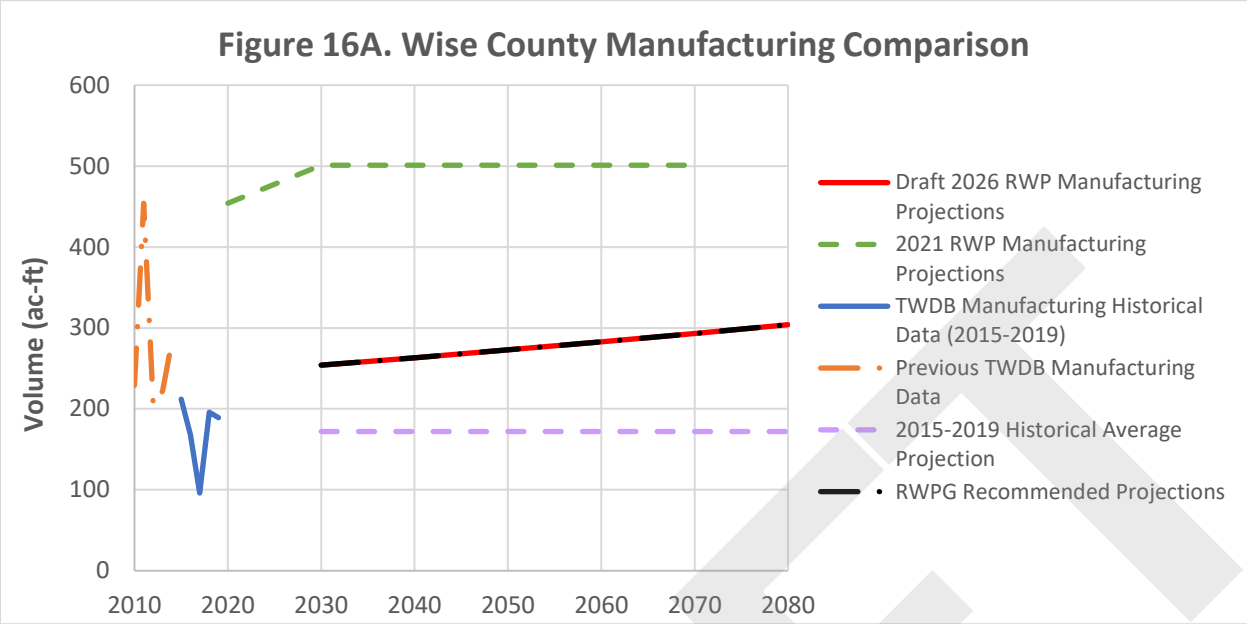
Figure 16A. Wise County Manufacturing Comparison
Volume (ac-ft)
600
500
400
300
200
100
0
2010
2020
2030
2040
2050
2060
2070
2080
Draft 2026 RWP Manufacturing Projections
2021 RWP Manufacturing Projections
TWDB Manufacturing Historical Data (2015-2019)
Previous TWDB Manufacturing Data
2015-2019 Historical Average Projection
RWPG Recommended Projections

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MEMORANDUM

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TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft Steam Electric Power Water Use Projections

DATE: 11/9/2022

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections in January and August 2022. The review process of these projections includes review by the individual planning groups, with recommended changes provided to the TWDB by July 2023. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the TWDB and incorporated into the 2027 State Water Plan (SWP). The purpose of this technical memorandum is to document information related to historical steam electric power (SEP) usage and provide information supporting recommended modifications, if needed, to the draft SEP demands.

SEP water use is defined by the TWDB as consumed water used in the production process of SEP, including water used by employees for drinking and sanitation purposes. It does not include cooling water that is returned to a lake or stream. Historically, SEP has accounted for approximately 21 percent of all non-municipal water use in Region C[1].

1.1 Historical Steam Electric Power Water Use Estimates

The TWDB's SEP water use estimates are obtained from SEP facilities that complete TWDB Water Use Surveys. These typically include large power generation plants that sell power on the open market and do not include cogeneration plants for manufacturing or mining processes. SEP water uses reported by municipal users in their Water Use Surveys are also included in the SEP water use estimates.

As of January 2022, historical data estimates are available through the year 2019. Since the year 2015, the region-wide SEP water use estimates have ranged from 14,783 to 37,475 acre-feet (Figure 1). The TWDB historical SEP water use estimates include water provided by reuse programs.

[1] Based on historical water use estimates from the TWDB.

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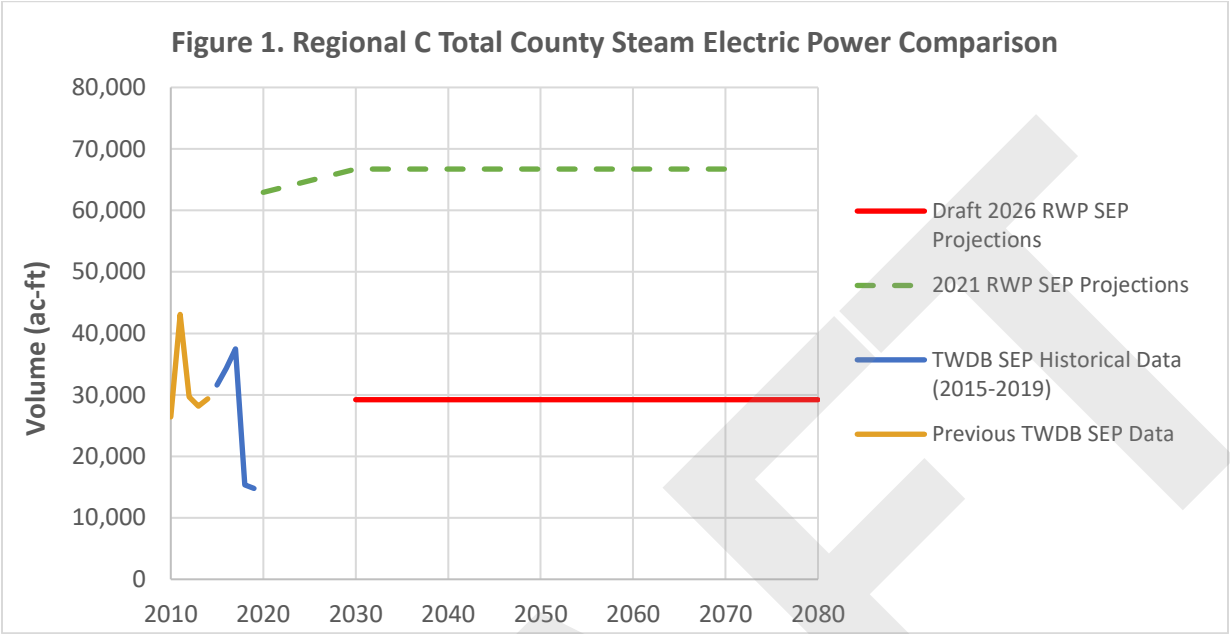

1.2 TWDB Draft Steam Electric Power Water Demand Projections

TWDB's draft 2030 SEP demand projections for the 2026 Regional Water Plan are based on the maximum annual SEP water use that occurred in each county during 2015-2019. After 2030, the draft SEP water demand projections are held constant through 2080 with one exception: estimated water use from new SEP facilities listed in state and federal reports is added to the projections from the anticipated operation date to 2080. For new facilities, TWDB staff estimated water demand from fuel type, generation capacity, average water use information, and average operational time.
Based on this information, new facilities have occurred in the following counties since the last 2021 Region C Water plan:

- Dallas (online by 2016): WM Renewable Energy LLC – Skyline Gas Recovery
- Denton (online by 2018): Denton Energy Center
- Ellis (online by 2019): Ennis Power Company LLC
- Wise (Online by 2012): Wise County Power Company LLC

Water use from some of these facilities are captured in the historical SEP water use. Overall, there has been a reduction in SEP water use in Region C over the past decade. This is primarily due to the number of facilities that are no longer operating. Retired facilities since the 2021 RWP in the following counties include:

- Dallas (retired prior to 2015): Luminant Generation Company LLC – North Lake Plant
- Fannin (retired prior to 2015): Valley NG Power Company LLC – Valley Steam Electric Station
- Freestone (retired after 2017): Luminant Generation Company LLC – Big Brown Steam Electric Station
- Parker (retired prior to 2015): Brazos Electric Power CO OP INC – North Texas Plant
- Tarrant (retired prior to 2015): Luminant Generation Company LLC – Eagle Mountain Steam Electric Station

For SEP plants that have not returned a Water Use Survey, water use was either obtained from the operator or water demand was estimated from kilowatt-hour output and fuel type. Power plants driven by landfill gas, wood waste biomass, battery, or renewable energy sources are not included in the draft water demand projections.

TWDB staff members have determined that holding 2030-2080 steam electric power water demands constant is "efficient, effective, and reasonable" for the following reasons:[2]

1. Basing projections on the highest county water use in recent years ensures sufficient supply for current water uses.
2. Developing modeled projections would be complicated and expensive. Modeling would have to include a number of potential water use drivers, including facility replacement schedules, anticipation of generation efficiency and cooling systems, carbon capture activities, cost of various fuels, and federal environmental/regulatory policies. Each of these drivers has its own probability of occurrence and level of impact.
3. Projected increases in solar and wind generation capacity will offset the need to operate some water-consuming facilities.
4. New steam electric power plants will be more efficient than existing plants.
5. It would be difficult to allocate increased demands by county, because locations of new facilities listed in government reports cannot be identified. This could also lead to double counting of demands from any new facilities brought forward by the RWPG.
6. There will be opportunities to update the projections during each planning cycle.

Although the Region C population has increased substantially since the 1980s, the reported SEP water use has declined (Figure 1). The decline is due in part to the retiring of coal facilities that used once through cooling and the construction of more water efficient energy facilities. This declining trend also supports holding 2030-2080 SEP water demands constant.

1.3 Criteria for Revising the Draft Steam Electric Power Water Demand Projections

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the SEP water demand projections:

- Documentation that the TWDB draft projections have not included a facility that warrants inclusion.
- Any local information related to new facilities or facility closures that may not have been included in Electrical Reliability Council of Texas's Capacity, Demand, and Reserves report.
- Evidence of a long-term projected water demand of a facility or in a county that is substantially different than the draft projections.
- Evidence of errors identified in historical water use, including volumes of reuse (treated effluent) water or brackish groundwater that were not included in the draft projections.
- Evidence that a currently-operating power generation facility has experienced a higher dry-year water use beyond the most recent five years, within the most recent 10 years.

[2] Texas Water Development Board, Methodologies for Developing Draft Irrigation, Manufacturing, and Steam-Electric Water Demand Projections, August 2022.

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The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any adjustments to the SEP water demand projections:

- Historical (2015-2019) water use data and description of a surveyed or future facility, including the fuel type, cooling process, capacity, average percent of time operating, and any other information necessary to estimate water use.
- Reports describing alternative trends or anticipated water use for steam-electric power generation.
- Specific information of an anticipated facility not listed in state or federal reports necessary to estimate the volume of water reasonably expected to be consumed. Such information would include generation method, cooling method, generation capacity and any additional information necessary to estimate the future water use.
- Other data that the RWPG considers adequate to justify an adjustment to the steam electric power water demand projections.

2.0 Proposed SEP Water Use

FNI consulted with the RWPG's electric power representative on the draft demands and approach adopted by the TWDB. Based on this input and our review of the draft projections, the following procedural changes are recommended:

- For existing facilities, use the highest use over the past ten years for each facility. This will provide representative demand during extreme hot weather, as experienced in the early 2010s.
- For facilities that have reached the end of their useful life and have recently been closed or decommissioned, the existing water supplies may be used by new facilities. Texas is growing and the need for greater electrical generation is high.
    - If a power provider retains the water right or contracted water for power generation, then include a demand equivalent to two-thirds (2/3) of the consumptive water right. The lower amount reflects a more water efficient replacement unit. However, the new power generation facility may be larger than the retired facility for less water demand.
    - If the water right is no longer retained, do not include future power demand at that location.

These changes will affect the following locations (Table 1). Table 1 shows the locations, water source and authorized consumption for power generation.

Table 1 Existing Water Supplies for Retired Facilities

County	Power Company	Water Source	Water right	Consumptive amount (ac-ft/yr)
Freestone	Big Brown	Fairfield Lake	CA-5040	14,150
Tarrant	Luminant	Eagle Mountain Lake	Contract 451, expires 2052	4,636

For the other facilities noted retired by the TWDB, the water right for the North Lake Power Station was sold to the City of Coppell. It has retained its industrial purpose, but it will likely not be used for future power generation. The Brazos Electric Co-op facility in Parker County was on Lake Weatherford and received water from the City of Weatherford. It is no longer operating and is not expected to reinitiate operations. The Valley Steam Electric Station in Fannin County was determined by ERCOT not to be needed for reliability. Luminant does not intend to construct a new facility at this location.

Luminant holds the water rights for Forest Grove Reservoir and a contract for water from Cedar Creek Lake. However, Forest Grove Reservoir has never filled, and it is uncertain if it will be used for power generation in the future. The TWDB has no reported use for this facility over the past ten years and therefore did not consider future use in the projected demands. Since there is no active lake or power facility, the potential demands associated with the water right and contract are not included in the Region C projections.

In addition to the inclusion of the above facilities, we reviewed the steam electric power demand memorandum developed for the 2021 Region C Water Plan and correspondence with wholesale water providers. We identified several new or potential facilities that are not included in the TWDB draft demands. These include:

- Grayson (additional 2,439 ac-ft/yr): Navasota Energy Generation Holdings Van Alstyne Energy Center.
- Henderson (additional 2,060 ac-ft/yr): Halyard Energy Henderson, LLC Halyard Henderson Energy Center.

The Van Alstyne Energy Center is still in permitting and is expected to be constructed in 2022 – 2024[3]. The Halyard Energy Center appears to have been delayed for now.

Since the Region C area will continue to need power generation, it is recommended to include the Val Alstyne Energy Center to be online by 2030 and the Halyard Henderson Energy Center to be online by 2040.

A comparison of the draft projections for the 2026 RWP (provided by TWDB), the final 2021 RWP projections, and the proposed RCWPG revisions to the 2026 SWP projections is presented in Table 2 and Figure 2.

[3] . Van Alstyne Energy Center Power Plant, US (power-technology.com)

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Table 2. Comparison of Region C Steam Electric Power Demand Projections

County Name	2021 RWP Projections (ac-ft/yr)						Draft Projections for 2026 RWP (ac-ft/yr)						Recommended RWPG Revisions (ac-ft/yr)					
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
Collin	40	40	40	40	40	40	20	20	20	20	20	20	40	40	40	40	40	40
Cooke	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6
Dallas	1065	1065	1065	1065	1065	1065	1,840	1,840	1,840	1,840	1,840	1,840	2,412	2,412	2,412	2,412	2,412	2,412
Denton	173	173	173	173	173	173	1,103	1,103	1,103	1,103	1,103	1,103	1,175	1,175	1,175	1,175	1,175	1,175
Ellis	901	901	901	901	901	901	1,854	1,854	1,854	1,854	1,854	1,854	1,854	1,854	1,854	1,854	1,854	1,854
Fannin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freestone	34,432	34,432	34,432	34,432	34,432	34,432	4,831	4,831	4,831	4,831	4,831	4,831	4,831	14,269	14,269	14,269	14,269	14,269
Grayson	4,387	4,387	4,387	4,387	4,387	4,387	2,134	2,134	2,134	2,134	2,134	2,134	4,573	4,573	4,573	4,573	4,573	4,573
Henderson	3,709	3,709	3,709	3,709	3,709	3,709	70	70	70	70	70	70	132	2,192	2,192	2,192	2,192	2,192
Jack	3772	3772	3772	3772	3772	3772	3,772	3,772	3,772	3,772	3,772	3,772	3,772	3,772	3,772	3,772	3,772	3,772
Kaufman	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793	9,793
Navarro	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parker	604	604	604	604	604	604	0	0	0	0	0	0	0	0	0	0	0	0
Rockwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tarrant	1157	4948	4948	4948	4948	4948	945	945	945	945	945	945	1,157	4,249	4,249	4,249	4,249	4,249
Wise	2,894	2,894	2,894	2,894	2,894	2,894	2,844	2,844	2,844	2,844	2,844	2,844	2,894	2,894	2,894	2,894	2,894	2,894
Total	**62,932**	**66,723**	**66,723**	**66,723**	**66,723**	**66,723**	**29,212**	**29,212**	**29,212**	**29,212**	**29,212**	**29,212**	**32,639**	**47,229**	**47,229**	**47,229**	**47,229**	**47,229**

Grey text indicates that the was no change from the TWDB Draft projections.

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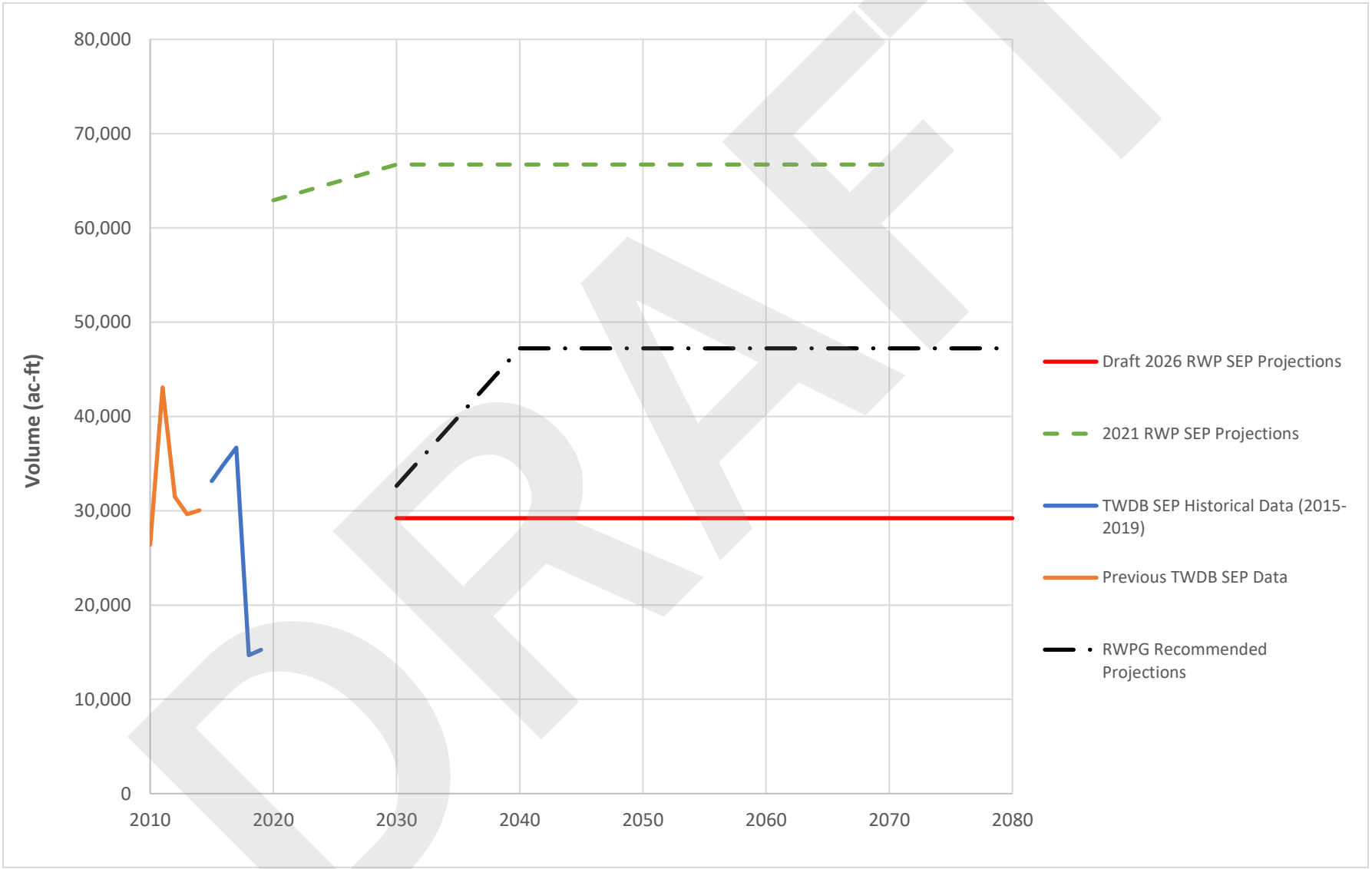
Figure 2. Region C Steam Electric Power – Comparison of Water Use Estimates, 2021 Region C Water Plan Projection, Proposed Projections, and Revised Projections



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Attachment A
Steam Electric Power Demand by County
Historical Usage and Projections

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Figure 1A. Collin County Steam Electric Power Comparison

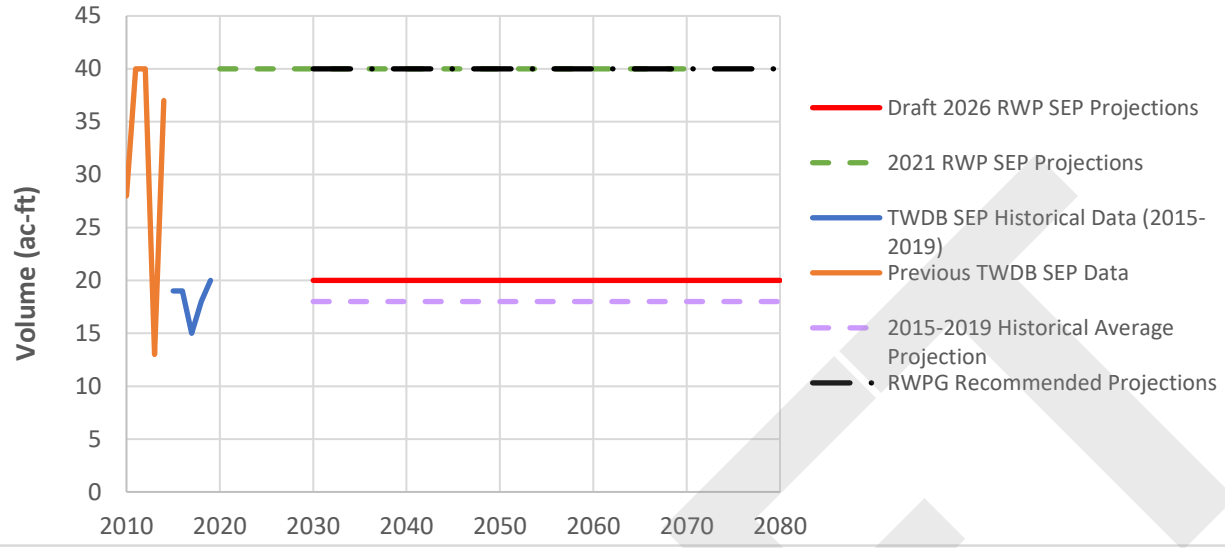

Figure 2A. Cooke County Steam Electric Power Comparison

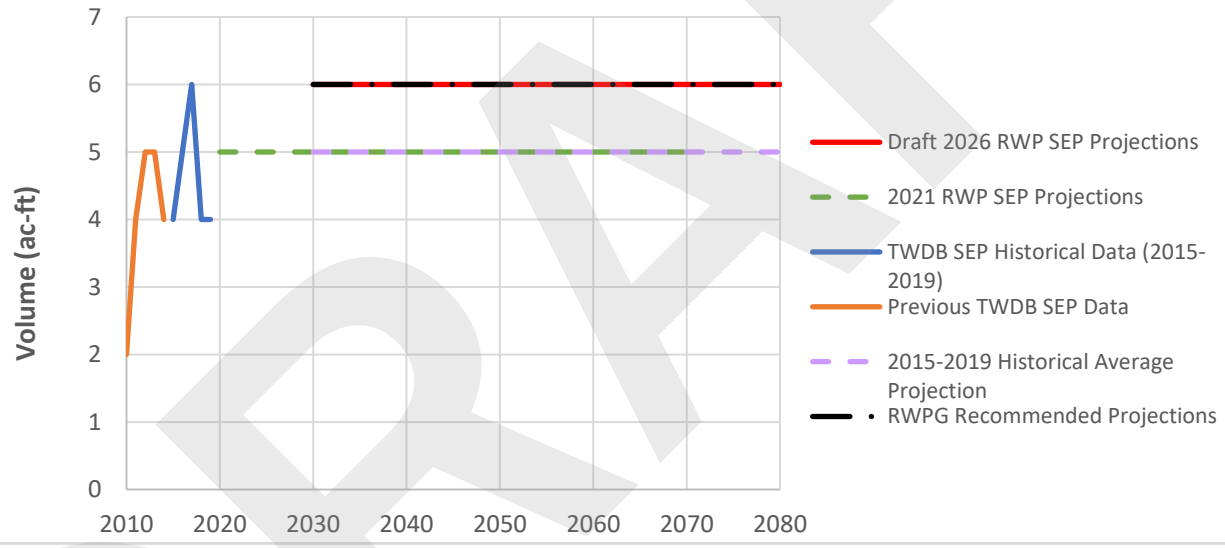

Figure 3A. Dallas County Steam Electric Power Comparison

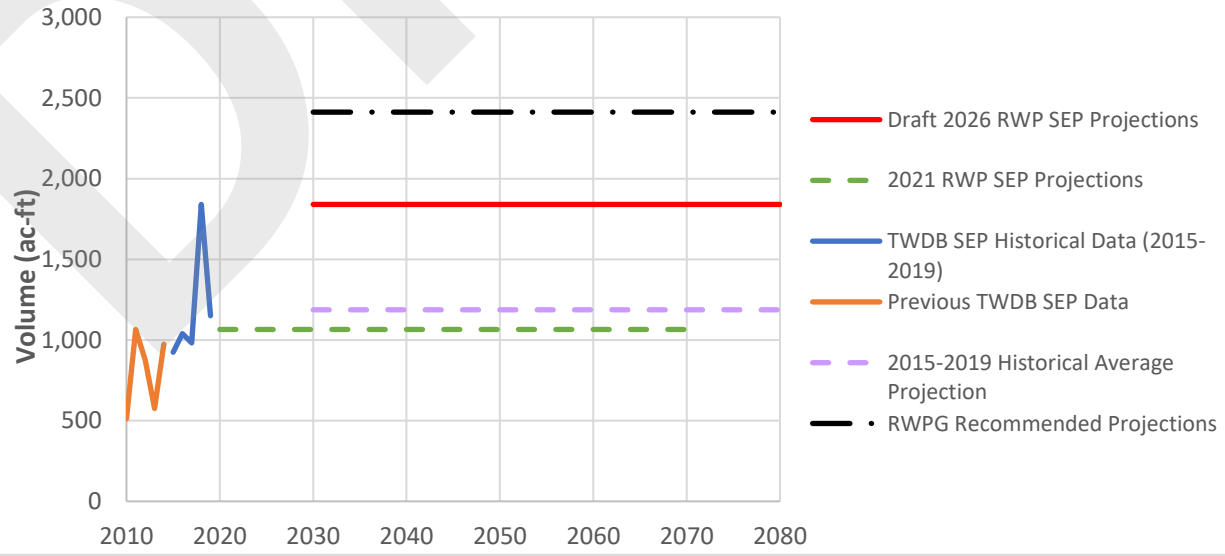

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Figure 4A. Denton County Steam Electric Power Comparison

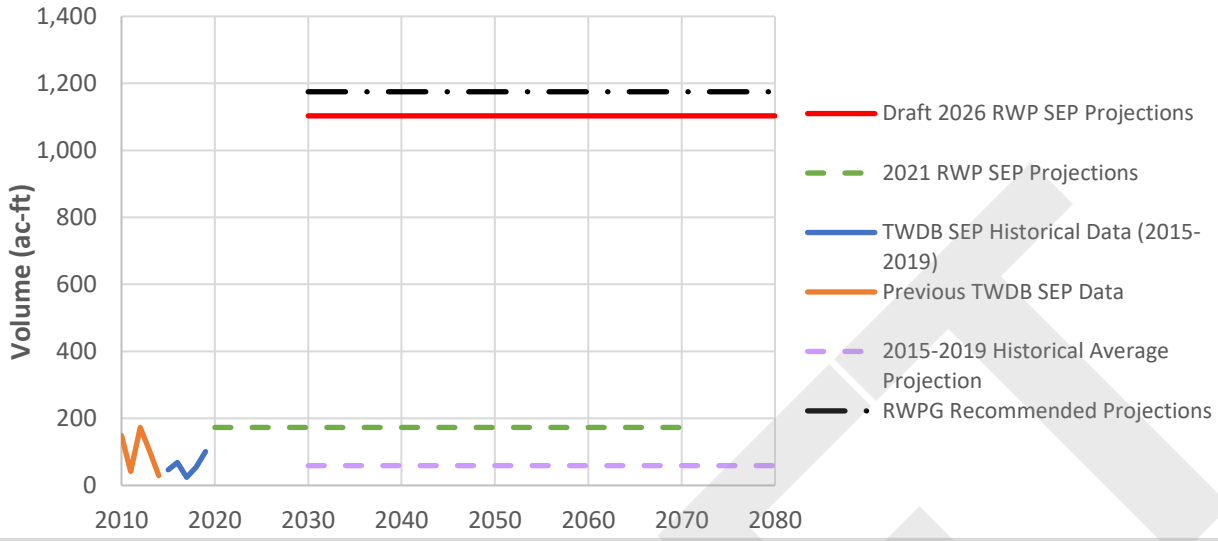

Figure 5A. Ellis County Steam Electric Power Comparison

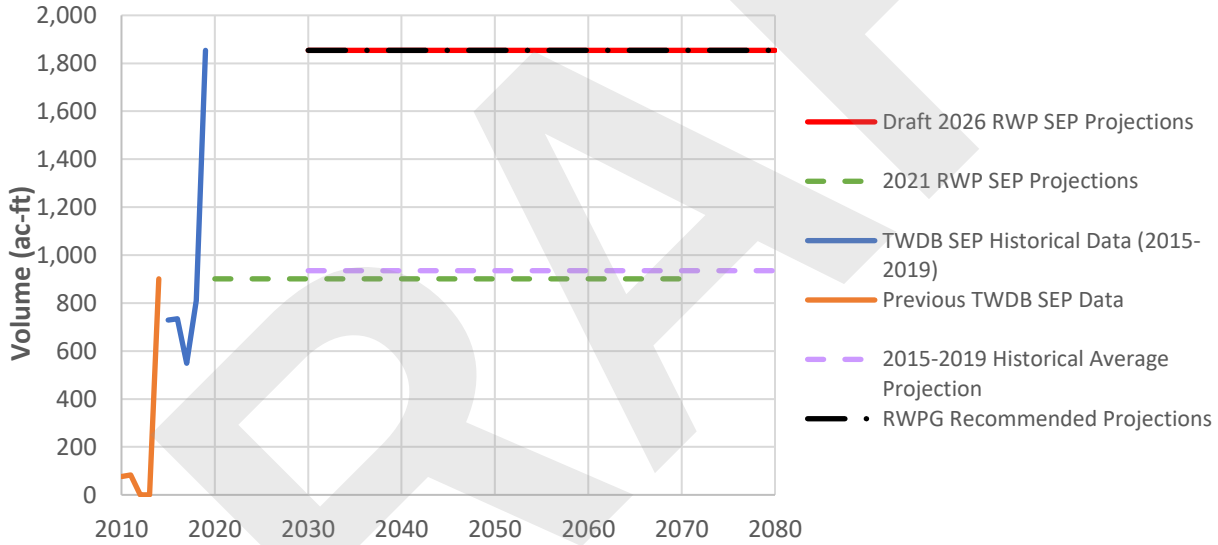

Figure 6A. Fannin County Steam Electric Power Comparison

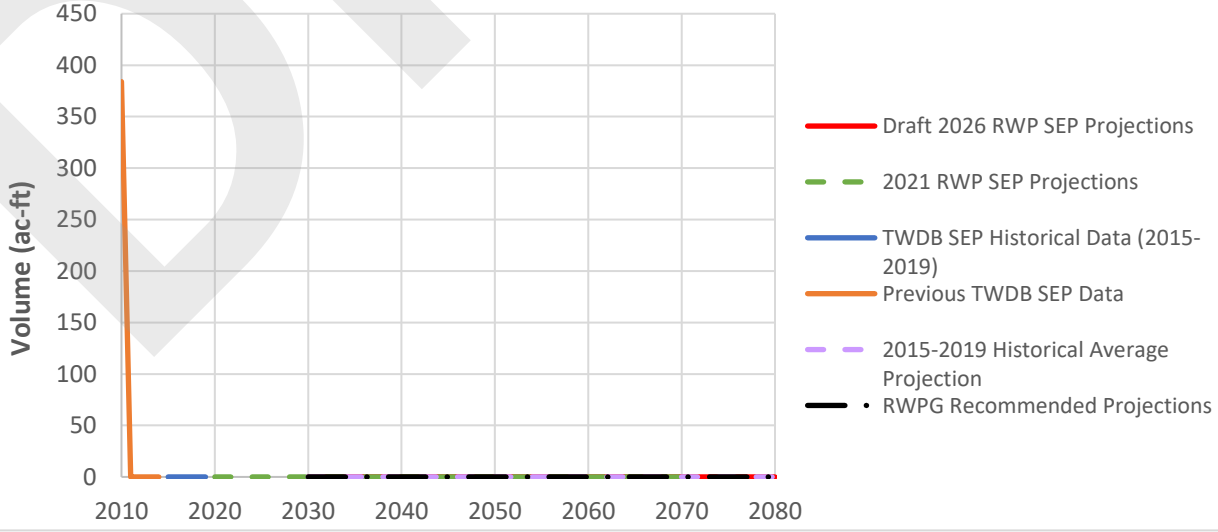

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Figure 7A. Freestone County Steam Electric Power Comparison

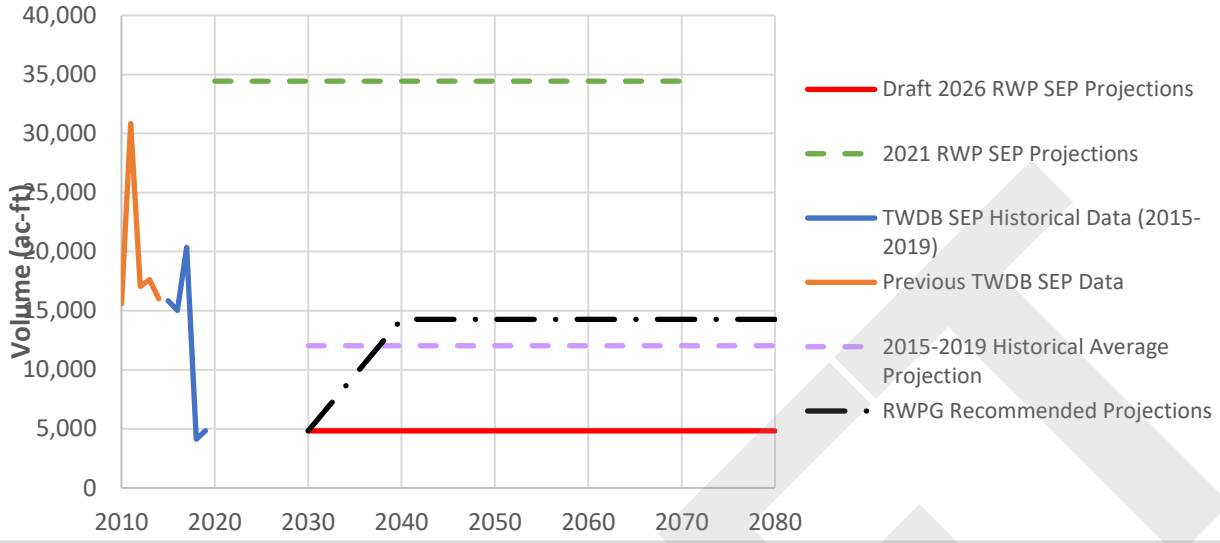

Figure 8A. Grayson County Steam Electric Power Comparison

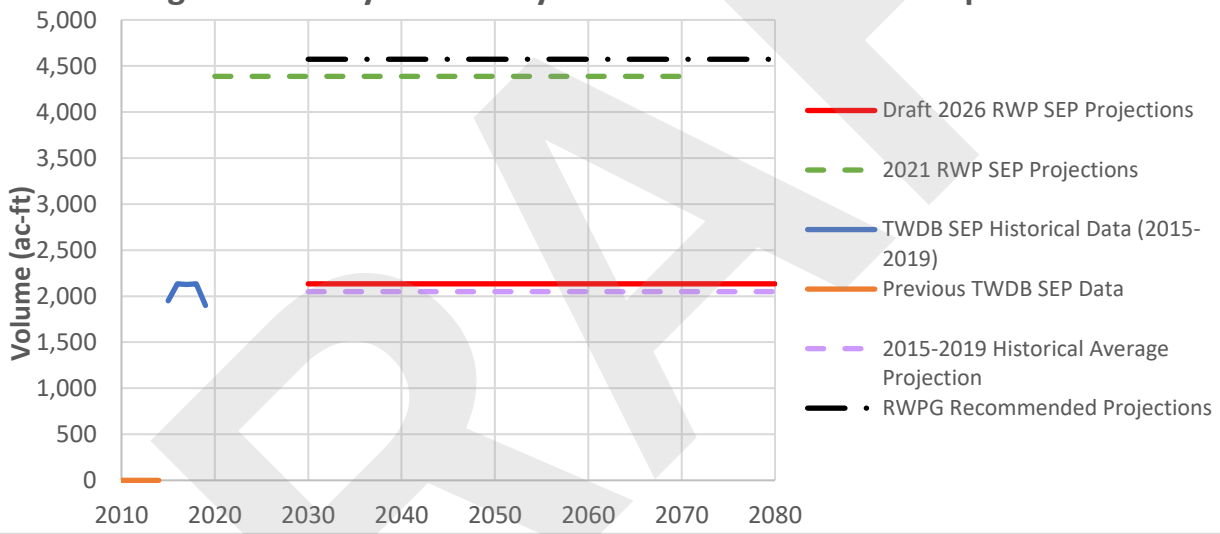

Figure 9A. Henderson County Steam Electric Power Comparison

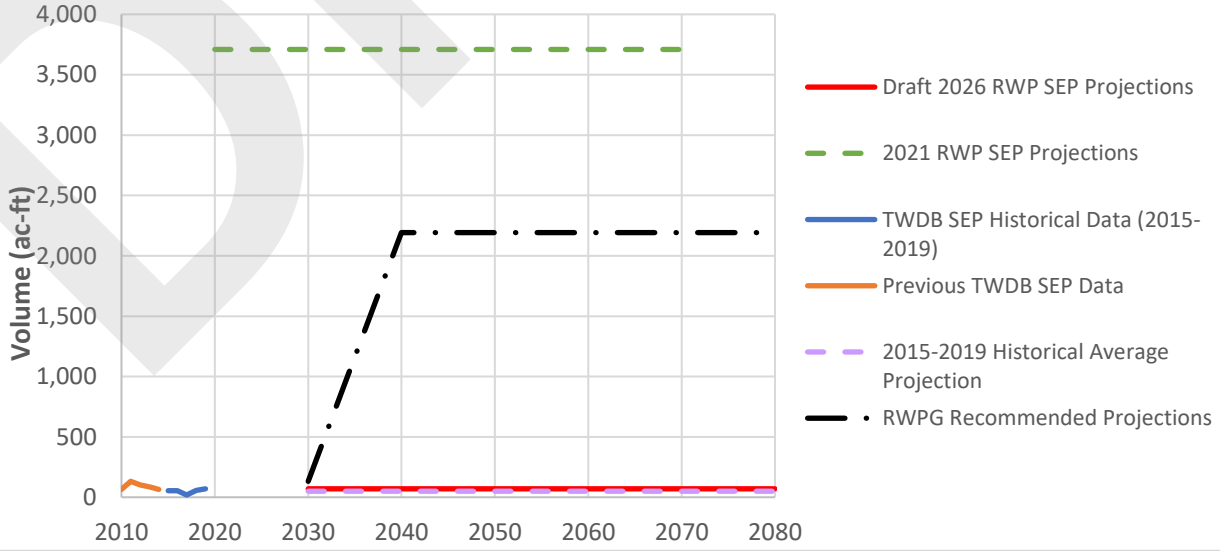

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Figure 10A. Jack County Steam Electric Power Comparison

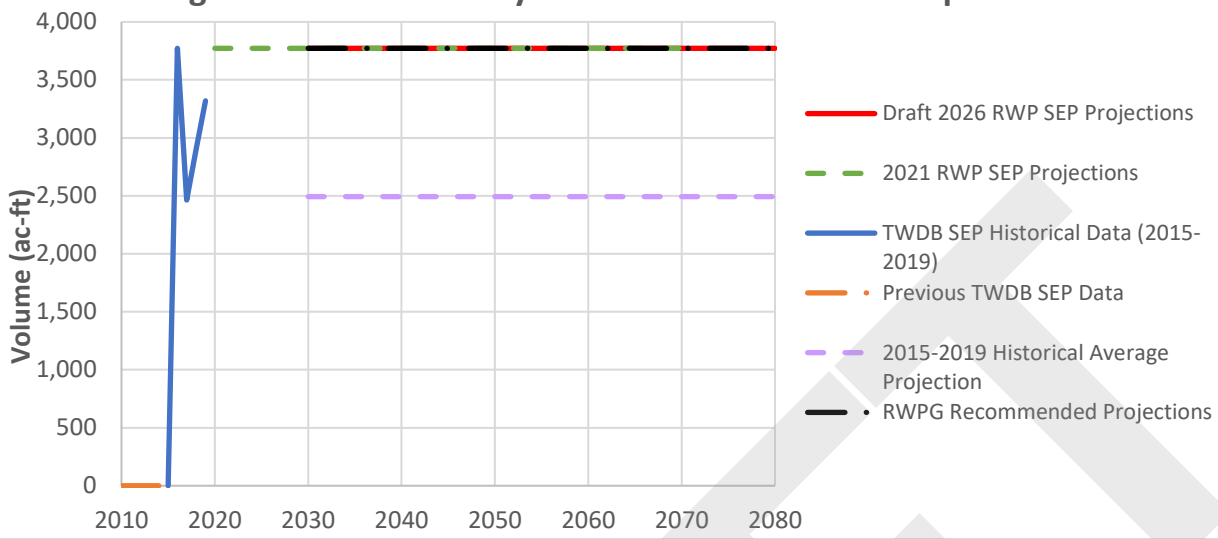

Figure 11A. Kaufman County Steam Electric Power Comparison

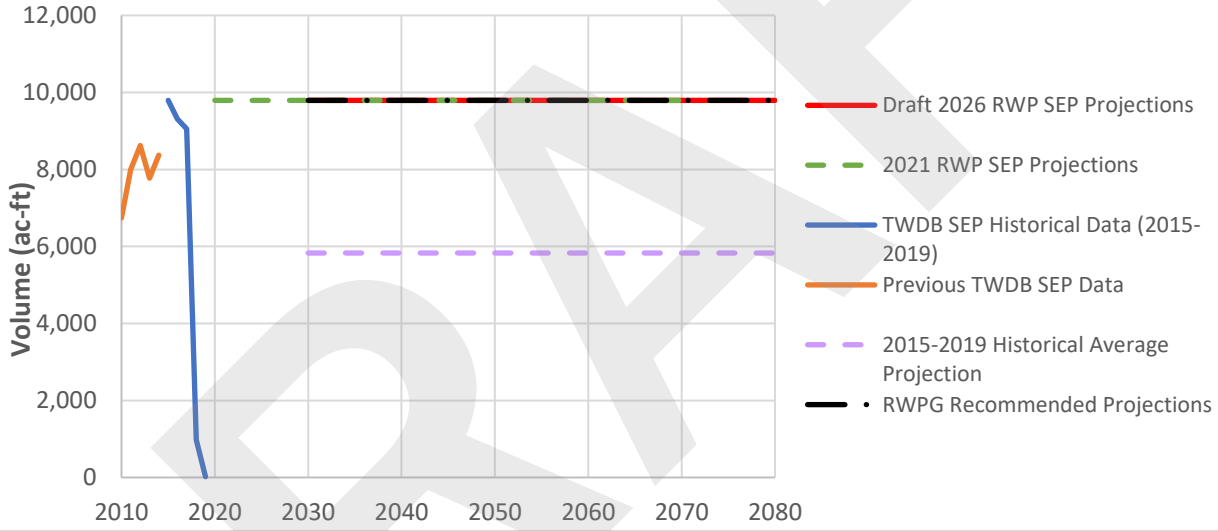

Figure 12A. Navarro County Steam Electric Power Comparison

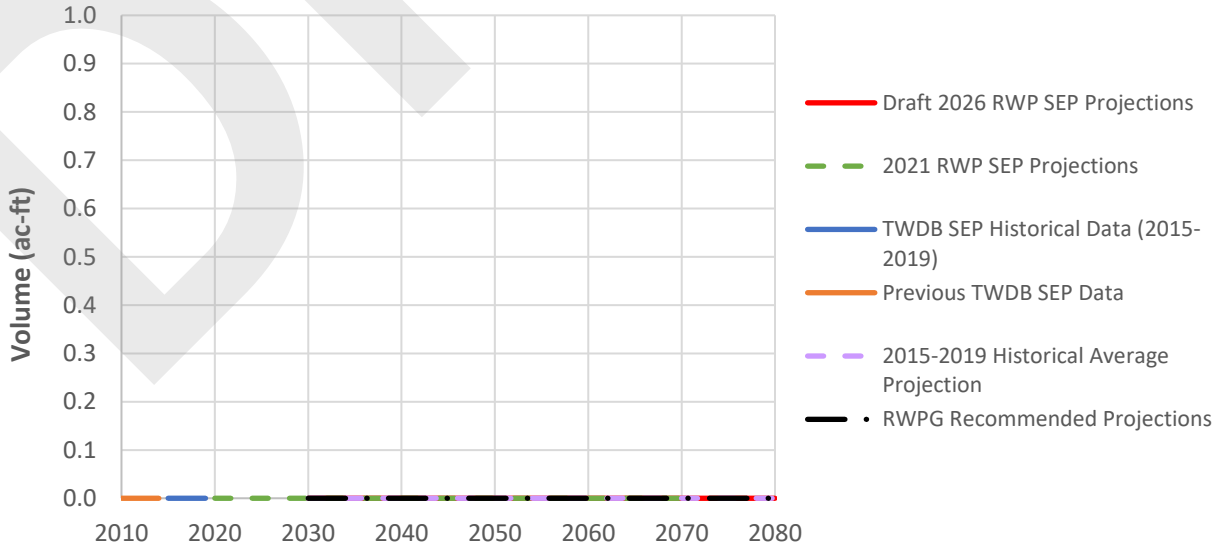

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Figure 13A. Parker CountySteam Electric Power Comparison

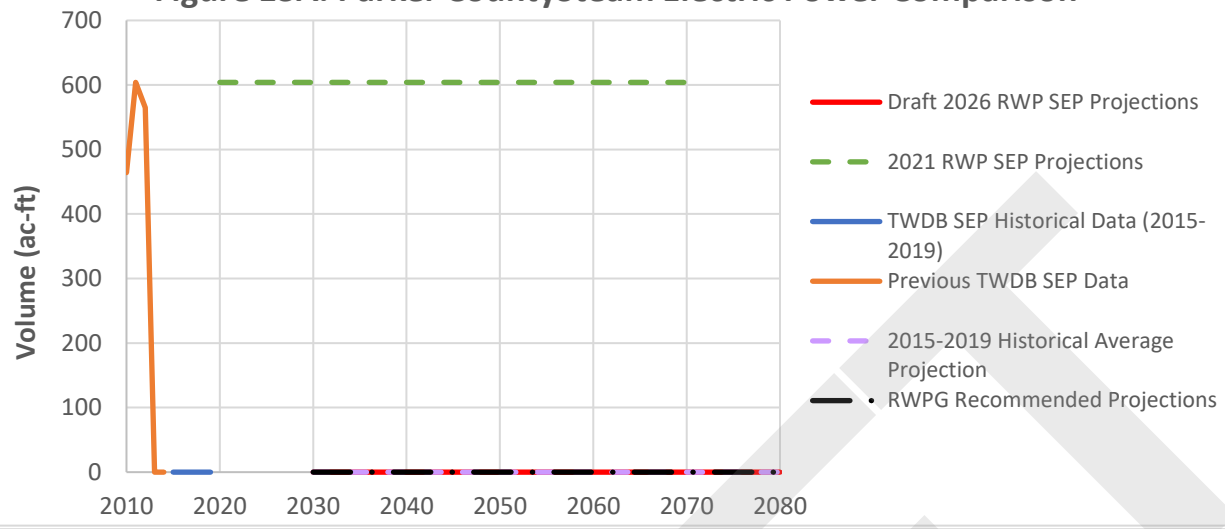


Figure 14A. Rockwall County Steam Electric Power Comparison

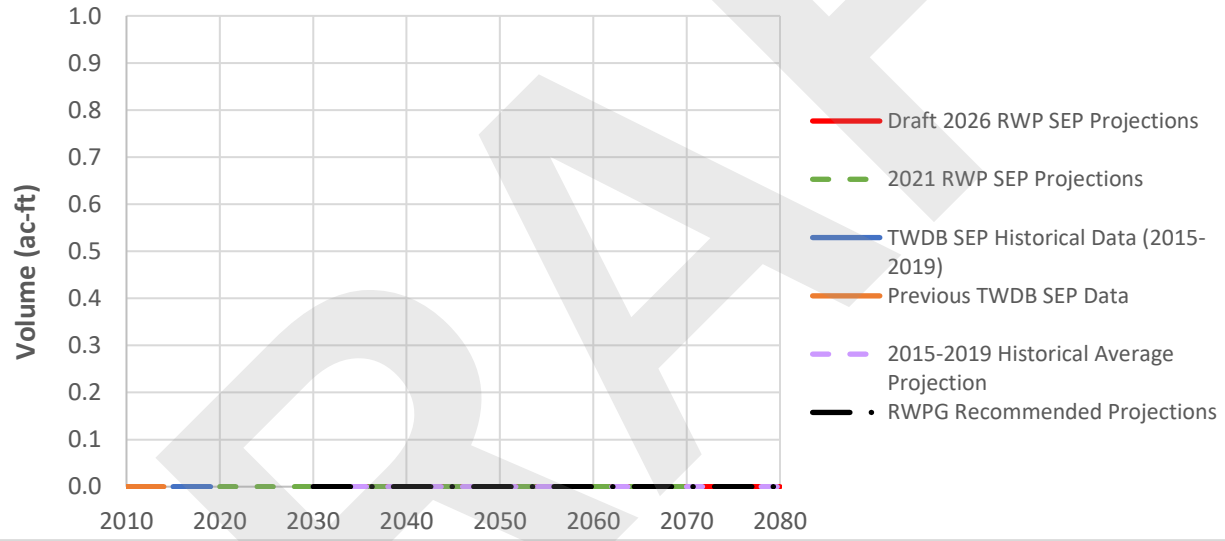
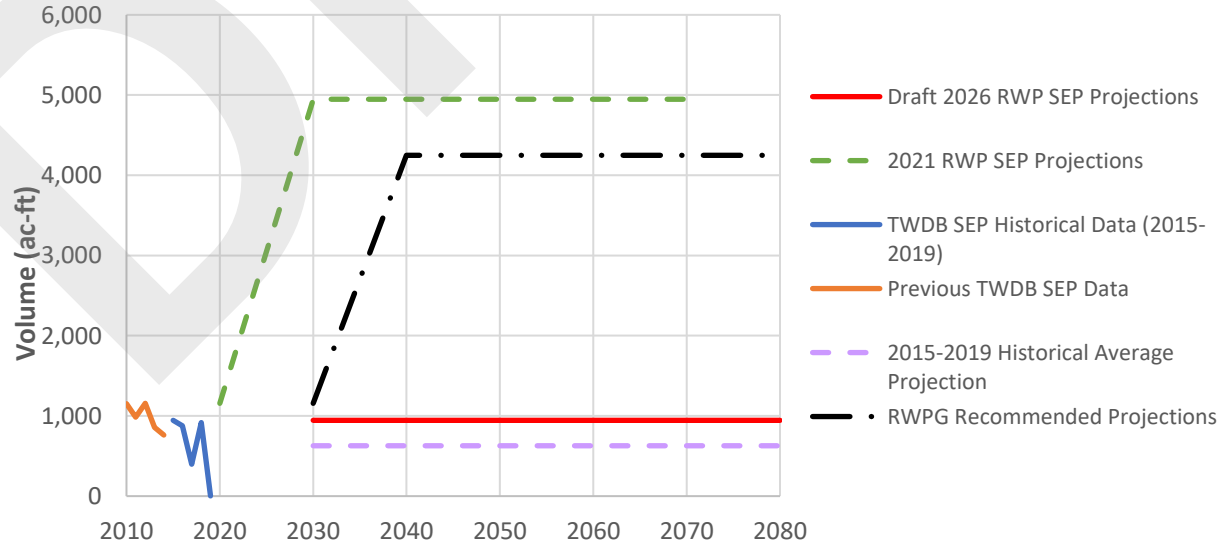


Figure 15A. Tarrant CountySteam Electric Power Comparison



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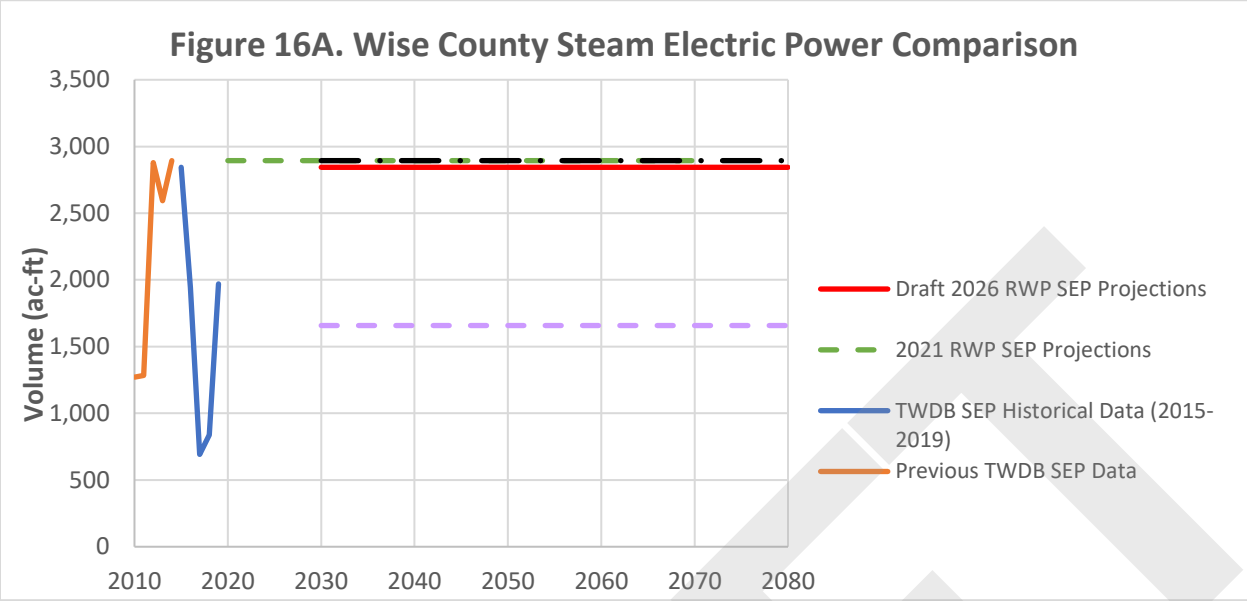
Figure 16A. Wise County Steam Electric Power Comparison
Volume (ac-ft)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2010
2020
2030
2040
2050
2060
2070
2080
Draft 2026 RWP SEP Projections
2021 RWP SEP Projections
TWDB SEP Historical Data (2015-2019)
Previous TWDB SEP Data

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801 Cherry Street, Suite 2800 + Fort Worth, Texas 76102 + 817-735-7300 + FAX 817-735-7491 www.freese.com

TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft Livestock Water Use Projections

DATE: 11/2/2022

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft livestock demand projections in January of 2022. The draft projections will be reviewed by the individual planning groups and recommendations will be provided to the TWDB to be considered. The final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2027 State Water Plan (SWP). The purpose of this technical memorandum is to document information related to historical livestock usage and provide information supporting recommended modifications to the draft livestock demands.

Livestock water use is defined by the TWDB as water used in the production of livestock, both for drinking and for cleaning or environmental purposes. It does not include the processing of livestock for food. Livestock processing water use is considered as part of the manufacturing water use. Historically, livestock has accounted for approximately 12 percent of all non-municipal water use in Region C[1]. Generally, most livestock water use in Region C is associated with ranching.

1.1 Historical Livestock Water Use Estimates

The historical 2015-2019 livestock water use estimates are based on a combination of TWDB Water Use Surveys and estimates derived from applying a water use coefficient for each livestock category to county-level inventory estimates from the National Agricultural Statistical Service and the Texas Department of Agriculture.

As of January 2022, historical data estimates are available through the year 2019. Since the year 2015, the region-wide livestock water use estimates have ranged from 15,648 to 16,155 acre-feet per year (Figure 1).

[1] Based on historical water use estimates from the TWDB.

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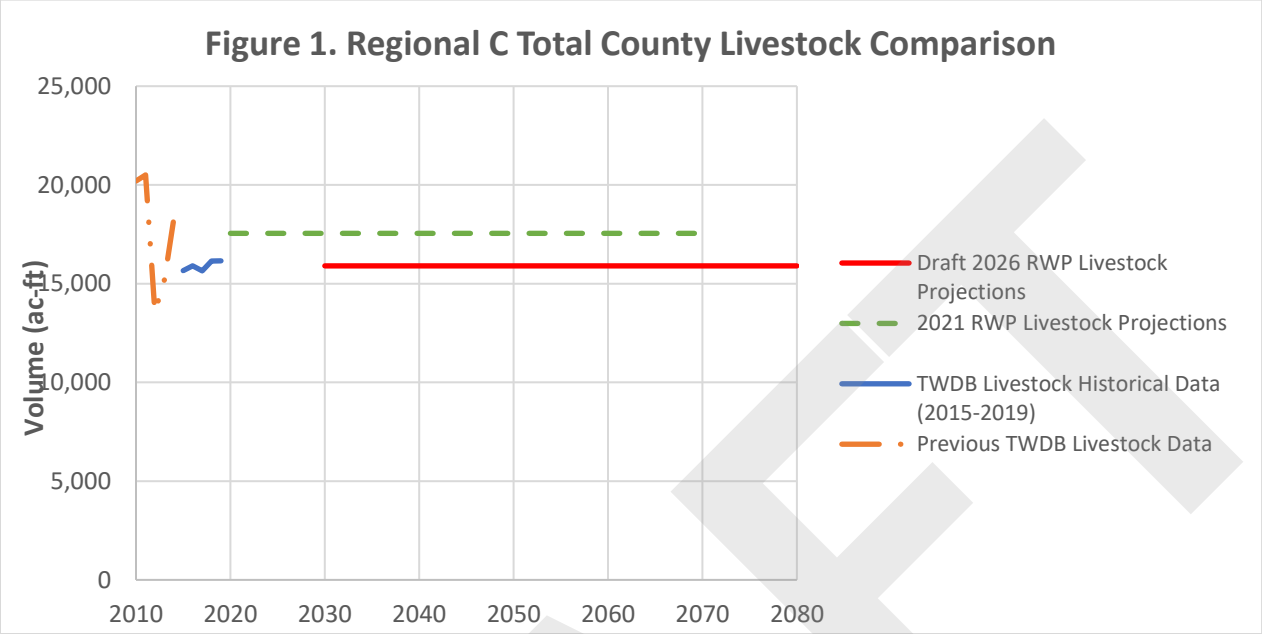

1.2 TWDB Draft Livestock Water Demand Projections

TWDB's draft non-municipal livestock demand projections for the 2027 State Water Plan utilize an average of the 2015-2019 livestock water use estimates as a base (2030 projection), and the rate of change for projections from the *2021 Region C Water Plan* is applied to the base for the years 2030-2080.[2]

1.3 Criteria for Revising the Draft Livestock Water Demand Projections

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the livestock water demand projections:

- Evidence that livestock water use estimates for a county from another source are more accurate than those used in the draft projections.
- Plans for the construction of a confined livestock feeding operation in a county at some future date.
- Documentation of an existing confined livestock feeding operation not captured in the draft projections.
- Other evidence of change in livestock inventory or water requirements that would justify an adjustment in the projected future rate of change in livestock water demand.
- Evidence of errors identified in historical water use, including volumes of reuse (treated effluent) or brackish groundwater that were not included in the draft projections.

[2] In 2019, the TWDB updated water use estimates for 2015-2019 using updated geographic splits (region/county/basin), assumed water use parameters for five types of livestock, and broiler chicken inventory estimates.

During the review process, the TWDB also imposes one other restriction on revisions of the draft livestock water demand projections: Projections for all counties must have the same basis. For example, if the Planning Group recommends using the average of the 2015-2019 livestock water use estimates to project future water demand, then it must recommend this basis for all counties.

The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any adjustments to the livestock water demand projections:

- Documentation of plans for the construction of a confined livestock feeding facility in a county at some future date will include the following:
    - Confirmation of land purchase or lease arrangements for the facility.
    - The construction schedule including the date the livestock feeding facility will become operational.
    - The daily water requirements of the planned livestock feeding facility.
- Other evidence that would document an expected increase or decrease in the livestock inventory in the county.
- Other data that the RWPG considers adequate to justify an adjustment to the livestock water demand projections.

2.0 RCWPG-RECOMMENDED REVISIONS TO DRAFT Livestock Water DEMAND PROJECTIONS

A comparison of the draft projections for the 2026 RWP (provided by TWDB) and the final 2021 RWP projections is presented in Table 1 and Figure 2. After reviewing the available data, the Planning Group recommends no changes to the draft projections for the 2026 RWP.

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Table 1. Comparison of Region C Livestock Demand Projections

County Name	2021 RWP Projections (ac-ft/yr)						Draft Projections for 2026 RWP (ac-ft/yr)						Recommended RWPG Revisions (ac-ft/yr)					
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
Collin	912	912	912	912	912	912	801	801	801	801	801	801	801	801	**801**	801	801	801
Cooke	1,330	1,330	1,330	1,330	1,330	1,330	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508
Dallas	758	758	758	758	758	758	248	248	248	248	248	248	248	248	248	248	248	248
Denton	769	769	769	769	769	769	840	840	840	840	840	840	840	840	840	840	840	840
Ellis	1,140	1,140	1,140	1,140	1,140	1,140	923	923	923	923	923	923	923	923	923	923	923	923
Fannin	1,411	1,411	1,411	1,411	1,411	1,411	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375
Freestone	1,207	1,207	1,207	1,207	1,207	1,207	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430	1,430
Grayson	1,143	1,143	1,143	1,143	1,143	1,143	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106
Henderson	1,261	1,261	1,261	1,261	1,261	1,261	694	694	694	694	694	694	694	694	694	694	694	694
Jack	785	785	785	785	785	785	685	685	685	685	685	685	685	685	685	685	685	685
Kaufman	1,570	1,570	1,570	1,570	1,570	1,570	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413
Navarro	1,691	1,691	1,691	1,691	1,691	1,691	1,512	1,512	1,512	1,512	1,512	1,512	1,512	1,512	1,512	1,512	1,512	1,512
Parker	1,634	1,634	1,634	1,634	1,634	1,634	1,503	1,503	1,503	1,503	1,503	1,503	1,503	1,503	1,503	1,503	1,503	1,503
Rockwall	111	111	111	111	111	111	106	106	106	106	106	106	106	106	106	106	106	106
Tarrant	627	627	627	627	627	627	341	341	341	341	341	341	341	341	341	341	341	341
Wise	1,198	1,198	1,198	1,198	1,198	1,198	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415
Total	**17,547**	**17,547**	**17,547**	**17,547**	**17,547**	**17,547**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**	**15,900**

Grey text indicates that the was no change from the TWDB Draft projections.

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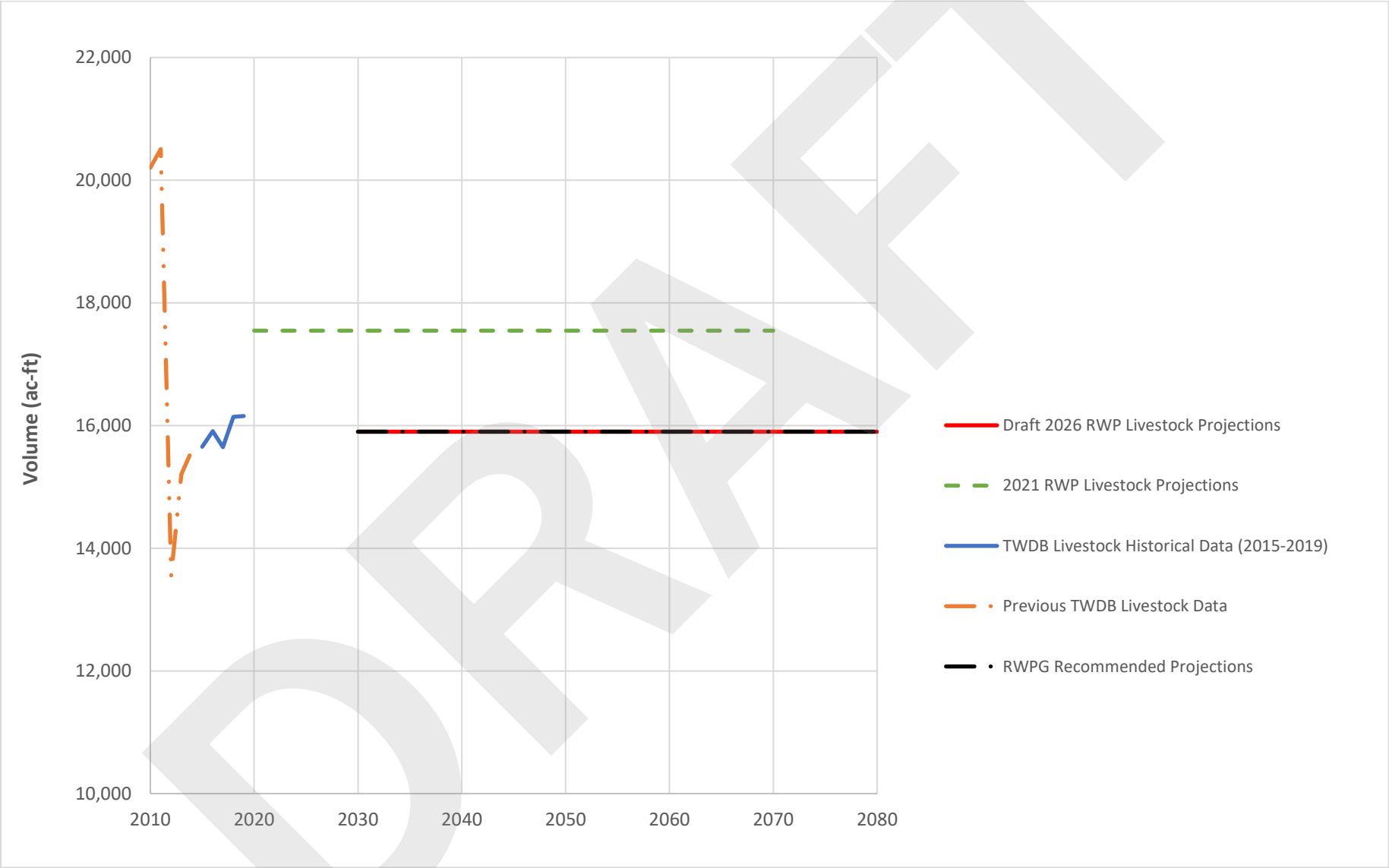
Figure 2. Region C Livestock – Comparison of Water Use Estimates, 2021 Region C Water Plan Projection, Proposed Projections, and Revised Projections



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Attachment A
Livestock Demand by County
Historical Usage and Projections

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Figure 1A. Collin County Livestock Comparison

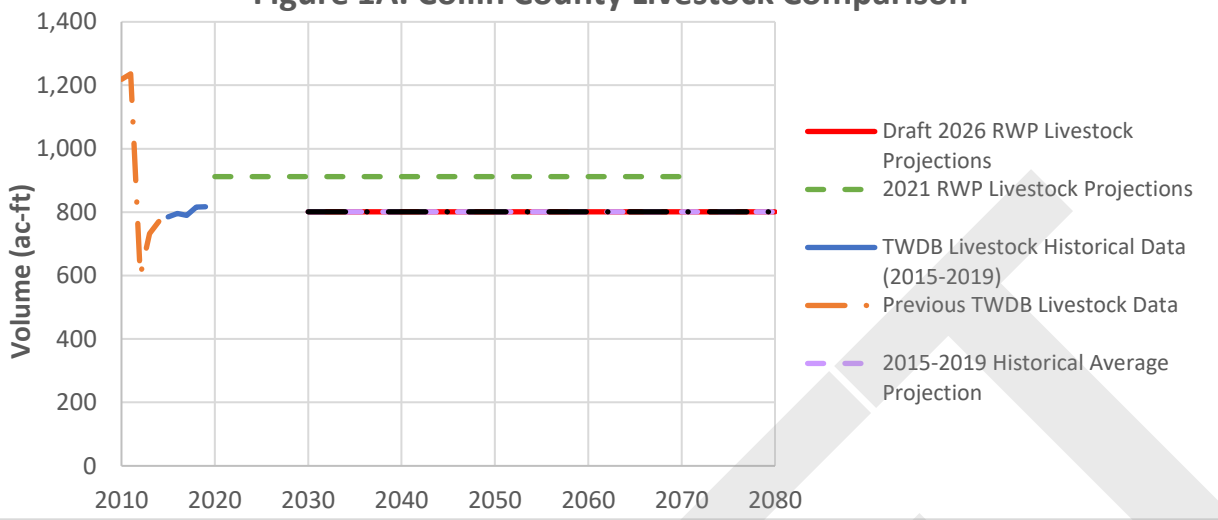

Figure 2A. Cooke County Livestock Comparison

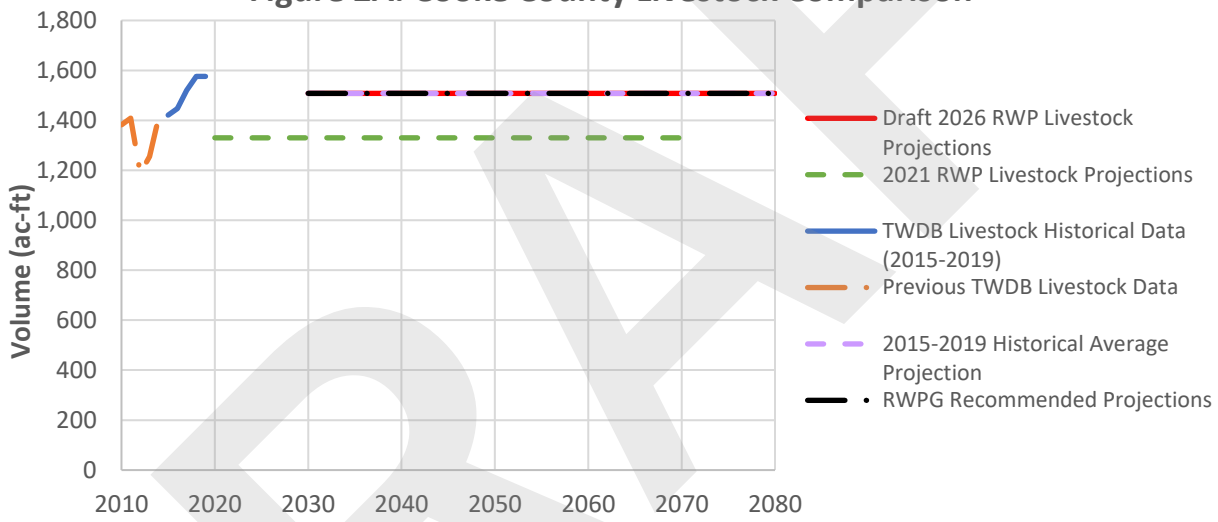

Figure 3A. Dallas County Livestock Comparison

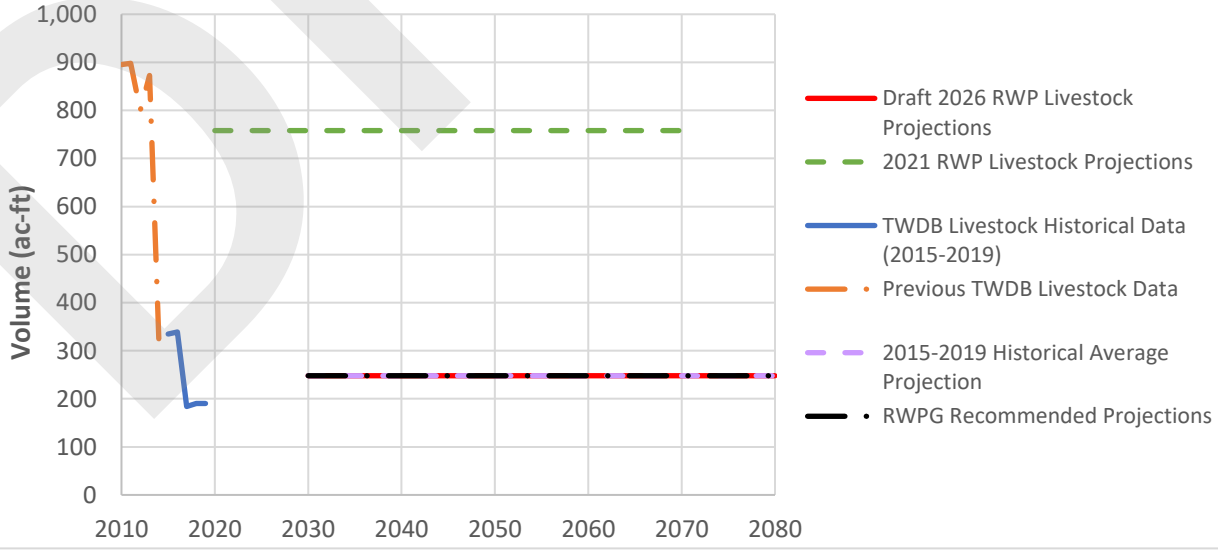

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Figure 4A. Denton County Livestock Comparison

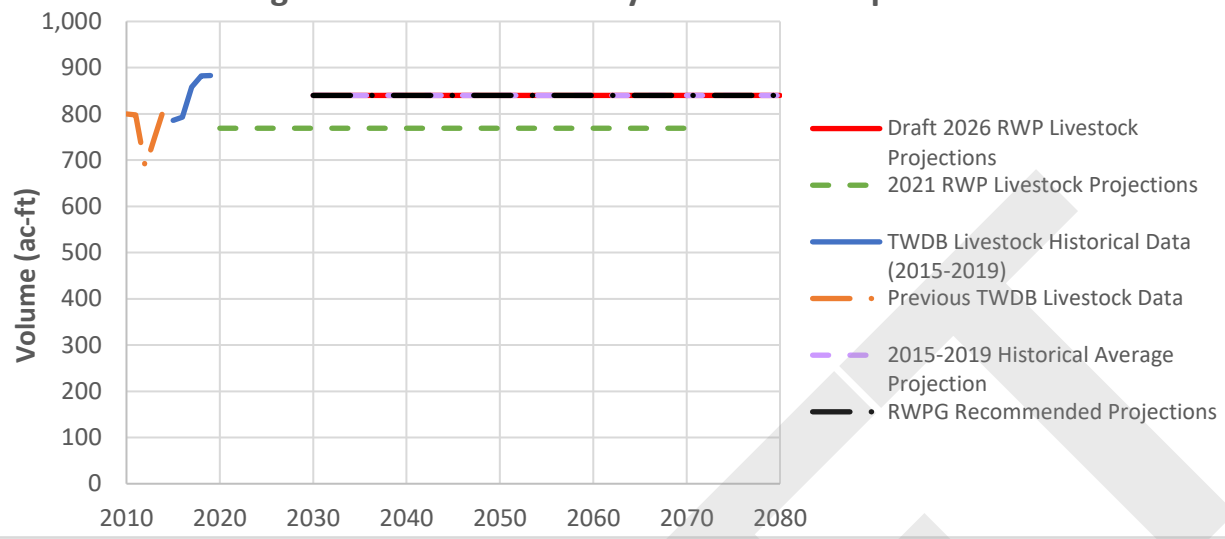

Figure 5A. Ellis County Livestock Comparison

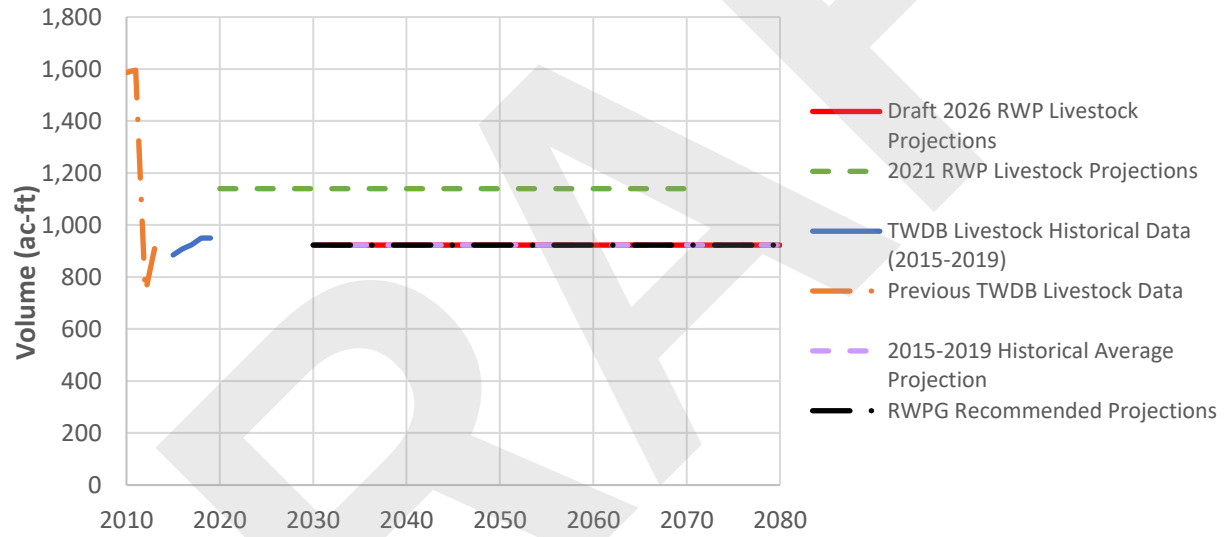

Figure 6A. Fannin County Livestock Comparison

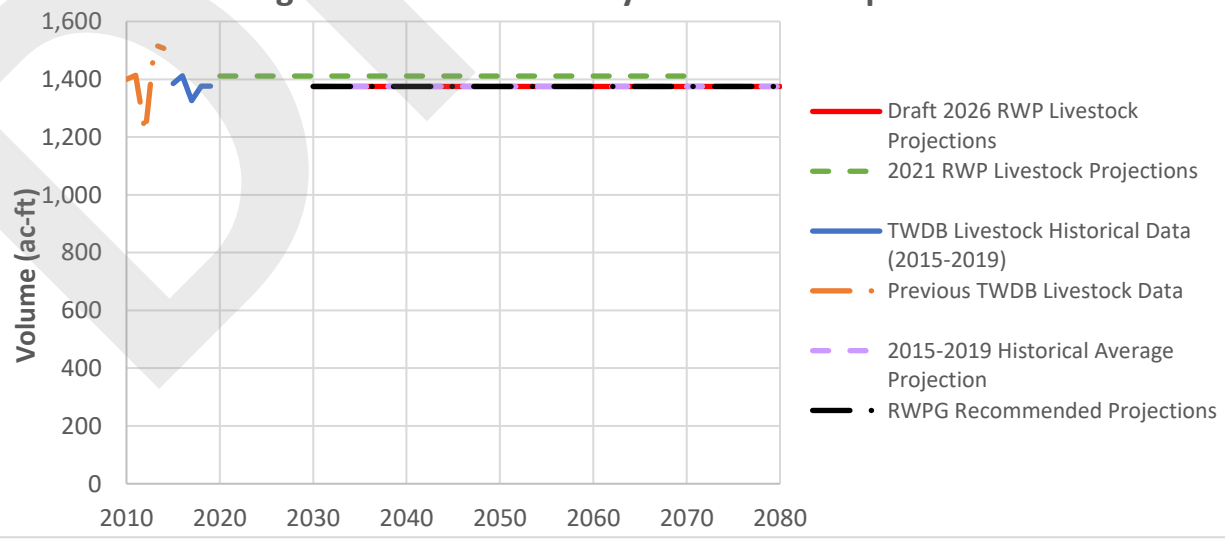

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Figure 7A. Freestone County Livestock Comparison

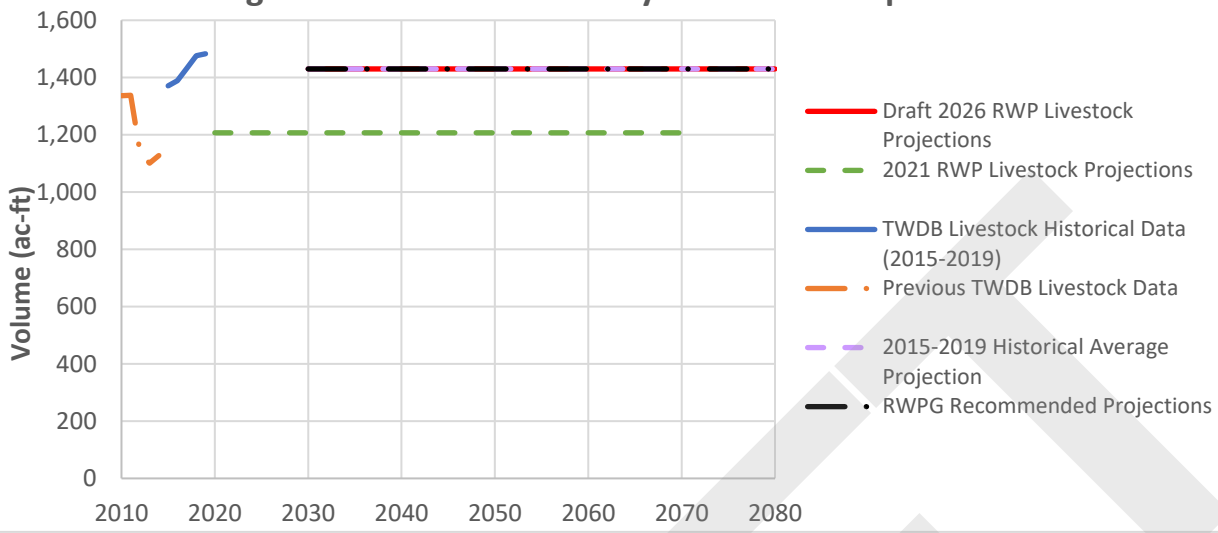

Figure 8A. Grayson County Livestock Comparison

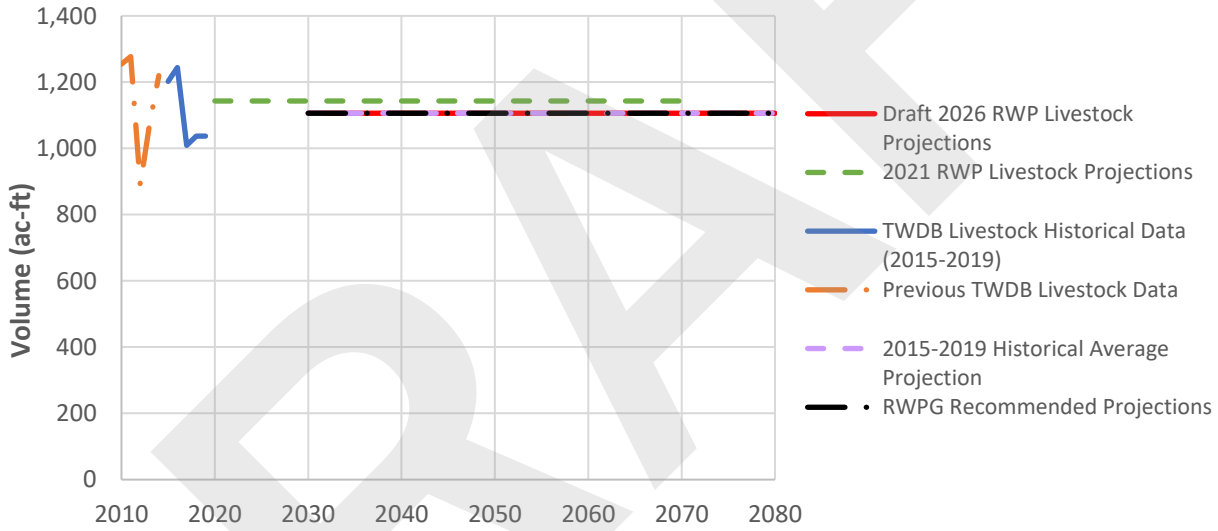

Figure 9A. Henderson County Livestock Comparison

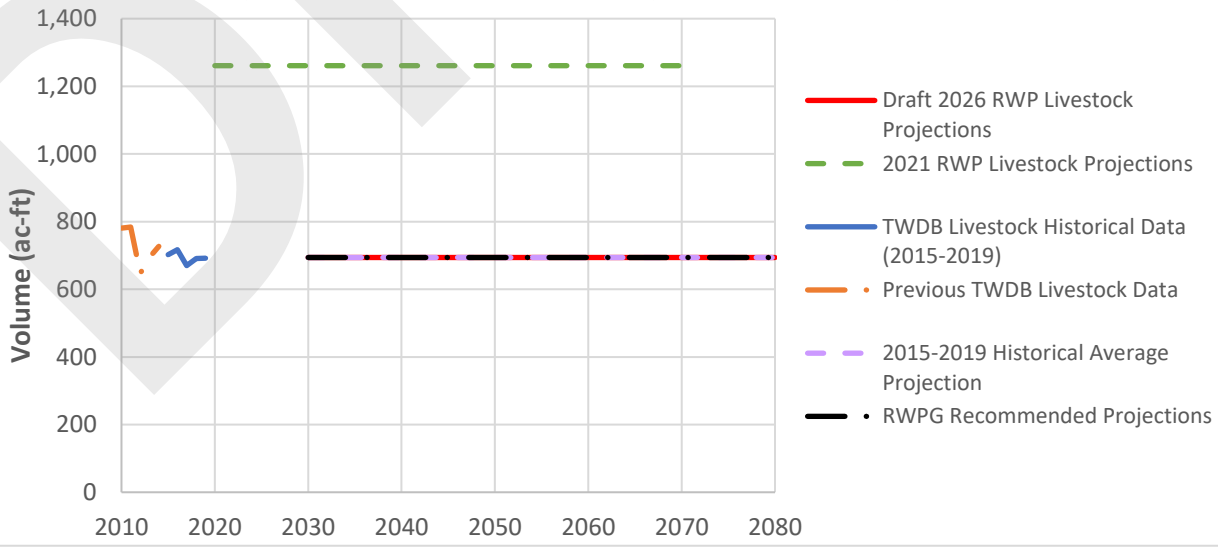

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Figure 10A. Jack County Livestock Comparison

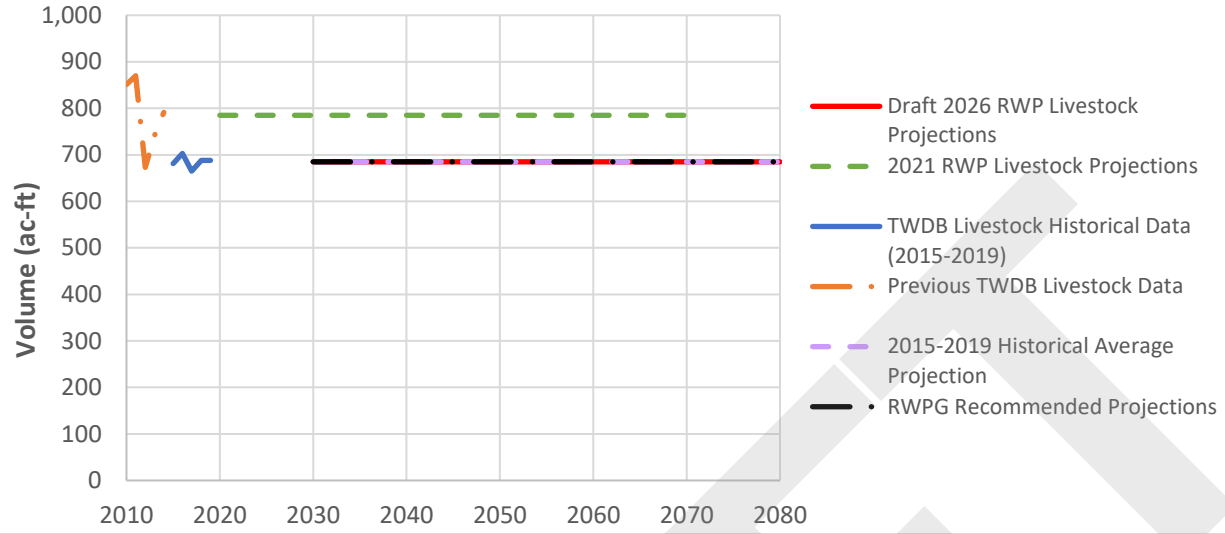

Figure 11A. Kaufman County Livestock Comparison

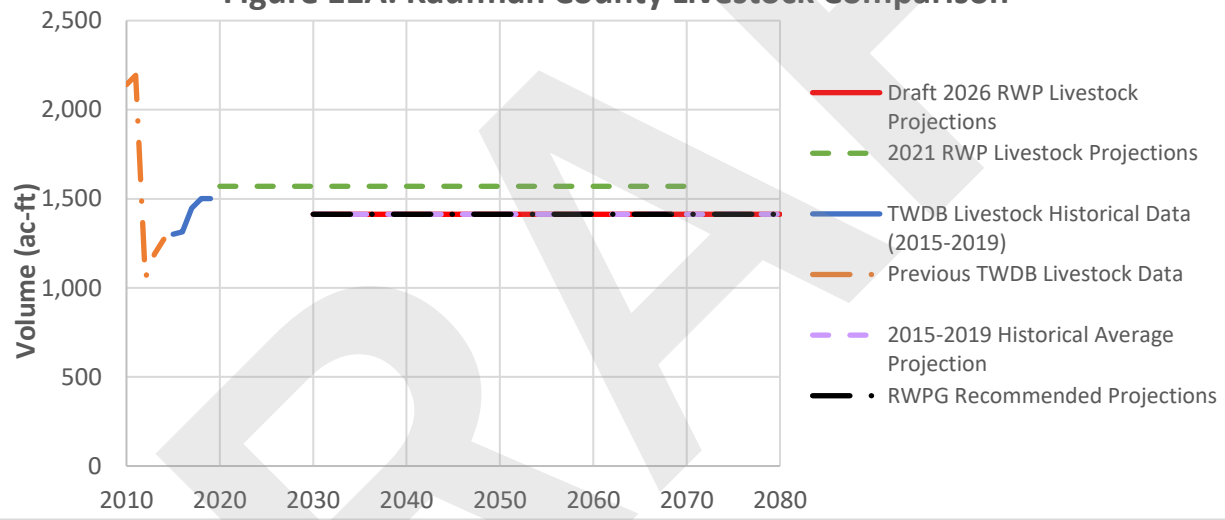

Figure 12A. Navarro County Livestock Comparison

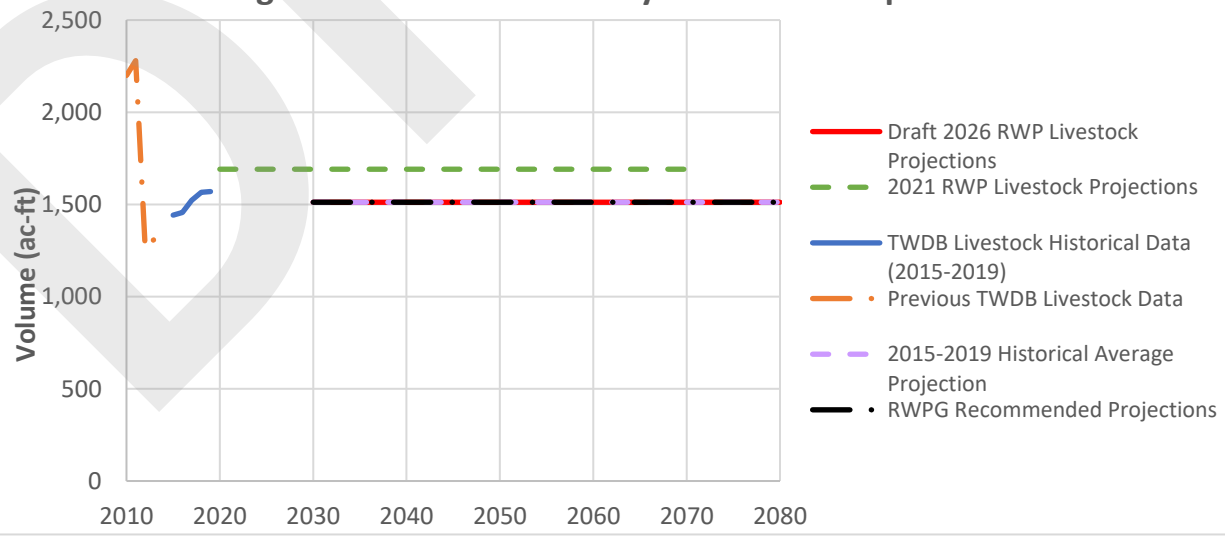

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Figure 13A. Parker County Livestock Comparison

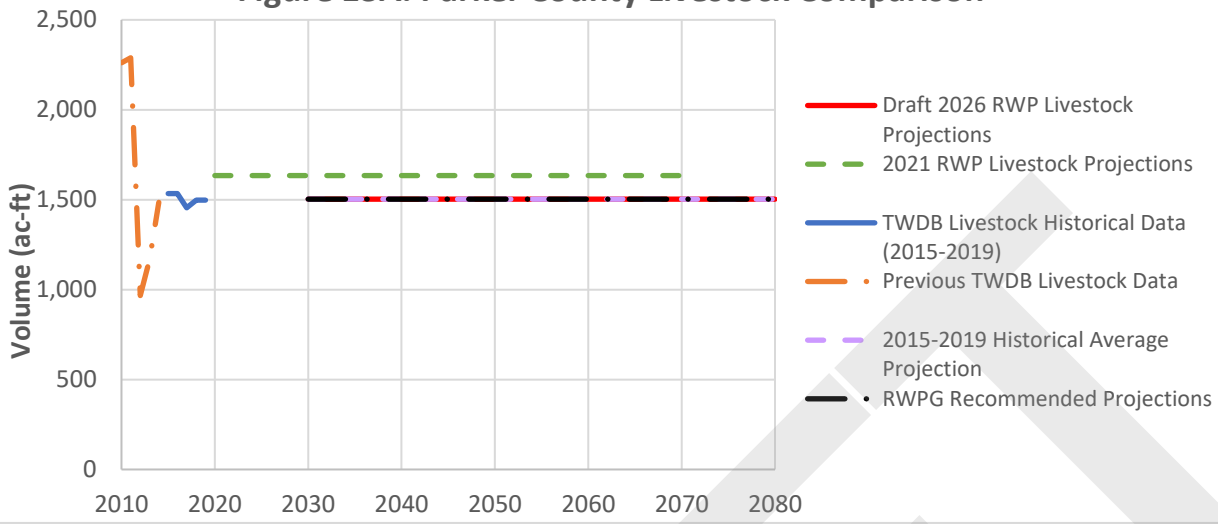


Figure 14A. Rockwall County Livestock Comparison

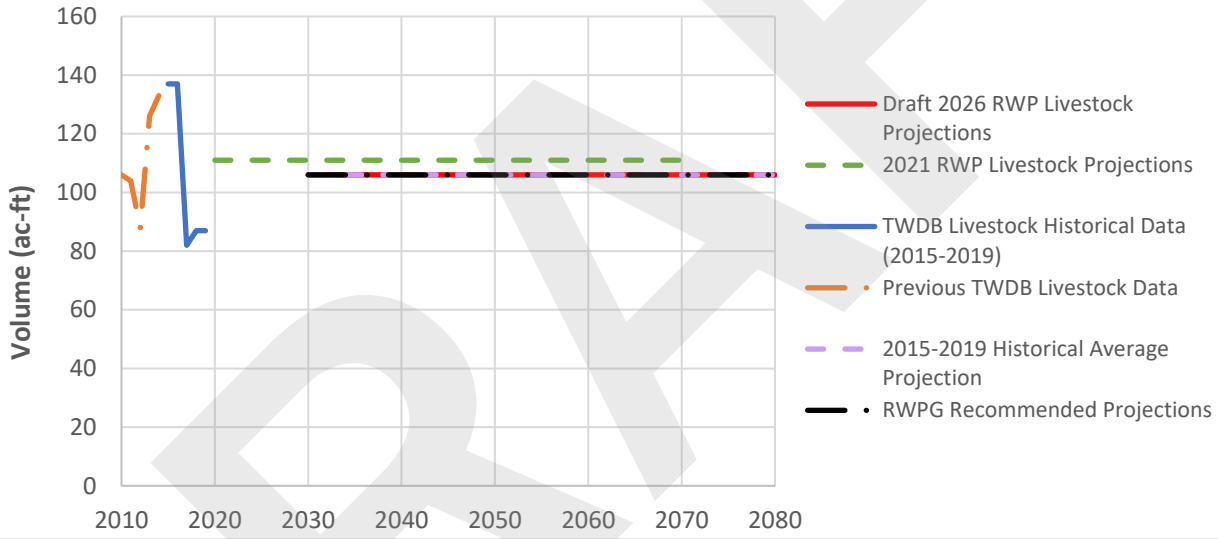
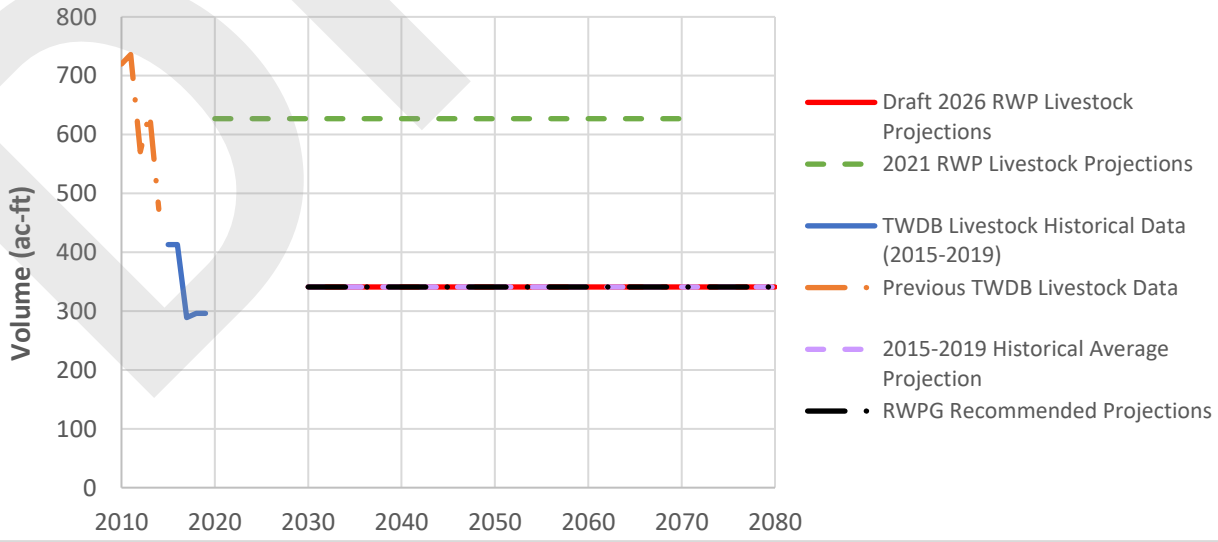


Figure 15A. Tarrant County Livestock Comparison



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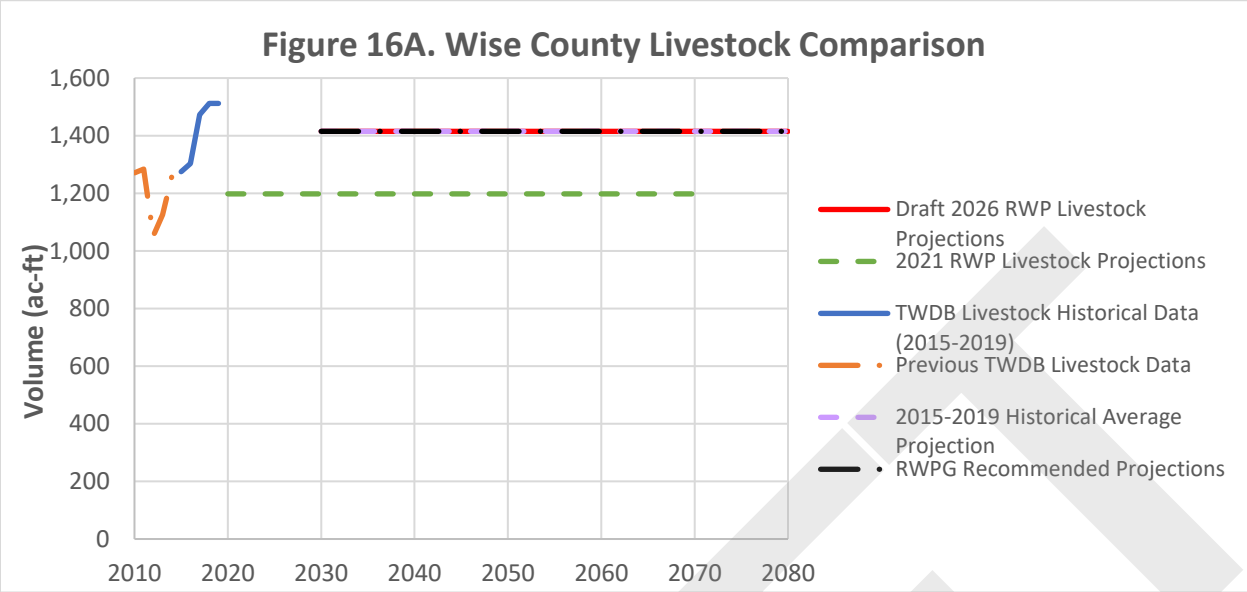
Figure 16A. Wise County Livestock Comparison
Volume (ac-ft)
1,600
1,400
1,200
1,000
800
600
400
200
0
2010
2020
2030
2040
2050
2060
2070
2080
Draft 2026 RWP Livestock Projections
2021 RWP Livestock Projections
TWDB Livestock Historical Data (2015-2019)
Previous TWDB Livestock Data
2015-2019 Historical Average Projection
RWPG Recommended Projections

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MEMORANDUM

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TO: Region C Regional Water Planning Group

CC: File

FROM: Freese and Nichols, Inc.

SUBJECT: Memorandum on Draft Mining Water Use Projections

DATE: 11/2/2022

PROJECT: TRA21862

1.0 BACKGROUND

The Texas Water Development Board (TWDB) provided the planning groups with draft mining demand projections in August of 2022. These projections were developed in conjunction with a special study on mining water use authorized by the TWDB. This study evaluated water use for the oil and gas industry, coal mining, and aggregate mining within Texas. The draft mining demand projections are presented by county and will be reviewed by the individual planning groups. Any recommended changes to these projections will be provided to the TWDB for consideration, and the final projections will ultimately be adopted by the planning groups and the TWDB. Historically, mining has accounted for approximately 10 percent of all non-municipal water use in Region C[1].

1.1 Historical Mining Water Use Estimates

The TWDB publishes historical annual mining water use estimates for each county. Mining water use is water used for oil and gas development, as well as coal and lignite, sand aggregate, and other resource extraction. Since the year 2015, the region-wide mining water use estimates have ranged from 5,812 to 9,116 acre-feet per year (Figure 1). As of August 2022, historical data estimates were available through the year 2019.

[1] Based on historical water use estimates from the TWDB.

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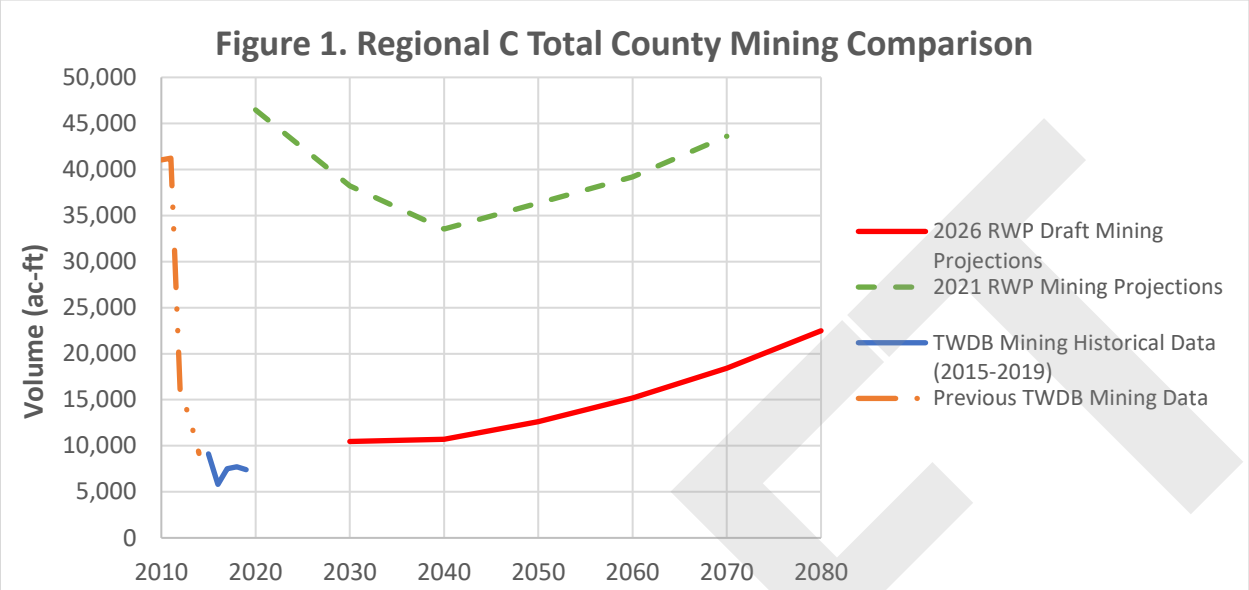


1.2 TWDB Draft Mining Water Demand Projections

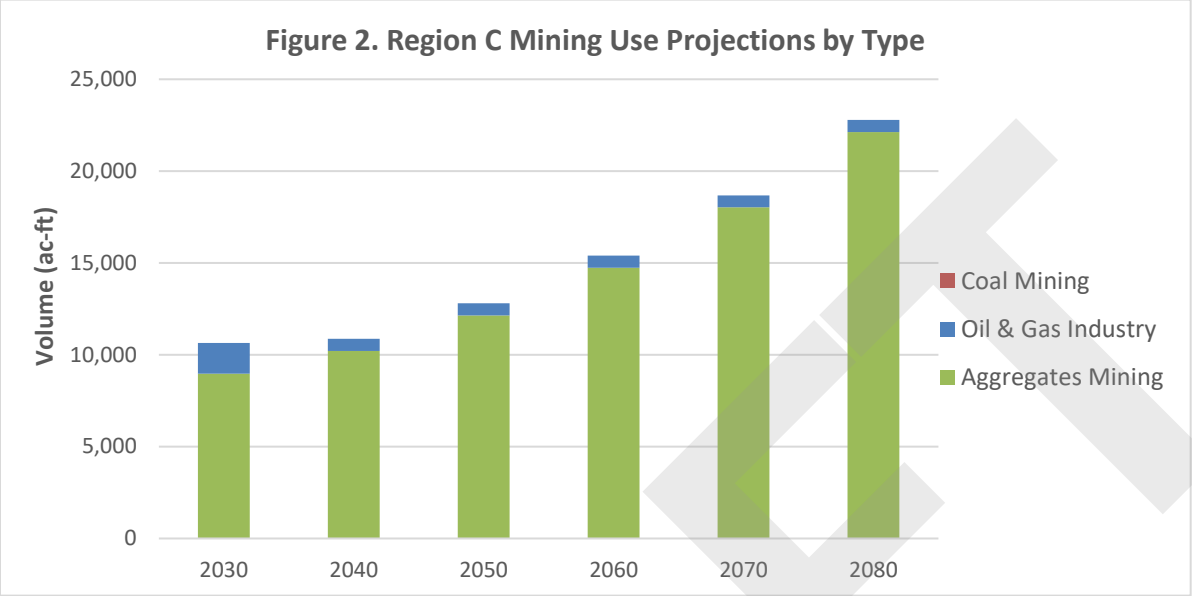
TWDB's draft mining water demand projections for the 2026 Regional Water Plan (RWP) were developed from a 2022 TWDB-contracted mining use study with the Bureau of Economic Geology (BEG) and U.S. Geological Survey (USGS).[2]

The mining use study estimated current mining water use and projected use across the planning horizon using data collected from trade organizations, government agencies, and other industry representatives. The projections include information from three mining categories: oil and gas industry, coal mining, and aggregates mining. Figure 2 shows Region C mining use projections by type. The mining use study projects Region C mining use to gradually increase through 2080 due to increased demand for aggregate industry products. Oil and gas mining use is projected to decrease in 2040 as major oil and gas development matures. Currently, there are no active coal mines in Region C. In the past there were two lignite coal mines located in Freestone County, Turlington Strip Mine and Big Brown Strip, which closed in 2011 and 2017 respectively.

Data used to evaluate the draft mining demands in the mining use study were obtained from the following sources:

- Texas Water Development Board (TWDB)
- Texas Commission on Environmental Quality (TCEQ)
- Railroad Commission of Texas (RRC)
    - Information Handling Services (IHS)[3]
    - B3 Insight[4]
- United States Geological Survey (USGS)
- FracFocus (referenced above)

[2] Bureau of Economic Geology and U.S. Geological Survey, *Water Use by the Mining Industry in Texas*, prepared for Texas Water Development Board, August 2022.
[3] https://ihsmarkit.com/
[4] https://www.b3insight.com/



1.3 Criteria for Revising the Draft Mining Water Demand Projections

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the mining water demand projections:

- Evidence that mining water use in a county is substantially different than the draft projections. This could include trends in water use data from FracFocus national online registry,[5] the Texas Railroad Commission, or other sources.
- Evidence of new facilities coming online, reported closures in surveyed facilities that may impact county projections
- Evidence of errors identified in historical water use, including volumes of reuse (treated effluent) water or brackish groundwater that were not included in the draft projections.

The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any adjustments to the mining water demand projections:

- Historical (2015-2019) water use data and description of a surveyed or future facility, and any other information necessary to estimate water use.
- Reports describing alternative trends or anticipated water use for mining.
- Other data that the RWPG considers adequate to justify an adjustment to the mining water demand projections will be considered.

[5] https://fracfocus.org/

2.0 RCWPG REVIEW OF DRAFT MINING WATER DEMAND PROJECTIONS

A comparison of the draft projections for the 2026 RWP (provided by TWDB) and the final 2021 RWP projections is presented in Table 1 and Figure 3. The 2021 RWP projections were originally developed from a 2011 TWDB-contracted study with the BEG[6] and a September 2012 update to the BEG study[7]. The 2021 SWP projections for Ellis, Fannin, Grayson, Henderson, Jack, Navarro, and Tarrant Counties were then revised based on input from the Region C Water Planning Group (RCWPG).

Overall, Region C's 2026 RWP mining use projections have declined compared to the 2021 RWP projections due to a historic decline in overall mining use from 2012 through 2019 (Figure 3). Additionally, two lignite mines, Turlington Strip Mine and Big Brown Strip, closed in 2011 and 2017 respectively. Fannin and Kaufman Counties 2026 RWP mining projections have increased compared to the 2021 RWP projections due to an increase in aggregate mining. On the other hand, the 2026 RWP projections have decreased since the last RWP in Cooke, Dallas, Denton, Freestone, Parker, Tarrant, and Wise Counties due to reduced oil and gas fracking. Henderson and Jack Counties saw a decrease in water use projections due to a decrease in aggregate mining.

After reviewing the data described in the previous section, the RCWPG recommends no change to the draft county-level mining water demand projections.

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[6] Bureau of Economic Geology, *Current and Projected Water Use in the Texas Mining and Oil and Gas Industry*, prepared for Texas Water Development Board, June 2011.
[7] Bureau of Economic Geology, *Oil and Gas Water Use in Texas: Update to the 2011 Mining Water Use Report*, prepared for Texas Water Development Board, September 2012.

Table 1. Comparison of Region C Mining Demand Projections

County Name	2021 RWP Projections (ac-ft/yr)						Draft Projections for 2026 RWP (ac-ft/yr)						Recommended RWPG Revisions (ac-ft/yr)					
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
Collin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooke	1,583	900	378	446	511	586	12	12	12	13	13	13	12	12	12	13	13	13
Dallas	3,038	2,656	2,279	1,930	1,922	1,916	32	32	32	32	32	32	32	32	32	32	32	32
Denton	4,326	2,729	3,345	4,306	5,204	6,291	259	75	87	99	111	120	259	75	87	99	111	120
Ellis	931	547	164	123	82	55	0	0	0	0	0	0	0	0	0	0	0	0
Fannin	574	351	128	128	128	128	1,747	2,070	2,561	3,376	4,258	5,130	1,747	2,070	2,561	3,376	4,258	5,130
Freestone	5,347	5,115	5,251	5,286	5,356	5,582	200	200	200	200	200	200	200	200	200	200	200	200
Grayson	312	210	107	123	142	163	295	295	295	295	295	295	295	295	295	295	295	295
Henderson	434	506	481	484	479	469	15	16	17	19	22	26	15	16	17	19	22	26
Jack	3,396	1,821	1,698	1,731	1,768	1,862	35	35	35	35	35	35	35	35	35	35	35	35
Kaufman	296	386	491	646	783	951	1,453	1,736	2,101	2,679	3,357	4,134	1,453	1,736	2,101	2,679	3,357	4,134
Navarro	1,193	1,238	1,282	1,572	1,806	2,076	1,748	1,915	2,125	2,352	2,723	3,293	1,748	1,915	2,125	2,352	2,723	3,293
Parker	3,182	4,029	4,006	4,073	4,124	4,364	1,062	1,126	1,385	1,712	2,060	2,411	1,062	1,126	1,385	1,712	2,060	2,411
Rockwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tarrant	11,535	6,562	1,589	1,537	1,497	1,464	525	106	115	121	129	136	525	106	115	121	129	136
Wise	10,320	11,159	12,337	13,975	15,378	17,694	3,084	3,074	3,650	4,246	5,193	6,663	3,084	3,074	3,650	4,246	5,193	6,663
Total	**46,467**	**38,209**	**33,536**	**36,360**	**39,180**	**43,601**	**10,467**	**10,692**	**12,615**	**15,179**	**18,428**	**22,488**	10,467	10,692	12,615	15,179	18,428	22,488

Grey text indicates that the was no change from the TWDB Draft projections.

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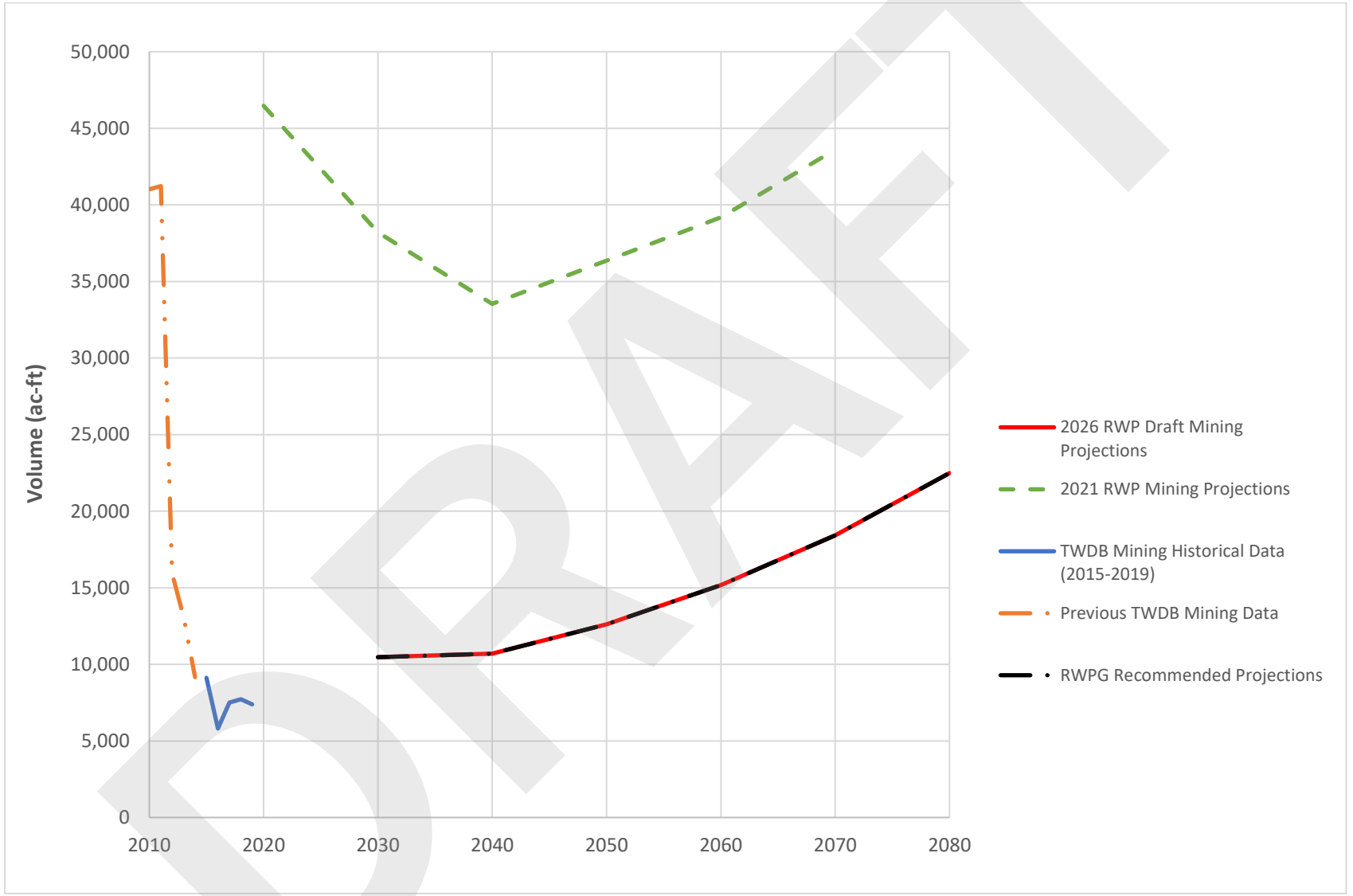
Figure 3. Region C Mining – Comparison of Water Use Estimates, 2021 Region C Water Plan Projection, Proposed Projections, and Revised Projections



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Attachment A
Mining Demand by County
Historical Usage and Projections

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Figure 1A. Collin County Mining Comparison

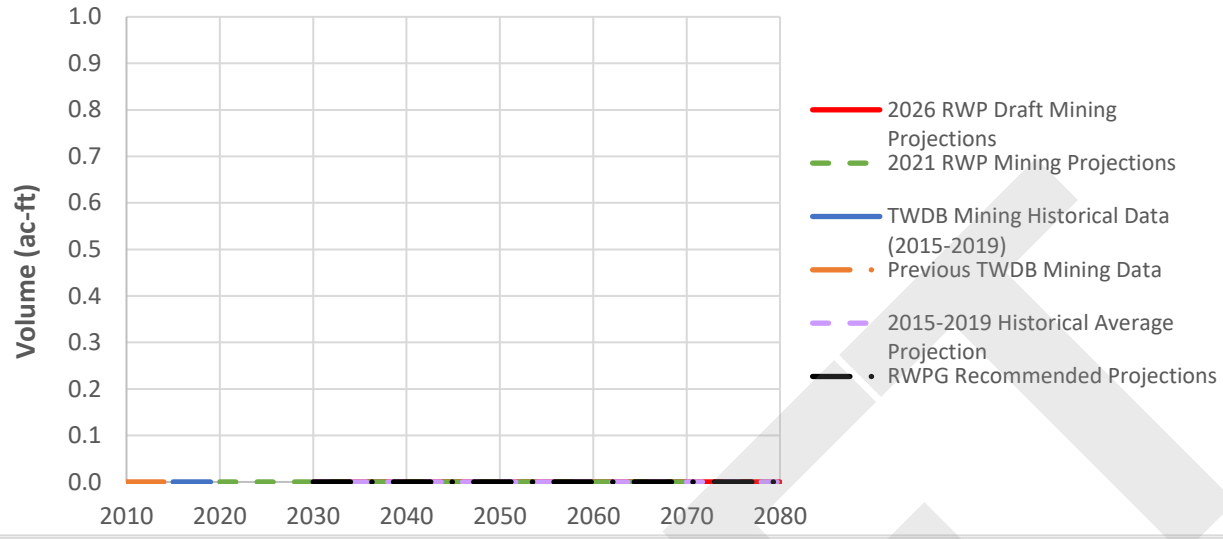

Figure 2A. Cooke County Mining Comparison

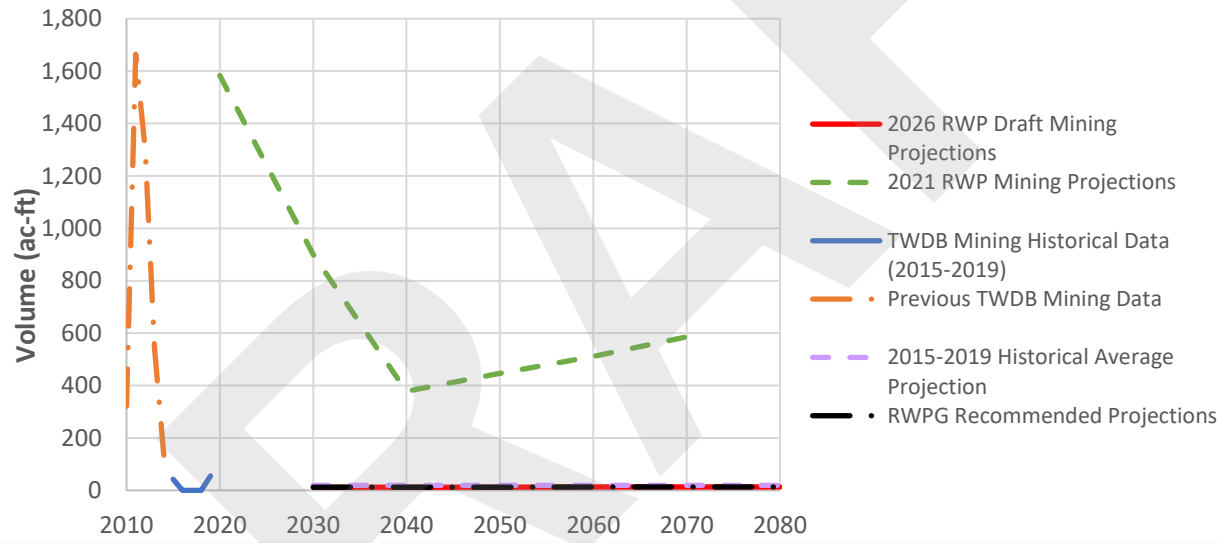

Figure 3A. Dallas County Mining Comparison

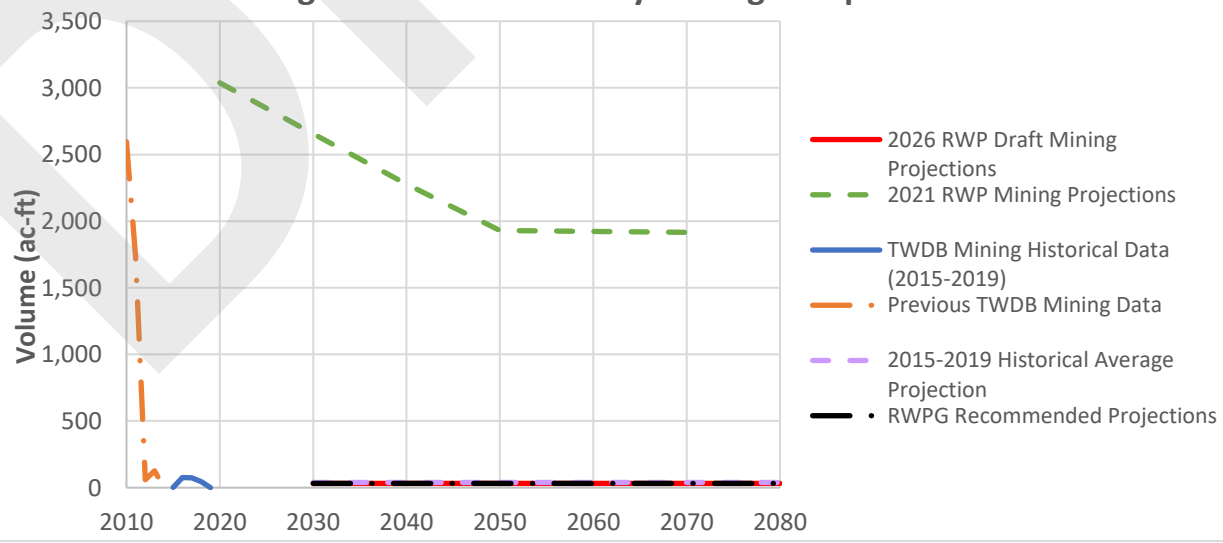

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Figure 4A. Denton County Mining Comparison

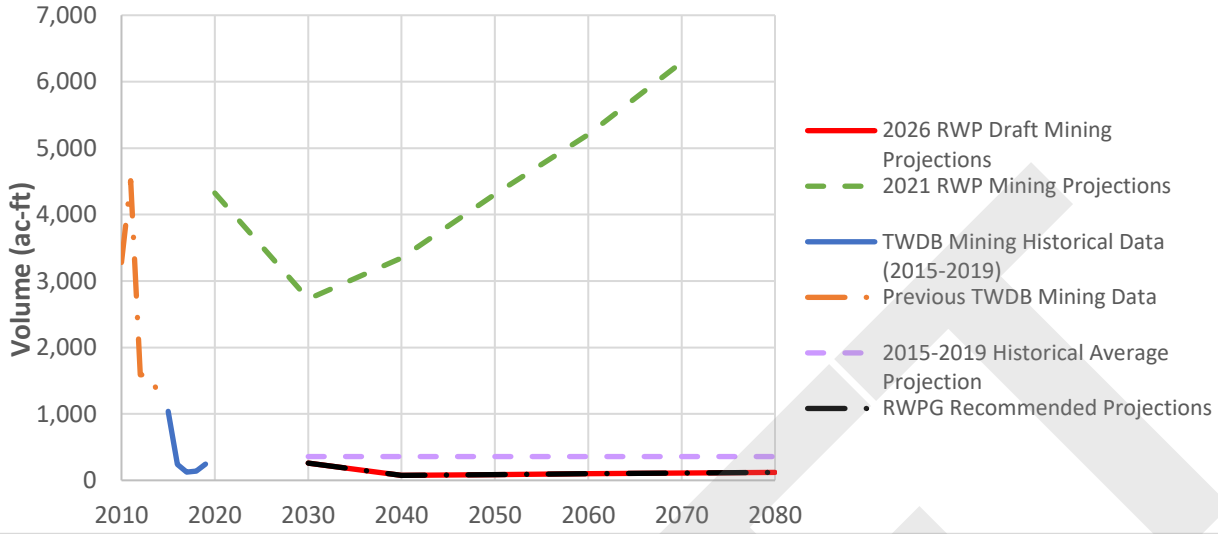

Figure 5A. Ellis County Mining Comparison

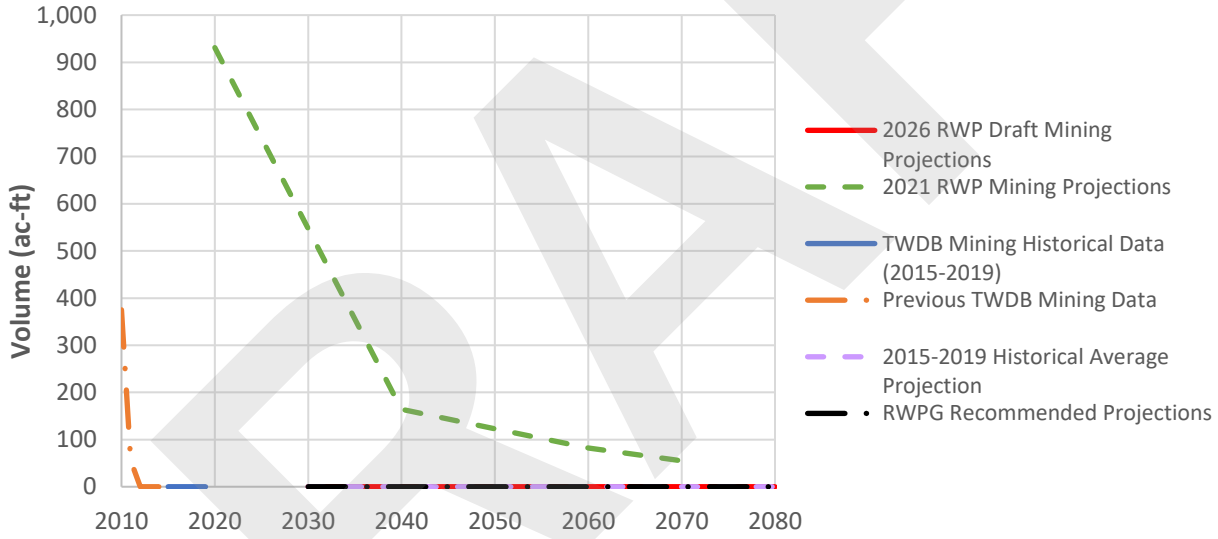

Figure 6A. Fannin County Mining Comparison

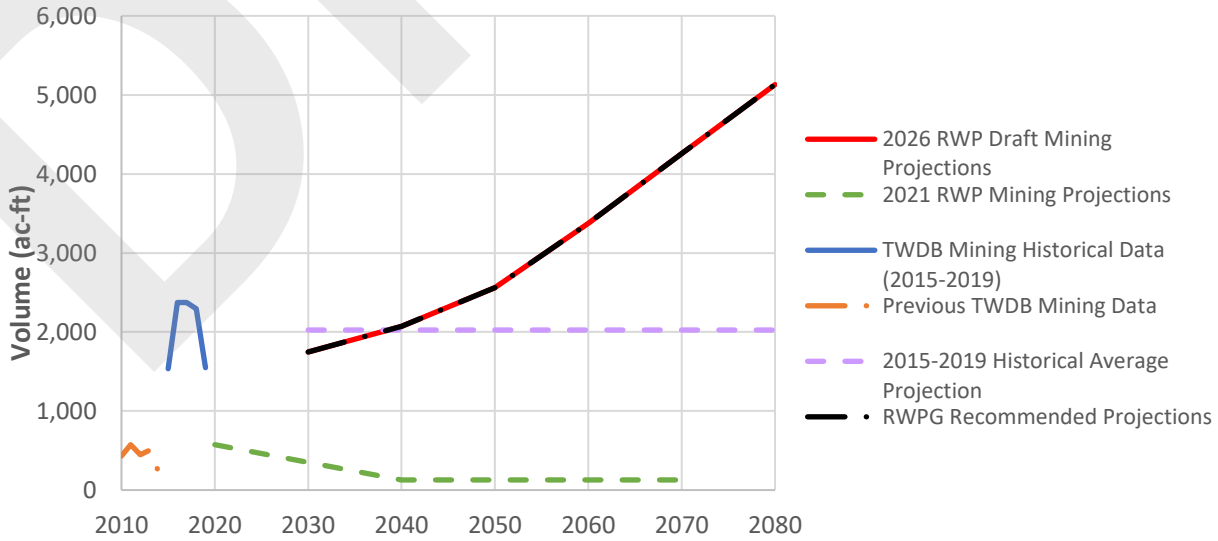

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Figure 7A. Freestone County Mining Comparison

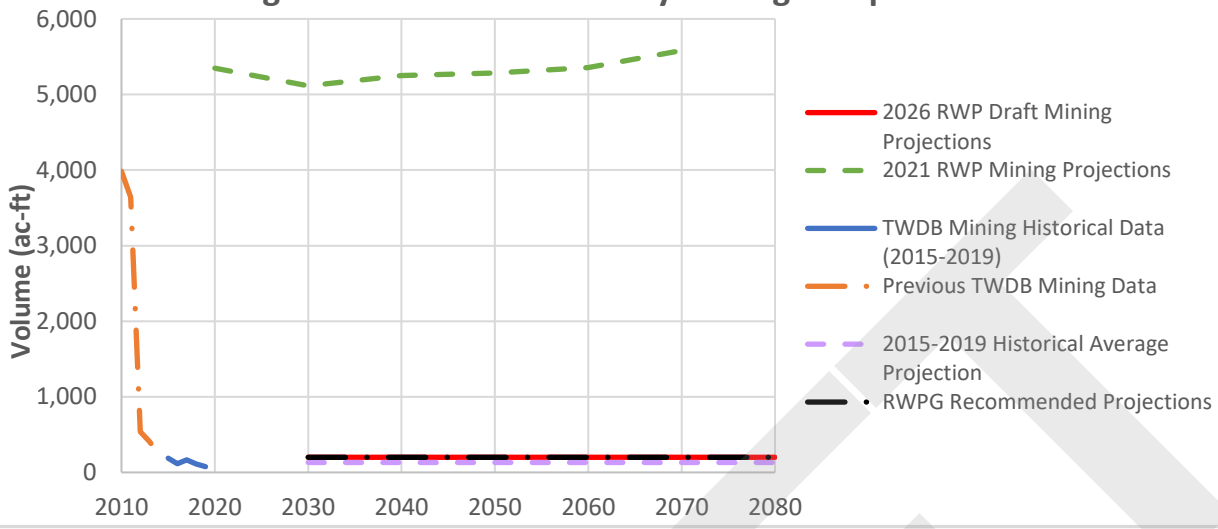

Figure 8A. Grayson County Mining Comparison

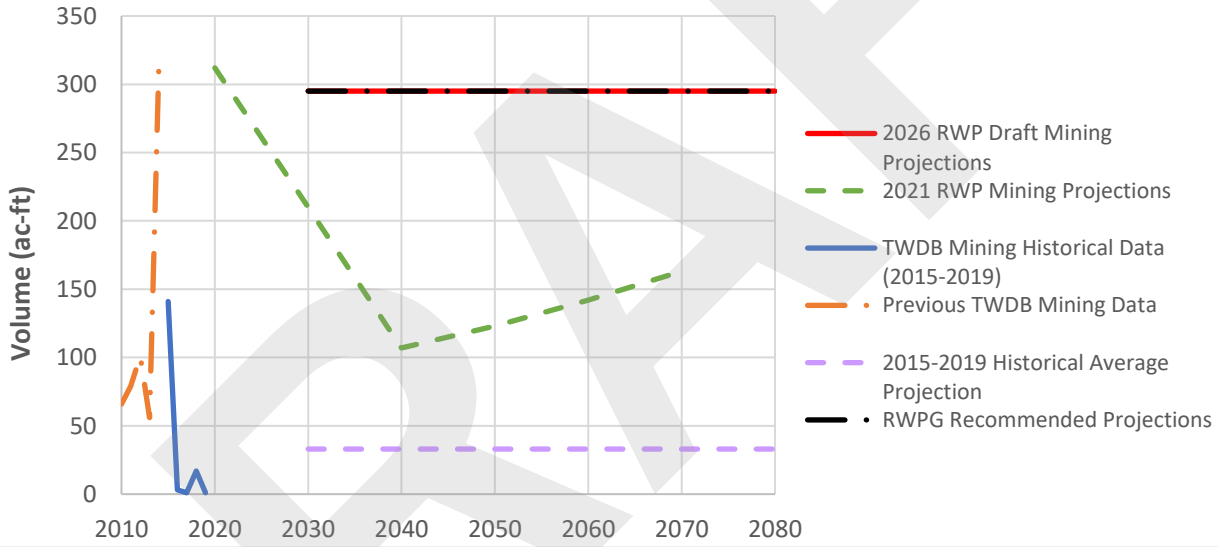

Figure 9A. Henderson County Mining Comparison

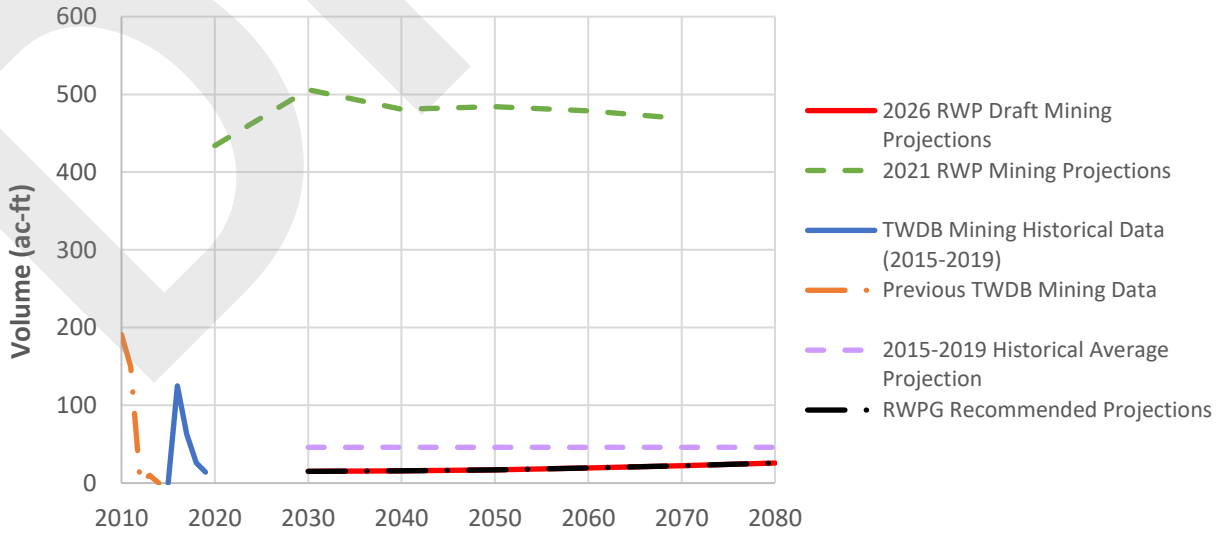

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Figure 10A. Jack County Mining Comparison

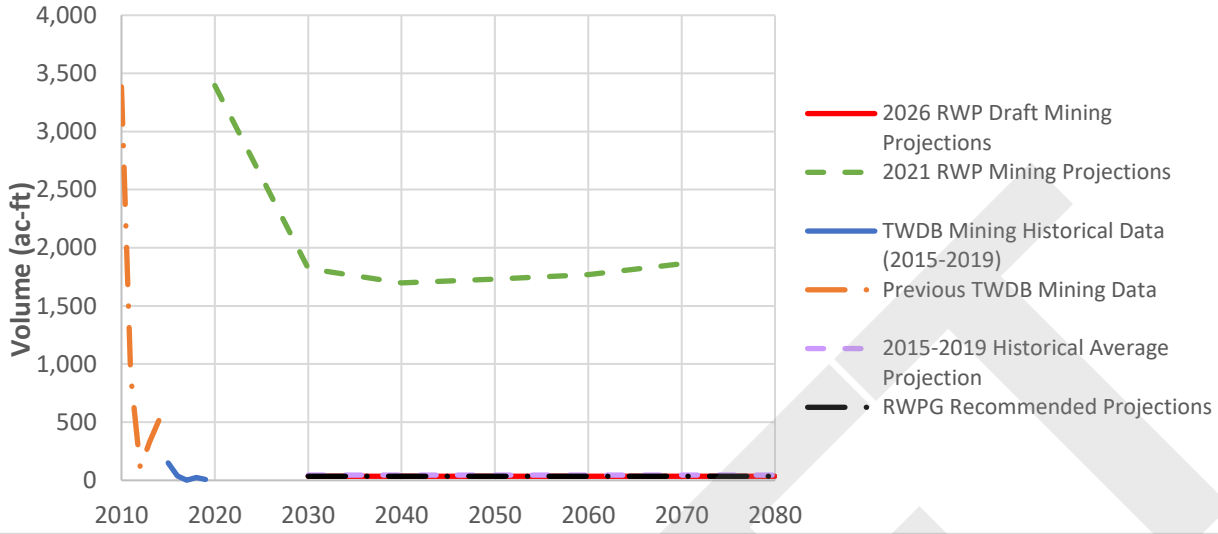

Figure 11A. Kaufman County Mining Comparison

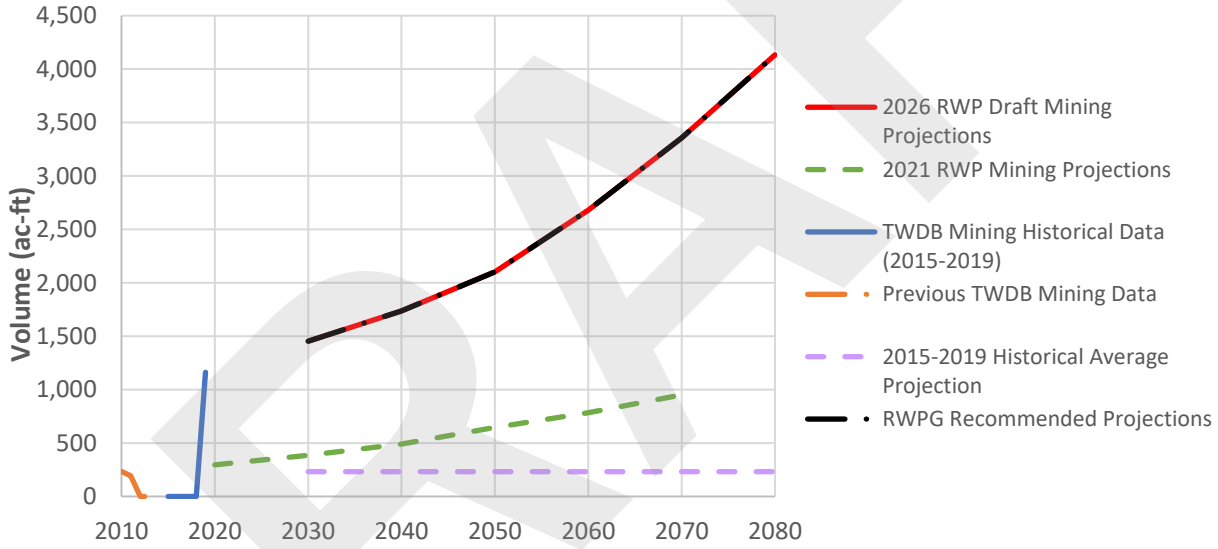

Figure 12A. Navarro County Mining Comparison

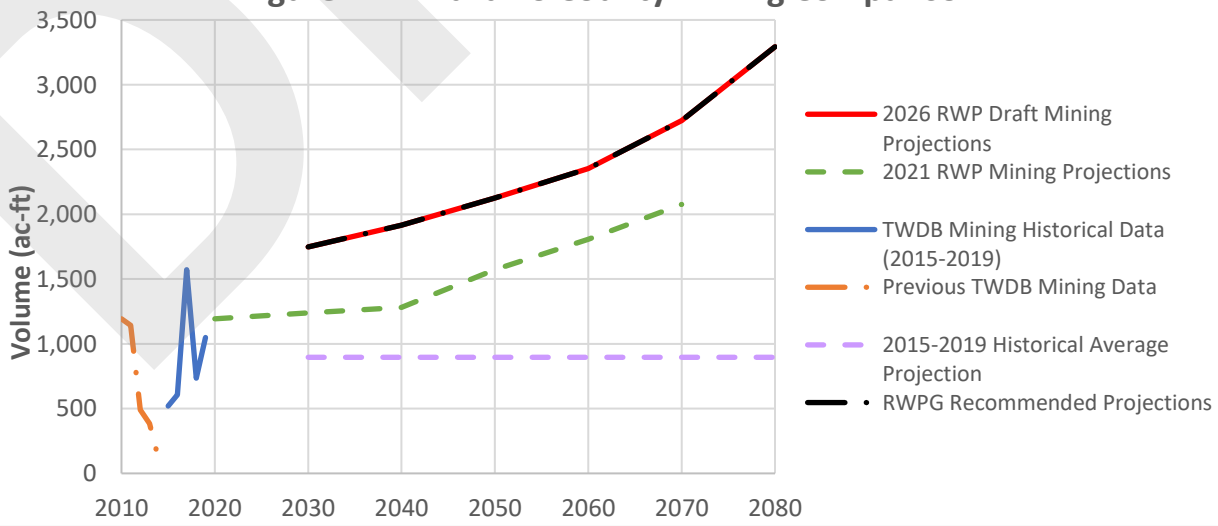

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Figure 13A. Parker County Mining Comparison

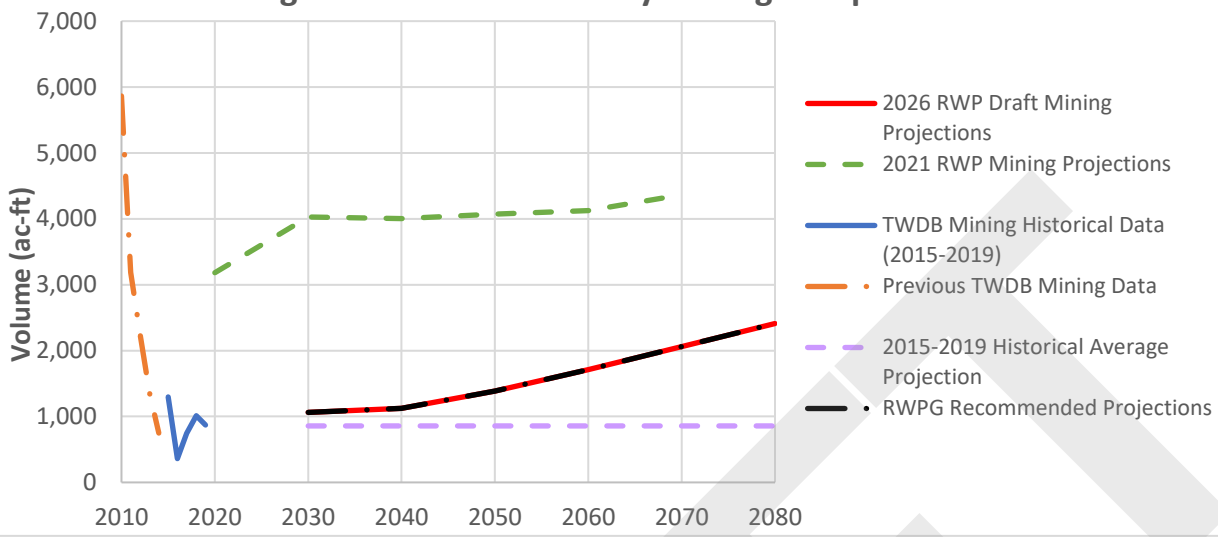


Figure 14A. Rockwall County Mining Comparison

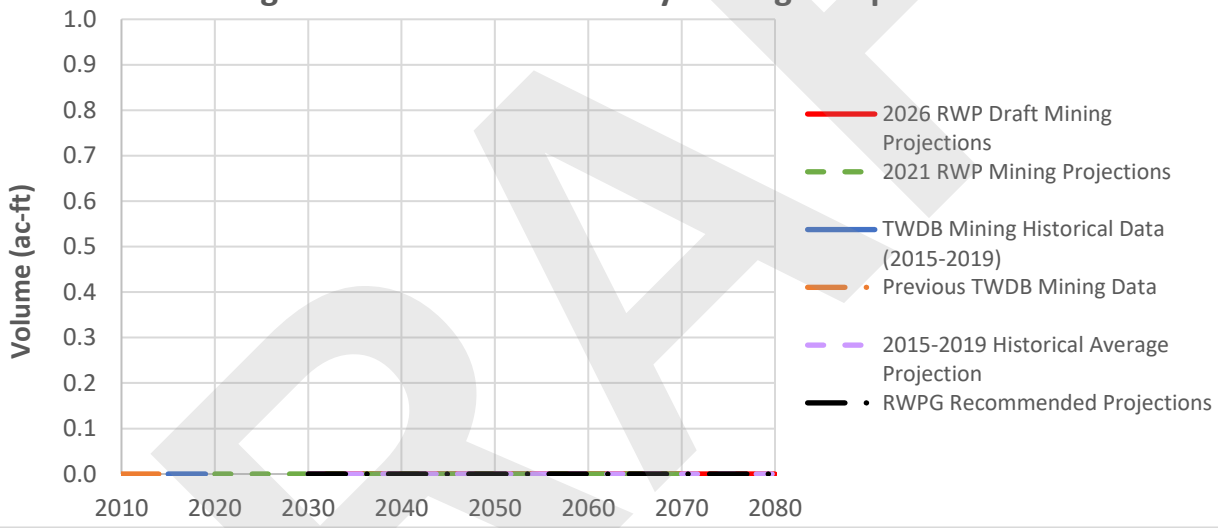
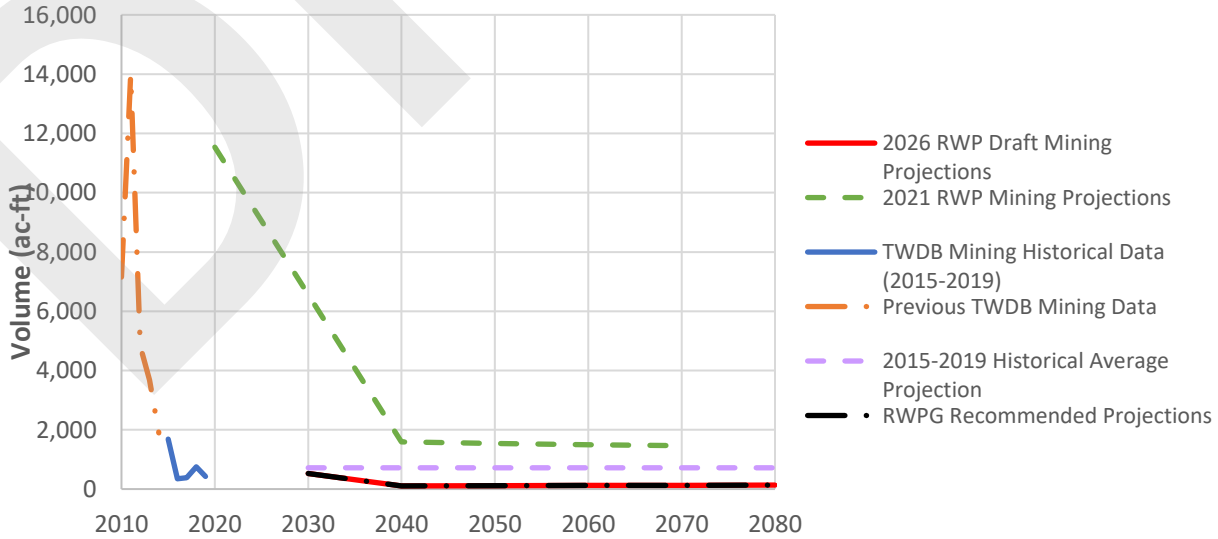


Figure 15A. Tarrant County Mining Comparison



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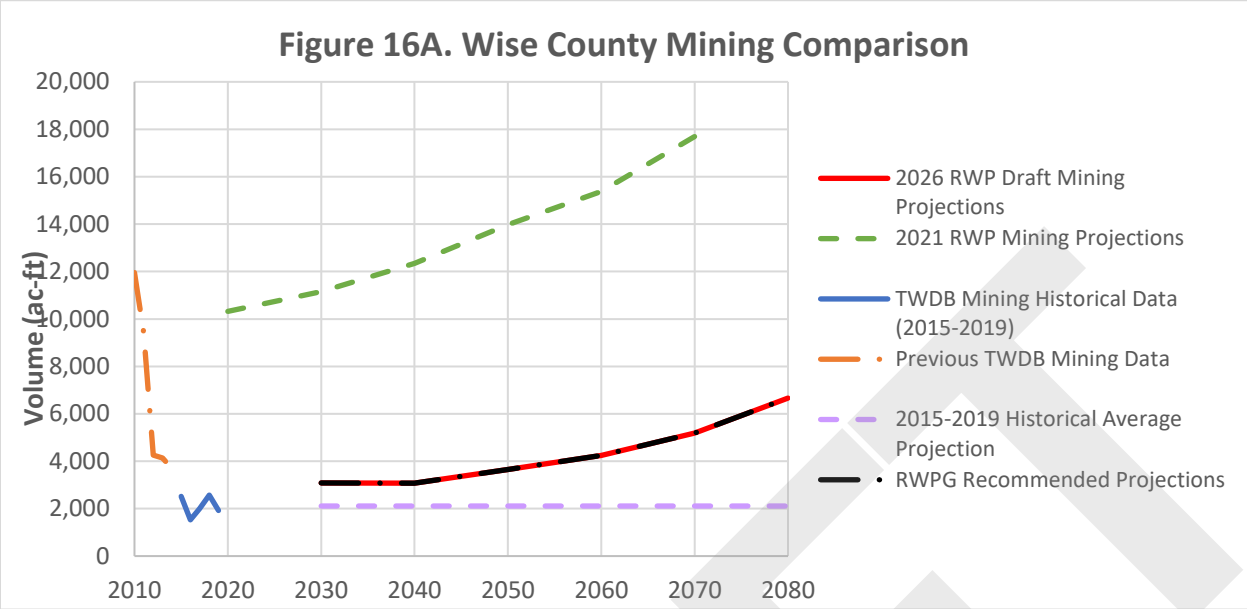
Figure 16A. Wise County Mining Comparison
Volume (ac-ft)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2010
2020
2030
2040
2050
2060
2070
2080
2026 RWP Draft Mining Projections
2021 RWP Mining Projections
TWDB Mining Historical Data (2015-2019)
Previous TWDB Mining Data
2015-2019 Historical Average Projection
RWPG Recommended Projections

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Attachment C-6

Projected Savings Due to Plumbing Code for Municipal WUGs

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Plumbing Code Savings
(GPCD)

Entity Name	County	Basin	PC2030	PC2040	PC2050	PC2060	PC2070	PC2080
ABLES SPRINGS SUD	KAUFMAN	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
ABLES SPRINGS SUD	KAUFMAN	SABINE	0.00	0.00	0.00	0.00	0.00	0.00
ADDISON	DALLAS	TRINITY	5.90	6.79	6.79	6.79	6.79	6.79
ALEDO	PARKER	TRINITY	4.64	5.19	5.19	5.19	5.19	5.19
ALLEN	COLLIN	TRINITY	4.48	5.05	5.05	5.05	5.05	5.05
ALVORD	WISE	TRINITY	4.07	4.45	4.45	4.45	4.45	4.45
AMC CREEKSIDE	DENTON	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
AMC CREEKSIDE	DALLAS	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
ANNA	COLLIN	TRINITY	3.93	4.42	4.42	4.42	4.42	4.42
ANNETTA	PARKER	TRINITY	4.13	4.47	4.47	4.47	4.47	4.47
ARGYLE WSC	DENTON	TRINITY	4.20	4.60	4.60	4.60	4.60	4.60
ARLEDGE RIDGE WSC	FANNIN	SULPHUR	1.17	1.30	1.30	1.30	1.30	1.30
ARLEDGE RIDGE WSC	FANNIN	RED	3.23	3.61	3.61	3.61	3.61	3.61
ARLINGTON	TARRANT	TRINITY	4.67	5.24	5.24	5.24	5.24	5.24
ATHENS	HENDERSON	TRINITY	5.03	5.62	5.62	5.62	5.62	5.62
AUBREY	DENTON	TRINITY	4.59	5.07	5.07	5.07	5.07	5.07
AVALON WATER SUPPLY & SEWER SERVICE	ELLIS	TRINITY	4.30	4.75	4.75	4.75	4.75	4.75
AZLE	PARKER	TRINITY	4.51	5.02	5.02	5.02	5.02	5.02
AZLE	TARRANT	TRINITY	4.51	5.02	5.02	5.02	5.02	5.02
B AND B WSC	NAVARRO	TRINITY	4.42	4.96	4.96	4.96	4.96	4.96
BALCH SPRINGS	DALLAS	TRINITY	4.33	4.92	4.92	4.92	4.92	4.92
BEAR CREEK SUD	COLLIN	TRINITY	3.93	4.41	4.41	4.41	4.41	4.41
BEAR CREEK SUD	ROCKWALL	SABINE	1.80	2.02	2.02	2.02	2.02	2.02
BEAR CREEK SUD	ROCKWALL	TRINITY	2.13	2.39	2.39	2.39	2.39	2.39
BECKER JIBA WSC	KAUFMAN	TRINITY	4.39	4.86	4.86	4.86	4.86	4.86
BEDFORD	TARRANT	TRINITY	5.01	5.51	5.51	5.51	5.51	5.51
BELLS	GRAYSON	RED	4.55	5.07	5.07	5.07	5.07	5.07
BENBROOK WATER AUTHORITY	TARRANT	TRINITY	4.76	5.27	5.27	5.27	5.27	5.27
BETHESDA WSC	TARRANT	TRINITY	4.20	4.82	4.82	4.82	4.82	4.82
BLACK ROCK WSC	DENTON	TRINITY	5.07	5.46	5.46	5.46	5.46	5.46
BLACKLAND WSC	ROCKWALL	SABINE	2.01	2.27	2.27	2.27	2.27	2.27
BLACKLAND WSC	ROCKWALL	TRINITY	2.56	2.89	2.89	2.89	2.89	2.89
BLOOMING GROVE	NAVARRO	TRINITY	4.60	5.10	5.10	5.10	5.10	5.10
BLUE MOUND	TARRANT	TRINITY	4.42	4.94	4.94	4.94	4.94	4.94
BLUE RIDGE	COLLIN	TRINITY	4.10	4.53	4.53	4.53	4.53	4.53
BOIS D ARC MUD	FANNIN	SULPHUR	0.03	0.03	0.03	0.03	0.03	0.03
BOIS D ARC MUD	FANNIN	RED	4.50	5.02	5.02	5.02	5.02	5.02
BOLIVAR WSC	DENTON	TRINITY	4.98	5.50	5.50	5.50	5.50	5.50
BOLIVAR WSC	COOKE	TRINITY	4.98	5.50	5.50	5.50	5.50	5.50
BOLIVAR WSC	WISE	TRINITY	4.98	5.50	5.50	5.50	5.50	5.50
BONHAM	FANNIN	RED	4.79	5.31	5.31	5.31	5.31	5.31
BOYD	WISE	TRINITY	4.74	5.20	5.20	5.20	5.20	5.20
BRIDGEPORT	WISE	TRINITY	4.66	5.22	5.22	5.22	5.22	5.22
BUENA VISTA-BETHEL SUD	ELLIS	TRINITY	4.16	4.63	4.63	4.63	4.63	4.63
BURLESON	TARRANT	TRINITY	4.38	4.91	4.91	4.91	4.91	4.91
BUTLER WSC	FREESTONE	TRINITY	4.61	5.20	5.20	5.20	5.20	5.20
CADDO BASIN SUD	COLLIN	SABINE	2.31	2.58	2.58	2.58	2.58	2.58
CADDO BASIN SUD	COLLIN	TRINITY	1.91	2.13	2.13	2.13	2.13	2.13
CALLISBURG WSC	COOKE	RED	1.01	1.15	1.15	1.15	1.15	1.15
CALLISBURG WSC	COOKE	TRINITY	3.11	3.57	3.57	3.57	3.57	3.57
CARROLLTON	DENTON	TRINITY	4.78	5.48	5.48	5.48	5.48	5.48
CARROLLTON	DALLAS	TRINITY	4.78	5.48	5.48	5.48	5.48	5.48
CASH SUD	ROCKWALL	SABINE	4.37	4.87	4.87	4.87	4.87	4.87
CEDAR HILL	DALLAS	TRINITY	4.53	5.16	5.16	5.16	5.16	5.16
CELINA	DENTON	TRINITY	3.48	3.87	3.87	3.87	3.87	3.87
CELINA	COLLIN	TRINITY	3.48	3.87	3.87	3.87	3.87	3.87
CHATFIELD WSC	NAVARRO	TRINITY	4.57	5.15	5.15	5.15	5.15	5.15
CHICO	WISE	TRINITY	4.75	5.25	5.25	5.25	5.25	5.25
COCKRELL HILL	DALLAS	TRINITY	4.25	4.79	4.79	4.79	4.79	4.79
COLLEGE MOUND SUD	KAUFMAN	TRINITY	1.00	1.00	1.00	1.00	1.00	1.00
COLLEYVILLE	TARRANT	TRINITY	4.46	5.01	5.01	5.01	5.01	5.01

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COLLINSVILLE	GRAYSON	TRINITY	4.52	5.04	5.04	5.04	5.04	5.04
COMBINE WSC	DALLAS	TRINITY	4.18	4.67	4.67	4.67	4.67	4.67
COMBINE WSC	KAUFMAN	TRINITY	4.18	4.67	4.67	4.67	4.67	4.67
COMMUNITY WSC	PARKER	TRINITY	4.48	4.95	4.95	4.95	4.95	4.95
COMMUNITY WSC	TARRANT	TRINITY	4.48	4.95	4.95	4.95	4.95	4.95
COPEVILLE SUD	COLLIN	TRINITY	4.13	4.54	4.54	4.54	4.54	4.54
COPPELL	DENTON	TRINITY	4.69	5.49	5.49	5.49	5.49	5.49
COPPELL	DALLAS	TRINITY	4.69	5.49	5.49	5.49	5.49	5.49
CORBET WSC	NAVARRO	TRINITY	4.54	5.02	5.02	5.02	5.02	5.02
CORINTH	DENTON	TRINITY	4.55	5.04	5.04	5.04	5.04	5.04
CORSICANA	NAVARRO	TRINITY	4.65	5.21	5.21	5.21	5.21	5.21
COUNTY-OTHER, COLLIN	COLLIN	SABINE	2.40	2.72	2.72	2.72	2.72	2.72
COUNTY-OTHER, COLLIN	COLLIN	TRINITY	4.13	4.67	4.67	4.67	4.67	4.67
COUNTY-OTHER, COOKE	COOKE	RED	0.82	0.92	0.92	0.92	0.92	0.92
COUNTY-OTHER, COOKE	COOKE	TRINITY	4.17	4.71	4.71	4.71	4.71	4.71
COUNTY-OTHER, DALLAS	DALLAS	TRINITY	3.40	4.29	4.29	4.29	4.29	4.29
COUNTY-OTHER, DENTON	DENTON	TRINITY	5.32	5.70	5.70	5.70	5.70	5.70
COUNTY-OTHER, ELLIS	ELLIS	TRINITY	3.91	4.48	4.48	4.48	4.48	4.48
COUNTY-OTHER, FANNIN	FANNIN	SULPHUR	1.54	1.69	1.69	1.69	1.69	1.69
COUNTY-OTHER, FANNIN	FANNIN	RED	3.59	3.92	3.92	3.92	3.92	3.92
COUNTY-OTHER, FREESTONE	FREESTONE	BRAZOS	0.10	0.11	0.11	0.11	0.11	0.11
COUNTY-OTHER, FREESTONE	FREESTONE	TRINITY	5.66	6.42	6.42	6.42	6.42	6.42
COUNTY-OTHER, GRAYSON	GRAYSON	RED	4.25	4.87	4.87	4.87	4.87	4.87
COUNTY-OTHER, HENDERSON	HENDERSON	TRINITY	4.98	5.44	5.44	5.44	5.44	5.44
COUNTY-OTHER, JACK	JACK	BRAZOS	1.74	1.97	1.97	1.97	1.97	1.97
COUNTY-OTHER, JACK	JACK	TRINITY	2.93	3.29	3.29	3.29	3.29	3.29
COUNTY-OTHER, KAUFMAN	KAUFMAN	SABINE	0.03	0.03	0.03	0.03	0.03	0.03
COUNTY-OTHER, KAUFMAN	KAUFMAN	TRINITY	4.13	4.54	4.54	4.54	4.54	4.54
COUNTY-OTHER, NAVARRO	NAVARRO	TRINITY	4.63	5.22	5.22	5.22	5.22	5.22
COUNTY-OTHER, PARKER	PARKER	BRAZOS	1.11	1.25	1.25	1.25	1.25	1.25
COUNTY-OTHER, PARKER	PARKER	TRINITY	3.15	3.52	3.52	3.52	3.52	3.52
COUNTY-OTHER, ROCKWALL	ROCKWALL	TRINITY	0.04	0.05	0.05	0.05	0.05	0.05
COUNTY-OTHER, ROCKWALL	ROCKWALL	SABINE	4.03	4.59	4.59	4.59	4.59	4.59
COUNTY-OTHER, TARRANT	TARRANT	TRINITY	4.85	5.38	5.38	5.38	5.38	5.38
COUNTY-OTHER, WISE	WISE	TRINITY	4.37	4.93	4.93	4.93	4.93	4.93
CRANDALL	KAUFMAN	TRINITY	4.82	5.30	5.30	5.30	5.30	5.30
CRESCENT HEIGHTS WSC	HENDERSON	TRINITY	4.58	5.18	5.18	5.18	5.18	5.18
CROSS TIMBERS WSC	DENTON	TRINITY	4.55	4.96	4.96	4.96	4.96	4.96
CROWLEY	TARRANT	TRINITY	4.20	4.73	4.73	4.73	4.73	4.73
CULLEOKA WSC	COLLIN	TRINITY	4.31	4.72	4.72	4.72	4.72	4.72
DALLAS	COLLIN	TRINITY	4.96	5.59	5.59	5.59	5.59	5.59
DALLAS	DALLAS	TRINITY	4.96	5.59	5.59	5.59	5.59	5.59
DALLAS	DENTON	TRINITY	4.96	5.59	5.59	5.59	5.59	5.59
DALWORTHINGTON GARDENS	TARRANT	TRINITY	4.75	5.36	5.36	5.36	5.36	5.36
DAWSON	NAVARRO	TRINITY	4.75	5.27	5.27	5.27	5.27	5.27
DECATUR	WISE	TRINITY	4.98	5.53	5.53	5.53	5.53	5.53
DENISON	GRAYSON	RED	4.90	5.45	5.45	5.45	5.45	5.45
DENTON	DENTON	TRINITY	4.57	5.06	5.06	5.06	5.06	5.06
DENTON COUNTY FWSD 10	DENTON	TRINITY	3.50	3.88	3.88	3.88	3.88	3.88
DENTON COUNTY FWSD 11-C	DENTON	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
DENTON COUNTY FWSD 1-A	DENTON	TRINITY	4.05	4.57	4.57	4.57	4.57	4.57
DENTON COUNTY FWSD 7	DENTON	TRINITY	3.87	4.33	4.33	4.33	4.33	4.33
DESERT WSC	COLLIN	TRINITY	4.71	5.20	5.20	5.20	5.20	5.20
DESERT WSC	FANNIN	RED	0.10	0.11	0.11	0.11	0.11	0.11
DESERT WSC	FANNIN	TRINITY	4.61	5.09	5.09	5.09	5.09	5.09
DESERT WSC	GRAYSON	TRINITY	4.71	5.20	5.20	5.20	5.20	5.20
DESOTO	DALLAS	TRINITY	4.58	5.18	5.18	5.18	5.18	5.18
DOGWOOD ESTATES WATER	HENDERSON	TRINITY	4.56	5.11	5.11	5.11	5.11	5.11
DORCHESTER	GRAYSON	RED	2.27	2.51	2.51	2.51	2.51	2.51
DORCHESTER	GRAYSON	TRINITY	2.48	2.75	2.75	2.75	2.75	2.75
DUNCANVILLE	DALLAS	TRINITY	4.60	5.20	5.20	5.20	5.20	5.20
EAST CEDAR CREEK FWSD	HENDERSON	TRINITY	1.00	1.00	1.00	1.00	1.00	1.00
EAST FORK SUD	COLLIN	TRINITY	3.87	4.39	4.39	4.39	4.39	4.39
EAST FORK SUD	DALLAS	TRINITY	3.87	4.39	4.39	4.39	4.39	4.39
EAST FORK SUD	ROCKWALL	TRINITY	3.87	4.39	4.39	4.39	4.39	4.39

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EAST GARRETT WSC	ELLIS	TRINITY	4.20	4.58	4.58	4.58	4.58	4.58
EDGECLIFF	TARRANT	TRINITY	4.07	4.59	4.59	4.59	4.59	4.59
ELMO WSC	KAUFMAN	TRINITY	4.23	4.67	4.67	4.67	4.67	4.67
ENNIS	ELLIS	TRINITY	4.71	5.32	5.32	5.32	5.32	5.32
EULESS	TARRANT	TRINITY	4.56	5.14	5.14	5.14	5.14	5.14
EUSTACE	HENDERSON	TRINITY	4.31	4.74	4.74	4.74	4.74	4.74
EVERMAN	TARRANT	TRINITY	4.42	4.92	4.92	4.92	4.92	4.92
FAIRFIELD	FREESTONE	TRINITY	4.64	5.26	5.26	5.26	5.26	5.26
FAIRVIEW	COLLIN	TRINITY	4.63	5.22	5.22	5.22	5.22	5.22
FARMERS BRANCH	DALLAS	TRINITY	5.37	6.21	6.21	6.21	6.21	6.21
FARMERSVILLE	COLLIN	TRINITY	4.78	5.35	5.35	5.35	5.35	5.35
FATE	ROCKWALL	TRINITY	0.76	0.85	0.85	0.85	0.85	0.85
FATE	ROCKWALL	SABINE	2.88	3.19	3.19	3.19	3.19	3.19
FERRIS	ELLIS	TRINITY	4.72	5.27	5.27	5.27	5.27	5.27
FLOWER MOUND	TARRANT	TRINITY	4.42	4.87	4.87	4.87	4.87	4.87
FLOWER MOUND	DENTON	TRINITY	4.42	4.87	4.87	4.87	4.87	4.87
FOREST HILL	TARRANT	TRINITY	4.33	4.84	4.84	4.84	4.84	4.84
FORNEY	KAUFMAN	TRINITY	4.19	4.69	4.69	4.69	4.69	4.69
FORNEY LAKE WSC	KAUFMAN	TRINITY	3.74	4.15	4.15	4.15	4.15	4.15
FORT WORTH	TARRANT	TRINITY	4.53	5.13	5.13	5.13	5.13	5.13
FORT WORTH	WISE	TRINITY	4.53	5.13	5.13	5.13	5.13	5.13
FORT WORTH	PARKER	TRINITY	4.53	5.13	5.13	5.13	5.13	5.13
FORT WORTH	DENTON	TRINITY	4.53	5.13	5.13	5.13	5.13	5.13
FRISCO	COLLIN	TRINITY	4.17	4.71	4.71	4.71	4.71	4.71
FRISCO	DENTON	TRINITY	4.17	4.71	4.71	4.71	4.71	4.71
FROGNOT WSC	COLLIN	TRINITY	4.46	4.87	4.87	4.87	4.87	4.87
FROGNOT WSC	FANNIN	TRINITY	4.46	4.87	4.87	4.87	4.87	4.87
GAINESVILLE	COOKE	RED	0.13	0.15	0.15	0.15	0.15	0.15
GAINESVILLE	COOKE	TRINITY	4.67	5.25	5.25	5.25	5.25	5.25
GARLAND	DALLAS	TRINITY	4.59	5.21	5.21	5.21	5.21	5.21
GASTONIA SCURRY SUD	KAUFMAN	TRINITY	1.00	1.00	1.00	1.00	1.00	1.00
GLENN HEIGHTS	DALLAS	TRINITY	4.12	4.59	4.59	4.59	4.59	4.59
GLENN HEIGHTS	ELLIS	TRINITY	4.12	4.59	4.59	4.59	4.59	4.59
GRAND PRAIRIE	DALLAS	TRINITY	4.58	5.31	5.31	5.31	5.31	5.31
GRAND PRAIRIE	TARRANT	TRINITY	4.58	5.31	5.31	5.31	5.31	5.31
GRAPEVINE	TARRANT	TRINITY	5.35	6.21	6.21	6.21	6.21	6.21
GUNTER	GRAYSON	TRINITY	4.57	5.06	5.06	5.06	5.06	5.06
HACKBERRY	DENTON	TRINITY	3.46	3.86	3.86	3.86	3.86	3.86
HALTOM CITY	TARRANT	TRINITY	4.74	5.31	5.31	5.31	5.31	5.31
HASLET	TARRANT	TRINITY	5.60	6.90	6.90	6.90	6.90	6.90
HEATH	KAUFMAN	TRINITY	4.22	4.73	4.73	4.73	4.73	4.73
HEATH	ROCKWALL	TRINITY	4.22	4.73	4.73	4.73	4.73	4.73
HIGH POINT WSC	KAUFMAN	TRINITY	3.67	4.02	4.02	4.02	4.02	4.02
HIGH POINT WSC	ROCKWALL	TRINITY	3.67	4.02	4.02	4.02	4.02	4.02
HIGHLAND PARK	DALLAS	TRINITY	4.68	5.19	5.19	5.19	5.19	5.19
HIGHLAND VILLAGE	DENTON	TRINITY	4.46	4.95	4.95	4.95	4.95	4.95
HONEY GROVE	FANNIN	RED	0.99	1.10	1.10	1.10	1.10	1.10
HONEY GROVE	FANNIN	SULPHUR	3.84	4.25	4.25	4.25	4.25	4.25
HORSESHOE BEND WATER SYSTEM	PARKER	BRAZOS	4.64	5.03	5.03	5.03	5.03	5.03
HOWE	GRAYSON	RED	1.60	1.77	1.77	1.77	1.77	1.77
HOWE	GRAYSON	TRINITY	2.65	2.93	2.93	2.93	2.93	2.93
HUDSON OAKS	PARKER	TRINITY	4.21	4.79	4.79	4.79	4.79	4.79
HURST	TARRANT	TRINITY	4.79	5.42	5.42	5.42	5.42	5.42
HUTCHINS	DALLAS	TRINITY	5.11	6.47	6.47	6.47	6.47	6.47
IRVING	DALLAS	TRINITY	4.81	5.52	5.52	5.52	5.52	5.52
ITALY	ELLIS	TRINITY	4.47	4.94	4.94	4.94	4.94	4.94
JACKSBORO	JACK	TRINITY	5.10	5.64	5.64	5.64	5.64	5.64
JOHNSON COUNTY SUD	TARRANT	TRINITY	4.23	4.73	4.73	4.73	4.73	4.73
JOSEPHINE	COLLIN	SABINE	3.76	4.14	4.14	4.14	4.14	4.14
JUSTIN	DENTON	TRINITY	4.34	4.84	4.84	4.84	4.84	4.84
KAUFMAN	KAUFMAN	TRINITY	4.47	4.93	4.93	4.93	4.93	4.93
KAUFMAN COUNTY DEVELOPMENT DISTRICT 1	KAUFMAN	TRINITY	3.80	4.33	4.33	4.33	4.33	4.33
KAUFMAN COUNTY MUD 11	KAUFMAN	TRINITY	3.89	4.37	4.37	4.37	4.37	4.37
KAUFMAN COUNTY MUD 14	KAUFMAN	TRINITY	3.09	3.39	3.39	3.39	3.39	3.39
KELLER	TARRANT	TRINITY	4.41	4.97	4.97	4.97	4.97	4.97

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KEMP	KAUFMAN	TRINITY	4.44	4.96	4.96	4.96	4.96	4.96
KENNEDALE	TARRANT	TRINITY	4.69	5.23	5.23	5.23	5.23	5.23
KENTUCKYTOWN WSC	GRAYSON	RED	2.25	2.49	2.49	2.49	2.49	2.49
KENTUCKYTOWN WSC	GRAYSON	TRINITY	2.27	2.52	2.52	2.52	2.52	2.52
KERENS	NAVARRO	TRINITY	4.56	5.12	5.12	5.12	5.12	5.12
KRUM	DENTON	TRINITY	4.28	4.75	4.75	4.75	4.75	4.75
LADONIA	FANNIN	SULPHUR	4.99	5.47	5.47	5.47	5.47	5.47
LAKE CITIES MUNICIPAL UTILITY AUTHORITY	DENTON	TRINITY	4.55	5.06	5.06	5.06	5.06	5.06
LAKE KIOWA SUD	COOKE	TRINITY	4.64	5.13	5.13	5.13	5.13	5.13
LAKE WORTH	TARRANT	TRINITY	5.22	5.98	5.98	5.98	5.98	5.98
LAKESIDE	TARRANT	TRINITY	4.13	4.69	4.69	4.69	4.69	4.69
LANCASTER	DALLAS	TRINITY	4.55	5.27	5.27	5.27	5.27	5.27
LANCASTER MUD 1	DALLAS	TRINITY	3.66	4.10	4.10	4.10	4.10	4.10
LEONARD	FANNIN	RED	0.03	0.03	0.03	0.03	0.03	0.03
LEONARD	FANNIN	SULPHUR	0.02	0.03	0.03	0.03	0.03	0.03
LEONARD	FANNIN	TRINITY	4.65	5.15	5.15	5.15	5.15	5.15
LEWISVILLE	DALLAS	TRINITY	4.69	5.32	5.32	5.32	5.32	5.32
LEWISVILLE	DENTON	TRINITY	4.69	5.32	5.32	5.32	5.32	5.32
LINDSAY	COOKE	RED	0.06	0.06	0.06	0.06	0.06	0.06
LINDSAY	COOKE	TRINITY	4.53	5.08	5.08	5.08	5.08	5.08
LITTLE ELM	DENTON	TRINITY	3.86	4.60	4.60	4.60	4.60	4.60
LOG CABIN	HENDERSON	TRINITY	4.94	5.41	5.41	5.41	5.41	5.41
LUCAS	COLLIN	TRINITY	4.05	4.55	4.55	4.55	4.55	4.55
LUELLA SUD	GRAYSON	TRINITY	0.57	0.63	0.63	0.63	0.63	0.63
LUELLA SUD	GRAYSON	RED	4.01	4.48	4.48	4.48	4.48	4.48
M E N WSC	NAVARRO	TRINITY	4.45	4.96	4.96	4.96	4.96	4.96
MABANK	KAUFMAN	TRINITY	4.07	4.72	4.72	4.72	4.72	4.72
MABANK	HENDERSON	TRINITY	4.07	4.72	4.72	4.72	4.72	4.72
MALAKOFF	HENDERSON	TRINITY	5.16	5.73	5.73	5.73	5.73	5.73
MANSFIELD	ELLIS	TRINITY	4.43	5.05	5.05	5.05	5.05	5.05
MANSFIELD	TARRANT	TRINITY	4.43	5.05	5.05	5.05	5.05	5.05
MARKOUT WSC	KAUFMAN	TRINITY	3.88	4.24	4.24	4.24	4.24	4.24
MCKINNEY	COLLIN	TRINITY	4.33	4.88	4.88	4.88	4.88	4.88
MELISSA	COLLIN	TRINITY	3.45	3.86	3.86	3.86	3.86	3.86
MESQUITE	DALLAS	TRINITY	4.63	5.28	5.28	5.28	5.28	5.28
MIDLOTHIAN	ELLIS	TRINITY	4.57	5.21	5.21	5.21	5.21	5.21
MILLIGAN WSC	COLLIN	TRINITY	4.92	5.64	5.64	5.64	5.64	5.64
MINERAL WELLS	PARKER	BRAZOS	4.83	5.42	5.42	5.42	5.42	5.42
MOUNT ZION WSC	ROCKWALL	TRINITY	4.82	5.53	5.53	5.53	5.53	5.53
MOUNTAIN PEAK SUD	ELLIS	TRINITY	3.99	4.46	4.46	4.46	4.46	4.46
MOUNTAIN SPRINGS WSC	DENTON	TRINITY	4.62	5.18	5.18	5.18	5.18	5.18
MOUNTAIN SPRINGS WSC	COOKE	TRINITY	4.62	5.18	5.18	5.18	5.18	5.18
MUENSTER	COOKE	TRINITY	4.98	5.64	5.64	5.64	5.64	5.64
MURPHY	COLLIN	TRINITY	4.16	4.96	4.96	4.96	4.96	4.96
MUSTANG SUD	COLLIN	TRINITY	3.41	3.72	3.72	3.72	3.72	3.72
MUSTANG SUD	GRAYSON	TRINITY	3.41	3.72	3.72	3.72	3.72	3.72
MUSTANG SUD	DENTON	TRINITY	3.41	3.72	3.72	3.72	3.72	3.72
NASH FORRESTON WSC	ELLIS	TRINITY	4.20	4.69	4.69	4.69	4.69	4.69
NAVARRO MILLS WSC	NAVARRO	TRINITY	4.50	5.00	5.00	5.00	5.00	5.00
NEVADA SUD	COLLIN	SABINE	1.44	1.59	1.59	1.59	1.59	1.59
NEVADA SUD	COLLIN	TRINITY	2.70	2.98	2.98	2.98	2.98	2.98
NEVADA SUD	ROCKWALL	SABINE	4.14	4.57	4.57	4.57	4.57	4.57
NEWARK	WISE	TRINITY	4.37	4.77	4.77	4.77	4.77	4.77
NORTH COLLIN SUD	COLLIN	TRINITY	4.17	4.64	4.64	4.64	4.64	4.64
NORTH FARMERSVILLE WSC	COLLIN	TRINITY	4.73	5.26	5.26	5.26	5.26	5.26
NORTH KAUFMAN WSC	KAUFMAN	TRINITY	2.00	2.00	2.00	2.00	2.00	2.00
NORTH RICHLAND HILLS	TARRANT	TRINITY	4.74	5.29	5.29	5.29	5.29	5.29
NORTHLAKE	DENTON	TRINITY	4.50	5.03	5.03	5.03	5.03	5.03
NORTHWEST GRAYSON COUNTY WCID 1	GRAYSON	RED	4.53	5.01	5.01	5.01	5.01	5.01
OAK RIDGE SOUTH GALE WSC	GRAYSON	RED	3.99	4.66	4.66	4.66	4.66	4.66
OVILLA	DALLAS	TRINITY	4.13	4.49	4.49	4.49	4.49	4.49
OVILLA	ELLIS	TRINITY	4.13	4.49	4.49	4.49	4.49	4.49
PALMER	ELLIS	TRINITY	4.27	4.72	4.72	4.72	4.72	4.72
PALOMA CREEK NORTH	DENTON	TRINITY	3.29	3.95	3.95	3.95	3.95	3.95
PALOMA CREEK SOUTH	DENTON	TRINITY	3.17	3.78	3.78	3.78	3.78	3.78

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PANTEGO	TARRANT	TRINITY	5.43	6.26	6.26	6.26	6.26	6.26
PARKER	COLLIN	TRINITY	3.96	4.49	4.49	4.49	4.49	4.49
PARKER COUNTY SUD	PARKER	BRAZOS	4.03	4.49	4.49	4.49	4.49	4.49
PELICAN BAY	TARRANT	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
PILOT POINT	GRAYSON	TRINITY	4.46	4.85	4.85	4.85	4.85	4.85
PILOT POINT	DENTON	TRINITY	4.46	4.85	4.85	4.85	4.85	4.85
PINK HILL WSC	GRAYSON	RED	4.49	5.00	5.00	5.00	5.00	5.00
PLANO	COLLIN	TRINITY	4.82	5.39	5.39	5.39	5.39	5.39
PLANO	DENTON	TRINITY	4.82	5.39	5.39	5.39	5.39	5.39
PLEASANT GROVE WSC	FREESTONE	TRINITY	4.66	5.23	5.23	5.23	5.23	5.23
PLEASANT GROVE WSC	NAVARRO	TRINITY	4.66	5.23	5.23	5.23	5.23	5.23
POETRY WSC	KAUFMAN	SABINE	1.98	2.17	2.17	2.17	2.17	2.17
POETRY WSC	KAUFMAN	TRINITY	2.45	2.69	2.69	2.69	2.69	2.69
POINT ENTERPRISE WSC	FREESTONE	TRINITY	2.18	2.46	2.46	2.46	2.46	2.46
POINT ENTERPRISE WSC	FREESTONE	BRAZOS	2.42	2.72	2.72	2.72	2.72	2.72
PONDER	DENTON	TRINITY	4.15	4.63	4.63	4.63	4.63	4.63
POTTSBORO	GRAYSON	RED	4.67	5.22	5.22	5.22	5.22	5.22
PRINCETON	COLLIN	TRINITY	3.82	4.25	4.25	4.25	4.25	4.25
PROSPER	COLLIN	TRINITY	3.58	4.06	4.06	4.06	4.06	4.06
PROSPER	DENTON	TRINITY	3.58	4.06	4.06	4.06	4.06	4.06
PROVIDENCE VILLAGE WCID	DENTON	TRINITY	3.85	4.50	4.50	4.50	4.50	4.50
R C H WSC	ROCKWALL	TRINITY	3.83	4.25	4.25	4.25	4.25	4.25
RED OAK	ELLIS	TRINITY	4.01	4.50	4.50	4.50	4.50	4.50
RENO (PARKER)	PARKER	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
RENO (PARKER)	TARRANT	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
RHOME	WISE	TRINITY	5.00	5.58	5.58	5.58	5.58	5.58
RICE WATER SUPPLY AND SEWER SERVICE	ELLIS	TRINITY	4.23	4.71	4.71	4.71	4.71	4.71
RICE WATER SUPPLY AND SEWER SERVICE	NAVARRO	TRINITY	4.23	4.71	4.71	4.71	4.71	4.71
RICHARDSON	COLLIN	TRINITY	4.82	5.44	5.44	5.44	5.44	5.44
RICHARDSON	DALLAS	TRINITY	4.82	5.44	5.44	5.44	5.44	5.44
RICHLAND HILLS	TARRANT	TRINITY	4.81	5.37	5.37	5.37	5.37	5.37
RIVER OAKS	TARRANT	TRINITY	4.55	5.09	5.09	5.09	5.09	5.09
ROANOKE	DENTON	TRINITY	4.36	4.95	4.95	4.95	4.95	4.95
ROCKETT SUD	DALLAS	TRINITY	4.31	4.80	4.80	4.80	4.80	4.80
ROCKETT SUD	ELLIS	TRINITY	4.31	4.80	4.80	4.80	4.80	4.80
ROCKWALL	ROCKWALL	TRINITY	4.46	5.04	5.04	5.04	5.04	5.04
ROSE HILL SUD	KAUFMAN	TRINITY	4.32	4.82	4.82	4.82	4.82	4.82
ROWLETT	DALLAS	TRINITY	4.59	5.19	5.19	5.19	5.19	5.19
ROWLETT	ROCKWALL	TRINITY	4.59	5.19	5.19	5.19	5.19	5.19
ROYSE CITY	COLLIN	SABINE	4.29	4.85	4.85	4.85	4.85	4.85
ROYSE CITY	ROCKWALL	SABINE	4.29	4.85	4.85	4.85	4.85	4.85
RUNAWAY BAY	WISE	TRINITY	4.56	4.96	4.96	4.96	4.96	4.96
SACHSE	COLLIN	TRINITY	4.15	4.81	4.81	4.81	4.81	4.81
SACHSE	DALLAS	TRINITY	4.15	4.81	4.81	4.81	4.81	4.81
SAGINAW	TARRANT	TRINITY	4.40	5.06	5.06	5.06	5.06	5.06
SANGER	DENTON	TRINITY	4.53	5.03	5.03	5.03	5.03	5.03
SANSOM PARK	TARRANT	TRINITY	4.31	4.80	4.80	4.80	4.80	4.80
SARDIS LONE ELM WSC	ELLIS	TRINITY	4.20	4.67	4.67	4.67	4.67	4.67
SAVOY	FANNIN	RED	4.83	5.35	5.35	5.35	5.35	5.35
SEAGOVILLE	DALLAS	TRINITY	4.19	4.78	4.78	4.78	4.78	4.78
SEIS LAGOS UD	COLLIN	TRINITY	3.50	4.05	4.05	4.05	4.05	4.05
SHERMAN	GRAYSON	RED	5.00	5.59	5.59	5.59	5.59	5.59
SOUTH ELLIS COUNTY WSC	ELLIS	TRINITY	4.22	4.75	4.75	4.75	4.75	4.75
SOUTH ELLIS COUNTY WSC	NAVARRO	TRINITY	4.22	4.75	4.75	4.75	4.75	4.75
SOUTH FREESTONE COUNTY WSC	FREESTONE	BRAZOS	1.02	1.21	1.21	1.21	1.21	1.21
SOUTH FREESTONE COUNTY WSC	FREESTONE	TRINITY	3.05	3.60	3.60	3.60	3.60	3.60
SOUTH GRAYSON SUD	COLLIN	TRINITY	4.01	4.54	4.54	4.54	4.54	4.54
SOUTH GRAYSON SUD	GRAYSON	TRINITY	4.01	4.54	4.54	4.54	4.54	4.54
SOUTHERN OAKS WATER SUPPLY	FREESTONE	TRINITY	4.37	4.86	4.86	4.86	4.86	4.86
SOUTHERN OAKS WATER SUPPLY	NAVARRO	TRINITY	4.37	4.86	4.86	4.86	4.86	4.86
SOUTHLAKE	TARRANT	TRINITY	4.39	5.01	5.01	5.01	5.01	5.01
SOUTHLAKE	DENTON	TRINITY	4.39	5.01	5.01	5.01	5.01	5.01
SOUTHMAYD	GRAYSON	RED	5.22	5.86	5.86	5.86	5.86	5.86
SOUTHWEST FANNIN COUNTY SUD	FANNIN	TRINITY	0.81	0.91	0.91	0.91	0.91	0.91
SOUTHWEST FANNIN COUNTY SUD	FANNIN	RED	3.40	3.84	3.84	3.84	3.84	3.84

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SOUTHWEST FANNIN COUNTY SUD	GRAYSON	RED	4.21	4.75	4.75	4.75	4.75	4.75
SPRINGTOWN	PARKER	TRINITY	4.81	5.30	5.30	5.30	5.30	5.30
STARR WSC	GRAYSON	RED	4.85	5.31	5.31	5.31	5.31	5.31
SUNNYVALE	DALLAS	TRINITY	4.49	5.29	5.29	5.29	5.29	5.29
TALTY SUD	KAUFMAN	TRINITY	4.03	4.50	4.50	4.50	4.50	4.50
TEAGUE	FREESTONE	TRINITY	2.20	2.45	2.45	2.45	2.45	2.45
TEAGUE	FREESTONE	BRAZOS	2.38	2.65	2.65	2.65	2.65	2.65
TERRA SOUTHWEST	DENTON	TRINITY	4.14	4.60	4.60	4.60	4.60	4.60
TERRELL	KAUFMAN	TRINITY	4.78	5.34	5.34	5.34	5.34	5.34
THE COLONY	DENTON	TRINITY	4.59	5.10	5.10	5.10	5.10	5.10
TIOGA	GRAYSON	TRINITY	4.32	4.77	4.77	4.77	4.77	4.77
TOM BEAN	GRAYSON	RED	0.88	0.98	0.98	0.98	0.98	0.98
TOM BEAN	GRAYSON	TRINITY	3.88	4.34	4.34	4.34	4.34	4.34
TRENTON	FANNIN	RED	0.10	0.11	0.11	0.11	0.11	0.11
TRENTON	FANNIN	TRINITY	4.93	5.46	5.46	5.46	5.46	5.46
TRINIDAD	HENDERSON	TRINITY	4.49	5.00	5.00	5.00	5.00	5.00
TROPHY CLUB MUD 1	TARRANT	TRINITY	3.76	4.29	4.29	4.29	4.29	4.29
TROPHY CLUB MUD 1	DENTON	TRINITY	3.76	4.29	4.29	4.29	4.29	4.29
TWO WAY SUD	COOKE	RED	4.57	5.10	5.10	5.10	5.10	5.10
TWO WAY SUD	GRAYSON	TRINITY	1.87	2.08	2.08	2.08	2.08	2.08
TWO WAY SUD	GRAYSON	RED	2.70	3.02	3.02	3.02	3.02	3.02
UNIVERSITY PARK	DALLAS	TRINITY	4.39	4.94	4.94	4.94	4.94	4.94
VAN ALSTYNE	GRAYSON	TRINITY	4.45	4.96	4.96	4.96	4.96	4.96
VERONA SUD	COLLIN	TRINITY	4.12	4.56	4.56	4.56	4.56	4.56
WALNUT CREEK SUD	WISE	TRINITY	4.30	4.73	4.73	4.73	4.73	4.73
WALNUT CREEK SUD	PARKER	TRINITY	4.30	4.73	4.73	4.73	4.73	4.73
WATAUGA	TARRANT	TRINITY	4.61	5.12	5.12	5.12	5.12	5.12
WAXAHACHIE	ELLIS	TRINITY	4.35	4.82	4.82	4.82	4.82	4.82
WEATHERFORD	PARKER	BRAZOS	0.69	0.77	0.77	0.77	0.77	0.77
WEATHERFORD	PARKER	TRINITY	4.01	4.46	4.46	4.46	4.46	4.46
WEST CEDAR CREEK MUD	KAUFMAN	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
WEST CEDAR CREEK MUD	HENDERSON	TRINITY	0.00	0.00	0.00	0.00	0.00	0.00
WEST LEONARD WSC	COLLIN	TRINITY	4.24	4.64	4.64	4.64	4.64	4.64
WEST LEONARD WSC	FANNIN	TRINITY	4.24	4.64	4.64	4.64	4.64	4.64
WEST WISE SUD	WISE	TRINITY	4.90	5.47	5.47	5.47	5.47	5.47
WESTLAKE	TARRANT	TRINITY	3.58	4.14	4.14	4.14	4.14	4.14
WESTMINSTER SUD	COLLIN	TRINITY	4.42	4.84	4.84	4.84	4.84	4.84
WESTMINSTER SUD	GRAYSON	TRINITY	4.42	4.84	4.84	4.84	4.84	4.84
WESTOVER HILLS	TARRANT	TRINITY	4.66	5.16	5.16	5.16	5.16	5.16
WESTWORTH VILLAGE	TARRANT	TRINITY	4.83	5.38	5.38	5.38	5.38	5.38
WHITE SETTLEMENT	TARRANT	TRINITY	4.72	5.27	5.27	5.27	5.27	5.27
WHITE SHED WSC	FANNIN	RED	4.77	5.25	5.25	5.25	5.25	5.25
WHITESBORO	GRAYSON	RED	2.09	2.31	2.31	2.31	2.31	2.31
WHITESBORO	GRAYSON	TRINITY	2.77	3.06	3.06	3.06	3.06	3.06
WHITEWRIGHT	FANNIN	RED	4.73	5.27	5.27	5.27	5.27	5.27
WHITEWRIGHT	GRAYSON	TRINITY	0.53	0.59	0.59	0.59	0.59	0.59
WHITEWRIGHT	GRAYSON	RED	4.20	4.68	4.68	4.68	4.68	4.68
WILLOW PARK	PARKER	TRINITY	4.32	4.84	4.84	4.84	4.84	4.84
WILMER	DALLAS	TRINITY	4.84	5.79	5.79	5.79	5.79	5.79
WOLFE CITY	FANNIN	SULPHUR	4.70	5.22	5.22	5.22	5.22	5.22
WOODBINE WSC	COOKE	RED	0.34	0.38	0.38	0.38	0.38	0.38
WOODBINE WSC	COOKE	TRINITY	4.19	4.66	4.66	4.66	4.66	4.66
WOODBINE WSC	GRAYSON	TRINITY	4.53	5.04	5.04	5.04	5.04	5.04
WORTHAM	FREESTONE	TRINITY	4.79	5.30	5.30	5.30	5.30	5.30
WYLIE	COLLIN	TRINITY	4.32	4.91	4.91	4.91	4.91	4.91
WYLIE NORTHEAST SUD	COLLIN	TRINITY	4.00	4.61	4.61	4.61	4.61	4.61

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Appendix D

DB27 Reports

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Appendix D DB27 Reports 1

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Table 1 Texas Water Development Board Database Reports 2

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APPENDIX D DB27 REPORTS

The Texas Water Development Board (TWDB) hosts a statewide database, known as DB27, which houses all the data and information from each of the 16 Regional Water Plans across the state. TWDB uses this data to assist in the development of the State Water Plan. In order to facilitate statewide data collection, there are specific requirements in how the data must be entered and reflected in DB27. In some cases, the aggregation and reporting of this data from the database differs from how the data is aggregated and reported in the written Regional Water Plan. The Regional Water Plan aims to present the data in a format that is easily understandable to stakeholders and the public. Divergence between the numbers in tables in the Plan and the DB27 reports do not necessarily represent errors.

Examples of these differences include:

> Total strategy water volumes are aggregated by water user group in the DB27 reports. If a strategy is not fully allocated to a water user group or multiple water user groups, then the total volumes may differ between the DB27 report and the Plan. This is the case for several strategies developed by major water providers.
>
> Water management strategy volumes only display the seller and the end user, not any intermediate sellers. For instance, if a Wholesale Provider sells to City A and City A sells a portion of that supply to City B, the volume sold to City B will only be shown under City B as a sale from the Wholesale Provider. The sale to City A will only show the supply used by City A. The total volume sold to City A is not shown and sale from City A to City B is not shown.

There are no database reports that are blank.

Region C's required DB27 reports can be accessed through the TWDB Database Reports application at https://www3.twdb.texas.gov/apps/SARA/reports/list and following the steps below. The reports available for access in DB27 are listed in **Table 1**.

1. Enter '2026 Regional Water Plan' into the "Report Name" field to filter to all DB27 reports associated with the 2026 Regional Water Plans
2. Click on the report name hyperlink to load the desired report
3. Enter the planning region letter parameter, click view report

In Region C, there are several strategies which are recommended but fully allocated in DB27 to 'Unassigned Volumes'. This occurs when a wholesale water provider plans to develop supplies beyond the exact projected needs of their customers (a management supply factor of greater than 1). This is prudent planning given uncertainty in growth of existing and potential future customers and the potential for a drought worse than the drought of record. In these cases, the strategy is still recommended. However, it is not allocated out to customers as surpluses because this water is not owned by the individual water user group (WUG). This is a surplus that the wholesale provider keeps as a margin of safety against a worse potential drought, unanticipated growth, or new customers. Since it is unknown which of these factors it will be used for, it is left on the wholesale water provider. In the database it is allocated to 'unassigned volumes.'

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TABLE 1 TEXAS WATER DEVELOPMENT BOARD DATABASE REPORTS

REPORT
Report 1 – WUG Population
Report 2 – WUG Water Demand
Report 3 – Source Total Availability
Report 4 – WUG Existing Water Supply
Report 5 – WUG Needs/Surplus
Report 6 – WUG Second-Tier Identified Water Need
Report 7 – WUG Data Comparison to 2021 RWP
Report 8 – Source Data Comparison to 2021 RWP
Report 9 – WUG Unmet Needs
Report 10 – Recommended WUG Water Management Strategies
Report 11 – Recommended Projects Associated with Water Management Strategies
Report 12 – Alternative WUG Water Management Strategies
Report 13 – Alternative Projects Associated with Water Management Strategies
Report 14 – WUG Management Supply Factor
Report 15 – Recommended water Management Strategy Supply Associated with a new or amended IBT Permit
Report 16 – WUG Recommended WMS Supply Associated with a new or amended IBT Permit and Total Recommended conservation WMS Supply
Report 17 – Sponsored Recommended WMS Supplies Unallocated to WUGs
Report 18 – MWP Existing sales and Transfers
Report 19 – MWP WMS Summary

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Final DB27 Reports to be included for the Final Plan Submittal.

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Appendix E

Water Supply Available

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APPENDIX E WATER SUPPLY AVAILABLE TO REGION C

SECTION OUTLINE

Section E.1	Methodology for Determining Surface Water Availability
Section E.2	Water Supply Systems in Region C
Section E.3	Reservoirs in Region C
Section E.4	Unpermitted Yields in Region C Reservoirs
Section E.5	Imports
Section E.6	Irrigation Local Supply and Other Local Supply
Section E.7	Reuse
Section E.8	Desalination
Section E.9	Groundwater

Table E.1 shows the overall water supply available to Region C. The rest of this appendix explains the sources of the data in **Table E.1**. The table represents the water supply that might be available to the region, whether it is currently connected to a water user group or not.

TABLE E.1 OVERALL WATER SUPPLY AVAILABILITY IN REGION C

SOURCE	VALUES IN ACRE-FEET PER YEAR					
	2030	2040	2050	2060	2070	2080
Reservoirs in Region C	1,359,066	1,343,176	1,327,280	1,311,410	1,294,751	1,279,105
Run-of-River Supply	9,197	9,197	9,197	9,197	9,197	9,197
Other Local Supply	18,151	18,351	18,824	19,192	19,192	19,192
Groundwater	159,525	160,586	161,649	162,712	163,670	163,670
Reuse [a]	409,291	425,811	435,377	439,185	443,578	448,503
Surface Water and Groundwater Imports	491,739	485,212	478,772	472,013	464,710	457,933
REGION C TOTAL	***2,446,969***	***2,442,333***	***2,431,099***	***2,413,709***	***2,395,098***	***2,377,600***

[a]Volumes associated with certain reuse supplies may not be included as infrastructure is not yet available to make use of these supplies.

E.1 Methodology for Determining Surface Water Availability

Table E.3 presents the water availability for reservoir systems and reservoirs in Region C. In accordance with the Texas Water Development Board's (TWDB) established procedures [(i)], these surface water supplies are determined using the TCEQ-approved Water Availability Models (WAM), Full Authorization Scenario (Run 3). WAMs have been completed for each of the major river basins in Texas. The WAM models were developed for the purpose of reviewing and granting new surface water rights permits. The assumptions in the WAM models are based on the legal interpretation of water rights. Availabilities for each water right are analyzed in priority date order, with water rights with the earliest permit date diverting first. WAM Run 3, which is the version used for planning, assumes full permitted diversions by all water rights and no return flows unless return flows are specifically required in the water right.

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Run 3 also does not include agreements or operations that are not reflected in the water right permits and does not account for reductions in reservoir capacities due to sediment accumulation, and in some cases do not accurately reflect current operations. For planning purposes, adjustments were made to the WAMs to better reflect current and future surface water conditions in the region. These adjustments were approved by the Region C Water Planning Group and the Executive Administrator (EA) of the Texas Water Development Board in a letter to the Chairman of the Region C Water Planning Group, dated October 26, 2023. This letter and the requested hydrologic variances are included in **Attachment E-1**.

Generally, changes to the WAMs included:

- Assessment of reservoir sedimentation rates and calculation of area-capacity conditions for 2030, 2050, and 2080 conditions. This WAM change results in reservoir yields that usually decrease over time due to the assumed accumulation of sediment.
- Inclusion of subordination agreements not already included in the TCEQ WAM
- Inclusion of system operation where appropriate
- Other corrections

The reliable supply from run-of-the-river diversions for irrigation and mining was calculated using the minimum annual diversion from WAM Run 3 for the permitted water rights. For municipalities with run-of-river supplies as their sole source and manufacturing and steam electric users, an individual firm yield analysis was performed. All run-of-the-river supplies are based on the TCEQ WAM Run 3.

E.1.1 Anticipated Sedimentation

For all major reservoirs in the Trinity, Red, and Sulphur Basins, anticipated sedimentation rates and revised area-capacity rating curves were developed to estimate reservoir storage in future decades. Annual sedimentation rates, expressed in acre-feet per square mile (AF/SqMi), were estimated for each major reservoir based on sediment surveys, published sedimentation rates, or comparing changes in conservation pool capacity between two or more reservoir surveys. The total accumulated sediment for a specific year was calculated as:

[Sedimentation Rate] x [Drainage Area] x [Number of years from the Initial Survey]

This formula was used to estimate the reservoir capacity for decades 2030, 2050, and 2080. The total sediment quantity is applied to the initial area-capacity-elevation (ACE) curve using either a conical or trapezoidal shape method (depending upon the best fit for the reservoir). To develop the new ACE, reservoirs were sliced into incremental storage volumes based on elevation, then a uniform reduction was applied to the horizontal surface area of each slice. New storage volumes were calculated for each increment and added together to calculate the total storage at each elevation. A summary of the sedimentation analyses and projected conservation capacities for the reservoirs in Region C is shown in **Table E.2**.

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TABLE E.2 ESTIMATED SEDIMENTATION RATES AND PROJECTED CAPACITIES

RESERVOIR	DRAINAGE AREA (SQMI)	ANNUAL SEDIMENT RATE (AF/SQMI)	DATE OF INITIAL CAPACITY	CONSERVATION CAPACITIES (AC-FT)				SEDIMENT RATE SOURCE
				INITIAL	2030	2050	2080	
Red River Basin								
Bois d' Arc	271	0.94	2006	367,609	367,609	359,967	352,325	FNI, 2013
Bonham	29	0.90	2004	11,038	10,364	9,842	9,059	TWDB, 2005
Moss	69	0.70	1999	24,155	22,674	21,708	20,259	TWDB, 1999
Texoma	39,719	0.26	2002	2,516,232	2,233,825	2,028,471	1,720,455	TWDB, 2003
Sulphur River Basin								
Ralph Hall	101	0.62	2025	180,000	179,687	178,433	176,552	Harvey
Trinity River Basin								
Arlington	143	0.76	2007	40,188	37,785	35,609	32,346	TWDB, 2008
Bardwell	148	1.35	2020	43,917	42,014	38,009	32,001	TWDB, 2022
Benbrook	320	0.18	1998	85,648	83,808	82,658	80,934	TWDB, 2003
Bridgeport	1,085	0.30	2020	366,782	363,700	357,038	347,046	TWDB, 2022
Cedar Creek	934	0.90	2017	631,401	620,923	604,111	578,894	TWDB, 2018
Eagle Mountain	859	0.32	2018	185,083	181,981	176,497	168,270	TWDB, 2019
Fairfield	34	6.43	1999	44,169	37,463	33,090	26,531	TWDB, 1999
Forest Grove	59	0.48	1980	2,129	713	147	0	TBWE, 1959
Grapevine	695	0.60	2011	166,797	161,919	153,619	141,170	TWDB, 2012
Halbert	12	2.36	1999	6,033	5,158	4,592	3,742	TWDB, 2003
Joe Pool	232	1.06	2022	150,999	149,112	144,192	136,812	TWDB, 2023
Lavon	770	0.76	2021	412,498	407,522	395,818	378,262	TWDB, 2022
Lewisville	968	0.56	2007	598,902	586,841	576,041	559,842	TWDB, 2008
Lost Creek	26	0.70	1990	12,800	11,244	10,886	10,348	TBWE, 1959
Mountain Creek	63	1.06	1937	22,840	16,630	15,294	13,291	TBWE, 1959
Navarro Mills	320	0.81	2008	49,827	44,189	39,005	31,229	TWDB, 2009
New Terrell City	14	0.30	1997	8,594	8,457	8,373	8,247	TWDB, 2003
North[a]	3	0.85	1957	17,000	16,814	16,763	16,686	TBWE, 1959
Ray Hubbard	301	2.39	2015	439,559	429,130	414,750	393,181	TWDB, 2016
Ray Roberts	692	0.57	2008	788,490	780,138	772,278	760,489	TWDB, 2010
Richland Chambers	1,447	1.32	2018	1,125,199	1,104,050	1,065,895	1,008,664	TWDB, 2019

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RESERVOIR	DRAINAGE AREA (SQMI)	ANNUAL SEDIMENT RATE (AF/SQMI)	DATE OF INITIAL CAPACITY	CONSERVATION CAPACITIES (AC-FT)				SEDIMENT RATE SOURCE
				INITIAL	2030	2050	2080	
Waxahachie	30	0.97	2020	11,643	11,368	10,784	9,910	TWDB, 2022
Weatherford	109	0.34	2008	17,812	17,020	16,280	15,170	TWDB, 2009
White Rock	100	1.06	2015	10,230	8,657	6,537	3,357	TWDB, 2016
Worth	94	1.18	2001	33,495	30,315	28,096	24,769	TWDB, 2002

[a]*The yield for North was analyzed under 2030 sediment conditions and held constant across the planning period.*

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The following lists specific adjustments to the WAMs to more accurately reflect the water rights and agreements for water supply sources in Region C are:

E.1.2 Trinity River Basin WAM

- Inclusion of any new water rights that are not currently included in the posted TCEQ WAM.
- Modeling of Lake Jacksboro and Lost Creek Reservoir as a system. System modeling includes subordination of Lake Bridgeport.
- Use of the full storage for Forest Grove Reservoir with an annual depletion limit (inflow for storage, diversion, and evaporation) of 16,348 acre-feet per year. The TCEQ WAM incorrectly uses the 16,348 acre-feet as the storage of the reservoir rather than the authorized storage of 20,038 acre-feet.
- Modeling of Corsicana's rights from Richland-Chambers Reservoir as a system with Lake Halbert, reflecting how these rights are actually used.

The following variances are required only for modeling the yields of these supplies. When calculating the firm yield of other sources, the modeling will be identical to Run 3.

- Modeling of Tarrant Regional Water District's West Fork reservoirs (Bridgeport, Eagle Mountain, and Worth) as a system.
- Modeling of Dallas' water rights in the Elm Fork of the Trinity River as a system with Lakes Grapevine, Lewisville and Ray Roberts.
- Modeling of Lake Benbrook as one pool instead of multiple pools to facilitate calculation of yields. The current modeling incorrectly assigns evaporation to the dead pool of the reservoir which does not refill because it is modeled as non-priority. In actual operation, TRWD cannot use water from the reservoir unless this dead storage is full. This modeling respects the USACE minimum elevation for water supply.

E.1.3 Red River Basin WAM

- Modeling of Lake Randell and Valley Lake as stand-alone reservoirs without Lake Texoma backups for the firm yield calculation of these two reservoirs. Backup supply for these reservoirs from Lake Texoma is included in the supplies from Lake Texoma. This prevents double counting of the makeup water from Lake Texoma. For firm yield calculations for reservoirs other than Lake Randell, Valley Lake and Lake Texoma, the backups for Lake Randell and Valley Lake were retained.
- Lake Texoma is located on the Texas-Oklahoma border, and in accordance with the Red River Compact, water in Lake Texoma is equally shared by Texas and Oklahoma. There are three distinct water storage pools in Lake Texoma: 1) water supply, 2) hydropower, and 3) sediment storage (dead pool). Use of water from Lake Texoma is authorized by multiple Texas water rights and Oklahoma water rights, as well as authorizations by the US Congress and contracts with the Corps. To assess the firm yield of the reservoir for Region C, the total firm yield for both the water supply and hydropower pools are modeled. This total yield is equally split between Texas and Oklahoma. The reliable supplies from the lake are limited to the Texas water rights and associated storage contracts with the Corps.
- Removal of diversion backups of individual Texas water rights in Lake Texoma from the hydropower pool. All Texas water rights are 100% reliable in the WAM, so these backups

are not invoked in the WAM. The code was removed because it made the modeling unnecessarily complicated.

E.1.4 Sulphur River Basin WAM

- Inclusion of any new water rights granted that are not currently included in the approved TCEQ WAM.
- Modeling of Lake Chapman as one pool instead of multiple pools to facilitate calculation of the firm yield. All authorizations have the same priority date, and a single pool correctly distributes inflows among the water right holders. This modeling respects the USACE minimum elevation for water supply.

E.1.5 Other WAMs

Region C has very few water supplies in the Brazos River Basin. Thus, the water availability information as determined by the Brazos G Regional Water Planning Group was adopted.

For water supplies in the Neches and Sabine River Basin, the water availability information as determined by the Region I Water Planning Group was adopted.

E.1.6 Alternative Yields

Several providers in Region C have chosen to use alternative yields rather than firm yield for planning purposes. Tarrant Regional Water District (TRWD) and Dallas Water Utilities (DWU or Dallas) have elected to use safe yields for the allocation and distribution of surface water supplies from reservoirs owned and/or operated by these two wholesale water providers. Safe yield is the amount of water that can be used during the critical drought while leaving a minimum supply in reserve (one-year reserve for TRWD and nine-month reserve for DWU). Safe yield is consistent with the current operations of these two surface water suppliers and previous regional water planning. Both firm yield and safe yield are reported for these reservoirs. However, the safe yield is what is used to determine the overall water supply availability in Region C.

The Texas Legislature authorized the regional water planning groups to consider droughts worse than the drought of record in its planning efforts, which can reflect expected climate uncertainties and trends in water availability. Several water providers in Region C consider such conditions in their long-term water planning. North Texas Municipal Water District (NTMWD) has recently completed a Long-Range Water Supply Plan [2] that did a detailed evaluation on the potential impacts of a drought worse than the drought of record on its water supplies. NTMWD requested the use of the results of this analysis for the allocation and distribution of surface water supplies from reservoirs owned and/or operated by NTMWD.

Table E.4 shows the firm and alternative yield for supplies using alternative yields as source availability. **Table E.5** shows the drought of record period for Reservoirs in Region C. At the end of this appendix, **Table E.11** summarizes the WAM models used for the *2026 Region C Plan*. Water right information associated with surface water sources entered into DB27 is included in **Attachment E-2**.

E.2 Water Supply Systems in Region C

The water availability for water supply systems in Region C is shown in **Table E.3**. The systems listed are operated as physical systems – the water they provide cannot easily be separated by individual source. The supply available is based on the calculation of the WAMs, as described above. More detailed discussions on water supply available for each system are given below.

E.2.1 Lost Creek/Jacksboro System (Jacksboro)

Lake Jacksboro is a 2,129-acre-foot reservoir located just outside of the City of Jacksboro in the Trinity River Basin in Jack County, and Lost Creek Reservoir is an 11,961-acre-foot reservoir located 1.5 miles downstream of the Lake Jacksboro dam. The City of Jacksboro holds a water right for the combined use of both reservoirs for municipal water supply and the right to divert 1,397 acre-feet per year. The water right authorizes the reservoirs to be operated as a system, so the WAM was modified to include system operation and the upstream diversion agreement with TRWD. According to the WAM, the firm yield from this system (without return flows) exceeds the permit amount. The available supply from this system is limited to the permitted amount of 1,397 acre-feet per year.

E.2.2 West Fork Including Bridgeport Local System (TRWD)

TRWD's West Fork Reservoir system is comprised of Lake Bridgeport, Lake Worth, and Eagle Mountain Lake. The WAM was modified to include the system operation of these three reservoirs. The water right for Lake Bridgeport allows for between 15,000 acre-feet per year and 27,000 acre-feet per year to be diverted for local use at Lake Bridgeport. Based on planned TRWD operations, the modified WAM model assumes 27,000 acre-feet per year is used locally at Lake Bridgeport. The resulting combined system firm yield was 118,961 acre-feet per year in 2030 and 115,711 acre-feet per year in 2080.

Under current conditions, this system provides somewhat less supply than the firm yield. TRWD operates its water supplies on a safe yield basis, which provides a smaller supply than the firm yield numbers shown. (In safe yield operation, the user takes less than the firm yield in order to leave a reserve supply in the reservoir in case a drought worse than any historical drought occurs). The safe yield for the West Fork System is 96,161 acre-feet per year in 2030 and 93,361 acre-feet per year in 2080.

E.2.3 Elm Fork/Lewisville/Ray Roberts/Grapevine System (Dallas)

This system is comprised of water rights owned by Dallas in Lake Lewisville, Lake Ray Roberts, Lake Grapevine, and run-of-the-river rights from the Elm Fork of the Trinity River. The WAM was modified to include the system operation of these supplies. The resulting combined system firm yield was 207,399 acre-feet per year in 2030 and 201,269 acre-feet per year in 2080. The safe yield of the reservoir system in 2030 is 174,899 acre-feet per year and in 2080 is 169,539 acre-feet per year.

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TABLE E.3 SUPPLY AVAILABLE FROM WATER SUPPLY SYSTEMS AND RESERVOIRS IN REGION C (NOT CONSIDERING TRANSMISSION CONSTRAINTS)

RESERVOIR	WATER RIGHT NO.(S)	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Systems in Region C								
Lost Creek/Jacksboro System	C3313	Trinity	1,397	1,397	1,397	1,397	1,397	1,397
West Fork (includes Bridgeport Local) [a]	C3340, C3809, C3808	Trinity	96,161	95,561	94,961	94,428	93,894	93,361
Elm Fork/Lewisville/Ray Roberts/Grapevine (Dallas) [a]	C2456, C2455, C2457, C5414, C2458	Trinity	174,899	174,109	173,319	172,059	170,799	169,539
Subtotal of Systems in Region C			**272,457**	**271,067**	**269,677**	**267,884**	**266,090**	**264,297**
Reservoirs in Region C								
Cedar Creek [a]	C4976	Trinity	157,150	155,340	153,530	151,797	150,063	148,330
Richland-Chambers (TRWD) [a]	C5035	Trinity	190,000	188,266	186,531	184,781	183,030	181,280
Richland-Chambers (Corsicana) and Halbert	C5030	Trinity	13,843	13,833	13,823	13,803	13,783	13,763
Moss	C4881	Red	4,900	4,800	4,700	4,633	4,567	4,500
Texoma (Texas' Share - NTMWD)	P/A 5003	Red	197,000	197,000	197,000	197,000	197,000	197,000
Texoma (Texas' Share - GTUA)	P4301 A2006	Red	83,200	83,200	83,200	83,200	83,200	83,200
Texoma (Texas' Share - Denison)	C4901	Red	24,400	24,400	24,400	24,400	24,400	24,400
Texoma (Texas' Share - Luminant)	C4900	Red	16,400	16,400	16,400	16,400	16,400	16,400
Texoma (Texas' Share - RRA)	C4898, C4899	Red	2,250	2,250	2,250	2,250	2,250	2,250
Randell	C4901	Red	1,600	1,600	1,600	1,600	1,600	1,600
Valley	C4900	Red	2,800	2,800	2,800	2,800	2,800	2,800
Bonham	C4925	Red	3,800	3,700	3,600	3,533	3,467	3,400
Ray Roberts (Denton)	C2335	Trinity	18,600	18,480	18,360	18,207	18,053	17,900
Lewisville (Denton)	C2348	Trinity	5,200	5,075	4,950	4,800	4,650	4,500
Benbrook [a]	P5157	Trinity	3,371	3,371	3,371	3,371	3,371	3,371
Weatherford	C3356	Trinity	2,860	2,810	2,760	2,717	2,673	2,630
Grapevine (DCPCM)	C2363	Trinity	17,300	17,125	16,950	16,750	16,550	16,350
Grapevine (Grapevine)	C2362	Trinity	2,050	2,025	2,000	1,960	1,920	1,880

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RESERVOIR	WATER RIGHT NO.(S)	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Arlington [a]	C3391	Trinity	7,500	7,385	7,270	7,157	7,043	6,930
Joe Pool	C3404	Trinity	14,050	13,725	13,400	13,133	12,867	12,600
Mountain Creek	C3408	Trinity	6,400	6,400	6,400	6,400	6,400	6,400
North	C2365	Trinity	70	70	70	70	70	70
Ray Hubbard (Dallas) [a]	C2462	Trinity	46,239	45,450	44,660	43,927	43,194	42,461
White Rock [a]	C4161	Trinity	2,540	2,375	2,210	2,023	1,837	1,650
Terrell	C4972	Trinity	2,410	2,395	2,380	2,370	2,360	2,350
Clark	C5019	Trinity	210	210	210	210	210	210
Bardwell	C5021	Trinity	9,410	9,010	8,610	8,287	7,963	7,640
Waxahachie	C5018	Trinity	2,980	2,910	2,840	2,773	2,707	2,640
Forest Grove	C4983	Trinity	650	328	5	3	2	-
Trinidad	C4970	Trinity	2,950	2,950	2,950	2,950	2,950	2,950
Navarro Mills	C4992	Trinity	17,000	15,975	14,950	13,817	12,683	11,550
Fairfield	C5041	Trinity	6,395	6,163	5,930	5,725	5,520	5,315
Bryson	C3462	Brazos	-	-	-	-	-	-
Mineral Wells	C4039	Brazos	2,495	2,483	2,470	2,458	2,445	2,433
Teague City	C5291	Brazos	189	189	189	189	189	189
Lavon [b]	C2410	Trinity	88,111	83,963	79,927	75,892	70,959	67,148
Bois d'Arc [b]	P12151	Red	89,456	86,878	84,187	81,497	78,918	76,228
Muenster	C2323	Trinity	250	250	250	250	250	250
Ralph Hall	P5821	Sulphur	40,580	40,525	40,470	40,393	40,317	40,240
Subtotal of Reservoirs in Region C			**1,086,609**	**1,072,109**	**1,057,603**	**1,043,526**	**1,028,661**	**1,014,808**

[a] *Amounts reported are safe yields.*
[b] *Amounts reported consider droughts worse than the drought of record.*

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E.3 Reservoirs in Region C

All major reservoirs in Region C as well as some smaller reservoirs used for municipal supply are listed in **Table E.3**. The supply available is based on the calculation of the WAMs, which limits the supply to the lesser of the firm yield or the permit amount. In some cases, the safe yield is used as the supply available based on the operational policies of the reservoir owner. **Table E.4** shows the firm and alternative yield for supplies using alternative yields as source availability. **Table E.5** shows the drought of record period for Reservoirs in Region C.

TABLE E.4 FIRM YIELD AND ALTERNATIVE YIELD FOR SUPPLIES USING ALTERNATIVE YIELDS AS SOURCE AVAILABILITY

SOURCE	2030	2040	2050	2060	2070	2080
Tarrant Regional Water District [a]						
West Fork (includes Bridgeport Local)						
Firm Yield	118,961	118,361	117,761	117,078	116,394	115,711
Safe Yield	96,161	95,561	94,961	94,428	93,894	93,361
Cedar Creek						
Firm Yield	207,350	206,105	204,860	203,640	202,420	201,200
Safe Yield	157,150	155,340	153,530	151,797	150,063	148,330
Richland-Chambers (TRWD)						
Firm Yield	224,650	223,205	221,760	220,357	218,953	217,550
Safe Yield	190,000	188,266	186,531	184,781	183,030	181,280
Benbrook						
Firm Yield	4,271	4,271	4,271	4,271	4,271	4,271
Safe Yield	3,371	3,371	3,371	3,371	3,371	3,371
Arlington						
Firm Yield	9,500	9,350	9,200	9,067	8,933	8,800
Safe Yield	7,500	7,385	7,270	7,157	7,043	6,930
Dallas Water Utilities [b]						
Elm Fork/Lewisville/Ray Roberts (Dallas)						
Firm Yield	207,399	206,409	205,419	204,036	202,652	201,269
Safe Yield	174,899	174,109	173,319	172,059	170,799	169,539
Ray Hubbard (Dallas)						
Firm Yield	55,730	54,790	53,850	52,953	52,057	51,160
Safe Yield	46,239	45,450	44,660	43,927	43,194	42,461
White Rock						
Firm Yield	3,400	3,200	3,000	2,800	2,600	2,400
Safe Yield	2,540	2,375	2,210	2,023	1,837	1,650

SOURCE	2030	2040	2050	2060	2070	2080
North Texas Municipal Water District [c]						
Bois d' Arc						
Firm Yield	90,600	89,900	89,200	88,733	88,267	87,800
Alternative Yield	89,456	86,878	84,187	81,497	78,918	76,228
Chapman (NTMWD)						
Firm Yield	40,940	39,966	38,992	38,018	37,044	36,070
Alternative Yield	39,700	37,600	35,500	33,500	31,100	29,200
Lavon						
Firm Yield	105,000	104,350	103,700	103,000	102,300	101,600
Alternative Yield	88,111	83,963	79,927	75,892	70,959	67,148

[a]Safe yield for TRWD is defined as retaining a minimum of 1-year supply in the reservoir during a repeat of the drought of record.
[b]Safe yield for DWU is defined as retaining a minimum of 9-month supply in the reservoir during a repeat of the drought of record.
[c]Alternative yield for NTMWD is based on a drought worse than the drought of record as evaluated in the NTMWD Long-Range Water Supply Plan [(2)]

TABLE E.5 DROUGHT OF RECORDS FOR REGION C RESERVOIR

RIVER BASIN	RESERVOIR/SYSTEM	DATE OF MINIMUM CONTENT	DROUGHT OF RECORD
Red	Bois d'Arc	2/2015	4/2010 to 12/2015
Red	Bonham	12/2014	4/2012 to 5/2015
Red	Lake Ralph Hall	2/1957	7/1942 to 5/1969
Red	Lake Texoma	2/2015	10/2010 to 5/2015
Red	Moss	2/2015	4/2010 to 5/2015
Red	Randell	2/1957	7/1951 to 11/1957
Red	Valley	3/1967	6/1948 to 3/1975
Trinity	Arlington	3/1957	7/1951 to 4/1957
Trinity	Bardwell	10/1956	6/1952 to 4/1957
Trinity	Benbrook	1/1957	10/1950 to 5/1957
Trinity	Cedar Creek	1/1957	6/1950 to 6/1957
Trinity	Clark	10/1956	6/1948 to 5/1957
Trinity	Fairfield	4/1957	7/1950 to 5/1959
Trinity	Forest Grove	10/1956	6/1956 to 2/1957
Trinity	Grapevine - Total	3/1957	10/1950 to 4/1957
Trinity	Joe Pool	3/1957	10/1950 to 3/1958
Trinity	Lake Lavon	2/1957	7/1951 to 6/1957
Trinity	Lake Ray Hubbard	2/1957	7/1951 to 6/1957
Trinity	Lewisville	1/1957	10/1950 to 5/1957
Trinity	Lost Creek/ Jacksboro System	1/1957	2/1941 to 3/1957
Trinity	Mountain Creek	1/1957	6/1950 to 5/1957
Trinity	Muenster	3/1957	10/1950 to 5/1957

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RIVER BASIN	RESERVOIR/SYSTEM	DATE OF MINIMUM CONTENT	DROUGHT OF RECORD
Trinity	Navarro Mills	1/1965	7/1962 to 4/1966
Trinity	North	2/1957	6/1950 to 4/1957
Trinity	Ray Roberts	3/1957	10/1950 to 6/1968
Trinity	Richland-Chambers	1/1957	6/1948 to 11/1957
Trinity	Terrell	10/1956	6/1953 to 5/1957
Trinity	Trinidad	12/1956	2/1954 to 1/1977
Trinity	Waxahachie	1/1957	6/1953 to 5/1957
Trinity	Weatherford	1/1957	7/1951 to 5/1957
Trinity	West Fork (Bridgeport, Eagle Mountain, Worth)	10/1956	10/1950 to 5/1966
Trinity	White Rock	3/1957	8/1953 to 5/1957

E.3.1 Cedar Creek

Cedar Creek Reservoir is located on Cedar Creek in the Trinity River Basin in Henderson and Kaufman Counties. The reservoir has a permitted conservation storage of 678,900 acre-feet. TRWD holds a water right for diversion of 175,000 acre-feet per year. According to the WAM, the firm yield (not limited to the water right) is 207,350 acre-feet per year in 2030 decreasing to 201,200 acre-feet per year by 2080. The available supply from Cedar Creek is limited to the permit amount of 175,000 acre-feet per year. The safe yield, on which TRWD bases its supplies, is 157,150 acre-feet per year in 2030 decreasing to 148,330 acre-feet per year in 2080. The firm yield and safe yield include a deduction of 250 acre-feet per year associated with Trinidad Lake. Forest Grove is a reservoir located just upstream of Cedar Creek on Caney Creek. Based on feedback from TRWD, Cedar Creek was modeled assuming that the dam gates at Forest Grove were closed.

E.3.2 Richland-Chambers (Corsicana) and Halbert

Richland-Chambers Reservoir is located on Richland Creek in the Trinity River Basin in Freestone and Navarro Counties. The reservoir has a permitted conservation storage of 1,135,000 acre-feet. TRWD and City of Corsicana hold water rights in the reservoir (210,000 acre-feet per year for TRWD and 13,650 acre-feet per year for Corsicana). According to the WAM, the firm yield of the TRWD water right is 224,650 acre-feet per year in 2030, decreasing to 217,550 acre-feet per year by 2080. The firm yield from Richland-Chambers is limited to the permitted amount of 210,000 acre-feet per year. The safe yield is 190,000 acre-feet per year in 2030, decreasing to 181,280 acre-feet per year in 2080.

Corsicana's water right in Lake Halbert is backed up by the city's water right in Richland-Chambers. Lake Halbert is located on Elm Creek in the Trinity River Basin in Navarro County. The reservoir has permitted conservation storage of 7,357 acre-feet. The City of Corsicana holds a water right in Lake Halbert for 4,003 acre-feet per year. According to the WAM, the available supply from Richland-Chambers Reservoir and Lake Halbert to Corsicana is 13,843 acre-feet per year in 2030, decreasing slightly to 13,763 acre-feet per year in 2080.

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E.3.3 Moss

Moss Lake is located on Fish Creek in the Red River Basin in Cooke County. The reservoir has permitted conservation storage of 23,210 acre-feet. The City of Gainesville holds water rights in the reservoir for 7,740 acre-feet per year. According to the WAM, the available supply from Moss Lake in 2030 is 4,900 acre-feet per year and in 2080 is 4,500 acre-feet per year.

E.3.4 Texoma (Texas' share)

Lake Texoma is located along the Texas and Oklahoma border in the Red River Basin in Grayson and Cooke Counties. The permitted conservation storage for water supply in Texas is 300,000 acre-feet. NTMWD, Greater Texoma Utility Authority (GTUA), Denison, Luminant, and Red River Authority of Texas (RRA) all hold water rights in the reservoir. The total Texoma firm yield as of 2080 is limited to the total water rights of 323,250 acre-feet per year (197,000 acre-feet per year for NTMWD; 83,200 acre-feet per year for GTUA; 24,400 acre-feet per year for Denison; 16,400 acre-feet per year for Luminant, and 2,250 acre-feet per year for RRA). The firm yield of Texas' share of Lake Texoma is greater than the total of the Texas water rights and is 477,850 acre-feet per year in 2030, decreasing to 457,200 acre-feet per year by 2080.

E.3.5 Randell

Randell Lake is located on an unnamed tributary of Shawnee Creek in the Red River Basin in Grayson County. The reservoir has permitted conservation storage of 5,400 acre-feet. The City of Denison holds a water right in the reservoir for 5,280 acre-feet per year. The supply from Randell Lake is backed up by up to 24,400 acre-feet per year of diversions from Lake Texoma, which are fully reliable. The available supply from Randell as of 2080 is 1,600 acre-feet per year without a backup from Lake Texoma.

E.3.6 Valley

Valley Lake is located on Sand Creek in the Red River Basin in Fannin and Grayson Counties. The reservoir has a permitted conservation storage of 15,000 acre-feet. This reservoir is operated by Luminant for steam electric power cooling in conjunction with their water right in Lake Texoma. The total amount of water that can be diverted from either Texoma or Valley Lake is 16,400 acre-feet per year. The available supply from Valley as of 2080 is 2,800 acre-feet per year without a backup from Lake Texoma.

E.3.7 Bonham

Lake Bonham is located on Timber Creek in the Red River Basin in Fannin County. The reservoir has permitted conservation storage of 13,000 acre-feet. The City of Bonham holds a water right in the reservoir for 5,340 acre-feet per year. NTMWD has an agreement with the City of Bonham to operate the lake and water treatment plant. According to the WAM, the firm yield of Lake Bonham is 3,800 acre-feet per year in 2030, decreasing to 3,400 acre-feet per year by 2080. NTMWD's Long Range Water Supply Plan [(2)] used a stand-alone yield model with mass balance to estimate the firm yield for Bonham, which was higher than the firm yield calculated using the WAM. Therefore, the firm yield from the WAM instead of NTWMD's Long Range Water Supply Plan was used as the available supply in the 2026 Plan to be conservative.

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E.3.8 Ray Roberts (Denton)

Lake Ray Roberts and Lake Lewisville were modeled as part of the Elm Fork System to find the firm yields of Denton's water rights. Lake Ray Roberts is located on the Elm Fork of the Trinity River in Denton, Cooke, and Grayson Counties. The reservoir has a permitted conservation storage of 799,600 acre-feet. The City of Dallas and the City of Denton hold combined water rights in the reservoir totaling 799,600 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Ray Roberts was discussed above under Water Supply Systems. According to the WAM, Denton's available supply from Ray Roberts as of 2030 was 18,600 acre-feet per year and as of 2080 is 17,900 acre-feet per year.

E.3.9 Lewisville (Denton)

Lake Lewisville is located on the Elm Fork of the Trinity River in Denton County. The reservoir has a permitted conservation storage of 618,400 acre-feet. The City of Dallas and the City of Denton hold combined water rights in the reservoir totaling 473,424 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Lewisville was discussed above under Water Supply Systems. According to the WAM, Denton's available supply from Lewisville as of 2030 is 5,200 acre-feet per year and as of 2080 is 4,500 acre-feet per year.

E.3.10 Benbrook

Lake Benbrook is located on the Clear Fork of the Trinity River in Tarrant County. Certificate of Adjudication 08-5157 authorizes the impoundment of 72,500 acre-feet of water in Benbrook Reservoir between the elevations of 665 feet and 694 feet. The authorized diversions from Lake Benbrook are 72,500 acre-feet per year, of which only 6,833 acre-feet per year are on a priority basis. TRWD holds the water right, which specifies use amounts for Benbrook Water and Sewer Authority, City of Fort Worth, and City of Weatherford.

According to the WAM, the firm yield of Lake Benbrook is 4,271 acre-feet per year in 2080. The safe yield is 3,371 acre-feet per year in 2080. Lake Benbrook is used as terminal storage for water pumped from Cedar Creek and Richland-Chambers Reservoirs. The available supply does not include water from these sources. According to the 1998 TWDB volumetric survey of Benbrook Reservoir, the storage capacity at elevation 665.0 feet is 14,307 acre-feet and the capacity at 694.0 feet is 89,402 acre-feet. This results in a usable conservation storage of 71,341 acre-feet, which is less than the authorized amount.

E.3.11 Weatherford

Lake Weatherford is located on the Clear Fork of the Trinity River in Parker County. The reservoir has permitted conservation storage of 19,470 acre-feet. The City of Weatherford holds a water right for consumptive use of 5,220 acre-feet per year. The permit also authorizes 59,400 acre-feet per year of non-consumptive industrial use. According to the WAM, the available supply from Lake Weatherford is 2,860 acre-feet per year in 2030, decreasing to 2,630 acre-feet per year in 2080.

E.3.12 Grapevine

Lake Grapevine is located on Denton Creek in the Trinity River Basin in Tarrant and Denton Counties. The reservoir has a permitted conservation storage of 161,250 acre-feet. The City of

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Dallas, City of Grapevine, and Dallas County Park Cities MUD hold combined water rights in the reservoir for a total diversion of 161,250 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Grapevine was discussed above under Water Supply Systems. According to the WAM, Dallas County PCMUD's available supply from Lake Grapevine is 17,300 acre-feet per year in 2030, decreasing to 16,350 acre-feet per year in 2080. The City of Grapevine's available supply from Lake Grapevine is 2,050 acre-feet per year in 2030, decreasing to 1,880 acre-feet per year in 2080.

E.3.13 Arlington

Lake Arlington is located on Village Creek in the Trinity River Basin in Tarrant County. The reservoir has a permitted conservation storage of 45,710 acre-feet. The City of Arlington and Luminant jointly hold a water right for 23,120 acre-feet per year (13,000 acre-feet per year for Arlington and 10,120 acre-feet per year for Luminant). By contract, the City of Arlington has dedicated its Lake Arlington water rights to the TRWD System. According to the WAM, the firm yield of Lake Arlington is 9,500 acre-feet per year in 2030 and 8,800 acre-feet per year in 2080. The safe yield is 7,500 acre-feet per year in 2030 and 6,930 acre-feet per year in 2080. Like Lake Benbrook, Lake Arlington serves as terminal storage for water pumped from Richland-Chambers and Cedar Creek Reservoirs. The available supply from Lake Arlington does not include water from these sources.

E.3.14 Joe Pool

Joe Pool Lake is located on Mountain Creek in the Trinity River Basin in Dallas and Tarrant Counties. The reservoir has a permitted conservation storage of 176,900 acre-feet. The Trinity River Authority (TRA) holds a water right for 17,000 acre-feet per year. According to the WAM, available supply from Joe Pool Lake is 14,050 acre-feet per year in 2030, decreasing to 12,600 acre-feet per year in 2080.

E.3.15 Mountain Creek

Mountain Creek Lake is located on Mountain Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 22,840 acre-feet. Luminant holds a water right for 6,400 acre-feet per year. According to the WAM, the firm yield of Mountain Creek Lake is 10,200 acre-feet per year in 2030, decreasing to 9,600 acre-feet per year by 2080. The available supply from Mountain Creek Lake is limited to the permitted amount of 6,400 acre-feet per year.

E.3.16 North

North Lake is an off-channel reservoir located on the South Fork of Grapevine Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 17,100 acre-feet. Luminant holds a water right for 1,000 acre-feet per year. According to the WAM, available supply from North Lake as of 2080 is 70 acre-feet per year without backup from the Elm Fork.

E.3.17 Ray Hubbard

Lake Ray Hubbard is located on the Elm Fork of the Trinity River in Dallas, Kaufman, and Rockwall Counties. The reservoir has a permitted conservation storage of 490,000 acre-feet. The City of Dallas holds a water right for 208,067 acre-feet per year. According to the WAM, the firm yield of Ray Hubbard as of 2030 is 55,730 acre-feet per year, decreasing to 51,160 acre-feet per year by

2080. The safe yield, on which Dallas bases its supplies, is 46,239 acre-feet per year in 2030 and 42,461 acre-feet per year in 2080.

E.3.18 White Rock

White Rock Lake is located on White Rock Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 21,345 acre-feet. The City of Dallas holds a water right for 8,703 acre-feet per year. According to the WAM, available supply from White Rock Lake is 3,400 acre-feet per year in 2030 and 2,400 acre-feet per year in 2080. The safe yield is 2,540 acre-feet per year in 2030 and 1,650 acre-feet per year in 2080. The modeling on this lake assumes sedimentation to be conservative. Dallas may or may not continue dredging the lake to maintain its current capacity.

E.3.19 Terrell

Lake Terrell is located on Muddy Cedar Creek in the Trinity River Basin in Kaufman County. The reservoir has a permitted conservation storage of 8,712 acre-feet. The City of Terrell holds a water right for 5,800 acre-feet per year. According to the WAM, available supply from Terrell is 2,410 acre-feet per year in 2030, decreasing slightly to 2,350 acre-feet per year in 2080. The City of Terrell no longer uses water from Lake Terrell.

E.3.20 Clark

Lake Clark is located on Little Mustang Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 1,549 acre-feet. The City of Ennis holds a water right for 450 acre-feet per year. According to the WAM, the available supply from Lake Clark is 210 acre-feet per year. The City of Ennis no longer uses water from Lake Clark.

E.3.21 Bardwell

Lake Bardwell is located on Waxahachie Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 54,900 acre-feet. TRA holds a water right for 9,600 acre-feet per year for municipal purposes. According to the WAM, the firm yield of Lake Bardwell is 9,410 acre-feet per year in 2030, decreasing to 7,640 acre-feet per year by 2080.

E.3.22 Waxahachie

Lake Waxahachie is located on Waxahachie Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 13,500 acre-feet. Ellis County Water Control and Improvement District #1 (an entity of the City of Waxahachie) holds a water right for 3,570 acre-feet per year. According to the WAM, available supply from Lake Waxahachie is 2,980 acre-feet per year in 2030, decreasing slightly to 2,640 acre-feet per year in 2080.

E.3.23 Forest Grove

Forest Grove Reservoir is located on Caney Creek in the Trinity River Basin in Henderson County. The reservoir has a permitted conservation storage of 20,038 acre-feet. Luminant holds a water right for consumptive use of 9,500 acre-feet per year. Presently, the dam for Forest Grove Reservoir is built, but the gates have not been closed so the lake only stores a small amount of water. According to the WAM, available supply from Forest Grove is 650 acre-feet per year in 2030,

decreasing to 0 acre-feet per year in 2080. Based on feedback from TRWD, Forest Grove was modeled assuming that the dam gates were open.

E.3.24 Trinidad

Lake Trinidad is an off-channel reservoir located just off the Trinity River in Henderson County, with permitted diversions from the Trinity River. The reservoir has a permitted conservation storage of 6,200 acre-feet. Luminant holds a water right for 4,000 acre-feet per year. According to the WAM, available supply from Lake Trinidad with the diversions from the Trinity is 2,950 acre-feet per year.

E.3.25 Navarro Mills

Lake Navarro Mills is located on Richland Creek in the Trinity River Basin in Navarro County. The reservoir has a permitted conservation storage of 63,300 acre-feet. TRA holds a water right to divert 19,400 acre-feet per year. According to the WAM, available supply from Navarro Mills is 17,000 acre-feet per year in 2030, decreasing to 11,550 acre-feet per year in 2080.

E.3.26 Fairfield

Lake Fairfield is located on Big Brown Creek in the Trinity River Basin in Freestone County. The reservoir has a permitted conservation storage of 50,600 acre-feet. According to the WAM, available supply from Lake Fairfield is 6,395 acre-feet per year in 2030 and 5,315 acre-feet per year in 2080 without backup from the Trinity River.

E.3.27 Bryson

Lake Bryson is located on East Rock Creek in the Brazos River Basin in Jack County. The reservoir has a permitted conservation storage of 950 acre-feet. The City of Bryson holds a water right for 90 acre-feet per year. According to the WAM, available supply from Bryson as of 2080 is 0 acre-feet per year.

E.3.28 Mineral Wells

Lake Mineral Wells is located on Rock Creek in the Brazos River Basin in Parker County. The reservoir has a permitted conservation storage of 7,065 acre-feet. The City of Mineral Wells holds a water right for 2,520 acre-feet per year. According to the WAM, available supply from Lake Mineral Wells is 2,495 acre-feet per year in 2030, decreasing slightly to 2,433 in 2080. The City of Mineral Wells is not currently using water from Lake Mineral Wells.

E.3.29 Teague City

Teague City Lake is located on Holman Creek in the Brazos River Basin in Freestone County. The reservoir has permitted conservation storage of 1,160 acre-feet. The City of Teague holds a water right for 605 acre-feet per year. According to the WAM, available supply from Teague City Lake is 189 acre-feet per year. The City of Teague no longer uses Teague City Lake for water supply.

E.3.30 Lavon

Lake Lavon is located on the East Fork of the Trinity River in Collin County. The reservoir has permitted conservation storage of 443,800 acre-feet. NTMWD holds water rights for 118,670 acre-feet per year. According to the WAM, the firm yield from Lake Lavon is 105,000 acre-feet per year in

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2030, decreasing to 101,600 acre-feet per year by 2080. This yield does not include return flows or imported water. The alternative yield on which NTMWD bases its supplies is 88,111 acre-feet per year in 2030, decreasing to 67,148 acre-feet per year by 2080.

E.3.31 Bois d' Arc

Bois d' Arc Lake is a new reservoir located on Bois d' Arc Creek in Fannin County, northeast of the City of Bonham. NTMWD holds water rights for 175,000 acre-feet per year. Bois d'Arc Lake is the newest major Texas reservoir in over 30 years and NTMWD began delivering water in March of 2023. According to the WAM, the firm yield of Bois d' Arc Lake is 90,600 acre-feet per year in 2030 and 87,800 acre-feet per year in 2080. The alternative yield is 89,456 acre-feet per year in 2030 and 76,228 acre-feet per year in 2080.

E.3.32 Muenster

Lake Muenster is a 4,700-acre-foot lake located in the Trinity River Basin in Cooke County. Muenster Water Districts holds a water right to divert 500 acre-feet per year. According to the WAM, the available supply from Lake Muenster is 250 acre-feet per year.

E.3.33 Ralph Hall

Lake Ralph Hall is a new reservoir currently being constructed on the North fork of the Sulphur River in Fannin County. Construction of the reservoir began in June of 2021 with plans to deliver water by 2026. Upper Trinity Regional Water District (UTRWD) holds water rights for 45,000 acre-feet per year. According to the WAM, the firm yield of Lake Ralph Hall is 40,580 acre-feet per year in 2030 and 40,240 acre-feet per year in 2080.

E.4 Unpermitted Firm Yields in Region C Reservoirs

According to the WAMs, there are four reservoirs and one reservoir system in Region C with firm yields that exceed the currently permitted diversion amounts. These reservoirs with their unpermitted firm yields are listed in **Table E.6**. Note that the Oklahoma share of Lake Texoma yield is not included in the table. The unpermitted yield in Lake Texoma is dedicated by contract for hydropower by the USACE.

TABLE E.6 UNPERMITTED FIRM YIELDS IN REGION C RESERVOIRS

SOURCE	BASIN	VALUES IN ACRE-FEET PER YEAR					
		2030	2040	2050	2060	2070	2080
Lost Creek/ Jacksboro System	Trinity	1,050	1,025	1,000	983	967	950
Cedar Creek	Trinity	32,600	31,355	30,110	28,890	27,670	26,450
Richland Chambers (TRWD)	Trinity	14,650	13,205	11,760	10,357	8,953	7,550
Texoma (Texas' Share) [a]	Red	154,600	151,725	148,850	143,883	138,917	133,950
Mountain Creek	Trinity	3,800	3,700	3,600	3,467	3,333	3,200

[a] *This amount assumes the full permitted amount of 84,000 acre-feet per year, a portion of which NTMWD is not currently authorized to use. According to their water right, NTMWD is only authorized to use up to 77,300 acre-feet per year. The remaining 6,700 acre-feet per year are allocated to the channel losses between Lake Texoma and Lake Lavon.*

E.5 Imports

The total supply available (not limited to infrastructure constraints) from imports is based upon the WAMs from TCEQ and the current contracts with the owners of the water sources. **Table E.7** shows those imports. Below is a discussion of each of the imported water sources.

TABLE E.7 TOTAL AVAILABLE SURFACE WATER SUPPLIES FROM IMPORTS

SOURCE	BASIN OF ORIGIN	VALUES IN ACRE-FEET PER YEAR					
		2030	2040	2050	2060	2070	2080
Chapman (NTMWD) [a]	Sulphur	39,700	37,600	35,500	33,500	31,100	29,200
Chapman (Irving)	Sulphur	38,644	37,725	36,805	35,886	34,967	34,048
Chapman (UTRWD)	Sulphur	11,522	11,248	10,974	10,700	10,425	10,151
Tawakoni (Dallas)	Sabine	180,991	179,634	178,278	176,922	175,565	174,208
Fork (Dallas) [b]	Sabine	107,473	106,299	105,124	103,948	102,773	101,599
Upper Sabine (NTMWD) [c]	Sabine	10,582	10,499	10,416	10,333	10,251	10,168
Palestine (Dallas) [d]	Neches	96,204	95,086	93,967	92,874	91,778	90,673
Lake Athens (Athens) [e]	Neches	665	1,187	1,807	1,964	1,967	1,969
Brazos River Authority		2,828	2,789	2,741	2,697	2,666	2,669
Lake Aquilla	*Brazos*	247	267	288	307	325	342
Main Stem Lake/Reservoir System)	*Brazos*	2,581	2,522	2,453	2,390	2,341	2,327
Parker County (from Lake Palo Pinto)	Brazos	1,573	1,594	1,620	1,649	1,679	1,708
TOTAL		***490,182***	***483,661***	***477,232***	***470,473***	***463,171***	***456,393***

[a]Although this Reservoir is physically located in another region, this source has been combined with other NTWMD supplies into a system in DB27 and is now included in the DB27 reports for Region C source.
[b]The import of water from Lake Fork to the Trinity Basin is limited to 120,000 acre-feet per year. The first phase of the infrastructure to transport this water to DWU is completed. The second phase is scheduled to be completed in the next five years.
[c]NTMWD acquired Terrell's and Ables Springs SUD's supply in Lake Tawakoni.
[d]There is no current infrastructure to transport the water from Lake Palestine to DWU.
[e]The amount of water from Lake Athens is the amount that is imported to Region C.

E.5.1 Chapman

Lake Chapman is a reservoir located in Region D. NTMWD, the City of Irving, and the Sulphur River Water District hold water rights in Lake Chapman totaling 146,520 acre-feet per year. Of this total, 127,320 acre-feet per year can be exported for use in Region C: 57,214 acre-feet per year for NTMWD, 54,000 acre-feet per year for Irving, and 16,106 acre-feet per year for UTRWD (purchased from the Sulphur River Water District through the City of Commerce). The firm yield of Lake Chapman was developed by the Region D Water Planning Group by which Region C applied the Chapman Accounting Plan distribution to water suppliers in Region C. According to the WAM, the firm yield of Lake Chapman is 104,840 acre-feet per year in 2030 and 92,370 acre-feet per year in 2080.

The values in **Table E.7** show Lake Chapman's computed firm yield divided proportionally among the Region C water suppliers with a share of the water. According to the WAM, the firm yield of the NTMWD portion of Lake Chapman is 40,940 acre-feet per year in 2030 and 36,070 acre-feet per year in 2080. The firm yield for Lake Chapman developed for this round of planning was lower than

the alternative yield developed as part of the NTMWD Long-Range Water Supply Plan.[2] Due to this, the expected factor from the NTMWD Long-Range Water Supply Plan[2] was applied to the new firm yield provided by Region D. This results in a slightly lower yield than the NTMWD Long-Range Water Supply Plan. The alternative yield is 39,700 acre-feet per year in 2030 and 29,200 acre-feet per year in 2080.

It should be noted that UTRWD's contract with the City of Commerce, which was originally signed in 1991, renews every 25 years unless UTRWD provides five years notice prior to termination. The contract was renewed in 2016 with no changes. According to the terms of the contract, after 2066, the City of Commerce can reduce the quantity of water supplied with each subsequent renewal, and in 2141 they have the right to cancel the contract if they wish. It should also be noted that the actual availability for UTRWD is limited by the yield rather than the contract amount.

E.5.2 Tawakoni (Dallas)

Lake Tawakoni is in the Sabine River Basin. The Sabine River Authority (SRA) holds water rights for 238,100 acre-feet per year. The City of Dallas has a contract with SRA for 190,480 acre-feet per year and NTMWD has contracts with SRA for a total of 11,210 acre-feet per year. The yield of Lake Tawakoni was determined by Region I using the Sabine River WAM. The firm yield of Lake Tawakoni is 226,239 in year 2030, reducing to 217,760 acre-feet per year by 2080. The supplies available to the City of Dallas and NTMWD are based on the proportion of the contracted amount to the firm yield. Adjustments were made so that supplies to each customer of the SRA were reduced proportionally. NTMWD's share of the Lake Tawakoni supply is included in the Upper Sabine Basin Supply in **Table E.7**.

E.5.3 Lake Fork (Dallas)

Lake Fork is located in the Sabine River Basin. SRA holds water rights for 188,660 acre-feet per year. The City of Dallas has a contract for 131,860 acre-feet per year. Of this amount, 120,000 acre-feet per year can be exported to the Trinity Basin in Region C. The remainder can only be used in the Sabine River Basin. The firm yield of Lake Fork was determined by Region I and is estimated as 168,966 acre-feet per year in 2030, decreasing to 159,730 acre-feet per year in 2080. The supply to Dallas is based on the proportion of the contracted amount to the firm yield. The total amount exported to Region C was limited to the 120,000 acre-feet per year specified in the trans-basin diversion permit.

E.5.4 Upper Sabine Basin Supply (NTMWD)

NTMWD has two contracts with SRA for a total of 11,210 acre-feet per year from Lake Tawakoni that were transferred from the City of Terrell and Ables Springs WSC. The available supply to NTMWD from the Upper Sabine Basin that is shown in **Table E.7** is based on the NTMWD Long-Range Water Supply Plan[2].

E.5.5 Palestine (Dallas)

Lake Palestine is located on the Neches River in the Neches River Basin. The lake is owned and operated by the Upper Neches River Municipal Water Authority (UNRMWA) in conjunction with a downstream diversion point (Rocky Point). The UNRMWA holds water rights totaling 238,110 acre-feet per year from the Lake Palestine system. The firm yield of the Palestine system using the

numbers provided by Region I is estimated at 177,110 acre-feet per year in year 2030, reducing to 166,910 acre-feet per year by 2080. The City of Dallas has a contract with the UNRMWA for 114,337 acre-feet per year. The supply to Dallas was reduced due to the reduced yield. Presently the infrastructure to transport this water from Lake Palestine to Dallas is under construction. This connection will be considered as a water management strategy.

E.5.6 Athens (Athens)

Lake Athens is located in Henderson County in the Neches River Basin. The Athens Municipal Water Authority holds water rights in Lake Athens totaling 8,500 acre-feet per year. Of this amount 3,023 acre-feet per year is designated for industrial use for the Athens Fish Hatchery, which is located at the lake. The yield of Lake Athens determined by Region I, using the Neches Basin Water Availability Model was estimated at 4,540 acre-feet per year in 2030 and 4,300 acre-feet per year in 2080. The amount that is exported to Region C for use by the Region C portion of City of Athens is 665 acre-feet per year in 2030, increasing to 1,969 acre-feet per year in 2080.

E.5.7 Lake Aquilla

Lake Aquilla is in the Brazos River Basin in Region G. The Aquilla Water Supply Corporation provides water to entities in Ellis and Navarro Counties in Region C. The total estimated supply provided to Region C from Lake Aquilla is 247 acre-feet per year in 2030, increasing to 342 acre-feet per year by 2080.

E.5.8 Main Stem Lake/Reservoir System (Lake Granbury)

Lake Granbury is located in the Brazos River Basin in Region G. The Brazos River Authority (BRA) owns and operates the lake as part of the Authority's water system (Main Stem Lake/Reservoir System). Currently, the Authority sells water from Lake Granbury to Johnson County Special Utility District (SUD) and Parker County SUD. The amount of existing supplies imported to Region C is estimated at 3,105 acre-feet per year in 2030, increasing to 2,859 acre-feet per year in 2080.

E.5.9 Lake Palo Pinto

Lake Palo Pinto is located in Palo Pinto County in the Brazos River Basin in Region G. A portion of Mineral Wells is in Parker County in Region C. All of Mineral Wells' water supply currently comes from Lake Palo Pinto. (Mineral Wells has a water right in Lake Mineral Wells in Parker County but has no plans to use that source for water supply.) The supply from Lake Palo Pinto to Region C also supplies Mineral Wells' customers located in Region C, which include portions of Parker County Other, Parker County Manufacturing, and Santo SUD. The existing supplies imported to Region C from Lake Palo Pinto is estimated at 1,566 acre-feet per year in 2030 to 1,676 acre-feet per year in 2080.

E.6 Irrigation Local Supply and Other Local Supply

Other local supplies include run-of-the-river supplies associated with water rights and used for irrigation, manufacturing, mining, municipal, and steam electric power generation. They also include local surface water supplies used for livestock and mining. For irrigation and mining, the reliable supply from run-of-the-river diversions was calculated using the minimum annual diversion from WAM Run 3 for the permitted water rights. For municipalities with run-of-river

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supplies as their sole source and manufacturing and steam electric users, an individual firm yield analysis was performed.

Other local supplies include mining and livestock local supplies that do not have a water right. Most surface water used for livestock is taken from stock ponds or directly from streams. Most of the livestock supplies are exempt from needing a water right so they are not included in the WAMs, so these supplies are based on historical use. For livestock and mining local supplies, the available supply volumes are based on the maximum historical use from 2015-2019 [3,4] and the projected demands. **Table E.8** shows the available supply for irrigation and other local supplies.

TABLE E.8 SUMMARY OF LOCAL SURFACE WATER SUPPLIES FOR REGION C

USE	COUNTY	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Irrigation Run-of-River Supplies								
Irrigation	Fannin	Red	2,295	2,295	2,295	2,295	2,295	2,295
Irrigation	Grayson	Red	768	768	768	768	768	768
Irrigation	Collin	Trinity	265	265	265	265	265	265
Irrigation	Dallas	Trinity	309	309	309	309	309	309
Irrigation	Ellis	Trinity	1	1	1	1	1	1
Irrigation	Freestone	Trinity	91	91	91	91	91	91
Irrigation	Henderson	Trinity	1,246	1,246	1,246	1,246	1,246	1,246
Irrigation	Kaufman	Trinity	83	83	83	83	83	83
Irrigation	Navarro	Trinity	535	535	535	535	535	535
Irrigation	Parker	Trinity	68	68	68	68	68	68
Irrigation	Tarrant	Trinity	513	513	513	513	513	513
Irrigation	Parker	Brazos	66	66	66	66	66	66
Subtotal Irrigation Run-of-River			**6,240**	**6,240**	**6,240**	**6,240**	**6,240**	**6,240**
Non-Irrigation Run-of-River Supplies								
Municipal	Fannin	Sulphur	45	45	45	45	45	45
Municipal	Freestone	Trinity	41	41	41	41	41	41
Municipal	Navarro	Trinity	252	252	252	252	252	252
Mining	Fannin	Red	75	75	75	75	75	75
Mining	Wise	Trinity	39	39	39	39	39	39
Manufacturing	Grayson	Red	3	3	3	3	3	3
Steam Electric Power	Dallas	Trinity	1,423	1,423	1,423	1,423	1,423	1,423
Steam Electric Power	Tarrant	Trinity	1,079	1,079	1,079	1,079	1,079	1,079
Subtotal Non-Irrigation Run-of-River			**2,957**	**2,957**	**2,957**	**2,957**	**2,957**	**2,957**
Livestock and Mining Local Supplies								
Livestock	Collin	Sabine	39	39	39	39	39	39
Livestock	Collin	Trinity	762	762	762	762	762	762
Livestock	Cooke	Red	429	429	429	429	429	429
Livestock	Cooke	Trinity	910	910	910	910	910	910
Livestock	Dallas	Trinity	51	51	51	51	51	51
Livestock	Denton	Trinity	618	618	618	618	618	618
Livestock	Ellis	Trinity	931	931	931	931	931	931
Livestock	Fannin	Red	99	99	99	99	99	99
Livestock	Fannin	Sulphur	34	34	34	34	34	34
Livestock	Fannin	Trinity	8	8	8	8	8	8
Livestock	Freestone	Brazos	106	106	106	106	106	106

USE	COUNTY	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Livestock	Freestone	Trinity	1,229	1,229	1,229	1,229	1,229	1,229
Livestock	Grayson	Red	566	566	566	566	566	566
Livestock	Grayson	Trinity	367	367	367	367	367	367
Livestock	Henderson	Trinity	430	430	430	430	430	430
Livestock	Jack	Brazos	173	173	173	173	173	173
Livestock	Jack	Trinity	425	425	425	425	425	425
Livestock	Kaufman	Sabine	86	86	86	86	86	86
Livestock	Kaufman	Trinity	1,340	1,340	1,340	1,340	1,340	1,340
Livestock	Navarro	Trinity	1,492	1,492	1,492	1,492	1,492	1,492
Livestock	Parker	Brazos	649	649	649	649	649	649
Livestock	Parker	Trinity	732	732	732	732	732	732
Livestock	Rockwall	Sabine	64	64	64	64	64	64
Livestock	Rockwall	Trinity	72	72	72	72	72	72
Livestock	Tarrant	Trinity	351	351	351	351	351	351
Livestock	Wise	Trinity	1,210	1,210	1,210	1,210	1,210	1,210
Mining	Denton	Trinity	764	764	764	764	764	764
Mining	Fannin	Red	1,800	2,100	2,373	2,373	2,373	2,373
Mining	Freestone	Trinity	32	32	32	32	32	32
Mining	Kaufman	Trinity	1,162	1,162	1,162	1,162	1,162	1,162
Mining	Navarro	Trinity	800	1,000	1,200	1,568	1,568	1,568
Mining	Parker	Brazos	20	20	20	20	20	20
Mining	Tarrant	Trinity	400	100	100	100	100	100
Subtotal Livestock and Mining			**18,151**	**18,351**	**18,824**	**19,192**	**19,192**	**19,192**
TOTAL RUN-OF-RIVER AND LOCAL SUPPLIES			***27,348***	***27,548***	***28,021***	***28,389***	***28,389***	***28,389***

E.7 Reuse

The reuse quantities listed in **Table E.1** are limited to currently permitted and operating indirect reuse projects and existing direct reuse for irrigation or industrial purposes. **Table E.9** shows the individual reuse projects that make up the total overall (not limited to infrastructure constraints) reuse amount in **Table E.1** along with the methodology and sources of quantities. The recommended regional reuse plan is outlined in **Chapter 5B** of the *2026 Region C plan*.

- RWPGs must classify reuse availability as either direct or indirect. (Contract Exhibit C, Section 2.3.3)
- For indirect reuse [existing supplies], RWPGs must base their drought of record existing indirect reuse analyses on currently installed wastewater treatment infrastructure; currently permitted wastewater discharge amounts; and the amount of wastewater anticipated to be treated at the WWTP, based on associated decade populations/demands. These amounts may not exceed the amounts of water available to utilities generating the wastewater. (Contract Exhibit C, Section 2.3.6)

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TABLE E.9 SUMMARY OF SUPPLIES AVAILABLE FROM REUSE

PROJECT NAME	METHODOLOGY/SOURCE	TYPE	COUNTY	VALUES IN ACRE-FEET PER YEAR					
				2030	2040	2050	2060	2070	2080
City of Annetta/Golf Course Irrigation	Based on a return flow factor of 29% which is the average return factor from the 2021 Plan.	Direct Reuse	Parker	129	154	180	205	231	256
City of Azle/ Golf Course Irrigation	Wastewater treatment plant discharge.	Direct Reuse	Tarrant	300	300	300	300	300	300
City of Bryson/Jack County Irrigation	Based on current population reported on TML of 561, 100 gpcd, and a 40% return factor. This also assumes the population will remain constant for the City of Bryson.	Direct Reuse	Jack	25	25	25	25	25	25
City of Crandall/Golf Course Irrigation	Based on actual 2011 water use and return flow (58.4% return flow).	Direct Reuse	Kaufman	579	666	666	666	666	666
City of Dallas/Golf Course Irrigation	Provided under Chapter 210 Authorization R10060001 for Cedar Crest Golf Course (561 AF/Y) and Stevens Park Golf Course irrigation (560 AF/Y).	Direct Reuse	Dallas	1,121	1,121	1,121	1,121	1,121	1,121
City of Denton/Denton County SEP	Set equal to the SEP demands in Denton County.	Direct Reuse	Denton	1,175	1,175	1,175	1,175	1,175	1,175
City of Denton/Irrigation	Based on 5-year average data from 2007-2011.	Direct Reuse	Denton	265	265	265	265	265	265
City of Denton/Lake Lewisville	Wastewater treatment plant discharge.	Indirect Reuse	Denton	4,608	4,969	4,953	6,457	8,320	10,143
City of Ennis /Lake Bardwell	TRA is authorized to divert up to 3,696 AF/Y from the City of Ennis WWTP. For 2030 2/3 of total permitted amount minus other Ennis projected reuse. For 2040-2080 total permitted amount minus other Ennis projected reuse.	Indirect Reuse	Ellis	890	2,122	2,122	2,122	2,122	2,122
City of Ennis/Vistra Energy Generation Power Plant	Based on Ellis County SEP demands on the City of Ennis.	Direct Reuse	Ellis	1,574	1,574	1,574	1,574	1,574	1,574

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PROJECT NAME	METHODOLOGY/SOURCE	TYPE	COUNTY	VALUES IN ACRE-FEET PER YEAR					
				2030	2040	2050	2060	2070	2080
City of Fort Worth/Cities of Fort Worth, Arlington, Euless, and DFW Airport	Based on 2017 reuse sales.	Direct Reuse	Tarrant	2,296	2,296	2,296	2,296	2,296	2,296
City of Fort Worth/Golf Course Irrigation	Based on 2017 reuse sales.	Direct Reuse	Tarrant	550	550	550	550	550	550
City of Gainesville/Irrigation	Based on feedback from Gainesville 2/2018.	Direct Reuse	Cooke	4	4	4	4	4	4
City of Garland /Luminant	From the NTMWD LRWSP.	Direct Reuse	Kaufman	10,089	10,089	10,089	10,089	10,089	10,089
City of Grapevine/Lake Grapevine	Based on a return flow factor of 17.9%.	Indirect Reuse	Tarrant	3,355	3,346	3,346	3,346	3,346	3,346
City of Lewisville/Golf Course Irrigation	Based on anticipated peak demand of 2 MGD (contract) with a 2.5 peaking factor.	Direct Reuse	Denton	897	897	897	897	897	897
City of The Colony/Golf Course Irrigation	Based on maximum reported historical usage from 2016 RCWP.	Direct Reuse	Collin	457	457	457	457	457	457
City of Weatherford/Golf Course Irrigation	Based on available WTP flows to the lagoons (10%), limited to historic use of 123 AF/Y provided from Weatherford.	Direct Reuse	Parker	123	123	123	123	123	123
City of Weatherford/Lake Weatherford	Based on WWTP discharges with a 50% return flow limited to Lake Weatherford's firm yield.	Indirect Reuse	Parker	2,860	2,810	2,760	2,717	2,673	2,630
City of Weatherford/Lake Weatherford	Based on available WTP flows to the lagoons (10%) less direct reuse to Oeste Ranch Golf Course, limited by 1 MGD.	Indirect Reuse	Parker	700	855	1,034	1,121	1,121	1,121
DWU/Lake Lewisville	Wastewater treatment plant discharge from various DWU WWTPs located upstream of Lake Lewisville.	Indirect Reuse	Denton	44,265	51,332	59,790	62,160	64,842	68,097
Millsap ISD/Irrigation	Based on wastewater treatment plant discharge.	Direct Reuse	Parker	2	2	2	2	2	2
NTMWD/ Lake Lavon	Based on wastewater treatment plant discharge limited to the permitted capacity of 73,008 AF/Y (71,882 AF/Y	Indirect Reuse	Collin	69,402	73,008	73,008	73,008	73,008	73,008

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PROJECT NAME	METHODOLOGY/SOURCE	TYPE	COUNTY	VALUES IN ACRE-FEET PER YEAR					
				2030	2040	2050	2060	2070	2080
	Wilson Creek, 252 AF/Y Farmersville No. 1, 594 AF/Y Farmersville No. 2, and 280 AF/Y Seis Lagos).								
NTMWD/City of Frisco	From the NTMWD LRWSP.	Direct Reuse	Collin	3,038	3,038	3,038	3,038	3,038	3,038
NTMWD/East Fork Wetlands to Lake Lavon	Limited by wetland treatment capacity.	Indirect Reuse	Kaufman	102,000	102,000	102,000	102,000	102,000	102,000
NTMWD/Golf Course Irrigation	Based on feedback from NTMWD on 10/2024.	Direct Reuse	Rockwall	672	0	0	0	0	0
NTMWD/Golf Course Irrigation	Wastewater treatment plant discharge.	Direct Reuse	Collin	1,540	1,540	1,540	1,540	1,540	1,540
NTMWD/Irrigation, Collin	Wastewater treatment plant discharge.	Direct Reuse	Collin	100	100	100	100	100	100
Pinnacle Club WWTP/Pinnacle Club Golf Course	Limited by projected flow to the Pinnacle Club WWTP.	Direct Reuse	Henderson	32	32	32	32	32	32
TRA/DCURD Las Colinas	Wastewater treatment plant discharge.	Indirect Reuse	Dallas	8,000	8,000	8,000	8,000	8,000	8,000
TRA/Fishing Hole Lake	Lake has no yield on its own. This is only a holding pond for effluent from TRA Central RWS for City of Irving Reuse Diversions. Based on current contract between TRA and Irving to purchase 25 MGD of effluent from TRA Central WWTP minus 486 AF/Y for TRA/Trinity River (City of Irving) reuse supply.	Indirect Reuse	Dallas	27,539	27,539	27,539	27,539	27,539	27,539
Waxahachie/Lake Bardwell	Assumed full permitted amount of 5,129 AF/Y.	Indirect Reuse	Ellis	5,129	5,129	5,129	5,129	5,129	5,129
Mountain Creek WWTP/Joe Pool	Projections received from TRA 7/2024.	Indirect Reuse	Ellis	10,089	13,452	13,452	13,452	13,452	13,452
TRA/South Creek Ranch Irrigation	Wastewater treatment plant discharge.	Direct Reuse	Dallas	125	125	125	125	125	125

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PROJECT NAME	METHODOLOGY/SOURCE	TYPE	COUNTY	VALUES IN ACRE-FEET PER YEAR					
				2030	2040	2050	2060	2070	2080
TRA/Trinity River (City of Irving)	Irving has water right 03-4799D, which permits them to withdraw 486 AF/Y for this purpose.	Indirect Reuse	Dallas	486	486	486	486	486	486
TRA/Landscape Irrigation, Flower Mound	Based on the 2014 DCRWS Master Plan Update.	Direct Reuse	Tarrant	222	556	556	556	556	556
Trophy Club Mud #1/Golf Course Irrigation	Based on upper limit of 800 AF/Y placed in 2011 RCWP.	Direct Reuse	Denton	800	800	800	800	800	800
TRWD/Richland-Chambers Reservoir	Based on FW VCWRF only and is the minimum of RC permit amount and the FW VCWRF reuse flows available. Limited to full permitted amount of 100,456 AF/Y.	Indirect Reuse	Navarro	100,465	100,465	100,465	100,465	100,465	100,465
UTRWD/Lake Lewisville Originating From Lake Chapman	Assumed 30% return flows in 2030, 40% in 2040, and 50% 2050-2080 from UTRWD's portion of Chapman.	Indirect Reuse	Denton	3,388	4,409	5,378	5,243	5,109	4,974
City of Annetta/Golf Course Irrigation	Based on a return flow factor of 29% which is the average return factor from the 2021 Plan.	Direct Reuse	Parker	129	154	180	205	231	256
City of Azle/ Golf Course Irrigation	Wastewater treatment plant discharge.	Direct Reuse	Tarrant	300	300	300	300	300	300
TOTAL IN ACRE-FEET PER YEAR				***409,291***	***425,811***	***435,377***	***439,185***	***443,578***	***448,503***
TOTAL IN MGD				***365***	***380***	***388***	***392***	***396***	***400***

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E.8 Desalination

Three desalination facilities are currently operated by public water systems within Region C. The City of Sherman operates a 10 MGD electrodialysis reversal membrane plant to treat brackish water from Lake Texoma and has recently expanded its treatment capacity with a 10 MGD expansion reverse osmosis facility. The City of Bardwell and Parker County SUD operate reverse osmosis facilities to treat brackish groundwater. These supplies are included in the total supplies from reservoirs (Sherman), groundwater (Bardwell) and imported surface water from BRA (Parker County SUD). In addition, the Brazos River Authority (BRA) operates the Lake Granbury Surface Water and Treatment System (SWATS). Although Lake Granbury is located in Region G, BRA provides water from SWATS to the Johnson County SUD, which serves customers within Region C. The amount of water provided by SWATS is accounted for in **Table E.7** (imports to Region C).

E.9 Groundwater

Groundwater supplies in Region C are obtained from the following;

- Two major aquifers (Carrizo-Wilcox and Trinity),
- Four minor aquifers (Woodbine, Nacatoch, Cross Timbers, Queen City), and
- Locally undifferentiated formations, referred to as "Other aquifer."

As required by regional planning rules, Modeled Available Groundwater (MAG) estimates provided by the TWDB were used to determine groundwater availability [5]. For Region C, TWDB provided estimates for the Carrizo-Wilcox, Trinity, Woodbine and Queen City aquifers.

There are sixteen Groundwater Management Areas in Texas. GMA 8 covers all of Region C except for Jack County, Henderson County, and small portions of Navarro, Parker, and Wise County. GMA 6, GMA 11, and GMA 12 cover small portions of Region C. The GMAs are responsible for developing Desired Future Conditions (DFCs) for aquifers within their respective areas. The TWDB quantifies Modeled Available Groundwater (MAG) based on the DFCs provided by the GMAs. The regional water planning groups must use MAG estimates as the basis for existing groundwater supplies for all locations that have a DFC [2].

GMA-8 and GMA-11 deemed the Nacatoch aquifer "non-relevant", and new water availability estimates for this aquifer were not included in the MAGs developed by TWDB. Therefore, availability for this aquifer was assumed to be the same as the amounts used in the *2021 Region C Water Plan*. The Cross Timbers aquifer was designated as a new minor aquifer in 2017. No desired future conditions have been established by the GMAs for this aquifer; therefore, no MAG amounts are available. For this reason, the availability from this aquifer is assumed to be the same as the amounts used in the *2021 Region C Water Plan*. There are also several locally undifferentiated formations in Region C, referred to as "Other aquifer." Other aquifer supplies are used in Fannin, Kaufman and Navarro counties in Region C. Available supplies from these undifferentiated formations are not included in the MAG numbers. Other aquifer available supply amounts are based on historical pumping data obtained from the TWDB [5] and are assumed to be the same as the amounts used in the *2021 Region C Water Plan*. **Table E.10** details the groundwater availability for Region C.

There are currently seven Groundwater Conservation Districts (GCDs) that include one or more counties in Region C:

- Upper Trinity GCD (Wise and Parker Counties)
- Northern Trinity GCD (Tarrant County)
- Neches and Trinity Valleys GCD (Henderson County)
- Mid East Texas GCD (Freestone County)
- Prairielands GCD (Ellis County)
- North Texas GCD (Collin, Cooke, and Denton Counties)
- Red River GCD (Grayson and Fannin Counties)

TABLE E.10 GROUNDWATER AVAILABILITY FOR REGION C

AQUIFER	COUNTY	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Trinity	Collin	Sabine	0	0	0	0	0	0
Trinity	Collin	Trinity	5,795	5,795	5,795	5,795	5,795	5,795
Woodbine	Collin	Sabine	0	0	0	0	0	0
Woodbine	Collin	Trinity	4,254	4,254	4,254	4,254	4,254	4,254
Subtotal	**Collin**		**10,049**	**10,049**	**10,049**	**10,049**	**10,049**	**10,049**
Trinity	Cooke	Red	2,186	2,186	2,186	2,186	2,186	2,186
Trinity	Cooke	Trinity	8,335	8,335	8,335	8,335	8,335	8,335
Woodbine	Cooke	Red	262	262	262	262	262	262
Woodbine	Cooke	Trinity	539	539	539	539	539	539
Subtotal	**Cooke**		**11,322**	**11,322**	**11,322**	**11,322**	**11,322**	**11,322**
Trinity	Dallas	Trinity	3,691	3,691	3,691	3,691	3,691	3,691
Woodbine	Dallas	Trinity	2,798	2,798	2,798	2,798	2,798	2,798
Subtotal	**Dallas**		**6,489**	**6,489**	**6,489**	**6,489**	**6,489**	**6,489**
Trinity	Denton	Trinity	30,091	30,091	30,091	30,091	30,091	30,091
Woodbine	Denton	Trinity	3,609	3,609	3,609	3,609	3,609	3,609
Subtotal	**Denton**		**33,700**	**33,700**	**33,700**	**33,700**	**33,700**	**33,700**
Nacatoch	Ellis	Trinity	20	20	20	20	20	20
Trinity	Ellis	Trinity	6,168	6,168	6,168	6,168	6,168	6,168
Woodbine	Ellis	Trinity	2,074	2,074	2,074	2,074	2,074	2,074
Subtotal	**Ellis**		**8,262**	**8,262**	**8,262**	**8,262**	**8,262**	**8,262**
Trinity	Fannin	Red	0	0	0	0	0	0
Trinity	Fannin	Sulphur	2,088	2,088	2,088	2,088	2,088	2,088
Trinity	Fannin	Trinity	0	0	0	0	0	0
Woodbine	Fannin	Red	3,547	3,547	3,547	3,547	3,547	3,547
Woodbine	Fannin	Sulphur	550	550	550	550	550	550
Woodbine	Fannin	Trinity	827	827	827	827	827	827
Other	Fannin	Red	2,919	2,919	2,919	2,919	2,919	2,919

AQUIFER	COUNTY	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Subtotal	**Fannin**		**9,931**	**9,931**	**9,931**	**9,931**	**9,931**	**9,931**
Carrizo-Wilcox	Freestone	Trinity	5,946	6,823	7,698	8,575	9,363	9,363
Carrizo-Wilcox	Freestone	Brazos	1,257	1,432	1,609	1,784	1,941	1,941
Queen City	Freestone	Trinity	77	77	77	77	77	77
Subtotal	**Freestone**		**7,280**	**8,332**	**9,384**	**10,436**	**11,381**	**11,381**
Trinity	Grayson	Red	6,665	6,665	6,665	6,665	6,665	6,665
Trinity	Grayson	Trinity	4,051	4,051	4,051	4,051	4,051	4,051
Woodbine	Grayson	Red	5,603	5,603	5,603	5,603	5,603	5,603
Woodbine	Grayson	Trinity	1,923	1,923	1,923	1,923	1,923	1,923
Subtotal	**Grayson**		**18,242**	**18,242**	**18,242**	**18,242**	**18,242**	**18,242**
Carrizo-Wilcox	Henderson	Trinity	3,226	3,226	3,226	3,226	3,226	3,226
Queen City	Henderson	Trinity	154	154	154	154	154	154
Subtotal	**Henderson**		**3,380**	**3,380**	**3,380**	**3,380**	**3,380**	**3,380**
Cross Timbers	Jack	Brazos	284	284	284	284	284	284
Cross Timbers	Jack	Trinity	650	650	650	650	650	650
Trinity	Jack	Trinity	449	449	449	449	449	449
Trinity	Jack	Brazos	188	188	188	188	188	188
Subtotal	**Jack**		**1,571**	**1,571**	**1,571**	**1,571**	**1,571**	**1,571**
Nacatoch	Kaufman	Sabine	49	49	49	49	49	49
Nacatoch	Kaufman	Trinity	877	877	877	877	877	877
Other	Kaufman	Trinity	1,756	1,756	1,756	1,756	1,756	1,756
Trinity	Kaufman	Sabine	0	0	0	0	0	0
Trinity	Kaufman	Trinity	0	0	0	0	0	0
Woodbine	Kaufman	Trinity	0	0	0	0	0	0
Woodbine	Kaufman	Sabine	0	0	0	0	0	0
Subtotal	**Kaufman**		**2,682**	**2,682**	**2,682**	**2,682**	**2,682**	**2,682**
Carrizo-Wilcox	Navarro	Trinity	105	114	125	136	149	149
Nacatoch	Navarro	Trinity	980	980	980	980	980	980
Other	Navarro	Trinity	435	435	435	435	435	435
Trinity	Navarro	Trinity	0	0	0	0	0	0
Woodbine	Navarro	Trinity	68	68	68	68	68	68
Subtotal	**Navarro**		**1,588**	**1,597**	**1,608**	**1,619**	**1,632**	**1,632**
Cross Timbers	Parker	Brazos	50	50	50	50	50	50
Trinity	Parker	Trinity	11,793	11,793	11,793	11,793	11,793	11,793
Trinity	Parker	Brazos	2,656	2,656	2,656	2,656	2,656	2,656
Subtotal	**Parker**		**14,499**	**14,499**	**14,499**	**14,499**	**14,499**	**14,499**
Nacatoch	Rockwall	Trinity	13	13	13	13	13	13
Nacatoch	Rockwall	Sabine	0	0	0	0	0	0
Trinity	Rockwall	Trinity	0	0	0	0	0	0
Trinity	Rockwall	Sabine	0	0	0	0	0	0
Woodbine	Rockwall	Trinity	0	0	0	0	0	0
Woodbine	Rockwall	Sabine	0	0	0	0	0	0

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AQUIFER	COUNTY	BASIN	VALUES IN ACRE-FEET PER YEAR					
			2030	2040	2050	2060	2070	2080
Subtotal	**Rockwall**		**13**	**13**	**13**	**13**	**13**	**13**
Trinity	Tarrant	Trinity	17,926	17,926	17,926	17,926	17,926	17,926
Woodbine	Tarrant	Trinity	1,139	1,139	1,139	1,139	1,139	1,139
Subtotal	**Tarrant**		**19,065**	**19,065**	**19,065**	**19,065**	**19,065**	**19,065**
Trinity	Wise	Trinity	11,452	11,452	11,452	11,452	11,452	11,452
Subtotal	**Wise**		**11,452**	**11,452**	**11,452**	**11,452**	**11,452**	**11,452**
REGION C TOTAL			***159,525***	***160,586***	***161,649***	***162,712***	***163,670***	***163,670***

TABLE E.11 SUMMARY OF WATER AVAILABILITY MODELS (WAMS) USE BY REGION C

WAM MODEL VERSION	MODIFICATIONS TO MODEL	DATE MODIFICATIONS APPROVED BY EA	ENTITY THAT PERFORMED MODEL RUN	DATE OF MODEL RUN
TCEQ Trinity WAM Run 3	See hydraulic variance request letter dated August 22, 2023.	October 26, 2023	Freese and Nichols, Inc.	October 2023
TCEQ Red WAM Run 3	See hydraulic variance request letter dated August 22, 2023.	October 26, 2023	Freese and Nichols, Inc.	October 2023
TCEQ Sulphur WAM Run 3	See hydraulic variance request letter dated August 22, 2023.	October 26, 2023	Freese and Nichols, Inc.	October 2023
TCEQ Neches WAM Run 3	See Hydraulic Variance Request from Region I Planning Group.	See Region I Plan	Plummer Associates, Inc.	See Region I Plan
TCEQ Sabine WAM Run 3	See Hydraulic Variance Request from Region I Planning Group.	See Region I Plan	Plummer Associates, Inc.	See Region I Plan
TCEQ Brazos WAM Run 3	See Hydraulic Variance Request from Region G Planning Group.	See Region G Plan	Carollo Engineers	See Region G Plan
TCEQ Sulphur WAM Run 3 [a]	No modifications except for Consensus Environmental Flows	N/A	Freese and Nichols, Inc.	November 2024
TCEQ Trinity WAM Run 3 [b]	Project was added.	N/A	Freese and Nichols, Inc.	November 2024

[a]WAM run for Marvin Nichols Reservoir and Wright Patman.
[b]WAM run for Lake Tehuacana.
[c]Project yields for George Parkhouse (North) and George Parkhouse (South) were obtained from the NTMWD Long-Range Water Supply Plan (2024). This plan used the TCEQ-approved WAM for the Sulphur River Basin.
[d]Surface water supplies for DWU strategies were obtained from Dallas Long-Range Water Supply Plan (2024).

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Appendix E List of References

(i) Texas Water Development Board: *Exhibit C Second Amended General Guidelines for Development of the 2026 Regional Water Plans* (September, 2023), Austin, [Online] Available URL: https://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2026/projectdocs/2026RWP_ExhibitC.pdf?d=5272, July 1, 2024.

(2) Freese and Nichols, Inc., Advanced Groundwater Solutions, ATMOS Research and Consulting, Alan Plummer Associates, Inc.: *North Texas Municipal Water District Long Range Water Supply Plan*, prepared for North Texas Municipal Water District, August 2024.

(3) Texas Water Development Board: *2010-2019 Historical Water Use Estimates: Non-Surveyed Livestock Water Use Estimates by Region-County* (January 2022).

(4) Texas Water Development Board: *2010-2019 Historical Water Use Estimates: Mining by Region-County* (August 2022).

(5) Texas Water Development Board: *RWP 27 Groundwater Data Details*, (July 2023).

(6) HDR Engineering, Inc., Maddaus Water Management: *2024 Dallas Long Range Water Supply Plan*, prepared for Dallas Water Utilities, City of Dallas, December 2024.

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Attachment E-1

Hydrologic Variance Request and Approval for Surface Water

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REGION C WATER PLANNING GROUP

Senate Bill One Sixth Round of Regional Water Planning - Texas Water Development Board

Board Members
Kevin Ward , Chair
Russell Laughlin, Vice-Chair
Jenna Covington , Secretary
John Paul Dineen III
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Ryan Bayle
Grace Darling
Bob Riley
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Chris Harder
Rick Shaffer
Denis Qualls
Jay Barksdale
John Lingenfelder
Steve Mundt
Paul Sigle
Dan Buhman
Chris Boyd
Connie Standridge

August 2023

Jeff Walker
Texas Water Development Board
1700 North Congress
Austin, Texas 78711-3231

RE: Region C Request for Modifications to TCEQ Water Availability Models for Planning Purposes

Dear Mr. Walker:

Region C is located primarily within the Trinity and Red River Basins. Small areas of the region are in the Sabine, Sulphur and Brazos River Basins. Reservoirs in each of these river basins and the Neches River Basin supply water to Region C. As part of the 2026 planning efforts, the Full Authorization Water Availability Models (WAM[1]), also known as Run 3, for each of these basins will be updated to determine surface water availability in the region. To reflect the current conditions and operations of the region, the following hydrologic variances are summarized below. Completed hydrologic variance request forms for each river basin are included in Attachment A.

Safe Yield

Based on requests from Tarrant Regional Water District (TRWD) and Dallas Water Utilities (DWU), Region C requests the use of safe yield for the allocation and distribution of surface water supplies from reservoirs owned and operated by these two wholesale water providers. In accordance with the TWDB planning rules, firm yields will also be determined and reported in the plan. Firm yield will be used for other surface water reservoirs.

Drought Worse than the Drought of Record

The Texas Legislature authorized the regional water planning groups to consider droughts worse than the drought of record in its planning efforts, which can reflect expected climate uncertainties and trends in water availability. Several water providers in Region C consider such conditions in their long-term water planning. NTMWD has recently completed a Long-Range Water Supply Plan that did a detailed evaluation on the potential impacts of a drought worse than the drought of record on its water supplies. Region C requests the use of the results of this analysis for the allocation and distribution of surface water supplies from reservoirs owned and operated by NTMWD. DWU is also considering the potential impacts of climatic uncertainties in the update of its Long-Range Water Supply Plan, but this update is not available at this time. Therefore, Region C has requested the use of safe yield as discussed above.

[1] The term WAM refers throughout this document to TCEQ's Full Authorization Scenario, also known as Run 3, with modifications as proposed in this letter.

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If the DWU update becomes available prior to the completion of the 2026 Region C Water Plan, Region C respectfully requests the option to use these results for the allocation and distribution of surface water supplies from reservoirs owned and operated by DWU.

Trinity River WAM

Multiple changes are requested for the Trinity WAM to account for current operating conditions, including:

- Subordination agreements,
- System operations, where appropriate, and
- Other corrections noted during review of the models.

Red River WAM

Water supplies from the Red River Basin include supplies from Lake Texoma, several small lakes, and run of the river supplies. Hydrologic variance requests for the Red River WAM include changes to Lake Texoma and associated water rights to avoid potential double counting of supply and more accurately define the firm yields of the Region C reservoirs.

Sulphur WAM

The only reservoir in the Sulphur Basin currently used by Region C is Lake Chapman. This reservoir is used by multiple providers and is modeled in the WAM as individual water rights. Region C requests modeling Lake Chapman as a single pool to assess the firm yield, and then assign supplies proportionally based on each provider's water right.

Other WAMs

For the 2026 Region C Water Plan, we request to use the Neches and Sabine River WAM models as modified by the Region I Planning Group with the approval of the Texas Water Development Board. For supplies in the Brazos River Basin, we request to use the Brazos G WAM as modified by the Brazos G Planning Group with the approval of the Texas Water Development Board.

As intended by Senate Bill 1, the assessment of surface water availability in Region C will be conducted to accurately reflect water supplies that are available for use.

Please call me if you have any questions regarding our request.

Sincerely,

Kevin Ward
Chair, Region C Water Planning Group

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Attachment A

Hydrologic Variance Request Forms

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Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

Water Planning Region: C

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   Trinity River Basin

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   Region C requests to use the posted TCEQ Trinity WAM for use in the 2021 Region C Plan with the following variances for all water supply analyses:
   - Inclusion of any new water rights that are not currently included in the posted TCEQ WAM.
   - Modeling of Lake Jacksboro and Lost Creek Reservoir as a system. System modeling includes subordination of Lake Bridgeport.
   - Use of the full storage for Forest Grove Reservoir with an annual depletion limit (inflow for storage, diversion, and evaporation) of 16,348 acre-feet per year. The TCEQ WAM incorrectly uses the 16,348 acre-feet as the storage of the reservoir rather than the authorized storage of 20,038 acre-feet.

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

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- Modeling of Corsicana's rights from Richland-Chambers Reservoir as a system with Lake Halbert, reflecting how these rights are actually used.

The following variances are required only for modeling the yields of these supplies. When calculating the firm yield of other sources, the modeling will be identical to Run 3.

- Modeling of Tarrant Regional Water District's West Fork reservoirs (Bridgeport, Eagle Mountain, and Worth) as a system.
- Modeling of Dallas' water rights in the Elm Fork of the Trinity River as a system with Lakes Grapevine, Lewisville and Ray Roberts.
- Modeling of Lake Benbrook as one pool instead of multiple pools to facilitate calculation of yields. The current modeling incorrectly assigns evaporation to the dead pool of the reservoir which does not refill because it is modeled as non-priority. In actual operation, TRWD cannot use water from the reservoir unless this dead storage is full. This modeling respects the USACE minimum elevation for water supply.

These adjustments to the WAMs are requested to reflect the water rights and agreements more accurately for water supply sources in Region C.

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   Yes

   The same hydrologic variance requests were implemented in the 2021 Region C Water Plan. This request only differs in the inclusion of any new water rights that are not currently in the WAM.

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   No

   Choose an item.

   Click or tap here to enter text.

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   Yes

   Existing Supply

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Based on requests from Tarrant Regional Water District (TRWD) and Dallas Water Utilities, Region C requests the use of safe yield for the allocation and distribution of surface water supplies from reservoirs owned and operated by these two wholesale water providers. The TRWD reservoirs include Lake Bridgeport, Eagle Mountain Lake, Lake Worth, Lake Benbrook, Lake Arlington, Richland-Chambers Reservoir and Cedar Creek Reservoir. Dallas reservoirs include Lake Ray Roberts, Lake Lewisville, Lake Grapevine, Lake Ray Hubbard, Lake Tawakoni, and Lake Fork. For some of these lakes, Dallas holds only a portion of the water rights. Supply for the other water right holders in these lakes will continue to be calculated using firm yield.

Safe yield is the amount of water that can be used during the critical drought while leaving a minimum supply in reserve. Safe yield is consistent with the current operations of these two surface water suppliers and previous regional water planning. In accordance with the TWDB planning rules, firm yields will also be determined and reported in the plan.

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

   Yes

   Existing Supply

   The Texas Legislature authorized the regional water planning groups to consider droughts worse than the drought of record in its planning efforts, which can reflect expected climate uncertainties and trends in water availability. Several water providers in Region C consider such conditions in their long-term water planning. NTMWD has recently completed a Long-Range Water Supply Plan that did a detailed evaluation on the potential impacts of a drought worse than the drought of record on its water supplies. Region C requests the use of the results of this analysis for the allocation and distribution of surface water supplies from reservoirs owned and operated by NTMWD. DWU is also considering the potential impacts of climatic uncertainties in the update of its Long-Range Water Supply Plan, but this update is not available at this time. Therefore, Region C has requested the use of safe yield as discussed above.

   If the DWU update becomes available prior to the completion of the 2026 Region C Water Plan, Region C respectfully requests the option to use these results for the allocation and distribution of surface water supplies from reservoirs owned and operated by DWU.

7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

   No

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Choose an item.

Click or tap here to enter text.

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   Yes

   Existing Supply

Multiple changes are requested for the Trinity WAM to account for current operating conditions, including:

- Subordination agreements,
- System operations, and
- Other corrections noted during review of the models.

These changes are detailed in Question 2.

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   No

   Choose an item.

   Only return flows authorized in existing surface water rights and modeled in the existing WAM Run 3 will be included in the analysis.

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    Unknown

    Each of the river basins modeled by Region C are also used by other regions. It is unknown whether the other regions will adopt the modifications made by Region C in the analysis of

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

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the supplies for each respective region. We do not expect our modifications to affect the supplies for these regions.

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    Click or tap here to enter text.

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Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

Water Planning Region: C

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   Red River Basin

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   Region C requests to use the posted TCEQ Red River WAM for use in the 2021 Region C Plan with the following variances;

   - Modeling of Lake Randell and Valley Lake as stand-alone reservoirs without Lake Texoma backups for the firm yield calculation of these two reservoirs. Backup supply for these reservoirs from Lake Texoma is included in the supplies from Lake Texoma. This prevents double counting of the makeup water from Lake Texoma. For firm yield calculations for reservoirs other than Lake Randell, Valley Lake and Lake Texoma, the backups for Lake Randell and Valley Lake were retained.
   - Lake Texoma is located on the Texas-Oklahoma border, and in accordance with the Red River Compact, water in Lake Texoma is equally shared by Texas and Oklahoma. There are three distinct water storage pools in Lake Texoma: 1) water supply, 2) hydropower, and 3) sediment storage (dead pool). Use of water from Lake Texoma is authorized by

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

multiple Texas water rights and Oklahoma water rights, as well as authorizations by the US Congress and contracts with the Corps. To assess the firm yield of the reservoir for Region C, the total firm yield for both the water supply and hydropower pools will be modeled. This total yield is equally split between Texas and Oklahoma. The reliable supplies from the lake are limited to the Texas water rights and associated storage contracts with the Corps.

- Removal of diversion backups of individual Texas water rights in Lake Texoma from the hydropower pool. All Texas water rights are 100% reliable in the WAM, so these backups are not invoked in the WAM. The code was removed because it made the modeling unnecessarily complicated.

These adjustments to the WAMs are requested to reflect the water rights and agreements more accurately for water supply sources in Region C.

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   Yes

   The same hydrologic variance requests were implemented in the 2021 Region C Water Plan.

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   No

   Choose an item.

   Click or tap here to enter text.

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   No

   Choose an item.

   Click or tap here to enter text.

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

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No

Choose an item.

Click or tap here to enter text.

7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

   No

   Choose an item.

   Click or tap here to enter text.

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   Yes

   Existing Supply

Multiple changes are requested for the Red River WAM to account for current operating conditions, as detailed in the response to Question 2

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   No

   Choose an item.

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

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Only return flows authorized in existing surface water rights and modeled in the existing WAM Run 3 will be included in the analysis.

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    Unknown

    Click or tap here to enter text.

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    Click or tap here to enter text.

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Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. Please complete a separate checklist for each river basin in which variances are being requested.

Water Planning Region: C

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

   Sulphur River Basin

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

   Region C requests to use the approved TCEQ Sulphur WAM for use in the 2021 Region C Plan with the following variances for all water supply analyses:
   - Inclusion of any new water rights granted that are not currently included in the approved TCEQ WAM.

The following variance is requested for modeling existing supplies from Lake Chapman.

- Modeling of Lake Chapman as one pool instead of multiple pools to facilitate calculation of the firm yield. All authorizations have the same priority date, and a single pool correctly distributes inflows among the water right holders. This modeling respects the USACE minimum elevation for water supply.

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)

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These adjustments to the WAMs are requested to reflect the water rights and agreements more accurately for water supply sources in Region C.

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

   Yes

   The same hydrologic variance requests were implemented in the 2021 Region C Water Plan. This request only differs in the inclusion of any new water rights that are not currently in the WAM.

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

   No

   Choose an item.

   Click or tap here to enter text.

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

   No

   Choose an item.

   Click or tap here to enter text.

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

   No

   Choose an item.

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7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

   No

   Choose an item.

   Click or tap here to enter text.

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

   Yes

   Existing Supply

Changes are requested for the Sulphur WAM are in Question 2.

-

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

   No

   Choose an item.

   Only return flows authorized in existing surface water rights and modeled in the existing WAM Run 3 will be included in the analysis.

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

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10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

    Unknown

    Click or tap here to enter text.

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

    Click or tap here to enter text.

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Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

October 26, 2023

Mr. Kevin Ward
Chair
Region C Regional Water Planning Group
c/o Trinity River Authority
P.O. Box 60
Arlington, Texas 76044

Dear Chairman Ward:

I have reviewed your request dated August 22, 2023, for approval of alternative water supply assumptions to be used in determining existing surface water availability. This letter confirms that the TWDB approves the following assumptions:

1. Use of safe yield for the allocation and distribution of surface water supplies from reservoirs owned and operated by Dallas Water Utilities (nine-month safe yield) and Tarrant Regional Water District (one-year safe yield).

2. Use of the results of North Texas Municipal Water District's Long-Range Water Supply plan, which accounted for the potential impacts of a drought worse than the drought of record, for the allocation and distribution of surface water supplies from reservoirs owned and operated by North Texas Municipal Water District.

3. Multiple changes to the Trinity WAM to account for current operating conditions, including subordination agreements, systems operations, and other corrections noted during review of the models, as detailed in Attachment A of the hydrologic variance request.

4. Changes to Lake Texoma and associated water rights in the Red River WAM to avoid potential double counting of supply and to improve the accuracy of firm yield estimates from Region C reservoirs, as detailed in Attachment A of the hydrologic variance request.

5. Model Lake Chapman, in the Sulphur WAM, as a single pool to assess its firm yield and then assign supplies proportionally based on each provider's water right, with inclusion of any new water rights granted that are not currently in the approved TCEQ WAM.

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6. Use of surface water availabilities, based upon the hydrologic variance approved for use by the Region I RWPG and the TWDB for the Neches and Sabine River Basins.

7. Use of surface water availabilities, based upon the hydrologic variance approved for use by the Brazos G RWPG and the TWDB for the Brazos River Basin.

Because we have not had the opportunity to review the related information, the TWDB is not pre-approving the use of potential impacts of climatic uncertainties from the Dallas Water Utilities Long-Range Water Supply plan at this time. Once the updated long-range plan information is made available including the information on the methodology that will be the basis for assessing climatic uncertainties as will be incorporated into the regional water plan, the TWDB requests that a separate hydrologic variance request be submitted to approve this one item so that staff can review the updated information.

Although the TWDB approves the use of a nine-month (Dallas Water Utilities) and one-year (Tarrant Regional Water District) safe yield for developing estimates of current water supplies, firm yield for each reservoir must still be reported to TWDB in the online planning database and plan documents. For the purpose of evaluating potentially feasible water management strategies, the TCEQ WAM Run 3 is to be used, unless a separate hydrologic variance for water management strategy availability is submitted and approved by the TWDB.

While the TWDB authorizes these modifications to evaluate existing water supplies for development of the 2026 Region C RWP, it is the responsibility of the RWPG to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and in all other regards will be evaluated in accordance with the most recent version of regional water planning contract Exhibit C, *General Guidelines for Development of the 2026 Regional Water Plans.*

If you have any questions, please do not hesitate to contact Kevin Smith of our Regional Water Planning staff at 512-475-1561 or kevin.smith@twdb.texas.gov.

Sincerely,

Jeff Walker Digitally signed by Jeff Walker Date: 2023.11.30 07:44:34 -06'00'

Jeff Walker
Executive Administrator

c: Howard Slobodin, Trinity River Authority
Abigail Gardner, P.E., Freese and Nichols, Inc.
Tony Smith, P.E., Carollo Engineers (Region G)
Brigit Buff, P.E., Plummer Associates, Inc. (Region I)
Kevin Smith, Water Supply Planning

DRAFT

Nelun Fernando, Ph.D., Surface Water

DRAFT

Attachment E-2

DB27 Water Rights Collection Spreadsheet

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ATTACHMENT E-2
DB27 WATER RIGHT COLLECTION SPREADSHEET

WATER RIGHT TYPE	WATER RIGHT PERMIT NUMBER	WATER RIGHT OWNER NAME	DB27 SOURCEID	DB27 SOURCE NAME	PERMITTED ANNUAL DIVERSION VOLUME (AC-FT/YR)	RESERVOIR OPERATOR	PERMITTED STORAGE CAPACITY (AC-FT/YR)	SOURCE COUNTY	COMMENTS
ADJ	C5021	TRINITY RIVER AUTHORITY	3	BARDWELL LAKE/RESERVOIR	9,600	U.S CORPS OF ENGINEERS	54,900	RESERVOIR	
WRPERM	P12151	NORTH TEXAS MUNICIPAL WATER DISTRICT	36	BOIS D ARC LAKE/RESERVOIR	175,000	NORTH TEXAS MUNICIPAL WATER DISTRICT	367,609	RESERVOIR	
ADJ	C4925	NORTH TEXAS MUNICIPAL WATER DISTRICT	553	BONHAM LAKE/RESERVOIR	5,340	BONHAM MWA	13,000	RESERVOIR	
ADJ	C3462	CITY OF BRYSON	476	BRYSON LAKE/RESERVOIR	90	CITY OF BRYSON	950	RESERVOIR	NO LONGER USED FOR WATER SUPPLY
ADJ	C5019	CITY OF ENNIS	9	CLARK LAKE/RESERVOIR	450	CITY OF ENNIS	1,549	RESERVOIR	NO LONGER USED FOR WATER SUPPLY
ADJ	C5040	FLG-OWNER, LLC	14	FAIRFIELD LAKE/RESERVOIR	14,150	FLG-OWNER, LLC	50,600	RESERVOIR	
ADJ	C4983	LUMINANT GENERATION CO LLC	11	FOREST GROVE LAKE/RESERVOIR	9,500	LUMINANT POWER	20,038	RESERVOIR	NOT CONSTRUCTED
ADJ	C2363	DALLAS COUNTY PARK CITIES MUD	862	GRAPEVINE LAKE/RESERVOIR NON-SYSTEM PORTION	50,000	U.S CORPS OF ENGINEERS	50,000	RESERVOIR	
ADJ	C2362	CITY OF GRAPEVINE	862	GRAPEVINE LAKE/RESERVOIR NON-SYSTEM PORTION	26,250	U.S CORPS OF ENGINEERS	26,250	RESERVOIR	
ADJ	C5030	CITY OF CORSICANA	1	HALBERT LAKE/RESERVOIR	4,003	CITY OF CORSICANA	7,357	RESERVOIR	
ADJ	C4881	CITY OF GAINESVILLE	555	HUBERT H MOSS LAKE/RESERVOIR	7,740	GAINESVILLE	23,210	RESERVOIR	
ADJ	C3404	TRINITY RIVER AUTHORITY	863	JOE POOL LAKE/RESERVOIR	17,000	U.S CORPS OF ENGINEERS	176,900	RESERVOIR	
ADJ	C2348	CITY OF DENTON	15	LEWISVILLE LAKE/RESERVOIR NON-SYSTEM PORTION	58,424	U.S CORPS OF ENGINEERS	68,424	RESERVOIR	
ADJ	C3313	CITY OF JACKSBORO	37	LOST CREEK-JACKSBORO LAKE/RESERVOIR SYSTEM	1,397	JACKSBORO	11,961	RESERVOIR	
ADJ	C4039	CITY OF MINERAL WELLS	484	MINERAL WELLS LAKE/RESERVOIR	2,520	CITY OF MINERAL WELLS	7,065	RESERVOIR	
ADJ	C3408	MOUNTAIN CREEK POWER LLC	860	MOUNTAIN CREEK LAKE/RESERVOIR	6,400	EXELON GENERATION	22,840	RESERVOIR	
ADJ	C2323	MUENSTER WATER DISTRICT	559	MUENSTER LAKE/RESERVOIR	500	CITY OF MUENSTER	4,700	RESERVOIR	
ADJ	C4992	TRINITY RIVER AUTHORITY	2	NAVARRO MILLS LAKE/RESERVOIR	19,400	U.S CORPS OF ENGINEERS	63,300	RESERVOIR	
WRPERM	P5821	UPPER TRINITY REGIONAL WATER DISTRICT	2351	RALPH HALL LAKE/RESERVOIR	45,000	UPPER TRINITY REGIONAL WATER DISTRICT	180,000	RESERVOIR	
ADJ	C4900	LUMINANT GENERATION COMPANY LLC	2991	VALLEY LAKE/RESERVOIR	16,400	PRIVATE	15,000	RESERVOIR	
ADJ	C4901	CITY OF DENISON	552	RANDALL LAKE/RESERVOIR	5,280	DENISON	5,400	RESERVOIR	
ADJ	C2462	CITY OF DALLAS	5	RAY HUBBARD LAKE/RESERVOIR	208,067	CITY OF DALLAS/DWU	490,000	RESERVOIR	
ADJ	C2335	CITY OF DENTON	859	RAY ROBERTS LAKE/RESERVOIR NON-SYSTEM PORTION	207,896	U.S CORPS OF ENGINEERS	207,896	RESERVOIR	
ADJ	C2455	CITY OF DALLAS	38	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	591,704	U.S CORPS OF ENGINEERS	591,704	RESERVOIR	RAY ROBERTS
ADJ	C2456	CITY OF DALLAS	38	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	549,976	U.S CORPS OF ENGINEERS	549,976	RESERVOIR	LEWISVILLE
ADJ	C2458	CITY OF DALLAS	38	RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	84,500	U.S CORPS OF ENGINEERS	85,000	RESERVOIR	GRAPEVINE
ADJ	C5030	CITY OF CORSICANA	1	RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	13,650	CORSICANNA		RESERVOIR	WATER RIGHTS DOES NOT GIVE STORAGE; STORAGE IS AUTHORIZED UNDER TRWD PERMIT.
WRPERM	P5291	CITY OF TEAGUE	477	TEAGUE CITY LAKE/RESERVOIR	605	TEAGUE	1,160	RESERVOIR	
ADJ	C4972	CITY OF TERRELL	8	TERRELL LAKE/RESERVOIR	6,000	CITY OF TERRELL	8,712	RESERVOIR	
ADJ	C4898	RED RIVER AUTHORITY	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	2,000	U.S CORPS OF ENGINEERS	11,150	RESERVOIR	NO STORAGE VOLUME - ASSUMED WAM STORAGE VOLUME. NO SPECIFIC STORAGE VOLUME IN EITHER WR OR CORP CONTRACT. STORAGE LIMITED TO ELEVATION BETWEEN 590 AND 617 FT.
ADJ	C4899	RED RIVER AUTHORITY	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	250	U.S CORPS OF ENGINEERS	450	RESERVOIR	
WRPERM	P4301B; 4301C	GREATER TEXOMA UTILITY AUTHORITY	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	83,200	U.S CORPS OF ENGINEERS	74,115	RESERVOIR	
ADJ	C4901	DENISON	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	24,400	U.S CORPS OF ENGINEERS	24,400	RESERVOIR	
ADJ	C4900	LUMINANT GENERATION COMPANY LLC	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	16,400	U.S CORPS OF ENGINEERS	16,400	RESERVOIR	
WRPERM	P5003	NORTH TEXAS MUNICIPAL WATER DISTRICT	554	TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	197,000	U.S CORPS OF ENGINEERS	175,000	RESERVOIR	SUPPLY AUTHORIZED UNDER THIS PERMIT IS ALSO INCLUDED UNDER DB22 SOURCE 36
ADJ	C4984	CITY OF TRINIDAD	12	TRINIDAD CITY LAKE/RESERVOIR	200	CITY OF TRINIDAD	498	RESERVOIR	

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ATTACHMENT E-2
DB27 WATER RIGHT COLLECTION SPREADSHEET

WATER RIGHT TYPE	WATER RIGHT PERMIT NUMBER	WATER RIGHT OWNER NAME	DB27 SOURCEID	DB27 SOURCE NAME	PERMITTED ANNUAL DIVERSION VOLUME (AC-FT/YR)	RESERVOIR OPERATOR	PERMITTED STORAGE CAPACITY (AC-FT/YR)	SOURCE COUNTY	COMMENTS
ADJ	C4970	TEXAS UTILITIES ELECTRIC COMPANY	13	TRINIDAD LAKE/RESERVOIR	4,000	LUMINANT POWER	6,200	RESERVOIR	
ADJ	C5018	ELLIS COUNTY WCID 1	10	WAXAHACHIE LAKE/RESERVOIR	3,570	ELLIS COUNTY WCID 1	13,500	RESERVOIR	
ADJ	C3356	CITY OF WEATHERFORD	861	WEATHERFORD LAKE/RESERVOIR	5,220	WEATHERFORD	19,470	RESERVOIR	
ADJ	C2461	CITY OF DALLAS	7	WHITE ROCK LAKE/RESERVOIR	8,703	DALLAS	21,345	RESERVOIR	
ADJ	C2365	DALLAS COUNTY IRRIGATION DISTRICT NO. 1	2984	NORTH LAKE/RESERVOIR	1,000	DALLAS COUNTY IRRIGATION DISTRICT NO. 1	17,100	RESERVOIR	
ADJ	C2410	NORTH TEXAS MUNICIPAL WATER DISTRICT	36	NORTH TEXAS MWD LAKE/RESERVOIR SYSTEM	118,670	U.S CORPS OF ENGINEERS	443,800	RESERVOIR	LAVON
WRPERM	P5003	NORTH TEXAS MUNICIPAL WATER DISTRICT	36	NORTH TEXAS MWD LAKE/RESERVOIR SYSTEM	197,000	U.S CORPS OF ENGINEERS	175,000	RESERVOIR	SUPPLY AUTHORIZED UNDER THIS PERMIT IS ALSO INCLUDED UNDER DB22 SOURCE 554
ADJ	C4798	NORTH TEXAS MUNICIPAL WATER DISTRICT	36	NORTH TEXAS MWD LAKE/RESERVOIR SYSTEM	54,000	U.S CORPS OF ENGINEERS	114,265	RESERVOIR	LAKE CHAPMAN
WRPERM	P5157A	TARRANT REGIONAL WATER DISTRICT	39	TRWD LAKE/RESERVOIR SYSTEM	6,833	U.S CORPS OF ENGINEERS	72,500	RESERVOIR	BENBROOK
ADJ	C3391	ARLINGTON	39	TRWD LAKE/RESERVOIR SYSTEM	23,120	ARLINGTON	45,710	RESERVOIR	LAKE ARLINGTON
ADJ	C4976	TARRANT REGIONAL WATER DISTRICT	39	TRWD LAKE/RESERVOIR SYSTEM	175,000	TARRANT REGIONAL WATER DISTRICT	678,900	RESERVOIR	CEDAR CREEK LAKE
ADJ	C3809	TARRANT REGIONAL WATER DISTRICT	39	TRWD LAKE/RESERVOIR SYSTEM	159,600	TARRANT REGIONAL WATER DISTRICT	210,000	RESERVOIR	WEST FORK SYSTEM (EAGLE MOUNTAIN)
ADJ	C3340	CITY OF FORT WORTH	39	TRWD LAKE/RESERVOIR SYSTEM	13,288	TARRANT REGIONAL WATER DISTRICT	38,124	RESERVOIR	WEST FORK SYSTEM (LAKE WORTH)
ADJ	C3808	TARRANT REGIONAL WATER DISTRICT	39	TRWD LAKE/RESERVOIR SYSTEM	17,000	TARRANT REGIONAL WATER DISTRICT	387,000	RESERVOIR	WEST FORK SYSTEM (BRIDGEPORT (LOCAL))
ADJ	C5035	TARRANT REGIONAL WATER DISTRICT	39	TRWD LAKE/RESERVOIR SYSTEM	210,000	TARRANT REGIONAL WATER DISTRICT	1,135,000	RESERVOIR	RICHLAND-CHAMBERS (SYSTEM PORTION)
ADJ	C2378	J BELLINGER CUSTOM HOMES INC	346	TRINITY RUN-OF-RIVER	11		6	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2378	NORTH DALLAS 20 JOINT VENTURE	346	TRINITY RUN-OF-RIVER	9			COLLIN	MULTIPLE/IRRIGATION
ADJ	C2379	WILLOW BEND LAKES MASTERS HOA	346	TRINITY RUN-OF-RIVER	20		100	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2400	GRAYSON-COLLIN REC ASSN INC	346	TRINITY RUN-OF-RIVER	150		490	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2401	THOMAS J CARTER ET AL	346	TRINITY RUN-OF-RIVER	60		220	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2403	COLMENA RANCH LP	346	TRINITY RUN-OF-RIVER	73		217	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2405	RICHARD A SAYLES ET UX	346	TRINITY RUN-OF-RIVER	67		123	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2407	JAMES R CHAFFIN, GEORGE W BROWN, BILLY M LANIER, RYAN R LANIER	346	TRINITY RUN-OF-RIVER	60		30	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2408	FF 14TH FAIRWAY LP, TEXAS DEPT OF TRANSPORTATION	346	TRINITY RUN-OF-RIVER	17		173	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2413	KATHRYN L MCCARTHY	346	TRINITY RUN-OF-RIVER	60		200	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2414	WILLIAM E WINN ET AL	346	TRINITY RUN-OF-RIVER	65		200	COLLIN	MULTIPLE/IRRIGATION
WRPERM	P4186	GCC ASSET MANAGEMENT INC	346	TRINITY RUN-OF-RIVER	747			COLLIN	MULTIPLE/IRRIGATION
ADJ	C5072	STONEBRIDGE RANCH DEVELOPMENT CORP, CSR GOLF GROUP INC	346	TRINITY RUN-OF-RIVER	1,130		1,216	COLLIN	MULTIPLE/IRRIGATION
WRPERM	P5144	CF PLANTATION ARCIS LLC	346	TRINITY RUN-OF-RIVER	395		206	COLLIN	MULTIPLE/IRRIGATION
ADJ	C5303	HEWLETT-PACKARD CORPORATION	346	TRINITY RUN-OF-RIVER	881		119	COLLIN	MULTIPLE/IRRIGATION
WRPERM	P5550	DOUBLE CREEKS GOLF CLUB LP	346	TRINITY RUN-OF-RIVER	175		7	COLLIN	MULTIPLE/IRRIGATION
ADJ	C2793	CLUBCORP NV V, LLC	346	TRINITY RUN-OF-RIVER	395		51	COLLIN	MULTIPLE/IRRIGATION
ADJ	C3400	TEXAS INDUSTRIES INC	358	TRINITY RUN-OF-RIVER	9			ELLIS	MULTIPLE/IRRIGATION
WRPERM	P5007	WISE ASSET NO 3 LTD	358	TRINITY RUN-OF-RIVER	200		200	ELLIS	MULTIPLE/IRRIGATION
WRPERM	P5008	GIBSON D LEWIS & WARNER CROFT	358	TRINITY RUN-OF-RIVER	125		102	ELLIS	MULTIPLE/IRRIGATION
ADJ	C5009	JOE S WILSON ESTATE	358	TRINITY RUN-OF-RIVER	14		223	ELLIS	MULTIPLE/IRRIGATION
ADJ	C5010	GIBSON D LEWIS & WARNER CROFT	358	TRINITY RUN-OF-RIVER	37		102	ELLIS	MULTIPLE/IRRIGATION
ADJ	C5014	WAXAHACHIE COUNTRY CLUB INC	358	TRINITY RUN-OF-RIVER	70		300	ELLIS	MULTIPLE/IRRIGATION
ADJ	C5016	BILLIE J FRY	358	TRINITY RUN-OF-RIVER	5			ELLIS	MULTIPLE/IRRIGATION
ADJ	C5017	THE SALVATION ARMY	358	TRINITY RUN-OF-RIVER	62		196	ELLIS	MULTIPLE/IRRIGATION
WRPERM	P5804	PATSY ANDERTON	358	TRINITY RUN-OF-RIVER	135		120	ELLIS	MULTIPLE/IRRIGATION
ADJ	C3315	HEIDELBERG MATERIALS SOUTHWEST AGG LLC	291	TRINITY RUN-OF-RIVER	177		305	WISE	MULTIPLE/MINING
ADJ	C3318	HEIDELBERG MATERIALS SOUTHWEST AGG LLC	291	TRINITY RUN-OF-RIVER	510			WISE	MULTIPLE/MINING
WRPERM	P5597	ARCOSA AGGREGATES, INC.	291	TRINITY RUN-OF-RIVER	25			WISE	MULTIPLE/MINING
ADJ	C3316	HEIDELBERG MATERIALS SOUTHWEST AGG LLC	291	TRINITY RUN-OF-RIVER	2,220		139	WISE	MULTIPLE/MINING
ADJ	C2355	JAMES C THOMASON TRUSTEE	291	TRINITY RUN-OF-RIVER	30			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C2356	DECATUR GOLF CLUB INC	291	TRINITY RUN-OF-RIVER	12			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C2358	JOE R BANKS JR ET UX	291	TRINITY RUN-OF-RIVER	23			WISE	MULTIPLE/IRRIGATION AND MINING

ATTACHMENT E-2
DB27 WATER RIGHT COLLECTION SPREADSHEET

WATER RIGHT TYPE	WATER RIGHT PERMIT NUMBER	WATER RIGHT OWNER NAME	DB27 SOURCEID	DB27 SOURCE NAME	PERMITTED ANNUAL DIVERSION VOLUME (AC-FT/YR)	RESERVOIR OPERATOR	PERMITTED STORAGE CAPACITY (AC-FT/YR)	SOURCE COUNTY	COMMENTS
ADJ	C2359	GLENN P SHOOP, MERILOU SHOOP LOVE TRUST	291	TRINITY RUN-OF-RIVER	50			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3315	HANSON AGGREGATES WEST, INC.	291	TRINITY RUN-OF-RIVER	177		305	WISE	MULTIPLE/IRRIGATION AND MINING CONSUMPTIVE AMOUNT IT 177 AF/Y
ADJ	C3316	HANSON AGGREGATES CENTRAL INC	291	TRINITY RUN-OF-RIVER	1,850		139	WISE	MULTIPLE/IRRIGATION AND MINING CONSUMPTIVE AMOUNT IS LIMITED TO 370 AF/Y
ADJ	C3318	HANSON AGGREGATES CENTRAL INC	291	TRINITY RUN-OF-RIVER	510		936	WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3325	GARY L DICKENSON	291	TRINITY RUN-OF-RIVER	62			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3326	GARY L DICKENSON	291	TRINITY RUN-OF-RIVER	90			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3327	MICHAEL D MOYERS, JOSEPH W LEWIS ET UX	291	TRINITY RUN-OF-RIVER	104			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3328	GORDON PERKINS	291	TRINITY RUN-OF-RIVER	20			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3329	LOYD R WOOD	291	TRINITY RUN-OF-RIVER	68			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3330	F M MCGILVRAY	291	TRINITY RUN-OF-RIVER	43			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3331	F M MCGILVRAY	291	TRINITY RUN-OF-RIVER	249			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3332	W J SHEPHERD	291	TRINITY RUN-OF-RIVER	4			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3333	SEWELL RANCH INC	291	TRINITY RUN-OF-RIVER	291			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3334	ED & CATHERINE MAX	291	TRINITY RUN-OF-RIVER	56			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C3335	THERESE TAYLOR WILLIAMS TRUST, JESSICA NICOLE TAYLOR TRUST, KYLE BRETT ERWIN TRUST	291	TRINITY RUN-OF-RIVER	20			WISE	MULTIPLE/IRRIGATION AND MINING
WRPERM	P5597	TRINITY MATERIALS INC	291	TRINITY RUN-OF-RIVER	25			WISE	MULTIPLE/IRRIGATION AND MINING
ADJ	C5061	IC RANCHES, LLC LAH ENTERPRISES LIMITED PARTNERSHIP ELLEN V LEONARD EMILY A LEONARD MARGERY ELIZABETH LEONARD LEONARD, ROBERT W JR NANCY A. LEONARD INVESTMENT COMPANY, L.P. O.P. LEONARD, JR. INVESTMENT COMPANY, LTD. ROBERT W LEONARD FAMILY TRUST VIRGINIA A. LEONARD MARITAL TRUST	286	TRINITY RUN-OF-RIVER	200			FREESTONE	MULTIPLE/IRRIGATION AND MUNICIPAL
WRPERM	P5078	DESTEC PROPERTIES LIMITED PARTNERSHIP	286	TRINITY RUN-OF-RIVER	128		106	FREESTONE	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5082	BEENE & EUBANKS, L.P.	286	TRINITY RUN-OF-RIVER	15		96	FREESTONE	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5038	BURLINGTON NORTHERN SANTA FE CORPORATION CITY OF STREETMAN	286	TRINITY RUN-OF-RIVER	41		225	FREESTONE	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C4971	CITY OF KERENS	288	TRINITY RUN-OF-RIVER	252		778	NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5028	RICE WATER SUPPLY AND SEWER SERVICE CORPORATION	288	TRINITY RUN-OF-RIVER	25			NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C4967	FORTSON, JAMES E FORTSON, JAMES H HARDAWAY, JANE FORTSON MARCY, ANN FORTSON	288	TRINITY RUN-OF-RIVER	170		175	NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5025	JAMES E. FORTSON JAMES H. FORTSON JANE FORTSON HARDAWAY ANN FORTSON MARCY	288	TRINITY RUN-OF-RIVER	46			NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5027	JAMES B. BONHAM CORPORATION, LOYD GOWEN	288	TRINITY RUN-OF-RIVER	750			NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C5037	JANET K. SMITH	288	TRINITY RUN-OF-RIVER	23		28	NAVARRO	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C3355	PORTER, H J	289	TRINITY RUN-OF-RIVER	158		248	PARKER	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C3359	TEXAS PYTHIAN HOME, INC.	289	TRINITY RUN-OF-RIVER	13			PARKER	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C3360	BETTY JO HAILE	289	TRINITY RUN-OF-RIVER	13			PARKER	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C3358	CITY OF WEATHERFORD	289	TRINITY RUN-OF-RIVER	530		530	PARKER	MULTIPLE/IRRIGATION AND MUNICIPAL
ADJ	C2388	LUMINANT GENERATION COMPANY LLC	284	TRINITY RUN-OF-RIVER	3,188		1,330	DALLAS	MULTIPLE/IRRIGATION AND STEAM ELECTRIC POWER
ADJ	C3375	TARRANT REGIONAL WATER DISTRICT	290	TRINITY RUN-OF-RIVER	11,210			TARRANT	MULTIPLE/IRRIGATION AND STEAM ELECTRIC POWER

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ATTACHMENT E-2
DB27 WATER RIGHT COLLECTION SPREADSHEET

WATER RIGHT TYPE	WATER RIGHT PERMIT NUMBER	WATER RIGHT OWNER NAME	DB27 SOURCEID	DB27 SOURCE NAME	PERMITTED ANNUAL DIVERSION VOLUME (AC-FT/YR)	RESERVOIR OPERATOR	PERMITTED STORAGE CAPACITY (AC-FT/YR)	SOURCE COUNTY	COMMENTS
ADJ	C3376	LAFARGE NORTH AMERICA INC.	290	TRINITY RUN-OF-RIVER	2,500		128	TARRANT	MULTIPLE/IRRIGATION AND STEAM ELECTRIC POWER CONSUMPTIVE AMOUNT IS LIMITED TO 650 AF/Y
ADJ	C5018	SAFARI WATERS RANCH POA	378	TRINITY RUN-OF-RIVER	4		304	HENDERSON	MULTIPLE/IRRIGATION
ADJ	C4968	HORIZON RANCH LIMITED PARTNERSHIP	378	TRINITY RUN-OF-RIVER	100			HENDERSON	MULTIPLE/IRRIGATION
ADJ	C4969	J W KEY INVESTMENT INC KEY, JOHN W SR KEY, RUBY L	378	TRINITY RUN-OF-RIVER	1,000			HENDERSON	MULTIPLE/IRRIGATION
ADJ	C5041	RAINBO CLUB, INC.	378	TRINITY RUN-OF-RIVER	120		1,009	HENDERSON	MULTIPLE/IRRIGATION
ADJ	C5045	WAYMON G. PEAVY TRUST	378	TRINITY RUN-OF-RIVER	100			HENDERSON	MULTIPLE/IRRIGATION
WRPERM	P4116	T & L RANCH COMPAN Y	387	TRINITY RUN-OF-RIVER	60			JACK	MULTIPLE/IRRIGATION
ADJ	C3307	CAMPSEY-SIDES HAPPY C RANCH, L.P.	387	TRINITY RUN-OF-RIVER	50		168	JACK	MULTIPLE/IRRIGATION
ADJ	C2399	TRIPLE R RANCH, L.P.	389	TRINITY RUN-OF-RIVER	263			KAUFMAN	MULTIPLE/IRRIGATION
ADJ	C4973	HUNT OIL COMPANY	389	TRINITY RUN-OF-RIVER	74		700	KAUFMAN	MULTIPLE/IRRIGATION
ADJ	C4040	DELMAR & MARTHA JANE KING	409	BRAZOS RUN-OF-RIVER	38		60	PARKER	MULTIPLE/IRRIGATION
ADJ	C4041	WALDEN FAMILY PROPERTIES LTD	409	BRAZOS RUN-OF-RIVER	8		8	PARKER	MULTIPLE/IRRIGATION
ADJ	C4042	WALDEN FAMILY PROPERTIES LTD	409	BRAZOS RUN-OF-RIVER	42		30	PARKER	MULTIPLE/IRRIGATION
ADJ	C4043	BRANSON CAPITAL PARTNERS LTD	409	BRAZOS RUN-OF-RIVER	100		162	PARKER	MULTIPLE/IRRIGATION
ADJ	C4044	D. C. WOODRUFF, WANDA J WOODRUFF, BOB R SIMPSON, MARY A MORSE ET AL, LIONEL R LANE ET UX, SIDNEY L. DEAN ET UX, STACI L. TYLER ET VIR, JEANNIE WOODRUFF MCWHORTER, EDWARD B. FERNSTROM ET UX, RONALD T. BELL ET UX, ROBERT S. TAYLOR ET UX, THE KRAEMER FAMILY LIVING TRUST, SHERYL ANN WOODRUFF-BROWN, BENJAMIN K. DAVIS ET UX	409	BRAZOS RUN-OF-RIVER	149			PARKER	MULTIPLE/IRRIGATION
ADJ	C4045	FRED D DUNCAN ET UX, DAVID NASH ET UX, JOHN W. ELDERS ET UX	409	BRAZOS RUN-OF-RIVER	75			PARKER	MULTIPLE/IRRIGATION
ADJ	C4046	JOHN WILLIAM FULLER, STEVEN SCHRECKHISE ET UX	409	BRAZOS RUN-OF-RIVER	69			PARKER	MULTIPLE/IRRIGATION
ADJ	C4047	BOB R SIMPSON, MSMJM FAMILY LLC	409	BRAZOS RUN-OF-RIVER	290			PARKER	MULTIPLE/IRRIGATION
ADJ	C4052	BOB R SIMPSONK	409	BRAZOS RUN-OF-RIVER	760		3	PARKER	MULTIPLE/IRRIGATION
WRPERM	P5759	MAX & BILLIE CLARK FOUNDATION	409	BRAZOS RUN-OF-RIVER	11		15	PARKER	MULTIPLE/IRRIGATION
WRPERM	P5767	HERMAN STROUD ET UX	409	BRAZOS RUN-OF-RIVER	70		33	PARKER	MULTIPLE/IRRIGATION
WSC	P13138	J & J LAND & LIVESTOCK CO	409	BRAZOS RUN-OF-RIVER	25			PARKER	MULTIPLE/IRRIGATION
ADJ	C4883	ROBERT E DAVIS JR	287	RED RUN-OF-RIVER	80		87	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4884	SIMMENTAL RANCH CORPORATION	287	RED RUN-OF-RIVER	72		32	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4886	J B RICH	287	RED RUN-OF-RIVER	33		85	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4889	RAYMOND W JOHNSON	287	RED RUN-OF-RIVER	30			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4890	SKINNER FARM LLC	287	RED RUN-OF-RIVER	20		20	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4891	J P HUFF	287	RED RUN-OF-RIVER	130			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4892	NIOBE D NOLAND INDEPENDENT EXECUTRIX	287	RED RUN-OF-RIVER	20			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4893	CARROLL HEDGES, CHARLES F SMALLEY ET UX	287	RED RUN-OF-RIVER	24			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4895	US DEPT OF THE INTERIOR	287	RED RUN-OF-RIVER	208		342	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4896	BOBBY G & MARY ARNETT	287	RED RUN-OF-RIVER	21		50	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4898	RED RIVER AUTHORITY	287	RED RUN-OF-RIVER	250		24	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4902	DENISON COUNTY CLUB	287	RED RUN-OF-RIVER	120		234	GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4904	MUNSON REALTY COMPANY	287	RED RUN-OF-RIVER	482			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4907	GEORGE ROBERT WHITMIRE	287	RED RUN-OF-RIVER	200			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4908	DALE BORDELON	287	RED RUN-OF-RIVER	135			GRAYSON	MULTIPLE/IRRIGATION AND MINING
ADJ	C4911	WOODLAWN COUNTRY CLUB	287	RED RUN-OF-RIVER	30			GRAYSON	MULTIPLE/IRRIGATION AND MINING
WRPERM	P5113	GRAYSON CO JR COLLEGE DIST	287	RED RUN-OF-RIVER	125		4	GRAYSON	MULTIPLE/IRRIGATION AND MINING
WRPERM	P5630	JIMMIE C EVANS	287	RED RUN-OF-RIVER	797			GRAYSON	MULTIPLE/IRRIGATION AND MINING
WRPERM	P12346	RAY DAVIS	287	RED RUN-OF-RIVER	3			GRAYSON	MULTIPLE/IRRIGATION AND MINING

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ATTACHMENT E-2
DB27 WATER RIGHT COLLECTION SPREADSHEET

WATER RIGHT TYPE	WATER RIGHT PERMIT NUMBER	WATER RIGHT OWNER NAME	DB27 SOURCEID	DB27 SOURCE NAME	PERMITTED ANNUAL DIVERSION VOLUME (AC-FT/YR)	RESERVOIR OPERATOR	PERMITTED STORAGE CAPACITY (AC-FT/YR)	SOURCE COUNTY	COMMENTS
WRPERM	P4033	CONNECTICUT MUTUAL LIFE INS, FELIX N STEPHENS, PILGRIMS PRIDE CORP, NORTH TEXAS MUNICIPAL WATER DISTRICT	285	RED RUN-OF-RIVER	7,236			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
WRPERM	P4044	NORTH TEXAS MUNICIPAL WATER DISTRICT, PILGRIMS PRIDE CORP	285	RED RUN-OF-RIVER	4,228			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
WRPERM	P4059	MAYFIELD MCCRAW ET AL	285	RED RUN-OF-RIVER	360			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
WRPERM	P4294	RONNIE FOSTER ET AL	285	RED RUN-OF-RIVER	103		103	FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4912	LATTIMORE MATERIALS COMPANY	285	RED RUN-OF-RIVER	987		44	FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4913	WILLIAM DAVID ELLIOT	285	RED RUN-OF-RIVER	30			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4914	HAROLD H WALKER	285	RED RUN-OF-RIVER	30		1	FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4916	CHARLES R RAMSEY, HARVEY A WEST ET UX	285	RED RUN-OF-RIVER	160			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4917	ROBERT E OLD JR	285	RED RUN-OF-RIVER	219			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4918	J W WHITE, RAYMOND E KELTON	285	RED RUN-OF-RIVER	360			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4919	D W WHITE	285	RED RUN-OF-RIVER	20			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4920	NORTH TEXAS MUNICIPAL WATER DISTRICT	285	RED RUN-OF-RIVER	640			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4921	PAUL & FLORENC E KEAHEY	285	RED RUN-OF-RIVER	109			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4922	RAY JOE RILEY & MARY TAYLOR	285	RED RUN-OF-RIVER	362			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4926	RAY JOE RILEY TRUSTEE ET AL	285	RED RUN-OF-RIVER	520			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4931	D RANNALS	285	RED RUN-OF-RIVER	10			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4933	J WELDON SIMMONS	285	RED RUN-OF-RIVER	110		110	FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4936	FINAS D WADE	285	RED RUN-OF-RIVER	20			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
ADJ	C4937	MARVIN L HURD ET AL	285	RED RUN-OF-RIVER	30			FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
WRPERM	P5129	VERMELLE KIRKPATRICK	285	RED RUN-OF-RIVER	92		140	FANNIN	MULTIPLE/IRRIGATION, MINING, AND MUNICIPAL
WRPERM	P3890	CITY OF PECAN GAP	360	SULPHUR RUN-OF-RIVER	102		152	FANNIN	SINGLE/MUNICIPAL

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Appendix F

Potentially Feasible Water Management Strategies

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APPENDIX F POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

ATTACHMENT	ITEM	PAGE NUMBER
F-1	Tabular List of Potentially Feasible Water Management Strategies	F-2
F-2	Potentially Feasible Water Management Strategies for Wholesale Water Providers	F-6
F-3	Potentially Feasible Water Management Strategies for Municipal WUGs by County	F-11
F-4	Example of Water Management Survey Email to WUGs	F-28

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Attachment F-1

Tabular List of Potentially Feasible Water Management Strategies

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TABLE F.1 TABULAR LIST OF POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES
Conservation:
Conservation Measures
Drought Management:
Implementation of Drought Contingency Plans/Measures as needed
Reuse:
Elm Fork Swap
Main Stem Balancing Reservoir
Direct Reuse
Indirect Reuse
Additional Direct Reuse
Additional Indirect Reuse
Marty Leonard Wetlands
Mary's Creek Reuse
Alliance Direct Reuse
Village Creek WRF Direct Reuse
Reuse from TRA Central Regional RWS
Lake Ralph Hall Indirect Reuse
Expanded Wetland Reuse
Additional Lavon Watershed Reuse
Additional Richland Chambers Reuse
Sabine Creek WWTP Reuse
Tarrant and Denton County Direct Reuse
TCWSP Supply with Reuse Swap
Direct Reuse from UTRWD
Direct Reuse from local WWTPs
Denton Creek RWS (TRA) Direct Reuse
Direct Reuse from Sherman
TRA Reuse for SEP
Purchase Reuse water from DCPCMUD (Lake Grapevine)
Existing Supplies:
Toledo Bend
Carrizo-Wilcox Groundwater
IPL Connect to Lake Palestine
IPL Connection of Existing Supplies (Richland-Chambers)
Arkansas
Oklahoma

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POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES
Add'l measure to access full Lavon yield
Lake Texoma Blending
Lake O' the Pines
Purchase of Additional Supplies from current provider
Connect to and Begin Purchasing Supplies from Water Provider
Renew Contract for Supplies from current provider
Reallocation of flood storage at Wright Patman (New IBT)
Interim Upper Sabine Basin
Share of Additional Discharges to Lewisville Lake
Ray Hubbard Exchange
Grapevine Lake Exchange
Additional Chapman Lake (Sulphur Springs)
New Well(s) in Carrizo-Wilcox Aquifer
New Well(s) in Trinity Aquifer
New Well(s) in Woodbine Aquifer
New Well(s) in Nacatoch Aquifer
Lake Ralph Hall Supply
Development of New Supplies:
Marvin Nichols Reservoir 328' MSL (New IBT)
George Parkhouse North Lake (New IBT)
George Parkhouse South Lake (New IBT)
Lake Columbia (New IBT)
Tehuacana Reservoir
Neches Run-of-River Diversions (IBT)
Red River Off Channel Reservoir (New IBT)
Reallocation/Management of Supplies:
Expansion of Treatment and Delivery System
Conjunctive Use:
Conjunctive Use of Ground & Surface Water
Aquifer Storage and Recovery
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:
Fannin County Water Supply Project
Collin-Grayson Municipal Alliance
GTUA Regional Water System
Tarrant County Water Supply Project
Grayson County Water Supply Project
New Parker County Regional Water District (Brazon Basin)

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POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES
New Parker County Regional Water District (Trinity Basin)
New Wise County Regional Water District
Voluntary Transfer of Water (Incl. Regional Water Banks, Sales, Leases, Options, Subordination Agreements, and Financing Agreements):
Emergency Transfer of Water:
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality:
System Operation
Desalination:
Desalination Plant
Supplies From the Gulf of Mexico with Desalination
Desalination Plant - Grayson County WUGs, Sherman, Denison
Lake Texoma Desalination

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Attachment F-2

Potentially Feasible Water Management Strategies for Wholesale Water Providers

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Table F.2
Potentially Feasible Water Management Strategies for Major Water Providers and Regional Wholesale Water Providers

Water Management Strategies	DWU	TRWD	NTMWD	TRA	UTRWD	Fort Worth	GTUA	Corsicana
Conservation*:	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management:								
Implementation of Drought Contingency Plans/Measures as needed	PF	PF	PF	PF	PF	PF	PF	PF
Reuse:								
Elm Fork Swap	PF							
Main Stem Balancing Reservoir	PF							
Direct Reuse					PF			
Indirect Reuse					PF			
Marty Leonard Wetlands		PF						
Mary's Creek Reuse		PF				PF		
Alliance Direct Reuse						PF		
Village Creek WRF Direct Reuse						PF		
Reuse from TRA Central Regional RWS		PF						
Lake Ralph Hall Indirect Reuse					PF			
Expanded Wetland Reuse			PF					
Additional Lavon Watershed Reuse			PF					
Additional Richland Chambers Reuse		PF						
Sabine Creek WWTP Reuse			PF					
Tarrant and Denton County Direct Reuse				PF		PF		
Existing Supplies:								
Expansion of Treatment and Delivery System	PF	PF	PF		PF	PF	PF	PF
Toledo Bend	PF	PF	PF		PF			
Carrizo-Wilcox Groundwater		PF	PF		PF			
IPL Connect to Lake Palestine	PF							
IPL Connection of Existing Supplies (Richland-Chambers)		PF						
Arkansas	PF							
Oklahoma	PF	PF	PF		PF			
Add'l measure to access full Lavon yield			PF					
Lake Texoma Blending			PF		PF			
Lake O' the Pines			PF					
Purchase of Additional Supplies from current provider					PF	PF		
Renew Contract for Supplies from current provider					PF			
Reallocation of flood storage at Wright Patman (New IBT)	PF	PF	PF		PF			
Interim Upper Sabine Basin			PF					
Share of Additional Discharges to Lewisville Lake	PF							
Ray Hubbard Exchange	PF							
Grapevine Lake Exchange					PF			
Additional Chapman Lake (Sulphur Springs)					PF			
Conjunctive Use:								
Conjunctive use of Ground & Surface Water	PF							
Aquifer Storage and Recovery		PF	PF		PF			
Development of New Supplies:								
Marvin Nichols Reservoir 328' MSL (New IBT)	PF	PF	PF		PF			
George Parkhouse North Lake (New IBT)			PF		PF			
George Parkhouse South Lake (New IBT)			PF		PF			
Lake Columbia (New IBT)	PF							
Tehuacana Reservoir		PF						
Neches Run-of-River Diversions (IBT)	PF							
Red River Off Channel Reservoir (New IBT)	PF				PF			
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:**								
Fannin County Water Supply Project			PF					
Collin-Grayson Municipal Alliance							PF	
GTUA Regional Water System							PF	

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Table F.2
Potentially Feasible Water Management Strategies for Major Water Providers and Regional Wholesale Water Providers

Water Management Strategies	DWU	TRWD	NTMWD	TRA	UTRWD	Fort Worth	GTUA	Corsicana
Tarrant County Water Supply Project				PF				
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements):								
Emergency Transfer of Water (Section 11.139):								
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality								
System Operation								
Desalination:								
Supplies from the Gulf of Mexico with Desalination								
Lake Texoma Desalination	PF		PF					

Blanks Indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered)
PF = considered 'potentially feasible' and therefore evaluated

* Note: Specific Conservation Strategies are listed in a separate analysis.
** Note: All strategies for wholesale water suppliers could be considered as "Development of Regional Water Supply"
IBT denotes a Permitted Interbasin Transfer.
New IBT denotes an Interbasin Transfer requiring a new IBT permit.

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Table F.3

Potentially Feasible Water Management Strategies for Wholesale Water Providers

Water Management Strategies	Arlington	Athens MWA	DCPCMUD	Denison	Denton	Ennis	Forney	Gainesville	Garland	Grand Prairie	Mansfield	Midlothian
Conservation*:	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management:												
Implementation of Drought Contingency Plans as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse:												
Indirect Reuse		PF										PF
Additional Indirect Reuse with Storage					PF							
Expand Direct Reuse								PF				
Reallocation/Management of Existing Supplies:												
Expansion of Treatment and Delivery System	PF	PF		PF	PF	PF	PF	PF		PF	PF	PF
Conjunctive Use:												
Aquifer Storage and Recovery					PF							
Acquisition of Available Existing Supplies:												
Purchase of Additional Supplies from current provider					PF	PF	PF		PF	PF	PF	PF
Additional Lake Texoma				PF								
Begin Purchasing from Arlington										PF		
New Well(s) in Carrizo-Wilcox		PF										
Development of New Supplies:												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:**												
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements):												
Emergency Transfer of Water (Section 11.139):												
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality												
System Operation												
Desalination:												
Desalination Plant				PF								

Blanks Indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered)
PF = considered 'potentially feasible' and therefore evaluated

* Note: Specific Conservation Strategies are listed in a separate analysis.
** Note: All strategies for wholesale water suppliers could be considered as "Development of Regional Water Supply"

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Table F.3 (Cont.)

Potentially Feasible Water Management Strategies for Wholesale Water Providers

Water Management Strategies	Mustang SUD	North Richland Hills	Princeton	Rockett SUD	Rockwall	Seagoville	Sherman	Terrell	Walnut Creek SUD	Waxahachie	Weatherford	Wise Co. WSD
Conservation*:	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management:												
Implementation of Drought Contingency Plans as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse:												
Direct Potable Reuse	PF											
Indirect Reuse							PF			PF	PF	
Reallocation/Management of Existing Supplies:												
Expansion of Treatment and Delivery System	PF	PF		PF	PF		PF	PF	PF	PF	PF	PF
Conjunctive Use:												
Acquisition of Available Existing Supplies:												
Purchase of Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
New Well(s) in Trinity Aquifer	PF											
New Well(s) in Woodbine Aquifer	PF											
Development of New Supplies:												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:**												
GTUA Regional Water System	PF											
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements):												
Emergency Transfer of Water (Section 11.139):												
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality												
System Operation												
Desalination:												
Desalination Plant							PF					

Blanks Indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered)
PF = considered 'potentially feasible' and therefore evaluated

* Note: Specific Conservation Strategies are listed in a separate analysis.
** Note: All strategies for wholesale water suppliers could be considered as "Development of Regional Water Supply"

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Attachment F-3

Potentially Feasible Water Management Strategies for Municipal WUGs by County

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Table F.4 - Potentially Feasible Water Management Strategies for Collin County Municipal WUGs*

Water Management Strategies	Allen	Anna	Bear Creek SUD	Blue Ridge	Caddo Basin SUD	Celina	Copeville SUD	County-Other	Culleoka WSC	East Fork SUD	Fairview	Farmersville	Frisco	Frognot WSC	Josephine	Lucas	McKinney	Melissa	Milligan WSC	Murphy	Nevada SUD	North Collin SUD	North Farmerswille WSC	Parker	Plano	Princeton	Prosper	Seis Lagos UD	Verona SUD	Westminster WSC	Wylie	Wylie Northeast SUD	Irrigation	Livestock	Manufacturing	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																																				
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	
Drought Management																																				
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	
Reuse												PF																								
Reallocation/ Management of Existing Supplies																																				
Expansion of Treatment and Delivery System				PF						PF			PF					PF													PF					
Desalination																																				
Conjuctive Use																																				
Acquisition of Available Existing Supplies																																				
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	PF	PF		PF	
New Well(s) in Trinity Aquifer						PF		PF																												
New Well(s) in Woodbine Aquifer						PF																														
Development of New Supplies																																				
New Surface water																																				
New Groundwater																																				
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																				
Grayson County Water Supply Project		PF				PF												PF																		
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																				
Emergency Transfer of Water (Section 11.139)																																				
Additional WMSs named to be considered by rule**																																				
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																																				
Interbasin Transfer																																				
Aquifier Storage and Recovery																																				

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
*If a WUG is located in Multiple Counties, it is only shown on the County in which the majority of the WUG is located.
**Region C does not consider the following WMSs to be potentially feasible for Region C WUGs: brush control; precipitation enhancement; cancellation of water rights; and rainwater harvesting. Region C supports rainwater harvesting on an individual basis but does not considered it to be a strategy that is feasible for a water provider to implement.

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Table F.5 - Potentially Feasible Water Management Strategies for Cooke County Municipal WUGs*

Water Management Strategies	Callisburg WSC	County-Other	Lake Kiowa SUD	Lindsay	Mountain Springs WSC	Muenster	Woodbine WSC	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE												
Conservation	PF	PF	PF	PF	PF	PF	PF	PF				
Drought Management												
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF				
Reuse												
Reallocation/ Management of Existing Supplies												
Expansion of Treatment and Delivery System						PF						
Desalination												
Conjuctive Use												
Acquisition of Available Existing Supplies												
Additional Supplies from current provider		PF		PF	PF			PF		PF		
Begin Purchasing Water from Gainesville						PF						
Development of New Supplies												
New Surface water												
New Groundwater												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities												
Grayson County Water Supply Project							PF					
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)												
Emergency Transfer of Water (Section 11.139)												
Additional WMSs named to be considered by rule**												
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality												
Interbasin Transfer												
Aquifier Storage and Recovery												
Other												
Lake Muenster						PF						

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated

*If a WUG is located in Multiple Counties, it is only shown on the County in which the majority of the WUG is located.

**Region C does not consider the following WMSs to be potentially feasible for Region C WUGs: brush control; precipitation enhancement; cancellation of water rights; and rainwater harvesting. Region C supports rainwater harvesting on an individual basis but does not considered it to be a strategy that is feasible for a water provider to implement.

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Table F.6 - Potentially Feasible Water Management Strategies for Dallas County Municipal WUGs*

Water Management Strategies	Addison	Balch Springs	Cedar Hill	Cockrell Hill	Coppell	County-Other	DeSoto	Duncanville	Farmers Branch	Glenn Heights	Highland Park	Hutchins	Irving	Lancaster	Lancaster MUD 1	Mesquite	Richardson	Rowlett	Sachse	Sunnyvale	University Park	Wilmer	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																											
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Drought Management																											
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Reuse																											
Direct Reuse													PF														
Main Stem Balancing Reservoir													PF														
TCWSP Supply with Reuse Swap													PF														
TRA Central Reuse Project													PF														
Reallocation/ Management of Existing Supplies																											
Expansion of Treatment and Delivery System																	PF		PF		PF						
Desalination																											
Conjuctive Use																											
Acquisition of Available Existing Supplies																											
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF		PF			PF		PF
Reallocation of flood storage at Wright Patman (New IBT)													PF														
Oklahoma													PF														
Additional Lake Chapman Supplies from Sulphur Springs													PF														
Development of New Supplies																											
New Surface water																											
Marvin Nichols Reservoir													PF														
New Groundwater																											
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																											
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																											
Emergency Transfer of Water (Section 11.139)																											
Additional WMSs named to be considered by rule**																											
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																											
Interbasin Transfer																											
Aquifier Storage and Recovery																											

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)

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Table F.7 - Potentially Feasible Water Management Strategies for Denton County Municipal WUGs*

Water Management Strategies	Argyle WSC	Aubrey	Black Rock WSC	Bolivar WSC	Carrollton	Corinth	County-Other	Cross Timbers WSC	Denton County FWSD 1-A	Denton County FWSD 7	Denton County FWSD 10	Denton County FWSD 11-C	Flower Mound	Hackberry	Highland Village	Justin	Krum	Lake Cities MUA	Lewisville	Little Elm	Northlake	Paloma Creek North CRU	Paloma Creek South CRU	Pilot Point	Ponder	Providence Village WCID	Roanoke	Sanger	Terra Southwest	The Colony	Trophy Club	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																																				
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF			
Drought Management																																				
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF			
Reuse																																				
Direct Reuse from UTRWD																														PF						
Direct Reuse from local WWTPs												PF																								
Denton Creek RWS (TRA) Direct Reuse												PF																								
Reallocation/ Management of Existing Supplies																																				
Expansion of Treatment and Delivery System				PF				PF						PF					PF					PF	PF											
Desalination																																				
Conjuctive Use																																				
Acquisition of Available Existing Supplies																																				
New Well(s) in Trinity Aquifer		PF	PF	PF			PF	PF																PF				PF								
New Well(s) in Woodbine Aquifer							PF																													
Additional Supplies from current provider	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF		PF		
Begin purchasing water from Gainesville				PF																																
Begin purchasing water from UTRWD				PF																				PF												
Development of New Supplies																																				
New Surface water																																				
New Groundwater																																				
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																				
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																				
Emergency Transfer of Water (Section 11.139)																																				
Additional WMSs named to be considered by rule**																																				
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																																				
Interbasin Transfer																																				
Aquifier Storage and Recovery																																				

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
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Table F.8 - Potentially Feasible Water Management Strategies for Ellis County Municipal WUGs*

Water Management Strategies	Avalon Water Supply and Sewer Service	Buena Vista-Bethel SUD	County-Other	East Garrett WSC	Ferris	Files Valley WSC	Hilco United Services	Italy	Mountain Peak SUD	Nash Forreston WSC	Ovilla	Palmer	Red Oak	Rice Water Supply and Sewer Service	Sardis Lone Elm WSC	South Ellis County WSC	Venus	Irrigation	Livestock	Manufacturing	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																					
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	
Drought Management																					
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	
Reuse																					
Reallocation/ Management of Existing Supplies																					
Expansion of Treatment and Delivery System					PF	PF		PF			PF	PF			PF						
Desalination																					
Conjuctive Use																					
Acquisition of Available Existing Supplies																					
New Well(s) in Woodbine Aquifer																					
New Well(s) in Trinity Aquifer		PF																			
Additional Supplies from current provider	PF		PF	PF	PF	PF			PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Begin purchasing water from Waxahachie								PF													
Development of New Supplies																					
New Surface water																					
New Groundwater																					
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																					
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																					
Emergency Transfer of Water (Section 11.139)																					
Additional WMSs named to be considered by rule**																					
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																					
Interbasin Transfer																					
Aquifier Storage and Recovery																					

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
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Table F.9 - Potentially Feasible Water Management Strategies for Fannin County Municipal WUGs*

Water Management Strategies	Arledge Ridge WSC	Bois D Arc MUD	Bonham	County-Other	Delta County MUD	Desert WSC	Hickory Creek SUD	Honey Grove	Ladonia	Leonard	North Hunt SUD	Savoy	SW Fannin Co SUD	Trenton	West Leonard WSC	White Shed WSC	Wolfe City	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																						
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Drought Management																						
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Reuse																						
Reallocation/ Management of Existing Supplies																						
Expansion of Treatment and Delivery System		PF							PF	PF												
Desalination																						
Conjuctive Use																						
Acquisition of Available Existing Supplies																						
New Well(s) in Trinity Aquifer							PF		PF								PF					
New Well(s) in Woodbine Aquifer	PF													PF								
Begin Purchasing from NTMWD		PF	PF	PF				PF		PF			PF	PF								
Lake Ralph Hall Supply									PF													
Additional Supplies from current provider																						
Development of New Supplies																						
New Surface water																						
New Groundwater																						
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																						
Fannin County Water Supply Project			PF	PF				PF		PF			PF	PF								
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																						
Emergency Transfer of Water (Section 11.139)																						
Additional WMSs named to be considered by rule**																						
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																						
Interbasin Transfer																						
Aquifier Storage and Recovery																						

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
*If a WUG is located in Multiple Counties, it is only shown on the County in which the majority of the WUG is located.

**Region C does not consider the following WMSs to be potentially feasible for Region C WUGs: brush control; precipitation enhancement; cancellation of water rights; and rainwater harvesting. Region C supports rainwater harvesting on an individual basis but does not considered it to be a strategy that is feasible for a water provider to implement.

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Table F.10 - Potentially Feasible Water Management Strategies for Freestone County Municipal WUGs*

Water Management Strategies	Butler WSC	County-Other	Fairfield	Flo Community WSC	Pleasant Grove WSC	Point Enterprise WSC	South Freestone Co WSC	Southern Oaks Water Supply	Teague	Wortham	Irrigation	Livestock	Manufacturing	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE														
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			
Drought Management														
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			
Reuse														
Reallocation/ Management of Existing Supplies														
Expansion of Treatment and Delivery System			PF											
Desalination														
Conjuctive Use														
Acquisition of Available Existing Supplies														
New Well(s) in Carrizo-Wilcox Aquifer				PF										
Additional Supplies from current provider									PF					PF
Begin Purchasing from TRWD														
Development of New Supplies														
New Surface water														
New Groundwater														
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities														
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)														
Emergency Transfer of Water (Section 11.139)														
Additional WMSs named to be considered by rule**														
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality														
Interbasin Transfer														
Aquifier Storage and Recovery														

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
*If a WUG is located in Multiple Counties, it is only shown on the County in which the majority of the WUG is located.

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Table F.11 - Potentially Feasible Water Management Strategies for Grayson County Municipal WUGs*

Water Management Strategies	Bells	Collinsville	County-Other	Dorchester	Gunter	Howe	Kentucky Town WSC	Luella SUD	Northwest Grayson Co WCID1	Oak Ridge South Gale WSC	Pink Hill WSC	Pottsboro	Red River Authority of Texas	South Grayson SUD	Southmayd	Starr WSC	Trioga	Tom Bean	Two Way SUD	Van Alstyne	Whitesboro	Whitewright	Woodbine WSC	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																												
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Drought Management																												
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Reuse																												
Direct Reuse from Sherman																										PF		
Reallocation/ Management of Existing Supplies																												
Expansion of treatment and delivery system	PF					PF							PF			PF			PF		PF							
Desalination																												
Conjuctive Use																												
Acquisition of Available Existing Supplies																												
New Well(s) in Trinity Aquifer								PF												PF								
New Well(s) in Woodbine Aquifer	PF																											
Additional Supplies from current provider			PF		PF	PF				PF		PF							PF						PF		
Development of New Supplies																												
New Surface water																												
New Groundwater																												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																												
GTUA Regional Water System		PF			PF				PF									PF		PF		PF						
Collin Grayson Municipal Alliance						PF													PF							PF		
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																												
Emergency Transfer of Water (Section 11.139)																												
Additional WMSs named to be considered by rule**																												
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																												
Interbasin Transfer																												
Aquifer Storage and Recovery																												

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
*If a WUG is located in Multiple Counties, it is only shown on the County in which the majority of the WUG is located.
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Table F.12 - Potentially Feasible Water Management Strategies for Henderson County Municipal WUGs*

Water Management Strategies	B B S WSC	County-Other	Crescent Heights WSC	Dogwood Estates Water	East Cedar Creek FWSD	Eustace	Log Cabin	Malakoff	Trinidad	Virginia Hill WSC	West Cedar Cr MUD	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				
Drought Management																
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				
Reuse																
Reallocation/ Management of Existing Supplies																
Desalination																
Conjuctive Use																
Acquisition of Available Existing Supplies																
New Well(s) in Carrizo-Wilcox Aquifer												PF				
Additional Supplies from current provider		PF			PF			PF	PF		PF			PF		
Development of New Supplies																
New Surface water																
New Groundwater																
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																
Emergency Transfer of Water (Section 11.139)																
Additional WMSs named to be considered by rule**																
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																
Interbasin Transfer																
Aquifier Storage and Recovery																

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Table F.13 - Potentially Feasible Water Management Strategies for Jack County Municipal WUGs*

Water Management Strategies	County-Other	Jacksboro	Irrigation	Livestock	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE						
Conservation	PF	PF	PF			
Drought Management						
Implement Drought Contingency Plan/measures as needed	PF	PF	PF			
Reuse						
Reallocation/ Management of Existing Supplies						
Expansion of treatment and delivery system	PF					
Desalination						
Conjuctive Use						
Acquisition of Available Existing Supplies						
Purchase water from Walnut Creek SUD	PF					
Purchase water from TRWD						PF
Development of New Supplies						
New Surface water						
New Groundwater						
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities						
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)						
Emergency Transfer of Water (Section 11.139)						
Additional WMSs named to be considered by rule**						
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality						
Interbasin Transfer						
Aquifier Storage and Recovery						

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Table F.14 - Potentially Feasible Water Management Strategies for Kaufman County Municipal WUGs*

Water Management Strategies	Ables Springs WSC	Becker Jiba WSC	College Mound WSC	Combine WSC	County-Other	Crandall	Elmo WSC	Forney Lake WSC	Gastonia Scurry SUD	High Point WSC	Kaufman	Kaufman Co Dev Dist 1	Kaufman Co MUD 11	Kaufman Co MUD 14	Kemp	Mabank	MacBee SUD	Markout WSC	North Kaufman WSC	Poetry WSC	Rose Hill SUD	Talty SUD	West Cedar Ck MUD	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																												
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				PF	
Drought Management																												
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				PF	
Reuse																												
TRA Reuse for SEP																												
Reallocation/ Management of Existing Supplies																												
Expansion of Treatment and Delivery System			PF		PF											PF												
Desalination																												
Conjuctive Use																												
Acquisition of Available Existing Supplies																												
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF
New Well(s) in Nacatoch Aquifer																										PF		
Development of New Supplies																												
New Surface water																												
New Groundwater																												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																												
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																												
Emergency Transfer of Water (Section 11.139)																												
Additional WMSs named to be considered by rule**																												
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																												
Interbasin Transfer																												
Aquifier Storage and Recovery																												

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Table F.15 - Potentially Feasible Water Management Strategies for Navarro County Municipal WUGs*

Water Management Strategies	B and B WSC	Blooming Grove	Brandon Irene WSC	Chatfield WSC	Corbet WSC	County-Other	Dawson	Kerens	M E N WSC	Navarro Mills WSC	Post Oak SUD	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	PF	
Drought Management																
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	PF	
Reuse																
Reallocation/ Management of Existing Supplies																
Expansion of Treatment and Delivery System									PF							
Desalination																
Conjuctive Use																
Acquisition of Available Existing Supplies																
Additional Supplies from current provider	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF			PF		
Development of New Supplies																
New Surface water																
New Groundwater																
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																
Emergency Transfer of Water (Section 11.139)																
Additional WMSs named to be considered by rule**																
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																
Interbasin Transfer																
Aquifier Storage and Recovery																

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Table F.16 - Potentially Feasible Water Management Strategies for Parker County Municipal WUGs*

Water Management Strategies	Aledo	Annetta	County-Other	Horseshoe Bend Water System	Hudson Oaks	Mineral Wells	North Rural WSC	Parker County SUD	Reno	Santo SUD	Springtown	Willow Park	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																	
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Drought Management																	
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Reuse																	
Reallocation/ Management of Existing Supplies																	
Expansion of Treatment and Delivery System	PF	PF						PF			PF	PF					
Desalination																	
Conjuctive Use																	
Acquisition of Available Existing Supplies																	
New Well(s) in Trinity Aquifer		PF	PF														
Additional Supplies from current provider	PF				PF	PF		PF	PF	PF	PF	PF			PF		
Begin Purchasing from Weatherford (TRWD)		PF	PF														
Begin Purchasing from Fort Worth (TRWD)												PF					
Development of New Supplies																	
New Surface water																	
New Groundwater																	
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																	
New Parker County Regional Water District (Brazos Basin)			PF														
New Parker County Regional Water District (Trinity Basin)			PF														
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																	
Emergency Transfer of Water (Section 11.139)																	
Additional WMSs named to be considered by rule**																	
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																	
Interbasin Transfer																	
Aquifier Storage and Recovery																	

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**Region C does not consider the following WMSs to be potentially feasible for Region C WUGs: brush control; precipitation enhancement; cancellation of water rights; and rainwater

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Table F.17 - Potentially Feasible Water Management Strategies for Rockwall County Municipal WUGs*

Water Management Strategies	Blackland WSC	Cash SUD	County-Other	Fate	Heath	Mount Zion WSC	R C H WSC	Royse City	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE													
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Drought Management													
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Reuse													
Reallocation/ Management of Existing Supplies													
Expansion of Treatment and Delivery System	PF	PF		PF									
Desalination													
Conjuctive Use													
Acquisition of Available Existing Supplies													
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Development of New Supplies													
New Surface water													
New Groundwater													
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities													
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)													
Emergency Transfer of Water (Section 11.139)													
Additional WMSs named to be considered by rule**													
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality													
Interbasin Transfer													
Aquifier Storage and Recovery													

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Table F.18 - Potentially Feasible Water Management Strategies for Tarrant County Municipal WUGs*

Water Management Strategies	Azle	Bedford	Benbrook	Bethesda WSC	Blue Mound	Burleson	Colleyville	Community WSC	County-Other	Crowley	Dalworth Gardens	Edgecliff	Euless	Everman	Forest Hill	Grapevine	Haltom City	Haslet	Hurst	Johnson Co SUD	Keller	Kennedale	Lake Worth	Lakeside	Pantego	Pelican Bay	Richland Hills	River Oaks	Saginaw	Sansom Park	Southlake	Watauga	Westlake	Westover Hills	Westworth Village	White Settlement	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE																																								
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				
Drought Management																																								
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF				
Reuse																																								
Purchase Reuse water from DCPCMUD (Lake Grapevine)															PF																										
Reallocation/ Management of Existing Supplies																																								
Expansion of Treatment and Delivery System	PF		PF			PF				PF											PF			PF	PF					PF	PF									
Desalination																																								
Conjuctive Use																																								
Acquisition of Available Existing Supplies																																								
New Well(s) in Trinity Aquifer																									PF																
Additional Supplies from current provider	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF		PF		PF
Begin Purchasing from Arlington (TRWD)																								PF																
Begin Purchasing from Azle (Ft Worth)																									PF																
Begin Purchasing from Fort Worth (TRWD)																								PF																
Development of New Supplies																																								
New Surface water																																								
New Groundwater																																								
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																								
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																								
Emergency Transfer of Water (Section 11.139)																																								
Additional WMSs named to be considered by rule**																																								
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality																																								
Interbasin Transfer																																								
Aquifier Storage and Recovery																																								
Other																																								

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Table F.19 - Potentially Feasible Water Management Strategies for Wise County Municipal WUGs*

Water Management Strategies	Alvord	Boyd	Bridgeport	Chico	County-Other	Decatur	Newark	Rhome	Runaway Bay	West Wise SUD	Irrigation	Livestock	Manufacturing	Mining	SEP
WMSs NAMED TO BE CONSIDERED BY STATUTE															
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Drought Management															
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Reuse															
Reallocation/ Management of Existing Supplies															
Expansion of Treatment and Delivery System	PF			PF		PF	PF		PF	PF					
Desalination															
Conjuctive Use															
Acquisition of Available Existing Supplies															
Additional Supplies from current provider		PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF		PF
New Well(s) in Trinity Aquifer					PF										
Begin Purchasing from Rhome															
Begin Purchasing from West Wise SUD (TRWD)	PF														
Development of New Supplies															
New Surface water															
New Groundwater															
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities															
New Wise County Regional Water Provider (through TRWD)					PF										
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)															
Emergency Transfer of Water (Section 11.139)															
Additional WMSs named to be considered by rule**															
System optimazation, reallocation of reservoir storage, contracts, water marketing, enhancement of yield, improvement of water quality															
Interbasin Transfer															
Aquifer Storage and Recovery															

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Attachment F-4

Example of Water Management Survey Email to WUGs

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«WUG_Name»,

The Texas Water Development Board (TWDB), which is responsible for developing the State Water Plan, has begun a new cycle of regional/state water planning. I am part of the consultant team developing the *2026 Region C Water Plan*. Region C includes a 16 county-area in and around the DFW Metroplex.

Region C consultants are updating the currently available water supplies (existing supplies) and water management strategies (planned future water supplies) for each entity in Region C. Water management strategies are planned water supply projects to meet a water supply need, and include projects like new reservoirs, new wells, new pipelines or pump stations, reuse projects, etc. *Note: Only water management strategies that are included in the Regional Water Plans are eligible for TWDB SWIFT financing.*

Your input allows us to generate a more accurate Region C Plan that reflects the most current information available. Please help us by replying to this 6-question survey by filling in your entity's information in the tables below. **Thank you** for your time and participation. If you have any questions, please don't hesitate to contact me (contact information below). **Please respond by June 21st, 2024**.

Note: **If your entity is a **NEW** water user group (WUG), the 2021 column in the tables below will be blank. Please fill in the grey cells for 2026 only.*

1) Do you agree with the Currently Available Water Supply sources listed in the table below? If not, please provide changes in the grey blanks provided.

*2021 Region C Water Plan**	*2026 Region C Water Plan Revisions*
Currently Available Water Supplies	**Currently Available Water Supplies**
«Supply_1»	
«Supply_2»	
«Supply_3»	
«Supply_4»	

2) Do you agree with the Water Management Strategies listed in the table below? If not, please provide changes in the grey blanks provided.

*2021 Region C Water Plan**	*2026 Region C Water Plan Revisions*
Water Management Strategies	**Water Management Strategies**
«WMS_1»	
«WMS_2»	
«WMS_3»	
«WMS_4»	
«WMS_5»	

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3) Are there any Water Management Strategies listed under question #2 above that you are actively in the process of implementing or have already implemented (permitting, design, construction, or completed)? If yes, please list them in the table below.

Name of Water Management Strategy Currently Being Implemented	Stage of Implementation	Expected Date of Completion	Additional Comments (phasing, concerns, etc.)

4) Do you have current contracts to purchase water from a water supplier? Please list the water supplier and the contract amount (including units) in the table below.

Supplier Name	Contract Amount (include units)

5) Please tell us the capacity of all infrastructure associated with delivering your water supply to your distribution system *(do not include any items within your distribution system)*. This would include groundwater wells, supply pipelines and pump stations, and water treatment plants. See examples below. Please list each item separately. *

* Infrastructure limitations are needed to determine currently available supply.

Source of Supply and/or description of Infrastructure	Peak Operating Capacity (include units)	Groundwater Wells Only			Additional Comments (water quality concerns, plans to discontinue use in the next five years, etc.)
		Average Annual Supply (include units)	Aquifer (Trinity, Carrizo-Wilcox, etc.)	County in which well is located	
EXAMPLES:					
Groundwater well #1	*200 gpm*	*52 M gal/yr*	*Trinity*	*Tarrant*	*High salinity*
Groundwater well #2	*300 gpm*	*79 M gal/yr*	*Trinity*	*Denton*	*Plan to stop using well in 2025.*
24" Delivery line from Texas Water District	*3 MGD*				
PS #5 at Tx WD delivery point	*6 MGD*				
Clean Water Treatment Plant	*10 MGD*				
Enter Your Data Below:					

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6) Does your entity currently have an emergency interconnection to an alternate source of supply (or do you have plans to develop an emergency interconnection)? If so, please provide: the name of the entity the interconnection is with, the maximum capacity/volume that can be supplied, and a general description of the facility and location.

[Enter Text]

Thanks,

Holt Chambers | Water Resource Planning | Freese and Nichols, Inc. | 817-415-2842 | Holt.Chambers@freese.com | www.freese.com

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Appendix G

Water Management Strategy Evaluation

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APPENDIX G WATER MANAGEMENT STRATEGY EVALUATION

SECTION OUTLINE	
Section G.1	Water Management Strategy Evaluation Process
Section G.2	General Water Management Strategy Technical Memorandums
Section G.3	Joint Major Water Management Strategy Technical Memorandums
Section G.4	DWU Major Water Management Strategy Technical Memorandums
Section G.5	NTMWD Major Water Management Strategy Technical Memorandums
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Section G.8	Other Major Water Management Strategy Technical Memorandums

The information contained in this appendix details the strategy evaluation for water management strategies in Region C.

In accordance with TWDB rules and guidelines, the Region C Water Planning Group has adopted a standard procedure for providing an equitable comparison of potential water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning. The overall strategy evaluations can be found in **Table G.3** and **Table G.4.** Technical memorandums on each strategy can be found afterwards.

G.1 Water Management Strategy Evaluation Process

All strategies are compared based upon the following categories:

- Quantity
- Reliability
- Cost
- Environmental Factors
- Agricultural Resources/Rural Areas
- Other Natural Resources
- Key Water Quality Parameters
- Third Party Social & Economic Factors

Each category is quantitatively assessed. If quantitative values were not available, a ranking from 1 to 5 was assigned. **Table G.1** shows the correlation between the category and the ranking of the non-environmental categories where quantitative values were not available. (The Environmental Factors are discussed in the next section.)

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TABLE G.1 EVALUATION MATRIX CATEGORY RANKING CORRELATION

RANK	CERTAINTY	REMAINING STRATEGY IMPACTS [a]
1	Low	High
2	Low to Medium	Medium High
3	Medium	Medium
4	Medium to High	Medium Low
5	High	Low or None

[a]*Includes impacts on agricultural resources, other natural resources, key water quality parameters, and third party impacts.*

All recommended projects are considered 100 percent reliable since they must meet the TWDB reliability standards for regional planning: firm yield for surface water and MAG limitations for groundwater. However, there are varying levels of uncertainty for different projects, such as competition for water for groundwater projects and reliance on adoption rates for conservation. Therefore, "certainty" is considered in the evaluations of the water management strategies.

Impacts on Agricultural Resources are quantified based on the permanent impacts to water supplies to irrigation users or direct impacts to irrigated acreage. Projects with only temporary impacts, such as pipeline projects, would be classified as low impacts. Specific assumptions include:

- If the location of the strategy is known and data is available, actual impacts on agricultural lands will be used.
- If a strategy impacts more than 5,000 acres of agricultural land, the impacts are classified as "high". If a strategy impacts less than 1,000 acres of agricultural lands, the impacts are classified as "low".
- If actual impact data was not available for a new reservoir, impacts of medium high were assumed.

More detailed information regarding the scoring for key water quality parameters is included in Chapter 6. Key water quality parameters were scored according to the "remaining strategy impacts" ranking listed in **Table G.1**.

In addition to the required evaluation categories, Region C considered whether the strategy was consistent with the provider's water supply plan. This could be verified with an independent water supply plan developed specifically for the provider or direct correspondence from the provider during the development of the Region C Water Plan. Strategies that are considered but not recommended in a provider's plan are considered consistent with the Region C Water Plan. Only those strategies not requested by the provider or considered in the providers' plans are shown as not consistent.

G.1.1 Environmental Matrix

The Environmental Matrix (**Table G.4**) is used to determine the score of the 'Environmental Factors' category on the Evaluation Matrix (**Table G.3**).

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The Environmental Matrix (**Table G.4**) takes into consideration the following categories:

- Total Acres Impacted
- Total Wetland Acres Impacted
- Environmental Water Needs
- Habitat
- Threatened and Endangered Species
- Cultural Resources
- Bays & Estuaries

Each category is quantitatively assessed. If quantitative values were not available, a ranking from 1 to 5 was assigned. **Table G.2** shows the correlation between the rankings assigned within each category.

TABLE G.2 ENVIRONMENTAL MATRIX CATEGORY RANKING CORRELATION

RANK	HABITAT	ALL REMAINING CATEGORIES
1	Greater than 30,000 Acres	High Impact
2	20,000-30,000 Acres	Medium High Impact
3	7,000-20,000 Acres	Medium Impact
4	5,000-7,000 Acres	Medium Low Impact
5	0-5,000 Acres (or 'varies')	Low Impact or n/a

G.1.2 Acres Impacted

Acres Impacted refers to the total amount of area that will be impacted due to the implementation of a strategy.

The following conservative assumptions were made (unless more detailed information was available):

- Each well or storage tank will impact approximately 2 acres of land.
- The acres impacted by pipelines is equivalent to the right of way easements required.
- Reservoirs will impact an area equal to their surface area.
- A conventional water treatment plant will impact 5 acres.
- Conservation strategies will have no impact on acres.

G.1.3 Wetland Acres Impacted

Wetland Acres refers to how many acres that are classified as wetlands are impacted by implementation of the strategy.

The following conservative assumptions were made (unless more detailed information was available):

- For pipelines and groundwater wells, it was assumed wetlands would be avoided as feasible and would therefore have low impacts.

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G.1.4 Environmental Water Needs

Environmental Water Needs refers to how the strategy will impact the area's overall environmental water needs. Water is vital to the environmental health of a region, and so it is important to take into account how strategies will impact the amount of water that will be available to the environment.

The following conservative assumptions were made (unless more detailed information was available):

- The majority of the strategies will have a low impact on environmental water needs.
- Reuse will have a medium impact if the effluent was previously used for irrigation or discharged back into the water system. This will decrease the overall amount of water that is available to the environment by diverting the effluent and using it for another purpose.

G.1.5 Habitat

Habitat refers to how the strategy will impact the habitat of the local area. The more area that is impacted due to the implementation of the strategy, the more the area's habitat will be disrupted. The ranges used for this ranking are in **Table G.2**, unless more detailed information is available.

G.1.6 Threatened and Endangered Species

Threatened and endangered species refers to how the strategy would potentially impact those species in the area once implemented.

The following conservative assumptions were made (unless more detailed information was available):

- Only applicable to strategies implementing infrastructure.
- Rankings were based on the number of threatened and endangered species located within the county. This amount was found using the Texas Parks and Wildlife Database located at http://tpwd.texas.gov/gis/rtest/ and the U.S. Fish and Wildlife Service Database located at *http://www.fws.gov/endangered/*
- This ranking only includes threatened and endangered species as defined in the TWDB guidelines and does not include species without official protection such as those proposed for listing or species that are considered rare or otherwise of special concern.

G.1.7 Cultural Resources

Cultural Resources refers to how the strategy will impact cultural resources located within the area. Cultural resources are defined as the collective evidence of the past activities and accomplishments of people. Locations, buildings and features with scientific, cultural or historic value are considered to be cultural resources.

The following conservative assumptions were made (unless more detailed information was available):

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- Only applicable to strategies implementing infrastructure.
- All strategies requiring only a pipeline or groundwater wells will have low impacts.
- New reservoirs will have medium high impacts.

G.1.8 Bays and Estuaries

Region C is located too far away from any bays or estuaries to have a quantifiable impact. It was assumed that the only strategies that could have potential impacts to bays and estuaries are the Gulf of Mexico and Toledo Bend strategies. These were given a ranking of medium low impacts.

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TABLE G.3 EVALUATION MATRIX

Strategy	Entity	Potentially Feasible, Recommended, or Alternative Strategy	County Used	Basin Used	Quantity (Ac-Ft/Yr)	Certainty	Cost $/kgal	Impacts of Strategy on:					Consistency		Implementation Issues	Comments
								Agricultural Resources/ Rural Areas (Acres)	Agricultural Resources/ Rural Areas Score	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors	Suppliers	Other Regions		
Conservation - General	Multiple	Recommended	Multiple	Multiple	Varies	4	Varies	Low	5	5	5	5	Yes	N/A		
Dredging - General	Multiple	Potentially Feasible	Multiple	Multiple	7,200	3	Varies	Low	5	5	5	5	N/A	N/A	Requires Section404 Permit and DPES permit for discharging materials	
Groundwater - General	Multiple	Varies	Multiple	Multiple	Varies	Varies	Varies	Low	5	5	5	5	Yes	N/A		
Increase Delivery Infrastructure - General	Multiple	Varies	Multiple	Multiple	0[a]	N/A	Varies	Low	5	5	5	5	Yes	N/A		
Indirect Reuse - General	Multiple	Varies	Multiple	Multiple	Varies	5	Varies	Low	5	5	4	5	Yes	N/A		
Direct Reuse - General	Multiple	Varies	Multiple	Multiple	Varies	5	Varies	Low	5	5	5	5	Yes	N/A		
Aquifer Storage and Recovery - Large	Multiple	Potentially Feasible	Multiple	Multiple	Varies	4	Varies	Low	5	4	5	5	No	N/A	Unknown technical feasibility in Region C	
Aquifer Storage and Recovery - Small	Multiple	Varies	Multiple	Multiple	Varies	4	Varies	Low	5	4	5	5	Yes	N/A		
Water Treatment Plants - General	Multiple	Varies	Multiple	Multiple	0[a]	N/A	Varies	Low	5	5	5	5	Yes	N/A		
Gulf of Mexico - Desalination	Multiple	Potentially Feasible	Multiple	Multiple	200,000	4	$21.42	Low	5	4	4	4	No	N/A	Technology is still developing for this application at this scale. May require state water right permit and IBT.	Slightly lower reliability due to long transmission. Strategy was costed to central location. Supply is treated water.
George Parkhouse South	NTWMD and/or UTRWD	Alternative	Multiple	Multiple	114,960	4	$4.19	16,120[b]	1	3	4	3	Yes	Not inconsistent	Requires new water rights permit and IBT.	Yield impactsed by development of other strategies in Sulphur Basin
George Parkhouse North	NTMWD or UTRWD	Alternative	Multiple	Multiple	94,460	4	$3.73	11,344[b]	1	3	4	3	Yes	Not inconsistent	Requires new water rights permit and IBT.	Yield impactsed by development of other strategies in Sulphur Basin
Integrated Pipeline (IPL)	TRWD and DWU	Recommended	Multiple	Trinity	N/A	N/A	N/A	Low	5	5	5	5	Yes	N/A		Pipeline delivers existing supplies.
Marvin Nichols Reservoir (328')	NTMWD, TRWD, UTRWD, DWU and/or Irving	Recommended (Alternative for DWU and Irving)	Multiple	Multiple	320,000	4	$4.62	30,170[c]	1	2	4	1	Yes	Not inconsistent (does not use same water)	Requires new water rights permit and IBT. Known public opposition.	
Wright Patman Reallocation (235')	NTMWD, TRWD, UTRWD, DWU and/or Irving	Recommended (Alternative for UTRWD, DWU, and Irving)	Multiple	Multiple	125,000	3	$7.59	194	5	4	4	3	Yes	Not inconsistent	Requires Congressional approval	Slight impacts to White Oak Mitigation area
Lake Texoma Blending	NTMWD	Recommended	Multiple	Multiple	111,519	5	$2.46 - $2.63	Low	5	5	3	5	Yes	N/A	Requires fresh wate rsource for blending	
Lake Texoma Blending	UTRWD	Alternative	Multiple	Trinity	25,000	4	$6.55	Low	5	3	3	4	Yes	N/A	Requires IBT, state water right, Congressional authorization, and contract with USACE.	Requires reallocation of storage in Lake Texoma
Lake Texoma Desalination	DWU	Alternative	Multiple	Trinity	145,730	3	$9.06	Low	5	3	3	3	Yes	N/A	Requires IBT, state water right, Congressional authorization, and contract with USACE.	Requires reallocation of storage in Lake Texoma. Delivers treated water.
Lake Texoma Desalination	NTMWD	Alternative	Multiple	Multiple	33,630	5	$11.51	Low	5	3	3	4	Yes	N/A		Delivers treated water.
Additional Measures to Access Full Lake Lavon Yield	NTMWD	Recommended	Multiple	Multiple	12,667	5	$3.76	Low	5	3	4	4	Yes	N/A		
Aquifer Storage and Recovery	TRWD	Recommended	Multiple	Trinity	5,000	4	$0.98	Low	5	3	4	4	Yes	N/A		
Carrizo-Wilcox Aquifer	NTMWD	Alternative	Multiple	Multiple	42,000	4	$6.23	Low	5	2	4	3	Yes	Not inconsistent	Requires coordination with local groundwater districts. Competing uses for water.	Supplies are limited to MAGs
Carrizo-Wilcox Aquifer	DWU	Recommended	Multiple	Trinity	27,800	4	$6.05	Low	5	2	4	3	Yes	Not inconsistent	Requires coordination with local groundwater districts. Competing uses for water.	Supplies are limited to MAGs, but there are no GCDs in location of groundwater
Carrizo-Wilcox Aquifer	TRWD	Recommended	Multiple	Trinity	26,800	4	$3.75	Low	5	2	4	3	Yes	Not inconsistent	Requires coordination with local groundwater districts. Competing uses for water.	Supplies are limited to MAGs
Marty Leonard Wetland Reuse	TRWD	Recommended	Multiple	Trinity	48,455	5	$2.00	Low	5	5	3	5	Yes	N/A	TRWD has permit for reuse.	
Lake of the Pines (Cypress Basin Supplies)	NTMWD	Recommended	Multiple	Multiple	78,590	4	$4.06	Low	5	5	4	4	Yes	Not inconsistent	Requires IBT, renegotiating existing contracts, and contract with NETMWD.	
Lake Columbia	DWU	Alternate	Multiple	Trinity	53,808	4	$3.30	135	5	3	3	3	Yes	Yes	Requires contract with ANRA and IBT.	
Connect IPL to Bachman (Lake Palestine)	DWU	Recommended	Multiple	Trinity	95,086	5	$1.21	Low	5	5	3	4	Yes	Yes	DWU has IBT permit.	
Lake Ralph Hall Reuse	UTRWD	Recommended	Multiple	Trinity	20,204	5	$4.11	Low	5	4	4	4	Yes	N/A	Requires new water right and IBT.	
Lake Tehuacana	TRWD	Recommended	Multiple	Trinity	22,330	4	$3.32	4,128	2	3	4	3	Yes	N/A	Requires new water rights permit.	
Main Stem Balancing Reservoir	DWU	Recommended	Multiple	Trinity	114,342	5	$3.71	3,500	2	4	4	4	Yes	N/A		
Expanded Wetland Reuse	NTMWD	Recommended	Multiple	Multiple	0	5	$5.05	Low	5	5	3	5	Yes	N/A	Requires water right permit amendment.	
Neches Run-of-River Diversions	DWU	Recommended	Multiple	Trinity	53,808	4	$3.96	Low	5	4	4	4	Yes	Not inconsistent	Requires new water rights permit and IBT.	
Red River Off-Channel Reservoir	DWU	Alternative	Multiple	Trinity	114,000	4	$5.75	Medium High	2	5	4	4	Yes	N/A		
Red River Off-Channel Reservoir	DWU and UTRWD	Alternative	Multiple	Trinity	129,000	4	$5.75	Medium High	2	5	4	4	Yes	N/A		
Toledo Bend	DWU, NTMWD TRWD, and UTRWD	Recommended (Alternative for DWU)	Multiple	Multiple	350,000 (Alt) 250,000 (Rec)	5	$8.62	Low	4	4	4	4	Yes	Yes	Requires IBT and agreements with multiple users.	Cost shown is total cost for all participants.
GTUA Regional Water System – Phase I	GTUA	Recommended	Multiple	Red	14,150	4	$15.35	Low	5	4	3	5	Yes	N/A		
GTUA Regional Water System – Phase II	GTUA	Recommended	Multiple	Red	23,800	4	$12.45	Low	5	5	3	5	Yes	N/A		
Parker County Regional Water Provider	New Water Provider	Recommended	Parker	Trinity	22,000	4	$7.40	Low	5	4	5	4	Yes	N/A	Requires creation of new district	

TABLE G.3 EVALUATION MATRIX

Strategy	Entity	Potentially Feasible, Recommended, or Alternative Strategy	County Used	Basin Used	Quantity (Ac-Ft/Yr)	Certainty	Cost $/kgal	Impacts of Strategy on:					Consistency		Implementation Issues	Comments
								Agricultural Resources/ Rural Areas (Acres)	Agricultural Resources/ Rural Areas Score	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors	Suppliers	Other Regions		
Parker County Regional Water Provider	New Water Provider	Alternate	Parker	Brazos	5,259	3	$17.93	Low	5	4	3	4	Yes	N/A	Requires creation of new district	Requires new source of water. No provider has agreed to supplying water.
Wise County Regional Water Provider	New Regional Water Provider	Recommended	Wise	Trinity	27,463	5	$6.92	Low	5	4	5	4	Yes	N/A	Requires creation of new district	
Irving Reuse - Indirect	Irving	Alternative	Dallas	Trinity	27,539	3	$0.67 - $3.94	Low	5	5	4	4	Yes	N/A	Requires agreements with other providers	
Irving Reuse - Direct	Irving	Alternative	Dallas	Trinity	19,277	5	$9.79	Low	5	5	3	5	Yes	N/A	Requires discharge permits and TCEQ approval for DPR	
Reallocation of Storage in Lake Texoma	GTUA, DWU, UTRWD	Recommended, Alt, Alt	Multiple	Multiple	Varies	3	Varies	Low	5	4	3	3	Yes	N/A	Requires USACE approval, contract with USACE and water right	Quantity is below the threshold for Congressional approval
Sabine River Off-Channel Reservoir	DWU	Recommended	Multiple	Trinity	73,986	4	$3.08	800	4	4	4	5	Yes	Not inconsistent		
Main Stem Pump Station - DWU, NTMWD	DWU, NTMWD	Recommended for DWU	Multiple	Trinity	12,638	5	TBD	Low	5	5	4	5	Yes	N/A		
Arkansas (Little River Millwood Lake)	DWU	Alternate	Multiple	Trinity	300,000	3	$6.29	Low	5	5	4	4	Yes	N/A	Requires agreement with Arkansas and/or modification to Red River Compact	Reliability is moderate due to the uncertainity of securing long-term agreements
Louisiana (Toldeo Bend, SRA-Louisiana	DWU	Alternate	Multiple	Trinity	200,000	3	$9.10	Low	5	5	4	4	Yes	N/A	Requires agreement with SRA- LA and/or modification to Sabine River Compact	
Oklahoma (Kiamachi River)	DWU	Alternate	Multiple	Trinity	300,000	3	$3.69	Low	5	5	4	4	Yes	N/A	Oklahoma has moratorium for export of water out of state.	
Oklahoma	NTMWD	Alternate	Multiple	Multiple	50,000	3	$4.39	Low	5	5	4	4	Yes	N/A		
Oklahoma (Hugo to Lake Lewisville)	UTRWD	Alternative	Multiple	Trinity	55,000	3	$2.77	Low	5	5	4	4	Yes	N/A		
Oklahoma (Lake Texoma)	TRWD	Alternative	Multiple	Trinity	50,000	3	$3.82	Low	5	5	4	4	Yes	N/A		
Interim Upper Sabine Basin	NTMWD	Recommended	Multiple	Multiple	0	5	$0.00	Low	5	5	5	4	Yes	Yes		
Fannin County Water Supply System	NTMWD	Recommended	Fannin	Multiple	10,649	5	$12.61	Low	5	5	5	5	Yes	N/A		
Reuse from Fort Worth Mary's Creek WWTP	TRWD	Recommended	Multiple	Trinity	25,928	5	$0.64	Low	5	5	4	4	Yes	N/A		
Additional Richland Chambers Reuse	TRWD	Recommended	Multiple	Trinity	66,691	5	$0.00	Low	5	5	4	4	Yes	N/A		
Reuse from TRA Central WWTP	TRWD	Recommended	Multiple	Trinity	60,000	5	$0.39	Low	5	5	4	4	Yes	N/A		
Tarrant County Water Supply Project	TRA	Recommended	Multiple	Trinity	19,741	5	$1.50	Low	5	5	5	5	Yes	N/A		
Denton Direct Potable Reuse	Denton	Recommended	Denton	Trinity	5,605	4	$11.60	Low	5	5	4	4	Yes	N/A		
Voluntary Purchase of Water	Multiple	Varies	Varies	Varies	Varies	4	Varies	Low	5	5	5	5	Varies	N/A		
Main Stem Balancing Reservoir	Irving	Alternate	Dallas	Trinity	25,000	4	$1.74	3,500	3	4	4	4	No	N/A		May require increased storage

[a] Does not create new supply, but is necessary to utilize the supplies created by other strategies.
[b] Includes grassland and row crops. Bottomland and Upland Forests and forested wetlands were not considered a potential agricultural resource for these reservoirs.
[c] Includes grassland, row crops, and upland forests for timber harvesting.

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TABLE G.4 ENVIRONMENTAL MATRIX

Strategy	Entity	County	Basin	Environmental Factors												
				Acres Impacted	Wetland Acres Impacted	Env. Water Needs	Env. Water Needs Score	Habitat[a]	Habitat Score	County Impacted	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score
Conservation - General	Multiple	Multiple	Multiple	0	0	N/A	5	N/A	5	N/A	N/A	5	N/A	5	N/A	5
Dredging - General	Multiple	Multiple	Multiple	Varies	0	N/A	5	Low	5	N/A	N/A	5	Low	5	N/A	5
Groundwater - General	Multiple	Multiple	Multiple	Varies	0	N/A	5	Low	5	N/A	N/A	5	Low	5	N/A	5
Increase Delivery Infrastructure - General	Multiple	Multiple	Multiple	Varies	Varies	N/A	5	Low	5	Varies	Varies	5	Low	5	N/A	5
Reuse - General	Multiple	Multiple	Multiple	Varies	Varies	Low	5	Low	5	Varies	Varies	5	Low	5	N/A	5
Reuse - General	Multiple	Multiple	Multiple	Varies	Varies	Low	5	Low	5	Varies	Varies	5	Low	5	N/A	5
Aquifer Storage and Recovery - Large	Multiple	Multiple	Multiple	Varies	0	Low	5	Low	5	N/A	N/A	5	Low	5	N/A	5
Aquifer Storage and Recovery - Small	Multiple	Multiple	Multiple	Varies	0	Low	5	Low	5	N/A	N/A	5	Low	5	N/A	5
Water Treatment Plants - General	Multiple	Multiple	Multiple	Varies	0	N/A	5	N/A	5	N/A	N/A	5	N/A	5	N/A	5
Gulf of Mexico - Desalination	Multiple	Multiple	Multiple	4,521	0	Medium Low	4	Low	5	Harris, Montgomery, Madison, Leon, Navarro, Ellis, Dallas	>40	1	Low	5	Medium Low	4
George Parkhouse South	NTWMD and/or UTRWD	Multiple	Multiple	28,900	6,197	Medium High	2	Medium High	2	Fannin, Delta, Hopkins	15	3	Medium High	2	N/A	5
George Parkhouse North	NTMWD and/or UTRWD	Multiple	Multiple	14,400	1,235	Medium High	2	Medium	3	Fannin, Delta, Hopkins	15	3	Medium High	2	N/A	5
Integrated Pipeline (IPL)	TRWD and DWU	Multiple	Trinity	0	0	Low	5	Low	5	Anderson, Henderson, Navarro, Ellis, Johnson, Tarrant	N/A	5	Low	5	N/A	5
Marvin Nichols Reservoir (328')	NTMWD, TRWD, UTRWD, DWU and/or Irving	Multiple	Multiple	66,103	24,959	Medium	3	High	1	Franklin, Titus, and Red River Counties	17	2	Medium High	2	N/A	5
Wright Patman Reallocation (235')	NTMWD, TRWD, UTRWD, DWU and/or Irving	Multiple	Multiple	14,372	11,009	Medium Low	4	Medium	3	Bowie, Red River, Delta, Fanin, Denton	23	3	Medium High	2	N/A	5
Lake Texoma Blending	NTMWD	Multiple	Multiple	866	0	Low	5	Low	5	Fannin	12	5	Low	5	N/A	5
Lake Texoma Blending	UTRWD	Multiple	Trinity	400	0	Medium Low	4	Low	5	Fannin	12	5	Low	5	N/A	5
Lake Texoma Desalination	DWU	Multiple	Trinity	1,914	0	Medium Low	4	Low	5	Grayson	20	4	Low	5	N/A	5
Lake Texoma Desalination	NTMWD	Multiple	Multiple	522	0	Medium Low	4	Low	5	Fannin	12	4	Low	5	N/A	5
Additional Measures to Access Full Lake Lavon Yield	NTMWD	Multiple	Multiple	0	0	Low	5	Low	5	Collin	12	4	Low	5	N/A	5
Aquifer Storage and Recovery	TRWD	Multiple	Trinity	4	0	N/A	5	Low	5	Tarrant	13	5	Low	5	N/A	5
Carrizo-Wilcox Aquifer	NTMWD	Multiple	Multiple	1,462	0	N/A	5	Low	5	Henderson, Anderson	25	5	Low	5	N/A	5
Carrizo-Wilcox Aquifer	DWU	Multiple	Trinity	1,010	0	N/A	5	Low	5	Cherokee County	22	5	Low	5	N/A	5
Carrizo-Wilcox Aquifer	TRWD	Multiple	Trinity	422	0	N/A	5	Low	5	Freestone, Anderson	28	5	Low	5	N/A	5
Marty Leonard Wetland Reuse	TRWD	Multiple	Trinity	243	0	Low	5	Low	5	Henderson, Navarro	22	5	Low	5	N/A	5
Lake of the Pines (Cypress Basin Supplies)	NTMWD	Multiple	Multiple	1,234	0	Low	5	Low	5	Harrison, Upshur, Wood	29	5	Low	5	N/A	5
Lake Columbia	DWU	Multiple	Trinity	11,989	5,746	Medium	3	Medium	3	Cherokee	22	3	Medium High	2	N/A	5
Connect IPL to Bachman (Lake Palestine)	DWU	Multiple	Trinity	1,629	0	Low	5	Low	5		28	5	Low	5	N/A	5
Lake Ralph Hall Reuse	UTRWD	Multiple	Trinity	0	0	Medium	3	Low	5	Denton	11	5	Medium	3	N/A	5
Lake Tehuacana	TRWD	Multiple	Trinity	15,000	4,000	Medium	3	Medium	3	Freestone	21	4	Medium High	2	N/A	5
Main Stem Balancing Reservoir	DWU	Multiple	Trinity	4,584	300	Medium	3	Medium Low	4	Ellis	14	5	Medium	3	N/A	5
Expanded Wetland Reuse	NTMWD	Multiple	Multiple	391	0	Low	5	Low	5	Kaufman	16	4	Low	5	N/A	5
Neches Run-of-River Diversions	DWU	Multiple	Trinity	266	0	Low	5	Low	5	Cherokee	22	4	Low	5	N/A	5
Red River Off-Channel Reservoir	DWU	Multiple	Trinity	3,286	20	Medium	3	Medium	3	Lamar, Fannin, Grayson	17	4	Medium	3	N/A	5
Red River Off-Channel Reservoir	DWU and UTRWD	Multiple	Trinity	3,286	20	Medium	3	Medium	3	Lamar, Fannin, Grayson, Denton	19	4	Medium	3	N/A	5
Toledo Bend	DWU, NTMWD TRWD, and UTRWD	Multiple	Multiple	3,110	0	Medium Low	4	Low	5	Sabine, Shelby, Upshur, Hunt	24	4	Low	5	Medium	3
GTUA Regional Water System – Phase I	GTUA	Multiple	Red	180	0	Low	5	Low	5	Grayson, Cook, Denton, Collin	19	4	Low	5	N/A	5
GTUA Regional Water System – Phase II	GTUA	Multiple	Red	117	0	Low	5	Low	5	Grayson, Cook, Denton, Collin	19	4	Low	5	N/A	5
Parker County Regional Water Provider	New Water Provider	Parker	Trinity	306	0	Low	5	Low	5	Parker	13	4	Low	5	N/A	5
Parker County Regional Water Provider	New Water Provider	Parker	Brazos	144	0	Low	5	Low	5	Parker	13	4	Low	5	N/A	5

TABLE G.4 ENVIRONMENTAL MATRIX

Strategy	Entity	County	Basin	Environmental Factors												
				Acres Impacted	Wetland Acres Impacted	Env. Water Needs	Env. Water Needs Score	Habitat[a]	Habitat Score	County Impacted	Threat and Endanger Species	Threat and Endanger Species Score	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score
Wise County Regional Water Provider	New Regional Water Provider	Wise	Trinity	136	0	Low	5	Low	5	Wise	11	4	Low	5	N/A	5
Irving Reuse - Indirect	Irving	Dallas	Trinity	14	0	Medium	3	Low	5	Dallas	16	4	Low	5	N/A	5
Irving Reuse - Direct	Irving	Dallas	Trinity	52	0	Medium	3	Low	5	Dallas	16	4	Low	5	N/A	5
Reallocation of Storage in Lake Texoma	GTUA, DWU, UTRWD	Multiple	Multiple	0	0	Low	5	Low	5	Grayson, Cook, Denton, Collin	19	4	N/A	5	N/A	5
Sabine River Off-Channel Reservoir	DWU	Multiple	Trinity	380	0	Medium	3	Low	5	Cherokee	22	4	Medium High	2	N/A	5
Main Stem Pump Station - DWU, NTMWD	DWU, NTMWD	Multiple	Trinity	TBD	0	Medium	3	Low	5	Kaufman	16	5	Low	5	N/A	5
Arkansas (Little River Millwood Lake)	DWU	Multiple	Trinity	2523	0	Low	5	Low	5	Little River, Red River, Fannin	17	3	Low	5	N/A	5
Louisiana (Toldeo Bend, SRA-Louisiana	DWU	Multiple	Trinity	3110	0	Medium Low	4	Low	5	Sabine, Shelby, Upshur, Hunt	24	4	Low	5	Medium	3
Oklahoma (Kiamachi River)	DWU	Multiple	Trinity	1524	0	Low	5	Low	5	Choctaw, Lamar, Grayson	17	4	Low	5	N/A	5
Oklahoma	NTMWD	Multiple	Multiple	1,347	0	Low	5	Low	5	Dallas	16	4	Low	5	N/A	5
Oklahoma (Hugo to Lake Lewisville)	UTRWD	Multiple	Trinity	350	0	Low	5	Low	5		17[c]	4	Low	5	N/A	5
Interim Upper Sabine Basin	NTMWD	Multiple	Multiple	0	0	Low	5	Low	5	Hunt	16	5	N/A	5	N/A	5
Fannin County Water Supply System	NTMWD	Fannin	Multiple	34	0	Low	5	Low	5	Fannin	12	5	Low	5	N/A	5
Reuse from Fort Worth Mary's Creek WWTP	TRWD	Multiple	Trinity	19	0	Medium	3	Low	5	Tarrant	13	5	Low	5	N/A	5
Additional Richland Chambers Reuse	TRWD	Multiple	Trinity	0	0	Medium	3	Low	5	Navarro, Ellis, Johnson, Tarrant	20	5	N/A	5	N/A	5
Reuse from TRA Central WWTP	TRWD	Multiple	Trinity	0	0	Medium	3	Low	5	Henderson, Navarro	22	5	N/A	5	N/A	5
Tarrant County Water Supply Project	TRA	Multiple	Trinity	0		Low	5	Low	5	Tarrant	13	5	N/A	5	N/A	5
Denton Direct Potable Reuse	Denton	Denton	Trinity	49	0	Medium	3	Low	5	Denton	13	5	Low	5	N/A	5
Voluntary Purchase of Water	Varies	Varies	Varies	Varies	Varies	Low	5	Low	5	Varies	Varies	N/A	Low	5	N/A	5
Main Stem Balancing Reservoir	Irving	Dallas	Trinity	4584	300	Medium	3	Low	5	Ellis	14	4	Medium	3	N/A	5

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G.2 General Water Management Strategy Technical Memorandums

G.2.1 Conservation

Potential Sponsor(s)	Municipal, Irrigation, Manufacturing and Mining WUGs Considered
WMS/Project Type:	Conservation
Potential Supply Quantity: [a]	285,495 acre-feet/year Municipal 13,505 acre-feet/year Non-Municipal (Including Mining Recycling)
Implementation Decade:	2030
Strategy Capital Cost:	Varies
Unit Water Cost ($/kgal)	Varies; See Table H.11A through Table H.11D
Application:	Recommended

[a]*Does not include passive savings associated with low flow plumbing fixtures, efficient residential clothes washer standards, and efficient residential dishwasher standards already included in the demand projections.*

Strategy Description

More detailed information on this strategy can be found in **Appendix I**. This strategy is to proactively reduce water demands through water conservation efforts. In Region C this strategy was assessed for municipal, irrigation, and mining users. This strategy represents a compilation of actions that may include but are not limited to, public education and outreach, reducing water waste, conservation-oriented rate structures, enhanced water loss control programs, limiting of outdoor water use (both time-of-day and twice per week limits), adding a conservation coordinator, establishment of a landscape ordinance for new development, increasing efficiency of irrigation processes, and onsite reuse for mining customers.

Supply Development (Quantity, Reliability, Quality)

This strategy delays the need to develop other water supplies through demand reductions of users. High levels of conservation have already been achieved in Region C to date.

Water Quantity

The total demand reduction achieved through conservation savings in Region C is shown in **Table G.5**.

TABLE G.5 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
Municipal Conservation	84,397	158,420	209,863	236,978	262,321	285,495
Non-Municipal Conservation	168	1,727	3,486	5,985	9,307	13,505
TOTAL CONSERVATION	***84,565***	***160,147***	***213,349***	***242,963***	***271,628***	***299,000***

[a]*The conservation quantities shown above are associated with the Region C primary WUGs whose demand is located within the Region C area. Conservation quantities for non-Region C primary WUGs within the Region C area will be determined after other regions finalize their conservation estimates, potentially following the release of the Initially Prepared Plan (IPP).*

Reliability

Since this strategy is a demand reduction the reliability is high. Certainty is moderately high since some conservation measures rely on changes in customer behavior.

Water Quality

This strategy equates to a reduction in need from other water management strategies and therefore has no associated water quality parameters.

Environmental Considerations

This strategy is expected to have no adverse environmental impacts. Rather, it is anticipated to positively impact the environment by delaying the need for other projects that potentially have more impacts.

Permitting and Development

Conservation does not require any permits and is generally accepted by the public. The TCEQ and TWDB require specific water users to maintain a conservation plan.

Cost Analysis

Cost estimates were prepared for each individual WUGs conservation strategy. These cost estimates are contained in **Appendix H**.

Water Management Strategy Evaluation

Conservation was applied to all municipal water user groups, golf course irrigation water users, and manufacturing water user groups and mining customers with needs. Based on the analysis provided above, the conservation strategy was evaluated across different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan.

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G.2.2 Increased Capacity at Existing Reservoirs (Dredging)

Potential Sponsor(s)	Various
WMS/Project Type:	Existing Surface Water (Dredging)
Potential Supply Quantity:	1,700 to 7,200 acre-feet per year
Implementation Decade:	Various
Strategy Capital Cost:	$1.3 billion to $2.7 billion for dredging
Unit Water Cost ($/kgal)	$128 to $138 per 1,000 gallons
Application:	Potentially Feasible for select Region C Reservoirs

Strategy Description

This strategy evaluates the options to increase water supply through increasing storage at local area lakes in the Metroplex. This increase in supply could be achieved through dredging existing lakes up to the original permitted capacity.

Over time reservoirs can lose storage capacity due to sediment accumulation. This reduction in storage can affect the reliable supplies from these sources. In Region C, the reliable supplies of existing reservoirs are shown to decrease approximately 6 percent over the 50-year planning horizon.

To regain potential loss of supply, there have been suggestions from the public to dredge the lakes. Dredging of lakes has been done for a few local reservoirs, such as White Rock Lake and Lake Worth, for recreational and water quality purposes. There has not been a wholesale dredging project conducted on a large major reservoir for water supply purposes. This is likely for multiple reasons, including ownership of the lake, cost, challenges with disposal, and limited gains in water supply.

There are 9 large lakes In the Metroplex area that are used for water supply: Bridgeport, Eagle Mountain, Benbrook, Grapevine, Lewisville, Ray Roberts, Lavon, Ray Hubbard, Joe Pool. Of these lakes, Benbrook, Grapevine, Lewisville, Ray Roberts, Joe Pool and Lavon are operated by the USACE for flood control with contracts for water supply. Each of these lakes has a sediment pool to account for sediment accumulation and would not be amenable to increasing water supply conservation through dredging. Therefore, these lakes were not considered for dredging.

Bridgeport and Eagle Mountain Lake are owned and operated by TRWD and Ray Hubbard is owned and operated by DWU. Any dredging project of these lakes would be a substantial effort. The potential to regain lost storage capacity is shown on **Table G.6**. It was assumed that 75% of the lost capacity could be regained through dredging. The volume of sediment is based on the most recent sediment survey of the lakes.

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TABLE G.6 POTENTIAL FOR INCREASE IN STORAGE CAPACITY (ACRE-FEET)

RESERVOIR	ACCUMULATED SEDIMENT [a]	REGAINED CAPACITY
Bridgeport	25,019	18,764
Eagle Mountain	15,861	11,896
Ray Hubbard	33,085	24,814

[a]*Accumulated sediment volumes are from the latest TWDB sediment survey (see references)*

One of the biggest challenges to dredging large quantities of sediment is the disposal of the removed materials. For purposes of this analysis, it was assumed that a suitable site could be found in the vicinity of the lake. If no site is available and materials must be trucked to an offsite location, the costs would increase significantly.

Supply Development (Quantity, Reliability, Quality)

Water supply quantities were determined using the TCEQ Trinity River WAM for Region C. It was assumed that any increase in available supply would be associated with the existing water rights for the respective lake.

Water Quantity

The water quantities in **Table G.7** represent the increased supply associated with the increased storage.

TABLE G.7 SUMMARY OF QUANTITIES (AC-FT/YR)

RESERVOIR	DREDGING
Bridgeport	2,500
Eagle Mountain	1,700
Ray Hubbard	3,360

Reliability

The reliability of increased supplies associated with dredging would be the same as the permitted water. Water rights with more senior priority would be highly reliable. However, a new drought of record could impact supplies.

Water Quality

The quality of the water is expected to be similar to existing quality of the reservoir or slightly improved as additional fresh water becomes available. However, dredging operations may increase turbidity and suspended solids in the lake. This is expected to be temporary.

Environmental Considerations

For dredging scenarios, there are concerns about the disposal of the dredged materials and potential impingement of aquatic species through the operations. Care would be taken to limit impingement. The dredged material would need to be tested to ensure that the materials can be land placed. If elevated constituents (such as heavy metals, organics, etc.) are identified, the

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material would need to be disposed an appropriate classified disposal facility. This would significantly increase the costs for dredging.

Permitting and Development

Dredging would require a Section 404 permit and a DPES permit for the discharged materials. It is assumed that no changes to the existing water rights are needed. One of the biggest development obstacles is the location and quantity of the discharged materials.

Cost Analysis

Capital costs were based on previous projects and dredging costs. However, the scale of these projects is quite different, and the technical challenges associated with the much larger quantities may affect the assumed unit costs, which could increase or slightly decrease. Whether these costs change slightly, the project would be very expensive for the additional quantity of water developed. Costs associated with general dredging projects include bathymetric survey, sediment testing, dredging, and disposal. While the unit cost after debt service is shown as zero, it is likely that the sponsor would need to dredge the lake again in 20 to 40 years to maintain the gain in water supply.

TABLE G.8 SUMMARY OF GENERAL DREDGING COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Bridgeport	$2,065,275,000	$137.82	--
Eagle Mountain	$1,309,461,000	$128.51	--
Ray Hubbard	$2,731,484,000	$135.63	--

Water Management Strategy Evaluation

Dredging a large major reservoir is a massive technical and financial undertaking with only small gains in water supply. For a lake like Ray Hubbard that is 21,000 acres, the technology and cost to build the infrastructure needed to discharge the dredged materials to the shore is unprecedented. Also, the quantity of dredged materials would cover nearly 4,000 acres at a depth of 10 feet. Land application at lower depths (<10 feet) would require additional acreage. If the material needs to be disposed of as Special Waste, the costs will increase significantly.

Increasing the storage capacity of area lakes is not a practical or economically feasible strategy.

Water User Group Application

This strategy was considered for owners and sponsors of area lakes in the Metroplex.

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G.2.3 Additional Groundwater and New Wells

Potential Sponsor(s)	Multiple
WMS/Project Type:	New Groundwater Source
Potential Supply Quantity:	Varies
Implementation Decade:	Varies
Strategy Capital Cost:	Varies, See Table H.14
Unit Water Cost ($/kgal)	Varies; See Table H.14
Application:	Varies

Strategy Description

This strategy is to develop groundwater through the drilling of a new well(s) including small groundwater projects in rural areas. It also includes the construction of all associated transmission and treatment that may be required.

Supply Development (Quantity, Reliability, Quality)

This strategy was developed in accordance with Modeled Available Groundwater (MAG) values for the appropriate aquifer and county. As such, it is considered to be reliable supply that will not compromise the Desired Future Conditions (DFCs) as established by the Groundwater Management Area (GMA).

Environmental Considerations

The right of way for the wells and transmission lines may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the well and transmission pipeline. It may be possible to route the pipeline to avoid environmentally sensitive areas.

Additionally, the right of way for the transmission lines may temporarily affect a small amount of agricultural acreage during construction. To the extent that this strategy is recommended for a rural user, the increased water supply may enhance the vitality of the community.

Permitting and Development

All recommended groundwater strategies comply within the Modeled Available Groundwater (MAG) values for their respective counties and aquifers. As such, these strategies should have no adverse effects on the Desired Future Conditions of the aquifers. Permit requirements will vary on well location and whether there is a governing GCD.

Cost Analysis

Cost estimates were prepared for each individual groundwater strategy. These cost estimates are contained in **Appendix H**.

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Water Management Strategy Evaluation

Based on the analysis provided above, the Additional Groundwater and New Wells strategy was evaluated across different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in **Table G.3** and **Table G.4.**

Water User Group Application

The Additional Groundwater and New Wells strategy was evaluated on the basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

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G.2.4 Increase Delivery Infrastructure

Potential Sponsor(s):	Multiple
WMS/Project Type:	Various
Potential Supply Quantity:	0 acre-feet per year This strategy does not create new supply but is essential for transporting supplies to end users.
Implementation Decade:	Multiple
Strategy Capital Cost:	Varies
Unit Water Cost ($/kgal):	Varies
Application:	Varies

Strategy Description

This strategy is to develop new transmission facilities or increase the size of existing water supply transmission pipelines and pump stations. In many cases this represents the connection of an entity to a wholesale provider or the expansion of an existing transmission system. In other cases, the transmission supply is to connect existing supplies to the end users. This strategy may also include some infrastructure needed to take delivery of water from another provider such as ground storage. All projects evaluated under this strategy are directly associated with the delivery of additional water supplies from new water sources, more efficient use of existing supplies, or volumetric increases to existing water supplies.

Several regional systems fit into this category of Infrastructure development. The Parker County Regional System, Wise County Regional System, and GTUA Regional System are discussed separately in **Section G.8**. Two other regional systems are discussed here. One is the Fannin County Water Supply Project. For this project, NTWMD will cooperate with Fannin County entities to develop a treated water supply system for Fannin County water users by 2040. This project will include over 70 miles of pipelines (8" to 24" pipelines) and associated pump stations to deliver water to up to six WUGs, with delivery of over 3,900 acre-feet per year by 2080.

The other regional system is GTUA's Collin-Grayson Municipal Alliance (CGMA) Water System. This system serves Anna, Melissa, Howe and Van Alstyne. Currently GTUA purchases treated water from NTWMD and delivers this water to four WUGs in southern Grayson and northern Collin Counties. GTUA plans to expand this system in the future by paralleling existing pipelines and coordinating with NTMWD for treatment.

Supply Development (Quantity, Reliability, Quality)

While this strategy does not create supply, it is vital to making existing and future supplies usable to those with needs. This transmission infrastructure enables the entity to receive the water.

Environmental Considerations

The right of way for the transmission lines may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the

transmission pipeline. The pipeline may be able to be routed to avoid environmentally sensitive areas.

Additionally, the right of way for the transmission line may temporarily affect a small amount of agricultural acreage during construction. To the extent that this strategy is recommended for a rural user, the increased water supply may enhance the vitality of the community.

Permitting and Development

Construction of the pipeline can likely be done under a nationwide Section 404 permit. If the pipeline is part of another larger supply development strategy, there may be additional permitting requirements. Those requirements are considered with the appropriate larger supply development strategy.

Cost Analysis

Cost estimates were prepared for each individual water management strategy. These cost estimates are contained in **Appendix H.**

Water Management Strategy Evaluation

Based on the analysis provided above, the Increase Delivery Infrastructure strategy was evaluated across different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in **Table G.3** and **Table G.4**.

Water User Group Application

The Increase Delivery Infrastructure strategy was evaluated on the basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the current capacity of delivery infrastructure and the ultimate needed capacity of delivery infrastructure.

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G.2.5 Reuse

Potential Sponsor(s)	Multiple
WMS/Project Type:	Reuse
Potential Supply Quantity:	Varies
Implementation Decade:	Varies
Strategy Capital Cost:	Varies
Unit Water Cost ($/kgal)	Varies
Application:	Varies

Strategy Description

This strategy is to develop projects that reuse treated wastewater effluent, either directly or indirectly. It includes the construction of all associated transmission that may be required. Recommended reuse projects are summarized in **Chapter 5B,** specifically **Table 5B.8**. Further descriptions of large individual reuse projects are in **Chapter 5C**. Several large reuse projects sponsored by a Major Water Provider (MWP) are discussed in this appendix under the respective section for the MWP. Recommended reuse projects also are included in **Chapter 5D** and **Chapter 5E,** organized by project sponsor.

Supply Development (Quantity, Reliability, Quality)

The supply amounts for this strategy were developed based on estimates of water use and related return flows from specific wastewater treatment plants. Where applicable, consideration was given for specific minimum by-pass flow requirements if required by water rights. For Direct Potable Reuse projects, it was assumed that 30% of the supply would be lost as reject water during the treatment process. There are no losses associated with Direct Non-Potable Reuse or Indirect Reuse.

Environmental Considerations

Direct reuse projects will reduce the volume of treated wastewater effluent that is returned to natural waterways. The right of way for transmission lines may temporarily affect the environment during construction, for which there would be mitigation. Additional studies and mitigation may be required before the construction of transmission pipelines. Pipelines may be able to be routed to avoid environmentally sensitive areas.

Indirect reuse projects may reduce the volume of flow in natural waterways in certain areas, but only to the extent that they remove flows returned by upstream wastewater treatment plants. Much of the indirect reuse is from new water developed from outside of the receiving basin, such that there is minimal to no impact on the receiving basin. No naturalized stream flow (naturally occurring runoff from precipitation) will be removed from waterways as part of any reuse projects. It should be noted that some return flow water rights dictate the allowable use of return flow and minimum by-pass requirements in order to protect the environment.

Additionally, the right of way for any transmission lines may temporarily affect a small amount of agricultural acreage during construction.

Permitting and Development

All recommended indirect reuse strategies that are currently permitted have been structured to comply with the terms of the associated water right. All recommended reuse strategies (both direct and indirect) that are not currently permitted are anticipated to apply for and obtain any necessary permits from TCEQ including but not limited to reuse water right permits and Section 210 permits.

Cost Analysis

Cost estimates were prepared for each reuse strategy except for the Athens Fish Hatchery (see below). These cost estimates are contained in **Appendix H**.

Athens Fish Hatchery – The Texas Freshwater Fisheries Center in Athens ("Fish Hatchery") has a contract with Athens MWA for 3,023 acre-feet per year from Lake Athens. After using the water in its facility, the Fish Hatchery discharges almost all of that water back into Lake Athens. Athens MWA has an agreement that allows them to use this return flow. Since Athens MWA already has existing pumping and treatment facilities on the lake, there are no additional facilities needed and thus no capital costs.

Water Management Strategy Evaluation

Based on the analysis provided above, the Reuse strategy was evaluated across different criteria for the purpose of comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in **Table G.3** and **Table G.4.**

Water User Group Application

The reuse strategy was evaluated on several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

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G.2.6 Aquifer Storage and Recovery

Potential Sponsor(s):	Multiple
WMS/Project Type:	Aquifer Storage and Recovery
Potential Supply Quantity:	25,000 - 50,000 acre-feet per year (90-95% recovery rate)
Implementation Decade:	Varies
Strategy Capital Cost:	$4,603,318,000 (50,000 af/y; less for smaller quantities)
Unit Water Cost ($/kgal):	$22.08 during Debt Service; $6.72 after Debt Service
Application:	Potentially Feasible and Alternative for NTMWD

Strategy Description

Aquifer Storage and Recovery (ASR) is a water management solution that allows for storing surplus water in local aquifers during periods of high or surplus surface flows and withdrawing the stored water later during periods of drought or peak demands. It also can be used to temporarily store treated brackish groundwater or treated wastewater for use during high demand periods. ASR can provide a cost-effective and reliable alternative to the construction of above-ground storage reservoirs; however, identifying and securing suitable aquifer formations for storage and the geochemical evaluation of the mixed waters can be challenging. ASR in Texas is currently being studied to assess if it is a reliable and cost-effective technology that should be considered as part of a diversified portfolio of water supply options. Current regulatory framework allows recharge of either fully treated or partially treated surface water, provided that recharge of the surface water is not degrading the native groundwater quality any further. The most desirable feature of the ASR as a water management strategy is its scalability. It can be developed as a region-wide strategy to serve as an alternative drought-resilient long-term WMS for multiple major water providers. It can also be developed as an entity-specific strategy to meet short-term peak demands. The WMS discussed in this technical memorandum is a region-wide strategy that benefits multiple major water providers in Region C.

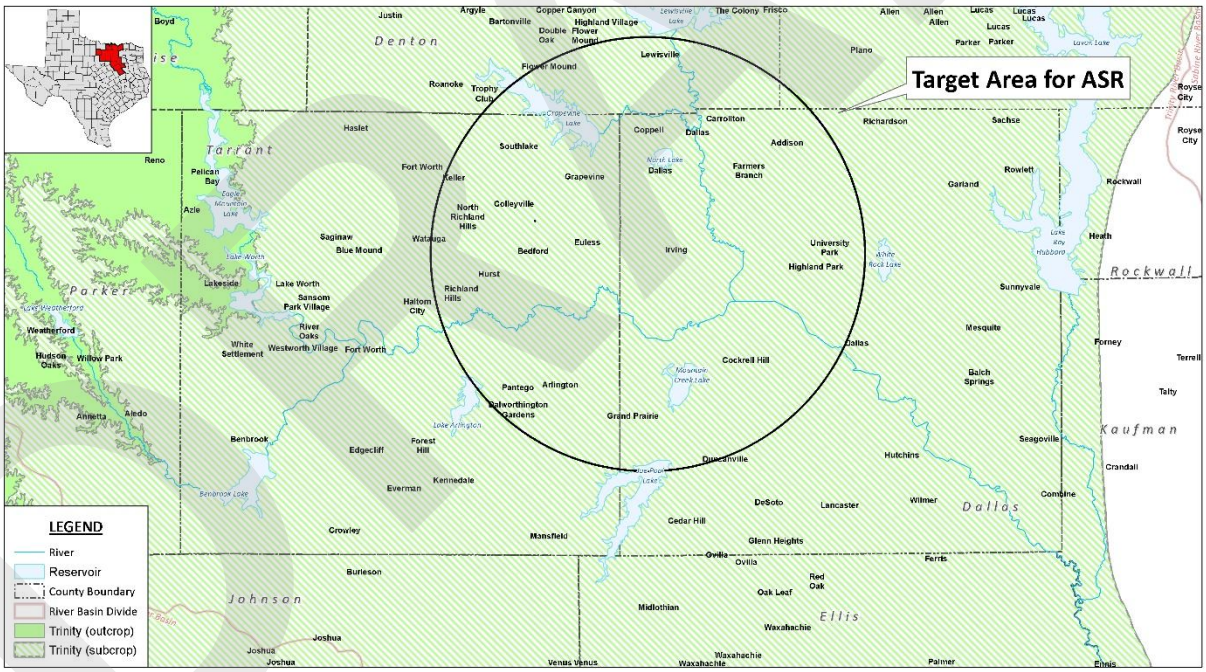
In Region C, the most likely application of ASR would be to store surplus surface water when lakes are full and spilling, store reuse water, increase operational flexibility of multiple sources, and serve as a short-term source to meet peak demands. ASR could reduce evaporative losses, store water that otherwise would have spilled downstream, maximize use of water rights, and possibly delay infrastructure improvements that would be needed to meet peak demands.

To fully evaluate an ASR strategy, detailed hydrogeological studies are needed to identify an appropriate receiving formation and size the infrastructure of the recharge system. Owing to that, there are fewer hydrogeological studies defining the aquifer characteristics of the Trinity Aquifer (the primary aquifer for potential ASR operations). There are a couple of studies that were recently conducted to define the storage and migration potential of the Trinity aquifer and some regional water providers are currently in the process of confirming the information from the hydrogeological models by means of a pilot study. For these reasons, a generic ASR strategy for 50,000 acre-feet per year was developed for the purpose of this study. Based on the available literature, this strategy assumes that an appropriate receiving site can be identified in the Trinity Aquifer within 50 miles of the major water providers. The depth of this formation is about 2,000 feet below ground

surface and the migration potential is minimal to retain the stored water bubble. Since much of the shallow overlying formations in the metroplex area consist of clays and less permeable soils, it is assumed that recharge wells would be used rather than an infiltration basin. It is also assumed that there is existing infrastructure capacity to move water to within 50 miles of the ASR site. Additional infrastructure would be needed to move the water to the recharge site. For this strategy, it is assumed that the recharge wells will double as recovery wells.

In general, an ASR system in Region C would consist of a combination of the following infrastructure elements:

- Pump station, with ground storage, and transmission pipelines to move the water 50 miles from existing infrastructure to the ASR site
- Water Treatment Plant (in Texas it is required to treat source water to the same level as the groundwater formation prior to injecting it underground)
- Wellfield facilities (recharge / recovery wells) and wellfield piping
- Transmission system from the ASR site to the end location (the transmission system could connect directly to a treatment plant for further treatment or to a distribution system if the water quality meets drinking water standards. For this generic strategy, the transmission pipeline is assumed to be 50 miles long.)



Supply Development (Quantity, Reliability, Quality)

Water Quantity

It is assumed that the source of water for this strategy would be excess surface water or reuse water from water rights owned by NTMWD, DWU, TRWD, TRA or UTRWD. The project is sized to store and use 50,000 acre-feet per year. Water would be pumped directly to the ASR site from existing raw water transmission systems. At the ASR site, the water is treated to the same level or better than the receiving formation groundwater. (Note: there could be scenarios where the water is pretreated at an existing water treatment facility and then diverted to the ASR site. However, this generic strategy assumes that the raw water is treated on site at the ASR facility.) The water is then recharged into the receiving formation through 49 recharge wells. It is assumed that these facilities are sized to transport and recharge the 50,000 acre-feet per year over a 6-month period, with a peaking factor of 2. This provides the peak capacity to recover and utilize excess flows over a short period and then have access to the water during peak demand periods. The assumed maximum recharge capacity for each recharge well is 1,500 gpm. A 102-in diameter transmission pipeline would be required to convey raw water to an on-site 180 MGD water treatment plant. In Texas, it is required to treat source water to the same level as the groundwater formation prior to injecting it underground.

Reliability

Successful ASR development is highly reliable. It is normally possible to achieve 90-95% recovery efficiency. Challenges to reliability include natural groundwater flow away from the ASR site and the associated drift of the storage bubble, thus reducing available supplies. Flat hydraulic gradients are not typical in Texas, especially in shallow aquifers. This migration of stored water is an important consideration in determining the reliability and viability of an ASR project. Also, since withdrawal of groundwater is a property right, competition with other nearby users could reduce the reliability of this water. One way to address the issue of other competing wells is to own the property rights over the storage bubble but that will drive up the strategy costs. If the water is recharged and recovered over a relatively short period (e.g., one year), the likelihood of reduced reliability is low. However, short-term ASR operations are highly dependent on the local aquifer hydrogeological features and that may impact reliability as well.

Water Quality

Because of the guidelines stipulated in the ASR regulations for Texas, the quality of the recharge water would be the same as the receiving aquifer, which is generally good. The recovered ASR water would be treated to standards required by the end use unless the native groundwater quality is equivalent to the potable water quality. When recharge water is treated to meet drinking water standards prior to storage, the recovered water will only need simple re-disinfection prior to being distributed to end-users.

Environmental Considerations

Environmental impacts are expected to be low. The footprint of an ASR project may be significantly smaller than a surface reservoir project of similar storage capacity and eliminates the need to

inundate large areas of land. The transmission system and the ASR facilities can be designed to avoid environmentally sensitive areas. As previously mentioned, the recharge water must be of equal or better quality than the native groundwater in the receiving aquifer.

The challenge will be to locate the facilities (transmission, treatment, and wellfield) in areas that are increasingly urban.

Permitting and Development

There is much support for developing ASR projects in Texas, but the principal challenge for development is identifying appropriate receiving formations and aquifer zones that are near areas of water sources and demand. The Texas Legislature has enacted legislation to remove some of the legal and regulatory frameworks that have previously impeded application of this technology. This legislation now allows the water quality of the recharge water to be at the same level or higher as the receiving formation (versus drinking water standards) and permits the recovery of the same amount of recharge water under the new ASR regulations. However, there remains concerns about protection of the water once it is recharged for storage. Since groundwater is considered a property right, stored ASR water can become subject to competition for use by other property owners, especially if the natural flow is not restricted.

Recharge wells for ASR projects are regulated by TCEQ's Underground Injection Control (UIC) program and are classified as Class V Injection Wells. Thus, they must be permitted pursuant to Chapter 27, Texas Code, and Chapter 331, Title 30 of the Texas Administrative Code.

An ASR project may require groundwater permits from GCDs. The Northern Trinity GCD (Tarrant County) does not require permits for wells that are used solely for ASR. If a withdrawal well also extracts native groundwater, a permit is required. There are groundwater districts in Tarrant, Collin, Denton, Johnson and Ellis Counties. There are no groundwater districts in Dallas County.

Cost Analysis

For the Region C cost analysis, planning level opinions of costs for this strategy have been developed using the TWDB's costing tool. In accordance with TWDB Guidance, the analysis of costs for WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon. This strategy assumes that there are no purchased water costs, and water already developed by a sponsor is the source for the ASR project.

There may be opportunities to reduce cost associated with treatment facilities, but for a large-scale ASR project it is unlikely that there are sufficient capacities at existing facilities to treat these quantities.

TABLE G.9 SUMMARY OF COSTS

ENTITY	QUANTITY (AC-FT/YR)	CAPITAL COST	UNIT COST ($/1,000 GAL)	
			WITH DEBT SERVICE	AFTER DEBT SERVICE
Region C WWP	50,0000	$4,603,318,000	$22.08	$6.72
NTMWD	26,456	$332,260,000	$5.02	$2.93

Water Management Strategy Evaluation

Based on the analysis provided above, the Aquifer Storage and Recovery strategy was evaluated across different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in **Table G.3 and Table G.4.**

The table below summarizes the main advantages and disadvantages of ASR projects.

TABLE G.10 ADVANTAGES AND DISADVANTAGES OF ASR PROJECTS

ADVANTAGES	DISADVANTAGES
Conservation of water through reduced evaporation, capture of spills, and excess flows	Suitable ASR sites may not be located at a reasonable distance from demand centers
High recovery efficiency (could reach 90-95%)	Potential for water losses due to hydraulic gradients
Eliminates the need for inundating large areas of land for storage	Technical uncertainties for a large-scale ASR project. Technical operation of the system poses challenges to infrastructure that may not be used regularly.
No storage loss due to sedimentation	Lack of clarity in the regulatory processes
Minimal environmental impacts	Significant capital investment for a 50,000

Water User Group Application

This strategy is a considered strategy for water providers in Region C with a need. It is not a recommended strategy. It is an alternative strategy for NTMWD. Specific ASR strategies are considered for individual water users.

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G.2.7 Small Aquifer Storage and Recovery

Potential Sponsor(s):	Wholesale Water Providers
WMS/Project Type:	Aquifer Storage and Recovery
Potential Supply Quantity:	2,500 acre-feet per year during drought
Implementation Decade:	Varies
Strategy Capital Cost:	$ 11,232,000
Unit Water Cost ($/kgal):	$1.32 during Debt Service; $0.57 after Debt Service
Application:	Potentially Feasible

Strategy Description

Aquifer Storage and Recovery (ASR) is a water management solution that allows for storing surplus water in local aquifers during periods of excess surface water availability and withdrawing the stored water later during periods of drought or peak demands. Region C evaluated a large-scale generic ASR project to provide water each year to meet growing demands. This strategy was determined to be economically infeasible and uncertain from a technical perspective. However, a small-scale ASR project that is used to help meet peak demands during drought conditions may be feasible and is highly dependent on local hydrogeology.

Conceptually, the small-scale ASR project would treat excess surface water or reuse water at an existing water treatment plant. The water is treated to a level that will not degrade receiving formation groundwater. The treated water would then be stored in a local aquifer within one mile of the water treatment plant during low demand months and normal to wet years. This concept recognizes that during summer months and periods of drought, the ability to store water may be limited. Therefore, this project would likely be operated as part of a system that stores water during wet periods and uses stored water during dry periods. During recovery, the water would be retrieved and pumped to the water treatment plant for subsequent treatment and distribution.

A small-scale ASR system would consist of a combination of the following infrastructure elements:

- Wellfield facilities (3 recharge / recovery wells) and wellfield piping. Wells are approximately 1,000 feet below the ground surface, depending on local hydrogeology. The Trinity aquifer depth ranges from 130 to 1,500 ft thick.
- Transmission infrastructure to move the water between the treatment plant and the wellfield.

It is assumed that there is sufficient capacity of existing infrastructure to move the raw water to the treatment plant and to treat this supply. The Trinity aquifer, which is primarily composed of sand, gravels, sandstone, and limestone with some faults and fractures, has the potential for successful ASR. The suitability score of the Trinity aquifer for ASR is 0.69 overall, and the Trinity aquifer is ranked in the top four of the nine major aquifers examined for the TWDB.

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Supply Development (Quantity, Reliability, Quality)

Water Quantity

The quantity of water is contingent upon the excess treatment capacity at the water treatment plant, available excess surface water and/or reuse supplies, and the ability of the local aquifer to accept the stored water. Each of these factors will be unique to the sponsor and selected ASR site. For purposes of this generic analysis, it is assumed that the water would be stored in the subcrop, confined portion of the lower layer of the Trinity Aquifer. Maximum recharge/recovery rates are assumed to be 600 gallons per minute, and a minimum of five wells would be installed. Based on these assumptions, a small-scale ASR project would store up to 5,000 acre-feet over a three-year period and recover this amount over a two-year period.

Based on these assumptions, the project would supply up to 2,500 acre-feet per year during a recovery year (up to four years each decade). This requires a minimum of two to three years of storage before water could be retrieved, during which additional treatment capacity could be utilized to generate excess treated water to be stored in cold-weather (low-irrigation) months. After this period, stored supply would aid during high-demand months and to meet increased demand, with storage occurring approximately 6 months out of the year and recovery on a monthly basis. The amount of retrievable water would be determined on a case-by-case basis.

Reliability

Successful ASR development is highly reliable. It is normally possible to achieve 90-95% recovery efficiency. Challenges to reliability include natural groundwater flow away from the ASR site and the associated drift of the storage bubble, thus reducing available supplies. This migration of stored water is an important consideration in determining the reliability and viability of an ASR project, and for this reason confined aquifer locations are preferred. The potential for migration increases as residence time in the aquifer increases. Also, since withdrawal of groundwater is a property right, competition with other nearby users could reduce the reliability of this water. One way to address the issue of other competing wells is to own the property rights over the storage bubble, which would increase strategy costs.

Water Quality

Because of the guidelines stipulated in the ASR regulations for Texas, the quality of the recharge water must not degrade the quality of the receiving aquifer, which is generally good. The recovered ASR water would be treated to standards required by the end use unless the native groundwater quality is equivalent to the potable water quality. When recharge water is treated to meet drinking water standards prior to storage, the recovered water may only need simple re-disinfection prior to being distributed to end-users.

Treatment to deoxygenate water prior to storage is required in addition to meeting turbidity and drinking water standards to prevent mobilization of arsenic and other constituents of concern from pyrite. Additionally, chlorine and ammonia removal are necessary to prevent formation of trihalomethanes (THMs) in the stored supply resulting from disinfection byproducts (DBPs).

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Environmental Considerations

Environmental impacts are expected to be low. The footprint of an ASR project may be significantly smaller than a surface reservoir project of similar storage capacity and eliminates the need to inundate large areas of land. The transmission system and the ASR facilities can be designed to avoid environmentally sensitive areas. As previously mentioned, the recharge water must not degrade the quality of the groundwater in the receiving aquifer.

The challenge will be to locate the facilities (transmission, treatment, and wellfield) in areas that are increasingly urban.

Permitting and Development

There is much support for developing ASR projects in Texas, but the principal challenge for development is identifying appropriate receiving formations and aquifer zones that are near areas of water sources and demand. The Texas Legislature has enacted legislation to remove some of the legal and regulatory obstacles that have previously impeded application of this technology. This legislation now allows the water quality of the recharge water to be such that it does not degrade the quality of water in the formation (versus drinking water standards) and permits the recovery of nearly the same amount of recharge water under the new ASR regulations. However, there remains concerns about protection of the water once it is recharged for storage. Since groundwater is considered a property right, stored ASR water can become subject to competition for use by other property owners, especially if the natural flow is not restricted. While the TCEQ does not limit the size of an ASR project, any water recovered beyond the recoverable water percentage may be subject to GCD rules and an ASR project may be required to follow GCD reporting requirements.

Recharge wells for ASR projects are regulated by TCEQ's Underground Injection Control (UIC) program and are classified as Class V Injection Wells. Thus, they must be permitted pursuant to Chapter 27, Texas Code, and Chapter 331, Title 30 of the Texas Administrative Code.

An ASR project may require groundwater permits from GCDs. Some GCDs do not require permits for wells that are used solely for ASR. If a withdrawal well also extracts native groundwater, a permit is required.

Cost Analysis

For the Region C cost analysis, planning level opinions of costs for this strategy have been developed using the TWDB's costing tool. In accordance with TWDB Guidance, the analysis of costs for WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon. This strategy assumes no water treatment costs, no purchased water costs, and water already developed by a sponsor is the source for the ASR project.

TABLE G.11 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Region C WWP	$11,232,000	$1.32	$0.57

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Water Management Strategy Evaluation

ASR provides a drought resiliency strategy that has considerable potential for users with sources of excess water. Depending upon the storage formation, the recovery efficiency could be as high as 90 to 95 percent. This recovery efficiency in part depends on TDS in the receiving aquifer, as higher TDS relates to lower recovery efficiency and recoverability. Care must be taken to limit losses due to the natural movement of groundwater and competition from adjacent landowners. For multi-year droughts, this strategy may not provide supplies in some years.

Further study is needed to address technical uncertainties. Technical operation of the system may pose challenges to infrastructure that may not be used regularly.

Water User Group Application

This strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

This strategy is a considered strategy for wholesale providers with potential surplus supplies during non-drought periods. A table showing the water providers and quantities from ASR is shown below (**Table G.12**).

TABLE G.12 ASR PROJECTS FOR WWPS AND WUGS

ENTITY	COUNTY	AQUIFER	SOURCE	STORAGE QUANTITY (AC-FT/YR)	PERCENT RECOVERY	QUANTITY (AC-FT/YR)
Recommended WMS						
TRWD [a]	Tarrant	Trinity	TRWD System	5,700	88%	5,000
Denton	Denton	Trinity	Lewisville/Ray Roberts	2,800	90%	2,500
Alternative WMS						
UTRWD	Denton	Trinity	Multiples sources	2,800	90%	2,500
New Provider	Parker	Trinity/ Cross Timbers	TRWD System	2,800	90%	2,500

[a] *A separate technical memorandum and cost was prepared for this project.*

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G.2.8 Water Treatment Plants

Potential Sponsor(s)	Multiple
WMS/Project Type:	Water Treatment Plants
Potential Supply Quantity:	0 ac-ft/yr. This strategy does not create new supply, but it is necessary to utilize the supplies created by other strategies.
Implementation Decade:	Varies
Strategy Capital Cost:	Varies
Unit Water Cost ($/kgal)	Varies; See Tables H.12 and H.13
Application:	Varies

Strategy Description

This strategy is to develop required water treatment capacity to use raw water supplies developed as part of other strategies. In some cases, this strategy involves the construction of a new facility and in other instances it is an expansion of existing facilities. Some water treatment facilities are included with the raw water strategy and not shown in Tables H.12 or H.13.

For plant expansions, the cost estimates assume there is existing land available at the site for the expansion. The costs also assume there is existing piping such that the expansion would only require the addition of basic infrastructure like treatment trains. For that reason, it was assumed that if the expansion capacity of a treatment plant was more than 50% of the existing water treatment plant capacity, there would not be existing land, piping, and other items that are assumed to be available in the costing of an expansion. Therefore, those expansions were costed as new water treatment plants.

Supply Development (Quantity, Reliability, Quality)

This strategy is to develop required water treatment capacity to use raw water supplies developed as part of other strategies. While this strategy does not explicitly create supply, it is necessary to utilize the supplies as drinking water.

Environmental Considerations

The construction of the treatment plant may temporarily impact the environment during construction. Additional study and mitigation may be required before construction of the water treatment plant. In most cases, water treatment plants can be located to avoid environmentally sensitive areas.

Permitting and Development

Wastewater discharge permits may be necessary for new facilities. Further evaluation and study will be needed to determine the impact of discharges on receiving water bodies. This will be performed as part of the permitting process.

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Cost Analysis

Cost estimates were prepared using the TWDB Costing Tool. It was assumed that if the expansion capacity of a treatment plant was more than 50% of the existing water treatment plant capacity, there would not be existing land, piping, and other items that are assumed to be available in the costing of an expansion. Therefore, those expansions were costed as new water treatment plants. **Tables H.12** and **H.13** summarize the costs.

Water Management Strategy Evaluation

Based on the analysis provided above, the Water Treatment Plants strategy was evaluated across different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in **Table G.3 and Table G.4.**

Water User Group Application

This strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

This strategy is a recommended strategy for wholesale providers and water users with raw water sources and not enough treatment capacity.

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G.2.9 Gulf of Mexico Desalination

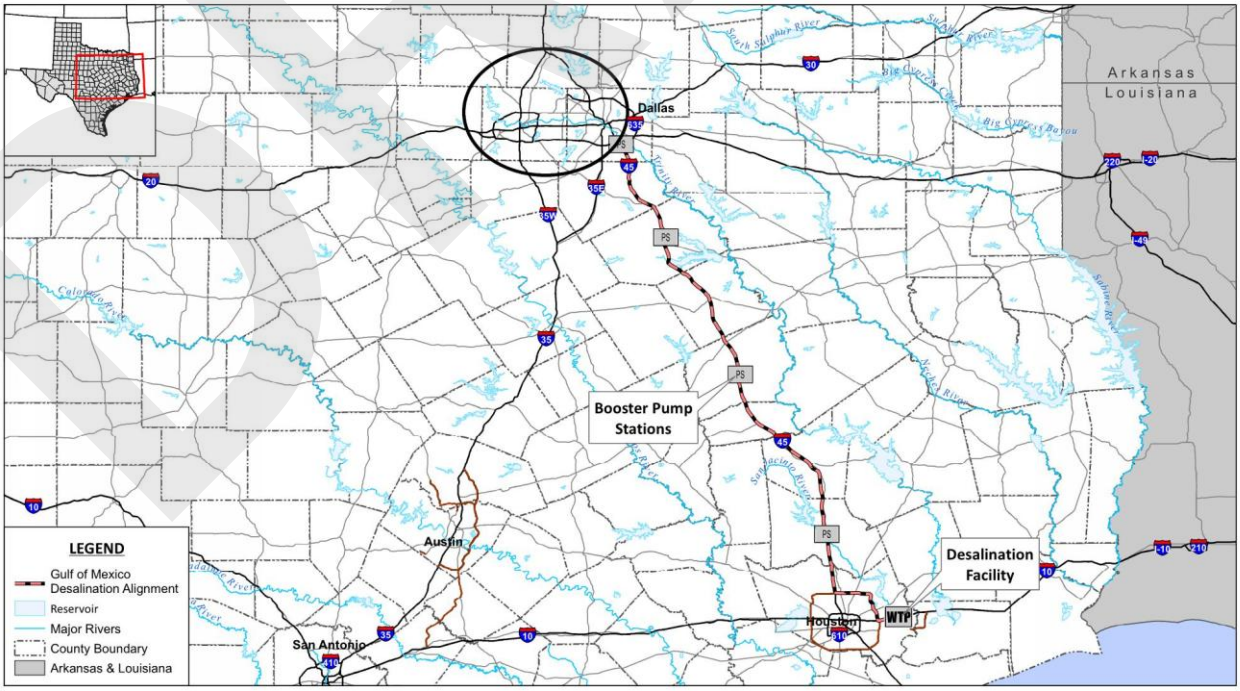
Potential Sponsor(s):	Metroplex Water Provider
WMS/Project Type:	New Surface Water (Desalination)
Potential Supply Quantity:	200,000 acre-feet per year
Implementation Decade:	N/A
Strategy Capital Cost:	$15,157,402,000
Unit Water Cost ($/kgal):	$21.24 during Debt Service; $8.60 after Debt Service
Application:	Potentially Feasible

Strategy Description

The cost of desalination has been decreasing in recent years, and some municipalities in Florida and California have developed desalinated seawater as a supply source. The State of Texas has recently permitted a seawater desalination project, and this is seen as a potential future supply source for the state. While Region C is not a coastal region, seawater desalination has been mentioned through public input during the planning process, and a generic strategy was evaluated in response to that input.

This strategy assumes seawater would be taken from the Gulf of Mexico near Baytown, Texas, and desalinated near the diversion location as shown. The treated water would be transported to the Metroplex generally following the I-45 corridor.

For planning purposes, it is assumed that the initial strategy would deliver 200,000 acre-feet per year by means of one 132-inch pipeline (alternatively, could use two parallel pipelines) and multiple booster pump stations. The water would be desalinated by reverse osmosis and the reject stream from the treatment process would be discharged back to the Gulf of Mexico. This would likely be developed as a joint strategy with multiple providers.



Supply Development (Quantity, Reliability, Quality)

Water Quantity

The quantity of water available from the Gulf of Mexico is relatively unlimited. For this strategy it is assumed that 200,000 acre-feet per year of treated water would be delivered to the Metroplex. Since all of the water would require desalination, the amount of source water would need to be 400,000 acre-feet per year and 200,000 acre-feet per year would be discharged as waste.

Reliability

The availability of the water from the Gulf of Mexico is high; however, due to the long transmission of the water to the Metroplex, the reliability of the transmission system may be moderate.

Water Quality

The treated water quality should be good. However, maintaining and operating a very large desalination plant is challenging and maintaining the treated quality will require highly skilled operators. Changes in the water quality of the source water can affect the operations and treated water quality.

Environmental Considerations

There are several environmental considerations associated with desalinating large quantities of Gulf of Mexico water. The location of the intake could potentially affect aquatic life near the intake. Care would be needed to be sure that aquatic life was not impinged in the intake pump station and there are no significant changes to general salt content of the source area, especially if the intake is located in a brackish area of the Gulf. The brine water in the reject stream could potentially affect aquatic life near the discharge location as well.

The transmission pipeline would likely cross wetlands and streams, but highly sensitive areas may be avoided.

Permitting and Development

Technology for desalination is still developing for this application at this scale. This strategy will require a state water right permit, interbasin transfer (IBT), and a discharge permit. It will also likely require a Section 404 permit for the intake structure, discharge structure, and stream crossings of the transmission system.

There are mixed views on seawater desalination and the project could face public opposition. Considering the permitting requirements, verification of the treatment technology, and construction of an approximately 300-mile transmission system, the strategy would likely take about 20 years to develop.

Cost Analysis

TWDB costing guidance was followed. Infrastructure was sized with a 1.5 peaking factor. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

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TABLE G.13 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Metroplex Provider	$15,157,402,000	$21.24	$8.60

Water Management Strategy Evaluation

Because the cost of desalination and the distance to the Gulf of Mexico, seawater desalination is not a particularly promising source of supply for Region C. The major challenges for this strategy are the technical developments for a project of this scale. Maintaining and operating a remote desalination water treatment plant and a 300-mile transmission system is costly and difficult for the water providers.

The supply from seawater desalination is essentially unlimited, but the cost is a great deal higher than the cost of the other water management strategies for Region C.

Water User Group Application

The Gulf of Mexico desalination strategy was evaluated on a basis of several criteria to determine the providers to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

The Gulf of Mexico Desalination Project is not a recommended or alternative strategy for any water supplier in Region C.

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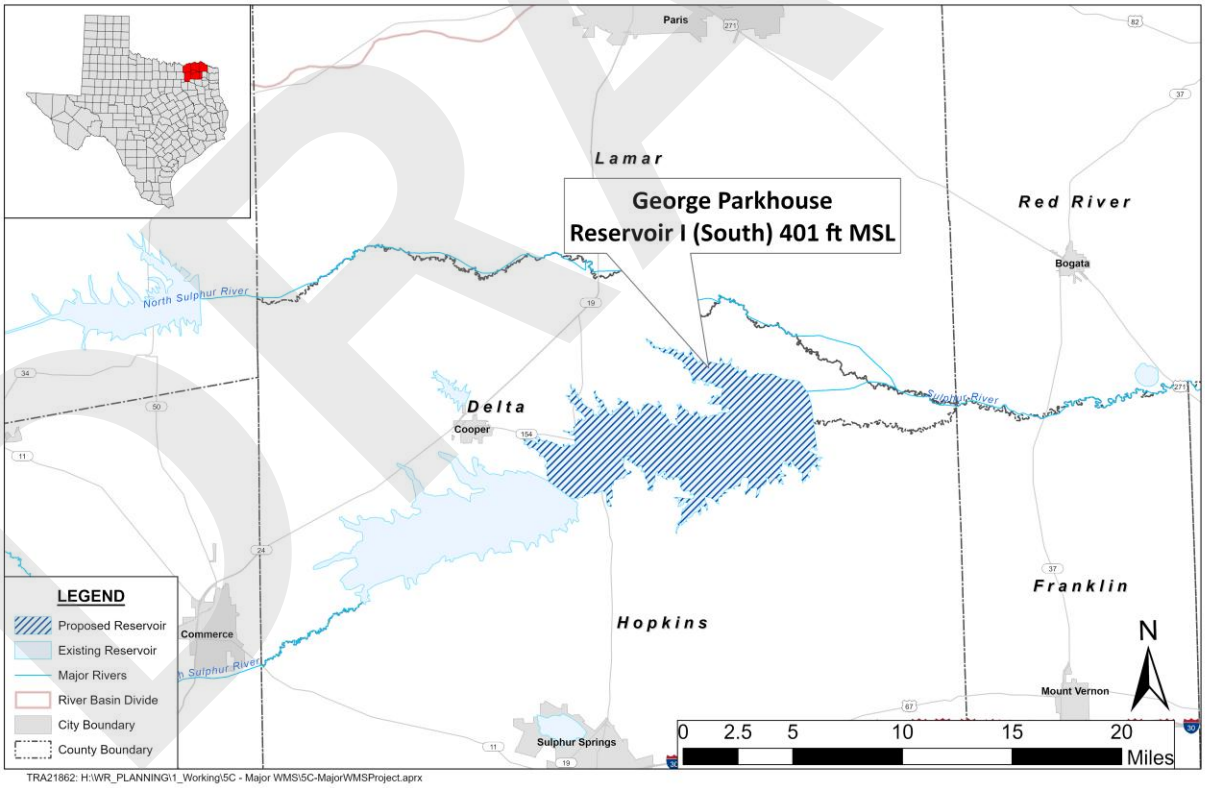
G.3 Joint Major Water Management Strategy Technical Memorandums

G.3.1 George Parkhouse Reservoir I (South)

Potential Sponsor(s):	NTMWD and/or UTRWD
WMS/Project Type:	New Surface Water (Reservoir)
Potential Supply Quantity:	Up to 114,960 ac-ft/yr (102.6 MGD)
Implementation Decade:	2060
Strategy Capital Cost:	$2,555,287,340 (Joint Strategy)
Unit Water Cost ($/kgal)	$4.19 during Debt Service; $0.71 after Debt Service
Application:	Alternative

Strategy Description

George Parkhouse Reservoir I (South) is a potential reservoir located on the South Sulphur River in Hopkins and Delta Counties as shown. This reservoir site was originally proposed as the first phase of the larger George Parkhouse Reservoir, also known as Sulphur Bluff. It is located immediately downstream from Jim Chapman Lake and would yield 114,960 acre-feet per year. At conservation elevation 401 ft. MSL, George Parkhouse Reservoir I (South) would inundate approximately 28,900 acres and store 651,700 acre-feet.



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The reservoir, as currently configured, would abut the dam for Jim Chapman Lake and over thirty-five percent of the land impacted would be bottomland hardwood forest or wetland. This project is considered a potential strategy for NTMWD and UTRWD. It is assumed that the project will either be pursued solely by NTMWD or jointly with UTRWD. It is assumed that the entire yield will be available to Region C users. Pipelines and pump station(s) are included in both strategies to transport the supplies from the reservoir to the service area of the sponsor.

Supply Development (Quantity, Reliability, Quality)

Water supplies from George Parkhouse I (South) were determined using the Sulphur Basin WAM model. Environmental flows as specified under the Senate Bill 3 have not been developed for the Sulphur Basin. As required by regional water planning, the Consensus Criteria for Environmental Flow Needs (CCEFN) were used to estimate environmental flows. The process set by Senate Bill 3 could result in different environmental releases and that could reduce the yields determined using the CCEFN.

Considerations regarding supplies from George Parkhouse I (South) include:

- The project, if constructed, would have an impact on the yield of other projects being considered for development in the Sulphur Basin, including the proposed Marvin Nichols Reservoir and Lake Wright Patman reallocation. This impact was not assessed.

Water Quantity

The quantity of water available to Region C water providers is 114,960 acre-feet per year. The quantities for the joint project are shown in **Table G.14**. The yield of George Parkhouse I (South) is contingent upon other water development in the Sulphur River Basin. If other downstream projects are permitted with a senior priority to George Parkhouse I, then the yield would decrease. Previous studies have indicated the reduction in yield could be up to 60% of the stand-alone firm yield (HDR et.al., 2008). This would likely make this project not economically viable for Region C providers.

This project could be developed in conjunction with George Parkhouse II (North). The yield of the combined projects has not been assessed.

Imposition of different environmental flow criteria could also impact the reliable supply from the project.

TABLE G.14 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	PERCENT OF TOTAL	QUANTITY (AC-FT/YR)
Joint Project		
NTMWD	*70%*	*80,472*
UTRWD	*30%*	*34,488*
TOTAL		***114,960***

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Reliability

The reliability of this supply would be moderately high, pending the implementation of other projects in the Sulphur River Basin. However, a drought worse than the drought of record could occur which could impact the reservoir yield.

Water Quality

This project is located on the South Sulphur River immediately downstream of Lake Jim Chapman. Lake Jim Chapman has been listed on the 303(d) list for high pH levels. The high pH is assumed to come from natural sources. Since there is a required minimum release of 5 cfs from Lake Chapman, there could be an impact on George Parkhouse I (South).

Environmental Considerations

The reservoir is a new source of surface water; therefore environmental impacts have the potential to be greater than other strategies utilizing existing sources.

- **Habitat and Vegetative Cover**. George Parkhouse I (South) would impact approximately 28,362 acres. **Figure G.1** shows different cover types within the impact area at the reservoir site, and **Table G.15** documents the estimated acreages of each cover type. Most of the land cover is grassland and agricultural lands. Approximately 9,754 acres are classified as bottomland hardwoods or forested wetlands. All data are based on desktop evaluations. The proposed reservoir is upstream of priority 1 bottomland hardwoods in Red River County. Priority 1, as classified by USFWS, means excellent quality bottomlands of high value to key waterfowl species (USFWS, 1984). While these designated bottomland hardwoods are located to the east of the reservoir, further study would be needed to assess the potential indirect impacts of the proposed reservoir on these resources.
- **Threatened and endangered species.** There are 22 threatened or endangered species that are known to occur or have the potential to occur within Delta and Hopkins counties. Of these species, six are federally listed and 16 are state listed. The three federally listed species: American Burying Beetle, Black Rail, Ouachita Rock Pocketbook, Piping Plover, Rufa Red Knot, and Whooping Crane have low to no potential to be negatively impacted by the proposed Parkhouse South reservoir. Of the state-listed species, there is a moderate potential that the reservoir could negatively impact the creek chubsucker and timber rattlesnake. No impact or low impact would be expected to the other species. The timber rattlesnake is listed as threatened by the TPWD and prefers moist lowland forests and hilly woodlands or thickets near streams. Within the Parkhouse South site, there are approximately 9,754 acres of bottomlands and forested wetlands that could provide habitat for this species. The creek chubsucker is a freshwater fish that prefers small rivers and creeks that are often highly vegetated. This species has potential to occur within the Parkhouse South area and is listed as threatened by the TPWD. This species seldom inhabits impoundments, such as ponds and lakes. Based on its preferred habitat, there are approximately 176 miles of potential stream habitats for the creek chubsucker within the Parkhouse South reservoir site (FNI, 2013).

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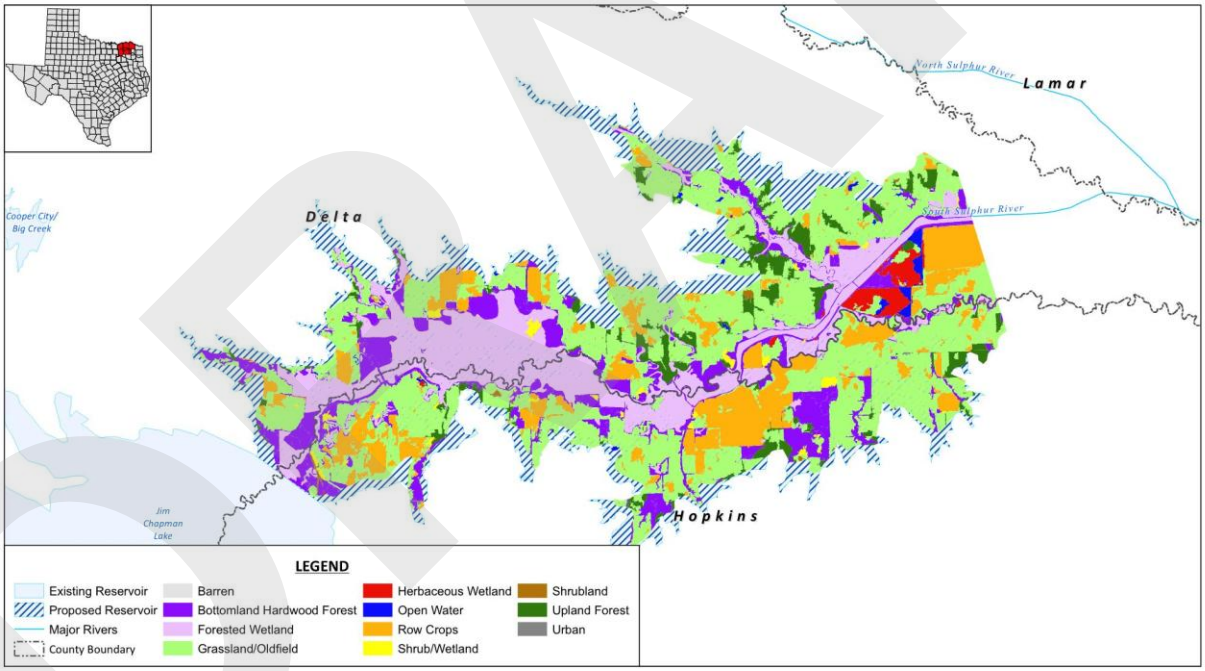
TABLE G.15 VEGETATION COVER TYPES WITHIN RESERVOIR FOOTPRINT[A]

TYPE OF COVER	ACRES
Barren	1
Riparian Woodland/Bottomland Hardwood	4,267
Forested Wetland	5,487
Emergent/Herbaceous Wetland	432
Grassland/Old Field	12,133
Cropland	3,987
Shrub wetland	278
Evergreen forest	1,521
Upland deciduous forest	
Shrubland	65
Open water/Lacustrine	181
Urban	10
TOTAL	***28,362***

[a]*Environmental Evaluation Interim Report, Sulphur River Basin Comparative Assessment, June 2013*

FIGURE G.1 COVER TYPES



- **Cultural resources.** There are nine known cultural resource sites within the Parkhouse South site. Eight sites are prehistoric. Several of these sites have moderate to high potential for listing under the National Register of Historic Places (NRHP). At this time no detailed cultural resource survey has been conducted at the Parkhouse South site.

Permitting and Development

Development of George Parkhouse Reservoir I (South) requires a water right permit and an interbasin transfer permit from TCEQ and a Section 404 permit from the Fort Worth District USACE. The permitting process requires numerous studies and coordination with state and federal agencies. As part of the permitting process, a mitigation plan would be required to compensate for impacts to waters of the U.S. (includes wetlands and streams). Permits for a new lake can take 10 to 20 years to obtain, pending public opposition.

Cost Analysis

Detailed cost estimates for the reservoir were provided by the sponsor where available. For consistency with SB1 planning guidance, the costs were updated to September 2023 dollars using the ENR index. Transmission costs were developed using the Uniform Cost Model and TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance.

TABLE G.16 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD (only)	$2,189,128,000	$3.50	$0.56
NTMWD (joint)	$1,536,057,000	$3.18	$0.47
UTRWD (joint)	$1,019,229,640	$6.54	$1.27

Water Management Strategy Evaluation

The proposed George Parkhouse Reservoir I (South) reservoir is a potentially feasible strategy for two water providers in the Metroplex. The available yield of the project is contingent upon other water supply development in the basin. This reservoir site has over 10,000 acres of vegetative coverage in bottomland hardwood forest or potential wetlands (marsh and seasonally flooded shrubland). The impacts to these resources would require mitigation and likely face opposition from the public and environmental groups.

The proposed reservoir would be located immediately downstream of an existing water source for both NTMWD and UTRWD. There may be potential to operate these lakes as a system for both supply and transport.

Water User Group Application

The George Parkhouse Reservoir I (South) strategy was evaluated on the basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

The potential sponsors of this strategy are NTMWD and UTRWD and their customers. This strategy is an alternative strategy for NTMWD and UTRWD.

G.3.2 George Parkhouse Reservoir II (North)

Potential Sponsor(s)	NTMWD or UTRWD
WMS/Project Type:	New Surface Water (Reservoir)
Potential Supply Quantity:	94,460 ac-ft /yr (84.3 MGD)
Implementation Decade:	2060
Strategy Capital Cost:	$1.8 billion
Unit Water Cost ($/kgal)	$3.56 during Debt Service; $0.65 after Debt Service
Application:	Alternative

Strategy Description

George Parkhouse Reservoir II (North), also known as Parkhouse II, is a potential reservoir located on the North Sulphur River in Lamar and Delta Counties, about 15 miles southeast of the City of Paris as shown. This reservoir site was originally proposed as the second phase of the larger George Parkhouse Reservoir, formerly known as Sulphur Bluff. At a proposed conservation elevation of 410.0 ft MSL, the reservoir would store approximately 331,000 acre-feet of water and inundate 14,400 acres. This project is a potential strategy for NTMWD and UTRWD. It is assumed that the project will either be pursued solely by NTMWD or solely by UTRWD. Pipelines and pump station(s) are included in both strategies to transport the supplies from the reservoir to the service area of the sponsor.

Facilities included in this strategy include both the proposed reservoir and the infrastructure needed to transport raw water to the Leonard Water Treatment Plant in Fannin County for NTMWD. For UTRWD, the transmission system delivers water to the Lake Ralph Hall Terminal Storage, located west of Greenville. Alternatively, UTRWD may take the water directly to Lake Ralph Hall and construct a pipeline to the Harpool Water Treatment Plant in Providence Village.

Supply Development (Quantity, Reliability, Quality)

Water supplies from George Parkhouse Reservoir II (North) were determined using the Sulphur River WAM. Environmental flows as specified under Senate Bill 3 have not been developed for the Sulphur Basin. Yields were evaluated using the Consensus Criteria for Environmental Flow Needs (CCEFN), as reported in the Site Protection Study (HDR et al. 2008). The new process set by Senate Bill 3 could result in different environmental releases and that could reduce the yields determined using the CCEFN.

Considerations regarding supplies from George Parkhouse Reservoir II (North) include:

- The project, if constructed, would have an impact on the yield of other projects being considered for development in the Sulphur Basin, including the proposed Marvin Nichols Reservoir and Lake Wright Patman reallocation. This impact was not assessed.

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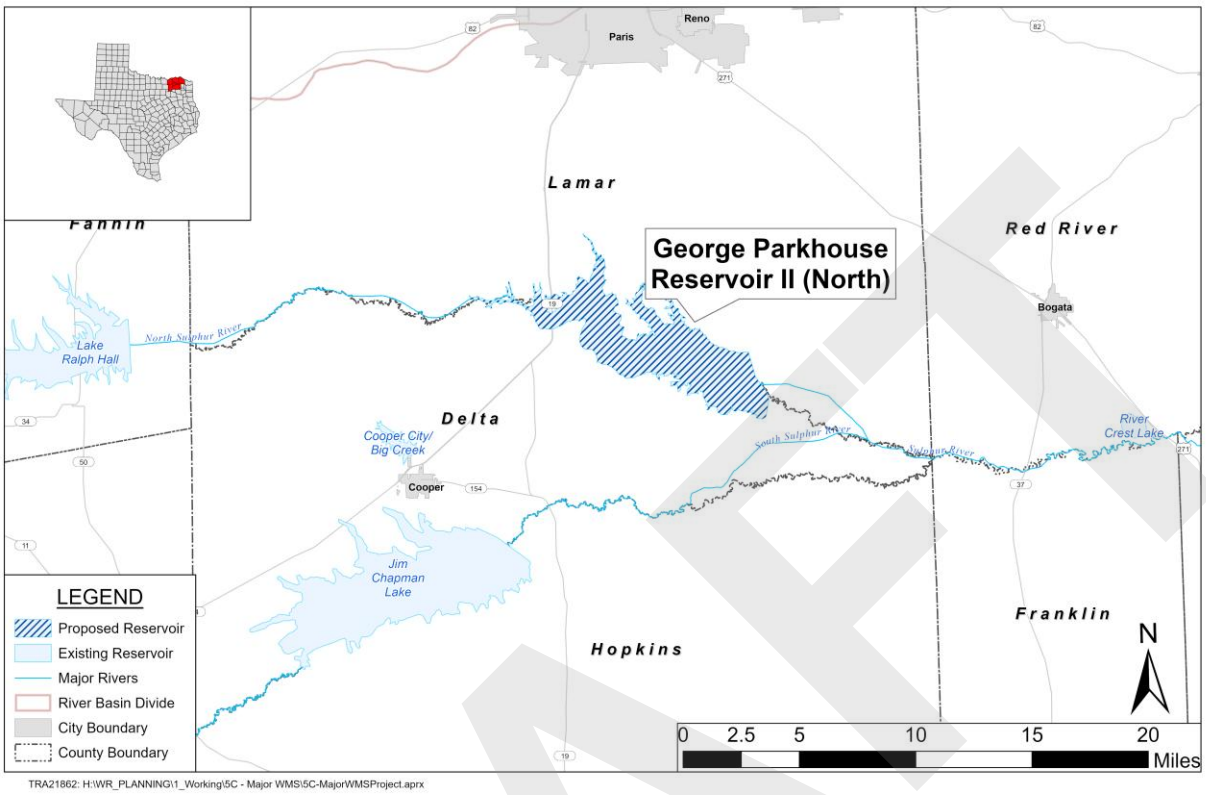

Water Quantity

With these assumptions, the firm yield of George Parkhouse Reservoir II (North) with CCEFN instream flow releases is estimated at 94,460 acre-feet per year. The entire firm yield will be available to Region C users. The yield of George Parkhouse Reservoir II (North) is contingent upon other water development in the Sulphur River Basin. If other downstream projects are permitted with a senior priority to George Parkhouse Reservoir II (North), then the yield would decrease. Previous studies have shown that the reduction in yield could be more than 70% (HDR et.al., 2008). This would likely make this project not economically viable for Region C providers.

This project could be developed in conjunction with George Parkhouse Reservoir I (South). The yield of the combined projects has not been assessed.

Reliability

The reliability of this supply would be moderately high, pending the development of other projects in the Sulphur River Basin. However, a drought worse than the drought of record could occur which could impact the reservoir yield. Imposition of different environmental flow criteria could also impact the reliable supply from the project.

Water Quality

The North Sulphur River and its tributaries are deeply incised and eroding. Current conditions are the result of channelization in the 1920s to early 1930s, which has caused accelerated erosion such that the river channel is now about 300 feet wide and 40 feet deep in some places. These

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drastic changes to the stream channel have resulted in an extremely flashy stream system with often little to no flow. Large flow events continue to erode the channel carrying heavy sediment loads which would accumulate in the proposed reservoir. The construction of Lake Ralph Hall would reduce some of this sediment transport downstream.

The segment of the North Sulphur where Parkhouse North would be located has elevated chlorophyll-a levels. Also, a tributary to the proposed reservoir, Aud's Creek, has been listed for a concern for habitat and impaired macrobenthic community. The entire stretch of the North Sulphur River is listed as not fully supporting aquatic life (FNI, 2013). Aside from these impairments, the water in the North Sulphur is generally freshwater runoff. Based on expected water quality parameters in Bois d'Arc Lake, total dissolved solids (TDS) levels are expected to be about 300 mg/L in Parkhouse North.

Environmental Considerations

The reservoir is a new source of surface water, therefore environmental impacts have the potential to be greater than other strategies utilizing existing sources.

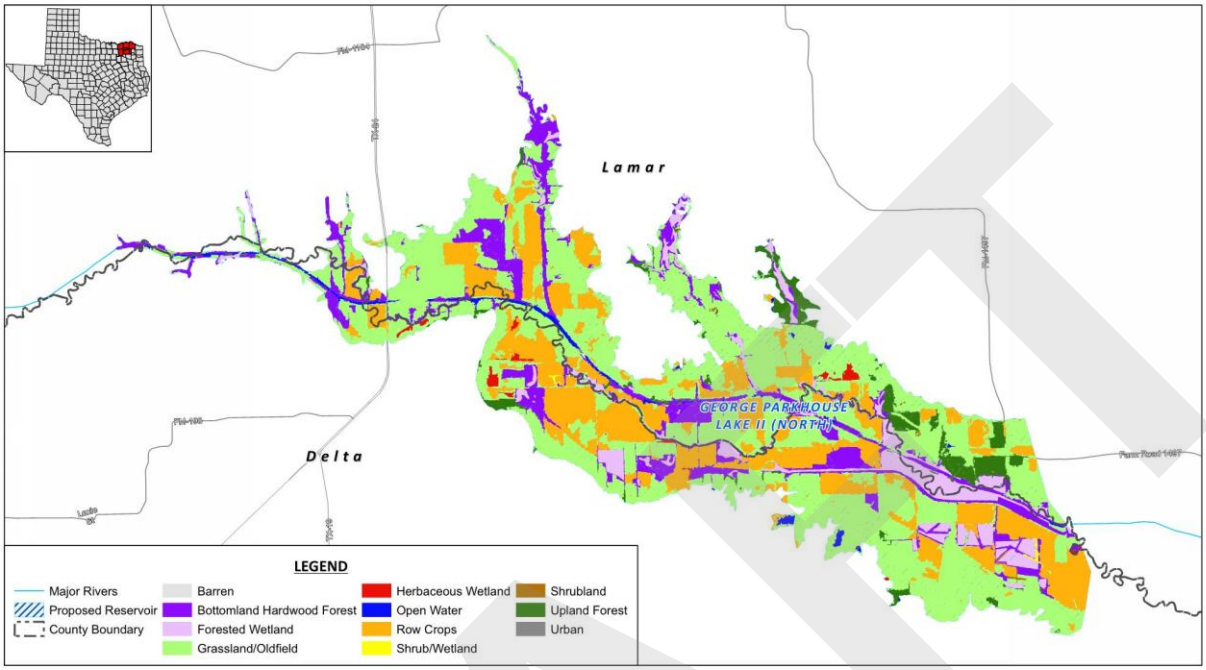
- **Habitat and Vegetative Cover.** Parkhouse North would inundate 14,400 acres and impact an additional 1,600 acres for construction of the dam, spillway, pump station and pipeline. **Figure G.2** shows different cover types within the impact area at Parkhouse North site (including the dam footprint), and **Table G.17** documents the estimated acreages of each cover type. Most of the land cover is grassland and agricultural lands. Approximately 3,076 acres are classified as bottomland hardwoods or forested wetlands. Using NHD stream data, approximately 93 miles of streams would be inundated. All data are based on desktop evaluations. Parkhouse North is upstream of priority 1 bottomland hardwoods in Red River County. While these designated bottomland hardwoods are located approximately 27 miles to the east of the reservoir, further study would be needed to assess the potential indirect impacts of the proposed reservoir on these resources.

TABLE G.17 VEGETATION COVER TYPES WITHIN RESERVOIR FOOTPRINT[A]

TYPE OF COVER	ACRES
Riparian Woodland/Bottomland Hardwood	1,960
Forested Wetland	1,116
Emergent/Herbaceous Wetland	91
Grassland/Old Field	7,718
Cropland	3,626
Shrub wetland	28
Evergreen forest and Upland deciduous forest	602
Shrubland	19
Open water/Lacustrine	182
Urban	14
TOTAL	***15,356***

[a]*Environmental Evaluation Interim Report, Sulphur River Basin Comparative Assessment, June 2013*

FIGURE G.2 COVER TYPES



- **Threatened and endangered species**. There are 23 threatened or endangered species that are known to occur or have the potential to occur within Lamar and Delta counties. Of these species, six are federally listed and seventeen are state-listed. The six federally listed species: American Burying Beetle, Black Rail, Ouachita Rock Pocketbook, Piping Plover, Rufa Red Knot, and Whooping Crane have low to no potential to be negatively impacted by the proposed Parkhouse North reservoir. Of the state-listed species, there is a moderate potential that the reservoir could negatively impact the creek chubsucker and timber rattlesnake. No impact or low impact would be expected to the other species. The timber rattlesnake is listed as threatened by the TPWD and prefers moist lowland forests and hilly woodlands or thickets near streams. Within the Parkhouse North site, there are approximately 3,076 acres of bottomlands and forested wetlands that could provide habitat for this species. The creek chubsucker is a freshwater fish that prefers small rivers and creeks that are often highly vegetated. This species has potential to occur within the Parkhouse North area and is listed as threatened by the TPWD. This species seldom inhabits impoundments, such as ponds and lakes. Based on its preferred habitat, there are approximately 93 miles of potential stream habitats for the creek chubsucker within the Parkhouse North reservoir site (FNI, 2013).

- **Cultural resources**. Parkhouse North is located in an area with moderate potential for cultural resources. There are seven known cultural resource sites within the Parkhouse North site. Two sites are associated with the Caddo Nation and five sites are prehistoric. There is the possibility that one site may contain human remains. Several of these sites have moderate to high potential for listing under the National Register of Historic Places

(NRHP). Preliminary field investigations at the Lake Ralph Hall site, located 15 miles upstream of the Parkhouse North site, suggest that there is strong potential for unrecorded prehistoric and historic properties along the first terrace of the Sulphur River valley (Skinner et al, 2005). At this time no detailed cultural resource survey has been conducted at the Parkhouse North site.

Permitting and Development

To construct a new reservoir, both a state water right permit and a federal Section 404 permit are required. Parkhouse II also would require an interbasin transfer basin to move the water from the Sulphur River Basin to the Trinity River Basin. As part of the permitting process, a mitigation plan would be required to compensate for impacts to waters of the U.S. (includes wetlands and streams).

The permitting process for a new reservoir often takes 15 to 20 years, depending upon the permit requests, complexity of the project site, and potential opposition to the project. The project design and construction could then take an additional 5 to 10 years. This project is proposed to be developed by 2060.

Cost Analysis

Detailed cost estimates for this strategy were provided by the sponsor where available. These costs are more detailed estimates developed during planning and/or design. For consistency with SB1 planning guidance, the costs were updated to September 2023 dollars using the ENR index. When detailed costs were not available, TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance.

TABLE G.18 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD (only)	$1,875,428,235	$3.73	$0.65
UTRWD (only)	$2,505,047,235	$5.03	$0.84

Water Management Strategy Evaluation

This project has the potential to produce a reliable source for Region C. The proposed George Parkhouse Reservoir II (North) is a potentially feasible strategy for two water providers in the Metroplex. The available yield of the project is contingent upon other water supply development in the basin. It is located near Lake Jim Chapman and Lake Ralph Hall, so it could be operated as a system with those sources.

Although this project has been considered for many years, it has not been studied in detail and a feasibility study is recommended before pursuing this project.

Water User Group Application

The George Parkhouse Reservoir II (North) strategy was evaluated on the basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to

the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

The potential sponsors of this strategy are NTMWD or UTRWD. This strategy is an alternative strategy for NTMWD and UTRWD.

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G.3.3 Integrated Pipeline

Potential Sponsor(s):	TRWD and DWU
WMS/Project Type:	New Surface Water (Infrastructure)
Potential Supply Quantity:	This is an infrastructure project that will transport supplies from multiple strategies for TRWD and DWU. Supply quantities are shown with the source water strategy.
Implementation Decade:	2040
Strategy Capital Cost:	$1.4 billion
Unit Water Cost ($/kgal):	N/A
Application:	Recommended

Strategy Description

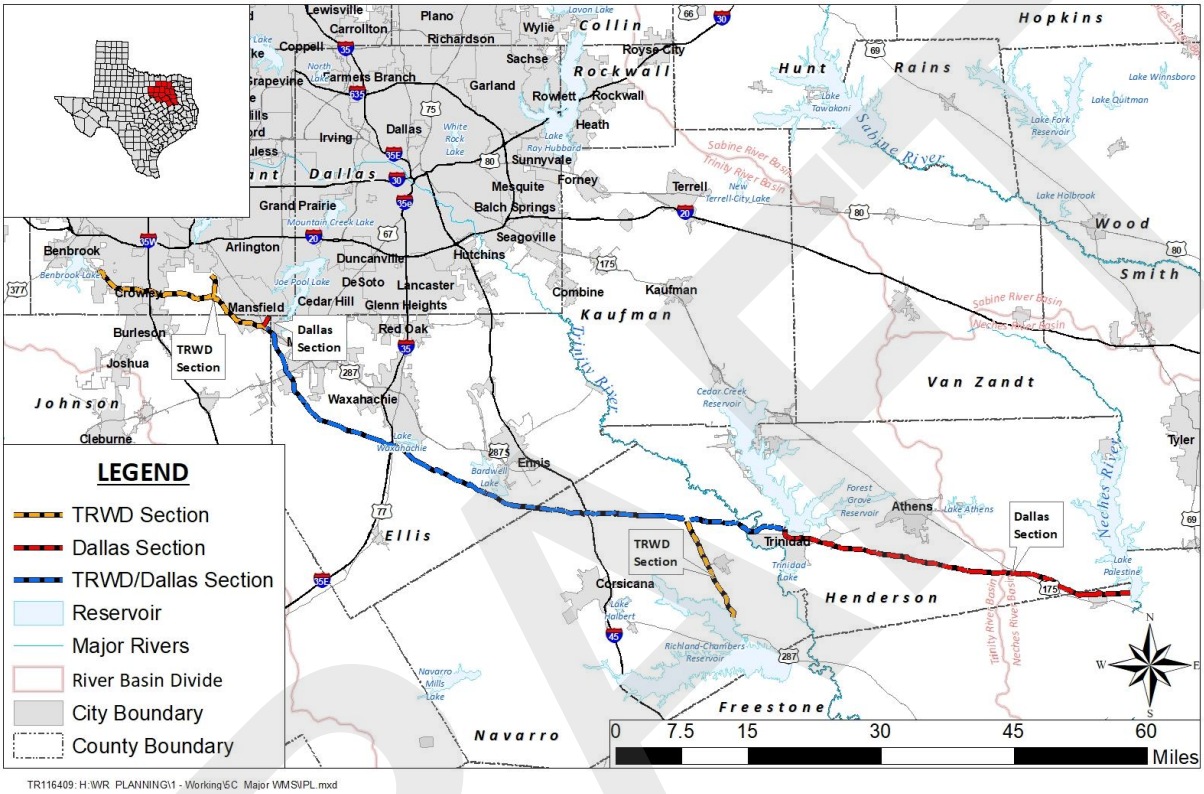
The Tarrant Regional Water District (TRWD) and Dallas Water Utilities (DWU) have partnered to construct and operate the Integrated Pipeline (IPL) Project. The IPL project is an integrated water delivery transmission system that extends from Lake Palestine to Benbrook Lake with connections to Cedar Creek and Richland-Chambers Reservoirs. The pipeline will have an ultimate capacity of approximately 350 MGD (200 MGD for TRWD and 150 MGD for DWU). Dallas's share of the project will deliver water from Lake Palestine and TRWD's share will deliver surface water and reuse supplies from Cedar Creek and Richland-Chambers Reservoirs.

A portion of the IPL has been constructed and is currently delivering raw water to TRWD customers. The intake and pump station on Lake Palestine is under construction and should be completed before 2030. The pipeline to transport DWU's supplies from Lake Palestine to the IPL pump station at Cedar Creek Reservoir is also under construction and when completed would be able to transport DWU's full contracted supply from Lake Palestine and the Neches Run-of River supplies. None of the DWU water supplies are discharged to TRWD reservoirs. The remaining portions of the IPL to be completed, which are included in this project, will provide capacity to deliver the TRWD permitted reuse supplies that are currently limited by infrastructure capacity. Additional projects will be needed to fully develop these reuse supplies, such as construction of the Marty Leonard Wetlands at Cedar Creek Reservoir. The completed IPL will be used to transport additional reuse at Richland-Chambers, reuse at Cedar Creek Reservoir, and a portion of the reuse from TRA.

The IPL project addresses only the portions of the IPL that have not yet been completed and includes:

- TRWD Joint Richland-Chambers Pump Station (250 MGD ultimate design capacity)
- TRWD Pipeline Segment Section 9 (10.6 mile 84" Pipeline and 5 mile 120" tunnel; Kennedale Balancing Reservoir turn-out tee to existing Benbrook connection pipeline)
- TRWD Pipeline Segment Section 16 (12.3 mile 96" Pipeline)
- TRWD Booster Pump Station (JB4 at 197 MGD)
- Shared Booster Pump Stations (JB2 and JB3 at 347 MGD). JB3 exists but there will be a future expansion for additional pumps, motors, VFDs, substation equipment, and balancing reservoirs.

Additional transmission capacity for TRWD will be needed by 2050 to move new water developed from Lake Tehuacana, Carrizo-Wilcox aquifer and the remaining reuse from TRA. The timing of this additional delivery system may be delayed if there is unused capacity in the IPL. The additional transmission system would be a separate project from the IPL, dedicated only for TRWD.



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Supply Development (Quantity, Reliability, Quality)

This project provides the infrastructure necessary to transport existing TRWD permitted water from Richland-Chambers and Cedar Creek Reservoirs and additional reuse supplies that will become available after the completion of the wetland project at Cedar Creek Reservoir (see *TRWD Marty Leonard Wetlands*). This joint project also includes the infrastructure needed to transport DWU's contracted water in Lake Palestine (see *IPL Connection to Dallas System)*.

Water Quantity

Since this project addresses only the portions of the IPL that are not complete, the quantity of water represents the amount of TRWD water (both surface water and reuse supplies) that is not available today due to infrastructure constraints and future supplies to be developed. The quantities for future supplies for TRWD and DWU are listed in **Table G.19** but are associated with the respective water management strategy. The future supplies include additional TRWD reuse, DWU's contract for Lake Palestine water, and future developed water from the Neches Run-of-River strategy.

TABLE G.19 SUMMARY OF ADDITIONAL SUPPLIES THROUGH IPL (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
TRWD	0	60,086	60,086	60,086	60,086	60,086
DWU	0	95,086	93,967	92,874	145,586	144,481

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Reliability

The reliability of the source water is addressed under each strategy. The reliability of the IPL itself is high. Both TRWD and DWU have multiple sources of water and transmission systems to accommodate periodic downtimes for maintenance and/or repairs.

Water Quality

The water quality of the source water is expected to be good. There will be a review of the different sources to assess potential mixing concerns. Water from Lake Palestine is not intended to be stored but is planned to be delivered directly to a point upstream of Joe Pool Lake in Dallas. Alternatively, DWU could deliver the water to a potential new water treatment facility in southeast Dallas.

Environmental Considerations

As previously noted, much of the IPL from TRWD's sources has been completed. Environmental studies for the remaining sections from Richland Chambers have been completed, and environmentally sensitive areas have been avoided. The environmental studies for the segment from Lake Palestine are on-going.

- **Habitat and Vegetative Cover**. Lake intake and transmission pipeline infrastructure were located to avoid conflicts with environmentally sensitive bottomland hardwoods and riparian areas in addition to ecologically significant stream sections. Where possible, the pipeline follows existing road rights-of-way or crosses areas of agricultural use.
- **Threatened and Endangered Species**. The project area includes 28 species that are federally or state listed as threatened or endangered or are federal candidate species in the counties for which the project is located. No designated areas of critical habitat currently occur within the project area.
- **Environmental Water Needs.** Implementation and operation of the IPL will have a very limited impact on daily flows since it will operate in accordance with authorized water right permits.
- **Wetlands.** Impacts to wetlands associated with this project are anticipated to be low.

Permitting and Development

This project would pose limited permitting challenges. A Section 404 permit from the USACE for impacts to a waterway from construction activities has been obtained and construction activities for several components are underway.

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Cost Analysis

Detailed cost estimates for portions of the IPL were provided by TRWD where available. These costs are more detailed estimates developed during design and were used for the specific components. It does not include costs for portions of the project already constructed. Annual costs were not developed because the project does not directly provide water, only infrastructure capacity.

DWU has additional costs associated with connecting supplies from the IPL to their Bachman WTP that are not included in the costs below. The Bachman WTP connection is discussed in **Section G.4.2**

TABLE G.20 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
IPL Completion			
TRWD	$1,327,000,000	N/A	N/A
DWU	$114,000,000	N/A	N/A
TOTAL	***$1,441,000,000***	***N/A***	***N/A***

Water Management Strategy Evaluation

The IPL provides the means to use existing water supplies that are currently not available to TRWD or DWU because of infrastructure limitations. This project has minimal environmental impacts. Extensive environmental studies have been conducted or are on-going to identify potentially environmentally sensitive areas. Where possible, these areas have been avoided. The IPL also provides a means to share water resources between TRWD and DWU during emergencies or on an interim basis. This flexibility in operations, provided by the IPL, increases the resiliency of the source water.

Water User Group Application

The strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

The IPL Project is recommended by the Region C Regional Water Planning Group. The IPL Project is sponsored by TRWD and DWU and will serve the customers of both.

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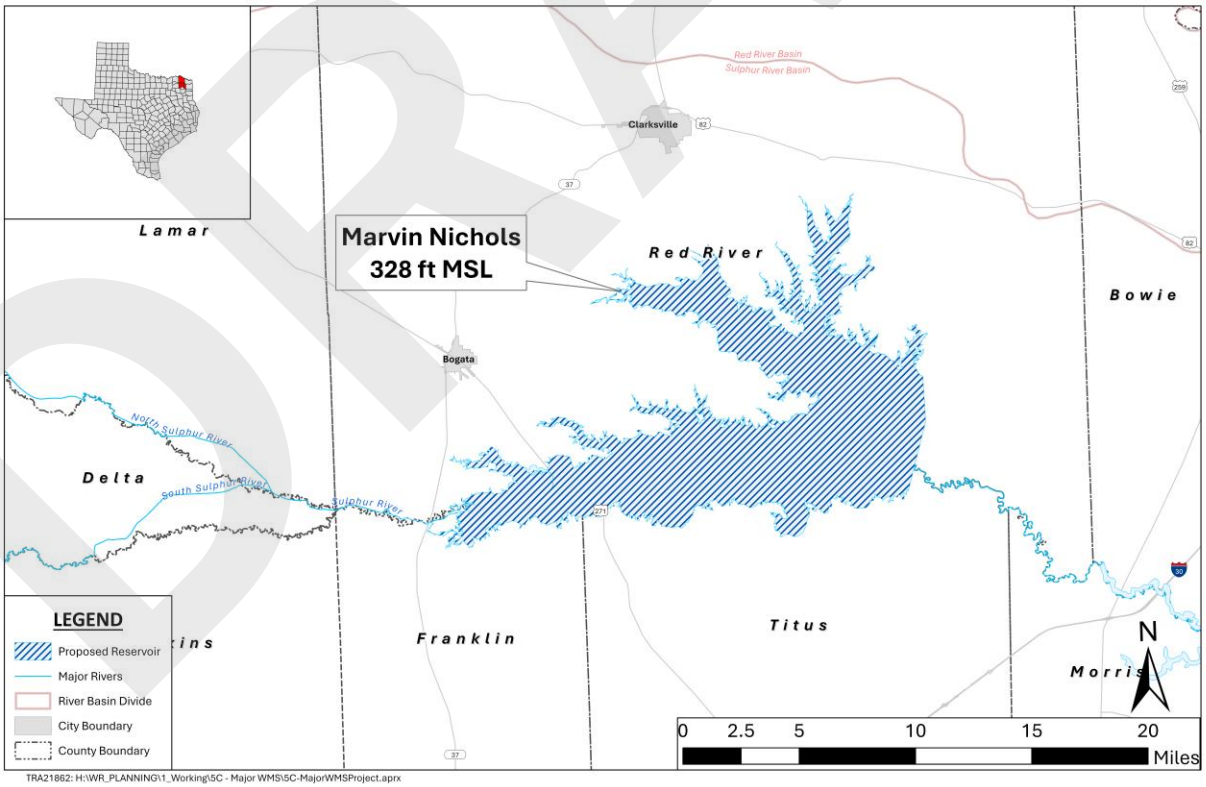
G.3.4 Marvin Nichols Reservoir Site 1A (328' MSL)

Potential Sponsor(s):	NTMWD, TRWD, UTRWD, DWU and/or Irving
WMS/Project Type:	New Surface Water (Reservoir)
Potential Supply Quantity:	320,160 acre-feet per year
Implementation Decade:	2070
Strategy Capital Cost:	$7,364,971,000 (recommended)
Unit Water Cost ($/kgal):	$4.62 during Debt Service, $0.96 after Debt Service
Application:	Recommended (NTMWD, TRWD, UTRWD) Alternative (DWU and Irving)

Strategy Description

Marvin Nichols Reservoir (Site 1A) is a potential reservoir located on the Sulphur River in Titus, Red River and Franklin Counties, about 45 miles west of Texarkana as shown in **Figure G.3**. The reservoir, if constructed, would be approximately 100 miles from the Metroplex. This strategy has been included in every state water plan since 1968. At a proposed conservation elevation of 328 feet MSL, the reservoir would store 1,532,000 acre-feet of water with a water surface area of 66,103 acres. This strategy has historically been developed as a joint strategy by several Metroplex water providers.

FIGURE G.3 MAP OF MARVIN NICHOLS RESERVOIR (328 MSL)



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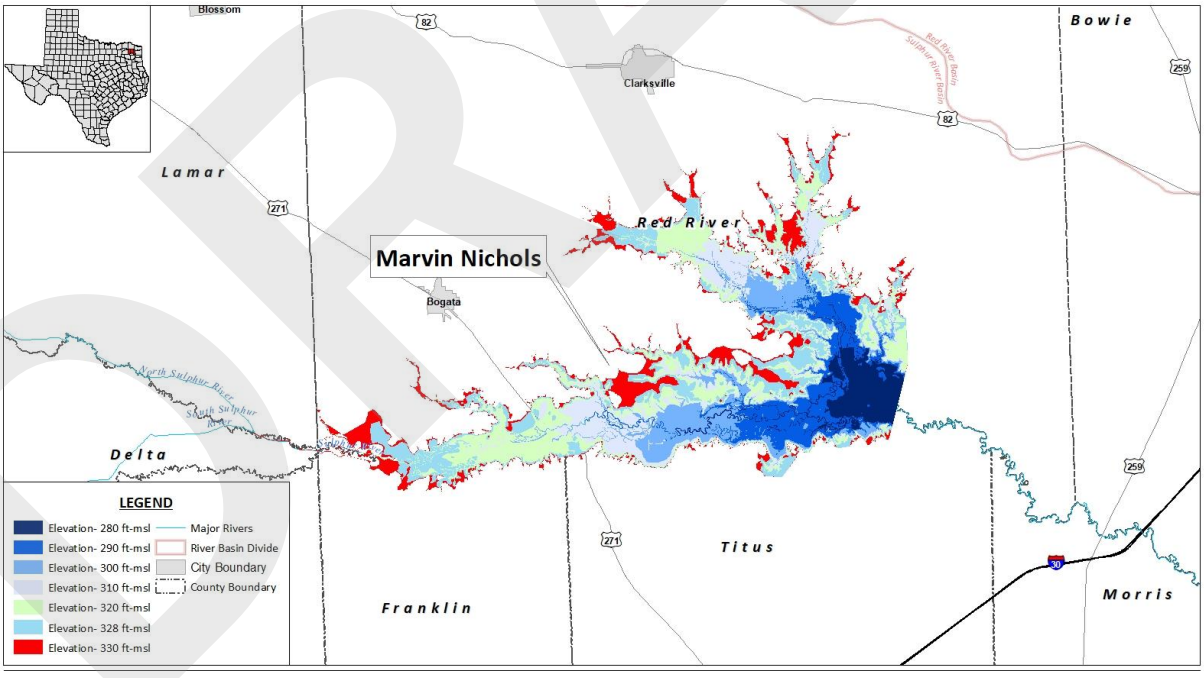
Supply Development (Quantity, Reliability, Quality)

The available supply from Marvin Nichols Reservoir at 328 feet MSL was determined using the TCEQ's Sulphur River Basin water availability model (WAM). The Sulphur River Basin is one of a few river basins that TCEQ has not established environmental flow criteria. Therefore, environmental flow bypasses were estimated based on the Consensus Criteria for Environmental Flow Needs (CCEFN) as required by TWDB for regional water planning. It was also assumed that if the TCEQ received a major water application in the Sulphur River Basin (such as Marvin Nichols Reservoir), TCEQ would establish environmental flows for the entire basin prior to evaluating the application. Based on this assumption environmental by-pass criteria were estimated at two locations in the Sulphur WAM: below the Marvin Nichols Reservoir and below Lake Wright Patman.

Considerations regarding supplies from Marvin Nichols Reservoir include:

- Twenty percent of the yield of the project is reserved for local use in the Sulphur Basin. This assumption is based on an informal agreement with the Sulphur Basin Authority.
- Releases from Marvin Nichols for environmental flows were based on CCEFN.
- The yield of the project assumed without consideration of pending water right applications and other proposed Sulphur Basin projects. However, other projects being considered for development in the Sulphur Basin, including the Lake Wright Patman reallocation, could have an impact on the yield if permitted as senior to Marvin Nichols Reservoir.

FIGURE G.4 INUNDATION MAP OF MARVIN NICHOLS RESERVOIR



Water Quantity

With these assumptions, the firm yield of Marvin Nichols Reservoir at 328 feet MSL (with CCEFN environmental flow releases) is estimated to be 400,200 acre-feet per year. Of this amount, 320,160 acre-feet per year would be available to water providers in Region C. The remaining 20% of the yield would remain in the Sulphur Basin for local use. Also, if other proposed projects in the Sulphur River Basin are permitted as senior to the Marvin Nichols Reservoir, this could have an impact on the quantity of available supply. Application of different environmental flow requirements could also have an impact on project yield.

There are five potential sponsors of this strategy: TRWD, NTMWD, DWU, UTRWD and the city of Irving. For the 2026 Region C Plan, the Marvin Nichols Reservoir is a recommended strategy for TRWD, NTMWD and UTRWD. It is an alternative strategy for all five sponsors. The supply distribution to each sponsor is shown below.

TABLE G.21 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
Recommended Strategy						
TRWD	0	0	0	0	148,555	148,555
NTMWD	0	0	0	0	148,555	148,555
UTRWD	0	0	0	0	23,050	23,050
Alternative Strategy						
TRWD	0	0	0	0	103,092	103,092
NTMWD	0	0	0	0	103,092	103,092
UTRWD	0	0	0	0	23,052	23,052
DWU	0	0	0	0	74,596	74,596
Irving	0	0	0	0	16,328	16,328
TOTAL	***0***	***0***	***0***	***0***	***320,160***	***320,160***

Reliability

The Sulphur River Basin is in an area with average rainfall between 42 and 50 inches. The reliability of this supply would be high. However, a drought worse than the drought of record could occur which could impact the reservoir yield.

Water Quality

There are no major impairments or concerns on the segment of the Sulphur River where Marvin Nichols would be located; however, Kickapoo Creek, a tributary to the Sulphur River within the footprint of Marvin Nichols, is listed for impaired macrobenthic community (FNI, 2013). Inundation of the channel by the reservoir should serve to dilute the pollutants that may be affecting the macrobenthic organisms. There is also a concern for habitat and impaired macrobenthic community in Big Sandy Creek, a tributary of the North Sulphur River upstream of the reservoir. Existing impairments upstream are not currently affecting water quality in this reach, so they would not be expected to negatively impact the water quality of the reservoir (FNI, 2013).

Environmental Considerations

The reservoir is a new source of surface water, therefore environmental impacts have the potential to be greater than other strategies utilizing existing sources.

- **Habitat and Vegetative Cover.** Marvin Nichols Reservoir at 328 feet MSL would inundate 66,103 acres. The additional acres impacted by construction of the dam, spillway, pump station and pipeline were not available for this evaluation. **Figure G.5** shows different cover types within the impact area at the Marvin Nichols site, and **Table G.22** documents the estimated acreages of each cover type. Over 90% of the land cover is made up of four land use categories: forested wetland, grassland, bottomland hardwood forest, and upland forest. Approximately 28,900 acres are classified as bottomland hardwoods or forested wetlands. All data are based on desktop evaluations and have not been field verified. Priority 1 bottomland hardwoods are located within and downstream of the Marvin Nichols Reservoir site. Priority 1, as classified by USFWS, means excellent quality bottomlands of high value to key waterfowl species (USFWS, 1984). Further study would be needed to assess the potential indirect impacts of the proposed reservoir on the downstream bottomland hardwoods.

TABLE G.22 VEGETATION COVER TYPES[A]

COVER TYPE	ACRES IMPACTED
Barren	<1
Bottomland Hardwood Forest	9,289
Forested Wetland	19,622
Grassland/Old Field	18,241
Herbaceous Wetland	1,244
Open Water	1,162
Row Crops	706
Shrub Wetland	4,093
Shrubland	444
Upland Forest	11,223
Urban	78
TOTAL	***66,103***

[a]*Watershed Overview Sulphur River Basin Overview Final Report January 2014, table updated by FNI, 2024*

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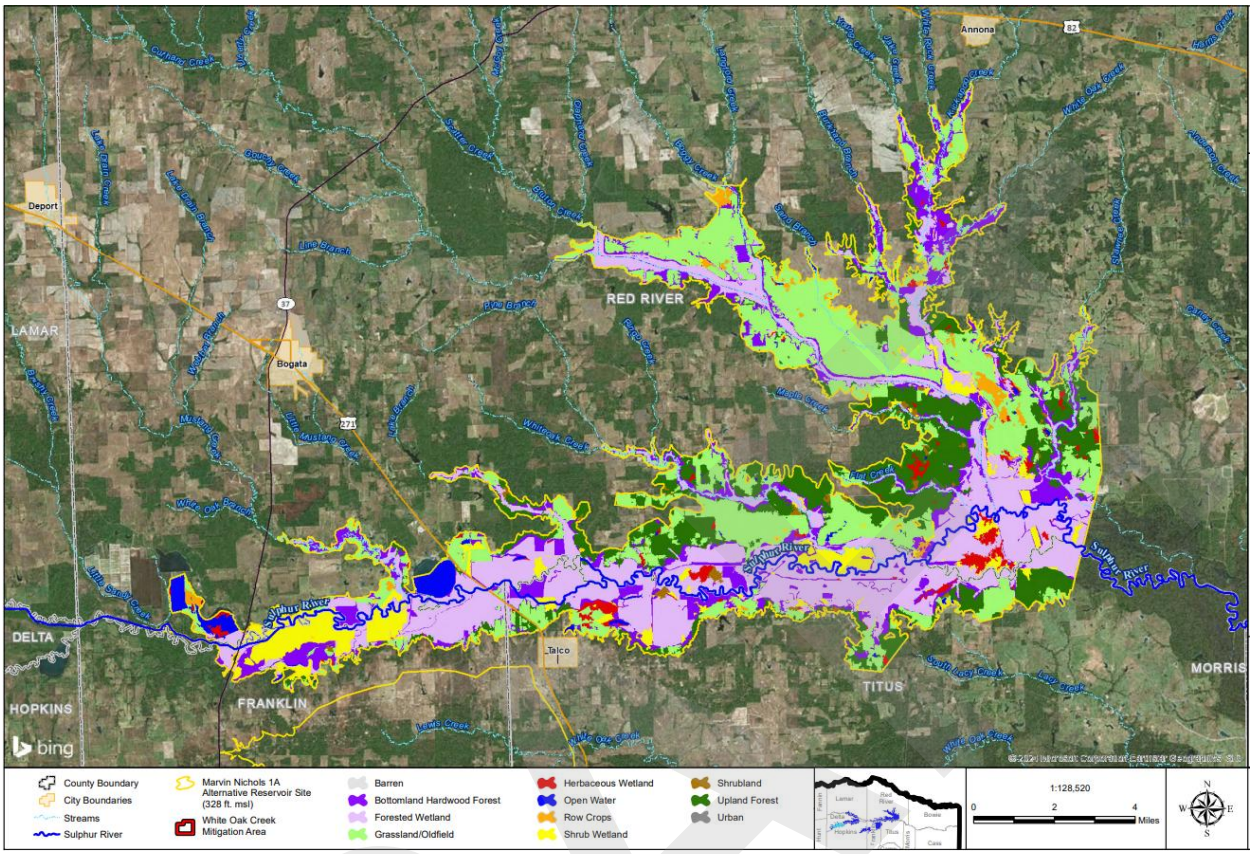
FIGURE G.5 LAND COVER TYPES



- **Threatened and endangered species.** There are 20 threatened or endangered species that are known to occur or have the potential to occur within Titus, Red River, and Franklin counties. Of these species, seven are federally listed and 13 are state listed. Three of the federally listed species are unlikely to be impacted by the project. The Piping plover has a moderate potential to be impacted. The species with a high potential to be impacted include the Yellow-billed cuckoo (*Coccyzus americanus*), the American burying beetle (*Nicrophorus americanus*), and the Ouachita rock pocketbook (*Arcidens wheeleri*). There are seven state-listed threatened or endangered species that have moderate to high potential to be impacted.

- **Cultural Resources**. Marvin Nichols is located in an area with high potential for cultural resources. There are 66 known cultural resource sites within the Marvin Nichols site. Thirteen sites are associated with the Caddo Nation, 43 sites are prehistoric, seven span more than one category, and three lack sufficient information to evaluate. Several of these sites have moderate to high potential for listing under the National Register of Historic Places (NRHP). No detailed cultural resource survey has been conducted at the Marvin Nichols site.

Permitting and Development

Feasibility studies have been conducted for the Marvin Nichols Reservoir, but no detailed field studies or permit applications have been submitted. To construct a new reservoir, both a state water right permit and a federal Section 404 permit are required. Marvin Nichols also requires an interbasin transfer permit to move the water from the Sulphur River Basin to the Trinity River Basin. Permits for a new lake can take 15 to 20 years or longer to obtain, pending public opposition.

Cost Analysis

In 2024, the sponsors of the Marvin Nichols Reservoir conducted a study to update the hydraulic and hydrologic analysis of the reservoir and cost estimates. The capital costs for this project are based on detailed costs developed for this study (FNI, 2024). All costs were updated to September 2023 dollars, following TWDB cost guidance. Annual costs were also developed following TWDB guidance.

TABLE G.23 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Recommended Strategy			
TRWD	$4,389,997,000	$6.03	$1.29
NTMWD	$2,559,708,000	$3.39	$0.69
UTRWD	$415,266,000	$3.42	$0.60
TOTAL	***$7,364,971,000***	***$4.62***	***$0.96***
Alternative Strategy			
TRWD	$3,088,764,000	$6.13	$1.32
NTMWD	$1,873,622,000	$3.57	$0.72
UTRWD	$408,707,000	$3.38	$0.60
DWU	$1,690,464,000	$4.53	$0.93
Irving	$201,397,000	$2.23	$0.35
TOTAL	***$7,262,954,000***	***$4.54***	***$0.93***

Water Management Strategy Evaluation

This strategy provides a reliable new source of freshwater supplies for Region C water providers at a reasonable cost. It is located near other existing water sources that could potentially be operated as a system.

The challenges to this strategy are permitting and the current political opposition. Based on desktop analyses, there are approximately 25,000 acres of wetlands and another 9,000 acres of bottomland hardwoods. These natural resources are valuable to the local ecosystem and would require compensatory mitigation. A mitigation plan would be required to compensate for impacts to waters of the U.S. (includes wetlands and streams) as part of the permitting process. Based on recently permitted new reservoirs, the land required for mitigation is approximately equivalent to the total acreage of the proposed new reservoir (i.e., 1:1 ratio or more). The land most desirable for mitigation would be non-forested acreage that could be restored into emergent and forested wetlands and bottomland hardwoods.

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Economic studies conducted as part of the 2021 Region C Water Plan show that the construction and operation of the reservoir would induce economic benefit to the local communities. The construction of the reservoir would provide nearly $5.5 billion economic benefits over the construction period and $228 million annually during operation (**Appendix J, Attachment J-2**).

Appendix J contains additional information on the quantitative evaluation of this strategy.

Water User Group Application

This strategy was considered for the major water providers in Region C. This strategy is a recommended strategy for NTMWD, TRWD, and UTRWD. It is an alternative strategy for DWU and Irving.

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G.3.5 Wright Patman Reallocation

Potential Sponsor(s):	NTMWD, UTRWD, TRWD, DWU and/or Irving
WMS/Project Type:	New Surface Water (Reallocation)
Potential Supply Quantity:	125,000 acre-feet per year
Implementation Decade:	2080
Strategy Capital Cost:	$4.76 billion
Unit Water Cost ($/kgal):	$7.59 during Debt Service; $1.39 after Debt Service
Application:	Recommended (NTMWD and TRWD) Alternative (DWU, Irving, and UTRWD)

Strategy Description

The Wright Patman Reallocation strategy involves development of new surface water supplies from the Sulphur River Basin through a reallocation of storage at Wright Patman Lake from its current purpose, flood control, to water conservation storage. The supply quantity and cost identified above are for a specific reallocation of Wright Patman at elevation 235 ft MSL. At that conservation pool elevation, the pool raise at Wright Patman Lake would impact up to 15,152 acres above the permitted conservation pool elevation (ultimate rule curve). Infrastructure would be developed to transport the water to the Region C water providers. The Wright Patman Reallocation strategy is considered for NTMWD, UTRWD, TRWD, Dallas and the City of Irving.

Wright Patman Lake is an existing reservoir on the Sulphur River, about 150 miles from the Metroplex. It is owned and operated by the U.S. Army Corps of Engineers (USACE), and the City of Texarkana has contracted with the Corps of Engineers for storage in the lake and holds a Texas water right to use up to 180,000 acre-feet per year from the lake.

The Region C entities that are interested in the development of Sulphur Basin Supplies conducted joint studies with the USACE on the potential reallocation of Lake Wright Patman. Based on these analyses, the Fort Worth USACE recommended the reallocation of Wright Patman to 235 ft MSL. This recommendation provides quantity of water for Region C, while minimizing impacts on the White Oak Mitigation Area.

Supply Development (Quantity, Reliability, Quality)

This strategy is conceived as an independent strategy from other potential Sulphur Basin supplies. The amount of supply available from Wright Patman was determined using Sulphur Basin WAM. Since the Sulphur River Basin does not have approved SB3 flows, consistent with TWDB rules, environmental flow bypasses are based on the Consensus Criteria for Environmental Flow Needs (CCEFN).

Considerations regarding Wright Patman supplies include:

- The yield of the project assumed senior priority over other proposed Sulphur Basin projects, excluding Marvin Nichols Reservoir. However, other projects being considered for development in the Sulphur Basin, including Parkhouses I and II, could have an impact on the yield if permitted senior to either Marvin Nichols Reservoir or Lake Wright Patman reallocation.

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- Yield for the Wright Patman reallocation assumed that the City of Texarkana would receive its full water right amount of 180,000 acre-feet per year that is associated with the Ultimate Rule Curve operation of Wright Patman.
- Sensitivity to project supplies was evaluated based on the order of priority between Marvin Nichols Reservoir and Lake Wright Patman (FNI, 2024).

Water Quantity

The firm yield with reallocation of Wright Patman to elevation 235 ft MSL, above the 180,000 acre-feet per year permitted to Texarkana, would be 125,000 acre-feet per year. It is assumed that all the reallocation supplies would be available to Region C providers. This reallocation would still increase the reliable supply to Region D since it firms up Texarkana's water right. Without the reallocation, the reliable supply for Texarkana is less than 180,000 acre-feet per year.

These quantities assume that Marvin Nichols is permitted senior to Lake Wright Patman. If Lake Wright Patman is permitted as senior to the Marvin Nichols Reservoir, the supply from Wright Patman would increase, but the supply from Marvin Nichols would decrease. Application of different environmental flow requirements could also have an impact on project yield.

TABLE G.24 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
Recommended Strategy						
TRWD	0	0	0	0	0	62,550
NTMWD	0	0	0	0	0	62,550
Alternative Strategy						
TRWD	0	0	0	0	0	40,250
NTMWD	0	0	0	0	0	40,250
UTRWD	0	0	0	0	0	9,000
DWU	0	0	0	0	0	29,125
Irving	0	0	0	0	0	6,375
TOTAL	***0***	***0***	***0***	***0***	***0***	***125,000***

Reliability

The Sulphur River Basin is in an area with average rainfall between 42 and 50 inches. The reliability of this supply would be high. However, a drought worse than the drought of record could occur which could impact the reservoir yield.

Water Quality

Lake Wright Patman has been listed on the Texas 303(d) list since 1996. Some subsegments in the lake do not meet pH or dissolved oxygen (DO) criteria. Occasional fish kills have been attributed to low DO levels. There also have been concerns for chlorophyll-a, orthophosphorus, and total phosphorus. Increasing the water conservation pool will likely not improve or worsen current water quality issues since much of the sources of the concerns are associated with the tributaries to the lake. Generally, this water source will continue to be a suitable municipal water supply (FNI, 2013).

Environmental Considerations

There are several environmental considerations associated with this joint strategy.

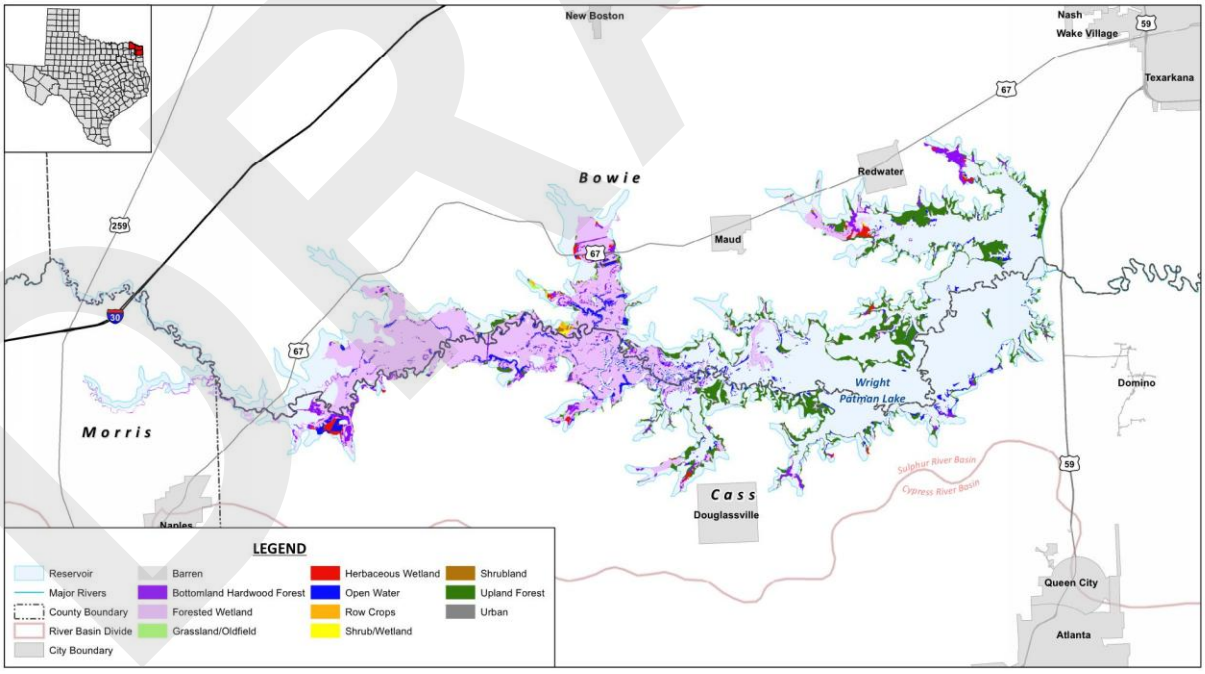
- **Habitat and Vegetative Cover.** Reallocated storage would permanently inundate agricultural, silvicultural, and natural resources. The pool raise at Wright Patman Lake would convert 14,327 acres above the ultimate rule curve conservation pool elevation to permanent open water and create 825 acres of additional swamp land. For the Wright Patman reallocation, the cover types were classified by the different types of bottomland forest wetlands (swamp, bottomland, seasonally flooded and temporarily flooded) and uplands, which are shown on **Table G.25**. These quantities are compared to the cover types and areas inundated under the Ultimate Rule Curve.

TABLE G.25 VEGETATIVE COVER TYPE FOR WRIGHT PATMAN REALLOCATION AT 235' MSL[A]

HABITAT	WIGHT PATMAN (URC)	REALLOCATION TO 235' MSL	
		REMAINING HABITAT	NET CHANGE
Open Water	36,870	51,242	14,372
Swamp	1,476	2,301	825
Bottomland	5,177	954	-4,223
Seasonally Flooded	20,629	19,273	-1,356
Temporarily Flooded	23,750	17,495	-6,255
Upland	17,704	17,898	194

[a]*Sulphur Basin Study, Terrestrial habitat Modeling, September 2018 URC – Ultimate Rule Curve (elevation 228 ft)*

FIGURE G.6 VEGETATIVE COVER TYPES FOR WRIGHT PATMAN REALLOCATION AT 235' MSL



- **Threatened and Endangered Species**. There are six federally listed threatened and endangered species with the potential to occur within the counties in which this WMS is located: American Burying Beetle, Black Rail, Ouachita Rock Pocketbook, Piping Plover, Rufa Red Knot, and Whooping Crane. There is low to no potential to impact any of these species from the construction of this project. There are no preferred habitats for these species within the project sites. In addition to these three species, there are 23 state listed species potentially occurring within the project counties (this includes the recently federally delisted bald eagle and black bear). Of these state-listed species, the western creek chubsucker, northern scarlet snake, and timber rattlesnake have moderate potential to be negatively impacted by the project. Further study would be needed to assess potential impacts, if any.
- **Cultural Resources.** A desktop assessment of the potential for cultural resources was conducted as part of the Sulphur Basin study. The Wright Patman reallocation would require additional cultural resources surveys. However, some of the areas have had surveys conducted as part of the initial development of the reservoir. Of the area for high potential for cultural resources, over half have been previously surveyed. There are approximately 150 known cultural resource sites, of which less than 50 have the potential for significance.
- **Other Considerations**. In addition to considerations of impacts to habitats and waters of the U.S., the reallocation of Wright Patman has the potential to impact the White Oak Creek Wildlife Management Area (WOCWMA). This site is located upstream of Lake Wright Patman and is designated as mitigation for the construction of Jim Chapman Reservoir. At elevation 235 ft MSL, the increase in the conservation pool at Lake Wright Patman would increase water levels on approximately 450 acres of the WOCWMA and affect some riparian bottomland hardwoods. However, reallocation at this elevation would not affect the functioning of constructed wetland structures and would still allow the wetland structures to function as designed.

Permitting and Development

Reallocation at Wright Patman Lake on the scale envisioned in this strategy would require approval of the U.S. Congress. A new State water right and inter-basin transfer approval would be required from TCEQ to implement each component of the strategy. A section 404 permit would be needed for the transmission system and a Section 408 authorization is needed for impacts to federal lands.

Cost Analysis

This planning level opinion of costs has been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. The costs developed for the Sulphur Basin study were the basis of this cost update for the dam modification and increased storage at Lake Wright Patman (FNI, 2014b). Transmission costs were updated to reflect updated quantities and delivery points using the TWDB costing tool.

TABLE G.26 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Recommended Strategy			
TRWD	$3,127,515,500	$10.36	$1.87
NTMWD	$1,632,513,500	$4.82	$0.91
TOTAL	***$4,760,029,000***	***$7.59***	***$1.39***
Alternative Strategy			
TRWD	$2,211,508,800	$11.27	$2.17
NTMWD	$1,108,788,700	$5.08	$0.90
UTRWD	$251,248,700	$7.24	$1.27
DWU	$1,102,983,500	$7.30	$1.35
Irving	$116,548,700	$3.56	$0.58
TOTAL	***$4,791,259,000***	***$7.67***	***$1.42***

Water Management Strategy Evaluation

This strategy provides a reliable new source of fresh water supplies for Region C water providers. It is located near other existing water sources that could potentially be operated as a system.

The challenges to this strategy are permitting and Congressional approval needed for reallocation. While impacts to the WOCWMA are minimized, there is uncertainty regarding mitigating for any impacts to an existing mitigation site. These natural resources are valuable to the local ecosystem and would require compensatory mitigation. A mitigation plan would be required to compensate for impacts to waters of the U.S. (includes wetlands and streams) as part of the permitting process.

Reallocation of Lake Wright Patman would be sponsored by the USACE and would require additional environmental studies. Currently, the USACE is reluctant to approve reallocation of flood storage to water conservation storage. Further study would be needed to ensure that there is no increase in flooding risks after reallocation.

Positive economic benefits are expected for the construction and operation of the Lake Wright Patman reallocation.

Water User Group Application

The Wright Patman Reallocation strategy was considered for DWU, TRWD, City of Irving, UTRWD, and NTMWD. This strategy is a recommended strategy for TRWD and NTMWD. This strategy is an alternative strategy for UTRWD, DWU, and Irving.

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G.3.6 Water from Oklahoma

Potential Sponsor(s):	NTMWD, UTRWD, DWU, TRWD, and/or Irving
WMS/Project Type:	New Surface Water (Purchase)
Potential Supply Quantity:	25,000 - 300,000 acre-feet per year
Implementation Decade:	Varies
Strategy Capital Cost:	Varies
Unit Water Cost ($/kgal):	Varies
Application:	Alternative (NTMWD, UTRWD, DWU, TRWD, and/or and Irving)

Strategy Description

This strategy was evaluated for five wholesale water providers in Region C: NTMWD, UTRWD, DWU, TRWD, and the City of Irving. . At the present time, the Oklahoma Legislature has established a moratorium on the export of water from the state. Previously, the Tarrant Regional Water District pursued a case in Federal Court to determine whether this moratorium could be overturned, and the Supreme Court subsequently ruled in favor of Oklahoma. For the long term, Oklahoma remains a potential source of water supply for Region C.

There are multiple sources of Oklahoma water that have been evaluated in previous studies. These sources include Lake Hugo, Lake Texoma, Kiamichi River, Boggy Creek, Cache Creek and Beaver Creek. Since this strategy would not be implemented for several decades, the source of water will be simply defined as Oklahoma water. **Table G.27** shows the source of water for each water provider that was assumed for costing purposes.

TABLE G.27 WATER PROVIDER AND SOURCE LOCATION

WATER PROVIDER	SOURCE LOCATION
NTMWD	Kiamichi River
UTRWD	Lake Hugo
DWU	Kiamichi River
TRWD	Lake Texoma
Irving	Lake Hugo

It is assumed that if this strategy is pursued, it would be developed individually by each provider. As such, the infrastructure and delivery location will be unique to each provider. For NTMWD and DWU, a new river diversion and pump station would be constructed on the Kiamichi River just upstream of the confluence with the Red River. A transmission pipeline would be tunneled beneath the Red River and then constructed to the final delivery location. For UTRWD and Irving, an intake pump station would be built on Lake Hugo, and a transmission pipeline would then carry water to their respective delivery location. Other transmission infrastructure would include a booster pump station(s) and a storage tank(s). For TRWD, an intake pump station would be constructed at Lake Texoma with a transmission pipeline being built to transport water that would be pretreated before delivery at Lake Bridgeport. **Table G.28** shows the delivery locations for each water provider.

TABLE G.28 WATER PROVIDER AND DELIVERY LOCATION

WATER PROVIDER	DELIVERY LOCATION
NTMWD	Bois d'Arc Lake
UTRWD	Lake Ralph Hall
DWU	Lake Ray Roberts
TRWD	Lake Bridgeport
Irving	Lake Lewisville

Supply Development (Quantity, Reliability, Quality)

Previous studies and the Oklahoma State Water Plan have shown substantial amounts of water is available in the Kiamichi watershed.

Water Quantity

Lake Hugo has a storage capacity of 157,600 acre-feet at conservation pool. The Kiamichi watershed encompasses approximately 1,830 square miles, of which some is regulated through existing lakes. No yield analyses were conducted for the supplies. It is assumed based on the Oklahoma Resource Board assessment of water supplies that there is 50,000 acre-feet per year or more water available to other users at this location. The quantity of supplies for each strategy is summarized in **Table G.29**.

TABLE G.29 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
NTMWD	-	-	-	-	-	50,000
UTRWD	-	25,000	55,000	55,000	55,000	55,000
DWU	-	-	-	-	-	300,000
TRWD	-	-	-	-	50,000	50,000
Irving	-	-	25,000-	25,000	25,000	25,000

Reliability

The water from Oklahoma is expected to be highly reliable. Historically these supplies have been reliable, however increased use in Oklahoma might change this. Additionally, there is always the potential that a new drought could occur that would reduce the supplies, but the quantity used in this evaluation is less than the firm yield. An availability analysis would be required prior to implementation. The greatest potential to reliability is a changing political climate that may impede out-of-state water sales.

Water Quality

Water quality in Lake Hugo and the lower Kiamichi River watershed is generally good. Main issues are turbidity (average turbidity is 36 NTU) and pH (6.3-8.3 pH units). Further analysis is needed to determine if water from Lake Texoma will require pretreatment or blending before delivery to meet current water quality standards.

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Environmental Considerations

Environmental studies will need to be conducted before construction begins on any of the strategies.

- **Habitat and Vegetative Cover.** Impacts to environmentally sensitive areas along the pipeline route should be minimal and would be avoided where possible. Lake intake and transmission pipeline infrastructure would be located to avoid conflicts with environmentally sensitive areas in addition to ecologically significant stream sections. Where possible, the pipeline follows existing road rights-of-way or crosses areas of agricultural use. Impacts to the Red River are avoided by tunneling beneath the river. This strategy proposes to transfer the water to existing lakes. Care should be taken to minimize the transfer of invasive species, especially since this water crosses state lines. If the placement of water into an existing lake becomes a concern, the water could be delivered directly to the intake at the receiving lake.
- **Threatened and Endangered Species**. The project area includes 19 species that are federal or state-listed as threatened or endangered or are federal candidate species in the counties for which the project is located. No designated areas of critical habitat currently occur within the project area.
- **Environmental Water Needs**. Implementation and operation of the strategies will have a limited impact on daily flows since the strategies will operate in accordance with authorized water right permits.
- **Wetlands.** Impacts to wetlands associated with this project are anticipated to be low.

Permitting and Development

Permitting and development of Oklahoma water has been an obstacle to developing this strategy. Currently Oklahoma has moratorium for export of water out of state. This includes both sales of water that is already permitted and new water right permits.

There are also several issues beyond the moratorium:

- The Chickasaw and Choctaw Indian Nations have asserted legal claims to water in southeastern Oklahoma. Neither tribe has asserted their claims in court but may do so in the future.
- Oklahoma City has filed permit applications for water from the Kiamichi River basin. The courts will have to assess the impact of intrastate needs in conjunction with the interstate permit applications filed by Texas entities.
- The use of Oklahoma water in Texas has no precedence in Texas Water law or TCEQ rules.

A new water right requires the granting of this right by the Oklahoma Water Resource Board. Alternatively, water could be sold directly from an existing water right holder, such as the City of Hugo or others. The river diversion and transmission pipeline would require a federal Section 404 permit. Since this water originates outside of Texas, an interbasin transfer permit is not required by TCEQ.

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The public and political opposition to this strategy effectively limits development opportunities in the near future. It is expected that this opposition will subside over time. Another major obstacle is the federal Lacey Act that prohibits the transference of invasive species across state lines. This could be addressed through changes in legislation. The resolution of these development issues will likely take some time.

Cost Analysis

TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

TABLE G.30 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD	$1,075,067,000	$4.39	$0.84
UTRWD	$645,268,000	$2.77	$0.82
DWU	$4,258,261,000	$3.69	$0.64
TRWD	$924,991,000	$3.83	$0.75
Irving	$341,796,025	$3.53	$1.25

Water Management Strategy Evaluation

This strategy provides a reliable water supply in close proximity to other existing water sources for the identified potential sponsors. There are minimal environmental concerns with the intake and pipeline. The challenges with this strategy are the development issues, including the political moratorium on out-of-state water sales and the Lacey Act. Under the Lacey Act, it is unlawful to import, export, sell, acquire or purchase fish, wildlife or plants that are taken, possessed, transported, or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any fish, wildlife, or plants taken, possessed or sold in violation of State or foreign law. Since there is considerable uncertainty as to when these obstacles could be overcome, this strategy cannot be counted on for near-term water supplies.

Water User Group Application

The Oklahoma strategies were evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which they may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

The Oklahoma Strategy is recommended as an alternative strategy for NTMWD, UTRWD, DWU, TRWD, and Irving by the Region C Regional Water Planning Group.

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G.3.7 Lake Texoma Supplies

Potential Sponsor(s)	DWU, GTUA, NTMWD, UTRWD, Sherman, and Denison
WMS/Project Type:	New Surface Water (Desalination/Blending)
Potential Supply Quantity:	Varies.
Implementation Decade:	Varies.
Strategy Capital Cost:	Varies.
Unit Water Cost ($/kgal)	Varies.
Application:	Varies.

Strategy Description

Lake Texoma is an existing Corps of Engineers reservoir on the Red River on the border between Texas and Oklahoma. The reservoir is about 50 miles from the Metroplex. The lake is used for water supply, hydropower generation, flood control, and recreation. In Texas, the North Texas Municipal Water District (NTMWD), the Greater Texoma Utility Authority (GTUA), the City of Denison, Texas Utilities (TXU), and the Red River Authority (RRA) have contracts with the Corps of Engineers and Texas water rights allowing them to use water from Lake Texoma.

Water from Lake Texoma is brackish, which means that the use of Texoma water requires the water to be blended with a freshwater source or desalinated. This has historically limited the amount of water that is used from Lake Texoma, either due to limited quantities of fresh water for blending or operational constraints for desalination. The water rights for each entity are summarized in **Table G.31**. GTUA has contracted their water right to several entities within the region. Currently the only entities that have the transmission infrastructure to access these supplies through GTUA are Sherman and its customers.

TABLE G.31 LAKE TEXOMA REGION C WATER RIGHTS

ENTITY	WATER RIGHT YIELD (AC-FT/YR)	CONSTRAINT
NTMWD	197,000	Must blend with other supplies due to quality (3:1 Blending Ratio).
GTUA	**83,200**	Limited by the Sherman Desalination Plant Capacity.
Collinsville	*1,130*	*No transmission infrastructure.*
Denison	*12,204*	*Limited by plant capacity and quality. This is in addition to Denison's own right.*
Gainesville	*12,204*	*No transmission infrastructure.*
Gunter	*1,130*	*No transmission infrastructure.*
Lake Kiowa	*848*	*No transmission infrastructure.*
Lindsay	*1,695*	*No transmission infrastructure.*
Marilee SUD	*2,260*	*No transmission infrastructure.*
NWGCWCID #1	*678*	*No transmission infrastructure.*
Pottsboro	*5,650*	*No transmission infrastructure.*
Sherman	*37,209*	*Limited by the Sherman Desalination Plant Capacity.*
Southmayd	*565*	*No transmission infrastructure.*
Two Way SUD	*2,260*	*No transmission infrastructure.*
Whitesboro	*2,260*	*No transmission infrastructure.*

ENTITY	WATER RIGHT YIELD (AC-FT/YR)	CONSTRAINT
Woodbine	*848*	*No transmission infrastructure.*
Denison	24,400	Limited by Plant capacity and quality. This is in addition to supplies contracted with GTUA.
TXU	16,400	TXU facility closed. Valley Lake was sold to a private entity. TXU still holds water right but relinquished its contract with the USACE for storage.
RRA	2,250	

Dallas (DWU), Upper Trinity Regional Water District (UTRWD), GTUA, and Sherman have expressed interest in developing additional supplies from Lake Texoma. However, all the currently authorized Texas storage in the lake is contracted with existing users. For entities without or without enough existing water rights in Lake Texoma, there are three possibilities to obtain additional Texoma supplies:

(1) **Purchase of existing water rights in Lake Texoma.** There are several unused water rights in Lake Texoma, including the TXU water right. Purchasing the USACE storage contract and water right would provide additional supply to the new owner. If only the storage contract is available for purchase, an entity would need to seek a new water right to divert the water.

(2) **Additional reallocation of hydropower storage to water supply in Lake Texoma.** According to the Corps of Engineers, the firm yield of Lake Texoma with all hydropower storage reallocated to water supply would be 1,088,500 acre-feet per year. Texas' share would be 544,250 acre-feet per year, leaving about 220,000 acre-feet per year of additional supply available to Texas (beyond the supplies already contracted for the currently authorized reallocation). Reallocation above 50,000 acre-feet would require a new authorization by Congress.

(3) **Texas water providers could contract directly with Oklahoma for supply from the Oklahoma share of Texoma.** There are political issues with this option that are discussed in more detail under the *Water from Oklahoma Technical Memorandum* included within this appendix.

Due to the proximity of Lake Texoma to the Metroplex and the individual needs of the Region C water providers, there are multiple strategies that propose to use water from Lake Texoma.

Supply Development (Quantity, Reliability, Quality)

Water Quantity

The amount of water available for each of the Texoma blending strategies is highly dependent upon the water quality of Lake Texoma and the fresh water source. For NTMWD, there are multiple potential sources of water for blending: Bois d'Arc Lake, Lake O' the Pines, Marvin Nichols Reservoir, and Wright Patman Reservoir reallocation. All these sources are expected to have good quality water with TDS levels at 300 mg/l or less. If all the blending strategies are implemented, then there will be minimal remaining permitted supplies available for the desalination strategy and additional supplies would need to be permitted and/or contracted. The blending source for UTRWD

includes Lake Ralph Hall and Marvin Nichols Reservoir. Considering these sources, a blend ratio of 3:1 is assumed to be achievable. However, operational testing after implementation would be needed to verify this assumption.

For desalination strategies, a portion of the Texoma source water would be discharged as waste. Loss amounts from the desalination process can range depending on the source water quality. To minimize the amount of treatment losses, the desalinated water could be blended back with only conventionally treated Texoma water. For this analysis, the loss from the treatment process is assumed to be 15 percent of the total supply.

A summary of the quantities of Texoma water for each strategy is shown in **Table G.32**.

TABLE G.32 SUMMARY OF QUANTITIES (AC-FT/YR)

	WMS	BLEND WATER	TEXOMA RAW (AF/Y)	2030	2040	2050	2060	2070	2080
NTMWD	Blend	Bois d'Arc Lake/ Lavon	39,309	3,844	36,934	38,137	39,309	38,997	38,170
		Lake O' the Pines	24,516	-	-	24,516	23,932	23,004	22,108
		Marvin Nichols	49,518	-	-	-	-	49,518	49,518
		TOTAL		***3,844***	***36,934***	***62,653***	***63,241***	***111,519***	***109,796***
	Desal	NA	40,000	33,630	33,630	33,630	33,630	33,630	33,630
GTUA	Desal	NA	36,300[a]	-	7,055	30,855	30,855	30,855	30,855
Sherman	Desal	NA	20,824[b]	5,900	17,700	17,700	17,700	17,700	17,700
DWU	Desal	NA	175,000[c]	-	-	-	-	-	146,000
UTRWD	Blend	Sulphur Basin	25,000[c]	-	25,000	25,000	25,000	25,000	25,000
Denison	Desal	NA	21,355	4,906	7,582	10,171	12,797	16,191	18,152

[a]*Quantity includes reallocation of storage in Lake Texoma and use of some of GTUA's existing water right.*

[b]*Quantity includes acquisition of unused storage contract and water right in Lake Texoma and use of some of Sherman's unused contract with GTUA.*

[c]*Quantity assumes reallocation of storage in Lake Texoma and/or contracts with Oklahoma.*

Reliability

Lake Texoma is a reliable source for water supply. NTMWD, GTUA and customers, Sherman and Denison hold the water rights to this source. Blending of Texoma water is as reliable as the fresh water source. If there is a decrease in available fresh water, then the amount of water that can be used from Texoma will also decrease. For UTRWD and DWU, there is considerable uncertainty regarding reallocation of Texoma water at the amount proposed for municipal water supply. The smaller reallocation for GTUA also has uncertainties, but it does not require Congressional approval.

There is some uncertainty regarding the ability to desalinate and dispose of the large quantities of reject water. The technology to dispose of large quantities of saline waste for an inland desalination project is uncertain. Large quantities of brine would likely need to be disposed of through deep well

injection. Smaller quantities could potentially be discharged back to water in the Red River Basin, including Lake Texoma and the Red River. For deep well injection, no hydrogeologic studies have been conducted to identify a suitable formation to receive the brine discharges. If the sponsor cannot locate suitable disposal sites nearby, the quantity available from this alternative could be considerably smaller and/or considerably more expensive.

Water Quality

The lake has elevated levels of dissolved solids, and the water must be blended with higher quality water or desalinated for municipal use. The elevated dissolved solids in Lake Texoma would have some environmental impacts whether the water is used by blending or desalination. Blending water from Lake Texoma with water from other sources provides an inexpensive supply for Region C. Desalination provides treated water but is a more expensive strategy, and there are uncertainties in the long-term costs.

Environmental Considerations

The reservoir is an existing source of water, therefore environmental impacts are limited for use of permitted supplies. Reallocation of hydropower storage could reduce hydropower flows that are currently released downstream. The primary environmental impacts of this project are associated with the pipeline, pump station, terminal storage reservoir, desalination plant and the carbon emissions associated with the electricity needed to pump the water. Additionally, for the blending strategies, there is the potential to transfer invasive species (zebra mussels) from Texoma. Infrastructure can be designed or improved in a way to minimize such transfers. Impacts of increased demand on Lake Texoma would also occur but have not been evaluated.

- **Vegetative Cover.** No detailed studies have been conducted of the vegetative cover for this alternative. The location of the proposed infrastructure generally lies within urban and rural areas. The proposed pipelines could be routed to avoid highly sensitive environmental areas. There are numerous stream crossings to move the water from Texoma as well.
- **Threatened and endangered species.** There are six threatened or endangered federal species that are known to occur or have the potential to occur within the counties in which the project is located. Also, the bald eagle, which is delisted but being monitored, may occur in these counties. It is expected that implementation of this alternative would have low to no potential to negatively impact the species.
- **Other.** The presence of zebra mussels in Lake Texoma can create additional obstacles for entities planning on using this source. Additional steps need to be taken when developing transmission infrastructure to prevent the spread of zebra mussels. Additionally, injecting large quantities of brackish water (desalination strategies) could potentially increase seismic activity in the area. Recent studies on oil and gas fracking activities have indicated a connection with injection wells and increases in small earthquakes. The reject water would need to be injected deep enough to prevent impacts to the overlying aquifer.

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Permitting and Development

Lake Texoma supplies require an interbasin transfer permit if used outside the Red River Basin, state water right, possible Congressional authorization, and a contract with USACE. For the desalination strategies, a brine discharge permit for deep well injection may be needed. For brine discharges to surface water, a TPDES permit from TCEQ would be needed.

The State of Oklahoma does retain the right to a significant portion of unpermitted water that is allocated to municipal and industrial use. However, Oklahoma has a moratorium on exporting water. UTRWD has applied for up to 115,000 acre-feet per year from any three sources in Oklahoma, including Lake Texoma.

Development of this supply will require agreement between the water rights stakeholders in Texas along with the state of Oklahoma and the Corps of Engineers.

Cost Analysis

Detailed cost estimates for the Lake Texoma Desalination and Blending Projects were provided by the associated sponsors where available. These costs are more detailed estimates developed during design. For consistency with SB1 planning guidance, the costs were updated to September 2023 dollars using the ENR index.

When detailed costs were not available, the UCM and TWDB costing guidance were followed. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

TABLE G.33 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD – Blending Phase I	$465,653,000	$2.46	$0.48
NTMWD – Blending Phase II	$997,393,000	$2.63	$0.43
NTMWD – Desalination [a]	$1,447,262,000	$16.43	$7.22
GTUA – Phase 1 [a,b]	$553,807,000	$15.30	$6.15
GTUA – Phase 2 [a]	$570,036,000	$12.45	$6.65
Sherman[a]	$487,865,000	$23.40	$11.60
DWU [a]	$3,823,824,000	$9.06	$3.42
UTRWD	$809,697,000	$6.55	$1.18
Denison [a,c]	$256,786,000	Varies	Varies

[a]Costs are for treated water.

[b]Costs for GTUA – Phase 1 includes both Texoma water and brackish groundwater.

[c]Costs for Denison include increased transmission capacity that would be used for both blending and desalination of Texoma water.

Water Management Strategy Evaluation

Based on the yield of Lake Texoma, these strategies provide a reliable source of additional supplies with limited impacts. However, for this supply to be viable for the blending strategies, another freshwater source of supply must be acquired as well.

For the desalination strategies, there is no need to acquire a separate source, however, there are significant costs associated with desalination as well as issues with waste disposal. Costs vary depending on the new infrastructure required. Blending of Texoma water with existing sources is the least expensive option. Desalination is more expensive to construct and operate. However, Lake Texoma is a nearby source and the infrastructure to move the water to the areas with needs is relatively short as compared to other major new sources of water.

Water User Group Application

This is a recommended strategy for NTMWD Blending, GTUA Desalination, Sherman Desalination, Sherman Water Right Acquisition, and Denison Desalination. It is an alternative strategy for NTMWD Desalination, DWU Desalination, and UTRWD Blending.

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G.3.8 Red River Off-Channel Reservoir

Potential Sponsor(s):	DWU, UTRWD
WMS/Project Type:	New Surface Water (Off-Channel Reservoir)
Potential Supply Quantity:	92,400 acre-feet per year (82.4 MGD)
Implementation Decade:	2060
Strategy Capital Cost:	$2,062,385,000
Unit Water Cost ($/kgal):	$5.75 during Debt Service; $1.18 after Debt Service
Application:	Alternative

Strategy Description

This strategy would develop new water supplies from the Red River, downstream of Lake Texoma. In this stretch of the Red River, water flowing in the river is equally split between Texas and Oklahoma. Dallas proposes to permit a portion of Texas' share of this flow for diversion and impoundment in a series of off-channel reservoirs. The water would then be transported to Lake Ray Roberts for subsequent diversion and use. UTRWD is also interested in a joint version of this strategy where UTRWD would connect to Dallas' pipeline and transport supplies to the Tom Harpool Water Treatment plant.

This project includes a 162 MGD (250 cfs) intake and pump station on the Red River at Arthur City, TX immediately downstream of the Highway 271 Bridge as shown. Diversions from the Red River would be pumped approximately 2 miles to three off-channel reservoirs (OCR) in series. The first OCR would consist of a 2,500 AF basin for initial sediment settling and removal. The next OCR in the series would have a capacity of 5,300 AF and would provide additional sediment removal and water quality improvement. The third and final OCR would consist of a 32,000 AF storage basin to allow for extended pumping when the flow in the Red River is extremely low or water quality is impaired. Water would then be diverted from the third OCR by a 129 MGD (200 cfs) intake and pump station that would transport supplies via an 84-inch transmission pipeline to Lake Ray Roberts for subsequent blending and use by Dallas.

The total area of the reservoirs is 803 acres with a total capacity of 39,800 AF. The upper OCR has a conservation pool elevation of 525 ft-msl, a storage capacity of 2,500 AF and surface area of 76 acres. The middle OCR has a conservation pool elevation of 151 ft-msl, a storage capacity of 5,300 AF with a surface area of 189 acres. The third and largest OCT has a conservation pool elevation of 505 ft-msl with an embankment height of 70 feet and an active conservation pool capacity of 32,000 AF.

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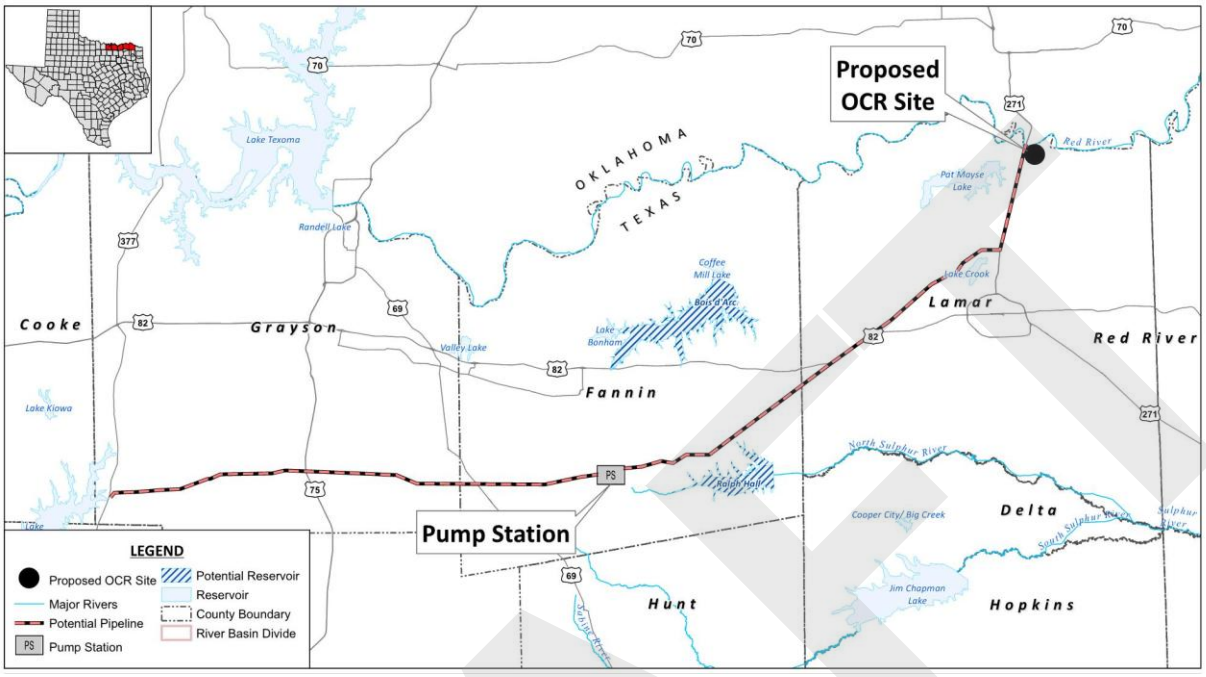
FIGURE G.7 RED RIVER OFF CHANNEL RESERVOIR AND ROUTE



Supply Development (Quantity, Reliability, Quality)

Water Quantity

As part of the *Dallas Long Range Water Supply Plan*, a yield analysis was completed using monthly available flow at Arthur City extracted from the TCEQ Red River WAM. The flows were adjusted to account for instream flow requirements in the Red River Compact (RRC). The results found that the 129 MGD river diversion would be able to be exercised approximately 94% of the time without consideration of water quality. However, the available yield from this supply, as an alternative strategy for Dallas, is limited by the proposed infrastructure to approximately 82.4 MGD. If this WMS is pursued jointly, UTRWD would participate for 15,000 acre-feet/year.

TABLE G.34 SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY
DWU (Stand-alone)	92,370
UTRWD (Joint)	*15,000*

Reliability

The reliability of the water supplies is projected to be good.

Water Quality

From 1968 to 2012, the City of Dallas in cooperation with the USGS conducted water quality sampling of the Red River for the reach downstream of Denison Dam and specifically at the Arthur City USGS stream gage. The sampling done showed that slightly less than 15% of the time, the water quality within the Red River would not meet drinking water standards for TDS, chlorides and

sulfates without blending from other water sources with better quality. Additionally, since the city of Dallas uses ozone in its water treatment process the formation of bromates can be a problem when bromide concentration exceeds 0.2 mg/L. Dallas plans to mitigate these concerns by not operating the Red River Pump Station when water quality is problematic and would also plan to blend the Red River water with other water supplies.

Environmental Considerations

Environmental issues for this project are expected to be low.

- **Habitat and Vegetative Cover.** River and transmission infrastructure would be located to avoid conflicts with environmentally sensitive areas where feasible. There are currently no areas of designated critical habitat within the project area. The OCR site is primarily pasture areas with some forested areas. The use of best management practices during construction activities will help to minimize potential impacts to these areas.
- **Threatened and Endangered Species.** The counties within which the project is located include 18 species that are federally or state listed as threatened or endangered or are federal candidate species. No known designated areas of critical habitat currently occur within the project area.
- **Environmental Water Needs.** Implementation will have a limited impact on daily flows in the Red River since average gaged streamflow from 1998 to 2013 has been over 13 million AF per year and the 162 MGD intake facility would divert less than 2 percent of the flows on average.
- **Wetlands.** Impacts to wetlands associated with this project are anticipated to be low.

Permitting and Development

Dallas would need to obtain a water rights permit for the river diversion from the TCEQ including an interbasin transfer authorization. In addition to the water rights permit, Dallas would need to obtain a 404 permit from the USACE for impacts to a waterway from construction activities.

Diversions from the Red River would potentially need to comply with provisions of the Lacey Act which prohibits the transport of non-native species across state boundaries. In this case zebra mussels might be a concern, depending on where the intake and pump station facilities are constructed. Diversions would also need to comply with the Red River Compact.

Cost Analysis

Detailed cost estimates for the strategy were provided by DWU. For the joint strategy, the split of costs for UTRWD is based on the relative quantities of water (approximately 13%). TWDB costing guidance was followed. Annual costs were developed following TWDB guidance for debt service and operation and maintenance costs.

Cost estimates for the Red River OCR supplies are included in **Appendix H**.

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TABLE G.35 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU (Stand-Alone)	$2,062,385,000	$5.75	$1,18
UTRWD (Joint)	*$334,802,000*	*$5.75*	*$1.18*

Water Management Strategy Evaluation

Although the Red River OCR project has the potential to provide DWU with significant new water supplies, there are several concerns with the project in its current state. These issues include bank stability for the intake structure along the Red River, water quality, sediment control and invasive species. Additionally, the Red River OCR project possesses a high level of risk associated with permitting as well as performance risk associated with a worse drought of record and future upstream diversions and impoundments. A significant portion of the available flow to the project originates in the Blue and Muddy Boggy River watershed in Oklahoma. If large reservoirs are constructed in these watersheds, the available flow could be reduced.

Water User Group Application

The Red River OCR project is an alternative strategy by the Region C Regional Water Planning Group for DWU and UTRWD.

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G.3.9 Toledo Bend

Potential Sponsor(s):	NTMWD, TRWD, DWU, and UTRWD
WMS/Project Type:	New Surface Water (Purchase)
Potential Supply Quantity:	Phase One - 250,000 acre-feet per year (Recommended) - 350,000 acre-feet per year (Alternative)
Implementation Decade:	2070
Strategy Capital Cost:	$9,831,285,000 (Recommended); $11,492,315,000 (Alternative)
Unit Water Cost ($/kgal):	$8.62 during Debt Service; $1.93 after Debt Service (Recommended) $7.27 during Debt Service; $1.66 after Debt Service (Alternative)
Application:	Recommended (NTMWD, TRWD, UTRWD); Alternative (DWU)

Strategy Description

Toledo Bend Reservoir is located on the state border with Louisiana, approximately 200 miles from the Metroplex. The reservoir is owned and operated by the Sabine River Authority (SRA) of Texas and the Sabine River Authority of Louisiana for water supply and hydropower generation. The reservoir has a conservation surface area of 181,600 acres and a shared storage capacity of 4,477,000 acre-feet. The SRA Texas holds a Texas water right to divert 970,067 acre-feet per year from Toledo Bend.

Several Region C Metroplex suppliers have been investigating the possibility of developing additional water supplies from the Toledo Bend Reservoir, with ultimately up to 650,000 acre-feet per year delivered to Region C. Although these supplies are intended to be used within Region C, the Toledo Bend Reservoir is physically located in Region I, the East Texas Region. The development of this supply will require an agreement among the SRA and Metroplex suppliers, an interbasin transfer permit from the Sabine River Basin to the Trinity River Basin (and possibly other basins), and development of water transmission facilities.

This strategy is envisioned as a recommended or alternative joint strategy with multiple water providers in the Region C area. Participants in the joint strategy would include NTMWD, TRWD, and UTRWD for the recommended strategy with the inclusion of DWU in the alternative strategy. The joint pipeline would convey supplies to the reservoirs or terminal storage of each respective participant as summarized in **Table G.36**.

TABLE G.36 PROPOSED DELIVERY LOCATIONS FOR PARTICIPATING ENTITY

PARTICIPATING ENTITY	PROPOSED DELIVERY LOCATION
NTMWD	Tawakoni WTP
TRWD	Benbrook Lake
DWU	Joe Pool Lake
UTRWD	Lake Ralph Hall Balancing Reservoir

Figure G.8 shows a potential layout for the alternative joint strategy. The recommended strategy layout would not include delivery at Joe Pool Lake. The strategy would be constructed in two phases, with approximately half of the ultimate capacity constructed in the first phase and the remainder in the second phase. Phase 2 is not included in the strategy evaluation.

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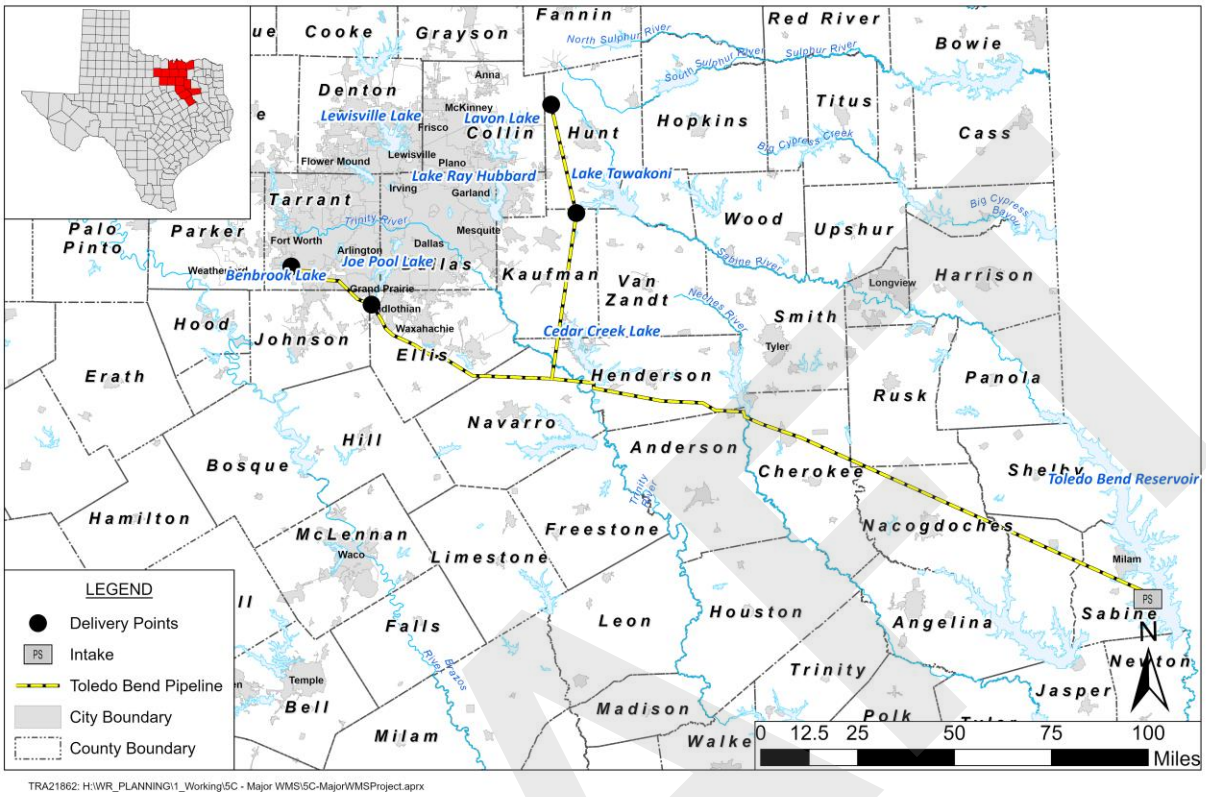
FIGURE G.8 TOLEDO BEND ROUTE



TRA21862: H:\WR_PLANNING\1_Working\5C - Major WMS\5C-MajorWMSProject.aprx

Supply Development (Quantity, Reliability, Quality)

Water Quantity

The SRA water right for Toledo Bend authorizes the diversion and use of 970,067 acre-feet per year for municipal, industrial and irrigation purposes. Currently only a small portion of this water right is under contract and in use. There is sufficient supply available to provide a project yield up to 350,000 acre-feet per year (Phase 1). Agreements with SRA on the quantity and price of water and an interbasin transfer permit to move the water to the Metroplex would be needed. The projected supplies for Phase 1 are summarized in **Table G.37**. Phase 2 would provide the same amounts as Phase 1 to NTMWD, TRWD and DWU for a total of 300,000 acre-feet per year.

TABLE G.37 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	PHASE 1 QUANTITY
Recommended Strategy	
TRWD	100,000
NTMWD	100,000
UTRWD	50,000
TOTAL	***250,000***
Alternative Strategy	
DWU	100,000
TRWD	100,000
NTMWD	100,000

DESCRIPTION	PHASE 1 QUANTITY
UTRWD	50,000
TOTAL	***350,000***

Reliability

The water is considered reliable since only a portion of the available supply is currently used, and it is an existing supply. However, the water must be conveyed using multiple pump stations (including the intake) and approximately 200 miles of pipeline. There is concern that if there is a line breakage or pump failure, the down time could impact the ability to meet customers' demands.

Water Quality

The Sabine River Basin and Toledo Bend Reservoir are considered to have good quality water. According to stream standards, Toledo Bend has lower total dissolved solids than Lake Lavon (TAC 307). Toledo Bend does contain giant salvinia, an invasive plant species. Specific management actions would be needed to limit transfer of this species to other lakes and streams along the pipeline route. Generally, it is not anticipated that there would be any water quality impact to Region C supplies from using Toledo Bend Reservoir.

Environmental Considerations

The reservoir is an existing source of water, therefore environmental impacts are limited. The primary environmental impacts of this project are associated with the pipeline, pump station, terminal storage reservoir and the carbon emissions associated with the electricity needed to pump the water. Impacts of increased demand on Toledo Bend Reservoir would also occur but have not been evaluated.

- **Habitat and Vegetative Cover.** No detailed studies have been conducted of the vegetative cover for this alternative. The location of the proposed infrastructure generally lies within rural areas. The pipeline route will cross through the Sabine National Forest which is adjacent to almost the entire shoreline of Toledo Bend Reservoir in Texas. The pipeline will follow a general rural path. Where possible the alignment will follow the IPL right-of-way, minimizing habitat disturbances. If needed, the proposed pipeline alignments possibly could be routed to avoid sensitive environmental areas.
- **Threatened and endangered species**. The strategy crosses portions of twelve counties which include numerous state and federally listed endangered or threatened species, and federal candidate species that use these various habitats. More detailed analysis of the pipeline alignment would need to be conducted to identify if any potential habitat for these species is impacted.
- **Environmental Water Needs.** Implementation and operation of this strategy could have an impact on daily flows in the Sabine River due to the amount of supply diverted from storage that might have been previously passed downstream. The project will abide by any environmental flow requirements determined by TCEQ, as appropriate.
- **Bays and Estuaries**. Quantifying the impact from transporting supplies out of the basin will require additional detailed analysis. The implementation of the strategy may impact flows

to Sabine Lake and its estuary downstream of the Toledo Bend Reservoir since freshwater stream flows are critical to the health of the Sabine estuary system. However, since this strategy proposes to use existing water sources that have been permitted (i.e., no new appropriations), utilization of existing water rights was considered as part of the SB3 environmental flow evaluations.

- **Wetlands.** There may be several wetlands along the proposed pipeline alignments; however, flexibility in the pipeline routing can be used to minimize or avoid potential impacts.

Permitting and Development

As previously discussed, this strategy would require an interbasin permit to transfer the water from the Sabine River Basin to the Trinity River Basin and potential other basins. It is uncertain if the transfer of water from the Sabine River Basin would subject the existing water right to Texas environmental flow standards (TAC Title 30 Chapter 298). Construction of a transmission system would require a Section 404 permit for the intake pump station and stream and wetland crossings of the pipeline and related infrastructure. Because of the size of the Toledo Bend pipeline current conceptual status, development and implementation of this alternative would take 15 to 20 years.

Cost Analysis

Detailed costs were developed using the Uniform Cost Model. Costs to purchase water from SRA are based on the Region C rate for raw water at the source, which is a placeholder for the strategy evaluation. The purchase water cost would be negotiated between the buyers and sellers.

TABLE G.38 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Recommended Strategy			
TRWD	$4,333,383,000	$9.55	$2.17
NTMWD	$3,389,968,000	$7.44	$1.66
UTRWD	$2,107,934,000	$9.14	$1.98
TOTAL	***$9,831,285,000***	***$8.62***	***$1.93***
Alternative Strategy			
DWU	$3,009,692,000	$6.69	$1.53
TRWD	$3,526,584,000	$7.87	$1.82
NTMWD	$2,930,008,000	$6.43	$1.43
UTRWD	$1,877,953,000	$8.13	$1.75
TOTAL	***$11,334,237,000***	***$7.16***	***$1.62***

Toledo Bend Reservoir is approximately 200 miles from Region C, so this is a relatively more expensive source of supply for the Region. Additionally, the project would pose several permitting challenges, including obtaining an interbasin permit and a Section 404 permit. However, it does offer a substantial water supply, and environmental impacts will be limited because it is an existing source.

There is some uncertainty regarding reaching agreements with SRA and other water providers if a joint strategy is pursued. There may be competition for this supply.

Water User Group Application

The Toledo Bend strategy was evaluated on a basis of several criteria to determine the Water User application. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy This is a recommended strategy for TRWD, NTMWD, and UTRWD and an alternative strategy for DWU, TRWD, NTMWD, and UTRWD.

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G.3.10 Carrizo-Wilcox Groundwater from Region I

Potential Sponsor(s):	NTMWD, TRWD
WMS/Project Type:	New Groundwater
Potential Supply Quantity:	42,000 acre-feet per year
Implementation Decade:	2040
NTMWD:	
Strategy Capital Cost:	$1,253,455,000
Unit Water Cost ($/kgal):	$6.23 during Debt Service; $1.25 after Debt Service
Application:	Alternative
TRWD:	
Strategy Capital Cost:	$823,439,000
Unit Water Cost ($/kgal):	$4.71 during Debt Service; $1.23 after Debt Service
Application:	Alternative

Strategy Description

There are existing groundwater holdings in multiple counties in east Texas south of Lake Palestine that could be developed for use in Region C. A portion of these holdings are in the southeastern part of Anderson County. Additionally, there are groundwater supplies available in Wood, Upshur, and Smith counties.

This strategy is considered for NTMWD and TRWD. The project would develop a new well field and pump the water to the NTMWD Tawakoni Water Plant (or a new southeast water plant) through a new transmission line. For TRWD, the water would be delivered to the IPL near Cedar Creek Reservoir. The proposed groundwater supplies would provide up to 42,000 acre-feet per year of supply.

The well field in southeastern Anderson County is located about 90 miles southeast of the NTMWD delivery point and 53 miles southeast of the TRWD delivery point. A total of 92 wells at 46 well sites were assumed for this strategy, supplying 37.5 MGD on an average basis for 50 years. Each well site contains a well completed in the Queen City aquifer and a well completed in the Carrizo aquifer.

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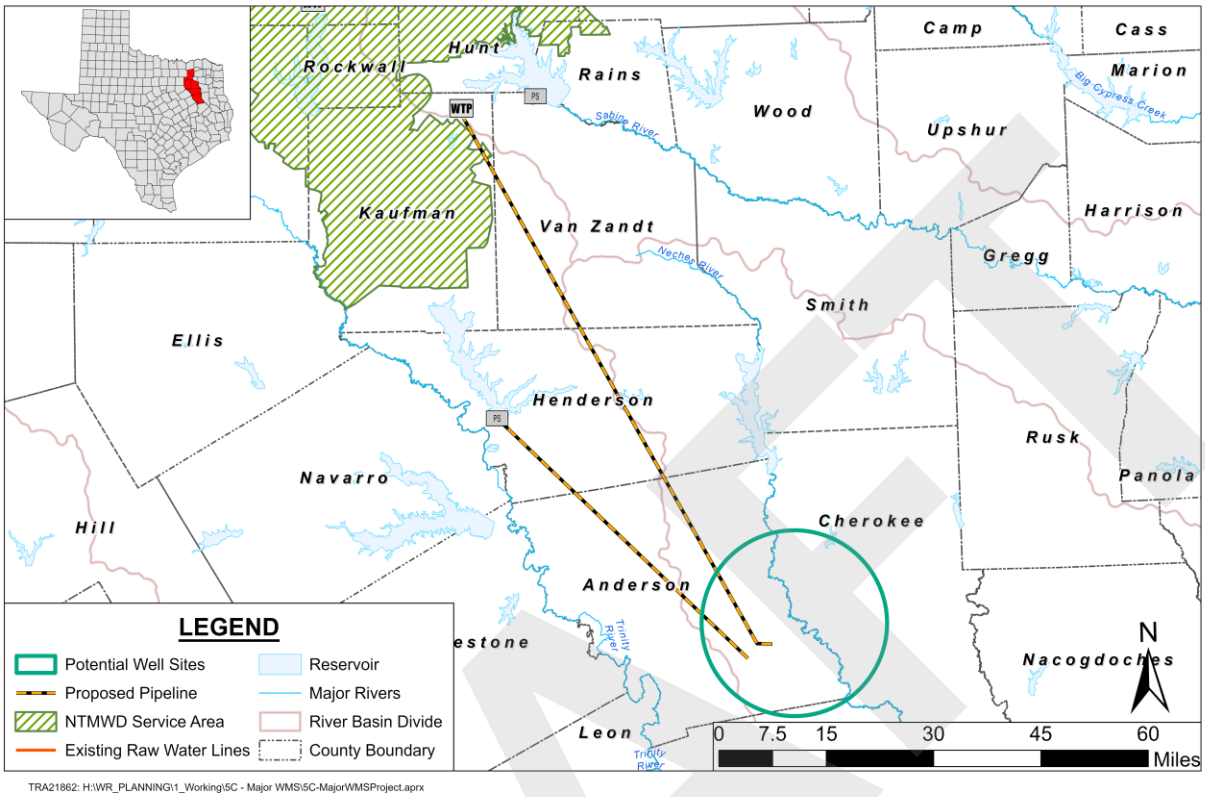
FIGURE G.9 GROUNDWATER IN ANDERSON COUNTY (REGION I)



Supply Development (Quantity, Reliability, Quality)

Water Quantity

Previous studies indicate there is approximately 42,000 acre-feet of groundwater available from the Carrizo-Wilcox and Queen City aquifers beneath existing holdings in Anderson County. For planning purposes, this strategy is sized for the full 42,000 acre-feet per year. However, the amount of groundwater that could be developed under regional planning rules may be less.

Reliability

The reliability is low to moderate. Previous studies indicate the water is available, but the regulatory framework does not confirm these amounts. Even with regulatory management of these aquifers, the aquifers are subject to recharge and pumpage from other users, both within the GCD and adjacent areas. Also, changes in GCD operating rules and Desired Future Conditions (DFCs), as well as the Modeled Available Groundwater (MAG) may affect the long-term reliability of this source.

Water Quality

Water from the Carrizo-Wilcox and Queen City aquifers in Anderson County is fresh water with TDS levels of 200 to 300 mg/l and is anticipated to only need disinfection. If the water quality is poorer, further study would likely be needed to determine any potential additional treatment required.

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Environmental Considerations

Environmental impacts would be low. The pipeline would require multiple stream crossings, but likely could be routed to avoid and/or minimize environmentally sensitive areas.

Permitting and Development

Anderson County is in the Neches and Trinity Valley GCD. It is assumed that most to all the proposed groundwater is already permitted by the current owners.

The construction of the groundwater project such as described above could be implemented by 2040. This time frame includes negotiations with the seller, water testing, design and construction of the infrastructure.

Cost Analysis

Costs were developed using the TWDB Uniform Cost model. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

Cost estimates for the strategy supplies are included in **Appendix H.**

TABLE G.39 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 gal)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD	$1,253,455,000	$6.23	$1.25
TRWD	$823,439,000	$4.71	$1.23

Water Management Strategy Evaluation

This strategy can provide additional supplies, but the reliability is uncertain. Further study is needed to confirm the reliability of the supplies . Supply amounts can change based on changes in regulatory rules, which can also affect the long-term reliability of this source.

Water User Group Application

The Carrizo Groundwater Project is designated as an alternative strategy for NTMWD and TRWD by the Region C Water Planning Group.

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G.4 DWU Major Water Management Strategy Technical Memorandums

G.4.1 Main Stem Balancing Reservoir

Potential Sponsor(s):	DWU
WMS/Project Type:	Reuse (Off-Channel Reservoir)
Potential Supply Quantity:	114,342 acre-feet per year
Implementation Decade:	2050
Strategy Capital Cost:	$1,767,099,000
Unit Water Cost ($/kgal):	$3.71 during Debt Service; $0.72 after Debt Service
Application:	Recommended

Strategy Description

The project description for the Main Stem Balancing Reservoir is based on the information provided by the Dallas Long Range Plan (HDR, 2024). Dallas has been granted water rights (permit 12468) to store return flows from the Central and Southside wastewater treatment plants in an off-channel reservoir, the Main Stem Balancing Reservoir. The off-channel reservoir could store up to 300,000 acre-feet of water over 4,337 acres. The Main Stem Balancing Reservoir would be located in Ellis County southeast of Bristol, Texas, and will receive diversion from the Trinity River. This project has a good amount of flexibility and different potential configurations require additional evaluation. For the configuration selected for Region C, reuse water is delivered from the balancing reservoir to Joe Pool Lake through a 36.5-mile transmission system. The proposed siting and transmission infrastructure for the Main Stem Balancing Reservoir are shown.

The source of water for the Main Stem Balancing Reservoir is return flows from Dallas' Central and Southside wastewater treatment plants. However, total return flows available to be stored in the reservoir consider certain obligations and an amendment to instream flow requirements. Obligations pertain to the proposed Elm Fork and Lake Ray Hubbard Swap, which are agreements made with North Texas Municipal Water District (NTMWD). DWU will provide NTMWD with water from the Central and Southside WWTP in equal exchange for NTMWD's reuse flows into Lake Lewisville (above agreed upon historical amounts) and Lake Ray Hubbard. The quantities shown in the 2026 Region C Regional Water Plan are projected for planning purposes, however it is important to note that these return flows are contingent on actual return flows.

Supply Development (Quantity, Reliability, Quality)

Water Quantity

The quantity of water associated with the Main Stem Balancing Reservoir is shown in **Table G.40**. These supplies reconsider the swap agreement with NTMWD and an amendment to Dallas' instream flow requirement.

TABLE G.40 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
DWU	0	0	112,997	114,342	114,342	114,342

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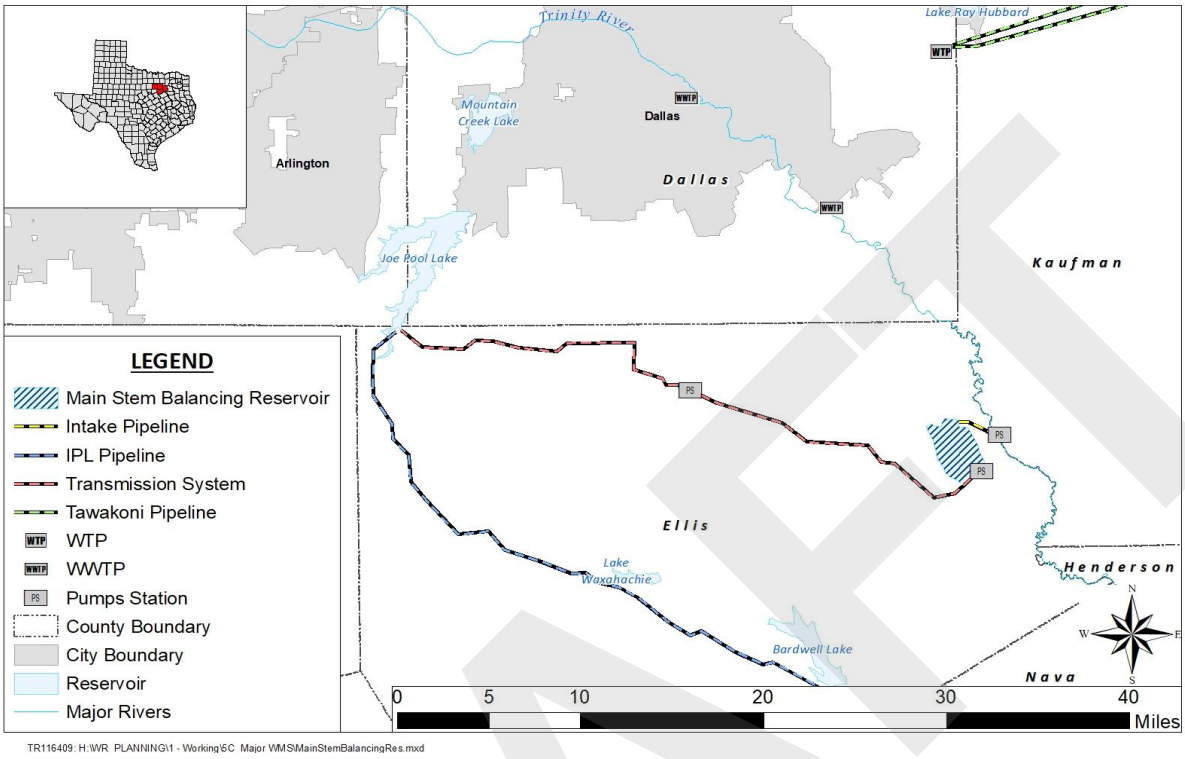
FIGURE G.10 MAIN STEM BALANCING RESERVOIR



Reliability

The return flows from the Central and Southside wastewater treatment plants are expected to be highly reliable.

Water Quality

There are some water quality concerns with the Main Stain Balancing Reservoir strategy. The Trinity River is on the TCEQ 303(d) list of dioxins, Polychlorinated Biphenyls (PCBs), and Bacteria. Further, there may be PFAS contamination in the Dallas-Fort Worth area. The project's water quality risks could be mitigated through blending with other DWU sources and by operating the reservoir to maintain adequate residence time to allow natural processes to enhance water quality, and by the addition of mixing units at the reservoir to reduce stratification. Water quality is to be evaluated and addressed during design.

Environmental Considerations

- **Habitat and Vegetative Cover.** The footprint of the Main Stem Balancing Reservoir and associated pipeline will cover developed agricultural land, forested areas, wooded riparian areas, and wetlands. No critical habitat lies within the project area. Utilizing previously disturbed agricultural areas in preference to preferred habitats will help reduce impacts. Where necessary, impacts on different species and wetland areas should be avoided as

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much as possible. Best management practices (BMPs) during construction of the pipeline will reduce potential impacts to wetlands.

- **Environmental Flows.** This project proposes to conform to the environmental flow standards adopted by TCEQ for the Trinity River, as granted by TCEQ in a January 2019 amendment to the reuse authorization. It is presumed that compliance with the TCEQ environmental flow criteria provides adequate instream flows for the Trinity River.
- **Bays and Estuaries.** Implementation and operation of the Main Stem Balancing Reservoir relies on permitted return flows and is expected to have limited effects on flow to the Trinity Bay by TCEQ environmental flow standards.
- **Threatened and Endangered Species.** The Main Stem Balancing Reservoir project area includes 25 species that are federally or state listed as threatened or endangered species and federal candidate species in the county for which the project will be located.

Permitting and Development

Dallas has water rights for the use of return flows for the Main Stem Balancing Reservoir. Additional permits would be required. Similar to other new water projects in Texas, a surface water permit for the channel dam (if needed) on the Trinity River would be required from TCEQ. In addition to the potential surface water permit, a Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the diversion facilities and pipeline. **Table G.41** summarizes the permits required and the challenges associated with implementation of this strategy.

TABLE G.41 SUMMARY OF REQUIRED PERMITS AND POTENTIAL CHALLENGES

PERMIT	REGULATORY ENTITY	POTENTIAL CHALLENGES
Water Right and Storage Permit	TCEQ	Dallas has rights to divert its wastewater discharges but will need additional permits to store water in the Balancing Reservoir and channel dam.
Section 404	USACE	Required for construction in waters of the US.

Cost Analysis

The costs for this project are based on the costs developed for the Dallas Long-Range Water Supply Plan. When detailed costs were not available, TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

Cost estimates for the Main Stem Balancing Reservoir supplies are included in **Appendix H**.

TABLE G.42 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU	$1,767,099,000	$ 3.71	$ 0.72

Water Management Strategy Evaluation

The Main Stem Balancing Reservoir is a potentially feasible strategy for DWU. The reservoir would provide a means to store reuse water and manage water supplies across the DWU system. With the diversion pump station located downstream of the confluence of the Trinity River and East Fork of the Trinity River, water could be released from DWU's eastern supplies and moved to the western areas of its service area. The size of the balancing reservoir would allow temporary storage of available reuse water.

Reuse water is a reliable supply, and this project does not require additional appropriation of state water. An off-channel reservoir is expected to have fewer environmental concerns.

Water User Group Application

The Main Stem Balancing Reservoir strategy was evaluated for DWU and its customers. It is a recommended strategy in Dallas' Long-Range Water Supply Plan. This strategy is recommended for DWU by the Region C Regional Water Planning Group.

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G.4.2 IPL Connection to Dallas System

Potential Sponsor(s):	Dallas Water Utilities
WMS/Project Type:	Surface Water (Infrastructure)
Potential Supply Quantity:	114,337 acre-feet per year (Lake Palestine)
Implementation Decade:	2040
Strategy Capital Cost:	$586,902,000 (Capital costs associated with the IPL Project for DWU are shown with the IPL Project)
Unit Water Cost ($/kgal)	N/A, Part of the infrastructure needed to access Lake Palestine water
Application:	Recommended

Strategy Description

Lake Palestine is an existing reservoir located in the East Texas Region (Region I) on the Neches River. The lake is owned and operated by the Upper Neches River Municipal Water Authority (UNRMWA). The permitted diversion is 238,110 acre-feet per year. Dallas Water Utilities (DWU) has a contract with UNRMWA for 53.73% of the yield of the reservoir up to a maximum of 114,337 acre-feet per year (102 MGD). The contract includes an interbasin transfer permit allowing the use of water from the lake in the Trinity River Basin.

To date, DWU has not used water from Lake Palestine because there is no infrastructure to transport the water to the Dallas area. TRWD will own and operate the 150-mile long raw water transmission pipeline, which ranges in diameter from 84-inch to 108-inch and will convey water at a planned peak capacity of 347 MGD. Dallas has contracted with TRWD for a portion of the capacity in the IPL. Dallas' capacity of the shared pipeline is currently planned to be 150 MGD. Dallas has contracted with Upper Neches River Municipal Water Authority (UNRMWA) for 102 MGD of Lake Palestine supply, which will be conveyed through the IPL to Dallas' system.

The IPL is subdivided into segments to allocate costs between TRWD and Dallas as well as to split the permitting, design, and construction into multiple packages. The IPL will initially deliver Dallas' share of Lake Palestine water to a location near the upper end of Joe Pool Lake as shown in **Figure G.11**. From this location, Dallas will construct a delivery system to transport water to the Dallas system. A 2020 study conducted by HDR recommends an expansion of Bachman's capacity; however, alternative delivery points are being considered by DWU which could result in a change from this specific strategy.

After the Neches Run-of-River strategy is developed, the IPL would be used to convey this water in addition to the Lake Palestine water to DWU's delivery point.

This project includes the transmission pipeline from Lake Palestine to the IPL connection at Cedar Creek Reservoir. The intake and pump station on Lake Palestine is under construction and is not included in costs of this project.

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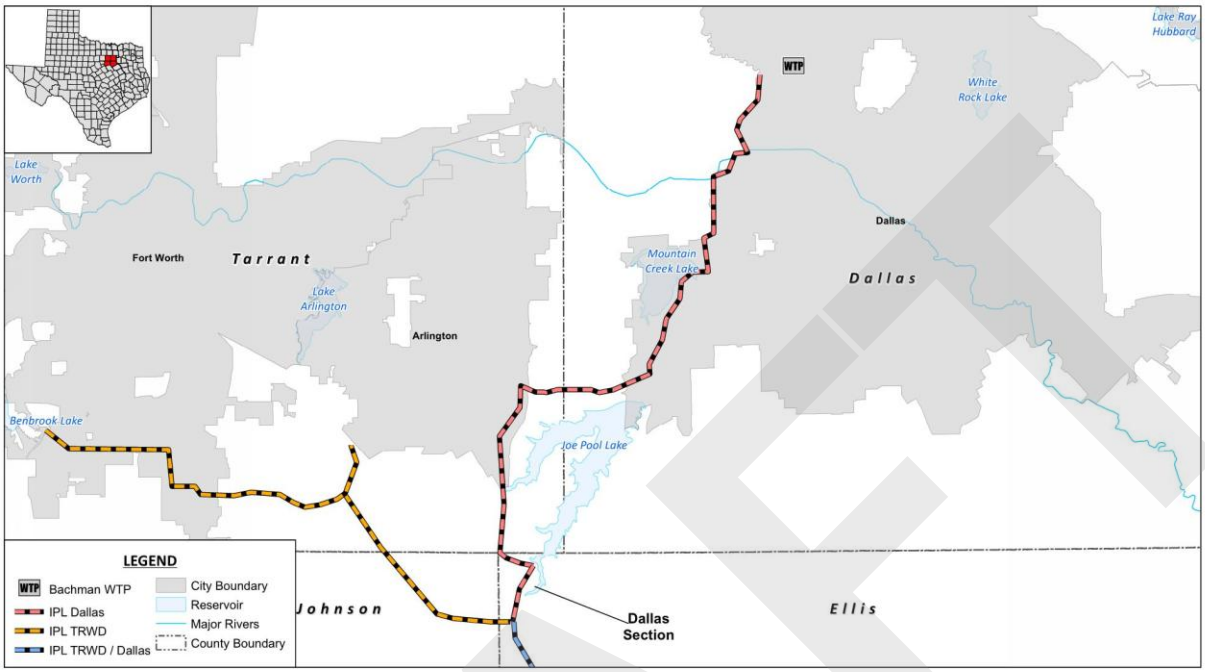
FIGURE G.11 LAKE PALESTINE PIPELINE PROJECT



Supply Development (Quantity, Reliability, Quality)

Water Quantity

The proposed project would carry water from the IPL transmission pipeline to the DWU system. DWU has contracted 150 MGD of transmission capacity in the IPL from TRWD. Currently, DWU plans to utilize up to 102 MGD of the capacity with water from Lake Palestine. The remaining 48 MGD capacity will be used to convey the Neches Run-of-River supply.

Reliability

The water from Lake Palestine is expected to be highly reliable.

Water Quality

Water quality in Lake Palestine is considered to be generally good. However, Lake Palestine is on the TCEQ 303(d) list for depressed levels of dissolved Oxygen and for pH impairments. Lake Joe Pool also causes some concern with high levels of Bromide and Manganese. These water quality issues are common and both Lake Palestine and Joe Pool are currently treated to EPA standards by DWU or other entities. The 2020 DWU report from HDR recommends additional pre-oxidant for manganese removal and modifications to Bachman WTP's ozone treatment procedure.

Environmental Considerations

The environmental concerns for use of an existing surface water source are low. Environmental studies are currently ongoing for this project.

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- **Habitat and Vegetative Cover.** Where possible, the pipeline route follows existing road rights-of-way to minimize impacts on habitat and vegetative cover by utilizing these previously disturbed areas. Wooded riparian areas commonly occur along and adjacent to stream and river crossings that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. However, pipelines generally have sufficient design flexibility to avoid most impacts or significantly reduce potential impacts to geographically limited environmental habitats.
- **Threatened and Endangered Species.** There are 18 species that are federally or state listed as threatened or endangered species in Tarrant and Dallas Counties. Much of the pipeline connection to Bachman Lake will be constructed in urban areas in Dallas County. No designated areas of critical habitat currently occur within the project area.
- **Environmental Water Needs.** Implementation and operation of this project could reduce flows in the Neches River as more water is diverted and exported to the Trinity River Basin. Return flows from this project will either be reused for beneficial use or discharged to the Trinity River Basin, which could increase instream flows in the Trinity River.
- **Wetlands**. Flexibility in the pipeline siting would be used to minimize or avoid potential impacts to wetland areas. Therefore, impacts to wetlands associated with this project are expected to be low.

Permitting and Development

Permits to use the water from Lake Palestine have already been obtained. A Section 404 permit from the USACE would be needed for the pipeline and new intake and pump station at Lake Palestine. A Section 408 permit from the USACE may be required for construction activities near a levee. The project is expected to be online by 2040.

The conservation pool of Joe Pool Lake is owned by the USACE and is regulated by the USACE in coordination with the TRA under TRA's state water rights permit. Coordination will be necessary with the USACE and TRA to allow Dallas to temporarily store water in Joe Pool Lake. Coordination with TPWD is necessary to obtain permission to cross Cedar Hill State Park, outside of existing easements. A new easement agreement may be required with TPWD or Dallas County (property owner). The Wildlife Habitat Assessment Project Review will occur during the EA process, unless no EA is required, then the project review will occur independently. TPWD will likely require BMPs for construction and maintenance activities.

Cost Analysis

Capital costs for this strategy include only the pipeline portion from the IPL delivery point to the Bachman WTP. Capital costs to move the water from Lake Palestine to the IPL delivery point are shown in the IPL Technical Memorandum. To understand DWU's total unit cost for the supplies from Lake Palestine, the transport cost to Joe Pool Lake is included as an annual cost.

Cost estimates for this project are included in **Appendix H.**

TABLE G.43 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU	$586,902,000	$1.21	$0.10

Water Management Strategy Evaluation

As previously discussed, DWU plans to connect Lake Palestine to its water supply system as part of the IPL Project being developed jointly with Tarrant Regional Water District. This is a source that DWU contracted for when the reservoir was built for long-term water supply. Several alternatives were evaluated to bring the IPL supplies from the delivery point to the DWU service area. Delivery of the water directly to the Bachman WTP through a pipeline was recommended because it carried the lowest implementation and permitting risk. Development of a supply from Lake Palestine provides water at a low cost and with a low environmental impact.

Water User Group Application

The Lake Palestine strategy is sponsored by DWU, and the strategy is recommended for DWU by the Region C Regional Water Planning Group. The water provided from Lake Palestine and transported by the IPL Project will be used by DWU and customers.

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G.4.3 Neches River Basin Supply

Neches Run-of-River Strategy	
Potential Sponsor(s):	Upper Neches River Municipal Water Authority
WMS/Project Type:	Existing Surface Water (Run-of-River)
Potential Supply Quantity:	53,808 acre-feet per year
Implementation Decade:	2070
Strategy Capital Cost:	$719,027,000
Unit Water Cost[a] ($/kgal):	$3.96 during Debt Service; $0.59 after Debt Service
Application:	Recommended

[a]These unit costs do not include the cost to transport this water from Lake Palestine to DWU through the IPL.

Lake Columbia Strategy	
Potential Sponsor(s):	DWU
WMS/Project Type:	New Surface Water (Reservoir and Water Purchase)
Potential Supply Quantity:	53,808 acre-feet per year
Implementation Decade:	2070
Strategy Capital Cost:	$685,022,000 (DWU Portion Only)[a]
Unit Water Cost ($/kgal):	$3.30 during Debt Service; $0.96 after Debt Service
Application:	Alternative

[a]Cost reflects transmission to Lake Palestine. Additional infrastructure to move the water to DWU is discussed under DWU infrastructure expansion.

Strategy Description

There are two proposed strategies located in the Neches River Basin, Neches Run-of-River and Lake Columbia. Both projects assume delivery to the DWU system through the available capacity of the IPL.

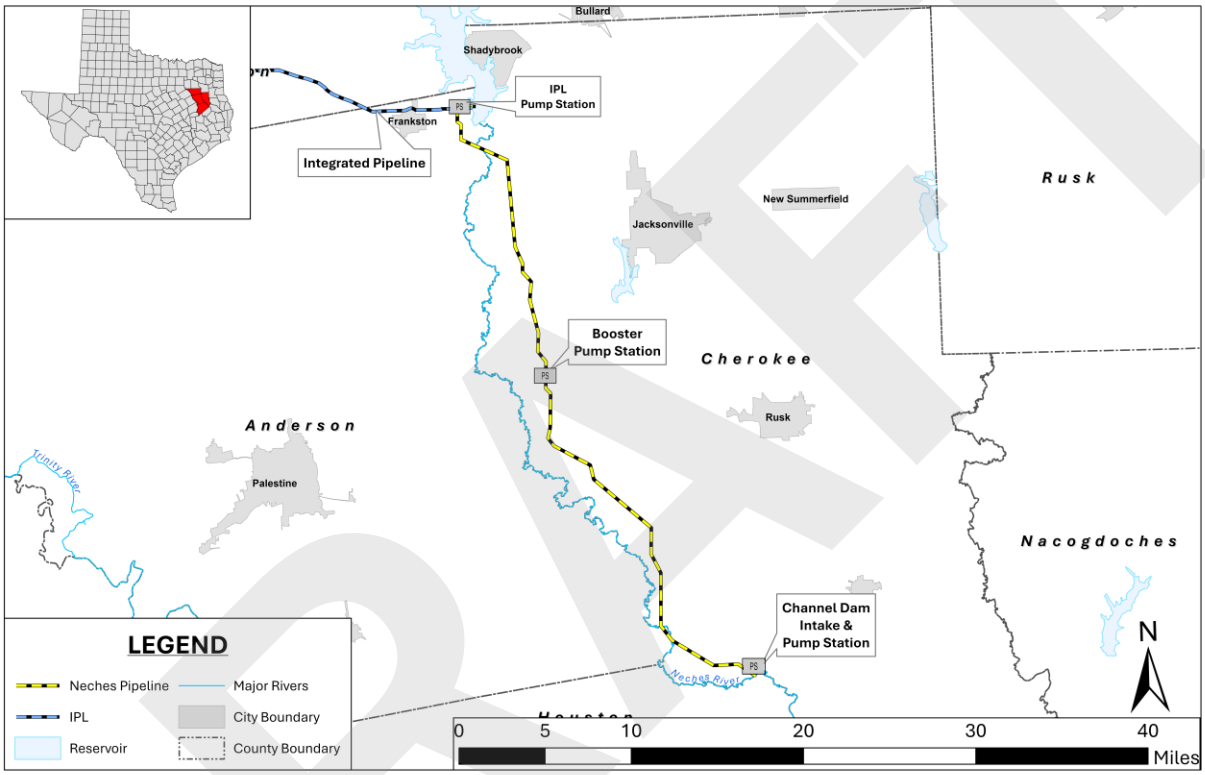
Neches Run-of-River. The Neches River Run-of-River Diversion Strategy would be sponsored by the Upper Neches River Municipal Water Authority (UNRMWA) with contracted water supplies to Dallas Water Utilities (DWU).

The Neches Run-of-River strategy includes a new river intake and pump station for a run-of-river diversion from the Neches River near the SH 21 crossing. Water would be delivered through a 42-mile pipeline (23 miles of 72-inch diameter pipe and 19 miles of 66-inch pipe) to Dallas' pump station at Lake Palestine for delivery to Dallas through the IPL. Facilities include a small diversion dam on the Neches River, a river intake and pump station, and a transmission pipeline and booster pump station with delivery to the IPL pump station site near Lake Palestine **(Figure G-11).** Modeling indicates that up to 74 MGD of Neches River water could be reliably diverted as part of this strategy; however, the available capacity of the IPL is less.

The proposed integrated pipeline project (IPL) includes the construction of a new intake and pump station at Lake Palestine that is currently proposed to have an initial 150 MGD capacity to deliver Dallas' Lake Palestine supplies through the IPL. Dallas' existing contract with UNRMWA for Lake Palestine water is for 53.73% of the annual dependable yield, limited to 114,337 acre-feet per year (102 MGD). Based on the most recent Neches WAM, the firm yield of Lake Palestine decreased to 177,110 acre-feet per year, potentially resulting in reduced supplies to DWU. To address a

potential reduction during drought, DWU may contract for unused supply by local water users for a total supply of 102 MGD from Lake Palestine. Since the IPL will have a capacity of 150 MGD, the remaining capacity of approximately 48 MGD (or about 53,800 ac) could be utilized by Dallas to deliver additional water from the Neches Run-of-River strategy. Potential additional supply from this strategy and other sources in the Neches River Basin (such as Lake Columbia – see below) would be transported through a new parallel IPL to the DWU service area that would be implemented after 2080.

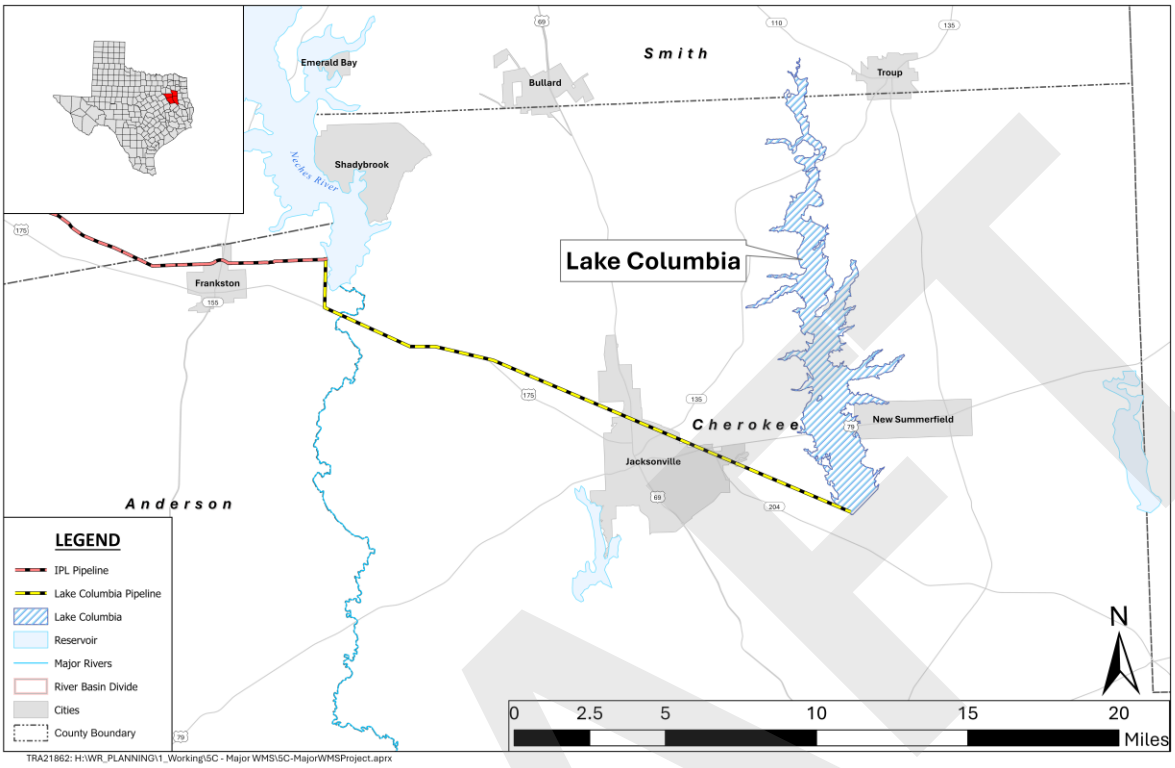
FIGURE G.12 NECHES RUN-OF-RIVER PROJECT



Lake Columbia. The project description for the Lake Columbia Strategy is based on the information provided by Angelina and Neches River Authority (ANRA) and summarized in the Dallas Long Range Water Supply Plan (HDR, 2024). ANRA is the sponsor for the Lake Columbia project on Mud Creek in Cherokee and Rusk Counties. ANRA has been granted a water right permit (Permit No. 4228) by the TCEQ to impound 195,500 acre-feet per year and to divert 85,507 acre-feet per year (76.3 MGD) for municipal and industrial purposes. Lake Columbia is identified as a potential component of a recommended WMS for Dallas Water Utilities (DWU) in Dallas' Long-Range Water Supply Plan (HDR, 2024). After considering the local needs in the East Texas Region, DWU would purchase up to 53,800 acre-feet per year from Lake Columbia for this alternative strategy.

The water from Lake Columbia would be connected to Dallas' western system via a pipeline from the reservoir to the IPL pump station at Lake Palestine. Supplies would then be transported to the Lake Joe Pool area via a new pipeline parallel to the IPL. The proposed siting and transmission infrastructure to Lake Palestine are shown.

FIGURE G.13 LAKE COLUMBIA PROJECT



Supply Development (Quantity, Reliability, Quality)

The firm yield of the project was determined using the TCEQ Neches River Water Availability Model. The run-of-river supplies are modeled with back-up from storage in Lake Palestine when stream flows are not available due to drought conditions, senior water rights calls and/or TCEQ environmental flow restrictions. The new run-of-river diversion will be interruptible, so the quantity available with this strategy is the incremental increase in the firm yield of Lake Palestine resulting from system operations of the new diversion and the existing reservoir.

Lake Columbia is a proposed new reservoir in the upper Neches River basin. The Angelina-Neches River Authority (ANRA) has been granted a water right permit by the TCEQ to impound 195,500 acre-feet and to divert 85,507 acre-feet per year (76.3 MGD) for municipal and industrial purposes. Based on discussions between ANRA and DWU, Dallas would contract for supplies from ANRA and participate in the development of this project. The projected share of the proposed Lake Columbia project for DWU is 56,000 acre-feet per year.

Water Quantity

Dallas' existing contract with UNRMWA for Lake Palestine water is for an annual quantity of 114,337 ac-ft/yr (102 MGD). The strategy can provide 74 MGD of reliable supply from the Neches River Basin. The IPL, when completed, will have a capacity of 150 MGD, so there is a remaining infrastructure capacity of approximately 48 MGD available for this strategy. The remaining 26 MGD of available supply from the Neches Run-of-River would require additional transmission capacity to

convey the water to DWU's service area. If other new water rights are granted in the Neches River Basin prior to obtaining a water right for this project, the yield could be affected.

The quantity of water from the Lake Columbia strategy is assumed to be 56,000 acre-feet per year.

Quantities for both sources of water are limited to the available capacity in the IPL.

TABLE G.44 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
Neches Run-of-River	-	-	-	-	53,800	53,800
DWU – Lake Columbia [a]	-	-	-	-	53,800	53,800

[a]*The Lake Columbia option is considered an alternative strategy and may be implemented after 2080.*

Reliability

The reliability of Neches Run-of-River source is moderately high, provided Lake Palestine provides the backup supplies as modeled. A drought worse than the drought of record could affect the run-of-river supplies and backup from Lake Palestine.

The reliability of Lake Columbia water is moderate to high. The reservoir has a water right permit for 85,507 acre-feet per year. If the required permitting process specifies additional environmental flow releases, the project yield may be affected, and the amount available to DWU may be reduced. Also, during drought the supplies could be reduced.

Water Quality

The water quality for the Neches Run-of-River strategy is expected to be good. Water quality for Lake Columbia was evaluated, and it was found that there are no drinking water impairments. Mud Creek, where Lake Columbia is located, is currently listed on the TCEQ 303(d) list for bacteria and depressed dissolved oxygen. However, this designation is not expected to impact treatability.

Environmental Considerations

Environmental considerations were investigated in the Dallas Long Range Water Supply Plan and are as identified below.

- **Habitat and Vegetative Cover.** The vegetation near the river ranges from bald-cypress dominated swamps to mixed pine-hardwood stands depending on local river flooding and floodplain topography. River and transmission infrastructure would be located to avoid conflicts with the Neches River National Wildlife Refuge and ecologically significant stream segments upstream of the proposed intake site. There is currently no designated critical habitat in the project area. The proposed pipeline route will cross areas of U.S. Fish and Wildlife Service (USFWS) Priority 1 bottomland hardwoods. A large portion of the pipeline route occurs within forested areas, but it also crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be affected by the pipeline corridor. The pipeline route would also cross wetland areas which will be disturbed by construction activities. However, pipelines generally have sufficient design flexibility to

avoid most impacts or significantly reduce potential impacts to geographically limited environmental habitats. As a result, any impacts to existing habitat are anticipated to be low.

The footprint of Lake Columbia will impact approximately 5,746 acres of waters of the U.S., including 3,689 acres of forested wetlands and the remainder comprised of shrub and emergent wetlands (144 and 1,518 acres, respectively), open water, streams and a hillside bog. Impacts associated with the Lake Columbia project are discussed in the Region I Water Plan. Environmental impacts of this project for DWU are associated with the pipeline construction and are expected to be minimal.

- **Threatened and Endangered Species.** The project area for the Neches Run-of-River includes 25 species that are federally or state listed as threatened or endangered or are federal candidate species in the counties for which the project is located. No designated areas of critical habitat currently occur within the project area.

  The Lake Columbia pipeline project area includes 29 species that are federally or state listed as threatened or endangered. These species would need to be considered through the design process and could potentially require mitigation measures during project permitting and implementation. However, the pipeline would be sited to avoid specific habitat types to minimize potential impacts to species along the pipeline corridor.

- **Environmental Water Needs.** Implementation and operation of the Upper Neches Project will comply with TCEQ environmental flow standards and will leave adequate flows in the Neches River to sustain a healthy ecosystem.

  The current TCEQ Permit No. 4228 allowing the construction and operation of Lake Columbia does not require any instream flow releases. However, if Dallas wants to move water from Lake Columbia in the Neches Basin to Trinity River Basin, an amendment to the Permit is required to allow interbasin transfers. This amendment may trigger environmental flow compliance in the Neches River Basin. Also, it is likely the federal permitting process would require the review and possible consideration of environmental flow releases.

- **Bays and Estuaries.** The Neches River flows into Sabine Lake and the Sabine Lake Estuary downstream, which experiences an average annual flow of 4.6 million acre-feet per year. Since the Upper Neches Project would only divert 53,800 acre-feet per year from the river, the proposed pipeline would have very limited effects on freshwater inflow to the lake and estuary with long-term average freshwater inflows to the Sabine Lake Estuary being reduced by just over 1.0 percent.

  Lake Columbia project is over 280 river miles upstream from the Neches estuary at Sabine Lake and is therefore expected to have no measurable effect on the freshwater inflows into Sabine Lake and Sabine Lake estuary. Recognizing the diminishing effect of upstream distance on bay and estuary inflows, the Texas Water Code (Section 11.147) requires

consideration of such effects only if a proposed project is within 200 river miles of the coast.

- **Wetlands.** The proposed pipeline passes through approximately 14 acres of NWI mapped wetlands, including the Neches River and dozens of named creeks and streams in the Neches River Basin. Although a number of NWI-mapped wetlands occur along the proposed pipeline corridor, flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas.

Permitting and Development

The Neches Run-of-River strategy would pose several permitting challenges along with the typical challenges associated with a new project. Similar to other new water projects in Texas, a surface water permit for the channel dam and river diversion from the Neches River would be required from TCEQ and would need to include an inter-basin transfer authorization. In addition to the surface water permit, a Section 404 permit from the USACE for impacts to waters of the U.S. from construction activities would likely be needed for the construction of the diversion facilities and pipeline.

Lake Columbia would require a contract with ANRA and an interbasin transfer permit. ANRA is currently seeking a 404 permit for construction. Currently, the Lake Columbia project is subject to completion of the NEPA process and issuance of a 404 permit from the USACE.

The existing Lake Columbia water right permit would need to be amended to include the interbasin transfer permit. There is a potential that the authorized diversions from Lake Columbia project may be subject to some supply reductions associated with potential environmental flow standards that may be applied during the amendment process.

Cost Analysis

Detailed capital costs for this strategy were provided by the sponsor. For consistency with SB1 planning guidance, the costs were updated to September 2023 dollars using the ENR index. When detailed costs were not available, TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

The cost estimates for this strategy are included in **Appendix H**.

TABLE G.45 SUMMARY OF COSTS

ENTITY	PROJECT	CAPITAL COST	UNIT COST ($/1,000 GAL)	
			WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU	Neches Run-of-River	$719,027,000	$3.96	$0.59
	Lake Columbia	$685,022,000	$3.30	$0.96

This water management strategy for ANRA was developed to address the total current contracted and potential future customer demand through the construction of Lake Columbia. ANRA holds the water right for the supply source and will be the project sponsor. It was specified in the 20 Dallas Long Range Supply Plan that DWU will be responsible for 70 percent of the dam, reservoir land

acquisition, and relocations, and ANRA will be responsible for the remaining 30 percent of the reservoir construction and land acquisition costs. This cost split is subject to change during the potential negotiations between DWU and ANRA. Additionally, these costs differ from the Dallas Long Range Water Supply Plan because a parallel pipeline to the IPL is assumed to be needed since the Neches Run-of-River Strategy is both recommended and is scheduled to be implemented prior to the supplies from Lake Columbia.

When detailed costs were not available, TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs. Cost estimates for the Lake Columbia supplies are included in **Appendix H**.

Water Management Strategy Evaluation

The Neches Run-of-the-River strategy provides supplemental water for DWU that is located near existing DWU water sources. This strategy assumes existing and planned (IPL) infrastructure can be used to transport this water to DWU service area, which minimizes transmission costs. Also, the use of a small river diversion structure provides fewer environmental impacts than a new reservoir, and the operations with Lake Palestine provide the necessary reliability for the river diversion.

Lake Columbia would provide a new water source near existing water resources for DWU. This makes it easier to operate and maintain as part of the overall DWU system.

The environmental concerns are relatively low for a new reservoir site. However, further study is needed to better understand the potential for impacts to threatened and endangered species.

Also, the yield of the project is subject to future permitting requirements and negotiations with ANRA since the authority holds the water rights.

Water User Group Application

The Neches River Run-of-the-River Diversion strategy was evaluated based on several criteria. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy. Based on consideration of these criteria, the strategy is recommended for DWU by the Region C Regional Water Planning Group.

The Lake Columbia strategy was evaluated on the same criteria and is a project identified by DWU for potential future water supplies. The strategy is recommended for DWU by the Region C Regional Water Planning Group. This strategy is also recommended for other users located in Region I.

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G.4.4 Sabine Conjunctive Use

Groundwater Wells	
Potential Sponsor(s):	Dallas Water Utilities
WMS/Project Type:	New Groundwater
Potential Supply Quantity:	25,000 acre-feet per year
Implementation Decade:	2060
Strategy Capital Cost:	$694,882,000
Unit Water Cost ($/kgal)	$6.05 during Debt Service; $1.05 after Debt Service
Application:	Recommended

Off-Channel Reservoir (OCR)	
Potential Sponsor(s):	Dallas Water Utilities
WMS/Project Type:	New Surface Water
Potential Supply Quantity:	74,000 acre-feet per year
Implementation Decade:	2080
Strategy Capital Cost:	$903,296,000
Unit Water Cost ($/kgal)	$3.08 during Debt Service; $1.03 after Debt Service
Application:	Recommended

Strategy Description

The Sabine Conjunctive Use strategy combines groundwater supplies from the Carrizo-Wilcox and Queen City aquifers with an off-channel reservoir (OCR) in Smith County that impounds surface water diverted from the Sabine River. The combination of the two projects has the potential to provide a significantly larger volume of water to DWU than the yields of stand-alone projects.

The Carrizo-Wilcox and Queen City aquifers cover a large portion of northeast Texas. This strategy evaluates the potential for groundwater development in Smith, Wood, and Upshur Counties in Region D for DWU. Use of these aquifers for other major water providers are discussed separately.

The proposed infrastructure for this strategy is as shown. Where appropriate, the wells would be screened in both the Carrizo-Wilcox and Queen City aquifers to provide the greatest amount of available supply. A series of wellfields and pump stations would be strategically located to transport the water 58 miles to the Lake Fork intake and pump station. From this location, the groundwater would be transported to the DWU Eastside water treatment plant via existing infrastructure.

The OCR allows the project to operate as a conjunctive-use resource utilizing groundwater to supplement the yield of an off-channel reservoir during times of low river flows. The OCR stores streamflow diverted from the Sabine River using a 400 cfs (258 MGD) intake and pump station and two 90-inch diameter short-distance transmission pipelines. Water stored in the OCR is subsequently diverted at a maximum rate of 93 MGD to the Lake Fork pump station through a 78-inch diameter pipeline.

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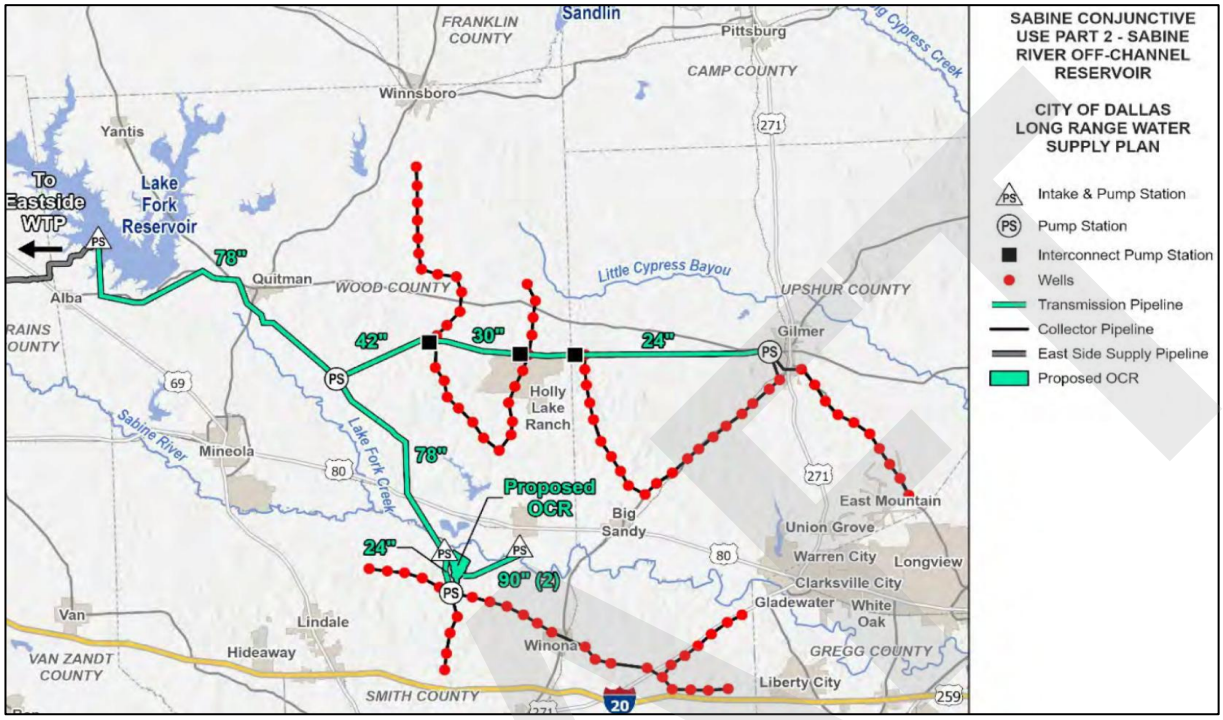
FIGURE G.14 SABINE CONJUNCTIVE USE



Source: 2024 Dallas Long Range Water Supply Plan Draft (Figure 7-17).

Supply Development (Quantity, Reliability, Quality)

Water Quantity

The groundwater portion of the strategy is designed for 30,000 acre-feet/year. However, the supplies available according to the Modeled Available Groundwater (MAG) values are limited to less than 25,000 acre-feet/year. The values shown in this plan are limited to the available MAG. This is most of the potentially available supply from the two aquifers within the target counties. Most of this supply would be from the Queen City Aquifer. There is less than 10,000 acre-feet per year of available supply from the Carrizo-Wilcox Aquifer.

There is no groundwater conservation district (GCD) in Region D. Therefore, the regional water planning group develops the quantities of available groundwater for regional planning purposes. With no GCDs in the targeted counties, there are no pumping regulations or limitations.

For this strategy, the supply available was estimated based on the amount of water that is not being used by others in Region D, as reported in the TWDB database. Additional studies are needed to determine the economically sustainable production from specific well fields. A summary of the potentially available supply for this strategy is shown on **Table G.46**.

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TABLE G.46 SUMMARY OF LOCAL GROUNDWATER AVAILABILITY

COUNTY	AQUIFER	2020 SOURCE BALANCE (AC-FT/YR)	2070 SOURCE BALANCE (AC-FT/YR)
Smith	Carrizo-Wilcox	3,203	3,049
Smith	Queen City	11,351	10,595
Upshur	Carrizo-Wilcox	1,588	1,527
Upshur	Queen City	10,298	10,266
Wood	Carrizo-Wilcox	4,008	3,853
Wood	Queen City	3,035	3,016
TOTAL		***33,483***	***32,306***

The primary source of the OCR is surface water and groundwater supplies are used to backup the surface water supplies when surface water becomes limited. This helps meet demands during drought periods and minimizes the use of groundwater when surface water is plentiful. The conjunctive use system provides a firm yield of 104,200 acre-feet per year. If the OCR component and groundwater component are operated independently, they have a combined yield of 97,200 acre-feet per year (87 MGD), with 60 MGD from the OCR and 27 MGD from groundwater. By operating these two components as a system, the combined yield is increased by about 6 MGD or about 7 percent.

Reliability

The reliability is expected to be moderately high. However, since groundwater is a property right, there could be competing development that may impact supplies. Securing sufficient groundwater rights would help protect the long-term productivity of the well fields. The OCR site was chosen because of its proximity to the groundwater well fields and provided the largest amount of supply of the OCRs evaluated in this area.

Water Quality

Water is generally fresh in both the Carrizo and Queen City aquifers. While there are areas with elevated dissolved solids, the quality tends to improve near the outcrop and in the northern portion of the formation. There are areas within the Queen City Aquifer that contain high iron concentrations and high acidity. Magnesium and iron may also be a concern for the deeper portions of the Carrizo-Wilcox. Water quality testing and compatibility analyses would be needed to assess treatability. The OCR project location is listed as free of impairments by the TCEQ and EPA.

Environmental Considerations

Environmental impacts would be low.

- **Habitat and Vegetative Cover.** Well fields, OCR and transmission pipeline infrastructure were located to avoid conflicts with environmentally sensitive areas in addition to ecologically significant stream sections. Where possible, the pipeline follows existing road rights-of-way or crosses areas of agricultural use.

- **Threatened and Endangered Species.** The project area includes 18 species that are federally or state listed as threatened or endangered or are federal candidate species in the counties for which the project is located. No designated areas of critical habitat currently occur within the project area.
- **Environmental Water Needs.** Implementation and operation of the groundwater project will not impact stream flows as the source of supply is groundwater. For the OCR, Sabine River diversions will periodically reduce Sabine River stream flows during periods of abundant flow. This new division will need to be permitted by TCEQ and, therefore, will comply with applicable TCEQ environmental flow standards.
- **Wetlands.** Impacts to wetlands associated with this project are anticipated to be low for the groundwater wells. Approximately 77 acres of potential wetlands occur in the OCR footprint and would be inundated by the project. A delineation of potential waters of the US would be required during the project development phase to determine impacts. It is likely that coordination with USACE would be required during the Section 404 permitting process, and mitigation would be necessary for these areas.

Permitting and Development

At this time, there are no GCDs and therefore, no groundwater permits are required. If a GCD is formed in one or more of the identified counties, the permitting requirements would be developed at that time. A federal Section 404 permit may be needed to construct the transmission pipeline. This would be confirmed during design. Implementation of the Sabine River diversion and OCR will require permits from both state and federal agencies.

While there are few regulatory requirements with this strategy, there may be public opposition to a large groundwater project that exports the water outside of the county and region.

This strategy could take 5 to 10 years to develop, considering the acquisition of water rights, pilot tests, and final design and construction.

TABLE G.47 SUMMARY OF REQUIRED PERMITS AND POTENTIAL CHALLENGES

PERMIT	REGULATORY ENTITY	POTENTIAL CHALLENGES
Water Right Permit	TCEQ	Will require an inter-basin transfer authorization to transfer water to the Trinity River Basin.
Section 404	USACE	Required for construction in waters of the US.

Cost Analysis

The capital costs for the well field and transmission system were obtained from the Dallas Long Range Water Supply Plan. Annual costs were developed following TWDB guidance for debt service and operation and maintenance costs.

Cost estimates for the strategy supplies are included in **Appendix H.**

TABLE G.48 SUMMARY OF GROUNDWATER COSTS [a]

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU	$694,882,000	$6.05	$1.05

[a]*The groundwater strategy was designed for a total supply of 30,000 acre-feet/year. However, the MAG values are limited to 25,000 acre-feet/year. The costs shown in the table are based on the 30,000 acre-feet/year supply.*

TABLE G.49 SUMMARY OF OCR COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
DWU	$903,296,000	$3.08	$1.03

Water Management Strategy Evaluation

Groundwater provides a reliable water supply to DWU's portfolio of water resources. This source is less susceptible to drought-related impacts, such as evaporation. The source of water is relatively near existing infrastructure and other DWU resources. The quantity of water is limited, and there may be water quality concerns for mixed supplies (groundwater and surface water). However, these concerns can be addressed through treatment if needed. At this time, it is assumed that no additional treatment is required. There are few development concerns. Further study would be needed to confirm the quantity and quality of the groundwater and verify the sustainability of this source for the long term.

Water User Group Application

The Sabine Conjunctive Use strategy was evaluated for DWU. It is a recommended strategy by the Region C Regional Water Planning Group.

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G.5 NTMWD Major Water Management Strategy Technical Memorandums

G.5.1 Expanded Wetland Reuse

Potential Sponsor(s):	NTMWD
WMS/Project Type:	Reuse
Potential Supply Quantity:	33,809 acre-feet per year
Implementation Decade:	2030
Strategy Capital Cost:	$686,489,000
Unit Water Cost ($/kgal):	$5.04 during Debt Service; $0.73 after Debt Service
Application:	Recommended

Strategy Description

The proposed Expanded Wetland Reuse project will treat return flows from wastewater treatment plants owned and operated by NTMWD and the City of Dallas. The return flows will be diverted from the main stem of the Trinity River. The water would then flow through a new or expanded wetland and be conveyed through a new pump station and delivered to Lake Tawakoni. This strategy does not include the cost of an expansion for the Tawakoni Water Treatment Plant.

The return flows for this project come from two sources. The first is through growth in return flows from plants owned and operated by NTMWD that discharge into the East Fork of the Trinity River. It is expected that the quantity of return flows available from this source will exceed the treatment capacity of the existing East Fork Wetland by the year 2030. The second source of water for the project is return flows from Dallas' (DWU) Central and Southside wastewater treatment plants, provided through a swap agreement between DWU and NTMWD. This agreement provides NTMWD return flow from DWU's Central and Southside WWTPs in exchange for NTMWD's Elm Fork return flows into DWU's reservoirs. The return flows available for the pump station and wetland expansion are shown in **Table G.50**. If available, other sources of return flows conveyed through the wetland and Lake Tawakoni would also be consistent with this plan.

Supply Development (Quantity, Reliability, Quality)

Water Quantity

Table G.50 shows the quantity of water expected to be produced by the project over the planning period. The water quantity is based on expected growth in return flows in the East Fork and Elm Fork watersheds assuming there are sufficient supplies to support the projected demands. The quantities also consider losses during treatment in the wetland, as well as estimates of water bypassed for environmental purposes in accordance with NTMWD's reuse permits. Actual quantities will be dependent upon the amount of wastewater discharged.

TABLE G.50 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
Elm Fork/ Hubbard Swap	9,499	12,368	11,966	11.966	11,966	11,966
Additional East Fork Reuse	1,166	5,467	12,638	18,080	20,950	21,843
TOTAL	***10,665***	***18,105***	***24,604***	***30,046***	***32,916***	***33,809***

Reliability

The reliability of the reuse supplies is high. There is the potential for the reuse supplies to develop at a faster or slower rate, depending on the volume of return flows.

Water Quality

The water quality is expected to be good. The wetland will filter out excess nutrients and pollutants and trap natural sediment and organic matter, providing higher quality water than diverted from the Trinity River.

Environmental Considerations

This project should have positive environmental impacts, as it improves the water quality of the diverted effluent and the constructed wetland will provide habitat for wildlife. The project assumes that environmental flows in NTMWD's existing authorizations are applied.

Permitting and Development

The proposed project would require a bed and banks authorization for the transport of supplies through Lake Tawakoni. A federal Section 404 permit would be needed to construct the intake pump station, pipelines, and wetland. The project is expected to be online by 2030. There are no known development issues.

Cost Analysis

TWDB costing guidance was followed for transmission costs. The wetland cost is based on the estimate for the TRWD Cedar Creek Reuse Project. Annual costs were developed following TWDB guidance for debt service and operation and maintenance costs. Cost estimates for this project are included in **Appendix H.**

TABLE G.51 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 gal)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD	$686,489,000	$ 5.05	$ 0.73

Water Management Strategy Evaluation

The Expanded Wetland Reuse strategy provides NTMWD with additional water supply in an ecologically sustainable manner. The source water will increase over time as return flows increase, providing a highly reliable supply assuming additional supplies are developed to meet the projected demands. The created wetland also provides increased habitats for wildlife.

Water User Group Application

The Expanded Wetland Reuse strategy is recommended by the Region C for NTMWD members and customers.

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G.5.2 Lake O' The Pines

Potential Sponsor(s):	NTWMD
WMS/Project Type:	New Surface Water (Reservoir)
Potential Supply Quantity:	75,000 acre-feet per year
Implementation Decade:	2040
Strategy Capital Cost:	$1,345,782,000
Unit Water Cost ($/kgal):	$4.06 during Debt Service; $1.07 after Debt Service
Application:	Recommended

Strategy Description

Lake O' the Pines is an existing Corps of Engineers reservoir, with Texas water rights held by the Northeast Texas Municipal Water District (NETMWD). The lake is on Cypress Creek in the Cypress Creek Basin in Region D, the Northeast Texas Region. It is about 120 miles from the Metroplex. Some Region C water suppliers have explored the possibility of purchasing supplies in excess of local needs from the Cypress Creek Basin for use in the Metroplex.

NTMWD is currently negotiating with the NETMWD and other entities with contracts in Lake O' the Pines for supply for use in its service area. The firm supply is estimated from the purchase is 75,000 acre-feet per year. The water from the Lake O' the Pines would be transferred to a new water treatment plant in the southeast part of the NTMWD's service area. Based on the most recent information available from Region D, there is approximately 72,000 to 78,000 acre-feet per year of supply from the Lake O' the Pines Reservoir. For planning purposes, the firm supply amount is shown, however, actual contract amounts may be higher and are consistent with this plan.

Supply Development (Quantity, Reliability, Quality)

Water Quantity

Supply availability is based on the amount of unused water from NETMWD and the contractual supply for manufacturing use in Morris County. The manufacturing facility in Morris County is no longer operational and the supply is proposed to be repurposed for municipal use.

TABLE G.52 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
NTMWD	0	74,978	73,549	71,797	69,013	66,323

Reliability

The water from this strategy would be moderately to highly reliable. The supply from Lake O' the Pines is based on the firm yield of the reservoir using the Cypress WAM. The supplies shown represent the firm supply, however non-firm supplies may also be purchased. If additional instream flow releases are required, the firm supply may decrease.

Water Quality

The treated water quality is expected to be good. Lake O' the Pines water has low total dissolved solids (TDS) and salts. The average TDS level is approximately 100 mg/L. The reservoir also has slightly higher than average nutrients, including ammonia-nitrogen. Other nutrient values are below the screening levels.

Environmental Considerations

Since the Lake O' the Pines water management strategy obtains water from an existing source, the environmental impacts are expected to be low.

- **Threatened and Endangered Species.** There are 29 state and federal threatened and endangered species potentially impacted by this WMS, based on the species listed in the counties in which this WMS is located.
- **Environmental Water Needs.** The environmental flow needs will be evaluated during the permitting process as required by TCEQ and/or USACE.

Permitting and Development

Development of this source would require contracts between NTMWD and entities contracting for water from Lake O' the Pines that have excess supplies. This strategy would also require an interbasin transfer permit to use the water in the NTMWD service area.

Cost Analysis

For the Region C cost analysis, planning level opinion of costs has been developed using the TWDB's costing tool. In accordance with TWDB Guidance, the analysis of costs for WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources to a future treatment facility. Water treatment plants are costed separately. Cost estimates for this strategy are included in **Appendix H.**

TABLE G.53 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 gal)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
NTMWD	$1,345,792,000	$4.05	$1.07

Water Management Strategy Evaluation

This strategy provides a reliable freshwater supply at a reasonable cost for NTMWD. The low salinity levels in the water make it amenable for blending with some of NTMWD's other sources, such as Lake Texoma and/or reuse.

Water User Group Application

The Lake O' the Pines strategy is recommended by Region C for NTWMD and customers.

G.6 TRWD Major Water Management Strategy Technical Memorandums

G.6.1 Aquifer Storage and Recovery

Potential Sponsor(s):	TRWD
WMS/Project Type:	Aquifer Storage and Recovery
Potential Supply Quantity:	5,000 acre-feet per year during drought
Implementation Decade:	2030
Strategy Capital Cost:	$14,932,000
Unit Water Cost ($/kgal):	$0.98 during Debt Service; $0.49 after Debt Service
Application:	Recommended

Strategy Description

Aquifer Storage and Recovery (ASR) is a water management solution that allows for storing surplus water in local aquifers during periods of excess surface water availability and withdrawing the stored water later during periods of drought or peak demands. TRWD has completed a pilot well near an existing surface water treatment facility and is currently conducting tests. This demonstration study is on-going, and the results are not available.

Conceptually, the ASR project would treat excess surface water at an existing water treatment plant. The treated water would then be stored in the Hosston formation of the Trinity aquifer during low demand winter or spring months and normal to wet years. This concept recognizes that during drought conditions, the ability to store water may be limited. Therefore, this project would likely be operated as part of a system that stores water during wet periods and uses stored water during dry periods.

An ASR system for TRWD would consist of a combination of the following infrastructure elements:

- Wellfield facilities (3 recharge / recovery wells) Wells are approximately 1,500 to 1,700 feet below the ground surface.
- Connection piping at the water treatment plant

Supply Development (Quantity, Reliability, Quality)

Water Quantity

It is assumed that the source of water for this strategy would be excess surface water from water rights owned by TRWD. The project is sized to store up to 5,000 acre-feet per year over a three-to four year period and recover up to 88 percent of this amount over a two-year period. Water would be pumped directly to the water treatment and ASR site from existing raw water transmission systems. The water is fully treated and will not degrade receiving formation groundwater. The water is then recharged into the receiving formation through recharge wells. It is assumed that these facilities are sized to transport and recharge 1,600 acre-feet per year over a 9-month period, with a peaking factor of 1.25. This provides the peak capacity to recover and utilize excess flows over a

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short period and store sufficient quantities to meet demands during dry periods. The assumed maximum recharge/recovery capacity for each well is 450 gpm.

TABLE G.54 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
TRWD	2,500	2,500	5,000	5,000	5,000	5,000

Reliability

Successful ASR development is highly reliable. TRWD's initial ASR demonstration well is permitted to be able to recover 88 percent of water stored. Challenges to reliability include natural groundwater flow away from the ASR site and the associated drift of the storage bubble, thus reducing available supplies. This migration of stored water is an important consideration in determining the reliability and viability of an ASR project. The potential for migration increases as residence time in the aquifer increases. Also, since withdrawal of groundwater is a property right, competition with other nearby users could reduce the reliability of this water. One way to address the issue of other competing wells is to own the property rights over the storage bubble, which would increase strategy costs. The demonstration well is on property owned by TRA.

Water Quality

Because of the guidelines stipulated in the ASR regulations for Texas, the quality of the recharge water must not degrade the quality of the receiving aquifer, which is generally good. The recovered ASR water would be treated to standards required by the end use. When the injected water is treated to meet drinking water standards prior to storage, the recovered water may only need simple re-disinfection prior to being distributed to end-users.

Environmental Considerations

Environmental impacts are expected to be low. The footprint of an ASR project may be significantly smaller than a surface reservoir project of similar storage capacity and eliminates the need to inundate large areas of land. The transmission system and the ASR facilities can be designed to avoid environmentally sensitive areas. The project will not degrade the quality of the groundwater in the receiving aquifer.

The challenge will be to locate the facilities (transmission, treatment, and wellfield) in areas that are increasingly urban.

Permitting and Development

There is much support for developing ASR projects in Texas, but the principal challenge for development is identifying appropriate receiving formations and aquifer zones that are near areas of water sources and demand. The Texas Legislature has enacted legislation to remove some of the legal and regulatory obstacles that have previously impeded application of this technology. This legislation now allows the water quality of the recharge water to be such that it does not degrade the quality of water in the formation (versus drinking water standards) and permits the recovery of nearly the same amount of recharge water under the new ASR regulations. However, there remains

concerns for protection of the water once it is injected for storage. Since groundwater is considered a property right, stored ASR water can become subject to competition for use by other property owners, especially if the natural flow is not restricted.

Recharge wells for ASR projects are regulated by TCEQ's Underground Injection Control (UIC) program and are classified as Class V Injection Wells. Thus, they must be permitted pursuant to Chapter 27, Texas Code, and Chapter 331, Title 30 of the Texas Administrative Code. TRWD has already permitted one demonstration well with TCEQ under this program.

An ASR project requires wells to be registered with the applicable GCD. If a well does not recovery more water than stored, a permit is not needed. TRWD has registered the initial demonstration well with the Northern Trinity GCD (Tarrant County).

Cost Analysis

For the Region C cost analysis, planning level opinions of costs for this strategy have been developed using the TWDB's costing tool. In accordance with TWDB Guidance, the analysis of costs for WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon. This strategy assumes that there are no purchased water costs, and water already developed by a sponsor is the source for the ASR project.

Cost estimates for this project are included in **Appendix H.**

TABLE G.55 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD	$14,932,000	$0.98	$0.49

Water Management Strategy Evaluation

ASR provides a drought resiliency strategy that has considerable potential for users with sources of excess water. The recovery efficiency is estimated at 88 percent based on the initial TRWD demonstration well permit. Additional testing will determine if the recovery efficiency could be improved for future wells. Care must be taken to limit losses due to the natural movement of groundwater and competition from adjacent landowners.

Further study is needed to address technical uncertainties. Technical operation of the system may pose challenges to infrastructure that may not be used regularly.

Water User Group Application

The initial demonstration well is currently being implemented and tested by TRWD. This is a recommended strategy for TRWD.

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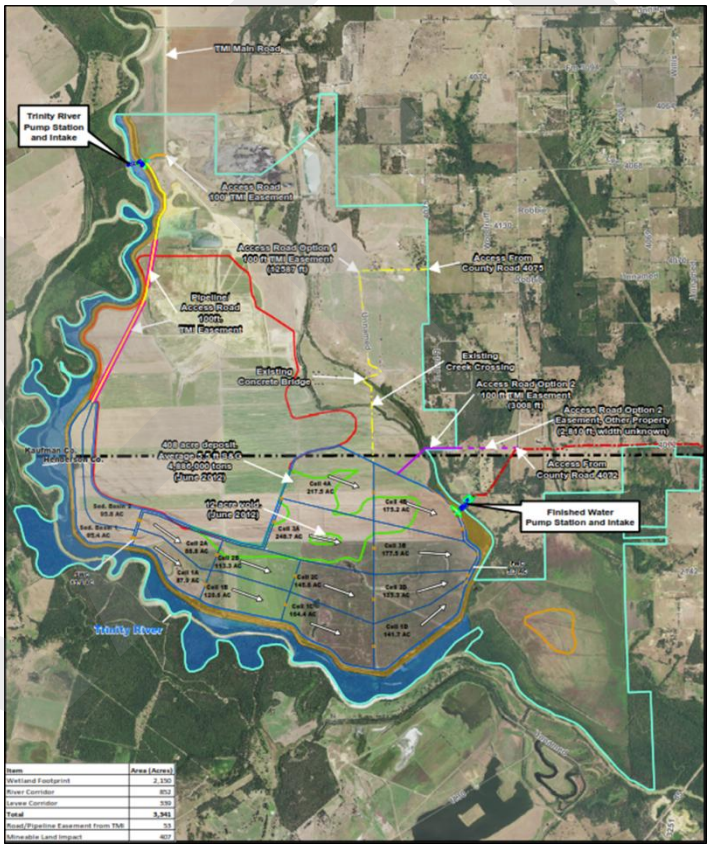
G.6.2 Marty Leonard Wetland (Cedar Creek Wetland Reuse)

Potential Sponsor(s):	Tarrant Regional Water District
WMS/Project Type:	Reuse
Potential Supply Quantity:	88,059 acre-feet per year
Implementation Decade:	2030
Strategy Capital Cost:	$673,381,000
Unit Water Cost ($/kgal):	$2.00 during Debt Service and $0.73 after Debt Service
Application:	Recommended

Strategy Description



The Tarrant Regional Water District (TRWD) has water rights allowing the diversion of return flows of treated wastewater from the Trinity River. To utilize these flows, TRWD has developed a reuse project at Richland-Chambers Reservoir. Treated wastewater is discharged to the Trinity River and its tributaries, flows downstream, is pumped from the Trinity River into the constructed George W. Shannon Wetlands and then pumped into Richland-Chambers Reservoir. The return flows are then diverted from Richland-Chambers Reservoir and transported to the TRWD service area. However, this project can only divert and treat a portion of the permitted reuse supplies. To fully utilize the available reuse, TRWD will develop a similar reuse project at Cedar Creek Reservoir, named the Marty Leonard Wetlands. In November 2014, TRWD's certificates of adjudication for these reuse projects were amended to increase the total permitted reuse supply to 188,524 acre-feet per year. This includes 100,465 acre-feet per year at Richland-Chambers and 88,059 acre- feet per year at Cedar Creek Reservoir. This project is currently in design and is expected to be completed before the 2030 decade.

This strategy addresses the development of a reuse project at Cedar Creek Reservoir, which includes a new diversion structure, constructed wetlands, a balancing reservoir, and other infrastructure necessary to deliver the treated return flows into Cedar Creek Reservoir. The wetlands will be constructed adjacent to the Trinity River, east of the City of Ennis. The reuse supplies would then be diverted from the lake and transported by the Integrated Pipeline (see Integrated Pipeline Technical Memorandum).

Supply Development (Quantity, Reliability, Quality)

Supply availability was evaluated by the Region C Consultants with consideration to the maximum return flow available to TRWD for diversion.

Water Quantity

The water quantity for the Marty Leonard wetlands considers available return flows, amount diverted and treated by the Richland Chambers Wetlands (at Richland Chambers Reservoir), and any evaporative losses during treatment in the wetlands. As municipal water demands increase, the available return flows increase. The quantity of supplies available through this strategy is summarized in **Table G.56**. According to these projections, the project will not reach the total permitted amount (88,059 AFY) during the 2080 planning period. However, TRWD intends to divert the return flows from the TRA Central Regional Wastewater System WWTP (see the Reuse from TRA Central WWTP Technical Memorandum) to the Marty Leonard Wetlands and then reach the total permitted amount (88,059 AFY) by 2060.

TABLE G.56 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
TRWD	10,167	18,085	20,969	29,037	38,956	48,455

Reliability

The reliability of the reuse supplies is high. There is the potential for the reuse supplies to develop at a faster or slower rate, depending on the volume of return flows.

Water Quality

The water quality is expected to be good. The wetlands will filter out excess nutrients and pollutants and trap natural sediment and organic matter, providing higher quality water than diverted from the Trinity River.

Environmental Considerations

There are no significant environmental considerations associated with this strategy. The wetlands will be designed to handle the volume and quality of the return flows appropriately. In addition to their function of improving the water quality of the diversions, the constructed wetlands will provide habitat for wildlife.

During the preliminary design phase of this project, the project team identified several federally listed threatened or endangered species with the potential to occur within the project limits. Field surveys of the project site did not identify any current federally listed or proposed listed species within the project footprint. However, habitat conditions were observed for eight threatened or endangered species including the monarch butterfly (federal candidate), tricolored bat (federal proposed endangered), alligator snapping turtle (federal proposed threatened and state threatened), northern scarlet snake (state threatened), Louisiana Pigtoe (federal proposed threatened and state threatened), Texas Fawnsfoot (federal and state threatened), Texas Heelsplitter (federal proposed endangered and state threatened), and Trinity Pigtoe (state

threatened). A mussel survey was performed for the portion of the Trinity River within the project area and no federally listed mussel species were identified during the survey. Completion of coordination with USFWS, as well as other site surveys for species throughout design and prior to construction, may be required.

Permitting and Development

TRWD has already secured water right permits to develop the Marty Leonard Wetlands reuse project. A federal Section 404 permit would be needed to construct the intake pump station, pipelines, and wetlands because of possible impacts to waters of the U.S. TRWD acquired the property for the Marty Leonard Wetlands in 2014 and is in the process of acquiring the site and right-of-way for the finished water pipeline and pump station facilities. The Marty Leonard Wetlands are currently in the design phase of the project at the time of the regional planning effort.

The project is expected to be online by 2030. There are no known development issues.

Cost Analysis

Capital construction costs for this project were obtained from TRWD based on 30% design of pump stations and pipelines and 10% design for wetlands sedimentation basins and cells. Original capital costs were in 2013 dollars and were updated to September 2023 dollars using the ENR index. Costs include additional wetlands needed for full TRA reuse purchases and ultimate TRWD permitted reuse. Annual costs were developed following TWDB guidance for debt service, operation and maintenance costs, and pumping costs.

Cost estimates for this project are included in **Appendix H.**

TABLE G.57 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD	$673,381,000	$2.00	$0.73

Water Management Strategy Evaluation

The Marty Leonard Wetlands provides TRWD with a low-cost water supply in an ecologically sustainable manner. The source water will increase over time as demands increase, providing a highly reliable supply. Additionally, the strategy is to pump water out of the reservoirs and to TRWD customers on the same day as it is delivered from the wetlands. This eliminates evaporative losses and will not impact reservoir storage that could otherwise be used. The constructed wetlands also provide increased habitat for wildlife and a source of clean water to Cedar Creek Lake.

Water User Group Application

The Marty Leonard Wetland Reuse Project is sponsored by TRWD and the strategy is recommended for TRWD by the Region C Regional Water Planning Group. The water provided from the Marty Leonard Wetland Reuse Project will be used by TRWD customers.

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G.6.3 Reuse from Mary's Creek WRF

Potential Sponsor(s):	Tarrant Regional Water District
WMS/Project Type:	Reuse
Potential Supply Quantity:	25,928 acre-feet per year
Implementation Decade:	2030
Strategy Capital Cost:	$68,938,000
Unit Water Cost ($/kgal):	$0.64 during Debt Service; $0.20 after Debt Service
Application:	Recommended

Strategy Description

The City of Fort Worth is currently designing a new wastewater treatment plant, Mary's Creek Water Reclamation Facility (WRF), that is located in the western parts of the City of Fort Worth. The Mary's Creek WRF is expected to be online by 2028 and will discharge to Mary's Creek which flows into the Clear Fork of the Trinity River. Through a partnership with Fort Worth, TRWD is planning to divert available return flows from Mary's Creek to Eagle Mountain Lake via a pipeline system.

This strategy includes the construction of an intake pump station and 3.5 miles of pipeline. This strategy was assumed to connect to the existing TRWD conveyance system north of TRWD's Eagle Mountain Balancing Reservoir where it will tie into an existing pipeline and be delivered to Eagle Mountain Lake. Land acquisition for this strategy is yet to be complete.

Supply Development (Quantity, Reliability, Quality)

Supply availability was evaluated by the Region C Consultants with consideration of the maximum return flow available to TRWD for diversion.

Water Quantity

The water quantity for this strategy considers available return flows after accounting for anticipated direct reuse by the City of Fort Worth from Mary's Creek WRF. As municipal water demands increase, the available return flows increase. The quantity of supplies available through this strategy is summarized in **Table G.58**. According to these projections, the project will supply the maximum amount of available reuse (25,928 AFY) over the 2080 planning period.

TABLE G.58 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
TRWD	10,405	17,547	17,288	20,168	23,048	25,928

Reliability

The reliability of the reuse supplies is high. There is the potential for the reuse supplies to develop at a faster or slower rate, depending on the volume of return flows.

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Water Quality

The water quality is expected to be fair. While the effluent from the Mary's Creek WRF is expected to be very high quality, natural flows in Mary's Creek can contain nutrients, sediment, organic matter, and other pollutants and may degrade the quality, especially following rain events.

Environmental Considerations

No detailed environmental assessments have been conducted for the intake pump station and pipeline route. Site selection and design are on-going. Habitat and vegetation cover and threatened and endangered species could be impacted by this strategy depending on the locations of the intake pump station and route of the pipeline. However, these facilities will be located to minimize impacts where possible.

Permitting and Development

TRWD does not have water rights for the use of return flows in Eagle Mountain Lake and would require an amendment to the existing Eagle Mountain Lake water rights for the bed and banks permit. A Section 404 permit may be required for the construction of this project depending on location of the intake pump station and route and construction methods of the pipeline.

Cost Analysis

Cost estimates for this project are included in **Appendix H.**

TABLE G.59 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD	$68,938,000	$0.64	$0.20

Water Management Strategy Evaluation

The Reuse from Mary's Creek WRF provides TRWD with a low-cost water supply. The source water will increase over time as demands increase, providing a highly reliable supply. Additionally, the source water from this strategy will be pumped out of reservoirs and to TRWD customers on the same day as it is delivered from the Mary's Creek WRF. This eliminates evaporative losses and will not impact reservoir storage that could otherwise be used.

Water User Group Application

This project is sponsored by TRWD and is a recommended strategy for TRWD by the Region C Regional Water Planning Group.

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G.6.4 Reuse from TRA Central RWS

Potential Sponsor(s):	Tarrant Regional Water District
WMS/Project Type:	Reuse
Potential Supply Quantity:	60,000 acre-feet per year
Implementation Decade:	2030
Strategy Capital Cost:	$0 (Capital costs are included with the Marty Leonard Wetlands)
Unit Water Cost ($/kgal):	$0.39 (purchase and pumping costs)
Application:	Recommended

Strategy Description

The Tarrant Regional Water District (TRWD) entered into an agreement with the Trinity Regional Authority (TRA) to purchase a portion of the treated wastewater return flows from the TRA Central Regional Wastewater System (CRWS) Wastewater Treatment Plant (WWTP) for indirect reuse in TRWD's system. In combination with its existing reuse sources, this purchase of return flows will ensure that TRWD has enough available flow to meet its total permitted reuse supply of 188,524 acre-feet per year.

Currently, TRWD does not have a direct way to access the purchased return flows from the TRA CWRS WWTP which are discharged into the Trinity River. Following completion of the Marty Leonard Wetlands, these purchased return flows can be accessed via an intake on the Trinity River, treated in the constructed wetland, pumped to Cedar Creek Reservoir, and ultimately diverted from the reservoir and transported by the Integrated Pipeline (IPL) and Additional Transmission infrastructure to TRWD's customers. It was assumed this project included upgrades to diversion structures, and new wetland cells would be required to treat all-the purchased flows. Amendment to the certificates of adjudication may be required to access the entire quantity of this supply following 2060.

Supply Development (Quantity, Reliability, Quality)

Supply availability was provided to the Region C Consultants following coordination with TRA.

Water Quantity

The water quantity for the reuse from the TRA CRWS WWTP is the agreed-upon quantity that TRWD can purchase from TRA and does not include water losses via conveyance along the Trinity River. The quantity of supply available through this strategy is summarized in **Table G.61**. According to these projections, the project will supply a maximum amount of available reuse to be purchased (60,000 AFY) during the 2080 planning period.

TABLE G.60 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
TRWD	25,500	37,000	48,500	60,000	60,000	60,000

Reliability

The reliability of the reuse supplies is high. There is the potential for the reuse supplies to develop at a faster or slower rate, depending on the volume of return flows.

Water Quality

The water quality is expected to be good. Ultimately this reuse supply will be treated by the Marty Leonard Wetlands which will filter out excess nutrients and pollutants and trap natural sediment and organic matter, providing higher quality water than diverted from the Trinity River.

Environmental Considerations

There are no significant environmental considerations associated with this strategy. The wetlands will be designed to handle the volume and quality of the return flows appropriately. In addition to their function of improving the water quality of the diversions, the constructed wetlands will provide habitat for wildlife.

During the preliminary design phase of the Marty Leonard Wetland project (see Marty Leornard Wetland Technical Memorandum), the project team identified several federally listed threatened or endangered species with the potential to occur within the project limits. Field surveys of the project site did not identify any current federally listed or proposed listed species within the project footprint. However, habitat conditions were observed for eight threatened or endangered species including the monarch butterfly (federal candidate), tricolored bat (federal proposed endangered), alligator snapping turtle (federal proposed threatened and state threatened), northern scarlet snake (state threatened), Louisiana Pigtoe (federal proposed threatened and state threatened), Texas Fawnsfoot (federal and state threatened), Texas Heelsplitter (federal proposed endangered and state threatened), and Trinity Pigtoe (state threatened). A mussel survey was performed for the portion of the Trinity River within the project area and no federally listed mussel species were identified during the survey. Completion of coordination with USFWS, as well as other site surveys for species throughout design and prior to construction, may be required.

Permitting and Development

A federal Section 404 permit would be needed to upgrade the intake pump station and pipelines and construct additional wetlands because of possible impacts to waters of the U.S.

TRWD currently has certificates of adjudication for reuse projects that provide a total permitted reuse supply of 188,524 acre-feet per year. Amendment to these water rights may be required to access the entire quantity of this supply following 2060.

Cost Analysis

Capital construction costs associated with upgrades to the Marty Leonard Wetlands for this strategy were included in the capital construction costs associated with the Marty Leonard Wetlands (see the Marty Leonard Wetland Technical Memorandum). Annual costs were developed pumping costs and an assumed purchase of reuse water at $0.30 per 1,000 gal. Actual costs would be negotiated between the buyer and seller.

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Cost estimates for this project are included in **Appendix H.**

TABLE G.61 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD	$0	$0.39	$0.39

Water Management Strategy Evaluation

The Reuse from TRA Central WWTP provides TRWD with a low-cost water supply in an ecologically sustainable manner. The source water will increase over time as demands increase, providing a highly reliable supply. Additionally, the source water from this strategy will be pumped out of reservoirs and to TRWD customers on the same day as it is delivered from the wetlands. This eliminates evaporative losses and will not impact reservoir storage that could otherwise be used.

Water User Group Application

This strategy is sponsored by both TRA and TRWD and is recommended for TRWD by the Region C Regional Water Planning Group.

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G.6.5 Tehuacana Reservoir

Potential Sponsor(s):	Tarrant Regional Water District
WMS/Project Type:	New Surface Water (Reservoir)
Potential Supply Quantity:	22,330 acre-feet per year
Implementation Decade:	2050
Strategy Capital Cost:	$575,134,000
Unit Water Cost ($/kgal):	$4.07 during Debt Service; $0.27 after Debt Service
Application:	Recommended

Strategy Description

Tehuacana Reservoir is a proposed reservoir in Freestone County on Tehuacana Creek within the Trinity River Basin. Tehuacana Creek is a tributary of the Trinity River and lies immediately south and adjacent to Richland Creek on which the existing Richland-Chambers Reservoir is located. Tehuacana Reservoir would connect to Richland-Chambers Reservoir by a 9,000-foot channel and be operated as an integrated extension of that reservoir. The project would have a firm yield of 26,400 acre-feet per year and a safe yield of 22,330 acre-feet per year. The reservoir would store approximately 338,000 acre-feet and inundate approximately 15,000 acres. The existing spillway for Richland-Chambers Reservoir was designed to provide enough discharge capacity to accommodate the increased flood flows from Tehuacana Reservoir for the probable maximum flood event at the time of design. Therefore, it is assumed that the dam for Tehuacana Reservoir can be constructed without a spillway and can function as merely increased storage for the Richland-Chambers-Tehuacana Reservoir. Supplies derived from Tehuacana would be transported from the expanded reservoir utilizing existing and proposed TRWD transmission facilities.

The strategy includes a zoned earthen embankment with a maximum height of 81 feet, a 9,000-foot channel at elevation 290 feet connecting to Richland-Chambers Reservoir and a booster pump station to access the full yield of Tehuacana down to elevation 270 feet. Depending upon the sequencing of strategy implementation, some or all the water from Tehuacana can be conveyed through the IPL. However, by 2050 a new pipeline will be needed to transport the supplies from TRWD strategies, including Lake Tehuacana. The new pipeline could be built within the IPL right of way and designed to carry Tehuacana yield as well as supply sources from southeast of Dallas/Fort Worth.

Supply Development (Quantity, Reliability, Quality)

The supply available for Tehuacana Reservoir was developed using the Trinity Basin Water Availability Model (WAM), modified for Region C strategy evaluation. This model includes the adopted environmental flow standards for the Trinity Basin. It also includes an estimate of the environmental flows at the reservoir site based on scaling the SB3 standards (using naturalized flows and drainage area ratios) from the Trinity River near Oakwood (USGS 0806500), shown in **Table G.62**. The scaling is based on methods recommended by TCEQ (Wood, 2013).

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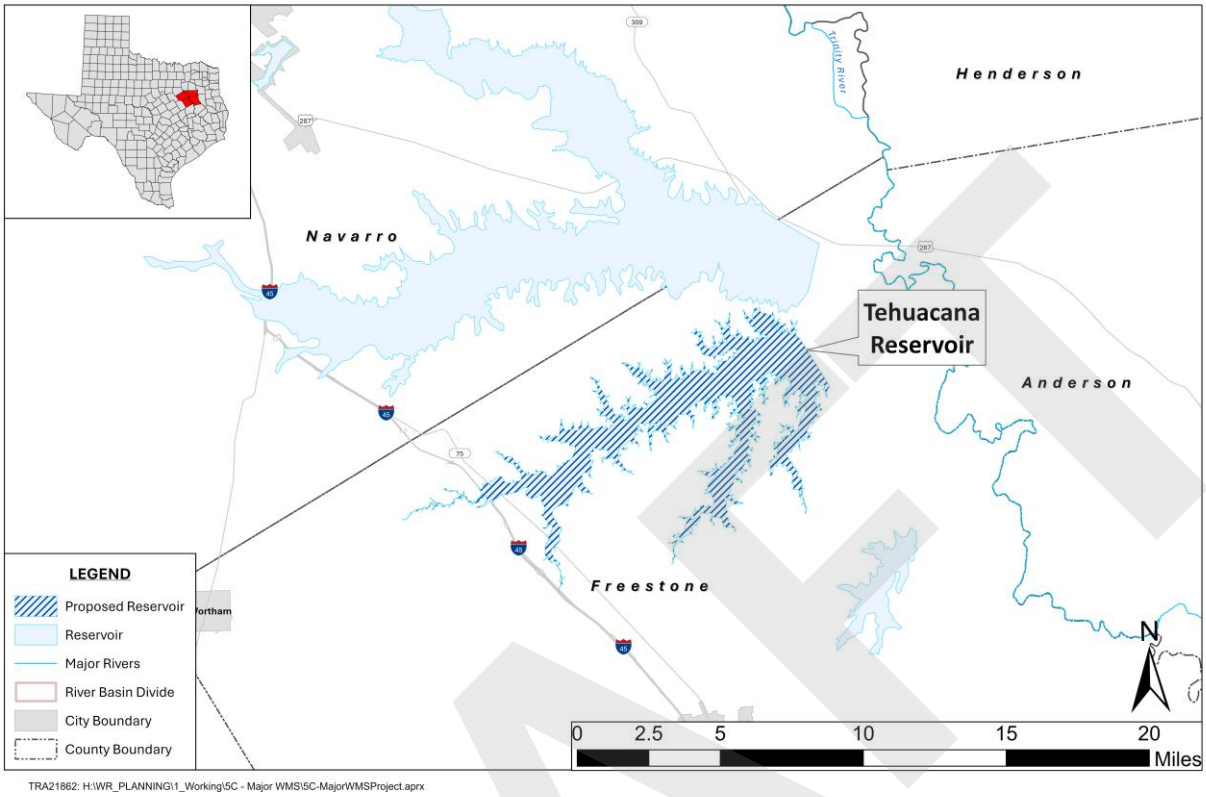


TABLE G.62 ENVIRONMENTAL FLOW CRITERIA FOR TEHUACANA RESERVOIR

SEASON	SUBSISTENCE	BASE	PULSE (2 PER SEASON)
Winter	3 cfs	9 cfs	Trigger: 104 cfs Volume: 500 af Duration: 4 days
Spring	4 cfs	12 cfs	Trigger: 243 cfs Volume: 3,285 af Duration: 8 days
Summer	2 cfs	7 cfs	Trigger: 87 cfs Volume: 639 af Duration: 4 days
Fall	3 cfs	7 cfs	Trigger: 87 cfs Volume: 639 af Duration: 4 days

Water Quantity

Tehuacana Reservoir was analyzed as a stand-alone project junior to all existing Trinity Basin priority rights. TRWD uses safe yield for its reliable supply estimates. The stand-alone safe yield of Tehuacana Reservoir is 22,330 acre-feet per year, which includes environmental flow releases as shown in **Table G.62**. However, if other new water rights are granted in the Trinity River Basin prior to obtaining a water right for this project, the yield of the reservoir could be affected. The yield has

already been reduced from previous estimates due to new water rights and the incorporation of the environmental flow standards.

The project may offer more benefit to the TRWD system than indicated by the safe yield. The additional storage may provide more opportunities to use water from the TRWD Richlands reuse project and the TRWD Excess Flows permit. Additional studies will be required to evaluate this benefit.

Reliability

The reliability of Lake Tehuacana is expected to be moderately high. The use of safe yield provides a buffer if there is a new drought of record.

Water Quality

The water quality is expected to be adequate with composition like Richland-Chambers Reservoir.

Environmental Considerations

The reservoir is a new source of surface water, therefore environmental impacts have the potential to be greater than other strategies utilizing existing sources.

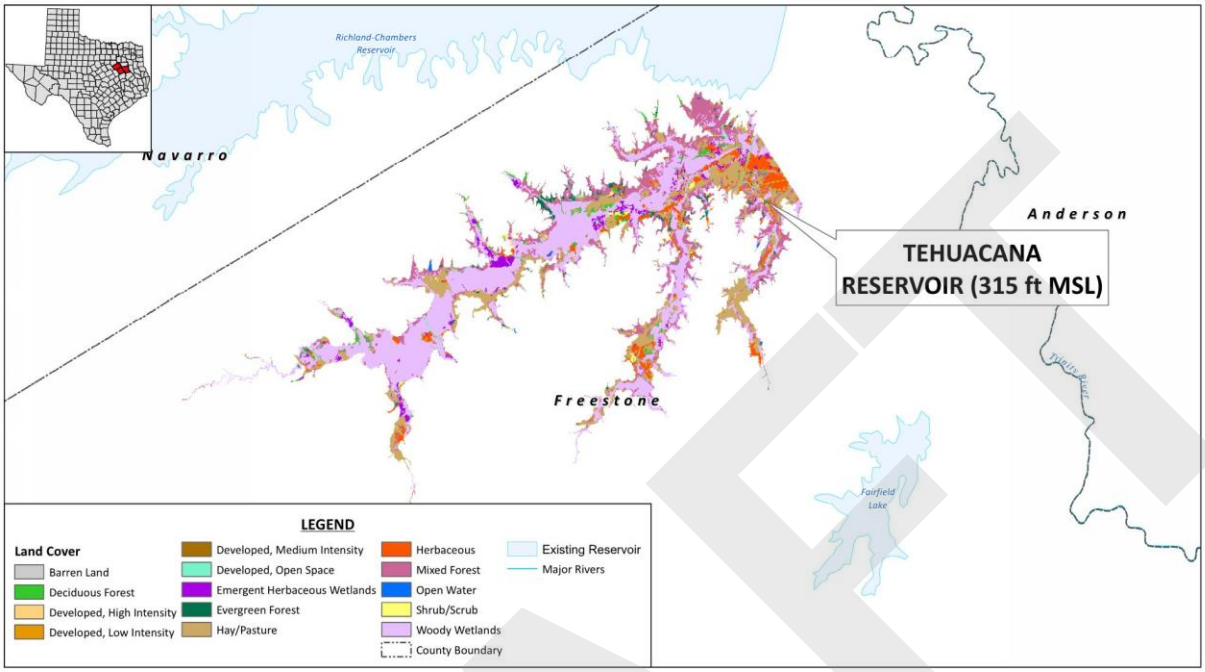
- **Habitat and Vegetative Cover.** Tehuacana Reservoir would inundate about 15,000 acres adjacent to Richland-Chambers Reservoir. Most of the reservoir site is classified as upland deciduous forest and grassland. Less than 3 percent is presently classified as marsh or open water. There are about 1,200 acres of bottomland hardwood forest, which is concentrated near the dam site (see **Figure G.15**). There are no priority bottomland hardwoods within the site, but the Tehuacana Reservoir site is also located immediately upstream of two Priority 5 bottomland hardwood preservation sites identified as Tehuacana Creek and Boone Fields (USFWS, 1985). The vegetative cover as reported in the TWDB Reservoir Site Protection Study is shown on **Table G.63**.

TABLE G.63 VEGETATIVE LAND COVER

LANDCOVER CLASSIFICATION	ACREAGE[A]	PERCENT
Bottomland Hardwood Forest	1,213	8.2%
Marsh	285	1.9%
Evergreen Forest	65	0.4%
Upland Deciduous Forest	8,605	58.0%
Grassland	2,992	20.1%
Shrubland	427	2.9%
Agricultural Land	1,136	7.7%
Open Water	122	0.8%
TOTAL	***14,845***	***100.0%***

[a]Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship.

FIGURE G.15 LAND COVER FOR TEHUACANA RESERVOIR



- **Threatened and Endangered Species.** The reservoir is located just upstream of a segment of the Trinity River identified with the Texas heelsplitter freshwater mussels. There are nine federally listed threatened or endangered species and 11 other state-listed species in the one county affected by this project.

Permitting and Development

Developing this site will require obtaining a new water right and a federal Section 404 permit to construct the dam and reservoir. Part of the Tehuacana Reservoir site is underlain by lignite, which has impeded development in the past. However, most of the lignite has been mined and is no longer used locally. With these changes, the economic feasibility of obtaining the land for this project improves.

This project has been in TRWD's water supply planning since prior to the design, permitting and construction of the Richland-Chambers Reservoir which commenced in the late 1970's.

Cost Analysis

Detailed cost estimates for this strategy were provided by the sponsor where available. These costs are more detailed estimates developed during planning and/or design. For consistency with SB1 planning guidance, the costs were updated to September 2023 dollars using the ENR index. When detailed costs were not available, TWDB costing guidance was followed. Annual costs were also developed following TWDB guidance. Transmission costs and costs for the new, parallel pipeline are not currently included in this strategy cost estimate, but are included as a separate project cost since this infrastructure will be associated with other supply sources.

Cost estimates for this project are included in **Appendix H**.

TABLE G.64 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD	$575,134,000	$4.07	$0.27

Water Management Strategy Evaluation

Lake Tehuacana would provide a new water source near existing water resources for TRWD. This makes it easier to operate and maintain as part of the TRWD East Texas Reservoir System. There also would be cost savings with construction of the dam since a new spillway is not needed.

The environmental concerns are relatively low for a new reservoir site. However, further study is needed to better understand the potential for impacts to threatened and endangered species. The lignite deposits in the lake site have historically posed some obstacles in development but based on current development and expected future demand for these resources, it was assumed that the lignite deposits have minimal impact to the reservoir development and cost. The yield of the project is subject to potential new water rights granted in the Trinity River Basin.

This project, as currently proposed, would provide a reliable supply for a moderate cost and potentially low environmental impacts.

Water User Group Application

The Tehuacana Reservoir strategy is a recommended strategy for TRWD.

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G.6.6 Eastern Study Area Carrizo-Wilcox Groundwater

Potential Sponsor(s):	TRWD
WMS/Project Type:	New Groundwater
Potential Supply Quantity:	32,000 acre-feet per year
Implementation Decade:	2050
Strategy Capital Cost:	$356,209,000
Unit Water Cost ($/kgal):	$3.75 during Debt Service and $1.89 after Debt Service
Application:	Recommended

Strategy Description

This strategy proposes to develop groundwater from the Carrizo-Wilcox and Queen City aquifers in Freestone and Anderson Counties. The groundwater would be transported approximately 28 miles to the Integrated Pipeline (IPL) near Cedar Creek Reservoir or a new parallel pipeline. This pipeline would then be used to move the groundwater to TRWD's service area. This strategy assumes the groundwater is mixed directly in the transmission system with surface water and/or reuse water. Alternatively, TRWD could blend the groundwater in one of its East Texas Reservoirs (Cedar Creek and Richland Chambers) prior to transporting to its service area.

This groundwater supply would supplement TRWD's existing water sources and provide diversity to its existing portfolio. As a supplemental supply, TRWD may choose to operate the well system on a continual basis or seasonally to provide water during the higher demand periods. This strategy assumes the wells are operated continuously on an average annual basis.

The infrastructure required for this strategy includes 39 wells (most likely distributed over multiple well fields), well field piping, ground storage, pump station, and 28 miles of 36- to 54-inch diameter transmission pipeline. The proposed water management strategy includes costs for sites E1A, E4, and E1B.

Supply Development (Quantity, Reliability, Quality)

A preliminary study was conducted by TRWD to assess the potential available supply within the designated target area. The study evaluated two different potential operation scenarios this project. The Average Scenario assumes that up to 32,000 acre-feet per year could be developed from the targeted area, with the project operating year-round at a fairly steady level of production. The Peak Scenario assumes that the project would operate only for four months per year during high demand periods, with delivery at a higher rate. Operating this way, the Peak Scenario could deliver 21,000 acre-feet per year. Further study would be needed to confirm the long-term reliable supply for either scenario.

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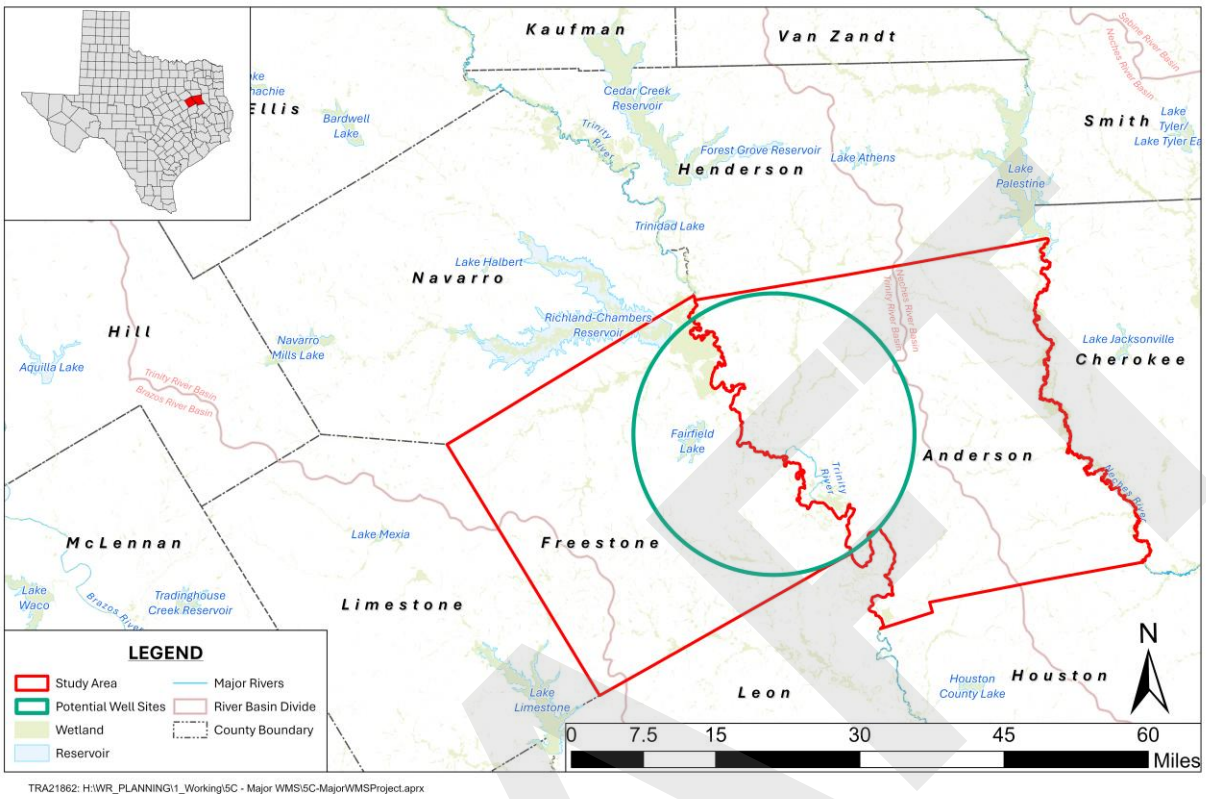

Water Quantity

For regional water planning purposes, the amount of available water for this strategy is limited by the Modeled Available Groundwater (MAG) and current users. The total amount of water available from both Freestone and Anderson counties is estimated at 26,800 acre-feet per year.

Reliability

The reliability is moderate. Previous studies indicate groundwater is available, but the long-term sustainability is unknown. Even with regulatory management of these aquifers, the aquifers are subject to recharge and pumpage from other users, both within the GCD and adjacent areas. There are also known water marketers actively pursuing the development of groundwater in eastern Anderson County. This could affect the amount of water that is available to permit.

Water Quality

Water from the Carrizo-Wilcox and Queen City aquifers in Anderson and Freestone Counties is generally fresh water with TDS levels of 200 to 300 mg/l. Some local wells indicate exceedances for nitrates and iron. Both of these constitutes can be addressed through treatment and/or blending. Further study and testing would be needed to confirm compatibility for blending with the surface water sources.

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Environmental Considerations

Environmental considerations were investigated in the Study of Impaired Groundwater Availability and Quality Report (Intera, 2016) produced for TRWD and Wichita Falls and are as identified below.

- **Wildlife Management Areas (WMA).** There are three wildlife management areas (WMA) designated within the target area for groundwater development. These WMAs include the Gus Engeling WMA in northwest Anderson County, Big Lake Bottom WMA in southwest Anderson County, and the Richland Creek WMA, which lies between Richland-Chambers Reservoir and the Trinity River. A groundwater development project would be sited outside these areas and is not expected to affect the WMAs, and the pipeline would be routed to avoid these areas.
- **Rivers and Other Environmental Sensitive Areas**. As conceived for this strategy, the pipeline to move water from Freestone County would need to cross the Trinity River. This strategy proposes to tunnel under the river to avoid impacting waters of the U.S. Where possible, the pipeline would be routed to avoid environmentally sensitive areas.
- **Threatened and Endangered Species.** There are 11 federally listed and 18 state-listed threatened and endangered species potentially occurring in the counties affected by this project (Anderson, Freestone, and Henderson Counties). None of these species are expected to be permanently impacted by this project.

Permitting and Development

Groundwater in Texas is a property right, which can be purchased with the land or acquired through a lease or severing of the water right from the property. In some counties, groundwater is managed by groundwater conservation districts (GCD). This project falls under two GCDs: Mid-East Texas GCD in Freestone County and Neches and Trinity Valleys GCD in Anderson County.

Development of a well field would require groundwater permits. The amount of water that could be permitted under the current Modeled Available Groundwater (MAG) value is near the proposed total quantity for this strategy. This leaves little water available to new in-county users and poses some uncertainty on whether the full 32,000 acre-feet per year can be permitted. While GCDs can permit above the MAG, the aquifer is to be managed to the Desired Future Conditions (DFC). Since the MAGs are a modeled representation of the available supply from the aquifer while complying with the DFC, there is some uncertainty on whether the full 32,000 acre-feet per year can be permitted without changes to the DFCs.

The construction of groundwater project is proposed to be online by 2050. This time frame allows for negotiations with sellers, water testing, design and construction of the infrastructure. This timeline also allows time if the DFCs have to be amended and/or the permit application is protested. The next update of the DFCs is scheduled for 2026.

Large-scale groundwater export proposals could face public opposition, especially if it is perceived to affect neighboring wells. Further study is likely to address these potential concerns.

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Cost Analysis

Detailed costs were provided by TRWD and updated using the TWDB unit cost tables and ENR indexing, where appropriate. Annual costs were also developed following TWDB guidance for debt service and operation and maintenance costs.

Cost estimates for these supplies are included in **Appendix H**.

TABLE G.65 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
TRWD (Average)	$356,209,000	$3.75	$1.89

Water Management Strategy Evaluation

This strategy provides a new water source that provides a higher level of resistance to future droughts than current surface water sources. The proposed groundwater well fields are located near TRWD's existing water sources, and existing infrastructure can be used to transport the water to TRWD's service area. The quality of the water is generally good and likely would not require extensive treatment.

The amount of water is limited and due to limitations of the formations, numerous wells would be required to develop this supply. Over time, the permitted amount of diversion can be adjusted by the GCD as part of its management objectives. This may affect the long-term reliability of this supply.

Water User Group Application

This strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Based on consideration of these criteria, the strategy is recommended for TRWD by the Region C Regional Water Planning Group.

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G.7 UTRWD Major Water Management Strategy Technical Memorandums

G.7.1 Lake Ralph Rall Indirect Reuse

Potential Sponsor(s):	UTRWD
WMS/Project Type:	Reuse
Potential Supply Quantity:	20,007 acre-feet per year
Implementation Decade:	2030
Strategy Capital Cost:	$0
Unit Water Cost ($/kgal):	$0.00 during Debt Service; $0.00 after Debt Service
Application:	Recommended

Strategy Description

Lake Ralph Hall is a new reservoir currently being constructed on the North fork of the Sulphur River in Fannin County. Construction of the reservoir began in June of 2021 with plans to deliver water by 2026. This project is sponsored by the Upper Trinity Regional Water District (UTRWD). UTRWD has a water right permit to impound and divert 45,000 acre-feet per year from Lake Ralph Hall. UTRWD will be seeking a state water right to reuse return flows from water originating from the project, providing an additional 20,007 acre-feet per year by 2080. The source of this reuse water will be various UTRWD WWTPs in the Lewisville Lake Basin, based on the amount of effluent that originates from Lake Ralph Hall. This reclaimed water would augment UTRWD's supply. There are no additional transmission facilities needed to utilize this Ralph Hall reuse.

Supply Development (Quantity, Reliability, Quality)

Water Quantity

For this strategy, it was assumed that UTRWD would obtain authorization for the reuse of wastewater discharges originating from the use of Lake Ralph Hall water. This reuse is limited to the actual amount discharged. Based on the projected use of the lake, the amount of reuse is estimated to be 20,204 acre-feet per year by 2030 which slightly reduces to 20,007 acre-feet per year by 2080 due to lake sedimentation. This assumes that approximately 30% up to 50% by 2050 of the diverted water from the lake is returned as treated wastewater and is available for reuse by UTRWD. It is important to note that the reuse quantities shown in the Region C Plan are based on the drought of record amount in the Water Availability Model for Lake Ralph Hall and may be less than amount in the permit application. The total quantity of supplies available through this strategy is summarized in **Table G.66.**

TABLE G.66 SUMMARY OF QUANTITIES (AC-FT/YR)

DESCRIPTION	2030	2040	2050	2060	2070	2080
UTRWD	12,174	16,204	20,204	20,120	20,046	20,007

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Reliability

The reliability of the supplies from the Lake Ralph Hall return flows is high. This additional source of raw water will help the UTRWD system to accommodate periodic downtimes for maintenance and/or repairs on system infrastructure.

Water Quality

Water quality is expected to be good and similar in composition to the North Sulphur River and Lewisville Lake.

Environmental Considerations

Indirect reuse projects will reduce the volume of flow in natural waterways in certain areas, but only to the extent that they remove flows returned by upstream wastewater treatment plants. No naturalized stream flow (naturally occurring runoff from precipitation) will be removed from waterways as part of this project. No additional infrastructure needs to be constructed for UTRWD to access this supply.

Permitting and Development

UTRWD has been granted a state water right to impound, divert, and use water associated with the Lake Ralph Hall project. Additional authorizations will be needed for reuse of the water. UTRWD also has an interbasin transfer permit to move the water from the Sulphur River Basin to the Trinity River Basin. Lake Ralph Hall is expected to be constructed and supplying water by 2030. The development of the reuse supplies from Lake Ralph Hall source water will occur over time beginning as early as 2030.

Cost Analysis

No costs were associated with this project since no infrastructure to convey return flows from UTRWD WWTPs in the Lewisville Lake Basin is required.

TABLE G.67 SUMMARY OF COSTS

Entity	Capital Cost	Unit Cost ($/1,000 gal)	
		With Debt Service	After Debt Service
UTRWD – Ralph Hall Indirect Reuse	$0	N/A	N/A

Water Management Strategy Evaluation

The Lake Ralph Hall indirect reuse project provides UTRWD with a long-term reliable supply. The reuse provides an environmentally friendly, low-cost source of additional water to UTRWD.

Water User Group Application

The sponsor of this strategy is UTRWD, and the strategy provides supplies for UTRWD for their customers. This is a recommended strategy for UTRWD.

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G.8 Other Major Water Management Strategy Technical Memorandums

G.8.1 GTUA Regional System

Potential Sponsor(s):	GTUA with Participating Entities
WMS/Project Type:	Existing Surface Water (Infrastructure) + Reallocation
Potential Supply Quantity:	37,950 acre-feet per year (34 MGD)
Implementation Decade:	2040 (Phase I), 2050 (Phase II)
Strategy Capital Cost:	$ 1.6 billion
Unit Water Cost ($/kgal):	$ 13.50 during Debt Service and $6.46 after Debt Service
Application:	Recommended

The Greater Texoma Utility Authority (GTUA) currently holds water rights in Lake Texoma for up to 83,200 acre-feet per year (ac-ft/yr). Fourteen different entities have contracts in place with GTUA allowing them to use a portion of the permitted Lake Texoma water supply. **Table G.68** lists the entities with contractual rights to the permitted water supply along with the storage and yield volumes allocated to each. Currently, only the cities of Sherman and Denison and the RRA are accessing water from Lake Texoma.

These entities secured the Lake Texoma water rights to ensure the availability of water. Many of the current water right holders will not need this water during the 2026 planning period. However, if growth occurs faster than projected in this plan, these entities will work with GTUA to fully develop and use the rights listed above. This GTUA Regional Water System addresses water needs for several current water right holders and the City of Celina.

TABLE G.68 CONTRACTUAL STORAGE AND YIELD ALLOCATIONS FROM LAKE TEXOMA

ENTITY	STORAGE (AC-FT)	YIELD (AC-FT/YR)
Collinsville	1,000	1,130
Denison	10,800	12,204
Gainesville	10,800	12,204
Mustang SUD	3,000	3,390
Lindsay	1,500	1,695
Northwest Grayson County WCID#1	600	678
Pottsboro[1]	5,000	5,650
RRA Preston Shores System	2,450	2,510
Sherman	33,400	37,209
Southmayd	500	565
Two Way SUD	2,000	2,260
Whitesboro	2,000	2,260
Lake Kiowa	750	848
Woodbine	750	848
TOTAL	***74,550***	***83,451***

Strategy Description

A regional water system strategy was developed for communities in northern Denton and Grayson counties. Several of the entities in this area hold water rights in Lake Texoma but currently do not have access to this resource. The source water for the regional system comes from three distinct strategies: 1) utilizing existing contracts and water rights in Lake Texoma, 2) brackish groundwater in Grayson County, and 3) reallocation of storage in Lake Texoma for new supply. The regional system would be developed in two phases with Phase I using the existing supplies in Lake Texoma and the brackish groundwater. Phase II would use the water from reallocation.

GTUA would act as the regional water provider and provide both the treatment and delivery system for the water users. This strategy also includes a new intake and pump station on Lake Texoma, and a new desalination plant to treat the brackish surface water from Lake Texoma and the brackish groundwater. The brine waste from the treatment system would be transported and discharged to Lake Texoma. A conceptual transmission is shown in **Figure G.16**. Where possible the transmission pipelines generally follow existing highways or county roads to minimize right-of-way impacts.

This strategy includes:

- New desalination plant
- New Lake Texoma intake and pump station (sized for ultimate capacity)
- New raw water transmission line between the intake pump station and the water treatment plant
- New brackish groundwater well field and transmission to desalination plant
- Brine discharge pipeline (sized for ultimate capacity)
- Treated water distribution system

Supply Development (Quantity, Reliability, Quality)

The GTUA was designated as a cooperating local sponsor to negotiate with the U.S. Army Corps of Engineers for purchase of water from Lake Texoma on behalf of the cities in the area. The GTUA has an existing water right for 83,200 acre-feet per year from Lake Texoma. Some of this water right is currently being used by several participants, but others have not perfected their rights. Phase I of this strategy assumes approximately 8,300 acre-feet of existing water rights are used to serve the participants in the regional system. Several of the participating entities have water rights from Lake Texoma as shown in **Table G.69.**

For those without surface water rights, brackish groundwater would provide the Phase I supply from a new groundwater well field. There are available brackish groundwater resources within the Trinity and Woodbine Aquifers located within a reasonable distance to the proposed GTUA WTP. Based on a preliminary desktop investigation, a potentially feasible brackish groundwater well field location could be located near the City of Knollwood, just north of US Highway 82. The well field could support up to 9,400 acre-feet per year.

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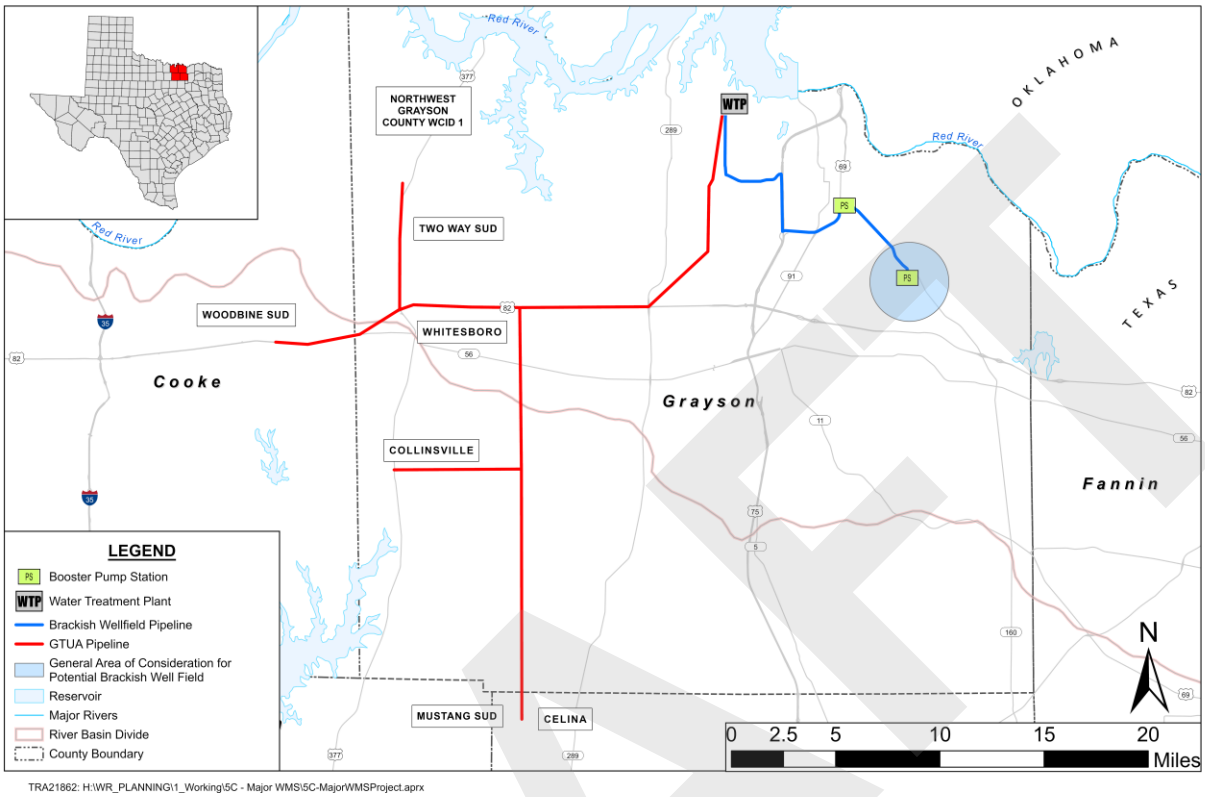
FIGURE G.16 GTUA REGIONAL WATER SYSTEM



Phase I is designed assuming approximately 8,400 acre-feet per year of brackish groundwater would be developed. It is assumed this quantity is separate and in addition to the freshwater supplies reported in the Modeled Available Groundwater (MAG) value. However, the TWDB restricted the total groundwater available in Grayson County to the MAG values determined through the Joint Planning Process. The values shown in this Plan are limited to the available MAG.

The proposed well field would include 12 lower Antlers Sand wells with an average flow rate of 500 gallons per minute (gpm). Due to well spacing requirements set by the Red River Groundwater Conservation District (GCD) it is estimated that water rights would be needed over approximately 1,300 to 1,500 acres of land to develop the proposed wellfield. Brackish groundwater from each well would be pumped to a central collection point and then transported to the proposed GTUA WTP.

To provide water for Phase II supply, GTUA would seek to reallocate up to 50,000 acre-feet per year of storage from other uses to water supply and then would contract with the USACE for the 25,000 acre-feet of Texas' share of storage. The annual yield available from the 25,000 acre-feet of storage is estimated to be 28,000 acre-feet per year based on previous modeling. After losses due to the brackish desalination treatment process, this strategy would provide 23,800 acre-feet/year of new supplies.

The proposed distribution of treated water supply through the regional system is shown in the table below.

TABLE G.69 TREATED WATER SUPPLIES FOR PARTICIPATING ENTITIES (AC-FT/YR)

ENTITY	CURRENT WATER RIGHT YIELD	PHASE I TREATED SUPPLY [a,b]	PHASE II TREATED SUPPLY
Celina	0	460 [b]	19,000
Collinsville	1,130	500	0
Mustang SUD	3,390 [c]	2,000	4,800
Northwest Grayson County	678	500	0
Two-Way SUD	2,260	1,500	0
Whitesboro	2,260	1,500	0
Woodbine WSC	848	700	0
TOTAL	***13,924***	***7,160***	***23,800***

[a]Phase I and II supplies are treated water. It is assumed that 15 percent of the diverted water is lost during the treatment process.

[b]Phase I was designed for a total treated water supply of 14,150 acre-feet per year. The TWDB restricted the total groundwater available in Grayson County to the MAG values determined through the Joint Planning Process. The values shown in this table are not limited to the available MAG.

[c]Mustang SUD currently receives some of its Texoma supplies through Sherman.

Water Quantity

Phase I is designed for a treated water supply of 14,150 acre-feet per year and Phase II for 23,800 acre-feet per year. The total raw water for Phase I is 16,650 acre-feet per year and 28,000 acre-feet per year for Phase II. The estimated total brine discharge for both phases is 6,700 acre-feet per year.

Phase I was designed for a treated water supply of 14,150 acre-feet per year. The TWDB restricted the total groundwater available in Grayson County to the MAG values determined through the Joint Planning Process. The values shown in this Plan are limited to the available MAG; however, no DFCs are set for brackish groundwater. While the brackish production zone in Grayson County was not specifically analyzed through the Joint Planning process, correspondence from the GCD and GMA indicate interest in evaluating the brackish groundwater production zone availability through the current and/or future Joint Planning process.

Reliability

The reliability of Lake Texoma water is high. This strategy proposes to use only a portion of GTUA's existing water rights. Based on water availability modeling Lake Texoma has sufficient supplies to provide for the existing water rights and proposed reallocation. The reliability of the brackish groundwater is expected to be moderate to high. The Antlers Sand of the Trinity Aquifer is estimated to contain large volumes of brackish groundwater available for long term supply. Site specific investigations will be required to determine the long-term reliability of the proposed well field location.

Water Quality

Both Lake Texoma and the groundwater have elevated levels of salts and dissolved solids. This strategy proposes to treat the water through reverse osmosis for municipal use. The treated water would have high water quality.

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Environmental Considerations

Environmental concerns about the raw water sources (Lake Texoma and brackish groundwater) are expected to be low. The potential for environmental impacts of this project is associated with the new intake on Lake Texoma, brine discharge, transmission systems, and the new desalination water treatment plant. Impacts of increased demand on Lake Texoma would also occur but are expected to be minimal.

- **Vegetative Cover.** No detailed studies have been conducted of the vegetative cover for this alternative. The intake would be sited to minimize impacts along the Lake Texoma shoreline. The location of the proposed distribution system generally lies within urban and rural areas and pipelines follow road rights-of-way. If needed, the proposed pipelines could be routed to avoid highly sensitive environmental areas. The groundwater well field would generally be located in undeveloped areas and the well sites could be placed to avoid environmentally sensitive areas.
- **Threatened and endangered species**. There are four threatened or endangered federal species that are known to occur or have the potential to occur within Denton and Grayson counties. It is expected that implementation of this alternative would have low to no potential to negatively impact the species.
- **Other.** The presence of zebra mussels in Lake Texoma presents additional operational considerations for entities planning on using this source. The brine discharge to Lake Texoma could impact water quality at the discharge location but would have minimal impact on the overall water quality of Lake Texoma.

Permitting and Development

There are existing permits for a portion of the Texoma water proposed for treatment and distribution. For the Phase II supplies, the USACE would need to approve the reallocation of 50,000 ac-ft of storage from hydropower pool for water supply use. Then GTUA would need to obtain a storage agreement from USACE for the 25,000 ac-ft of reallocated storage belonging to Texas. GTUA would also need to obtain a water use permit from TCEQ to divert the estimated 28,000 ac-ft/yr of annual yield assumed to be available for this strategy. The new intake and pump station would need a Section 404 permit from the USACE.

For the proposed wellfield GTUA would need to obtain groundwater permits from the Red River GCD to develop this future supply. The strategy must abide by the regulations of the GCD including pumping limitations and well spacing rules for the project area. The brackish groundwater production zone is not subject to management to the DFC or limited by the MAG.

Cost Analysis

Cost estimates were developed for the GTUA Regional Water Supply System, including the brackish groundwater well field and surface water systems. These costs are shown in **Table G.70** for each implementation phase. Cost estimates for the strategy supplies are included in **Appendix H.**

TABLE G.70 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Phase I	$816,504,000	$15.85	$6.22
Phase II	$863,153,000	$12.74	$6.69
TOTAL	***$1,679,657,000***	***$13.90***	***$6.51***

Water Management Strategy Evaluation

Each of the proposed sources of water for the proposed GTUA regional system are within Grayson County, near the proposed new water treatment plant. Lake Texoma provides a proven reliable source of additional supplies with limited impacts. Further study is needed on the reliability of the brackish groundwater, but it is expected to provide the quantities in this strategy. This strategy would enable several of the participating entities to begin using water that has been contracted. However, this strategy would provide water that is more expensive than current supplies for many of the users due to the advanced treatment required. However, alternative sources of water are limited and would require long pipelines to convey the water.

Due to the water needs in the area, this strategy supports a regional concept. To make the regional system effective, it requires commitment from the participants and a sponsor for the operation, maintenance, and administration of the system. For purposes of this study, it is assumed that GTUA will fill that role.

Water User Group Application

The GTUA Regional Water System Supply strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Based on consideration of these criteria, the strategy is recommended for GTUA and the identified participants by the Region C Regional Water Planning Group.

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G.8.2 Parker County Regional Water System

Potential Sponsor(s):	New Water Provider with Participating Entities - Trinity River Basin
WMS/Project Type:	Existing Surface Water (Infrastructure)
Potential Supply Quantity:	22,000 acre-feet per year (19.6 MGD)
Implementation Decade:	2040
Strategy Capital Cost:	$593 million
Unit Water Cost ($/kgal):	$7.40 during Debt Service and $2.90 after Debt Service
Application:	Recommended

Potential Sponsor(s):	New Water Provider with Participating Entities - Brazos River Basin
WMS/Project Type:	Existing Surface Water (Infrastructure)
Potential Supply Quantity:	5,259 acre-feet per year
Implementation Decade:	2040
Strategy Capital Cost:	$ 270 million
Unit Water Cost ($/kgal):	$17.93 during Debt Service and $9.37 after Debt Service
Application:	Alternative

Strategy Description

The County Commissioners in Parker County are currently seeking to form a public utility agency (PUA) to provide water to the fast-growing rural areas in Parker County. Parker County is split between the Trinity River Basin and the Brazos River Basin, with the Trinity River Basin to the east and the Brazos Basin in the western part of the county. Water to the Trinity River Basin portion of the county would be supplied through TRWD. Water to the Brazos River Basin would need to be supplied through entities in the Brazos River Basin, such as Brazos River Authority (BRA) and/or Mineral Wells. However, none of these entities have agreed to provide water to Parker County beyond limited additional supplies to Parker County SUD from BRA. If a source of water can be found for the Brazos River Basin portion of the county, the new water district would serve both basins through two distinct water systems.

Once the PUA is formed, the phasing and details of the regional system will be developed. For the Region C Water Plan, two conceptual distribution systems are shown. The eastern system assumes water from TRWD would be obtained from the western part of TRWD's system and transported to a new regional water treatment plant in northeast Parker County. This Trinity Basin regional system will deliver water to County-Other in eastern Parker County. Walnut Creek SUD could be served by this system or a potential future regional water district in Wise County. The 2026 Region C Plan shows Walnut Creek SUD receiving water directly from TRWD. The western system would serve County-Other in the Brazos Basin, and possibly Parker County SUD and North Rural WSC.

This strategy includes:

<u>Trinity Basin System</u>

- New intake and pump station on Eagle Mountain Lake
- New Regional Water Treatment Plant

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- Transmission infrastructure (pipelines and booster pump stations)

Brazos Basin System

- New channel dam, intake and pump station on Brazos River
- New Regional Desalination Treatment Plant
- Transmission infrastructure (pipelines and booster pump stations)

Supply Development (Quantity, Reliability, Quality)

TRWD is willing to serve the rural communities in Parker County within the Trinity River Basin, provided there are limited points of contact due to the challenges of serving many small users. The new water agency provides a single point of contact. TRWD has sufficient water for the regional water system with the development of new water supplies. The cost of all transmission and treatment infrastructure would be borne by the new water agency. The reliability and quality of the supply is good. The total quantity for the Trinity Basin distribution system is 22,000 acre-feet per year.

BRA is currently serving Parker County SUD in the Brazos River Basin. BRA is not willing to provide additional water within its system operations permit for the basin as this time. Other entities in the Brazos River Basin also have not committed to supplying water to Parker County. As a result of the uncertainty of the future source of water, this strategy is conceived as a potential strategy that could be developed if agreements can be reached for water supply. These future agreements could be developed through the new water agency or Parker County SUD. For planning purposes, Region C is showing the sponsor of the project as the water agency. The BRA water has moderate to high reliability because it is backed up by upstream reservoirs in the BRA system. The water has elevated salts and will require desalination for potable use.

The distribution of supplies by water user group is shown in **Table G.71**.

TABLE G.71 SUMMARY OF QUANTITIES (AC-FT/YR)

ENTITY	2030	2040	2050	2060	2070	2080
Trinity River Basin						
Parker County-Other	0	704	8,500	13,000	18,000	22,000
Brazos River Basin						
Parker County-Other, Brazos Basin	0	1,000	2,000	3,000	3,000	3,000
Parker County SUD	0	0	73	547	1268	2259
TOTAL BRAZOS BASIN	***0***	***1,000***	***2,073***	***3,547***	***4,268***	***5,259***

Environmental Considerations

Water for this strategy would be supplied from an existing reservoir, therefore environmental impacts associated with the Trinity Basin system are limited. The potential for environmental impacts of this project is associated with the new infrastructure (water treatment plant and transmission system). Impacts of increased demand on the TRWD West Fork system would also occur but are expected to be mitigated with the development of new supplies.

The source of water for the Brazos Basin system is the Brazos River. Parker County SUD has an existing intake on the river that could potentially be used and/or expanded. For this strategy we are assuming a new channel dam and intake. This intake and associated infrastructure for the project would be located to minimize environmental.

- **Vegetative Cover.** No detailed studies for the new intakes and pipeline alignments have been conducted. It is assumed that the proposed infrastructure would be sited to avoid highly sensitive environmental areas and minimize impacts.
- **Threatened and endangered species**. There are four threatened or endangered federal species that are known to occur or have the potential to occur within Parker County. It is expected that implementation of this strategy would have low potential to negatively impact these species.
- **Other.** The brine discharge from the desalination plant may increase the salt levels in the receiving stream. It is assumed that the resulting water quality with the discharge is within the stream's water quality criteria.

Permitting and Development

Permits for new sources of water from TRWD would be acquired by TRWD and are discussed under the respective strategy. This strategy would need to acquire a Section 404 permit for a new intake on one or more of TRWD's reservoirs. The associated TRWD water right may need to be amended to show a new diversion point.

BRA has the necessary permits for the water from the Brazos River. A Section 404 permit from the USACE is needed to construct a new channel dam and intake on the Brazos River. A wastewater discharge permit is also required for the discharge of the brine from the desalination treatment plant.

The Texas Legislature also will need to pass legislation creating a new water district.

Cost Analysis

Cost estimates for the Parker County Regional Water Supply System were developed using the UCM and follow SB1 planning guidance. Cost estimates for the strategy supplies are included in **Appendix H.**

TABLE G.72 SUMMARY OF COSTS

SYSTEM	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Trinity Basin System	$593,307,000	$7.40	$2.90
Brazos Basin System	$269,795,000	$17.93	$9.37

Water Management Strategy Evaluation

This strategy provides a reliable source of additional supplies to eastern Parker County (Trinity River Basin) with limited impacts. The new regional water district provides a mechanism to develop surface water to address the growing population in Parker County and reduce its reliance on groundwater. To make the regional system effective, it requires commitment from the participants

and a sponsor for the operation, maintenance, and administration of the system. For purposes of this study, it is assumed that the new water agency will fill that role.

There is limited water available to the Brazos River Basin portion of Parker County and groundwater is also limited. Water sources in this area tend to be brackish and require advanced treatment for potable supplies. As a result, the costs are high at nearly $18 per thousand gallons during debt service. A new regional water agency could potentially negotiate with local providers to develop additional supplies to western Parker County.

Water User Group Application

The Parker County Regional Water System Supply strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Based on consideration of these criteria, the eastern Regional Water System is recommended for Parker County-Other in the Trinity River Basin. The western system is an alternative strategy for Parker County SUD and Parker County-Other, Brazos Basin, until agreements with water providers are reached.

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G.8.3 Wise County Regional Water System

Potential Sponsor(s):	New Regional Water Provider with Participating Entities
WMS/Project Type:	Existing Surface Water (Infrastructure)
Potential Supply Quantity:	27,463 acre-feet per year
Implementation Decade:	2040
Strategy Capital Cost:	$681 million
Unit Water Cost ($/kgal):	$6.92 during Debt Service and $2.79 after Debt Service
Application:	Recommended

Strategy Description

Several entities in Wise County are currently seeking to form a regional water district or public utility agency (PUA) that would initially serve southeastern Wise County and expand to the greater county areas. In 2023 the cities of Aurora, Boyd, Paradise, Rhome, Newark, and New Fairview formed the Wise County Coalition of Mayors to work together to solve common issues. The initial concept of the regional water provider came from this group and has garnered support from others including the City of Bridgeport and Walnut Creek SUD.

Several of these entities have current contracts with TRWD, which would be the primary source of water for the regional water district. The phasing and details of the regional system will be developed once the district is formed. The Region C Water Plan considers a conceptual distribution system. This system assumes water from TRWD would be obtained from the western part of TRWD's system and transported to a new regional water treatment plant in southeast Wise County. The location and source of TRWD water will be negotiated with TRWD. This initial phase of the regional system will deliver water to entities in eastern Wise County, including the cities of Boyd, Rhome, Newark, and New Fairview and rural users in County-Other. A future western system could serve Bridgeport, Runaway Bay, Paradise and other rural customers. Walnut Creek SUD could be served by the Wise County regional water district or a potential future regional water district in Parker County. The 2026 Region C Plan shows Walnut Creek SUD receiving water directly from TRWD.

This strategy includes:

- New intake and pump station on Eagle Mountain Lake
- New Regional Water Treatment Plant
- Transmission infrastructure (pipelines and booster pump stations)

Supply Development (Quantity, Reliability, Quality)

TRWD has existing contracts with some of the participating entities in this strategy. TRWD is also willing to serve the rural communities in Wise County provided there are limited points of contact due to the challenges of serving many small users. TRWD has sufficient water for the regional water with the development of new water supplies. The cost of all transmission and treatment infrastructure would be borne by the new regional water district. The reliability and quality of the supply is good. The total quantity for the initial distribution phase is 27,463 acre-feet per year. The

distribution of supplies by water user group is shown in **Table G.73**. The actual distributions and delivery systems may differ from this conceptual design used for regional water planning.

TABLE G.73 SUMMARY OF QUANTITIES (AC-FT/YR)

ENTITY	2030	2040	2050	2060	2070	2080
Boyd	15	77	185	282	374	434
Rhome	173	173	173	173	173	173
County-Other through Rhome	80	76	71	64	60	56
Newark	6	40	111	217	380	517
Wise County-Other [a]	0	2,961	7,867	14,702	21,489	26,283
TOTAL	***274***	***3,327***	***8,407***	***15,438***	***22,476***	***27,463***

[a]New Fairview is included in County – Other, Wise County.

Environmental Considerations

Water for this strategy would be supplied from an existing reservoir, therefore environmental impacts are limited. The potential for environmental impacts of this project is associated with the new infrastructure (water treatment plant and transmission system). Impacts of increased demand on the TRWD West Fork system would also occur but are expected to be mitigated with the development of new supplies.

- **Vegetative Cover.** No detailed studies for the new intake and pipeline alignment have been conducted. It is assumed that the proposed infrastructure would be sited to avoid highly sensitive environmental areas and minimize impacts.
- **Threatened and endangered species**. There are three threatened or endangered federal species that are known to occur or have the potential to occur within Wise County. It is expected that implementation of this strategy would have low to no potential to negatively impact the species.
- **Other.** None.

Permitting and Development

Permits for new sources of water from TRWD would be acquired by TRWD and are discussed under the respective strategy. This strategy may require a 404 permit for the transmission system and possibly a new intake on one or more of TRWD's reservoirs. If a new intake is needed, the associated TRWD water right may need to be amended to show a new diversion point. Also, the Texas Legislature will need to pass legislation creating a new water district.

Cost Analysis

Cost estimates for the Wise County Regional Water Supply System were developed using the UCM and follow SB1 planning guidance. Cost estimates for the strategy supplies are included in **Appendix H.**

TABLE G.74 SUMMARY OF COSTS

ENTITY	CAPITAL COST	UNIT COST ($/1,000 GAL)	
		WITH DEBT SERVICE	AFTER DEBT SERVICE
Regional Water Provider	$680,554,000	$6.92	$2.79

Water Management Strategy Evaluation

This strategy provides a reliable source of additional supplies with limited impacts to eastern Wise County. This strategy addresses the growing population in Wise County and recognizes that continued groundwater development is unsustainable. Developing the system requires commitment from the participants and a sponsor for the operation, maintenance, and administration of the system. For purposes of this study, it is assumed that the new regional water district or PUA will fill that role.

Water User Group Application

The Wise County Regional Water System strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Based on consideration of these criteria, the strategy is recommended for Boyd, Rhome, Newark, and Wise County-Other (including New Fairview).

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Appendix H

Cost Estimates

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H REGIONAL WATER PLANNING AREA COST ESTIMATES

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Section H.3	Conveyance Systems
Section H.4	Water Treatment Plants
Section H.5	New Groundwater Wells
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Section H.7	Assumptions for Annual Costs

As part of the 2026 Regional Water Plans, cost estimates are to be developed for each of the recommended and alternate water management strategies. In accordance with the Texas Water Development Board guidance, the costs for water management strategies are reported in September 2023 dollars. The methodology used to develop the 2026 costs is described in the following sections. When detailed costs were provided by the sponsor, these costs were used, and where necessary, the costs were adjusted to September 2023 dollars using the Engineering News Record (ENR) Index for construction.

H.1 Introduction

1. The evaluation of water management strategies requires developing cost estimates. Guidance for cost estimates may be found in the TWDB's "Second Amended General Guidelines for Sixth Cycle of Regional Water Plan Development (Exhibit C)", Section 2.5. Costs are to be reported in September 2023 dollars.
2. Standard unit costs for installed pipe, pump stations, standard treatment facilities, and well fields were developed and/or updated using the costing tool provided by the TWDB. The unit costs do not include engineering, contingency, financial and legal services, costs for land and rights-of-way, permits, environmental and archeological studies, or mitigation. The costs for these items are determined separately in the cost tables.
3. The information presented in this section is intended to be 'rule-of-thumb' guidance. Specific situations may call for alteration of the procedures and costs. Note that the costs in this memorandum provide a planning-level estimate for comparison purposes.
4. It is important that when comparing alternatives, the cost estimates be similar and include similar items. If an existing reliable cost estimate is available for a project, it should be used where appropriate. All cost estimates must meet the requirements set forth in the TWDB's "Second Amended General Guidelines for Sixth Cycle of Regional Water Plan Development (Exhibit C)".
5. The cost estimates have two components:
    - Initial Capital Costs: Including total construction cost of facilities, engineering and legal contingencies, environmental and archaeology studies and mitigation, land acquisition

and surveying, and interest incurred during construction (3.5% annual interest rate less a 0.5% rate of return on investment of unspent funds).

- Average Annual Costs: Including annual operation and maintenance costs, pumping energy costs, purchase of water and debt service.

TWDB does not require the consultant to determine life cycle or present value analysis. For most situations, annual costs are sufficient for comparison purposes, and a life-cycle analysis is not required.

H.2 Assumptions for Capital Costs

The unit cost and factors shown in **Table H.1** through **Table H.5** were developed directly from the TWDB Costing Tool. These costs are the basis of the capital costs developed for this plan. If applicable, other capital costs should include:

- Engineering, contingencies, financial, and legal services
- Permitting and mitigation activities, including, but not limited to archeological/historic resources, environmental and biological analyses, mitigation activities (evaluation, land acquisition, implementation, monitoring), and other activities.
- Land purchase costs not associated with mitigation (**Table H.6**).
- Easement costs. For pipelines, this includes a permanent easement plus a temporary construction easement as well as rights to enter easements for maintenance
- Purchases of water rights.

H.3 Conveyance Systems

Standard pipeline costs used for these cost estimates are shown in **Table H.1**. Pump station costs are based on required Horsepower capacity of capacity (MGD) and are listed in **Table H.2**. The power capacity is to be determined from the hydraulic analyses included in the TWDB costing tool (or detailed analysis if available). Pipelines and pump stations are to be sized for peak pumping capacity.

- Pump efficiency is assumed to be 70 percent.
- Peaking factor of 2 times the average demand is to be used for strategies when the water is pumped directly to a water treatment plant. (or historical peaking factor, if available)
- A lower peaking factor can be used if there are additional water sources and/or the water is transported to a terminal storage facility (typically, 1.2 to 1.5).
- The target flow velocity in pipes is less than 5 fps and the Hazen-Williams Factor is assumed to be 120.
- Pipe sizes should be 120-inch or less. If larger pipe sizes are needed, parallel pipes should be used.
- Ground storage is to be provided at each booster pump station along the transmission line unless there is a more detailed design. Large quantities of water should use a ring dike or terminal storage rather than storage tanks.

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- Ground storage tanks should provide sufficient storage for 2.5 to 4 hours of pumping at peak capacity. Costs for ground storage are shown in **Table H.3**. Covered storage tanks are used for all strategies transporting treated water or groundwater.

H.4 Water Treatment Plants

Water treatment plants are to be sized for peak day capacity (assume peaking factor of 2 if no specific data is available). Costs estimated include six different treatment levels of varying degree. These levels are groundwater chlorine disinfection, iron and manganese removal, simple filtration, construction of a new conventional treatment plant, expansion of a conventional treatment plant, brackish desalination, and seawater desalination. Costs are also based upon a TDS factor that will increase or decrease the cost of treatment accordingly. These costs are summarized in **Table H.4**. All treatment plants are to be sized for finished water capacity.

For brackish desalination of surface water, both conventional surface water treatment and brackish desalination treatment are needed. Pending the initial water quality, some of the desalinated water can be blended back with the conventionally treated water to reduce the size of the desalination system.

Direct Reuse
Direct reuse refers to the introduction of reclaimed water directly from a water reclamation plant to a distribution system. The following assumptions were made for direct potable and non-potable reuse strategies.

Direct Potable Reuse
Direct potable reuse (DRP) is the use of reclaimed water that is transported directly from a wastewater treatment plant to a drinking water system. In the most recent version of the TWDB costing tool, cost estimation tables for advanced water treatment facilities (AWTF) were added for direct potable reuse strategies. These costs were adapted from TWDB DPR Resource Document Table 5-1. There are two AWTF schemes listed for direct potable reuse. The primary difference between the two is the use of RO, which is included in Scheme 1 but not in Scheme 2. In order to utilize Scheme 2, nitrogen must be removed at the WWTP.

Direct Non-Potable Reuse
Non-potable reuse is the use of reclaimed water that is used directly for non-potable beneficial uses such as landscape irrigation. The TWDB costing tool currently does not have a direct non-potable reuse treatment plant improvements option. Therefore, the following assumptions were made.

- It was assumed that the cost of an iron and manganese removal plant would be an appropriate approximation of the improvements that would be needed at the Wastewater Treatment Plant. This cost was further refined by assuming that only upgrades to an existing facility would be required and not the construction of an entirely new plant.
- Approximately two miles of a 6-inch pipeline were also included in the cost estimates for the transport of the treated water to the destination. Since reuse is still relatively new, there is a lack of piping infrastructure for reuse water. It was also assumed that the pump station was included in the WWTP improvements.

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Treatment Losses
Treatment losses should be accounted for in sizing and costing advanced treatment systems. These losses will vary depending upon the water quality of the source water. Generally, slightly brackish water will have losses in the 15 to 20 percent range, while the losses assumed for seawater desalination are 50 percent of the raw water. Conventional treatment losses are not included in the strategy evaluations. For some providers that only provide wholesale water, such as NTMWD, treatment losses are considered as part of the demands.

H.5 New Groundwater Wells

Cost estimates required for water management strategies that include additional wells or well fields were determined through the TWDB costing tool (unless a more detailed design was available). The associated costs are shown in **Table H.5**. The costing tool differentiated the wells based on purpose. The categories were Public Supply, Irrigation, and Aquifer Storage and Recovery (ASR). These cost relationships are "rule-of-thumb" in nature and are only appropriate in the broad context of the cost evaluations for the RWP process.

The cost relationships assume construction methods required for public water supply wells, including carbon steel surface casing and pipe-based, stainless steel, and wire-wrap screens. The cost estimates assume that wells would be gravel-packed in the screen sections and the surface casing cemented to their total depth. Estimates include the cost of drilling, completion, well development, well testing, pump, motor, motor controls, column pipe, installation and mobilization. The cost relationships do not include engineering, contingency, financial and legal services, land costs, or permits. A more detailed cost analysis should be completed prior to developing a project.

The costs associated with conveyance systems for multi-well systems can vary widely based on the distance between wells, terrain characteristics, well production, and distance to the treatment facility. These costs should be estimated using standard engineering approaches and site-specific information. For planning purposes, these costs were estimated using the TWDB costing tool's assumptions for conveyance. It is important to note that conveyance costs were not included for point-of-use water user groups such as mining.

H.6 Other Costs

1. Engineering, contingency, construction management, financial and legal costs are to be estimated at 30 percent of construction cost for pipelines and 35 percent of construction costs for pump stations, treatment facilities and reservoir projects. (This is in accordance with TWDB guidance.)
2. Permitting and mitigation for transmission and treatment projects are to be estimated at $25,000 per mile. For reservoirs, mitigation and permitting costs are assumed to be equal to the land purchase cost unless site-specific data is available.
3. Right-of-way (ROW) costs for transmission lines are estimated through costs provided by the Texas A&M University Real Estate Center (https://www.recenter.tamu.edu/data/rural-land/), which gives current land costs based on county. The ROW width is assumed to be 20 ft. If a small pipeline follows existing rights-of-ways (such as highways), no additional right-of-way cost may be assumed. Large pipelines will require ROW costs regardless of routing.

4. Interest during construction is the total interest accrued at the end of the construction period using a 3 percent annual interest rate on total borrowed funds, less a 0.5 percent rate of return on investment of unspent funds. This is calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction.

H.7 Assumptions for Annual Costs

Annual costs are to be estimated using the following assumptions:

- Debt service for all non-reservoir infrastructure (transmission and treatment facilities) is to be annualized over 30 years unless otherwise justified. For reservoirs, this period is 40 years, but not longer than the life of the project. Length of debt-service for the purpose of comparing across all projects was approved by the Region C Regional Water Planning Group and the respective project sponsors. [Note: uniform amortization periods should be used when evaluating similar projects for an entity.]
- Annual interest rate for debt service is 3.5 percent for both reservoir and non-reservoir projects.
- Generic water purchase costs are to be used based on typical regional costs, unless specified by a water provider. Treated water is estimated at $4.00 (per 1,000 gallons) and delivered raw water at $1.50 (per 1,000 gallons). In-situ raw water, in-situ groundwater, and indirect reuse is estimated at $0.30 (per 1,000 gallons).
- Operation and Maintenance costs are to be calculated based on the construction cost of the capital improvement. Engineering, permitting, etc., should not be included as a basis for this calculation. Per the "Second Amended General Guidelines for Sixth Cycle of Regional Water Plan Development (Exhibit C)", O&M should be calculated at:
    - 1 percent of the construction costs for pipelines
    - 1.5 percent for dams
    - 2.5 percent of the construction costs for pump stations
    - O&M Costs for the varying levels of water treatment plant and AWTF improvements were developed by the TWDB.
- Pumping costs are to be estimated using an electricity rate of $0.09 per Kilowatt Hour. If local data is available, this can be used.
- Power connection costs for pump stations are estimated to be $200 per HP.

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TABLE H.1 PIPELINE COSTS

DIAMETER	SOIL		ROCK	
	RURAL	URBAN	RURAL	URBAN
(INCHES)	($/FOOT)	($/FOOT)	($/FOOT)	($/FOOT)
6	141	212	153	236
8	165	248	198	287
10	189	284	244	337
12	214	321	289	388
14	238	356	335	436
16	262	393	381	484
18	286	430	427	532
20	310	465	470	582
24	358	538	562	678
30	432	646	698	823
36	590	1014	846	1204
42	750	1380	993	1586
48	909	1748	1141	1967
54	1020	1961	1289	2348
60	1130	2173	1436	2729
66	1242	2389	1584	3110
72	1353	2602	1731	3491
78	1464	2815	1879	3872
84	1639	3152	2073	4226
90	1789	3440	2236	4522
96	1939	3729	2403	4828
102	2089	4017	2571	5139
108	2239	4306	2741	5454
114	2389	4595	2911	5769
120	2539	4883	3082	6090
132	2840	5461	3425	6733
144	3140	6038	3770	7380

TABLE H.2 PUMP STATION COSTS

HORSEPOWER	BOOSTER PS COST ($-MILLIONS)	INTAKE PS COST ($-MILLIONS)
0	$0.00	$0.00
5	$3.51	$0.58
10	$3.63	$0.62
20	$3.89	$0.71
25	$4.02	$0.75
50	$4.66	$0.95
100	$5.94	$1.37
200	$8.50	$2.21
300	$11.05	$3.05
400	$13.61	$3.88

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HORSEPOWER	BOOSTER PS COST ($-MILLIONS)	INTAKE PS COST ($-MILLIONS)
500	$16.17	$4.72
600	$18.74	$5.56
700	$21.30	$6.40
800	$23.86	$7.23
900	$26.42	$8.07
1,000	$28.98	$8.91
2,000	$54.58	$17.27
3,000	$56.59	$25.63
4,000	$58.62	$33.99
5,000	$60.64	$42.36
6,000	$62.65	$44.01
7,000	$64.68	$45.66
8,000	$66.70	$47.31
9,000	$68.71	$48.96
10,000	$70.73	$50.61
20,000	$89.86	$67.09
30,000	$108.98	$83.58
40,000	$128.10	$100.05
50,000	$147.22	$116.53
60,000	$166.34	$133.02
70,000	$185.46	$149.50

TABLE H.3 GROUND STORAGE TANKS

TANK VOLUME (MG)	WITH ROOF	WITHOUT ROOF
0.5	$1,404,011	$852,945
1	$1,784,442	$1,128,898
1.5	$2,164,873	$1,404,851
2	$2,545,304	$1,680,954
2.5	$2,925,735	$1,956,907
3	$3,306,166	$2,233,010
3.5	$3,686,597	$2,508,963
4	$4,067,028	$2,784,915
5	$4,827,890	$3,336,971
6	$5,588,752	$3,889,027
7	$6,349,614	$4,441,083
8	$7,110,476	$4,993,139
10	$8,632,200	$6,498,937
12	$10,153,924	$8,004,735
14	$11,675,648	$9,510,684

Costs assume steel tanks smaller than 1 MG, concrete tanks 1 MG and large

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TABLE H.4 CONVENTIONAL WATER TREATMENT PLANT COSTS

CAPACITY (MGD)	LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3 (NEW)	LEVEL 3 (EXP)	LEVEL 4	LEVEL 5
	CHLORINE DISINFECTION (GW)	IRON & MANGANESE REMOVAL	SIMPLE FILTRATION	CONVENTIONAL TREATMENT	CONVENTIONAL TREATMENT	BRACKISH DESALINATION	SEAWATER DESALINATION
	CAPITAL COST	CAPITAL COST	CAPITAL COST	CAPITAL COST	CAPITAL COST	CAPITAL COST	CAPITAL COST
0	$0	$0	$0	$0	$0	$0	$0
0.1	$30,707	$348,017	$1,596,785	$2,129,047	$2,129,047	$2,316,216	$3,418,758
1	$102,358	$1,402,305	$5,598,984	$21,331,413	$7,523,315	$23,133,206	$22,887,255
10	$685,799	$5,824,172	$45,815,453	$71,845,099	$28,813,784	$77,902,062	$153,148,079
50	$3,418,758	$16,899,310	$128,244,371	$231,226,782	$104,036,698	$250,711,071	$578,251,199
75	$5,128,137	$24,381,682	$179,996,590	$330,186,522	$165,400,335	$358,019,424	$808,126,856
100	$6,847,752	$29,878,308	$231,748,808	$427,477,826	$200,488,667	$463,503,757	$1,024,747,147
150	$10,266,510	$45,713,095	$335,253,244	$618,651,913	$300,727,882	$670,795,431	$1,432,121,857
200	$13,685,268	$52,642,733	$438,757,681	$806,601,721	$370,894,309	$874,593,479	$1,816,005,400

Plant is sized for finished peak day capacity.

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TABLE H.5 WATER WELL COSTS

WELL DEPTH (FT)	PUBLIC SUPPLY WELL COSTS					
	WELL CAPACITY (MGD)					
	100	175	350	700	1000	1800
150	$203,302	$308,626	$453,985	$667,043	$806,153	$1,010,256
300	$271,968	$388,528	$540,560	$760,986	$909,620	$1,126,561
500	$352,104	$485,660	$641,915	$909,028	$1,082,999	$1,311,028
700	$424,953	$573,078	$754,694	$1,044,083	$1,238,791	$1,487,701
1000	$558,509	$733,346	$937,703	$1,290,820	$1,527,758	$1,793,668
1500	$781,912	$1,002,888	$1,239,383	$1,703,778	$2,005,182	$2,299,176
2000	$1,005,314	$1,270,000	$1,532,046	$2,116,736	$2,485,121	$2,806,901
Irrigation Well Costs						
150	$97,133	$149,922	$255,499	$293,508	$371,635	$536,338
300	$128,805	$192,153	$312,511	$369,524	$468,768	$654,585
500	$160,480	$240,718	$373,747	$451,874	$574,345	$791,837
700	$185,817	$276,615	$426,535	$521,557	$667,255	$910,084
1000	$242,830	$356,855	$536,338	$665,143	$850,960	$1,142,355
1500	$339,963	$494,107	$717,932	$903,749	$1,155,025	$1,526,661
2000	$434,983	$627,134	$899,526	$1,140,245	$1,461,202	$1,913,077
ASR Well Costs						
150	$264,293	$401,214	$590,181	$867,156	$1,047,999	$1,313,333
300	$353,559	$505,086	$702,728	$989,282	$1,182,506	$1,464,529
500	$457,736	$631,358	$834,489	$1,181,737	$1,407,899	$1,704,337
700	$552,438	$745,001	$981,102	$1,357,307	$1,610,428	$1,934,012
1000	$726,062	$953,350	$1,219,014	$1,678,066	$1,986,085	$2,331,768
1500	$1,016,486	$1,303,754	$1,611,198	$2,214,911	$2,606,737	$2,988,929
2000	$1,306,909	$1,651,000	$1,991,660	$2,751,757	$3,230,657	$3,648,971

TABLE H.6 LAND PURCHASE COSTS

COUNTY	LAND COST $/ACRE	COUNTY	LAND COST $/ACRE
Collin	$10,805	**Jack**	$3,150
Cooke	$12,470	**Kaufman**	$10,805
Dallas	$10,805	**Navarro**	$7,389
Denton	$10,805	**Parker**	$10,805
Ellis	$10,805	**Rockwall**	$13,795
Fannin	$12,470	**Tarrant**	$13,795
Freestone	$7,389	**Wise**	$13,795
Grayson	$12,470		
Henderson	$5,995		

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Table H.149 Southlake - Increase Delivery Infrastructure to Purchase Additional Water from Fort Worth
Table H.150 Watauga and North Richland Hills - New Pipeline from Fort Worth
Table H.151 County-Other, Tarrant - Connect to and Purchase Water from Euless for Service to DFW International Airport
Table H.152 Alvord Connect to and Purchase Water from West Wise SUD (TRWD)
Table H.153 Chico - Increase Delivery Infrastructure to Purchase Additional Water from West Wise SUD
Table H.154 Wise County WSD - Infrastructure Improvements
Table H.155 Newark - Connect to and Purchase Water from Rhome
Table H.156 Runaway Bay - Increase Delivery Infrastructure to Provide Additional Water to Customers (Lake Intake)
Table H.157 Wise County Regional Summary Costs
Table H.158 County-Other, Wise - Alternative UTRWD through Justin (New Fairview)

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TABLE H.11A CONSERVATION SAVINGS AND COSTS FOR ALL MUNICIPAL CONSERVATION STRATEGIES COMBINED

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Ables Springs SUD	3	6	8	11	14	17	$1,372	$855	$712	$560	$487	$416	$4,569	$4,760	$5,506	$6,157	$6,909	$7,254	$66,908
Addison	295	450	509	546	595	653	$68	$74	$47	$45	$42	$40	$20,143	$33,127	$23,868	$24,576	$25,230	$25,951	$2,709,005
Aledo	26	40	58	75	94	110	$832	$583	$501	$446	$400	$363	$21,639	$23,313	$29,039	$33,439	$37,622	$39,955	$341,818
Allen	213	575	549	584	649	729	$205	$101	$86	$81	$73	$65	$43,750	$58,054	$47,500	$47,500	$47,500	$47,500	$4,178,644
Alvord	7	13	18	22	27	34	$1,214	$804	$677	$617	$560	$494	$8,499	$10,448	$12,188	$13,584	$15,122	$16,810	$233,925
AMC Creekside	4	7	8	10	14	17	$1,896	$1,346	$1,397	$1,288	$1,187	$1,115	$7,584	$9,422	$11,175	$12,876	$16,616	$18,950	$12,124
Anna	301	789	1,032	1,246	1,469	1,574	$347	$196	$164	$154	$145	$143	$104,409	$154,475	$168,939	$191,583	$213,688	$225,500	$945,222
Annetta	8	15	18	23	29	36	$1,117	$710	$687	$612	$544	$486	$8,934	$10,649	$12,362	$14,074	$15,789	$17,501	$14,851
Argyle WSC	82	140	412	648	716	755	$508	$375	$209	$154	$137	$139	$41,627	$52,540	$86,287	$99,705	$98,151	$104,751	$487,244
Arledge Ridge WSC	4	7	8	9	10	12	$998	$613	$556	$508	$471	$405	$3,991	$4,290	$4,446	$4,573	$4,712	$4,862	$624,127
Arlington	2,638	3,772	4,401	4,894	5,592	5,938	$102	$80	$70	$66	$62	$60	$268,346	$300,758	$308,392	$323,652	$344,539	$354,778	$12,680,661
Athens	58	99	296	431	541	595	$775	$535	$289	$232	$189	$186	$44,906	$53,091	$85,425	$99,853	$102,470	$110,490	$616,575
Aubrey	17	47	203	335	398	377	$1,342	$927	$455	$337	$333	$351	$22,807	$43,588	$92,259	$113,052	$132,404	$132,404	$255,604
Avalon Water Supply & Sewer Service	2	4	5	5	7	8	$1,488	$824	$728	$796	$622	$596	$2,976	$3,297	$3,642	$3,980	$4,356	$4,769	$39,375
Azle	48	79	201	259	297	340	$1,000	$690	$392	$328	$273	$255	$47,980	$54,546	$78,645	$85,000	$81,038	$86,612	$247,741
B And B WSC	6	9	11	13	15	18	$895	$654	$574	$516	$477	$424	$5,371	$5,886	$6,313	$6,713	$7,151	$7,631	$26,766
Balch Springs	109	141	172	203	241	263	$435	$430	$313	$285	$262	$252	$47,421	$60,800	$53,609	$57,855	$63,275	$66,100	$231,708
Bear Creek SUD	31	290	288	283	312	274	$580	$137	$110	$117	$113	$129	$17,971	$39,635	$31,640	$33,204	$35,316	$35,316	$222,737
Becker Jiba WSC	7	16	25	34	45	57	$1,761	$1,206	$1,041	$899	$792	$712	$12,324	$19,295	$26,027	$30,565	$35,658	$40,562	$30,956
Bedford	344	489	516	599	606	629	$128	$116	$91	$81	$80	$77	$43,907	$56,861	$46,853	$48,600	$48,600	$48,600	$295,475
Bells	4	5	6	7	9	10	$1,256	$1,090	$968	$875	$719	$686	$5,023	$5,450	$5,807	$6,122	$6,471	$6,855	$15,987
Benbrook Water Authority	288	422	491	555	619	684	$294	$237	$192	$179	$168	$159	$84,744	$100,132	$94,357	$99,135	$103,917	$108,696	$895,180
Black Rock WSC	7	12	17	22	30	37	$646	$468	$397	$360	$345	$322	$4,524	$5,611	$6,749	$7,911	$10,336	$11,925	$539,946
Blackland WSC	18	26	31	41	48	57	$840	$604	$524	$459	$421	$382	$15,117	$15,700	$16,251	$18,800	$20,220	$21,747	$272,228
Blooming Grove	4	5	6	7	8	10	$776	$642	$576	$526	$496	$427	$3,103	$3,212	$3,457	$3,683	$3,966	$4,266	$14,432
Blue Mound	4	5	7	8	9	12	$1,900	$1,676	$1,289	$1,191	$1,120	$891	$7,601	$8,379	$9,024	$9,528	$10,083	$10,693	$3,637
Blue Ridge	5	9	14	18	24	32	$956	$685	$553	$518	$461	$405	$4,778	$6,163	$7,737	$9,316	$11,055	$12,974	$25,024
Bois D Arc MUD	6	9	11	12	14	16	$1,422	$993	$834	$777	$678	$605	$8,579	$8,984	$9,227	$9,379	$9,545	$9,728	$113,838
Bolivar WSC	32	54	73	182	258	328	$1,174	$828	$702	$418	$339	$301	$37,559	$44,691	$51,243	$76,019	$87,496	$98,440	$512,062
Bonham	39	70	222	347	483	600	$1,092	$727	$395	$311	$251	$236	$42,580	$50,887	$87,751	$108,144	$121,099	$141,877	$351,151
Boyd	5	8	12	17	22	28	$860	$674	$607	$529	$483	$418	$4,299	$5,393	$7,285	$8,994	$10,622	$11,711	$11,500
Bridgeport	18	27	31	35	39	42	$895	$611	$544	$487	$443	$417	$16,105	$16,497	$16,864	$17,060	$17,281	$17,529	$5,864
Buena Vista-Bethel SUD	37	65	90	120	153	190	$618	$425	$370	$327	$325	$296	$22,852	$27,611	$33,334	$39,191	$49,734	$56,296	$219,108
Butler WSC	4	5	6	5	6	6	$629	$498	$409	$476	$384	$369	$2,514	$2,490	$2,454	$2,382	$2,301	$2,211	$15,281
Callisburg WSC	2	4	4	5	6	6	$2,336	$1,217	$1,238	$996	$836	$841	$4,671	$4,867	$4,952	$4,982	$5,014	$5,047	$8,696
Carrollton	907	1,220	1,433	1,643	1,858	1,880	$107	$92	$75	$69	$64	$64	$97,261	$112,790	$107,504	$113,082	$118,986	$119,392	$610,707
Cedar Hill	408	566	687	794	912	1,041	$158	$141	$107	$98	$91	$86	$64,668	$79,885	$73,216	$78,118	$83,414	$89,138	$1,129,020
Celina	622	2,181	4,094	3,626	4,709	5,860	$225	$100	$76	$89	$81	$75	$140,002	$217,826	$312,211	$323,212	$379,482	$441,521	$1,754,463
Chatfield WSC	6	9	12	13	16	18	$1,552	$1,111	$881	$852	$727	$680	$9,310	$10,002	$10,573	$11,077	$11,635	$12,245	$182,952
Chico	7	11	12	13	15	16	$838	$534	$489	$451	$391	$367	$5,869	$5,869	$5,869	$5,869	$5,869	$5,869	$12,881
Cockrell Hill	5	5	7	8	9	11	$505	$474	$326	$279	$241	$191	$2,526	$2,370	$2,285	$2,231	$2,172	$2,106	$39,883
College Mound SUD	11	18	30	175	310	398	$1,224	$821	$627	$277	$239	$198	$13,463	$14,783	$18,817	$48,464	$74,052	$78,652	$278,158
Colleyville	381	449	485	520	556	592	$70	$59	$55	$51	$48	$45	$26,550	$26,550	$26,550	$26,550	$26,550	$26,550	$2,769,434
Collinsville	5	8	10	12	13	16	$1,493	$1,024	$880	$779	$765	$663	$7,467	$8,191	$8,796	$9,346	$9,947	$10,606	$27,181
Combine WSC	3	4	6	8	12	15	$841	$714	$542	$460	$347	$312	$2,522	$2,856	$3,253	$3,683	$4,159	$4,686	$23,263
Community WSC	11	19	22	27	31	37	$1,046	$678	$638	$554	$516	$521	$11,502	$12,882	$14,036	$14,967	$15,993	$19,282	$46,707
Copeville WSC	12	27	51	64	163	211	$942	$664	$503	$441	$305	$254	$11,306	$17,925	$25,646	$28,207	$49,716	$53,465	$307,225
Coppell	403	471	513	554	594	630	$94	$80	$74	$69	$64	$61	$37,988	$37,883	$37,974	$38,046	$38,150	$38,150	$2,185,542
Corbet WSC	4	7	7	8	9	12	$1,747	$1,069	$1,127	$1,031	$960	$756	$6,988	$7,484	$7,892	$8,248	$8,640	$9,076	$183,698
Corinth	258	377	581	569	596	586	$348	$280	$192	$200	$197	$200	$89,886	$105,543	$111,273	$113,766	$117,400	$117,400	$1,407,053
Corsicana	288	408	459	503	554	610	$300	$248	$205	$194	$182	$171	$86,416	$101,303	$94,338	$97,436	$100,850	$104,611	$328,812
County-Other, Collin	2	6	10	16	23	31	$0	$294	$220	$164	$133	$113	$0	$1,762	$2,197	$2,631	$3,066	$3,500	$93,599
County-Other, Cooke	3	5	8	11	14	18	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$123,071
County-Other, Dallas	9	22	41	65	93	128	$106	$72	$31	$24	$20	$16	$952	$1,582	$1,260	$1,540	$1,820	$2,100	$70,691
County-Other, Denton	25	73	144	238	387	535	$1,482	$793	$538	$413	$335	$281	$37,049	$57,879	$77,506	$98,338	$129,584	$150,416	$1,050,771
County-Other, Ellis	3	5	9	13	17	22	$0	$0	$0	$212	$172	$140	$0	$0	$0	$2,758	$2,919	$3,080	$122,636
County-Other, Fannin	1	3	4	6	8	11	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$57,531
County-Other, Freestone	1	2	3	3	4	5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$44,095
County-Other, Grayson	6	10	15	20	27	33	$751	$427	$259	$204	$166	$138	$4,507	$4,273	$3,880	$4,088	$4,480	$4,550	$231,906
County-Other, Henderson	3	7	13	16	20	22	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$229,796
County-Other, Jack	2	3	4	5	6	7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$70,073
County-Other, Kaufman	6	12	24	36	59	79	$902	$515	$311	$243	$190	$162	$5,411	$6,176	$7,459	$8,732	$11,220	$12,801	$227,522
County-Other, Navarro	3	5	9	13	18	23	$0	$0	$302	$226	$183	$152	$0	$0	$2,722	$2,937	$3,290	$3,500	$111,723
County-Other, Parker	35	104	223	398	655	929	$1,423	$759	$514	$393	$318	$267	$49,811	$78,923	$114,718	$156,514	$208,600	$248,500	$1,537,899
County-Other, Rockwall	1	2	5	8	16	24	$0	$0	$0	$0	$128	$106	$0	$0	$0	$0	$2,045	$2,553	$68,027
County-Other, Tarrant	36	87	158	251	363	496	$603	$362	$257	$201	$166	$141	$21,723	$31,523	$40,600	$50,400	$60,200	$70,000	$1,282,877
County-Other, Wise	29	76	161	286	478	672	$1,305	$756	$524	$407	$332	$281	$37,837	$57,433	$84,294	$116,446	$158,900	$189,000	$1,037,799
Crandall	18	56	277	523	743	850	$862	$575	$248	$171	$136	$137	$15,517	$32,178	$68,612	$89,522	$101,211	$116,381	$168,942
Crescent Heights WSC	3	4	5	5	7	8	$1,727	$1,333	$1,179	$1,198	$871	$776	$5,181	$5,333	$5,896	$5,992	$6,095	$6,207	$31,363
Cross Timbers WSC	42	78	109	139	362	569	$820	$552	$478	$436	$245	$184	$34,445	$43,087	$52,103	$60,553	$88,686	$104,894	$207,696

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TABLE H.11A CONSERVATION SAVINGS AND COSTS FOR ALL MUNICIPAL CONSERVATION STRATEGIES COMBINED

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Crowley	114	204	254	289	332	380	$193	$177	$111	$105	$98	$92	$21,933	$36,174	$28,203	$30,303	$32,605	$35,129	$219,412
Culleoka WSC	27	45	60	75	172	223	$1,447	$993	$872	$781	$486	$446	$39,074	$44,666	$52,341	$58,553	$83,794	$99,372	$292,732
Dallas	10,468	13,623	15,748	17,825	19,973	22,236	$77	$63	$56	$52	$48	$46	$805,373	$853,016	$882,418	$924,331	$968,673	$1,015,382	$27,680,184
Dalworthington Gardens	12	15	18	21	24	27	$254	$205	$138	$118	$104	$92	$3,045	$3,068	$2,484	$2,485	$2,489	$2,493	$26,062
Dawson	2	4	4	5	5	6	$1,238	$626	$632	$503	$502	$418	$2,475	$2,502	$2,526	$2,517	$2,511	$2,505	$28,886
Decatur	57	101	150	400	611	716	$538	$367	$323	$191	$149	$125	$30,660	$37,022	$48,441	$76,513	$91,369	$89,748	$517,835
Denison	608	1,155	1,481	1,795	2,226	2,413	$234	$156	$130	$120	$110	$109	$142,429	$180,821	$192,019	$215,154	$245,319	$262,058	$362,616
Denton	1,431	3,069	4,241	5,215	6,495	7,659	$204	$119	$99	$93	$86	$83	$291,709	$365,098	$419,163	$482,395	$560,789	$637,441	$6,807,856
Denton County FWSD 1-A	180	414	428	416	427	430	$374	$227	$205	$213	$211	$209	$67,311	$94,269	$87,767	$88,618	$89,856	$89,856	$609,918
Denton County FWSD 10	31	43	47	50	54	58	$718	$518	$461	$433	$401	$373	$22,255	$22,255	$21,653	$21,653	$21,653	$21,653	$50,687
Denton County FWSD 11-C	9	20	33	46	61	133	$2,153	$1,493	$1,211	$1,099	$1,008	$692	$19,380	$29,855	$39,952	$50,538	$61,483	$92,307	$192,433
Denton County FWSD 7	99	136	148	159	170	181	$440	$336	$305	$284	$265	$249	$43,532	$45,719	$45,117	$45,117	$45,117	$45,117	$425,699
Desert WSC	6	9	11	13	15	18	$892	$657	$573	$513	$472	$418	$5,352	$5,916	$6,308	$6,675	$7,078	$7,527	$87,521
Desoto	402	537	592	634	683	738	$228	$200	$166	$158	$149	$141	$91,575	$107,374	$98,389	$99,994	$101,762	$103,712	$1,273,247
Dogwood Estates Water	4	4	6	6	7	8	$872	$855	$603	$609	$527	$466	$3,487	$3,419	$3,615	$3,651	$3,689	$3,727	$13,577
Dorchester	4	7	7	8	9	10	$945	$554	$565	$498	$447	$407	$3,781	$3,877	$3,953	$3,983	$4,024	$4,073	$27,756
Duncanville	213	276	305	322	340	360	$178	$181	$133	$126	$119	$113	$37,912	$50,110	$40,439	$40,547	$40,547	$40,547	$861,395
East Cedar Creek FWSD	163	221	234	252	272	293	$416	$370	$307	$290	$272	$257	$67,885	$82,026	$71,848	$72,882	$74,027	$75,289	$1,400,029
East Fork SUD	106	195	267	318	357	409	$315	$252	$164	$154	$150	$143	$33,389	$49,134	$43,897	$49,084	$53,566	$58,517	$231,525
East Garrett WSC	5	9	14	18	25	31	$1,039	$725	$569	$524	$497	$465	$5,194	$6,525	$7,968	$9,433	$12,425	$14,426	$37,169
Edgecliff	8	10	12	14	17	19	$568	$455	$329	$282	$232	$208	$4,547	$4,547	$3,945	$3,945	$3,945	$3,945	$65,810
Elmo WSC	4	5	8	10	13	16	$1,657	$1,544	$1,138	$1,065	$951	$891	$6,626	$7,718	$9,106	$10,649	$12,364	$14,262	$26,659
Ennis	176	239	269	296	328	361	$416	$365	$296	$280	$264	$251	$73,180	$87,139	$79,670	$83,008	$86,765	$90,420	$486,367
Euless	348	408	441	474	506	539	$141	$120	$111	$103	$97	$91	$48,992	$48,992	$48,992	$48,992	$48,992	$48,992	$1,591,405
Eustace	6	9	10	12	13	16	$1,455	$1,059	$935	$804	$767	$646	$8,730	$9,531	$9,351	$9,645	$9,974	$10,339	$25,558
Everman	5	7	8	10	12	14	$912	$652	$570	$456	$380	$326	$4,561	$4,561	$4,561	$4,561	$4,561	$4,561	$21,367
Fairfield	18	25	28	30	30	30	$761	$532	$461	$403	$376	$349	$13,704	$13,295	$12,906	$12,087	$11,273	$10,464	$93,968
Fairview	38	68	389	435	415	418	$229	$158	$79	$71	$48	$48	$8,714	$10,742	$30,652	$30,652	$20,098	$20,098	$602,504
Farmers Branch	374	542	606	648	700	763	$87	$84	$60	$57	$54	$51	$32,679	$45,655	$36,389	$37,141	$37,972	$38,885	$320,576
Farmersville	10	42	317	421	436	457	$655	$367	$156	$128	$110	$115	$6,546	$15,432	$49,388	$53,841	$48,123	$52,488	$381,022
Fate	199	503	777	1,024	1,293	1,590	$173	$114	$78	$73	$69	$67	$34,384	$57,162	$60,711	$74,552	$89,760	$106,480	$222,333
Ferris	12	16	20	22	26	30	$773	$612	$486	$465	$415	$381	$9,281	$9,785	$9,726	$10,225	$10,790	$11,421	$17,996
Flower Mound	839	1,806	2,506	2,185	2,087	2,095	$83	$53	$40	$46	$48	$48	$69,915	$94,980	$99,752	$99,788	$99,833	$99,833	$518,990
Forest Hill	14	22	30	39	110	137	$1,110	$777	$612	$496	$348	$291	$15,541	$17,085	$18,361	$19,357	$38,286	$39,949	$197,734
Forney	152	317	444	546	606	564	$182	$140	$91	$84	$82	$88	$27,708	$44,386	$40,404	$45,872	$49,597	$49,597	$891,846
Forney Lake WSC	67	216	259	304	309	320	$412	$237	$201	$148	$149	$146	$27,596	$51,227	$52,095	$45,134	$45,847	$46,559	$185,458
Fort Worth	1,810	5,336	5,499	7,151	8,896	10,804	$155	$64	$62	$52	$45	$40	$281,129	$343,979	$342,828	$369,443	$398,378	$429,655	$27,500,873
Frisco	635	2,420	2,101	2,053	2,185	2,405	$138	$46	$49	$50	$47	$42	$87,505	$112,158	$102,012	$102,012	$102,012	$102,012	$22,773,608
Frognot WSC	4	7	9	13	16	20	$1,504	$1,064	$1,008	$822	$780	$722	$6,071	$7,536	$9,152	$10,802	$12,591	$14,586	$166,806
Gainesville	55	158	180	202	232	262	$1,173	$531	$468	$382	$357	$338	$64,541	$84,034	$84,385	$77,021	$82,785	$88,467	$299,488
Garland	340	688	880	1,039	1,132	1,239	$220	$130	$93	$81	$74	$68	$74,894	$89,774	$81,791	$83,669	$84,045	$84,045	$5,567,989
Gastonia Scurry SUD	20	29	48	246	469	563	$885	$702	$545	$260	$184	$160	$17,700	$20,358	$26,147	$63,743	$86,271	$90,300	$286,329
Glenn Heights	97	156	193	225	262	301	$310	$290	$195	$182	$170	$161	$30,105	$45,258	$37,671	$40,969	$44,594	$48,580	$302,188
Grand Prairie	293	657	990	1,054	1,212	1,272	$230	$127	$80	$77	$69	$66	$67,406	$83,564	$79,461	$81,128	$83,417	$83,417	$3,579,553
Grapevine	156	218	280	342	405	467	$167	$119	$93	$76	$64	$56	$26,009	$26,009	$26,009	$26,009	$26,009	$26,009	$396,473
Gunter	6	9	12	15	18	22	$927	$714	$596	$523	$479	$430	$5,559	$6,425	$7,146	$7,851	$8,619	$9,454	$40,772
Hackberry	42	78	113	157	203	258	$510	$383	$343	$309	$286	$265	$21,410	$29,900	$38,790	$48,476	$58,000	$68,422	$181,390
Haltom City	45	62	80	98	115	133	$556	$403	$313	$255	$217	$188	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$615,129
Haslet	53	89	140	176	210	228	$140	$111	$100	$98	$89	$82	$7,411	$9,905	$14,013	$17,267	$18,670	$18,670	$1,642,035
Heath	80	150	517	588	546	535	$449	$309	$151	$135	$126	$129	$35,905	$46,343	$77,967	$79,522	$68,968	$68,968	$1,160,686
High Point WSC	89	278	450	623	799	991	$871	$439	$332	$298	$281	$270	$77,523	$121,984	$149,032	$185,832	$224,649	$267,178	$246,377
Highland Park	76	111	124	138	152	166	$337	$231	$207	$186	$169	$154	$25,624	$25,624	$25,624	$25,624	$25,624	$25,624	$540,235
Highland Village	67	104	119	132	145	158	$642	$440	$388	$350	$319	$292	$43,031	$45,751	$46,213	$46,213	$46,213	$46,213	$1,034,241
Honey Grove	5	8	9	10	11	12	$1,026	$657	$584	$525	$478	$438	$5,129	$5,254	$5,254	$5,254	$5,254	$5,254	$13,851
Horseshoe Bend Water System	4	5	8	11	17	24	$957	$858	$669	$632	$550	$507	$3,828	$4,290	$5,352	$6,953	$9,354	$12,166	$15,197
Howe	8	13	18	22	27	34	$1,663	$1,222	$1,003	$918	$835	$738	$13,304	$15,890	$18,057	$20,204	$22,540	$25,080	$17,332
Hudson Oaks	45	65	73	82	93	103	$395	$283	$250	$230	$211	$197	$17,777	$18,370	$18,254	$18,846	$19,633	$20,247	$236,328
Hurst	57	79	103	125	148	171	$379	$273	$210	$173	$146	$127	$21,592	$21,558	$21,588	$21,611	$21,645	$21,645	$304,567
Hutchins	24	35	44	54	62	73	$508	$386	$309	$259	$233	$204	$12,193	$13,511	$13,610	$14,011	$14,435	$14,901	$213,425
Irving	500	928	1,051	1,219	1,410	1,608	$160	$102	$80	$69	$60	$52	$80,224	$94,498	$83,992	$84,042	$84,092	$84,092	$705,501
Italy	5	7	7	8	9	10	$1,111	$795	$796	$693	$613	$549	$5,556	$5,564	$5,570	$5,540	$5,513	$5,491	$19,318
Jacksboro	15	21	24	28	33	38	$693	$487	$439	$393	$360	$322	$10,388	$10,233	$10,541	$11,003	$11,872	$12,220	$34,537
Josephine	11	36	68	90	287	317	$565	$394	$302	$253	$152	$137	$6,400	$14,013	$20,474	$22,749	$43,539	$43,577	$303,320
Justin	23	45	72	113	371	668	$966	$685	$567	$491	$255	$177	$22,229	$30,806	$40,805	$55,526	$94,581	$118,292	$353,453
Kaufman	10	16	30	47	66	203	$526	$370	$275	$216	$181	$157	$5,259	$5,926	$8,256	$10,160	$11,940	$31,934	$158,334
Kaufman County Development District 1	17	26	46	78	132	171	$632	$493	$428	$389	$375	$341	$10,737	$12,822	$19,688	$30,358	$49,535	$58,379	$25,193
Kaufman County MUD 11	14	24	34	47	66	84	$1,015	$697	$607	$553	$491	$480	$14,213	$16,730	$20,643	$26,005	$32,374	$40,309	$75,747
Kaufman County MUD 14	45	59	65	71	77	82	$499	$380	$336	$308	$284	$266	$22,440	$22,440	$21,838	$21,838	$21,838	$21,838	$228,350
Keller	107	174	206	244	285	327	$236	$208	$124	$104	$90	$78	$25,283	$36,048	$25,494	$25,494	$25,494	$25,494	$2,639,472
Kemp	5	8	9	10	12	14	$933	$603	$559	$521	$453	$406	$4,663	$4,827	$5,028	$5,213	$5,434	$5,687	$21,215

TABLE H.11A CONSERVATION SAVINGS AND COSTS FOR ALL MUNICIPAL CONSERVATION STRATEGIES COMBINED

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Kennedale	30	58	88	299	455	525	$410	$296	$243	$152	$113	$88	$12,294	$17,162	$21,408	$45,347	$51,450	$46,324	$209,158
Kentuckytown WSC	6	11	12	15	17	20	$1,345	$802	$787	$667	$625	$565	$8,072	$8,823	$9,446	$10,007	$10,625	$11,303	$27,384
Kerens	4	4	4	5	4	4	$1,069	$994	$925	$689	$802	$746	$4,277	$3,977	$3,700	$3,444	$3,207	$2,985	$11,913
Krum	29	56	88	135	382	624	$787	$539	$446	$434	$249	$189	$22,834	$30,164	$39,263	$58,547	$95,179	$117,727	$434,014
Ladonia	2	4	6	10	14	16	$1,161	$715	$669	$579	$506	$443	$2,322	$2,859	$4,015	$5,793	$7,083	$7,083	$6,782
Lake Cities Municipal Utility Authority	61	202	241	241	245	250	$959	$437	$377	$337	$333	$326	$58,522	$88,072	$90,891	$81,149	$81,635	$81,635	$241,693
Lake Kiowa SUD	22	33	36	41	46	50	$405	$284	$248	$220	$198	$184	$8,908	$9,357	$8,942	$9,021	$9,110	$9,206	$26,593
Lake Worth	14	21	28	34	42	48	$479	$347	$253	$219	$185	$168	$6,711	$7,282	$7,086	$7,433	$7,772	$8,073	$35,079
Lakeside	15	21	23	25	27	29	$498	$356	$298	$275	$254	$237	$7,466	$7,466	$6,864	$6,864	$6,864	$6,864	$67,999
Lancaster	269	352	391	421	455	492	$202	$193	$150	$142	$133	$125	$54,266	$67,780	$58,790	$59,692	$60,605	$61,571	$1,160,254
Lancaster MUD 1	7	12	16	17	19	22	$1,129	$884	$689	$685	$648	$593	$7,903	$10,612	$11,031	$11,642	$12,314	$13,057	$12,803
Leonard	7	11	15	19	25	32	$1,128	$772	$668	$615	$556	$519	$7,897	$8,496	$10,023	$11,676	$13,889	$16,611	$428,986
Lewisville	686	816	1,011	1,070	1,157	1,205	$119	$113	$86	$82	$77	$74	$81,654	$92,640	$86,888	$87,896	$89,363	$89,363	$1,240,985
Lindsay	4	5	6	7	8	8	$1,239	$1,013	$853	$731	$639	$639	$4,955	$5,063	$5,115	$5,115	$5,112	$5,112	$75,703
Little Elm	50	65	110	142	163	172	$457	$341	$209	$167	$148	$141	$22,871	$22,140	$23,027	$23,766	$24,250	$24,250	$1,094,015
Log Cabin	2	3	4	5	5	7	$1,007	$671	$588	$477	$484	$352	$2,013	$2,013	$2,352	$2,385	$2,422	$2,462	$8,494
Lucas	27	43	57	69	82	94	$286	$202	$156	$129	$108	$95	$7,735	$8,696	$8,883	$8,883	$8,883	$8,883	$1,834,002
Luella SUD	5	7	8	9	10	10	$1,535	$1,096	$959	$853	$767	$767	$7,674	$7,674	$7,674	$7,674	$7,674	$7,674	$47,568
M E N WSC	10	16	20	24	29	34	$1,044	$750	$665	$608	$551	$515	$10,437	$12,002	$13,295	$14,583	$15,988	$17,520	$44,638
Mabank	50	73	83	91	99	111	$717	$520	$459	$427	$396	$361	$35,577	$37,730	$38,214	$38,760	$39,426	$40,199	$411,976
Malakoff	5	8	9	10	11	12	$1,371	$907	$844	$770	$710	$660	$6,855	$7,252	$7,598	$7,701	$7,807	$7,925	$52,192
Mansfield	1,045	1,447	2,313	4,067	3,569	3,437	$76	$66	$43	$33	$38	$40	$79,118	$94,989	$100,091	$134,014	$135,965	$138,146	$7,053,582
Markout WSC	10	16	26	41	60	91	$833	$615	$590	$536	$487	$427	$8,330	$9,844	$15,341	$21,974	$29,225	$38,876	$47,031
McKinney	407	1,287	2,521	3,714	3,018	2,825	$168	$68	$37	$30	$37	$39	$68,249	$87,526	$92,689	$111,223	$111,223	$111,223	$8,361,720
Melissa	80	491	789	1,007	1,000	865	$284	$80	$44	$39	$42	$49	$22,690	$39,374	$34,420	$39,720	$42,268	$42,268	$238,762
Mesquite	200	342	580	833	1,090	1,295	$270	$194	$104	$79	$66	$59	$54,020	$66,315	$60,502	$65,883	$71,526	$76,336	$2,373,931
Midlothian	357	557	742	902	1,068	1,198	$278	$216	$170	$155	$143	$135	$99,072	$120,321	$126,171	$140,094	$152,529	$162,298	$1,676,240
Milligan WSC	3	5	7	10	14	18	$784	$494	$412	$335	$277	$239	$2,351	$2,468	$2,885	$3,352	$3,876	$4,310	$31,629
Mount Zion WSC	3	5	6	8	10	12	$495	$306	$264	$204	$168	$145	$1,484	$1,531	$1,584	$1,631	$1,684	$1,745	$36,276
Mountain Peak SUD	374	765	1,059	1,344	1,669	2,047	$231	$162	$128	$119	$111	$102	$86,537	$124,118	$135,865	$159,459	$184,471	$209,060	$1,482,820
Mountain Springs WSC	6	9	10	11	13	14	$954	$644	$587	$536	$455	$424	$5,725	$5,798	$5,872	$5,891	$5,910	$5,932	$27,846
Muenster	6	9	11	12	13	14	$1,017	$678	$555	$508	$469	$436	$6,101	$6,101	$6,101	$6,101	$6,101	$6,101	$131,748
Murphy	210	258	339	417	492	541	$138	$156	$94	$84	$77	$74	$29,073	$40,203	$31,974	$34,971	$38,031	$40,278	$696,261
Mustang SUD	930	2,183	3,183	4,046	4,626	5,124	$300	$176	$151	$143	$142	$141	$278,563	$384,881	$479,425	$577,837	$656,657	$724,457	$759,375
Nash Forreston WSC	5	8	10	14	19	23	$1,463	$1,075	$940	$772	$723	$680	$7,316	$8,603	$9,403	$10,810	$13,738	$15,640	$26,404
Navarro Mills WSC	5	8	10	12	13	16	$1,588	$1,063	$897	$782	$756	$645	$7,993	$8,557	$9,025	$9,433	$9,880	$10,375	$364,823
Nevada SUD	5	9	16	94	261	321	$804	$565	$485	$288	$136	$95	$4,020	$5,081	$7,759	$27,041	$35,547	$30,609	$185,984
Newark	2	4	7	12	19	26	$1,824	$1,139	$924	$777	$723	$671	$3,648	$4,554	$6,468	$9,324	$13,728	$17,455	$3,031
North Collin SUD	10	15	26	39	52	68	$845	$630	$439	$359	$313	$277	$8,446	$9,455	$11,409	$14,008	$16,265	$18,842	$89,028
North Farmersville WSC	1	3	5	6	7	8	$1,395	$550	$429	$417	$404	$372	$1,395	$1,650	$2,145	$2,502	$2,826	$2,976	$7,376
North Kaufman WSC	4	8	12	17	22	31	$2,416	$1,578	$1,366	$1,217	$1,155	$983	$9,664	$12,623	$16,393	$20,681	$25,407	$30,488	$27,036
North Richland Hills	116	236	274	317	374	408	$280	$188	$125	$109	$93	$86	$32,530	$44,463	$34,263	$34,543	$34,950	$34,950	$2,835,769
Northlake	191	315	516	646	767	830	$144	$135	$74	$68	$65	$64	$27,572	$42,516	$38,364	$43,928	$49,552	$53,518	$226,829
Northwest Grayson County WCID 1	4	5	7	8	11	12	$1,452	$1,289	$996	$933	$728	$716	$5,809	$6,444	$6,972	$7,464	$8,003	$8,591	$14,028
Oak Ridge South Gale WSC	5	7	7	8	9	10	$1,586	$1,158	$1,178	$1,036	$927	$841	$7,930	$8,104	$8,246	$8,287	$8,341	$8,412	$7,577
Ovilla	19	33	48	66	90	120	$430	$306	$241	$208	$187	$174	$8,178	$10,096	$11,579	$13,697	$16,850	$20,860	$220,710
Palmer	6	10	13	16	21	27	$1,449	$1,026	$874	$817	$712	$701	$8,692	$10,260	$11,356	$13,065	$14,947	$18,925	$30,467
Paloma Creek North	49	61	65	69	73	77	$427	$343	$312	$294	$278	$264	$20,911	$20,911	$20,309	$20,309	$20,309	$20,309	$32,571
Paloma Creek South	59	77	83	89	96	102	$542	$415	$378	$353	$327	$308	$31,981	$31,981	$31,379	$31,379	$31,379	$31,379	$137,634
Pantego	12	17	20	22	24	26	$625	$441	$375	$341	$313	$288	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$18,184
Parker	34	56	101	145	165	185	$211	$163	$142	$132	$116	$103	$7,157	$9,120	$14,309	$19,079	$19,079	$19,079	$375,603
Parker County SUD	18	36	56	174	299	420	$1,602	$1,075	$903	$491	$391	$321	$28,837	$38,694	$50,550	$85,204	$116,956	$135,174	$722,999
Pelican Bay	4	7	12	17	25	36	$2,083	$1,582	$1,385	$1,306	$1,187	$1,081	$8,330	$11,077	$16,622	$22,195	$29,669	$38,920	$12,123
Pilot Point	16	30	59	204	247	235	$1,098	$849	$725	$385	$337	$311	$17,575	$25,470	$42,753	$78,524	$83,407	$72,853	$183,489
Pink Hill WSC	5	7	9	10	13	14	$1,259	$992	$832	$799	$656	$652	$6,294	$6,945	$7,486	$7,987	$8,534	$9,133	$69,522
Plano	605	884	1,763	1,971	2,017	2,179	$133	$103	$49	$45	$44	$41	$80,463	$91,411	$86,933	$88,917	$88,917	$88,917	$5,451,148
Pleasant Grove WSC	2	4	5	5	6	6	$2,106	$1,131	$987	$967	$787	$767	$4,211	$4,524	$4,936	$4,835	$4,723	$4,601	$8,511
Point Enterprise WSC	3	5	5	6	6	6	$1,263	$834	$823	$617	$617	$617	$3,941	$3,873	$3,780	$3,736	$3,671	$3,605	$14,062
Ponder	16	30	43	57	76	99	$1,081	$760	$651	$594	$530	$481	$17,299	$22,792	$27,975	$33,854	$40,318	$47,613	$73,134
Pottsboro	11	18	22	26	30	33	$919	$688	$601	$537	$492	$475	$10,113	$12,376	$13,212	$13,950	$14,763	$15,660	$18,942
Princeton	228	971	1,292	1,326	1,392	1,311	$337	$164	$151	$163	$169	$179	$76,854	$159,160	$195,451	$216,756	$234,834	$234,834	$759,291
Prosper	120	479	808	727	782	704	$219	$82	$40	$45	$43	$48	$26,319	$39,328	$31,937	$32,719	$33,858	$33,858	$339,329
Providence Village WCID	25	33	36	39	42	45	$1,026	$777	$695	$642	$596	$556	$25,639	$25,639	$25,037	$25,037	$25,037	$25,037	$41,140
R C H WSC	23	37	54	83	113	149	$797	$560	$527	$464	$417	$378	$18,342	$20,717	$28,477	$38,492	$47,115	$56,369	$58,218
Red Oak	27	46	64	198	283	340	$501	$376	$318	$211	$165	$121	$13,531	$17,281	$20,344	$41,798	$46,712	$41,057	$213,492
Reno (Parker)	5	9	12	17	21	26	$2,382	$1,602	$1,437	$1,190	$1,119	$1,042	$11,910	$14,420	$17,245	$20,224	$23,498	$27,103	$19,224
Rhome	7	13	22	36	58	88	$930	$641	$553	$549	$499	$438	$6,512	$8,330	$12,166	$19,753	$28,948	$38,533	$38,908
Rice Water Supply and Sewer Service	22	38	52	66	83	189	$1,369	$946	$800	$728	$662	$429	$30,121	$35,943	$41,612	$48,027	$54,974	$81,246	$252,456
Richardson	242	430	643	746	788	864	$173	$125	$70	$62	$59	$54	$41,879	$53,763	$45,267	$46,250	$46,250	$46,250	$2,224,231
Richland Hills	10	18	27	36	45	56	$661	$438	$334	$274	$244	$211	$6,614	$7,890	$9,025	$9,876	$10,964	$11,803	$35,611

TABLE H.11A CONSERVATION SAVINGS AND COSTS FOR ALL MUNICIPAL CONSERVATION STRATEGIES COMBINED

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
River Oaks	16	23	27	30	33	36	$1,392	$965	$828	$749	$686	$629	$22,265	$22,200	$22,344	$22,461	$22,627	$22,627	$32,724
Roanoke	71	90	105	120	136	149	$230	$196	$165	$146	$131	$120	$16,339	$17,650	$17,322	$17,539	$17,856	$17,856	$513,361
Rockett SUD	202	349	462	555	714	828	$613	$439	$351	$323	$287	$273	$123,769	$153,202	$162,281	$179,040	$205,268	$226,541	$612,349
Rockwall	84	338	692	1,093	910	778	$313	$118	$51	$39	$48	$56	$26,269	$39,944	$34,998	$42,519	$43,674	$43,674	$2,535,355
Rose Hill SUD	3	5	9	12	16	20	$1,150	$831	$544	$468	$387	$342	$3,450	$4,153	$4,893	$5,617	$6,198	$6,840	$53,260
Rowlett	97	185	378	418	456	447	$330	$235	$96	$90	$85	$87	$31,969	$43,538	$36,295	$37,718	$38,774	$38,774	$381,047
Royse City	270	1,019	1,333	1,323	1,470	1,370	$237	$119	$106	$116	$116	$125	$64,177	$121,718	$141,405	$153,813	$170,521	$170,719	$948,773
Runaway Bay	13	25	32	45	59	80	$465	$294	$280	$243	$226	$204	$6,047	$7,356	$8,960	$10,929	$13,344	$16,306	$31,363
Sachse	44	96	174	184	195	194	$394	$298	$113	$110	$106	$107	$17,315	$28,653	$19,686	$20,281	$20,673	$20,673	$248,498
Saginaw	33	72	79	89	102	114	$529	$403	$237	$211	$185	$165	$17,469	$29,134	$18,688	$18,773	$18,898	$18,898	$520,835
Sanger	28	51	69	118	188	254	$1,078	$722	$635	$561	$412	$307	$30,190	$36,838	$43,833	$66,332	$77,454	$77,904	$290,439
Sansom Park	13	20	24	28	32	38	$1,506	$1,079	$942	$854	$791	$707	$19,580	$21,575	$22,619	$23,904	$25,322	$26,881	$59,835
Sardis Lone Elm WSC	255	506	678	673	643	642	$296	$201	$154	$160	$168	$168	$75,363	$101,903	$104,394	$107,935	$107,935	$107,935	$297,081
Savoy	1	3	3	3	4	4	$2,133	$704	$706	$698	$517	$509	$2,133	$2,112	$2,118	$2,094	$2,067	$2,034	$6,296
Seagoville	86	116	130	142	152	166	$416	$427	$308	$291	$278	$261	$35,739	$49,587	$40,182	$41,212	$42,282	$43,366	$346,776
Seis Lagos UD	5	7	10	12	16	18	$333	$231	$169	$146	$112	$100	$1,667	$1,614	$1,691	$1,757	$1,795	$1,799	$5,683
Sherman	517	750	854	948	1,054	1,172	$248	$196	$167	$155	$145	$136	$127,985	$147,089	$142,340	$147,439	$153,058	$159,248	$729,443
South Ellis County WSC	11	19	24	30	39	48	$403	$277	$257	$235	$206	$190	$4,432	$5,268	$6,161	$7,062	$8,050	$9,141	$67,282
South Freestone County WSC	5	7	9	9	9	10	$1,470	$1,097	$902	$877	$850	$738	$7,350	$7,682	$8,118	$7,897	$7,650	$7,377	$225,326
South Grayson SUD	12	21	26	31	39	47	$1,431	$944	$839	$785	$694	$641	$17,172	$19,826	$21,815	$24,321	$27,077	$30,110	$62,045
Southern Oaks Water Supply	4	6	10	11	12	13	$852	$698	$496	$459	$428	$401	$3,409	$4,189	$4,960	$5,046	$5,130	$5,219	$21,295
Southlake	122	379	472	546	628	709	$161	$84	$47	$42	$38	$35	$19,681	$31,849	$22,293	$23,179	$24,067	$24,900	$4,487,588
Southmayd	2	3	3	3	4	4	$1,446	$992	$1,014	$1,024	$777	$788	$2,892	$2,976	$3,041	$3,071	$3,106	$3,150	$16,625
Southwest Fannin County SUD	15	25	29	35	42	48	$1,545	$1,151	$1,043	$909	$803	$731	$23,180	$28,785	$30,247	$31,809	$33,711	$35,083	$1,423,076
Springtown	22	42	70	96	122	146	$685	$537	$458	$409	$368	$337	$15,076	$22,536	$32,064	$39,262	$44,855	$49,166	$197,124
Starr WSC	4	7	8	10	11	12	$1,652	$1,025	$956	$807	$776	$753	$6,607	$7,173	$7,650	$8,069	$8,532	$9,041	$38,681
Sunnyvale	25	44	67	85	103	119	$250	$175	$134	$109	$91	$79	$6,238	$7,702	$8,945	$9,284	$9,407	$9,407	$369,984
Talty SUD	35	57	96	376	696	771	$929	$628	$530	$236	$156	$144	$32,519	$35,823	$50,833	$88,668	$108,814	$111,151	$221,222
Teague	11	13	14	15	15	16	$876	$679	$552	$499	$480	$432	$9,634	$8,831	$7,731	$7,481	$7,206	$6,906	$24,406
Terra Southwest	6	10	14	19	22	29	$1,756	$1,316	$1,216	$1,061	$1,073	$944	$10,536	$13,157	$17,029	$20,154	$23,597	$27,389	$25,126
Terrell	146	223	324	399	507	583	$166	$168	$97	$89	$81	$77	$24,250	$37,397	$31,499	$35,598	$41,007	$44,761	$530,568
The Colony	280	481	588	561	564	583	$219	$167	$131	$137	$136	$132	$61,422	$80,532	$76,720	$76,720	$76,720	$76,720	$308,355
Tioga	5	8	9	12	15	18	$1,021	$751	$753	$627	$556	$513	$5,104	$6,011	$6,773	$7,524	$8,338	$9,228	$78,915
Tom Bean	4	5	6	7	7	8	$827	$662	$551	$473	$473	$414	$3,308	$3,308	$3,308	$3,308	$3,308	$3,308	$51,166
Trenton	2	4	5	5	6	6	$1,197	$643	$533	$548	$470	$485	$2,394	$2,571	$2,667	$2,739	$2,820	$2,910	$11,769
Trinidad	3	4	5	5	6	8	$1,122	$854	$704	$716	$607	$464	$3,365	$3,414	$3,520	$3,580	$3,642	$3,711	$12,667
Trophy Club MUD 1	45	64	84	103	124	145	$208	$149	$115	$95	$80	$69	$9,352	$9,520	$9,659	$9,774	$9,900	$10,037	$574,321
Two Way SUD	15	24	31	37	45	51	$1,116	$831	$764	$699	$637	$596	$16,739	$19,940	$23,685	$25,857	$28,668	$30,420	$73,626
University Park	138	200	225	250	275	300	$460	$317	$282	$254	$231	$212	$63,484	$63,484	$63,484	$63,484	$63,484	$63,484	$216,676
Van Alstyne	17	52	137	208	285	331	$1,361	$933	$549	$471	$423	$415	$23,139	$48,514	$75,243	$97,957	$120,663	$137,426	$88,276
Verona SUD	8	15	21	28	36	45	$1,173	$784	$689	$691	$631	$587	$9,384	$11,757	$14,461	$19,344	$22,714	$26,428	$42,492
Walnut Creek SUD	174	253	447	760	1,104	1,421	$457	$376	$268	$216	$190	$179	$79,492	$95,108	$119,904	$164,321	$209,450	$254,110	$577,185
Watauga	23	32	41	50	59	68	$667	$480	$374	$307	$260	$226	$15,348	$15,348	$15,348	$15,348	$15,348	$15,348	$470,836
Waxahachie	393	700	924	1,137	1,378	1,649	$291	$202	$160	$145	$133	$123	$114,529	$141,284	$147,466	$164,377	$182,980	$203,450	$2,104,611
Weatherford	150	375	534	678	834	1,009	$621	$306	$214	$184	$163	$147	$93,115	$114,751	$114,123	$124,543	$136,019	$148,660	$364,863
West Cedar Creek MUD	21	28	35	39	43	49	$784	$556	$474	$431	$397	$353	$16,468	$15,556	$16,585	$16,816	$17,055	$17,307	$109,900
West Leonard WSC	5	9	12	14	17	20	$1,281	$854	$703	$657	$590	$547	$6,516	$7,799	$8,565	$9,345	$10,181	$11,119	$31,363
West Wise SUD	9	15	17	20	24	26	$1,255	$824	$783	$702	$618	$605	$11,295	$12,359	$13,315	$14,041	$14,839	$15,718	$199,997
Westlake	77	123	165	209	259	320	$50	$39	$30	$27	$25	$23	$3,817	$4,794	$5,007	$5,676	$6,409	$7,215	$31,037
Westminster SUD	7	13	20	26	33	41	$883	$589	$524	$476	$439	$409	$6,180	$7,655	$10,489	$12,382	$14,471	$16,766	$63,283
Westover Hills	21	25	28	31	34	38	$64	$54	$27	$24	$22	$20	$1,346	$1,344	$745	$747	$751	$751	$14,205
Westworth Village	5	7	10	13	15	17	$779	$567	$358	$289	$263	$241	$3,896	$3,972	$3,579	$3,761	$3,939	$4,101	$19,433
White Settlement	85	117	136	154	174	195	$236	$278	$173	$161	$149	$139	$20,036	$32,567	$23,645	$24,797	$25,885	$27,085	$378,800
White Shed WSC	5	7	8	9	10	12	$1,332	$996	$895	$809	$741	$629	$6,659	$6,974	$7,160	$7,277	$7,405	$7,546	$209,571
Whitesboro	11	16	20	23	27	32	$1,225	$916	$782	$717	$647	$579	$13,472	$14,651	$15,637	$16,502	$17,458	$18,514	$22,730
Whitewright	7	12	15	17	20	24	$933	$595	$508	$473	$426	$377	$6,533	$7,135	$7,614	$8,047	$8,515	$9,038	$15,682
Willow Park	23	40	56	74	94	117	$1,118	$768	$640	$568	$512	$468	$25,703	$30,723	$35,838	$42,024	$48,083	$54,724	$53,514
Wilmer	16	25	30	34	40	46	$1,151	$831	$734	$670	$590	$533	$18,410	$20,775	$22,032	$22,778	$23,599	$24,503	$122,574
Woodbine WSC	13	20	22	25	28	30	$1,475	$996	$920	$814	$730	$686	$19,181	$19,910	$20,240	$20,341	$20,447	$20,567	$96,180
Wortham	2	3	3	3	4	4	$1,388	$841	$724	$700	$505	$483	$2,775	$2,523	$2,172	$2,100	$2,019	$1,932	$27,962
Wylie	58	80	130	161	173	190	$414	$298	$189	$156	$145	$132	$24,017	$23,828	$24,668	$25,147	$25,147	$25,147	$831,324
Wylie Northeast SUD	37	60	192	239	236	232	$613	$481	$279	$236	$198	$202	$22,689	$28,840	$53,469	$56,396	$46,831	$46,831	$836,072
TOTAL	***39,879***	***70,968***	***93,390***	***111,865***	***129,006***	***144,587***	***$212***	***$149***	***$123***	***$116***	***$112***	***$107***	***$8,449,806***	***$10,591,345***	***$11,502,946***	***$12,961,228***	***$14,398,907***	***$15,537,209***	***$232,707,027***

Note: Savings presented above represent total savings for WUG as a whole, regardless of regional splits. Both savings and costs include the total costs from water use reduction strategies as well as water loss mitigation strategies. Residual savings are not included in the totals above.

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TABLE H.11B CONSERVATION SAVINGS AND COSTS FOR MUNICIPAL WATER USE REDUCTION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Ables Springs SUD	3	6	8	11	14	17	$1,372	$855	$712	$560	$487	$416	$4,569	$4,760	$5,506	$6,157	$6,909	$7,254	$0
Addison	305	473	534	572	622	681	$66	$70	$45	$43	$41	$38	$20,143	$33,127	$23,868	$24,576	$25,230	$25,951	$150,000
Aledo	26	40	58	75	94	110	$832	$583	$501	$446	$400	$363	$21,639	$23,313	$29,039	$33,439	$37,622	$39,955	$0
Allen	980	1,431	1,405	1,440	1,505	1,585	$45	$41	$34	$33	$32	$30	$43,750	$58,054	$47,500	$47,500	$47,500	$47,500	$150,000
Alvord	7	13	18	22	27	34	$1,214	$804	$677	$617	$560	$494	$8,499	$10,448	$12,188	$13,584	$15,122	$16,810	$0
AMC Creekside	4	7	8	10	14	17	$1,896	$1,346	$1,397	$1,288	$1,187	$1,115	$7,584	$9,422	$11,175	$12,876	$16,616	$18,950	$0
Anna	350	890	1,160	1,397	1,645	1,763	$298	$174	$146	$137	$130	$128	$104,409	$154,475	$168,939	$191,583	$213,688	$225,500	$150,000
Annetta	8	15	18	23	29	36	$1,117	$710	$687	$612	$544	$486	$8,934	$10,649	$12,362	$14,074	$15,789	$17,501	$0
Argyle WSC	94	162	441	684	757	801	$443	$324	$195	$146	$130	$131	$41,627	$52,540	$86,287	$99,705	$98,151	$104,751	$158,560
Arledge Ridge WSC	4	7	8	9	10	12	$998	$613	$556	$508	$471	$405	$3,991	$4,290	$4,446	$4,573	$4,712	$4,862	$0
Arlington	2,638	3,772	4,401	4,894	5,592	5,938	$102	$80	$70	$66	$62	$60	$268,346	$300,758	$308,392	$323,652	$344,539	$354,778	$150,000
Athens	61	107	306	443	556	612	$736	$494	$279	$225	$184	$180	$44,906	$53,091	$85,425	$99,853	$102,470	$110,490	$159,519
Aubrey	17	47	203	335	398	377	$1,342	$927	$455	$337	$333	$351	$22,807	$43,588	$92,259	$113,052	$132,404	$132,404	$150,000
Avalon Water Supply & Sewer Service	2	4	5	5	7	8	$1,488	$824	$728	$796	$622	$596	$2,976	$3,297	$3,642	$3,980	$4,356	$4,769	$0
Azle	51	86	209	268	307	351	$941	$634	$377	$317	$264	$247	$47,980	$54,546	$78,645	$85,000	$81,038	$86,612	$150,000
B And B WSC	6	9	11	13	15	18	$895	$654	$574	$516	$477	$424	$5,371	$5,886	$6,313	$6,713	$7,151	$7,631	$0
Balch Springs	113	149	180	212	251	273	$420	$407	$299	$273	$252	$242	$47,421	$60,800	$53,609	$57,855	$63,275	$66,100	$159,728
Bear Creek SUD	163	531	563	583	642	604	$110	$75	$56	$57	$55	$58	$17,971	$39,635	$31,640	$33,204	$35,316	$35,316	$150,000
Becker Jiba WSC	7	16	25	34	45	57	$1,761	$1,206	$1,041	$899	$792	$712	$12,324	$19,295	$26,027	$30,565	$35,658	$40,562	$0
Bedford	344	489	516	599	606	629	$128	$116	$91	$81	$80	$77	$43,907	$56,861	$46,853	$48,600	$48,600	$48,600	$150,000
Bells	4	5	6	7	9	10	$1,256	$1,090	$968	$875	$719	$686	$5,023	$5,450	$5,807	$6,122	$6,471	$6,855	$0
Benbrook Water Authority	329	480	555	624	693	763	$258	$209	$170	$159	$150	$143	$84,744	$100,132	$94,357	$99,135	$103,917	$108,696	$150,000
Black Rock WSC	7	12	17	22	30	37	$646	$468	$397	$360	$345	$322	$4,524	$5,611	$6,749	$7,911	$10,336	$11,925	$0
Blackland WSC	18	26	31	41	48	57	$840	$604	$524	$459	$421	$382	$15,117	$15,700	$16,251	$18,800	$20,220	$21,747	$8,560
Blooming Grove	4	5	6	7	8	10	$776	$642	$576	$526	$496	$427	$3,103	$3,212	$3,457	$3,683	$3,966	$4,266	$0
Blue Mound	4	5	7	8	9	12	$1,900	$1,676	$1,289	$1,191	$1,120	$891	$7,601	$8,379	$9,024	$9,528	$10,083	$10,693	$0
Blue Ridge	8	13	19	24	32	41	$597	$474	$407	$388	$345	$316	$4,778	$6,163	$7,737	$9,316	$11,055	$12,974	$0
Bois D Arc MUD	6	9	11	12	14	16	$1,422	$993	$834	$777	$678	$605	$8,579	$8,984	$9,227	$9,379	$9,545	$9,728	$0
Bolivar WSC	32	54	73	182	258	328	$1,174	$828	$702	$418	$339	$301	$37,559	$44,691	$51,243	$76,019	$87,496	$98,440	$158,560
Bonham	41	76	230	358	498	618	$1,039	$670	$381	$302	$243	$230	$42,580	$50,887	$87,751	$108,144	$121,099	$141,877	$158,560
Boyd	5	8	12	17	22	28	$860	$674	$607	$529	$483	$418	$4,299	$5,393	$7,285	$8,994	$10,622	$11,711	$0
Bridgeport	18	27	31	35	39	42	$895	$611	$544	$487	$443	$417	$16,105	$16,497	$16,864	$17,060	$17,281	$17,529	$0
Buena Vista-Bethel SUD	37	65	90	120	153	190	$618	$425	$370	$327	$325	$296	$22,852	$27,611	$33,334	$39,191	$49,734	$56,296	$8,560
Butler WSC	4	5	6	5	6	6	$629	$498	$409	$476	$384	$369	$2,514	$2,490	$2,454	$2,382	$2,301	$2,211	$0
Callisburg WSC	2	4	4	5	6	6	$2,336	$1,217	$1,238	$996	$836	$841	$4,671	$4,867	$4,952	$4,982	$5,014	$5,047	$0
Carrollton	939	1,288	1,505	1,719	1,938	1,961	$104	$88	$71	$66	$61	$61	$97,261	$112,790	$107,504	$113,082	$118,986	$119,392	$150,000
Cedar Hill	421	595	718	828	949	1,080	$154	$134	$102	$94	$88	$83	$64,668	$79,885	$73,216	$78,118	$83,414	$89,138	$167,119
Celina	639	2,241	4,194	3,730	4,837	6,015	$219	$97	$74	$87	$78	$73	$140,002	$217,826	$312,211	$323,212	$379,482	$441,521	$150,000
Chatfield WSC	6	9	12	13	16	18	$1,552	$1,111	$881	$852	$727	$680	$9,310	$10,002	$10,573	$11,077	$11,635	$12,245	$0
Chico	7	11	12	13	15	16	$838	$534	$489	$451	$391	$367	$5,869	$5,869	$5,869	$5,869	$5,869	$5,869	$0
Cockrell Hill	5	5	7	8	9	11	$505	$474	$326	$279	$241	$191	$2,526	$2,370	$2,285	$2,231	$2,172	$2,106	$0
College Mound SUD	11	18	30	175	310	398	$1,224	$821	$627	$277	$239	$198	$13,463	$14,783	$18,817	$48,464	$74,052	$78,652	$158,560
Colleyville	504	598	634	669	705	741	$53	$44	$42	$40	$38	$36	$26,550	$26,550	$26,550	$26,550	$26,550	$26,550	$150,000
Collinsville	5	8	10	12	13	16	$1,493	$1,024	$880	$779	$765	$663	$7,467	$8,191	$8,796	$9,346	$9,947	$10,606	$0
Combine WSC	3	4	6	8	12	15	$841	$714	$542	$460	$347	$312	$2,522	$2,856	$3,253	$3,683	$4,159	$4,686	$0
Community WSC	11	19	22	27	31	37	$1,046	$678	$638	$554	$516	$521	$11,502	$12,882	$14,036	$14,967	$15,993	$19,282	$0
Copeville WSC	12	27	51	64	163	211	$942	$664	$503	$441	$305	$254	$11,306	$17,925	$25,646	$28,207	$49,716	$53,465	$158,560
Coppell	417	499	541	582	623	659	$91	$76	$70	$65	$61	$58	$37,988	$37,883	$37,974	$38,046	$38,150	$38,150	$150,000
Corbet WSC	4	7	7	8	9	12	$1,747	$1,069	$1,127	$1,031	$960	$756	$6,988	$7,484	$7,892	$8,248	$8,640	$9,076	$0
Corinth	274	403	613	603	632	622	$328	$262	$182	$189	$186	$189	$89,886	$105,543	$111,273	$113,766	$117,400	$117,400	$159,989
Corsicana	296	425	477	521	573	630	$292	$238	$198	$187	$176	$166	$86,416	$101,303	$94,338	$97,436	$100,850	$104,611	$150,000
County-Other, Collin	2	6	10	16	23	31	$0	$294	$220	$164	$133	$113	$0	$1,762	$2,197	$2,631	$3,066	$3,500	$0
County-Other, Cooke	3	5	8	11	14	18	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
County-Other, Dallas	9	22	41	65	93	128	$106	$72	$31	$24	$20	$16	$952	$1,582	$1,260	$1,540	$1,820	$2,100	$8,560
County-Other, Denton	25	73	144	238	387	535	$1,482	$793	$538	$413	$335	$281	$37,049	$57,879	$77,506	$98,338	$129,584	$150,416	$17,119
County-Other, Ellis	3	5	9	13	17	22	$0	$0	$0	$212	$172	$140	$0	$0	$0	$2,758	$2,919	$3,080	$0
County-Other, Fannin	1	3	4	6	8	11	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
County-Other, Freestone	1	2	3	3	4	5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
County-Other, Grayson	6	10	15	20	27	33	$751	$427	$259	$204	$166	$138	$4,507	$4,273	$3,880	$4,088	$4,480	$4,550	$8,560
County-Other, Henderson	3	7	13	16	20	22	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
County-Other, Jack	2	3	4	5	6	7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
County-Other, Kaufman	6	12	24	36	59	79	$902	$515	$311	$243	$190	$162	$5,411	$6,176	$7,459	$8,732	$11,220	$12,801	$8,560
County-Other, Navarro	3	5	9	13	18	23	$0	$0	$302	$226	$183	$152	$0	$0	$2,722	$2,937	$3,290	$3,500	$0
County-Other, Parker	35	104	223	398	655	929	$1,423	$759	$514	$393	$318	$267	$49,811	$78,923	$114,718	$156,514	$208,600	$248,500	$17,119
County-Other, Rockwall	1	2	5	8	16	24	$0	$0	$0	$0	$128	$106	$0	$0	$0	$0	$2,045	$2,553	$0
County-Other, Tarrant	36	87	158	251	363	496	$603	$362	$257	$201	$166	$141	$21,723	$31,523	$40,600	$50,400	$60,200	$70,000	$10,271

TABLE H.11B CONSERVATION SAVINGS AND COSTS FOR MUNICIPAL WATER USE REDUCTION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
County-Other, Wise	29	76	161	286	478	672	$1,305	$756	$524	$407	$332	$281	$37,837	$57,433	$84,294	$116,446	$158,900	$189,000	$17,119
Crandall	18	59	287	537	763	874	$862	$545	$239	$167	$133	$133	$15,517	$32,178	$68,612	$89,522	$101,211	$116,381	$150,000
Crescent Heights WSC	3	4	5	5	7	8	$1,727	$1,333	$1,179	$1,198	$871	$776	$5,181	$5,333	$5,896	$5,992	$6,095	$6,207	$0
Cross Timbers WSC	42	78	109	139	362	569	$820	$552	$478	$436	$245	$184	$34,445	$43,087	$52,103	$60,553	$88,686	$104,894	$158,560
Crowley	124	221	275	312	357	408	$177	$164	$103	$97	$91	$86	$21,933	$36,174	$28,203	$30,303	$32,605	$35,129	$149,706
Culleoka WSC	27	45	60	75	172	223	$1,447	$993	$872	$781	$486	$446	$39,074	$44,666	$52,341	$58,553	$83,794	$99,372	$158,560
Dallas	10,468	13,623	15,748	17,825	19,973	22,236	$77	$63	$56	$52	$48	$46	$805,373	$853,016	$882,418	$924,331	$968,673	$1,015,382	$150,000
Dalworthington Gardens	13	16	19	22	25	28	$234	$192	$131	$113	$100	$89	$3,045	$3,068	$2,484	$2,485	$2,489	$2,493	$8,560
Dawson	2	4	4	5	5	6	$1,238	$626	$632	$503	$502	$418	$2,475	$2,502	$2,526	$2,517	$2,511	$2,505	$0
Decatur	57	101	150	400	611	716	$538	$367	$323	$191	$149	$125	$30,660	$37,022	$48,441	$76,513	$91,369	$89,748	$150,000
Denison	623	1,193	1,526	1,847	2,288	2,480	$229	$152	$126	$116	$107	$106	$142,429	$180,821	$192,019	$215,154	$245,319	$262,058	$165,619
Denton	1,470	3,170	4,366	5,363	6,672	7,865	$198	$115	$96	$90	$84	$81	$291,709	$365,098	$419,163	$482,395	$560,789	$637,441	$150,000
Denton County FWSD 1-A	180	414	428	416	427	430	$374	$227	$205	$213	$211	$209	$67,311	$94,269	$87,767	$88,618	$89,856	$89,856	$150,000
Denton County FWSD 10	31	43	47	50	54	58	$718	$518	$461	$433	$401	$373	$22,255	$22,255	$21,653	$21,653	$21,653	$21,653	$8,560
Denton County FWSD 11-C	9	20	33	46	61	133	$2,153	$1,493	$1,211	$1,099	$1,008	$692	$19,380	$29,855	$39,952	$50,538	$61,483	$92,307	$158,560
Denton County FWSD 7	103	144	156	167	178	189	$423	$317	$289	$270	$253	$239	$43,532	$45,719	$45,117	$45,117	$45,117	$45,117	$8,560
Desert WSC	6	9	11	13	15	18	$892	$657	$573	$513	$472	$418	$5,352	$5,916	$6,308	$6,675	$7,078	$7,527	$0
Desoto	415	564	620	662	712	767	$221	$190	$159	$151	$143	$135	$91,575	$107,374	$98,389	$99,994	$101,762	$103,712	$167,119
Dogwood Estates Water	4	4	6	6	7	8	$872	$855	$603	$609	$527	$466	$3,487	$3,419	$3,615	$3,651	$3,689	$3,727	$0
Dorchester	4	7	7	8	9	10	$945	$554	$565	$498	$447	$407	$3,781	$3,877	$3,953	$3,983	$4,024	$4,073	$0
Duncanville	233	307	337	354	372	392	$163	$163	$120	$115	$109	$103	$37,912	$50,110	$40,439	$40,547	$40,547	$40,547	$150,000
East Cedar Creek FWSD	163	221	234	252	272	293	$416	$370	$307	$290	$272	$257	$67,885	$82,026	$71,848	$72,882	$74,027	$75,289	$150,000
East Fork SUD	110	204	277	330	370	423	$304	$241	$158	$149	$145	$138	$33,389	$49,134	$43,897	$49,084	$53,566	$58,517	$158,560
East Garrett WSC	5	9	14	18	25	31	$1,039	$725	$569	$524	$497	$465	$5,194	$6,525	$7,968	$9,433	$12,425	$14,426	$0
Edgecliff	8	10	12	14	17	19	$568	$455	$329	$282	$232	$208	$4,547	$4,547	$3,945	$3,945	$3,945	$3,945	$8,560
Elmo WSC	4	5	8	10	13	16	$1,657	$1,544	$1,138	$1,065	$951	$891	$6,626	$7,718	$9,106	$10,649	$12,364	$14,262	$0
Ennis	181	249	279	307	339	373	$404	$351	$286	$270	$256	$242	$73,180	$87,139	$79,670	$83,008	$86,765	$90,420	$158,560
Euless	388	464	497	530	562	595	$126	$106	$99	$92	$87	$82	$48,992	$48,992	$48,992	$48,992	$48,992	$48,992	$150,000
Eustace	6	9	10	12	13	16	$1,455	$1,059	$935	$804	$767	$646	$8,730	$9,531	$9,351	$9,645	$9,974	$10,339	$0
Everman	6	8	9	11	13	15	$760	$570	$507	$415	$351	$304	$4,561	$4,561	$4,561	$4,561	$4,561	$4,561	$0
Fairfield	18	25	28	30	30	30	$761	$532	$461	$403	$376	$349	$13,704	$13,295	$12,906	$12,087	$11,273	$10,464	$0
Fairview	44	83	407	453	433	436	$198	$129	$75	$68	$46	$46	$8,714	$10,742	$30,652	$30,652	$20,098	$20,098	$150,000
Farmers Branch	424	622	694	740	796	865	$77	$73	$52	$50	$48	$45	$32,679	$45,655	$36,389	$37,141	$37,972	$38,885	$150,000
Farmersville	11	48	330	435	452	475	$595	$321	$149	$124	$107	$110	$6,546	$15,432	$49,388	$53,841	$48,123	$52,488	$158,560
Fate	205	519	799	1,052	1,328	1,633	$168	$110	$76	$71	$68	$65	$34,384	$57,162	$60,711	$74,552	$89,760	$106,480	$158,764
Ferris	12	16	20	22	26	30	$773	$612	$486	$465	$415	$381	$9,281	$9,785	$9,726	$10,225	$10,790	$11,421	$8,560
Flower Mound	869	1,880	2,596	2,275	2,177	2,185	$80	$51	$38	$44	$46	$46	$69,915	$94,980	$99,752	$99,788	$99,833	$99,833	$150,000
Forest Hill	16	26	35	44	115	143	$971	$657	$525	$440	$332	$279	$15,541	$17,085	$18,361	$19,357	$38,286	$39,949	$150,000
Forney	152	317	444	546	606	564	$182	$140	$91	$84	$82	$88	$27,708	$44,386	$40,404	$45,872	$49,597	$49,597	$150,000
Forney Lake WSC	67	216	259	304	309	320	$412	$237	$201	$148	$149	$146	$27,596	$51,227	$52,095	$45,134	$45,847	$46,559	$158,560
Fort Worth	8,327	13,039	13,420	15,686	18,100	20,731	$34	$26	$26	$24	$22	$21	$281,129	$343,979	$342,828	$369,443	$398,378	$429,655	$150,000
Frisco	3,019	5,416	5,113	5,065	5,197	5,417	$29	$21	$20	$20	$20	$19	$87,505	$112,158	$102,012	$102,012	$102,012	$102,012	$150,000
Frognot WSC	4	7	9	13	16	20	$1,504	$1,064	$1,008	$822	$780	$722	$6,071	$7,536	$9,152	$10,802	$12,591	$14,586	$0
Gainesville	58	165	187	209	240	271	$1,113	$509	$451	$369	$345	$326	$64,541	$84,034	$84,385	$77,021	$82,785	$88,467	$158,560
Garland	1,615	2,115	2,369	2,574	2,676	2,783	$46	$42	$35	$33	$31	$30	$74,894	$89,774	$81,791	$83,669	$84,045	$84,045	$150,000
Gastonia Scurry SUD	20	29	48	246	469	563	$885	$702	$545	$260	$184	$160	$17,700	$20,358	$26,147	$63,743	$86,271	$90,300	$158,560
Glenn Heights	104	168	206	240	279	320	$289	$270	$183	$171	$160	$152	$30,105	$45,258	$37,671	$40,969	$44,594	$48,580	$158,560
Grand Prairie	1,392	1,931	2,421	2,526	2,740	2,800	$48	$43	$33	$32	$30	$30	$67,406	$83,564	$79,461	$81,128	$83,417	$83,417	$150,000
Grapevine	741	826	888	950	1,013	1,075	$35	$31	$29	$27	$26	$24	$26,009	$26,009	$26,009	$26,009	$26,009	$26,009	$150,000
Gunter	6	9	12	15	18	22	$927	$714	$596	$523	$479	$430	$5,559	$6,425	$7,146	$7,851	$8,619	$9,454	$0
Hackberry	42	78	113	157	203	258	$510	$383	$343	$309	$286	$265	$21,410	$29,900	$38,790	$48,476	$58,000	$68,422	$8,560
Haltom City	45	62	80	98	115	133	$556	$403	$313	$255	$217	$188	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$150,000
Haslet	53	89	140	176	210	228	$140	$111	$100	$98	$89	$82	$7,411	$9,905	$14,013	$17,267	$18,670	$18,670	$8,560
Heath	85	163	534	605	563	552	$422	$284	$146	$131	$123	$125	$35,905	$46,343	$77,967	$79,522	$68,968	$68,968	$150,000
High Point WSC	89	278	450	623	799	991	$871	$439	$332	$298	$281	$270	$77,523	$121,984	$149,032	$185,832	$224,649	$267,178	$158,560
Highland Park	200	235	248	262	276	290	$128	$109	$103	$98	$93	$88	$25,624	$25,624	$25,624	$25,624	$25,624	$25,624	$0
Highland Village	72	114	129	142	155	168	$598	$401	$358	$325	$298	$275	$43,031	$45,751	$46,213	$46,213	$46,213	$46,213	$0
Honey Grove	5	8	9	10	11	12	$1,026	$657	$584	$525	$478	$438	$5,129	$5,254	$5,254	$5,254	$5,254	$5,254	$0
Horseshoe Bend Water System	4	5	8	11	17	24	$957	$858	$669	$632	$550	$507	$3,828	$4,290	$5,352	$6,953	$9,354	$12,166	$0
Howe	8	13	18	22	27	34	$1,663	$1,222	$1,003	$918	$835	$738	$13,304	$15,890	$18,057	$20,204	$22,540	$25,080	$0
Hudson Oaks	45	65	73	82	93	103	$395	$283	$250	$230	$211	$197	$17,777	$18,370	$18,254	$18,846	$19,633	$20,247	$8,560
Hurst	269	298	323	345	369	392	$80	$72	$67	$63	$59	$55	$21,592	$21,558	$21,588	$21,611	$21,645	$21,645	$150,000
Hutchins	24	35	44	57	68	79	$508	$386	$309	$246	$212	$189	$12,193	$13,511	$13,610	$14,011	$14,435	$14,901	$8,560
Irving	2,353	2,899	3,023	3,193	3,386	3,584	$34	$33	$28	$26	$25	$23	$80,224	$94,498	$83,992	$84,042	$84,092	$84,092	$150,000
Italy	5	7	7	8	9	10	$1,111	$795	$796	$693	$613	$549	$5,556	$5,564	$5,570	$5,540	$5,513	$5,491	$0
Jacksboro	15	21	24	28	33	38	$693	$487	$439	$393	$360	$322	$10,388	$10,233	$10,541	$11,003	$11,872	$12,220	$0

TABLE H.11B CONSERVATION SAVINGS AND COSTS FOR MUNICIPAL WATER USE REDUCTION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Josephine	11	37	69	91	288	318	$565	$383	$298	$250	$151	$137	$6,400	$14,013	$20,474	$22,749	$43,539	$43,577	$161,534
Justin	23	45	72	113	371	668	$966	$685	$567	$491	$255	$177	$22,229	$30,806	$40,805	$55,526	$94,581	$118,292	$158,560
Kaufman	10	16	33	53	74	212	$526	$370	$250	$192	$161	$151	$5,259	$5,926	$8,256	$10,160	$11,940	$31,934	$150,000
Kaufman County Development District 1	17	26	46	78	132	171	$632	$493	$428	$389	$375	$341	$10,737	$12,822	$19,688	$30,358	$49,535	$58,379	$0
Kaufman County MUD 11	14	24	34	47	66	84	$1,015	$697	$607	$553	$491	$480	$14,213	$16,730	$20,643	$26,005	$32,374	$40,309	$8,560
Kaufman County MUD 14	45	59	65	71	77	82	$499	$380	$336	$308	$284	$266	$22,440	$22,440	$21,838	$21,838	$21,838	$21,838	$8,560
Keller	509	598	630	668	709	751	$50	$60	$40	$38	$36	$34	$25,283	$36,048	$25,494	$25,494	$25,494	$25,494	$150,000
Kemp	5	8	9	10	12	14	$933	$603	$559	$521	$453	$406	$4,663	$4,827	$5,028	$5,213	$5,434	$5,687	$0
Kennedale	30	58	88	299	455	525	$410	$296	$243	$152	$113	$88	$12,294	$17,162	$21,408	$45,347	$51,450	$46,324	$158,560
Kentuckytown WSC	6	11	12	15	17	20	$1,345	$802	$787	$667	$625	$565	$8,072	$8,823	$9,446	$10,007	$10,625	$11,303	$0
Kerens	4	4	4	5	4	4	$1,069	$994	$925	$689	$802	$746	$4,277	$3,977	$3,700	$3,444	$3,207	$2,985	$0
Krum	29	56	88	135	382	624	$787	$539	$446	$434	$249	$189	$22,834	$30,164	$39,263	$58,547	$95,179	$117,727	$158,560
Ladonia	2	4	6	10	14	16	$1,161	$715	$669	$579	$506	$443	$2,322	$2,859	$4,015	$5,793	$7,083	$7,083	$0
Lake Cities Municipal Utility Authority	64	209	249	249	253	258	$914	$422	$365	$326	$322	$316	$58,522	$88,072	$90,891	$81,149	$81,635	$81,635	$158,560
Lake Kiowa SUD	22	33	36	41	46	50	$405	$284	$248	$220	$198	$184	$8,908	$9,357	$8,942	$9,021	$9,110	$9,206	$8,560
Lake Worth	14	21	28	34	42	48	$479	$347	$253	$219	$185	$168	$6,711	$7,282	$7,086	$7,433	$7,772	$8,073	$8,560
Lakeside	15	21	23	25	27	29	$498	$356	$298	$275	$254	$237	$7,466	$7,466	$6,864	$6,864	$6,864	$6,864	$8,560
Lancaster	300	399	439	471	505	543	$181	$170	$134	$127	$120	$113	$54,266	$67,780	$58,790	$59,692	$60,605	$61,571	$150,000
Lancaster MUD 1	7	12	16	17	19	22	$1,129	$884	$689	$685	$648	$593	$7,903	$10,612	$11,031	$11,642	$12,314	$13,057	$8,560
Leonard	7	11	15	19	25	32	$1,128	$772	$668	$615	$556	$519	$7,897	$8,496	$10,023	$11,676	$13,889	$16,611	$0
Lewisville	686	816	1,011	1,070	1,157	1,205	$119	$113	$86	$82	$77	$74	$81,654	$92,640	$86,888	$87,896	$89,363	$89,363	$150,000
Lindsay	4	5	6	7	8	8	$1,239	$1,013	$853	$731	$639	$639	$4,955	$5,063	$5,115	$5,115	$5,112	$5,112	$0
Little Elm	234	248	303	343	370	379	$98	$89	$76	$69	$65	$64	$22,871	$22,140	$23,027	$23,766	$24,250	$24,250	$150,000
Log Cabin	2	3	4	5	5	7	$1,007	$671	$588	$477	$484	$352	$2,013	$2,013	$2,352	$2,385	$2,422	$2,462	$0
Lucas	27	43	57	69	82	94	$286	$202	$156	$129	$108	$95	$7,735	$8,696	$8,883	$8,883	$8,883	$8,883	$0
Luella SUD	5	7	8	9	10	10	$1,535	$1,096	$959	$853	$767	$767	$7,674	$7,674	$7,674	$7,674	$7,674	$7,674	$0
M E N WSC	10	16	20	24	29	34	$1,044	$750	$665	$608	$551	$515	$10,437	$12,002	$13,295	$14,583	$15,988	$17,520	$0
Mabank	50	73	83	91	99	111	$717	$520	$459	$427	$396	$361	$35,577	$37,730	$38,214	$38,760	$39,426	$40,199	$8,493
Malakoff	5	8	9	10	11	12	$1,371	$907	$844	$770	$710	$660	$6,855	$7,252	$7,598	$7,701	$7,807	$7,925	$0
Mansfield	1,082	1,526	2,410	4,202	3,706	3,576	$73	$62	$42	$32	$37	$39	$79,118	$94,989	$100,091	$134,014	$135,965	$138,146	$146,708
Markout WSC	10	16	26	41	60	91	$833	$615	$590	$536	$487	$427	$8,330	$9,844	$15,341	$21,974	$29,225	$38,876	$0
McKinney	1,934	3,162	4,921	6,732	6,036	5,843	$35	$28	$19	$17	$18	$19	$68,249	$87,526	$92,689	$111,223	$111,223	$111,223	$150,000
Melissa	377	950	1,405	1,773	1,837	1,702	$60	$41	$24	$22	$23	$25	$22,690	$39,374	$34,420	$39,720	$42,268	$42,268	$150,000
Mesquite	952	1,153	1,480	1,846	2,231	2,543	$57	$58	$41	$36	$32	$30	$54,020	$66,315	$60,502	$65,883	$71,526	$76,336	$150,000
Midlothian	401	622	821	994	1,173	1,314	$247	$193	$154	$141	$130	$123	$99,072	$120,321	$126,171	$140,094	$152,529	$162,298	$150,000
Milligan WSC	3	5	7	10	14	18	$784	$494	$412	$335	$277	$239	$2,351	$2,468	$2,885	$3,352	$3,876	$4,310	$0
Mount Zion WSC	3	5	6	8	10	12	$495	$306	$264	$204	$168	$145	$1,484	$1,531	$1,584	$1,631	$1,684	$1,745	$0
Mountain Peak SUD	374	765	1,059	1,344	1,669	2,047	$231	$162	$128	$119	$111	$102	$86,537	$124,118	$135,865	$159,459	$184,471	$209,060	$150,465
Mountain Springs WSC	6	9	10	11	13	14	$954	$644	$587	$536	$455	$424	$5,725	$5,798	$5,872	$5,891	$5,910	$5,932	$0
Muenster	6	9	11	12	13	14	$1,017	$678	$555	$508	$469	$436	$6,101	$6,101	$6,101	$6,101	$6,101	$6,101	$0
Murphy	216	270	353	432	509	559	$135	$149	$91	$81	$75	$72	$29,073	$40,203	$31,974	$34,971	$38,031	$40,278	$158,560
Mustang SUD	950	2,241	3,260	4,143	4,738	5,249	$293	$172	$147	$139	$139	$138	$278,563	$384,881	$479,425	$577,837	$656,657	$724,457	$167,119
Nash Forreston WSC	5	8	10	14	19	23	$1,463	$1,075	$940	$772	$723	$680	$7,316	$8,603	$9,403	$10,810	$13,738	$15,640	$8,560
Navarro Mills WSC	5	8	10	12	13	16	$1,588	$1,063	$897	$782	$756	$645	$7,993	$8,557	$9,025	$9,433	$9,880	$10,375	$0
Nevada SUD	27	37	57	183	421	535	$149	$137	$136	$148	$84	$57	$4,020	$5,081	$7,759	$27,041	$35,547	$30,609	$150,000
Newark	2	4	7	12	19	26	$1,824	$1,139	$924	$777	$723	$671	$3,648	$4,554	$6,468	$9,324	$13,728	$17,455	$0
North Collin SUD	10	15	26	40	53	69	$845	$630	$439	$350	$307	$273	$8,446	$9,455	$11,409	$14,008	$16,265	$18,842	$8,560
North Farmersville WSC	1	3	5	6	7	8	$1,395	$550	$429	$417	$404	$372	$1,395	$1,650	$2,145	$2,502	$2,826	$2,976	$0
North Kaufman WSC	4	8	12	17	22	31	$2,416	$1,578	$1,366	$1,217	$1,155	$983	$9,664	$12,623	$16,393	$20,681	$25,407	$30,488	$0
North Richland Hills	551	718	765	813	880	914	$59	$62	$45	$42	$40	$38	$32,530	$44,463	$34,263	$34,543	$34,950	$34,950	$150,000
Northlake	191	315	516	646	767	830	$144	$135	$74	$68	$65	$64	$27,572	$42,516	$38,364	$43,928	$49,552	$53,518	$150,000
Northwest Grayson County WCID 1	4	5	7	8	11	12	$1,452	$1,289	$996	$933	$728	$716	$5,809	$6,444	$6,972	$7,464	$8,003	$8,591	$0
Oak Ridge South Gale WSC	5	7	7	8	9	10	$1,586	$1,158	$1,178	$1,036	$927	$841	$7,930	$8,104	$8,246	$8,287	$8,341	$8,412	$0
Ovilla	19	33	48	66	90	120	$430	$306	$241	$208	$187	$174	$8,178	$10,096	$11,579	$13,697	$16,850	$20,860	$8,560
Palmer	6	10	13	16	21	27	$1,449	$1,026	$874	$817	$712	$701	$8,692	$10,260	$11,356	$13,065	$14,947	$18,925	$8,560
Paloma Creek North	49	61	65	69	73	77	$427	$343	$312	$294	$278	$264	$20,911	$20,911	$20,309	$20,309	$20,309	$20,309	$8,560
Paloma Creek South	59	77	83	89	96	102	$542	$415	$378	$353	$327	$308	$31,981	$31,981	$31,379	$31,379	$31,379	$31,379	$8,560
Pantego	12	17	20	22	24	26	$625	$441	$375	$341	$313	$288	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$0
Parker	65	101	164	219	239	259	$110	$90	$87	$87	$80	$74	$7,157	$9,120	$14,309	$19,079	$19,079	$19,079	$0
Parker County SUD	18	36	56	174	299	420	$1,602	$1,075	$903	$491	$391	$321	$28,837	$38,694	$50,550	$85,204	$116,956	$135,174	$158,560
Pelican Bay	4	7	12	17	25	36	$2,083	$1,582	$1,385	$1,306	$1,187	$1,081	$8,330	$11,077	$16,622	$22,195	$29,669	$38,920	$0
Pilot Point	16	30	59	204	247	235	$1,098	$849	$725	$385	$337	$311	$17,575	$25,470	$42,753	$78,524	$83,407	$72,853	$150,000
Pink Hill WSC	5	7	9	10	13	14	$1,259	$992	$832	$799	$656	$652	$6,294	$6,945	$7,486	$7,987	$8,534	$9,133	$0
Plano	2,871	3,250	4,368	4,655	4,701	4,863	$28	$28	$20	$19	$19	$18	$80,463	$91,411	$86,933	$88,917	$88,917	$88,917	$150,000
Pleasant Grove WSC	2	4	5	5	6	6	$2,106	$1,131	$987	$967	$787	$767	$4,211	$4,524	$4,936	$4,835	$4,723	$4,601	$0
Point Enterprise WSC	3	5	5	6	6	6	$1,263	$834	$823	$617	$617	$617	$3,941	$3,873	$3,780	$3,736	$3,671	$3,605	$0

TABLE H.11B CONSERVATION SAVINGS AND COSTS FOR MUNICIPAL WATER USE REDUCTION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Ponder	16	30	43	57	76	99	$1,081	$760	$651	$594	$530	$481	$17,299	$22,792	$27,975	$33,854	$40,318	$47,613	$8,560
Pottsboro	11	18	22	26	30	33	$919	$688	$601	$537	$492	$475	$10,113	$12,376	$13,212	$13,950	$14,763	$15,660	$0
Princeton	234	998	1,329	1,367	1,436	1,355	$328	$160	$147	$159	$163	$173	$76,854	$159,160	$195,451	$216,756	$234,834	$234,834	$166,682
Prosper	120	479	808	727	782	704	$219	$82	$40	$45	$43	$48	$26,319	$39,328	$31,937	$32,719	$33,858	$33,858	$150,000
Providence Village WCID	25	33	36	39	42	45	$1,026	$777	$695	$642	$596	$556	$25,639	$25,639	$25,037	$25,037	$25,037	$25,037	$8,560
R C H WSC	23	37	54	83	113	149	$797	$560	$527	$464	$417	$378	$18,342	$20,717	$28,477	$38,492	$47,115	$56,369	$8,560
Red Oak	30	50	69	204	290	349	$451	$346	$295	$204	$161	$118	$13,531	$17,281	$20,344	$41,798	$46,712	$41,057	$158,560
Reno (Parker)	5	9	12	17	21	26	$2,382	$1,602	$1,437	$1,190	$1,119	$1,042	$11,910	$14,420	$17,245	$20,224	$23,498	$27,103	$0
Rhome	7	13	22	36	58	88	$930	$641	$553	$549	$499	$438	$6,512	$8,330	$12,166	$19,753	$28,948	$38,533	$0
Rice Water Supply and Sewer Service	22	38	52	66	83	189	$1,369	$946	$800	$728	$662	$429	$30,121	$35,943	$41,612	$48,027	$54,974	$81,246	$158,560
Richardson	1,147	1,412	1,691	1,825	1,867	1,943	$37	$38	$27	$25	$25	$24	$41,879	$53,763	$45,267	$46,250	$46,250	$46,250	$150,000
Richland Hills	11	20	29	38	48	59	$601	$394	$311	$260	$228	$200	$6,614	$7,890	$9,025	$9,876	$10,964	$11,803	$0
River Oaks	17	24	28	31	34	37	$1,310	$925	$798	$725	$666	$612	$22,265	$22,200	$22,344	$22,461	$22,627	$22,627	$0
Roanoke	80	100	115	130	147	160	$204	$176	$151	$135	$121	$112	$16,339	$17,650	$17,322	$17,539	$17,856	$17,856	$8,560
Rockett SUD	202	349	462	555	714	828	$613	$439	$351	$323	$287	$273	$123,769	$153,202	$162,281	$179,040	$205,268	$226,541	$163,137
Rockwall	400	739	1,226	1,806	1,650	1,518	$66	$54	$29	$24	$26	$29	$26,269	$39,944	$34,998	$42,519	$43,674	$43,674	$150,000
Rose Hill SUD	3	5	9	12	16	20	$1,150	$831	$544	$468	$387	$342	$3,450	$4,153	$4,893	$5,617	$6,198	$6,840	$0
Rowlett	458	578	835	902	961	952	$70	$75	$43	$42	$40	$41	$31,969	$43,538	$36,295	$37,718	$38,774	$38,774	$150,000
Royse City	270	1,019	1,333	1,323	1,470	1,370	$237	$119	$106	$116	$116	$125	$64,177	$121,718	$141,405	$153,813	$170,521	$170,719	$165,980
Runaway Bay	13	25	32	45	59	80	$465	$294	$280	$243	$226	$204	$6,047	$7,356	$8,960	$10,929	$13,344	$16,306	$0
Sachse	209	278	380	400	416	415	$83	$103	$52	$51	$50	$50	$17,315	$28,653	$19,686	$20,281	$20,673	$20,673	$150,000
Saginaw	157	213	221	232	247	259	$111	$137	$85	$81	$76	$73	$17,469	$29,134	$18,688	$18,773	$18,898	$18,898	$150,000
Sanger	75	112	144	214	310	408	$403	$329	$304	$310	$250	$191	$30,190	$36,838	$43,833	$66,332	$77,454	$77,904	$150,000
Sansom Park	13	20	24	28	32	38	$1,506	$1,079	$942	$854	$791	$707	$19,580	$21,575	$22,619	$23,904	$25,322	$26,881	$8,560
Sardis Lone Elm WSC	262	523	699	695	665	664	$288	$195	$149	$155	$162	$163	$75,363	$101,903	$104,394	$107,935	$107,935	$107,935	$158,560
Savoy	1	3	3	3	4	4	$2,133	$704	$706	$698	$517	$509	$2,133	$2,112	$2,118	$2,094	$2,067	$2,034	$0
Seagoville	89	122	136	148	159	173	$402	$406	$295	$279	$265	$250	$35,739	$49,587	$40,182	$41,212	$42,282	$43,366	$158,560
Seis Lagos UD	5	7	10	12	16	18	$333	$231	$169	$146	$112	$100	$1,667	$1,614	$1,691	$1,757	$1,795	$1,799	$0
Sherman	531	781	887	982	1,090	1,211	$241	$188	$160	$150	$140	$132	$127,985	$147,089	$142,340	$147,439	$153,058	$159,248	$150,000
South Ellis County WSC	11	19	24	30	39	48	$403	$277	$257	$235	$206	$190	$4,432	$5,268	$6,161	$7,062	$8,050	$9,141	$0
South Freestone County WSC	5	7	9	9	9	10	$1,470	$1,097	$902	$877	$850	$738	$7,350	$7,682	$8,118	$7,897	$7,650	$7,377	$0
South Grayson SUD	12	21	26	31	39	47	$1,431	$944	$839	$785	$694	$641	$17,172	$19,826	$21,815	$24,321	$27,077	$30,110	$8,560
Southern Oaks Water Supply	4	6	10	11	12	13	$852	$698	$496	$459	$428	$401	$3,409	$4,189	$4,960	$5,046	$5,130	$5,219	$8,560
Southlake	562	871	997	1,100	1,211	1,319	$35	$37	$22	$21	$20	$19	$19,681	$31,849	$22,293	$23,179	$24,067	$24,900	$150,000
Southmayd	2	3	3	3	4	4	$1,446	$992	$1,014	$1,024	$777	$788	$2,892	$2,976	$3,041	$3,071	$3,106	$3,150	$0
Southwest Fannin County SUD	15	25	29	35	42	48	$1,545	$1,151	$1,043	$909	$803	$731	$23,180	$28,785	$30,247	$31,809	$33,711	$35,083	$0
Springtown	22	42	70	96	122	146	$685	$537	$458	$409	$368	$337	$15,076	$22,536	$32,064	$39,262	$44,855	$49,166	$0
Starr WSC	4	7	8	10	11	12	$1,652	$1,025	$956	$807	$776	$753	$6,607	$7,173	$7,650	$8,069	$8,532	$9,041	$0
Sunnyvale	25	49	78	97	115	131	$250	$157	$115	$96	$82	$72	$6,238	$7,702	$8,945	$9,284	$9,407	$9,407	$0
Talty SUD	37	62	104	387	712	790	$879	$578	$489	$229	$153	$141	$32,519	$35,823	$50,833	$88,668	$108,814	$111,151	$150,000
Teague	11	13	14	15	15	16	$876	$679	$552	$499	$480	$432	$9,634	$8,831	$7,731	$7,481	$7,206	$6,906	$0
Terra Southwest	6	10	14	19	22	29	$1,756	$1,316	$1,216	$1,061	$1,073	$944	$10,536	$13,157	$17,029	$20,154	$23,597	$27,389	$8,560
Terrell	151	235	338	416	527	605	$161	$159	$93	$85	$78	$74	$24,250	$37,397	$31,499	$35,598	$41,007	$44,761	$150,000
The Colony	290	503	613	586	589	608	$212	$160	$125	$131	$130	$126	$61,422	$80,532	$76,720	$76,720	$76,720	$76,720	$150,000
Tioga	5	8	9	12	15	18	$1,021	$751	$753	$627	$556	$513	$5,104	$6,011	$6,773	$7,524	$8,338	$9,228	$0
Tom Bean	4	5	6	7	7	8	$827	$662	$551	$473	$473	$414	$3,308	$3,308	$3,308	$3,308	$3,308	$3,308	$0
Trenton	2	4	5	5	6	6	$1,197	$643	$533	$548	$470	$485	$2,394	$2,571	$2,667	$2,739	$2,820	$2,910	$0
Trinidad	3	4	5	5	6	8	$1,122	$854	$704	$716	$607	$464	$3,365	$3,414	$3,520	$3,580	$3,642	$3,711	$0
Trophy Club MUD 1	213	242	265	286	310	334	$44	$39	$36	$34	$32	$30	$9,352	$9,520	$9,659	$9,774	$9,900	$10,037	$0
Two Way SUD	15	24	31	37	45	51	$1,116	$831	$764	$699	$637	$596	$16,739	$19,940	$23,685	$25,857	$28,668	$30,420	$0
University Park	373	444	469	494	519	544	$170	$143	$135	$129	$122	$117	$63,484	$63,484	$63,484	$63,484	$63,484	$63,484	$150,000
Van Alstyne	17	52	137	208	285	331	$1,361	$933	$549	$471	$423	$415	$23,139	$48,514	$75,243	$97,957	$120,663	$137,426	$0
Verona SUD	8	15	21	28	36	45	$1,173	$784	$689	$691	$631	$587	$9,384	$11,757	$14,461	$19,344	$22,714	$26,428	$0
Walnut Creek SUD	174	253	447	760	1,104	1,421	$457	$376	$268	$216	$190	$179	$79,492	$95,108	$119,904	$164,321	$209,450	$254,110	$158,560
Watauga	114	127	136	145	154	163	$135	$121	$113	$106	$100	$94	$15,348	$15,348	$15,348	$15,348	$15,348	$15,348	$150,000
Waxahachie	412	740	973	1,195	1,446	1,729	$278	$191	$152	$138	$127	$118	$114,529	$141,284	$147,466	$164,377	$182,980	$203,450	$150,000
Weatherford	150	375	534	678	834	1,009	$621	$306	$214	$184	$163	$147	$93,115	$114,751	$114,123	$124,543	$136,019	$148,660	$150,000
West Cedar Creek MUD	21	28	35	39	43	49	$784	$556	$474	$431	$397	$353	$16,468	$15,556	$16,585	$16,816	$17,055	$17,307	$8,560
West Leonard WSC	5	9	12	14	17	20	$1,281	$854	$703	$657	$590	$547	$6,516	$7,799	$8,565	$9,345	$10,181	$11,119	$0
West Wise SUD	9	15	17	20	24	26	$1,255	$824	$783	$702	$618	$605	$11,295	$12,359	$13,315	$14,041	$14,839	$15,718	$0
Westlake	77	123	165	209	259	320	$50	$39	$30	$27	$25	$23	$3,817	$4,794	$5,007	$5,676	$6,409	$7,215	$8,560
Westminster SUD	7	13	20	26	33	41	$883	$589	$524	$476	$439	$409	$6,180	$7,655	$10,489	$12,382	$14,471	$16,766	$0
Westover Hills	25	29	32	35	38	42	$54	$46	$23	$21	$20	$18	$1,346	$1,344	$745	$747	$751	$751	$8,560
Westworth Village	5	7	10	13	15	17	$779	$567	$358	$289	$263	$241	$3,896	$3,972	$3,579	$3,761	$3,939	$4,101	$8,560
White Settlement	92	129	149	169	189	211	$218	$252	$158	$147	$137	$128	$20,036	$32,567	$23,645	$24,797	$25,885	$27,085	$150,000
White Shed WSC	5	7	8	9	10	12	$1,332	$996	$895	$809	$741	$629	$6,659	$6,974	$7,160	$7,277	$7,405	$7,546	$0

TABLE H.11B CONSERVATION SAVINGS AND COSTS FOR MUNICIPAL WATER USE REDUCTION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Whitesboro	11	16	20	23	27	32	$1,225	$916	$782	$717	$647	$579	$13,472	$14,651	$15,637	$16,502	$17,458	$18,514	$0
Whitewright	7	12	15	17	20	24	$933	$595	$508	$473	$426	$377	$6,533	$7,135	$7,614	$8,047	$8,515	$9,038	$0
Willow Park	23	40	56	74	94	117	$1,118	$768	$640	$568	$512	$468	$25,703	$30,723	$35,838	$42,024	$48,083	$54,724	$8,560
Wilmer	16	25	30	34	40	46	$1,151	$831	$734	$670	$590	$533	$18,410	$20,775	$22,032	$22,778	$23,599	$24,503	$0
Woodbine WSC	13	20	22	25	28	30	$1,475	$996	$920	$814	$730	$686	$19,181	$19,910	$20,240	$20,341	$20,447	$20,567	$0
Wortham	2	3	3	3	4	4	$1,388	$841	$724	$700	$505	$483	$2,775	$2,523	$2,172	$2,100	$2,019	$1,932	$0
Wylie	275	302	363	400	412	429	$87	$79	$68	$63	$61	$59	$24,017	$23,828	$24,668	$25,147	$25,147	$25,147	$150,000
Wylie Northeast SUD	37	60	192	239	236	232	$613	$481	$279	$236	$198	$202	$22,689	$28,840	$53,469	$56,396	$46,831	$46,831	$158,560
TOTAL	***64,661***	***100,071***	***124,681***	***145,437***	***163,955***	***180,659***	***$131***	***$106***	***$92***	***$89***	***$88***	***$86***	***$8,449,806***	***$10,591,345***	***$11,502,946***	***$12,961,228***	***$14,398,907***	***$15,537,209***	***$17,452,829***
Note: Savings presented above represent total savings for WUG as a whole, regardless of regional splits. The capital cost presented here reflects the adoption of the new ordinances, which does not require loan services.																			

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TABLE H.11C CONSERVATION SAVINGS AND COSTS FOR WATER LOSS MITIGATION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Ables Springs SUD	2	2	3	3	3	4	$2,424	$2,337	$300	$300	$300	$300	$5,373	$5,401	$808	$900	$1,009	$1,060	$66,908
Addison	42	92	129	134	139	144	$4,635	$2,274	$309	$309	$309	$309	$192,911	$208,351	$39,995	$41,337	$42,816	$44,441	$2,559,005
Aledo	20	64	105	119	136	146	$1,563	$727	$351	$351	$351	$351	$31,015	$46,501	$36,710	$41,907	$47,755	$51,292	$341,818
Allen	225	755	1,006	1,006	1,006	1,006	$1,588	$705	$330	$330	$330	$330	$357,747	$532,283	$331,765	$331,765	$331,765	$331,765	$4,028,644
Alvord	2	3	3	3	4	4	$8,290	$6,767	$300	$300	$300	$300	$17,077	$17,223	$894	$999	$1,113	$1,241	$233,925
AMC Creekside	1	1	1	2	2	2	$1,243	$1,055	$300	$300	$300	$300	$1,125	$1,192	$404	$467	$537	$612	$12,124
Anna	108	524	884	1,052	1,217	1,305	$853	$442	$335	$335	$335	$335	$92,194	$231,541	$296,458	$352,902	$408,015	$437,449	$795,222
Annetta	2	3	3	4	4	4	$770	$694	$300	$300	$300	$300	$1,712	$1,841	$929	$1,061	$1,193	$1,325	$14,851
Argyle WSC	13	17	23	28	32	35	$2,030	$1,638	$300	$300	$300	$300	$27,138	$28,314	$6,875	$8,496	$9,687	$10,562	$328,684
Arledge Ridge WSC	1	1	1	1	1	1	$38,486	$35,715	$300	$300	$300	$300	$44,259	$44,286	$386	$398	$411	$425	$624,127
Arlington	373	1,125	1,598	1,677	1,786	1,839	$2,662	$1,084	$300	$300	$300	$300	$993,644	$1,219,248	$479,523	$503,248	$535,727	$551,649	$12,530,661
Athens	61	217	382	460	556	614	$931	$550	$402	$402	$402	$402	$56,596	$119,516	$153,410	$185,078	$223,356	$246,733	$457,056
Aubrey	5	8	14	19	23	23	$1,866	$1,201	$300	$300	$300	$300	$8,854	$9,905	$4,250	$5,780	$6,951	$6,951	$105,604
Avalon Water Supply & Sewer Service	3	8	12	14	15	17	$1,402	$630	$300	$300	$300	$300	$3,524	$5,292	$3,732	$4,103	$4,523	$4,993	$39,375
Azle	12	14	16	18	19	21	$851	$781	$300	$300	$300	$300	$10,623	$11,167	$4,815	$5,294	$5,820	$6,399	$97,741
B And B WSC	2	2	2	2	2	2	$1,527	$1,418	$300	$300	$300	$300	$2,344	$2,389	$545	$581	$620	$663	$26,766
Balch Springs	14	15	17	18	20	21	$655	$634	$300	$300	$300	$300	$9,346	$9,614	$4,974	$5,421	$5,990	$6,287	$71,980
Bear Creek SUD	16	28	32	35	38	38	$619	$483	$300	$300	$300	$300	$9,928	$13,515	$9,602	$10,457	$11,463	$11,463	$72,737
Becker Jiba WSC	2	3	4	5	6	7	$1,417	$1,013	$300	$300	$300	$300	$2,763	$3,095	$1,242	$1,467	$1,718	$1,994	$30,956
Bedford	49	52	53	56	56	56	$510	$496	$300	$300	$300	$300	$24,835	$25,903	$15,921	$16,730	$16,730	$16,730	$145,475
Bells	1	1	1	1	1	1	$1,557	$1,460	$300	$300	$300	$300	$1,393	$1,416	$311	$329	$348	$369	$15,987
Benbrook Water Authority	54	173	248	265	283	300	$1,278	$602	$300	$300	$300	$300	$68,516	$104,456	$74,501	$79,635	$84,770	$89,905	$745,180
Black Rock WSC	2	2	3	3	4	5	$20,616	$16,501	$300	$300	$300	$300	$38,552	$38,695	$854	$1,007	$1,175	$1,361	$539,946
Blackland WSC	5	5	5	6	6	7	$4,351	$4,206	$300	$300	$300	$300	$19,926	$19,977	$1,536	$1,782	$1,919	$2,064	$263,668
Blooming Grove	1	1	1	1	1	1	$1,495	$1,454	$300	$300	$300	$300	$1,270	$1,279	$287	$306	$332	$359	$14,432
Blue Mound	1	1	1	1	1	1	$562	$539	$300	$300	$300	$300	$548	$577	$347	$366	$387	$413	$3,637
Blue Ridge	1	2	2	3	3	4	$1,567	$1,273	$300	$300	$300	$300	$2,178	$2,304	$689	$834	$995	$1,172	$25,024
Bois D Arc MUD	2	2	2	2	2	2	$4,951	$4,755	$300	$300	$300	$300	$8,526	$8,549	$555	$564	$574	$586	$113,838
Bolivar WSC	24	86	135	156	185	222	$1,353	$590	$300	$300	$300	$300	$31,959	$50,637	$40,513	$46,674	$55,415	$66,515	$353,502
Bonham	53	195	369	487	644	784	$646	$463	$393	$393	$393	$393	$34,572	$90,174	$145,027	$191,265	$253,246	$307,961	$192,591
Boyd	1	2	2	3	3	3	$974	$831	$300	$300	$300	$300	$1,169	$1,267	$626	$779	$924	$1,022	$11,500
Bridgeport	5	5	5	5	5	5	$384	$382	$300	$300	$300	$300	$1,892	$1,922	$1,544	$1,562	$1,583	$1,605	$5,864
Buena Vista-Bethel SUD	96	350	558	649	749	859	$583	$471	$429	$429	$429	$429	$56,054	$165,094	$239,067	$278,182	$321,167	$368,527	$210,548
Butler WSC	1	1	1	1	1	1	$1,495	$1,515	$300	$300	$300	$300	$1,345	$1,341	$263	$255	$246	$237	$15,281
Callisburg WSC	1	1	1	1	1	1	$1,168	$1,138	$300	$300	$300	$300	$823	$831	$224	$225	$227	$228	$8,696
Carrollton	128	135	143	152	161	161	$553	$540	$300	$300	$300	$300	$70,919	$73,004	$42,972	$45,495	$48,165	$48,350	$460,707
Cedar Hill	365	1,192	1,735	1,875	2,027	2,190	$628	$500	$443	$443	$443	$443	$229,605	$595,978	$768,897	$830,939	$898,019	$970,504	$961,901
Celina	443	2,317	5,151	5,376	6,637	8,027	$681	$475	$426	$426	$426	$426	$301,696	$1,100,528	$2,195,556	$2,291,439	$2,828,991	$3,421,592	$1,604,463
Chatfield WSC	2	2	2	2	2	2	$7,784	$7,296	$300	$300	$300	$300	$13,389	$13,425	$584	$612	$644	$678	$182,952
Chico	2	2	2	2	2	2	$758	$759	$300	$300	$300	$300	$1,500	$1,499	$593	$593	$593	$593	$12,881
Cockrell Hill	16	44	57	56	54	52	$600	$486	$423	$423	$423	$423	$9,517	$21,557	$24,081	$23,519	$22,854	$22,138	$39,883
College Mound SUD	6	7	10	15	20	26	$1,604	$1,473	$300	$300	$300	$300	$10,352	$10,568	$2,912	$4,503	$6,143	$7,781	$119,598
Colleyville	54	154	205	205	205	205	$3,721	$1,496	$300	$300	$300	$300	$200,469	$230,535	$61,639	$61,639	$61,639	$61,639	$2,619,434
Collinsville	1	2	2	2	2	2	$1,666	$1,550	$300	$300	$300	$300	$2,333	$2,372	$494	$527	$561	$599	$27,181
Combine WSC	2	2	2	2	3	3	$1,292	$1,178	$300	$300	$300	$300	$2,132	$2,196	$639	$725	$822	$927	$23,263
Community WSC	33	110	161	172	184	197	$552	$482	$453	$453	$453	$453	$18,181	$53,262	$72,710	$77,610	$83,097	$88,977	$46,707
Copeville WSC	5	7	11	12	13	15	$2,547	$1,727	$300	$300	$300	$300	$11,857	$12,659	$3,233	$3,548	$3,962	$4,377	$148,665
Coppell	57	94	126	126	126	126	$2,814	$1,823	$300	$300	$300	$300	$160,311	$171,442	$37,735	$37,822	$37,941	$37,941	$2,035,542
Corbet WSC	1	1	1	1	1	1	$12,551	$11,789	$300	$300	$300	$300	$13,242	$13,263	$357	$374	$392	$413	$183,698
Corinth	24	31	52	54	56	56	$3,893	$3,099	$300	$300	$300	$300	$95,071	$97,148	$15,610	$16,061	$16,720	$16,720	$1,247,064
Corsicana	31	33	35	37	39	40	$702	$676	$300	$300	$300	$300	$21,979	$22,613	$10,580	$11,052	$11,574	$12,147	$178,812
County-Other, Collin	3	4	5	6	7	7	$2,607	$2,047	$300	$300	$300	$300	$7,442	$7,717	$1,409	$1,688	$1,967	$2,246	$93,599
County-Other, Cooke	4	4	4	4	4	4	$2,570	$2,506	$300	$300	$300	$300	$9,804	$9,837	$1,214	$1,250	$1,296	$1,334	$123,071
County-Other, Dallas	10	14	18	22	26	31	$729	$607	$300	$300	$300	$300	$7,427	$8,648	$5,498	$6,719	$7,941	$9,162	$62,131
County-Other, Denton	31	48	66	84	110	128	$2,677	$1,809	$300	$300	$300	$300	$81,907	$87,189	$19,776	$25,091	$33,065	$38,379	$1,033,652
County-Other, Ellis	4	4	4	5	5	5	$2,535	$2,397	$300	$300	$300	$300	$9,787	$9,863	$1,316	$1,397	$1,479	$1,560	$122,636
County-Other, Fannin	2	2	2	2	3	3	$2,304	$2,294	$300	$300	$300	$300	$4,654	$4,657	$645	$687	$755	$794	$57,531
County-Other, Freestone	2	1	1	1	1	1	$2,203	$2,389	$300	$300	$300	$300	$3,592	$3,548	$381	$387	$389	$386	$44,095
County-Other, Grayson	7	6	7	7	8	8	$2,591	$2,752	$300	$300	$300	$300	$17,773	$17,638	$2,033	$2,142	$2,348	$2,384	$223,346
County-Other, Henderson	6	6	6	6	6	6	$2,964	$2,845	$300	$300	$300	$300	$17,989	$18,075	$1,900	$1,895	$1,833	$1,715	$229,796
County-Other, Jack	2	2	2	2	2	2	$2,329	$2,439	$300	$300	$300	$300	$5,659	$5,622	$644	$612	$579	$548	$70,073
County-Other, Kaufman	7	8	11	13	17	19	$2,410	$2,129	$300	$300	$300	$300	$17,596	$17,934	$3,381	$3,959	$5,087	$5,804	$218,962
County-Other, Navarro	4	4	4	5	5	5	$2,380	$2,298	$300	$300	$300	$300	$8,995	$9,041	$1,265	$1,365	$1,529	$1,626	$111,723
County-Other, Parker	44	70	103	141	187	223	$2,740	$1,833	$300	$300	$300	$300	$120,157	$127,939	$30,903	$42,162	$56,195	$66,942	$1,520,780
County-Other, Rockwall	2	2	3	3	5	6	$2,607	$3,099	$300	$300	$300	$300	$5,409	$5,299	$765	$882	$1,368	$1,709	$68,027
County-Other, Tarrant	34	49	65	81	97	112	$2,949	$2,111	$300	$300	$300	$300	$99,682	$104,374	$19,551	$24,270	$28,989	$33,708	$1,272,606

TABLE H.11C CONSERVATION SAVINGS AND COSTS FOR WATER LOSS MITIGATION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
County-Other, Wise	30	46	70	96	131	156	$2,664	$1,849	$300	$300	$300	$300	$80,929	$85,727	$20,855	$28,809	$39,312	$46,758	$1,020,680
Crandall	5	11	18	26	36	44	$569	$426	$300	$300	$300	$300	$2,821	$4,514	$5,322	$7,730	$10,916	$13,088	$18,942
Crescent Heights WSC	1	1	1	1	1	1	$3,242	$3,166	$300	$300	$300	$300	$2,432	$2,438	$257	$261	$266	$270	$31,363
Cross Timbers WSC	11	13	16	19	22	27	$629	$563	$300	$300	$300	$300	$6,612	$7,408	$4,797	$5,657	$6,677	$8,154	$49,136
Crowley	16	19	22	24	26	29	$603	$556	$300	$300	$300	$300	$9,756	$10,644	$6,494	$7,103	$7,773	$8,594	$69,707
Culleoka WSC	7	8	9	10	12	13	$1,735	$1,556	$300	$300	$300	$300	$11,414	$11,695	$2,718	$3,081	$3,468	$3,831	$134,172
Dallas	4,757	14,881	20,783	21,770	22,814	23,914	$834	$557	$427	$427	$427	$427	$3,968,730	$8,292,375	$8,875,653	$9,297,238	$9,743,238	$10,213,047	$27,530,184
Dalworthington Gardens	5	5	5	5	5	5	$573	$571	$300	$300	$300	$300	$2,583	$2,593	$1,373	$1,373	$1,376	$1,379	$17,502
Dawson	1	1	1	1	1	1	$3,334	$3,311	$300	$300	$300	$300	$2,233	$2,235	$206	$204	$204	$203	$28,886
Decatur	14	17	23	28	36	42	$2,091	$1,811	$300	$300	$300	$300	$30,216	$31,020	$6,932	$8,546	$10,818	$12,542	$367,835
Denison	59	75	90	104	124	134	$534	$484	$300	$300	$300	$300	$31,651	$36,476	$26,954	$31,344	$37,068	$40,245	$196,997
Denton	158	544	899	1,068	1,278	1,483	$3,267	$1,161	$300	$300	$300	$300	$515,813	$631,769	$269,637	$320,402	$383,348	$444,889	$6,657,856
Denton County FWSD 1-A	20	27	29	29	30	30	$1,927	$1,510	$300	$300	$300	$300	$38,329	$40,382	$8,576	$8,691	$8,861	$8,861	$459,918
Denton County FWSD 10	6	6	6	6	6	6	$812	$813	$300	$300	$300	$300	$4,701	$4,697	$1,733	$1,733	$1,733	$1,733	$42,127
Denton County FWSD 11-C	2	3	4	5	6	8	$1,613	$1,138	$300	$300	$300	$300	$2,928	$3,237	$1,179	$1,509	$1,872	$2,273	$33,873
Denton County FWSD 7	16	17	17	17	17	17	$2,138	$2,043	$300	$300	$300	$300	$34,141	$34,401	$5,051	$5,051	$5,051	$5,051	$417,139
Desert WSC	6	21	30	32	34	36	$1,279	$607	$316	$316	$316	$316	$8,181	$12,853	$9,546	$10,140	$10,760	$11,461	$87,521
Desoto	50	54	55	56	58	59	$1,842	$1,751	$300	$300	$300	$300	$92,968	$93,922	$16,632	$16,943	$17,285	$17,663	$1,106,128
Dogwood Estates Water	1	1	1	1	1	1	$1,392	$1,424	$300	$300	$300	$300	$1,218	$1,210	$272	$275	$278	$281	$13,577
Dorchester	15	45	62	62	63	64	$565	$475	$432	$432	$432	$432	$8,328	$21,595	$26,649	$26,878	$27,223	$27,568	$27,756
Duncanville	135	423	579	581	581	581	$783	$530	$411	$411	$411	$411	$105,503	$224,171	$238,327	$239,062	$239,062	$239,062	$711,395
East Cedar Creek FWSD	31	99	133	136	139	142	$3,129	$1,191	$300	$300	$300	$300	$97,281	$117,556	$39,782	$40,665	$41,631	$42,712	$1,250,029
East Fork SUD	15	17	21	24	26	29	$649	$594	$300	$300	$300	$300	$9,544	$10,370	$6,215	$7,071	$7,809	$8,628	$72,965
East Garrett WSC	17	64	105	125	147	171	$577	$462	$421	$421	$421	$421	$9,699	$29,563	$44,207	$52,581	$61,832	$72,056	$37,169
Edgecliff	3	3	3	3	3	3	$1,567	$1,571	$300	$300	$300	$300	$4,982	$4,979	$951	$951	$951	$951	$57,250
Elmo WSC	1	1	1	2	2	2	$2,274	$1,997	$300	$300	$300	$300	$2,161	$2,207	$395	$464	$540	$624	$26,659
Ennis	103	323	453	473	496	521	$652	$500	$428	$428	$428	$428	$67,204	$161,567	$194,160	$202,700	$212,380	$223,198	$327,807
Euless	49	49	49	49	49	49	$2,361	$2,370	$300	$300	$300	$300	$116,179	$116,120	$14,702	$14,702	$14,702	$14,702	$1,441,405
Eustace	2	2	2	2	2	2	$1,417	$1,325	$300	$300	$300	$300	$2,281	$2,325	$516	$534	$552	$573	$25,558
Everman	3	3	3	3	3	3	$853	$857	$300	$300	$300	$300	$2,319	$2,313	$810	$810	$810	$810	$21,367
Fairfield	5	5	5	4	4	4	$1,613	$1,659	$300	$300	$300	$300	$8,122	$8,071	$1,416	$1,325	$1,233	$1,143	$93,968
Fairview	112	423	693	693	693	693	$723	$513	$438	$438	$438	$438	$80,856	$217,411	$303,812	$303,812	$303,812	$303,812	$452,504
Farmers Branch	53	58	60	62	63	65	$526	$508	$300	$300	$300	$300	$27,905	$29,306	$18,075	$18,528	$19,025	$19,574	$170,576
Farmersville	4	26	69	78	89	98	$4,732	$902	$300	$300	$300	$300	$16,712	$23,457	$20,618	$23,461	$26,561	$29,339	$222,462
Fate	22	32	44	56	70	85	$502	$440	$300	$300	$300	$300	$11,112	$14,037	$13,128	$16,898	$21,038	$25,592	$63,569
Ferris	36	113	159	168	177	188	$462	$449	$444	$444	$444	$444	$16,432	$50,664	$70,659	$74,384	$78,643	$83,300	$9,436
Flower Mound	119	148	180	180	180	180	$519	$475	$300	$300	$300	$300	$61,588	$70,502	$54,030	$54,053	$54,081	$54,081	$368,990
Forest Hill	8	9	9	10	11	11	$721	$683	$300	$300	$300	$300	$5,751	$5,991	$2,843	$3,006	$3,186	$3,384	$47,734
Forney	32	122	202	239	265	265	$1,938	$726	$300	$300	$300	$300	$61,759	$88,928	$60,633	$71,590	$79,588	$79,588	$741,846
Forney Lake WSC	15	18	18	20	20	21	$424	$408	$300	$300	$300	$300	$6,484	$7,161	$5,483	$5,958	$6,078	$6,197	$26,898
Fort Worth	2,087	7,398	10,105	10,980	11,831	12,766	$1,248	$586	$325	$325	$325	$325	$2,603,484	$4,332,113	$3,288,553	$3,573,341	$3,850,044	$4,154,417	$27,350,873
Frisco	381	867	1,161	1,161	1,161	1,161	$4,473	$2,137	$300	$300	$300	$300	$1,706,262	$1,851,781	$348,365	$348,365	$348,365	$348,365	$22,623,608
Frognot WSC	1	1	2	2	2	3	$11,314	$9,136	$300	$300	$300	$300	$12,056	$12,135	$489	$579	$677	$788	$166,806
Gainesville	14	14	14	15	16	17	$1,024	$1,005	$300	$300	$300	$300	$14,027	$14,134	$4,277	$4,472	$4,826	$5,175	$140,928
Garland	204	219	229	236	238	238	$2,168	$2,037	$300	$300	$300	$300	$442,434	$447,042	$68,724	$70,842	$71,265	$71,265	$5,417,989
Gastonia Scurry SUD	7	8	11	19	28	34	$1,557	$1,379	$300	$300	$300	$300	$11,135	$11,489	$3,353	$5,645	$8,355	$10,257	$127,769
Glenn Heights	67	234	352	389	429	474	$570	$462	$419	$419	$419	$419	$38,197	$108,073	$147,322	$162,842	$179,824	$198,552	$143,628
Grand Prairie	524	1,754	2,627	2,702	2,805	2,805	$793	$471	$333	$333	$333	$333	$415,911	$825,096	$874,621	$899,509	$933,653	$933,653	$3,429,553
Grapevine	94	93	93	93	93	93	$485	$486	$300	$300	$300	$300	$45,457	$45,379	$28,037	$28,037	$28,037	$28,037	$246,473
Gunter	2	2	2	2	2	3	$2,181	$1,921	$300	$300	$300	$300	$3,326	$3,400	$593	$654	$720	$792	$40,772
Hackberry	7	10	13	16	20	24	$1,995	$1,501	$300	$300	$300	$300	$14,313	$15,198	$3,972	$4,923	$5,972	$7,125	$172,830
Haltom City	27	27	27	27	27	27	$1,527	$1,534	$300	$300	$300	$300	$40,730	$40,682	$7,955	$7,955	$7,955	$7,955	$465,129
Haslet	13	18	23	25	27	27	$9,230	$6,843	$300	$300	$300	$300	$118,794	$120,203	$6,944	$7,556	$8,235	$8,235	$1,633,475
Heath	32	125	222	227	227	227	$2,605	$916	$349	$349	$349	$349	$82,121	$114,921	$77,477	$79,382	$79,382	$79,382	$1,010,686
High Point WSC	9	14	21	28	36	45	$961	$732	$300	$300	$300	$300	$8,984	$10,472	$6,206	$8,390	$10,788	$13,422	$87,817
Highland Park	21	21	21	21	21	21	$2,135	$2,137	$300	$300	$300	$300	$44,227	$44,220	$6,209	$6,209	$6,209	$6,209	$540,235
Highland Village	18	20	27	27	27	27	$4,269	$3,898	$300	$300	$300	$300	$78,271	$78,838	$8,179	$8,179	$8,179	$8,179	$1,034,241
Honey Grove	21	64	85	85	85	85	$505	$474	$458	$458	$458	$458	$10,530	$30,259	$39,046	$39,046	$39,046	$39,046	$13,851
Horseshoe Bend Water System	1	1	1	2	2	3	$1,495	$1,364	$300	$300	$300	$300	$1,338	$1,371	$383	$503	$684	$896	$15,197
Howe	33	117	179	200	224	249	$484	$458	$447	$447	$447	$447	$15,913	$53,755	$79,844	$89,506	$99,973	$111,379	$17,332
Hudson Oaks	9	10	10	10	11	11	$2,012	$1,957	$300	$300	$300	$300	$18,834	$18,927	$2,981	$3,080	$3,210	$3,312	$227,768
Hurst	34	34	34	34	34	34	$620	$622	$300	$300	$300	$300	$21,063	$20,997	$10,142	$10,157	$10,181	$10,181	$154,567
Hutchins	9	10	11	11	11	12	$1,866	$1,715	$300	$300	$300	$300	$17,176	$17,470	$3,222	$3,321	$3,429	$3,548	$204,865
Irving	300	318	318	319	319	319	$430	$423	$300	$300	$300	$300	$129,225	$134,511	$95,499	$95,573	$95,649	$95,649	$555,501
Italy	1	1	1	1	1	1	$1,392	$1,396	$300	$300	$300	$300	$1,733	$1,731	$372	$371	$369	$368	$19,318
Jacksboro	54	159	218	228	246	254	$516	$486	$470	$470	$470	$470	$27,780	$77,131	$102,682	$107,302	$115,902	$119,496	$34,537

TABLE H.11C CONSERVATION SAVINGS AND COSTS FOR WATER LOSS MITIGATION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Josephine	6	13	19	21	23	23	$2,004	$1,083	$300	$300	$300	$300	$11,733	$13,799	$5,556	$6,214	$6,950	$6,950	$141,786
Justin	10	41	77	109	152	213	$1,687	$631	$300	$300	$300	$300	$16,678	$26,143	$23,229	$32,572	$45,655	$63,994	$194,893
Kaufman	6	7	10	13	15	18	$394	$383	$300	$300	$300	$300	$2,464	$2,698	$3,036	$3,837	$4,586	$5,348	$8,334
Kaufman County Development District 1	37	118	244	378	561	649	$488	$456	$441	$441	$441	$441	$18,178	$53,924	$107,603	$166,770	$247,399	$286,046	$25,193
Kaufman County MUD 11	4	4	5	7	8	9	$1,613	$1,408	$300	$300	$300	$300	$5,807	$6,007	$1,644	$2,078	$2,547	$2,823	$67,187
Kaufman County MUD 14	9	9	9	9	9	9	$2,105	$2,107	$300	$300	$300	$300	$18,036	$18,033	$2,568	$2,568	$2,568	$2,568	$219,790
Keller	97	294	392	392	392	392	$2,141	$924	$328	$328	$328	$328	$206,820	$271,464	$128,402	$128,402	$128,402	$128,402	$2,489,472
Kemp	1	1	2	2	2	2	$1,362	$1,329	$300	$300	$300	$300	$1,914	$1,928	$455	$473	$494	$518	$21,215
Kennedale	9	13	16	20	25	28	$684	$584	$300	$300	$300	$300	$6,338	$7,315	$4,916	$6,140	$7,388	$8,535	$50,598
Kentuckytown WSC	2	2	2	2	2	2	$1,417	$1,325	$300	$300	$300	$300	$2,444	$2,491	$606	$642	$684	$728	$27,384
Kerens	1	1	1	1	1	1	$1,292	$1,382	$300	$300	$300	$300	$1,092	$1,071	$215	$200	$185	$171	$11,913
Krum	53	211	375	500	667	890	$776	$501	$409	$409	$409	$409	$41,006	$105,685	$153,522	$204,788	$273,143	$364,357	$275,454
Ladonia	9	32	62	92	113	113	$421	$382	$367	$367	$367	$367	$3,698	$12,368	$22,792	$33,582	$41,509	$41,509	$6,782
Lake Cities Municipal Utility Authority	12	15	15	15	16	16	$785	$702	$300	$300	$300	$300	$9,466	$10,219	$4,575	$4,623	$4,653	$4,653	$83,133
Lake Kiowa SUD	5	5	5	5	5	5	$569	$556	$300	$300	$300	$300	$2,682	$2,758	$1,523	$1,536	$1,553	$1,569	$18,033
Lake Worth	6	7	7	8	8	8	$596	$572	$300	$300	$300	$300	$3,754	$3,924	$2,186	$2,294	$2,399	$2,493	$26,519
Lakeside	3	3	3	3	3	3	$1,735	$1,737	$300	$300	$300	$300	$5,057	$5,055	$873	$873	$873	$873	$59,439
Lancaster	82	260	358	364	370	378	$1,196	$603	$330	$330	$330	$330	$98,174	$156,952	$118,008	$120,022	$122,254	$124,706	$1,010,254
Lancaster MUD 1	1	2	2	2	2	2	$517	$475	$300	$300	$300	$300	$711	$810	$564	$597	$632	$671	$4,243
Leonard	5	15	23	27	32	39	$6,954	$2,362	$300	$300	$300	$300	$31,545	$34,576	$6,936	$8,116	$9,693	$11,641	$428,986
Lewisville	547	1,643	2,342	2,374	2,420	2,420	$596	$503	$456	$456	$456	$456	$326,058	$826,229	$1,068,199	$1,082,639	$1,103,708	$1,103,708	$1,090,985
Lindsay	1	3	4	4	4	4	$5,232	$2,077	$300	$300	$300	$300	$5,651	$6,226	$1,215	$1,215	$1,215	$1,215	$75,703
Little Elm	32	91	128	134	137	137	$2,380	$1,030	$300	$300	$300	$300	$76,000	$93,724	$38,437	$40,127	$41,235	$41,235	$944,015
Log Cabin	1	1	1	1	1	1	$1,348	$1,348	$300	$300	$300	$300	$769	$769	$179	$182	$185	$188	$8,494
Lucas	16	18	19	19	19	19	$8,300	$7,311	$300	$300	$300	$300	$133,881	$134,564	$5,657	$5,657	$5,657	$5,657	$1,834,002
Luella SUD	1	1	1	1	1	1	$2,734	$2,743	$300	$300	$300	$300	$3,759	$3,758	$411	$411	$411	$411	$47,568
M E N WSC	3	3	3	4	4	4	$1,527	$1,366	$300	$300	$300	$300	$3,909	$4,024	$981	$1,077	$1,184	$1,299	$44,638
Mabank	45	140	186	189	192	198	$937	$502	$300	$300	$300	$300	$41,756	$70,476	$55,945	$56,680	$57,613	$59,391	$403,483
Malakoff	6	20	28	28	28	29	$942	$539	$353	$353	$353	$353	$5,869	$10,629	$9,732	$9,862	$10,025	$10,155	$52,192
Mansfield	148	466	754	1,052	1,075	1,087	$3,585	$1,342	$300	$300	$300	$300	$530,354	$625,829	$226,131	$315,494	$322,422	$326,011	$6,906,874
Markout WSC	3	3	4	6	8	11	$1,613	$1,409	$300	$300	$300	$300	$4,065	$4,205	$1,250	$1,800	$2,403	$3,206	$47,031
McKinney	342	1,212	2,069	2,602	2,602	2,602	$1,988	$777	$300	$300	$300	$300	$680,462	$941,435	$620,625	$780,692	$780,692	$780,692	$8,211,720
Melissa	48	71	95	118	129	129	$431	$388	$300	$300	$300	$300	$20,503	$27,430	$28,454	$35,333	$38,642	$38,642	$88,762
Mesquite	603	1,876	2,776	3,126	3,518	3,852	$678	$502	$419	$419	$419	$419	$409,072	$942,063	$1,162,267	$1,308,910	$1,472,891	$1,612,649	$2,223,931
Midlothian	93	319	508	586	666	730	$1,504	$689	$353	$353	$353	$353	$140,320	$220,091	$179,357	$206,691	$235,228	$257,635	$1,526,240
Milligan WSC	2	2	2	3	3	4	$1,450	$1,402	$300	$300	$300	$300	$2,806	$2,831	$711	$830	$962	$1,071	$31,629
Mount Zion WSC	2	2	2	2	2	2	$1,567	$1,530	$300	$300	$300	$300	$3,157	$3,175	$645	$665	$687	$714	$36,276
Mountain Peak SUD	276	1,091	1,851	2,255	2,732	3,225	$781	$528	$442	$442	$442	$442	$215,783	$575,793	$818,079	$996,672	$1,207,354	$1,425,578	$1,332,355
Mountain Springs WSC	2	2	2	2	2	2	$1,495	$1,484	$300	$300	$300	$300	$2,451	$2,456	$504	$506	$507	$509	$27,846
Muenster	2	2	2	2	2	2	$5,493	$5,523	$300	$300	$300	$300	$9,805	$9,802	$533	$533	$533	$533	$131,748
Murphy	24	25	27	30	33	36	$1,866	$1,840	$300	$300	$300	$300	$45,081	$45,204	$8,142	$9,026	$9,987	$10,692	$537,701
Mustang SUD	82	116	155	193	224	250	$810	$660	$300	$300	$300	$300	$66,194	$76,440	$46,391	$57,917	$67,148	$75,089	$592,256
Nash Forreston WSC	1	1	2	2	2	2	$1,392	$1,216	$300	$300	$300	$300	$1,601	$1,667	$486	$561	$644	$734	$17,844
Navarro Mills WSC	1	2	2	2	2	2	$17,948	$16,802	$300	$300	$300	$300	$26,106	$26,136	$492	$517	$541	$570	$364,823
Nevada SUD	3	4	5	11	20	27	$1,206	$1,018	$300	$300	$300	$300	$3,370	$3,589	$1,572	$3,320	$5,927	$7,965	$35,984
Newark	1	1	1	2	3	3	$626	$557	$300	$300	$300	$300	$410	$462	$360	$527	$783	$999	$3,031
North Collin SUD	5	6	7	9	10	12	$1,348	$1,231	$300	$300	$300	$300	$7,282	$7,486	$2,228	$2,675	$3,117	$3,633	$80,468
North Farmersville WSC	0	1	1	1	1	1	$1,348	$1,187	$300	$300	$300	$300	$667	$694	$228	$266	$300	$317	$7,376
North Kaufman WSC	5	18	31	40	49	59	$715	$405	$300	$300	$300	$300	$3,277	$7,323	$9,432	$11,944	$14,693	$17,750	$27,036
North Richland Hills	94	301	408	414	421	421	$2,303	$927	$300	$300	$300	$300	$217,271	$279,392	$122,548	$124,123	$126,414	$126,414	$2,685,769
Northlake	26	29	36	42	49	53	$507	$487	$300	$300	$300	$300	$13,239	$14,080	$10,766	$12,647	$14,552	$15,968	$76,829
Northwest Grayson County WCID 1	1	1	1	1	1	1	$1,292	$1,193	$300	$300	$300	$300	$1,286	$1,319	$360	$386	$416	$447	$14,028
Oak Ridge South Gale WSC	1	1	1	1	1	1	$752	$746	$300	$300	$300	$300	$887	$892	$366	$368	$371	$374	$7,577
Ovilla	22	83	136	161	188	218	$1,059	$565	$386	$386	$386	$386	$23,485	$47,109	$52,391	$62,033	$72,640	$84,318	$212,150
Palmer	1	2	2	2	3	3	$1,417	$1,237	$300	$300	$300	$300	$1,955	$2,035	$584	$674	$773	$882	$21,907
Paloma Creek North	6	6	6	6	6	6	$582	$583	$300	$300	$300	$300	$3,486	$3,480	$1,791	$1,791	$1,791	$1,791	$24,011
Paloma Creek South	51	154	205	205	205	205	$591	$473	$414	$414	$414	$414	$30,364	$72,720	$84,851	$84,851	$84,851	$84,851	$129,074
Pantego	3	3	3	3	3	3	$680	$681	$300	$300	$300	$300	$2,289	$2,286	$1,007	$1,007	$1,007	$1,007	$18,184
Parker	15	19	26	30	30	30	$2,114	$1,723	$300	$300	$300	$300	$30,797	$31,999	$7,689	$8,937	$8,937	$8,937	$375,603
Parker County SUD	5	6	9	12	16	21	$8,777	$6,549	$300	$300	$300	$300	$41,120	$41,621	$2,583	$3,474	$4,751	$6,428	$564,439
Pelican Bay	1	1	2	2	3	4	$1,157	$939	$300	$300	$300	$300	$1,151	$1,253	$537	$719	$965	$1,293	$12,123
Pilot Point	4	5	9	13	14	14	$858	$734	$300	$300	$300	$300	$3,622	$3,984	$2,807	$4,026	$4,346	$4,346	$33,489
Pink Hill WSC	1	1	1	2	2	2	$4,277	$3,897	$300	$300	$300	$300	$5,261	$5,300	$441	$471	$504	$542	$69,522
Plano	1,848	5,566	8,172	8,418	8,418	8,418	$654	$519	$452	$452	$452	$452	$1,207,547	$2,886,837	$3,691,061	$3,801,865	$3,801,865	$3,801,865	$5,301,148
Pleasant Grove WSC	1	1	1	1	1	1	$1,168	$1,109	$300	$300	$300	$300	$806	$821	$243	$239	$233	$227	$8,511
Point Enterprise WSC	1	1	1	1	1	1	$1,392	$1,418	$300	$300	$300	$300	$1,261	$1,255	$261	$257	$253	$249	$14,062

TABLE H.11C CONSERVATION SAVINGS AND COSTS FOR WATER LOSS MITIGATION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Ponder	3	5	6	7	8	10	$1,613	$1,287	$300	$300	$300	$300	$5,582	$5,925	$1,746	$2,117	$2,525	$2,973	$64,574
Pottsboro	3	3	3	4	4	4	$747	$712	$300	$300	$300	$300	$2,227	$2,303	$1,038	$1,098	$1,163	$1,235	$18,942
Princeton	25	54	73	82	89	89	$1,940	$1,073	$300	$300	$300	$300	$49,324	$57,871	$21,932	$24,486	$26,654	$26,654	$592,609
Prosper	72	84	101	105	111	111	$486	$458	$300	$300	$300	$300	$34,815	$38,580	$30,168	$31,382	$33,150	$33,150	$189,329
Providence Village WCID	5	5	5	5	5	5	$804	$807	$300	$300	$300	$300	$3,656	$3,648	$1,356	$1,356	$1,356	$1,356	$32,580
R C H WSC	6	7	9	11	14	17	$893	$823	$300	$300	$300	$300	$5,263	$5,498	$2,558	$3,413	$4,163	$5,076	$49,658
Red Oak	9	11	13	16	18	21	$741	$655	$300	$300	$300	$300	$6,495	$7,131	$3,968	$4,679	$5,460	$6,320	$54,932
Reno (Parker)	1	2	2	2	3	3	$1,243	$1,075	$300	$300	$300	$300	$1,783	$1,876	$629	$740	$860	$995	$19,224
Rhome	2	2	4	5	8	10	$1,722	$1,406	$300	$300	$300	$300	$3,315	$3,480	$1,097	$1,592	$2,343	$3,125	$38,908
Rice Water Supply and Sewer Service	6	7	8	9	11	12	$1,495	$1,304	$300	$300	$300	$300	$8,266	$8,581	$2,339	$2,732	$3,182	$3,695	$93,896
Richardson	797	2,491	3,544	3,651	3,651	3,651	$636	$511	$453	$453	$453	$453	$506,531	$1,273,500	$1,604,132	$1,652,305	$1,652,305	$1,652,305	$2,074,231
Richland Hills	6	7	8	9	9	10	$694	$658	$300	$300	$300	$300	$4,415	$4,606	$2,264	$2,552	$2,810	$3,095	$35,611
River Oaks	4	4	4	4	4	4	$822	$827	$300	$300	$300	$300	$3,626	$3,614	$1,320	$1,328	$1,337	$1,337	$32,724
Roanoke	20	19	19	20	20	20	$2,114	$2,164	$300	$300	$300	$300	$41,391	$41,233	$5,838	$5,936	$6,078	$6,078	$504,801
Rockett SUD	64	229	366	420	506	575	$791	$438	$300	$300	$300	$300	$50,924	$100,403	$109,741	$126,128	$151,778	$172,584	$449,212
Rockwall	50	99	176	234	243	243	$3,627	$1,997	$300	$300	$300	$300	$182,970	$197,501	$52,687	$70,302	$73,006	$73,006	$2,385,355
Rose Hill SUD	2	2	3	3	4	4	$2,128	$1,823	$300	$300	$300	$300	$4,362	$4,485	$872	$1,002	$1,107	$1,223	$53,260
Rowlett	58	60	70	74	78	78	$582	$569	$300	$300	$300	$300	$33,582	$34,404	$21,080	$22,340	$23,276	$23,276	$231,047
Royse City	29	56	74	80	90	90	$2,173	$1,291	$300	$300	$300	$300	$63,898	$71,746	$22,109	$24,042	$27,077	$26,997	$782,793
Runaway Bay	3	4	5	6	8	9	$953	$832	$300	$300	$300	$300	$3,221	$3,450	$1,524	$1,871	$2,294	$2,814	$31,363
Sachse	26	28	32	33	34	34	$564	$548	$300	$300	$300	$300	$14,805	$15,329	$9,522	$9,945	$10,223	$10,223	$98,498
Saginaw	20	22	22	22	22	22	$1,613	$1,501	$300	$300	$300	$300	$32,053	$32,608	$6,573	$6,618	$6,684	$6,684	$370,835
Sanger	8	9	11	15	19	24	$1,613	$1,350	$300	$300	$300	$300	$12,139	$12,704	$3,428	$4,458	$5,631	$7,110	$140,439
Sansom Park	3	4	4	4	4	5	$1,417	$1,315	$300	$300	$300	$300	$4,577	$4,674	$1,151	$1,217	$1,290	$1,371	$51,275
Sardis Lone Elm WSC	28	34	41	43	43	43	$652	$586	$300	$300	$300	$300	$18,047	$19,984	$12,363	$12,915	$12,915	$12,915	$138,521
Savoy	<1	<1	<1	<1	<1	<1	$1,243	$1,253	$300	$300	$300	$300	$584	$583	$140	$138	$137	$134	$6,296
Seagoville	11	12	13	13	13	14	$1,495	$1,396	$300	$300	$300	$300	$16,569	$16,867	$3,794	$3,894	$4,004	$4,124	$188,216
Seis Lagos UD	3	3	3	3	4	4	$422	$426	$300	$300	$300	$300	$1,384	$1,349	$998	$1,037	$1,061	$1,064	$5,683
Sherman	393	1,279	1,820	1,920	2,031	2,153	$554	$482	$450	$450	$450	$450	$217,736	$616,450	$819,122	$864,328	$914,181	$969,057	$579,443
South Ellis County WSC	3	3	4	5	5	6	$1,970	$1,692	$300	$300	$300	$300	$5,585	$5,754	$1,203	$1,386	$1,590	$1,812	$67,282
South Freestone County WSC	1	1	1	1	1	1	$12,983	$12,496	$300	$300	$300	$300	$16,229	$16,244	$413	$401	$387	$374	$225,326
South Grayson SUD	3	4	4	5	5	6	$1,495	$1,334	$300	$300	$300	$300	$4,708	$4,855	$1,242	$1,386	$1,545	$1,721	$53,485
Southern Oaks Water Supply	1	1	1	1	1	1	$1,495	$1,224	$300	$300	$300	$300	$1,121	$1,187	$368	$374	$381	$389	$12,735
Southlake	83	277	394	416	438	459	$4,035	$1,444	$344	$344	$344	$344	$333,684	$400,761	$135,878	$143,382	$150,902	$157,948	$4,337,588
Southmayd	2	8	10	10	11	11	$772	$453	$300	$300	$300	$300	$1,914	$3,467	$3,120	$3,149	$3,207	$3,236	$16,625
Southwest Fannin County SUD	4	4	5	5	5	5	$24,781	$22,625	$300	$300	$300	$300	$101,356	$101,475	$1,415	$1,476	$1,544	$1,616	$1,423,076
Springtown	36	143	264	322	374	413	$780	$490	$393	$393	$393	$393	$27,986	$70,190	$103,994	$126,732	$147,082	$162,464	$197,124
Starr WSC	1	1	1	1	1	2	$2,667	$2,486	$300	$300	$300	$300	$3,067	$3,095	$399	$422	$447	$474	$38,681
Sunnyvale	15	19	22	23	24	24	$2,030	$1,677	$300	$300	$300	$300	$30,547	$31,705	$6,732	$7,020	$7,125	$7,125	$369,984
Talty SUD	10	11	16	23	32	37	$815	$763	$300	$300	$300	$300	$7,930	$8,260	$4,788	$6,875	$9,482	$11,150	$71,222
Teague	43	118	137	132	127	122	$475	$450	$435	$435	$435	$435	$20,496	$53,058	$59,701	$57,611	$55,390	$53,039	$24,406
Terra Southwest	1	1	2	2	3	3	$1,292	$1,085	$300	$300	$300	$300	$1,518	$1,611	$546	$648	$761	$884	$16,566
Terrell	200	683	1,117	1,298	1,537	1,724	$583	$488	$449	$449	$449	$449	$116,605	$333,471	$501,365	$582,749	$690,160	$774,069	$380,568
The Colony	38	45	50	50	50	50	$592	$549	$300	$300	$300	$300	$22,599	$24,551	$14,982	$14,982	$14,982	$14,982	$158,355
Tioga	1	2	3	4	4	5	$5,006	$2,771	$300	$300	$300	$300	$5,907	$6,227	$1,018	$1,137	$1,263	$1,401	$78,915
Tom Bean	4	13	18	18	18	18	$1,114	$581	$313	$313	$313	$313	$5,011	$7,811	$5,615	$5,615	$5,615	$5,615	$51,166
Trenton	1	1	1	1	1	1	$1,450	$1,375	$300	$300	$300	$300	$1,044	$1,059	$240	$246	$254	$261	$11,769
Trinidad	10	31	43	43	44	45	$512	$453	$424	$424	$424	$424	$5,181	$13,923	$18,023	$18,347	$18,671	$19,103	$12,667
Trophy Club MUD 1	89	273	369	374	380	386	$884	$580	$432	$432	$432	$432	$78,911	$158,058	$159,440	$161,557	$163,875	$166,422	$574,321
Two Way SUD	4	4	5	5	6	6	$1,613	$1,547	$300	$300	$300	$300	$6,364	$6,427	$1,484	$1,622	$1,800	$1,911	$73,626
University Park	38	38	38	38	38	38	$425	$425	$300	$300	$300	$300	$15,968	$15,944	$11,253	$11,253	$11,253	$11,253	$66,676
Van Alstyne	5	9	15	18	23	27	$1,613	$981	$300	$300	$300	$300	$7,630	$8,949	$4,358	$5,351	$7,011	$8,241	$88,276
Verona SUD	2	3	3	4	5	6	$1,653	$1,377	$300	$300	$300	$300	$3,653	$3,822	$1,028	$1,224	$1,442	$1,680	$42,492
Walnut Creek SUD	19	21	29	43	60	77	$1,850	$1,730	$300	$300	$300	$300	$35,155	$35,636	$8,583	$12,861	$17,940	$22,964	$418,625
Watauga	36	107	143	143	143	143	$929	$511	$300	$300	$300	$300	$33,344	$54,718	$42,858	$42,858	$42,858	$42,858	$320,836
Waxahachie	43	53	64	76	88	101	$3,478	$2,880	$300	$300	$300	$300	$150,510	$153,523	$19,310	$22,661	$26,346	$30,401	$1,954,611
Weatherford	41	49	58	67	77	89	$669	$610	$300	$300	$300	$300	$27,425	$29,758	$17,322	$20,136	$23,237	$26,651	$214,863
West Cedar Creek MUD	5	5	6	6	6	6	$1,613	$1,695	$300	$300	$300	$300	$8,759	$8,663	$1,704	$1,728	$1,752	$1,779	$101,340
West Leonard WSC	1	2	2	2	2	3	$1,781	$1,541	$300	$300	$300	$300	$2,654	$2,740	$592	$647	$702	$774	$31,363
West Wise SUD	2	3	3	3	3	3	$6,151	$5,661	$300	$300	$300	$300	$14,794	$14,860	$849	$897	$948	$1,005	$199,997
Westlake	18	23	28	31	35	40	$390	$369	$300	$300	$300	$300	$6,860	$8,498	$8,282	$9,407	$10,635	$11,985	$22,477
Westminster SUD	16	59	97	115	134	156	$653	$447	$372	$372	$372	$372	$10,339	$26,463	$35,951	$42,613	$49,964	$58,062	$63,283
Westover Hills	5	5	5	5	5	5	$386	$387	$300	$300	$300	$300	$1,776	$1,771	$1,380	$1,383	$1,391	$1,391	$5,645
Westworth Village	2	2	2	3	3	3	$646	$639	$300	$300	$300	$300	$1,428	$1,442	$719	$756	$792	$825	$10,873
White Settlement	51	167	239	253	268	284	$696	$474	$377	$377	$377	$377	$35,150	$78,874	$90,210	$95,291	$100,880	$107,040	$228,800
White Shed WSC	1	1	1	1	1	1	$12,337	$11,820	$300	$300	$300	$300	$15,113	$15,130	$395	$401	$408	$416	$209,571

TABLE H.11C CONSERVATION SAVINGS AND COSTS FOR WATER LOSS MITIGATION STRATEGIES

ENTITY NAME	SAVINGS VOLUMES IN ACRE-FEET PER YEAR						UNIT COSTS IN DOLLARS PER ACRE-FOOT						ANNUAL COSTS IN DOLLARS						CAPITAL COST
	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Whitesboro	3	3	3	3	4	4	$860	$817	$300	$300	$300	$300	$2,456	$2,528	$992	$1,049	$1,110	$1,178	$22,730
Whitewright	2	2	2	3	3	3	$834	$789	$300	$300	$300	$300	$1,723	$1,780	$723	$767	$813	$864	$15,682
Willow Park	6	7	9	10	12	14	$815	$730	$300	$300	$300	$300	$5,005	$5,370	$2,625	$3,066	$3,552	$4,086	$44,954
Wilmer	4	13	19	20	20	21	$2,419	$940	$300	$300	$300	$300	$9,845	$12,670	$5,725	$5,925	$6,138	$6,374	$122,574
Woodbine WSC	4	4	4	4	4	4	$2,201	$2,141	$300	$300	$300	$300	$7,835	$7,870	$1,121	$1,127	$1,133	$1,140	$96,180
Wortham	<1	<1	<1	<1	<1	<1	$3,374	$3,692	$300	$300	$300	$300	$2,159	$2,141	$150	$144	$138	$134	$27,962
Wylie	35	34	36	37	37	37	$1,683	$1,704	$300	$300	$300	$300	$58,341	$58,184	$10,736	$11,058	$11,058	$11,058	$681,324
Wylie Northeast SUD	9	11	14	15	15	15	$5,451	$4,485	$300	$300	$300	$300	$50,447	$51,087	$4,211	$4,509	$4,629	$4,629	$677,512
TOTAL	***19,735***	***58,575***	***85,735***	***92,356***	***99,377***	***106,016***	***$1,151***	***$650***	***$393***	***$392***	***$392***	***$392***	***$22,718,853***	***$38,087,852***	***$33,722,520***	***$36,211,443***	***$38,954,943***	***$41,572,384***	***$215,254,205***
Note: Savings presented above represent total savings for WUG as a whole, regardless of regional splits. The capital cost presented here reflect the main replacement cost, which is likely required loan services.																			

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TABLE H.11D CONSERVATION SAVINGS AND COSTS FOR NON-MUNICIPAL CUSTOMERS

COUNTY	CONSERVATION SAVINGS (AC-FT/YR)						UNIT COST ($/AC-FT)
	2030	2040	2050	2060	2070	2080	
Manufacturing Customers							
Collin	0	89	139	192	249	310	$ 326
Cooke	0	1	2	3	4	5	$ 326
Dallas	0	223	347	479	621	773	$ 326
Denton	0	6	10	13	17	22	$ 326
Ellis	0	59	91	126	164	204	$ 326
Fannin	0	<1	<1	<1	<1	<1	$ 326
Freestone	0	1	1	1	2	2	$ 326
Grayson	0	191	288	386	485	586	$ 326
Henderson	0	13	20	28	37	46	$ 326
Kaufman	0	12	19	26	34	42	$ 326
Navarro	0	17	26	36	47	59	$ 326
Parker	0	1	1	2	2	3	$ 326
Rockwall	0	5	7	10	13	16	$ 326
Tarrant	0	128	199	275	357	444	$ 326
Wise	0	3	4	6	7	9	$ 326
Region C Manufacturing Subtotal	**0**	**749**	**1,156**	**1,586**	**2,040**	**2,521**	**-**
Irrigation Customers							
Collin	5	78	150	187	223	258	$ 305
Cooke	1	24	46	57	68	79	$ 305
Dallas	20	333	641	803	954	1,106	$ 305
Denton	4	64	124	155	184	213	$ 305
Ellis	1	17	33	42	50	58	$ 305
Fannin	1	20	39	49	59	68	$ 305
Freestone	0	2	4	5	6	7	$ 305
Grayson	2	32	62	77	92	106	$ 305
Henderson	0	2	4	6	7	8	$ 305
Jack	0	2	4	5	6	7	$ 305
Parker	2	32	62	78	92	107	$ 305
Rockwall	0	7	13	16	19	22	$ 305
Tarrant	9	153	295	369	438	508	$ 305
Wise	0	1	2	2	3	3	$ 305
Region C Irrigation Subtotal	**45**	**767**	**1,479**	**1,851**	**2,201**	**2,550**	**-**
Mining Customers							
Fannin	0	0	113	928	1,810	2,682	$ 200
Kaufman	0	0	310	888	1,566	2,343	$ 200
Navarro	0	0	0	0	179	749	$ 200
Parker	0	0	0	0	300	691	$ 200
Wise	123	211	428	732	1,211	1,969	$ 200
Region C Mining Subtotal	**123**	**211**	**851**	**2,548**	**5,066**	**8,434**	**-**
NON-MUNICIPAL CONSERVATION TOTAL	***168***	***1,727***	***3,486***	***5,985***	***9,307***	***13,505***	**-**

Note: Savings presented above are associated with the demand within Region C only.

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TABLE H.12 NEW WATER TREATMENT PLANTS

ENTITY	WATER MANAGEMENT STRATEGY	COUNTY	ONLINE DATE	PLANT SIZE (MGD)	CAPITAL COST	UNIT COST ($/1000 GAL)		ANNUAL COST
						WITH DEBT SERVICE	AFTER DEBT SERVICE	
Corsicana	New 8 MGD WTP, Halbert-Richland Chambers	Navarro	2030	8.00	See Table H.96			
Walnut Creek SUD	New 15 MGD WTP-Eagle Mountain	Parker	2060	15.00	$132,171,000	$5.05	$2.38	$13,610,000
Mansfield	New 30 MGD WTP	Tarrant	2030	30.00	$218,335,000	$4.10	$1.94	$22,479,000

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TABLE H.13 WATER TREATMENT PLANT EXPANSIONS

ENTITY	WATER MANAGEMENT STRATEGY	COUNTY	ONLINE DATE	PLANT EXPANSION (MGD)	CAPITAL COST	UNIT COST ($/1000 GAL)		ANNUAL COST
						WITH DEBT SERVICE	AFTER DEBT SERVICE	
Recommended WMSs								
Arlington	8 MGD WTP Expansion	Tarrant	2070	8.0	$34,750,000	$2.46	$1.16	$3,591,000
Azle	4 MGD WTP Expansion	Tarrant	2030	4.0	$54,940,000	$8.33	$4.24	$6,085,000
Benbrook	3 MGD WTP Expansion	Tarrant	2050	3.0	$17,668,000	$3.42	$1.67	$1,877,000
Corsicana	8 MGD WTP Expansion, Halbert-Richland Chambers-1	Navarro	2050	8.0	$34,694,000	$2.46	$1.16	$3,588,000
Corsicana	8 MGD WTP Expansion, Halbert-Richland Chambers-2	Navarro	2080	8.0	$34,694,000	$2.46	$1.16	$3,588,000
Decatur	3 MGD WTP Expansion	Wise	2030	3.0	$34,939,000	$5.14	$1.67	$2,816,000
Decatur	8 MGD WTP Expansion	Wise	2050	8.0	$34,750,000	$2.46	$1.16	$3,591,000
Denison	12 MGD Desalination WTP Expansion	Grayson	2030	12.0	$192,477,000	$11.84	$7.07	$25,953,000
Denison	21 MGD Desalination WTP Expansion	Grayson	2040	21.0	$282,557,000	$9.97	$5.97	$38,260,000
Denton	35 MGD WTP Plant Expansion	Denton	2040	35.0	$246,939,000	$3.98	$1.88	$25,428,000
Denton	20 MGD WTP Plant Expansion	Denton	2060	20.0	$160,826,000	$4.53	$2.14	$16,562,000
Denton	18 MGD WTP Plant Expansion	Denton	2080	18.0	$149,342,000	$4.68	$2.21	$15,381,000
Ennis	1 MGD WTP Expansion	Ellis	2070	1.0	$10,828,000	$6.51	$3.29	$1,191,000
Ennis	3 MGD WTP Expansion	Ellis	2030	3.0	$17,657,000	$3.42	$1.67	$1,876,000
Fort Worth	35 MGD WTP-Eagle Mountain	Tarrant	2030	35.0	$247,056,000	$3.98	$1.88	$25,435,000
Fort Worth	20 MGD WTP Expansion-Westside 1	Tarrant	2030	20.0	$155,983,000	$4.46	$2.14	$16,299,000
Fort Worth	20 MGD WTP Expansion-Westside 2	Tarrant	2040	20.0	$155,983,000	$4.46	$2.14	$16,299,000
Fort Worth	30 MGD WTP Expansion-Eagle Mountain	Tarrant	2040	30.0	$218,335,000	$4.10	$1.94	$22,479,000
Fort Worth	50 MGD WTP Expansion-Rolling Hills	Tarrant	2050	50.0	$343,387,000	$3.82	$1.77	$34,856,000
Fort Worth	50 MGD WTP Expansion-General 1	Tarrant	2060	50.0	$343,387,000	$3.82	$1.77	$34,856,000
Fort Worth	50 MGD WTP Expansion-General 2	Tarrant	2070	50.0	$343,387,000	$3.82	$1.77	$34,856,000
Fort Worth	50 MGD WTP Expansion-General 3	Tarrant	2080	50.0	$343,387,000	$3.82	$1.77	$34,856,000
Gainesville	6 MGD WTP Expansion	Cooke	2030	6.0	$71,102,000	$6.77	$3.24	$7,418,000
Lewisville	3 MGD WTP Expansion	Denton	2030	3.0	$46,846,000	$8.23	$4.03	$4,992,000
Mabank	2 MGD WTP Expansion	Kaufman	2030	2.0	$38,763,000	$11.45	$5.68	$4,184,000
Mansfield	20 MGD WTP Expansion	Tarrant	2030	20.0	$68,774,000	$1.94	$0.91	$7,072,000
Mansfield	28 MGD WTP Expansion	Tarrant	2060	28.0	$90,527,000	$1.85	$0.87	$9,308,000
Mansfield	30 MGD WTP Expansion	Tarrant	2050	30.0	$95,968,000	$1.80	$0.85	$9,868,000
Midlothian	12 MGD Expansion - Auger WTP	Ellis	2060	12.0	$45,178,000	$1.06	$0.52	$4,657,000
Parker County SUD	3.5 MGD WTP Desal Expansion-BRA supply	Parker	2050	3.5	$90,989,000	$17.25	$10.53	$12,696,000
Red River Authority of Texas	Preston Shores 1 MGD WTP Expansion	Grayson	2030	1.0	$10,831,000	$6.51	$3.29	$1,191,000
Rockett Special Utility District	7 MGD WTP Expansion at Sokoll	Ellis	2030	7.0	$79,172,000	$6.43	$3.07	$8,227,000
Runaway Bay	2 MGD WTP Expansion	Wise	2030	2.0	$38,770,000	$11.45	$5.68	$4,184,000
Sherman	10 MGD Desal WTP Expansion	Grayson	2030	10.0	$187,209,000	$11.96	$6.66	$22,992,000
Sherman	20 MGD Desal WTP Expansion	Grayson	2040	20.0	$227,497,000	$7.70	$4.49	$29,623,000
Walnut Creek SUD	10 MGD WTP Expansion	Parker	2030	10.0	$103,449,000	$5.83	$2.75	$10,654,000
Waxahachie	15 MGD Expansion WTP-1	Ellis	2030	15.0	$132,121,000	$4.97	$2.34	$13,608,000
Waxahachie	15 MGD Expansion WTP-2	Ellis	2050	15.0	$132,121,000	$4.98	$2.35	$13,608,000
Weatherford	8 MGD WTP Expansion	Parker	2030	8.0	$87,279,000	$6.18	$2.94	$9,037,000
Weatherford	10 MGD WTP Expansion	Parker	2040	10.0	$103,449,000	$5.83	$2.75	$10,654,000
Weatherford	6 MGD WTP Expansion	Parker	2080	6.0	$27,916,000	$2.65	$1.27	$2,906,000
West Wise SUD	1 MGD WTP Expansion	Wise	2030	1.0	$10,833,000	$6.51	$3.29	$1,191,000
Alternative WMSs								
Corsicana	Alternative - Navarro Mills WTP Expansion and Pipeline Replacement	Navarro	2050	10.0	$194,881,000	$7.63	$1.83	$13,933,000

TABLE H.14 NEW WELLS

ENTITY	PROJECT NAME	COUNTY	PROJECT YIELD (AF/Y)	ONLINE DATE	CAPITAL COST	UNIT COST ($/1000 GAL)		ANNUAL COST
						WITH DEBT SERVICE	AFTER DEBT SERVICE	
Municipal Wells								
Annetta	New Well(s) in Trinity Aquifer	Parker	100	2030	$2,250,000	$5.98	$1.14	$195,000
Arledge Ridge WSC	New Well(s) in Woodbine Aquifer	Fannin	50	2030	$1,886,000	$9.45	$1.29	$154,000
Aubrey	New Well(s) in Trinity Aquifer	Denton	500	2030	$4,990,000	$2.85	$0.69	$464,000
Bells	New Well(s) in Woodbine Aquifer	Grayson	45	2030	$1,881,000	$10.64	$1.64	$156,000
Black Rock WSC	New Well(s) in Trinity Aquifer	Denton	450	2040	$2,993,000	$1.83	$0.40	$269,000
Bolivar WSC	New Well(s) in Trinity Aquifer	Denton	250	2030	$2,290,000	$2.53	$0.55	$206,000
Buena Vista-Bethel SUD	New Well(s) in Trinity Aquifer	Ellis	546	2030	$4,343,000	$2.41	$0.69	$429,000
Celina	New Well(s) in Trinity and Woodbine Aquifers	Collin	5000	2030	$157,458,000	$6.76	$1.51	$11,023,000
Collinsville	New Well(s) in Trinity Aquifer	Grayson	40	2030	$1,933,000	$11.97	$1.53	$156,000
County-Other, Collin	New Well(s) in Trinity Aquifer	Collin	850	2040	$6,939,000	$2.42	$0.65	$669,000
County-Other, Denton	New Well(s) in Trinity Aquifer	Denton	7700	2040	$20,970,000	$0.95	$0.37	$2,392,000
County-Other, Denton	New Well(s) in Woodbine Aquifer	Denton	1500	2040	$7,096,000	$1.55	$0.53	$759,000
County-Other, Parker	New Well(s) in Trinity Aquifer	Parker	4000	2030	$14,728,000	$1.00	$0.20	$1,299,000
County-Other, Wise	New Well(s) in Trinity Aquifer	Wise	3400	2030	$15,456,000	$1.61	$0.63	$1,781,000
Cross Timbers WSC	New Well(s) in Trinity Aquifer	Denton	350	2030	$3,266,000	$2.47	$0.46	$282,000
Ladonia	New Well(s) in Trinity Aquifer	Fannin	40	2050	$2,165,000	$13.35	$1.69	$174,000
Mustang SUD	New Well(s) in Trinity and Woodbine Aquifers	Denton	5000	2030	$137,990,000	$5.68	$1.08	$9,256,000
Northwest Grayson County WCID 1	New Well(s) in Trinity Aquifer	Grayson	40	2030	$1,959,000	$12.27	$1.69	$160,000
Pelican Bay	New Well(s) in Trinity Aquifer	Tarrant	50	2030	$1,626,000	$6.51	$1.10	$106,000
Pilot Point	New Well(s) in Trinity Aquifer	Denton	200	2030	$3,989,000	$5.08	$0.77	$331,000
Terra Southwest	New Well(s) in Trinity Aquifer	Denton	200	2030	$2,207,000	$2.95	$0.57	$192,000
Trenton	New Well(s) in Woodbine Aquifer	Fannin	50	2030	$2,102,000	$10.43	$1.35	$170,000
Two Way SUD	New Well(s) in Trinity Aquifer	Grayson	90	2030	$2,902,000	$8.15	$1.19	$239,000
Whitesboro	New Well(s) in Trinity Aquifer	Grayson	20	2030	$1,898,000	$23.01	$2.45	$150,000
Non-Municipal Wells								
Irrigation, Fannin	New Well(s) in Trinity Aquifer	Fannin	350	2030	$3,787,000	$2.75	$0.42	$314,000
Mining, Kaufman	New Well(s) in Nacatoch Aquifer	Kaufman	39	2050	$1,883,000	$11.49	$1.10	$146,000
Alternative WMSs								
Mustang SUD	Alternative - New Well(s) in Wood and Smith Counties	Denton	5,000	2040	$320,077,000	$13.57	$2.89	$22,105,000
Celina	Alternative - New Well(s) in Wood and Smith Counties	Collin	5,000	2040	$285,371,000	$12.24	$2.72	$19,945,000

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Table H.15

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Gulf of Mexico Desalination

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (267.8 MGD)	$213,966,000
Transmission Pipeline (108-132 in. dia., 296 miles)	$5,048,213,000
Transmission Pump Station(s) & Storage Tank(s)	$207,306,000
Storage Tanks (Other Than at Booster Pump Stations)	$64,963,000
Two Water Treatment Plants (250 MGD and 535 MGD)	$4,265,754,000
Integration, Relocations, Backup Generator & Other	$16,727,000
TOTAL COST OF FACILITIES	**$9,816,929,000**
Engineering:	
- Planning (3%)	$294,508,000
- Design (7%)	$687,185,000
- Construction Engineering (1%)	$98,169,000
Legal Assistance (2%)	$196,339,000
Fiscal Services (2%)	$196,339,000
Pipeline Contingency (15%)	$757,232,000
All Other Facilities Contingency (20%)	$953,743,000
Environmental & Archaeology Studies and Mitigation	$10,652,000
Land Acquisition and Surveying (4521 acres)	$27,529,000
Interest During Construction (3.5% for 5 years with a 0.5% ROI)	$2,118,777,000
TOTAL COST OF PROJECT	**$15,157,402,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$824,128,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$51,727,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$9,462,000
Water Treatment Plant	$474,594,000
Pumping Energy Costs (274421573 kW-hr @ 0.09 $/kW-hr)	$24,698,000
TOTAL ANNUAL COST	**$1,384,609,000**
Available Project Yield (acft/yr)	200,000
Annual Cost of Water ($ per acft), based on PF=1.5	$6,923
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$2,802
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$21.24
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$8.60
Note: One or more cost element has been calculated externally	

CLV *9/24/2024*

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Table H.16

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Dredging - Generic Strategy A*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Lake Bridgeport Example	$1,995,435,013
AVERAGE COST OF DREDGING	**$1,995,435,000**
Interest During Construction (12 months)	$69,840,000
TOTAL COST OF PROJECT	**$2,065,275,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$112,292,000
Operation and Maintenance	
TOTAL ANNUAL COST	**$112,292,000**
Available Project Yield (acft/yr)	2,500
Annual Cost of Water ($ per acft), based on PF=0	$44,917
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$44,917
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$137.82
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$137.82
HAC	*2/19/2025*

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Table H.17

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Aquifer Storage Recovery (ASR) - Generic Strategy

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (178.5 MGD)	$140,890,000
Transmission Pipeline (102 in. dia., 99.3 miles)	$1,950,317,000
Transmission Pump Station(s) & Storage Tank(s)	$56,028,000
Well Fields (Wells, Pumps, and Piping)	$190,182,000
Water Treatment Plant (180 MGD)	$731,422,000
Integration, Relocations, Backup Generator & Other	$5,475,000
Engineering:	
- Planning (3%)	$92,229,000
- Design (7%)	$215,202,000
- Construction Engineering (1%)	$30,743,000
Legal Assistance (2%)	$61,486,000
Fiscal Services (2%)	$61,486,000
Pipeline Contingency (15%)	$292,548,000
All Other Facilities Contingency (20%)	$224,799,000
Environmental & Archaeology Studies and Mitigation	$5,605,000
Land Acquisition and Surveying (1021 acres)	$15,320,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$529,586,000
TOTAL COST OF PROJECT	**$4,603,318,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$250,289,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$21,460,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$4,923,000
Water Treatment Plant	$51,200,000
Pumping Energy Costs (353794110 kW-hr @ 0.09 $/kW-hr)	$31,841,000
TOTAL ANNUAL COST	**$359,713,000**
Available Project Yield (acft/yr)	50,000
Annual Cost of Water ($ per acft), based on PF=2	$7,194
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$2,188
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$22.08
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$6.72

CLV *9/25/2024*

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Table H.18

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Wholesale Providers - Small Generic ASR*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,149,000
Transmission Pipeline (14 in. dia., 1 miles)	$1,881,000
Well Fields (Wells, Pumps, and Piping)	$4,676,000
Integration, Relocations, Backup Generator & Other	$19,000
TOTAL COST OF FACILITIES	**$7,725,000**
Engineering:	
- Design (7%)	$541,000
- Construction Engineering (1%)	$77,000
Legal Assistance (2%)	$155,000
Fiscal Services (2%)	$155,000
Pipeline Contingency (15%)	$282,000
All Other Facilities Contingency (20%)	$1,169,000
Environmental & Archaeology Studies and Mitigation	$104,000
Land Acquisition and Surveying (9 acres)	$106,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$686,000
TOTAL COST OF PROJECT	**$11,232,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$611,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$66,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$29,000
Pumping Energy Costs (4144114 kW-hr @ 0.09 $/kW-hr)	$373,000
TOTAL ANNUAL COST	**$1,079,000**
Available Project Yield (acft/yr)	2,500
Annual Cost of Water ($ per acft), based on PF=1.1	$432
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.1	$187
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.1	$1.32
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.1	$0.57
CLV	*9/25/2024*

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Table H.19

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Toledo Bend Reservoir for DWU, TRWD, NTMWD and UTRWD
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*	*TRWD Share*	*NTMWD Share*	*DWU Share*	*UTRWD Share*
CAPITAL COST					
Terminal Storage	$249,344,000	$113,605,000	$90,493,000	$0	$45,246,000
Primary Pump Stations	$569,980,000	$265,715,000	$172,905,000	$0	$131,360,000
Transmission Pipeline	$6,033,763,000	$2,644,051,000	$2,101,433,000	$0	$1,288,279,000
Transmission Pump Station(s) & Storage Tank(s)	$93,822,000	$37,529,000	$37,529,000	$0	$18,764,000
Integration, Relocations, Backup Generator & Other	$28,520,000	$14,392,000	$8,648,000	$0	$5,480,000
TOTAL COST OF FACILITIES	**$6,726,085,000**	**$2,961,687,000**	**$2,320,515,000**	**$0**	**$1,443,883,000**
Engineering:					
- Planning (3%)	$209,262,000	$92,258,000	$72,330,000	$0	$44,674,000
- Design (7%)	$488,279,000	$215,270,000	$168,770,000	$0	$104,239,000
- Construction Engineering (1%)	$69,753,000	$30,753,000	$24,109,000	$0	$14,891,000
Legal Assistance (2%)	$139,509,000	$61,506,000	$48,220,000	$0	$29,783,000
Fiscal Services (2%)	$139,509,000	$61,506,000	$48,220,000	$0	$29,783,000
Pipeline Contingency (15%)	$905,064,000	$396,607,000	$315,215,000	$0	$193,242,000
All Other Facilities Contingency (20%)	$188,332,000	$86,248,000	$61,914,000	$0	$40,170,000
Environmental & Archaeology Studies and Mitigation	$17,524,000	$7,890,000	$5,797,000	$0	$3,837,000
Land Acquisition and Surveying	$52,416,000	$24,592,000	$15,678,000	$0	$12,146,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$895,552,000	$395,066,000	$309,200,000	$0	$191,286,000
TOTAL COST OF PROJECT	**$9,831,285,000**	**$4,333,383,000**	**$3,389,968,000**	**$0**	**$2,107,934,000**
ANNUAL COST					
Debt Service (3.5 percent, 30 years)	$527,694,000	$232,475,000	$181,844,000	$0	$113,375,000
Operation and Maintenance					
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$60,621,000	$26,584,000	$21,100,000	$0	$12,937,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$16,596,000	$7,582,000	$5,261,000	$0	$3,753,000
Pumping Energy Costs (@ 0.09 $/kW-hr)	$42,110,000	$21,250,000	$12,769,000	$0	$8,091,000
Purchase of Water (350000 acft/yr @ 98 $/acft)	$34,300,000	$13,720,000	$13,720,000	$0	$6,860,000
TOTAL ANNUAL COST	**$702,634,000**	**$311,336,000**	**$242,419,000**	**$0**	**$148,879,000**
Available Project Yield (acft/yr), based on PF=1.5	250,000	100,000	100,000	0	50,000
Annual Cost of Water ($ per acft), based on PF=1.5	$2,811	$3,113	$2,424	0	$2,978
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$629	$708	$542	0	$646
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$8.62	$9.55	$7.44	0	$9.14
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.93	$2.17	$1.66	0	$1.98

Note: One or more cost element has been calculated externally

HAC *9/17/2025*

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Table H.20

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Toledo Bend Reservoir for DWU, TRWD, NTMWD and UTRWD
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*	*TRWD Share*	*NTMWD Share*	*DWU Share*	*UTRWD Share*
CAPITAL COST					
Terminal Storage	$359,317,000	$125,830,000	$85,583,000	$105,113,000	$42,791,000
Primary Pump Stations	$682,924,000	$233,288,000	$155,351,000	$171,703,000	$122,582,000
Transmission Pipeline	$6,997,862,000	$2,167,326,000	$1,806,183,000	$1,883,699,000	$1,140,654,000
Transmission Pump Station(s) & Storage Tank(s)	$125,513,000	$35,861,000	$35,861,000	$35,861,000	$17,930,000
Integration, Relocations, Backup Generator & Other	$39,868,000	$14,505,000	$8,580,000	$11,337,000	$5,446,000
TOTAL COST OF FACILITIES	**$7,846,167,000**	**$2,450,980,000**	**$2,005,975,000**	**$2,102,600,000**	**$1,286,612,000**
Engineering:					
- Planning (3%)	$246,163,000	$77,304,000	$62,746,000	$66,231,000	$39,882,000
- Design (7%)	$574,384,000	$180,377,000	$146,409,000	$154,540,000	$93,058,000
- Construction Engineering (1%)	$82,053,000	$25,768,000	$20,915,000	$22,077,000	$13,293,000
Legal Assistance (2%)	$164,110,000	$51,536,000	$41,831,000	$44,154,000	$26,589,000
Fiscal Services (2%)	$164,110,000	$51,536,000	$41,831,000	$44,154,000	$26,589,000
Pipeline Contingency (15%)	$1,049,680,000	$325,099,000	$270,928,000	$282,555,000	$171,098,000
All Other Facilities Contingency (20%)	$241,525,000	$81,897,000	$57,075,000	$64,803,000	$37,750,000
Environmental & Archaeology Studies and Mitigation	$18,172,000	$5,855,000	$4,479,000	$4,659,000	$3,179,000
Land Acquisition and Surveying	$53,067,000	$17,632,000	$12,474,000	$12,417,000	$10,544,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,052,884,000	$330,899,000	$268,151,000	$283,073,000	$170,761,000
TOTAL COST OF PROJECT	**$11,492,315,000**	**$3,598,883,000**	**$2,932,814,000**	**$3,081,263,000**	**$1,879,355,000**
ANNUAL COST					
Debt Service (3.5 percent, 30 years)	$615,049,000	$192,226,000	$157,136,000	$164,666,000	$101,021,000
Operation and Maintenance					
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$70,592,000	$21,880,000	$18,209,000	$19,012,000	$11,491,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$19,674,000	$6,576,000	$4,626,000	$5,036,000	$3,436,000
Pumping Energy Costs (@ 0.09 $/kW-hr)	$58,866,000	$21,417,000	$12,669,000	$16,739,000	$8,041,000
Purchase of Water (350000 acft/yr @ 98 $/acft)	$34,300,000	$9,800,000	$9,800,000	$9,800,000	$4,900,000
TOTAL ANNUAL COST	**$829,140,000**	**$262,650,000**	**$209,734,000**	**$224,220,000**	**$132,536,000**
Available Project Yield (acft/yr), based on PF=1.5	350,000	100,000	100,000	100,000	50,000
Annual Cost of Water ($ per acft), based on PF=1.5	$2,369	$2,627	$2,097	$2,242	$2,651
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$539	$616	$466	$522	$570
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$7.27	$8.06	$6.44	$6.88	$8.13
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.66	$1.89	$1.43	$1.60	$1.75

Note: One or more cost element has been calculated externally

HAC *8/6/2025*

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Cost Estimate Summary
Sulphur River Basin Reservoir and Transmission System Alternatives
September 2023 Prices

Recommened - Marvin Nichols (328) Strategy for NTMWD, TRWD, and UTRWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*	*TRWD Share*	*DWU Share*	*NTMWD Share*	*UTRWD Share*	*Irving Share*
CAPITAL COST						
Dam and Reservoir	$402,530,000	$186,774,000	$0	$186,774,000	$28,982,000	$0
Conflicts	$191,493,000	$88,853,000	$0	$88,853,000	$13,787,000	$0
Terminal Storage	$66,667,000	$0	$0	$66,667,000	$0	$0
Intake Pump Station	$274,805,000	$129,054,000	$0	$129,054,000	$16,697,000	$0
Transmission Pipeline	$2,410,164,000	$1,675,788,000	$0	$610,013,000	$124,364,000	$0
Transmission Pump Station(s) & Storage Tank(s)	$431,096,000	$315,473,000	$0	$103,671,000	$11,952,000	$0
TOTAL COST OF FACILITIES	**$3,776,755,000**	**$2,395,942,000**	**$0**	**$1,185,032,000**	**$195,782,000**	**$0**
Dam & Reservoir						
Engineering and Contingency (35%)	$140,886,000	$65,371,000	$0	$65,371,000	$10,144,000	$0
Land Acquisition and Surveying (72,192 acres)	$472,858,000	$219,406,000	$0	$219,406,000	$34,046,000	$0
Environmental & Archaeology Studies and Mitigation	$519,162,000	$240,891,000	$0	$240,891,000	$37,380,000	$0
Mitigation Lands (66,103 acres)	$432,975,000	$200,900,000	$0	$200,900,000	$31,174,000	$0
Permitting	$75,000,000	$34,800,000	$0	$34,800,000	$5,400,000	$0
Transmission Engineering and Contingency (30% for Pipelines & 35% for All Other Facilities)	$993,449,000	$658,320,000	$0	$287,790,000	$47,336,000	$0
Environmental & Archaeology Studies and Mitigation	$38,190,000	$25,442,000	$0	$10,912,000	$1,834,000	$0
Land Acquisition and Surveying	$25,312,000	$18,198,000	$0	$5,150,000	$1,965,000	$0
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$583,041,000	$388,119,000	$0	$166,847,000	$28,075,000	$0
Reservoir Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$307,345,000	$142,608,000	$0	$142,608,000	$22,129,000	$0
TOTAL COST OF PROJECT	**$7,364,973,000**	**$4,389,998,000**	**$0**	**$2,559,708,000**	**$415,267,000**	**$0**
ANNUAL COST						
Debt Service (3.5 percent, 30 years)	$262,217,000	$174,553,000	$0	$75,038,000	$12,626,000	$0
Reservoir Debt Service (3.5 percent, 40 years)	$119,047,000	$55,238,000	$0	$55,238,000	$8,571,000	$0
Operation and Maintenance						
Pipelines (1% of Facilities + 20%) and Pump Stations (2.5% of Facilities + 20%)	$51,156,000	$33,346,000	$0	$15,466,000	$2,344,000	$0
Dam and Reservoir (1.5% of Facilities + 20%)	$7,246,000	$3,362,000	$0	$3,362,000	$522,000	$0
Pumping Energy Costs (0.09$/kW-hr)	$42,035,000	$25,558,000	$0	$14,813,000	$1,664,000	$0
TOTAL ANNUAL COST	**$481,701,000**	**$292,057,000**	**$0**	**$163,917,000**	**$25,727,000**	**$0**
Available Project Yield (acft/yr)	320,160	148,555		148,555	23,050	
Annual Cost of Water until Amortized ($ per acft)	$1,505	$1,966		$1,103	$1,116	
Annual Cost of Water until Amortized ($ per 1,000 gallons)	$4.62	$6.03		$3.39	$3.42	
Annual Cost of Water after Amortization ($ per acft)	$314	$419		$226	$197	
Annual Cost of Water after Amortization ($ per 1,000 gallons)	$0.96	$1.29		$0.69	$0.60	

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Cost Estimate Summary
Sulphur River Basin Reservoir and Transmission System Alternatives
September 2023 Prices

Alternative - Marvin Nichols (328) Strategy for NTMWD, TRWD, UTRWD, DWU and Irving

Item	*Estimated Costs for Facilities*	*TRWD Share*	*DWU Share*	*NTMWD Share*	*UTRWD Share*	*Irving Share*
PROJECT COST						
Dam and Reservoir	$543,416,000	$174,979,952	$126,615,928	$174,979,952	$39,125,952	$27,714,216
Land Acquisition and Surveying	$472,858,000	$152,260,276	$110,175,914	$152,260,276	$34,045,776	$24,115,758
Conflicts	$191,493,000	$61,660,746	$44,617,869	$61,660,746	$13,787,496	$9,766,143
Environmental & Archeology Studies and Mitigation	$519,162,000	$167,170,164	$120,964,746	$167,170,164	$37,379,664	$26,477,262
Mitigation Land (66,103 acres)	$432,975,000	$139,417,950	$100,883,175	$139,417,950	$31,174,200	$22,081,725
Permitting	$75,000,000	$24,150,000	$17,475,000	$24,150,000	$5,400,000	$3,825,000
Pipeline Segment 1: MN Intake LPS to Lake Chapman Split/BPS #1	$1,001,601,000	$329,265,464	$238,257,308	$329,265,464	$61,353,813	$43,458,951
MNR Intake LPS	$371,096,000	$121,993,785	$88,275,006	$121,993,785	$22,731,761	$16,101,664
Pipeline Segment 2: BPS #1/Lake Chapman Split to Leonard TSR Split	$684,806,000	$243,117,455	$175,920,395	$243,117,455	$22,650,695	$0
BPS #1/Lake Chapman Split and Storage Reservoir	$277,634,000	$98,564,662	$71,321,634	$98,564,662	$9,183,043	$0
Pipeline Segment 3: Leonard TSR Split to BPS #2	$145,063,000	$79,846,643	$57,777,229	$0	$7,439,128	$0
Pipeline Segment 4: BPS #2 to Lake Ralph Hall TSR Split	$577,446,000	$317,842,072	$229,991,313	$0	$29,612,615	$0
BPS #2 and Storage Reservoir	$154,895,000	$85,258,444	$61,693,222	$0	$7,943,333	$0
Pipeline Segment 5: Lake Ralph Hall TSR Split to Trinity River/Ray Roberts Split	$53,113,000	$30,815,110	$22,297,890	$0	$0	$0
Pipeline Segment 6: Trinity River/Ray Roberts Split to BPS #3	$108,188,000	$108,188,000	$0	$0	$0	$0
BPS #3 and Storage Reservoir	$134,051,000	$134,051,000	$0	$0	$0	$0
Pipeline Segment 7: BPS #3 to Lake Bridgeport	$444,995,000	$444,995,000	$0	$0	$0	$0
Discharge Structure 5: Lake Bridgeport	$1,772,000	$1,772,000	$0	$0	$0	$0
Pipeline Segment 8: Leonard TSR Split to Leonard TSR	$41,958,000	$0	$0	$41,958,000	$0	$0
Discharge Structure 2 and new TSR near Leonard	$92,573,000	$0	$0	$92,573,000	$0	$0
Pipeline Segment 9: Trinity River/Ray Roberts Split to Lake Ray Roberts	$18,792,000	$0	$18,792,000	$0	$0	$0
Discharge Structure 4: Trinity River/Ray Roberts	$1,037,000	$0	$1,037,000	$0	$0	$0
Pipeline Segment 10: BPS #1/Lake Chapman Split to Chapman Lake Outfall	$5,740,000	$0	$0	$0	$2,375,172	$3,364,828
Discharge Structure 1: Chapman Lake Outfall	$245,000	$0	$0	$0	$101,379	$143,621
Pipeline Segment 11: Lake Ralph Hall TSR Split to Lake Ralph Hall TSR	$34,831,000	$0	$0	$0	$34,831,000	$0
Discharge Structure 3: Lake Ralph Hall TSR	$161,000	$0	$0	$0	$161,000	$0
TOTAL COST OF PROJECT	**$6,384,901,000**	**$2,715,349,000**	**$1,486,096,000**	**$1,647,111,000**	**$359,296,000**	**$177,049,000**
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$570,708,000	$274,450,000	$132,757,000	$127,546,000	$27,282,000	$8,673,000
Reservoir Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$307,345,000	$98,965,000	$71,611,000	$98,965,000	$22,129,000	$15,675,000
TOTAL COST OF PROJECT WITH INTEREST DURING CONSTRUCTION	**$7,262,954,000**	**$3,088,764,000**	**$1,690,464,000**	**$1,873,622,000**	**$408,707,000**	**$201,397,000**
ANNUAL COST						
Debt Service (3.5 percent, 30 years)	$256,672,000	$123,432,000	$59,706,000	$57,363,000	$12,270,000	$3,901,000
Reservoir Debt Service (3.5 percent, 40 years)	$119,046,000	$38,333,000	$27,738,000	$38,333,000	$8,571,000	$6,071,000
Operation and Maintenance						
Pipelines (1% of Facilities + 20%) and Pump Stations (2.5% of Facilities + 20%)	$50,025,000	$23,720,000	$11,595,000	$11,627,000	$2,304,000	$779,000
Dam and Reservoir (1.5% of Facilities + 20%)	$7,246,000	$2,333,212	$1,688,318	$2,333,212	$521,712	$369,546
Pumping Energy Costs (0.10 $/kW-hr)	$40,200,000	$18,174,000	$9,291,000	$10,304,000	$1,707,000	$724,000
TOTAL ANNUAL COST	**$473,189,000**	**$205,992,000**	**$110,018,000**	**$119,960,000**	**$25,374,000**	**$11,845,000**
Available Project Yield (acft/yr)	320,160	103,092	74,596	103,092	23,052	16,328
Annual Cost of Water until Amortized ($ per acft)	$1,478	$1,998	$1,475	$1,164	$1,101	$725
Annual Cost of Water until Amortized ($ per 1,000 gallons)	$4.54	$6.13	$4.53	$3.57	$3.38	$2.23
Annual Cost of Water after Amortization ($ per acft)	$304	$429	$303	$235	$197	$115
Annual Cost of Water after Amortization ($ per 1,000 gallons)	$0.93	$1.32	$0.93	$0.72	$0.60	$0.35

8/5/2025

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Table H.23

Cost Estimate Summary Water Supply Project Option September 2023 Prices Wright Patman Reallocation for NTMWD and TRWD Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023			
Item	**Estimated Costs for Facilities**	**TRWD Share**	**NTMWD Share**
CAPITAL COST			
Dam and Reservoir	$20,971,000	$10,485,500	$10,485,500
Terminal Storage	$296,567,000	$222,425,000	$74,142,000
Intake Pump Stations	$91,712,000	$45,856,000	$45,856,000
Transmission Pipelines	$2,201,757,000	$1,485,444,000	$716,313,000
Transmission Pump Station(s) & Storage Tank(s)	$213,596,000	$155,063,000	$58,533,000
Integration, Relocations, Backup Generator & Other	$119,036,000	$62,678,000	$56,358,000
TOTAL COST OF FACILITIES	**$2,943,639,000**	**$1,981,951,500**	**$961,687,500**
Engineering:			
- Planning (3%)	$88,309,000	$57,234,000	$31,075,000
- Design (7%)	$206,055,000	$133,547,000	$72,508,000
- Construction Engineering (1%)	$29,436,000	$19,078,000	$10,358,000
Legal Assistance (2%)	$58,873,000	$38,156,000	$20,717,000
Fiscal Services (2%)	$58,873,000	$38,156,000	$20,717,000
Pipeline Contingency (15%)	$330,264,000	$222,817,000	$107,447,000
All Other Facilities Contingency (20%)	$148,376,000	$84,473,000	$63,903,000
Environmental & Archaeology Studies and Mitigation	$209,181,000	$106,108,000	$103,073,000
Mitigation Lands (15,000 acres)	$91,500,000	$45,750,000	$45,750,000
Land Acquisition and Surveying - Transmission (2034 acres)	$47,908,000	$27,530,000	$20,378,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$547,615,000	$372,715,000	$174,900,000
TOTAL COST OF PROJECT	**$4,760,029,000**	**$3,127,515,500**	**$1,632,513,500**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$212,476,000	$152,983,000	$59,493,000
Reservoir Debt Service (3.5 percent, 40 years)	$39,904,000	$19,952,000	$19,952,000
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,208,000	$16,710,000	$6,498,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$7,633,000	$3,816,500	$3,816,500
Dam and Reservoir (1.5% of Cost of Facilities)	$4,763,000	$2,381,500	$2,381,500
Pumping Energy Costs (235655083 kW-hr @ 0.09 $/kW-hr)	$21,209,000	$15,270,000	$5,939,000
TOTAL ANNUAL COST	**$309,193,000**	**$211,113,000**	**$98,080,000**
Available Project Yield (acft/yr)	125,000	62,500	62,500
Annual Cost of Water ($ per acft), based on PF=1.5	$2,474	$3,378	$1,569
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$455	$611	$298
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$7.59	$10.36	$4.82
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.39	$1.87	$0.91
Note: One or more cost element has been calculated externally			
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Table H.24

Cost Estimate Summary
Wright Patman Reallocation for NTMWD, TRWD, UTRWD, DWU and Irving
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*	*TRWD Share*	*DWU Share*	*NTMWD Share*	*UTRWD Share*	Irving Share
CAPITAL COST						
Dam and Reservoir	$20,971,000	$6,752,800	$4,886,000	$6,752,800	$1,509,900	$1,069,500
Terminal Storage	$296,567,000	$165,646,000	$66,213,000	$50,695,000	$10,796,000	$3,217,000
Intake Pump Stations	$95,438,000	$31,374,200	$22,702,500	$31,374,200	$5,846,100	$4,141,000
Transmission Pipelines	$2,222,244,000	$1,038,247,000	$517,452,600	$507,895,300	$109,669,700	$48,979,400
Transmission Pump Station(s) & Storage Tank(s)	$210,810,000	$111,250,000	$49,576,000	$39,268,000	$8,176,000	$2,540,000
Integration, Relocations, Backup Generator & Other	$119,688,000	$41,163,000	$27,688,000	$36,647,000	$8,561,000	$5,629,000
TOTAL COST OF FACILITIES	**$2,965,718,000**	**$1,394,433,000**	**$688,518,100**	**$672,632,300**	**$144,558,700**	**$65,575,900**
Engineering:						
- Planning (3%)	$88,972,000	$41,833,000	$20,656,000	$20,179,000	$4,337,000	$1,967,000
- Design (7%)	$207,600,000	$97,610,300	$48,196,300	$47,084,000	$10,119,100	$4,590,300
- Construction Engineering (1%)	$29,657,000	$13,944,000	$6,885,000	$6,726,000	$1,446,000	$656,000
Legal Assistance (2%)	$59,314,000	$27,888,700	$13,770,000	$13,452,600	$2,891,200	$1,311,500
Fiscal Services (2%)	$59,314,000	$27,888,700	$13,770,000	$13,452,600	$2,891,200	$1,311,500
Pipeline Contingency (15%)	$333,337,000	$155,737,000	$77,618,000	$76,185,000	$16,450,000	$7,347,000
All Other Facilities Contingency (20%)	$148,694,000	$71,237,000	$34,213,000	$32,947,000	$6,978,000	$3,319,000
Environmental & Archaeology Studies and Mitigation	$209,493,000	$68,717,000	$48,716,000	$66,548,000	$15,056,000	$10,456,000
Mitigation Lands (15,000 acres)	$91,500,000	$29,462,000	$21,320,000	$29,463,000	$6,588,000	$4,667,000
Land Acquisition and Surveying - Transmission (2034 acres)	$48,618,000	$27,180,800	$7,367,100	$10,181,100	$2,276,500	$1,612,500
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$549,042,000	$255,577,300	$121,954,100	$119,938,100	$37,837,200	$13,735,300
TOTAL COST OF PROJECT	**$4,791,259,000**	**$2,211,508,800**	**$1,102,983,600**	**$1,108,788,700**	**$251,428,900**	**$116,549,000**
ANNUAL COST						
Debt Service (3.5 percent, 30 years)	$214,589,000	$106,583,900	$47,157,400	$42,046,800	$14,644,500	$4,156,400
Reservoir Debt Service (3.5 percent, 40 years)	$39,904,000	$12,849,100	$9,297,700	$12,849,100	$2,873,100	$2,035,000
Operation and Maintenance						
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,419,000	$11,632,000	$5,146,600	$4,588,800	$1,598,000	$453,600
Intakes and Pump Stations (2.5% of Cost of Facilities)	$7,656,000	$4,276,000	$1,709,000	$1,309,000	$279,000	$83,000
Dam and Reservoir (1.5% of Cost of Facilities)	$4,763,000	$1,533,700	$1,109,800	$1,533,700	$342,900	$242,900
Pumping Energy Costs (238611598 kW-hr @ 0.09 $/kW-hr)	$22,172,000	$11,013,000	$4,873,000	$4,344,000	$1,513,000	$429,000
Purchase of Water (acft/yr @ $/acft)	**$312,503,000**	**$147,887,700**	**$69,293,500**	**$66,671,400**	**$21,250,500**	**$7,399,900**
Available Project Yield (acft/yr)	125,000	40,250	29,125	40,250	9,000	6,375
Annual Cost of Water ($ per acft)	$2,500	$3,674	$2,379	$1,656	$2,361	$1,161
Annual Cost of Water After Debt Service ($ per acft)	$464	$707	$441	$293	$415	$190
Annual Cost of Water ($ per 1,000 gallons)	$7.67	$11.27	$7.30	$5.08	$7.25	$3.56
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$1.42	$2.17	$1.35	$0.90	$1.27	$0.58

Note: One or more cost element has been calculated externally
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Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Joint DWU and UTRWD - Red River OCR

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*	*DWU Share*	*UTRWD Share*
CAPITAL COST			
Off-Channel Storage/Ring Dike (Conservation Pool 32000 acft, 800 acres)	$180,643,000	$151,318,000	$29,325,000
Intake Pump Stations (103.1 MGD)	$171,741,000	$143,861,000	$27,880,000
Transmission Pipeline (78-84 in. dia., 99.8 miles)	$968,152,000	$810,984,000	$157,168,000
Transmission Pump Station(s) & Storage Tank(s)	$55,127,000	$46,178,000	$8,949,000
Integration, Relocations, Backup Generator & Other	$9,745,000	$8,163,000	$1,582,000
TOTAL COST OF FACILITIES	**$1,385,408,000**	**$1,160,504,000**	**$224,904,000**
Engineering:			
- Planning (3%)	$41,562,000	$34,815,000	$6,747,000
- Design (7%)	$96,979,000	$81,236,000	$15,743,000
- Construction Engineering (1%)	$13,854,000	$11,605,000	$2,249,000
Legal Assistance (2%)	$27,708,000	$23,210,000	$4,498,000
Fiscal Services (2%)		$23,210,000	$4,498,000
Pipeline Contingency (15%)	$145,223,000	$121,648,000	$23,575,000
All Other Facilities Contingency (20%)	$83,451,000	$69,904,000	$13,547,000
Environmental & Archaeology Studies and Mitigation	$13,188,000	$11,047,000	$2,141,000
Mitigation Land (50 acres)	$650,000	$544,000	$106,000
Land Acquisition and Surveying (3286 acres)	$44,300,000	$37,108,000	$7,192,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$182,354,000	$152,751,000	$29,603,000
TOTAL COST OF PROJECT	**$2,062,385,000**	**$1,727,582,000**	**$334,803,000**
ANNUAL COST			
Debt Service (3.5 percent, 20 years)	$124,043,000	$103,906,000	$20,137,000
Reservoir Debt Service (3.5 percent, 40 years)	$13,565,000	$11,363,000	$2,202,000
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$9,779,000	$8,191,000	$1,588,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$5,672,000	$4,751,000	$921,000
Dam and Reservoir (1.5% of Cost of Facilities)	$2,710,000	$2,270,000	$440,000
Water Treatment Plant	$4,191,000	$3,511,000	$680,000
Pumping Energy Costs (117213772 kW-hr @ 0.09 $/kW-hr)	$10,549,000	$8,836,000	$1,713,000
Sediment Basin Dredging	$2,710,000	$2,270,000	$440,000
TOTAL ANNUAL COST	**$173,219,000**	**$145,098,000**	**$28,121,000**
Available Project Yield (acft/yr)	92,400	77,400	15,000
Annual Cost of Water ($ per acft), based on PF=1.25	$1,875	$1,875	$1,875
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$385	$385	$385
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$5.75	$5.75	$5.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$1.18	$1.18	$1.18

Costs are from Draft Dallas Long Range Water Supply Plan, 2024

CZG *8/5/2025*

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Table H.26

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *NTMWD and UTRWD - George Parkhouse I (South)* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*			
Item	*Estimated Costs for Facilities*	*NTMWD Share*	*UTRWD Share*
CAPITAL COST			
Dam and Reservoir (Conservation Pool 651712 acft, 28855 acres)	$314,808,000	$220,366,000	$94,442,000
Terminal Storage (Conservation Pool 495 acft, 40 acres)	$24,782,000	$17,347,000	$7,435,000
Intake Pump Stations (153.9 MGD)	$87,111,000	$60,977,700	$26,133,300
Transmission Pipeline (48-90 in. dia., 89.8 miles)	$718,998,000	$358,187,000	$360,811,000
Transmission Pump Station(s) & Storage Tank(s)	$117,170,000	$34,613,000	$82,557,000
Integration, Relocations, Backup Generator & Other	$6,214,000	$4,350,000	$1,864,000
TOTAL COST OF FACILITIES	**$1,269,083,000**	**$695,840,700**	**$573,242,300**
Engineering:			
- Planning (3%)	$38,072,000	$20,875,000	$17,197,000
- Design (7%)	$88,836,000	$48,709,000	$40,127,000
- Construction Engineering (1%)	$12,691,000	$6,958,000	$5,733,000
Legal Assistance (2%)	$25,382,000	$13,917,000	$11,465,000
Fiscal Services (2%)	$25,382,000	$13,917,000	$11,465,000
Pipeline Contingency (15%)	$107,850,000	$53,728,000	$54,122,000
All Other Facilities Contingency (20%)	$110,017,000	$67,531,000	$42,486,000
Environmental & Archaeology Studies and Mitigation	$190,944,000	$133,661,000	$57,283,000
Mitigation Lands (28,855 acres)	$188,058,340	$131,641,000	$56,417,340
Land Acquisition and Surveying (30004 acres)	$205,000,000	$143,500,000	$61,500,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$293,972,000	$205,780,000	$88,192,000
TOTAL COST OF PROJECT	**$2,555,287,340**	**$1,536,057,700**	**$1,019,229,640**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$75,998,000	$39,057,000	$36,941,000
Reservoir Debt Service (3.5 percent, 40 years)	$54,204,000	$31,890,000	$22,314,000
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,252,000	$3,582,000	$3,670,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$5,107,000	$1,633,000	$3,474,000
Dam and Reservoir (1.5% of Cost of Facilities)	$5,094,000	$3,566,000	$1,528,000
Pumping Energy Costs (101945069 kW-hr @ 0.09 $/kW-hr)	$9,175,000	$3,564,000	$5,611,000
TOTAL ANNUAL COST	**$156,830,000**	**$83,292,000**	**$73,538,000**
Available Project Yield (acft/yr)	114,960	80,472	34,488
Annual Cost of Water ($ per acft), based on PF=1.5	$1,364	$1,035	$2,132
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$232	$153	$414
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$4.19	$3.18	$6.54
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.71	$0.47	$1.27
Note: One or more cost element has been calculated externally			
Holt Chambers			*6/13/2025*

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Table H.27

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
TRWD - Aquifer Storage and Recovery Pilot

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$4,571,000
Integration, Relocations, Backup Generator & Other	$5,810,000
TOTAL COST OF FACILITIES	**$10,381,000**
Engineering:	
- Planning (3%)	$311,000
- Design (7%)	$727,000
- Construction Engineering (1%)	$104,000
Legal Assistance (2%)	$208,000
Fiscal Services (2%)	$208,000
All Other Facilities Contingency (20%)	$2,076,000
Environmental & Archaeology Studies and Mitigation	$5,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$912,000
TOTAL COST OF PROJECT	**$14,932,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$812,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$104,000
Pumping Energy Costs (7644443 kW-hr @ 0.09 $/kW-hr)	$688,000
TOTAL ANNUAL COST	**$1,604,000**
Available Project Yield (acft/yr)	5,000
Annual Cost of Water ($ per acft), based on PF=1	$321
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$158
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.98
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.49
Note: One or more cost element has been calculated externally	

ADB *9/19/2024*

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Table H.28

Water Supply Project Option *TRWD - Marty Leonard Wetlands (Cedar Creek Wetland)* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.5 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Stations and Intake Facilities	$142,404,000
Raw Water Pipeline, Finishied Water Pipeline, and Balancing Reservoir	$108,521,000
Cedar Creek Wetlands Sedimentation Basins and Wetland Cells	$193,600,000
TOTAL COST OF FACILITIES	**$444,525,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$150,158,000
Environmental & Archaeology Studies and Mitigation	$21,000,000
Land Acquisition and Surveying	$16,600,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$41,098,000
TOTAL COST OF PROJECT	**$673,381,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$36,613,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,021,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,560,000
Pumping Energy Costs (kW-hr @ 0.09 $/kW-hr)	$14,307,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$57,501,000**
Available Project Yield (acft/yr)	88,059
Annual Cost of Water ($ per acft)	$652.98
Annual Cost of Water After Debt Service ($ per acft)	$237.20
Annual Cost of Water ($ per 1,000 gallons)	$2.00
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$0.73

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Table H.29

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
TRWD - Mary's Creek Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$15,950,000
Transmission Pipeline (42 in. dia., 3.5 miles)	$12,768,000
Integration, Relocations, Backup Generator & Other	$19,315,000
TOTAL COST OF FACILITIES	**$48,033,000**
Engineering:	
- Planning (3%)	$1,441,000
- Design (7%)	$3,362,000
- Construction Engineering (1%)	$480,000
Legal Assistance (2%)	$961,000
Fiscal Services (2%)	$961,000
Pipeline Contingency (15%)	$1,915,000
All Other Facilities Contingency (20%)	$7,053,000
Environmental & Archaeology Studies and Mitigation	$243,000
Land Acquisition and Surveying (18 acres)	$281,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$4,208,000
TOTAL COST OF PROJECT	**$68,938,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$3,748,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$321,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$399,000
Pumping Energy Costs (10334419 kW-hr @ 0.09 $/kW-hr)	$930,000
TOTAL ANNUAL COST	**$5,398,000**
Available Project Yield (acft/yr)	25,928
Annual Cost of Water ($ per acft), based on PF=2	$208
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$64
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.64
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.20
Note: One or more cost element has been calculated externally	

CJM - Plummer *12/12/2024*

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Table H.30

Water Supply Project Option *TRWD - Cedar Creek Wetland Expansion (Reuse from TRA Central RWS)* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.5 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
TOTAL COST OF FACILITIES	**$0**
TOTAL COST OF PROJECT	**$0**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Pumping Energy Costs (kW-hr @ 0.09 $/kW-hr)	$1,848,000
Purchase of Water (60,000 acft/yr @ $97.76 $/acft)	$5,865,000
TOTAL ANNUAL COST	**$7,713,000**
Available Project Yield (acft/yr)	60,000
Annual Cost of Water ($ per acft)	$128.55
Annual Cost of Water After Debt Service ($ per acft)	$128.55
Annual Cost of Water ($ per 1,000 gallons)	$0.39
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$0.39

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Table H.31

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
TRWD - Tehuacana Reservoir

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, 15000 acres)	$80,358,000
Integration, Relocations, Backup Generator & Other	$72,684,000
TOTAL COST OF FACILITIES	**$153,042,000**
Engineering:	
- Planning (3%)	$4,591,000
- Design (7%)	$10,713,000
- Construction Engineering (1%)	$1,530,000
Legal Assistance (2%)	$3,061,000
Fiscal Services (2%)	$3,061,000
All Other Facilities Contingency (20%)	$30,608,000
Environmental & Archaeology Studies and Mitigation	$110,855,000
Mitigation Land (15,000 acres)	$110,835,000
Land Acquisition and Surveying (15000 acres)	$111,735,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$35,103,000
TOTAL COST OF PROJECT	**$575,134,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$5,683,000
Reservoir Debt Service (3.5 percent, 40 years)	$22,037,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$727,000
Dam and Reservoir (1.5% of Cost of Facilities)	$1,205,000
TOTAL ANNUAL COST	**$29,652,000**
Available Project Yield (acft/yr)	22,330
Annual Cost of Water ($ per acft), based on PF=0	$1,328
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$87
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$4.07
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.27
Note: One or more cost element has been calculated externally	

ADB *9/20/2024*

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Table H.32

Cost Estimate Summary *TRWD - Groundwater Fields E1B, 4, & 1A - Section 16 (Average Scenario)*	
September 2023 Dollars	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline Rural Segment E1B - E4 (36 in dia., 4.2 miles)	$14,663,000
Transmission Pipeline Rural Segment E4 - E1A (42 in dia., 8.3 miles)	$37,722,000
Transmission Pipeline Rural Segment E1A - Section 16 (54 in dia., 18.8 miles)	$116,190,000
E1A Pump Station (2854 HP)	$24,917,000
Well Field E1B	$19,758,000
Well Field E4	$12,969,000
Well Field E1A	$22,365,000
Ground Storage Tank (3MG)	$3,306,000
TOTAL COST OF FACILITIES	**$251,890,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$79,568,000
Environmental & Archaeology Studies and Mitigation	$1,798,000
Land Acquisition and Surveying	$1,213,000
Interest During Construction (2 years)	$21,740,000
TOTAL COST OF PROJECT	**$356,209,000**
ANNUAL COST	
Debt Service (3.5% for 30 years)	$19,368,000
Electricity ($0.08 per kWh)	$3,790,000
Pump Station & Pipeline Operation & Maintenance	$3,719,000
Raw Water Purchase ($1.50/1,000 gal)	$12,219,000
TOTAL ANNUAL COST	**$39,096,000**
Available Project Yield (acft/yr)	32,000
Annual Cost of Water ($ per acft)	$1,222
Annual Cost of Water After Debt Service ($ per acft)	$617
Annual Cost of Water ($ per 1,000 gallons)	$3.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$1.89

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Table H.33

Cost Estimate Summary *Water Supply Project* *TRWD and DWU - IPL*			
Based on Costs Provided by Sponsors			
Item	***Estimated Costs for Facilities***	***TRWD Portion***	***DWU Portion***
CAPITAL COST			
JRC1 Richland-Chambers Reservoir Pump Station (250 MGD) and Transmission Pipeline Segment 16	$480,000,000	$480,000,000	$0
JB2 Booster Pump Station (347 MGD)	$223,000,000	$127,429,000	$95,571,000
JB3 Booster Pump Station Expansion (347 MGD)	$43,000,000	$24,571,000	$18,429,000
JB4 Booster Pump Station (197 MGD)	$233,000,000	$233,000,000	$0
Transmission Pipeline Segment Section 9	$462,000,000	$462,000,000	$0
TOTAL COST OF PROJECT	**$1,441,000,000**	**$1,327,000,000**	**$114,000,000**

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Table H.34

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
TRWD - Additional Transmission

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 500 acft, 45 acres)	$99,983,000
Intake Pump Stations (44.7 MGD)	$95,313,000
Transmission Pipeline (54-72 in. dia., 105.8 miles)	$631,490,000
Transmission Pump Station(s) & Storage Tank(s)	$77,830,000
Integration, Relocations, Backup Generator & Other	$6,252,000
TOTAL COST OF FACILITIES	**$910,868,000**
- Planning (3%)	$27,326,000
- Design (7%)	$63,761,000
- Construction Engineering (1%)	$9,109,000
Legal Assistance (2%)	$18,217,000
Fiscal Services (2%)	$18,217,000
Pipeline Contingency (15%)	$94,723,000
All Other Facilities Contingency (20%)	$55,876,000
Environmental & Archaeology Studies and Mitigation	$5,120,000
Land Acquisition and Surveying (846 acres)	$1,981,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$117,508,000
TOTAL COST OF PROJECT	**$1,322,706,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$63,658,000
Reservoir Debt Service (3.5 percent, 30 years)	$8,259,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$6,377,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$4,329,000
Dam and Reservoir (1.5% of Cost of Facilities)	$1,500,000
Pumping Energy Costs (102564729 kW-hr @ 0.09 $/kW-hr)	$9,231,000
TOTAL ANNUAL COST	**$93,354,000**
Available Project Yield (acft/yr)	77,400
Annual Cost of Water ($ per acft), based on PF=1.25	$1,206
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$277
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$3.70
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$0.85

CZG *12/20/2024*

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Table H.35

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *TRWD - Carrizo Wilcox Groundwater (Anderson County)*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 277.68 for September 2023	
Item	***for Carrizo Wilcox Groundwater (Anderson***
CAPITAL COST	
Pump Stations (56.2 MGD)	$68,251,000
Transmission Pipeline (54 in. dia., 57.9 miles)	$338,199,000
Well Fields (Wells, Pumps, and Piping)	$140,620,000
Integration, Relocations, Backup Generator & Other	$1,093,000
TOTAL COST OF FACILITIES	**$614,260,000**
Engineering:	
- Planning (3%)	$18,395,000
- Design (7%)	$42,922,000
- Construction Engineering (1%)	$6,132,000
Legal Assistance (2%)	$12,263,000
Fiscal Services (2%)	$12,263,000
Pipeline Contingency (15%)	$50,730,000
All Other Facilities Contingency (20%)	$54,994,000
Environmental & Archaeology Studies and Mitigation	$6,051,000
Land Acquisition and Surveying (823 acres)	$5,429,000
TOTAL COST OF PROJECT	**$823,439,000**
ANNUAL COST	
Debt Service (4 percent, 30 years)	$47,556,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,841,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,227,000
Pumping Energy Costs (51965633 kW-hr @ 0.09 $/kW-hr)	$4,677,000
Purchase of Water (42000 acft/yr @ 97.7553 $/acft)	$4,106,000
TOTAL ANNUAL COST	**$64,407,000**
Available Project Yield (acft/yr)	42,000
Annual Cost of Water ($ per acft), based on PF=1.5	$1,534
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$401
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$4.71
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.23
Lissa Gregg	*11/22/2024*

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Table H.36

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
TRWD - ALTERNATIVE - Oklahoma Water

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 200 acft, 13 acres)	$12,150,000
Intake Pump Stations (66.9 MGD)	$64,725,000
Transmission Pipeline (60 in. dia., 74.1 miles)	$480,818,000
Transmission Pump Station(s) & Storage Tank(s)	$69,677,000
Integration, Relocations, Backup Generator & Other	$2,551,000
TOTAL COST OF FACILITIES	**$629,921,000**
Engineering:	
- Planning (3%)	$18,898,000
- Design (7%)	$44,094,000
- Construction Engineering (1%)	$6,299,000
Legal Assistance (2%)	$12,598,000
Fiscal Services (2%)	$12,598,000
Pipeline Contingency (15%)	$72,123,000
All Other Facilities Contingency (20%)	$29,820,000
Environmental & Archaeology Studies and Mitigation	$2,604,000
Land Acquisition and Surveying (926 acres)	$13,861,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$82,175,000
TOTAL COST OF PROJECT	**$924,991,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$49,293,000
Terminal Storage Debt Service (3.5 percent, 30 years)	$1,000,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,834,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,360,000
Dam and Reservoir (1.5% of Cost of Facilities)	$182,000
Pumping Energy Costs (41848851 kW-hr @ 0.09 $/kW-hr)	$3,766,000
TOTAL ANNUAL COST	**$62,435,000**
Available Project Yield (acft/yr)	50,000
Annual Cost of Water ($ per acft), based on PF=1.5	$1,249
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$243
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$3.83
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.75

HAC *5/30/2025*

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Table H.37

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *DWU - Main Stem Balancing Reservoir*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Off-Channel Storage/Ring Dike (Conservation Pool 300000 acft, 4337 acres)	$282,129,000
Intake Pump Stations (127.5 MGD)	$127,285,000
Transmission Pipeline (72-90 in. dia., 38.3 miles)	$642,549,000
Transmission Pump Station(s) & Storage Tank(s)	$75,339,000
Integration, Relocations, Backup Generator & Other	$15,652,000
TOTAL COST OF FACILITIES	**$1,142,954,000**
Engineering:	
- Planning (3%)	$34,289,000
- Design (7%)	$80,007,000
- Construction Engineering (1%)	$11,430,000
Legal Assistance (2%)	$22,859,000
Fiscal Services (2%)	$22,859,000
Pipeline Contingency (15%)	$96,274,000
All Other Facilities Contingency (20%)	$100,225,000
Environmental & Archaeology Studies and Mitigation	$45,077,000
Mitigation Land (300 acres)	$3,900,000
Land Acquisition and Surveying (4584 acres)	$50,910,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$156,315,000
TOTAL COST OF PROJECT	**$1,767,099,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$87,010,000
Reservoir Debt Service (3.5 percent, 40 years)	$24,487,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$6,796,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$4,529,000
Dam and Reservoir (1.5% of Cost of Facilities)	$4,232,000
Pumping Energy Costs (124098746 kW-hr @ 0.09 $/kW-hr)	$11,169,000
TOTAL ANNUAL COST	**$138,223,000**
Available Project Yield (acft/yr)	114,337
Annual Cost of Water ($ per acft), based on PF=1.25	$1,209
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$234
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$3.71
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$0.72
Note: One or more cost element has been calculated externally	
P Newell Updated by C Nellis	*5/20/2024*

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Table H.38

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *DWU - Connect to Bachman*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (None)	$385,192,000
TOTAL COST OF FACILITIES	**$385,192,000**
Engineering:	$59,702,000
Legal Assistance (2%)	$6,401,000
Fiscal Services (1%)	$3,853,000
Pipeline Contingency (15%)	$57,779,000
Environmental & Archaeology Studies and Mitigation	$1,434,000
Land Acquisition and Surveying	$27,810,000
Interest During Construction (3% for 3 years with a 0.5% ROI)	$44,730,000
TOTAL COST OF PROJECT	**$586,902,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$41,194,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,852,000
TOTAL ANNUAL COST	**$45,046,000**
Available Project Yield (acft/yr)	114,337
Annual Cost of Water ($ per acft), based on PF=0	$394
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$33.69
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.21
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.10
Note: One or more cost element has been calculated externally	

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Table H.39

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
DWU - UNWSP - East Route (E3) - Scenario 1 (SW)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$13,201,000
Intake Pump Stations (91.4 MGD)	$69,929,000
Transmission Pipeline (66-72 in. dia., 42.3 miles)	$370,378,000
Transmission Pump Station(s) & Storage Tank(s)	$55,850,000
Integration, Relocations, Backup Generator & Other	$2,283,000
TOTAL COST OF FACILITIES	**$511,641,000**
Engineering:	
- Planning (3%)	$15,349,000
- Design (7%)	$35,815,000
- Construction Engineering (1%)	$5,116,000
Legal Assistance (2%)	$10,233,000
Fiscal Services (2%)	$10,233,000
Pipeline Contingency (15%)	$55,557,000
All Other Facilities Contingency (20%)	$28,253,000
Environmental & Archaeology Studies and Mitigation	$1,329,000
Land Acquisition and Surveying (266 acres)	$1,756,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$43,745,000
TOTAL COST OF PROJECT	**$719,027,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$50,431,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,806,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,945,000
Dam and Reservoir (1.5% of Cost of Facilities)	$198,000
Pumping Energy Costs (37458554 kW-hr @ 0.09 $/kW-hr)	$3,371,000
Delivery through IPL ($180,000 per MGD)	$8,646,000
TOTAL ANNUAL COST	**$69,397,000**
Available Project Yield (acft/yr)	53,800
Annual Cost of Water ($ per acft), based on PF=1.9027	$1,290
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.9027	$192
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.9027	$3.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.9027	$0.59

P Newell Updated by C Nellis and C Burton *8/28/2024*

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Table H.40

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Sabine Conjunctive Use Part 1 - Carrizo Wilcox Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (8.5 MGD)	$12,030,000
Transmission Pipeline (18-78 in. dia., 57.7 miles)	$263,637,000
Transmission Pump Station(s) & Storage Tank(s)	$58,396,000
Well Fields (Wells, Pumps, and Piping)	$150,872,000
TOTAL COST OF FACILITIES	**$484,935,000**
Engineering:	
- Planning (3%)	$14,133,000
- Design (7%)	$32,978,000
- Construction Engineering (1%)	$4,711,000
Legal Assistance (2%)	$9,422,000
Fiscal Services (2%)	$9,422,000
Pipeline Contingency (15%)	$37,472,000
All Other Facilities Contingency (20%)	$44,260,000
Environmental & Archaeology Studies and Mitigation	$8,484,000
Land Acquisition and Surveying (1010 acres)	$6,654,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$42,411,000
TOTAL COST OF PROJECT	**$694,882,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$48,893,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,129,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,454,000
Pumping Energy Costs (26618908 kW-hr @ 0.09 $/kW-hr)	$2,396,000
Delivery through Eastside Supply Pipeline ($ 60000/MGD)	$2,269,000
TOTAL ANNUAL COST	**$59,141,000**
Available Project Yield (acft/yr)	30,000
Annual Cost of Water ($ per acft), based on PF=0	$1,971
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$342
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$6.05
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$1.05

P Newell Updated By C Burton *9/25/2024*

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Table H.41

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Sabine Conjunctive Use Part 2 - Sabine River Off Channel Reservoir

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$13,201,000
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$401,621,000
Intake Pump Stations (63.1 MGD)	$130,022,000
Transmission Pipeline (24-90 in. dia., 7.5 miles)	$77,546,000
TOTAL COST OF FACILITIES	**$622,390,000**
Engineering:	
- Planning (3%)	$18,672,000
- Design (7%)	$43,567,000
- Construction Engineering (1%)	$6,224,000
Legal Assistance (2%)	$12,448,000
Fiscal Services (2%)	$12,448,000
Pipeline Contingency (15%)	$11,597,000
All Other Facilities Contingency (20%)	$109,015,000
Environmental & Archaeology Studies and Mitigation	$6,501,000
Mitigation Land (50 acres)	$300,000
Land Acquisition and Surveying (880 acres)	$5,002,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$55,132,000
TOTAL COST OF PROJECT	**$903,296,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$22,211,000
Reservoir Debt Service (3.5 percent, 40 years)	$27,517,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$775,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,251,000
Dam and Reservoir (1.5% of Cost of Facilities)	$6,222,000
Pumping Energy Costs (99254469 kW-hr @ 0.09 $/kW-hr)	$8,933,000
Delivery through Eastside Supply Pipeline ($ 60000/ MGD)	$5,612,107
TOTAL ANNUAL COST	**$74,521,107**
Available Project Yield (acft/yr)	74,200
Annual Cost of Water ($ per acft), based on PF=0	$1,004
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$334
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$3.08
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$1.03
Note: One or more cost element has been calculated externally	

Z Stein Updated By C Burton *9/25/2024*

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Table H.42

DWU - System Improvements		
Amount	268,403	AF/Y
OWNER:	DWU	

Project	Capital Budget (Includes Engineering and Contingency)
2030 Projects	
Pipelines	
Southwest Pipeline Phase 1	$113,000,000
Southwest Pipeline Phase 2	$200,000,000
Southwest Pipeline Phase 3	$230,000,000
All Other Facilities	
Lake June PS Phase 1 (Reservoirs)	$70,000,000
Bachman WTP; High-Rate Treatment Trains and Filters	$240,000,000
Wintergreen Pump Station - Initial Stage	$80,000,000
Wintergreen Pump Station - Final Buildout	$26,000,000
Pipeline Total	**$543,000,000**
All Other Facilities Total	**$416,000,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	**$26,372,500**
Total, 2030 Projects	**$985,373,000**
Annual Costs for 2030 Projects	
Debt Service (3.5% interest, 30 year bonds)	$53,576,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,430,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$4,400,000
Dam and Reservoir (1.5% of Cost of Facilities)	$1,050,000
WTP Operations	$16,800,000
Total Pre-Amortization	**$81,256,000**
Total After Amortization	**$27,680,000**

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Continued	
2040 Projects	
Pipelines	
72-inch Treated Water Pipeline; Bachman WTP to Elm Fork WTP	$90,000,000
All Other Facilities	
Elm Fork WTP; Water Quality Improvements Program (CMAR delivery)	$491,000,000
New 150MGD Western WTP	$891,280,000
Lake June PS Phase 2	$170,000,000
Pipeline Total	**$90,000,000**
All Other Facilities Total	**$1,552,280,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	**$45,162,700**
Total, 2040 Projects	**$1,687,443,000**
Annual Costs for 2040 Projects	
Debt Service (3.5% interest, 30 year bonds)	$91,749,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$900,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$4,250,000
Water Treatment Plant Operation	$96,759,600
Total Pre-Amortization	**$193,658,600**
Total After Amortization	**$101,909,600**
2050 Projects	
144-in Pipeline; Tawakoni Interconnect to Balancing Reservoir and on to East Side WTP	$390,000,000
East Side WTP; Stage V Filters	$55,000,000
New 240MGD Eastern WTP	$1,378,772,000
Pipeline Total	**$390,000,000**
All Other Facilities Total	**$1,433,772,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	$50,153,730
Total, 2050 Projects	**$1,873,926,000**
Annual Costs for 2050 Projects	
Debt Service (3.5% interest, 30 year bonds)	$101,888,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,900,000
Water Treatment Plant Operation	$100,364,040
Total Pre-Amortization	**$206,152,040**
Total After Amortization	**$104,264,040**

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Continued	
2070 Projects	
Western WTP Expansion	$289,462,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$7,960,205
Total, 2070 Projects	**$297,422,000**
Annual Costs for 2070 Projects	
Debt Service (3.5% interest, 30 year bonds)	$16,171,000
Operation and Maintenance	
Water Treatment Plant Operation	$20,262,340
Total During Amortization	**$36,433,340**
Total After Amortization	**$20,262,340**
2080 Projects	
Expand Eastern WTP	$376,295,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$10,348,113
Total, 2080 Projects	**$386,643,000**
Annual Costs for 2080 Projects	
Debt Service (3.5% interest, 30 year bonds)	$21,022,000
Operation and Maintenance	
Water Treatment Plant Operation	$26,340,650
Total During Amortization	**$47,362,650**
Total After Amortization	**$26,340,650**
TOTAL CAPITAL COST	**$5,230,807,000**
UNIT COSTS (During Amortization)	
Per Acre-Foot	**$2,105**
Per 1,000 Gallons	**$6.46**
UNIT COSTS (After Amortization)	
Per Acre-Foot	**$1,045**
Per 1,000 Gallons	**$3.21**

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Table H.43

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
DWU - Red River Off-Channel Reservoir

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Off-Channel Storage/Ring Dike (Conservation Pool 32000 acft, 800 acres)	$180,643,000
Intake Pump Stations (103.1 MGD)	$171,741,000
Transmission Pipeline (78-84 in. dia., 99.8 miles)	$968,152,000
Transmission Pump Station(s) & Storage Tank(s)	$55,127,000
Integration, Relocations, Backup Generator & Other	$9,745,000
TOTAL COST OF FACILITIES	**$1,385,408,000**
- Planning (3%)	$41,562,000
- Design (7%)	$96,979,000
- Construction Engineering (1%)	$13,854,000
Legal Assistance (2%)	$27,708,000
Fiscal Services (2%)	$27,708,000
Pipeline Contingency (15%)	$145,223,000
All Other Facilities Contingency (20%)	$83,451,000
Environmental & Archaeology Studies and Mitigation	$13,188,000
Mitigation Land (50 acres)	$650,000
Land Acquisition and Surveying (3286 acres)	$44,300,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$182,354,000
TOTAL COST OF PROJECT	**$2,062,385,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$124,043,000
Reservoir Debt Service (3.5 percent, 40 years)	$13,565,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$9,779,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$5,672,000
Dam and Reservoir (1.5% of Cost of Facilities)	$2,710,000
Water Treatment Plant	$4,191,000
Pumping Energy Costs (117213772 kW-hr @ 0.09 $/kW-hr)	$10,549,000
Sediment Basin Dredging	$2,710,000
TOTAL ANNUAL COST	**$173,219,000**
Available Project Yield (acft/yr)	92,400
Annual Cost of Water ($ per acft), based on PF=1.25	$1,875
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$385
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$5.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$1.18

Note: One or more cost element has been calculated externally

Z Stein Updated by C Nellis *5/23/2024*

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Table H.44

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
DWU - Lake Texoma

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (181.1 MGD)	$196,547,000
Transmission Pipeline (30-90 in. dia., 96.7 miles)	$1,083,333,000
Transmission Pump Station(s) & Storage Tank(s)	$13,245,000
Two Water Treatment Plants (90.6 MGD and 181.1 MGD)	$1,167,105,000
Integration, Relocations, Backup Generator & Other	$6,450,000
TOTAL COST OF FACILITIES	**$2,466,680,000**
- Planning (3%)	$74,000,000
- Design (7%)	$172,668,000
- Construction Engineering (1%)	$24,667,000
Legal Assistance (2%)	$49,334,000
Fiscal Services (2%)	$49,334,000
Pipeline Contingency (15%)	$162,500,000
All Other Facilities Contingency (20%)	$276,669,000
Environmental & Archaeology Studies and Mitigation	$3,667,000
Land Acquisition and Surveying (1914 acres)	$10,693,000
Interest During Construction (3.5% for 5 years with a 0.5% ROI)	$533,612,000
TOTAL COST OF PROJECT	**$3,823,824,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$268,595,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$10,922,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$5,185,000
Water Treatment Plant	$132,404,000
Pumping Energy Costs (105818823 kW-hr @ 0.09 $/kW-hr)	$9,524,000
Purchase of Water (146000 acft/yr @ 31.0599602177554 $/acft)	$4,535,000
TOTAL ANNUAL COST	**$431,165,000**
Available Project Yield (acft/yr)	146,000
Annual Cost of Water ($ per acft), based on PF=1.25	$2,953
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$1,113
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$9.06
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$3.42
Note: One or more cost element has been calculated externally	

L Starosta Updated by C Nellis *5/28/2024*

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Table H.45

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *DWU - Lake Columbia*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Dam and Reservoir (Conservation Pool 195500 acft, 11500 acres)	$45,860,000
Intake Pump Stations (52.6 MGD)	$65,870,000
Transmission Pipeline (54 in. dia., 19.9 miles)	$150,239,000
Integration, Relocations, Backup Generator & Other	$98,596,000
TOTAL COST OF FACILITIES	**$360,565,000**
Engineering:	
- Planning (3%)	$10,817,000
- Design (7%)	$25,240,000
- Construction Engineering (1%)	$3,606,000
Legal Assistance (2%)	$7,211,000
Fiscal Services (2%)	$7,211,000
Pipeline Contingency (15%)	$22,536,000
All Other Facilities Contingency (20%)	$42,065,000
Environmental & Archaeology Studies and Mitigation	$113,731,000
Land Acquisition and Surveying (11988 acres)	$31,402,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$60,638,000
TOTAL COST OF PROJECT	**$685,022,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$32,334,000
Reservoir Debt Service (3.5 percent, 40 years)	$10,443,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,488,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,647,000
Dam and Reservoir (1.5% of Cost of Facilities)	$688,000
Pumping Energy Costs (40470671 kW-hr @ 0.09 $/kW-hr)	$3,642,000
Delivery through IPL (50 MGD @ 180000 $/MGD)	$8,992,000
TOTAL ANNUAL COST	**$60,234,000**
Available Project Yield (acft/yr)	56,000
Annual Cost of Water ($ per acft), based on PF=1	$1,076
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$312
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$3.30
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.96
Note: One or more cost element has been calculated externally	
Z Stein Updated By C Nellis, C Burton	*9/26/2024*

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Table H.46

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *DWU - Interstate - Little River-Millwood Lake*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Channel Dam	$12,609,000
Intake Pump Stations (281.2 MGD)	$84,853,000
Transmission Pipeline (132 in. dia., 206.5 miles)	$4,778,645,000
Transmission Pump Station(s) & Storage Tank(s)	$229,304,000
Integration, Relocations, Backup Generator & Other	$34,332,000
TOTAL COST OF FACILITIES	**$5,139,743,000**
Engineering:	
- Planning (3%)	$154,192,000
- Design (7%)	$359,782,000
- Construction Engineering (1%)	$51,397,000
Legal Assistance (2%)	$102,795,000
Fiscal Services (2%)	$102,795,000
Pipeline Contingency (15%)	$716,797,000
All Other Facilities Contingency (20%)	$72,220,000
Environmental & Archaeology Studies and Mitigation	$6,220,000
Land Acquisition and Surveying (2523 acres)	$3,373,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$651,299,000
TOTAL COST OF PROJECT	**$7,360,613,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$515,837,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$48,130,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$7,854,000
Dam and Reservoir (1.5% of Cost of Facilities)	$189,000
Pumping Energy Costs (481225500 kW-hr @ 0.09 $/kW-hr)	$43,310,000
TOTAL ANNUAL COST	**$615,320,000**
Available Project Yield (acft/yr)	300,000
Annual Cost of Water ($ per acft), based on PF=1.05	$2,051
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.05	$332
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.05	$6.29
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.05	$1.02
Note: One or more cost element has been calculated externally	
Charley Burton	*5/31/2024*

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Table H.47

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *DWU - Interstate - Kiamichi River*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Channel Dam	$12,609,000
Intake Pump Stations (281.2 MGD)	$91,466,000
Transmission Pipeline (132 in. dia., 124.5 miles)	$2,702,120,000
Transmission Pump Station(s) & Storage Tank(s)	$139,846,000
Integration, Relocations, Backup Generator & Other	$24,996,000
TOTAL COST OF FACILITIES	**$2,971,037,000**
Engineering:	
- Planning (3%)	$89,131,000
- Design (7%)	$207,973,000
- Construction Engineering (1%)	$29,710,000
Legal Assistance (2%)	$59,421,000
Fiscal Services (2%)	$59,421,000
Pipeline Contingency (15%)	$405,318,000
All Other Facilities Contingency (20%)	$53,784,000
Environmental & Archaeology Studies and Mitigation	$3,752,000
Land Acquisition and Surveying (1524 acres)	$2,193,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$376,521,000
TOTAL COST OF PROJECT	**$4,258,261,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$298,209,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$27,271,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$5,783,000
Dam and Reservoir (1.5% of Cost of Facilities)	$189,000
Pumping Energy Costs (328059406 kW-hr @ 0.09 $/kW-hr)	$29,525,000
TOTAL ANNUAL COST	**$360,977,000**
Available Project Yield (acft/yr)	300,000
Annual Cost of Water ($ per acft), based on PF=1.05	$1,203
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.05	$209
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.05	$3.69
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.05	$0.64
Note: One or more cost element has been calculated externally	
Charley Burton	*5/30/2024*

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Table H.48

Cost Estimate Summary Water Supply Project Option September 2023 Prices NTWMD - Texoma Blend Phase I			
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023			
Item	***Estimated Cost (Project Total)***	***Estimated Cost (NTMWD)***	***Estimated Cost (Sherman)***
CAPITAL COST			
Terminal Storage (Conservation Pool 200 acft, 15 acres)	$12,150,000	$12,150,000	$0
Intake Pump Stations (0 MGD)	$55,409,000	$44,327,000	$11,082,000
Transmission Pipeline (84 in. dia., 35.1 miles)	$321,878,000	$273,291,000	$48,587,000
Integration, Relocations, Backup Generator & Other	$1,808,000	$1,446,000	$362,000
TOTAL COST OF FACILITIES	**$391,245,000**	**$331,214,000**	**$60,031,000**
Engineering:			
- Planning (3%)	$11,737,000	$9,936,000	$1,801,000
- Design (7%)	$27,387,000	$23,185,000	$4,202,000
- Construction Engineering (1%)	$3,912,000	$3,312,000	$600,000
Legal Assistance (2%)	$7,825,000	$6,624,000	$1,201,000
Fiscal Services (2%)	$7,825,000	$6,624,000	$1,201,000
Pipeline Contingency (15%)	$48,282,000	$40,994,000	$7,288,000
All Other Facilities Contingency (20%)	$13,874,000	$11,585,000	$2,289,000
Environmental & Archaeology Studies and Mitigation	$1,241,000	$1,082,000	$159,000
Land Acquisition and Surveying (233 acres)	$3,108,000	$2,676,000	$432,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$33,569,000	$28,421,000	$5,148,000
TOTAL COST OF PROJECT	**$550,005,000**	**$465,653,000**	**$84,352,000**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$28,933,000	$24,496,000	$4,437,000
Reservoir Debt Service (3.5 percent, 40 years)	$837,000	$837,000	$0
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,237,000	$2,748,000	$489,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,385,000	$1,108,000	$277,000
Dam and Reservoir (1.5% of Cost of Facilities)	$182,000	$182,000	$0
Pumping Energy Costs (29665313 kW-hr @ 0.09 $/kW-hr)	$2,670,000	$2,136,000	$534,000
TOTAL ANNUAL COST	**$37,244,000**	**$31,507,000**	**$5,737,000**
Available Project Yield (acft/yr)		39,309	11,385
Annual Cost of Water ($ per acft), based on PF=2		$802	$504
Annual Cost of Water After Debt Service ($ per acft), based on PF=2		$157	$114
Annual Cost of Water ($ per 1,000 gallons), based on PF=2		$2.46	$1.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2		$0.48	$0.35
HAC			*11/11/2024*

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Table H.49

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Additional Measures to Access Full Lake Lavon Yield

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$155,326,000
Transmission Pipeline (None)	$24,659,000
TOTAL COST OF FACILITIES	**$179,985,000**
Engineering:	
- Planning (3%)	$5,400,000
- Design (7%)	$12,599,000
- Construction Engineering (1%)	$1,800,000
Legal Assistance (2%)	$3,600,000
Fiscal Services (2%)	$3,600,000
Pipeline Contingency (15%)	$3,699,000
All Other Facilities Contingency (20%)	$31,065,000
Environmental & Archaeology Studies and Mitigation	$2,322,000
Land Acquisition and Surveying (0 acres)	$914,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$19,421,000
Credit for Replacement Capacity in lieu of Rehabilitation	($55,057,000)
TOTAL COST OF PROJECT	**$209,348,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,383,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$247,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,883,000
TOTAL ANNUAL COST	**$15,513,000**
Available Project Yield (acft/yr)	12,667
Annual Cost of Water ($ per acft), based on PF=0	$1,225
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$326
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$3.76
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$1.00
Note: One or more cost element has been calculated externally	

HAC *11/12/2024*

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Table H.50

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *NTMWD - Expanded Wetland Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (47.8 MGD)	$31,786,000
Transmission Pipeline (48-54 in. dia., 52.2 miles)	$327,845,000
Intake Pump Stations (45.3 MGD)	$64,373,000
Constructed Wetlands (690 ac.)	$26,292,000
Backup Generator	$1,394,000
TOTAL COST OF FACILITIES	**$451,690,000**
Engineering:	
- Planning (3%)	$13,551,000
- Design (7%)	$31,618,000
- Construction Engineering (1%)	$4,517,000
Legal Assistance (2%)	$9,034,000
Fiscal Services (2%)	$9,034,000
Pipeline Contingency (15%)	$49,177,000
All Other Facilities Contingency (20%)	$24,769,000
Environmental & Archaeology Studies and Mitigation	$20,072,000
Land Acquisition and Surveying (391 acres)	$12,040,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$60,987,000
TOTAL COST OF PROJECT	**$686,489,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$46,309,000
Reservoir Debt Service (3.5 percent, 40 years)	$1,326,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,555,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,404,000
Pumping Energy Costs (22862206 kW-hr @ 0.09 $/kW-hr)	$2,058,000
TOTAL ANNUAL COST	**$55,652,000**
Available Project Yield (acft/yr)	33,809
Annual Cost of Water ($ per acft), based on PF=1.5	$1,646
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$237
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$5.05
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.73
Note: One or more cost element has been calculated externally	
HAC	*12/10/2024*

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Table H.51

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *NTWMD - Sabine Creek Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Permitting	$500,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$17,000
TOTAL COST OF PROJECT	**$517,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$36,000
TOTAL ANNUAL COST	**$36,000**
Available Project Yield (acft/yr)	10,649
Annual Cost of Water ($ per acft), based on PF=0	$3
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.01
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00
HAC	*12/11/2024*

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Table H.52

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *NTWMD - Additional Lavon Watershed Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Permtting	$500,000
TOTAL COST OF PROJECT	**$517,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$36,000
TOTAL ANNUAL COST	**$36,000**
Available Project Yield (acft/yr)	45,045
Annual Cost of Water ($ per acft), based on PF=0	$1
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.0025
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00
HAC	*12/11/2024*

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Table H.53

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Lake O' the Pines

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 308 acft, 25 acres)	$33,543,000
Intake Pump Stations (100.4 MGD)	$87,452,000
Transmission Pipeline (72 in. dia., 96.9 miles)	$777,902,000
Transmission Pump Station(s) & Storage Tank(s)	$52,490,000
Integration, Relocations, Backup Generator & Other	$4,710,000
TOTAL COST OF FACILITIES	**$956,097,000**
Engineering:	
- Planning (3%)	$28,683,000
- Design (7%)	$66,927,000
- Construction Engineering (1%)	$9,561,000
Legal Assistance (2%)	$19,122,000
Fiscal Services (2%)	$19,122,000
Pipeline Contingency (15%)	$116,685,000
All Other Facilities Contingency (20%)	$35,639,000
Environmental & Archaeology Studies and Mitigation	$3,701,000
Land Acquisition and Surveying (1234 acres)	$8,117,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$82,138,000
TOTAL COST OF PROJECT	**$1,345,792,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$70,515,000
Reservoir Debt Service (3.5 percent, 40 years)	$2,288,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,826,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,499,000
Dam and Reservoir (1.5% of Cost of Facilities)	$503,000
Pumping Energy Costs (77279159 kW-hr @ 0.09 $/kW-hr)	$6,955,000
Purchase of Water (75000 acft/yr @ 97.7553 $/acft)	$7,332,000
TOTAL ANNUAL COST	**$98,918,000**
Available Project Yield (acft/yr)	75,000
Annual Cost of Water ($ per acft), based on PF=1.5	$1,319
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$348
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$4.05
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.07
Note: One or more cost element has been calculated externally	

HAC *11/11/2024*

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Table H.54

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Texoma Blend Phase II

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 400 acft, 35 acres)	$41,435,000
Intake Pump Stations (100.4 MGD)	$104,222,000
Transmission Pipeline (48-72 in. dia., 91.4 miles)	$537,097,000
Integration, Relocations, Backup Generator & Other	$1,357,000
TOTAL COST OF FACILITIES	**$684,111,000**
Engineering:	
- Planning (3%)	$20,523,000
- Design (7%)	$47,888,000
- Construction Engineering (1%)	$6,841,000
Legal Assistance (2%)	$13,682,000
Fiscal Services (2%)	$13,682,000
Pipeline Contingency (15%)	$80,565,000
All Other Facilities Contingency (20%)	$29,403,000
Environmental & Archaeology Studies and Mitigation	$3,615,000
Land Acquisition and Surveying (634 acres)	$8,475,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$88,608,000
TOTAL COST OF PROJECT	**$997,393,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$50,787,000
Reservoir Debt Service (3.5 percent, 40 years)	$2,965,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,385,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,606,000
Pumping Energy Costs (22264968 kW-hr @ 0.09 $/kW-hr)	$2,004,000
TOTAL ANNUAL COST	**$64,369,000**
Available Project Yield (acft/yr)	75,000
Annual Cost of Water ($ per acft), based on PF=1.5	$858
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$142
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$2.63
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.43

HAC *11/11/2024*

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Table H.55

NTMWD - Treatment & Treated Water Distribution Improvements		
Probable Amount	519,504	AF/Y
OWNER:	NTMWD	
Construction Costs (Including Engineering and Contingencies)		**Cost**
2030-2040 Projects		
Water Distribution System Improvements - Pipelines		$428,895,562
Water Distribution System Improvements - Pump Stations		$201,006,567
WTP Construction and Expansion		$233,000,703
Storage Tanks		
Other		$81,449,501
Subtotal		**$944,352,332**
Interest During Construction (3% for 1 years with a 0.5% ROI)		$25,969,689
Total 2030-2040 Projects		**$970,322,000**
Annual Costs for 2030-2040 Projects		
Debt Service (3.5% interest, 30 year bonds)		$52,758,000
Facility Operation and Maintenance		$10,114,657
WTP Operation and Maintenance		$37,767,469
Total During Amortization		**$100,640,127**
Total After Amortization		**$47,882,127**
2040-2050 Projects		
Water Distribution System Improvements - Pipelines		$240,228,000
Water Distribution System Improvements - Pump Stations		$177,168,000
WTP Construction and Expansion		$2,130,233,900
Storage Tanks		
Other		$10,212,000
Subtotal		**$2,557,841,900**
Interest During Construction (3% for 1 years with a 0.5% ROI)		$70,340,652

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Total 2040-2050 Projects	**$2,628,183,000**
Annual Costs for 2040-2050 Projects	
Debt Service (3.5% interest, 30 year bonds)	$142,898,000
Facility Operation and Maintenance	$6,831,480
WTP Operation and Maintenance	$126,451,766
Total During Amortization	**$276,181,246**
Total After Amortization	**$133,283,246**
2050-2060 Projects	
WTP Construction and Expansion	$221,007,000
Subtotal	**$221,007,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	$6,077,693
Total 2050-2060 Projects	**$227,085,000**
Annual Costs for 2050-2060 Projects	
Debt Service (3.5% interest, 30 year bonds)	$12,347,000
WTP Operation and Maintenance	$10,719,000
Total During Amortization	**$23,066,000**
Total After Amortization	**$10,719,000**
2060-2070 Projects	
WTP Construction and Expansion	$836,185,000
Subtotal	**$836,185,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	$22,995,088
Total 2060-2070 Projects	**$859,180,000**
Annual Costs for 2060 Projects	
Debt Service (3.5% interest, 30 year bonds)	$46,715,000

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WTP Operation and Maintenance	$40,629,000
Total During Amortization	**$87,344,000**
Total After Amortization	**$40,629,000**
TOTAL CAPITAL COST	**$4,684,770,000**
ANNUAL COSTS	
Debt Service (3.5% for 30 years)	$254,717,000
Electricity ($0.09 per kWh)	$0
Operation and Maintenance	$232,513,372
Total Annual Costs	**$487,230,372**
UNIT COSTS (During Amortization)	
Per Acre-Foot	**$938**
Per 1,000 Gallons	**$2.88**
UNIT COSTS (After Amortization)	
Per Acre-Foot	**$448**
Per 1,000 Gallons	**$1.37**

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Table H.56

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Fannin County Water Supply Project

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (6.4 MGD)	$9,581,000
Transmission Pipeline (8-24 in. dia., 73.1 miles)	$134,195,000
Storage Tanks (Other Than at Booster Pump Stations)	$5,308,000
Integration, Relocations, Backup Generator & Other	$115,000
TOTAL COST OF FACILITIES	**$149,199,000**
Engineering:	
- Planning (3%)	$4,476,000
- Design (7%)	$10,444,000
- Construction Engineering (1%)	$1,492,000
Legal Assistance (2%)	$2,984,000
Fiscal Services (2%)	$2,984,000
Pipeline Contingency (15%)	$20,129,000
All Other Facilities Contingency (20%)	$3,001,000
Environmental & Archaeology Studies and Mitigation	$2,405,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$13,144,000
TOTAL COST OF PROJECT	**$215,353,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,709,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,396,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$240,000
Pumping Energy Costs (1879990 kW-hr @ 0.09 $/kW-hr)	$169,000
Purchase of Water (4816 acft/yr @ 1303.404 $/acft)	$6,277,000
TOTAL ANNUAL COST	**$19,791,000**
Available Project Yield (acft/yr)	4,816
Annual Cost of Water ($ per acft), based on PF=2	$4,109
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,678
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$12.61
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.15

HAC *11/19/2024*

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Table H.57

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Lake Texoma Desalination at Leonard WTP

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 350 acft, 30 acres)	$18,573,000
Intake Pump Stations (53.6 MGD)	$56,343,000
Transmission Pipeline (24-54 in. dia., 59.6 miles)	$272,787,000
Two Water Treatment Plants (60 MGD and 36 MGD)	$464,267,000
Integration, Relocations, Backup Generator & Other	$1,074,000
TOTAL COST OF FACILITIES	**$813,044,000**
Engineering:	
- Planning (3%)	$24,391,000
- Design (7%)	$56,913,000
- Construction Engineering (1%)	$8,130,000
Legal Assistance (2%)	$16,261,000
Fiscal Services (2%)	$16,261,000
Pipeline Contingency (15%)	$40,918,000
All Other Facilities Contingency (20%)	$108,051,000
Environmental & Archaeology Studies and Mitigation	$2,164,000
Land Acquisition and Surveying (522 acres)	$6,327,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$106,516,000
TOTAL COST OF PROJECT	**$1,198,976,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$82,367,000
Reservoir Debt Service (3.5 percent, 40 years)	$1,327,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,739,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,409,000
Dam and Reservoir (1.5% of Cost of Facilities)	$279,000
Water Treatment Plant	$55,158,000
Pumping Energy Costs (17626689 kW-hr @ 0.09 $/kW-hr)	$1,586,000
TOTAL ANNUAL COST	**$144,865,000**
Available Project Yield (acft/yr)	33,630
Annual Cost of Water ($ per acft), based on PF=2	$4,308
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,819
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$13.22
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.58

HAC *11/11/2024*

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Table H.58

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *NTMWD - Carrizo-Wilcox Groundwater* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
Primary Pump Station (56.2 MGD)	$50,086,000
Transmission Pipeline (54 in. dia., 90.8 miles)	$578,096,000
Transmission Pump Station(s) & Storage Tank(s)	$46,761,000
Well Fields (Wells, Pumps, and Piping)	$142,410,000
Storage Tanks (Other Than at Booster Pump Stations)	$35,027,000
Integration, Relocations, Backup Generator & Other	$2,051,000
TOTAL COST OF FACILITIES	**$854,431,000**
- Planning (3%)	$25,633,000
- Design (7%)	$59,810,000
- Construction Engineering (1%)	$8,544,000
Legal Assistance (2%)	$17,089,000
Fiscal Services (2%)	$17,089,000
Pipeline Contingency (15%)	$86,714,000
All Other Facilities Contingency (20%)	$55,267,000
Environmental & Archaeology Studies and Mitigation	$7,885,000
Land Acquisition and Surveying (1462 acres)	$9,638,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$111,355,000
TOTAL COST OF PROJECT	**$1,253,455,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$68,152,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,598,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,366,000
Water Treatment Plant	$0
Pumping Energy Costs (33653823 kW-hr @ 0.09 $/kW-hr)	$3,029,000
Purchase of Water (42000 acft/yr @ 97.7553 $/acft)	$4,106,000
TOTAL ANNUAL COST	**$85,251,000**
Available Project Yield (acft/yr)	42,000
Annual Cost of Water ($ per acft), based on PF=1.5	$2,030
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$407
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$6.23
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.25
Holt Chambers	*11/5/2024*

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Table H.59

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - George Parkhouse II (North)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool 330871 acft, 15356 acres)	$361,646,000
Terminal Storage (Conservation Pool 621 acft, 35 acres)	$30,173,000
Intake Pump Stations (126.5 MGD)	$95,707,000
Transmission Pipeline (84 in. dia., 52.9 miles)	$525,796,000
Integration, Relocations, Backup Generator & Other	$4,306,000
TOTAL COST OF FACILITIES	**$1,017,628,000**
Engineering:	
- Planning (3%)	$30,529,000
- Design (7%)	$71,234,000
- Construction Engineering (1%)	$10,176,000
Legal Assistance (2%)	$20,353,000
Fiscal Services (2%)	$20,353,000
Pipeline Contingency (15%)	$78,869,000
All Other Facilities Contingency (20%)	$98,366,000
Environmental & Archaeology Studies and Mitigation	$101,871,000
Mitigation Land (15,356 acres)	$100,252,235
Land Acquisition and Surveying (16037 acres)	$110,039,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$215,758,000
TOTAL COST OF PROJECT	**$1,875,428,235**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$50,936,000
Reservoir Debt Service (3.5 percent, 40 years)	$43,953,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,301,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,393,000
Dam and Reservoir (1.5% of Cost of Facilities)	$5,877,000
Pumping Energy Costs (70647930 kW-hr @ 0.09 $/kW-hr)	$6,358,000
TOTAL ANNUAL COST	**$114,818,000**
Available Project Yield (acft/yr)	94,460
Annual Cost of Water ($ per acft), based on PF=1.5	$1,216
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$211
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$3.73
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.65
Note: One or more cost element has been calculated externally	

Holt Chambers *11/5/2024*

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Table H.60

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - George Parkhouse I (South)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool 651712 acft, 28855 acres)	$314,808,000
Terminal Storage (Conservation Pool 756 acft, 62 acres)	$35,949,000
Intake Pump Stations (153.9 MGD)	$103,376,000
Transmission Pipeline (90 in. dia., 53 miles)	$571,804,000
Integration, Relocations, Backup Generator & Other	$4,961,000
TOTAL COST OF FACILITIES	**$1,030,898,000**
Engineering:	
- Planning (3%)	$30,927,000
- Design (7%)	$72,163,000
- Construction Engineering (1%)	$10,309,000
Legal Assistance (2%)	$20,618,000
Fiscal Services (2%)	$20,618,000
Pipeline Contingency (15%)	$85,771,000
All Other Facilities Contingency (20%)	$91,819,000
Environmental & Archaeology Studies and Mitigation	$189,956,000
Mitigation Land (28,855 acres)	$188,334,000
Land Acquisition and Surveying (29564 acres)	$195,868,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$251,847,000
TOTAL COST OF PROJECT	**$2,189,128,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$55,113,000
Reservoir Debt Service (3.5 percent, 40 years)	$55,045,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,768,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,584,000
Dam and Reservoir (1.5% of Cost of Facilities)	$5,261,000
Pumping Energy Costs (81391597 kW-hr @ 0.09 $/kW-hr)	$7,325,000
TOTAL ANNUAL COST	**$131,096,000**
Available Project Yield (acft/yr)	114,960
Annual Cost of Water ($ per acft), based on PF=1.5	$1,140
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$182
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$3.50
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.56
Note: One or more cost element has been calculated externally	

Holt Chambers *11/5/2024*

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Table H.61

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Aquifer Storage & Recovery

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$2,000,000
Well Fields (Wells, Pumps, and Piping)	$164,042,000
Two Water Treatment Plants (23.6 MGD and 23.6 MGD)	$56,005,000
TOTAL COST OF FACILITIES	**$222,047,000**
- Planning (3%)	$6,661,000
- Design (7%)	$15,543,000
- Construction Engineering (1%)	$2,220,000
Legal Assistance (2%)	$4,441,000
Fiscal Services (2%)	$4,441,000
All Other Facilities Contingency (20%)	$44,409,000
Environmental & Archaeology Studies and Mitigation	$1,628,000
Land Acquisition and Surveying (54 acres)	$1,352,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$29,518,000
TOTAL COST OF PROJECT	**$332,260,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$18,065,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,906,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$234,000
Water Treatment Costs for ASR Water	$10,549,000
O&M for Additional Water Treatment Capacity	$3,807,000
Pumping Energy Costs (52491695 kW-hr @ 0.09 $/kW-hr)	$4,724,000
TOTAL ANNUAL COST	**$43,285,000**
Available Project Yield (acft/yr)	26,456
Annual Cost of Water ($ per acft), based on PF=1	$1,636
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$953
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$5.02
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$2.93
Note: One or more cost element has been calculated externally	

HAC *11/12/2024*

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Table H.62

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTMWD - Oklahoma OCR

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Off-Channel Storage/Ring Dike (Conservation Pool 10000 acft, 419 acres)	$24,525,000
Terminal Storage (Conservation Pool 411 acft, 33 acres)	$21,188,000
Intake Pump Stations (66.9 MGD)	$71,029,000
Transmission Pipeline (60 in. dia., 80.3 miles)	$560,060,000
Transmission Pump Station(s) & Storage Tank(s)	$49,293,000
Integration, Relocations, Backup Generator & Other	$2,991,000
TOTAL COST OF FACILITIES	**$729,086,000**
Engineering:	
- Planning (3%)	$21,873,000
- Design (7%)	$51,036,000
- Construction Engineering (1%)	$7,291,000
Legal Assistance (2%)	$14,582,000
Fiscal Services (2%)	$14,582,000
Pipeline Contingency (15%)	$84,009,000
All Other Facilities Contingency (20%)	$33,805,000
Environmental & Archaeology Studies and Mitigation	$7,486,000
Land Acquisition and Surveying (1347 acres)	$15,809,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$95,508,000
TOTAL COST OF PROJECT	**$1,075,067,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$54,176,000
Reservoir Debt Service (3.5 percent, 40 years)	$3,684,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,646,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,970,000
Dam and Reservoir (1.5% of Cost of Facilities)	$686,000
Pumping Energy Costs (49072694 kW-hr @ 0.09 $/kW-hr)	$4,417,000
TOTAL ANNUAL COST	**$71,579,000**
Available Project Yield (acft/yr)	50,000
Annual Cost of Water ($ per acft), based on PF=1.5	$1,432
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$274
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$4.39
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.84

HAC *11/5/2024*

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Table H.63

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Fort Worth, Haslet, Roanoke, and Westlake - Alliance Corridor

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (8.7 MGD)	$7,353,000
Transmission Pipeline (20-24 in. dia., 6.6 miles)	$10,690,000
Water Treatment Plant (0 MGD)	$538,000
Integration, Relocations, Backup Generator & Other	$271,000
TOTAL COST OF FACILITIES	**$23,743,000**
Engineering:	
- Planning (3%)	$712,000
- Design (7%)	$1,662,000
- Construction Engineering (1%)	$237,000
Legal Assistance (2%)	$475,000
Fiscal Services (2%)	$475,000
Pipeline Contingency (15%)	$1,603,000
All Other Facilities Contingency (20%)	$2,611,000
Environmental & Archaeology Studies and Mitigation	$404,000
Land Acquisition and Surveying (31 acres)	$470,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,106,000
TOTAL COST OF PROJECT	**$34,498,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,876,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$126,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$264,000
Water Treatment Plant	$72,000
Pumping Energy Costs (4441636 kW-hr @ 0.09 $/kW-hr)	$400,000
TOTAL ANNUAL COST	**$2,738,000**
Available Project Yield (acft/yr)	7,840
Annual Cost of Water ($ per acft), based on PF=1.25	$349
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$110
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$1.07
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$0.34
Note: One or more cost element has been calculated externally	

AH *11/22/2024*

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Table H.64

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Fort Worth - Village Creek Future Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,699,000
Transmission Pipeline (14 in. dia., 15 miles)	$18,865,000
Transmission Pump Station(s) & Storage Tank(s)	$5,785,000
Water Treatment Plant (0 MGD)	$5,464,000
Integration, Relocations, Backup Generator & Other	$1,557,000
TOTAL COST OF FACILITIES	**$33,370,000**
Engineering:	
- Planning (3%)	$1,001,000
- Design (7%)	$2,336,000
- Construction Engineering (1%)	$334,000
Legal Assistance (2%)	$667,000
Fiscal Services (2%)	$667,000
Pipeline Contingency (15%)	$2,830,000
All Other Facilities Contingency (20%)	$2,901,000
Environmental & Archaeology Studies and Mitigation	$588,000
Land Acquisition and Surveying (46 acres)	$704,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,951,000
TOTAL COST OF PROJECT	**$48,349,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,629,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$229,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$126,000
Water Treatment Plant	$285,000
Pumping Energy Costs (3766800 kW-hr @ 0.09 $/kW-hr)	$339,000
TOTAL ANNUAL COST	**$3,608,000**
Available Project Yield (acft/yr)	2,442
Annual Cost of Water ($ per acft), based on PF=1.25	$1,477
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$401
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$4.53
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$1.23
Note: One or more cost element has been calculated externally	

AH *11/22/2024*

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Table H.65

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Fort Worth - Mary's Creek WRF Future Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$14,970,000
Transmission Pipeline (30 in. dia., 7.8 miles)	$15,248,000
Storage Tanks (Other Than at Booster Pump Stations)	$2,968,000
Integration, Relocations, Backup Generator & Other	$12,386,000
TOTAL COST OF FACILITIES	**$45,572,000**
Engineering:	
- Planning (3%)	$1,367,000
- Design (7%)	$3,190,000
- Construction Engineering (1%)	$456,000
Legal Assistance (2%)	$911,000
Fiscal Services (2%)	$911,000
Pipeline Contingency (15%)	$2,287,000
All Other Facilities Contingency (20%)	$6,065,000
Environmental & Archaeology Studies and Mitigation	$329,000
Land Acquisition and Surveying (23 acres)	$1,029,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$4,038,000
TOTAL COST OF PROJECT	**$66,155,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$3,597,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$306,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$374,000
Pumping Energy Costs (11011334 kW-hr @ 0.09 $/kW-hr)	$991,000
TOTAL ANNUAL COST	**$5,268,000**
Available Project Yield (acft/yr)	6,278
Annual Cost of Water ($ per acft), based on PF=2	$839
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$266
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.57
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.82
Note: One or more cost element has been calculated externally	

CJM - Plummer *12/27/2024*

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Table H.66

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UTRWD - Additional Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$2,874,000
Transmission Pipeline (18 in. dia., 10 miles)	$24,495,000
Transmission Pump Station(s) & Storage Tank(s)	$4,201,000
Integration, Relocations, Backup Generator & Other	$84,000
TOTAL COST OF FACILITIES	**$31,654,000**
Engineering:	
- Planning (3%)	$950,000
- Design (7%)	$2,216,000
- Construction Engineering (1%)	$317,000
Legal Assistance (2%)	$633,000
Fiscal Services (2%)	$633,000
Pipeline Contingency (15%)	$3,674,000
All Other Facilities Contingency (20%)	$1,432,000
Environmental & Archaeology Studies and Mitigation	$408,000
Land Acquisition and Surveying (71 acres)	$839,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,780,000
TOTAL COST OF PROJECT	**$45,536,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,476,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$259,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$144,000
Pumping Energy Costs (1377324 kW-hr @ 0.09 $/kW-hr)	$124,000
TOTAL ANNUAL COST	**$3,003,000**
Available Project Yield (acft/yr)	2,240
Annual Cost of Water ($ per acft), based on PF=2	$1,341
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$235
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.11
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.72

AH *11/22/2024*

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Table H.67

UTRWD - Treatment and Distribution System Improvements		
Amount	127,922	AF/Y
OWNER:	UTRWD	

Project	Capital Budget (Including Engineering and Contingencies)
2030 Projects	
Pipelines	
Lake Ralph Hall Terminal Storage Raw Water Pipeline	$35,000,000
RTWS Lake Lewisville Parallel Pipeline	$50,000,000
RTWS Southwest Pipeline, Phase 3	$80,000,000
RTWS Northeast Pipeline, Phase 4	$60,000,000
RTWS Southwest Pipeline, Phase 4	$40,000,000
RTWS Northeast Pipeline, Phase 5	$150,000,000
RTWS Southwest Pipeline, Phase 5	$100,000,000
RTWS Southwest Pipeline, Phase 6	$100,000,000
RTWS Northeast Pipeline, Phase 6	$80,000,000
Harpool WTP Raw Water Parallel Pipeline	$70,000,000
TxDOT Relocations	$60,000,000
All Other Facilities	
Lake Ralph Hall Terminal Storage	$65,000,000
Pump Station, Ground Storage Tanks and Pipeline	$65,000,000
Pump Station, Additional Storage and Other Improvements	$60,000,000
RTWS Taylor WTP Expansion, Phase 4	$600,000,000
Pipeline Total	**$825,000,000**
All Other Facilities Total	**$790,000,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	**$44,412,500**
Total, 2030 Projects	**$1,659,413,000**
Annual Costs for 2030 Projects	
Debt Service (3.5% interest, 30 year bonds)	$90,224,000
Power (Estimated)	$3,000,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$8,250,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,125,000
Dam and Reservoir (1.5% of Cost of Facilities)	$975,000
Water Treatment Plant Operation	$27,199,000
Total Pre-Amortization	**$132,773,000**
Total After Amortization	**$42,549,000**

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2040 Projects	
Pipelines	
RTWS Southwest Pipeline, Phase 7	$120,000,000
RTWS Southwest Pipeline, Phase 8	$150,000,000
RTWS Pump Station, Storage Tanks, and Pipelines	$70,000,000
Ray Roberts Intake and Pipeline to Harpool RWTP	$175,000,000
RTWS Northeast Pipeline, Phase 7	$125,000,000
RTWS Northeast Pipeline, Phase 8	$200,000,000
RTWS Southwest Pipeline, Phase 9	$175,000,000
TxDOT Relocations	$70,000,000
Lake Ralph Hall Pipeline and Pumping Improvements	$200,000,000
RTWS Northeast Pipeline, Phase 9	$95,000,000
All Other Facilities	
Harpool RWTP High Service Pumping Improvements	$60,000,000
Harpool RWTP Expansion, Phase 5	$650,000,000
RTWS Pump Station, Storage Tanks, and Pipeline	$90,000,000
Harpool RWTP Phased Treatment Improvements	$100,000,000
RTWS General Treatment & Pumping Improvements	$100,000,000
Pump Station Improvements and Ground Storage Tanks	$300,000,000
75 MGD WTP Expansion	$238,711,000
Pipeline Total	**$1,380,000,000**
All Other Facilities Total	**$1,538,711,000**
Interest During Construction (3% for 1 years with a 0.5% ROI)	**$80,264,553**
Total, 2040 Projects	**$2,998,976,000**

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Continued	
Annual Costs for 2040 Projects	
Debt Service (3.5% interest, 30 year bonds)	$163,058,000
Power (Estimated)	$3,489,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$13,800,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$13,750,000
Water Treatment Plant Operation	$46,663,000
Total Pre-Amortization	**$240,760,000**
Total After Amortization	**$74,213,000**
2060 Projects	
75 MGD WTP Expansion	$238,711,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$6,564,553
Total, 2060 Projects	**$245,276,000**
Annual Costs for 2060 Projects	
Debt Service (3.5% interest, 30 year bonds)	$13,336,000
Water Treatment Plant Operation	$11,578,000
Total Pre-Amortization	**$24,914,000**
Total After Amortization	**$11,578,000**
TOTAL CAPITAL COST	**$4,903,665,000**
UNIT COSTS (During Amortization)	
Per Acre-Foot	**$3,115**
Per 1,000 Gallons	**$9.56**
UNIT COSTS (After Amortization)	
Per Acre-Foot	**$1,003**
Per 1,000 Gallons	**$3.08**

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Table H.68

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UTRWD - Lake Texoma Blend with Sulphur Basin Water

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 357 acft, 12 acres)	$18,873,000
Intake Pump Stations (44.6 MGD)	$61,637,000
Transmission Pipeline (54 in. dia., 63.1 miles)	$478,287,000
Integration, Relocations, Backup Generator & Other	$361,000
TOTAL COST OF FACILITIES	**$559,158,000**
Engineering:	
- Planning (3%)	$16,775,000
- Design (7%)	$39,141,000
- Construction Engineering (1%)	$5,592,000
Legal Assistance (2%)	$11,183,000
Fiscal Services (2%)	$11,183,000
Pipeline Contingency (15%)	$71,743,000
All Other Facilities Contingency (20%)	$16,174,000
Environmental & Archaeology Studies and Mitigation	$2,078,000
Land Acquisition and Surveying (400 acres)	$4,737,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$71,933,000
TOTAL COST OF PROJECT	**$809,697,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$42,488,000
Reservoir Debt Service (3.5 percent, 40 years)	$1,323,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,786,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,541,000
Dam and Reservoir (1.5% of Cost of Facilities)	$283,000
Pumping Energy Costs (5929862 kW-hr @ 0.09 $/kW-hr)	$534,000
Purchase of Water (25000 acft/yr @ 97.76 $/acft)	$2,444,000
TOTAL ANNUAL COST	**$53,399,000**
Available Project Yield (acft/yr)	25,000
Annual Cost of Water ($ per acft), based on PF=2	$2,136
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$384
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$6.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.18

CLV *9/24/2024*

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Table H.69

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UTRWD - Oklahoma Water From Hugo to Lake Lewisville via Lake Chapman

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (61.4 MGD)	$60,638,000
Transmission Pipeline (60 in. dia., 56 miles)	$336,196,000
Transmission Pump Station(s) & Storage Tank(s)	$45,190,000
Integration, Relocations, Backup Generator & Other	$2,233,000
TOTAL COST OF FACILITIES	**$444,257,000**
Engineering:	
- Planning (3%)	$13,328,000
- Design (7%)	$31,098,000
- Construction Engineering (1%)	$4,443,000
Legal Assistance (2%)	$8,885,000
Fiscal Services (2%)	$8,885,000
Pipeline Contingency (15%)	$50,429,000
All Other Facilities Contingency (20%)	$21,612,000
Environmental & Archaeology Studies and Mitigation	$1,764,000
Land Acquisition and Surveying (349 acres)	$3,242,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$57,325,000
TOTAL COST OF PROJECT	**$645,268,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$35,084,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,441,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,503,000
Pumping Energy Costs (36640730 kW-hr @ 0.09 $/kW-hr)	$3,298,000
Purchase of Water (55000 acft/yr @ 97.76 $/acft)	$5,377,000
TOTAL ANNUAL COST	**$49,703,000**
Available Project Yield (acft/yr)	55,000
Annual Cost of Water ($ per acft), based on PF=1.25	$904
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$266
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$2.77
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$0.82

CLV *9/24/2024*

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Table H.70

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UTRWD - Groundwater - Carizzo-Wilcox, East Texas

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (13.4 MGD)	$43,553,000
Transmission Pump Station(s) & Storage Tank(s)	$33,118,000
Well Fields (Wells, Pumps, and Piping)	$30,575,000
Storage Tanks (Other Than at Booster Pump Stations)	$23,351,000
Integration, Relocations, Backup Generator & Other	$701,000
TOTAL COST OF FACILITIES	**$131,298,000**
Engineering:	
- Planning (3%)	$3,939,000
- Design (7%)	$9,191,000
- Construction Engineering (1%)	$1,313,000
Legal Assistance (2%)	$2,626,000
Fiscal Services (2%)	$2,626,000
All Other Facilities Contingency (20%)	$26,260,000
Environmental & Archaeology Studies and Mitigation	$6,605,000
Land Acquisition and Surveying (1010 acres)	$6,657,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$18,576,000
TOTAL COST OF PROJECT	**$209,091,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,369,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$600,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,781,000
Pumping Energy Costs (11502644 kW-hr @ 0.09 $/kW-hr)	$1,035,000
Purchase of Water (10000 acft/yr @ 97.7553 $/acft)	$978,000
TOTAL ANNUAL COST	**$15,763,000**
Available Project Yield (acft/yr)	10,000
Annual Cost of Water ($ per acft), based on PF=1.5	$1,576
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$439
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$4.84
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.35

SFK *12/30/2024*

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Table H.71

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UTRWD - George Parkhouse II (North)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool 330871 acft, 15356 acres)	$361,646,000
Terminal Storage (Conservation Pool 621 acft, 35 acres)	$30,173,000
Intake Pump Stations (126.5 MGD)	$96,332,000
Transmission Pipeline (84 in. dia., 89 miles)	$896,025,000
Integration, Relocations, Backup Generator & Other	$4,888,000
TOTAL COST OF FACILITIES	**$1,438,706,000**
Engineering:	
- Planning (3%)	$43,161,000
- Design (7%)	$100,709,000
- Construction Engineering (1%)	$14,387,000
Legal Assistance (2%)	$28,774,000
Fiscal Services (2%)	$28,774,000
Pipeline Contingency (15%)	$134,404,000
All Other Facilities Contingency (20%)	$108,536,000
Environmental & Archaeology Studies and Mitigation	$103,017,000
Mitigation Lands (15,356 acres)	$100,252,235
Land Acquisition and Surveying (16480 acres)	$116,135,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$288,192,000
TOTAL COST OF PROJECT	**$2,505,047,235**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$85,169,000
Reservoir Debt Service (3.5 percent, 40 years)	$43,953,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$9,009,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$3,649,000
Dam and Reservoir (1.5% of Cost of Facilities)	$5,877,000
Pumping Energy Costs (80187738 kW-hr @ 0.09 $/kW-hr)	$7,217,000
TOTAL ANNUAL COST	**$154,874,000**
Available Project Yield (acft/yr)	94,460
Annual Cost of Water ($ per acft), based on PF=1.5	$1,640
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$273
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$5.03
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.84
Note: One or more cost element has been calculated externally	

Holt Chambers *6/13/2025*

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Table H.72

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
GTUA - Regional Water System

Item	*Estimated Costs for Facilities*		
CAPITAL COST	**Total**	**Phase 1**	**Phase 2**
Texoma Intake and Pump Station (58 MGD)	$59,538,000	$32,332,000	$27,206,000
Texoma pipeline to WTP (60 in. dia.)	$18,982,000	$18,982,000	$0
Conventional Surface Water Treatment Plant (58 MGD)	$262,894,000	$91,800,000	$171,094,000
Advanced Surface Water Treatment (37 MGD)	$198,085,000	$90,500,000	$107,585,000
Advanced Groundwater Treatment (8 MGD)	$67,723,000	$67,723,000	$0
Brine Discharge Pipeline (24 in dia)	$2,611,000	$2,611,000	$0
Distribution pipelines	$303,884,000	$125,787,000	$178,097,000
Booster pump stations	$74,393,000	$35,958,000	$38,435,000
Ground Storage at WTP (Groundwater)	$7,871,500	$7,871,500	$0
Ground Storage at WTP (Surface water)	$43,117,000	$8,858,000	$34,259,000
Brackish Groundwater Well field	$29,520,000	$29,520,000	$0
Ground Storage at well field	$7,871,500	$7,871,500	$0
Groundwater Transmission to WTP	$45,387,000	$45,387,000	$0
Integration, Relocations, Backup Generator & Other	$1,532,000	$571,000	$961,000
Purchase of Storage in Texoma	$12,500,000	0	$12,500,000
TOTAL COST OF FACILITIES	**$1,135,909,000**	**$565,772,000**	**$570,137,000**
Engineering:			
- Planning (3%)	$34,077,000	$16,973,000	$17,104,000
- Design (7%)	$79,514,000	$39,604,000	$39,910,000
- Construction Engineering (1%)	$11,359,000	$5,658,000	$5,701,000
Legal Assistance (2%)	$22,718,000	$11,315,000	$11,403,000
Fiscal Services (2%)	$22,718,000	$11,315,000	$11,403,000
Pipeline Contingency (15%)	$55,630,000	$28,915,000	$26,715,000
All Other Facilities Contingency (20%)	$150,509,000	$74,601,000	$75,908,000
Environmental & Archaeology Studies and Mitigation	$24,388,000	$9,093,000	$15,295,000
Land Acquisition and Surveying	$24,858,000	$9,269,000	$15,589,000
Interest during Construction	$117,977,000	$43,989,000	$73,988,000
TOTAL COST OF PROJECT	**$1,679,657,000**	**$816,504,000**	**$863,153,000**
ANNUAL COST			
Debt Service (3.5% for 30 years)	$91,325,000	$44,394,000	$46,931,000
Operation and Maintenance			
Pipelines, Wells, Storage (1% of Cost)	$4,592,000	$2,469,000	$2,124,000
Intakes and pump stations (2.5% of Cost)	$3,348,000	$1,707,000	$1,641,000
Water Treatment Plant	$18,403,000	$3,781,000	$14,622,000
Advanced Water Treatment Facility	$50,088,000	$18,676,000	$31,412,000
Pumping Energy Costs	$3,293,000	$1,228,000	$2,065,000
Purchase of groundwater ($98/ac-ft)	$818,000	$818,000	$0
TOTAL ANNUAL COST	$171,867,000	$73,073,000	$98,795,000
Available Project Yield (acft/yr)	37,950	14,150	23,800
Annual Cost of Water ($ per acft)	$4,529	$5,164	$4,151
Annual Cost of Water After Debt Service ($ per acft)	$2,122	$2,027	$2,179
Annual Cost of Water ($ per 1,000 gallons)	$13.90	$15.85	$12.74
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$6.51	$6.22	$6.69

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Table H.73

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
GTUA - Collin-Grayson Municipal Alliance Parallel Water Transmission System

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Melissa to Anna (36 in dia., 4.4 miles)	$13,579,000
Transmission Pump Station(s) & Storage Tank(s)	$11,309,000
Anna to Weston (42 in dia., 7 miles)	$27,758,000
Transmission Pump Station(s) & Storage Tank(s)	$18,527,000
McKinney to Melissa (48 in dia., 12.5 miles)	$45,550,000
Primary Pump Stations (38 MGD)	$21,664,000
Transmission Pump Station(s) & Storage Tank(s)	$3,914,000
Integration, Relocations, Backup Generator & Other	$396,000
TOTAL COST OF FACILITIES	**$142,697,000**
Engineering:	
- Planning (3%)	$4,281,000
- Design (7%)	$9,989,000
- Construction Engineering (1%)	$1,427,000
Legal Assistance (2%)	$2,854,000
Fiscal Services (2%)	$2,854,000
Pipeline Contingency (15%)	$13,033,000
All Other Facilities Contingency (20%)	$11,162,000
Environmental & Archaeology Studies and Mitigation	$878,000
Land Acquisition and Surveying (122 acres)	$1,447,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$12,391,000
TOTAL COST OF PROJECT	**$203,013,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,038,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$970,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,142,000
Pumping Energy Costs (6500950 kW-hr @ 0.09 $/kW-hr)	$585,000
Purchase of Water (21278 acft/yr @ 1303.404 $/acft)	$27,734,000
TOTAL ANNUAL COST	**$41,469,000**
Available Project Yield (acft/yr)	21,278
Annual Cost of Water ($ per acft), based on PF=2	$1,949
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,430
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.98
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$4.39

CLV *9/23/2024*

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Table H.74

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Blue Ridge - Connect to and Purchase Water from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$808,000
Transmission Pipeline (6 in. dia., 2.5 miles)	$1,754,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,784,000
Integration, Relocations, Backup Generator & Other	$630,000
TOTAL COST OF FACILITIES	**$6,856,000**
Engineering:	
- Planning (3%)	$206,000
- Design (7%)	$480,000
- Construction Engineering (1%)	$69,000
Legal Assistance (2%)	$137,000
Fiscal Services (2%)	$137,000
Pipeline Contingency (15%)	$263,000
All Other Facilities Contingency (20%)	$1,021,000
Environmental & Archaeology Studies and Mitigation	$204,000
Land Acquisition and Surveying (18 acres)	$214,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$624,000
TOTAL COST OF PROJECT	**$10,211,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$555,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$52,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$40,000
Pumping Energy Costs (48513 kW-hr @ 0.09 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$651,000**
Available Project Yield (acft/yr)	359
Annual Cost of Water ($ per acft), based on PF=2	$1,813
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$267
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.56
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.82

ADB *11/16/2024*

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Table H.75

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *East Fork SUD - Increase Delivery Infrastructure from NTMWD*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,238,000
Transmission Pipeline (16 in. dia., 0 miles)	$2,047,000
Storage Tanks (Other Than at Booster Pump Stations)	$2,647,000
Integration, Relocations, Backup Generator & Other	$12,000
TOTAL COST OF FACILITIES	**$5,944,000**
Engineering:	
- Planning (3%)	$178,000
- Design (7%)	$416,000
- Construction Engineering (1%)	$59,000
Legal Assistance (2%)	$119,000
Fiscal Services (2%)	$119,000
Pipeline Contingency (15%)	$307,000
All Other Facilities Contingency (20%)	$779,000
Environmental & Archaeology Studies and Mitigation	$54,000
Land Acquisition and Surveying (5 acres)	$59,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$523,000
TOTAL COST OF PROJECT	**$8,557,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$465,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$47,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$31,000
Pumping Energy Costs (195029 kW-hr @ 0.09 $/kW-hr)	$18,000
TOTAL ANNUAL COST	**$561,000**
Available Project Yield (acft/yr)	2,310
Annual Cost of Water ($ per acft), based on PF=2	$243
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$42
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.13
Note: One or more cost element has been calculated externally	
ADB	*11/16/2024*

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Table H.76

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Frisco - Additional Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Stations	$5,202,000
Transmission Pipeline (None)	$48,077,000
Integration, Relocations, Backup Generator & Other	$15,727,000
TOTAL COST OF FACILITIES	**$69,006,000**
Engineering:	
- Planning (3%)	$2,070,000
- Design (7%)	$4,830,000
- Construction Engineering (1%)	$690,000
Legal Assistance (2%)	$1,380,000
Fiscal Services (2%)	$1,380,000
Pipeline Contingency (15%)	$7,212,000
All Other Facilities Contingency (20%)	$4,186,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,900,000
TOTAL COST OF PROJECT	**$96,654,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$5,255,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$638,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$130,000
TOTAL ANNUAL COST	**$6,023,000**
Available Project Yield (acft/yr)	500
Annual Cost of Water ($ per acft), based on PF=0	$12,046
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$1,536
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$36.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$4.71
Note: One or more cost element has been calculated externally	
AH	*11/22/2024*

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Table H.77

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Frisco - Additional Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (0 MGD)	$5,202,000
Transmission Pipeline (None)	$48,077,000
Integration, Relocations, Backup Generator & Other	$15,727,000
TOTAL COST OF FACILITIES	**$69,006,000**
Engineering:	
- Planning (3%)	$2,070,000
- Design (7%)	$4,830,000
- Construction Engineering (1%)	$690,000
Legal Assistance (2%)	$1,380,000
Fiscal Services (2%)	$1,380,000
Pipeline Contingency (15%)	$7,212,000
All Other Facilities Contingency (20%)	$4,186,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,900,000
TOTAL COST OF PROJECT	**$96,654,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$5,255,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$638,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$130,000
TOTAL ANNUAL COST	**$6,023,000**
Available Project Yield (acft/yr)	500
Annual Cost of Water ($ per acft), based on PF=0	$12,046
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$1,536
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$36.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$4.71
Note: One or more cost element has been calculated externally	
AH	*11/22/2024*

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Table H.78

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Melissa - Additional Delivery Infrastructure from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$4,876,000
Transmission Pipeline (30 in. dia., 1 miles)	$2,359,000
Integration, Relocations, Backup Generator & Other	$83,000
TOTAL COST OF FACILITIES	**$7,318,000**
Engineering:	
- Planning (3%)	$220,000
- Design (7%)	$512,000
- Construction Engineering (1%)	$73,000
Legal Assistance (2%)	$146,000
Fiscal Services (2%)	$146,000
Pipeline Contingency (15%)	$354,000
All Other Facilities Contingency (20%)	$992,000
Environmental & Archaeology Studies and Mitigation	$85,000
Land Acquisition and Surveying (8 acres)	$89,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$646,000
TOTAL COST OF PROJECT	**$10,581,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$575,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$24,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$122,000
Pumping Energy Costs (1359090 kW-hr @ 0.09 $/kW-hr)	$122,000
TOTAL ANNUAL COST	**$843,000**
Available Project Yield (acft/yr)	8,190
Annual Cost of Water ($ per acft), based on PF=2	$103
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$33
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.32
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.10

HAC *2/18/2025*

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Table H.79

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Melissa - Increase Delivery Infrastructure from NTMWD through McKinney*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Integration, Relocations, Backup Generator & Other	$2,327,000
TOTAL COST OF FACILITIES	**$2,327,000**
Engineering:	
- Planning (3%)	$70,000
- Design (7%)	$163,000
- Construction Engineering (1%)	$23,000
Legal Assistance (2%)	$47,000
Fiscal Services (2%)	$47,000
All Other Facilities Contingency (20%)	$465,000
Environmental & Archaeology Studies and Mitigation	$54,000
Land Acquisition and Surveying (5 acres)	$62,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$212,000
TOTAL COST OF PROJECT	**$3,470,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$189,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,000
Pumping Energy Costs (19334 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$214,000**
Available Project Yield (acft/yr)	229
Annual Cost of Water ($ per acft), based on PF=2	$934
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$109
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.87
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.33
Note: One or more cost element has been calculated externally	
ADB	*11/16/2024*

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Table H.80

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Parker - Increase Delivery Infrastructure from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$2,459,000
Transmission Pipeline (14 in. dia., 3.2 miles)	$4,012,000
Transmission Pump Station(s) & Storage Tank(s)	$1,697,000
Integration, Relocations, Backup Generator & Other	$23,000
TOTAL COST OF FACILITIES	**$8,191,000**
Engineering:	
- Planning (3%)	$246,000
- Design (7%)	$573,000
- Construction Engineering (1%)	$82,000
Legal Assistance (2%)	$164,000
Fiscal Services (2%)	$164,000
Pipeline Contingency (15%)	$602,000
All Other Facilities Contingency (20%)	$836,000
Environmental & Archaeology Studies and Mitigation	$150,000
Land Acquisition and Surveying (13 acres)	$151,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$726,000
TOTAL COST OF PROJECT	**$11,885,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$646,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$40,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$104,000
Pumping Energy Costs (385230 kW-hr @ 0.09 $/kW-hr)	$35,000
TOTAL ANNUAL COST	**$825,000**
Available Project Yield (acft/yr)	2,064
Annual Cost of Water ($ per acft), based on PF=2	$400
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$87
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.23
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.27
Note: One or more cost element has been calculated externally	

ADB *11/16/2024*

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Table H.81

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Wylie Northeast SUD - Increase Delivery Infrastructure from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Storage Tanks (Other Than at Booster Pump Stations)	$2,682,000
Integration, Relocations, Backup Generator & Other	$2,305,000
TOTAL COST OF FACILITIES	**$4,987,000**
Engineering:	
- Planning (3%)	$150,000
- Design (7%)	$349,000
- Construction Engineering (1%)	$50,000
Legal Assistance (2%)	$100,000
Fiscal Services (2%)	$100,000
All Other Facilities Contingency (20%)	$997,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$438,000
TOTAL COST OF PROJECT	**$7,171,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$390,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$67,000
TOTAL ANNUAL COST	**$480,000**
Available Project Yield (acft/yr)	1,234
Annual Cost of Water ($ per acft), based on PF=2	$389
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$73
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.19
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.22
Note: One or more cost element has been calculated externally	

ADB *11/16/2024*

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Table H.82

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Gainesville - Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$666,000
Transmission Pipeline (6 in. dia., 3 miles)	$3,622,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$4,289,000**
Engineering:	
- Planning (3%)	$129,000
- Design (7%)	$300,000
- Construction Engineering (1%)	$43,000
Legal Assistance (2%)	$86,000
Fiscal Services (2%)	$86,000
Pipeline Contingency (15%)	$543,000
All Other Facilities Contingency (20%)	$133,000
Environmental & Archaeology Studies and Mitigation	$152,000
Land Acquisition and Surveying (23 acres)	$318,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$396,000
TOTAL COST OF PROJECT	**$6,475,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$352,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$36,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$17,000
Pumping Energy Costs (16561 kW-hr @ 0.09 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$406,000**
Available Project Yield (acft/yr)	70
Annual Cost of Water ($ per acft), based on PF=2	$5,800
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$771
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$17.80
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.37

AH *11/22/2024*

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Table H.83

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Gainesville - Increase Delivery Infrastructure*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (18 in. dia., 94.4 miles)	$116,030,000
Transmission Pump Station(s) & Storage Tank(s)	$22,274,000
Integration, Relocations, Backup Generator & Other	$172,000
TOTAL COST OF FACILITIES	**$138,476,000**
- Design (7%)	$9,693,000
- Construction Engineering (1%)	$1,385,000
Legal Assistance (2%)	$2,770,000
Fiscal Services (2%)	$2,770,000
Pipeline Contingency (15%)	$17,405,000
All Other Facilities Contingency (20%)	$4,489,000
Environmental & Archaeology Studies and Mitigation	$3,082,000
Land Acquisition and Surveying (333 acres)	$4,571,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$18,408,000
TOTAL COST OF PROJECT	**$207,203,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,266,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,206,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$446,000
Pumping Energy Costs (2820727 kW-hr @ 0.09 $/kW-hr)	$254,000
TOTAL ANNUAL COST	**$13,172,000**
Available Project Yield (acft/yr)	3,318
Annual Cost of Water ($ per acft), based on PF=2	$3,970
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$574
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$12.18
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.76
ADB	*11/16/2024*

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Table H.84

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Muenster - Connect to and Purchase Water from Gainesville

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (6-8 in. dia., 11.5 miles)	$9,009,000
Integration, Relocations, Backup Generator & Other	$6,000
TOTAL COST OF FACILITIES	**$9,015,000**
Engineering:	
- Planning (3%)	$270,000
- Design (7%)	$631,000
- Construction Engineering (1%)	$90,000
Legal Assistance (2%)	$180,000
Fiscal Services (2%)	$180,000
Pipeline Contingency (15%)	$1,351,000
All Other Facilities Contingency (20%)	$1,000
Environmental & Archaeology Studies and Mitigation	$470,000
Land Acquisition and Surveying (38 acres)	$520,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$827,000
TOTAL COST OF PROJECT	**$13,535,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$736,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$90,000
Pumping Energy Costs (103070 kW-hr @ 0.09 $/kW-hr)	$9,000
Purchase of Water (280 acft/yr @ 1473 $/acft)	$412,000
TOTAL ANNUAL COST	**$1,247,000**
Available Project Yield (acft/yr)	280
Annual Cost of Water ($ per acft), based on PF=2	$4,454
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,825
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$13.67
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.60

ADB *11/16/2024*

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Table H.85

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Muenster - Develop Muenster Lake Supply

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0.5 MGD)	$4,181,000
Transmission Pipeline (6 in. dia., 2 miles)	$1,494,000
Water Treatment Plant (0.5 MGD)	$10,663,000
Integration, Relocations, Backup Generator & Other	$3,000
TOTAL COST OF FACILITIES	**$16,341,000**
Engineering:	
- Planning (3%)	$490,000
- Design (7%)	$1,144,000
- Construction Engineering (1%)	$163,000
Legal Assistance (2%)	$327,000
Fiscal Services (2%)	$327,000
Pipeline Contingency (15%)	$224,000
All Other Facilities Contingency (20%)	$2,969,000
Environmental & Archaeology Studies and Mitigation	$125,000
Land Acquisition and Surveying (10 acres)	$139,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,447,000
TOTAL COST OF PROJECT	**$23,696,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,288,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$15,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$105,000
Water Treatment Plant	$877,000
Pumping Energy Costs (48391 kW-hr @ 0.09 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$2,289,000**
Available Project Yield (acft/yr)	280
Annual Cost of Water ($ per acft), based on PF=2	$8,175
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,575
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$25.08
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$10.97

ADB *11/18/2024*

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Table H.86

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Grand Prairie - Connect to Arlington*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Stations	$2,439,000
Transmission Pipeline (20 in. dia., 2.5 miles)	$5,649,000
Integration, Relocations, Backup Generator & Other	$29,000
TOTAL COST OF FACILITIES	**$8,117,000**
Engineering:	
- Planning (3%)	$244,000
- Design (7%)	$568,000
- Construction Engineering (1%)	$81,000
Legal Assistance (2%)	$162,000
Fiscal Services (2%)	$162,000
Pipeline Contingency (15%)	$847,000
All Other Facilities Contingency (20%)	$494,000
Environmental & Archaeology Studies and Mitigation	$144,000
Land Acquisition and Surveying (20 acres)	$306,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$724,000
TOTAL COST OF PROJECT	**$11,849,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$644,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$57,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$61,000
Pumping Energy Costs (483075 kW-hr @ 0.09 $/kW-hr)	$43,000
TOTAL ANNUAL COST	**$805,000**
Available Project Yield (acft/yr)	2,031
Annual Cost of Water ($ per acft), based on PF=2	$396
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$79
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.22
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.24
Note: One or more cost element has been calculated externally	
ADB	*11/18/2024*

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Table H.87

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Grand Prairie - Increase Infrastructure from DWU

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (7.5 MGD)	$19,866,000
Transmission Pipeline (24 in. dia., 15 miles)	$42,647,000
Integration, Relocations, Backup Generator & Other	$76,000
TOTAL COST OF FACILITIES	**$62,589,000**
Engineering:	
- Planning (3%)	$1,878,000
- Design (7%)	$4,381,000
- Construction Engineering (1%)	$626,000
Legal Assistance (2%)	$1,252,000
Fiscal Services (2%)	$1,252,000
Pipeline Contingency (15%)	$6,397,000
All Other Facilities Contingency (20%)	$3,988,000
Environmental & Archaeology Studies and Mitigation	$519,000
Land Acquisition and Surveying (96 acres)	$1,455,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,482,000
TOTAL COST OF PROJECT	**$89,819,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$4,884,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$427,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$497,000
Pumping Energy Costs (1251344 kW-hr @ 0.09 $/kW-hr)	$113,000
TOTAL ANNUAL COST	**$5,921,000**
Available Project Yield (acft/yr)	4,188
Annual Cost of Water ($ per acft), based on PF=2	$1,414
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$248
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.34
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.76

ADB *11/18/2024*

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Table H.88

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Irving - Main Stem Balancing Reservoir*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (0 MGD)	$14,080,000
Transmission Pipeline (None)	$100,931,000
TOTAL COST OF FACILITIES	**$115,011,000**
Engineering:	
- Planning (3%)	$3,450,000
- Design (7%)	$8,051,000
- Construction Engineering (1%)	$1,150,000
Legal Assistance (2%)	$2,300,000
Fiscal Services (2%)	$2,300,000
Pipeline Contingency (15%)	$15,140,000
All Other Facilities Contingency (20%)	$2,816,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$9,765,000
TOTAL COST OF PROJECT	**$159,983,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$8,698,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,009,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$352,000
Pumping Energy Costs (18144444 kW-hr @ 0.09 $/kW-hr)	$1,633,000
Purchase of Water (25000 acft/yr @ 97.76 $/acft)	$2,444,000
TOTAL ANNUAL COST	**$14,136,000**
Available Project Yield (acft/yr)	25,000
Annual Cost of Water ($ per acft), based on PF=0	$565
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$218
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.74
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.67
Note: One or more cost element has been calculated externally	
AH	*11/22/2024*

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Table H.89

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Irving - TRA Central Reuse Project*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
Intake Pump Stations (25.9 MGD)	$23,436,000
Transmission Pipeline (42 in. dia., 8.3 miles)	$57,012,000
Advanced Water Treatment Facility (25 MGD)	$114,743,000
Integration, Relocations, Backup Generator & Other	$352,000
TOTAL COST OF FACILITIES	**$195,543,000**
- Planning (3%)	$5,866,000
- Design (7%)	$13,688,000
- Construction Engineering (1%)	$1,955,000
Legal Assistance (2%)	$3,911,000
Fiscal Services (2%)	$3,911,000
Pipeline Contingency (15%)	$8,552,000
All Other Facilities Contingency (20%)	$27,706,000
Environmental & Archaeology Studies and Mitigation	$2,749,000
Land Acquisition and Surveying (14 acres)	$3,119,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$17,356,000
TOTAL COST OF PROJECT	**$284,356,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$15,461,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$574,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$586,000
Advanced Water Treatment Facility	$10,717,000
Pumping Energy Costs (5780963 kW-hr @ 0.09 $/kW-hr)	$520,000
Purchase of Water (27539 acft/yr @ 97.7553 $/acft)	$2,692,000
TOTAL ANNUAL COST	**$30,550,000**
Available Project Yield (acft/yr)	27,539
Annual Cost of Water ($ per acft), based on PF=1	$1,109
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$548
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$3.40
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$1.68
Note: One or more cost element has been calculated externally	
Courtney Corso	*1/21/2025*

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Table H.90

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Irving - TCWSP Supply with Reuse Swap*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (49.2 MGD)	$20,780,000
Transmission Pipeline (54 in. dia., 12.5 miles)	$120,703,000
Integration, Relocations, Backup Generator & Other	$277,000
TOTAL COST OF FACILITIES	**$141,760,000**
Engineering:	
- Planning (3%)	$4,253,000
- Design (7%)	$9,923,000
- Construction Engineering (1%)	$1,418,000
Legal Assistance (2%)	$2,835,000
Fiscal Services (2%)	$2,835,000
Pipeline Contingency (15%)	$18,105,000
All Other Facilities Contingency (20%)	$4,211,000
Environmental & Archaeology Studies and Mitigation	$376,000
Land Acquisition and Surveying (81 acres)	$16,720,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$13,159,000
TOTAL COST OF PROJECT	**$215,595,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$11,722,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,210,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$520,000
Pumping Energy Costs (4539271 kW-hr @ 0.09 $/kW-hr)	$409,000
Purchase of Water (27539 acft/yr @ 1205.6487 $/acft)	$33,202,000
TOTAL ANNUAL COST	**$47,063,000**
Available Project Yield (acft/yr)	27,539
Annual Cost of Water ($ per acft), based on PF=2	$1,709
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,283
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.24
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.94
Courtney Corso	*1/22/2025*

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Table H.91

Cost Estimate Summary Water Supply Project Option September 2023 Prices Irving - Oklahoma Lake Hugo	
Cost based on ENR CCI 13485.67 for September 2023 and PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Lake Hugo Pump Station	
26.8 MGD Lake Hugo Pump Station and Intake (3,050 HP)	$20,207,000
Mobilization (5%)	$1,010,000
Pipeline	
Hugo to Paris 42-inch Pipeline and Appurtenances	$35,192,000
Trench Safety	$158,000
ROW Clearing	$1,804,000
Paris to Lake Chapman 42-inch Pipeline and Appurtenances	$59,856,000
Trench Safety	$269,000
ROW Clearing	$3,068,000
26.8 MGD Discharge Structure	$126,000
Mobilization (5%)	$5,024,000
Lake Chapman Phase I Facilities	
Existing Lake Chapman Pump Station Expansion (Addition of 55MGD Pump)	$1,395,500
Mobilization (5%)	$70,000
Transmission Infrastructure	
55 MG Chapman BPS Reservoir (6 hours of storage)	$15,656,000
220 MGD Chapman Booster Pump Station (21,500 HP)	$56,579,000
24 MG Merit Balancing Reservoir to Supplement Ex. 12 MG Reservoir (2.6 hours of storage)	$8,193,000
Mobilization (5%)	$4,021,000
Lake Chapman Phase II Facilities	
Upgrade of Existing Princeton Booster Pump Station	$27,413,000
Mobilization (5%)	$1,371,000
TOTAL COST OF FACILITIES	**$241,412,500**
Engineering:	
- Planning (3%)	$7,242,375
- Design (7%)	$16,898,875
- Construction Engineering (1%)	$2,414,125
Legal Assistance (2%)	$4,828,250
Fiscal Services (2%)	$4,828,250
Pipeline Contingency (15%)	$15,824,550
All Other Facilities Contingency (20%)	$27,183,100
Environmental & Archaeology Studies and Mitigation	$1,975,000
Land Acquisition and Surveying	$8,430,000
Interest During Construction (3.5% for 1 year with a 0.5%ROI)	$10,759,000
TOTAL COST OF PROJECT	**$341,796,025**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$18,584,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,293,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,802,000
Pumping Energy Costs (kW-hr @ 0.09 $/kW-hr)	$6,097,000
TOTAL ANNUAL COST	**$28,776,000**
Available Project Yield (acft/yr)	25,000
Annual Cost of Water ($ per acft)	$1,151.04
Annual Cost of Water After Debt Service ($ per acft)	$407.68
Annual Cost of Water ($ per 1,000 gallons)	$3.53
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$1.25

**Some of the capital costs could possibly be split with other potential participants.*

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Table H.92

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Irving - Direct Potable Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (18.1 MGD)	$27,741,000
Transmission Pipeline (36-42 in. dia., 5.3 miles)	$23,005,000
Water Treatment Plant (20 MGD)	$111,691,000
Advanced Water Treatment Facility (20 MGD)	$147,218,000
Integration, Relocations, Backup Generator & Other	$519,000
TOTAL COST OF FACILITIES	**$310,174,000**
- Design (7%)	$21,712,000
- Construction Engineering (1%)	$3,102,000
Legal Assistance (2%)	$6,203,000
Fiscal Services (2%)	$6,203,000
Pipeline Contingency (15%)	$3,451,000
All Other Facilities Contingency (20%)	$57,434,000
Environmental & Archaeology Studies and Mitigation	$4,159,000
Land Acquisition and Surveying (62 acres)	$11,479,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$14,080,000
TOTAL COST OF PROJECT	**$447,302,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$31,473,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$235,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$694,000
Water Treatment Plant	$7,818,000
Advanced Water Treatment Facility	$17,841,000
Pumping Energy Costs (8511065 kW-hr @ 0.09 $/kW-hr)	$766,000
Purchase of Water (27539 acft/yr @ 97.7553 $/acft)	$2,692,000
TOTAL ANNUAL COST	**$61,519,000**
Available Project Yield (acft/yr)	19,277
Annual Cost of Water ($ per acft), based on PF=1	$3,191
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$1,559
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$9.79
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$4.78
Courtney Corso	*1/29/2025*

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Table H.93

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Rowlett - Increase Delivery Infrastructure from NTMWD*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pump Station(s) & Storage Tank(s)	$2,866,000
Integration, Relocations, Backup Generator & Other	$706,000
TOTAL COST OF FACILITIES	**$3,572,000**
Engineering:	
- Planning (3%)	$107,000
- Design (7%)	$250,000
- Construction Engineering (1%)	$36,000
Legal Assistance (2%)	$71,000
Fiscal Services (2%)	$71,000
All Other Facilities Contingency (20%)	$714,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$314,000
TOTAL COST OF PROJECT	**$5,135,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$279,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$72,000
TOTAL ANNUAL COST	**$358,000**
Available Project Yield (acft/yr)	6,421
Annual Cost of Water ($ per acft), based on PF=2	$56
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$12
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.17
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.04
Note: One or more cost element has been calculated externally	
ADB	*11/18/2024*

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Table H.94

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Sunnyvale - Increase Delivery Infrastructure from NTWMD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,785,000
Transmission Pipeline (14 in. dia., 1.8 miles)	$2,301,000
Integration, Relocations, Backup Generator & Other	$14,000
TOTAL COST OF FACILITIES	**$4,100,000**
Engineering:	
- Planning (3%)	$123,000
- Design (7%)	$287,000
- Construction Engineering (1%)	$41,000
Legal Assistance (2%)	$82,000
Fiscal Services (2%)	$82,000
Pipeline Contingency (15%)	$345,000
All Other Facilities Contingency (20%)	$360,000
Environmental & Archaeology Studies and Mitigation	$109,000
Land Acquisition and Surveying (9 acres)	$112,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$367,000
TOTAL COST OF PROJECT	**$6,008,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$327,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$45,000
Pumping Energy Costs (230375 kW-hr @ 0.09 $/kW-hr)	$21,000
TOTAL ANNUAL COST	**$416,000**
Available Project Yield (acft/yr)	2,126
Annual Cost of Water ($ per acft), based on PF=2	$196
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$42
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.13

ADB *8/7/2024*

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Table H.95

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Wilmer - Connect to and Purchase Water from DWU

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (6 in. dia., 0 miles)	$14,791,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,898,000
Integration, Relocations, Backup Generator & Other	$5,000
TOTAL COST OF FACILITIES	**$16,694,000**
Engineering:	
- Planning (3%)	$501,000
- Design (7%)	$1,169,000
- Construction Engineering (1%)	$167,000
Legal Assistance (2%)	$334,000
Fiscal Services (2%)	$334,000
Pipeline Contingency (15%)	$2,219,000
All Other Facilities Contingency (20%)	$381,000
Environmental & Archaeology Studies and Mitigation	$76,000
Land Acquisition and Surveying (7 acres)	$83,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,428,000
TOTAL COST OF PROJECT	**$23,386,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,271,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$167,000
Pumping Energy Costs (85441 kW-hr @ 0.09 $/kW-hr)	$8,000
TOTAL ANNUAL COST	**$1,446,000**
Available Project Yield (acft/yr)	1,012
Annual Cost of Water ($ per acft), based on PF=2	$1,429
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$173
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.38
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.53
Note: One or more cost element has been calculated externally	

ADB *11/18/2024*

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Table H.96

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Corsicana - New 8 MGD WTP, Halbert-Richland Chambers* *Cost based on ENR CCI 13485.67 for September 2023 and* *a PPI of 278.502 for September 2023*		
Item	*Estimated Costs for All Facilities*	*Estimated Costs for New Water*
CAPITAL COST		
Pump Station Expansion	$4,128,000	$4,128,000
Water Treatment Plant (8 MGD)	$60,620,000	$30,310,000
TOTAL COST OF FACILITIES	**$64,748,000**	**$34,438,000**
Engineering:		
- Planning (3%)	$1,942,000	$1,033,000
- Design (7%)	$4,532,000	$2,411,000
- Construction Engineering (1%)	$647,000	$344,000
Legal Assistance (2%)	$1,295,000	$689,000
Fiscal Services (2%)	$1,295,000	$689,000
All Other Facilities Contingency (20%)	$12,950,000	$6,888,000
Environmental & Archaeology Studies and Mitigation	$67,000	$52,000
Land Acquisition and Surveying (9 acres)	$73,000	$57,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,691,000	$3,029,000
TOTAL COST OF PROJECT	**$93,240,000**	**$49,630,000**
ANNUAL COST		
Debt Service (3.5 percent, 30 years)	$5,070,000	$2,698,000
Operation and Maintenance		
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$13,000	$13,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$70,000	$70,000
Water Treatment Plant	$4,291,000	$2,146,000
TOTAL ANNUAL COST	**$9,444,000**	**$4,927,000**
Available Project Yield (acft/yr)	-	2,242
Annual Cost of Water ($ per acft), based on PF=2	-	$2,198
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	-	$994
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	-	$6.74
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	-	$3.05
ADB		*12/4/2024*

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Table H.97

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Mustang SUD - Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$3,658,000
Transmission Pipeline (16 in. dia., 6.2 miles)	$8,509,000
Water Treatment Plant (5 MGD)	$16,986,000
Integration, Relocations, Backup Generator & Other	$26,000
TOTAL COST OF FACILITIES	**$29,179,000**
Engineering:	
- Planning (3%)	$875,000
- Design (7%)	$2,042,000
- Construction Engineering (1%)	$292,000
Legal Assistance (2%)	$584,000
Fiscal Services (2%)	$584,000
Pipeline Contingency (15%)	$1,276,000
All Other Facilities Contingency (20%)	$4,134,000
Environmental & Archaeology Studies and Mitigation	$266,000
Land Acquisition and Surveying (22 acres)	$267,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,568,000
TOTAL COST OF PROJECT	**$42,067,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,287,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$85,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$91,000
Water Treatment Plant	$1,231,000
Pumping Energy Costs (427516 kW-hr @ 0.09 $/kW-hr)	$38,000
TOTAL ANNUAL COST	**$3,732,000**
Available Project Yield (acft/yr)	2,803
Annual Cost of Water ($ per acft), based on PF=2	$1,331
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$516
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.09
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.58

HAC *2/17/2025*

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Table H.98

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Mustang SUD - Connect to and Purchase Water from Denton

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$5,788,000
Transmission Pipeline (24 in. dia., 8.3 miles)	$15,691,000
Integration, Relocations, Backup Generator & Other	$57,000
TOTAL COST OF FACILITIES	**$21,536,000**
Engineering:	
- Planning (3%)	$646,000
- Design (7%)	$1,508,000
- Construction Engineering (1%)	$215,000
Legal Assistance (2%)	$431,000
Fiscal Services (2%)	$431,000
Pipeline Contingency (15%)	$2,354,000
All Other Facilities Contingency (20%)	$1,169,000
Environmental & Archaeology Studies and Mitigation	$303,000
Land Acquisition and Surveying (25 acres)	$298,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,878,000
TOTAL COST OF PROJECT	**$30,769,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,673,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$157,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$145,000
Pumping Energy Costs (933995 kW-hr @ 0.09 $/kW-hr)	$84,000
TOTAL ANNUAL COST	**$2,059,000**
Available Project Yield (acft/yr)	5,605
Annual Cost of Water ($ per acft), based on PF=2	$367
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$69
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.13
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.21

HAC *2/18/2025*

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Table H.99

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Cross Timbers WSC - Infrastructure Improvements*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (None)	$4,941,000
Storage Tanks (Other Than at Booster Pump Stations)	$2,415,000
TOTAL COST OF FACILITIES	**$7,356,000**
Engineering:	
- Planning (3%)	$221,000
- Design (7%)	$515,000
- Construction Engineering (1%)	$74,000
Legal Assistance (2%)	$147,000
Fiscal Services (2%)	$147,000
Pipeline Contingency (15%)	$741,000
All Other Facilities Contingency (20%)	$483,000
Environmental & Archaeology Studies and Mitigation	$22,000
Land Acquisition and Surveying (2 acres)	$24,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$633,000
TOTAL COST OF PROJECT	**$10,363,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$563,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$74,000
TOTAL ANNUAL COST	**$637,000**
Available Project Yield (acft/yr)	2,117
Annual Cost of Water ($ per acft), based on PF=0	$301
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$35
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.92
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.11
Note: One or more cost element has been calculated externally	
ADB	*11/18/2024*

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Table H.100

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Denton - Additional Indirect Reuse with Storage

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Terminal Storage (Conservation Pool 500 acft, 40 acres)	$24,996,000
Intake Pump Stations (9.2 MGD)	$8,018,000
Transmission Pipeline (24 in. dia., 8.5 miles)	$27,072,000
Integration, Relocations, Backup Generator & Other	$235,000
TOTAL COST OF FACILITIES	**$60,321,000**
Engineering:	
- Planning (3%)	$1,810,000
- Design (7%)	$4,223,000
- Construction Engineering (1%)	$603,000
Legal Assistance (2%)	$1,206,000
Fiscal Services (2%)	$1,206,000
Pipeline Contingency (15%)	$4,061,000
All Other Facilities Contingency (20%)	$6,650,000
Environmental & Archaeology Studies and Mitigation	$688,000
Land Acquisition and Surveying (45 acres)	$435,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,279,000
TOTAL COST OF PROJECT	**$86,482,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,698,000
Reservoir Debt Service (3.5 percent, 40 years)	$1,726,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$273,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$200,000
Dam and Reservoir (1.5% of Cost of Facilities)	$375,000
Pumping Energy Costs (3858857 kW-hr @ 0.09 $/kW-hr)	$347,000
TOTAL ANNUAL COST	**$5,619,000**
Available Project Yield (acft/yr)	8,286
Annual Cost of Water ($ per acft), based on PF=1.25	$678
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.25	$144
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.25	$2.08
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.25	$0.44

CZG *1/28/2025*

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Table H.101

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Denton - Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (8.9 MGD)	$17,286,000
Transmission Pipeline (24 in. dia., 10.5 miles)	$30,305,000
Advanced Water Treatment Facility (9 MGD)	$67,749,000
Integration, Relocations, Backup Generator & Other	$48,000
TOTAL COST OF FACILITIES	**$115,388,000**
Engineering:	
- Planning (3%)	$3,462,000
- Design (7%)	$8,077,000
- Construction Engineering (1%)	$1,154,000
Legal Assistance (2%)	$2,308,000
Fiscal Services (2%)	$2,308,000
Pipeline Contingency (15%)	$4,546,000
All Other Facilities Contingency (20%)	$17,017,000
Environmental & Archaeology Studies and Mitigation	$369,000
Land Acquisition and Surveying (35 acres)	$362,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$10,075,000
TOTAL COST OF PROJECT	**$165,066,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$8,975,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$304,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$432,000
Advanced Water Treatment Facility	$9,114,000
Pumping Energy Costs (787810 kW-hr @ 0.09 $/kW-hr)	$71,000
TOTAL ANNUAL COST	**$18,896,000**
Available Project Yield (acft/yr)	5,000
Annual Cost of Water ($ per acft), based on PF=2	$3,779
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,984
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$11.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$6.09

CZG *1/28/2025*

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Table H.102

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Hackberry - Additional Water from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,853,000
Transmission Pipeline (14 in. dia., 2.3 miles)	$3,966,000
Integration, Relocations, Backup Generator & Other	$15,000
TOTAL COST OF FACILITIES	**$5,834,000**
Engineering:	
- Planning (3%)	$175,000
- Design (7%)	$408,000
- Construction Engineering (1%)	$58,000
Legal Assistance (2%)	$117,000
Fiscal Services (2%)	$117,000
Pipeline Contingency (15%)	$595,000
All Other Facilities Contingency (20%)	$374,000
Environmental & Archaeology Studies and Mitigation	$123,000
Land Acquisition and Surveying (11 acres)	$125,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$516,000
TOTAL COST OF PROJECT	**$8,442,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$459,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$40,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$46,000
Pumping Energy Costs (250585 kW-hr @ 0.09 $/kW-hr)	$23,000
TOTAL ANNUAL COST	**$568,000**
Available Project Yield (acft/yr)	1,999
Annual Cost of Water ($ per acft), based on PF=2	$284
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$55
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.87
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.17

ADB *8/6/2024*

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Table H.103

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Flower Mound - Denton Creek RWS Direct Reuse* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Primary Pump Station (4500 GPM)	$3,976,000
Transmission System	$17,908,000
Storage Tanks (Other Than at Booster Pump Stations)	$5,091,000
Integration, Relocations, Backup Generator & Other	$77,000
TOTAL COST OF FACILITIES	**$27,052,000**
Engineering:	
- Planning (3%)	$812,000
- Design (7%)	$1,894,000
- Construction Engineering (1%)	$271,000
Legal Assistance (2%)	$541,000
Fiscal Services (2%)	$541,000
Pipeline Contingency (15%)	$2,686,000
All Other Facilities Contingency (20%)	$1,829,000
Environmental & Archaeology Studies and Mitigation	$84,000
Land Acquisition and Surveying (8 acres)	$91,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,327,000
TOTAL COST OF PROJECT	**$38,128,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,073,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$231,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$99,000
Pumping Energy Costs (46948 kW-hr @ 0.09 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$2,407,000**
Available Project Yield (acft/yr)	556
Annual Cost of Water ($ per acft), based on PF=2	$4,329
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$601
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$13.28
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.84
Note: One or more cost element has been calculated externally	
HAC	*8/1/2025*

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Table H.104

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Flower Mound - Long Prairie & Lakeside Business District Reuse

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$3,657,000
Transmission Pipeline (24 in. dia., 12 miles)	$20,886,000
Storage Tanks (Other Than at Booster Pump Stations)	$3,569,000
Integration, Relocations, Backup Generator & Other	$34,000
TOTAL COST OF FACILITIES	**$28,146,000**
Engineering:	
- Planning (3%)	$844,000
- Design (7%)	$1,970,000
- Construction Engineering (1%)	$281,000
Legal Assistance (2%)	$563,000
Fiscal Services (2%)	$563,000
Pipeline Contingency (15%)	$3,133,000
All Other Facilities Contingency (20%)	$1,452,000
Environmental & Archaeology Studies and Mitigation	$436,000
Land Acquisition and Surveying (36 acres)	$429,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,459,000
TOTAL COST OF PROJECT	**$40,276,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,190,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$245,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$91,000
Pumping Energy Costs (553210 kW-hr @ 0.09 $/kW-hr)	$50,000
TOTAL ANNUAL COST	**$2,576,000**
Available Project Yield (acft/yr)	4,066
Annual Cost of Water ($ per acft), based on PF=2	$634
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$95
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.94
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.29

Plummer *12/17/2024*

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Table H.105

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Ponder - Connect to Denton*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Primary Pump Station	$718,000
Transmission Pipeline (10 in. dia., 1.5 miles)	$152,000
TOTAL COST OF FACILITIES	**$870,000**
Engineering:	
- Planning (3%)	$26,000
- Design (7%)	$61,000
- Construction Engineering (1%)	$9,000
Legal Assistance (2%)	$17,000
Fiscal Services (2%)	$17,000
Pipeline Contingency (15%)	$23,000
All Other Facilities Contingency (20%)	$144,000
Environmental & Archaeology Studies and Mitigation	$99,000
Land Acquisition and Surveying (9 acres)	$103,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$89,000
TOTAL COST OF PROJECT	**$1,458,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$79,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
TOTAL ANNUAL COST	**$99,000**
Available Project Yield (acft/yr)	991
Annual Cost of Water ($ per acft), based on PF=2	$100
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$20
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.31
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.06
HAC	*2/13/2025*

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Table H.106

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Ferris - Increase Delivery Infrastructure from Rockett SUD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$648,000
Transmission Pipeline (6 in. dia., 2 miles)	$1,380,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$2,029,000**
Engineering:	
- Planning (3%)	$61,000
- Design (7%)	$142,000
- Construction Engineering (1%)	$20,000
Legal Assistance (2%)	$41,000
Fiscal Services (2%)	$41,000
Pipeline Contingency (15%)	$207,000
All Other Facilities Contingency (20%)	$130,000
Environmental & Archaeology Studies and Mitigation	$114,000
Land Acquisition and Surveying (10 acres)	$117,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$189,000
TOTAL COST OF PROJECT	**$3,091,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$168,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$14,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$16,000
Pumping Energy Costs (10899 kW-hr @ 0.09 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$199,000**
Available Project Yield (acft/yr)	111
Annual Cost of Water ($ per acft), based on PF=2	$1,793
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$279
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.50
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.86

CJM - Plummer *11/21/2024*

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Table H.107

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Midlothian - Tayman Expansion and Raw Water Delivery*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 277.68 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (24 in. dia., 2.5 miles)	$6,421,000
Transmission Pump Station(s) & Storage Tank(s)	$11,281,000
Water Treatment Plant (8.5 MGD)	$25,265,000
Integration, Relocations, Backup Generator & Other	$2,610,000
TOTAL COST OF FACILITIES	**$45,577,000**
- Planning (3%)	$1,367,000
- Design (7%)	$3,190,000
- Construction Engineering (1%)	$456,000
Legal Assistance (2%)	$912,000
Fiscal Services (2%)	$912,000
Pipeline Contingency (15%)	$963,000
All Other Facilities Contingency (20%)	$7,831,000
Environmental & Archaeology Studies and Mitigation	$176,000
Land Acquisition and Surveying (20 acres)	$184,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,986,000
TOTAL COST OF PROJECT	**$64,554,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,660,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$90,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$282,000
Water Treatment Plant	$1,806,000
Pumping Energy Costs (1505217 kW-hr @ 0.09 $/kW-hr)	$135,000
TOTAL ANNUAL COST	**$4,973,000**
Available Project Yield (acft/yr)	5,605
Annual Cost of Water ($ per acft), based on PF=4	$887
Annual Cost of Water After Debt Service ($ per acft), based on PF=4	$413
Annual Cost of Water ($ per 1,000 gallons), based on PF=4	$2.72
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=4	$1.27
Note: One or more cost element has been calculated externally	
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Table H.108

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Palmer - Increase Delivery Infrastructure from Rockett SUD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$793,000
Transmission Pipeline (6 in. dia., 12.5 miles)	$8,591,000
Transmission Pump Station(s) & Storage Tank(s)	$3,620,000
Integration, Relocations, Backup Generator & Other	$4,000
TOTAL COST OF FACILITIES	**$13,008,000**
Engineering:	
- Planning (3%)	$390,000
- Design (7%)	$911,000
- Construction Engineering (1%)	$130,000
Legal Assistance (2%)	$260,000
Fiscal Services (2%)	$260,000
Pipeline Contingency (15%)	$1,289,000
All Other Facilities Contingency (20%)	$883,000
Environmental & Archaeology Studies and Mitigation	$537,000
Land Acquisition and Surveying (45 acres)	$538,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,184,000
TOTAL COST OF PROJECT	**$19,390,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,054,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$107,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$58,000
Pumping Energy Costs (71475 kW-hr @ 0.09 $/kW-hr)	$6,000
TOTAL ANNUAL COST	**$1,225,000**
Available Project Yield (acft/yr)	229
Annual Cost of Water ($ per acft), based on PF=2	$5,349
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$747
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$16.41
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.29

CJM - Plummer *11/21/2024*

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Table H.109

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Ovilla - Increase Delivery Infrastructure from DWU

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$1,649,000
Transmission Pipeline (10 in. dia., 1 miles)	$1,000,000
Integration, Relocations, Backup Generator & Other	$16,000
TOTAL COST OF FACILITIES	**$2,665,000**
Engineering:	
- Planning (3%)	$80,000
- Design (7%)	$187,000
- Construction Engineering (1%)	$27,000
Legal Assistance (2%)	$53,000
Fiscal Services (2%)	$53,000
Pipeline Contingency (15%)	$150,000
All Other Facilities Contingency (20%)	$333,000
Environmental & Archaeology Studies and Mitigation	$84,000
Land Acquisition and Surveying (7 acres)	$88,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$242,000
TOTAL COST OF PROJECT	**$3,962,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$215,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$10,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$41,000
Pumping Energy Costs (268464 kW-hr @ 0.09 $/kW-hr)	$24,000
TOTAL ANNUAL COST	**$290,000**
Available Project Yield (acft/yr)	1,241
Annual Cost of Water ($ per acft), based on PF=2	$234
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$60
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.72
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.19

CJM - Plummer *11/21/2024*

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Table H.110

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Sardis-Lone Elm WSC - Direct Connection to TRWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (4.8 MGD)	$7,327,000
Transmission Pipeline (16 in. dia., 5 miles)	$6,354,000
Integration, Relocations, Backup Generator & Other	$26,000
TOTAL COST OF FACILITIES	**$16,975,000**
Engineering:	
- Planning (3%)	$509,000
- Design (7%)	$1,188,000
- Construction Engineering (1%)	$170,000
Legal Assistance (2%)	$339,000
Fiscal Services (2%)	$339,000
Pipeline Contingency (15%)	$953,000
All Other Facilities Contingency (20%)	$2,124,000
Environmental & Archaeology Studies and Mitigation	$284,000
Land Acquisition and Surveying (25 acres)	$291,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,507,000
TOTAL COST OF PROJECT	**$24,679,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,342,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$78,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$230,000
Water Treatment Plant	$4,668,000
Pumping Energy Costs (422240 kW-hr @ 0.09 $/kW-hr)	$38,000
TOTAL ANNUAL COST	**$6,356,000**
Available Project Yield (acft/yr)	2,694
Annual Cost of Water ($ per acft), based on PF=2	$2,359
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,861
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.24
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.71

AH *11/22/2024*

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Table H.111

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Waxahachie - Phase I Delivery Infrastructure to Customers in South Ellis County

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (14-42 in. dia., 13.2 miles)	$20,629,000
Transmission Pump Station(s) & Storage Tank(s)	$8,047,000
Integration, Relocations, Backup Generator & Other	$221,000
TOTAL COST OF FACILITIES	**$28,897,000**
Engineering:	
- Planning (3%)	$867,000
- Design (7%)	$2,023,000
- Construction Engineering (1%)	$289,000
Legal Assistance (2%)	$578,000
Fiscal Services (2%)	$578,000
Pipeline Contingency (15%)	$3,094,000
All Other Facilities Contingency (20%)	$1,654,000
Environmental & Archaeology Studies and Mitigation	$451,000
Land Acquisition and Surveying (37 acres)	$441,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,527,000
TOTAL COST OF PROJECT	**$41,399,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,251,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$233,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$141,000
Pumping Energy Costs (3618356 kW-hr @ 0.09 $/kW-hr)	$326,000
TOTAL ANNUAL COST	**$2,951,000**
Available Project Yield (acft/yr)	16,794
Annual Cost of Water ($ per acft), based on PF=2	$176
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$42
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.54
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.13
Note: One or more cost element has been calculated externally	

AH *11/22/2024*

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Table H.112

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bois D Arc - Connect to and Purchase Water from NTWMD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$798,000
Transmission Pipeline (6 in. dia., 7 miles)	$4,839,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$5,638,000**
Engineering:	
- Planning (3%)	$169,000
- Design (7%)	$395,000
- Construction Engineering (1%)	$56,000
Legal Assistance (2%)	$113,000
Fiscal Services (2%)	$113,000
Pipeline Contingency (15%)	$726,000
All Other Facilities Contingency (20%)	$160,000
Environmental & Archaeology Studies and Mitigation	$274,000
Land Acquisition and Surveying (22 acres)	$303,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$517,000
TOTAL COST OF PROJECT	**$8,464,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$460,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$48,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$20,000
Pumping Energy Costs (11227 kW-hr @ 0.09 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$529,000**
Available Project Yield (acft/yr)	207
Annual Cost of Water ($ per acft), based on PF=2	$2,556
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$333
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.84
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.02

ADB *8/6/2024*

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Table H.113

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Ladonia - Infrastructure and Treatment for Water from Ralph Hall (UTRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0.3 MGD)	$3,651,000
Transmission Pipeline (6 in. dia., 1 miles)	$687,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,784,000
Water Treatment Plant (0.5 MGD)	$10,663,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$16,786,000**
Engineering:	
- Planning (3%)	$504,000
- Design (7%)	$1,175,000
- Construction Engineering (1%)	$168,000
Legal Assistance (2%)	$336,000
Fiscal Services (2%)	$336,000
Pipeline Contingency (15%)	$103,000
All Other Facilities Contingency (20%)	$3,220,000
Environmental & Archaeology Studies and Mitigation	$120,000
Land Acquisition and Surveying (10 acres)	$133,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,488,000
TOTAL COST OF PROJECT	**$24,369,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,325,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$25,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$91,000
Water Treatment Plant	$877,000
Pumping Energy Costs (18493 kW-hr @ 0.09 $/kW-hr)	$2,000
Purchase of Water (150 acft/yr @ 488.72 $/acft)	$73,000
TOTAL ANNUAL COST	**$2,393,000**
Available Project Yield (acft/yr)	150
Annual Cost of Water ($ per acft), based on PF=2	$15,953
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$7,120
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$48.95
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$21.85

ADB *11/18/2024*

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Table H.114

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Leonard - Water System Improvements

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (84 in. dia., 1.5 miles)	$11,939,000
Transmission Pump Station(s) & Storage Tank(s)	$1,101,000
Well Fields (Wells, Pumps, and Piping)	$1,926,000
Water Treatment Plant (0.5 MGD)	$63,000
Integration, Relocations, Backup Generator & Other	$3,000
TOTAL COST OF FACILITIES	**$15,032,000**
Engineering:	
- Planning (3%)	$451,000
- Design (7%)	$1,052,000
- Construction Engineering (1%)	$150,000
Legal Assistance (2%)	$301,000
Fiscal Services (2%)	$301,000
Pipeline Contingency (15%)	$1,791,000
All Other Facilities Contingency (20%)	$619,000
Environmental & Archaeology Studies and Mitigation	$109,000
Land Acquisition and Surveying (8 acres)	$104,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,295,000
TOTAL COST OF PROJECT	**$21,205,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,153,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$150,000
Water Treatment Plant	$38,000
Pumping Energy Costs (48377 kW-hr @ 0.09 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$1,345,000**
Available Project Yield (acft/yr)	573
Annual Cost of Water ($ per acft), based on PF=2	$2,347
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$335
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.20
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.03

ADB *11/18/2024*

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Table H.115

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Fairfield - Purchase Water from TRWD with New 2 MGD WTP

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (1.8 MGD)	$6,682,000
Transmission Pipeline (10 in. dia., 16.7 miles)	$16,699,000
Transmission Pump Station(s) & Storage Tank(s)	$8,322,000
Water Treatment Plant (2 MGD)	$26,944,000
Integration, Relocations, Backup Generator & Other	$41,000
TOTAL COST OF FACILITIES	**$58,688,000**
Engineering:	
- Planning (3%)	$1,761,000
- Design (7%)	$4,108,000
- Construction Engineering (1%)	$587,000
Legal Assistance (2%)	$1,174,000
Fiscal Services (2%)	$1,174,000
Pipeline Contingency (15%)	$2,505,000
All Other Facilities Contingency (20%)	$8,398,000
Environmental & Archaeology Studies and Mitigation	$656,000
Land Acquisition and Surveying (61 acres)	$500,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,171,000
TOTAL COST OF PROJECT	**$84,722,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$4,606,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$202,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$288,000
Water Treatment Plant	$2,076,000
Pumping Energy Costs (680662 kW-hr @ 0.09 $/kW-hr)	$61,000
TOTAL ANNUAL COST	**$7,233,000**
Available Project Yield (acft/yr)	984
Annual Cost of Water ($ per acft), based on PF=2	$7,351
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$2,670
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$22.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$8.19

CJM - Plummer *11/21/2024*

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Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices*			
County-Other, Freestone and Wortham - Connect to Corsicana			
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023			
Item	***Estimated Costs for Facilities***	***County-Other, Freestone Share***	***Wortham Share***
CAPITAL COST			
Primary Pump Station	$800,000	$312,000	$488,000
Transmission Pipeline (6 in. dia., 21.5 miles)	$16,062,000	$6,256,000	$9,806,000
Transmission Pump Station(s) & Storage Tank(s)	$3,623,000	$1,411,000	$2,212,000
Integration, Relocations, Backup Generator & Other	$5,000	$2,000	$3,000
TOTAL COST OF FACILITIES	**$20,490,000**	**$7,981,000**	**$12,509,000**
Engineering:			
- Planning (3%)	$615,000	$240,000	$375,000
- Design (7%)	$1,434,000	$559,000	$875,000
- Construction Engineering (1%)	$205,000	$80,000	$125,000
Legal Assistance (2%)	$410,000	$160,000	$250,000
Fiscal Services (2%)	$410,000	$160,000	$250,000
Pipeline Contingency (15%)	$2,409,000	$938,000	$1,471,000
All Other Facilities Contingency (20%)	$886,000	$345,000	$541,000
Environmental & Archaeology Studies and Mitigation	$756,000	$294,000	$462,000
Land Acquisition and Surveying (67 acres)	$546,000	$213,000	$333,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,831,000	$713,000	$1,118,000
TOTAL COST OF PROJECT	**$29,992,000**	**$11,683,000**	**$18,309,000**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$1,631,000	$635,000	$996,000
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$182,000	$71,000	$111,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$58,000	$23,000	$35,000
Pumping Energy Costs (79351 kW-hr @ 0.09 $/kW-hr)	$7,000	$3,000	$4,000
TOTAL ANNUAL COST	**$1,878,000**	**$732,000**	**$1,146,000**
Available Project Yield (acft/yr)	190	74	116
Annual Cost of Water ($ per acft), based on PF=2	$9,884	$9,884	$9,884
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,300	$1,300	$1,300
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$30.33	$30.33	$30.33
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.99	$3.99	$3.99
HAC			*8/1/2025*

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Table H.117

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Denison - Expand Raw Water Delivery from Lake Texoma

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (32.4 MGD)	$30,544,000
Transmission Pipeline (48 in. dia., 1.5 miles)	$6,800,000
Water Treatment Plant (0 MGD)	$1,565,000
Integration, Relocations, Backup Generator & Other	$11,463,000
TOTAL COST OF FACILITIES	**$50,372,000**
Engineering:	
- Planning (3%)	$1,511,000
- Design (7%)	$3,526,000
- Construction Engineering (1%)	$504,000
Legal Assistance (2%)	$1,007,000
Fiscal Services (2%)	$1,007,000
Pipeline Contingency (15%)	$1,020,000
All Other Facilities Contingency (20%)	$8,714,000
Environmental & Archaeology Studies and Mitigation	$109,000
Land Acquisition and Surveying (9 acres)	$120,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$4,413,000
TOTAL COST OF PROJECT	**$72,303,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$3,931,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$183,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$764,000
Pumping Energy Costs (2872023 kW-hr @ 0.09 $/kW-hr)	$258,000
TOTAL ANNUAL COST	**$5,136,000**
Available Project Yield (acft/yr)	18,152
Annual Cost of Water ($ per acft), based on PF=2	$283
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$66
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.87
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.20
Note: One or more cost element has been calculated externally	

HAC *2/16/2025*

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Table H.118

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Van Alstyne - Increase Delivery Infrastructure to Purchase Additional Water from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Primary Pump Stations (8 MGD)	$4,984,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,267,000
Integration, Relocations, Backup Generator & Other	$56,000
TOTAL COST OF FACILITIES	**$6,307,000**
Engineering:	
- Planning (3%)	$189,000
- Design (7%)	$441,000
- Construction Engineering (1%)	$63,000
Legal Assistance (2%)	$126,000
Fiscal Services (2%)	$126,000
All Other Facilities Contingency (20%)	$1,261,000
Environmental & Archaeology Studies and Mitigation	$87,000
Land Acquisition and Surveying (19 acres)	$96,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$566,000
TOTAL COST OF PROJECT	**$9,262,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$504,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$13,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$125,000
Pumping Energy Costs (915352 kW-hr @ 0.09 $/kW-hr)	$82,000
TOTAL ANNUAL COST	**$724,000**
Available Project Yield (acft/yr)	4,464
Annual Cost of Water ($ per acft), based on PF=2	$162
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$49
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.50
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.15

HAC *2/16/2025*

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Table H.119

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Grayson County Manufacturing - Direct Reuse from Sherman

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$936,000
Transmission Pipeline (10 in. dia., 10 miles)	$9,997,000
Advanced Water Treatment Facility (0.5 MGD)	$5,701,000
Integration, Relocations, Backup Generator & Other	$14,000
TOTAL COST OF FACILITIES	**$16,648,000**
Engineering:	
- Planning (3%)	$499,000
- Design (7%)	$1,165,000
- Construction Engineering (1%)	$166,000
Legal Assistance (2%)	$333,000
Fiscal Services (2%)	$333,000
Pipeline Contingency (15%)	$1,500,000
All Other Facilities Contingency (20%)	$1,330,000
Environmental & Archaeology Studies and Mitigation	$362,000
Land Acquisition and Surveying (29 acres)	$401,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,478,000
TOTAL COST OF PROJECT	**$24,215,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,317,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$100,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$23,000
Advanced Water Treatment Facility	$389,000
Pumping Energy Costs (224618 kW-hr @ 0.09 $/kW-hr)	$20,000
TOTAL ANNUAL COST	**$1,849,000**
Available Project Yield (acft/yr)	561
Annual Cost of Water ($ per acft), based on PF=1	$3,296
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$948
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$10.11
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$2.91

CMC *2/9/2025*

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Table H.120

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
NTWMD - Texoma Blend Phase I

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Cost (Project Total)*	*Estimated Cost (NTMWD)*	*Estimated Cost (Sherman)*
CAPITAL COST			
Terminal Storage (Conservation Pool 200 acft, 15 acres)	$12,150,000	$12,150,000	$0
Intake Pump Stations (0 MGD)	$55,409,000	$44,327,000	$11,082,000
Transmission Pipeline (84 in. dia., 35.1 miles)	$321,878,000	$273,291,000	$48,587,000
Integration, Relocations, Backup Generator & Other	$1,808,000	$1,446,000	$362,000
TOTAL COST OF FACILITIES	**$391,245,000**	**$331,214,000**	**$60,031,000**
Engineering:			
- Planning (3%)	$11,737,000	$9,936,000	$1,801,000
- Design (7%)	$27,387,000	$23,185,000	$4,202,000
- Construction Engineering (1%)	$3,912,000	$3,312,000	$600,000
Legal Assistance (2%)	$7,825,000	$6,624,000	$1,201,000
Fiscal Services (2%)	$7,825,000	$6,624,000	$1,201,000
Pipeline Contingency (15%)	$48,282,000	$40,994,000	$7,288,000
All Other Facilities Contingency (20%)	$13,874,000	$11,585,000	$2,289,000
Environmental & Archaeology Studies and Mitigation	$1,241,000	$1,082,000	$159,000
Land Acquisition and Surveying (233 acres)	$3,108,000	$2,676,000	$432,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$33,569,000	$28,421,000	$5,148,000
TOTAL COST OF PROJECT	**$550,005,000**	**$465,653,000**	**$84,352,000**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$28,933,000	$24,496,000	$4,437,000
Reservoir Debt Service (3.5 percent, 40 years)	$837,000	$837,000	$0
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,237,000	$2,748,000	$489,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,385,000	$1,108,000	$277,000
Dam and Reservoir (1.5% of Cost of Facilities)	$182,000	$182,000	$0
Pumping Energy Costs (29665313 kW-hr @ 0.09 $/kW-hr)	$2,670,000	$2,136,000	$534,000
TOTAL ANNUAL COST	**$37,244,000**	**$31,507,000**	**$5,737,000**
Available Project Yield (acft/yr)		39,309	11,385
Annual Cost of Water ($ per acft), based on PF=2		$802	$504
Annual Cost of Water After Debt Service ($ per acft), based on PF=2		$157	$114
Annual Cost of Water ($ per 1,000 gallons), based on PF=2		$2.46	$1.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2		$0.48	$0.35

HAC *11/11/2024*

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Table H.121

Cost Estimate Summary Water Supply Project Option September 2023 Prices Sherman - 5-MGD Pump Station Expansion (2040)	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Station Expansion	$1,049,000
TOTAL COST OF FACILITIES	**$1,049,000**
Engineering:	
- Planning (3%)	$31,000
- Design (7%)	$73,000
- Construction Engineering (1%)	$10,000
Legal Assistance (2%)	$21,000
Fiscal Services (2%)	$21,000
All Other Facilities Contingency (20%)	$210,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$46,000
TOTAL COST OF PROJECT	**$1,461,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$79,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$26,000
Pumping Energy Costs (2,866,667 kW-hr @ 0.09 $/kW-hr)	$258,000
TOTAL ANNUAL COST	**$363,000**
Available Project Yield (acft/yr)	6,352
Annual Cost of Water ($ per acft), based on PF=1.5	$57
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$45
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$0.18
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.14
CMC	*2/7/2025*

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Table H.122

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Sherman - Indirect Reuse*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Station (6.1 MGD)	$4,844,000
Transmission Pipeline (24 in. dia., 16.5 miles)	$32,101,000
Integration, Relocations, Backup Generator & Other	$175,000
TOTAL COST OF FACILITIES	**$37,120,000**
- Planning (3%)	$1,114,000
- Design (7%)	$2,598,000
- Construction Engineering (1%)	$371,000
Legal Assistance (2%)	$742,000
Fiscal Services (2%)	$742,000
Pipeline Contingency (15%)	$4,815,000
All Other Facilities Contingency (20%)	$1,004,000
Environmental & Archaeology Studies and Mitigation	$495,000
Land Acquisition and Surveying (105 acres)	$1,372,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$3,275,000
TOTAL COST OF PROJECT	**$53,648,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$2,917,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$323,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$121,000
Pumping Energy Costs (2870552 kW-hr @ 0.09 $/kW-hr)	$258,000
TOTAL ANNUAL COST	**$3,619,000**
Available Project Yield (acft/yr)	5,530
Annual Cost of Water ($ per acft), based on PF=1	$654
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$127
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$2.01
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.39
CMC	*2/8/2025*

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Table H.123

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
College Mound WSC - Increase Delivery Insfrastructure from Terrell

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations	$1,875,000
Transmission Pipeline (14 in. dia., 8.3 miles)	$9,598,000
Transmission Pump Station(s) & Storage Tank(s)	$6,276,000
Integration, Relocations, Backup Generator & Other	$43,000
TOTAL COST OF FACILITIES	**$17,792,000**
Engineering:	
- Planning (3%)	$534,000
- Design (7%)	$1,245,000
- Construction Engineering (1%)	$178,000
Legal Assistance (2%)	$356,000
Fiscal Services (2%)	$356,000
Pipeline Contingency (15%)	$1,440,000
All Other Facilities Contingency (20%)	$1,639,000
Environmental & Archaeology Studies and Mitigation	$411,000
Land Acquisition and Surveying (35 acres)	$417,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,584,000
TOTAL COST OF PROJECT	**$25,952,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,411,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$122,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$139,000
Pumping Energy Costs (709466 kW-hr @ 0.09 $/kW-hr)	$64,000
TOTAL ANNUAL COST	**$1,736,000**
Available Project Yield (acft/yr)	2,036
Annual Cost of Water ($ per acft), based on PF=2	$853
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$160
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.62
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.49

ADB *8/6/2024*

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Table H.124

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Forney - Increase Delivery Infrastructure from NTMWD (Pump Station)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations	$15,760,000
TOTAL COST OF FACILITIES	**$15,760,000**
- Design (7%)	$1,103,000
- Construction Engineering (1%)	$158,000
Legal Assistance (2%)	$315,000
Fiscal Services (2%)	$315,000
All Other Facilities Contingency (20%)	$3,152,000
TOTAL COST OF PROJECT	**$21,276,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,157,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$394,000
Pumping Energy Costs (3620292 kW-hr @ 0.09 $/kW-hr)	$326,000
TOTAL ANNUAL COST	**$1,877,000**
Available Project Yield (acft/yr)	11,770
Annual Cost of Water ($ per acft), based on PF=1	$159
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$61
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.49
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.19
Note: One or more cost element has been calculated externally	

ADB *12/2/2024*

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Table H.125

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Mabank - Increase Delivery Infrastructure from TRWD (Cedar Creek Lake)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (1.2 MGD)	$4,131,000
Transmission Pipeline (8 in. dia., 0 miles)	$15,000
Integration, Relocations, Backup Generator & Other	$4,000
TOTAL COST OF FACILITIES	**$4,150,000**
Engineering:	
- Planning (3%)	$125,000
- Design (7%)	$291,000
- Construction Engineering (1%)	$42,000
Legal Assistance (2%)	$83,000
Fiscal Services (2%)	$83,000
Pipeline Contingency (15%)	$2,000
All Other Facilities Contingency (20%)	$827,000
Environmental & Archaeology Studies and Mitigation	$55,000
Land Acquisition and Surveying (5 acres)	$60,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$372,000
TOTAL COST OF PROJECT	**$6,090,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$331,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$103,000
Pumping Energy Costs (69493 kW-hr @ 0.09 $/kW-hr)	$6,000
TOTAL ANNUAL COST	**$440,000**
Available Project Yield (acft/yr)	697
Annual Cost of Water ($ per acft), based on PF=2	$631
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$156
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.94
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.48

ADB *8/7/2024*

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Table H.126

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Terrell - Infrastructure Improvements*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (16 in. dia., 4.7 miles)	$5,949,000
Integration, Relocations, Backup Generator & Other	$1,101,000
TOTAL COST OF FACILITIES	**$7,050,000**
Engineering:	
- Planning (3%)	$212,000
- Design (7%)	$494,000
- Construction Engineering (1%)	$71,000
Legal Assistance (2%)	$141,000
Fiscal Services (2%)	$141,000
Pipeline Contingency (15%)	$892,000
All Other Facilities Contingency (20%)	$220,000
Environmental & Archaeology Studies and Mitigation	$141,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$609,000
TOTAL COST OF PROJECT	**$9,971,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$542,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$71,000
TOTAL ANNUAL COST	**$613,000**
Available Project Yield (acft/yr)	7,531
Annual Cost of Water ($ per acft), based on PF=1	$81
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$9
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.25
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.03
Note: One or more cost element has been calculated externally	
ADB	*12/2/2024*

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Table H.127

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Kaufman County Other - Water from TRWD with new delivery and treatment facilities (0.5 MGD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0.2 MGD)	$717,000
Transmission Pipeline (6 in. dia., 10 miles)	$7,471,000
Water Treatment Plant (0.5 MGD)	$10,663,000
Integration, Relocations, Backup Generator & Other	$2,000
TOTAL COST OF FACILITIES	**$18,853,000**
- Planning (3%)	$566,000
- Design (7%)	$1,320,000
- Construction Engineering (1%)	$189,000
Legal Assistance (2%)	$377,000
Fiscal Services (2%)	$377,000
Pipeline Contingency (15%)	$1,121,000
All Other Facilities Contingency (20%)	$2,276,000
Environmental & Archaeology Studies and Mitigation	$357,000
Land Acquisition and Surveying (29 acres)	$351,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,677,000
TOTAL COST OF PROJECT	**$27,464,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,493,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$75,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
Water Treatment Plant	$877,000
Pumping Energy Costs (28986 kW-hr @ 0.09 $/kW-hr)	$3,000
TOTAL ANNUAL COST	**$2,466,000**
Available Project Yield (acft/yr)	95
Annual Cost of Water ($ per acft), based on PF=2	$25,958
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$10,242
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$79.65
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$31.43
Note: One or more cost element has been calculated externally	

ADB *8/6/2024*

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Table H.128

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
M E N WSC - Increase Delivery Infrastructure from Corsicana

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0.3 MGD)	$734,000
Transmission Pipeline (6 in. dia., 2 miles)	$1,375,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,784,000
Integration, Relocations, Backup Generator & Other	$396,000
TOTAL COST OF FACILITIES	**$4,289,000**
Engineering:	
- Planning (3%)	$129,000
- Design (7%)	$300,000
- Construction Engineering (1%)	$43,000
Legal Assistance (2%)	$86,000
Fiscal Services (2%)	$86,000
Pipeline Contingency (15%)	$206,000
All Other Facilities Contingency (20%)	$583,000
Environmental & Archaeology Studies and Mitigation	$112,000
Land Acquisition and Surveying (12 acres)	$96,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$386,000
TOTAL COST OF PROJECT	**$6,316,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$343,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$36,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
Pumping Energy Costs (34737 kW-hr @ 0.09 $/kW-hr)	$3,000
TOTAL ANNUAL COST	**$400,000**
Available Project Yield (acft/yr)	163
Annual Cost of Water ($ per acft), based on PF=2	$2,454
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$350
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.53
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.07
Note: One or more cost element has been calculated externally	

CJM - Plummer *12/12/2024*

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Table H.129

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Annetta - Connect to and Purchase Water from Weatherford (TRWD)*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Pump Stations	$701,000
Integration, Relocations, Backup Generator & Other	$2,000
TOTAL COST OF FACILITIES	**$703,000**
Engineering:	
- Planning (3%)	$21,000
- Design (7%)	$49,000
- Construction Engineering (1%)	$7,000
Legal Assistance (2%)	$14,000
Fiscal Services (2%)	$14,000
All Other Facilities Contingency (20%)	$141,000
Environmental & Archaeology Studies and Mitigation	$262,000
Land Acquisition and Surveying (21 acres)	$313,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$100,000
TOTAL COST OF PROJECT	**$1,624,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$88,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
Pumping Energy Costs (24812 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$108,000**
Available Project Yield (acft/yr)	100
Annual Cost of Water ($ per acft), based on PF=2	$1,080
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$200
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$3.31
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.61
ADB	*10/7/2024*

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Table H.130

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Aledo - Parallel Pipe & Pump Station Expansions from TRWD (Fort Worth)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (8-20 in. dia., 10.8 miles)	$13,922,000
Transmission Pump Station(s) & Storage Tank(s)	$1,891,000
Integration, Relocations, Backup Generator & Other	$3,000
TOTAL COST OF FACILITIES	**$15,816,000**
Engineering:	
- Planning (3%)	$474,000
- Design (7%)	$1,107,000
- Construction Engineering (1%)	$158,000
Legal Assistance (2%)	$316,000
Fiscal Services (2%)	$316,000
Pipeline Contingency (15%)	$2,088,000
All Other Facilities Contingency (20%)	$379,000
Environmental & Archaeology Studies and Mitigation	$393,000
Land Acquisition and Surveying (9 acres)	$142,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,378,000
TOTAL COST OF PROJECT	**$22,567,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,227,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$139,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$47,000
Pumping Energy Costs (23984 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$1,415,000**
Available Project Yield (acft/yr)	621
Annual Cost of Water ($ per acft), based on PF=2	$2,279
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$303
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$6.99
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.93
Note: One or more cost element has been calculated externally	

ADB *12/2/2024*

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Table H.131

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Springtown - Increase Delivery Infrastructure, Surface Water Treatment Plant & Supply Project

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$646,000
Water Treatment Plant	$2,972,000
TOTAL COST OF FACILITIES	**$3,618,000**
Engineering:	
- Planning (3%)	$109,000
- Design (7%)	$253,000
- Construction Engineering (1%)	$36,000
Legal Assistance (2%)	$72,000
Fiscal Services (2%)	$72,000
All Other Facilities Contingency (20%)	$724,000
Environmental & Archaeology Studies and Mitigation	$7,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$318,000
TOTAL COST OF PROJECT	**$5,209,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$283,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$16,000
TOTAL ANNUAL COST	**$299,000**
Available Project Yield (acft/yr)	1,214
Annual Cost of Water ($ per acft), based on PF=1	$246
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$13
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.76
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.04
Note: One or more cost element has been calculated externally	

ADB *12/2/2024*

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Table H.132

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Walnut Creek SUD - Infrastructure to deliver to customers

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$13,829,000
Transmission Pipeline (36 in. dia., 1.8 miles)	$5,486,000
Integration, Relocations, Backup Generator & Other	$268,000
TOTAL COST OF FACILITIES	**$19,583,000**
Engineering:	
- Planning (3%)	$588,000
- Design (7%)	$1,371,000
- Construction Engineering (1%)	$196,000
Legal Assistance (2%)	$392,000
Fiscal Services (2%)	$392,000
Pipeline Contingency (15%)	$823,000
All Other Facilities Contingency (20%)	$2,819,000
Environmental & Archaeology Studies and Mitigation	$122,000
Land Acquisition and Surveying (9 acres)	$141,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,718,000
TOTAL COST OF PROJECT	**$28,145,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,530,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$58,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$346,000
Pumping Energy Costs (4397335 kW-hr @ 0.09 $/kW-hr)	$396,000
TOTAL ANNUAL COST	**$2,330,000**
Available Project Yield (acft/yr)	13,878
Annual Cost of Water ($ per acft), based on PF=2	$168
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$58
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.52
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.18

HAC *2/18/2025*

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Table H.133

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Weatherford - Increase Capacity of Lake Benbrook Pump Station

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$14,470,000
TOTAL COST OF FACILITIES	**$14,470,000**
Engineering:	
- Planning (3%)	$434,000
- Design (7%)	$1,013,000
- Construction Engineering (1%)	$145,000
Legal Assistance (2%)	$289,000
Fiscal Services (2%)	$289,000
All Other Facilities Contingency (20%)	$2,894,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,270,000
TOTAL COST OF PROJECT	**$20,804,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,131,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$362,000
TOTAL ANNUAL COST	**$1,493,000**
Available Project Yield (acft/yr)	1,682
Annual Cost of Water ($ per acft), based on PF=0	$888
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$215
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$2.72
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.66
Note: One or more cost element has been calculated externally	

ADB *10/7/2024*

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Table H.134

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Weatherford - Increase Capacity of Lake Benbrook Pump Station* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline (36 in. dia., 0.7 miles)	$3,258,000
TOTAL COST OF FACILITIES	**$3,258,000**
Engineering:	
- Planning (3%)	$98,000
- Design (7%)	$228,000
- Construction Engineering (1%)	$33,000
Legal Assistance (2%)	$65,000
Fiscal Services (2%)	$65,000
Pipeline Contingency (15%)	$489,000
Environmental & Archaeology Studies and Mitigation	$20,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$277,000
TOTAL COST OF PROJECT	**$4,533,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$246,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$33,000
TOTAL ANNUAL COST	**$279,000**
Available Project Yield (acft/yr)	4,939
Annual Cost of Water ($ per acft), based on PF=0	$56
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$7
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.17
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.02
Note: One or more cost element has been calculated externally	
ADB	*10/7/2024*

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Table H.135

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Willow Park - Connect to and Purchase Water from Fort Worth (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Pump Stations	$1,066,000
Transmission Pipeline (10 in. dia., 3.9 miles)	$3,929,000
Integration, Relocations, Backup Generator & Other	$2,000
TOTAL COST OF FACILITIES	**$4,997,000**
Engineering:	
- Planning (3%)	$150,000
- Design (7%)	$350,000
- Construction Engineering (1%)	$50,000
Legal Assistance (2%)	$100,000
Fiscal Services (2%)	$100,000
Pipeline Contingency (15%)	$589,000
All Other Facilities Contingency (20%)	$214,000
Environmental & Archaeology Studies and Mitigation	$187,000
Land Acquisition and Surveying (15 acres)	$220,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$453,000
TOTAL COST OF PROJECT	**$7,410,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$403,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$39,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$27,000
Pumping Energy Costs (38538 kW-hr @ 0.09 $/kW-hr)	$3,000
TOTAL ANNUAL COST	**$472,000**
Available Project Yield (acft/yr)	798
Annual Cost of Water ($ per acft), based on PF=2	$591
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$86
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.81
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.27

ADB *8/7/2024*

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Table H.136

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
New Regional Water Provider - Parker County Regional System - Brazos Basin

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Intake Pump Stations (2.7 MGD)	$35,478,000
Transmission Pipeline (14-30 in. dia., 20.1 miles)	$30,767,000
Two Water Treatment Plants (10 MGD and 5 MGD)	$120,011,000
Integration, Relocations, Backup Generator & Other	$235,000
TOTAL COST OF FACILITIES	**$186,491,000**
- Planning (3%)	$5,595,000
- Design (7%)	$13,054,000
- Construction Engineering (1%)	$1,865,000
Legal Assistance (2%)	$3,730,000
Fiscal Services (2%)	$3,730,000
Pipeline Contingency (15%)	$4,615,000
All Other Facilities Contingency (20%)	$31,145,000
Environmental & Archaeology Studies and Mitigation	$913,000
Land Acquisition and Surveying (144 acres)	$2,190,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$16,467,000
TOTAL COST OF PROJECT	**$269,795,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$14,669,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$310,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$887,000
Water Treatment Plant	$14,006,000
Pumping Energy Costs (3848611 kW-hr @ 0.09 $/kW-hr)	$346,000
Purchase of Water (5259 acft/yr @ 97.7553 $/acft)	$514,000
TOTAL ANNUAL COST	**$30,732,000**
Available Project Yield (acft/yr)	5,259
Annual Cost of Water ($ per acft), based on PF=2	$5,844
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,054
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$17.93
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$9.37

SFK *1/21/2025*

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Table H.137

Water Supply Project Option *New Regional Water Provider - Parker County Regional System* *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations	$97,764,000
Transmission Pipelines	$122,105,000
Water Treatment Plant (40 MGD)	$191,381,000
Integration, Relocations, Backup Generator & Other	$1,080,000
TOTAL COST OF FACILITIES	**$412,330,000**
Engineering:	
- Planning (3%)	$12,369,000
- Design (7%)	$28,863,000
- Construction Engineering (1%)	$4,123,000
Legal Assistance (2%)	$8,246,000
Fiscal Services (2%)	$8,246,000
Pipeline Contingency (15%)	$18,316,000
All Other Facilities Contingency (20%)	$58,045,000
Environmental & Archaeology Studies and Mitigation	$1,913,000
Land Acquisition and Surveying	$4,643,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$36,213,000
TOTAL COST OF PROJECT	**$593,307,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$32,259,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,231,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,444,000
Water Treatment Plant	$13,397,000
Pumping Energy Costs	$1,595,000
Purchase of Water (22000 acft/yr @ 97.7553 $/acft)	$2,151,000
TOTAL ANNUAL COST	**$53,077,000**
Available Project Yield (acft/yr)	22,000
Annual Cost of Water ($ per acft), based on PF=2	$2,413
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$946
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.40
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.90
HAC	*1/20/2025*

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Table H.138

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Parker County SUD - New 3.5 MGD Water Treatment Plant

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Two Water Treatment Plants (3.5 MGD and 1.8 MGD)	$63,228,000
TOTAL COST OF FACILITIES	**$63,228,000**
Engineering:	
- Planning (3%)	$1,897,000
- Design (7%)	$4,426,000
- Construction Engineering (1%)	$632,000
Legal Assistance (2%)	$1,265,000
Fiscal Services (2%)	$1,265,000
All Other Facilities Contingency (20%)	$12,646,000
Environmental & Archaeology Studies and Mitigation	$36,000
Land Acquisition and Surveying (3 acres)	$40,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$5,554,000
TOTAL COST OF PROJECT	**$90,989,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$4,947,000
Operation and Maintenance	
Water Treatment Plant	$7,749,000
TOTAL ANNUAL COST	**$12,696,000**
Available Project Yield (acft/yr)	2,259
Annual Cost of Water ($ per acft), based on PF=2	$5,620
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,430
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$17.25
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$10.53

ADB *8/2/2024*

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Table H.139

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Blackland WSC - Connect to and Purchase Water from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$127,000
Transmission Pipeline (8 in. dia., 6.3 miles)	$5,070,000
Transmission Pump Station(s) & Storage Tank(s)	$4,162,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,129,000
Integration, Relocations, Backup Generator & Other	$662,000
TOTAL COST OF FACILITIES	**$11,150,000**
Engineering:	
- Planning (3%)	$335,000
- Design (7%)	$781,000
- Construction Engineering (1%)	$112,000
Legal Assistance (2%)	$223,000
Fiscal Services (2%)	$223,000
Pipeline Contingency (15%)	$761,000
All Other Facilities Contingency (20%)	$1,216,000
Environmental & Archaeology Studies and Mitigation	$374,000
Land Acquisition and Surveying (32 acres)	$384,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,012,000
TOTAL COST OF PROJECT	**$16,571,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$901,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$91,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$52,000
Pumping Energy Costs (205219 kW-hr @ 0.09 $/kW-hr)	$18,000
TOTAL ANNUAL COST	**$1,062,000**
Available Project Yield (acft/yr)	597
Annual Cost of Water ($ per acft), based on PF=2	$1,779
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$270
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.46
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.83
Note: One or more cost element has been calculated externally	

ADB *12/2/2024*

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Table H.140

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Fate - Increase Delivery Infrastructure from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$3,143,000
Transmission Pipeline (24 in. dia., 0.5 miles)	$1,022,000
Integration, Relocations, Backup Generator & Other	$46,000
TOTAL COST OF FACILITIES	**$4,211,000**
Engineering:	
- Planning (3%)	$126,000
- Design (7%)	$295,000
- Construction Engineering (1%)	$42,000
Legal Assistance (2%)	$84,000
Fiscal Services (2%)	$84,000
Pipeline Contingency (15%)	$153,000
All Other Facilities Contingency (20%)	$638,000
Environmental & Archaeology Studies and Mitigation	$70,000
Land Acquisition and Surveying (6 acres)	$75,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$376,000
TOTAL COST OF PROJECT	**$6,154,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$335,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$11,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$79,000
Pumping Energy Costs (752545 kW-hr @ 0.09 $/kW-hr)	$68,000
TOTAL ANNUAL COST	**$493,000**
Available Project Yield (acft/yr)	6,474
Annual Cost of Water ($ per acft), based on PF=2	$76
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$24
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.23
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.07

ADB *8/6/2024*

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Table H.141

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Rockwall - Increase Delivery Infrastructure to Purchase Additional Water from NTMWD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$11,749,000
Transmission Pipeline (36 in. dia., 10.5 miles)	$32,861,000
Integration, Relocations, Backup Generator & Other	$125,000
TOTAL COST OF FACILITIES	**$44,735,000**
Engineering:	
- Planning (3%)	$1,342,000
- Design (7%)	$3,131,000
- Construction Engineering (1%)	$447,000
Legal Assistance (2%)	$895,000
Fiscal Services (2%)	$895,000
Pipeline Contingency (15%)	$4,929,000
All Other Facilities Contingency (20%)	$2,375,000
Environmental & Archaeology Studies and Mitigation	$370,000
Land Acquisition and Surveying (56 acres)	$667,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$3,887,000
TOTAL COST OF PROJECT	**$63,673,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$3,462,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$330,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$294,000
Pumping Energy Costs (2052275 kW-hr @ 0.09 $/kW-hr)	$185,000
TOTAL ANNUAL COST	**$4,271,000**
Available Project Yield (acft/yr)	13,235
Annual Cost of Water ($ per acft), based on PF=2	$323
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$61
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.99
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.19

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Table H.142

Arlington - Parallel Raw Water Pipeline	
Item	***Estimated Costs for Facilities***
Raw Water Pipeline (60-inch parallel pipeline)	$16,500,000
TOTAL COST OF FACILITIES	**$16,500,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,113,750
TOTAL COST OF PROJECT	**$17,614,000**
ANNUAL COST	
Debt Service (3.5% interest, 30 year bonds)	$958,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$165,000
TOTAL ANNUAL COST	**$1,123,000**

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Table H.143

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Crowley - Increase Delivery Infrastructure from Ft Worth

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$2,494,000
Transmission Pipeline (16 in. dia., 1.4 miles)	$2,967,000
Integration, Relocations, Backup Generator & Other	$28,000
TOTAL COST OF FACILITIES	**$5,489,000**
Engineering:	
- Planning (3%)	$165,000
- Design (7%)	$384,000
- Construction Engineering (1%)	$55,000
Legal Assistance (2%)	$110,000
Fiscal Services (2%)	$110,000
Pipeline Contingency (15%)	$445,000
All Other Facilities Contingency (20%)	$504,000
Environmental & Archaeology Studies and Mitigation	$112,000
Land Acquisition and Surveying (8 acres)	$128,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$488,000
TOTAL COST OF PROJECT	**$7,990,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$434,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$30,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$62,000
Pumping Energy Costs (465794 kW-hr @ 0.09 $/kW-hr)	$42,000
TOTAL ANNUAL COST	**$568,000**
Available Project Yield (acft/yr)	3,026
Annual Cost of Water ($ per acft), based on PF=2	$188
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$44
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.58
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.14

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Table H.144

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Kennedale - Connect to and Purchase Water from Arlington (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$839,000
Transmission Pipeline (6 in. dia., 2 miles)	$2,065,000
Integration, Relocations, Backup Generator & Other	$5,000
TOTAL COST OF FACILITIES	**$4,824,000**
Engineering:	
- Planning (3%)	$145,000
- Design (7%)	$338,000
- Construction Engineering (1%)	$48,000
Legal Assistance (2%)	$96,000
Fiscal Services (2%)	$96,000
Pipeline Contingency (15%)	$310,000
All Other Facilities Contingency (20%)	$552,000
Environmental & Archaeology Studies and Mitigation	$198,000
Land Acquisition and Surveying (15 acres)	$226,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$445,000
TOTAL COST OF PROJECT	**$7,278,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$396,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$31,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$42,000
Pumping Energy Costs (74272 kW-hr @ 0.09 $/kW-hr)	$7,000
TOTAL ANNUAL COST	**$476,000**
Available Project Yield (acft/yr)	385
Annual Cost of Water ($ per acft), based on PF=2	$1,236
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$208
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$3.79
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.64

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Table H.145

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Kennedale - Increase Delivery Infrastructure from Ft Worth

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$1,425,000
Transmission Pipeline (10 in. dia., 5 miles)	$6,898,000
Integration, Relocations, Backup Generator & Other	$14,000
TOTAL COST OF FACILITIES	**$10,933,000**
Engineering:	
- Planning (3%)	$328,000
- Design (7%)	$765,000
- Construction Engineering (1%)	$109,000
Legal Assistance (2%)	$219,000
Fiscal Services (2%)	$219,000
Pipeline Contingency (15%)	$1,035,000
All Other Facilities Contingency (20%)	$807,000
Environmental & Archaeology Studies and Mitigation	$288,000
Land Acquisition and Surveying (22 acres)	$336,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$978,000
TOTAL COST OF PROJECT	**$16,017,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$871,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$81,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$71,000
Pumping Energy Costs (236139 kW-hr @ 0.09 $/kW-hr)	$21,000
TOTAL ANNUAL COST	**$1,044,000**
Available Project Yield (acft/yr)	1,087
Annual Cost of Water ($ per acft), based on PF=2	$960
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$159
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.95
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.49

ADB *8/6/2024*

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Table H.146

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pantego - Connect to and Purchase Water from Arlington (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$231,000
Transmission Pipeline (6 in. dia., 2.2 miles)	$2,283,000
TOTAL COST OF FACILITIES	**$2,514,000**
Engineering:	
- Planning (3%)	$75,000
- Design (7%)	$176,000
- Construction Engineering (1%)	$25,000
Legal Assistance (2%)	$50,000
Fiscal Services (2%)	$50,000
Pipeline Contingency (15%)	$342,000
All Other Facilities Contingency (20%)	$46,000
Environmental & Archaeology Studies and Mitigation	$136,000
Land Acquisition and Surveying (10 acres)	$158,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$233,000
TOTAL COST OF PROJECT	**$3,805,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$207,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$6,000
TOTAL ANNUAL COST	**$236,000**
Available Project Yield (acft/yr)	33
Annual Cost of Water ($ per acft), based on PF=2	$7,152
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$879
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$21.94
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.70

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Table H.147

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pantego - Connect to and Purchase Water from Fort Worth (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$362,000
Transmission Pipeline (6 in. dia., 3.7 miles)	$3,846,000
TOTAL COST OF FACILITIES	**$4,208,000**
Engineering:	
- Planning (3%)	$126,000
- Design (7%)	$295,000
- Construction Engineering (1%)	$42,000
Legal Assistance (2%)	$84,000
Fiscal Services (2%)	$84,000
Pipeline Contingency (15%)	$577,000
All Other Facilities Contingency (20%)	$72,000
Environmental & Archaeology Studies and Mitigation	$181,000
Land Acquisition and Surveying (14 acres)	$213,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$383,000
TOTAL COST OF PROJECT	**$6,265,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$341,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$38,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$9,000
Pumping Energy Costs (7112 kW-hr @ 0.09 $/kW-hr)	$1,000
TOTAL ANNUAL COST	**$389,000**
Available Project Yield (acft/yr)	34
Annual Cost of Water ($ per acft), based on PF=2	$11,441
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,412
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$35.11
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$4.33

ADB *8/7/2024*

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Table H.148

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pelican Bay - Connect to and Purchase Water from Azle (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations	$875,000
Transmission Pipeline (6 in. dia., 5.6 miles)	$5,780,000
Integration, Relocations, Backup Generator & Other	$6,600
TOTAL COST OF FACILITIES	**$10,478,600**
Engineering:	
- Planning (3%)	$314,000
- Design (7%)	$734,000
- Construction Engineering (1%)	$105,000
Legal Assistance (2%)	$210,000
Fiscal Services (2%)	$210,000
Pipeline Contingency (15%)	$867,000
All Other Facilities Contingency (20%)	$940,000
Environmental & Archaeology Studies and Mitigation	$376,000
Land Acquisition and Surveying (29 acres)	$434,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$954,000
TOTAL COST OF PROJECT	**$15,622,600**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$849,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$79,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$64,000
Pumping Energy Costs (108162 kW-hr @ 0.09 $/kW-hr)	$9,700
TOTAL ANNUAL COST	**$1,001,700**
Available Project Yield (acft/yr)	345
Annual Cost of Water ($ per acft), based on PF=2	$2,903
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$443
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$8.91
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.36

ADB *8/7/2024*

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Table H.149

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Southlake - Increase Delivery Infrastructure from Ft Worth

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Station	$6,060,000
Transmission Pipeline (24 in. dia., 4.5 miles)	$12,879,000
Integration, Relocations, Backup Generator & Other	$69,000
TOTAL COST OF FACILITIES	**$19,008,000**
Engineering:	
- Planning (3%)	$570,000
- Design (7%)	$1,331,000
- Construction Engineering (1%)	$190,000
Legal Assistance (2%)	$380,000
Fiscal Services (2%)	$380,000
Pipeline Contingency (15%)	$1,932,000
All Other Facilities Contingency (20%)	$1,226,000
Environmental & Archaeology Studies and Mitigation	$205,000
Land Acquisition and Surveying (16 acres)	$243,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,656,000
TOTAL COST OF PROJECT	**$27,121,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,475,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$129,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$152,000
Pumping Energy Costs (1129537 kW-hr @ 0.09 $/kW-hr)	$102,000
TOTAL ANNUAL COST	**$1,858,000**
Available Project Yield (acft/yr)	6,623
Annual Cost of Water ($ per acft), based on PF=2	$281
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$58
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.86
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.18

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Table H.150

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices*			
Watauga and North Richland Hills - New Pipeline from Fort Worth			
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023			
Item	***Estimated Costs for Facilities***	***North Richland Hills Share***	***Watagua***
CAPITAL COST			
Primary Pump Station(s)	$3,054,000	$2,490,000	$564,000
Transmission Pipeline (42 in. dia., 1.2 miles)	$2,535,000	$2,066,000	$469,000
Storage Tanks (Other Than at Booster Pump Stations)	$4,116,000	$3,355,000	$761,000
Integration, Relocations, Backup Generator & Other	$374,000	$305,000	$69,000
TOTAL COST OF FACILITIES	**$10,079,000**	**$8,216,000**	**$1,863,000**
Engineering:			
- Planning (3%)	$302,000	$246,000	$56,000
- Design (7%)	$706,000	$576,000	$130,000
- Construction Engineering (1%)	$101,000	$82,000	$19,000
Legal Assistance (2%)	$202,000	$165,000	$37,000
Fiscal Services (2%)	$202,000	$165,000	$37,000
Pipeline Contingency (15%)	$380,000	$310,000	$70,000
All Other Facilities Contingency (20%)	$1,509,000	$1,230,000	$279,000
Environmental & Archaeology Studies and Mitigation	$36,000	$29,000	$7,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$879,000	$717,000	$162,000
TOTAL COST OF PROJECT	**$14,396,000**	**$11,736,000**	**$2,660,000**
ANNUAL COST			
Debt Service (3.5 percent, 30 years)	$783,000	$638,000	$145,000
Operation and Maintenance			
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$70,000	$57,000	$13,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$76,000	$62,000	$14,000
TOTAL ANNUAL COST	**$929,000**	**$757,000**	**$172,000**
Available Project Yield (acft/yr)	4,821	3,930	891
Annual Cost of Water ($ per acft), based on PF=2	$193	$193	$193
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$30	$30	$30
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.59	$0.59	$0.6
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.09	$0.09	$0.09
Note: One or more cost element has been calculated externally			
ADB			*11/18/2024*

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Table H.151

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
County-Other, Tarrant - Connect to Euless for DFW Airport (Alternative)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$2,792,000
Transmission Pipeline (14 in. dia., 3 miles)	$6,095,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,784,000
Integration, Relocations, Backup Generator & Other	$34,000
TOTAL COST OF FACILITIES	**$10,705,000**
Engineering:	
- Planning (3%)	$321,000
- Design (7%)	$749,000
- Construction Engineering (1%)	$107,000
Legal Assistance (2%)	$214,000
Fiscal Services (2%)	$214,000
Pipeline Contingency (15%)	$914,000
All Other Facilities Contingency (20%)	$922,000
Environmental & Archaeology Studies and Mitigation	$187,000
Land Acquisition and Surveying (14 acres)	$217,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$946,000
TOTAL COST OF PROJECT	**$15,496,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$843,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$79,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$70,000
Pumping Energy Costs (557007 kW-hr @ 0.09 $/kW-hr)	$50,000
Purchase of Water (2000 acft/yr @ 977.55 $/acft)	$1,955,000
TOTAL ANNUAL COST	**$2,997,000**
Available Project Yield (acft/yr)	2,000
Annual Cost of Water ($ per acft), based on PF=2	$1,499
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,077
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.30

ADB *12/2/2024*

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Table H.152

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Alvord - Connect to and Purchase Water from West Wise SUD (TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$1,017,000
Transmission Pipeline (8 in. dia., 10.1 miles)	$8,090,000
Transmission Pump Station(s) & Storage Tank(s)	$6,204,000
Integration, Relocations, Backup Generator & Other	$16,000
TOTAL COST OF FACILITIES	**$15,327,000**
Engineering:	
- Planning (3%)	$460,000
- Design (7%)	$1,073,000
- Construction Engineering (1%)	$153,000
Legal Assistance (2%)	$307,000
Fiscal Services (2%)	$307,000
Pipeline Contingency (15%)	$1,214,000
All Other Facilities Contingency (20%)	$1,447,000
Environmental & Archaeology Studies and Mitigation	$579,000
Land Acquisition and Surveying (44 acres)	$675,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,401,000
TOTAL COST OF PROJECT	**$22,943,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$1,247,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$114,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$98,000
Pumping Energy Costs (265350 kW-hr @ 0.09 $/kW-hr)	$24,000
TOTAL ANNUAL COST	**$1,483,000**
Available Project Yield (acft/yr)	571
Annual Cost of Water ($ per acft), based on PF=2	$2,597
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$413
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.97
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.27

ADB *8/7/2024*

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Table H.153

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Chico - Increase Delivery Infrastructure from West Wise SUD

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (0 MGD)	$685,000
Transmission Pipeline (6 in. dia., 7 miles)	$5,235,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$5,921,000**
Engineering:	
- Planning (3%)	$178,000
- Design (7%)	$414,000
- Construction Engineering (1%)	$59,000
Legal Assistance (2%)	$118,000
Fiscal Services (2%)	$118,000
Pipeline Contingency (15%)	$785,000
All Other Facilities Contingency (20%)	$137,000
Environmental & Archaeology Studies and Mitigation	$279,000
Land Acquisition and Surveying (22 acres)	$334,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$543,000
TOTAL COST OF PROJECT	**$8,886,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$483,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$52,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$17,000
Pumping Energy Costs (21398 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$554,000**
Available Project Yield (acft/yr)	80
Annual Cost of Water ($ per acft), based on PF=2	$6,925
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$888
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$21.25
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.72

ADB *8/6/2024*

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Table H.154

Wise County WSD - Infrastructure Improvements	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Raw Water Pump Station and Pipeline Expansion (3.0 MGD)	$33,876,000
TOTAL COST OF FACILITIES	**$33,876,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,286,630
TOTAL COST OF PROJECT	**$36,163,000**
ANNUAL COST	
Debt Service (3.5% interest, 30 year bonds)	$1,966,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$243,000
Intake and Pump Stations (2.5% of Cost of Facilities)	$240,000
TOTAL ANNUAL COST	**$2,449,000**
Available Project Yield (acft/yr)	1,682
Annual Cost of Water ($ per acft)	$1,456
Annual Cost of Water After Debt Service ($ per acft)	$287
Annual Cost of Water ($ per 1,000 gallons)	$4.47
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$0.88

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Table H.155

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Newark - Connect to and Purchase Water from Rhome (from Walnut Creek SUD from TRWD)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (8 in. dia., 4 miles)	$3,216,000
TOTAL COST OF FACILITIES	**$3,943,000**
Engineering:	
- Planning (3%)	$118,000
- Design (7%)	$276,000
- Construction Engineering (1%)	$39,000
Legal Assistance (2%)	$79,000
Fiscal Services (2%)	$79,000
Pipeline Contingency (15%)	$482,000
Environmental & Archaeology Studies and Mitigation	$189,000
Land Acquisition and Surveying (15 acres)	$224,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$363,000
TOTAL COST OF PROJECT	**$5,937,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$323,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$32,000
TOTAL ANNUAL COST	**$373,000**
Available Project Yield (acft/yr)	517
Annual Cost of Water ($ per acft), based on PF=2	$721
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$97
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.21
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.30

ADB *8/7/2024*

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Table H.156

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Runaway Bay - Increase Capacity of Lake Intake*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (1.4 MGD)	$6,348,000
TOTAL COST OF FACILITIES	**$6,348,000**
Engineering:	
- Planning (3%)	$190,000
- Design (7%)	$444,000
- Construction Engineering (1%)	$63,000
Legal Assistance (2%)	$127,000
Fiscal Services (2%)	$127,000
All Other Facilities Contingency (20%)	$1,270,000
Environmental & Archaeology Studies and Mitigation	$3,000
Interest During Construction (3.5% for 0.5 years with a 0.5% ROI)	$140,000
TOTAL COST OF PROJECT	**$8,712,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$474,000
Operation and Maintenance	
Intakes and Pump Stations (2.5% of Cost of Facilities)	$159,000
TOTAL ANNUAL COST	**$633,000**
Available Project Yield (acft/yr)	758
Annual Cost of Water ($ per acft), based on PF=2	$835
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$210
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.56
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.64
Note: One or more cost element has been calculated externally	
ADB	*11/16/2024*

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Table H.157

New Regional Water Provider - Wise County Regional System *Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Transmission Pipeline	$125,155,569
Transmission Pump Station(s) & Storage Tank(s)	$108,060,051
Advanced Water Treatment Facility (MGD)	$221,291,892
TOTAL COST OF FACILITIES	**$454,507,512**
Engineering:	
- Design (7%)	$13,669,167
- Construction Engineering (1%)	$31,894,361
Legal Assistance (2%)	$4,556,070
Fiscal Services (2%)	$9,113,097
Pipeline Contingency (15%)	$9,113,097
All Other Facilities Contingency (20%)	$16,209,153
Land Acquisition and Surveying (136 acres)	$1,762,990
Interest During Construction (0% for 0.005 years with a 3.5% ROI)	$4,090,910
TOTAL COST OF PROJECT	**$544,916,358**
ANNUAL COST	
Debt Service (0 percent, years)	$35,412,139
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (3.5% of Cost of Facilities)	$1,075,705
Intakes and Pump Stations (1% of Cost of Facilities)	$3,096,002
Water Treatment Plant	$15,490,538
Pumping Energy Costs (1520097 kW-hr @ 0 $/kW-hr)	$1,658,538
Purchase of Water (0 acft/yr @ 0.09 $/acft)	$2,569,634
TOTAL ANNUAL COST	**$59,302,556**
Available Project Yield (acft/yr)	26,283
Annual Cost of Water ($ per acft), based on PF=	$2,256
Annual Cost of Water After Debt Service ($ per acft), based on PF=	$909
Annual Cost of Water ($ per 1,000 gallons), based on PF=	$6.92
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=	$2.79
HAC	*1/20/2025*

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Table H.158

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
County-Other, Wise - Alternative TRWD through Justin (New Fairview)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Transmission Pipeline (12 in. dia., 3.6 miles)	$3,760,000
Storage Tanks (Other Than at Booster Pump Stations)	$6,522,000
Integration, Relocations, Backup Generator & Other	$14,000
TOTAL COST OF FACILITIES	**$10,296,000**
Engineering:	
- Planning (3%)	$309,000
- Design (7%)	$721,000
- Construction Engineering (1%)	$103,000
Legal Assistance (2%)	$206,000
Fiscal Services (2%)	$206,000
Pipeline Contingency (15%)	$564,000
All Other Facilities Contingency (20%)	$1,307,000
Environmental & Archaeology Studies and Mitigation	$302,000
Land Acquisition and Surveying (36 acres)	$545,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$947,000
TOTAL COST OF PROJECT	**$15,506,000**
ANNUAL COST	
Debt Service (3.5 percent, 30 years)	$843,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$103,000
Pumping Energy Costs (234443 kW-hr @ 0.09 $/kW-hr)	$21,000
TOTAL ANNUAL COST	**$967,000**
Available Project Yield (acft/yr)	1,500
Annual Cost of Water ($ per acft), based on PF=2	$645
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$83
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$1.98
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.25

HAC *2/17/2025*

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Appendix I

Water Conservation Savings

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APPENDIX I CONSERVATION MEASURES AND GPCD GOALS

CHAPTER OUTLINE

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Section I.3	Price Elasticity/Rate Structure Impact
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This appendix presents information on water conservation strategies (costs and savings) and per capita water use goals. The *2026 Region C Water Plan* recommends water conservation measures for municipal, irrigation, mining, and manufacturing water user groups (WUGs). The purpose of this appendix is to document the criteria for recommending strategies in the Water Conservation Package for a WUG, and to document assumptions made in projecting water savings and opinions of probable costs for these strategies. **Section I.2** describes conservation measures mandated by state or federal law and already included within demand projections. **Sections I.3** to **I.12** describe conservation measures chosen for Region C WUGs and recommended as strategies. The last section of this appendix contains the goals for per capita water use by WUG as required by TWDB. **Chapter 5B** discusses recommended conservation measures for manufacturing WUGs.

I.1 Relationship of Water Conservation and Water Demand Projections

Water demand projections for regional water planning are based on per capita water usage during the base year, which is the most recent very dry year with high water usage. For most Region C WUGs, the base year is 2011. To obtain the initial water demand projection for a given decade, the base year per capita water use is multiplied by the projected population for that decade.

I.1.1 Passive Water Conservation

Passive water conservation measures do not require actions from a WUG to realize the savings. The Texas Water Development Board (TWDB) has projected water savings that are expected to result from passive water conservation measures, including low-flow plumbing fixture rules, efficient new residential clothes washer standards, and efficient new residential dishwasher standards. The final water demand projections presented in **Chapter 2** are the initial water demand

projections minus the projected water savings from passive measures. Therefore, the projected water savings from passive measures are built into the Region C water demand projections.

The projected passive water savings are presented in **Table I.1** as "Water Savings Implicit in Water Demand Projections."

I.1.2 Active Water Conservation Through the Base Year

Active water conservation measures require actions from a WUG to realize the savings. Although significant water conservation occurred from active measures in Region C prior to and during the base year, the associated water savings have not been enumerated. Instead, all water conservation savings that occurred through the base year are assumed to be implicit in the base year per capita water use and are therefore built into the water demand projections.

I.1.3 Active Water Conservation from the 2026 RWP Recommendations

Region C WUGs have continued to implement active water conservation measures since the base year. The associated water savings from the previously implemented water conservation measures have reduced water demand in Region C, but this demand reduction is not reflected in the Region C water demand projections. These savings are included in the projected water savings from the recommended water management strategies. These strategies include active water conservation measures that are projected to save water during the planning period. The projected water savings from active water conservation measures are presented in **Table I.1** as "Water Savings from Recommended Water Management Strategies," and projected costs are projected in **Table I.2**.

TABLE I.1 SUMMARY OF PROJECTED MUNICIPAL WATER SAVINGS BY CONSERVATION MEASURE FOR REGION C WUGS

	2030	2040	2050	2060	2070	2080
Water Savings Implicit in Water Demand Projections						
Low Flow Plumbing Fixture Rules [a]	46,393	46,393	66,793	73,233	79,456	84,584
Efficient New Residential Clothes Washer Standards [a]						
Efficient New Residential Dishwasher Standards [a]						
Water Savings Implicit in Water Demand Projections	**46,393**	**46,393**	**66,793**	**73,233**	**79,456**	**84,584**
Water Savings from Recommended Water Management Strategies						
Public and School Education	11,521	15,011	17,260	19,149	21,151	22,972
Price Elasticity/Rate Structure Impact	5,923	13,437	22,454	32,723	44,085	56,146
Water Waste Ordinance	1,385	1,991	2,443	2,813	3,176	3,445
Time-of-Day Irrigation Restriction	376	545	672	762	856	927
Water Conservation Coordinator	1,068	2,483	2,925	3,282	3,540	3,756
Twice Weekly Irrigation Restriction	44,287	52,604	58,778	64,554	69,582	73,627
Landscape Ordinance for New Development	0	13,781	19,749	21,580	20,910	19,075

	2030	2040	2050	2060	2070	2080
Water Loss Mitigation Strategy	19,678	58,341	85,315	91,829	98,718	105,229
Water Savings from Recommended Water Management Strategies	**84,240**	**158,193**	**209,595**	**236,691**	**262,018**	**285,177**
Total Projected Water Savings [c]	***130,633***	***217,986***	***276,388***	***309,924***	***341,474***	***369,761***

[a]*Water savings estimated by Texas Water Development Board.*
[b]*Little information is available regarding WUGs that implemented enhanced public and school education programs during this time. In addition, it is very difficult to accurately measure water savings from these programs. For these reasons, there has been no estimate of water savings since the base year was made.*
[c]*Totals may not match the sums of individual entries exactly due to differences in rounding the numbers.*

TABLE I.2 SUMMARY OF PROJECTED UNIT COST BY MUNICIPAL CONSERVATION MEASURE

	Unit Cost ($/ac-ft)					
	2030	2040	2050	2060	2070	2080
Future Costs Implicit in Water Demand Projections						
Low Flow Plumbing Fixture Rules	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Efficient New Residential Clothes Washer Standards						
Efficient New Residential Dishwasher Standards						
Future Savings Implicit in Water Demand Projections	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***	***$0.00***
Future Cost for Recommended Water Management Strategies						
Public and School Education	$529	$462	$455	$449	$443	$438
Price Elasticity/Rate Structure Impact	$0	$0	$0	$0	$0	$0
Water Waste Ordinance	$377	$349	$336	$353	$374	$390
Time-of-Day Irrigation Restriction	$1,103	$1,005	$1,044	$1,111	$1,226	$1,298
Water Conservation Coordinator	$13	$17	$25	$32	$36	$40
Twice Weekly Irrigation Restriction	$31	$30	$32	$33	$35	$36
Landscape Ordinance for New development	$0	$53	$7	$10	$9	$6
Water Loss Mitigation Strategy	$1,151	$650	$393	$392	$392	$392
Future Cost for Recommended Water Management Strategies [a]	***$368***	***$297***	***$197***	***$188***	***$184***	***$181***

[a]*The future cost of recommended water management strategies is determined by calculating the weighted average of the expected savings and costs of individual conservation measures.*

I.2 Public and School Education

Most utilities in Region C have some kind of public and school education program. However, the levels of effort put into these programs, the budgets for these programs, and the water savings from these programs are highly variable. Although this measure does not define how a utility

should conduct its public and school education program, it assumes that participating utilities will operate their programs at a high (or "enhanced") level, committing resources as necessary to achieve significant water savings.

This measure incorporates elements of Best Management Practices (BMPs) 6.1 Public Information, 6.2 School Education, and 6.3 Public Outreach & Education [(1)].

I.2.1 Applicability

The enhanced public and school education program measure was evaluated for municipal WUGs that have an identified sponsor for the public and school education program.

I.2.2 Projected Water Savings

Water savings from public and school education are difficult to measure. Public and school education results in indirect savings through enhancement of other water conservation measures and direct savings from changes in customer behavior. In this memorandum, the indirect savings from public education will be attributed to the other water conservation measures with which they are associated. Therefore, the potential water savings from public and school education will be the direct savings from changes in customer behavior.

Tarrant Regional Water District (TRWD), North Texas Municipal Water District (NTMWD), and Dallas Water Utilities (DWU) began operating enhanced public education programs before the base year. Water savings from enhanced public and school education through the base year are built into the water demand projections.

It has been assumed that the direct customers of TRWD, NTMWD, and DWU will achieve an additional savings of 0.5 percent of municipal water demand during the planning period (**Table I.3**). For other WUGs, the projected water savings in a given decade is estimated to be from 1 to 2 percent of municipal water demand, with savings increasing according to **Table I.3**. WUGs that implement this program by 2020 are projected to achieve 2 percent water savings by 2030.

TABLE I.3 PROJECTED PERCENTAGE SAVINGS BY DECADE FOR ENCHANCED PUBLIC AND SCHOOL EDUCATION

WUGS	2030	2040	2050	2060	2070	2080
Customers of TRWD, NTWMD, and/or DWU	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Other WUGs	1.5%	2.0%	2.0%	2.0%	2.0%	2.0%

It is assumed that the savings from public and school education last one year [(2)] and that the program must be renewed each year to maintain and increase the estimated savings.

I.2.3 Additional Data Requirements

WUGs that have implemented enhanced public and school education programs since the base year need to be identified. No additional data is needed to project water savings from enhanced public and school education during the planning period.

I.2.4 Reliability

Water savings from enhanced public and school education are difficult to measure and depend on customer behavior. For these reasons, the reliability of the estimated water savings is low. Enhanced public and school education reinforces and builds on previously delivered conservation messages; therefore, it is important that the enhanced public and school education program be continued from year to year in order to increase the reliability of the savings.

I.2.5 Opinion of Probable Cost

Actual spending per resident can be difficult to track, because media markets overlap many cities. For example, DWU planned to budget about $1.38 million in fiscal year 2018-2019 for its public awareness program and its environmental education initiative [3]. Based on the retail customer population, this corresponds to $1.07 per resident. However, the associated media buys also reached wholesale customers. When the wholesale customer population is taken into account, the per capita spending was $0.58.

Based on this information, the cost of enhanced public and school education is expected to be about $1.00 per resident for the largest WUGs. It is anticipated that smaller cities would have to spend up to $3.00 per resident per year to deliver effective water conservation messages [3].

The opinion of probable annual cost for each WUG to which this measure applies was derived using population projections. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

These costs have been associated with the WUGs that benefit from the programs, regardless of whether the funding comes from the WUG itself or from a wholesale supplier.

I.3 Price Elasticity/Rate Structure Impact

Price increases or changes in rate structure impact water consumption. This measure incorporates elements of BMP 3.1 Water Conservation Pricing [3].

I.3.1 Applicability

The impact of real increases in water prices was evaluated for all municipal WUGs. Although many WUGs in Region C already have conservation-oriented rate structures, this measure is also assumed to account for rate structure changes.

I.3.2 Projected Water Savings

The change in water demand due to a real increase in the water price is called the price elasticity of water demand. A price elasticity of -0.20 indicates that a 1.0 percent increase in water rates will cause a -0.2 percent change in water usage.

Historical price elasticities depend upon economic and other conditions that may not persist in the future, and no projections of future price elasticities were identified. Therefore, a long-term price

elasticity of -0.20 is recommended for projecting the impact of increasing water prices in Region C [3]. It has also been assumed that real water prices will increase by 20 percent over the planning period and that half of the potential impact of increasing water prices will be offset by increasing income.

The projected water savings for each WUG is one half of the long-term price elasticity multiplied by the change in real water price multiplied by the municipal water demand. It was assumed that real water prices will increase linearly during planning period, for a total 20 percent increase by 2070 (**Table I.4**). By the end of the planning period, increasing water prices are projected to cause a 2 percent reduction in total water demand.

TABLE I.4 PROJECTED REAL WATER PRICE INCREASES DURING THE PLANNING PERIOD

2030	2040	2050	2060	2070	2080
3.3%	6.7%	10.0%	13.3%	16.6%	20%

I.3.3 Additional Data Requirements and Reliability

Customer participation is highly reliable for this measure, since changes in water prices automatically affect all water customers. However, the projected water savings are based on broad, general assumptions, and the reliability of the above projections is medium.

The reliability of the above projections could be increased if detailed projections of real treated water prices and real income were available. This would require projections of raw water costs, treatment costs, distribution costs, and administrative costs for each WUG.

I.3.4 Opinion of Probable Cost

The projected water savings due to real increases in water price will be realized at no cost to the WUGs.

I.4 Water Waste Ordinance

Many Region C WUGs have prohibited water waste. This measure incorporates elements of BMP 9.1 Prohibition on Wasting Water [3].

I.4.1 Applicability

Water waste prohibition was evaluated for municipal WUGs without a current water waste prohibition/ordinance.

It has been assumed that WUGs that lack ordinance-making authority will be able to implement a water waste prohibition through other means, such as the utilities' operation standards, water conservation plans, and terms of service.

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I.4.2 Projected Water Savings

The projected water savings for each WUG is the product of the following parameters:

- Potential water savings (as a percentage of irrigation water demand)
- Municipal water demand
- Percent seasonal water demand
- Percent automatic irrigation
- Compliance rate
- Implementation schedule percentage

The projected savings are based on use of rain sensors that shut off automatic irrigation systems when it is raining or when it has rained recently (depending on the type of sensor). It is estimated that the percentage of watering cycles missed during a drought year is approximately equal to the minimum annual percentage of days with ½-inch rainfall events. The projected water savings from an irrigation water waste prohibition is 3.3 percent of irrigation water use for accounts that have automatic irrigation systems.

The percentage of customers that have automatic irrigation systems varies considerably across the region and is unknown in most cases. In the July 2004 RCWPG survey, 52 out of 129 total responses provided an estimate of the percentage of customers that have automatic irrigation systems.

In cases where no information was available, assumptions were made based on the whether the WUG is located in a rural, suburban, or urban area, the pace of recent development and the degree of projected growth. Based on these factors, the current percentages of customers with automatic irrigation systems were assumed to be 5, 20, or 50 percent, and the percentages of future connections with automatic irrigation systems were assumed to be 5, 50, or 80 percent.

It is anticipated that it will take 10 years of implementation to realize full compliance with the water waste prohibition. However, anecdotal evidence indicates that there is some fraction of rain sensors that will be out of order. Therefore, “full compliance” is projected to be 90 percent participation.

The estimated potential water savings have been based on a requirement for rain sensors for automatic irrigation systems. As discussed previously, a water waste prohibition may address numerous other sources of waste, but it is not possible to predict what the ordinance for an individual WUG might prohibit. The potential water savings from other sources of water waste have not been estimated.

It is anticipated that the customer will replace the rain sensor at the end of its useful life at his or her own expense to maintain compliance with the water waste prohibition and that the projected water savings will be permanent.

For WUGs that have not implemented a water waste prohibition, projected water savings were estimated as described above. Where no implementation information was available, it was assumed that the WUG will implement a water waste prohibition in the future.

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I.4.3 Additional Data Requirements

The status of whether a WUG has implemented a water waste prohibition is known for WUGs that comprise 85 percent of 2080 municipal water demand. Additional information is necessary to refine the projected water savings for the remainder of the WUGs.

In addition, the percentage of customer accounts that have automatic irrigation systems is unknown for most WUGs. Additional data would improve the reliability of the assumptions stated in **Section I.1.2**.

I.4.4 Reliability

For an individual automatic irrigation system with a rain sensor in working order, the reliability of the potential water savings should be high. However, for an entire WUG to realize its projected savings, there must be enforcement of the water waste prohibition to ensure that the projected number of rain sensors are installed, and automatic irrigation system owners must keep the rain sensor in working order. In addition, there are uncertainties associated with the estimates of the market penetration of automatic irrigation systems. Due to uncertainties described above, the reliability of the projected savings is medium.

I.4.5 Opinion of Probable Cost

The primary costs for this measure include adoption of an ordinance and enforcement of the prohibition. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

It has been assumed that the probable cost to pass an ordinance in a city of up to 25,000 people is $8,560 and that the cost to pass an ordinance in a city of more than 50,000 people is $17,119. To obtain an opinion of probable annual costs, the ordinance cost was assumed to be paid in equal sums within the first decade and enforcement costs were assumed to be $0.35 per resident per year. Ordinance costs are based on the costs from the 2006 RWP and inflated it based on the CPI index. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

I.5 Time-Of-Day Irrigation Restriction

Time-of-day irrigation restriction ordinances have been passed for a number of WUGs in Region C, although in varying forms. Some ordinances specify time-of-day restrictions (no automatic irrigation watering from 10am through 6pm) throughout the year, while some choose only the warmer months (e.g., April through October). The exact times allowed throughout a day also vary across the Region. Almost all WUGs allow hand irrigation regardless of time of day or year.

I.5.1 Applicability

The time-of-day irrigation restriction was evaluated for municipal WUGs without an existing time-of-day irrigation restriction.

It has been assumed that WUGs that lack ordinance-making authority will be able to implement a time-of-day irrigation restriction through other means, such as the utilities' operation standards, water conservation plans, and terms of service.

I.5.2 Projected Water Savings

Sprinkler evaporation losses depend on relative humidity, air temperature, wind speed, nozzle diameter, and nozzle pressure [(4)]. Using long-term, monthly average weather data from the Dallas-Fort Worth International Airport weather station and assuming 5/16-inch nozzle diameter and 50 psi nozzle pressure, annual sprinkler evaporation losses were estimated to be 6.9 percent of irrigation water applied for irrigation between 10am and 6 pm and 4.0 percent if irrigation is restricted to 6pm to 10am. For each WUG, it was assumed that one-third of customers that have automatic irrigation systems would have to change their irrigation time in response to this restriction. For these customers, the estimated water savings are 2.9 percent of seasonal water demands. Seasonal water demands are calculated as the difference between monthly water usage and winter usage. Seasonal water demands are attributable largely to landscape irrigation, although cooling water usage and other factors may also contribute.

It is anticipated that it will take 10 years of implementation to realize full compliance with the time-of-day irrigation restriction. However, some customers will continue to irrigate from 10am to 6pm. Therefore, "full compliance" is projected to be 90 percent participation.

For WUGs that have not implemented a time-of-day irrigation restriction, projected water savings were estimated as described above. Where no implementation information was available, it was assumed that the WUG will implement a time-of-day irrigation restriction in the future.

I.5.3 Additional Data Requirements

Additional WUG surveys would help refine the number and type of ordinances currently enforced and the percentages of customers that have automatic irrigation systems.

I.5.4 Reliability

Customer participation is related to knowledge of the restriction and enforcement, which varies by WUG. It is also not possible to predict the exact irrigation restrictions that each WUG would adopt. In addition, amounts of water used in irrigation are dependent on weather patterns which cannot be predicted throughout the planning periods. Due to these unknowns the reliability of the savings estimate is medium.

I.5.5 Opinion of Probable Cost

No ordinance cost is considered as an ordinance is not needed for this strategy. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings. The per capita enforcement cost was assumed to be $0.35 per year.

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I.6 Water Conservation Coordinator

A water conservation coordinator "coordinates water utility staff, data from various departments, and other resources as necessary for the purpose of developing, implementing, and evaluating the effectiveness of the utility's water conservation plan [3]." Coordination will make other water conservation measures more effective.

I.6.1 Applicability

Beginning September 1, 2017, House Bill 1648 required all retail public utilities with 3,300 service connections or more to designate a water conservation coordinator that is responsible for implementing the water conservation plan.

The water conservation coordinator measure was evaluated for municipal WUGs with population greater than 10,000, assuming 3.3 people per household.

I.6.2 Projected Water Savings

It was assumed that WUGs that currently have fewer than 3,300 connections will appoint a water conservation coordinator as they meet this threshold. Savings from coordination of the water conservation program are projected to be 0.25 percent of municipal water demand.

No savings were projected for the County Other WUGs, since these are comprised of multiple utilities for which the number of connections is unknown and likely to be small.

I.6.3 Additional Data Requirements

Additional WUG surveys would help identify WUGs that have and have not appointed water conservation coordinators.

I.6.4 Reliability

The savings from this measure are uncertain and difficult to measure, since they result from improved effectiveness of the overall water conservation program. In addition, the savings depend on the level of effort by the water conservation coordinator. Due to these unknowns the reliability of the savings estimate is low.

I.6.5 Opinion of Probable Cost

Since the level of effort required of a water conservation coordinator is undefined and will likely vary among the various WUGs, a unit cost of $1.00 per thousand gallons of water savings was assigned to this measure. This cost was judged to be reasonably reflective of general water conservation savings, but it should be refined as more information becomes available.

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I.7 Twice Weekly Irrigation Restriction

Historically, twice weekly irrigation restrictions have been used as drought response measures in Region C. In recent years, however, a number of WUGs in Region C have implemented permanent twice weekly irrigation restrictions, although in varying forms. Some ordinances limit irrigation to two times per week year-round, while others also restrict irrigation to once per week during the winter months.

I.7.1 Applicability

The twice weekly irrigation restriction was evaluated as a water management strategy for municipal WUGs with the following characteristics:

- Population greater than 20,000 and
- No existing twice weekly irrigation restriction.

It has been assumed that WUGs that lack ordinance-making authority will be able to implement a twice weekly irrigation restriction through other means, such as the utilities' operation standards, water conservation plans, and terms of service.

I.7.2 Projected Water Savings

Water savings from a twice weekly irrigation restriction are difficult to measure and typically require statistical analysis to account for changes in weather and other factors that influence water use. Although this restriction has been used as a drought response measure in Region C for many years, the corresponding water savings have not been widely studied. In addition, a permanent restriction of this type is relatively new in Texas and the U.S., so there are limited data available regarding permanent water savings.

TRWD implemented Stage 1 drought response measures, primarily consisting of twice-weekly irrigation limits, from August 29, 2011 through May 3, 2012. An analysis of water use in the service area of their four major customers indicated that the water savings during this period were about 8.5 percent of the water that would have been delivered without the Stage 1 drought response measures [(5)].

For a permanent twice weekly irrigation restriction, reported savings for Texas cities as a percentage of municipal water demand are [(6)]:

- 1 to 9 percent (Fort Worth, 2013-2016)
- 7 percent (Dallas, 2012)
- 7 percent (Austin, 2009)

More recent unpublished data for major water providers in Region C indicate water savings of 1 to 4 percent of municipal water demand for permanent twice weekly irrigation restriction. Two major water providers submitted water conservation plans that project water savings from twice weekly watering restrictions at 1.5 to 2 percent of municipal water demand.

The effectiveness of a twice weekly irrigation restriction depends on public education and customer behavior. Customers have apparently been willing to comply with a twice weekly irrigation restriction as a drought measure, although the water savings data are limited. As a permanent measure, water savings may have eroded somewhat in recent years. Also, it is not clear what impact implementing a twice weekly irrigation restriction as a permanent measure will have on water savings during drought conditions.

Due to the limited data, it has been assumed that a permanent twice weekly irrigation restriction will result in savings of 3 percent of municipal water demand. It is anticipated that it will take ten years of implementation to realize the full water savings.

For WUGs that have not implemented a twice weekly irrigation restriction, projected water savings were estimated as described above. Where no implementation information was available, it was assumed that the WUG will implement a time-of-day irrigation restriction in the future.

I.7.3 Additional Data Requirements

Additional data should be collected on water savings realized from implementation of a permanent twice weekly irrigation restriction, particularly during drought periods. This will help refine the water savings estimate.

I.7.4 Reliability

Customer participation is related to knowledge of the restriction and enforcement, which varies by WUG. It is also not possible to predict the exact irrigation restrictions that each WUG would adopt. In addition, amounts of water used in irrigation are dependent on weather patterns which cannot be predicted throughout the planning periods. Due to these unknowns the reliability of the savings estimate is medium.

I.7.5 Opinion of Probable Cost

No ordinance cost is considered as an ordinance is not needed. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings. The per capita enforcement cost is assumed to be $0.35 per year.

I.8 Landscape Ordinance for New Development

The Landscape Ordinance for New Development is a newly recommended measure in the 2026 Region C Regional Water Plan. This measure allows WUGs to design restrictions that best suit their service areas. Therefore, the Region C Regional Water Planning Group has not prescribed any specific recommendations.

I.8.1 Applicability

Landscape Ordinance for New Development was evaluated for municipal WUGs with a population greater than 20,000 and no similar existing ordinance.

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It has been assumed that WUGs that lack ordinance-making authority will be able to implement a landscape ordinance through other means, such as including it in the terms of service.

I.8.2 Projected Water Savings

Using water use survey data, a per capita irrigation demand (GPCD) was estimated for each WUG by multiplying the total GPCD by the outdoor water use percentage. It was assumed that, for new customers, the irrigation GPCD will be reduced by 20 percent from adopting the landscape ordinance. The resulting savings will reflect the total savings from these new populations and their associated outdoor demand reduction. A decay factor of 50% per decade was applied to account for changes in landscaping practices over time.

As this measure is a newly added strategy with the potential for more stringent and cost-effective ordinances than what the WUGs are currently implementing,[1] it is assumed that any given WUG will be able to implement this strategy and achieve potential savings. For WUGs with a current population greater than 20,000, the savings will be realized beyond 2030, assuming it will take at least a few years for WUGs to implement and start seeing savings after the RWP adoption. For WUGs projected to surpass 20,000 in population, it is assumed that 50% of the savings will be realized upon reaching the threshold, with full savings achieved within the following decade.

I.8.3 Reliability

The reliability of the potential water savings will be high for a landscape ordinance based on the compliance being checked as part of the new building/construction permit.

I.8.4 Opinion of Probable Cost

The primary costs for this measure include adoption of an ordinance. There is no ongoing enforcement cost associated with the landscape ordinance. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

It has been assumed that the probable cost to pass a complicated ordinance such as landscape ordinance in a city is $150,000. This cost includes:

- **Consultant/Legal Support –** Assistance with drafting, reviewing, and finalizing the ordinance.
- **Public Outreach & Engagement** – Stakeholder meetings, public workshops, and outreach materials.
- **Staff Time & Training** – Staff efforts for research, coordination, and enforcement training.
- **Economic & Environmental Analysis** – Assessments of water savings, costs, and compliance impacts.
- **IT & Administrative Updates** – Modifications to permitting systems and documentation.

[1] *Local Government Code (Section 551.006) directs all municipalities with a population over 20,000 to adopt ordinances relating to irrigation. This requirement ensures that irrigation systems are designed, installed, and operated according to specific standards and specifications.*

- **Miscellaneous/Contingency** – Unexpected costs, revisions, or additional reviews.

To obtain an opinion of probable annual costs, the ordinance cost was assumed to be paid in equal sums within the first decade of implementation.

I.9 Water Loss Mitigation Strategy

Most utilities in Region C have some kind of water loss control program. However, the levels of effort put into these programs, the budgets for these programs, and the water savings from these programs are highly variable. Although this measure does not define how a utility should conduct its water loss control program, it assumes that participating utilities will operate their programs at a high (or "enhanced") level, committing resources as necessary to achieve significant water savings.

The Water Loss Mitigation Strategy consists of:

- Water audits, pressure control, and leak detection and repair (including Automated Metering Infrastructure), and
- Water main replacement

This measure incorporates elements of BMP 4.2 System Water Audit and Water Loss Control [3].

I.9.1 Applicability

Retail public utilities that supply potable water to more than 3,300 connections or receive financial assistance from the TWDB must file a system water loss audit with the TWDB by May 1 each year. Other retail public utilities that supply potable water must file a system water loss audit with the TWDB every five years (the next due date is May 1, 2026) [7]. The water loss mitigation strategy is considered a best management practice and applicable to all WUGs.

I.9.2 Projected Water Savings

For a given WUG, the projected water savings from the water loss mitigation strategy is calculated as the difference between the WUG's real water loss and the TWDB water loss thresholds. These thresholds, as shown in **Table I.5**, were approved by the TWDB in February 2023**.** The implementation schedule is shown in **Table I.6**. To ensure a conservative estimate, a cap of 30% of the demand projection has been applied to the calculated savings.

TABLE I.5 WATER LOSS MITIGATION TARGETS

SERVICE CONNECTIONS PER MILE OF MAIN	REAL WATER LOSS TARGET (GALLONS PER CONNECTION PER DAY)
Less than 32	57
32 or more	30

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TABLE I.6 WATER LOSS MITIGATION IMPLEMENTATION SCHEDULE

2030	2040	2050	2060	2070	2080
25%	75%	100%	100%	100%	100%

To maintain the target water loss levels, it is assumed that entities will invest appropriate resources in leak detection and management programs during the planning horizon. This ongoing effort is critical to sustaining the projected savings.

Water savings from the main replacement were estimated at 0.5% of the total water demand for each WUG. It is assumed that main replacements begin in 2030 with a capital cost and debt service. The length of mains expected to be replaced is based on the water loss per mile and the total length of the distribution system in miles.

I.9.3 Additional Data Requirements

Some WUGs did not report their water loss to the TWDB. In addition, some water loss accounting quantities are difficult to estimate (e.g., fire fighting, main flushing, etc.). As more utilities report and refine their system water audit data, the overall estimate of potential water savings from this measure should be refined.

I.9.4 Reliability

The projected water savings are based on reported water loss data, which increases the reliability of the estimates. However, water loss as a percentage of total produced and/or purchased water can vary widely from year to year, even if the total system water loss does not change. Therefore, the reliability of the potential water savings is medium.

I.9.5 Opinion of Probable Cost

Water savings from main replacement were estimated at 0.5% of the total water demand for each WUG. It is assumed that main replacements would begin in 2030 with a capital cost and loan service. The length of main to be replaced is based on the water loss per mile and the total length of the distribution system in miles. The following assumptions are utilized in the water loss mitigation cost estimates.

- Capital Cost:
  - The unit cost of main replacement is derived from the TWDB UCM model for an 8-inch PVC pipe: $198 per linear foot in rural rocky areas and $287 per linear foot in urban rocky areas.
  - An interest rate of 3.5% and a 20-year term are assumed.
  - The recommended WMSs are not expected to exceed two standard pipe diameters. For planning purposes, an 8-inch PVC pipe was used as a simplified yet representative cost estimate, given the limited available information on specific utility requirements. If, during implementation, a larger pipe size is required to meet

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adopted utility standards, the evaluation will document the specific standard and provide:

- A map of the proposed line replacement
- Detailed water loss calculations before and after the replacement
- This assumption ensures a reasonable cost estimate while allowing for future adjustments based on utility-specific design standards

- Annual O&M Cost: Leak Detection and Management Program
  - To achieve and maintain the projected water loss reduction, entities are expected to spend $300 per acre-foot per year (ac-ft/yr) to achieve up to a 34.7% reduction in water loss from their baseline year and $600/ac-ft/yr to achieve additional savings beyond the 34.7% reduction. These cost estimates are based on a 2022 water loss study that analyzed data from over 800 utilities in California, Texas, and Georgia.[8] The study found it is economically efficient for a median utility to reduce water losses by 34.7% at a cost of $277/ac-ft/yr. Adjusted for inflation, the rounded cost of $300/ac-ft/yr was adopted. Achieving savings beyond 34.7% is expected to be significantly more challenging, warranting a doubled cost factor to reflect the increased difficulty and expense.

I.10 Reuse of Treated Wastewater Effluent

Reuse is a significant water conservation measure in Region C. Reuse strategies were evaluated on a case-by-case basis, and reuse water supplies are described in Chapter 5B.

I.11 Golf Course Conservation

I.11.1 Applicability

The golf course conservation measure was evaluated for irrigation WUGs that have a projected water need.

I.11.2 Potential Water Savings

It has been assumed that where the measure is implemented, the potential water savings for the golf course conservation program is 15 percent of golf course water demand and that the potential water savings will last indefinitely (the golf course will continue to maintain and implement the conservation program at its own expense). Assumed participation rates for implementation by 2020 are shown in **Table I.7**.

TABLE I.7 ASSUMED PARTICIPATION RATES IN THE GOLF COURCE CONSERVATION PROGRAM

2030	2040	2050	2060	2070	2080
20%	40%	50%	60%	70%	80%

I.11.3 Additional Data Requirements

No additional data is required to estimate potential water savings from a golf course conservation program.

I.11.4 Reliability

The effectiveness of this measure depends on the degree of participation of golf courses. In addition, the estimate of potential water savings is not based on course-specific data. Therefore, the reliability of the potential water savings for the golf course conservation program is low.

I.11.5 Opinion of Probable Cost

Implementation alternatives include voluntary implementation for self-supplied golf courses, rebates for courses supplied by a municipal WUG, and ordinances if supplied by a city. The opinion of probable cost assumes that a municipal WUG offers a rebate to a golf course to implement a conservation program.

The opinion of probable cost for rebates is $305 per acre-foot of savings, including the rebate, marketing, and overhead. The cost for a single rebate is amortized at 3.5 percent interest over 15 years, the expected life of the associated measure. The opinion of probable annual cost is the sum of amortized costs for all rebates given in the previous 15 years. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

I.12 Mining Conservation Applicability

Mining water conservation was evaluated for those counties with a projected need (Kaufman, Navarro, Parker, Tarrant, and Wise Counties).

I.12.1 Potential Water Savings

Water savings for Mining Conservation were assumed to equal the projected water needs. Savings would be achieved through on-site recycling of process water.

I.12.2 Additional Data Requirements

To better estimate the potential water savings and costs for mining conservation methods, data are needed on the types of mining activities in each county, their relative water uses, and their water quality needs.

I.12.3 Reliability

Since few data are available on types of mining activities in each county, their relative water uses, and their water quality needs, the reliability of the potential water savings for mining conservation is low.

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I.12.4 Opinion of Probable Cost

The opinion of probable cost for Mining Conservation is based on the cost from the 2016 Region C Water Plan adjusted to September 2023 dollars.

I.13 GPCD Goals by WUG

As required by TWDB, GPCD goals for each WUG in included below in **Table I.8**. These calculations are based on the formula:

GPCD Goals = (Water Demand Projections - Recommended Conservation Water Management Strategies - Demand Reduction Since Base Year)/WUG Population

TABLE I.8 GPCD GOALS FOR MUNICIPAL WATER USER GROUPS

WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Ables Springs SUD	60	59	59	59	59	58	58
Addison	369	348	340	338	337	336	335
Aledo	165	155	149	146	145	145	144
Allen	187	174	168	167	166	166	165
Alvord	126	119	118	117	117	117	116
AMC Creekside	60	58	58	58	58	57	57
Anna	142	129	119	117	117	117	117
Annetta	129	122	120	120	120	119	119
Argyle WSC	178	167	164	156	152	152	153
Arledge Ridge WSC	155	147	145	145	144	144	143
Arlington	155	144	141	139	139	138	138
Athens	183	170	159	148	145	145	145
Aubrey	107	100	99	94	93	93	93
Avalon Water Supply & Sewer Service	114	106	99	97	97	96	96
Azle	141	133	131	126	125	125	124
B And B WSC	151	143	141	141	140	140	139
Balch Springs	94	86	84	84	83	83	83
Bear Creek SUD	107	97	92	93	94	93	94
Becker Jiba WSC	83	77	76	75	75	75	74
Bedford	171	159	157	157	156	156	155
Bells	96	89	88	88	88	87	87
Benbrook Water Authority	207	190	182	179	178	177	177
Black Rock WSC	219	209	207	206	205	204	204
Blackland WSC	181	172	170	170	169	168	168
Blooming Grove	151	142	141	141	140	140	139
Blue Mound	69	63	62	62	62	62	61
Blue Ridge	154	145	143	143	142	142	141
Bois D Arc MUD	105	98	97	96	96	96	95
Bolivar WSC	127	118	113	111	107	105	104

WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Bonham	144	132	123	114	112	112	111
Boyd	150	142	140	140	139	139	138
Bridgeport	156	148	146	145	145	144	144
Buena Vista-Bethel SUD	249	228	202	189	188	187	186
Butler WSC	196	186	184	183	184	183	183
Callisburg WSC	82	76	75	75	74	74	74
Carrollton	167	155	153	152	152	151	151
Cedar Hill	180	162	148	141	140	139	139
Celina	187	169	148	140	143	142	142
Chatfield WSC	97	90	89	89	88	88	88
Chico	177	168	166	166	165	164	164
Cockrell Hill	134	125	116	112	111	111	110
College Mound SUD	92	90	89	89	85	84	84
Colleyville	348	326	319	316	315	314	313
Collinsville	99	92	91	91	90	90	90
Combine WSC	86	81	80	80	80	79	79
Community WSC	136	122	106	99	98	98	97
Copeville WSC	112	106	105	104	104	100	99
Coppell	237	223	219	218	217	216	216
Corbet WSC	81	75	73	73	73	73	72
Corinth	154	140	137	134	134	134	135
Corsicana	205	190	186	185	185	184	183
County-Other, Collin	141	133	132	132	131	131	130
County-Other, Cooke	119	113	112	112	111	111	111
County-Other, Dallas	1822	1801	1795	1788	1782	1777	1771
County-Other, Denton	112	106	105	105	104	104	104
County-Other, Ellis	110	105	104	104	104	103	103
County-Other, Fannin	100	94	93	93	93	92	92
County-Other, Freestone	93	87	85	85	85	85	84
County-Other, Grayson	114	109	108	107	107	107	106
County-Other, Henderson	83	77	77	76	76	76	76
County-Other, Jack	101	95	95	94	94	94	93
County-Other, Kaufman	99	94	93	93	93	92	92
County-Other, Navarro	102	96	96	95	95	95	94
County-Other, Parker	117	112	111	110	110	110	109
County-Other, Rockwall	144	139	138	137	137	136	136
County-Other, Tarrant	206	199	198	197	197	196	195
County-Other, Wise	108	103	102	101	101	101	100
Crandall	163	155	153	144	140	140	141
Crescent Heights WSC	79	73	72	71	71	71	70
Cross Timbers WSC	196	187	184	184	183	175	170

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WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Crowley	133	123	120	120	119	119	118
Culleoka WSC	98	91	90	90	89	86	85
Dallas	202	187	178	174	173	173	172
Dalworthington Gardens	354	342	341	340	339	337	336
Dawson	150	142	140	140	139	139	138
Decatur	244	233	230	230	221	217	217
Denison	237	219	212	211	210	209	209
Denton	162	149	142	140	140	139	139
Denton County FWSD 10	169	160	158	158	157	157	156
Denton County FWSD 11-C	60	58	58	57	57	57	54
Denton County FWSD 1-A	155	143	138	138	139	139	139
Denton County FWSD 7	227	215	212	211	211	210	209
Desert WSC	148	137	130	126	126	125	125
Desoto	155	143	141	141	140	140	139
Dogwood Estates Water	137	129	128	127	127	126	126
Dorchester	159	141	118	108	108	107	106
Duncanville	128	116	109	105	105	105	104
East Cedar Creek FWSD	136	128	124	122	122	121	121
East Fork SUD	110	102	99	98	98	98	97
East Garrett WSC	148	133	115	106	105	105	104
Edgecliff	155	148	147	147	146	146	145
Elmo WSC	77	71	70	70	70	69	69
Ennis	169	152	140	134	134	133	133
Euless	149	138	136	136	135	135	134
Eustace	97	90	89	89	89	89	88
Everman	78	72	72	71	71	71	71
Fairfield	187	178	176	175	175	174	174
Fairview	320	305	288	267	265	266	265
Farmers Branch	265	248	244	243	242	241	240
Farmersville	108	101	98	90	88	89	90
Fate	158	146	141	139	139	139	138
Ferris	177	155	128	114	113	113	112
Flower Mound	226	212	206	204	206	207	207
Forest Hill	96	90	89	89	89	86	85
Forney	134	124	119	117	117	117	117
Forney Lake WSC	146	138	132	131	130	130	130
Fort Worth	177	164	158	157	156	155	154
Frisco	217	203	198	198	198	198	197
Frognot WSC	94	87	86	86	86	85	85
Gainesville	129	121	116	115	114	114	113
Garland	145	134	132	132	131	131	131

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WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Gastonia Scurry SUD	103	100	100	99	95	93	93
Glenn Heights	100	89	82	78	78	78	77
Grand Prairie	145	133	127	124	124	123	123
Grapevine	315	296	294	293	292	291	289
Gunter	145	137	136	135	134	134	133
Hackberry	217	206	204	203	202	201	200
Haltom City	100	94	93	93	92	92	92
Haslet	357	342	339	338	336	335	334
Heath	292	279	271	255	252	254	255
High Point WSC	82	74	70	69	69	69	69
Highland Park	402	376	372	371	370	368	367
Highland Village	201	192	189	188	188	187	186
Honey Grove	144	126	104	93	92	92	91
Horseshoe Bend Water System	127	119	118	118	117	117	116
Howe	86	74	61	54	54	54	54
Hudson Oaks	308	295	292	291	290	289	288
Hurst	153	142	140	140	139	139	138
Hutchins	202	193	191	191	190	189	188
Irving	193	180	178	178	177	177	176
Italy	119	112	110	110	110	109	109
Jacksboro	195	173	145	132	131	131	130
Josephine	192	185	184	183	183	175	174
Justin	158	149	145	143	143	136	132
Kaufman	151	145	144	143	142	142	137
Kaufman County Development District 1	214	198	178	169	168	167	166
Kaufman County MUD 11	152	144	143	142	142	141	140
Kaufman County MUD 14	246	235	233	232	231	230	230
Keller	229	214	209	206	206	205	204
Kemp	160	152	150	150	149	149	148
Kennedale	159	151	149	149	142	139	139
Kentuckytown WSC	112	105	103	103	103	102	102
Kerens	107	100	99	99	98	98	98
Krum	199	185	169	162	161	153	149
Ladonia	140	123	101	90	90	89	88
Lake Cities Municipal Utility Authority	126	118	112	110	111	110	110
Lake Kiowa SUD	363	348	344	343	342	340	339
Lake Worth	197	189	187	186	186	185	185
Lakeside	247	235	232	232	231	230	229
Lancaster	153	141	135	133	133	132	132
Lancaster MUD 1	111	104	103	102	102	102	101
Leonard	127	119	114	112	112	112	111

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WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Lewisville	155	141	131	126	125	125	124
Lindsay	117	110	108	107	106	106	106
Little Elm	123	114	111	110	109	109	109
Log Cabin	157	149	147	146	145	145	142
Lucas	255	248	246	245	245	244	243
Luella SUD	95	88	87	87	86	86	86
M E N WSC	127	120	118	118	117	117	117
Mabank	178	166	155	151	150	150	149
Malakoff	105	96	90	87	87	87	86
Mansfield	245	231	225	220	217	219	220
Markout WSC	156	148	147	146	146	145	145
McKinney	196	183	177	173	172	173	174
Melissa	197	185	179	178	178	178	179
Mesquite	134	121	113	109	108	108	107
Midlothian	208	190	181	177	176	176	175
Milligan WSC	108	102	101	100	100	100	99
Mount Zion WSC	178	171	170	169	168	168	167
Mountain Peak SUD	281	254	228	216	215	215	214
Mountain Springs WSC	151	143	141	141	140	139	139
Muenster	154	146	144	143	143	142	142
Murphy	206	192	189	187	186	185	184
Mustang SUD	135	123	118	117	117	117	117
Nash Forreston WSC	102	95	94	94	93	93	92
Navarro Mills WSC	96	89	88	88	87	87	87
Nevada SUD	90	81	81	80	78	76	76
Newark	99	93	91	91	91	90	90
North Collin SUD	132	126	125	124	124	123	123
North Farmersville WSC	195	187	184	183	182	182	182
North Kaufman WSC	62	58	55	53	53	53	53
North Richland Hills	160	148	144	143	142	142	141
Northlake	182	170	166	163	163	162	162
Northwest Grayson County WCID 1	92	85	85	84	84	83	83
Oak Ridge South Gale WSC	79	73	72	72	72	71	71
Ovilla	214	203	194	190	189	188	187
Palmer	101	94	93	93	92	92	91
Paloma Creek North	186	174	172	171	171	170	169
Paloma Creek South	184	170	158	152	151	151	150
Pantego	232	221	219	218	217	217	216
Parker	382	368	365	364	362	360	359
Parker County SUD	96	90	88	88	84	82	82
Pelican Bay	60	58	58	58	58	57	57

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WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Pilot Point	123	116	114	114	109	107	108
Pink Hill WSC	104	97	96	95	95	95	95
Plano	231	211	198	190	190	190	189
Pleasant Grove WSC	90	84	82	82	82	81	81
Point Enterprise WSC	128	121	119	119	118	118	118
Ponder	133	125	124	123	123	122	121
Pottsboro	152	144	142	141	141	140	140
Princeton	97	88	84	84	85	85	85
Prosper	235	228	223	221	222	222	222
Providence Village WCID	116	109	107	107	106	106	105
R C H WSC	189	181	179	178	177	176	176
Red Oak	134	127	126	125	120	119	118
Reno (Parker)	60	59	58	58	58	58	57
Rhome	155	147	145	144	144	143	142
Rice Water Supply and Sewer Service	108	101	100	99	99	99	95
Richardson	225	205	191	184	183	183	183
Richland Hills	123	117	115	115	114	114	114
River Oaks	102	95	94	93	93	93	92
Roanoke	254	243	241	240	240	239	238
Rockett SUD	106	95	90	88	87	87	87
Rockwall	168	156	152	149	148	149	150
Rose Hill SUD	78	73	72	72	71	71	71
Rowlett	137	126	125	123	123	123	123
Royse City	138	127	120	120	122	122	122
Runaway Bay	326	314	310	309	308	307	306
Sachse	163	152	150	148	148	148	148
Saginaw	123	113	112	111	111	111	110
Sanger	125	114	112	112	111	109	109
Sansom Park	99	92	91	91	90	90	90
Sardis Lone Elm WSC	241	224	217	215	216	217	217
Savoy	123	116	113	113	113	112	112
Seagoville	99	91	89	89	88	88	88
Seis Lagos UD	253	246	245	244	243	242	241
Sherman	220	197	178	170	169	168	168
South Ellis County WSC	336	324	320	320	319	317	316
South Freestone County WSC	90	84	82	82	82	82	81
South Grayson SUD	110	103	102	102	101	101	101
Southern Oaks Water Supply	165	156	154	153	152	152	151
Southlake	370	350	339	336	335	334	333
Southmayd	101	92	86	83	83	83	83
Southwest Fannin County SUD	91	85	83	83	83	82	82

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WUG NAME	BASELINE GPCD	GPCD GOAL					
		2030	2040	2050	2060	2070	2080
Springtown	199	185	171	164	163	163	162
Starr WSC	93	86	85	85	84	84	84
Sunnyvale	301	293	290	289	288	287	286
Talty SUD	147	140	138	137	130	126	127
Teague	154	135	112	100	99	99	98
Terra Southwest	71	65	64	64	63	63	63
Terrell	153	136	119	110	110	109	109
The Colony	137	127	124	123	124	123	123
Tioga	123	116	114	114	113	112	112
Tom Bean	169	157	149	144	144	144	143
Trenton	166	158	155	155	155	154	154
Trinidad	130	115	98	89	89	89	88
Trophy Club MUD 1	341	318	305	298	297	296	295
Two Way SUD	121	114	112	112	111	111	111
University Park	266	247	244	243	243	242	241
Van Alstyne	105	98	97	95	94	93	94
Verona SUD	122	115	114	113	113	112	112
Walnut Creek SUD	142	131	128	126	124	124	124
Watauga	104	94	90	89	88	88	88
Waxahachie	164	151	147	146	146	145	145
Weatherford	166	158	154	153	152	151	151
West Cedar Creek MUD	191	186	185	184	184	183	182
West Leonard WSC	120	113	112	111	111	111	110
West Wise SUD	111	104	102	102	101	101	101
Westlake	1033	1002	996	993	989	986	983
Westminster SUD	173	159	144	137	136	136	135
Westover Hills	1218	1174	1168	1165	1161	1157	1152
Westworth Village	131	124	123	122	122	121	121
White Settlement	110	99	93	90	90	90	89
White Shed WSC	98	91	90	89	89	89	88
Whitesboro	110	103	101	101	101	100	100
Whitewright	165	157	155	154	154	153	152
Willow Park	140	132	131	130	130	129	129
Wilmer	128	120	117	116	116	115	115
Woodbine WSC	96	89	88	88	87	87	87
Wortham	128	121	119	118	118	117	117
Wylie	135	125	124	123	122	122	122
Wylie Northeast SUD	108	101	100	96	95	95	95

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Appendix J

Updated Quantitative Analysis of the Impact of Marvin Nichols Reservoir

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Section J.2	Background
Section J.3	Analysis and Quantification of the Impacts on Natural Resources
Section J.4	Analysis and Quantification of the Impacts on Agricultural Resources
Section J.5	Mitigation and the Effect of Mitigation on Impacts to Natural and Agricultural Resources
Section J.6	Socio-Economic Assessment
Section J.7	Additional Information

J.1 Introduction

In 1997, the Texas Legislature passed Senate Bill One, which initiated a regional water planning process for Texas. The planning process was implemented by the Texas Water Development Board (TWDB), which set up rules governing planning and established 16 water planning regions across the state (See **Figure J.1**) Planning in each region is overseen by a regional water planning group, which develops a water supply plan addressing the future water needs of the region. The 16 regional plans are reviewed and approved by the Texas Water Development Board and assembled into a state water plan.

The water planning process is conducted on a five-year cycle. Regional water plans were approved in 2001, 2006, 2011, 2016, and 2021, and the sixth round of planning is currently underway. State water plans based on the regional plans were developed in 2002, 2007, 2012, 2017, and 2022.

The Region C Regional Water Planning Area includes all or part of 16 counties and includes the Dallas-Fort Worth Metropolitan area. Region C has over a fourth of the state's population and is the most populous of the 16 planning regions. The population of Region C is increasing rapidly. To meet this need, the Region C Water Plan identified multiple strategies to conserve water, utilize existing sources, and develop new water supplies. One of the new sources of water is the Marvin Nichols Reservoir, which is located in adjoining North East Texas Regional Water Planning Group (Region D). **Figure J.2** shows the location of Region C, Region D, and the proposed Marvin Nichols Reservoir. The Marvin Nichols Reservoir (elevation 328 msl) would be in Red River, Titus, and Franklin Counties in the Sulphur River Basin. This strategy is recommended for implementation by 2060. A separate Sulphur Basin strategy includes the reallocation of flood storage at the existing Wright Patman Reservoir (raising the conservation storage to 235 msl), which would be implemented by 2080. These strategies, which are in Region D, would be developed to meet needs in Region C.

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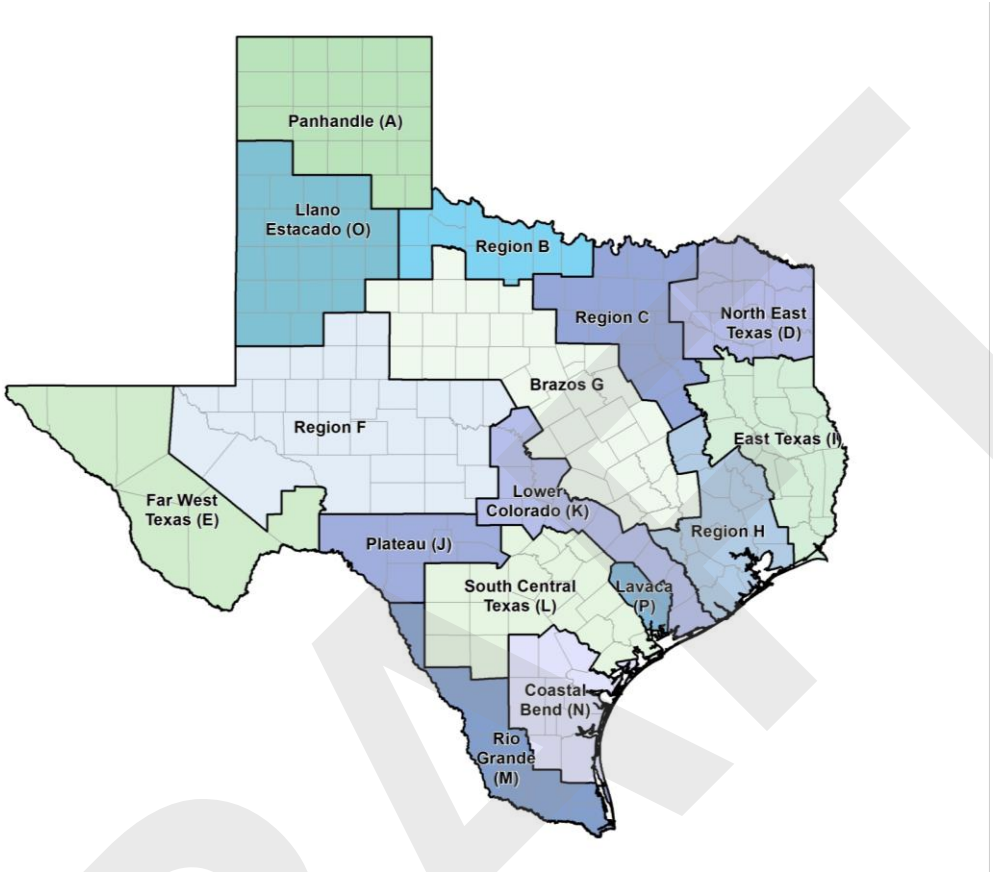
FIGURE J.1 REGIONAL WATER PLANNING AREAS EXTABLISHED BY TEXAS WATER DEVELOPMENT BAORD



Technical memoranda for each of these strategies are included in **Appendix G** in the *2026 Region C Water Plan*. This supplement, included as **Appendix J** to the *2026 Region C Water Plan,* focuses on additional information on the proposed Marvin Nichols Reservoir, with emphasis on the quantification and analysis of the impact of Marvin Nichols Reservoir on agricultural and natural resources. Also included is information on the Socio-Economic Assessment of developing the Marvin Nichols Reservoir and the TWDB's socio-economic assessment of impacts to Region C if needs are not met (**Section J.6**).

During the development of the *2016 Region C Water Plan*[1], there was an interregional conflict between the Region C and Region D regional water plans regarding the inclusion of the proposed Marvin Nichols Reservoir, requiring TWDB to take action to resolve the interregional conflict.

On August 7, 2014, the TWDB Board met to consider the interregional conflict and requested additional information from Region C. The Board action is reflected in the Interim Order of August 8, 2014, which included the following language:

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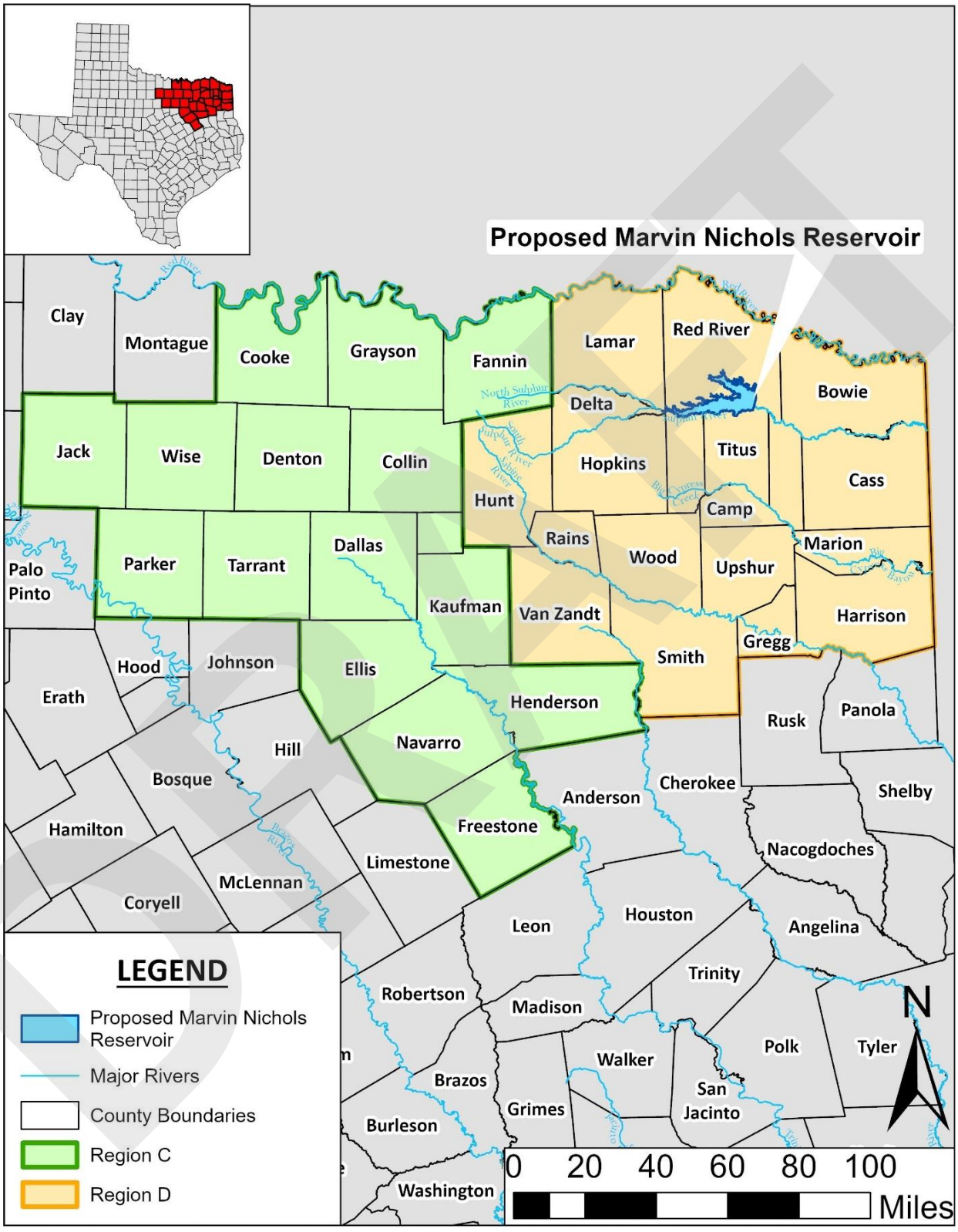
FIGURE J.2 LOCATION MAP FOR REGIN C, REGION D, AND THE PROPOSED MARVIN NICHOLS RESERVOIR



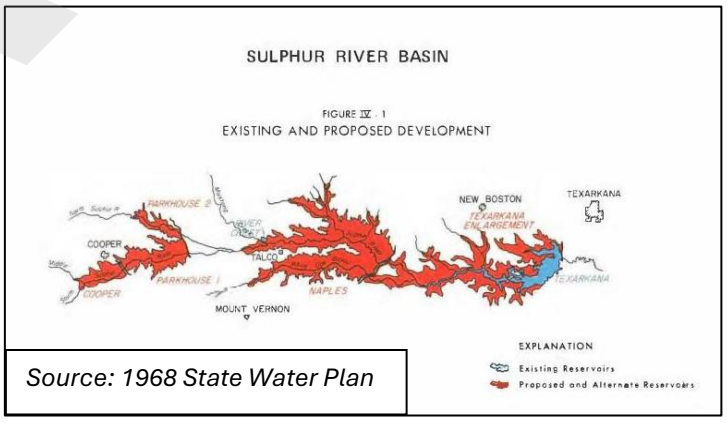
> "Region C is directed to conduct an analysis and quantification of the impacts of the Marvin Nichols Reservoir Water Management Strategy on the agricultural and natural resources of Region D and the State, pursuant to Sections 16.051 and 16.053 of the Texas Water Code and Chapters 357 and 358 of Board rules. Region C should submit this analysis and quantification to the Board by November 3, 2014. Upon receipt of the analysis and quantification, the Executive Administrator and Region D will be given the opportunity to submit a written response to the submission, and the matter will be scheduled for Board consideration. If no submittal is received by the Board on or before November 3, 2014, this matter will set for a Board Meeting to direct the Regions to revise their regional water plans reflecting the removal of the Marvin Nichols Reservoir Water Management Strategy from the 2011 Region C Plan, without prejudice."

The full Interim Order of August 8, 2014, was included as **Attachment J-1** to **Appendix J** in the *2016 Region C Water Plan*. The original version of this report (August 2014) was submitted to TWDB and provided the information requested by the TWDB Board in the Interim Order of August 8, 2014. This appendix is an update to that report. The information and discussions in this appendix have been modified to include additional information developed since 2014 and is incorporated in the *2026 Region C Water Plan* as **Appendix J**.

Section J.3 of this report provides the analysis and quantification of the impacts of Marvin Nichols Reservoir on natural resources. **Section J.4** provides the analysis and quantification of the impacts of the project on agricultural resources. **Section J.5** discusses potential mitigation requirements for the project and how they might affect impacts on natural and agricultural resources**. Section J.6** provides a socio-economic assessment. **Section J.7** provides additional information, and the Attachments include supporting information.

J.2 Background

The transfer of water from the Sulphur River Basin in east Texas to users in the greater Metroplex area has been included in every state plan, in some form, since the 1968 State Water Plan. The originally named Naples Reservoir was projected to meet Dallas-Fort Worth's 2020 water needs in the 1968 Plan. This first mention of the now proposed Marvin Nichols Reservoir includes the intention to use the reservoir to meet the water need in what is now Region C and has remained in the plan with that intent throughout the years. In the 1990 State Water Plan (when the plan was developed according to river basins) the Sulphur Basin's second largest demand was projected to be exporting water by 2040.



Source: 1968 State Water Plan

Throughout the continuous development of the *Region C Regional Water Plan* (2001-2026) the Marvin Nichols Reservoir has been extensively studied, and the footprint has changed several times in an effort to reduce the environmental impacts associated with the proposed reservoir. During the first round of regional water planning, representatives of both Region C and Region D met to discuss the proposed development of water supplies in the Sulphur River Basin. It was preferred by the Region D representatives that Region C recommend one large project (Marvin Nichols Reservoir) rather than multiple smaller reservoirs. As a result, the Marvin Nichols Reservoir was included in each Region C Water Plan since the inception of regional water planning. It was after the publication of the 2001 plans that Region D representatives objected to the project and amended the Region D plan to no longer support the reservoir.

Implementation of this project was recommended for 2030 in each regional water plan until the *2016 Region C Water Plan*. For that plan, the original implementation date of 2050 was modified to 2070 as part of the negotiated resolution of the declared conflict. In the *2021 Region C Water Plan* the implementation date was changed back to 2050 to meet the projected water needs. Currently, Marvin Nichols Reservoir is recommended to be online by 2060.

J.3 Analysis and Quantification of the Impacts on Natural Resources

J.3.1 Requirements of Texas Water Code and Texas Water Development Board Rules

The requirements for quantitative reporting on the impacts of water management strategies on natural resources are included in the Board rules in Texas Administrative Code §357. Specifically, §357.34(e)(3)(B), requires that the quantitative reporting address impacts on certain specific aspects of natural resources:

- Environmental water needs
- Wildlife habitat
- Cultural resources
- Effect on bays, estuaries, and arms of the Gulf of Mexico

A quantitative reporting of impacts on each of these areas is provided below, as is additional information on threatened and endangered species and mineral resources.

J.3.2 Available Data for Impacts on Natural Resources

Much of the more recent information on the impacts of the proposed Marvin Nichols Reservoir on natural resources came from the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*[2]. *This report was* developed in 2013 for the U.S. Army Corps of Engineers as part of an on-going basin-wide assessment of the Sulphur River Basin. The report includes environmental analyses of Marvin Nichols Reservoir and other potential water supply projects in the Sulphur Basin. In 2024, the sponsors of the project updated the hydrological analysis of the

project and the preliminary dam design to reflect the latest published hydrologic data (2019 Sulphur River Basin Water Availability Model[3] and TCEQ Probable Maximum Precipitation data[4]). For the *2026 Region C Water Plan*, environmental flow needs were developed using the TWDB-required Consensus Method with the updated hydrology. Vegetative cover types were updated based on recent aerial surveys if there were significant changes since the 2013 study. Other data, including statistics on timber production, prime farmlands, and threatened and endangered species were also updated as part of this plan development. The sources for data are cited in the respective tables.

J.3.3 Impacts on Environmental Water Needs

Texas Administrative Code §357.34(d)(3)(B) includes specific requirements for the evaluation of environmental water needs:

> "Evaluations of effects on environmental flows will include consideration of the Commission's adopted environmental flow standards under 30 TAC Chapter 298 (relating to Environmental Flow Standards for Surface Water). If environmental flow standards have not been established, then environmental information from existing site-specific studies, or in the absence of such information, state environmental planning criteria adopted by the Board for inclusion in the state water plan after coordinating with staff of the Commission and the Texas Parks and Wildlife Department to ensure that water management strategies are adjusted to provide for environmental water needs including instream flows and bays and estuaries inflows."

The Texas Commission on Environmental Quality (TCEQ) has not yet adopted environmental flow standards under 30 TAC Chapter 298 for the Sulphur Basin. As required by TWDB rules, the operation of the proposed reservoir was evaluated using state environmental planning criteria adopted by the Board for inclusion in the state water plan. **Table J.1** and **Figure J.3** summarize the flow-frequency relationship for the Sulphur River immediately below the proposed Marvin Nichols Reservoir with and without the reservoir. It is likely that the detailed studies required for reservoir permitting will result in different streamflow bypass requirements and different impacts on downstream flows. The results in **Table J.1** and **Figure J.3** reflect current TWDB consensus requirements.

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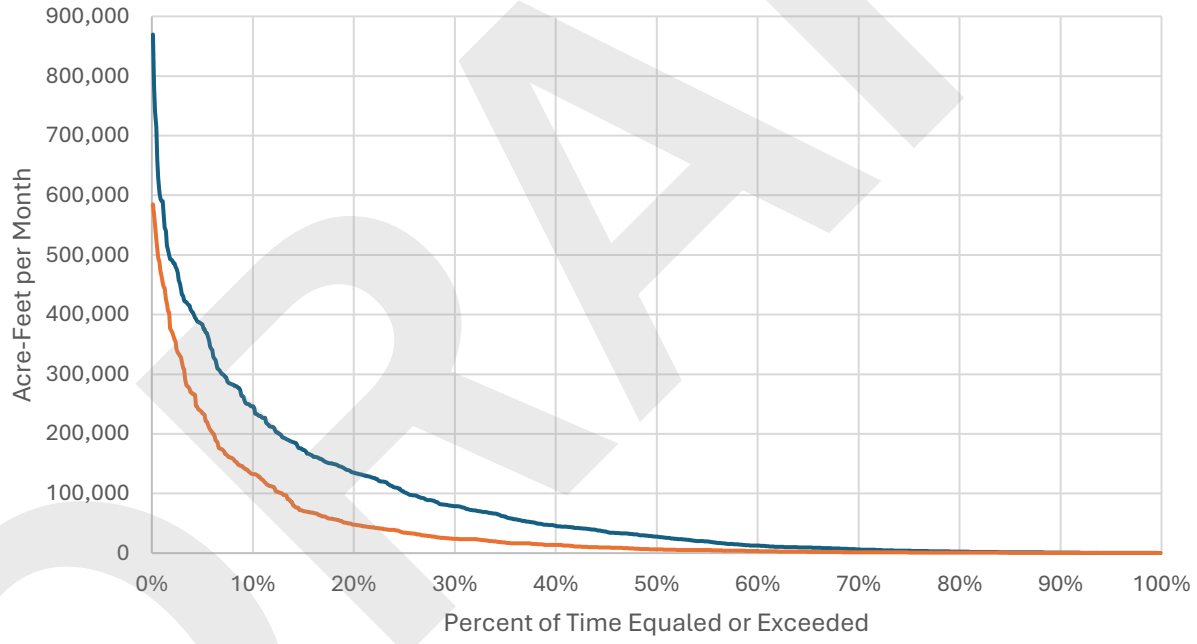
TABLE J.1 MONTHLY FLOW RELATIONSHIP WITH AND WITHOUT MARVIN NICHOLS RESEROIVR

% OF MONTHS FLOW IS EXCEEDED	FLOW IN ACRE-FEET/MONTH	
	WITHOUT MARVIN NICHOLS	WITH MARVIN NICHOLS
5%	366,534	255,222
10%	236,232	131,508
20%	143,577	35,937
30%	88,805	19,741
40%	55,545	11,232
50%	29,145	6,141
60%	15,137	3,384
70%	7,404	1,715
80%	3,310	922
90%	1,135	431
95%	506	252

FIGURE J.3 FLOW-FREQUENCY RELATIONSHIP OF SULPHUR RIVER AT MARVIN NICHOLS DAM SITE WITH AND WITHOUT THE RESERVOIR



J.3.4 Impacts on Wildlife Habitat

The primary impact of the proposed Marvin Nichols Reservoir on wildlife habitat would be the inundation of habitat by the reservoir. This impact was evaluated as part of the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment (Sulphur Basin Study)*[2], prepared for the U.S. Army Corps of Engineers. The *Sulphur Basin study* used the existing Texas Parks and Wildlife Ecological Systems Classification data set, which was developed by analysis of color infra-red and multi-spectral satellite imagery. The data set is considered the most recent, readily available data on land cover types in the Sulphur River Basin. The cover types determined

from the Ecological Systems Data set were grouped into larger categories based on EPA's Level One National Land Cover Data classifications. U.S. Fish and Wildlife Service National Wetlands Inventory data were used to further refine the classifications.

As part of the update for *the 2026 Region C Water Plan*, aerial photography was reviewed to identify changes in wildlife habitats. During this review approximately 4,100 acres of forested wetlands and bottomland hardwood forest appeared to have been clear cut and shrubs were now growing on the acreage. This acreage was re-classified from forested wetland and bottomland hardwood forest to shrub wetland. Since there have been no updates to the Texas Parks and Wildlife Ecological Systems Classification data set and no other significant changes were noted during the aerial photography review, no changes were made to the other cover types.

Table J.2 shows the acreage of each cover type within the footprint of the proposed Marvin Nichols Reservoir. For comparison, the area of each cover type in all of Region D is also included. **Attachment J-1** is a map of the cover types in the Marvin Nichols Reservoir site.

Table J.2 also presents the impact of the proposed Marvin Nichols Reservoir on wildlife habitat in terms of the acreage of different types of habitats inundated by the reservoir. The reservoir will affect 4.8 percent of the forested wetlands, 2.2 percent of the bottomland hardwood forests, and 0.4 percent of the upland forests in Region D. Bottomland hardwoods and forested wetlands are often lumped together as bottomland hardwoods, and they are considered particularly important as wildlife habitat. The total of these two types in the proposed Marvin Nichols Reservoir represents 3.4 percent of the bottomland hardwood and forested wetland areas in Region D. The 28,900 acres of bottomlands and forested wetlands that would be inundated by the proposed reservoir represents less than 1 percent of the estimated 5,973,000 acres[5] of bottomland hardwoods in Texas. As a part of permitting for the project, there will be more detailed assessments of the quantity and quality of the wildlife habitat that would be affected by the project, which will aid in the development of mitigation plans.

TABLE J.2 QUANTITIATIVE REPORTING ON IMPACTS ON WILDLIFE HABITAT

COVER TYPE	AREA (ACRES)		MARVIN NICHOLS RESERVOIR AREA AS A PERCENT OF REGION D
	MARVIN NICHOLS RESERVOIR	REGION D	
Barren	<1	8,437	0.0%
Bottomland Hardwood Forest	9,289	416,398	2.2%
Forested Wetland	19,622	412,751	4.8%
Grassland/Old Field	18,241	2,843,656	0.6%
Herbaceous Wetland	1,244	32,011	3.9%
Open Water	1,162	211,761	0.5%
Row Crops	706	314,184	0.2%
Shrub Wetland	4,093	19,133	21.4%
Shrubland	444	47,485	0.9%
Upland Forest	11,223	2,869,079	0.4%
Urban	78	158,878	0.0%
TOTAL	***66,103***	***7,333,774***	***0.9%***

J.3.5 Impacts on Cultural Resources

The impacts of Marvin Nichols Reservoir on cultural resources would result from the inundation of cultural resource sites. The *Sulphur Basin Study* collected the following data on potential cultural resource impacts from Marvin Nichols Reservoir site and other proposed reservoir sites in the Sulphur River Basin. No new sites have been identified since 2013.

- Number of known cultural resources
- Presence of known human remains/burials
- Acres of zones of archaeological potential
- Percentage of reservoir footprint with previous cultural resource surveys
- Surveyed site density

Table J.3 is a quantitative reporting of known cultural resources in the Marvin Nichols Reservoir footprint. **Table J.4** is a quantitative reporting of other measures of potential impacts on cultural resources. The data in both tables is taken from *Sulphur Basin Study*.

TABLE J.3 QUANTITATIVE REPORTING OF IMPACTS ON CULTURAL RESOURCES – KNOWN CULTURAL RESOURCES

LIKELY ELIGIBILITY OF SITES FOR THE NATIONAL REGISTER OF HISTORIC PROPERTIES (NRHP)	HISTORIC	PRE-HISTORIC	CADDO	MULTI-COMPONENT	PREHISTORIC MULTI-COMPONENT	TOTAL[a]
Likely NRHP Eligible	0	20	9	2	3	34
Possibly NRHP Eligible - Fair Chance	0	4	2	0	0	6
Possibly NRHP Eligible - Poor Chance	0	4	1	0	0	5
Not Likely NRHP Eligible	0	15	1	2	0	18

[a]*Total for "Likely NRHP Eligible" is corrected from 31 in Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment*[2].

TABLE J.4 QUANTITATIVE REPORTING OF IMPACTS ON CULTURAL RESOURCES – OTHER FACTORS

MEASUREMENT OF IMPACT ON CULTURAL RESOURCES	VALUE FOR MEASUREMENT
Ratio of High Value Sites to Low Value Sites	1.7[a]
Number of Known Cemeteries	1 (57 graves)
Acres with High Potential for Archaeological Sites	51,654
Percentage of Project Area Previously Surveyed for Cultural Resources	13%
Number of Acres Surveyed per Site Found in Survey	90.1

[a]"Ratio of High Value Sites to Low Value Sites" is corrected from 1.6 in *Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment*[2].

In general, impacts on cultural resources are mitigated through coordination with the Corps of Engineers and the Texas State Historical Commission during permitting. Coordination with Indian tribes on archeological issues would also be a part of the permitting process. Mitigation is accomplished by investigating and recording archaeological sites and proper relocation of cemeteries. This process of archaeological mitigation adds to project costs, and it has been considered in costs developed for the proposed Marvin Nichols Reservoir.

J.3.6 Impacts on Bays, Estuaries and Arms of the Gulf of Mexico

The proposed Marvin Nichols Reservoir would not directly affect flows discharging to bays, estuaries and arms of the Gulf of Mexico. The Sulphur River, on which the Marvin Nichols Reservoir would be located, is a tributary of the Red River, which does not flow to any bay, estuary or arm of the Gulf of Mexico in Texas. According to the U.S. Geological Survey, the Red River discharges to the Atchafalaya River, which flows to the Gulf of Mexico in Louisiana[6,7]. Natural discharges from the Atchafalaya to the Gulf of Mexico average 58,000 cubic feet per second, or 42 million acre-feet per year[6,7]. In addition, human diversions of flood flows from the Mississippi River to the Atchafalaya River add about 167,000 cfs, or 121 million acre-feet per year, to the discharge of the Atchafalaya[6,7], making a total discharge of 163 million acre-feet per year.

Assuming full use of Marvin Nichols Reservoir and no return flows, the project would reduce flows by about 473,000 acre-feet per year. This could reduce the discharge from the Atchafalaya River to the Gulf of Mexico in Louisiana by less than 0.4%. The impact of Marvin Nichols Reservoir on bays, estuaries and arms of the Gulf of Mexico would be negligible.

J.3.7 Impacts on Threatened and Endangered Species

The Texas Water Development Board rules do not require reporting on potential impacts to threatened and endangered species. However, Region C does identify the reported presence of threatened and endangered species as part of its environmental assessment in Chapter 5. The U.S. Fish and Wildlife Service maintains lists of federally endangered and threatened species by county. The Texas Parks and Wildlife Department maintains a separate Texas, or State, list of endangered and threatened species by county[8]. Protections for federally listed species differ from those only identified by the state, but both are considered during the permitting process.

Table J.5 summarizes State and Federally listed threatened and endangered species in the counties in which Marvin Nichols Reservoir would be located. The potential impact ranking was based on professional judgement, descriptions of habitat, and scarcity of the habitat in the project vicinity. Proposed federal endangered and threatened, and species listed as Threatened by Similarity of Appearance are not included in this table. Several of the identified species are not expected to be impacted by the reservoir. Confirmation of potential impacts and required mitigation, if needed, will be determined during the permitting process.

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TABLE J.5 QUANTITATIVE REPORTING OF POTENTIAL IMPACTS ON ENDANGERED AND THREATENED SPECIES

CLASSIFICATION OF ENDANGERED AND THREATENED SPECIES	POTENTIAL FOR IMPACT DUE TO MARVIN NICHOLS RESERVOIR	NUMBER PRESENT IN COUNTIES WHERE MARVIN NICHOLS RESERVOIR WOULD BE LOCATED
Federal Endangered Species	No Potential to Low Potential	1
	Moderate Potential	0
	High Potential	2
Federal Threatened Species	No Potential to Low Potential	2
	Moderate Potential	1
	High Potential	1
Texas Endangered Species	No Potential to Low Potential	0
	Moderate Potential	1
	High Potential	0
Texas Threatened Species	No Potential to Low Potential	7
	Moderate Potential	1
	High Potential	5

Seven species are federally listed in the counties where Marvin Nichols would be located. Three of these species, Black rail (*Laterallus jamaicensis*), Red-cockaded woodpecker (*Picoides borealis*), and Rufa red knot (*Calidris canutus rufa*), are unlikely to be impacted by the project. The Piping plover (*Charadrius melodus*) has a moderate potential to be impacted. The species with a high potential to be impacted include the Yellow-billed cuckoo (*Coccyzus americanus*), the American burying beetle (*Nicrophorus americanus*), and the Ouachita rock pocketbook (*Arcidens wheeleri*).

There is one endangered and 13 threatened State-listed species within these counties, but only two of these species have moderate potential to be impacted by the reservoir, and five threatened species have high potential. Because there are seven State-listed threatened and endangered species with moderate to high potential to be impacted by Marvin Nichols Reservoir, additional studies may be required to assess the impact on these species, if any, as reservoir development continues. The Texas Endangered Species Act does not protect wildlife species from indirect or incidental take (e.g., destruction of habitat, unfavorable management practices, etc.). The TPWD has a Memorandum of Understanding with every state agency to conduct a thorough environmental review of state initiated and funded projects, such as highways, reservoirs, land acquisition, and building construction, to determine their potential impact on state endangered or threatened species.[2]

J.3.8 Impacts on Minerals

In the past, the Region D area has been active with oil and gas production. Over time this production has declined. There are currently 48 active or permitted oil/gas wells in the footprint of

the Marvin Nichols Reservoir (28 oil wells, one oil and gas well and 19 permitted locations)[9]. There are also 176 non-active wells (dry holes and plugged wells)[9]. In addition to oil and gas, there has been recent interest in lithium mining. Lithium has been found in a brine formation about 10,000 feet below the ground surface known as the Smackover Formation. Removal of lithium from the brine is an emerging technology and there are no known active lithium wells in the footprint of the reservoir. Techniques to extract the brine solution include conventional vertical drilling and horizontal drilling (similar to the current fracking activities in the oil and gas industry). At this time, it is unknown whether there will be active lithium production within the Marvin Nichols footprint in the future. If there are lithium deposits within the footprint, these deposits will be treated like other mineral interests.

J.4 Analysis and Quantification of the Impacts on Agricultural Resources

J.4.1 Requirements of Texas Water Code and Texas Water Development Board Rules

The requirements for quantitative reporting on the impacts of water management strategies on agricultural resources are included in the Board rules in Texas Administrative Code §357. Specifically, §357.34(d)(3)(C) requires that the quantitative reporting address impacts on agricultural resources. The rules do not include any more detailed description of what quantitative reporting is required. To respond to this requirement, this report provides the following quantitative reporting on the impacts of the proposed Marvin Nichols Reservoir on agricultural resources:

- Inundation of land potentially useful as agricultural resources
- Loss of timber harvests
- Inundation of prime farmlands.

J.4.2 Available Data for Impacts on Agricultural Resources

Data on impacts to land cover types potentially useful as agricultural resources is based on a land classification developed for the *Environmental Evaluation Interim Report – Sulphur River Basin – Comparative Assessment*. The data available from that report has been adapted by a simplified re-classification that expands the geographic scope of the analysis for purposes of comparison within this study. Data on the loss of timber harvests is developed from data maintained by the Texas A&M Forestry Service. In the early 2000s, two analyses of the proposed Marvin Nichols reservoir's impacts on timber resources were performed, which reached radically different conclusions[10,11]. Both reports consider the impacts of a previous concept for the proposed Marvin Nichols Reservoir that differs in both size and location from the current concept for the reservoir and which is no longer being considered. Because these studies analyze a different project, they are not considered to be relevant for the current analysis. Data on inundation of prime farmlands is developed from prime farmland data maintained by the U.S. Department of Agriculture Natural Resources Conservation Service.

J.4.3 Impacts Due to Inundation of Land Potentially Useful as Agricultural Resources

The development of land cover type information for the proposed Marvin Nichols Reservoir is discussed in **Section J.4.2** and **Appendix G**. Five of the land cover types present in the footprint of the reservoir are potentially useful as agricultural resources. Forested wetlands, bottomland hardwoods, and upland forests might be useful in the growth and harvesting of timber (silvicultural activities). Row crops represent current farming activities. Grassland/old field would potentially include land used for grazing of livestock, although it would also include grassland not currently used for agricultural purposes. **Table J.6** includes information on the area of these land cover types that would be inundated by the Marvin Nichols Reservoir. For consideration of the impacts on agricultural resources of Region D and Texas, the areas of these cover types for Region D are included in the table.

The most significant impacts to agricultural resources relative to the resources of Region D and of Texas are on resources that could potentially be useful to the silviculture industry. These impacts are discussed further (in terms of impacts on timberland and timber sales) in **Section J.4.5**.

TABLE J.6 QUANTITATIVE REPORTING ON IMPACTS TO AGRICULTURAL RESOURCES – LAND POTENTIALLY USEFUL FOR AGRICULTURE

COVER TYPE		AREA (ACRES)		MARVIN NICHOLS RESERVOIR AREA AS A PERCENT OF REGION D
		Marvin Nichols Reservoir	Region D	
Timberlands	Bottomland Hardwood Forest	9,289	416,398	2.2%
	Forested Wetland	19,622	412,751	4.8%
	Upland Forest	11,223	2,869,079	0.4%
Active/Potential Agricultural and Pasture Lands	Row Crops	706	314,184	0.2%
	Grassland/Old Field	18,241	2,843,656	0.6%
Non-Agricultural Lands	Other Land Cover Types	7,022	477,707	1.5%
TOTAL		***66,103***	***7,333,774***	***0.9%***

J.4.4 Impacts Due to Inundation of Prime Farmland

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) maintains data on prime farmland, which is defined as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses[12]". Prime farmland is not necessarily currently in agricultural use, but it must be available for agricultural use. For example, prime farmland soils underlying an urban area would not be counted as prime farmland because they are not available for agricultural uses. **Table**

J.7 shows the acreage of prime farmland that would be inundated by the proposed Marvin Nichols Reservoir compared to prime farmland area in Region D and Texas. Marvin Nichols Reservoir would inundate 0.76 percent of the prime farmland in Region D and 0.04 percent of the prime farmland in Texas.

TABLE J.7 QUANTITATIVE REPORTING ON IMPACTS ON AGRICULTURAL RESOURCES – PRIME FARMLAND

COVER TYPE	AREA (ACRES)			MARVIN NICHOLS RESERVOIR AREA AS A PERCENT OF AREA:	
	MARVIN NICHOLS RESERVOIR	REGION D	TEXAS	REGION D	TEXAS
Prime Farmland	594	1,922,937	35,523,540	0.031%	0.002%

J.4.5 Impacts on Timberland and Timber Harvests

Agricultural use of the land that would be inundated by the proposed Marvin Nichols Reservoir includes the production of timber. The Texas A&M Forest Service maintains data on timberland, timber harvest, and the stumpage value of harvests by county. As part of this study, Freese and Nichols contacted the Texas A&M Forest Service to obtain information on the impact of the proposed Marvin Nichols Reservoir on timber resources. Unfortunately, the Texas A&M Forest Service database was not designed to provide information for relatively small areas like the proposed Marvin Nichols Reservoir. The Texas A&M Forest Service indicated that analysis of the data at the county level and above would be most meaningful.

The Texas A&M Forest Service produces annual reports of Harvest Trends for timber products in East Texas, which includes most of the timberland and timber production in Texas. **Figure J.4** shows the area covered by the Harvest Trends reports, as well as the location of the proposed Marvin Nichols Reservoir and the boundaries of Region D. Most of Region D (except for the western counties) is covered by the Harvest Trends Reports.

Although information on the impact of active timberland within the proposed reservoir cannot be gathered directly from data maintained by the Texas A&M Forest Service, it is possible to estimate the magnitude of potential impacts by looking at county data. Almost all the footprint of the proposed Marvin Nichols Reservoir is located in Red River, Titus and Franklin Counties. (There are extremely small areas of the reservoir in Delta and Lamar Counties, but they are contained on the Sulphur River floodway channel and would not have forested land.) The total timberland in these three counties is 523,629 acres. If we treat forested land cover types within the reservoir site as a close approximation of timberland, the proposed Marvin Nichols Reservoir will inundate about 40,134 acres of timberland (**Table J.8**), or about 7.7 percent of the 523,629 acres of timberland in Red River, Titus and Franklin Counties.

Table J.8 provides data on potential timberland in Marvin Nichols Reservoir and timberland in Region D and East Texas[13]. Note that the data for Region D and East Texas include only the area

shown in **Figure J.4**[13]. The data for Region D and East Texas were obtained from the Texas A&M Forest Service data set.

FIGURE J.4 REGION D AND AREA COVERED BY HARVEST TRENDS REPORT

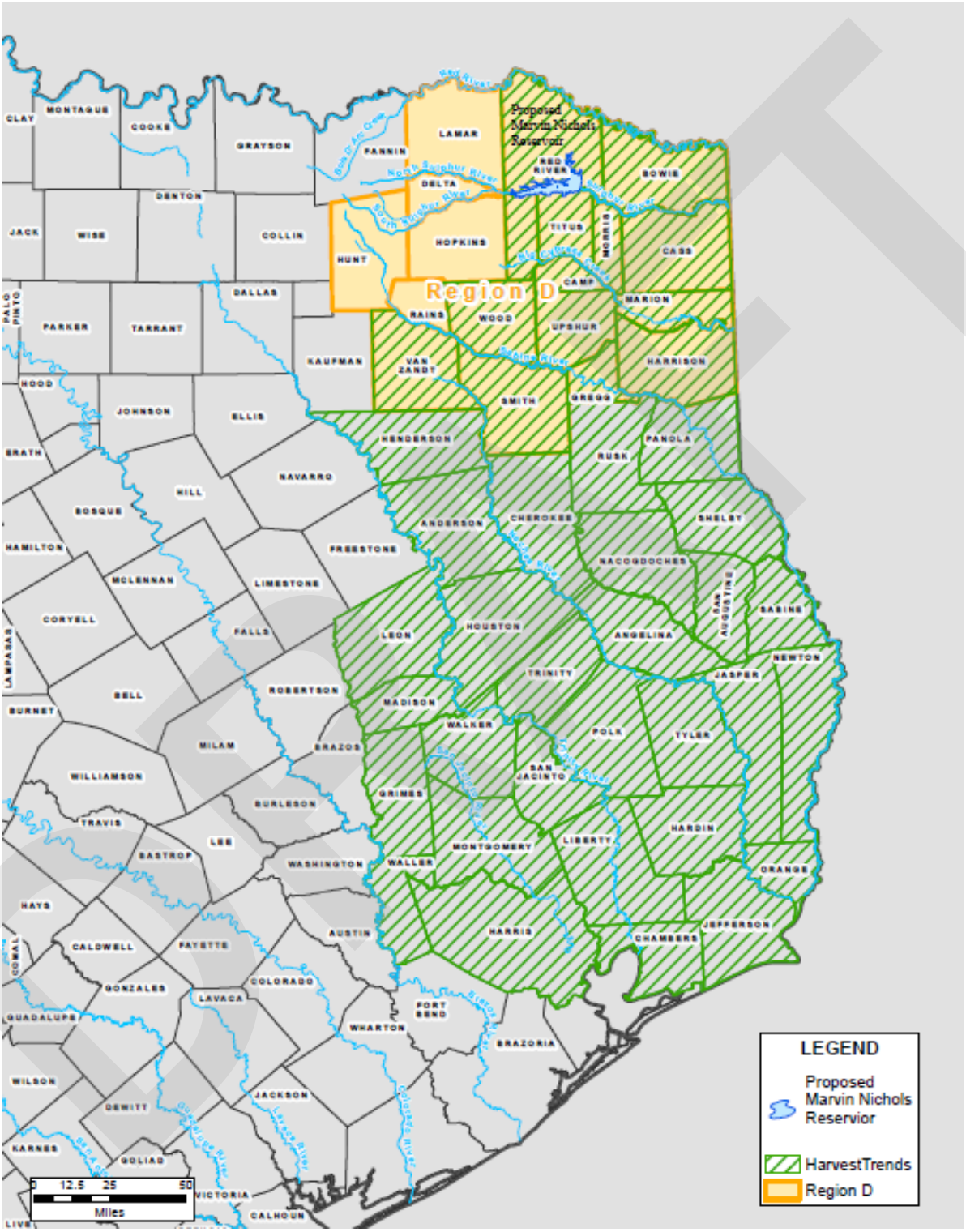

TABLE J.8 POTENTIAL TIMBERLAND IN MARVIN NICHOLS RESERVOIR

Potential Timberland in Marvin Nichols Reservoir	AREA (ACRES)	PERCENT IN MARVIN NICHOLS
Bottomland Hardwoods	9,289	
Forested Wetlands	19,622	
Upland Forest	11,223	
Total Potential Timberland in Marvin Nichols	**40,134**	
TOTAL TIMBERLAND IN RED RIVER, TITUS, & FRANKLIN COUNTIES	***523,629***	***7.7%***
TOTAL TIMBERLAND IN REGION D	***3,520,917***	***1.1%***
TOTAL TIMBERLAND IN EAST TEXAS	***11,906,539***	***0.3%***

Table J.9 is a summary of data on timber sales taken from the Texas A&M Forest Service report *Harvest Trends 2019*[13]. These data are available only on a county-wide basis. Note that the potential timberland inundated by the proposed Marvin Nichols Reservoir is estimated to be 7.7 percent of the timberland in Red River, Titus and Franklin Counties. As a result, the timber harvest volume and stumpage value from the reservoir area is assumed to be about 7.7 percent of the total value for the three counties. (The stumpage value is the value of the timber harvested, not including the costs of processing and delivering the timber.) The estimated stumpage value of the timber harvests in the Marvin Nichols Reservoir pool is less than one percent of the total for Region D and less than 0.2 percent of the total for East Texas.

TABLE J.9 ESTIMATED IMPACT OF MARVIN NICHOLS RESERVOIR ON TIMBER HARVEST VALUES

COUNTY	VOLUME HARVESTED (CUBIC FEET)			STUMPAGE VALUE OF THE HARVEST (THOUSAND DOLLARS)
	PINE	HARDWOOD	TOTAL	
Franklin	18,641	67,268	85,909	$85
Red River	7,013,180	3,433,757	10,446,937	$5,533
Titus	132,621	182,502	315,123	$321
TOTAL FOR MARVIN NICHOLS COUNTIES	***7,164,442***	***3,683,527***	***10,847,969***	***$5,939***
Estimated Stumpage Value for Marvin Nichols (7.7% of Total for Counties)				**$457**
TOTAL FOR REGION D (NOT INCLUDING HUNT, LAMAR, DELTA, HOPKINS AND RAINS COUNTIES)[a]	***92,716,340***	***28,570,546***	***121,286,886***	***$67,733***
TOTAL FOR EAST TEXAS	***484,846,271***	***81,328,486***	***566,174,757***	***$331,169***

[a]These counties are not listed separately in the Texas A&M Forest Service Report.

J.5 Mitigation and the Effect of Mitigation on Impacts to Natural and Agricultural Resources

Developers of a new reservoir project are often required to provide mitigation for the impacts on natural resources in the form of land set aside, protected from development, and managed to enhance ecological value. Mitigation is generally only required for specific types of resources that would be impacted such as waters of the U.S. and the state, including wetlands. The developer of a project gets mitigation credit for improving the environmental functions of the land used for mitigation. The usual approach is to purchase degraded areas with limited environmental value and improve them through restoration, enhancement and careful management to achieve desired compensatory results at minimum cost.

Table J.10 gives information on historical mitigation requirements for Texas reservoirs constructed or permitted since 1980. Significant changes have taken place to the mitigation process since the 1980s. Mitigation is no longer based strictly on acreage. It now considers the quality of the land being taken out of use as well as the improvements made to the mitigation land. It may be more beneficial to examine more recent examples of reservoir mitigation. The most recently permitted and fully constructed lake is Bois d'Arc Lake in Fannin County. Bois d'Arc Lake was completed in 2021and the lake began operation in 2023. Significant land was acquired for mitigation (approximately 17,000 acres), and the transactions were on a willing buyer-willing seller basis. The total mitigation for Bois d'Arc Lake is equivalent to a 1:1 ratio to the area impacted by construction. Another reservoir, Lake Ralph Hall, was permitted in 2020 and is currently under construction with little to no mitigation requirements. Lands for the reservoir and stream mitigation were also acquired on a willing buyer-willing seller basis.

One of the key differences between recently permitted projects and those permitted decades earlier is the approach to mitigation. No longer are ratios used, but rather habitat value. Also, as previously noted, preferred lands for mitigation are lands that could be improved and developed into new ecological habitats. The potential impacts to the timber industry from mitigation would be much less than claimed by opponents because the preferred land for mitigation would be non-forested. For the Bois d'Arc Lake project, ranch lands are currently being improved, with over 5 million trees planted, to create aquatic and terrestrial habitats on lands that otherwise had limited ecological value.

Mitigation offsets the impact of a project on natural resources by improving the ecological functions of other lands. Mitigation would be expected to offset the impacts of the proposed Marvin Nichols Reservoir on natural resources. While most of the lands dedicated to mitigation may not be active agricultural lands, the potential use of these lands in the future for agricultural purposes would be limited and probably not compatible for the purpose of the mitigation.

Mitigation requirements for new reservoirs are generally determined during the permitting process, and the requirements for the proposed Marvin Nichols Reservoir are not yet known. Estimates of mitigation requirements have been developed as part of cost estimates used for the *2026 Region C Water Plan*. For this Plan, the required mitigation acreage is estimated at approximately equivalent to the total acreage of the proposed new reservoir. For the proposed Marvin Nichols Reservoir, the

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acreage of the reservoir conservation pool and dam is 72,192 acres, and the estimated mitigation requirement is equal to that amount (72,192 acres). Costs for mitigation include the land purchase cost and an equivalent cost to improve the land to meet the mitigation requirements. This is consistent with historical mitigation requirements for reservoirs in Texas. It should be emphasized that this is only an estimate. Actual mitigation requirements and location will be developed as permitting for the proposed reservoir proceeds. As discussed above, mitigation is intended to offset impacts on natural resources but may increase impacts to agricultural resources.

TABLE J.10 MITIGATION REQUIREMENTS FOR TEXAS RESERVOIRS

RESERVOIR	DATE IMPOUNDED	CONSERVATION POOL (ACRES)	USACE MITIGATION (ACRES)	RATIO	MITIGATION SITE
Alan Henry	1993	2,884	3,000	1.04:1	Down Stream
Applewhite	Permitted in 1989	2,500	2,500	1.00:1	Accepted Down Stream
Bois d'Arc Lake	Permitted in 2018	16,641	16,800	1.01:1	Upstream and Down Stream
Cooper (including Flood Pool)	1991	19,200 (22,740)	35,500	1.85:1 (1.56:1)	Next to Reservoir and 50 miles Down Stream
Gilmer	1997	1,010	1,557	1.54:1	
Joe Pool	1986	7,470	0	0.00:1	None
Mitchell County	1993	1,463	0	0.00:1	None
O. H. Ivie	1990	19,149	5,990	0.31:1	Next to Reservoir
Palo Duro	1989	2,413	0	0.00:1	None
Ray Roberts	1986	29,350	0	0.00:1	None
Ralph Hall	NA[a]	7,568	0	0.00:1	None
Richland-Chambers	1987	44,752	13,700	0.31:1	Down Stream

[a]Lake Ralph Hall is currently under construction. Permit was issued in 2020.

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J.6 Socio-Economic Assessment

In 2014, the Corps of Engineers produced the report *Sulphur River Basin – Socio-Economic Assessment*[14]. It was estimated that the construction phase of Marvin Nichols Reservoir would produce over 12,000 direct, indirect, and induced jobs, and have an overall positive effect on the economy of $1.47 billion (in 2014 dollars).

An updated socio-economic study was conducted in April 2020 by Clower & Associates for the recommended Marvin Nichols Reservoir strategy. This strategy assumes the full-size reservoir (elevation 328 ft msl) with over 200 miles of transmission to NTMWD, TRWD, and UTRWD. It also looked at construction and operation of the project. All costs are in 2018 dollars, which is consistent with the 2021 regional water planning guidance.

The *Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir* is included as **Attachment J-2** to this appendix. This study found that the development of the lake and transmission system would result in over 38,000 direct, indirect and induced temporary jobs during construction and 1,800 permanent jobs during operations. The total economic activity would increase by $5.5 billion during construction and $228 million during operations. Much of this increased economic activity would occur in Region D, where the reservoir is located.

Terms

***Employment*:** the number of annual average monthly jobs that would be created, and can be either full-time or part-time.

***Labor income*:** represents all forms of employment income, including employee compensation (wages and benefits) and proprietor income.

***Value added*:** gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported), which consists of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

***Output*:** the value of industry production.

***Direct* employment:** jobs associated with the project itself.

***Indirect* employment:** employment generated from spending by employees of the project.

***Induced* employment:** employment generated from spending by indirect employees.

Table J.11 provides additional detail during construction and **Table J.12** presents the economic summary during operations. It should be noted that these impacts occur over different geographic areas and at different times, pending construction schedules and project component locations. All values represent direct, indirect and induced economic impacts.

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TABLE J.11 SOCIO-ECONOMIC IMPACT OF CONSTRUCTING MARVIN NICHOLS RESERVOIR

CONSTRUCTION[a]				
	DAM (6 YEARS)	TRANSMISSION (6 YEARS)	HOUSING/ COMMERCIAL (20 YEARS)	TOTAL
Economic Activity	$1,223,035,000	$3,830,050,000	$497,573,000	$5,550,658,000
Value Added	$545,522,235	$2,355,441,235	$236,857,235	$3,137,820,705
Labor Income	$396,345,000	$1,667,439,000	$168,042,000	$2,231,826,000
Employment	8,266	25,921	4,061	38,248
Indirect State and Local Taxes	$34,018,000	$109,615,000	$15,506,000	$159,139,000

[a]*Values represented in 2020 dollars.*

TABLE J.12 SOCIO-ECONOMIC IMPACT OF OPERATING MARVIN NICHOLS RESERVOIR

ANNUAL OPERATIONS[a]				
	DAM	TRANSMISSION	VISITOR/ RESIDENT SPENDING	TOTAL
Economic Activity	$39,877,000	$81,106,000	$106,906,000	$227,889,000
Value Added	$17,945,000	$46,802,000	$56,608,000	$121,355,000
Labor Income	$12,569,000	$17,701,000	$29,957,000	$60,227,000
Employment	289	216	1,327	1,832
Indirect State and Local Taxes	$1,121,000	$5,065,000	$9,282,000	$15,468,000

[a]*Values represented in 2020 dollars.*

The 2020 Clower Report also addressed potential socio-economic impacts to the North Texas region if this water supply project is not developed. The report notes that the North Texas region, including most of the communities served by the sponsors of the Marvin Nichols Reservoir, has witnessed an unprecedented economic boom over the past decade with record levels of population growth and job creation. Economic forecasts see this growth continuing for at least the next several decades.

Many of the driving factors for North Texas growth are the growth of industries and migration of workers to service these industries. Water is a major factor for both residents and industry. If water supplies are limited due to the inability to secure reliable new sources of water, continued growth in North Texas will slow. Industries are most likely to slow are those that are most dependent upon water, which include pharmaceutical, aerospace and semiconductor manufacturing, hospitals, and service industries such as hotels and restaurants. The impacts to projected job growth for just these six industries could be substantial with the loss of 136,000 jobs and $19 billion in annual economic activity. This assessment assumes a lack of water for growth. The TWDB looked at the effects a one-year drought would have on Region C.

As part of the *2026 Region C Water Plan*, the TWDB evaluated the socio-economic impacts of not meeting water needs in Region C. This report is included in **Appendix L** of the 2026 Plan and summarized in **Chapter 6**. The TWDB analysis is based on the projected needs for all water users in Region C, which reach approximately 1.3 million acre-feet per year by 2080. The analysis assumes that these needs cannot be met in a single year in the decade. Projected needs in other years in the decade are assumed to be met. This approach is predicated on the assumption that the needs are

solely drought driven. In Region C, most of the projected water needs are growth related. This means that the impact from not meeting the water need is not limited to a single year in the decade. Previous analyses by the TWDB for Region C (*2006 Region C Water Plan*) indicate that the socio-economic impacts associated with growth could be much higher than estimated using the standard TWDB protocol.

J.7 Additional Information

Table J.13 shows the needs for additional water supplies in the Trinity and Sulphur Basins, taken from the Texas Water Development Board database for the 2026 regional water plans[15]. The Texas Water Development Board defines needs as the difference between the supply currently available and the projected demands for a water user group. **Table J.13** shows the sum of net needs by river basin and planning group. For suppliers that have a surplus, needs are set at zero. As the table shows, there is a need for considerable additional water supply in the Trinity Basin, particularly in Region C.

TABLE J.13 NEEDS FOR ADDITIONAL WATER SUPPLY IN THE TRINITY AND SULPHUR BASINS

BASIN	2030	2040	2050	2060	2070	2080
Sulphur	27,134	28,478	29,883	31,351	32,855	34,459
Trinity	245,701	497,110	738,176	960,830	1,158,027	1,329,508

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J.8 Appendix J List of References

[1] Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: 2021 Region C Water Plan, prepared for the Region C Water Planning Group, Fort Worth, November 2020

[2] Freese and Nichols, Inc. Environmental Evaluation Interim Report - Sulphur River Basin - Comparative Assessment. 2013.

[3] Robert Brandes Consulting, Extension of Naturalized Streamflows and Update of Run 3 and Run 8 Versions of the Sulphur River Basin WAM. Prepared for Riverbend Water Resources District in coordination with Texas Commission on Environmental Quality, 2019

[4] Applied Weather Associates, Probable Maximum Precipitation Study for Texas. Prepared for the Texas Commission on Environmental Quality, 2016.

[5] Texas Parks and Wildlife Department: Texas Wetlands Conservation Plan, Austin, 1997.

[6] U.S. Geological Survey: Open-File Report 87-242, Water Fact Sheet – Largest Rivers in the United States, Washington D.C., May 1990.

[7] U.S. Census Bureau: Statistical Abstract of the United States: 2012, Table 365, Washington, D.C.

[8] Texas Parks and Wildlife Department. Rare, Threatened, and Endangered Species of Texas. August 2024. https://tpwd.texas.gov/gis/rtest/.

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[10] Xu, Ph.d. Weihuan, and Publication 162. The Economic Impact of the Proposed Marvin Nichols I Reservoir to the Northeast Texas Forest Industry. Texas Forest Service, Aug. 2002.

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[13] Texas A&M Forest Service. Harvest Trends 2019. Texas A&M Forest Service. April 2021. Web. September 3, 2024. [Available only on internet]: https://tfsweb.tamu.edu/wp-content/uploads/2024/05/HarvestTrends2019.pdf

[14] Freese and Nichols, Inc. Sulphur River Basin: Socio-Economic Assessment. Prepared for the Fort Worth USACE. 2014b.

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[15] 2026 Regional Water Planning Database (DB27). Texas Water Development Board. Obtained from DB27, January 2025.

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Attachment J-1

Land Cover Type Figure 4 from the Environmental Evaluation Interim Report – Sulphur River Basin Comparative Assessment

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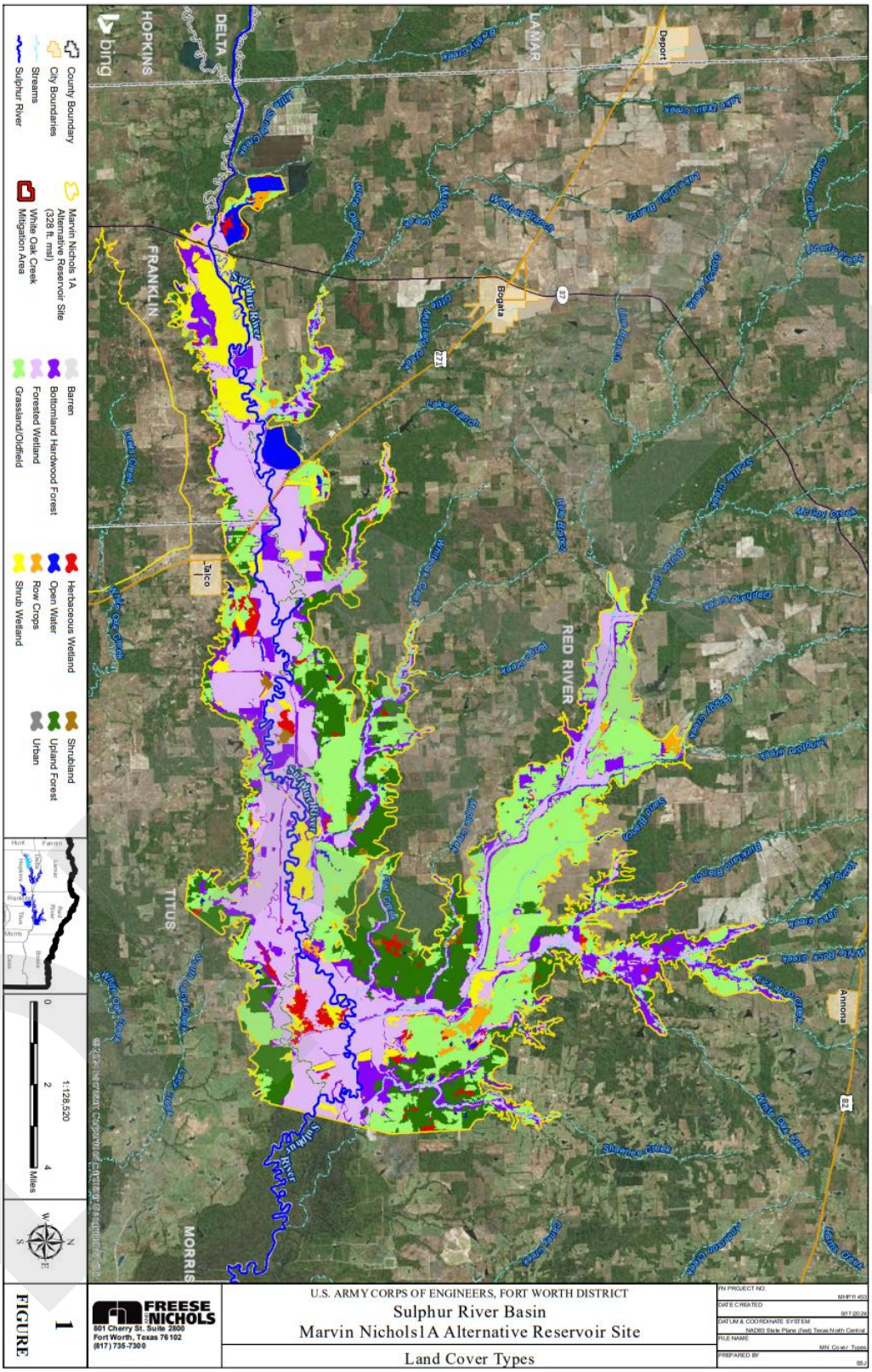
County Boundary
City Boundaries
Streams
Sulphur River
Marvin Nichols 1A Alternative Reservoir Site (328 ft. msl)
White Oak Creek Mitigation Area
Barren
Bottomland Hardwood Forest
Forested Wetland
Grassland/Oilfield
Herbaceous Wetland
Open Water
Row Crops
Shrub Wetland
Shrubland
Upland Forest
Urban
HOPKINS
DELTA
LAMAR
FRANKLIN
TITUS
MORRIS
RED RIVER
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FIGURE 1
FREESE NICHOLS
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U.S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT
Sulphur River Basin
Marvin Nichols1A Alternative Reservoir Site
Land Cover Types

Attachment J-2

Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir, April 13, 2020

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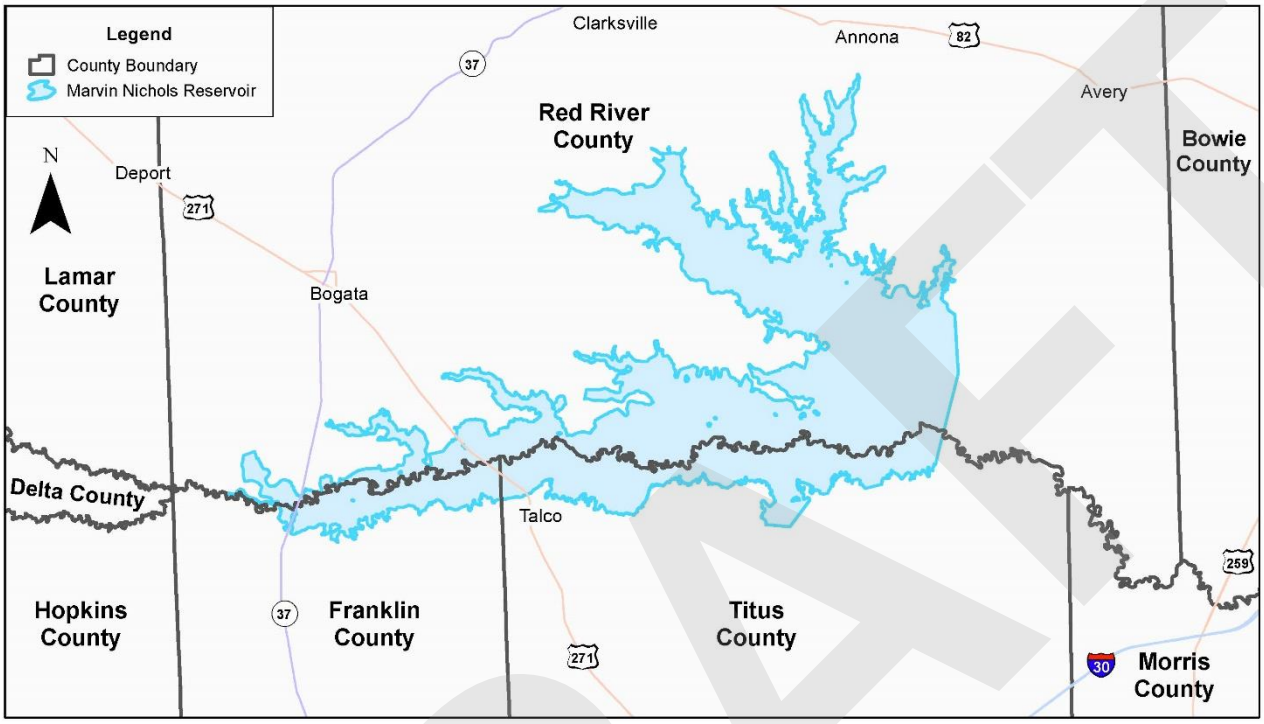

Economic, Fiscal and Developmental Impacts of the Proposed Marvin Nichols Reservoir

Prepared for:

North Texas Municipal Water District
Upper Trinity Regional Water District
Tarrant Regional Water District
Dallas Water Utilities

April 13, 2020

Clower & Associates

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Statement of Report Status: This is a draft report based on initial estimates of development and operating costs associated with the proposed Marvin Nichols Reservoir. Subsequent adjustments in total spending and budget allocations may influence the reported economic impacts.

Clower & Associates is a professional services firm providing economic and public policy analysis and advisory services to clients in the public, private, and non-profit sectors.

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Executive Summary

The following summarizes the findings of our analysis of the potential economic, fiscal, and developmental impacts that would attend the creation of the proposed Marvin Nichols Reservoir. This new Sulphur River basin lake will cover over 66,000 acres of surface area in Franklin, Red River, and Titus counties of northeast Texas, collectively referred to herein as the "Lake Counties."

Our analysis considers geographical differences in the effective economic study area at differing phases of development and operations of the reservoir. Therefore, the economic impacts of each development phase cannot be considered additive.

- Construction of the dam to impound the proposed Marvin Nichols Reservoir will cost in excess of $760 million, including work conducted to address required environmental mitigation strategies. The effective economic geography for this work includes the counties surrounding the proposed reservoir plus Bowie and Morris counties since it is expected that these counties will supply workers for the construction project. Construction of the dam and related infrastructure will boost local area economic activity by more than $1.2 billion during the multi-year project. This activity will increase gross regional product by over $545 million and support well over 8,200 person years of employment, boosting labor earnings by $396 million. A person-year of employment is one job lasting for one year and is the most accurate way to describe job impacts from projects that last more than one year.

- This proposed water resource development project also includes building a new raw water transmission pipeline from the reservoir to facilities in the Dallas-Fort Worth Metroplex. The related construction activities will occur in Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus and Wise counties. Total spending for materials, services, and the purchase of right-of-way and other construction and permitting-related activities will exceed $3 billion. Building the water transmission pipeline will temporarily boost regional economic activity by $3.8 billion, increase gross regional product by about $2.4 billion, and support almost 26,000 person-years of employment paying almost $1.7 billion in salaries, wages, and benefits.

- On-going annual expenditures for operations and maintenance of the dam will boost economic activity in nearby counties. We estimate that recurring annual maintenance and operations spending to support the Marvin Nichols Reservoir will increase local economic activity by $39.9 million per year, expressed in constant 2020 dollars, and increase local labor income by $12.6 million through the creation of 289 direct, indirect, and induced jobs.

- Operations and maintenance of the transmission pipeline will spread across a wider region and will include water district employees based in Dallas and Fort Worth. The annual economic impact of maintenance and operations spending for the pipeline and related infrastructure will boost regional economic activity by $81.1 million, increase gross regional product by $46.8 million, and support 216 direct, indirect, and induced jobs paying more than $17.7 million in salaries, wages and benefits.

- Once the lake is impounded, the surrounding counties will attract new investment and spending for commercial and residential properties, as well as spending by visitors who will enjoy lake-based recreational activities. We expect the local area to see 2,000 new residential units constructed, as well as commercial facilities such as campgrounds, lodging venues, marinas, restaurants and similar businesses. Total investment in new residential and commercial properties will boost construction spending by more than $360 million over a 20-year period. This spending will increase local economic activity by more than $497 million, enhance labor income by $168 million, and support over 4,000 person-years of employment. On average that would be about 200 jobs per year, helping to create recurring economic opportunities in Franklin, Red River, and Titus counties.

- The housing that will be built near the new reservoir will include homes for full-time residents as well as vacation homes. New residents will be contributing about $30 million in annual regional spending by year 20. In addition, based on the experience of other Texas lakes, we estimate that annual visitor spending will be about $56 million per year. Combined, this new spending will increase local economic activity by almost $107 million per year, in 2020 dollars, and support more than 1,300 permanent jobs paying about $30 million in annual labor income.

- The presence of the proposed Marvin Nichols Reservoir will enhance the region's attractiveness for business location. As a recreational amenity, the lake will enhance the quality of life features of the region, which is an increasingly important factor in business site location decisions. Industries requiring reliable local water resources will also find new reasons to locate in the area.

- In addition to temporary gains in tax revenues associated with construction and project development activities, local taxing jurisdictions in the Lake Counties will enjoy new property tax revenues from adjacent residential and commercial developments, as well as recurring tax revenue associated with household and visitor spending. By year 20, we project that Lake Counties governments will share about $3.3 million in new property tax revenues and that local school district revenues will increase by over $6.6 million annually. Local jurisdictions' recurring annual revenues from new residents and visitors will be about $6 million per year, assuming visitor-focused commercial enterprises are located within a taxing jurisdiction.

- In addition to creating substantial growth and development opportunities in northeast Texas, building the Marvin Nichols Reservoir is paramount for the Dallas-Fort Worth Metroplex to sustain its competitive economic advantage over the long term. Continued population growth, and the ability to attract new and expanding businesses in key industries, is highly dependent on reliable water supplies.

Table ES1
Temporary Local Economic Impacts of Construction Activities
(2020 dollars)

Description	Impact ($2020, Direct, Indirect, Induced)
Dam Construction Impacted counties: Bowie, Franklin, Morris, Red River, Titus.	
Total Economic Activity (economic transactions)	$ 1,223,035,000
Total Value Added (gross regional product)	$ 545,522,235
Total Labor Income (salaries, wages, benefits)	$ 396,345,000
Total Employment (person-years of employment)	8,266
Indirect State Taxes	$ 18,357,000
Indirect Local Taxes	$ 15,661,000
Pipeline & Pump Station Construction Impacted counties: Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus, Wise	
Total Economic Activity (economic transactions)	$ 3,830,050,000
Total Value Added (gross regional product)	$ 2,355,441,235
Total Labor Income (salaries, wages, benefits)	$ 1,667,439,000
Total Employment (person-years of employment)	25,921
Indirect State Taxes	$ 52,719,000
Indirect Local Taxes	$ 56,896,000
Housing and Commercial Construction Impacted counties: Franklin, Red River, Titus. Construction period: 20 years.	
Total Economic Activity (economic transactions)	$ 497,573,000
Total Value Added (gross regional product)	$ 236,857,235
Total Labor Income (salaries, wages, benefits)	$ 168,042,000
Total Employment (person-years of employment)	4,061
Indirect State Taxes	$ 7,315,000
Indirect Local Taxes	$ 8,191,000

Sources: Freese & Nichols, IMPLAN, Authors' estimates

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Table ES2
Recurring Annual Local Economic Impacts
(2020 dollars)

Description	Impact ($2020, Direct, Indirect, Induced)
Dam Operations Impacted counties: Bowie, Franklin, Morris, Red River, Titus	
Total Economic Activity (economic transactions)	$ 39,877,000
Total Value Added (gross regional product)	$ 17,945,000
Total Labor Income (salaries, wages, benefits)	$ 12,569,000
Total Employment (headcount)	289
Indirect State Taxes	$ 605,000
Indirect Local Taxes	$ 516,000
Pipeline & Pump Station Operations Impacted counties: Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise.	
Total Economic Activity (economic transactions)	$ 81,106,000
Total Value Added (gross regional product)	$ 46,802,000
Total Labor Income (salaries, wages, benefits)	$ 17,701,000
Total Employment (headcount)	216
Indirect State Taxes	$ 2,477,000
Indirect Local Taxes	$ 2,588,000
Visitor and Resident Spending Impacted counties: Franklin, Red River, Titus	
Total Annual Household Income: New Permanent Residents	$ 58,300,000
Total Annual Household Income: New Weekend Residents (portion while in local area)	$ 8,162,000
Total annual spending: recreational visitors	$ 56,090,000
Total Economic Activity (economic transactions)	$ 106,906,000
Total Value Added (gross regional product)	$ 56,608,000
Total Labor Income (salaries, wages, benefits)	$ 29,957,000
Total Employment (headcount)	1,327
Indirect State Taxes	$ 4,455,000
Indirect Local Taxes	$ 4,827,000

Sources: Freese & Nichols, IMPLAN, Authors' estimates

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ES3
Recurring Annual Fiscal Impacts of New Housing Developments and Resident and Recreational Out-of-Area Visitor Spending+

Description	Impact ($2020 Direct, Indirect, Induced)
Total Taxable Value of New Housing (permanent & weekend)	$ 408,000,000
Total Taxable Value of New Commercial Structures	$ 21,350,000
Total Increase in Taxable Land Values Adjacent and Near the Lake	$ 368,151,000
Net New Taxable Value (after removing lake & all mitigation land)	$ 539,794,000
Net# gain in county property tax revenues	$ 3,360,000
Net# gain in school district property tax revenues	$ 6.669.000
Other Local Government Revenue (taxes, fees, other)	$ 6,054,000

+ At buildout. # Net of losses to taxable property value of lake and environmental mitigation areas.
* Value will be impacted by land annexation and business location decisions.
Sources: Freese & Nichols, IMPLAN, Authors' estimates

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Section 1: Introduction

The following updates our 2003 analysis of the economic, fiscal and developmental impacts of the proposed Marvin Nichols Reservoir. The proposed reservoir will be located in Franklin, Red River, Titus counties in the Sulphur River basin of northeast Texas about 16 miles north of the city of Mount Pleasant. The project also includes a major investment in new pipeline infrastructure that will cross several counties from Red River County to north central Texas. The creation of a new large reservoir will bring temporary and recurring economic activity to the host regions from the reservoir and related pipeline, and it will also support economic development in localities near the reservoir and for communities gaining access to a new reliable source of water.

We begin our report with an overview of the regional economy in the three counties immediately surrounding the proposed reservoir including Franklin, Red River, and Titus counties, hereinafter referred to as the "Lake Counties." Section 3 describes the methodology used in this analysis. Section 4 presents the findings of our analysis of the temporary economic impacts that will attend the construction of the dam to impound the proposed reservoir, the water transmission pipeline and associated infrastructure. In addition, these temporary impacts include an assessment of the economic benefits from construction spending on new residential and commercial properties as the lake attracts households and business investment to the region. Section 5 discusses how on-going operations of the dam, pipeline, and spending by visitors and new residents around the reservoir will impact area economic activity and revenues for local taxing jurisdictions. Section 6 considers how increasing the availability of reliable water supplies will impact development opportunities in Region C that can create positive economic spillover effects across the state. Finally, Section 7 offers our conclusions.

Section 2: Economic Overview of the Host Counties Region

As noted, the proposed reservoir will cover parts of Franklin, Red River, and Titus counties in northeast Texas. According to the most recent data from the U.S. Census Bureau (five-year estimate 2014-2018), the resident population of this region is 55,684. The population has recently been growing at about 0.3 percent per year, on average, which is less than half the national annual population growth rate of 0.7 percent. The region has slightly higher proportions of the population under the age of 18 and 65+ years of age, which is reflected in the region's labor force participation rate at 59.3 percent versus the national average of 62.3 percent. Median annual household income in the Lake Counties region also trails the U.S. at $45,646 and $60,293, respectively. Unsurprisingly, the poverty rate in the Lake Counties is 2.8 percent higher than the national average of 14.1 percent. However, housing costs are comparably affordable with a median value of owner-occupied dwellings being $97,585, less than half the U.S. median, while the local cost of living is about 13 percent below the national average. Still, total area cost of living adjusted household purchasing power in this region is almost 25 percent below the national average.

While the percentage of working age adults possessing a college degree is lower than the national average, the workforce data suggests there is a good supply of workers with at least basic skills. As of the fourth quarter of 2019, total jobs in the Lake Counties region had grown to 24,743, a 4.9 percent year-over-year increase. The area unemployment rate of 4.2 percent is higher than the

national average but has dropped by one-half percent over the past year, as of January 2020.[1] Average wages of the jobs in the Lake Counties was $37,882 in 4Q2019 with a 2.1 increase over the preceding year. Table 1 below shows the ten largest industry sectors by jobs. The regional economy, particularly Franklin and Titus counties, has historically been built around Pilgrim's Pride's poultry processing operations and related agricultural and transportation activities. The region also has a concentration in transportation equipment manufacturing (trailers). Because of a somewhat older population, social services providers and residential care facilities are also important regional employers.

Table 1: Top Ten Industries by Employment, Lake Counties Region (4Q2019)

NAICS	Industry	Jobs	Avg Annual Wages	5-Year Job Change
311	Food Manufacturing	3,860	$41,498	156
611	Educational Services	2,249	$35,193	-156
621	Ambulatory Health Care Services	1,616	$44,852	255
722	Food Services and Drinking Places	1,478	$16,850	163
336	Transportation Equipment Manufacturing	1,071	$56,739	102
112	Animal Production and Aquaculture	1,006	$26,563	50
622	Hospitals	856	$49,495	302
493	Warehousing and Storage	813	$32,382	-29
624	Social Assistance	797	$14,308	500
623	Nursing and Residential Care Facilities	739	$26,487	-133

Source: JobsEQ, Chmura Economics.

Overall, due to the on-going influence of the poultry industry, and a few other key employment sectors, the Lake Counties regional economy is doing relatively well, especially for an area outside a major metropolitan market. But with population growth slowing, the counties that will host the proposed Marvin Nichols Reservoir need to attract new residents and investment. Importantly, over the past several years it has become clear that the region needs to diversify its economic base and bring in new sources of business and household spending. The addition of a major recreational amenity can help attract commercial development and households to the Lake Counties region, bringing new spending and economic opportunity for current and new area residents. In the following sections we provide estimates of the magnitude of this new regional economic activity.

Section 3: Overview of Methodology

In assessing the economic impacts of new spending related to the proposed Marvin Nichols Reservoir, we rely on data provided by Freese and Nichols (FNI), a professional engineering and planning firm, and the IMPLAN economic input-output model.

[1] At the time this report is being written we are just beginning to see the profound, and hopefully short-term, impacts the COVID-19 pandemic is having on U.S. labor markets.

The data provided to Clower and Associates is based on planning data and costs for the recommended strategy developed in accordance with state and regional water supply planning rules administered by the Texas Water Development Board (TWDB). This strategy assumes the Marvin Nichols Reservoir would have a conservation elevation of 328 feet mean sea level, a surface area of about 66,100 acres, and require approximately an equivalent number of acres for mitigation. The sponsors of the recommended project include NTMWD, TRWD and UTRWD. This project is an alternate strategy for Dallas Water Utilities (DWU) and therefore, associated transmission and operations spending by DWU related to water from the Marvin Nichols Reservoir is not included in this study. Land costs for both the reservoir and mitigation lands were obtained from the Lake Counties' tax assessors' offices.

The IMPLAN model is a planning tool that estimates how spending in a given sector of the economy flows through regional industries and households. The IMPLAN model is widely used in academic and professional research. The model provides estimates of direct, indirect and induced impacts of new spending. Direct impacts are those made by the companies, agencies or individuals who are the subject of the study, such as a water district engaging in new resource investments for planning, designing and building the dam and related infrastructure to create a new reservoir. Indirect effects capture the economic activity associated with the supply chain of the business/agency who is doing the spending. In this case, a water district hires a construction contractor who in turn buys materials and supplies, rents equipment, and makes other purchases of goods and services. The equipment rental company purchases equipment, buys parts, and hires an accounting service to prepare their tax filings. The accountant hires bookkeepers, rents office space and pays a janitorial service to clean the office, and so on. The model adjusts the spending to account for items that are not likely to be sourced from local vendors. For example, there are no petroleum refineries in the Lake Counties region, so the money used to purchase fuel for earthmovers would largely "leave" the regional economy. Induced effects are related to employees of all these firms spending a portion of their earnings in the regional economy for goods and services. The model provides estimates of total economic activity (business transactions), value added (gross regional product), employment (headcount jobs), and labor income (salaries, wages, and benefits). IMPLAN models also offer estimates of revenue that is generated by the indirect and induced economic activity for state and local jurisdictions. These revenues include sales and use taxes, property taxes, fees and other sources.

Because the IMPLAN model adjusts for spending that stays in a particular region, it is important to appropriately define the study area. Due to the varying geographic scale of the project components in creating the Marvin Nichols Reservoir, we use multiple study geographies in this research. Table 2 summarizes the geographies used for each research component. By convention, the study region will always include the location of physical activity, such as building the dam or pipeline, but can also be expanded to account for area labor markets.

Table 2: Study Geographies for Economic Modeling

Research Component	Counties	Notes
Dam Construction and Operations	Bowie, Franklin, Morris, Red River, Titus	Because of the location of the dam, we expect that contractors will draw some workers from Morris and Bowie counties.
Pipeline Construction	Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus, Wise	Reflects the pipeline's path.
Pipeline Operations	Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise	Pipeline and base location for water district employees.
New Commercial Operations & Households	Franklin, Red River, Titus	Core activities based at the new reservoir.

Source: FNI, Authors' estimates

In addition to geography, we also consider the nature of the spending. Construction spending is temporary by nature. The impacts may be large, but once the dam and pipeline are built, that spending and its related economic impacts cease. The temporary nature of construction spending requires one important change in the way we report job impacts. The construction of the dam and pipeline will take a few years to complete. Therefore, the job impacts from construction and related spending are expressed as person-years of employment, one job lasting for one year. If the employment impact were 500 person years of employment, and the project lasted for 5 years, that would suggest that the average annual employment impact would be 100 jobs. Since we do not know exactly how long the construction of the dam and pipeline will take, we present the jobs impacts as total person-years of employment for the entire project. Other key assumptions used in estimating the economic impacts of specific project components will be described in the relevant sections of this report.

Section 4: Economic Impacts of Construction Activities

Because the effective geography of impact is different across the reservoir development components and stages, we separate the discussion of our findings into three sub-sections: dam construction, pipeline construction, and the building of new commercial and residential properties near the new reservoir.

Dam Construction

Construction of the dam to impound the proposed Marvin Nichols Reservoir will cost in excess of $760 million, including work conducted to prepare required environmental mitigation areas. This spending includes project planning, design work, environmental studies and other outlays. However, to take a conservative approach in considering the potential regional impacts, we have adjusted some spending categories. For this project component we do not include budgeted contingency costs and interest costs during construction. Budgeted contingency costs, while in

practice are often actually spent, are not guaranteed spending so we do not include them in our economic impacts. Interest costs are the temporary borrowing costs incurred during construction. At the time of this analysis we do not know what entity or entities will be used for these financial services, so we do not know if any of those costs are relevant to the study area. In addition, we only include a portion of the costs to resolve conflicts and acquire land for the reservoir and mitigation area. Of the costs allocated for resolving conflicts, we assume that no more than 10 percent of these expected expenditures will be spent in the study area. Finally, our assessment of the economic impacts of construction spending include land acquisition costs. Based on data provided by FNI, we allocated land acquisition costs between the dam and pipeline construction projects. We assumed that no more than 50 percent of the monies paid for land acquisition would go to local landowners. We then modeled the reduced land acquisition spending as income to area households that would be spent in the regional economy. Combined, it is likely our exclusion of several categories of expenditure will result in estimates understating the total potential economic impact associated with building the proposed dam and related infrastructure.

Construction of the dam and related infrastructure will boost local area economic activity by more than $1.2 billion during this multi-year project (see Table 3). This activity will increase gross regional product by over $545 million and support well over 8,200 person years of employment, boosting labor earnings by $396 million. Area taxing jurisdictions will share more than $15.6 million in new revenues due to building the proposed dam and related economic activities.

Table 3: Temporary Local Economic Impacts of Dam Construction

Description	Impact ($2020 Direct, Indirect, Induced)
Dam Construction Impacted counties: Bowie, Franklin, Morris, Red River, Titus.	
Total Economic Activity (economic transactions)	$ 1,223,035,000
Total Value Added (gross regional product)	$ 545,522,235
Total Labor Income (salaries, wages, benefits)	$ 396,345,000
Total Employment (person-years of employment)	8,266
Indirect State Taxes	$ 18,357,000
Indirect Local Taxes	$ 15,661,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Pipeline Construction

This proposed water resource development project also includes building a new transmission pipeline from the reservoir to facilities in the Dallas-Fort Worth region. The related construction activities will occur in Collin, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Titus and Wise counties, which serve as the economic region for this component of our analysis. Total spending for materials, services, and the purchase of right-of-way, combined with other construction and permitting-related spending, will exceed $3 billion. As noted above, we do not include more than 10 percent of projected conflict costs, any of the budgeted financing or contingency costs, and we assume that only half of land and right-of-way acquisition expenses will go to study area households.

Building the water transmission pipeline will temporarily boost regional economic activity by $3.8 billion, increase gross regional product by about $2.4 billion, and support almost 26,000 person-years of employment paying almost $1.7 billion in salaries, wages, and benefits (see Table 4). Local government entities in the study area, combined, will receive an estimated $56.9 million in new revenues from taxes, fees and other government revenue sources.

Table 4: Temporary Local Economic Impacts of Pipeline Construction

Description	Impact ($2020 Direct, Indirect, Induced)
Pipeline & Pump Station Construction Impacted counties: Collin, Delta, Denton, Fannin, Red River, Wise	
Total Economic Activity (economic transactions)	$ 3,830,050,000
Total Value Added (gross regional product)	$ 2,355,441,235
Total Labor Income (salaries, wages, benefits)	$ 1,667,439,000
Total Employment (person-years of employment)	25,921
Indirect State Taxes	$ 52,719,000
Indirect Local Taxes	$ 56,896,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

New Commercial and Residential Construction

Once the reservoir is impounded and begins to fill, we expect substantial new residential and commercial development to be attracted to the lake. In developing our estimates of total potential housing and commercial property development we referenced multiple studies examining the impacts of reservoirs on their local communities. However, we focused our attention on a recent study[2] that examined the development of properties near several lakes in the "upper highland" area of central Texas. These lakes are Colorado River fed reservoirs including Buchannan, Inks, LBJ, Marble Falls, and Travis. Recognizing there are notable socio-economic and population density variances across these reservoirs, we focused our attention of those lakes that are further away from population centers. We also noted that these reservoirs are much smaller than the proposed Marvin Nichols Reservoir, but we chose not to simply scale-up the development impacts of the Upper Highlands Lakes based on relative surface area. We did use this study to inform our estimates of the value of new commercial and residential properties that we then tailored to the MNR study area.

Importantly, we do not attempt to forecast the specific timing of new commercial and residential property development in the Lake Counties. There are many environmental, socio-economic and regulatory factors that will influence the pace of new development. These include rainfall levels after impoundment, overall economic conditions, the permitting and development of supporting infrastructure, and the strategies employed by local government to plan and manage this potential growth. For purposes of this analysis, we have assumed development will occur over a 20-year

[2] The study can be accessed at: https://www.co.llano.tx.us/upload/page/0978/docs/Economic%20Impact%20Of%20The%20Upper%20Highland%20Lakes%20Of%20The%20Colorado%20River%20-%20Fall%202012%20(2).pdf

period after reservoir impoundment. We feel we have been conservative in both this timeline and our projections of development potential. We took this conservative approach specifically to show that even with careful management that keeps the pace of development in line with local government capacity to deliver services, there is tremendous economic potential for the Lake Counties region. Moreover, our assessment does not include the value of growth that will likely happen after this initial development period.

We expect the local area will attract 2,000 new residential units as well as commercial facilities such as campgrounds, lodging venues, marinas, restaurants and similar businesses. This new development activity will likely show up as a surge of initial investment, followed by market-driven growth over a twenty-plus year time horizon. The housing units will have an average value, not including land, of about $170,000 per unit, suggesting the Lake Counties will remain relatively affordable compared to the state's major metropolitan areas. Total investment in new residential and commercial properties will boost construction spending by more than $360 million over this extended time period. This spending will increase local economic activity by more than $497 million, enhance labor income by $168 million, and support over 4,000 person-years of employment (see Table 5). On average that would be about 200 jobs per year, creating recurring economic opportunities in Fannin, Red River, and Titus counties. New revenues to local tax jurisdictions related specifically to these construction activities will be $8.1 million.

Table 5: Temporary Local Economic Impacts of New Commercial and Residential Property Construction

Description	Impact ($2020 Direct, Indirect, Induced)
Housing and Commercial Construction Impacted counties: Franklin, Red River, Titus. Construction period: 20 years.	
Total Economic Activity (economic transactions)	$ 497,573,000
Total Value Added (gross regional product)	$ 236,857,235
Total Labor Income (salaries, wages, benefits)	$ 168,042,000
Total Employment (person years of employment)	4,061
Indirect State Taxes	$ 7,315,000
Indirect Local Taxes	$ 8,191,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Section 5: Recurring Economic Impacts of Marvin Nichols Reservoir

Recurring economic impacts of the proposed Marvin Nichols Reservoir include four separate types of spending: operations and maintenance of the dam, operations of the water transmission pipeline, household spending by new permanent and weekend residents, and visitor spending by non-residents. As noted previously, the operations of the dam, pipeline and new commercial and household spending will impact different regions.

Dam Operations

As with the construction of the dam, we expect employment and supplier opportunities for dam maintenance and operations to be concentrated in Bowie, Franklin, Morris, Red River and Titus counties. We estimate that recurring annual maintenance and operations spending to support the Marvin Nichols Reservoir will increase local economic activity by $39.9 million per year, expressed in constant 2020 dollars, and boost local labor income by $12.6 million through the creation of 289 direct, indirect, and induced jobs (see Table 6). Tax revenues for local governments will total $516,000 per year.

Table 6: Recurring Annual Local Economic Impacts

Description	Impact ($2020 Direct, Indirect, Induced)
Dam Operations Impacted counties: Bowie, Franklin, Morris, Red River, Titus	
Total Economic Activity (economic transactions)	$ 39,877,000
Total Value Added (gross regional product)	$ 17,945,000
Total Labor Income (salaries, wages, benefits)	$ 12,569,000
Total Employment (headcount) (190 direct jobs)	289
Indirect State Taxes	$ 605,000
Indirect Local Taxes	$ 516,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Pipeline Operations

Operations and maintenance expenditures for the pipeline will spread across the counties where the infrastructure is located and will also include Dallas and Tarrant counties, since some of the operations and maintenance work will be performed by employees based at headquarters of the North Texas Municipal Water District and the Tarrant Regional Water District. The annual economic impacts of maintenance and operations spending include boosting regional economic activity by $81.1 million, increasing gross regional product by $46.8 million, and supporting 216 direct, indirect, and induced jobs that will pay more than $17.7 million in salaries, wages and benefits (see Table 7). New tax and other revenues to local jurisdictions will increase by $2.6 million per year.

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Table 7: Recurring Annual Local Economic Impacts

Description	Impact ($2020 Direct, Indirect, Induced)
Pipeline & Pump Station Operations Impacted counties: Collin, Dallas, Delta, Denton, Fannin, Franklin, Hopkins, Hunt, Red River, Tarrant, Titus, Wise	
Total Economic Activity (economic transactions)	$ 81,106,000
Total Value Added (gross regional product)	$ 46,802,000
Total Labor Income (salaries, wages, benefits)	$ 17,701,000
Total Employment (headcount) (90 direct jobs)	216
Indirect State Taxes	$ 2,477,000
Indirect Local Taxes	$ 2,588,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Household and Visitor Spending

For this component of our analysis we focus on the economic and tax revenue impacts that will occur in the Lake Counties of Franklin, Red River, and Titus. In this preliminary assessment we do not attempt to forecast specific locations for the projected commercial and residential property development, which may prove to be unrelated to the amount of lake shoreline in each county.

The economic impact of new residents is based on household spending in the Lake Counties region. Our key assumptions in this analysis address average household income, the proportion of new households that are permanent versus weekend/vacation residents, and the number of days in residence for weekender households. We have assumed the average household income for new residents will be a little over $58,000 per year, which is higher than that of current residents. Our estimate is based on the level of income needed to afford the type of housing that will likely be built around the lake, acknowledging that some new residents will be retirees who have lower incomes but higher levels of assets. Some owners of vacation properties will have higher income levels but will not have proportionately higher levels of local spending. To illustrate this last point, we would assume that weekend/vacation residents would bring in some retail items like groceries with them, suggesting their proportional local household spending will be lower than permanent residents. We assumed that half of the 2,000 new households added over a 20-year period will be weekend/vacation residents who will spend an average of 51 days per year in-residence.

We modeled the economic impacts of new household spending at the projected 20-year build-out using the household spending module of the IMPLAN model. The model adjusts household consumption for total income, recognizing the relative wealth affects in spending patterns.

Our estimates of visitor spending are further informed by the previously referenced study of the economic impacts of the Upper Highlands lakes in central Texas and data from the Texas Governor's Office of Economic Development and Tourism. Using hotel receipts data from counties with a reservoir in the Upper Highlands, and adjusting for overall development density,

we estimated that at full development spending by visitors on lodging near the Marvin Nichols Reservoir will approach $20 million per year. This includes both hotel properties and receipts from vacation homes and AirBNB-type rentals. Using overall tourism spending data, we estimated other categories of visitor outlays including food and beverages, retail purchases, and local travel expenditures, which we modeled as purchases at gas stations for automobiles and boats. Our estimates suggest that at full development, visitors will bring about $56 million in new spending to the Lake Counties region.

When combined with household spending by new permanent and weekend residents, recurring annual economic activity in the Lake Counties region will increase by almost $107 million, boosting gross regional product by $56.6 million, generating almost $30 million in new labor income, and supporting over 1,300 jobs in the local economy (see Table 8). Taxes on the indirect and induced economic activity will add $4.8 million to annual revenues for local taxing jurisdictions.

Table 8: Recurring Annual Local Economic Impacts

Description	Impact ($2020, Direct, Indirect, Induced)
Visitor and Resident Spending Impacted counties: Franklin, Red River, Titus	
Total Annual Household Income: New Permanent Residents	$ 58,300,000
Total Annual Household Income: New Weekend Residents	$ 8,162,000
Total annual spending: recreational visitors	$ 56,090,000
Total Economic Activity (economic transactions)	$ 106,906,000
Total Value Added (gross regional product)	$ 56,608,000
Total Labor Income (salaries, wages, benefits)	$ 29,957,000
Total Employment (headcount)	1,327
Indirect State Taxes	$ 4,455,000
Indirect Local Taxes	$ 4,827,000

Sources: Freese & Nichols, IMPLAN, authors' estimates.

Recurring Revenues for Local Tax Jurisdictions

The combination of new property development, resident household spending, and visitor spending will have an impact on direct tax receipts in addition to the taxes paid on economic activities described in previous sections of this report. What is more, land values, especially for those properties located adjacent to the new reservoir, should increase significantly based on the experiences of other Texas counties not located immediately adjacent to a major metropolitan area. (For example, we did not consider land values around Lake Travis to be relevant to this analysis.) We estimate that the construction of 2,000 new residential units, along with higher land values on residential-sized lots, will increase total taxable values of residential properties in the Lake Counties by $408 million by year 20. In addition, larger properties and those not immediately converted to residential lots will see a substantial increase in value when they become waterfront, water view, or near waterfront properties totaling $368 million. Our estimates include an allowance

for homestead exemptions for permanent residents. New taxable commercial property value is estimated to be $21 million.

An important consideration in assessing the increase in area property taxes is accounting for the loss of value associated with the lake's footprint and the required environmental mitigation area. Using data gathered by FNI, and assuming that all the mitigated land will be in the Lake Counties, the creation of Marvin Nichols Reservoir will remove about $257 million in property values. This assumption likely overstates the loss of property value in the Lake Counties area since the final mitigation area may be smaller and located at least partially outside the area. Still, even if we maximize the assumed mitigation related property losses and use conservative projections of development, the net gain in taxable property values at year 20 will be almost $540 million (see Table 9). In assessing the tax revenues that will be generated, we have used an average current tax rate for jurisdictions in the Lake Counties area. We again caution that, in this preliminary assessment, we do not know exactly where the new development will be located within the study area. Based on these valuation assumptions, we expect the Lake Counties to share an additional $3.4 million in annual property tax revenues by year 20. Area school districts will see about $6.7 million in new property taxes each year.

Visitor and household spending will also generate new sales tax revenues in the Lake Counties region. We assume that as commercial and residential development occurs, local jurisdictions will look to expand their effective taxing jurisdictions and/or the counties will use their existing or new authority to tax hotel revenues. Adjusting visitor spending for sales that will likely be taxable, we estimate that annual local sales and hotel occupancy taxes will increase by $1.2 million. Overall, total tax revenues associated with recurring household and visitor spending, in addition to direct property tax payments, will reach $6 million per year as lake properties develop.

Table 9: Recurring Annual Fiscal Impacts

Description	Impact ($2020 Direct, Indirect, Induced)
Total Taxable Value of New Housing (permanent & weekend)	$ 408,000,000
Total Taxable Value of New Commercial Structures	$ 21,350,000
Total Increase in Taxable Land Values Adjacent and Near the Lake	$ 368,151,000
Net New Taxable Value (after removing lake & all mitigation land)	$ 539,794,000
Net[#] gain in county property tax revenues	$ 3,360,000
Net[#] gain in school district property tax revenues	$ 6,669,000
Other Local Government Revenue (taxes, fees, other)	$ 6,054,000

+ At 20 years. # Net of lake and environmental mitigation areas. Sources: FNI, IMPLAN, Authors' estimates

Section 6: The Developmental Impacts of the Marvin Nichols Reservoir on Region C and the Consequences of a "No Build" Scenario

In this analysis we examine how increasing the effective water supply by building the Marvin Nichols Reservoir will sustain economic growth and opportunities in North Central Texas and especially in the Dallas-Fort Worth area, a major driver of overall economic growth and resiliency in Texas. In assessing these impacts, it is essential to review how the planning and investment for water resources has allowed Texas to emerge over the past 40 years as a premier state attracting new residents and business investment.

Water and regional economic development

It almost goes without saying that access to clean water is an economic driver. Conversely, scarce water, either in terms of quantity or quality, will become a key limiting factor in regional economic growth. Since North Texas does not have any natural lakes of significant size, reservoirs are constructed to control flooding and to collect and store surface water to meet regional water supply needs. Without question, the huge economic success of the North Texas region over the past 70 years would not have occurred absent access to abundant, available and affordable water supplies for residential and industrial use—accomplished by building an extensive network of reservoirs. The proposed Marvin Nichols Reservoir Project is but an extension of that function.

Gone to Texas

Texas, now America's second largest state with a population more than 29 million, has been America's economic bellwether for the past several decades. No other large state comes close in terms of population growth, job creation, and business formation. Net migration to Texas has totaled nearly 2 million over the past decade and shows no signs of abating. Moreover, for years Texas has ranked first in the nation for corporate relocations and expansions.

According to the U.S. Census Bureau, between July 2018 and July 2019, Texas had the largest numeric growth among the 50 states, adding 367,215 people. By contrast, California—with a population about one-third larger than Texas—added only 50,635. Put differently, **Texas is currently growing seven times faster than California.** Texas grew both from more births than deaths and from a large net gain in movers from within and outside the United States. In percentage terms, Texas' population grew 1.3 percent last year, nearly twice the national rate of 0.7 percent. California's growth rate has been falling for nearly a decade and just equaled the national average last year.

The Census Bureau also recently reported that of the nation's 15 fastest-growing counties in terms of numeric population change, eight are in Texas while California only recorded one. What is more, three of the **top five fastest-growing cities** in numeric terms are found in Texas—San Antonio**, Dallas and Fort Worth**. Indeed, over the past decade Dallas-Fort Worth has added 1.2 million residents, **the most of any U.S. metropolitan area.** Seven of the 15 fastest-growing cities

in percentage terms last year are here in Texas. **Last year, Frisco, Texas grew at 8.2 percent, 11 times faster than the national average.**

Unlike in many other states, net-migration into Texas has accounted for a large share of the state's population growth over the past decade. According to the U.S. Bureau of the Census, net-migration to the state has averaged about 200,000 annually over the past decade. California sends more migrants to Texas than to any other state. Of total net out-migration of 521,000 between 2012 and 2016, more than 114,000 Californians relocated to Texas. Cities that had once been popular destinations for young people—in particular, New York, Los Angeles and Chicago—are now losing residents in large numbers. Last year alone, New York City registered a loss of more than 60,000 people, the biggest population decline of any American city. Many of those "out-migrants" chose to relocate to the Dallas area.

Another indicator of Texas' magnetic pull is the inflow of U-Haul vehicles. In 2018, for the third year in a row, Texas led the nation in "net inflow" of trucks and trailers. Locations in Houston, **Dallas-Fort Worth** and Austin saw the **largest influxes of U-Haul traffic**. Illinois, California and Michigan saw the largest "net outflow" of U-Hauls. Most migrants to Texas locate in the state's large metropolitan areas. In 2017, according to an analysis of Census data by Bloomberg, **Dallas-Fort Worth led the nation in net in-migration, with 246 more people moving into the region than out every day.**

Migration to Texas is partly due to a record number of business relocations from other states. Toyota's move from Torrance, California to Plano and PGA America's relocation from Palm Beach Gardens, Florida to Frisco have garnered the most attention. But a steady stream of small and middle-sized companies to the state has also spurred the in-migration of people. According to a recent analysis by Spectrum Location Solutions, Texas is the number one destination for California companies relocating to other states. In 2016 alone, 299 of these departures landed in Texas. The Dallas Regional Chamber reports that 43 of the 123 corporate headquarters that have relocated to Dallas-Fort Worth since 2010 came from California.

Employment trends

Job gains in Texas have been nothing short of remarkable in recent years. Over the past decade, total state employment has jumped by more than two million, or 18.3 percent, compared to a 5.6 percent increase for the nation. No other large state comes close. Indeed, Pennsylvania, Illinois and Ohio actually lost jobs over the decade. Incredibly***, one of every four U.S. jobs created over the past ten years has been in Texas.***

Demographic and employment changes in North Central Texas

Within the state of Texas, Dallas-Fort Worth has been the economic superstar over the past decade. As mentioned above, the North Texas region attracts the largest numbers of immigrants and the lion's share of corporate relocations. This population growth is occurring in cities that touch all three of the region's water districts sponsoring the Marvin Nichols Reservoir Project, North Texas

Municipal Water District (NTMWD), Tarrant Regional Water District (TRWD), and the Upper Trinity Regional Water District (UTRWD) plus Dallas Water Utilities (DWU).

As indicated in Tables 10 & 11, the North Central Texas Region (as defined by the North Central Texas Council of Governments) added about 830,000 residents between 2010 and 2019 for a population gain of 14 percent, or a 1.5 percent compounded average. But many of the cities grew at a much faster pace. Frisco and McKinney were the fastest-growing large cities served by NTMWD, adding 57 percent and 44 percent to their populations over the nine-year period. Plano, the largest municipality in the service area, grew more slowly than the region—mainly because the city is already close to its build-out potential. Frisco is the fastest growing city in America among places with a population of 50,000 or more. Over the past two years, the city's population grew by more than 22,000, or 14 percent. That's a growth rate 11 times faster than the national average. Some of the smaller cities grew at astronomical rates between 2010 and 2019. Melissa and Prosper posted triple-digit percentage gains while Princeton, Forney, and Little Elm grew four to five times faster than the region.

TABLE 10: Fastest Growing North Texas Cities by Count: 2010-2019

	2010	2019	Change	% Change	CAGR*
Fort Worth	741,206	848,860	107,654	14.5%	1.5%
Dallas	1,197,816	1,301,970	104,154	8.7%	0.9%
Frisco	116,989	183,560	66,571	56.9%	5.1%
McKinney	131,117	188,500	57,383	43.8%	4.1%
Plano	259,841	284,070	24,229	9.3%	1.0%
Irving	216,290	240,420	24,130	11.2%	1.2%
Denton	113,383	134,460	21,077	18.6%	1.9%
Arlington	365,438	386,180	20,742	5.7%	0.6%
Little Elm	25,898	44,530	18,632	71.9%	6.2%
Carrollton	119,097	136,170	17,073	14.3%	1.5%
Grand Prairie	175,396	191,720	16,324	9.3%	1.0%
Prosper	9,423	25,630	16,207	172.0%	11.8%
Allen	84,246	99,020	14,774	17.5%	1.8%
Richardson	99,223	113,710	14,487	14.6%	1.5%
Midlothian	18,037	32,100	14,063	78.0%	6.6%
N. Central Texas Region	5,927,539	6,755,320	827,781	14.0%	1.5%

* Compounded Annual Growth Rate Source: North Central Texas Council of Governments

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TABLE 11: Fasting Growing North Central Texas Cities by Percent Change: 2010-2019

	2010	2019	Change	% Chng	CAGR
Celina	6,028	17,680	11,652	193.3%	12.7%
Prosper	9,423	25,630	16,207	172.0%	11.8%
McLendon-Chisholm	1,373	3,470	2,097	152.7%	10.9%
Northlake	1,724	4,140	2,416	140.1%	10.2%
Fate	6,434	14,940	8,506	132.2%	9.8%
Melissa	4,695	10,820	6,125	130.5%	9.7%
Annetta	1,288	2,780	1,492	115.8%	8.9%
Josephine	812	1,550	738	90.9%	7.4%
Princeton	6,807	12,680	5,873	86.3%	7.2%
Anna	8,249	15,010	6,761	82.0%	6.9%
Midlothian	18,037	32,100	14,063	78.0%	6.6%
Aubrey	2,595	4,530	1,935	74.6%	6.4%
Lavon	2,219	3,860	1,641	74.0%	6.3%
Little Elm	25,898	44,530	18,632	71.9%	6.2%
Ponder	1,395	2,390	995	71.3%	6.2%

* Compounded Annual Growth Rate Source: North Central Texas Council of Governments

Employment and business development trends in North Central Texas

As discussed above, Texas led the nation in job growth last year, adding 284,414 positions (2.1 percent) and bringing the state's unemployment rate down to 3.5 percent. For Dallas-Fort Worth, employment jumped by 109,647 (2.9 percent) and the unemployment rate fell to 2.9 percent. Put differently, **with about 24 percent of Texas' population, 38.6 percent of all the job growth in the state occurred in North Central Texas**. Office jobs in the Dallas-Fort Worth Metroplex grew 5.7 percent in 2019, more than in the tech markets of San Francisco and Seattle, and the region is forecast by CBRE to lead again in 2020.

Job growth is being seen in core cities and suburban markets. For example, Frisco has been adding jobs at a rapid clip as many businesses and corporate headquarters have relocated to the city. According to the U.S. Bureau of Labor Statistics, just in the past eight years Frisco's employment jumped from 64,000 to almost 93,000. That's about two-thirds the number of jobs located in downtown Dallas.

The entire North Texas region is becoming one of the most dynamic data center markets in the country. For instance, Compass Datacenters LLC maintains a huge processing facility in Allen. According to Cushman & Wakefield**, Dallas-Fort Worth is now the third-largest data center market in the world** with more than 80 megawatts of capacity currently under construction in North Texas. **Importantly, the availability of reliable water supplies is a key site location consideration in the placement of data centers**.

Logistics—the movement of people and products—is one of the largest industries in the North Central Texas region. In fact, the Dallas-Fort Worth area is the largest transportation and distribution center between the two coasts and employs several hundred thousand people.

Defense-related manufacturing, food processing, and the health care/hospital industry also rank among the largest employers in the region. **Both manufacturing and food processing require huge amounts of water.**

Corporate relocations continue apace in North Texas, with Uber and Charles Schwab perhaps the most notable in recent months. Boeing, Samsung, Fannie Mae, JP Morgan and USAA have recently undertaken expansions or relocations to Plano. Last year, PGA of American and Keurig Dr Pepper announced relocations of their corporate headquarters to Frisco. Frisco is also home to The Star, the huge retail, residential, office, hotel and sports complex developed by the Dallas Cowboys organization that has become a major employment center.

Other indicators point to a robust North Texas economy. Last year, Dallas-Fort Worth was the top homebuilding market in the country with 33,000 new homes. North Texas also leads the nation in overall home sales, up 21 percent over the past year. According to RealPage, North Texas is the leading rental construction market in the country with 43,000 units permitted to date for 2020. At $22.5 billion, Dallas-Fort Worth ranked second nationwide in total construction last year after New York City while the region attracted nearly $10.5 billion in commercial investments.

What may happen to the North Texas economy if Marvin Nichols is not built?

The North Texas region, including most of the communities served by the North Texas Municipal Water District, has witnessed an unprecedented economic boom over the past decade with record levels of population growth and job creation. The Dallas-Fort Worth area also receives more migrants from other states than any other metropolitan region in the U.S. Recent forecasts from the North Central Texas Council of Governments see this growth continuing for at least the next several decades.

By 2040, the region's population is projected to grow to 10.7 million people, or 58 percent. That's an annual average growth rate of almost 3 percent. Employment, currently at 3.9 million, is expected to reach 6.7 million by 2040, a 72 percent increase from today's levels. Because economic development tends to compound where it is already occurring, a sizeable share of Dallas-Fort Worth's population and employment growth will likely occur in the NTMWD, TRWD and UTRWD service areas. However, realizing this growth potential requires new water resources to be brought on-line. Other water development projects, including the new Bois d'Arc Lake and the Integrated Pipeline will help but is clearly not enough.

Another way to consider the potential effects of *not building* the proposed Marvin Nichols Reservoir is to look at the potential contributions of industries that are particularly reliant on water availability. We previously mentioned data centers and food processing as key examples of these kind of industries. Using data available in the IMPLAN model we can identify the industries in the Dallas-Fort Worth region who are especially sensitive to water availability based on the value of their consumption of this resource. Aside from electric power generation and the rapidly growing higher education sector, examples of industries that have notable water requirements include Pharmaceutical Manufacturing, Aerospace Products and Parts Manufacturing, and Semi-

Conductor Manufacturing. In the services sector we include hotels, restaurants and hospitals. Table 12 shows current employment and projected new jobs for these industries in the Dallas-Fort Worth Metropolitan Area. These are some of the industries Texas and Dallas-Fort Worth need to support in order to remain competitive in an increasingly globalized economy. In rough terms, if a lack of available water supply were to disrupt the projected job growth in just the six industries shown in Table 12, the region would lose $19 billion in annual economic activity, expressed in 2020 dollars, and more than 136,000 total jobs.

Table 12: Selected Water Dependent Industries: Dallas-Fort Worth Metropolitan Area

Industry	4Q2019 Jobs	Projected 10-Year Growth
Pharmaceutical Manufacturing	4,580	460
Semiconductors and Related Devices Manufacturing	21,982	456
Aerospace Products & Parts Manufacturing	35,534	350
Hospitals	106,344	14,714
Restaurants	284,486	66,831
Hotels	33,747	3,565

Source: IMPLAN, JobsEQ,

Section 7: Conclusions

The construction of the proposed Marvin Nichols Reservoir is an important component of the state's overall resource management plan **to support economic development across Texas**. The spending for planning and development of the reservoir will boost economic activity in northeast Texas, along the proposed pipeline route, and in Region C creating thousands of job opportunities for local workers. Importantly, the operations of the dam and the creation of a high-quality recreational amenity will bring well over $100 million in new economic activity to the host region and support more than 1,300 direct, indirect and induced jobs. This will help diversify the economic base of the Lake Counties, thereby enhancing regional economic resiliency. Local taxing jurisdictions will receive millions in temporary and recurring revenues, especially as property development occurs around the lake over the next 20 years.

From a broader economic development perspective, bringing additional water resources online is a necessary condition for Texas, and especially North Texas, to remain competitive in the quest for jobs, new residents, and investment. Marvin Nichols, and other water projects planned for the region, must come online in order to support the rapid population and employment growth projected for the next several decades. **In a "no build" scenario for the Marvin Nichols Reservoir, economic development in the North Texas region will be constrained, especially in the fast-growing communities currently served by participating Region C water providers.**

Appendix K

Key Water Quality Parameters

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APPENDIX K SELECTION OF KEY WATER QUALITY PARAMETERS AND BASELINE WATER QUALITY CONDITIONS

SECTION OUTLINE	
Section K.1	Key Water Quality Parameters Selection
Section K.2	Baseline Water Quality Conditions
Section K.3	Water Quality Data Summary

K.1 Key Water Quality Parameters Selection

Regional Water Planning Groups are charged with selecting key water quality parameters that are important to water users in the region and assessing impacts of water management strategies on these parameters. This appendix describes the parameter selection process and establishes baseline water quality conditions for the selected parameters.

To provide some basis for selection of parameters and for quantitative comparisons between different water bodies within the region, regulatory standards and screening levels are referenced throughout this memorandum. However, it is not the intent of this memorandum to evaluate regulatory compliance of any water body within the region. These regulatory standards are only used as "yardsticks" for relative comparisons of water quality within the region.

K.1.1 Process of Selecting Key Water Quality Parameters

Selection of key water quality parameters for surface water and groundwater involved a two-stage process. The first stage included a compilation of potential water quality parameters from various sources. These sources are described below:

a) Parameters regulated by the Texas Commission on Environmental Quality (TCEQ) in the Texas Surface Water Quality Standards (TSWQS);

b) Parameters considered for the TCEQ Water Quality Inventory in evaluation of whether water body uses are supported, not supported, or have water quality concerns. The designated water body uses included in the Water Quality Inventory are:

   i. Aquatic life use
   ii. Contact recreation use
   iii. General use
   iv. Fish consumption use
   v. Public water supply use;

c) Parameters that may impact suitability of water for irrigation; and

d) Parameters that may impact treatability of water for municipal or industrial supply.

Categories a and b above were selected to represent environmental water quality parameters, and Categories c and d were selected to be representative of water quality as related to irrigation uses and treatability for municipal or industrial supplies.

For the second stage of the process, key water quality parameters were selected from this compiled list of potential parameters based on general guidelines which were originally established in Appendix P of the *2006 Region C Plan*. The general guidelines used to further develop a manageable and meaningful list of key water quality parameters are described below.

a) Selected parameters should be representative of water quality conditions that may be impacted on a regional scale and that are likely to be impacted by multiple water management strategies within the region. Water quality issues associated with localized conditions (such as elevated levels of a toxic material within one water body) will be addressed as necessary within the environmental impact evaluations of the individual water management strategies for each water user group. In addition, water quality parameters that could impact specific advanced treatment processes (e.g., membranes or ozone) will be addressed as necessary during pilot testing and/or preliminary design.

b) Sufficient data must be available for a parameter to include it as a key water quality parameter. If meaningful statistical summaries cannot be carried out on the parameter, it should not be designated as a key water quality parameter.

K.1.2 Selection of Parameters for the 2026 Plan

For this planning cycle, potential key water quality parameters were assessed for the Region C planning area according to the process described above. The only new parameters considered for the *2026 Region C Plan* are Per- and Polyfluoroalkyl Substances (PFAS). The U.S. Environmental Protection Agency (USEPA) issued a national, legally enforceable drinking water standard for several PFAS compounds in April 2024. However, there is a potential revision that may modify which parameters are subject to regulation and postpone implementation until 2031. These standards do not directly apply to raw water, and because of the lack of publicly available data and the timeline of the implementation of the regulations, no PFAS were included as key water quality parameters in this cycle of planning.

Following the process used in prior planning cycles yielded the same candidate key water quality parameters for surface water as those used in the *2021 Region C Water Plan*.

Similarly, following the process in previous planning cycles, key water quality parameters were identified for groundwater based on an evaluation of the parameters regulated by drinking water standards and those known to be potential problems for groundwater in Region C.

The following key water quality parameters were selected to assess impacts from water management strategies for the *2026 Region C Water Plan*:

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- Surface Water:
  - Ammonia-nitrogen
  - Nitrate-nitrogen
  - Total phosphorous
  - Chlorophyll-a
  - Total dissolved solids (TDS)
  - Chloride
  - Sulfate
- Groundwater
  - TDS
  - Chloride
  - Sulfate

K.2 Baseline Water Quality Conditions

Baseline water quality conditions were evaluated using data obtained from the Texas Surface Water Quality Monitoring Database. Water quality data for reservoirs and streams located within Region C were evaluated, as well as sources located outside of Region C that are currently being considered for use or are in use as raw water sources for the region. Bois D'Arc Lake was not included in the evaluation. At the time of plan development, there were no water quality data available for the lake from the Texas Surface Water Quality Monitoring Database due to it being only recently constructed and filled.

Statistical analyses were conducted to determine the number of data points (count), mean, median, 75th percentile, maximum, and minimum for each water body assessed. Data from 1998 through 2025 for surface water and from 1993 to 2023 for groundwater were assessed for each parameter. Statistical summaries for each surface water parameter are presented in **Section K.3** of this document.

To further demonstrate baseline water quality conditions in Region C, each water body was placed in categories based on parameter concentration. The lowest bin (Bin 1) constitutes levels that are less than regulatory or literature levels of concern. The second bin (Bin 2) represents parameter levels that are approaching regulatory standards or levels of concern (nominally 80 percent of regulated standard). The highest bin (Bin 3) represents parameter levels that exceed the stated regulatory standards, levels of concern, or screening criteria. Screening levels for nutrient parameters were based on the TCEQ *2024 Guidance for Assessing and Reporting Surface Water Quality in Texas*. For surface water assessment of TDS, chloride, and sulfate, screening levels were based on National Secondary Drinking Water Standards. For the groundwater TDS, chloride and sulfate assessment, screening limits were based on the State of Texas Secondary Drinking Water Standard.

It is important to note that placement in bins 2 or 3 does not necessarily indicate a violation of a water quality standard or the need for additional treatment levels. As mentioned earlier, the data presented here are summarized over the entire surface water segment (at all depths and all

stations located in the main water body) or the entire aquifer/county area. In many cases, regulatory application of the standard or level of concern is performed on a different group of data than are summarized here (e.g., for lake mixed layer samples only). The bin designations, while derived from regulatory standards, are only provided as a "yardstick" for assessing water quality conditions and as a basis for comparisons between water bodies. The bin designations are not to be used to evaluate whether conditions within a given waterbody are in compliance with regulatory standards. **Table K.1** and **Table K.2** demonstrate baseline surface water and groundwater quality bins by parameter.

TABLE K.1 DEFINITION OF BASELINE SURFACE WATER QUALITY BINS BY PARAMETER

PARAMETER	STATISTIC USED FOR COMPARISON	LOWER BOUND OF BIN 3	BASIS OF LOWER BOUND, BIN 3	LOWER BOUND OF BIN 2	BASIS OF LOWER BOUND, BIN 2
Total Dissolved Solids	Median	500 mg/L	National Secondary Drinking Water Standard	400 mg/L	80 percent of secondary standard
Chloride	Median	250 mg/L	National Secondary Drinking Water Standard	200 mg/L	80 percent of secondary standard
Sulfate	Median	250 mg/L	National Secondary Drinking Water Standard	200 mg/L	80 percent of secondary standard
Ammonia-Nitrogen (as N)	75th percentile	0.11 mg/L (reservoir) 0.33 mg/L (stream)	TCEQ 2024 Guidance for Assessing and Recording Surface Water Quality in Texas	0.088 mg/L (reservoir) 0.26 mg/L (stream)	80 percent of screening level
Nitrate-Nitrogen (as N)	75th percentile	0.37 mg/L (reservoir) 1.95 mg/L (stream)	TCEQ 2024 Guidance for Assessing and Recording Surface Water Quality in Texas	0.30 mg/L (reservoir) 1.56 mg/L (stream)	80 percent of screening level
Total Phosphorus (as P)	75th percentile	0.20 mg/L (reservoir) 0.69 mg/L (stream)	TCEQ 2024 Guidance for Assessing and Recording Surface Water Quality in Texas	0.16 mg/L (reservoir) 0.55 mg/L (stream)	80 percent of screening level
Chlorophyll-a	75th percentile	26.7 µg/L (reservoir) 14.1 µg/L (stream)	TCEQ 2024 Guidance for Assessing and Recording Surface Water Quality in Texas	21.4 µg/L (reservoir) 11.3 µg/L (stream)	80 percent of screening level

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TABLE K.2 DEFINITION OF BASELINE GROUNDWATER QUALITY BINS BY PARAMETER

PARAMETER	STATISTIC USED FOR COMPARISON	LOWER BOUND OF BIN 3	BASIS OF LOWER BOUND, BIN 3	LOWER BOUND OF BIN 2	BASIS OF LOWER BOUND, BIN 2
Total Dissolved Solids	Median	1000 mg/L	State of Texas Secondary Drinking Water Standard	500 mg/L	National Secondary Drinking Water Standard
Chloride	Median	300 mg/L	State of Texas Secondary Drinking Water Standard	250 mg/L	National Secondary Drinking Water Standard
Sulfate	Median	300 mg/L	State of Texas Secondary Drinking Water Standard	250 mg/L	National Secondary Drinking Water Standard

For TDS, chloride and sulfate, the median value is used for comparison with the numerical regulatory standard or level of concern, but for nutrients and chlorophyll-a (parameters subject to the TCEQ secondary screening levels), the 75th percentile is used. This value was used for comparison because the TCEQ secondary screening levels are applied such that a source water is "of concern" when more than 25 percent of the samples taken exceed the numerical screening limit.

K.2.1 Surface Water Baseline Conditions

The following sections summarize the baseline water quality conditions for each key surface water quality parameter. As discussed earlier, this review of baseline conditions is not intended to provide an evaluation of compliance with regulatory standards. When referenced, regulatory standards are only used as a means of making relative comparisons between water bodies.

With respect to nutrients, it should be noted that the impact of nutrients on chlorophyll-a concentrations is site-specific and can vary significantly between water bodies. Therefore, high levels of nutrients are not necessarily indicative of poor water quality in any given water body.

Ammonia Nitrogen

Ammonia Nitrogen levels were measured from 26 reservoirs between 1998 and 2025. Of the 26 reservoirs sampled, 15 demonstrated 75th percentile ammonia nitrogen concentrations ranging between 0.088 and 0.11 mg/L and fell into Bin 2. There were no lakes with screening levels exceeding 0.11 mg/L that would fall into Bin 3. Eleven other reservoirs fell into Bin 1 with screening levels less than 0.088 mg/L

All 20 streams sampled for ammonia nitrogen fell below screening levels and were categorized as Bin 1.

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Nitrate Nitrogen

Twenty-four reservoirs were sampled for nitrate nitrogen concentrations in the Region C planning area. Eight of the 24 reservoirs demonstrated 75th percentile concentrations exceeding the Bin 3 screening criteria of 0.37 mg/L. Four reservoirs were categorized as Bin 2 with 75th percentile concentrations between 0.3 mg/L and 0.37 mg/L. Twelve other reservoirs fell into Bin 1 with screening levels less than 0.3 mg/L.

Of the 16 streams sampled for nitrate nitrogen concentrations, 10 fell below screening criteria and were classified into Bin 1 (< 1.56 mg/L). Six streams exceeded the screening criteria of 1.95 mg/L and were placed in Bin 3. Streams categorized as Bin 3 included Elm Fork Trinity River above Ray Roberts Lake (Segment 824), Denton Creek (Segment 825), Upper Trinity River (Segment 805), Lower West Fork Trinity River (Segment 841), Trinity River Above Lake Livingston (Segment 804) and East Fork Trinity River (Segment 819). There were no streams that fell within Bin 2 with concentrations ranging between 1.56 and 1.95 mg/L.

Total Phosphorous

None of the 26 reservoirs sampled for total phosphorous in Region C exhibited 75th percentile concentrations that exceed the TCEQ screening level of 0.20 mg/L to be placed into Bin 3. One reservoir was found to approach screening levels and was placed into Bin 2 (0.16 to 0.20 mg/L). Lake Lavon (Segment 821) demonstrated a 75th percentile concentration of 0.16 mg/L.

Of the 20 streams sampled for total phosphorous concentrations, 5 streams demonstrated 75th percentile concentrations exceeding the Bin 3 screening criteria of 0.69 mg/L and included East Fork Trinity River (Segment 819), Lower West Fork Trinity River (Segment 841), Upper Trinity River (Segment 805), Clear Fork Trinity River Below Lake Weatherford (Segment 831), and Trinity River Above Lake Livingston (Segment 804). Fifteen out of 20 streams sampled for total phosphorous were below the screening criteria and fell in Bin 1. There were no streams that fell within Bin 2 with concentrations ranging between 0.55 mg/L and 0.69 mg/L.

Chlorophyll-a

Of the 25 reservoirs sampled for chlorophyll-a, 17 fell into Bins 2 or 3, demonstrating 75th percentile concentrations approaching or exceeding screening levels. Five reservoirs fell into Bin 2 with concentrations ranging from 21.4 to 26.7 µg/L, and 12 exceeded 26.7 µg/L and fell into Bin 3. Bin 2 reservoirs included Lake Fork (Segment 512), Grapevine Lake (Segment 826), Lake Waxahachie (Segment 816), Richland-Chambers Reservoir (Segment 836), and Chapman Lake (Segment 307).

Ten out of 19 streams that were sampled for chlorophyll-a exceeded the screening criteria of 14.1 µg/L and fell into Bin 3. One stream was categorized in Bin 2 (West Fork Trinity River above Bridgeport Reservoir, Segment 812) with a concentration ranging from 3.2 to 32.0 µg/L.

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Total Dissolved Solids

In general, concentrations of TDS in surface water for sampled water bodies were relatively low. Eight of 46 reservoirs and streams in the area approached or exceeded screening levels for TDS. Three water bodies were categorized into Bin 2 with median concentrations ranging from 400-500 mg/L. Bin 2 water bodies included the Upper Trinity River (Segment 805), Clear Fork Trinity River below Lake Weatherford (Segment 831), and the Lower West Fork Trinity River (Segment 841). Five water bodies demonstrated median concentrations above 500 mg/L and included East Fork Trinity River (Segment 819), Clear Fork Trinity River above Lake Weatherford (Segment 833), Red River above and below Lake Texoma (Segments 202 and 204), and Lake Texoma (Segment 203).

Sulfate

In general, concentrations of sulfate in surface water for sampled water bodies were relatively low. Only two of 44 reservoirs and streams in the area exceeded and approached screening levels for sulfate. Lake Texoma (Segment 203) was categorized into Bin 2 with a median concentration ranging from 200-250 mg/L. Red River Above Lake Texoma (Segment 204) fell into Bin 3 with a median concentration of 545.4 mg/L.

Chloride

In general, concentrations of chloride in surface water for sampled water bodies were relatively low. Three of 46 reservoirs and streams in the area approached or exceeded screening levels for chloride. One water body was categorized in Bin 2 with median concentrations ranging from 200-250 mg/L (Red River Below Lake Texoma, Segment 202). Two water bodies demonstrated median concentrations above 250 mg/L and included Lake Texoma (Segment 203) and Red River above Lake Texoma (Segment 204).

K.2.2 Groundwater Baseline Conditions

Baseline conditions for TDS, chloride and sulfate were summarized using data from 1993-2023. The groundwater quality data summaries are presented in **Table K.10** through **Table K.12**.

Total Dissolved Solids

With the exception of the Carrizo-Wilcox and Queen City Aquifers, most groundwater sources in Region C report median TDS concentrations greater than 500 mg/L which is the national secondary drinking water standard. The Trinity Aquifer beneath these counties generally reports median concentrations between 500 mg/L and 1,000 mg/L. TDS concentrations in the Woodbine Aquifer are even greater, with the highest median concentrations occurring in the most urban counties and those counties immediately down-gradient (Dallas, Tarrant, Ellis, and Navarro). Although limited, data for the Nacatoch Aquifer indicate that TDS levels are greater than 500 mg/L in Kaufman County and slightly below 500 mg/L in Navarro County.

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Sulfate

Median sulfate concentrations are generally below the national secondary drinking water standard of 250 mg/L in all aquifers except the Woodbine. The highest median sulfate concentrations (greater than 300 mg/L) were found in Dallas, Ellis, Navarro, and Tarrant Counties within the Woodbine Aquifer.

Chloride

Median chloride concentrations in all aquifers are well below the national secondary drinking water standard of 250 mg/L. Therefore, all aquifers were classified as Bin 1 for chloride.

K.3 Water Quality Data Summary

This section summarizes water quality data for surface water and groundwater in the Region C planning area.

K.3.1 Surface Water Quality Data Summary

Table K.3 through **Table K.9** summarize surface water quality data by segment and parameter.

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TABLE K.3 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

AMMONIA NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	521	0.10	0.09	0.10	0.50	0.01	2
302	Wright-Patman Lake	Lake	663	0.05	0.07	0.07	0.41	0.02	1
307	Chapman/Cooper Lake	Lake	415	0.10	0.08	0.10	0.31	0.02	2
403	Lake O' the Pines	Lake	529	0.05	0.10	0.09	6.00	0.01	2
504	Toledo Bend Reservoir	Lake	158	0.05	0.08	0.05	2.36	0.00	1
507	Lake Tawakoni	Lake	107	0.05	0.06	0.06	0.80	0.00	1
512	Lake Fork	Lake	153	0.05	0.06	0.05	1.00	0.00	1
605	Lake Palestine	Lake	655	0.05	0.08	0.07	1.13	0.01	1
807	Lake Worth	Lake	461	0.10	0.09	0.10	0.48	0.02	2
809	Eagle Mountain Reservoir	Lake	1346	0.10	0.09	0.10	1.28	0.02	2
811	Bridgeport Reservoir	Lake	848	0.06	0.07	0.10	2.03	0.02	2
815	Bardwell Reservoir	Lake	92	0.05	0.06	0.07	0.43	0.02	1
816	Lake Waxahachie	Lake	83	0.05	0.07	0.07	0.48	0.02	1
817	Navarro Mills Lake	Lake	86	0.05	0.06	0.06	0.20	0.02	1
818	Cedar Creek Reservoir	Lake	1573	0.10	0.10	0.10	2.30	0.02	2
820	Lake Ray Hubbard	Lake	407	0.05	0.07	0.10	0.49	0.02	2
821	Lake Lavon	Lake	1332	0.10	0.13	0.10	2.72	0.03	2

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AMMONIA NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
823	Lewisville Lake	Lake	265	0.05	0.10	0.10	2.92	0.01	2
826	Grapevine Lake	Lake	388	0.03	0.04	0.05	0.21	0.02	1
827	White Rock Lake	Lake	57	0.05	0.09	0.10	0.72	0.02	2
828	Lake Arlington	Lake	578	0.10	0.09	0.10	1.10	0.02	2
830	Benbrook Lake	Lake	765	0.10	0.11	0.10	2.60	0.02	2
832	Lake Weatherford	Lake	77	0.05	0.06	0.06	0.23	0.02	1
836	Richland-Chambers Reservoir	Lake	1508	0.10	0.12	0.10	3.76	0.02	2
838	Joe Pool Lake	Lake	74	0.02	0.05	0.07	0.31	0.02	1
840	Ray Roberts Lake	Lake	422	0.05	0.09	0.10	1.62	0.02	2
202	Red River Below Lake Texoma	Stream	371	0.05	0.07	0.10	0.67	0.02	1
204	Red River Above Lake Texoma	Stream	202	0.05	0.07	0.10	0.49	0.02	1
303	Sulphur/South Sulphur River	Stream	342	0.05	0.06	0.06	0.43	0.02	1
804	Trinity River Above Lake Livingston	Stream	609	0.07	0.08	0.10	0.47	0.02	1
805	Upper Trinity River	Stream	471	0.08	0.14	0.15	1.95	0.02	1
806	West Fork Trinity River Below Lake Worth	Stream	260	0.10	0.09	0.11	0.87	0.02	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	166	0.10	0.12	0.10	1.30	0.02	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	73	0.10	0.10	0.10	0.29	0.05	1

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AMMONIA NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	186	0.10	0.09	0.10	0.27	0.02	1
819	East Fork Trinity River	Stream	221	0.10	0.24	0.21	2.59	0.02	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	384	0.08	0.13	0.15	1.42	0.02	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	193	0.06	0.16	0.11	6.74	0.02	1
825	Denton Creek	Stream	56	0.10	0.15	0.11	1.53	0.03	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	102	0.05	0.06	0.07	0.20	0.02	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	218	0.10	0.18	0.11	3.50	0.02	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	15	0.05	0.08	0.14	0.17	0.02	1
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	0.05	0.07	0.07	0.14	0.05	1
837	Richland Creek Above Richland–Chambers Reservoir	Stream	61	0.05	0.06	0.05	0.28	0.02	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	25	0.10	0.09	0.10	0.25	0.02	1
841	Lower West Fork Trinity River	Stream	292	0.06	0.11	0.11	1.78	0.02	1

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.4 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

NITRATE NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	220	0.1145	0.15	0.25	0.46	0.02	1
302	Wright-Patman Lake	Lake	165	0.05	0.08	0.05	1.64	0.01	1
307	Chapman/Cooper Lake	Lake	262	0.0595	0.16	0.24	0.58	0.01	1
403	Lake O' the Pines	Lake	52	0.05	0.07	0.05	0.56	0.01	1
504	Toledo Bend Reservoir	Lake	2104	0.05	0.07	0.07	3.12	0.02	1
507	Lake Tawakoni	Lake	762	0.08	0.15	0.23	1.99	0.00	1
512	Lake Fork	Lake	755	0.05	0.11	0.15	1.28	0.01	1
605	Lake Palestine	Lake	34	0.33	2.07	2.53	10.70	0.05	3
809	Eagle Mountain Reservoir	Lake	131	0.19	0.24	0.34	0.93	0.01	2
811	Bridgeport Reservoir	Lake	24	0.19	0.24	0.29	0.50	0.14	1
815	Bardwell Reservoir	Lake	42	0.245	0.39	0.55	3.40	0.05	3
816	Lake Waxahachie	Lake	42	0.11	0.25	0.37	1.15	0.01	3
817	Navarro Mills Lake	Lake	6	0.075	1.00	1.92	3.23	0.05	3
818	Cedar Creek Reservoir	Lake	54	0.245	0.29	0.37	0.82	0.01	2
820	Lake Ray Hubbard	Lake	286	0.16	0.30	0.38	4.60	0.00	3
821	Lake Lavon	Lake	1208	0.3115	0.78	0.86	15.50	0.02	3
823	Lewisville Lake	Lake	203	0.16	0.77	0.43	11.95	0.00	3

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NITRATE NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
826	Grapevine Lake	Lake	178	0.21	0.24	0.37	1.15	0.00	2
828	Lake Arlington	Lake	19	0.3	0.28	0.38	0.78	0.05	3
830	Benbrook Lake	Lake	18	0.24	0.24	0.25	0.32	0.18	1
832	Lake Weatherford	Lake	6	0.05	0.06	0.05	0.09	0.05	1
836	Richland-Chambers Reservoir	Lake	48	0.245	0.28	0.34	0.79	0.01	2
838	Joe Pool Lake	Lake	117	0.14	0.20	0.25	1.29	0.05	1
840	Ray Roberts Lake	Lake	268	0.15	0.34	0.27	5.36	0.00	1
202	Red River Below Lake Texoma	Stream	67	0.06	0.18	0.22	1.06	0.04	1
204	Red River Above Lake Texoma	Stream	22	0.04	0.57	0.84	4.98	0.02	1
303	Sulphur/South Sulphur River	Stream	27	0.08	0.22	0.29	1.44	0.05	1
804	Trinity River Above Lake Livingston	Stream	265	2.65	3.48	5.22	13.65	0.02	3
805	Upper Trinity River	Stream	161	4.13	5.26	8.62	16.14	0.07	3
806	West Fork Trinity River Below Lake Worth	Stream	13	0.23	0.50	0.83	1.40	0.02	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	8	0.51	0.54	0.75	1.09	0.05	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	6	0.05	0.05	0.05	0.05	0.05	1

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NITRATE NITROGEN, TOTAL (MG/L AS N)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	5	0.8	0.87	1.24	2.10	0.05	1
819	East Fork Trinity River	Stream	16	9.97	10.19	13.25	17.80	4.90	3
822	Elm Form Trinity River Below Lewisville Lake	Stream	161	0.549	0.59	0.78	1.73	0.00	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	53	1.2	3.33	5.77	12.82	0.13	3
825	Denton Creek	Stream	26	1.02	1.45	2.30	4.33	0.30	3
829	Clear Fork Trinity River Below Benbrook Lake	Stream	8	0.275	0.30	0.34	0.54	0.17	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	24	0.17	0.29	0.29	1.32	0.01	1
841	Lower West Fork Trinity River	Stream	103	8.07	7.23	10.83	15.21	0.15	3

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.5 PHOSPHOROUS

PHOSPHOROUS TOTAL, WET METHOD (MG/L AS P)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	387	0.06	0.06	0.07	0.46	0.02	1
302	Wright-Patman Lake	Lake	667	0.1	0.12	0.15	1.65	0.01	1
307	Chapman/Cooper Lake	Lake	414	0.09	0.10	0.12	0.43	0.02	1
403	Lake O' the Pines	Lake	538	0.06	0.12	0.10	8.34	0.01	1
504	Toledo Bend Reservoir	Lake	1543	0.06	0.07	0.06	0.49	0.06	1
507	Lake Tawakoni	Lake	573	0.06	0.08	0.08	0.28	0.01	1
512	Lake Fork	Lake	658	0.06	0.08	0.07	0.62	0.02	1
605	Lake Palestine	Lake	602	0.06	0.11	0.08	3.96	0.01	1
807	Lake Worth	Lake	478	0.06	0.07	0.09	0.94	0.01	1
809	Eagle Mountain Reservoir	Lake	1373	0.07	0.08	0.10	0.64	0.01	1
811	Bridgeport Reservoir	Lake	877	0.04	0.06	0.06	0.66	0.01	1
815	Bardwell Reservoir	Lake	98	0.05	0.05	0.06	0.34	0.01	1
816	Lake Waxahachie	Lake	83	0.05	0.05	0.06	0.25	0.02	1
817	Navarro Mills Lake	Lake	88	0.06	0.06	0.07	0.25	0.02	1
818	Cedar Creek Reservoir	Lake	1642	0.078	0.10	0.11	1.58	0.01	1
820	Lake Ray Hubbard	Lake	398	0.05	0.06	0.06	1.50	0.01	1
821	Lake Lavon	Lake	1329	0.102	0.17	0.16	5.30	0.02	2
823	Lewisville Lake	Lake	266	0.05	0.11	0.08	2.50	0.01	1
826	Grapevine Lake	Lake	381	0.0449	0.05	0.05	0.58	0.01	1
827	White Rock Lake	Lake	55	0.07	0.07	0.09	0.26	0.02	1
828	Lake Arlington	Lake	615	0.054	0.07	0.08	1.29	0.01	1
830	Benbrook Lake	Lake	788	0.058	0.06	0.08	0.63	0.01	1
832	Lake Weatherford	Lake	77	0.05	0.06	0.06	0.13	0.02	1
836	Richland-Chambers Reservoir	Lake	1521	0.05	0.09	0.09	3.99	0.01	1
838	Joe Pool Lake	Lake	223	0.03	0.05	0.05	0.43	0.01	1

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PHOSPHOROUS TOTAL, WET METHOD (MG/L AS P)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
840	Ray Roberts Lake	Lake	408	0.03	0.06	0.05	0.50	0.01	1
202	Red River Below Lake Texoma	Stream	1081	0.17	0.17	0.17	0.17	0.17	1
204	Red River Above Lake Texoma	Stream	189	0.2	0.30	0.35	1.47	0.05	1
303	Sulphur/South Sulphur River	Stream	343	0.13	0.15	0.19	0.75	0.01	1
804	Trinity River Above Lake Livingston	Stream	571	0.72	0.84	1.10	3.30	0.04	3
805	Upper Trinity River	Stream	639	0.97	1.08	1.64	4.17	0.03	3
806	West Fork Trinity River Below Lake Worth	Stream	285	0.078	0.09	0.10	0.70	0.02	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	170	0.15	0.25	0.29	2.10	0.01	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	75	0.3	0.42	0.46	2.84	0.02	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	294	0.12	0.35	0.43	2.85	0.01	1
819	East Fork Trinity River	Stream	203	1.73	1.81	2.59	6.20	0.03	3
822	Elm Form Trinity River Below Lewisville Lake	Stream	358	0.11	0.13	0.15	2.87	0.01	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	183	0.15	0.54	0.42	4.12	0.02	1
825	Denton Creek	Stream	57	0.26	0.32	0.45	1.07	0.04	1

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PHOSPHOROUS TOTAL, WET METHOD (MG/L AS P)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
829	Clear Fork Trinity River Below Benbrook Lake	Stream	102	0.06	0.07	0.08	0.59	0.02	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	269	0.45	0.56	0.81	5.36	0.01	3
833	Clear Fork Trinity River Above Lake Weatherford	Stream	35	0.07	0.09	0.11	0.23	0.01	1
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	0.105	0.13	0.18	0.24	0.05	1
837	Richland Creek Above Richland–Chambers Reservoir	Stream	59	0.109	0.14	0.18	0.45	0.02	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	23	0.05	0.05	0.05	0.12	0.01	1
841	Lower West Fork Trinity River	Stream	283	0.81	0.88	1.17	2.66	0.06	3

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.6 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

CHLOROPHYLL-A, SPECTROPHOTOMETRIC ACID METHOD (µG/L)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	351	8.9	11.7	15.6	155.0	2.9	1
302	Wright-Patman Lake	Lake	231	18.0	26.3	35.2	150.0	1.0	3
307	Chapman/Cooper Lake	Lake	272	14.8	17.5	22.9	130.0	3.0	2
403	Lake O' the Pines	Lake	265	10.0	9.8	11.8	63.4	0.0	1
504	Toledo Bend Reservoir	Lake	555	10.0	13.6	18.0	204.0	1.0	1
507	Lake Tawakoni	Lake	463	32.0	35.5	49.0	124.0	1.0	3
512	Lake Fork	Lake	574	16.0	17.4	22.0	108.0	1.0	2
605	Lake Palestine	Lake	200	15.1	25.4	31.6	237.0	1.0	3
807	Lake Worth	Lake	474	17.4	22.3	31.7	159.3	0.5	3
809	Eagle Mountain Reservoir	Lake	1371	18.9	21.2	28.5	124.6	0.5	3
811	Bridgeport Reservoir	Lake	891	5.3	6.0	7.3	51.6	0.5	1
815	Bardwell Reservoir	Lake	78	15.5	19.1	27.8	59.0	1.0	3
816	Lake Waxahachie	Lake	65	12.0	15.7	22.0	46.0	1.0	2
817	Navarro Mills Lake	Lake	33	10.0	8.8	10.7	22.4	0.0	1
818	Cedar Creek Reservoir	Lake	1635	19.6	23.8	32.0	112.3	0.5	3
820	Lake Ray Hubbard	Lake	153	23.5	25.0	34.0	126.0	1.0	3
821	Lake Lavon	Lake	1278	28.3	37.5	51.3	244.0	3.0	3
823	Lewisville Lake	Lake	124	16.5	22.6	27.3	150.1	3.0	3

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CHLOROPHYLL-A, SPECTROPHOTOMETRIC ACID METHOD (µG/L)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
826	Grapevine Lake	Lake	209	17.0	17.7	23.3	58.4	3.0	2
828	Lake Arlington	Lake	615	20.3	24.5	34.7	95.4	0.9	3
830	Benbrook Lake	Lake	811	16.9	20.2	29.0	66.2	0.5	3
832	Lake Weatherford	Lake	17	10.0	14.7	19.8	35.2	1.0	1
836	Richland-Chambers Reservoir	Lake	1460	12.0	16.1	22.3	94.7	0.5	2
838	Joe Pool Lake	Lake	168	8.9	12.6	15.3	170.0	0.0	1
840	Ray Roberts Lake	Lake	103	7.0	8.3	10.8	37.4	3.0	1
202	Red River Below Lake Texoma	Stream	141	10.0	13.8	18.2	73.4	1.0	3
204	Red River Above Lake Texoma	Stream	26	16.2	26.3	42.7	93.3	1.0	3
303	Sulphur/South Sulphur River	Stream	93	10.0	10.7	10.4	45.4	1.0	1
804	Trinity River Above Lake Livingston	Stream	541	11.0	20.5	22.0	238.0	0.0	3
805	Upper Trinity River	Stream	475	11.0	12.9	16.0	80.0	0.2	3
806	West Fork Trinity River Below Lake Worth	Stream	282	18.0	21.6	29.6	94.0	0.9	3
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	31	10.0	10.7	10.7	41.6	1.0	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	11	10.0	12.8	12.5	32.0	3.2	2

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CHLOROPHYLL-A, SPECTROPHOTOMETRIC ACID METHOD (µG/L)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	13	10.0	9.6	10.7	19.6	1.3	1
819	East Fork Trinity River	Stream	88	10.0	12.8	15.3	45.6	3.0	3
822	Elm Form Trinity River Below Lewisville Lake	Stream	255	12.0	17.6	19.0	100.0	0.2	3
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	73	10.7	20.3	21.4	163.0	1.0	3
825	Denton Creek	Stream	23	10.0	8.7	10.0	13.9	1.0	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	33	10.0	9.6	10.0	30.0	1.0	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	83	4.0	6.0	9.9	38.4	0.2	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	31	4.3	6.1	10.0	18.1	0.8	1
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	10.0	25.8	25.8	73.3	10.0	3
837	Richland Creek Above Richland–Chambers Reservoir	Stream	7	1.3	3.2	2.8	12.8	1.0	1
841	Lower West Fork Trinity River	Stream	277	10.4	11.9	15.0	58.0	0.9	3

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.7 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

TOTAL DISSOLVED SOLIDS (MG/L) AS RESIDUE, TOTAL FILTRABLE (DRIED AT 180°)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	523	975.0	949.6	1,080.0	1,640.0	286.0	3
302	Wright-Patman Lake	Lake	380	136.5	141.8	158.3	536.0	21.0	1
307	Chapman/Cooper Lake	Lake	324	127.0	131.6	138.0	420.0	88.0	1
403	Lake O' the Pines	Lake	202	106.0	117.4	123.0	376.0	54.0	1
504	Toledo Bend Reservoir	Lake	3	77.0	77.7	81.0	85.0	71.0	1
507	Lake Tawakoni	Lake	116	107.5	108.8	118.0	150.0	78.0	1
512	Lake Fork	Lake	60	103.0	128.7	117.0	1,300.0	75.0	1
605	Lake Palestine	Lake	334	129.0	151.4	172.0	502.0	49.5	1
807	Lake Worth	Lake	481	214.0	216.7	233.0	451.0	135.0	1
809	Eagle Mountain Reservoir	Lake	1351	215.0	215.2	234.0	551.0	52.2	1
811	Bridgeport Reservoir	Lake	864	179.0	183.5	200.0	329.0	78.0	1
815	Bardwell Reservoir	Lake	81	228.0	230.9	256.0	415.0	75.0	1
816	Lake Waxahachie	Lake	79	184.0	189.7	211.5	291.0	53.0	1
817	Navarro Mills Lake	Lake	29	201.0	205.8	226.0	256.0	154.0	1
818	Cedar Creek Reservoir	Lake	1607	122.0	127.0	138.0	804.0	24.0	1
820	Lake Ray Hubbard	Lake	286	207.0	222.0	241.5	835.0	118.0	1
821	Lake Lavon	Lake	1333	222.0	242.3	266.0	744.0	120.0	1
823	Lewisville Lake	Lake	217	219.0	272.7	277.0	990.0	67.0	1
826	Grapevine Lake	Lake	272	225.5	234.8	253.0	686.0	92.0	1
827	White Rock Lake	Lake	7	270.0	247.6	281.0	288.0	184.0	1

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TOTAL DISSOLVED SOLIDS (MG/L) AS RESIDUE, TOTAL FILTRABLE (DRIED AT 180°)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
828	Lake Arlington	Lake	617	182.0	199.7	202.0	1,573.0	19.0	1
830	Benbrook Lake	Lake	798	197.0	200.6	213.0	1,400.0	119.0	1
832	Lake Weatherford	Lake	32	243.5	240.3	258.3	302.0	166.0	1
836	Richland-Chambers Reservoir	Lake	1466	162.0	167.6	180.0	498.0	59.1	1
838	Joe Pool Lake	Lake	161	288.0	329.3	348.0	1,095.0	154.0	1
840	Ray Roberts Lake	Lake	291	173.0	178.3	190.0	344.0	38.0	1
819	East Fork Trinity River	Stream	114	527.5	536.7	635.5	1,300.0	214.0	3
841	Lower West Fork Trinity River	Stream	193	435.0	419.5	488.0	662.0	210.0	2
805	Upper Trinity River	Stream	268	413.0	390.4	475.3	1,080.0	73.0	2
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	137	388.0	419.2	480.0	1,310.0	144.0	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	93	348.0	389.0	463.0	964.0	162.0	1
825	Denton Creek	Stream	74	255.0	270.3	315.3	472.0	185.0	1
806	West Fork Trinity River Below Lake Worth	Stream	26	253.0	249.4	273.5	326.0	153.0	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	40	181.5	185.1	202.3	241.0	135.0	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	50	323.0	363.7	427.3	788.0	170.0	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	286	252.0	259.5	286.0	708.0	69.0	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	52	279.0	279.8	312.5	690.0	28.0	1

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TOTAL DISSOLVED SOLIDS (MG/L) AS RESIDUE, TOTAL FILTRABLE (DRIED AT 180°)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
303	Sulphur/South Sulphur River	Stream	164	201.0	222.2	284.5	620.0	76.0	1
202	Red River Below Lake Texoma	Stream	375	729.0	749.9	956.0	9,380.0	45.0	3
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	20	283.0	559.4	604.0	3,450.0	109.0	1
804	Trinity River Above Lake Livingston	Stream	456	328.0	332.9	417.0	590.0	71.0	1
204	Red River Above Lake Texoma	Stream	159	2,850.0	2,887.0	3,755.0	5,590.0	610.0	3
831	Clear Fork Trinity River Below Lake Weatherford	Stream	63	422.0	430.9	467.0	922.0	258.0	2
833	Clear Fork Trinity River Above Lake Weatherford	Stream	15	544.0	528.0	566.0	610.0	422.0	3
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	232.0	224.3	243.0	270.0	163.0	1
837	Richland Creek Above Richland–Chambers Reservoir	Stream	30	229.0	350.2	412.0	1,010.0	160.0	1

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.8 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

SULFATE (MG/L AS SO4)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	534	230.5	223.2	262.0	920.0	28.0	2
302	Wright-Patman Lake	Lake	759	15.0	17.0	20.0	89.1	5.0	1
307	Chapman/Cooper Lake	Lake	500	8.0	9.0	10.0	119.0	1.0	1
403	Lake O' the Pines	Lake	540	21.0	23.0	27.0	121.0	1.7	1
504	Toledo Bend Reservoir	Lake	2825	16.0	17.5	20.0	112.0	1.1	1
507	Lake Tawakoni	Lake	902	10.0	10.1	11.0	44.0	1.5	1
512	Lake Fork	Lake	1034	18.0	18.2	21.2	38.0	3.2	1
605	Lake Palestine	Lake	668	23.0	25.2	29.4	80.0	7.0	1
807	Lake Worth	Lake	243	24.1	24.3	28.2	38.5	5.0	1
809	Eagle Mountain Reservoir	Lake	313	25.4	26.5	30.2	64.2	5.0	1
811	Bridgeport Reservoir	Lake	301	14.9	16.9	19.5	50.0	2.8	1
815	Bardwell Reservoir	Lake	165	43.3	44.2	48.3	82.1	11.7	1
816	Lake Waxahachie	Lake	84	22.5	27.1	34.5	58.4	12.0	1
817	Navarro Mills Lake	Lake	195	24.8	26.3	29.3	61.0	9.6	1
818	Cedar Creek Reservoir	Lake	522	19.9	20.4	23.6	73.6	5.0	1
820	Lake Ray Hubbard	Lake	150	40.0	41.2	47.8	98.5	5.0	1
821	Lake Lavon	Lake	1351	33.1	36.9	44.9	140.0	1.0	1
826	Grapevine Lake	Lake	240	35.0	34.4	38.9	52.0	15.9	1
827	White Rock Lake	Lake	57	37.0	38.6	47.0	63.0	18.0	1

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SULFATE (MG/L AS SO4)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
828	Lake Arlington	Lake	385	29.1	29.7	32.8	54.0	0.3	1
830	Benbrook Lake	Lake	237	26.9	27.8	29.8	55.7	5.0	1
832	Lake Weatherford	Lake	80	31.0	30.2	34.0	39.0	15.0	1
836	Richland-Chambers Reservoir	Lake	499	27.6	28.6	32.2	94.7	8.6	1
838	Joe Pool Lake	Lake	281	102.3	97.6	109.0	407.0	17.5	1
840	Ray Roberts Lake	Lake	190	14.0	13.8	16.0	19.3	7.0	1
202	Red River Below Lake Texoma	Stream	384	168.0	172.4	228.3	434.0	10.0	1
204	Red River Above Lake Texoma	Stream	195	537.0	545.4	734.5	1,200.0	24.0	3
303	Sulphur/South Sulphur River	Stream	380	21.1	34.9	47.3	251.0	1.0	1
804	Trinity River Above Lake Livingston	Stream	544	65.6	64.2	80.4	431.0	5.0	1
805	Upper Trinity River	Stream	484	77.0	73.1	87.9	223.9	13.2	1
806	West Fork Trinity River Below Lake Worth	Stream	211	33.0	35.1	40.4	128.0	6.0	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	54	37.5	42.6	50.5	110.0	11.0	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	20	11.5	57.7	36.8	506.0	2.0	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	213	70.1	86.7	112.1	312.0	2.5	1

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SULFATE (MG/L AS SO4)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
819	East Fork Trinity River	Stream	233	100.0	103.0	126.0	365.0	19.8	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	66	53.7	54.9	65.4	114.4	20.2	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	135	40.0	40.5	50.0	96.0	7.0	1
825	Denton Creek	Stream	62	38.0	40.3	47.8	73.0	18.0	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	105	36.7	38.8	46.0	68.0	9.0	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	102	50.5	49.4	58.4	95.0	14.0	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	15	68.0	62.9	71.9	78.0	34.0	1
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	34.0	36.0	47.3	54.0	22.0	1
837	Richland Creek Above Richland–Chambers Reservoir	Stream	81	30.0	58.3	78.0	279.0	7.0	1
841	Lower West Fork Trinity River	Stream	252	59.3	58.7	67.7	107.0	13.5	1

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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TABLE K.9 REGION C SURFACE WATER QUALITY SUMMARY BY SEGMENT AND PARAMETER
DATA COLLECTED 1/1/1998 – 1/31/2025 (SOURCE: TCEQ WATER QUALITY MONITORING DATABASE)

CHLORIDE (MG/L AS CL)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
203	Lake Texoma	Lake	533	312.0	303.8	373.0	603.0	33.5	3
302	Wright-Patman Lake	Lake	755	9.3	10.6	13.0	36.3	1.0	1
307	Chapman/Cooper Lake	Lake	498	4.2	5.0	5.0	172.0	1.0	1
403	Lake O' the Pines	Lake	541	13.1	14.4	16.0	57.0	3.0	1
504	Toledo Bend Reservoir	Lake	2832	15.0	16.8	18.5	161.0	2.2	1
507	Lake Tawakoni	Lake	998	6.0	6.8	8.0	38.0	1.8	1
512	Lake Fork	Lake	1040	14.0	14.1	17.0	48.0	4.3	1
605	Lake Palestine	Lake	656	22.0	25.0	28.0	103.0	5.0	1
807	Lake Worth	Lake	455	30.0	29.3	33.5	52.0	11.1	1
809	Eagle Mountain Reservoir	Lake	1280	31.1	30.9	34.8	64.8	9.1	1
811	Bridgeport Reservoir	Lake	776	19.5	21.2	24.4	174.2	9.8	1
815	Bardwell Reservoir	Lake	165	16.6	17.5	19.6	39.5	10.0	1
816	Lake Waxahachie	Lake	84	12.0	13.4	15.9	28.5	7.0	1
817	Navarro Mills Lake	Lake	194	9.1	10.0	10.8	88.0	1.7	1
818	Cedar Creek Reservoir	Lake	1451	13.4	13.6	15.2	99.7	2.2	1
820	Lake Ray Hubbard	Lake	388	23.5	25.7	29.0	104.3	5.0	1
821	Lake Lavon	Lake	1361	19.7	23.5	29.4	139.0	1.0	1
823	Lewisville Lake	Lake	248	21.3	29.7	29.5	190.0	4.5	1
826	Grapevine Lake	Lake	373	29.0	31.0	37.0	54.0	11.0	1

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CHLORIDE (MG/L AS CL)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
827	White Rock Lake	Lake	56	25.0	25.3	31.0	41.0	8.0	1
828	Lake Arlington	Lake	686	16.5	17.2	18.8	62.0	6.0	1
830	Benbrook Lake	Lake	685	22.6	23.0	24.6	186.0	10.9	1
832	Lake Weatherford	Lake	80	32.0	31.8	36.0	47.0	15.5	1
836	Richland-Chambers Reservoir	Lake	1328	10.2	11.8	11.8	119.0	2.5	1
838	Joe Pool Lake	Lake	214	18.6	19.8	21.9	69.0	6.1	1
840	Ray Roberts Lake	Lake	456	14.6	15.1	17.2	48.5	2.5	1
202	Red River Below Lake Texoma	Stream	384	207.5	212.6	296.0	600.0	10.0	2
204	Red River Above Lake Texoma	Stream	194	1,060.0	1,056.1	1,400.0	2,190.0	18.0	3
303	Sulphur/South Sulphur River	Stream	383	12.0	17.2	22.8	128.0	1.0	1
804	Trinity River Above Lake Livingston	Stream	515	44.1	47.4	67.1	112.1	5.1	1
805	Upper Trinity River	Stream	416	52.0	55.7	75.7	397.0	9.4	1
806	West Fork Trinity River Below Lake Worth	Stream	179	23.2	25.1	29.8	180.0	5.0	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	165	45.0	57.3	77.9	261.0	3.3	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	73	21.7	75.3	88.3	474.0	2.7	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	312	28.0	42.5	57.9	325.0	2.8	1

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CHLORIDE (MG/L AS CL)									
SEGMENT NUMBER	SEGMENT DESCRIPTION	WATER BODY TYPE	COUNT	MEDIAN	MEAN	75TH PERCENTILE	MAX	MIN	BIN
819	East Fork Trinity River	Stream	231	76.0	79.4	99.5	340.0	10.2	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	191	26.1	28.3	32.6	98.0	10.8	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	174	31.0	35.4	45.0	155.0	7.0	1
825	Denton Creek	Stream	78	28.5	31.9	42.5	55.8	15.2	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	104	23.9	24.7	28.0	61.0	9.5	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	219	51.0	56.5	74.5	158.0	6.0	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	15	69.0	68.3	75.9	95.0	40.0	1
835	Chambers Creek Below Richland–Chambers Reservoir	Stream	4	39.5	36.0	51.3	58.0	7.0	1
837	Richland Creek Above Richland–Chambers Reservoir	Stream	81	17.0	39.5	57.0	213.0	2.8	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	40	17.8	17.2	20.0	28.0	11.8	1
841	Lower West Fork Trinity River	Stream	227	73.5	69.6	88.0	167.0	12.0	1

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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K.3.2 Groundwater Quality Data Summary

Table K.10 through **Table K.12** summarize groundwater water quality data by aquifer and county.

TABLE K.10 REGION C GROUNDWATER QUALITY SUMMARY BY AQUIFER AND COUNTY DATA COLLECTED 1993 – 2023 (SOURCE: TWDB GROUNDWATER DATABASE)

TOTAL DISSOLVED SOLIDS (MG/L)								
AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Carrizo-Wilcox	Anderson	111	350.3	292.0	381.5	123.0	1,869.0	1
Carrizo-Wilcox	Freestone	63	300.9	280.0	332.2	99.0	632.0	1
Carrizo-Wilcox	Henderson	64	258.5	269.5	303.3	32.0	638.0	1
Carrizo-Wilcox	Navarro	3	406.3	326.0	462.0	295.0	598.0	1
Carrizo-Wilcox	Smith	136	305.6	240.5	343.3	99.0	972.0	1
Carrizo-Wilcox	Upshur	28	440.1	411.5	501.3	148.0	1,130.0	1
Carrizo-Wilcox	Wood	43	256.1	244.0	284.5	124.0	926.0	1
Nacatoch	Kaufman	6	876.7	865.0	992.5	730.0	1,041.0	2
Nacatoch	Navarro	6	446.8	440.0	459.0	316.0	642.0	1
Queen City	Anderson	23	164.2	150.0	193.0	65.0	278.0	1
Queen City	Freestone	2	107.0	107.0	107.5	106.0	108.0	1
Queen City	Henderson	14	179.0	150.5	168.0	92.0	418.0	1
Queen City	Smith	28	112.3	104.5	136.5	46.0	327.0	1
Queen City	Upshur	28	171.7	89.8	266.8	56.0	521.0	1
Queen City	Wood	12	195.6	184.0	253.8	66.0	355.0	1
Trinity	Collin	46	820.8	757.0	904.0	394.0	1,688.0	2
Trinity	Cooke	49	510.8	455.1	563.0	399.0	843.0	1
Trinity	Dallas	64	952.8	821.7	957.0	255.0	4,606.0	2
Trinity	Denton	106	631.0	610.0	722.9	408.0	1,291.0	2
Trinity	Ellis	62	897.0	731.0	1,104.5	634.0	1,432.0	2
Trinity	Fannin	19	887.3	891.0	904.0	804.1	932.0	2
Trinity	Grayson	126	669.6	602.0	802.3	268.0	1,492.0	2
Trinity	Jack	3	1,072.7	1,094.0	1,268.5	681.0	1,443.0	3
Trinity	Kaufman	4	1,073.5	1,070.0	1,085.0	1,048.0	1,106.0	3
Trinity	Parker	85	504.5	445.0	654.7	97.0	1,086.0	1
Trinity	Tarrant	122	746.2	694.0	875.0	316.0	3,302.0	2
Trinity	Wise	67	665.6	510.0	761.5	304.0	2,186.0	2
Woodbine	Collin	26	648.5	578.5	726.5	318.0	1,388.0	2
Woodbine	Cooke	6	595.8	409.5	623.5	184.0	1,505.0	1
Woodbine	Dallas	22	1,150.4	1,226.0	1,459.5	436.0	1,700.0	3
Woodbine	Denton	19	712.3	697.0	765.3	291.0	1,841.0	2
Woodbine	Ellis	36	1,370.3	1,390.5	1,696.6	785.0	2,144.0	3

TOTAL DISSOLVED SOLIDS (MG/L)								
AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Woodbine	Fannin	44	811.8	824.5	886.0	408.0	1,201.0	2
Woodbine	Grayson	70	597.4	587.0	741.5	186.0	1,105.0	2
Woodbine	Navarro	5	1,309.2	1,556.0	1,615.0	192.2	1,634.0	3
Woodbine	Tarrant	56	1,377.1	745.0	1,349.3	163.0	8,150.0	3

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

TABLE K.11 REGION C GROUNDWATER QUALITY SUMMARY BY AQUIFER AND COUNTY DATA COLLECTED 1993 – 2023 (SOURCE: TWDB GROUNDWATER DATABASE)

SULFATE (MG/L AS SO4)								
AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Carrizo-Wilcox	Anderson	100	19.8	17.1	27.3	52.0	1.0	1
Carrizo-Wilcox	Freestone	38	23.5	19.1	35.6	63.2	4.2	1
Carrizo-Wilcox	Henderson	49	24.5	25.2	35.0	80.0	1.0	1
Carrizo-Wilcox	Navarro	1	72.5	72.5	72.5	72.5	72.5	1
Carrizo-Wilcox	Smith	115	20.4	14.5	22.2	132.0	1.0	1
Carrizo-Wilcox	Upshur	25	18.2	8.8	30.0	62.0	1.0	1
Carrizo-Wilcox	Wood	32	19.7	16.3	28.3	53.0	1.0	1
Nacatoch	Kaufman	6	228.7	224.0	309.3	320.0	139.0	1
Nacatoch	Navarro	6	37.4	36.7	50.7	81.0	1.0	1
Queen City	Anderson	22	22.9	24.7	29.6	55.4	2.0	1
Queen City	Freestone	2	14.0	14.0	17.5	21.0	7.0	1
Queen City	Henderson	15	20.5	15.3	18.5	73.0	4.0	1
Queen City	Smith	25	15.9	12.0	15.9	97.1	1.0	1
Queen City	Upshur	28	14.9	5.3	16.5	58.4	1.0	1
Queen City	Wood	12	37.0	28.1	55.0	95.0	2.1	1
Trinity	Collin	41	134.5	89.6	126.0	590.0	47.7	1
Trinity	Cooke	45	38.4	32.0	36.0	129.0	24.5	1
Trinity	Dallas	61	245.2	176.0	207.0	2,920.0	77.0	1
Trinity	Denton	93	73.8	63.8	91.1	326.0	26.3	1
Trinity	Ellis	56	114.1	95.5	139.8	262.0	65.0	1
Trinity	Fannin	19	127.5	128.0	133.5	144.0	110.0	1
Trinity	Grayson	111	78.5	77.0	98.2	155.0	15.2	1
Trinity	Jack	2	163.1	163.1	202.5	242.0	84.1	1
Trinity	Parker	66	53.1	42.5	71.0	202.0	5.1	1
Trinity	Tarrant	107	124.8	99.4	159.5	1,430.0	23.2	1

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SULFATE (MG/L AS SO4)								
AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Trinity	Wise	44	65.8	47.8	71.3	207.0	20.9	1
Woodbine	Collin	20	121.0	96.5	135.3	394.0	19.0	1
Woodbine	Cooke	6	123.5	49.2	69.3	522.0	17.7	1
Woodbine	Dallas	21	332.2	348.0	428.0	507.0	36.6	3
Woodbine	Denton	17	131.1	102.0	196.0	347.0	43.0	1
Woodbine	Ellis	36	390.7	388.5	502.0	729.0	137.0	3
Woodbine	Fannin	37	185.4	202.0	213.0	260.0	67.0	1
Woodbine	Grayson	66	97.5	86.9	149.3	330.0	15.2	1
Woodbine	Navarro	5	356.8	436.0	440.0	440.0	47.9	3
Woodbine	Tarrant	19	414.9	101.0	250.0	3,300.0	5.4	3

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

TABLE K.12 REGION C GROUNDWATER QUALITY SUMMARY BY AQUIFER AND COUNTY DATA COLLECTED 1993 – 2023 (SOURCE: TWDB GROUNDWATER DATABASE)

CHLORIDE (MG/L AS CL)								
AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Carrizo-Wilcox	Anderson	100	18.8	10.0	20.0	196.0	2.9	1
Carrizo-Wilcox	Freestone	38	24.0	22.9	36.4	46.4	8.9	1
Carrizo-Wilcox	Henderson	49	27.7	15.9	42.2	164.0	2.0	1
Carrizo-Wilcox	Navarro	1	46.9	46.9	46.9	46.9	46.9	1
Carrizo-Wilcox	Smith	115	28.9	10.2	25.3	211.0	1.9	1
Carrizo-Wilcox	Upshur	25	51.7	40.0	83.0	116.0	9.0	1
Carrizo-Wilcox	Wood	32	21.1	12.2	36.8	71.8	3.7	1
Nacatoch	Kaufman	6	95.8	93.5	107.5	119.0	80.1	1
Nacatoch	Navarro	6	28.4	28.3	35.2	57.0	8.6	1
Queen City	Anderson	22	19.5	14.0	28.5	71.3	2.0	1
Queen City	Freestone	2	8.7	8.7	9.1	9.4	8.0	1
Queen City	Henderson	15	29.3	14.9	18.2	127.0	4.5	1
Queen City	Smith	25	7.6	5.9	8.9	25.8	2.0	1
Queen City	Upshur	28	18.2	14.5	20.1	91.3	3.0	1
Queen City	Wood	12	23.6	21.0	23.9	77.0	1.0	1
Trinity	Collin	41	78.7	22.7	44.0	647.0	10.6	1
Trinity	Cooke	45	56.8	16.0	46.3	311.0	2.2	1
Trinity	Dallas	61	92.2	75.0	103.0	340.0	16.5	1
Trinity	Denton	93	88.3	19.7	153.0	532.0	2.7	1

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AQUIFER	COUNTY	COUNT	MEAN	MEDIAN	75TH PERCENTILE	MAX	MIN	BIN
Trinity	Ellis	56	163.0	73.7	213.0	427.0	63.6	1
Trinity	Fannin	19	34.1	35.0	38.3	44.0	4.0	1
Trinity	Grayson	111	68.0	32.9	55.7	571.0	6.8	1
Trinity	Jack	2	124.9	124.9	139.0	153.0	96.8	1
Trinity	Parker	66	40.6	24.3	56.5	297.0	3.7	1
Trinity	Tarrant	107	82.5	40.0	87.0	1,822.0	5.6	1
Trinity	Wise	44	145.2	43.5	186.0	678.0	4.2	1
Woodbine	Collin	20	53.9	37.2	66.2	148.0	14.0	1
Woodbine	Cooke	6	126.2	39.2	201.5	369.0	24.6	1
Woodbine	Dallas	21	101.7	86.9	180.0	235.0	12.0	1
Woodbine	Denton	17	60.5	29.6	46.0	371.0	9.0	1
Woodbine	Ellis	36	110.6	76.6	145.3	364.0	31.5	1
Woodbine	Fannin	37	64.7	61.0	78.0	213.0	22.0	1
Woodbine	Grayson	66	34.7	26.0	40.0	180.0	6.0	1
Woodbine	Navarro	5	108.9	120.0	143.0	146.0	16.5	1
Woodbine	Tarrant	19	145.9	43.9	89.2	1,700.0	10.0	1

☐ Bin 1: Less than regulatory or literature levels of concern
☐ Bin 2: Approaching regulatory standards or levels of concern
☐ Bin 3: Exceed the stated regulatory standards, levels of concern, or screening criteria

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Appendix L

Socioeconomic Impacts

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Socioeconomic Impacts of Projected Water Shortages for the Region C Regional Water Planning Area

Prepared in Support of the 2026 Region C Regional Water Plan

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Projections & Socioeconomic Analysis,
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Executive Summary

Evaluating the social and economic impacts of not meeting identified water needs is a required analysis in the regional water planning process. The Texas Water Development Board (TWDB) estimates these impacts for regional water planning groups (RWPGs) and summarizes the impacts in the state water plan. The analysis presented is for the Region C Regional Water Planning Group (Region C).

Based on projected water demands and existing water supplies, Region C identified water needs (potential shortages) that could occur within its region under a repeat of the drought of record for six water use categories (irrigation, livestock, manufacturing, mining, municipal and steam-electric power). The TWDB then estimated the annual socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the region.

This analysis was performed using an economic impact modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques, and represents a snapshot of socioeconomic impacts that may occur during a single year repeat of the drought of record with the further caveat that no mitigation strategies are implemented. Decade-specific impact estimates assume that growth occurs, and future shocks are imposed on an economy at 10-year intervals. The estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

For regional economic impacts, income losses and jobs potentially at risk are estimated within each planning decade (2030 through 2080). The income losses represent an approximation of gross domestic product (GDP) that would be foregone if water needs are not met.

The analysis also provides estimates of financial transfer impacts, which include tax losses (state, local, and utility tax collections); water trucking costs; and utility revenue losses. In addition, social impacts are estimated, encompassing lost consumer surplus (a welfare economics measure of consumer wellbeing); as well as population and school enrollment losses.

IMPLAN data reported that Region C generated more than $636 billion in gross domestic product (GDP) (2023 dollars) and supported more than 4.7 million jobs in 2021. The Region C estimated total population was approximately 7.8 million in 2021.

It is estimated that not meeting the identified water needs in Region C would result in an annually combined lost income impact of approximately $6.87 billion in 2030, increasing to $64.79 billion in 2080 (Table ES-1). In 2030, the region could lose approximately 48,000 jobs, and by 2080 at risk job losses would increase to approximately 404,000 if anticipated needs are not mitigated.

All impact estimates are in year 2023 dollars and were calculated using a variety of data sources and tools including the use of a region-specific IMPLAN model, data from TWDB annual water use estimates, the U.S. Census Bureau, Texas Agricultural Statistics Service, and the Texas Municipal League.

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Table ES-1 Region C socioeconomic impact summary

Regional Economic Impacts	2030	2040	2050	2060	2070	2080
Income losses ($ millions)*	$6,867	$21,726	$32,069	$44,969	$56,590	$64,787
At risk job losses	48,082	138,298	204,344	283,649	353,542	404,362
Financial Transfer Impacts	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Tax losses on production and imports ($ millions)*	$185	$613	$951	$1,375	$1,766	$2,068
Water trucking costs ($ millions)*	$-	$7	$41	$123	$294	$482
Utility revenue losses ($ millions)*	$894	$1,974	$3,068	$4,059	$4,965	$5,732
Utility tax revenue losses ($ millions)*	$17	$38	$58	$77	$93	$107
Social Impacts	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Consumer surplus losses ($ millions)*	$179	$624	$1,498	$2,698	$4,184	$5,609
At risk population out-migration	6,885	19,804	29,262	40,618	50,627	57,905
At risk school enrollment losses	1,257	3,614	5,340	7,413	9,239	10,568

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

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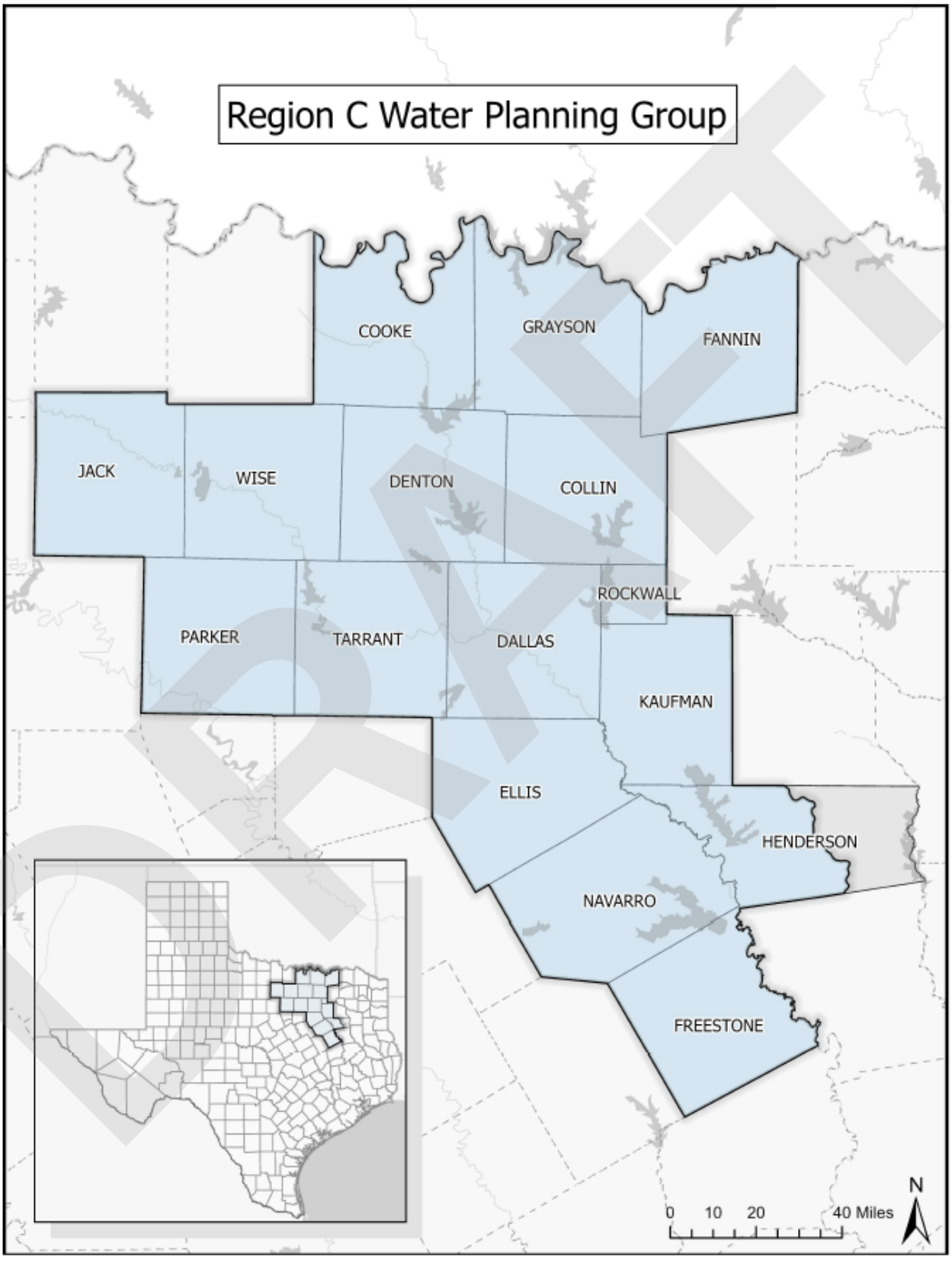
Figure ES-1 Region C Planning Area Map



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1 Introduction

Water shortages during a repeat of the drought of record would likely curtail or eliminate certain economic activity in businesses and industries that rely heavily on water. Insufficient water supplies could not only have an immediate and real impact on the regional economy in the short term, but they could also adversely and chronically affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages could disrupt activity in homes, schools and government, and could adversely affect public health and safety. For these reasons, it is important to evaluate and understand how water supply shortages during drought could impact communities throughout the state.

As part of the regional water planning process, RWPGs must evaluate the social and economic impacts of not meeting water needs (31 Texas Administrative Code §357.33 (c)). Due to the complexity of the analysis and limited resources of the planning groups, the TWDB has historically performed this analysis for the RWPGs upon their request. Staff of the TWDB's Projections & Socioeconomic Analysis department designed and conducted this analysis in support of Region C, and those efforts for this Region C as well as the other 15 regions allow consistency and a degree of comparability in the approach.

This document summarizes the results of the analysis and discusses the methodology used to generate the results. Section 1 provides a snapshot of the region's economy and summarizes the identified water needs in each water use category, which were calculated based on the RWPG's water supply and demand established during the regional water planning process. Section 2 defines each of ten impact assessment measures used in this analysis. Section 3 describes the methodology for the impact assessment and the approaches and assumptions specific to each water use category (i.e., irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Section 4 presents the impact estimates for each water use category with results summarized for the Region as a whole. Appendix A presents a further breakdown of the socioeconomic impacts by county.

1.1 Regional Economic Summary

The Region C Regional Water Planning Area generated more than $636 billion in gross domestic product (2023 dollars) and supported more than 4.7 million jobs in the year 2021, according to the IMPLAN dataset utilized in this socioeconomic analysis. This activity accounted for approximately 33 percent of the state's total gross domestic product of 1.9 trillion dollars for the year 2021 based on IMPLAN. Table 1-1 lists all economic sectors ranked by the total value-added to the economy in Region C. The professional, scientific, and technical services and manufacturing sectors generated 22 percent of the region's total value-added and were also significant sources of tax revenue. The top employers in the region were in professional, scientific, and technical services, health care and social assistance, and finance and insurance sectors. Region C's estimated total population was roughly 7.8 million in 2021, which comprises approximately 27 percent of the state's total population.

To get deeper insights into Region C's economy, it is helpful to examine Region C's industry types. Region C consists of 223 4-digit NAICS (North American Industry Classification System) industries

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with an employment share of 30 percent total jobs in Texas and 27 percent of state's total tax revenue. Trade plays pivotal roles in Region's economy, indicating connections with external markets. Major export commodities include natural gas & crude petroleum, aircrafts, and air transportation services. Major import commodities include refined petroleum products, advertising, public relations, & related services.

This represents a snapshot of the regional economy as a whole, and it is important to note that not all economic sectors were included in the TWDB socioeconomic impact analysis. Data considerations prompted use of only the more water-intensive sectors within the economy because damage estimates could only be calculated for those economic sectors which had both reliable income and water use estimates.

Table 1-1 Region C regional economy by economic sector*

Economic sector	Value-added ($ millions)	Tax ($ millions)	Jobs
Professional, Scientific, and Technical Services	$72,443.32	$680.82	504,779
Manufacturing	$67,433.84	$659.00	300,772
Finance and Insurance	$66,079.96	$2,458.09	427,791
Wholesale Trade	$65,146.82	$4,894.65	224,342
Real Estate and Rental and Leasing	$50,598.31	$4,062.75	255,716
Health Care and Social Assistance	$44,152.02	($1,164.08)	466,051
Retail Trade	$40,269.39	$6,504.56	425,503
Information	$38,945.34	$7,896.49	97,716
Transportation and Warehousing	$33,648.82	($250.52)	344,741
Administrative and Support and Waste Management and Remediation Services	$32,487.18	$445.71	408,319
Mining, Quarrying, and Oil and Gas Extraction	$28,353.72	$5,279.75	51,083
Construction	$27,222.07	($648.28)	256,034
Other Services (except Public Administration)	$21,199.23	$1,502.43	335,291
Accommodation and Food Services	$20,553.75	$51.06	373,168
Management of Companies and Enterprises	$12,049.62	$254.83	80,946
Utilities	$6,668.08	$1,209.94	11,279
Arts, Entertainment, and Recreation	$4,714.86	$190.95	74,771
Educational Services	$4,010.69	$38.39	73,663
Agriculture, Forestry, Fishing and Hunting	$751.00	($49.58)	37,579
Grand Total	**$636,728.01**	**$34,016.95**	**4,749,545**

*Source: 2021 IMPLAN for 546 sectors aggregated by 2-digit NAICS

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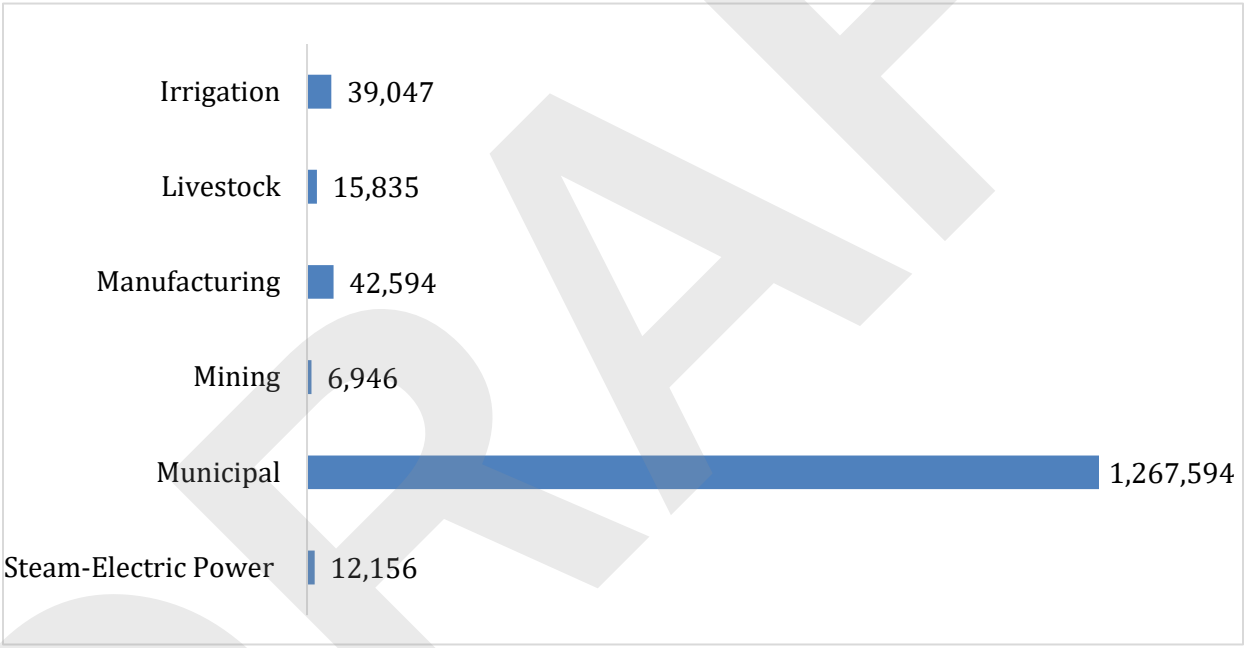
Note that for some sectors, taxes may be negative. This is due to federal subsidies in the sector and the subsequent net value in taxes collected and subsidies paid results in a negative tax payment (i.e., the subsidies paid were larger than the taxes collected for the year). Due to the Covid-19 pandemic, many sectors received more subsidies in the year 2021 than previous years, and the resulting net value for taxes is negative.

1.2 Regional Water Use Summary

While the professional, scientific, and technical services and manufacturing sectors led the region in economic output, the majority (92 percent) of water use occurred in municipal water use in 2021. In fact, almost 27 percent of the state's municipal water use occurred within Region C. Figure 1-1 illustrates Region C's breakdown of the 2021 water use estimates by TWDB water use category.

Figure 1-1 Region C 2021 water use estimates by water use category (in acre-feet)



Source: TWDB Annual Water Use Estimates (all values in acre-feet)

1.3 Identified Regional Water Needs (Potential Shortages)

As part of the regional water planning process, the TWDB adopted water demand projections for water user groups (WUG) in Region C with input from the planning group. WUG-level demand projections were established for utilities that provide more than 100 acre-feet of annual water supply, combined rural areas (designated as county-other), and county-wide water demand projections for five non-municipal categories (irrigation, livestock, manufacturing, mining and steam-electric power) per (31 TAC § 357.10(43)). The RWPG then compared demands to the existing water supplies of each WUG to determine potential shortages, or needs, by decade.

Table 1-2 summarizes the region's identified water needs in the event of a repeat of the drought of record (needs identified in the Initially Prepared Plans). Demand management, such as conservation, or the development of new infrastructure to increase supplies, are water

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management strategies that may be recommended by the planning group to address those needs. This analysis assumes that no strategies are implemented, and that the identified needs correspond to future water shortages. Note that projected water needs generally increase over time, primarily due to anticipated population growth, economic growth, or declining supplies. To provide a general sense of proportion, total projected needs as an overall percentage of total demand by water use category are also presented in aggregate in Table 1-2. Projected needs for individual water user groups within the aggregate can vary greatly and may reach 100% for a given WUG and water use category. A detailed summary of water needs appears in Chapter 4 of the 2026 Region C Regional Water Plan.

Table 1-2 Regional water needs summary by water use category*

Water Use Category		2030	2040	2050	2060	2070	2080
Irrigation	water needs (acre-feet per year)	5,501	5,498	5,498	5,507	5,538	5,584
	% of the category's total water demand	12%	12%	12%	12%	12%	12%
Livestock	water needs (acre-feet per year)	-	-	-	-	-	-
	% of the category's total water demand	0%	0%	0%	0%	0%	0%
Manufacturing	water needs (acre-feet per year)	9,142	19,946	24,070	27,767	31,018	33,740
	% of the category's total water demand	14%	27%	31%	35%	38%	40%
Mining	water needs (acre-feet per year)	123	211	890	2,587	5,105	8,473
	% of the category's total water demand	1%	2%	7%	17%	28%	38%
Municipal**	water needs (acre-feet per year)	219,053	465,306	706,474	928,930	1,127,171	1,295,181
	% of the category's total water demand	12%	23%	31%	38%	43%	46%
Steam-Electric Power	water needs (acre-feet per year)	1,022	5,591	6,845	8,163	9,196	10,034
	% of the category's total water demand	3%	12%	14%	17%	19%	21%

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Total water needs (acre-feet per year)	**234,841**	**496,552**	**743,777**	**972,954**	**1,178,028**	**1,353,012**

*Entries denoted by a dash (-) indicate no identified water need for a given water use category.

** Municipal category consists of residential and non-residential (commercial and institutional) subcategories.

2 Impact Assessment Measures

A required component of the regional and state water plans is to estimate the potential economic and social impacts of potential water shortages during a repeat of the drought of record. Consistent with previous water plans, ten impact measures were estimated and are described in Table 2-1.

Table 2-1 Socioeconomic impact analysis measures

Regional economic impacts	Description
Income losses - value-added	The value of output less the value of intermediate consumption; it is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry, sector, or group of sectors within a year. Value-added measures used in this report have been adjusted to include the direct, indirect, and induced monetary impacts on the region.
Income losses - electrical power purchase costs	Proxy for income loss in the form of additional costs of power as a result of impacts of water shortages.
At risk job losses	Number of part-time and full-time jobs at risk of being lost due to the shortage. These values have been adjusted to include the direct, indirect, and induced employment impacts on the region.
Financial transfer impacts	**Description**
Tax losses on production and imports	Sales and excise taxes not collected due to the shortage, in addition to customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments less subsidies. These values have been adjusted to include the direct, indirect and induced tax impacts on the region.
Water trucking costs	Estimated cost of shipping potable water.
Utility revenue losses	Foregone utility income due to not selling as much water.
Utility tax revenue losses	Foregone miscellaneous gross receipts tax collections.

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Social impacts	Description
Consumer surplus losses	A welfare measure of the lost value to consumers accompanying restricted water use.
At risk population out-migration	Potential population losses accompanying potential job losses.
At risk school enrollment losses	Potential school enrollment losses (K-12) accompanying potential job losses.

2.1 Regional Economic Impacts

The two key measures used to assess regional economic impacts are income losses and at risk job losses. The income losses presented consist of the sum of value-added losses and the additional purchase costs of electrical power.

Income Losses - Value-added Losses

Value-added is the value of total output less the value of the intermediate inputs also used in the production of the final product. Value-added is similar to GDP, a familiar measure of the productivity of an economy. The loss of value-added due to water shortages is estimated by input-output analysis using the IMPLAN software package, and includes the direct, indirect, and induced monetary impacts on the region. The indirect and induced effects are measures of reduced income as well as reduced employee spending for those input sectors which provide resources to the water shortage impacted production sectors.

Income Losses - Electric Power Purchase Costs

The electrical power grid and market within the state is a complex interconnected system. The industry response to water shortages, and the resulting impact on the region, are not easily modeled using traditional input/output impact analysis and the IMPLAN model. Adverse impacts on the region will occur and are represented in this analysis by estimated additional costs associated with power purchases from other generating plants within the region or state. Consequently, the analysis employs additional power purchase costs as a proxy for the value-added impacts for the steam-electric power water use category, and these are included as a portion of the overall income impact for completeness.

For the purpose of this analysis, it is assumed that power companies with insufficient water will be forced to purchase power on the electrical market at a projected higher rate of 5.60 cents per kilowatt hour. This rate is based upon the average day-ahead market purchase price of electricity in Texas that occurred during the recent drought period in 2011. This price is assumed to be comparable to those prices which would prevail in the event of another drought of record.

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At Risk Job Losses

The number of jobs at risk of being lost due to the economic impact is estimated using IMPLAN output associated with each TWDB water use category. Because of the difficulty in predicting outcomes and a lack of relevant data, at risk job loss estimates are not calculated for the steam-electric power category. Furthermore, the estimates of such job losses for the remaining water use sectors do not consider conversion to hybrid or remote employment, as IMPLAN employment estimates are based on the establishment locations.

2.2 Financial Transfer Impacts

Several impact measures evaluated in this analysis are presented to provide additional detail concerning potential impacts on a portion of the economy or government. These financial transfer impact measures include lost tax collections (on production and imports), trucking costs for imported water, declines in utility revenues, and declines in utility tax revenue collected by the state. These measures are not solely adverse, with some having both positive and negative impacts. For example, cities and residents would suffer if forced to pay large costs for trucking in potable water. Trucking firms, conversely, would benefit from the transaction. Additional detail for each of these measures follows.

Tax Losses on Production and Imports

Reduced production of goods and services accompanying water shortages adversely impacts the collection of taxes by state and local government. The regional IMPLAN model is used to estimate reduced tax collections associated with the reduced output in the economy. Impact estimates for this measure include the direct, indirect, and induced impacts for the affected sectors.

Water Trucking Costs

In instances where water shortages for a municipal water user group are estimated by RWPGs to exceed 80 percent of water demands, it is assumed that water would need to be trucked in to support basic consumption and sanitation needs. For water shortages of 80 percent or greater, a fixed, maximum of $45,500[1] per acre-foot of water applied as an economic cost. This water trucking cost was utilized for both the residential and non-residential portions of municipal water needs.

Utility Revenue Losses

Lost utility income is calculated as the price of water service multiplied by the quantity of water not sold during a drought shortage. Such estimates are obtained from utility-specific pricing data provided by the Texas Municipal League, where available, for both water and wastewater. These

[1] Based on a TWDB staff survey of year 2023 water trucking costs in the state. There are many factors and variables that would determine actual water trucking costs including distance, cost of water, and length of drought.

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water rates are applied to the potential water shortage to estimate forgone utility revenue as water providers sold less water during the drought due to restricted supplies.

Utility Tax Losses

Foregone utility tax losses include estimates of forgone miscellaneous gross receipts taxes[2]. Reduced water sales reduce the amount of utility tax that would be collected by the State of Texas for water and wastewater service sales.

2.3 Social Impacts

Consumer Surplus Losses for Municipal Water Users

Consumer surplus loss is a measure of impact to the wellbeing of municipal water users when their water use is restricted. Consumer surplus is the difference between how much a consumer is willing and able to pay for a commodity (i.e., water) and how much they actually have to pay. The difference is a benefit to the consumer's wellbeing since they do not have to pay as much for the commodity as they would be willing to pay. Consumer surplus may also be viewed as an estimate of how much consumers would be willing to pay to keep the original quantity of water which they used prior to the drought. Lost consumer surplus estimates within this analysis only apply to the residential portion of municipal demand, with estimates being made for reduced outdoor and indoor residential use. Lost consumer surplus estimates varied widely by location and degree of water shortage.

At Risk Population and School Enrollment Losses

Population at risk of out-migration due to water shortages, as well as the associated decline in school enrollment, are based upon the at risk job loss estimates discussed in Section 2.1. A simplified ratio of at risk jobs and population out-migration are calculated for the state as a whole based on a recent study of how job layoffs impact the labor market population.[3] For every 100 jobs lost, 14 people were assumed to move out of the area. This ratio does not consider conversion to hybrid or remote employment and subsequent impacts to the labor market population. School enrollment losses are estimated as a proportion of the population at risk of out-migration based upon public school enrollment data from the Texas Education Agency concerning the age K-12 population within the state (approximately 18%).

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[2] https://comptroller.texas.gov/taxes/misc-gross-receipts/

[3] Foote, Andrew, Grosz, Michel, Stevens, Ann. "Locate Your Nearest Exit: Mass Layoffs and Local Labor Market Response." University of California, Davis. April 2015, http://paa2015.princeton.edu/papers/150194. The study utilized Bureau of Labor Statistics data regarding layoffs between 1996 and 2013, as well as Internal Revenue Service data regarding migration, to model the change in the population as the result of a job layoff event. The study found that layoffs impact both out-migration and in-migration into a region, and that a majority of those who did move following a layoff moved to another labor market rather than an adjacent county.

3 Socioeconomic Impact Assessment Methodology

This portion of the report provides a summary of the methodology used to estimate the potential economic impacts of future water shortages. The general approach employed in the analysis was to obtain estimates for at risk income and job losses on the smallest geographic level that the available data would support, tie those values to their accompanying historic water use estimate, and thereby determine a maximum impact per acre-foot of water shortage for each of the socioeconomic measures. The calculations of economic impacts are based on the overall composition of the economy divided into many underlying economic sectors. Sectors in this analysis refer to one or more of the 546 specific production sectors of the economy designated within IMPLAN, the economic impact modeling software used for this assessment. Economic impacts within this report are estimated for approximately 330 of these economic sectors, with the focus on the more water-intensive production sectors. The economic impacts for a single water use category consist of an aggregation of impacts to multiple, related IMPLAN economic sectors.

3.1 Analysis Context

The context of this socioeconomic impact analysis involves situations where there are physical shortages of groundwater or surface water due to a recurrence of drought of record conditions. Anticipated shortages for specific water users may be nonexistent in earlier decades of the planning horizon, yet population growth or greater industrial, agricultural or other sector demands in later decades may result in greater overall demand, exceeding the existing supplies. Estimated socioeconomic impacts measure what would happen if water user groups experience water shortages for a period of one year. Actual socioeconomic impacts would likely become larger as drought of record conditions persist for periods greater than a single year.

3.2 IMPLAN Model and Data

The Input-Output (I-O) model provides a framework to analyze an event like a water shortage during a one-year repeat of the drought of record that impacts interdependent economic sectors. IMPLAN cloud is used as the primary software for estimating the value-added, jobs, and tax related impact measures. IMPLAN is a widely-accepted software model that combines data and analytics to empower a greater understanding of different economic impacts utilizing the foundations of I-O modeling techniques. This analysis employed regional level models, developed utilizing Regional Water Planning Area counties, to determine key economic impacts. IMPLAN was originally developed by the U.S. Forestry Service in the 1970's to model economic activity at varying geographic levels. The model is currently maintained by the IMPLAN Group LLC (implan.com) which collects and sells county and state specific data and software.

IMPLAN currently combines information for 546 IMPLAN industry sectors. For the purpose of this socioeconomic impact analysis, all water-intensive industries are consolidated into six water user categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Estimates of value-added for a water use category is obtained by summing value-added estimates across the relevant IMPLAN sectors associated with that water use category, for which there is

estimated water use in Texas. A similar approach was followed to estimate the number of at risk jobs as well as tax losses on production and imports.

IMPLAN categorizes the impact of water shortage events on value-added, jobs, and tax estimates into three components:

- ***Direct effects*** representing the initial change in the industry analyzed;
- ***Indirect effects*** that are changes in inter-industry transactions as supplying industries respond to reduced demands from the directly affected industries; and,
- ***Induced effects*** that reflect changes in local spending that result from reduced household income among employees in the directly and indirectly affected industry sectors.

3.3 Elasticity of Economic Impacts

The economic impact of a water need is based on the size of the water need relative to the total water demand for each water user group. Smaller water shortages, for example, less than 5 percent, are generally anticipated to result in no initial negative economic impact because water users are assumed to have a certain amount of flexibility in dealing with small shortages. As a water shortage intensifies, however, such flexibility lessens and results in actual and increasing economic losses, eventually reaching a representative maximum impact estimate per unit volume of water. To account for these characteristics, an elasticity adjustment function is used to estimate impacts for the income, tax and job loss measures. Figure 3-1 illustrates this general relationship for the adjustment functions. Negative impacts are assumed to begin accruing when the shortage reaches the lower bound 'b1' (5 percent in Figure 3-1), with impacts then increasing linearly up to the 100 percent impact level (per unit volume) once the upper bound reaches the 'b2' level shortage (40 percent in Figure 3-1).

To illustrate this, if the total annual value-added for manufacturing in the region was $2 million and the reported annual volume of water used in that industry is 10,000 acre-feet, the estimated economic measure of the water shortage would be $200 per acre-foot. The economic impact of the shortage would then be estimated using this value-added amount as the maximum impact estimate ($200 per acre-foot) applied to the anticipated shortage volume and then adjusted by the elasticity function. Using the sample elasticity function shown in Figure 3-1, an approximately 22 percent shortage in the manufacturing category would indicate an economic impact estimate of 50% of the original $200 per acre-foot impact value (i.e., $100 per acre-foot).

Such adjustments are not required in estimating lost consumer surplus, utility revenue losses, or utility tax losses. Estimates of lost consumer surplus rely on utility-specific demand curves with the lost consumer surplus estimate calculated based on the relative percentage of the utility's water shortage. Estimated changes in population and school enrollment are indirectly related to the elasticity of job losses.

Assumed values for the lower and upper bounds 'b1' and 'b2' vary by water use category and are presented in Table 3-1.

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Figure 3-1 Example economic impact elasticity function (as applied to a single water user's shortage)

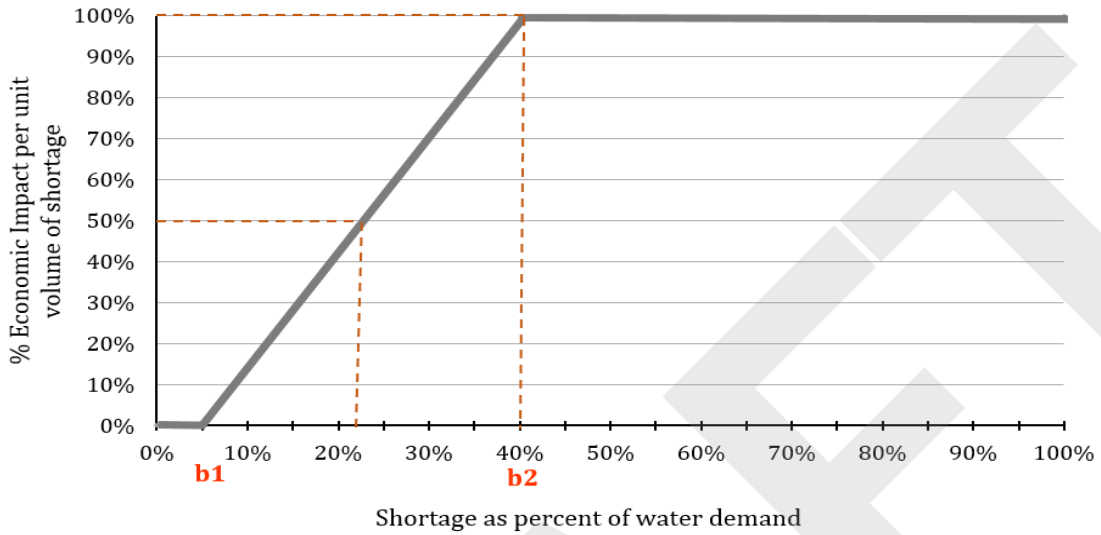

Table 3-1 Economic impact elasticity function lower and upper bounds

Water use category	Lower bound (b1)	Upper bound (b2)
Irrigation	**5%**	**40%**
Livestock	**5%**	**10%**
Manufacturing	**5%**	**40%**
Mining	**5%**	**40%**
Municipal (non-residential water intensive subcategory)	**5%**	**40%**
Steam-electric power	**N/A**	**N/A**

3.4 Analysis Assumptions and Limitations

The modeling of complex systems requires making many assumptions and acknowledging the model's uncertainty and limitations. This is particularly true when attempting to estimate a wide range of socioeconomic impacts over a large geographic area and into future decades. Some of the key assumptions and limitations of this methodology include:

1. The foundation for estimating the socioeconomic impacts of water shortages resulting from a drought are the water needs (potential shortages) that were identified by RWPGs as part of the regional water planning process. These needs have some uncertainty associated with them but serve as a reasonable basis for evaluating the potential impacts of a drought of record event.

2. All estimated socioeconomic impacts are snapshots for years in which water needs were identified (i.e., 2030, 2040, 2050, 2060, 2070, and 2080). The estimates are independent and distinct "what if" scenarios for each particular year, and water shortages are assumed to be temporary events resulting from a single year recurrence of drought of record conditions. The evaluation assumed that no recommended water management strategies are implemented. Note that the estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

3. Because the overarching context of this analysis is a one-year repeat drought of record, it is assumed that water-related utilities and companies would not implement mitigation measures or shock absorbers within such a short timeframe. Therefore, estimated impacts to the economy in this report may appear higher than if mitigation strategies were implemented in the short-term. If faced with drought over a longer timeframe, individual utilities and companies might alter their behavior to induce more efficient use of the limited water supplies available to them.

4. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. IMPLAN Input-output analysis is a backward-looking model, as it only reflects effects of input industries. This presumes that the relative contributions of all sectors of the economy would remain the same, regardless of changes in technology, availability of limited resources, and other structural changes to the economy that may occur in the future. Changes in water use efficiency will undoubtedly take place in the future as supplies become more stressed. Use of the static IMPLAN structure was a significant assumption and simplification considering the 50-year time period examined in this analysis. To presume an alternative future economic makeup, however, would entail positing many other major assumptions that would very likely generate as much or more error.

5. This is not a form of cost-benefit analysis. That approach to evaluating the economic feasibility of a specific policy or project employs discounting future benefits and costs to their present value dollars using some assumed discount rate. The methodology employed in this effort to estimate the economic impacts of future water shortages did not use any discounting methods to weigh future costs differently through time.

6. All monetary values originally based upon year 2021 IMPLAN and other sources are reported in constant year 2023 dollars to be consistent with the water management strategy requirements in the State Water Plan.

7. IMPLAN based loss estimates (income-value-added, jobs, and taxes on production and imports) are calculated only for those IMPLAN sectors for which the TWDB's Water Use Survey (WUS) data was available and deemed reliable. Every effort is made in the annual WUS effort

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to capture all relevant firms who are significant water users. Lack of response to the WUS, or omission of relevant firms, impacts the loss estimates.

8. Impacts are annual estimates. The socioeconomic analysis does not reflect the full extent of impacts that might occur as a result of persistent water shortages occurring over an extended duration. The drought of record in most regions of Texas lasted several years.

9. Loss in value-added estimates are the primary estimate of the economic impacts within this report. One may be tempted to add consumer surplus impacts to obtain an estimate of total adverse economic impacts to the region, but the consumer surplus measure represents the change to the wellbeing of households (and other water users), not an actual change in the flow of dollars through the economy. The two measures (value-added and consumer surplus) are both valid impacts but ideally should not be summed.

10. The value-added, jobs, and taxes on production and import impacts include the direct, indirect and induced effects to capture backward linkages in the economy described in Section 2.1. Population and school enrollment at risk of out-migration also indirectly include such effects as they are based on the associated losses in employment. The remaining measures (consumer surplus, utility revenue, utility taxes, additional electrical power purchase costs, and potable water trucking costs), however, do not include any induced or indirect effects.

11. The majority of impacts estimated in this analysis may be more conservative (i.e., smaller) than those that might actually occur under drought of record conditions due to not including impacts in the forward linkages in the economy. Input-output models such as IMPLAN only capture backward linkages on suppliers (including households that supply labor to directly affected industries). While this is a common limitation in this type of economic modeling effort, it is important to note that forward linkages on the industries that use the outputs of the directly affected industries can also be very important. A good example is impacts on livestock operators. Livestock producers tend to suffer substantially during droughts, not because there is not enough water for their stock, but because reductions in available pasture and higher prices for purchased hay have significant economic effects on their operations. Food processors could be in a similar situation if they cannot get the grains or other inputs that they need. These effects are not captured in IMPLAN, resulting in conservative impact estimates.

12. The model does not reflect dynamic economic responses to water shortages as they might occur, nor does the model reflect economic impacts associated with a recovery from a drought of record including:
    a. The likely significant economic rebound to some industries immediately following a drought, such as landscaping;
    b. The cost and time to rebuild liquidated livestock herds (a major capital investment in that industry);
    c. Direct impacts on recreational sectors (i.e., stranded docks and reduced tourism); or,
    d. Impacts of negative publicity on Texas' ability to attract population and business in the event that it was not able to provide adequate water supplies for the existing economy.

13. Estimates for at risk job losses and the associated population and school enrollment changes may exceed what would actually occur. In practice, firms may be hesitant to lay off employees, even in difficult economic times. Estimates of potential population and school enrollment changes are based on regional evaluations and therefore do not necessarily reflect what might occur on a statewide basis.

14. **The results must be interpreted carefully. It is the general and relative magnitudes of impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers.** Analyses of this type are much better at predicting relative percent differences brought about by a shock to a complex system (i.e., a water shortage) than the precise size of an impact. To illustrate, assuming that the estimated economic impacts of a drought of record on the manufacturing and mining water user categories are $2 and $1 million, respectively, one should be more confident that the economic impacts on manufacturing are twice as large as those on mining and that these impacts will likely be in the millions of dollars. But one should have less confidence that the actual total economic impact experienced would be $3 million.

15. The methodology does not capture "spillover" effects between regions – or the secondary impacts that occur outside of the region where the water shortage is projected to occur.

16. The methodology that the TWDB has developed for estimating the economic impacts of unmet water needs, and the assumptions and models used in the analysis, are specifically designed to estimate potential economic effects at the regional and county levels. Although it may be tempting to add the regional impacts together in an effort to produce a statewide result, the TWDB cautions against that approach for a number of reasons. The IMPLAN modeling (and corresponding economic multipliers) are all derived from regional models – a statewide model of Texas would produce somewhat different multipliers. As noted in point 14 within this section, the regional modeling used by TWDB does not capture spillover losses that could result in other regions from unmet needs in the Region analyzed, or potential spillover gains if decreased production in one region leads to increases in production elsewhere. The assumed drought of record may also not occur in every region of Texas at the same time, or to the same degree.

4 Analysis Results

This section presents estimates of potential economic impacts that could reasonably be expected in the event of water shortages associated with a drought of record and if no recommended water management strategies were implemented. Projected economic impacts for the six water use categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power) are reported by decade.

4.1 Impacts for Irrigation Water Shortages

Seven of the 16 counties in the Region are projected to experience water shortages in the irrigated agriculture water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-1. Note that tax collection impacts were not estimated for this water use category. IMPLAN data indicates a negative tax impact (i.e., increased tax collections) for the associated production sectors, primarily due to past subsidies from the federal government. However, it was not considered realistic to report increasing tax revenues during a drought of record.

Table 4-1 Impacts of water shortages on irrigation

Impact measure	2030	2040	2050	2060	2070	2080
Income losses ($ millions)*	$15	$15	$15	$15	$15	$15
At risk job losses	1,419	1,419	1,419	1,419	1,419	1,419

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.2 Impacts for Livestock Water Shortages

None of the 16 counties in the Region are projected to experience water shortages in the livestock water use category. Estimated impacts to this water use category appear in Table 4-2.

Table 4-2 Impacts of water shortages on livestock

Impact measure	2030	2040	2050	2060	2070	2080
Income losses ($ millions)*	$-	$-	$-	$-	$-	$-
At risk job losses	-	-	-	-	-	-
Tax losses on production and imports ($ millions)*	$-	$-	$-	$-	$-	$-

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.3 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the Region are projected to occur in 13 of the 16 counties for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 4-3.

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Table 4-3 Impacts of water shortages on manufacturing

Impacts measure	2030	2040	2050	2060	2070	2080
Income losses ($ millions)*	$5,924	$18,476	$26,388	$36,499	$45,656	$51,626
At risk job losses	38,439	111,828	154,145	206,992	254,656	287,029
Tax losses on production and Imports ($ millions)*	$157	$528	$782	$1,101	$1,390	$1,583

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.4 Impacts of Mining Water Shortages

Five of the 16 counties in the Region are projected to experience water shortages in the mining water use category. Estimated impacts to this water use type appear in Table 4-4.

Table 4-4 Impacts of water shortages on mining

Impacts measure	2030	2040	2050	2060	2070	2080
Income losses ($ millions)*	$-	$6	$54	$272	$684	$1,320
At risk job losses	-	21	217	1,241	3,126	5,870
Tax losses on production and Imports ($ millions)*	$-	$1	$5	$23	$57	$112

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.5 Impacts for Municipal Water Shortages

Fourteen of the 16 counties in the Region are projected to experience water shortages in the municipal water use category for one or more decades within the planning horizon.

Impact estimates were made for two sub-categories within municipal water use: residential and non-residential. Non-residential municipal water use includes commercial and institutional users, which are further divided into non-water-intensive and water-intensive subsectors including car wash, laundry, hospitality, health care, recreation, and education. Lost consumer surplus estimates were made only for needs in the residential portion of municipal water use. Available IMPLAN and TWDB Water Use Survey data for the non-residential, water-intensive portion of municipal demand allowed these sectors to be included in income, jobs, and tax loss impact estimate.

Trucking cost estimates, calculated for shortages exceeding 80 percent, assumed a fixed, maximum cost of $45,500 per acre-foot to transport water for municipal use. The estimated impacts to this water use category appear in Table 4-5.

Table 4-5 Impacts of water shortages on municipal water users

Impacts measure	2030	2040	2050	2060	2070	2080
Income losses[1] ($ millions)*	$762	$2,319	$4,499	$6,854	$8,738	$10,193
At risk job losses [1]	8,223	25,030	48,563	73,997	94,341	110,044
Tax losses on production and imports[1] ($ millions)*	$28	$85	$165	$251	$320	$373
Trucking costs ($ millions)*	$-	$7	$41	$123	$294	$482
Utility revenue losses ($ millions)*	$894	$1,974	$3,068	$4,059	$4,965	$5,732
Utility tax revenue losses ($ millions)*	$17	$38	$58	$77	$93	$107

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.6 Impacts of Steam-Electric Power Water Shortages

Five of the 21 counties in the Region are projected to experience water shortages in the steam-electric water category. Estimated impacts to this water use category appear in Table 4-6.

Note that estimated economic impacts to steam-electric power water users:

- Are reflected as an income loss proxy in the form of estimated additional purchasing costs for power from the electrical grid to replace power that could not be generated due to a shortage;
- Do not include estimates of impacts on jobs. Because of the unique conditions of power generators during drought conditions and lack of relevant data, it was assumed that the industry would retain, perhaps relocating or repurposing, their existing staff in order to manage their ongoing operations through a severe drought.
- Do not presume a decline in tax collections. Associated tax collections, in fact, would likely increase under drought conditions since, historically, the demand for electricity increases during times of drought, thereby increasing taxes collected on the additional sales of power.

Table 4-6 Impacts of water shortages on steam-electric power

Impacts measure	2030	2040	2050	2060	2070	2080
Income Losses ($ millions)*	$166	$910	$1,114	$1,329	$1,497	$1,633

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.7 Regional Social Impacts

Projected changes in population, based upon several factors (household size, population, and job loss estimates), as well as the accompanying change in school enrollment, were also estimated and are summarized in Table 4-7.

Table 4-7 Region-wide social impacts of water shortages

Impacts measure	2030	2040	2050	2060	2070	2080
Consumer surplus losses ($ millions)*	$179	$624	$1,498	$2,698	$4,184	$5,609
At risk population out-migration	6,885	19,804	29,262	40,618	50,627	57,905
At risk school enrollment losses	1,257	3,614	5,340	7,413	9,239	10,568

* Year 2023 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

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Appendix A - County Level Summary of Estimated Economic Impacts

County level summary of estimated regional economic impacts of not meeting identified water needs by water use category and decade (in 2023 dollars, rounded). Values are presented only for counties with projected economic impacts for at least one decade.
(* Entries denoted by a dash (-) indicate no estimated economic impact)

		Income losses ($ millions)						At risk job losses					
County	**Water Use Category**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Collin	Manufacturing	$ 97.39	$ 1,240.55	$ 3,250.18	$ 5,223.77	$ 6,148.15	$ 6,768.79	546	6,951	18,211	29,270	34,449	37,927
Collin	Municipal	$ 45.79	$ 380.46	$ 985.24	$ 1,541.71	$ 1,790.15	$ 1,958.76	494	4,107	10,636	16,644	19,326	21,147
Collin Total		$ 143.18	$ 1,621.01	$ 4,235.42	$ 6,765.48	$ 7,938.30	$ 8,727.55	1,040	11,058	28,847	45,914	53,776	59,074
Cooke	Municipal	$ 0.02	$ 0.07	$ 0.10	$ 0.12	$ 0.14	$ 0.15	0	1	1	1	1	2
Cooke Total		$ 0.02	$ 0.07	$ 0.10	$ 0.12	$ 0.14	$ 0.15	0	1	1	1	1	2
Dallas	Manufacturing	$ 75.40	$ 673.83	$ 1,762.93	$ 2,910.67	$ 4,175.36	$ 5,364.48	469	4,192	10,968	18,109	25,977	33,375
Dallas	Municipal	$ 215.46	$ 505.01	$ 881.19	$ 1,253.88	$ 1,631.59	$ 1,986.35	2,325	5,450	9,509	13,531	17,607	21,435
Dallas Total		$ 290.86	$ 1,178.84	$ 2,644.12	$ 4,164.55	$ 5,806.95	$ 7,350.83	2,794	9,642	20,477	31,640	43,584	54,810
Denton	Manufacturing	$ -	$ -	$ 240.76	$ 678.22	$ 1,231.61	$ 1,486.57	-	-	1,211	3,411	6,194	7,476
Denton	Municipal	$ 43.22	$ 306.93	$ 802.54	$ 1,135.61	$ 1,473.62	$ 1,771.32	466	3,312	8,661	12,255	15,902	19,115
Denton Total		$ 43.22	$ 306.93	$ 1,043.31	$ 1,813.83	$ 2,705.23	$ 3,257.89	466	3,312	9,871	15,666	22,096	26,591
Ellis	Irrigation	$ 0.34	$ 0.34	$ 0.34	$ 0.34	$ 0.34	$ 0.34	33	33	33	33	33	33
Ellis	Manufacturing	$ 826.72	$ 721.86	$ 965.84	$ 1,304.04	$ 1,712.19	$ 2,253.00	5,507	4,808	6,434	8,686	11,405	15,008
Ellis	Municipal	$ 15.09	$ 26.63	$ 45.14	$ 77.65	$ 141.18	$ 201.77	163	288	487	839	1,525	2,179
Ellis Total		$ 842.15	$ 748.83	$ 1,011.31	$ 1,382.03	$ 1,853.72	$ 2,455.10	5,703	5,129	6,954	9,558	12,963	17,219
Fannin	Irrigation	$ 14.59	$ 14.59	$ 14.59	$ 14.59	$ 14.59	$ 14.59	1,386	1,386	1,386	1,386	1,386	1,386
Fannin	Mining	$ -	$ -	$ -	$ 60.87	$ 184.79	$ 273.82	-	-	-	331	1,004	1,487
Fannin	Municipal	$ 0.00	$ 0.32	$ 1.64	$ 7.72	$ 33.00	$ 50.23	0	4	18	83	356	542
Fannin Total		$ 14.60	$ 14.92	$ 16.23	$ 83.19	$ 232.38	$ 338.64	1,386	1,389	1,403	1,800	2,746	3,415
Freestone	Steam Electric Power	$ -	$ 485.46	$ 582.00	$ 683.09	$ 767.58	$ 840.35	-	-	-	-	-	-
Freestone Total		$ -	$ 485.46	$ 582.00	$ 683.09	$ 767.58	$ 840.35	-	-	-	-	-	-
Grayson	Manufacturing	$ 1,667.31	$ 7,958.78	$ 8,244.56	$ 8,496.02	$ 8,769.82	$ 8,889.57	11,123	53,096	55,003	56,681	58,507	59,306
Grayson	Municipal	$ 72.25	$ 139.89	$ 193.76	$ 244.13	$ 311.01	$ 354.64	780	1,510	2,091	2,634	3,356	3,827

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		Income losses ($ millions)						At risk job losses					
County	**Water Use Category**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Grayson Total		$ 1,739.55	$ 8,098.67	$ 8,438.33	$ 8,740.15	$ 9,080.83	$ 9,244.21	11,903	54,606	57,094	59,315	61,863	63,133
Henderson	Manufacturing	$ 1,764.76	$ 1,862.45	$ 1,970.54	$ 2,082.79	$ 2,195.03	$ 2,309.36	13,855	14,622	15,471	16,352	17,234	18,131
Henderson	Municipal	$ 5.97	$ 6.94	$ 8.07	$ 16.66	$ 39.67	$ 57.05	64	75	87	180	428	616
Henderson Total		$ 1,770.73	$ 1,869.39	$ 1,978.61	$ 2,099.45	$ 2,234.71	$ 2,366.41	13,920	14,697	15,558	16,532	17,662	18,747
Jack	Steam Electric Power	$ 84.17	$ 147.49	$ 180.87	$ 218.96	$ 248.10	$ 270.57	-	-	-	-	-	-
Jack Total		$ 84.17	$ 147.49	$ 180.87	$ 218.96	$ 248.10	$ 270.57	-	-	-	-	-	-
Kaufman	Manufacturing	$ 0.92	$ 11.31	$ 29.37	$ 46.23	$ 53.23	$ 58.68	7	82	214	336	387	427
Kaufman	Mining	$ -	$ -	$ 11.82	$ 80.05	$ 163.86	$ 243.19	-	-	64	435	890	1,321
Kaufman	Municipal	$ 2.08	$ 22.18	$ 70.17	$ 131.69	$ 178.37	$ 213.00	23	240	760	1,428	1,936	2,313
Kaufman	Steam Electric Power	$ 15.95	$ 40.21	$ 60.89	$ 74.56	$ 82.37	$ 87.75	-	-	-	-	-	-
Kaufman Total		$ 18.96	$ 73.71	$ 172.25	$ 332.53	$ 477.85	$ 602.62	29	322	1,038	2,198	3,213	4,060
Navarro	Manufacturing	$ -	$ -	$ 13.79	$ 57.65	$ 132.80	$ 234.51	-	-	98	411	946	1,670
Navarro	Mining	$ -	$ -	$ -	$ -	$ 0.82	$ 38.77	-	-	-	-	4	211
Navarro	Municipal	$ 0.01	$ 0.03	$ 0.57	$ 2.25	$ 5.20	$ 9.29	0	0	6	24	56	101
Navarro Total		$ 0.01	$ 0.03	$ 14.36	$ 59.90	$ 138.83	$ 282.57	0	0	104	435	1,007	1,982
Parker	Irrigation	$ 0.03	$ 0.02	$ 0.02	$ 0.01	$ 0.01	$ 0.00	1	1	0	0	0	0
Parker	Manufacturing	$ 0.60	$ 4.48	$ 8.20	$ 22.51	$ 29.17	$ 45.43	4	26	48	132	170	265
Parker	Mining	$ -	$ -	$ -	$ -	$ 9.78	$ 55.72	-	-	-	-	50	285
Parker	Municipal	$ 3.14	$ 24.22	$ 68.33	$ 130.14	$ 184.05	$ 238.99	35	263	740	1,408	1,990	2,583
Parker Total		$ 3.78	$ 28.73	$ 76.55	$ 152.67	$ 223.00	$ 340.14	39	290	788	1,539	2,210	3,133
Rockwall	Manufacturing	$ 6.40	$ 76.13	$ 195.84	$ 308.10	$ 353.86	$ 390.47	49	587	1,510	2,375	2,728	3,010
Rockwall	Municipal	$ 1.56	$ 24.62	$ 81.65	$ 154.56	$ 187.19	$ 207.82	17	266	881	1,668	2,020	2,243
Rockwall Total		$ 7.96	$ 100.75	$ 277.49	$ 462.66	$ 541.06	$ 598.29	66	853	2,391	4,043	4,748	5,253
Tarrant	Manufacturing	$ 1,484.66	$ 5,926.64	$ 9,704.59	$ 15,365.07	$ 20,849.34	$ 23,818.55	6,879	27,462	44,968	71,197	96,610	110,368
Tarrant	Municipal	$ 346.49	$ 853.30	$ 1,306.59	$ 2,071.29	$ 2,633.64	$ 2,982.35	3,740	9,213	14,108	22,366	28,440	32,206
Tarrant	Steam Electric Power	$ 1.63	$ 123.89	$ 151.89	$ 184.12	$ 208.54	$ 227.26	-	-	-	-	-	-
Tarrant Total		$ 1,832.78	$ 6,903.83	$ 11,163.07	$ 17,620.49	$ 23,691.53	$ 27,028.16	10,620	36,675	59,076	93,563	125,049	142,574
Wise	Irrigation	$ -	$ -	$ -	$ -	$ -	$ 0.00	-	-	-	-	-	0
Wise	Manufacturing	$ -	$ -	$ 1.05	$ 3.45	$ 5.15	$ 6.94	-	-	10	33	49	66

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		Income losses ($ millions)						At risk job losses					
County	**Water Use Category**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Wise	Mining	$ -	$ 5.76	$ 42.17	$ 131.23	$ 324.96	$ 708.08	-	21	153	476	1,178	2,567
Wise	Municipal	$ 10.74	$ 28.05	$ 53.54	$ 86.78	$ 129.46	$ 160.91	116	303	578	936	1,397	1,736
Wise	Steam Electric Power	$ 64.63	$ 113.14	$ 138.70	$ 168.17	$ 190.47	$ 207.57	-	-	-	-	-	-
Wise Total		$ 75.37	$ 146.96	$ 235.46	$ 389.63	$ 650.04	$ 1,083.49	116	324	741	1,445	2,624	4,369
Region C Total		**$ 6,867.34**	**$ 21,725.61**	**$ 32,069.46**	**$ 44,968.72**	**$ 56,590.24**	**$ 64,786.96**	**48,082**	**138,298**	**204,344**	**283,649**	**353,542**	**404,362**

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Addendum to Socioeconomic Impact Analysis for the 2026 Regional Water Plans

After the release of the socioeconomic impact analysis regional reports, the TWDB determined that a portion of the multi-faceted socio-economic impact estimates likely include upwardly biased impact results. It appears that the baseline value-added per acre-foot, used to determine the final drought degree adjusted impact estimates, may be inflated for the manufacturing water use sector. A similar conclusion applies for the estimates for jobs at risk and tax collections within that sector since all three measures rely upon a similar calculation procedure and required datasets.

Initial estimates for the value-added per acre-foot of water use are obtained using IMPLAN data coupled with TWDB Water Use Survey data. These calculations are limited to production subsectors (4-digit NAICS codes) for which TWDB Water Use Survey data was available and deemed reliable. These value-added estimates are adjusted downward, if necessary, to better correspond to the footprint of the data collected in the Water Use Survey. This is done to better match the productivity estimate from IMPLAN with the quantitative estimate of the water used to produce that output. The adjustment process involves using the proportion of the number of firms surveyed in the Water Use Survey versus the number of firms in the U.S. Census County Business Pattern data, limited to those firms with more than 50 employees. This approach assumes that the Water Use Survey captures water use from the larger water users in the state for the manufacturing sector.

Historically, this methodology has served the socio-economic impact estimation effort well, yet several factors have combined to result in likely upwardly biased estimates during this cycle that include:

- Adherence to the usual 5-year increment to access baseline IMPLAN value-added estimates prompted use of year 2021 data, a year with significant economic impacts as well as data collection issues prompted by the COVID pandemic, and
- Increased data suppression (reduced geographic data coverage) within the U.S. Census County Business Pattern Employment Data

This addendum is to make consumers of this analysis aware of the potentially skewed results for the manufacturing sector. Factors that are at play in this likely overestimated impact include: abnormal data collection results accompanying the COVID pandemic resulting in much higher than normal impact estimates for this water use sector, and reality-check values for the value-added per acre-foot of water that are almost non-existent within the research literature. The few research-based values that do exist, however, apply for periods ten or more years ago and/or foreign countries. Neither of these sources are deemed as being reliable for determining a reasonable upper bound or reliable estimate for this unique impact measure. The net effect is believed to overstate large projected income losses, jobs at risk, and tax collections within the manufacturing sector. This likely impacts a number of the sixteen planning regions but cannot be conclusively determined prior to planning groups needing to adopt their final regional water plans.

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Appendix M

Summary of Drought Responses

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APPENDIX M SUMMARY OF DROUGHT RESPONSE

TABLE	ITEM	PAGE NUMBER
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M-2	Potential Emergency Supply Options	M-62

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Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
Major Water Providers											
Forth Worth, City of (CFW)	May-2024	WWP/WUG	TRWD	Lake Bridgeport, Eagle Mountain Lake, Lake Worth, Lake Benbrook, Cedar Creek Reservoir, Richland-Chambers Reservoir	3	• Water demand reaches or exceeds 90% of reliable treatment capacity for three consecutive days. The treatment capacity could be citywide or in a specified portion of the system. • Fort Worth's water demand for all or part of the delivery system approaches treatment capacity because treatment capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • TRWD initiated Stage 1 – Water Watch for one or more of the following reasons: o Total combined raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 75% (25% depleted) of conservation storage capacity. o TRWD water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. o One or more of TRWD's water supply sources has become limited in availability. o TRWD water demand is projected to approach the limit of permitted supply. o TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). o TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. o The TRWD General Manager finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Water demand reaches or exceeds 95% of reliable treatment capacity for three consecutive days. The treatment capacity could be citywide or in a specified portion of the system. • Demand for all or part of the delivery system equals or exceeds treatment capacity because treatment capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • TRWD initiated Stage 2 – Water Warning for one or more of the following reasons: o Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. o TRWD water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. o One or more of TRWD's water supply sources has become limited in availability. o TRWD water demand is projected to approach the limit of permitted supply. o TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species). o TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. o The TRWD General Manager finds that conditions warrant the declaration of a Stage 2 drought.	10%	• Water demand reaches or exceeds 98% of reliable treatment capacity for one day. The treatment capacity could be citywide or in a specified portion of the system. • Demand for all or part of the delivery system exceeds treatment capacity because treatment capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • TRWD has initiated Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: o Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity. o TRWD water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. o TRWD water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. o One or more of TRWD's water supply sources has become limited in availability. o TRWD water demand is projected to approach the limit of permitted supply. o TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). o TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. o The TRWD General Manager finds that conditions warrant the declaration of a Stage 3 drought.	20%
Dallas (DWU)	Apr-2024	WWP/WUG	N/A	Lake Ray Roberts, Lewisville Lake, Grapevine Lake, Elm Fork Channel of the Trinity River, Lake Ray Hubbard, Lake Tawakoni, Lake Fork, Lake Palestine (unconnected), White Rock Lake, Return Flows into Lakes Lewisville,	3	• Either:(1) the total raw water supply in connected lakes (east and west); or, (2) the western lakes; or, (3) the eastern lakes have dropped below 65% (35% depleted) of DWU's share of the total conservation storage of the lakes; or • Water demand has reached or exceeded 85% of delivery capacity for 4 consecutive days; or • Water demand approaches a reduced delivery capacity for all or part of the system, as determined by DWU; or • Water line breaks or pump or system failures, which impact the ability of DWU to provide treated water service; or • Natural or man-made contamination of the water • supply source(s) occurs	5%	• Either: (1) the total raw water supply in connected lakes (east and west); or, (2) the western lakes; or, (3) the eastern lakes have dropped below 50% (50% depleted) of DWU's share of the total conservation storage of the lakes; or • Water demand has reached or exceeded 90% of delivery capacity for 3 consecutive days; or • Water demand equals a reduced delivery capacity for all or part of the system, as determined by DWU; or • Water line breaks or pump or system failures occur, which impact the ability of DWU to provide treated water service; or • Natural or man-made contamination of the water supply source(s) occurs.	15%	• Either (1) the total raw water supply in connected lakes (east and west) or (2) the western lakes or (3) the eastern lakes have dropped below 35% (65% depleted) of DWU's share of the total conservation storage; or • Water demand has reached or exceeded 95% of delivery capacity for 2 consecutive days; or • Water demand exceeds a reduced delivery capacity for all or part of the system, as determined by DWU; or • Water line breaks or pump or system failures occur, which impact the ability of DWU to provide treated water service; or • Natural or man-made contamination of the water supply source(s) occurs	20%

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Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
				Ray Roberts and Ray Hubbard							
North Texas Municipal Water District (NTMWD)	Jan-2024	WWP	N/A	Lake Lavon, Jim Chapman Lake, Lake Texoma, SRA Upper Sabine Basin (Lake Tawakoni, Lake Fork), Lake Bonham, East Fork Raw Water Supply Project (wetland) Wilson Creek Reuse, Direct Reuse for Irrigation (Collin, Kaufman, Rockwall Counties), Main Stem Pump Station (reuse)		• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than: 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than: 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than: 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability.	30%
Tarrant Regional Water District (TRWD)	May-2024	WWP	N/A	Lake Bridgeport, Eagle Mountain Lake, Lake Benbrook, Cedar Creek Reservoir, George W. Shannon Wetlands	3	• Total combined raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 75% (25% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). • ▪ Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species). • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 2 drought.	10%	• Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e.,invasive species). • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 3 drought.	20%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Trinity River Authority (Livingston Wallisville)	May 2024	WWP	N/A	TRA Sources	3	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity; • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate; • Water demand is projected to approach the limit of permitted supply; • Supply source becomes contaminated; and Water supply system is unable to deliver water due to the failure or damage of major water system components.	5%	• Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). • Water supply system is unable to deliver water due to the failure or damage of major water system components. Independent of actions by TRWD, the General Manager may at his or her discretion find that conditions warrant the declaration of a Stage 2 drought.	10%	• Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity. Water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). Water supply system is unable to deliver water due to the failure or damage of major water system components.	25%
Trinity River Authority (Tarrant County Water Supply Project)	Apr-2024	WWP	N/A	TRWD Sources	3	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity; • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate; • Water demand is projected to approach the limit of permitted supply; • Supply source becomes contaminated; • Water supply system is unable to deliver water due to the failure or damage of major water system components; and The General Manager finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity; • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate; • Water demand is projected to approach the limit of permitted supply; • Supply source becomes contaminated; • Water supply system is unable to deliver water due to the failure or damage of major water system components; and The General Manager finds that conditions warrant the declaration of a Stage 2 drought. Subject to preceding paragraphs regarding the Termination of a Drought Response	10%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity; Water demand exceeds the amount that can be delivered to customers; • Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate; • One or more of TRWD's water supply sources has become limited in availability; • Water demand is projected to approach the limit of permitted supply; • Supply source becomes contaminated; • Water supply system is unable to deliver water due to the failure or damage of major water system components; and The General Manager finds that conditions warrant the declaration of a Stage 3 drought.	20%
Upper Trinity Regional Water District (UTRWD)	May-2024	WWP	N/A	DWU sources	3	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 75% (25% depleted) during the time period from April 1 to October 31; or • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities has initiated Stage 1 and given notice to Upper Trinity; or • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days; or • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the transmission system, as determined by Upper Trinity; or • The Executive Director, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 1.	5%	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 60% (40% depleted) during the time period from April 1 to October 31; or • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities has initiated Stage 2 and given notice to Upper Trinity; or • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days; or • Water demand has reached a level that is causing a reduced delivery capacity for all or part of the transmission system, as determined by Upper Trinity; or • The transmission system is unable to deliver water at normal rates due to failure of, or damage to, major water system components; or • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source; or • The Executive Director, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 2.	10%	The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 45% (55% depleted) during the time period from April 1 to October 31; or • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities has initiated Stage 3 and given notice to Upper Trinity; or • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days; or • Water demand exceeds the delivery capacity for all or part of the transmission system, as determined by Upper Trinity; or • The transmission system is unable to deliver water in adequate quantities due to failure of, or damage to, major water system components; or • Interruption of one or more water supply sources; or • Natural or man-made contamination of an Upper Trinity water supply source(s) that threatens water availability; or • The Executive Director, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 3.	20%

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Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
Regional Water Providers											
Corsicana, City of	May-2024	WWP	N/A	Lake Halbert, Navarro Mills Reservoir, Richland-Chambers Reservoir	4	Mild water shortage condition exists when the combined pro rata storage in Lake Halbert, Navarro Mills Reservoir, and Richland-Chambers Reservoir is equal to or less than 96,050 acre feet.	5%	Moderate water shortage condition exists when the combined pro rata storage in Lake Halbert, Navarro Mills Reservoir, and Richland-Chambers Reservoir is equal to or less than 71,679 acre feet.	10%	Severe water shortage condition exists when the combined pro rata storage in Lake Halbert, Navarro Mills Reservoir, and Richland-Chambers Reservoir is equal to or less than 47,308 acre feet.	30%
Greater Texoma Utility Authority (GTUA)	May-2024	WWP	NTMWD	NTMWD Sources, Lake Texoma	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	30%
Water User Group											
Allen, City of	April-2024	WUG	NTMWD	NTMWD sources	3	•The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. •One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. •The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. •Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) •A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. •Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. •The combined storage level, as published by the Texas Water Development Board, in Lavon Lake and Bois d'Arc Lake is less than 70 percent of the conservation pool capacity during the months of April through October OR 60% of conservation pool capacity during the months of November through March. •The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 1 drought. •NTMD has concern that Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump	2%	•The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. •One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. •The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. •Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. •The combined storage level, as published by the Texas Water Development Board, in Lavon Lake and Bois d'Arc Lake is less than 55 percent of the total conservation pool capacity during the months of April through October OR 45 percent of the total conservation pool capacity during the months of November through March. •The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2. •NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source maybe delivered to customers for three (3) months. • •The City's water demand exceeds or is expected to exceed 95 percent of the amount that can be delivered to customers for an extended period.	5%	•The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. •One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. •The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. •Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) •A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. •Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. •The combined storage level, as published by the Texas Water Development Board, in Lavon Lake and Bois d'Arc Lake is less than 30 percent of the total conservation pool capacity during the months of April through October or less than 20 percent of the total conservation pool capacity during the months of November through March. •The Sabine River Authority (SRA) has indicted that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 3 drought. •The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD source has become limited in availability. •	30%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						Station, or some other NTMWD source may be limited in availability within the next six (6) months. • • The city's water demand exceeds or is expected to exceed 90 percent of the maximum sustainable delivery capacity for an extended period. •The City's water demand for all or part of the delivery capacity is inadequate. •The City's water supply source becomes contaminated. •The City's water supply system is unable to deliver water due to the failure or damage of major water system components. •A portion of the City's service area is experiencing an extreme weather • event or power grid/supply disruptions.		•The City's water demand for all or part of the delivery system exceeds delivery capacity because delivery is inadequate. •The City's water supply source becomes contaminated. •The City's water supply is unable to deliver water due to the failure or damage of major water system components. •The City is unable to recover water storage of 75 percent in all storage facilities within a twenty-four hour period. • A portion of the City's service area is experiencing an extreme weather event or power grid/supply disruptions.		•The City's water demand exceeds the amount that can be delivered to customers. •The City's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. •The City's water supply source becomes contaminated. •The City's water supply is unable to deliver water due to the failure or damage of major water system components. •The City is unable to recover water storage of 50 percent in all storage facilities within a twenty-four hour period. • A portion of the City's service area is experiencing an extreme weather event or power grid/supply disruptions.	
Ables Springs SUD	May-2024	WUD	NTMWD	NTMWD Sources		• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 1. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:70% of the combined conservation pool capacity during any of the months of April Through October OR60% of the combined conservation pool capacity during any of the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	5%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	30%
Arledge Ridge WSC	Apr-2022	WUG	N/A	Woodbine aquifer	3	• Water consumption has reached 80 percent of daily maximum supply for three (3) consecutive days. • Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. • There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year.	N/A	• Water consumption has reached 90 percent of the amount available for three consecutive days. • The water level in any of the water storage tanks cannot be replenished for three (3) consecutive days.	N/A	• Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer. • Water consumption of 95 percent or more of the maximum available for three (3) consecutive days. • Water consumption of 100 percent of the maximum available and the water storage levels in the system drop during one 24-hour period. • Natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties served by the Corporation. • Reduction of wholesale water supply due to drought conditions.	N/A

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
										• Other unforeseen events which could cause imminent health or safety risks to the public.	
Arlington, City of	May-2019	WUG/WWP	TRWD	TRWD sources, Lake Arlington	3	• Total raw water supply in TRWD western and eastern division reservoirs drops to or below 45% (55% depleted) of conservation storage.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops to or below 60% (40% depleted) of conservation storage.	10%	• Total raw water supply in TRWD western and eastern division reservoirs drops to or below 45% (55% depleted) of conservation storage.	20%
Athens, City of	May-2024	WUG/WWP	Athens Municipal Water Authority	Lake Athens, Carrizo-Wilcox Aquifer	5	• When daily usage exceeds 4.5 million gallons per day (MGD).	Voluntary 10%	• When daily usage exceeds 4.5 MGD and the storage facilities do not refill above eighty (80) percent of full capacity overnight.	4.0 MGD	• When daily usage exceeds 4.5 MGD and the storage facilities do not refill above sixty-five (65) percent of full capacity overnight.	4.0 MGD or less
Azle, City of	Apr-2024	WUG	TRWD	Eagle Mountain Lake	3	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The City Manager, with concurrence of the City Council, finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The City Manager, with concurrence of the City Council, finds that conditions warrant the declaration of a Stage 2 drought.	10%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity. • Water demand exceeds the amount that can be delivered to customers. • Water demand for all or part of the Azle delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The City Manager, with concurrence of the City Council, finds that conditions warrant the declaration of a Stage 3 drought.	20%
Bear Creek SUD	Apr-2024	WUG	NTMWD	NTMWD Sources	3	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 1. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:70% of the combined conservation pool capacity during any of the months of April Through October OR60% of the combined conservation pool capacity during any of the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	5%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	30%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Bedford, City of	May-2024	WUG	TRWD	TRWD Sources	3	• Bedford's water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Bedford's water supply sources or water distribution system becomes contaminated. • Bedford's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Bedford's water supply system is unable to deliver water due to the failure or damage of major water system components	5%	• Bedford's water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Bedford's water supply sources or water distribution system becomes contaminated. • Bedford's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Bedford's water supply system is unable to deliver water due to the failure or damage of major water system components	10%	• Bedford's water demand reaches or exceeds 98% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Bedford's water supply sources or water distribution system becomes contaminated. • Bedford's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Bedford's water supply system is unable to deliver water due to the failure or damage of major water system components	20%
Benbrook Water Authority	Apr-2024	N/A	N/A	N/A	3	• Initiated by BWA: • BWA water demand exceeds 90% of reliable delivery capacity for three consecutive days. • The delivery capacity could be citywide or in a specified portion of the system. • BWA water treatment or distribution system becomes contaminated. • BWA water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • BWA water supply system is unable to deliver water due to the failure or damage of major water system components, or due to other criteria, such as energy shortages or outages. • Initiated by TRWD: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Initiated by BWA: • BWA water demand exceeds 95% of reliable delivery capacity for two consecutive days. • The delivery capacity could be citywide or in a specified portion of the system. • BWA demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • BWA water treatment or distribution system becomes contaminated. • BWA water supply system is unable to deliver water due to the failure or damage of major water system components, or due to other criteria, such as energy shortages or outages. Initiated by TRWD: • Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major • water system components. • The General Manager finds that conditions warrant the declaration of a Stage 2 drought.	10%	• Initiated by BWA • The BWA water demand exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • The BWA demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • The BWA water treatment or distribution system becomes contaminated. • The BWA water supply system is unable to deliver water due to the failure or damage of major water system components, or due to other criteria, such as energy shortages or outages. • Initiated by TRWD: • Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity. • Water demand exceeds the amount that can be delivered to customers. • Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager finds that conditions warrant the declaration of a Stage 3 drought.	20%
Blue Ridge, City of	Apr-2024	WUG	NTMWD	Woodbine Aquifer	3	• Condition 1: Notification is received from TCEQ requesting initiation of Stage 1 restrictions. • Condition 2: Water demand exceeds ninety percent (90%) of the water well flow rate for water supply for seven • (7) consecutive days. • Condition 3: Blue Ridge's combined water storage is less than 65 percent (65%) of capacity. • Condition 4: Deficiencies in the City's distribution system limit supply capabilities. • Condition 5: Supply source becomes contaminated. • Condition 6: As determined by the Director due to drought or reduced water supply	3%	• Condition 1: Notification is received from TCEQ requesting initiation of Stage 2 restrictions. • Condition 2: Water use exceeds 100 percent (100%) of the combined current maximum flow rate from Blue Ridge water supply for five (5) consecutive days. • Condition 3: Blue Ridge's combined water storage is less than 45 percent (45%) of total storage capacity. • Condition 4: Short-term deficiencies in the City's distribution system limit supply capabilities, such as system outage due to the failure or damage of major water system components. • Condition 5: Inability to maintain or replenish adequate volumes of water in storage to provide for public health and safety. • Condition 6: Supply source becomes contaminated. • Condition 7: As determined by Director due to drought or reduced water supply.	8%	• Condition 1: Notification is received from TCEQ requesting initiation of Stage 3 of the Plan. • Condition 2: Blue Ridge's combined water storage is less than 20 percent (20%) of Blue Ridge's total storage capacity. • Condition 3: Short-term deficiencies in the City's distribution system limit supply capabilities, such as system outage due to the failure or damage of major water system components. • Condition 4: Inability to maintain or replenish adequate volumes of water in storage to provide for public health and safety. • Condition 5: Supply source becomes contaminated. • Condition 6: As determined by the Director due to drought or reduced water supply.	20%
Bolivar WSC	Mar-2024	WUG	UTRWD	Trinity Aquifer	4	• Demand exceeds 90% of the amount that can be delivered to customers for seven consecutive days. • Water demand for all or part of the delivery system	2%	• Demand exceeds 95% of the amount that can be delivered to customers for three consecutive days. • Water demand for all or part of the delivery system	4%	• Demand exceeds 98% of the amount that can be delivered to customers for three consecutive days. • Water demand for all or part of the delivery system	7%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						approaches delivery capacity because delivery capacity is inadequate. • Supply Sources becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Water demand is approaching the limit of the permitted supply. •		equals delivery capacity because delivery capacity is inadequate. • Supply Sources becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Water demand is approaching the limit of the permitted supply. •		exceeds delivery capacity because delivery capacity is inadequate. • Supply Sources becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Water demand is approaching the limit of the permitted supply. •	
Bonham, City of	July- 2024	WUG	NTMWD	Bonham Lake, NTMWD Sources	3	General Criteria • The City of Bonham Public Works Director, with the concurrence of the City Manager, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The water surface elevation in Lake Bonham, as published by the USGS, is less than 562.0'.	5%	General Criteria • The City of Bonham Public Works Director, with the concurrence of the City Manager, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The water surface elevation in Lake Bonham, as published by the USGS, is less than 560.0'.	10%	General Criteria • The City of Bonham Public Works Director, with the concurrence of the City Manager, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The water surface elevation in Lake Bonham, as published by the USGS, is less than 558.0'.	20%
Buena Vista-Bethel SUD	Mar-2023	WUG	TRWD	Bardwell Lake/Reservoir; Indirect Reuse; Trinity Aquifer; TRWD Lake/Reservoir System; Waxahachie Lake/Reservoir	4	• Voluntary Conservation will begin annually on March 1 trough September 30 •	N/A	• Average daily well pump run-time is eighteen (18) hours for three (3) consecutive days and the net water storage is continually decreasing on a daily basis.	N/A	• Average daily well pump run time is twenty (20) hours for three (3) consecutive days and the net water storage is continually decreasing on a daily basis.	N/A
Cash SUD	Apr-2024	WUG	NTMWD	NTMWD Sources		• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 1. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to	2%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to	5%	• The executive director with the concurrence of the NTMWD Board of Directors, find that conditions warrant the declaration of Stage 2. • One or more sour(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to	30%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:70% of the combined conservation pool capacity during any of the months of April Through October OR60% of the combined conservation pool capacity during any of the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.		equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.		equipment. (NTMWD) may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB is less than:55% of the combined conservation pool capacity during any of the months of April Through October OR 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	
Carrollton, City of	Mar-2024	WUG	DWU	Trinity Aquifer, DWU sources	3	• The total raw water supply in connected lakes (east and west); or (2) the western lakes; or, (3) the eastern lakes has dropped below 65% (35% depleted) of DWU's share of the total conservation storage of the lakes • Water demand has reached or exceeded 85% of delivery capacity for 4 consecutive days • Water demand approaches a reduced delivery capacity for all or part of the system, as determined by DWU or the City of Carrollton Water utilities department • Water line breaks or pump/system failures, which impact the ability of DWU or the City of Carrollton Water Utilities department to provide treated water service • Natural or man-made contamination of the water supply source(s) occurs	5%	• The total raw water supply in connected lakes (east and west); or (2) the western lakes; or, (3) the eastern lakes has dropped below 50% (50% depleted) of DWU's share of the total conservation storage of the lakes • Water demand has reached or exceeded 90% of delivery capacity for 3 consecutive days • Water demand equals a reduced delivery capacity for all part of the system, as determined by DWU or the City of Carrollton Water Utilities department • Water line breaks or pump/system failures, which impact the ability of DWU or the City of Carrollton Water Utilities department to provide treated water service • Natural or man-made contamination of the water supply source(s) occurs •	15%	• The total raw water supply in connected lakes (east and west); or (2) the western lakes; or, (3) the eastern lakes has dropped below 35% (65% depleted) of DWU's share of the total conservation storage of the lakes • Water demand has reached or exceeded 95% of delivery capacity for 2 consecutive days • Water demand exceeds a reduced delivery capacity for all part of the system, as determined by DWU or the City of Carrollton Water Utilities department • Water line breaks or pump/system failures, which impact the ability of DWU or the City of Carrollton Water Utilities department to provide treated water service • Natural or man-made contamination of the water supply source(s) occurs	20%
Celina, City of	May- 2024	WUG	UTRWD	UTRWD sources	3	• UTRWD has announced Stage 1 – Water Watch, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 1; or • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days; or • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by the City of Celina or	5%	• UTRWD has initiated Stage 2 – Water Warning, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities has initiated Stage 2 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 2; or • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days; or • Water demand has reached a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by the City of Celina; or	10%	• UTRWD has initiated Stage 3 – Water Emergency, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities has initiated Stage 3 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 3; or • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days; or • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by the City of Celina; or • Water supply system is unable to deliver water in adequate	20%

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• The water supply system has a significant limitation due to failure of or damage to important water system components		• The water supply system is unable to deliver water at normal rates due to failure of or damage to major water system components or • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		quantities due to failure of or damage to major water system components; or • Interruption of one or more water supply source(s). • Natural or man-made contamination of the water supply source that threatens water availability.	
College Mound WSC	Apr-2024	WUG	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%
Copeville SUD	Apr-2019	WUG	NTMWD	NTMWD Sources	3	•The Executive Director, with the concurrence of the NTMWD Board of directors, finds that conditions warrant the declaration of Stage 1. •Water demand is projected to approach the limit of NTMWD's permitted supply. •The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 70 percent of the total conservation pool capacity during	2%	•The Executive Director, with the concurrence of the NTMWD Board of directors, finds that conditions warrant the declaration of Stage 2. •Water demand is projected to approach the limit of NTMWD's permitted supply. •The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 55 percent of the total conservation pool capacity during any of the	10%	•The Executive Director, with the concurrence of the NTMWD Board of directors, finds that conditions warrant the declaration of Stage 3. •Water demand is projected to approach the limit of NTMWD's permitted supply. •The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 30 percent of the total conservation pool capacity during any of the	Designated by NTMWD

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. •The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. •NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months. •Water demand exceeds 95 percent of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days. •Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. •Supply source is interrupted or unavailable due to •contamination, invasive species, equipment failure, or other cause. •Water supply system is unable to deliver water due to the failure or damage of major water system components. •Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. •Supplier's water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days. •Supplier's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate. •Supply source becomes contaminated. •Supplier's water system is unable to deliver water due to the failure or damage of major water system components. • Supplier's individual plan may be implemented if other criteria dictate.		months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. •The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. •NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months. •Water demand exceeds 98 percent of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days. •Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. •Supply source is interrupted or unavailable due to •contamination, invasive species, equipment failure, or other cause. •Water supply system is unable to deliver water due to the failure or damage of major water system components. •Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. •Supplier's water demand exceeds 98 percent of the amount that can be delivered to customers for three consecutive days. •Supplier's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate. •Supply source becomes contaminated. •Supplier's water system is unable to deliver water due to the failure or damage of major water system components. • Supplier's individual plan may be implemented if other criteria dictate.		months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March. •The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. •The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source has become limited in availability. •Water demand exceeds the amount that can be delivered to Customers. •Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. •Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. •Water supply system is unable to deliver water due to the •failure or damage of major water system components. •Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. •Supplier's water demand exceeds the amount that can be delivered to customers. •Supplier's water demand for all or part of the delivery system seriously exceeds delivery capacity because delivery capacity is inadequate. •Supply source becomes contaminated. •Supplier's water system is unable to deliver water due to the failure or damage of major water system components. • Supplier's individual plan may be implemented if other criteria dictate.	
Coppell, City of	July-2024	WUG	DWU	DWU sources	4	A. Notification is received by DWU initiating stage; or B. Water demand has reached or exceeded 85% of delivery capacity for 4 consecutive days: or C. Water demand approaches a reduced delivery capacity for all or part of the system; or D. Water line breaks or pump or system failures, which impact the ability of the city to provide treated water service; or E. Natural or man-made contamination of the water supply source(s) occurs	5%	A. Notification is received from DWU Stage 2; or B. Water demand has reached or exceeded 90% of delivery capacity for 3 consecutive days: or C. Water demand equals a reduced delivery capacity for all or part of the system; or Page 9 TM 108288 D. Water line breaks or pump or system failures occur, which impact the ability of the city to provide treated water service; or E. Natural or man-made contamination of the water supply source(s) occurs.	15%	A. Notification is received from DWU intorting Stage 3; or B. Water demand has reached or exceeded 95% of delivery capacity for 2 consecutive days; or C. Water demand exceeds a reduced delivery capacity for all or part of the system; or D. Water line breaks or pump or system failures occur, which impact the ability to provide treated water service; or E. Natural or man-made contamination of the water supply source(s) occurs.	20%
Corinth, City of	Apr 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50%	20%

Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
						available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by the City of Corinth. The water supply system has a significant limitation due to failure of or damage to important water system components.		available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by the City of Corinth. • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by the City of Corinth. • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability.	
Crandall, City of	May 2024	WUG	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD.	30%

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Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
						NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.		NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.		NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	
Cross Timbers WSC	Apr 2024	WUG	UTRWD	UTRWD Sources and Trinity aquifer	N/A	• No Triggers available	N/A	•	N/A	•	N/A
Crowley, City of	Apr-2024	WUG	Fort Worth (TRWD)	TRWD sources, Trinity Aquifer	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Fort Worth's water treatment or distribution system becomes contaminated. • City of Crowley water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Fort Worth's water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 1 – Water Watch may be initiated for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • The City of Crowley's water demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • The City of Crowley's water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 2 – Water Warning for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought	10%	• Water demand has reaches or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • City of Crowley's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Crowley's water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD has initiated Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach or exceed the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought.	
Dallas County Park Cities MUD	May-2024	WWP	N/A	Grapevine Lake	4	• The District's water supply in Grapevine Lake becomes 35% depleted as a result of drought conditions. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 90% of its delivery capacity for seven consecutive days. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage I. •	2%	• The District's water supply in Grapevine Lake becomes 45% depleted as a result of drought conditions. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 95% of its delivery capacity for seven consecutive days. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage II. •	5%	• The District's water supply in Grapevine Lake becomes 55% depleted as a result of drought conditions. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 98% of its delivery capacity for seven consecutive days. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage III. •	10%
Denison, City of	Aug- 2023	WWP	GUTA	Groundwater, Lake Randell, and Lake Texoma	5	• Demand exceeds eight (8) MGD of the amount that can be delivered to customers for seven (7) consecutive days • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components	0%	• Demand exceeds ten (10) MGD of the amount that can be delivered to customers for five (5) consecutive days • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components	2%	• Demand exceeds eleven (11) MGD of the amount that can be delivered to customers for three (3) consecutive days • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components • Water demand is approaching the limit of the permitted	5%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• Water demand is approaching the limit of the permitted supply		• Water demand is approaching the limit of the permitted supply		supply	
Denton, City of	Apr-2024	WUG/WWP	DWU	Lake Ray Roberts, Lake Lewisville	3	• UTRWD has announced Stage 1 – Water Watch, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 1; or • Water demand has reached or exceeded [80%] of delivery capacity for three consecutive days; or • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 6 or • • The water supply system has a significant limitation due to failure of or damage to important water system components.	5%	• UTRWD has initiated Stage 2 – Water Warning, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities has initiated Stage 2 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 2; or • Water demand has reached or exceeded [85%] of delivery capacity for three consecutive days; or • Water demand has reached a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 6; or • The water supply system is unable to deliver water at normal rates due to failure of or damage to major water system components or • • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.	15%	• UTRWD has initiated Stage 3 – Water Emergency, which may be a result of: o The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period from April 1 to October 31; or o The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to March 31; or o Dallas Water Utilities has initiated Stage 3 and given notice to UTRWD; or o UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 3; or • Water demand has reached or exceeded [90%] of delivery capacity for three consecutive days; or • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 6; or • Water supply system is unable to deliver water in adequate quantities due to failure of or damage to major water system components; or • Interruption of one or more water supply source(s). • • Natural or man-made contamination of the water supply source that threatens water availability.	20%
Denton County FWSD 6	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 6 • The water supply system has a significant limitation due to failure of or damage to important water system components.	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 6 • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 6 • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	20%
Denton County FWSD 7	Apr 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 7 • The water supply system has a significant limitation due to failure of or damage to important water system components.		• The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 7 • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 7 • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	
Denton County FWSD 8A	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 8-A • The water supply system has a significant limitation due to failure of or damage to important water system components.	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 8-A • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 8-A • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	20%
Denton County FWSD 8B	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by district 8-B • The water supply system has a significant limitation due to failure of or damage to important water system components.		• UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by district 8-B • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by district 8-B • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	
Denton County FWSD 11A	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 11-A • The water supply system has a significant limitation due to failure of or damage to important water system components.	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 11-A. • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 11-A. • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	20%
Denton County FWSD 11B	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 11-B.	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						reduced delivery capacity for all or part of the distribution system, as determined by District 11-B. • The water supply system has a significant limitation due to failure of or damage to important water system components.		reduced delivery capacity for all or part of the distribution system, as determined by District 11-B. • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		• The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	
Denton County FWSD 11C	May 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 11-C. • The water supply system has a significant limitation due to failure of or damage to important water system components.	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 11-C. • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 11-C. • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	20%
Duncanville, City of	May-2019	WUG	DWU	DWU Sources	5	If one or more occurs: • Dallas Water utilities initiates action and requests customer cities to do likewise • Combined required ground and elevated storage falls below 75 percent of capacity for a five-day period. • Distribution - Continued potable water storage depletion due to water demand or water pipeline breaks, pump or system failures which hinder system ability to continue to supply water at the demand encountered to all or part of the system. • Other - Natural or manmade contamination of water supply occurs.	1%	One of more may apply: • Dallas Water Utilities initiates action and requests customer cities to do likewise during high demand months. • Combined ground and elevated storage falls below 60 percent of capacity at the beginning of a 24-hour period. • Distribution - Stage 1 voluntary restrictions fail to alleviate continued potable water storage depletion • Situations that limit distribution of water, as determined by the Public Works Director, or designee, such as: • Short or long-term equipment failure or failure to maintain 20 psi at up to 200 locations or up to ten fire hydrants in a localized area. • Short-term deficiencies exist within an entire pressure district • Power failure or restrictions • Natural or manmade contamination of water supply occurs.	5%	One or more may apply: • Dallas Water utilities supply cut by five percent on a continuous basis during high demand month. • Combined ground and elevated storage fall below 50 percent of capacity at the beginning of a 24-hour period. • Distribution - Failure of Stage 2 restrictions to reduce usage below supply capability • Other - Situation that limit distribution of water, as determined by the Public Works Director, or designee, as such: • Long-term deficiencies in water supply within an entire pressure district. • Failure to maintain 20 psi at more than 300 service locations or more than 15 fire hydrants in a localized area. • Any unanticipated situations that limit distribution of water, as determined by the Public Works director, or Designee. • Power failure or restrictions. • Natural or manmade contamination of water supply occurs.	15%
East Cedar Creek (Brookshire)	Apr-2024	WUG	TRWD	TRWD sources	3	• ECCFWSD water demand exceeds 85% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system	5%	• ECCFWSD water demand exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system	10%	• ECCFWSD water demand exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system becomes	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						becomes contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 1- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.		becomes contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 2- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought.		contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 3- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought.	
East Cedar Creek (McKay)	Apr-2024	WUG	TRWD	TRWD sources	3	• ECCFWSD water demand exceeds 85% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system becomes contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 1- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.	5%	• ECCFWSD water demand exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system becomes contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 2- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought.	10%	• ECCFWSD water demand exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be system wide or in a specified portion of the system • ECCFWSD water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • ECCFWSD water treatment or distribution system becomes contaminated. • ECCFWSD water supply system us unable to deliver water due to the failure or damage of major water systems components, or due to other criteria, such as energy shortages or outages. • TRWD initiated Stage 3- Water watch for one or more of the following reasons: • Total combined raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought.	20%
Elm Ridge WCID	Mar 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD)	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD)	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by the District • The water supply system has a significant limitation due to failure of or damage to important water system components.		has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by the District • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		• UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by the District • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability. •	
Ennis, City of	Oct-2024	WUG/WWP	TRA(TRWS)	TRWD Sources, Lake Bardwell	5	• Elevation of Lake Bardwell is less than 421" Mean Sea Level (MSL) or the daily water usage is greater than 45% of system capacity.	0%	• When the elevation of Lake Bardwell is equal to or less than 417' MSL or 74% of available capacity, and/or the daily potable water supply system demand is 6.0 Million Gallons per Day (MGD) or 50% of plant capacity	2%	• When the elevation of Lake Bardwell is equal to or less than 414' MSL or 54% of available capacity, and/or the daily potable water supply system demand is 7.3 Million Gallons per Day (MGD) or 60% of plant capacity	3%
Euless, City of	Apr-2019	WUG	TRA(TRWD)	TRWD Sources	3	• Total combined raw water supply in Tarrant Regional Water District (TRWD) western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage. • Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The City Manager, or his/her designee, with concurrence or TRA, finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation shortage • Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate • Water demand is projected to approach the limit of permitted supply • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The city manager, with concurrence of the Trinity River Authority, finds that conditions warrant the declaration of a stage 2 drought.	10%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage. • Water demand exceeds the amount that can be delivered to customers. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The city manager, with the concurrence of the TRA, finds that conditions warrant the declaration of a Stage 3 drought.	20%
Everman, City of	May-2019	WUG	N/A	Trinity Aquifer	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Fort Worth's water treatment or distribution system becomes contaminated. • Fort Worth's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Fort Worth's water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 1 – Water Watch for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage. o Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 2 –Water Warning for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage. o Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. o Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. o TRWD's water supply system is unable to deliver water due to the failure or damage of major water	10%	• Water demand has reaches or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) • or water supply system. • Demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD has initiated Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach or exceed the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system	20%

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						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.		system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought.		components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought.	
Fairview, Town of	Oct- 2024	WUG	NTMWD	NTMWD sources	3	• General Criteria o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Demand Criteria o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • Supply Criteria o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than: ▪ 70% of the combined conservation pool capacity during any of the months of April through October ▪ 60% of the combined conservation pool capacity during any of the months of November through March o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	• General Criteria o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Demand Criteria o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • Supply Criteria o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than ▪ 55% of the combined conservation pool capacity during any of the months of April through October ▪ 45% of the combined conservation pool capacity during any of the months of November through March o SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	• General Criteria o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Demand Criteria o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. • Supply Criteria o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than ▪ 30% of the combined conservation pool capacity during any of the months of April through October ▪ 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • The supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%
Forney, City of	Mar 2024	WWP	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria	30%

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						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.		• The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.		• The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	
Forney Lake WSC	Oct 2022	WUG	NTMWD	NTMWD sources	6	• When continually falling treated water reservoir levels which do not refill above 100 percent overnight.	10%	• When continually falling treated water reservoir levels which do not refill above 90 percent overnight.	15%	• When continually falling treated water reservoir levels which do not refill above 85 percent overnight.	20%
Frisco, City of	May-2024	WUG	NTMWD	NTMWD sources	3	1. The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. 2. One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. 3. The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. 4. Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) 5. A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than: • 70% of the combined conservation pool capacity during any of the months of April through October • 60% of the combined conservation pool capacity during any of the months of November through March o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	1. The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. 2. One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. 3. The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. 4. Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) 5. A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than • 55% of the combined conservation pool capacity during any of the months of April through October • 45% of the combined conservation pool capacity during any of the months of November through March o SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD is concerned that Lake Texoma, Jim Chaprnan Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	1. The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. 2. One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other causes. 3. The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. 4. Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) 5. A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than ■ 30% of the combined conservation pool capacity during any of the months of April through October ■ 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • The supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%

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						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Gainesville, City of	May-2024	WUG/WWP	N/A	Hubert Moss Lake, Trinity Aquifer	5	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 1 • The water storage level in Moss Lake is less than 65% of the total conservation pool capacity • Ground water level reaches 100' above current pump settings • City's water demand exceeds 90 percent of the amount that can be delivered to customers for three consecutive days. • City's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is approaching the limit of the permitted supply	2%	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 1 • The water storage level in Moss Lake is less than 55% of the total conservation pool capacity • Ground water level reaches 75' above current pump settings • City's water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days • City's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Water demand is approaching the limit of the permitted supply.	5%	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 3 • The water storage level in Moss Lake is less than 45% of the total conservation pool capacity • Ground water level reaches 50' above current pump settings • City's water demand exceeds 98 percent of the amount that can be delivered to customers for three consecutive days • City's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate • Water demand is approaching the limit of the permitted supply.	10%
Garland, City of	May-2024	WUG/WWP	NTMWD	NTMWD sources	3	(i) TheCity'swholesalewaterprovider,NTMWD,notifies the Director of delivery or source shortages, requests initiation of Stage 1 of the plan, an the Director concurs (ii) Total daily water demand exceeds 95 percent of the amount that can be delivered to Customers for three consecutive days (iii) Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate (iv) Supplysourcebecomescontaminated (v) water system is unable to deliver water due to the failure or damage of major water system components • The water system experiences continually falling treated water storage levels that do not refill above 65% overnight.	2%	(i) TheCity'swholesalewaterprovider,NTMWD,notifiesthe Director of delivery or source shortages, requests initiation of Stage 2 of the plan, an the Director concurs (ii) Total daily water demand exceeds 98 percent of the amount that can be delivered to Customers for three consecutive days (iii) Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate (iv) Supply source becomes contaminated (v) water system is unable to deliver water due to the failure or damage of major water system components, or • The water system experiences continually falling treated water storage levels that do not refill above 50 percent overnight.	5%	(i) TheCity'swholesalewaterprovider,NTMWD,notifiesthe Director of delivery or source shortages, requests initiation of Stage 2 of the plan, an the Director concurs (ii) Total daily water demand exceeds the amount that can be delivered to Customers (iii) Water demand for all or part of the delivery system seriously exceeds delivery capacity because delivery capacity is inadequate (iv) Supply source becomes contaminated (v) Water supply system is unable to deliver water due to the failure or damage of major water system components, or • The water system experiences continually falling treated water storage levels that do not refill above 20 percent overnight.	30%
Gastonia, City of	Apr-2024	WUG	TRWD	TRWD Sources	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The treatment capacity could be citywide or in a specified portion of the system. • Fort Worth's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • • TRWD initiated Stage 1-Water Watch for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage. • TRWD water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species).. • TRWD's water supply system is unable to deliver water	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive • days. The treatment capacity could be citywide or in a specified portion of the system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event.. • TRWD initiated Stage 2 – Water Warning for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of • conservation storage. • TRWD water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species). • TRWD's water supply system is unable to deliver water	10%	• Water demand has reaches or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • TRWD has initiated Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage. • TRWD water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • TRWD water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach or exceed the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species).. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system	20%

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Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
						due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.		due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought.		components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought.	
Gastonia Scurry SUD	Unknown- 2024	WUG	N/A	Mineral Wells, Brazos River Authority, and Trinity Aquifer	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%
Grand Prairie, City of	May 2024	WUG/WWP	DWU	Fork Lake/Reservoir; Indirect Reuse; Ray Hubbard Lake/Reservoir; Ray Roberts-Lewisville Grapevine Lake/Reservoi	3	• Pursuant to requirements specified in the wholesale treated water purchase contracts with any wholesale water supplier, notification is received from such supplier requesting initiation of water restrictions. • Combined storage falls below 200 fallows per capita at the beginning of a 24- demand period. • Water demand exceeds ninety percent (90%) of the current maximum flow rate contracted with DWU for three (3) consecutive days.	5%	• Pursuant to requirements specified in the wholesale treated water purchase contracts with any wholesale water supplier, notification is received from one or more wholesale suppliers requesting initiation of water restrictions. • Total water supply reduced by ten percent (10%) on a continuous basis during high water usage months • Combined storage falls below 150 fallows per capita at the beginning of a 24- demand period. • Water demand exceeds one hundred percent (100%) of	5%	• Pursuant to requirements specified in the wholesale purchase contract, notification is received from either wholesale water supplier requesting initiation of water restrictions. • Total water supply reduced by twenty percent (20%) on a continuous basis during high water usage months. • Combined storage falls below 140 gallons per capita at the beginning of a 24-hour demand period. • Stage 2 restrictions fail to alleviate continued potable water storage depletion	10%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
				r System; Tawakoni Lake/Reservoir; Trinity Aquifer; TRWD Lake/Reservoir System		• Other situations that limit distribution of water, as determined by the Director, such as: Short or long-term equipment failure or failure to maintain 35 psi pressure at up to 500 service locations or up to 10 fire hydrants in localized areas Short term deficiencies within an entire pressure district. Power failure or restrictions. • Short term disruptions of major water supply lines.		the current maximum flow rate contracted from wholesale water suppliers for five (5) consecutive days. • Failure to maintain 35 psi pressure in any pressure plane • Water use exceeds one hundred and three percent (103%) of the current maximum flow rate contracted from either wholesale water supplier for three (3) consecutive days. • Short term in the City's distribution system limit supply capabilities such as system outage due to the failure or damage of major water system components. •		• Long term deficiencies in supply within an entire pressure district • Failure to maintain 25 psi pressure in any portion of the distribution system. • Any unanticipated situations that limit distribution of water, as determined by the Director. • Power failure or restrictions.	
Grapevine, City of	May-2019	WUG	TRA(TRWD)	TRWD Sources, Grapevine Lake	3	• Stage 1, moderate condition is attained when the surface water demand reaches 90 percent of pumping capacity of the City of Grapevine/Trinity River Authority water treatment plants). • Production at the combined City of Grapevine and Trinity River Authority surface water treatment plant reduced to a point such that the aggregate surface water demand of the system is 90 percent of the reduced pumping capacity.		• Stage 3, critical condition is attained when the surface water demand (seven-day period) exceeds 100 percent of pumping capacity of the City of Grapevine/Trinity River Authority water treatment plants). • Production at the City of Grapevine/Trinity River Authority plants reduced to a point such that aggregate surface water demand of the system exceeds the reduced production, including a complete failure of the plant to produce any water.		• Stage 3, critical condition is attained when the surface water demand (seven-day period) exceeds 100 percent of pumping capacity of the City of Grapevine/Trinity River Authority water treatment plants). • Production at the City of Grapevine/Trinity River Authority plants reduced to a point such that aggregate surface water demand of the system exceeds the reduced production, including a complete failure of the plant to produce any water.	
Highland Park, Town of	Apr-2024	WUG	DCPCMUD	Grapevine Lake	4	• The Town's water use is approaching the limit of its contracted supply. • The Town's demand exceeds 90% of its delivery capacity for seven consecutive days. • The Town's water demand for any portion of the delivery system approaches the delivery capacity. • The Town's supply source or delivery system becomes • contaminated. • The Town's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage I. This may occur with one or more of the following: • The District's water supply in Grapevine Lake becomes 35% depleted. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 90% of its delivery capacity for seven consecutive days. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage I.	2%	• The Town's water use is approaching the limit of its contracted supply. • The Town's demand exceeds 95% of its delivery capacity for seven consecutive days. • The Town's water demand for any portion of the delivery system approaches the delivery capacity. • The Town's supply source or delivery system becomes • contaminated. • The Town's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage II. This may occur with one or more of the following: The District's water supply in Grapevine Lake becomes 45% depleted. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 95% of its delivery capacity for five consecutive days. • The District's water system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage II.	5%	• The Town's water use is approaching the limit of its contracted supply. • The Town's demand exceeds 98% of its delivery capacity for seven consecutive days. • The Town's water demand for any portion of the delivery system approaches the delivery capacity. • The Town's supply source or delivery system becomes • contaminated. • The Town's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage III. This may occur with one or more of the following: • The District's water supply in Grapevine Lake becomes 55% depleted. • Grapevine reservoir has been contaminated. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • The District's water use is approaching the limit of the permitted supply. • Any other condition that would cause The District to initiate Stage III. • The District's demand exceeds 98% of its delivery capacity for three consecutive days.	10%
Hurst, City of	May-2024	WUG	Fort Worth(TRWD)	TRWD Sources, Trinity Aquifer	3	• When, pursuant to requirements specified in the City of Hurst wholesale water purchase contract with the City of Fort Worth, notification is received requesting initiation of Stage 1 of the Drought Plan. • Water demands reach or exceed 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Hurst' s water distribution system becomes contaminated. • Hurst' s water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate.	5%	• When, pursuant to requirements specified in the City of Hurst wholesale water purchase contract with the City of Fort Worth, notification is received requesting initiation of Stage 2 of the Drought Contingency Plan. • Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be city wide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate.	10%	• When, pursuant to requirements specified in the City of Hurst wholesale water purchase contract with the City of Fort Worth, notification is received requesting initiation of Stage 3 of the Drought Plan. • Water demand has reached or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the water system exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						• Hurst' s water supply system is unable to deliver water due to the failure or damage of major water system components, or due to other criteria, such as power outages or restrictions.		• Water supply system is unable to deliver water due to the failure or damage of major water system components.		• TRWD has initiated Stage 3 — Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply in TRWD western and eastern division' s reservoirs drops below 45% (55% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach or exceed the limit of TRWD' s permitted supply. • TRWD' s supply source becomes contaminated. • TRWD' s water supply system is unable to deliver water due to failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 Drought.	
Irving, City of	Apr-2024	WUG	DWU	DWU sources, Jim Chapman Lake	3	• Condition 1: Pursuant to the requirements specified in the wholesale treated water purchase contract, notification is received from DWU requesting initiation of the Stage 1 restrictions • Condition 2: Water use exceeds eighty-five percent (85%) of the combined current maximum wholesale flow rate contracted from DWU and Irving Lake Chapman water supply for four (4) consecutive days • Condition 3: Irving's combined water storage account in Jim Chapman Lake and Lewisville Lake is less than sixty-five percent (65%) of Irving's total storage account capacity in Jim Chapman Lake • Condition 4: Short-term deficiencies in the city's distribution system limit supply capabilities • Condition 5: Supply source becomes contaminated • Condition 6: As determined by Director due to drought or reduced water supply	3%	• Condition 1: Pursuant to the requirements specified in the wholesale treated water purchase contract, notification is received from DWU requesting initiation of the Stage 2 restrictions • Condition 2: Water use exceeds 100 percent (100%) of the combined current maximum wholesale flow rate contracted from DWU and Irving Lake Chapman water supply for five (5) consecutive days • Condition 3: Irving's combined water storage account in Jim Chapman Lake and Lewisville Lake is less than 45 percent (45%) of Irving's total storage account capacity in Jim Chapman Lake • Condition 4: Short-term deficiencies in the city's distribution system limit supply capabilities, such as system outage due to the failure or damage of major water system components • Condition 5: Inability to maintain or replenish adequate volumes of water in storage to provide for public health and safety • Condition 6: Supply source becomes contaminated • Condition 7: As determined by Director due to drought or reduced water supply	8%	• Condition 1: Pursuant to the requirements specified in the wholesale treated water purchase contract, notification is received from DWU requesting initiation of the Stage 3 restrictions • Condition 2: Irving's combined water storage account in Jim Chapman Lake and Lewisville Lake is less than 20 percent (20%) of Irving's total storage account capacity in Jim Chapman Lake • Condition 3: Short-term deficiencies in the city's distribution system limit supply capabilities, such as system outage due to the failure or damage of major water system components • Condition 4: Inability to maintain or replenish adequate volumes of water in storage to provide for public health and safety • Condition 5: Supply source becomes contaminated • Condition 6: As determined by Director due to drought or reduced water supply	20%
Kaufman, City of	May-2024	WUG	NTMWD	NTMWD Sources		• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 75% (25% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period from November 1 to march 31 • Dalas Water Utilities has initiated Stage 1 and given notice to Upper Trinity • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the transmission system as determined by Upper Trinity. • The General Manager, with the concurrence of the Upper Trinity Board of Directors finds that conditions warrant the declaration of stage 1.	5%	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 60% (40% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to march 31 • Dalas Water Utilities has initiated Stage 2 and given notice to Upper Trinity • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days • Water demand has reached a level that is causing a reduced delivery capacity for all or part of the transmission system as determined by Upper Trinity. • The transmission system is unable to deliver water at normal rates due to failure of or damage to, major water system components. • A significant deterioration in the quality of a water	10%	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 45% (55% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to march 31 • Dalas Water Utilities has initiated Stage 3 and given notice to Upper Trinity • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days • Water demand exceeds the delivery capacity for all or part of the transmission system, as determined by Upper Trinity. • The transmission system is unable to deliver water in adequate quantities due to failure of, or damage to, major water system components • Interruption of one or more water supply sources	20%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
								supply, being affected by a natural or man-made source. • The General Manager, with the concurrence of the Upper Trinity Board of Directors finds that conditions warrant the declaration of stage 2.		• Natural or man-made contamination of an Upper Trinity water supply source(s) that threatens after availability • The General Manager, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 3. •	
Keller, City of	May-2024	WUG	Fort Worth (TRWD)	TRWD Sources	3	• Keller's water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • Keller may initiate Stage 1 at any time if the Texas State Governor has issued a drought disaster declaration for Tarrant or the surrounding Counties. • Fort Worth initiates Stage 1 – Water Watch for one or more of the following reasons: • Total combined raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 75% (25% depleted) of conservation storage capacity. • TRWD water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach the limit of permitted supply. • TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). • TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Keller's water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • Keller may initiate Stage 2 at any time if the Texas State Governor has issued a drought disaster declaration for Tarrant or the surrounding Counties. • Fort Worth initiates Stage 2 – Water Warning for one or more of the following reasons: • Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. • TRWD water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach the limit of permitted supply. • TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species). • TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager finds that conditions warrant the declaration of a Stage 2 drought. •	10%	• Keller's water demand has reached or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • Keller may initiate Stage 3 at any time if the Texas State Governor has issued a drought disaster declaration for Tarrant or the surrounding Counties. • Fort Worth initiates Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity. • TRWD water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • TRWD water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of TRWD's water supply sources has become limited in availability. • TRWD water demand is projected to approach the limit of permitted supply. • TRWD supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). • TRWD water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager finds that conditions warrant the declaration of a Stage 3 drought. •	20%
Krum, City of	Nov-2019	WUG	UTRWD	UTRWD Sources, Trinity Aquifer	5	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 1 • Ground water level reaches 100' above current pump settings. • City's water demand exceeds 90 percent of the amount that can be delivered to customers for three consecutive days. • City's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is approaching the limit of the permitted supply.	2%	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 2. • Ground water level reaches 75' above current pump settings. • City's water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days. • City's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate. • Water demand is approaching the limit of the permitted supply.	5%	• The Mayor or his/her designee finds that conditions warrant the declaration of Stage 3. • Ground water level reaches 50' above current pump settings. • City's water demand exceeds 98 percent of the amount that can be delivered to customers for three consecutive days. • City's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is approaching the limit of the permitted supply.	10%
Ladonia, City of	Aug-2018	WUG	UTRWD	Trinity Aquifer	5	• Daily water exceeds 300,000 gallons per day for three consecutive • days, or • Daily water demand exceeds 250,000 gallons per day for seven consecutive days.		• Daily water exceeds 300,000 gallons per day for three consecutive days, or • Daily water demand exceeds 250,000 gallons per day for seven consecutive days.		• Daily water exceeds 450,000 gallons per day for three consecutive days	
Lake Cities Municipal Utility au	Apr-2024	WWP	UTRWD	UTRWD sources	3	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 75% (25% depleted) during the time period from April 1 to October 31 or;	5%	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 60% (40% depleted) during the time period from April 1 to October 31 or;	10%	• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 45% (55% depleted) during the time period from April 1 to October 31 or;	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period from November 1 to March 31 or • Dallas Water Utilities has initiated Stage 1 and given notice to Upper Trinity or; • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days or; • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the transmission system, as determined by Upper Trinity or; • The General Manager, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 1		• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to March 31 or • Dallas Water Utilities has initiated Stage 2 and given notice to Upper Trinity or; • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days or; • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the transmission system, as determined by Upper Trinity or; • The transmission system is unable to deliver water at normal rates due to failure of, or damage to, major water system components or; • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source: or • The General Manager, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 2		• The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to March 31 or • Dallas Water Utilities has initiated Stage 3 and given notice to Upper Trinity or; • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days or; • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the transmission system, as determined by Upper Trinity or; • The transmission system is unable to deliver water at normal rates due to failure of, or damage to, major water system components or; • Interruption of one or more water supply sources or; • Natural or man-made contamination of an Upper Trinity water supply source(s) that threatens water availability or; • The General Manager, with the concurrence of the Upper Trinity Board of Directors, finds that conditions warrant the declaration of Stage 3	
Lantana, City of	Mar 2024	WUG	UTRWD	UTRWD sources	3	• The total raw water supply in water supply lakes available to WTRWD has dropped below 75% (25% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during this time period from November 1 to March 31 • Dallas Water Utilities has initiated Stage 1 and given notice to UTRWD • UTRWD with concurrence of Board of Directors finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded [80%] of delivery capacity for three consecutive days • Water demands is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system as determined by District 7 • The water supply system has a significant limitation due to failure of or damage to major water system components. •	5%	• The total raw water supply in water supply lakes available to WTRWD has dropped below 60% (40% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during this time period from November 1 to March 31 • Dallas Water Utilities has initiated Stage 2 and given notice to UTRWD • UTRWD with concurrence of Board of Directors finds that conditions warrant the declaration of stage 2 • Water demand has reached or exceeded [85%] of delivery capacity for three consecutive days • Water demands has reached a level that is causing a reduced delivery capacity for all or part of the distribution system as determined by District 7 • The water supply system is unable to deliver water at normal rates due to failure of or damage to major water system components • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source	10%	• The total raw water supply in water supply lakes available to WTRWD has dropped below 45% (55% depleted) during the time period from April 1 to October 31 • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during this time period from November 1 to March 31 • Dallas Water Utilities has initiated Stage 3 and given notice to UTRWD • UTRWD with concurrence of Board of Directors finds that conditions warrant the declaration of stage 3 • Water demand has reached or exceeded [90%] of delivery capacity for three consecutive days • Water demands exceeds the delivery capacity for all or part of the distribution system as determined by District 7 • Water Supply system is unable to deliver water in adequate quantities due to failure of or damage to major water system components • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability.	20%
Leonard, City of	Mar 2022	WUG	NTMWD	Woodbine Aquifer	5	• Short- or long-term equipment failure or failure to maintain 35 psi at up to 250 service locations or up to ten hydrants localized area. • Daily water demand equals or exceeds 260,000 gallons for 7 consecutive days or 290,000 gallons on a single day • At the discretion of the city administrator (to facilitate operations, maintenance, or repairs)	10%	• Stage 1 measures fail to alleviate the continued trigger conditions • Daily water demand equals or exceeds 260,000 gallons for 14 consecutive days or 300,000 gallons on a single day. • Short- or long-term equipment failure or failure to maintain 35 psi at up to 500 service locations or up to fifteen hydrants in a localized area.	15%	• Stage 2 measures fail to alleviate the continued trigger conditions. • Daily water demand equals or exceeds 270,000 gallons for 14 consecutive days or 310,000 gallons on a single day.	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Lewisville, City of	Jan 2024	WWP	DWU	DWU sources	3	• No available triggers	5%	• Triggering Criteria: (If one or more occurs) • 1) Supply: • A. Total raw water supply in Dallas Water Utilities connected reservoirs exceeds 50% depletion. • B. Dallas Water Utilities implements conservation measures and requests wholesale customers to implement similar measures. • 2) Distribution: • Failure of Stage 1 restrictions to reduce usage below supply capacity • 3) Other: • Any unanticipated situations that limit distribution of water as determined by the Director of Public Services • A. Short-term or long-term equipment failure or failure to maintain 20 psi pressure at up to 500 service locations or up to ten fire hydrants in localized areas. • B. Short-term deficiencies within a gridded pressure zone.	15%	• Triggering Criteria: (If one or more occurs) • 1) Supply: • A. Total raw water supply in Dallas Water Utilities connected reservoirs exceeds 65% depletion. • B. Dallas Water Utilities implements conservation measures and requests wholesale customers to implement similar measures. • 2) Distribution: • Failure of Stage 2 restrictions to reduce usage below supply capacity • 3) Other: • Any unanticipated situations that limit distribution of water as determined by the Director of Public Services • A. Short-term or long-term equipment failure or failure to maintain 20 psi pressure at up to 500 service locations or up to ten fire hydrants in localized areas. • B. Short-term deficiencies within a gridded pressure zone.	20%
Little Elm Valley WSC	Apr-2019	WUG	NTMWD	NTMWD sources	3	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • Water demand is projected to approach the limit of NTMWD's permitted supply. • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), 3 is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months. • Water demand exceeds 95 percent of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted.	2%	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • Water demand is projected to approach the limit of NTMWD's permitted supply. • The storage level in Lavon Lake, as published by the TWDB, 3 is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months. • Water demand exceeds 98 percent of the amount that can be delivered to Customers for three (3) consecutive days. • Water demand for all or part of the delivery system equals delivery capacity, because delivery capacity is inadequate. • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the system impacted. • Town of Little Elm water demand exceeds 98 percent	10%	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • Water demand is projected to approach or exceed the limit of the permitted supply. • The storage level in Lavon Lake, as published by the TWDB, 3 is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD water source has become limited in availability. • Water demand exceeds the amount that can be delivered to Customers. • Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure or other cause. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the system impacted. • Town of Little Elm water demand exceeds the amount that can be delivered to customers. • Town of Little Elm water demand for all or part of the delivery system seriously exceeds delivery capacity because the	Obtained from NTMWD

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						• Town of Little Elm water demand exceeds 95 percent of the amount that can be delivered to customers for three consecutive days. • Town of Little Elm water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate. • Supply source becomes contaminated. • Town of Little Elm water system is unable to deliver water due to the failure or damage of major water system components. Town of Little Elm individual plan may be implemented if other criteria dictate. •		of the amount that can be delivered to customers for three consecutive days. • Town of Little Elm water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Supply source becomes contaminated. • Supply source is interrupted or unavailable due to invasive species. • Town of Little Elm water supply system is unable to deliver water due to the failure or damage of major water system components. • Town of Little Elm individual plan may be implemented if other criteria dictate.		delivery capacity is inadequate. • Supply source becomes contaminated. • Town of Little Elm water supply system is unable to deliver water due to the failure or damage of major water system components. • Town of Little Elm individual plan may be implemented if other criteria dictate.	
Lucas, City of	Apr 2024	WUG	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
MaBank, City of	Aug-2024	WUG	TRWD	Cedar Creek Reservoir	3	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Water supply system is unable to deliver water due to the failure or damage of major water system components.	5%	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager with concurrence of the TRWD Board of Directors finds that conditions warrant Stage 2 drought.	10%	• Total combined raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage capacity. • Water demand exceeds the amount that can be delivered. • Water demand for all or part of the system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • One or more of TRWD's water supply sources has become limited in availability. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager with concurrence of the TRWD Board of Directors finds that conditions warrant Stage 3 drought.	20%
Mansfield, City of	Apr 2024	WWP	Tarrant Regional Water District	TRWD Lake/Reservoir System	3	• Total raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. Water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. • Water demand is projected to approach the limit of TRWD's permitted supply • TRWD's supply source becomes contaminated • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought. • The city of Mansfield's demand exceeds the amount that can be delivered to customers • City's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • City's water treatment or distribution system becomes contaminated • City's water supply system is unable to deliver water due to the failure or damage of major water system components. • City's plan may be implemented if other criteria dictate.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage. • Water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought. • The city of Mansfield's demand exceeds the amount that can be delivered to customers for 1 day. • City's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • City's water treatment or distribution system becomes contaminated • City's water supply system is unable to deliver water due to the failure or damage of major water system components. • City's plan may be implemented if other criteria dictate.	10%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (40% depleted) of conservation storage. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought. • The city of Mansfield's demand exceeds the amount that can be delivered to customers for 2 consecutive day. • City's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Natural or man-made contamination of the water supplier's treatment or distribution system. • City's water supply system is unable to deliver water due to the failure or damage of major water system components. • City's plan may be implemented if other criteria dictate. •	20%
McKinney, City of	Apr-2024	WUG	NTMWD	NTMWD sources	3	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components.	2%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components	5%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to	30%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake as published by the Texas Water Development Board (TWDB), is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months. •		• Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months. •		equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 30 percent of the total conservation pool capacity during any of the months of April through October • 20 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. • The water supply from Lake Texoma, Jim Chapman Lake, the • East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD water source has become limited in availability	
Melissa, City of	Apr-2024	WUG	GTUA (NTMWD)	NTMWD sources, Woodbine Aquifer	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. oThe water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake as published by the Texas Water Development Board (TWDB) is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 1 drought. • 5. NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lakes published by the Texas Water Development Board (TWDB) is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 2 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake as published by the Texas Water Development Board (TWDB) is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March. o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 3 drought. • o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source has become limited in availability.	30%

Appendix M-1
Summary of Existing DCPs in Region C

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal
								Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months • o Water demand exceeds 98 percent of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days.			
Mesquite, City of	May-2024	WUG	NTMWD	NTMWD Sources	3	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s)is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage in Lavon and Bois d'Arc Lake, as published by the TWDB, is less than: • 70% of the combined conservation pool capacity during any of the months of April through October. • 60% of the combined conservation pool capacity during any of the months of November through March. • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months. •	5%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 30 percent of the total conservation pool capacity during any of the months of April through October • 20 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD water source has become limited in availability	30%, or as designated by NTMWD
Midlothian, City of	Apr-2024	WUG/WWP	TRWD	Joe Pool Lake/Reservoir; TRWD Lake/Reservoir System	3	• The Joe Pool Lake WSE declines to 516.0 feet; and • When the City Manager or their designee, is notified in writing by TRA that their Stage 1 drought management level has been declared. OR • Total combined raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 75% (25% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e., invasive species). • Water supply system is unable to deliver water due to the failure or damage of major water system components.	5%	• The Joe Pool Lake WSE declines to below 511.0 feet • When the City Manager or their designee, is notified in writing by TRA that the reservoir is now operating at less than 60% of the conservation pool, and their Stage 2 drought management level has been declared. OR • Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for other regulatory reasons (i.e. invasive species). • Water supply system is unable to deliver water due to the	10%	• The Joe Pool Lake WSE declines to below 501.0 feet • When the City Manager or their designee, is notified in writing by TRA that the reservoir is now operating at less than 35% of the conservation pool, and their Stage 3 drought management level has been declared. OR • Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (40% depleted) of conservation storage capacity. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. • One or more of TRWD's water supply sources has become limited in availability. • Water demand for all or part of the TRWD delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated or unusable for	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• The General Manager finds that conditions warrant the declaration of a Stage 1 drought. • When the City Manager or their designee, is notified in writing by TRWD that their Stage 1 has been declared. The City Manager or their designee finds that conditions warrant the declaration of a Stage 1 drought.		failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 2 drought. • When the City Manager or their designee, is notified in writing by TRWD that their Stage 2 has been declared. The City Manager or their designee, finds that conditions warrant the declaration of a Stage 2 drought.		other regulatory reasons (i.e. invasive species). • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager finds that conditions warrant the declaration of a Stage 3 drought. • When the City Manager or their designee, is notified in writing by TRWD that their Stage 3 has been declared. • . The City Manager or their designee, finds that conditions warrant the declaration of a Stage 3 drought.	
Murphy, City of	Apr-2024	WUG	NTMWD	NTMWD sources	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1 o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2 o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3 o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. o The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source has become limited in availability.	30%
Mustang SUD	May 2024	WWP	UTRWD	UTRWD Sources	3	• The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 80% (20% depleted) during the time period form November 1 to March 31.	5%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period form November 1 to March 31.	10%	• The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period form April 1 to October 31 • The total raw water supply in water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period form November 1 to March 31. • Dallas Water Utilities (a source of raw water to UTRWD)	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						• Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 1 • Water demand has reached or exceeded 80% of delivery capacity for three consecutive days. • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by District 11-C. The water supply system has a significant limitation due to failure of or damage to important water system components.		• Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 2. • Water demand has reached or exceeded 85% of delivery capacity for three consecutive days. • Water demand is approaching a level that is causing a reduced delivery capacity for all or part of the distribution system, as determined by District 11-C. • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components. A significant deterioration in the quality of a water supply, being affected by a natural or man-made source.		has initiated Stage 3 and given notice to UTRWD • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of stage 3. • Water demand has reached or exceeded 90% of delivery capacity for three consecutive days. • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by District 11-C. • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components. • Interruption of one or more water supply sources • Natural or man-made contamination of the water supply source that threatens water availability.	
North Collin SUD	May-2024	WUG	NTMWD	NTMWD sources	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions.	30%
North Farmersville WSC	Mar 2023	WUG	NTMWD	NTMWD sources	4	• Water stored in Lake Palo Pinto is equal to or less than 22,316 acre-feet or 865 ft. MSL (84% of storage capacity) and more than 14,759 acre feet or 861 ft. MSL (56% of storage capacity). • When total daily water demand equals or exceeds 90% of the safe operating capacity of the system for three consecutive days or 95% of system capacity on a single day. • Any mechanical failure of pumping equipment which will require more than 24 hours to repair when no water shortage conditions exist. Water availability is adequate but lake levels and/or reservoir capacities are low enough that some concern exist for future water supplies if the drought or emergency condition continues.	10%	• Water stored in Lake Palo Pinto is equal to or less than 14,759 acre-feet or 861 ft. MSL (56% of storage capacity) and more than 9,099 acre feet or 857 ft. MSL (35% of storage capacity). • Average daily water consumption reaches 100% of the safe operating capacity of the system for three consecutive days. • Average daily water consumption will not enable storage levels to be maintained. • System demand exceeds available high service pump capacity. • Any mechanical failure of pumping equipment, which will require more than 12 hours to repair if a mild drought is in progress. Water availability from the lake is below normal and may continue to decline and cause moderate concern for both current and future supplies or water supplies have been reduced due to failure of a portion of the water supply system.	20%	• Water stored in Lake Palo Pinto is equal to or less than 9,099 acre-feet or 857 ft. MSL (35% of storage capacity) and more than 6,279 acre-feet or 854 MSL (24% of storage capacity). • Average daily water consumption reaches 110% of production capacity for a 24-hour period. • Any mechanical failure of pumping equipment, which will require more than 12 hours to repair if a moderate drought is in progress. Water availability from the lake is well below normal, may continue to decline, and additional reductions in current of future water supplies are evident or water supplies have been reduced due to failure of a portion of the water supply system.	25%
North Richland Hills, City of	Apr-2024	WUG/WWP	TRA, CFW (TRWD)	TRWD sources	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Distribution system becomes contaminated. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate.	10%	• Water demand reaches or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system exceeds	20%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						the failure or damage of major water system components. • Total raw water supply within the Tarrant Regional Water District (TRWD) western and eastern division reservoirs, drops below 75% (25% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 1 of the Plan.		• Water supply system is unable to deliver water due to the failure or damage of major water system components. • Total raw water supply within TRWD, western and eastern division reservoirs, drops below 60% (40% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 of the Plan.		delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Total raw water supply within TRWD, western and eastern division reservoirs, drops below 45% (55% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach or exceed the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 3 of the Plan.	
Parker County SUD	May 2022	WUG	N/A	Mineral Wells, Brazos River Authority, and Trinity Aquifer	3	• Water stored in Lake Palo Pinto is equal to or less than 13,780 acre-feet or 860 ft. MSL (50% of storage capacity) and more than 6,279 acre feet or 854 ft. MSL. • Water consumption has reached 80 percent of daily maximum supply for three (3) consecutive days. • Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. • There is an extended period (at least eight (8) weeks) of low rainfall and daily use has 20 percent above the use for the same period during the previous year. • Any mechanical failure of pumping equipment which will require more than 24 hours repair when no water shortage conditions exist. Requirements for termination – Stage I of the Plan may be rescinded when all the conditions listed as triggering events have ceased to exist for a period of 10 consecutive days. Upon termination of Stage I, Stage 0 becomes operative. The District will notify its customers of the termination of Stage I.	20%	• Water stored in Lake Palo Pinto is equal to or less than 6,279 acre-feet or 854 ft. MSL 25% of storage capacity) and more than 3,392 acre feet or 849 ft. MSL. • Water consumption has reached 90 percent of the amount available for three consecutive days. • The water level in any of the water storage tanks cannot be replenished for three (3) consecutive days. Requirements for termination – Stage II of the Plan may be rescinded when all the conditions listed as triggering events have ceased to exist for a period of 10 consecutive days. Upon termination of Stage II, Stage I becomes operative.	25%	• Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer. • Water consumption of 95 percent or more of the maximum available for three (3) days. • Water consumption of 100 percent of the maximum available and the water storage levels in the system drop for one 24-hour period. • Natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties by the District. • Reduction of wholesale water supply due to drought conditions. Other unforeseen events which could cause imminent health or safety risks to the public.	30%
Plano, City of	Apr-2024	WUG	NTMWD	NTMWD sources	3	(1) The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. (2) Plano's water demand exceeds ninety-five (95) percent of the amount that can be delivered to customers for three consecutive days. (3) Plano's water demand for all or part of the water delivery system equals delivery capacity because delivery capacity is inadequate. (4) Plano's supply source becomes contaminated. (5) Plano's water supply system is unable to deliver	5%	(1) The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. (2) Plano's water demand exceeds ninety-eight (98) percent of the amount that can be delivered to customers for three consecutive days. (3) Plano's water demand for all or part of the water delivery system exceeds delivery capacity because delivery capacity is inadequate. (4) Plano's supply source becomes contaminated. (5) Plano's water supply system is unable to deliver	10%	(1) The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. (2) Plano's water demand exceeds the amount that can be delivered to customers. (3) Plano's water demand for all or part of the water delivery system seriously exceeds delivery capacity because the delivery capacity is inadequate. (4) Plano's supply source becomes contaminated. (5) Plano's water supply system is unable to deliver water due to the failure or damage of major water system components.	Designated by NTMWD

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						water due to the failure or damage of major water system components. Other criteria as determined by the City.		water due to the failure or damage of major water system components. Other criteria as determined by the City Manager.		(6) Plano is unable to recover water storage of one hundred (100) percent in all storage facilities within a twenty-four (24) hour period. (7) Plano's individual Plan may be implemented if other criteria dictate.	
Pleasant Grove WSCP	June 2022	WUG	N/A	Carrizo Wilcox Aquifer		• The static water level in the Pleasant Grove Water Supply Corporation well(s) is Equal to or less than 200 feet above mean sea level. • When the specific capacity of the Pleasant Grove Water Supply Corporation well(s) is Equal to or less than 75% of the well's original specific capacity. The public water supplier may devise other triggering criteria, which are tailored to its system		Well level drops to 190 feet.	25%	Static Water level is well drops to 180 feet above sea level.	50%
Point Enterprise WSC	Dec 2023	WUG	N/A	Carrizo-Wilcox Aquifer	3	• Water consumption has reached 80 percent of daily maximum supply for three (3) consecutive days. • Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. • There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year.	N/A	• Water consumption has reached 90 percent of the amount available for three consecutive days. The water level in any of the water storage tanks cannot be replenished for three consecutive days.	N/A	• Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer. • Water consumption of 95 percent or more of the maximum available for three (3) consecutive days. • Water consumption of 100 percent of the maximum available and the water storage levels in the system drop for one 24-hour period. • Natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties served by the Corporation. • Reduction of wholesale water supply due to drought conditions. Other unforeseen events which could cause imminent health or safety risks to the public.	N/A
Pottsboro, City of	May-2024	WUG	Denison	Denison sources, Woodbine Aquifer	4	• Demand exceeds 90% of the amount that can be delivered to customers for seven consecutive days • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components • Water demand is approaching the limit of the permitted supply due to the failure or damage of major water system components • Water demand is approaching the limit of the permitted supply	0%	• Demand exceeds 95% of the amount that can be delivered to customers for three consecutive days • Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components • Water demand is approaching the limit of the permitted supply	2%	• Demand exceeds 98% of the amount that can be delivered to customers for three consecutive days • Water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Water supply system is unable to deliver water due to the failure or damage of major water system components • Water demand is approaching the limit of the permitted supply	5%
Princeton, City of	May 2024	WUG/WWP	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for	30%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.		for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.		only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	
Prosper, Town of	Apr-2024	WUG	NTMWD	NTMWD sources	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1 o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2 o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3 o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni	30%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						(Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next six (6) months •		Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source may be limited in availability within the next three (3) months		and/or Lake Fork) are in a Stage 3 drought. o The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source has become limited in availability. o Water demand exceeds the amount that can be delivered by NTMWD to customers for three(3) consecutive days	
Providence Village WCID	Apr-2024	WUG	UTRWD	UTRWD Sources	3	• UTRWD has announced Stage 1 - Water Watch, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted); or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 1; or • Water demand has reached or exceeded (80%) of delivery capacity for three consecutive days; or • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by Town of Providence Village; or • The water supply system has a significant limitation due to failure of or damage to important water system components	5%	• UTRWD has announced Stage 2 - Water Warning, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted); or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 2; or • Water demand has reached or exceeded (85%) of delivery capacity for three consecutive days; or • Water demand has reached a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by Town of Providence Village; or • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components A significant deterioration in the quality of a water supply, being affected by a natural or man-made source	10%	• UTRWD has announced Stage 3 - Water Emergency, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted); or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 3; or • Water demand has reached or exceeded (90%) of delivery capacity for three consecutive days; or • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by Town of Providence Village; or • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components • interruption of one or more water supply source(s) Natural or man-made contamination of the water supply source that threatens water availability	20%
RCH WSC	Aug-2024	WUG	NTMWD	NTMWD sources	6	Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII – Definitions, when continually falling treated water reservoir levels which do not refill above 100 percent overnight.	10%	Customers shall be required to comply with the requirements and restrictions on certain nonessential water uses provided in Section IX of this Plan when falling treated water reservoir levels which routinely do not refill above 90 percent overnight.	15%	Customers shall be required to comply with the requirements and restrictions on certain nonessential water uses for Stage 3 of this Plan when falling treated water reservoir levels, which routinely do not refill above 85 percent overnight.	20%
Richardson, City of	Apr-2024	WUG	NTMWD	NTMWD sources	3	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (The City of Richardson may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 70 percent of the total conservation pool capacity during any of the months of	2%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (The City of Richardson may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake as published by the Texas Water Development Board (TWDB) is less than 55 percent of the total conservation pool capacity during any of the months of	5%	o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (The City of Richardson may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. o The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 30 percent of the total conservation pool capacity during any of the months of	30%

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source maybe limited in availability within the next six (6) months		April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source maybe limited in availability within the next three (3) months		April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March o The Sabin River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. o NTMWD's water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, or some other NTMWD water source maybe limited in availability	
Rockett SUD	Unknown	WUG/WWP	NTMWD	Joe Pool Lake/Reservoir; TRWD Lake/Reservoir System	4	Rockett Special Utility District will recognize that a mild water shortage condition exists when total daily water demands equals or exceeds 80% of the safe operating capacity of 10million gallons per day for 3 consecutive days.	20%	Rockett Special Utility District will recognize that moderate water shortage condition exists when the total daily water demands equals or exceeds 90% of the safe operating capacity of 11 million gallons per day for 3 consecutive days.	20%	Rockett Special Utility District will recognize that a severe water shortage condition exist, when the total daily water demands equals or exceeds 100% of the safe operating capacity of 12 million gallons per day for 3 consecutive days.	20%
Rockwall, City of	Aug-2024	WUG/WWP	NTMWD	NTMWD sources	6	Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII – Definitions, when continually falling • treated water reservoir levels which do not refill above 100 percent overnight.	10%	Customers shall be required to comply with the requirements and restrictions on certain nonessential water uses provided in Section IX of this Plan when falling treated water reservoir levels which routinely do not refill above 90 percent overnight.	15%	Customers shall be required to comply with the requirements and restrictions on certain nonessential water uses for Stage 3 of this Plan when falling treated water reservoir levels which routinely do not refill above 85 percent overnight.	20%
Rose Hill SUD	May 2022	WUG	NTMWD	NTMWD Sources, Lake Texoma, Jim chapman Lake, East Fork Water Reuse Project, Main Stem Pump stations,	3	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1 • Water demand is projected to approach the limit of NTMWDs permitted supply • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB) is less than 70% of the total conservation pool capacity during any of the months of April through October or less that 60% of the total conservation pool capacity during the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump stations, or some other NTMWD water source may be limited in availability with in the next 6 months • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system us unable to deliver water due to the failure or damage of major water system components • Part of the system has a shortage in supply or damage	2%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2 • Water demand is projected to approach the limit of NTMWDs permitted supply • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB) is less than 55% of the total conservation pool capacity during any of the months of April through October or less that 45% of the total conservation pool capacity during the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump stations, or some other NTMWD water source may be limited in availability with in the next 3 months • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system us unable to deliver water due to the failure or damage of major water system components • Part of the system has a shortage in supply or damage	10%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3 • Water demand is projected to approach the limit of NTMWDs permitted supply • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB) is less than 30% of the total conservation pool capacity during any of the months of April through October or less that 20% of the total conservation pool capacity during the months of November through March • The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 3 drought • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD water source has become limited in availability • Water demand exceeds the amount that can be delivered to Customers • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system us unable to deliver water due to the	Designated by NTMWD

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
						to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. • Suppliers water demand exceeds 95% of the amount that can be delivered to customers for three consecutive days • Suppliers water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Supplies water system is unable to deliver water due to the failure or damage of major water system components • Suppliers individual plan may be implemented if other criteria dictate		to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. • Suppliers water demand exceeds 98% of the amount that can be delivered to customers for three consecutive days • Suppliers water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Supply source is interrupted or unavailable due to invasive species • Supplies water system is unable to deliver water due to the failure or damage of major water system components Suppliers individual plan may be implemented if other criteria dictate		failure or damage of major water system components • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted. • Suppliers water demand exceeds the amount that can be delivered to customers • Suppliers water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Supply source becomes contaminated • Supply source is interrupted or unavailable due to invasive species • Supplies water system is unable to deliver water due to the failure or damage of major water system components Suppliers individual plan may be implemented if other	

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
Rowlett, City of	Apr-2024	WUG	NTMWD	NTMWD	3	**General Criteria** o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. o One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than: - 70% of the combined conservation pool capacity during any of the months of April through October. -60% of the combined conservation pool capacity during any of the months of November through March. o The Sabine River Authority (SRA) has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. o NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	**General Criteria** o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than -55% of the combined conservation pool capacity during any of the months of April through October. - 45% of the combined conservation pool capacity during any of the months of November through March. o SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. o NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	**General Criteria** o The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. o One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. o The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. o Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) o A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. **Demand Criteria** o Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. **Supply Criteria** o The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is less than - 30% of the combined conservation pool capacity during any of the months of April through October. - 20% of the combined conservation pool capacity during any of the months of November through March. o SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. o The supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	Designated by NTMWD Director

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Rural Bardwell WSC	Mar 2024	N/A	N/A	N/A	3	• Water consumption has reached 80 percent of daily maximum supply for three (3) consecutive days. • Water supply is reduced to a level that is only 20 percent greater than the average consumption for this previous month • There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year. The Corporation is placed on notice by its wholesale water provider of the existence of drought conditions.	N/A	• Water consumption has reached 90 percent of the amount available for three (3) consecutive days The water level in any of the water storage tanks cannot be replenished for three (3) consecutive days.	N/A	• Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer • Water consumption of 95 percent or more of the maximum available for three (3) consecutive days. • Water consumption of 100 percent of the maximum available and the water storage levels in the system drop during one 24-hour period. • Natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties served by the Corporation. • Reduction of wholesale water supply due to drought conditions. Other unforeseen events which could cause imminent health or safety risks to the public.	N/A

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
Sachse, City of	Apr 2024	WUG	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 70% of the combined conservation pool capacity during any of the months of April Through October 60% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 55% of the combined conservation pool capacity during any of the months of April Through October 45% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.	5%	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other case • The water Supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions Demand Criteria • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lake as published by the TWDB is less than: 30% of the combined conservation pool capacity during any of the months of April Through October 20% of the combined conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.	30%

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Saginaw, City of	May-2024	WUG	Fort worth(TRWD)	TRWD Sources	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system • Saginaw's water distribution system becomes contaminated • Saginaw's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Saginaw's water supply system is unable to deliver water due to the failure or damage of major water system components • Fort Worth initiated Stage 1 - Water Watch for one or more of the following reasons: • Fort Worth's water treatment or distribution system becomes contaminated • Fort Worth's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Fort Worth's water supply system is unable to deliver water due to the failure or damage of major water system components • TRWD initiated Stage 1 - Water Watch for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 75% (25% depleted) of conservation storage • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate • Water demand is projected to approach the limit of TRWD's permitted supply • TRWD's supply source becomes contaminated • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system • Saginaw's water distribution system becomes contaminated • Saginaw's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Saginaw's water supply system is unable to deliver water due to the failure or damage of major water system components • Fort Worth initiated Stage 2 - Water Warning for one or more of the following reasons: • Fort Worth's water treatment or distribution system becomes contaminated • Fort Worth's water demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate • Fort Worth's water supply system is unable to deliver water due to the failure or damage of major water system components • Fort Worth's water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system • TRWD initiated Stage 2 - Water Warning for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate • Water demand is projected to approach the limit of TRWD's permitted supply • TRWD's supply source becomes contaminated • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 drought	10%	• Customers shall be required to comply with the requirements and restrictions on certain nonessential water uses for Stage 3 of this Plan when falling treated water reservoir levels which routinely do not refill above 85 percent overnight. • Water demand reaches or exceeds 98% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system • Saginaw's water distribution system becomes contaminated • Saginaw's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Saginaw's water supply system is unable to deliver water due to the failure or damage of major water system components • Fort Worth initiated Stage 3 - Emergency Water Use for one or more of the following reasons: • Fort Worth's water treatment or distribution system becomes contaminated • Fort Worth's water demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate • Fort Worth's water supply system is unable to deliver water due to the failure or damage of major water system components • Fort Worth's water demand reaches or exceeds 98% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system • TRWD initiated Stage 3 - Emergency Water Use for one or more of the following reasons: • Total raw water supply in TRWD western and eastern division reservoirs drops below 45% (55% depleted) of conservation storage • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate • Water demand is projected to approach or exceed limit of TRWD's permitted supply • TRWD's supply source becomes contaminated • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 3 drought •	20%

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Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Sanger, City of	May-2024	WUG	UTRWD	UTRWD Sources, Trinity Aquifer	3	• UTRWD has announced Stage 1 - Water Watch, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 75% (25% depleted) during the time period from April 1 to October 31; or • The total raw water supply in water supply lakes available to UTRWD has dropped below 80% (20% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 1 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 1; or • Water demand has reached or exceeded (80%) of delivery capacity for three consecutive days; or • Water demand is approaching a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by City of Sanger; or • The water supply system has a significant limitation due to failure of or damage to important water system components	5%	• UTRWD has announced Stage 2 - Water Warning, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 60% (40% depleted) during the time period from April 1 to October 31; or • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 65% (35% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 2 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, finds that conditions warrant the declaration of Stage 2; or • Water demand has reached or exceeded (85%) of delivery capacity for three consecutive days; or • Water demand has reached a level that will cause a reduced delivery capacity for all or part of the distribution system, as determined by City of Sanger; or • The water supply system is unable to deliver water at normal rates due to failure of or damage to important water system components • A significant deterioration in the quality of a water supply, being affected by a natural or man-made source	10%	• UTRWD has announced Stage 3 - Water Emergency, which may be a result of: • The total raw water supply in water supply lakes available to UTRWD has dropped below 45% (55% depleted) during the time period from April 1 to October 31; or • The total raw water supply in the water supply lakes available to Upper Trinity has dropped below 50% (50% depleted) during the time period from November 1 to March 31; or • Dallas Water Utilities (a source of raw water to UTRWD) has initiated Stage 3 and given notice to UTRWD; or • UTRWD, with concurrence of the Board of Directors, • finds that conditions warrant • the declaration of Stage 3; or • Water demand has reached or exceeded (90%) of delivery capacity for three consecutive days; or • Water demand exceeds the delivery capacity for all or part of the distribution system, as determined by City of Sanger; or • The water supply system is unable to deliver water in adequate quantities due to failure of or damage to important water system components • Interruption of one or more water supply source(s) • Natural or man-made contamination of the water supply source that threatens water availability	20%

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						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
Sherman, City of	May-2019	WUG/ WWP	GUTA	Lake Texoma, Trinity Aquifer, Woodbine Aquifer	4	• Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in section 11.7 - Definitions, when total daily water demand equals 80 percent of 18 mgd for five (5) consecutive days based on the "safe" operating capacity of water supply facilities.	5%	• Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses	15%	• Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section 11.7 of this Plan when water demands equal or equals 100 percent, or 23 mgd for three (3) consecutive days based on the state operating capacity of the facilities.	20%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
South Ellis County Water Supply	July-2016	WUG	N/A	Trinity Aquifer	3	1)Water consumption has reached 80 percent o1'daily maximum supply for three (3) consecutive days. 2) Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. 3) There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year.	N/A	1) Water consumption has reached 90 percent o{'the amount available for three consecutive days. 2) The water level in any of the water storage tanks cannot be replenished for three (3) consecutive days.	N/A	1) Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer. 2) Water consumption of 95 percent or more of the maximum available for three (3) consecutive days. 3) Water consumption of 100 percent of the maximum available and the water storage levels in the system drop during one 24-hour period. 4) Natural or man-made contamination of the water supply source(s). 5) The declaration of a state of disaster due to drought conditions in a county or counties served by the Corporation. 6) Reduction of wholesale water supply due to drought conditions. 7) Other unforeseen events which could cause imminent health or safety risks to the public.	N/A

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Talty SUD	Apr 2024	WUG	NTMWD	NTMWD Sources	3	• The executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • Water demand is projected to approach the limit of the NTMWD's permitted supply. • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate • Water demand exceeds 95% of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days. • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted.	2%	• The executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • Water demand is projected to approach the limit of the NTMWD's permitted supply. • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months. • Water demand exceeds 98% of the amount that can be delivered by NTMWD to Customers for three (3) consecutive days. • Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Supply source is interrupted or unavailable due to contamination, invasive species, equipment failure, or other cause. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted.	10%	• The executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • Water demand is projected to approach or exceed the limit of the NTMWD's permitted supply. • The storage level in Lavon Lake as published by the Texas Water Development Board (TWDB), is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than 20 percent of the total conservation pool capacity during any of the months of November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability • Water demand exceeds the amount that can be delivered by NTMWD to Customers • Water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Water supply system is unable to deliver water due to the failure or damage of major water system components. • Part of the system has a shortage in supply or damage to equipment. NTMWD may implement measures for only that portion of the NTMWD system impacted.	Variable

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Terrell, City of	May-2024	WUG/WWP	NTMWD	NTMWD sources	3	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the Texas Water Development Board (TWDB) is less than 70 percent of the total conservation pool capacity during any of the months of April through October or less than 60 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 1 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station or some other NTMWD source may be limited in availability in the next six (6) months. •	2%	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB is less than 55 percent of the total conservation pool capacity during any of the months of April through October or less than 45 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. (Measures required by SRA under a Stage 2 drought designation are similar to those under NTMWD's Stage 2.) • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station or some other NTMWD source may be limited in availability within the next three (3) months. •	5%	• The NTMWD Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. The storage level in Lavon Lake, as published by the TWDB is less than 30 percent of the total conservation pool capacity during any of the months of April through October or less than20 percent of the total conservation pool capacity during any of the months of November through March. • The Sabine River Authority has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 Drought. (Measures required by SRA under Stage 3 drought designation are similar to those under NTMWD's Stage 3). • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station or some other NTMWD source has become severely limited in availability. •	30%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
Tioga, City of	June 2022	WUG	N/A	Trinity aquifer	3	• Daily water demand exceeds 644,400 gallons per day for three consecutive days (50% of rated capacity of all wells)	>644,400 gpd	• Daily water demand exceeds 773,280 gallons per day for three consecutive days (60% of capacity of all wells) • Water pressures in the distribution system reman below 40 psi for more than six consecutive hours • Failure of any well, coupled with demand over 399,600 gpd (75% of capacity of the two smaller wells).	>773.280 gpd	• Daily water demand exceeds 966,600 gallons per day for three consecutive days (75% of rated capacity of all wells) • Imminent failure of a system component where immediate health or safety hazards exist • Water pressures in the distribution system continue to drop after implementing management steps	>966,600 gpd

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
Trophy Club MUD 1	Apr-2024	WUG	Fort Worth (TRWD)	TRWD Sources, Trinity Aquifer	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three (3) consecutive days. • Contamination of the City of Fort Worth's water treatment or distribution system. • Inadequate delivery capacity by the City of Fort Worth. • Failure of or damage to the City of Fort Worth's water supply system. • Water demand approaches a reduced delivery capacity for all or part of the system due to supply or production capacity limitation including contamination of the system. • Pursuant to requirements established in the agreement with the City of Fort Worth, notification is received requesting initiation of Stage 1 of their Drought Contingency Plan. • Conditions within the District's water system that warrant a mild reduction in water usage. These conditions may include loss of supply, storage, or pumping capacity, water main break, or other system failure.	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three (3) consecutive days. The delivery capacity could be District-wide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • Pursuant to requirements established in the agreement with the City of Fort Worth, notification is received requesting initiation of Stage 2 of their Drought Contingency Plan. • Conditions within the District's water system that warrants a moderate reduction in water usage. These conditions may include loss of supply, storage, or pumping capacity, water main break, or other system failure.	10%	• Water demand has reached or exceeds 98% of reliable delivery capacity for one (1) day. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Pursuant to requirements established in the agreement with the City of Fort Worth, notification is received requesting initiation of Stage 3 of their Drought Contingency Plan. • Conditions within the District's water system that warrant a major reduction in water usage. These conditions may include loss of supply, storage, or pumping capacity, water main break, or other system failure	20%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
University Park, City of	May-2024	WUG	DCPCMUD	Grapevine Lake	4	• The City's water use is approaching the limit of its contracted supply. • The City's demand exceeds 90% of its delivery capacity for seven consecutive days. • The City's water demand for any portion of the delivery system approaches the delivery capacity. • The City's supply source or delivery system becomes contaminated. • The City's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage I. This may occur with one or more of the following: o The District's water supply in Grapevine Lake becomes 35% depleted. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 90% of its delivery capacity for seven consecutive days. • The District's water supply system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage I	2%	• The City's water use is approaching the limit of its contracted supply. • The City's demand exceeds 95% of its delivery capacity for seven consecutive days. • The City's water demand for any portion of the delivery system approaches the delivery capacity. • The City's supply source or delivery system becomes contaminated. • The City's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage II. This may occur with one or more of the following: o The District's water supply in Grapevine Lake becomes 45% depleted. • Grapevine Reservoir becomes contaminated. • The District's demand exceeds 95% of its delivery capacity for five consecutive days. • The District's water system is unable to deliver water to its customers due to the failure or damage of major water system components. • Any other condition that would cause the District to initiate Stage II	5%	• The City's water use is approaching the limit of its contracted supply. • The City's demand exceeds 98% of its delivery capacity for seven consecutive days. • The City's water demand for any portion of the delivery system approaches the delivery capacity. • The City's supply source or delivery system becomes contaminated. • The City's water supply system is unable to deliver water due to the failure or damage of major water system components. • The District has initiated Stage III. This may occur with one or more of the following: • The District's water supply in Grapevine Lake becomes 55% depleted. • Grapevine reservoir has been contaminated. • The District's demand exceeds 98% of its delivery capacity for three consecutive days. • The District's water supply system is unable to deliver water to it's customers due to the failure or damage of major water system components. • The District's water use is approaching the limit of the permitted supply. • Any other condition that would cause The District to initiate Stage III.	10%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
Verona SUD	N/A	WUG	N/A	Woodbine Aquifer	3	• Stage I may be implemented when one or more of the following conditions exist: • a. Water consumption has reached 80 percent of daily maximum supply for three (3) consecutive days. • b. Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. • c. There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year.	N/A	• Stage II rationing condition may be implemented when one of the following conditions exist: • a. Water consumption has reached 90 percent of the amount available for three consecutive days. • b. The water level in any of the water storage tanks cannot be replenished for three (3) consecutive days. •	N/A	• Stage III rationing conditions may be implemented when one of the following four conditions exist: • a. Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer. • b. Water consumption of 95 percent or more of the maximum available for three (3) consecutive days. • c. Water consumption of 100 percent of the maximum available and the water storage levels in the system drop during one 24 hour period. • d. Other unforeseen events which could cause imminent health or safety risks to the public. •	N/A
Walnut Creek SUD	Apr 2024	WWP	TRWD	TRWD sources	3	• Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager, with concurrence of the WCSUD Board of Directors, finds that conditions warrant the declaration of a Stage 1 drought.	5%	• Total raw water supply in TRWD western and eastern division reservoirs drops below 60% (40% depleted) of conservation storage capacity. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated.	10%	• Total raw water supply in TRWD western division reservoir drops below 45% (55% depleted) of conservation storage capacity. • Water demand exceeds the amount that can be delivered to customers. • Water demand for all or part of the WCSUD delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of WCSUD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the	30%

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						Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
										failure or damage of major water system components. • The General Manager, with concurrence of the WCSUD Board of Directors, finds that • conditions warrant the declaration of a Stage 3 drought.	
Watauga, City of	Apr-2024	WUG	North Richland Hills	TRWD Sources	3	• Water demand reaches or exceeds 90% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Distribution system becomes contaminated. • Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 1- Water Watch for one or more of the following reasons: • Total raw water supply within the Tarrant Regional Water District (TRWD) western and eastern division reservoirs, drops below 75% (25% depleted) of conservation storage. o Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 1 of the Plan.	5%	• Water demand reaches or exceeds 95% of reliable delivery capacity for three consecutive days. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD initiated Stage 2 – Water Warning for one or more of the following reasons: • Total raw water supply within TRWD, western and eastern division reservoirs, drops below 60% (40% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of a Stage 2 of the plan.	10%	• Water demand reaches or exceeds 98% of reliable delivery capacity for one day. The delivery capacity could be citywide or in a specified portion of the system. • Contamination of the water supply source(s) or water supply system. • Demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • TRWD has initiated Stage 3 – Emergency Water Use, which may also be initiated by one or more of the following: • Total raw water supply within TRWD, western and eastern division reservoirs, drops below 45% (55% depleted) of conservation storage. • Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. • Water demand is projected to approach or exceed the limit of TRWD's permitted supply. • TRWD's supply source becomes contaminated. • TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. • The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 3 of the plan.	20%
Waxahachie, City of	Oct - 2020	WUG/ WWP	TRA (TRWD)	Lake Waxahachie, Lake Bardwell, TRWD sources	6	Monitor weather conditions, activate Bardwell Reservoir Pump • Station to transfer raw water when Lake Waxahachie drops below elevation 531' msl for three consecutive days. This is 6" below the spillway overflow elevation. The lake is operating at approximately 97 percent capacity.	Voluntary	When Lake Waxahachie elevation drops to 527' msl. This is • 4.5-feet below spillway elevation and the lake is operating at less than 74 percent capacity: Customers will be encouraged to voluntarily conserve water and reduce non-essential water use as described in Section VII – Definitions, of this plan. The city will provide public education on water conservation tips and information through newspaper articles, city website and handouts. Lake Waxahachie and city parks adjacent to the lake will remain open.	2%	• When Lake Waxahachie elevation drops to 524' msl. This is 7.5-feet below spillway elevation and the lake is operating at less than 68 percent capacity: Customers shall be required to comply with requirements of mandatory limits on all lawn and landscape irrigation which will be restricted to Wednesday and Saturday only; provided however, that the City Manager, or his/her designee, after notice in the newspaper, radio, city website and any other methods deemed appropriate, may change the days to Tuesday, Thursday and Saturday. Non-essential water uses shall be prohibited, except for letter (a), as described in Section VII – Definitions, of this Plan. Items listed in letter (a) shall comply with mandatory watering limits in this stage. Require implementation of like procedures by Wholesale Water Customers in accordance with their contracts and state mandated drought and water conservation plans. Violators of this stage will be subject to fines. First offense - warning; second offense - minimum $150.00 fine; third offense - minimum $250.00 fine. Water rate penalty of $5.00 for water use in excess of 10,000 gallons per account and rate per 1,000 gallons will be increased ten percent (10%) on all accounts	5%
Weatherford, City of	Apr-2024	WUG/ WWP	TRWD	TRWD Sources, Lake Weatherfor	3	• The lake level in Lake Weatherford reaches 889.0 feet or 61.5% capacity; or • Water demand reaches 85 percent of the water treatment capacity for 3 consecutive days. The delivery capacity could be citywide or in a	5%	• The lake level in Lake Weatherford reaches 887.5 feet or 54% capacity; or • Water demand reaches 90 percent of the water treatment capacity for 3 consecutive days. The delivery capacity could be citywide or in a specified	10%	• The lake level in Lake Weatherford reaches 885.5 feet or 45% percent capacity; or • Water demand reaches 95 percent of the water treatment capacity for 3 consecutive days or 98% for one day. The delivery capacity could be citywide or in a specified	20%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal
				d		specified portion of the system; • Weatherford's water treatment or distribution system becomes contaminated; • Weatherford's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate; • Any mechanical failure of pumping equipment will require more than 48 hours to repair when dry weather conditions exist and continued dry weather is expected. • TRWD initiates Stage 1 – Water Watch for one or more of the following reasons: -Total raw water supply in TRWD water supply reservoirs drops below 75% (25% depleted) of conservation storage. -Water demand has exceeded or is expected to exceed 80% of maximum sustainable production of delivery capacity for an extended period. -One or more of TRWD's water supply sources has become limited in availability. -Water demand is projected to approach the limit of TRWD's permitted supply. -TRWD's supply source becomes contaminated or unusable for other regulatory reasons. -TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. -The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 1 drought.		portion of the system; • Weatherford's water treatment or distribution system becomes contaminated • Weatherford's water demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate; • Any mechanical failure of pumping equipment will require more than 48 hours to repair when dry weather conditions exist and continued dry weather is expected. • TRWD initiates Stage 2 – Water Warning for one or more of the following reasons: -Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 60% (40% depleted) of conservation storage capacity. -Water demand has exceeded or is expected to exceed 85% of maximum sustainable production of delivery capacity for an extended period. -One or more of TRWD's water supply sources has become limited in availability. -Water demand is projected to approach the limit of TRWD's permitted supply. -TRWD's supply source becomes contaminated or unusable for other regulatory reasons. -TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. - The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 2 drought.		portion of the system; • Weatherford's water treatment or distribution system becomes contaminated; • Weatherford's water demand for all or part of the delivery system equals or exceeds delivery capacity because delivery capacity is inadequate; • Major water line breaks, pump or system failures occur, which cause unprecedented loss of capability to provide water service; • TRWD initiates Stage 3 – Water Emergency for one or more of the following reasons: -Total raw water supply in TRWD water supply reservoirs (Bridgeport, Eagle Mountain, Richland Chambers and Cedar Creek) drops below 45% (55% depleted) of conservation storage capacity. -Water demand has exceeded or is expected to exceed 90% of maximum sustainable production of delivery capacity for an extended period. -Water demand for all or part of the TRWD delivery system exceeds delivery capacity because delivery capacity is inadequate. -One or more of TRWD's water supply sources has become limited in availability. -Water demand is projected to approach the limit of TRWD's permitted supply. -TRWD's supply source becomes contaminated or unusable for other regulatory reasons. -TRWD's water supply system is unable to deliver water due to the failure or damage of major water system components. -The TRWD General Manager, with the concurrence of the TRWD Board of Directors, finds that conditions warrant the declaration of Stage 3 drought.	
Westminster SUD	Jan-2018	WUG	N/A	Woodbine Aquifer	5	• Voluntary Conservation will begin: • Annually, on May1 through September 30, and/or • When total daily demand equals or exceeds 80% of daily maximum pump capacity for (3) consecutive days.	10%	• Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan: • When total daily water demand equals or exceeds 80% of daily maximum pump capacity for (3) consecutive days.	20%	• Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan: • When total daily water demand equals or exceeds 80% of daily maximum pump capacity for (3) consecutive days.	30%
West Wise SUD (Retail)	Mar-2019	WUG	TRWD, Walnut Creek SUD	TRWD Sources	3	• Stage 1 water allocation measures may be implemented when one or more of the following conditions exist: • Water consumption has reached 80 percent of daily maximum supply for three consecutive days (.800 mgd for 3 days). • Water supply is reduced to a level that is only 20 percent greater than the average consumption for the previous month. • There is an extended period (at least eight (8) weeks) of low rainfall and daily use has risen 20 percent above the use for the same period during the previous year.	N/A	• Stage 2 water allocation measures may be implemented when one of the following conditions exist: • Water consumption has reached 90 percent of the available for three consecutive days (.900 mgd for 3 days). • The Water level in any of the water storage tanks cannot be replenished for three consecutive days. Example: Water plant clear wells drop to 8 feet in 3 days.	N/A	• Stage 3 water allocation measures may be implemented when one of the following five conditions exist: • Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 20 psi for a period of 24 hours or longer • Water consumption of 95 percent or more of the maximum available for three consecutive days (.950 mgd for 3 days). • Water consumption of 100 percent of the maximum available and the water storage levels system drop during one 24-hour period. • Natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties served by the District. • Reduction of wholesale water supply due to drought conditions. • Other unforeseen events which could • cause imminent health or safety risks to the public.	N/A
West Wise SUD (Wholesale)	Apr-2019	WUG	TRWD, Walnut Creek SUD	TRWD Sources	3	• Total water demand equals or exceeds 80 percent of daily maximum supply for three consecutive days (.800 mgd for 3 days), or as notified per Tarrant Regional Water District. • Supply source becomes contaminated. • Water supply is unable to deliver water due to the	6%	• Total water demand equals or exceeds 90 percent of daily maximum supply for three consecutive days (.900 mgd for 3 days), or as notified per Tarrant Regional Water District. • Supply source becomes contaminated. • Water supply is unable to deliver water due to the failure	6%	• Water consumption of 95 percent or more of • maximum available for three consecutive days (.950 mgd for 3 days), or as notified per Tarrant Regional Water District. • Water demand exceeds the amount that can be delivered to customers.	6%

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Appendix M-1
Summary of Existing DCPs in Region C

					Stage 1		Stage 2		Stage 3	
Entity	**Plan Date**	**Entity Type**	**Wholesale Water Provider(s)**	**Source(s)**	**No. of Stages**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**	**Trigger**	**Savings Goal**
						failure or damage of major water system components. • The General Manager, with concurrence of the WWSUD Board of Directors, finds that conditions warrant declaration of a Stage 1 drought.		or damage of major water system components. • The General Manager, with concurrence of the WWSUD Board of Directors, finds that conditions warrant declaration of a Stage 2 drought.		• Water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • One or more of WWSUD's water supply sources has become limited in availability. • Water demand is projected to approach the limit of permitted supply. • Supply source becomes contaminated. • Water supply system is unable to deliver water due to the failure or damage of major water system components. • The General Manager, with concurrence of the WWSUD Board of Directors, finds that conditions warrant declaration of a Stage 3 drought.	
White Shed WSC	May-2024	WUG	N/A	Woodbine Aquifer	3	• Water consumption has reached 85 percent of daily maximum supply for three (3) consecutive days	N/A	• Water consumption has reached 90 percent of the amount available for three consecutive days	N/A	• Total daily water demand equals or exceeds 95 percent of the system's safe operating capacity for three (3) consecutive days. • Total daily water demand equals or exceeds 100 percent of capacity on a single day. • There is natural or man-made contamination of the water supply source(s). • The declaration of a state of disaster due to drought conditions in a county or counties served by the Corporation. • Reduction of wholesale water supply due to drought conditions. • Other unforeseen events which could cause imminent health or safety risks to the public.	N/A
Woodbine WSC	Apr-2025	WUG	GTUA Regional Water System through Sherman	Trinity Aquifer	4	Every April 1st, the utility will mail a public announcement to its customers. No notice to TCEQ required.	N/A	• Water consumption has reached 85% of daily maximum supply for five consecutive days. • Total daily demand has reached 85% of daily pumping capacity for five consecutive days.	10%	• Water consumption has reached 90% of daily maximum supply for three consecutive days. • Failure of a major component of the system or an event which reduces the minimum residual pressure in the system below 30 psi for a period of 24 hours or longer. • Total daily demand has reached 90% of daily pumping capacity for three (3) consecutive days.	15%

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Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Ssavings Goal	Trigger	Savings Goal
Wylie, City of	Apr 2024	WUG	NTMWD	NTMWD Sources	3	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 1. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 90% of maximum sustainable production or delivery capacity for an extended period. • The combined storage level, as published by the Texas Water Development Board, in Lavon Lake and Bois d'Arc Lake, is less than 70 percent of the total conservation pool capacity during the months of April through October or less than 60 percent of the total conservation pool capacity during the months of	2%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 55 percent of the total conservation pool capacity during the months of April through October or less than 45 percent of the total conservation pool capacity during the months of November through March. • SRA has indicated that	5%	• The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. • Water demand has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. • The combined storage level in Lavon Lake and Bois d'Arc Lake, as published by the TWDB, is less than 30 percent of the total conservation pool capacity during the months of April through October or less than 20 percent of the total conservation pool capacity during the months of November through March. • SRA has indicated that	30%	• Wylie	Apr 2024	• WUG	NTMWD	NTMWD • Sources	3

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Ssavings Goal	Trigger	Savings Goal
						November through March. • The Sabine River Authority has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in Stage 1 • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, or some other NTMWD source may be limited in availability within the next six (6) months. • The city's water demand exceeds 85 percent of the amount that can be delivered to customers for (3) three consecutive days. • The city's water demand for all or part of the delivery system approaches delivery capacity because delivery capacity is inadequate. • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • The City Manager or his/her designee		its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 2 drought. • NTMWD has concern that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station or some other NTMWD source may be limited in availability within the next three (3) months • The city's water demand exceeds 90 percent of the amount that can be delivered to customers for three consecutive days • The city's water demand for all or part of the delivery system equals delivery capacity because delivery capacity is inadequate • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • The City Manager or his/her designee determines that it is appropriate to initiate Stage 2. •		its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a Stage 3 drought. • The water supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, the Main Stem Pump Station or some other NTMWD source has become limited in availability • The city's water demand exceeds the amount that can be delivered to customers • The city's water demand for all or part of the delivery system exceeds delivery capacity because delivery capacity is inadequate • Water supply system is unable to deliver water due to the failure or damage of major water system components, supply source becomes contaminated, power outage, grid failure, natural disaster, or extreme weather event. • The City Manager or his/her designee determines that it is appropriate to initiate Stage 3. •						

Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Stage 1 Trigger	Stage 1 Savings Goal	Stage 2 Trigger	Stage 2 Savings Goal	Stage 3 Trigger	Stage 3 Savings Goal	Stage 4 Trigger	Stage 4 Savings Goal	Stage 5 Trigger	Stage 5 Ssavings Goal	Stage 6 Trigger	Stage 6 Savings Goal
						determines that it is appropriate to initiate Stage 1. •											
Wylie Northeast SUD	Apr 2024	WUG	NTMWD	NTMWD Sources	3	General Criteria • The Executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the termination of Stage 1. • The circumstances that caused the initiation of Stage 1 no longer prevail. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is greater than 75% of the combined conservation pool capacity during any of the months of April through October, or 65% of the combined conservation pool capacity during any of the months of November through March. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next six months.	2%	General Criteria • The executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 2. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. Demand Criteria • Water demanded has exceeded or is expected to exceed 95% of maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is greater than 55% of the combined conservation pool capacity during any of the months of April through October, or 45% of the combined conservation pool capacity during any of the months of		General Criteria • The executive Director, with the concurrence of the NTMWD Board of Directors, finds that conditions warrant the declaration of Stage 3. • One or more supply source(s) is interrupted, unavailable, or limited due to contamination, invasive species, equipment failure, or other cause. • The water supply system is unable to deliver needed supplies due to the failure or damage of major water system components. • Part of the system has a shortage of supply or damage to equipment. (NTMWD may implement measures for only that portion of the system impacted.) • A portion of the service area is experiencing an extreme weather event or power grid/supply disruptions. Demand Criteria • Water demanded has exceeded or is expected to exceed maximum sustainable production or delivery capacity for an extended period. Supply Criteria • The combined storage in Lavon and Bois d'Arc Lakes, as published by the TWDB, is greater than 55% of the combined conservation pool capacity during any of the months of April through October, or 45% of the combined conservation pool capacity during any of the months of		• Wylie Northeast SUD	Apr 2024	• WUG	NTMWD	NTMWD Sources	3

Appendix M-1
Summary of Existing DCPs in Region C

						Stage 1		Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
Entity	Plan Date	Entity Type	Wholesale Water Provider(s)	Source(s)	No. of Stages	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Savings Goal	Trigger	Ssavings Goal	Trigger	Savings Goal
								November through March. • NTMWD is concerned that Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source may be limited in availability within the next three months.		November through March. • SRA has indicated that its Upper Basin water supplies used by NTMWD (Lake Tawakoni and/or Lake Fork) are in a drought and have significantly reduced supplies available to NTMWD. • The supply from Lake Texoma, Jim Chapman Lake, the East Fork Water Reuse Project, Main Stem Pump Station, and/or some other NTMWD water source has become limited in availability.						

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
ALVORD	WISE	6,073	827	NO	NO	NO	NO	NO	YES	YES	YES	**Emergency Interconnect:** Conveyance Facilities; **Other Named Local Supply:** Conveyance facilities, Treatment facility; **Trucked in Water:** None	**Emergency Interconnect:** City of Chico, Montague Water Systems, West Wise SUD, City of Decatur, Bolivar WSC; **Other Named Local Supply:** Big Sandy Creek, Denton Creek, Lake Amon Carter	City of Chico, Montague Water Systems, West Wise SUD, City of Decatur, Bolivar WSC	NO
AMC CREEKSIDE	DENTON	6,078	408	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
ANNETTA	PARKER	6,327	883	YES	NO	YES	NO	NO	YES	YES	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well:** Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Other Named Local Supply:** Conveyance Infrastructure, Treatment Facility; **Trucked in Water:** None	**Release from Upstream Reservoir:** Lake Weatherford; **Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** City of Aledo, Aledo Mobile Home Park, City of Weatherford, City of Hudson Oaks, City of Willow Park; **Other Named Local Supply:** Town Creek, Clear Fork Trinity River	City of Aledo, Aledo Mobile Home Park, City of Weatherford, City of Hudson Oaks, City of Willow Park	NO
ARLEDGE RIDGE WSC	FANNIN	1,684	283	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**;** **Trucked in Water:** None	**Emergency Interconnect:** City of Leon	City of Leon	YES
AVALON WATER SUPPLY & SEWER SERVICE	ELLIS	1,650	202	NO	NO	YES	YES	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	South Ellis County WSC, Navarro, Mils WSC, B and B WSC, City of Italy, Rice Water Supply and Sewer Service, Buena Vista-Bethel SUD, City of Corsicana, City of Blooming Grove, City of Frost	NO
BELLS	GRAYSON	2,416	246	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**;** **Trucked in Water:** None	**Emergency Interconnect:** SW Fannin County SUD	W Fannin County SUD	YES
BLACK ROCK WSC	DENTON	3,791	907	YES	YES	YES	NO	NO	NO	NO	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well**: Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Trucked in Water: None**	**Release from Upstream Reservoir:** Lake Ray Roberts; **Local Groundwater Well:** Trinity Aquifer	Mustang SUD, City of Denton, Bolivar WSC, City of Pilot Point [a]	NO
BLUE MOUND	TARRANT	3,826	275	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
BLUE RIDGE	COLLIN	4,664	781	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities**;** **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Frognot WSC, Verona WSC, Westminster**;** **Other Named Local Supply:** Pilot Grove Creek	Frognot WSC, Verona WSC, Westminster	NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
BOIS D ARC MUD	FANNIN	3,453	387	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**; Trucked in Water:** None	**Emergency Interconnect:** City of Windom	City of Windom	YES
BRIDGEPORT	WISE	6,337	1,070	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
BUTLER WSC	FREESTONE	737	158	NO	NO	YES	NO	NO	NO	YES	YES	**Local Groundwater Well:** Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo- Wilcox Aquifer; **Other Named Local Supply:** Trinity River	South Freestone WSC, Tucker WSC, City of Oakwood, Turlington WSC	NO
CALLISBURG WSC	COOKE	1,752	152	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**; Trucked in Water:** None	**Emergency Interconnect:** Callisburg ISD	Callisburg ISD	YES
COLLINSVILLE	GRAYSON	3,794	399	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Two Way SUD, City of Tioga, Kiowa Homeowners WSC; **Other Named Local Supply:** Ray Roberts Lake;	Two Way SUD, City of Tioga, Kiowa Homeowners WSC	NO
COMMUNITY WSC	TARRANT	6,186	908	NO	NO	YES	NO	NO	NO	NO	NO	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities**; Trucked in Water:** None	**Local Groundwater Well: Trinity Aquifer;**		NO
COUNTY-OTHER	COLLIN	10,000	1,497	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Allen, Frisco, McKinney, Plano		NO
COUNTY-OTHER	COOKE	7,000	889	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Gainesville, Muenster		NO
COUNTY-OTHER	DALLAS	3,000	6,108	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Dallas		NO
COUNTY-OTHER	DENTON	214,880	25,586	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Denton		NO
COUNTY-OTHER	ELLIS	8,800	1,040	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Ennis, Midlothian, Rockett SUD, Waxahachie		NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
COUNTY-OTHER	FANNIN	5,000	529	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Bonham		NO
COUNTY-OTHER	FREESTONE	2,657	257	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Fairfield, Teague, Wortham		NO
COUNTY-OTHER	GRAYSON	13,000	1,589	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Denison, Sherman, Whitesboro		NO
COUNTY-OTHER	HENDERSON (C), HENDERSON (I)	10,000	869	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer, Queen City Aquifer Woodbine Aquifer; **Emergency Interconnect:** Athens, East Cedar Creek FWSD, West Cedar Creek MUD		NO
COUNTY-OTHER	JACK	3,400	365	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Cross Timbers Aquifer; **Emergency Interconnect:** Jacksboro, Bryson		NO
COUNTY-OTHER	KAUFMAN	36,575	3,869	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Nacatoch Aquifer; **Emergency Interconnect:** College Mound WSC, Forney, Kaufman, Terrell, West Cedar Creek MUD		NO
COUNTY-OTHER	NAVARRO	10,000	1,084	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Nacatoch Aquifer, Other Aquifer; **Emergency Interconnect:** Chatfield WSC, Corsicana, Navarro Mills WSC		NO
COUNTY-OTHER	PARKER	355,000	44,628	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Fort Worth, Walnut Creek SUD, Weatherford		NO
COUNTY-OTHER	ROCKWALL	7,294	1,139	NO	NO	NO	NO	NO	NO	NO	YES	**Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Emergency Interconnect:** Blackland WSC, Rockwall, Heath, Rockwall, Rowlett, Royse City, Wylie		NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
COUNTY-OTHER	TARRANT	100,000	22,472	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Arlington, Bedford, Benbrook, Bethesda WSC, Burleson, Colleyville, Crowley, Euless, Fort Worth, Grand Prairie, Grapevine, Haltom City, Hurst, Keller, Mansfield, North Richland Hills, Saginaw, Southlake, Watauga, White Settlement		NO
COUNTY-OTHER	WISE	270,000	31,172	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Bridgeport, Decatur, Fort Worth, Walnut Creek SUD, West Wise SUD		NO
CRESCENT HEIGHTS WSC	HENDERSON	2,178	180	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer	Athens, Malakoff, CRC WSC, Virginia Hill WSC, Lakeshore Utility Company Inc., Payne Springs WSC, City of Log Cabin, Bethel-Ash WSC, City of Eustace, Dogwood Estates Water	NO
DALWORTHINGTON GARDENS	TARRANT	2,352	919	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Emergency Interconnect: City of Fort Worth**		YES
DECATUR	WISE	31,300	8,361	NO	NO	YES	NO	NO	NO	NO	NO	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well: Trinity Aquifer;**		NO
DESERT WSC	FANNIN	2,663	425	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
DOGWOOD ESTATES WATER	HENDERSON	1,267	187	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance Infrastructure; **Emergency Interconnect:** Conveyance Infrastructure; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo- Wilcox Aquifer	Bethel-Ash WSC, Athens, Murchison, City of Eustace, Virginia Hill WSC, Crescent Heights WSC, Leagueville WSC	NO
EDGECLIFF	TARRANT	3,761	634	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Emergency Interconnect:** City of Fort Worth	City of Fort Worth	YES
EUSTACE	HENDERSON	3,696	382	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer; **Emergency Interconnect:** Bethel-Ash WSC, Athens Land Company, Payne Springs WSC, East Cedar Creek FWSD, City of Mabank, Quality Water **of East Texas; Other Named Local Supply: Cedar Creek Reservoir**	Bethel-Ash WSC, Athens Land Company, Payne Springs WSC, East Cedar Creek FWSD, City of Mabank, Quality Water of East Texas	NO

Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
EVERMAN	TARRANT	6,600	540	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	Bethesda WSC, City of Kennedale, City of Fort Worth, City of Forest Hill, City of Crowley, City of Arlington, City of Edgecliff, City of Burleson, Johnson County SUD	NO
FAIRFIELD	FREESTONE	3,742	762	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer	South Freestone WSC, Ward Prairie WSC, Turlington WSC, Pleasant Grove WSC	NO
FROGNOT WSC	COLLIN, HUNT (D)	5,205	520	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	City of Blue Ridge, Desert WSC, Westminster WSC, Verona WSC, Hickory Creek SUD, South Grayson WSC, City of Anna, North Collin SUD, West Leonard WSC, North Farmersville WSC, Caddo Basin SUD	NO
GUNTER	GRAYSON	3,371	528	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Marilee SUD; **Other Named Local Supply:** Little Elm Creek	Marilee SUD	NO
HASLET	TARRANT	6,540	2,574	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well: Conveyance facilities, Treatment Facilities; Trucked in Water: None**	**Local Groundwater Well:** Trinity Aquifer	N/A	NO
HONEY GROVE	FANNIN	1,828	284	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; Groundwater field near the intersection of Hwy 82 and 100th St. **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Bois D' Arc MUD, Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Bois D' Arc MUD, Lamar County Water Supply District, Dial WSC, Mccraw Chapel WSC	Bois D' Arc MUD, Lamar County Water Supply District, Dial WSC, Mccraw Chapel WSC	YES
HORSESHOE BEND WATER SYSTEM	PARKER	4,367	597	NO	NO	YES	NO	NO	NO	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water**: None	**Local Groundwater Well:** Trinity Aquifer; **Other Named Local Supply:** Brazos River	Parker County SUD, Rio Brazos WSC, Monarch Utilities	NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
JACKSBORO	JACK	4,387	931	NO	NO	NO	NO	NO	YES	YES	YES	**Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Emergency Interconnect:** City of Bryson, Walnut Creek SUD; **Other Named Local Supply:** West Fork Trinity River, Bridgeport Reservoir	City of Bryson, Walnut Creek SUD	NO
KEMP	KAUFMAN	1,987	345	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**;** **Trucked in Water:** None	**Emergency Interconnect:** City of Mabank	City of Mabank	YES
KENTUCKYTOWN WSC	GRAYSON	4,050	485	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
LADONIA	FANNIN	2,500	377	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Mccraw Chapel WSC, DIAL WSC, Delta County MUD, North Hunt SUD, Bartley WSC, Arledge Ridge WSC, City of Dodd City, Town of Windom; **Other Named Local Supply:** North Sulphur River, Pecan Creek, Middle Sulphur River	Mccraw Chapel WSC, DIAL WSC, Delta County MUD, North Hunt SUD, Bartley WSC, Arledge Ridge WSC, City of Dodd City, Town of Windom	NO
LAKE KIOWA SUD	COOKE	2,609	1,046	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Woodbine WSC	Woodbine WSC	NO
LAKESIDE	TARRANT	2,144	582	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Aqua Texas Inc., City of Fort Worth	Aqua Texas Inc., City of Fort Worth	YES
LEONARD	FANNIN	6,000	819	NO	NO	YES	YES	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Southwest Fannin County SUD, Hickory Creek SUD, West Leonard WSC, Arledge Ridge WSC	Southwest Fannin County SUD, Hickory Creek SUD, West Leonard WSC, Arledge Ridge WSC	NO
LINDSAY	COOKE	1,776	223	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Myra Water System, City of Muenster, City of Gainesville, Bolivar WSC, ERA WSC; **Other Named Local Supply:** Elm Fork Trinity River	Myra Water System, City of Muenster, City of Gainesville, Bolivar WSC, ERA WSC	NO
LOG CABIN	HENDERSON	735	125	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
LUELLA SUD	GRAYSON	2,717	274	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** City of Sherman, Pink Hill WSC, Kentuckytown WSC, South Grayson WSC, City of Howe; **Other Named Local Supply:** Deaver Creek	City of Sherman, Pink Hill WSC, Kentuckytown WSC, South Grayson WSC, City of Howe	NO
MOUNTAIN SPRINGS WSC	COOKE, DENTON	2,077	339	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	Woodbine WSC, City of Tioga, City of Gainesville, Bolivar WSC, City of Collinsville	NO
MUENSTER	COOKE	2,139	355	NO	NO	YES	NO	NO	YES	YES	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Release from Upstream Reservoir:** Lake Muenster; **Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** Forestburg WSC, City of Gainesville, City of Lindsay, Myra Water System, Bolivar WSC; **Other Named Local Supply:** Elm Fork Trinity River	Forestburg WSC, City of Gainesville, City of Lindsay, Myra Water System, Bolivar WSC	NO
NEWARK	WISE	6,310	666	NO	NO	YES	YES	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** City of Rhome	City of Rhome	NO
NORTHWEST GRAYSON COUNTY WCID 1	GRAYSON	3,054	298	YES	NO	YES	NO	NO	NO	YES	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Release from Upstream Reservoir:** Lake Texoma; **Local Groundwater Well:** Trinity Aquifer; **Other Named Local Supply:** Red River	Monarch Utilities, Callisburg WSC, Two Way SUD, City of Pottsboro, Woodbine WSC	NO
PANTEGO	TARRANT	2,653	671	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** City of Dalworthington Gardens, City of Arlington; **Other Named Local Supply:** Kee Branch	City of Dalworthington Gardens, City of Arlington	NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
PELICAN BAY	TARRANT	12,830	862	YES	NO	YES	YES	NO	YES	NO	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Release from Upstream Reservoir:** Eagle Mountain Lake; **Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** City of Azle, City of Fort Worth, Community WSC;	City of Azle, City of Fort Worth, Community WSC	NO
PLEASANT GROVE WSC	FREESTONE, NAVARRO	1,588	151	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer	Winkler WSC, Ward Prairie WSC, City of Fairfield, M E N WSC	NO
RUNAWAY BAY	WISE	5,217	1,876	NO	NO	YES	NO	NO	NO	NO	NO	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities**; Trucked in Water:** None	**Local Groundwater Well: Cross Timber Minor Aquifer;**		NO
SANSOM PARK	TARRANT	8,659	914	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**; Trucked in Water:** None	**Emergency Interconnect:** City of Fort Worth	City of Fort Worth	YES
SAVOY	FANNIN	678	89	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities**; Trucked in Water:** None	**Emergency Interconnect:** SW Fannin County SUD	SW Fannin County SUD	YES
SOUTH ELLIS COUNTY WSC	ELLIS, NAVARRO	3,256	1,208	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	South Ellis County WSC, Navarro Mils WSC, B and B WSC, City of Italy, Rice Water Supply and Sewer Service, Buena Vista-Bethel SUD, City of Corsicana, City of Blooming Grove, City of Frost	NO
SOUTHERN OAKS WATER SUPPLY	FREESTONE	1,444	259	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
SOUTHMAYD	GRAYSON	1,055	112	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer	Monarch Utilities, Callisburg WSC, Two Way SUD, City of Pottsboro, Woodbine WSC, Lass Water Company, City of Sherman, City of Dorchester, Aqua Texas Inc	NO

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
SOUTHWEST FANNIN COUNTY SUD	FANNIN, GRAYSON	11,157	1,077	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Starr WSC, Oak Ridge-South Gale WSC, City of Bells, City of Savoy, Ravenna Nunnelee WSC, City of Bonham, Randolph WSC, Arledge Ridge WSC, West Leonard WSC, Desert WSC, City of Trenton, City of Whitewright, Kentuckytown WSC; **Other Named Local Supply: B**ois D' Arc Creek, Red River	Starr WSC, Oak Ridge-South Gale WSC, City of bells, City of Savoy, Ravenna Nunnelee WSC, City of Bonham, Randolph WSC, Arledge Ridge WSC, West Leonard WSC, Desert WSC, City of Trenton, City of Whitewright, Kentuckytown WSC	NO
STARR WSC	GRAYSON	3,219	316	YES	NO	YES	NO	NO	NO	YES	YES	**Release from Upstream Reservoir:** Conveyance and treatment facilities; **Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Release from Upstream Reservoir:** Lake Texoma; **Local Groundwater Well:** Trinity Aquifer; **Other Named Local Supply:** Red River	City of Denison, Oak Ridge-South Gale WSC, Southwest Fannin County SUD, City of Sherman, Pink Hill WSC	NO
TIOGA	GRAYSON	3,288	435	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** City of Collinsville, Two Way SUD, Marilee SUD, City of Celina, Mustang SUD, City of Pilot Point	City of Collinsville, Two Way SUD, Marilee SUD, City of Celina, Mustang SUD, City of Pilot Point	NO
TOM BEAN	GRAYSON	1,113	204	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Kentuckytown WSC	Kentuckytown WSC	NO
TRENTON	FANNIN	970	174	NO	NO	YES	NO	NO	YES	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Southwest Fannin County SUD, Desert WSC	Southwest Fannin County SUD, Desert WSC	NO
TRINIDAD	HENDERSON	1,261	177	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer; **Emergency Interconnect:** West Cedar Creek MUD, Community Water Company, Monarch Utilities, Crescent Heights WSC, Aqua Texas Inc., CRC WSC, Chatfield WSC, City of Kerens; **Other Named Local Supply:** Trinity River, Cedar Creek Reservoir	West Cedar Creek MUD, Community Water Company, Monarch Utilities, Crescent heights WSC, Aqua Texas Inc., CRC WSC, Chatfield WSC, City of Kerens	YES

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Table M.2
Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
TWO WAY SUD	COOKE, GRAYSON	9,811	1,274	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Northwest Grayson Co WCID 1, City of Southmayd, City of Pottsboro, City of Denison, Lass Water Company, City of Dorchester, City of Tioga, City of Collinsville, Woodbine WSC, City of Whitesboro, Callisburg WSC; **Other Named Local Supply:** Big Mineral Creek, Mustang Creek Deaver Creek, Lake	Northwest Grayson Co WCID 1, City of Southmayd, City of Pottsboro, City of Denison, Lass Water Company, City of Dorchester, City of Tioga, City of Collinsville, Woodbine WSC, City of Whitesboro, Callisburg WSC	NO
VERONA SUD	COLLIN	8,512	1,120	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer	City of Blue Ridge, Frognot WSC, North Collin SUD, City of Princeton, North Farmersville WSC, Westminster WSC	NO
WEST CEDAR CREEK MUD	HENDERSON	5,543	1,186	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
WEST LEONARD WSC	FANNIN	3,919	506	NO	NO	NO	NO	NO	NO	NO	YES	**Trucked in Water:** None	N/A	N/A	NO
WESTOVER HILLS	TARRANT	676	919	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well: Conveyance facilities, Treatment Facilities; Trucked in Water: None**	**Local Groundwater Well:** Trinity Aquifer	N/A	NO
WEST WISE SUD	WISE	5,672	670	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Emergency Interconnect:** Walnut Creek SUD; City of Chico	Walnut Creek SUD; City of Chico	YES
WESTLAKE	TARRANT	6,933	7,990	NO	NO	YES	NO	NO	NO	NO	NO	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well: Woodbine Minor Aquifer;**		NO
WESTMINSTER SUD	COLLIN	5,367	1,011	NO	NO	NO	NO	NO	YES	NO	NO	**Emergency Interconnect:** Conveyance facilities; **Trucked in Water:** None	**Emergency Interconnect:** Collin County Adventure Camp	Collin County Adventure Camp	YES
WESTWORTH VILLAGE	TARRANT	3,129	442	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well: Conveyance facilities, Treatment Facilities; Trucked in Water: None**	**Local Groundwater Well:** Trinity Aquifer	N/A	NO
WHITE SHED WSC	FANNIN	2,670	277	NO	NO	YES	NO	NO	NO	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Other Named Local Supply:** Red River	Bois D'Arc MUD, City of Bonham, Ravenna Nunnelee WSC	NO

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Potential Emergency Supply Options

Water User Group Name	County	2030 Population	2030 Demand (Ac-Ft/Yr)	Release From Upstream Reservoir	Curtailment of Upstream/ Downstream Water Rights	Local Groundwater Well	Brackish Groundwater Limited Treatment	Brackish Groundwater Desalination	Emergency Interconnect	Other Named Local Supply	Trucked in Water	Type of Infrastructure Required	Entity Providing Supply	Other Local Entities Required to Participate/ Coordinate	Emergency Agreements/ Arrangements Already in Place?
WHITEWRIGHT	FANNIN, GRAYSON	3,218	576	NO	NO	YES	NO	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer, Woodbine Aquifer; **Emergency Interconnect:** Southwest Fannin County SUD, Desert WSC, South Grayson WSC, Kentuckytown WSC; **Other Named Local Supply:** Bois D' Arc Creek	Southwest Fannin County SUD, Desert WSC, South Grayson WSC, Kentuckytown WSC; Other Named Local Supply: Bois D' Arc Creek	NO
WOODBINE WSC	COOKE, GRAYSON	7,453	760	NO	NO	YES	NO	NO	NO	NO	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities; **Emergency Interconnect:** Conveyance facilities; **Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Trinity Aquifer; **Emergency Interconnect:** R & N enterprises, Oak Ridge ventures Inc., Callisburg WSC, Two Way SUD, City of Collinsville, Mountain Springs WSC City of Gainesville; **Other Named Local Supply:** Big Mineral Creek	R & N enterprises, Oak Ridge ventures Inc., Callisburg WSC, Two Way SUD, City of Collinsville, Mountain Springs WSC City of Gainesville	NO
WORTHAM	FREESTONE	644	89	NO	NO	YES	YES	NO	YES	YES	YES	**Local Groundwater Well:** Conveyance facilities, Treatment Facilities**;** **Emergency Interconnect:** Conveyance facilities**; Other Named Local Supply:** Conveyance facilities, Treatment Facilities; **Trucked in Water:** None	**Local Groundwater Well:** Carrizo-Wilcox Aquifer; **Emergency Interconnect:** Corbet WSC, Pleasant Grove WSC, Point enterprise WSC, City of Mexia, White Rock WSC, Post Oak SUD; **Other Named Local Supply:** Tehuacana Creek	Corbet WSC, Pleasant Grove WSC, Point enterprise WSC, City of Mexia, White Rock WSC, Post Oak SUD	NO

[a] *The City of Denton is listed as a potential emergency supply participant based on regional proximity and preliminary considerations. However, Denton does not currently have interconnections with Black Rock WSC, Mustang SUD, Bolivar WSC, or the City of Pilot Point, and has not been informed or engaged in planning discussions regarding this potential arrangement. This entry does not imply an existing agreement or infrastructure and would require further coordination for feasibility.*

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Appendix N

Water Management Strategy Implementation Survey

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APPENDIX N WATER MANAGEMENT STRATEGY IMPLEMENTATION SURVEY

TABLE	ITEM	PAGE NUMBER
N-1	Documenting the Implementation Status of Certain Water Management Strategies (Exhibit C Section 2.5.2.7)	N-2
N-2	2021 Regional Water Planning / 2022 State Water Plan Implementation Survey	N-3

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Table N.1
Documenting the Implementation Status of Certain WMSs (see Exhibit C Section 2.5.2.7)

REGIONAL WATER PLAN WMS/PROJECT DATA						ANTICIPATED/ESTIMATED (OR ACTUAL[1]) IMPLEMENTATION ACTIVITIES AND DATES															
							PERMITTING STATUS (as applicable)									PLANNING, DESIGN, AND CONSTRUCTION STATUS							
							STATE WATER RIGHT STATUS				FEDERAL 404 PERMIT STATUS (if applicable)		DESALINATION PERMIT STATUS		OTHER KEY PERMITS	GEOTECH/DESIGN	LAND ACQUISITION		CONSTRUCTION			TOTAL FUNDS EXPENDED TO DATE	Other significant activities completed (summary)
Water Management Strategy/Project Name	Project Sponsor	WMS Project Sponsor Region	Online Decade	Capital Cost	Anticipated Footprint Acreage (acres)	SPONSOR AUTHORIZATION	Anticipated (or actual) TCEQ application filed (date)	Anticipated (or actual) State Water Right Permit Administratively Complete (date)	Anticipated (or actual) Draft State Water Right Permit Issued (date)	Anticipated (or actual) Date Final State Water Right Permit Issued (date)	Anticipated (or actual) application for permit filed (date)	Anticipated (or actual) permit issuance (date)	Anticipated (or actual) diversion permit issued (date)	Anticipated (or actual) Discharge/Disposal Permit Issued (date)	Summary of other permits and status (summary)	Generally describe the types and amount (as %s) of geotechnical/ reconnaissance/ engineering feasibility or other technical, testing, and/or design work etc. performed to date (summary)	Percent Land Acquisition Completed (%)	Anticipated land acquisition completion (date)	Anticipated start of construction (Date)	Percent construction completed (%)	Anticipated construction completion (date)	Rough approximation of the total expenditures, to date, on ALL activities related to project implementation to date (millions of $s)	Comments
						Date(s) that the sponsor took an affirmative vote or other action to make expenditures necessary to construct or file applications for state or federal permits (date(s))																
Lake Tehuacana	TRWD	C	2050	$575,134,000	15,000	TRWD published its latest Integrated Water Supply Plan in 2014, and Tehuacana was included in 3 of the 4 recommended paths forward. TRWD is currently completing an updated Integrated Water Supply Plan, which includes an updated cost and modeling analysis of Tehuacana as a potential future water supply. The updated IWSP is expected to be completed by 2025.	2032	2033	2040	2041	2035	2040	N/A	N/A		3%	0%	2045	2043	0%	2048	$1,200,000.00	Project has been studied and evaluated under multiple planning efforts
Marvin Nichols Reservoir	TRWD, NTMWD, UTRWD	C	2070	$7,364,973,000	66,103	8/22/2024: 8/31/2023;10/21/2021	2042	2044	2053	2055	2048	2055	N/A	N/A		3%	0%	2062	2058	0%	2065	$4,771,169.00	Project has been studied and evaluated under multiple planning efforts
Main Stem Balancing Reservoir	DWU	C	2050	$1,767,099,000	3,500		2032	2033	2038	2039	2034	2039	N/A	N/A	DWU has the permits to reuse its wastewater	3%	0%	2045	2043	0%	2048		Project has been studied and evaluated under multiple planning efforts; Recommended in 2024 Dallas Long-Range Water Supply Plan.
Toledo Bend Reservoir	TRWD, NTMWD, UTRWD	C	2070	$9,831,285,000	N/A		2040	2042	2051	2053	2046	2053	N/A	N/A		0%	0%	2060	2059	0%	2065	$110,000.00	Project has been studied in NTMWD's 2024 Long-Range Water Supply Plan. Project has been studied in TRWD's updated Integrated Water Supply Plan which is expected to be completed by 2025. Project has been studied as part of UTRWD's USACE Environmental Impact Statement development and preparation.
Wright Patman Reallocation	TRWD, NTMWD	C	2080	$4,760,029,000	14,372	Expenditures have been made on multiple studies over the past years. The latest report was published on February 1, 2024, "Marvin Nichols Reservoirs and Lake Wright Patman Reallocation Yield Update". Report was funded by NTWMD, TRWD, DWU, UTRWD, Irving and SRBA.	2057	2058	2064	2064	2060	2065	N/A	N/A		3%	0%	2069	2067	0%	2074	$1,276,860.00	Project has been studied and evaluated under multiple planning efforts, including a joint study with the USACE.
Sabine Off-channel Reservoir	DWU	C	2080	$903,296,000	800		2060	2061	2065	2065	2067	2070	N/A	N/A		3%	0%	2074	2074	0%	2076		Project has been studied and evaluated under multiple planning efforts; Recommended in 2024 Dallas Long-Range Water Supply Plan.

FOOTNOTE 1 : ANY DATE ENTERED THAT IS PRIOR TO ADOPTION OF THE REGIONAL WATER PLAN IS ASSUMED TO BE AN 'ACTUAL' DATE

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Aledo - Parallel Pipeline & Pump Station Expansion from Fort Worth	2060	Project Sponsor(s): Aledo	Recommended WMS Project						
C	Alvord - Connect to West Wise SUD	2030	Project Sponsor(s): Alvord	Recommended WMS Project						
C	AMWA Athens Fish Hatchery Reuse	2060	WMS Seller: Athens Municipal Water Authority; WMS Supply Recipient: Irrigation, Henderson	Recommended WMS Supply Without WMS Project						
C	AMWA Athens Fish Hatchery Reuse	2060	WMS Seller: Athens Municipal Water Authority; WMS Supply Recipient: Livestock, Henderson	Recommended WMS Supply Without WMS Project						
C	Anna - New Well(s) in Woodbine Aquifer	2020	Project Sponsor(s): Anna	Recommended WMS Project	Yes	Project/WMS completed				
C	Annetta - Connect to Weatherford	2030	Project Sponsor(s): Annetta	Recommended WMS Project		Project/WMS not started				
C	Argyle WSC - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Argyle WSC	Recommended WMS Project	Yes	Project/WMS completed				
C	Arledge Ridge WSC - New Well(s) in Woodbine Aquifer	2040	Project Sponsor(s): Arledge Ridge WSC	Recommended WMS Project						
C	Athens MWA - New Wells Phase 1	2020	Project Sponsor(s): Athens Municipal Water Authority	Recommended WMS Project	No	Project/WMS completed				
C	Athens MWA - New Wells Phase 2	2020	Project Sponsor(s): Athens Municipal Water Authority	Recommended WMS Project	No	Project/WMS completed				
C	Athens MWA - WTP Infrastructure Improvements	2020	Project Sponsor(s): Athens Municipal Water Authority	Recommended WMS Project	No	Project/WMS not started		Shift in timeline		
C	Azle - 4 MGD WTP Expansion	2020	Project Sponsor(s): Azle	Recommended WMS Project	Yes	Project/WMS started				
C	B H P WSC - Direct Connection to NTWMD	2020	Project Sponsor(s): B H P WSC	Recommended WMS Project	Yes	Project/WMS completed				
C	Bells - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Bells	Recommended WMS Project						
C	Benbrook - 3 MGD WTP Expansion	2030	Project Sponsor(s): Benbrook Water Authority	Recommended WMS Project						
C	Black Rock WSC - New Well(s) in Trinity Aquifer	2050	Project Sponsor(s): Black Rock WSC	Recommended WMS Project						
C	Blackland WSC - Direct Connection to NTWMD	2030	Project Sponsor(s): Blackland WSC	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown
C	Blue Ridge - Connect to and Purchase Water from NTWMD	2030	Project Sponsor(s): Blue Ridge	Recommended WMS Project						
C	Blue Ridge - Increase Delivery Infrastructure from NTWMD-Phase 1	2040	Project Sponsor(s): Blue Ridge	Recommended WMS Project						
C	Blue Ridge - Increase Delivery Infrastructure from NTWMD-Phase 2	2060	Project Sponsor(s): Blue Ridge	Recommended WMS Project						
C	Bois D'Arc MUD - Connect to NTWMD	2030	Project Sponsor(s): Bois D Arc MUD	Recommended WMS Project						
C	Bolivar WSC - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Bolivar WSC	Recommended WMS Project	Yes	Project/WMS completed				
C	Bridgeport - 1 MGD WTP Expansion	2070	Project Sponsor(s): Bridgeport	Recommended WMS Project						
C	Bridgeport - 2 MGD WTP Expansion	2060	Project Sponsor(s): Bridgeport	Recommended WMS Project						
C	Bridgeport - Expand Capacity of Lake Intake and Pump Station	2050	Project Sponsor(s): Bridgeport	Recommended WMS Project		Project/WMS no longer being pursued				
C	Burleson - Additional Infrastructure from Fort Worth	2050	Project Sponsor(s): Burleson	Recommended WMS Project						
C	Cash WSC - Additional Delivery Infrastructure from NTMWD	2020	Project Sponsor(s): Cash SUD	Recommended WMS Project	Yes	Project/WMS started				

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Celina - Connect to and Purchase Water from NTMWD	2030	Project Sponsor(s): Celina	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown
C	Chico - Additional Delivery Infrastructure from West Wise SUD	2040	Project Sponsor(s): Chico	Recommended WMS Project						
C	College Mound - Additional Delivery Infrastructure from Terrell	2070	Project Sponsor(s): College Mound WSC	Recommended WMS Project						
C	Conservation - Ables Springs WSC	2020	WUG Reducing Demand: Ables Springs WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Addison	2020	WUG Reducing Demand: Addison	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Aledo	2020	WUG Reducing Demand: Aledo	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Allen	2020	WUG Reducing Demand: Allen	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Alvord	2020	WUG Reducing Demand: Alvord	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Anna	2020	WUG Reducing Demand: Anna	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Annetta	2020	WUG Reducing Demand: Annetta	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Argyle WSC	2020	WUG Reducing Demand: Argyle WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Arledge Ridge WSC	2020	WUG Reducing Demand: Arledge Ridge WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Arlington	2020	WUG Reducing Demand: Arlington	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Athens	2020	WUG Reducing Demand: Athens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Aubrey	2020	WUG Reducing Demand: Aubrey	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Avalon Water Supply and Sewer Service	2030	WUG Reducing Demand: Avalon Water Supply & Sewer Service	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Azle	2020	WUG Reducing Demand: Azle	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - B and B WSC	2020	WUG Reducing Demand: B And B WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Balch Springs	2020	WUG Reducing Demand: Balch Springs	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bhear Creek SUD	2020	WUG Reducing Demand: Bhear Creek SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Becker Jiba WSC	2020	WUG Reducing Demand: Becker Jiba WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bedford	2020	WUG Reducing Demand: Bedford	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bells	2020	WUG Reducing Demand: Bells	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Benbrook	2020	WUG Reducing Demand: Benbrook Water Authority	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Black Rock WSC	2020	WUG Reducing Demand: Black Rock WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Blackland WSC	2020	WUG Reducing Demand: Blackland WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Blooming Grove	2020	WUG Reducing Demand: Blooming Grove	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Blue Ridge	2020	WUG Reducing Demand: Blue Ridge	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bois D'Arc MUD	2020	WUG Reducing Demand: Bois D Arc MUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bolivar WSC	2020	WUG Reducing Demand: Bolivar WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bonham	2020	WUG Reducing Demand: Bonham	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Boyd	2020	WUG Reducing Demand: Boyd	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Bridgeport	2020	WUG Reducing Demand: Bridgeport	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Buena Vista - Bethel SUD	2020	WUG Reducing Demand: Buena Vista-Bethel SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Butler	2020	WUG Reducing Demand: Butler WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Callisburg WSC	2020	WUG Reducing Demand: Callisburg WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Carrollton	2020	WUG Reducing Demand: Carrollton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Cedar Hill	2020	WUG Reducing Demand: Cedar Hill	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Celina	2020	WUG Reducing Demand: Celina	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Chatfield WSC	2020	WUG Reducing Demand: Chatfield WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Chico	2020	WUG Reducing Demand: Chico	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Cockrell Hill	2020	WUG Reducing Demand: Cockrell Hill	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - College Mound WSC	2020	WUG Reducing Demand: College Mound WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Colleyville	2020	WUG Reducing Demand: Colleyville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Collin County Other	2020	WUG Reducing Demand: County-Other, Collin	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Collinsville	2020	WUG Reducing Demand: Collinsville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Combine WSC	2020	WUG Reducing Demand: Combine WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Community WSC	2020	WUG Reducing Demand: Community WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Cooke County Other	2020	WUG Reducing Demand: County-Other, Cooke	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Copeville SUD	2020	WUG Reducing Demand: Copeville SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Coppell	2020	WUG Reducing Demand: Coppell	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Corbet WSC	2020	WUG Reducing Demand: Corbet WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Corinth	2020	WUG Reducing Demand: Corinth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Corsicana	2020	WUG Reducing Demand: Corsicana	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Crandall	2020	WUG Reducing Demand: Crandall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Crescent Heights WSC	2020	WUG Reducing Demand: Crescent Heights WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Cross Timbers WSC	2020	WUG Reducing Demand: Cross Timbers WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Crowley	2020	WUG Reducing Demand: Crowley	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Culleoka WSC	2020	WUG Reducing Demand: Culleoka WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Dallas	2020	WUG Reducing Demand: Dallas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Dallas County	2020	WUG Reducing Demand: County-Other, Dallas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Dalworthington Gardens	2020	WUG Reducing Demand: Dalworthington Gardens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Dawson	2030	WUG Reducing Demand: Dawson	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Decatur	2020	WUG Reducing Demand: Decatur	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denison	2020	WUG Reducing Demand: Denison	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denton	2020	WUG Reducing Demand: Denton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denton County	2020	WUG Reducing Demand: County-Other, Denton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denton County FWSD 10	2020	WUG Reducing Demand: Denton County FWSD 10	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denton County FWSD 1A	2020	WUG Reducing Demand: Denton County FWSD 1-A	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Denton County FWSD 7	2020	WUG Reducing Demand: Denton County FWSD 7	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Desert WSC	2020	WUG Reducing Demand: Desert WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - DeSoto	2020	WUG Reducing Demand: Desoto	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Dogwood Estates Water	2020	WUG Reducing Demand: Dogwood Estates Water	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Dorchester	2030	WUG Reducing Demand: Dorchester	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Duncanville	2020	WUG Reducing Demand: Duncanville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - East Cedar Creek FWSD	2020	WUG Reducing Demand: East Cedar Creek FWSD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - East Fork SUD	2020	WUG Reducing Demand: East Fork SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - East Garrett WSC	2020	WUG Reducing Demand: East Garrett WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Edgecliff Village	2020	WUG Reducing Demand: Edgecliff	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ellis County	2020	WUG Reducing Demand: County-Other, Ellis	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Elmo WSC	2020	WUG Reducing Demand: Elmo WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ennis	2030	WMS Supply Recipient: Manufacturing, Ellis	Recommended WMS Supply Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ennis	2030	WMS Supply Recipient: Manufacturing, Ellis	Recommended WMS Supply Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ennis	2020	WUG Reducing Demand: Ennis	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Euless	2020	WUG Reducing Demand: Euless	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Eustace	2030	WUG Reducing Demand: Eustace	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Everman	2020	WUG Reducing Demand: Everman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Fairfield	2020	WUG Reducing Demand: Fairfield	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Fairview	2020	WUG Reducing Demand: Fairview	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Fannin County	2020	WUG Reducing Demand: County-Other, Fannin	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Farmers Branch	2020	WUG Reducing Demand: Farmers Branch	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Farmersville	2020	WUG Reducing Demand: Farmersville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Fate	2020	WUG Reducing Demand: Fate	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ferris	2020	WUG Reducing Demand: Ferris	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Flower Mound	2020	WUG Reducing Demand: Flower Mound	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Forest Hill	2020	WUG Reducing Demand: Forest Hill	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Forney	2020	WUG Reducing Demand: Forney	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Forney Lake WSC	2020	WUG Reducing Demand: Forney Lake WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Fort Worth	2020	WUG Reducing Demand: Fort Worth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Freestone County	2020	WUG Reducing Demand: County-Other, Freestone	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Frisco	2020	WUG Reducing Demand: Frisco	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Frognot	2020	WUG Reducing Demand: Frognot WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Gainesville	2020	WUG Reducing Demand: Gainesville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Garland	2020	WUG Reducing Demand: Garland	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Gastonia-Scurry SUD	2020	WUG Reducing Demand: Gastonia Scurry SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Glenn Heights	2020	WUG Reducing Demand: Glenn Heights	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Grand Prairie	2020	WUG Reducing Demand: Grand Prairie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Grapevine	2020	WUG Reducing Demand: Grapevine	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Grayson County	2020	WUG Reducing Demand: County-Other, Grayson	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Gunter	2020	WUG Reducing Demand: Gunter	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Hackberry	2020	WUG Reducing Demand: Hackberry	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Haltom City	2020	WUG Reducing Demand: Haltom City	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Haslet	2020	WUG Reducing Demand: Haslet	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Heath	2020	WUG Reducing Demand: Heath	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - High Point WSC	2020	WUG Reducing Demand: High Point WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Highland Park	2020	WUG Reducing Demand: Highland Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Highland Village	2020	WUG Reducing Demand: Highland Village	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Honey Grove	2020	WUG Reducing Demand: Honey Grove	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Horseshoe Bend Water System	2020	WUG Reducing Demand: Horseshoe Bend Water System	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Howe	2020	WUG Reducing Demand: Howe	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Hudson Oaks	2020	WUG Reducing Demand: Hudson Oaks	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Hurst	2020	WUG Reducing Demand: Hurst	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Hutchins	2020	WUG Reducing Demand: Hutchins	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Irving	2020	WUG Reducing Demand: Irving	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Italy	2020	WUG Reducing Demand: Italy	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Jack County	2020	WUG Reducing Demand: County-Other, Jack	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Jacksboro	2020	WUG Reducing Demand: Jacksboro	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Josephine	2020	WUG Reducing Demand: Josephine	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Justin	2020	WUG Reducing Demand: Justin	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kaufman	2020	WUG Reducing Demand: Kaufman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kaufman County	2020	WUG Reducing Demand: County-Other, Kaufman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kaufman County Development Dist 1	2020	WUG Reducing Demand: Kaufman County Development District 1	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kaufman County MUD 11	2020	WUG Reducing Demand: Kaufman County MUD 11	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Keller	2020	WUG Reducing Demand: Keller	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kemp	2020	WUG Reducing Demand: Kemp	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kennedale	2020	WUG Reducing Demand: Kennedale	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kentucky Town WSC	2020	WUG Reducing Demand: Kentuckytown WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Kerens	2020	WUG Reducing Demand: Kerens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Krum	2020	WUG Reducing Demand: Krum	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ladonia	2020	WUG Reducing Demand: Ladonia	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lake Cities MUA	2020	WUG Reducing Demand: Lake Cities Municipal Utility Authority	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Lake Kiowa SUD	2020	WUG Reducing Demand: Lake Kiowa SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lake Worth	2020	WUG Reducing Demand: Lake Worth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lakeside	2020	WUG Reducing Demand: Lakeside	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lancaster	2020	WUG Reducing Demand: Lancaster	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Leonard	2020	WUG Reducing Demand: Leonard	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lewisville	2020	WUG Reducing Demand: Lewisville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lindsay	2020	WUG Reducing Demand: Lindsay	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Little Elm	2020	WUG Reducing Demand: Little Elm	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Lucas	2020	WUG Reducing Demand: Lucas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Luella SUD	2020	WUG Reducing Demand: Luella SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - M E N WSC	2020	WUG Reducing Demand: M E N WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mabank	2020	WUG Reducing Demand: Mabank	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Malakoff	2020	WUG Reducing Demand: Malakoff	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mansfield	2020	WUG Reducing Demand: Mansfield	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Marilee SUD	2020	WUG Reducing Demand: Marilee SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Markout WSC	2020	WUG Reducing Demand: Markout WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - McKinney	2020	WUG Reducing Demand: McKinney	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Melissa	2020	WUG Reducing Demand: Melissa	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mesquite	2020	WUG Reducing Demand: Mesquite	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Midlothian	2020	WUG Reducing Demand: Midlothian	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Milligan WSC	2020	WUG Reducing Demand: Milligan WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mount Zion WSC	2020	WUG Reducing Demand: Mount Zion WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mountain Peak SUD	2020	WUG Reducing Demand: Mountain Peak SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mountain Spring WSC	2020	WUG Reducing Demand: Mountain Springs WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Muenster	2020	WUG Reducing Demand: Muenster	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Murphy	2020	WUG Reducing Demand: Murphy	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Mustang SUD	2020	WUG Reducing Demand: Mustang SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Navarro County	2020	WUG Reducing Demand: County-Other, Navarro	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Navarro Mills WSC	2020	WUG Reducing Demand: Navarro Mills WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Nevada SUD	2020	WUG Reducing Demand: Nevada SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Newark	2020	WUG Reducing Demand: Newark	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - North Collin WSC	2020	WUG Reducing Demand: North Collin SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - North Farmersville WSC	2020	WUG Reducing Demand: North Farmersville WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - North Kaufman WSC	2020	WUG Reducing Demand: North Kaufman WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - North Richland Hills	2020	WUG Reducing Demand: North Richland Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Northlake	2020	WUG Reducing Demand: Northlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Northwest Grayson Co WCID 1	2020	WUG Reducing Demand: Northwest Grayson County WCID 1	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Oak Ridge South Gale WSC	2020	WUG Reducing Demand: Oak Ridge South Gale WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ovilla	2020	WUG Reducing Demand: Ovilla	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Palmer	2020	WUG Reducing Demand: Palmer	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Paloma Creek North	2020	WUG Reducing Demand: Paloma Creek North	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Paloma Creek South	2020	WUG Reducing Demand: Paloma Creek South	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pantego	2020	WUG Reducing Demand: Pantego	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Parker	2020	WUG Reducing Demand: Parker	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Parker County	2020	WUG Reducing Demand: County-Other, Parker	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Parker County SUD	2020	WUG Reducing Demand: Parker County SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pelican Bay	2030	WUG Reducing Demand: Pelican Bay	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pilot Point	2020	WUG Reducing Demand: Pilot Point	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pink Hill WSC	2020	WUG Reducing Demand: Pink Hill WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Plano	2020	WUG Reducing Demand: Plano	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pleasant Grove WSC	2030	WUG Reducing Demand: Pleasant Grove WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Point Enterprise WSC	2030	WUG Reducing Demand: Point Enterprise WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Ponder	2020	WUG Reducing Demand: Ponder	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Pottsboro	2020	WUG Reducing Demand: Pottsboro	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Princeton	2020	WUG Reducing Demand: Princeton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Prosper	2020	WUG Reducing Demand: Prosper	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Providence Village WCID	2020	WUG Reducing Demand: Providence Village WCID	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - R C H WSC	2020	WUG Reducing Demand: R C H WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Red Oak	2020	WUG Reducing Demand: Red Oak	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Reno	2020	WUG Reducing Demand: Reno (Parker)	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Rhome	2020	WUG Reducing Demand: Rhome	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rice WSC	2020	WUG Reducing Demand: Rice Water Supply and Sewer Service	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Richardson	2020	WUG Reducing Demand: Richardson	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Richland Hills	2020	WUG Reducing Demand: Richland Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - River Oaks	2020	WUG Reducing Demand: River Oaks	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Roanoke	2020	WUG Reducing Demand: Roanoke	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rockett SUD	2020	WUG Reducing Demand: Rockett SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rockwall	2020	WUG Reducing Demand: Rockwall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rockwall County	2020	WUG Reducing Demand: County-Other, Rockwall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rose Hill SUD	2020	WUG Reducing Demand: Rose Hill SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Rowlett	2020	WUG Reducing Demand: Rowlett	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Royse City	2020	WUG Reducing Demand: Royse City	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Runaway Bay	2020	WUG Reducing Demand: Runaway Bay	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Sachse	2020	WUG Reducing Demand: Sachse	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Saginaw	2020	WUG Reducing Demand: Saginaw	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Sanger	2020	WUG Reducing Demand: Sanger	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Sansom Park	2020	WUG Reducing Demand: Sansom Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Sardis-Lone Elm WSC	2020	WUG Reducing Demand: Sardis Lone Elm WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Seagoville	2020	WUG Reducing Demand: Seagoville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Seis Lagos UD	2020	WUG Reducing Demand: Seis Lagos UD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Sherman	2020	WUG Reducing Demand: Sherman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - South Ellis County WSC	2020	WUG Reducing Demand: South Ellis County WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - South Freestone County WSC	2020	WUG Reducing Demand: South Freestone County WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - South Grayson WSC	2020	WUG Reducing Demand: South Grayson SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Southlake	2020	WUG Reducing Demand: Southlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Southmayd	2030	WUG Reducing Demand: Southmayd	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Southwest Fannin County SUD	2020	WUG Reducing Demand: Southwest Fannin County SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Springtown	2020	WUG Reducing Demand: Springtown	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Starr WSC	2020	WUG Reducing Demand: Starr WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Sunnyvale	2020	WUG Reducing Demand: Sunnyvale	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Talty SUD	2020	WUG Reducing Demand: Talty SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Tarrant County	2020	WUG Reducing Demand: County-Other, Tarrant	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Teague	2020	WUG Reducing Demand: Teague	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Terrell	2020	WUG Reducing Demand: Terrell	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - The Colony	2020	WUG Reducing Demand: The Colony	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Tioga	2020	WUG Reducing Demand: Tioga	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Tom Bean	2020	WUG Reducing Demand: Tom Bean	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Trenton	2030	WUG Reducing Demand: Trenton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Trinidad	2030	WUG Reducing Demand: Trinidad	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Trophy Club MUD 1	2020	WUG Reducing Demand: Trophy Club MUD 1	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation - Two Way SUD	2020	WUG Reducing Demand: Two Way SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - University Park	2020	WUG Reducing Demand: University Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Van Alstyne	2020	WUG Reducing Demand: Van Alstyne	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Verona SUD	2020	WUG Reducing Demand: Verona SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Virginia Hill WSC	2020	WUG Reducing Demand: Virginia Hill WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Walnut Creek SUD	2020	WUG Reducing Demand: Walnut Creek SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Watauga	2020	WUG Reducing Demand: Watauga	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Waxahachie	2020	WUG Reducing Demand: Waxahachie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Weatherford	2020	WUG Reducing Demand: Weatherford	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - West Cedar Creek MUD	2020	WUG Reducing Demand: West Cedar Creek MUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - West Leonard WSC	2020	WUG Reducing Demand: West Leonard WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - West Wise SUD	2020	WUG Reducing Demand: West Wise SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Westlake	2020	WUG Reducing Demand: Westlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Westminster WSC	2020	WUG Reducing Demand: Westminster WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Westover Hills	2020	WUG Reducing Demand: Westover Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Westworth Village	2020	WUG Reducing Demand: Westworth Village	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - White Settlement	2020	WUG Reducing Demand: White Settlement	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - White Shed WSC	2020	WUG Reducing Demand: White Shed WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Whitesboro	2020	WUG Reducing Demand: Whitesboro	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Whitewright	2020	WUG Reducing Demand: Whitewright	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation - Willow Park	2020	WUG Reducing Demand: Willow Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Wilmer	2020	WUG Reducing Demand: Wilmer	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Wise County	2020	WUG Reducing Demand: County-Other, Wise	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Woodbine WSC	2020	WUG Reducing Demand: Woodbine WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Wortham	2020	WUG Reducing Demand: Wortham	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Wylie	2020	WUG Reducing Demand: Wylie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation - Wylie Northeast SUD	2020	WUG Reducing Demand: Wylie Northeast SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Anna	2020	WUG Reducing Demand: Anna	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Argyle WSC	2030	WUG Reducing Demand: Argyle WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Athens	2030	WUG Reducing Demand: Athens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Benbrook	2020	WUG Reducing Demand: Benbrook Water Authority	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Blue Ridge	2020	WUG Reducing Demand: Blue Ridge	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Cedar Hill	2020	WUG Reducing Demand: Cedar Hill	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Colleyville	2030	WUG Reducing Demand: Colleyville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Corinth	2030	WUG Reducing Demand: Corinth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Dalworthington Gardens	2030	WUG Reducing Demand: Dalworthington Gardens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Denison	2020	WUG Reducing Demand: Denison	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Denton County FWSD 10	2030	WUG Reducing Demand: Denton County FWSD 10	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Denton County FWSD 7	2030	WUG Reducing Demand: Denton County FWSD 7	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, DeSoto	2020	WUG Reducing Demand: Desoto	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation – Waste Prohibition, East Garrett WSC	2060	WUG Reducing Demand: East Garrett WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Edgecliff	2030	WUG Reducing Demand: Edgecliff	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Ennis	2030	WUG Reducing Demand: Ennis	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Euless	2030	WUG Reducing Demand: Euless	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Farmers Branch	2020	WUG Reducing Demand: Farmers Branch	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Fate	2020	WUG Reducing Demand: Fate	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Forney Lake WSC	2020	WUG Reducing Demand: Forney Lake WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Hackberry	2020	WUG Reducing Demand: Hackberry	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Haslet	2030	WUG Reducing Demand: Haslet	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Hudson Oaks	2020	WUG Reducing Demand: Hudson Oaks	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Hutchins	2020	WUG Reducing Demand: Hutchins	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Kennedale	2030	WUG Reducing Demand: Kennedale	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Lake Worth	2030	WUG Reducing Demand: Lake Worth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Lakeside	2020	WUG Reducing Demand: Lakeside	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Lancaster	2020	WUG Reducing Demand: Lancaster	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Lucas	2020	WUG Reducing Demand: Lucas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Mabank	2020	WUG Reducing Demand: Mabank	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Midlothian	2020	WUG Reducing Demand: Midlothian	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Mount Zion WSC	2030	WUG Reducing Demand: Mount Zion WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Murphy	2020	WUG Reducing Demand: Murphy	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation – Waste Prohibition, Ovilla	2020	WUG Reducing Demand: Ovilla	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Paloma Creek North	2030	WUG Reducing Demand: Paloma Creek North	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Paloma Creek South	2030	WUG Reducing Demand: Paloma Creek South	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Parker	2020	WUG Reducing Demand: Parker	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, R C H WSC	2020	WUG Reducing Demand: R C H WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Roanoke	2030	WUG Reducing Demand: Roanoke	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Weatherford	2030	WUG Reducing Demand: Weatherford	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Westlake	2030	WUG Reducing Demand: Westlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation – Waste Prohibition, Westover Hills	2030	WUG Reducing Demand: Westover Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Addison	2020	WUG Reducing Demand: Addison	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Allen	2020	WUG Reducing Demand: Allen	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Anna	2020	WUG Reducing Demand: Anna	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Argyle WSC	2030	WUG Reducing Demand: Argyle WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Arlington	2030	WUG Reducing Demand: Arlington	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Athens	2030	WUG Reducing Demand: Athens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Bhear Creek SUD	2020	WUG Reducing Demand: Bhear Creek SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Bedford	2030	WUG Reducing Demand: Bedford	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Benbrook	2020	WUG Reducing Demand: Benbrook Water Authority	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Black Rock WSC	2050	WUG Reducing Demand: Black Rock WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Blackland WSC	2020	WUG Reducing Demand: Blackland WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Blooming Grove	2050	WUG Reducing Demand: Blooming Grove	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Blue Ridge	2020	WUG Reducing Demand: Blue Ridge	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Boyd	2030	WUG Reducing Demand: Boyd	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Bridgeport	2030	WUG Reducing Demand: Bridgeport	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Buena Vista-Bethel SUD	2040	WUG Reducing Demand: Buena Vista-Bethel SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Carrollton	2020	WUG Reducing Demand: Carrollton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Cedar Hill	2020	WUG Reducing Demand: Cedar Hill	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Celina	2020	WUG Reducing Demand: Celina	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Chico	2030	WUG Reducing Demand: Chico	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Colleyville	2030	WUG Reducing Demand: Colleyville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Coppell	2020	WUG Reducing Demand: Coppell	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Corinth	2030	WUG Reducing Demand: Corinth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Corsicana	2050	WUG Reducing Demand: Corsicana	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – County-Other, Dallas	2020	WUG Reducing Demand: County-Other, Dallas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – County-Other, Rockwall	2020	WUG Reducing Demand: County-Other, Rockwall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – County-Other, Tarrant	2020	WUG Reducing Demand: County-Other, Tarrant	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Crandall	2020	WUG Reducing Demand: Crandall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Cross Timbers WSC	2030	WUG Reducing Demand: Cross Timbers WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Crowley	2020	WUG Reducing Demand: Crowley	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Dallas	2020	WUG Reducing Demand: Dallas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Dalworthington Gardens	2030	WUG Reducing Demand: Dalworthington Gardens	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Decatur	2020	WUG Reducing Demand: Decatur	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Denison	2020	WUG Reducing Demand: Denison	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Denton	2020	WUG Reducing Demand: Denton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Denton County FWSD 1-A	2020	WUG Reducing Demand: Denton County FWSD 1-A	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Denton County FWSD 10	2030	WUG Reducing Demand: Denton County FWSD 10	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Denton County FWSD 7	2030	WUG Reducing Demand: Denton County FWSD 7	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – DeSoto	2020	WUG Reducing Demand: Desoto	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – East Fork SUD	2020	WUG Reducing Demand: East Fork SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – East Garrett WSC	2030	WUG Reducing Demand: East Garrett WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Edgecliff	2030	WUG Reducing Demand: Edgecliff	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Ennis	2030	WUG Reducing Demand: Ennis	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Euless	2030	WUG Reducing Demand: Euless	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Everman	2020	WUG Reducing Demand: Everman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Fairfield	2050	WUG Reducing Demand: Fairfield	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Fairview	2020	WUG Reducing Demand: Fairview	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Farmers Branch	2020	WUG Reducing Demand: Farmers Branch	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Fate	2020	WUG Reducing Demand: Fate	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Flower Mound	2020	WUG Reducing Demand: Flower Mound	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Forney Lake WSC	2020	WUG Reducing Demand: Forney Lake WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Fort Worth	2020	WUG Reducing Demand: Fort Worth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Frisco	2020	WUG Reducing Demand: Frisco	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Garland	2020	WUG Reducing Demand: Garland	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Grand Prairie	2020	WUG Reducing Demand: Grand Prairie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Grapevine	2020	WUG Reducing Demand: Grapevine	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Gunter	2020	WUG Reducing Demand: Gunter	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Hackberry	2020	WUG Reducing Demand: Hackberry	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Haltom City	2020	WUG Reducing Demand: Haltom City	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Haslet	2030	WUG Reducing Demand: Haslet	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Heath	2020	WUG Reducing Demand: Heath	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Highland Park	2020	WUG Reducing Demand: Highland Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Highland Village	2030	WUG Reducing Demand: Highland Village	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Hudson Oaks	2020	WUG Reducing Demand: Hudson Oaks	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Hurst	2020	WUG Reducing Demand: Hurst	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Hutchins	2020	WUG Reducing Demand: Hutchins	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Irving	2020	WUG Reducing Demand: Irving	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Josephine	2020	WUG Reducing Demand: Josephine	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Kaufman	2020	WUG Reducing Demand: Kaufman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Kaufman County Development District 1	2020	WUG Reducing Demand: Kaufman County Development District 1	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Kaufman County MUD 11	2020	WUG Reducing Demand: Kaufman County MUD 11	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Keller	2020	WUG Reducing Demand: Keller	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Kemp	2020	WUG Reducing Demand: Kemp	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Kennedale	2030	WUG Reducing Demand: Kennedale	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Krum	2020	WUG Reducing Demand: Krum	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Lake Worth	2030	WUG Reducing Demand: Lake Worth	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Lakeside	2020	WUG Reducing Demand: Lakeside	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Lancaster	2020	WUG Reducing Demand: Lancaster	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Lewisville	2020	WUG Reducing Demand: Lewisville	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Little Elm	2020	WUG Reducing Demand: Little Elm	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Lucas	2020	WUG Reducing Demand: Lucas	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mabank	2020	WUG Reducing Demand: Mabank	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mansfield	2020	WUG Reducing Demand: Mansfield	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Markout WSC	2020	WUG Reducing Demand: Markout WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – McKinney	2020	WUG Reducing Demand: McKinney	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Melissa	2020	WUG Reducing Demand: Melissa	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mesquite	2020	WUG Reducing Demand: Mesquite	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Midlothian	2020	WUG Reducing Demand: Midlothian	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mount Zion WSC	2020	WUG Reducing Demand: Mount Zion WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mountain Peak SUD	2020	WUG Reducing Demand: Mountain Peak SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Mountain Springs WSC	2060	WUG Reducing Demand: Mountain Springs WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation, Irrigation Restrictions – Murphy	2020	WUG Reducing Demand: Murphy	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Nevada SUD	2020	WUG Reducing Demand: Nevada SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – North Farmersville WSC	2020	WUG Reducing Demand: North Farmersville WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – North Richland Hills	2020	WUG Reducing Demand: North Richland Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Northlake	2030	WUG Reducing Demand: Northlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Ovilla	2020	WUG Reducing Demand: Ovilla	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Paloma Creek North	2030	WUG Reducing Demand: Paloma Creek North	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Paloma Creek South	2030	WUG Reducing Demand: Paloma Creek South	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Parker	2020	WUG Reducing Demand: Parker	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Plano	2020	WUG Reducing Demand: Plano	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Pottsboro	2020	WUG Reducing Demand: Pottsboro	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Prosper	2020	WUG Reducing Demand: Prosper	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – R C H WSC	2020	WUG Reducing Demand: R C H WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Rhome	2020	WUG Reducing Demand: Rhome	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Richardson	2020	WUG Reducing Demand: Richardson	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Roanoke	2030	WUG Reducing Demand: Roanoke	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Rockwall	2020	WUG Reducing Demand: Rockwall	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Rowlett	2020	WUG Reducing Demand: Rowlett	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Runaway Bay	2020	WUG Reducing Demand: Runaway Bay	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Sachse	2020	WUG Reducing Demand: Sachse	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Saginaw	2020	WUG Reducing Demand: Saginaw	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Sanger	2020	WUG Reducing Demand: Sanger	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Sardis Lone Elm WSC	2020	WUG Reducing Demand: Sardis Lone Elm WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Seis Lagos UD	2020	WUG Reducing Demand: Seis Lagos UD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Sherman	2060	WUG Reducing Demand: Sherman	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – South Ellis County WSC	2050	WUG Reducing Demand: South Ellis County WSC	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Southlake	2020	WUG Reducing Demand: Southlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Springtown	2020	WUG Reducing Demand: Springtown	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Sunnyvale	2020	WUG Reducing Demand: Sunnyvale	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Talty SUD	2020	WUG Reducing Demand: Talty SUD	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Teague	2020	WUG Reducing Demand: Teague	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Terrell	2020	WUG Reducing Demand: Terrell	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Tom Bean	2030	WUG Reducing Demand: Tom Bean	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Trenton	2030	WUG Reducing Demand: Trenton	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Trophy Club MUD 1	2020	WUG Reducing Demand: Trophy Club MUD 1	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – University Park	2020	WUG Reducing Demand: University Park	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Van Alstyne	2020	WUG Reducing Demand: Van Alstyne	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Watauga	2020	WUG Reducing Demand: Watauga	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Waxahachie	2040	WUG Reducing Demand: Waxahachie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Weatherford	2020	WUG Reducing Demand: Weatherford	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				

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C	Conservation, Irrigation Restrictions – Westlake	2030	WUG Reducing Demand: Westlake	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Westover Hills	2030	WUG Reducing Demand: Westover Hills	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Irrigation Restrictions – Wylie	2020	WUG Reducing Demand: Wylie	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Conservation - Desert WSC	2020	Project Sponsor(s): Desert WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Conservation - Dogwood Estates Water	2020	Project Sponsor(s): Dogwood Estates Water	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Conservation - South Ellis County WSC	2020	Project Sponsor(s): South Ellis County WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ables Springs WSC	2020	Project Sponsor(s): Ables Springs WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Addison	2020	Project Sponsor(s): Addison	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Aledo	2020	Project Sponsor(s): Aledo	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Allen	2020	Project Sponsor(s): Allen	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Alvord	2020	Project Sponsor(s): Alvord	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Anna	2020	Project Sponsor(s): Anna	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Annetta	2020	Project Sponsor(s): Annetta	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Argyle WSC	2020	Project Sponsor(s): Argyle WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Arledge Ridge WSC	2020	Project Sponsor(s): Arledge Ridge WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Arlington	2020	Project Sponsor(s): Arlington	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Athens	2020	Project Sponsor(s): Athens	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Aubrey	2020	Project Sponsor(s): Aubrey	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Avalon Water Supply and Sewer Service	2020	Project Sponsor(s): Avalon Water Supply and Sewer Service	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Azle	2020	Project Sponsor(s): Azle	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - B and B WSC	2020	Project Sponsor(s): B And B WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Balch Springs	2020	Project Sponsor(s): Balch Springs	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bhear Creek SUD	2020	Project Sponsor(s): Bhear Creek SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Becker Jiba WSC	2020	Project Sponsor(s): Becker Jiba WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bedford	2020	Project Sponsor(s): Bedford	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bells	2020	Project Sponsor(s): Bells	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Benbrook	2020	Project Sponsor(s): Benbrook Water Authority	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bethel-Ash WSC	2020	Project Sponsor(s): Bethel Ash WSC	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Bethesda WSC	2020	Project Sponsor(s): Bethesda WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Black Rock WSC	2020	Project Sponsor(s): Black Rock WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Blackland WSC	2020	Project Sponsor(s): Blackland WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Blooming Grove	2020	Project Sponsor(s): Blooming Grove	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Blue Ridge	2020	Project Sponsor(s): Blue Ridge	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bois D Arc MUD	2020	Project Sponsor(s): Bois D Arc MUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bolivar WSC	2020	Project Sponsor(s): Bolivar WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bonham	2020	Project Sponsor(s): Bonham	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Boyd	2020	Project Sponsor(s): Boyd	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Bridgeport	2020	Project Sponsor(s): Bridgeport	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Buena Vista - Bethel SUD	2020	Project Sponsor(s): Buena Vista-Bethel SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Burleson	2020	Project Sponsor(s): Burleson	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Butler WSC	2020	Project Sponsor(s): Butler WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Caddo Basin SUD	2020	Project Sponsor(s): Caddo Basin SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Callisburg WSC	2020	Project Sponsor(s): Callisburg WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Carrollton	2020	Project Sponsor(s): Carrollton	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Cash SUD	2020	Project Sponsor(s): Cash SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Cedar Hill	2020	Project Sponsor(s): Cedar Hill	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Celina	2020	Project Sponsor(s): Celina	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Chatfield WSC	2020	Project Sponsor(s): Chatfield WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Chico	2020	Project Sponsor(s): Chico	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Cockrell Hill	2020	Project Sponsor(s): Cockrell Hill	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - College Mound WSC	2020	Project Sponsor(s): College Mound WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Colleyville	2020	Project Sponsor(s): Colleyville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Collin County	2020	Project Sponsor(s): Municipal county-other (Collin)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Collinsville	2020	Project Sponsor(s): Collinsville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Combine WSC	2020	Project Sponsor(s): Combine WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Community WSC	2020	Project Sponsor(s): Community WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Cooke County	2020	Project Sponsor(s): Municipal county-other (Cooke)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Copeville SUD	2020	Project Sponsor(s): Copeville SUD	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Coppell	2020	Project Sponsor(s): Coppell	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Corbet WSC	2020	Project Sponsor(s): Corbet WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Corinth	2020	Project Sponsor(s): Corinth	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Corsicana	2020	Project Sponsor(s): Corsicana	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Crandall	2020	Project Sponsor(s): Crandall	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Crescent Heights WSC	2020	Project Sponsor(s): Crescent Heights WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Cross Timbers WSC	2020	Project Sponsor(s): Cross Timbers WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Crowley	2020	Project Sponsor(s): Crowley	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Culleoka WSC	2020	Project Sponsor(s): Culleoka WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Dallas	2020	Project Sponsor(s): Dallas	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Dallas County	2020	Project Sponsor(s): Municipal county-other (Dallas)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Dalworthington Gardens	2020	Project Sponsor(s): Dalworthington Gardens	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Dawson	2020	Project Sponsor(s): Dawson	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Decatur	2020	Project Sponsor(s): Decatur	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denison	2020	Project Sponsor(s): Denison	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denton	2020	Project Sponsor(s): Denton	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denton County	2020	Project Sponsor(s): Municipal county-other (Denton)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denton County FWSD 10	2020	Project Sponsor(s): Denton County FWSD 10	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denton County FWSD 1A	2020	Project Sponsor(s): Denton County FWSD 1-A	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Denton County FWSD 7	2020	Project Sponsor(s): Denton County FWSD 7	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - DeSoto	2020	Project Sponsor(s): Desoto	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Dorchester	2020	Project Sponsor(s): Dorchester	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Duncanville	2020	Project Sponsor(s): Duncanville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - East Cedar Creek FWSD	2020	Project Sponsor(s): East Cedar Creek FWSD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - East Fork SUD	2020	Project Sponsor(s): East Fork SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - East Garrett WSC	2020	Project Sponsor(s): East Garrett WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Edgecliff Village	2020	Project Sponsor(s): Edgecliff	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ellis County	2020	Project Sponsor(s): Municipal county-other (Ellis)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Elmo WSC	2020	Project Sponsor(s): Elmo WSC	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Ennis	2020	Project Sponsor(s): Ennis	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Euless	2020	Project Sponsor(s): Euless	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Eustace	2020	Project Sponsor(s): Eustace	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Everman	2020	Project Sponsor(s): Everman	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Fairfield	2020	Project Sponsor(s): Fairfield	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Fairview	2020	Project Sponsor(s): Fairview	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Fannin County	2020	Project Sponsor(s): Municipal county-other (Fannin)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Farmers Branch	2020	Project Sponsor(s): Farmers Branch	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Farmersville	2020	Project Sponsor(s): Farmersville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Fate	2020	Project Sponsor(s): Fate	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ferris	2020	Project Sponsor(s): Ferris	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Files Valley WSC	2020	Project Sponsor(s): Files Valley WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Flower Mound	2020	Project Sponsor(s): Flower Mound	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Forest Hill	2020	Project Sponsor(s): Forest Hill	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Forney	2020	Project Sponsor(s): Forney	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Forney Lake WSC	2020	Project Sponsor(s): Forney Lake WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Fort Worth	2020	Project Sponsor(s): Fort Worth	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Freestone County	2020	Project Sponsor(s): Municipal county-other (Freestone)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Frisco	2020	Project Sponsor(s): Frisco	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Frognot WSC	2020	Project Sponsor(s): Frognot WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Gainesville	2020	Project Sponsor(s): Gainesville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Garland	2020	Project Sponsor(s): Garland	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Gastonia-Scurry SUD	2020	Project Sponsor(s): Gastonia Scurry SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Glenn Heights	2020	Project Sponsor(s): Glenn Heights	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Grand Prairie	2020	Project Sponsor(s): Grand Prairie	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Grapevine	2020	Project Sponsor(s): Grapevine	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Grayson County	2020	Project Sponsor(s): Municipal county-other (Grayson)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Gunter	2020	Project Sponsor(s): Gunter	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Hackberry	2020	Project Sponsor(s): Hackberry	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Haltom City	2020	Project Sponsor(s): Haltom City	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Haslet	2020	Project Sponsor(s): Haslet	Recommended WMS Project	Yes	Project/WMS started				

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Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Conservation, Water Loss Control - Heath	2020	Project Sponsor(s): Heath	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Henderson County	2020	Project Sponsor(s): Municipal county-other (Henderson)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - High Point WSC	2020	Project Sponsor(s): High Point WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Highland Park	2020	Project Sponsor(s): Highland Park	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Highland Village	2020	Project Sponsor(s): Highland Village	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Honey Grove	2020	Project Sponsor(s): Honey Grove	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Horseshoe Bend Water System	2020	Project Sponsor(s): Horseshoe Bend Water System	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Howe	2020	Project Sponsor(s): Howe	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Hudson Oaks	2020	Project Sponsor(s): Hudson Oaks	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Hurst	2020	Project Sponsor(s): Hurst	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Hutchins	2020	Project Sponsor(s): Hutchins	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Irving	2020	Project Sponsor(s): Irving	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Italy	2020	Project Sponsor(s): Italy	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Jack County	2020	Project Sponsor(s): Municipal county-other (Jack)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Jacksboro	2020	Project Sponsor(s): Jacksboro	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Johnson County SUD	2020	Project Sponsor(s): Johnson County SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Josephine	2020	Project Sponsor(s): Josephine	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Justin	2020	Project Sponsor(s): Justin	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kaufman	2020	Project Sponsor(s): Kaufman	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kaufman County	2020	Project Sponsor(s): Municipal county-other (Kaufman)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kaufman County Development District 1	2020	Project Sponsor(s): Kaufman County Development District 1	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kaufman County MUD 11	2020	Project Sponsor(s): Kaufman County MUD 11	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Keller	2020	Project Sponsor(s): Keller	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kemp	2020	Project Sponsor(s): Kemp	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kennedale	2020	Project Sponsor(s): Kennedale	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kentucky Town WSC	2020	Project Sponsor(s): Kentuckytown WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Kerens	2020	Project Sponsor(s): Kerens	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Krum	2020	Project Sponsor(s): Krum	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ladonia	2020	Project Sponsor(s): Ladonia	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Lake Cities MUA	2020	Project Sponsor(s): Lake Cities Municipal Utility Authority	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lake Kiowa SUD	2020	Project Sponsor(s): Lake Kiowa SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lake Worth	2020	Project Sponsor(s): Lake Worth	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lakeside	2020	Project Sponsor(s): Lakeside	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lancaster	2020	Project Sponsor(s): Lancaster	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Leonard	2020	Project Sponsor(s): Leonard	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lewisville	2020	Project Sponsor(s): Lewisville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lindsay	2020	Project Sponsor(s): Lindsay	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Little Elm	2020	Project Sponsor(s): Little Elm	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Lucas	2020	Project Sponsor(s): Lucas	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Luella SUD	2020	Project Sponsor(s): Luella SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - M-E-N WSC	2020	Project Sponsor(s): M E N WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mabank	2020	Project Sponsor(s): Mabank	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Malakoff	2020	Project Sponsor(s): Malakoff	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mansfield	2020	Project Sponsor(s): Mansfield	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Marilee SUD	2020	Project Sponsor(s): Marilee SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Markout WSC	2020	Project Sponsor(s): Markout WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - McKinney	2020	Project Sponsor(s): McKinney	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Melissa	2020	Project Sponsor(s): Melissa	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mesquite	2020	Project Sponsor(s): Mesquite	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Midlothian	2020	Project Sponsor(s): Midlothian	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Milligan WSC	2020	Project Sponsor(s): Milligan WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mineral Wells	2020	Project Sponsor(s): Mineral Wells	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mount Zion WSC	2020	Project Sponsor(s): Mount Zion WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mountain Peak SUD	2020	Project Sponsor(s): Mountain Peak SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mountain Spring WSC	2020	Project Sponsor(s): Mountain Springs WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Muenster	2020	Project Sponsor(s): Muenster	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Murphy	2020	Project Sponsor(s): Murphy	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Mustang SUD	2020	Project Sponsor(s): Mustang SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Navarro County	2020	Project Sponsor(s): Municipal county-other (Navarro)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Navarro Mills WSC	2020	Project Sponsor(s): Navarro Mills WSC	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Nevada SUD	2020	Project Sponsor(s): Nevada SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Newark	2020	Project Sponsor(s): Newark	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - North Collin WSC	2020	Project Sponsor(s): North Collin SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - North Farmersville	2020	Project Sponsor(s): North Farmersville WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - North Kaufman WSC	2020	Project Sponsor(s): North Kaufman WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - North Richland Hills	2020	Project Sponsor(s): North Richland Hills	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Northlake	2020	Project Sponsor(s): Northlake	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Northwest Grayson County WDIS1	2020	Project Sponsor(s): Northwest Grayson County WCID 1	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Oak Ridge South Gale WSC	2020	Project Sponsor(s): Oak Ridge South Gale WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ovilla	2020	Project Sponsor(s): Ovilla	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Palmer	2020	Project Sponsor(s): Palmer	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Paloma Creek North	2020	Project Sponsor(s): Paloma Creek North	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Paloma Creek South	2020	Project Sponsor(s): Paloma Creek South	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pantego	2020	Project Sponsor(s): Pantego	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Parker	2020	Project Sponsor(s): Parker	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Parker County	2020	Project Sponsor(s): Municipal county-other (Parker)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Parker County SUD	2020	Project Sponsor(s): Parker County SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pelican Bay	2020	Project Sponsor(s): Pelican Bay	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pilot Point	2020	Project Sponsor(s): Pilot Point	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pink Hill WSC	2020	Project Sponsor(s): Pink Hill WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Plano	2020	Project Sponsor(s): Plano	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pleasant Grove WSC	2020	Project Sponsor(s): Pleasant Grove WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Poetry WSC	2020	Project Sponsor(s): Poetry WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Ponder	2020	Project Sponsor(s): Ponder	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Pottsboro	2020	Project Sponsor(s): Pottsboro	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Princeton	2020	Project Sponsor(s): Princeton	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Prosper	2020	Project Sponsor(s): Prosper	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Providence Village WCID	2020	Project Sponsor(s): Providence Village WCID	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - R C H WSC	2020	Project Sponsor(s): R C H WSC	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Red Oak	2020	Project Sponsor(s): Red Oak	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Red River Authority of Texas	2020	Project Sponsor(s): Red River Authority of Texas	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Reno	2020	Project Sponsor(s): Reno (Parker)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rhome	2020	Project Sponsor(s): Rhome	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rice WSC	2020	Project Sponsor(s): Rice Water Supply and Sewer Service	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Richardson	2020	Project Sponsor(s): Richardson	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Richland Hills	2020	Project Sponsor(s): Richland Hills	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - River Oaks	2020	Project Sponsor(s): River Oaks	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Roanoke	2020	Project Sponsor(s): Roanoke	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rockett SUD	2020	Project Sponsor(s): Rockett SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rockwall	2020	Project Sponsor(s): Rockwall	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rockwall County	2020	Project Sponsor(s): Municipal county-other (Rockwall)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rose Hill SUD	2020	Project Sponsor(s): Rose Hill SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Rowlett	2020	Project Sponsor(s): Rowlett	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Royse City	2020	Project Sponsor(s): Royse City	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Runaway Bay	2020	Project Sponsor(s): Runaway Bay	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sachse	2020	Project Sponsor(s): Sachse	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Saginaw	2020	Project Sponsor(s): Saginaw	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sanger	2020	Project Sponsor(s): Sanger	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sansom Park	2020	Project Sponsor(s): Sansom Park	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sardis Lone Elm WSC	2020	Project Sponsor(s): Sardis Lone Elm WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Seagoville	2020	Project Sponsor(s): Seagoville	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Seis Lagos UD	2020	Project Sponsor(s): Seis Lagos UD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sherman	2020	Project Sponsor(s): Sherman	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - South Freestone County WSC	2020	Project Sponsor(s): South Freestone County WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - South Grayson WSC	2020	Project Sponsor(s): South Grayson SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Southlake	2020	Project Sponsor(s): Southlake	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Southmayd	2020	Project Sponsor(s): Southmayd	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Southwest Fannin County SUD	2020	Project Sponsor(s): Southwest Fannin County SUD	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Springtown	2020	Project Sponsor(s): Springtown	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Starr WSC	2020	Project Sponsor(s): Starr WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Sunnyvale	2020	Project Sponsor(s): Sunnyvale	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Talty WSC	2020	Project Sponsor(s): Talty SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Tarrant County	2020	Project Sponsor(s): Municipal county-other (Tarrant)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Teague	2020	Project Sponsor(s): Teague	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Terrell	2020	Project Sponsor(s): Terrell	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - The Colony	2020	Project Sponsor(s): The Colony	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Tioga	2020	Project Sponsor(s): Tioga	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Tom Bean	2020	Project Sponsor(s): Tom Bean	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Trenton	2020	Project Sponsor(s): Trenton	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Trinidad	2020	Project Sponsor(s): Trinidad	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Trophy Club	2020	Project Sponsor(s): Trophy Club MUD 1	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Two Way SUD	2020	Project Sponsor(s): Two Way SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - University Park	2020	Project Sponsor(s): University Park	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Van Alstyne	2020	Project Sponsor(s): Van Alstyne	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Verona SUD	2020	Project Sponsor(s): Verona SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Virginia Hill WSC	2020	Project Sponsor(s): Virginia Hill WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Walnut Creek SUD	2020	Project Sponsor(s): Walnut Creek SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Watauga	2020	Project Sponsor(s): Watauga	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Waxahachie	2020	Project Sponsor(s): Waxahachie	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Weatherford	2020	Project Sponsor(s): Weatherford	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - West Cedar Creek MUD	2020	Project Sponsor(s): West Cedar Creek MUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - West Leonard WSC	2020	Project Sponsor(s): West Leonard WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - West Wise SUD	2020	Project Sponsor(s): West Wise SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Westlake	2020	Project Sponsor(s): Westlake	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Westminster WSC	2020	Project Sponsor(s): Westminster WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Westover Hills	2020	Project Sponsor(s): Westover Hills	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Westworth Village	2020	Project Sponsor(s): Westworth Village	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - White Settlement	2020	Project Sponsor(s): White Settlement	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - White Shed WSC	2020	Project Sponsor(s): White Shed WSC	Recommended WMS Project	Yes	Project/WMS started				

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C	Conservation, Water Loss Control - Whitesboro	2020	Project Sponsor(s): Whitesboro	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Whitewright	2020	Project Sponsor(s): Whitewright	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Willow Park	2020	Project Sponsor(s): Willow Park	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Wilmer	2020	Project Sponsor(s): Wilmer	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Wise County	2020	Project Sponsor(s): Municipal county-other (Wise)	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Woodbine WSC	2020	Project Sponsor(s): Woodbine WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Wortham	2020	Project Sponsor(s): Wortham	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Wylie	2020	Project Sponsor(s): Wylie	Recommended WMS Project	Yes	Project/WMS started				
C	Conservation, Water Loss Control - Wylie Northeast SUD	2020	Project Sponsor(s): Wylie Northeast SUD	Recommended WMS Project	Yes	Project/WMS started				
C	Corsicana - 8 MGD WTP Expansion, Halbert-Richland Chambers-1	2050	Project Sponsor(s): Corsicana	Recommended WMS Project						
C	Corsicana - 8 MGD WTP Expansion, Halbert-Richland Chambers-2	2070	Project Sponsor(s): Corsicana	Recommended WMS Project						
C	Corsicana - New 8 MGD WTP, Halbert-Richland Chambers	2030	Project Sponsor(s): Corsicana	Recommended WMS Project						
C	County Other, Jack - Infrastructure to Connect to Jacksboro	2020	Project Sponsor(s): Municipal county-other (Jack)	Recommended WMS Project	No	Project/WMS not started		Project sponsor not identified		
C	County Other, Jack - Infrastructure to Connect to Walnut Creek SUD	2020	Project Sponsor(s): Municipal county-other (Jack)	Recommended WMS Project	No	Project/WMS not started		Project sponsor not identified		
C	County Other, Kaufman - WTP and Connect to TRWD	2020	Project Sponsor(s): Municipal county-other (Kaufman)	Recommended WMS Project	No	Project/WMS not started		Project sponsor not identified		
C	County Other, Parker - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Municipal county-other (Parker)	Recommended WMS Project	Yes	Project/WMS completed				
C	County-Other, Denton - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Municipal county-other (Denton)	Recommended WMS Project	Yes	Project/WMS completed				
C	County-Other, Denton - New Well(s) in Woodbine Aquifer	2020	Project Sponsor(s): Municipal county-other (Denton)	Recommended WMS Project	Yes	Project/WMS completed				
C	County-Other, Freestone - Additional Delivery Infrastructure from Corsicana	2050	Project Sponsor(s): Municipal county-other (Freestone)	Recommended WMS Project						
C	County-Other, Freestone - New Delivery and Treatment Facilities from TRWD	2050	Project Sponsor(s): Municipal county-other (Freestone)	Recommended WMS Project						
C	County-Other, Parker-WTP and Transmission Facilities to TRWD	2060	Project Sponsor(s): Municipal county-other (Parker)	Recommended WMS Project						
C	Cross Timbers WSC - Additional Delivery Infrastructure	2030	Project Sponsor(s): Cross Timbers WSC	Recommended WMS Project						
C	Cross Timbers WSC - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Cross Timbers WSC	Recommended WMS Project	Yes	Project/WMS started				
C	Crowley - Additional Delivery Infrastructure Fort Worth	2030	Project Sponsor(s): Crowley	Recommended WMS Project						
C	Denison - 10 MGD Desalination WTP Expansion	2050	Project Sponsor(s): Denison	Recommended WMS Project						
C	Denison - Expand Raw Water Delivery from Lake Texoma - Phase 1	2030	Project Sponsor(s): Denison	Recommended WMS Project						
C	Denison - Expand Raw Water Delivery from Lake Texoma - Phase 2	2060	Project Sponsor(s): Denison	Recommended WMS Project		Project/WMS no longer being pursued				

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Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Denison - New 4 MGD Desalination WTP	2030	Project Sponsor(s): Denison	Recommended WMS Project	Yes	Project/WMS started				
C	Denton - 20 MGD WTP Expansion	2070	Project Sponsor(s): Denton	Recommended WMS Project						
C	Denton - 20 MGD WTP Expansion-Ray Roberts	2040	Project Sponsor(s): Denton	Recommended WMS Project						
C	Denton - 25 MGD WTP Expansion	2060	Project Sponsor(s): Denton	Recommended WMS Project						
C	Denton - 30 MGD WTP Expansion-Ray Roberts-1	2030	Project Sponsor(s): Denton	Recommended WMS Project		Project/WMS no longer being pursued	Fewer plant expansions recommended in 2026 Plan			
C	Denton - 30 MGD WTP Expansion-Ray Roberts-2	2050	Project Sponsor(s): Denton	Recommended WMS Project		Project/WMS no longer being pursued	Fewer plant expansions recommended in 2026 Plan			
C	Desert WSC - New Well(s) in Woodbine Aquifer	2070	Project Sponsor(s): Desert WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Dogwood Estates Water - New Well(s) in Carrizo-Wilcox Aquifer	2040	Project Sponsor(s): Dogwood Estates Water	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Dorchester - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Dorchester	Recommended WMS Project	No	Project/WMS no longer being pursued	No longer needed			
C	DWU - Connect IPL to Bachman	2030	Project Sponsor(s): Dallas	Recommended WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Addison	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Argyle WSC	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Aubrey	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Balch Springs	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Bolivar WSC	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Carrollton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Cedar Hill	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Celina	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Cockrell Hill	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Combine WSC	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Combine WSC	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Coppell	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Corinth	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: County-Other, Dallas	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: County-Other, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: County-Other, Tarrant	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: County-Other, Tarrant	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Cross Timbers WSC	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 10	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 10	Recommended WMS Supply Without WMS Project						

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C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 1-	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 1-	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 7	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Denton County FWSD 7	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Desoto	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Duncanville	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Farmers Branch	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Flower Mound	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Flower Mound	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Glenn Heights	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Glenn Heights	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Grand Prairie	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Grand Prairie	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Grapevine	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Grapevine	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Highland Village	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Highland Village	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Hutchins	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Hutchins	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Collin	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Collin	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Kaufman	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Kaufman	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Rockwall	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Irrigation, Rockwall	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Justin	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Justin	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Krum	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Krum	Recommended WMS Supply Without WMS Project						

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C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Ladonia	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Lake Cities Municipal Utility Authority	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Lake Cities Municipal Utility Authority	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Lancaster	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Lancaster	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Lewisville	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Lewisville	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Manufacturing, Dallas	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Manufacturing, Dallas	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Manufacturing, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Manufacturing, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Mining, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Mining, Denton	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Mustang SUD	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Mustang SUD	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Northlake	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Northlake	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Ovilla	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Ovilla	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Paloma Creek North	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Paloma Creek North	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Paloma Creek South	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Paloma Creek South	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Pilot Point	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Pilot Point	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Ponder	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Ponder	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Providence Village WCID	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Providence Village WCID	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Red Oak	Recommended WMS Supply Without WMS Project						

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C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Red Oak	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Sanger	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2040	WMS Seller: Dallas; WMS Supply Recipient: Sanger	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2060	WMS Seller: Dallas; WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Steam-Electric Power,	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: Steam-Electric Power,	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: The Colony	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2020	WMS Seller: Dallas; WMS Supply Recipient: The Colony	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2070	WMS Seller: Dallas; WMS Supply Recipient: Wilmer	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Seller: Dallas; WMS Supply Recipient: Wilmer	Recommended WMS Supply Without WMS Project						
C	DWU - Conservation Surplus Reallocation	2030	WMS Supply Recipient: Dallas	Recommended WMS Supply Without WMS Project						
C	DWU - Infrastructure to Treat and Deliver to Customers 2020	2030	Project Sponsor(s): Dallas	Recommended WMS Project						
C	DWU - Infrastructure to Treat and Deliver to Customers 2030	2040	Project Sponsor(s): Dallas	Recommended WMS Project						
C	DWU - Infrastructure to Treat and Deliver to Customers 2040	2050	Project Sponsor(s): Dallas	Recommended WMS Project						
C	DWU - Lake Columbia	2070	Project Sponsor(s): Dallas	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2040, thus not evaluated.	Shift in timeline		Unknown
C	DWU - Main Stem Balancing Reservoir	2050	Project Sponsor(s): Dallas	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	DWU - Neches River Run-of-the-River Diversions	2060	Project Sponsor(s): Dallas	Recommended WMS Project						
C	DWU - Parallel IPL	2070	Project Sponsor(s): Dallas	Recommended WMS Project						
C	East Fork SUD - Additional Delivery Infrastructure from NTMWD	2030	Project Sponsor(s): East Fork SUD	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown
C	Ennis - 16 MGD WTP Expansion	2070	Project Sponsor(s): Ennis	Recommended WMS Project		Project/WMS no longer being pursued				
C	Ennis - 6 MGD WTP Expansion	2050	Project Sponsor(s): Ennis	Recommended WMS Project						
C	Ennis - 8 MGD WTP Expansion	2060	Project Sponsor(s): Ennis	Recommended WMS Project		Project/WMS no longer being pursued				
C	Ennis - Indirect Reuse	2040	Project Sponsor(s): Ennis	Recommended WMS Project	Yes	Project/WMS started				
C	Eustace - New Well(s) in Carrizo-Wilcox Aquifer	2050	Project Sponsor(s): Eustace	Recommended WMS Project		Project/WMS no longer being pursued	Existing supply is sufficient			
C	Fairfield - New WTP and Transmission System from TRWD	2050	Project Sponsor(s): Fairfield	Recommended WMS Project						
C	Fate - Additional Delivery Infrastructure from NTWMD	2050	Project Sponsor(s): Fate	Recommended WMS Project						
C	Ferris - Additional Delivery Infrastructure from Rockett	2070	Project Sponsor(s): Ferris	Recommended WMS Project						
C	Flower Mound - Alliance Direct Reuse	2020	Project Sponsor(s): Flower Mound	Recommended WMS Project	Yes	Project/WMS started				
C	Forney - Increase Delivery Infrastructure from NTWMD	2020	Project Sponsor(s): Forney	Recommended WMS Project		Project/WMS not started		Shift in timeline		
C	Fort Worth - 23 MGD WTP Expansion-West Plant	2040	Project Sponsor(s): Fort Worth	Recommended WMS Project						

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C	Fort Worth - 30 MGD WTP Expansion-Eagle Mountain	2040	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 35 MGD WTP Expansion-Eagle Mountain	2030	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 35 MGD WTP Expansion-West Plant	2040	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 50 MGD WTP Expansion-General 1	2050	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 50 MGD WTP Expansion-General 2	2060	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 50 MGD WTP Expansion-General 3	2060	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 50 MGD WTP Expansion-General 4	2070	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth - 50 MGD WTP Expansion-Rolling Hills	2040	Project Sponsor(s): Fort Worth	Recommended WMS Project						
C	Fort Worth Direct Reuse - Alliance Corridor	2020	Project Sponsor(s): Fort Worth	Recommended WMS Project		Project/WMS not started		Shift in timeline		
C	Fort Worth Mary's Creek WRF Future Direct Reuse	2020	Project Sponsor(s): Fort Worth	Recommended WMS Project	Yes	Project/WMS started				
C	Fort Worth Village Creek WRF Future Direct Reuse	2020	Project Sponsor(s): Fort Worth	Recommended WMS Project		Project/WMS not started		Shift in timeline		
C	Frisco - Direct Reuse	2020	Project Sponsor(s): Frisco	Recommended WMS Project	Yes	Project/WMS started				
C	Gainesville - 5 MGD WTP Expansion 1	2050	Project Sponsor(s): Gainesville	Recommended WMS Project						
C	Gainesville - 5 MGD WTP Expansion 2	2070	Project Sponsor(s): Gainesville	Recommended WMS Project		Project/WMS no longer being pursued				
C	Gainesville - Expand Direct Reuse	2020	Project Sponsor(s): Gainesville	Recommended WMS Project						
C	Gainesville - Infrastructure to Deliver to Customers	2030	Project Sponsor(s): Gainesville	Recommended WMS Project						
C	Gainesville - Unallocated Groundwater Supply Utilization	2020	WMS Seller: Gainesville; WMS Supply Recipient: Mining, Cooke	Recommended WMS Supply Without WMS Project						
C	Glenn Heights Additional Delivery Infrastructure from DWU	2060	Project Sponsor(s): Glenn Heights	Recommended WMS Project		Project/WMS no longer being pursued				
C	Grand Prairie - Additional Delivery Infrastructure from DWU	2020	Project Sponsor(s): Grand Prairie	Recommended WMS Project		Project/WMS not started		Shift in timeline		
C	Grand Prairie - Connect to Arlington	2030	Project Sponsor(s): Grand Prairie	Recommended WMS Project						
C	GTUA - Connection from Sherman to CGMA	2030	Project Sponsor(s): Greater Texoma Utility Authority	Recommended WMS Project						
C	GTUA - Parallel Collin-Grayson Municipal Alliance Pipeline	2030	Project Sponsor(s): Greater Texoma Utility Authority	Recommended WMS Project						
C	GTUA - Regional Water System Phase 1	2020	Project Sponsor(s): Greater Texoma Utility Authority	Recommended WMS Project	Yes	Project/WMS started				
C	GTUA - Regional Water System Phase 2	2030	Project Sponsor(s): Greater Texoma Utility Authority	Recommended WMS Project						
C	Gunter - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Gunter	Recommended WMS Project	Yes	Project/WMS completed				
C	Hackberry - Additional Delivery Infrastructure from NTMWD	2050	Project Sponsor(s): Hackberry	Recommended WMS Project						
C	Hudson Oaks - Direct Connection to Fort Worth	2020	Project Sponsor(s): Hudson Oaks	Recommended WMS Project	Yes	Project/WMS completed				
C	Irrigation, Fannin - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Irrigation (Fannin)	Recommended WMS Project	Yes	Project/WMS completed				
C	Irving - TRA Central Reuse	2030	Project Sponsor(s): Irving	Recommended WMS Project	Yes	Project/WMS started				
C	Justin - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Justin	Recommended WMS Project	Yes	Project/WMS completed				
C	Kennedale - Additional Delivery Infrastructure from Fort Worth	2040	Project Sponsor(s): Kennedale	Recommended WMS Project						

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Kennedale - Connect to Arlington	2030	Project Sponsor(s): Kennedale	Recommended WMS Project						
C	Krum - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Krum	Recommended WMS Project	Yes	Project/WMS completed				
C	Ladonia - Infrastructure and Treatment from Water from Ralph Hall (UTRWD)	2030	Project Sponsor(s): Ladonia	Recommended WMS Project						
C	Lakeside - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Lakeside	Recommended WMS Project	Yes	Project/WMS started				
C	Leonard - Water System Improvements	2030	Project Sponsor(s): Leonard	Recommended WMS Project						
C	Lewisville - 6 MGD WTP Expansion-1	2030	Project Sponsor(s): Lewisville	Recommended WMS Project	Yes	Project/WMS completed				
C	Lewisville - 6 MGD WTP Expansion-2	2040	Project Sponsor(s): Lewisville	Recommended WMS Project		Project/WMS no longer being pursued				
C	Lewisville - 6.5 MGD WTP Expansion	2050	Project Sponsor(s): Lewisville	Recommended WMS Project		Project/WMS no longer being pursued				
C	Livestock, Henderson - New Well(s) in Carrizo-Wilcox Aquifer	2020	Project Sponsor(s): Livestock (Henderson)	Recommended WMS Project	Yes	Project/WMS completed				
C	Livestock, Tarrant - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Livestock (Tarrant)	Recommended WMS Project	Yes	Project/WMS completed				
C	M E N WSC - Additional Delivery Infrastructure from Corsicana (Upsize Lake Halbert Connection)	2050	Project Sponsor(s): M E N WSC	Recommended WMS Project						
C	Mabank - 3 MGD WTP Expansion	2020	Project Sponsor(s): Mabank	Recommended WMS Project	Yes	Project/WMS started				
C	Mabank - 5 MGD WTP Expansion	2060	Project Sponsor(s): Mabank	Recommended WMS Project		Project/WMS no longer being pursued				
C	Mabank - Additional Delivery Infrastructure from TRWD (Cedar Creek Reservoir)	2030	Project Sponsor(s): Mabank	Recommended WMS Project						
C	Mansfield - 15 MGD WTP Expansion	2030	Project Sponsor(s): Mansfield	Recommended WMS Project						
C	Mansfield - 20 MGD WTP Expansion	2060	Project Sponsor(s): Mansfield	Recommended WMS Project						
C	Mansfield - 35 MGD WTP Expansion	2060	Project Sponsor(s): Mansfield	Recommended WMS Project						
C	Manufacturing, Collin - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Manufacturing (Collin)	Recommended WMS Project	Yes	Project/WMS started				
C	Manufacturing, Wise County - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Manufacturing (Wise)	Recommended WMS Project	Yes	Project/WMS completed				
C	Marvin Nichols (328) - TRWD, NTMWD, UTRWD	2050	Project Sponsor(s): North Texas MWD; Tarrant Regional WD; Upper Trinity Regional WD	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2040, thus not evaluated.	Shift in timeline		Unknown
C	Melissa - Additional Delivery Infrastructure from NTMWD	2030	Project Sponsor(s): Melissa	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Midlothian - Expand Auger WTP to 16 MGD	2020	Project Sponsor(s): Midlothian	Recommended WMS Project	Yes	Project/WMS completed				
C	Midlothian - Expand Auger WTP to 24 MGD	2020	Project Sponsor(s): Midlothian	Recommended WMS Project	Yes	Project/WMS started				
C	Midlothian - Expand Auger WTP to 32 MGD	2040	Project Sponsor(s): Midlothian	Recommended WMS Project						
C	Midlothian - Expand Tayman WTP to 20 MGD	2020	Project Sponsor(s): Midlothian	Recommended WMS Project	Yes	Project/WMS started				
C	Mining, Grayson County - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Mining (Grayson)	Recommended WMS Project	Yes	Project/WMS completed				
C	Mining, Jack - Indirect Reuse (Jacksboro)	2020	WMS Seller: Jacksboro; WMS Supply Recipient: Mining, Jack	Recommended WMS Supply Without WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Mining, Kaufman County - New Well(s) in Nacatoch Aquifer	2040	Project Sponsor(s): Mining (Kaufman)	Recommended WMS Project						
C	Mining, Parker County - New Well(s) in Trinity Aquifer	2030	Project Sponsor(s): Mining (Kaufman)	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Muenster - Develop Lake Muenster Supply	2020	Project Sponsor(s): Muenster	Recommended WMS Project	Yes	Project/WMS started				
C	Navarro Mills WSC - New Well in Woodbine Aquifer Q-168	2050	Project Sponsor(s): Navarro Mills WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Newark - Connect to Rhome	2020	Project Sponsor(s): Newark	Recommended WMS Project						
C	Non-Municipal Conservation, Irrigation, Cooke	2050	WUG Reducing Demand: Irrigation, Cooke	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Non-Municipal Conservation, Irrigation, Ellis	2020	WUG Reducing Demand: Irrigation, Ellis	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Non-Municipal Conservation, Irrigation, Fannin	2020	WUG Reducing Demand: Irrigation, Fannin	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Non-Municipal Conservation, Irrigation, Wise	2030	WUG Reducing Demand: Irrigation, Wise	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Non-Municipal Conservation, Mining, Wise	2020	WUG Reducing Demand: Mining, Wise	Recommended Demand Reduction Strategy Without WMS Project	Yes	Project/WMS started				
C	Northwest Grayson County WCID 1 - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Northwest Grayson County WCID 1	Recommended WMS Project	Yes	Project/WMS started				
C	NTMWD & Irving - Lake Chapman Pump Station Expansion	2020	Project Sponsor(s): Irving; North Texas MWD	Recommended WMS Project		Project/WMS no longer being pursued				
C	NTMWD - Additional Lake Texoma Blend Phase 1	2040	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD - Additional Lake Texoma Blend Phase 2	2060	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD - Additional Lavon Watershed Reuse	2050	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD - Additional Measure to Access Full Lake Lavon Yield	2030	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD - Bois D'Arc Lake	2020	Project Sponsor(s): North Texas	Recommended WMS Project	Yes	Project/WMS completed				
C	NTMWD - Expanded Wetland Reuse	2030	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD - Oklahoma Water	2070	Project Sponsor(s): North Texas	Recommended WMS Project		Project/WMS not started				
C	NTMWD Treatment & Treated Water Distribution Improvements 2020-2030	2020	Project Sponsor(s): North Texas MWD	Recommended WMS Project	Yes					
C	NTMWD Treatment & Treated Water Distribution Improvements 2030-2040	2030	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD Treatment & Treated Water Distribution Improvements 2040-2050	2040	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD Treatment & Treated Water Distribution Improvements 2050-2060	2050	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTMWD Treatment & Treated Water Distribution Improvements 2060-2070	2060	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	NTWMD - Fannin County Water Supply Project	2030	Project Sponsor(s): North Texas MWD	Recommended WMS Project						
C	Ovilla - Additional Delivery Infrastructure from DWU	2070	Project Sponsor(s): Ovilla	Recommended WMS Project						
C	Palmer - Additional Delivery Infrastructure from Rockett	2060	Project Sponsor(s): Palmer	Recommended WMS Project						
C	Pantego - Connect to Arlington	2030	Project Sponsor(s): Pantego	Recommended WMS Project						
C	Pantego - Connect to Fort Worth	2030	Project Sponsor(s): Pantego	Recommended WMS Project						
C	Parker - Additional Delivery Infrastructure from NTWMD	2020	Project Sponsor(s): Parker	Recommended WMS Project	Yes					

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C	Parker County SUD - 3.5 MGD WTP Desal Expansion-BRA Supply	2030	Project Sponsor(s): Parker County SUD	Recommended WMS Project						
C	Pelican Bay - Connect to Azle	2030	Project Sponsor(s): Pelican Bay	Recommended WMS Project						
C	Pelican Bay - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Pelican Bay	Recommended WMS Project	Yes	Project/WMS completed				
C	Pilot Point - New Well(s) in Trinity Aquifer	2020	Project Sponsor(s): Pilot Point	Recommended WMS Project	Yes	Project/WMS completed				
C	Pink Hill WSC - New Well(s) in Trinity Aquifer	2030	Project Sponsor(s): Pink Hill WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Pink Hill WSC - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Pink Hill WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Pleasant Grove WSC - New Well(s) in Carrizo-Wilcox Aquifer	2070	Project Sponsor(s): Pleasant Grove WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Prosper - Additional Delivery Infrastructure from NTMWD	2030	Project Sponsor(s): Prosper	Recommended WMS Project	No	Project/WMS no longer being pursued	No longer needed			Unknown
C	Purchase Carrizo-Wilcox Supply From Mexia	2020	WMS Seller: Mexia; WMS Supply Recipient: Wortham	Recommended WMS Supply Without WMS Project						
C	Rice WSC - Additional Delivery Infrastructure from Corsicana	2030	Project Sponsor(s): Rice Water Supply and Sewer Service	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Rockett SUD - 10 MGD WTP Expansion at Sokoll-1	2030	Project Sponsor(s): Rockett SUD	Recommended WMS Project						
C	Rockett SUD - 10 MGD WTP Expansion at Sokoll-2	2060	Project Sponsor(s): Rockett SUD	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Rockett SUD - 4 MGD WTP Expansion at Sokoll	2070	Project Sponsor(s): Rockett SUD	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Rockett SUD - Unallocated Supply Utilization	2050	WMS Seller: Rockett SUD; WMS Supply Recipient: County-Other,	Recommended WMS Supply Without WMS Project						
C	Rockett SUD - Unallocated Supply Utilization	2050	WMS Seller: Rockett SUD; WMS Supply Recipient: Ferris	Recommended WMS Supply Without WMS Project						
C	Rockett SUD - Unallocated Supply Utilization	2050	WMS Seller: Rockett SUD; WMS Supply Recipient: Palmer	Recommended WMS Supply Without WMS Project						
C	Rockett SUD - Unallocated Supply Utilization	2050	WMS Seller: Rockett SUD; WMS Supply Recipient: Sardis Lone Elm	Recommended WMS Supply Without WMS Project						
C	Rockett SUD - Unallocated Supply Utilization	2030	WMS Supply Recipient: Rockett SUD	Recommended WMS Supply Without WMS Project						
C	Rockwall - Additional Delivery Infrastructure from NTWMD	2020	Project Sponsor(s): Rockwall	Recommended WMS Project						
C	Rowlett - Additional Delivery Infrastructure from NTWMD	2030	Project Sponsor(s): Rowlett	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not	Shift in timeline		Unknown
C	Runaway Bay - 3 MGD WTP Expansion-1	2020	Project Sponsor(s): Runaway Bay	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Runaway Bay - 3 MGD WTP Expansion-2	2060	Project Sponsor(s): Runaway Bay	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Runaway Bay - Increase Capacity of Lake Intake	2070	Project Sponsor(s): Runaway Bay	Recommended WMS Project						
C	Runaway Bay - Unallocated Supply Utilization	2020	WMS Seller: Runaway Bay; WMS Supply Recipient: County-Other,	Recommended WMS Supply Without WMS Project						
C	Sardis Lone Elm - Connect to TRWD	2020	Project Sponsor(s): Sardis Lone Elm WSC	Recommended WMS Project	No	Project/WMS not started	No data and did not hear back from the sponsor	Other	No data and did not hear back from the sponsor	Unknown
C	Seagoville - Unallocated Supply Utilization	2020	WMS Seller: Seagoville; WMS Supply Recipient: Combine WSC	Recommended WMS Supply Without WMS Project						
C	Seagoville - Unallocated Supply Utilization	2020	WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	Seagoville - Unallocated Supply Utilization	2020	WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	Seagoville - Unallocated Supply Utilization	2020	WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	Seagoville - Unallocated Supply Utilization	2020	WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						
C	Seagoville - Unallocated Supply Utilization	2020	WMS Supply Recipient: Seagoville	Recommended WMS Supply Without WMS Project						

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C	SEP, Tarrant - Reuse	2030	Project Sponsor(s): Steam-electric power (Tarrant)	Recommended WMS Project						
C	Sherman - 10 MGD WTP Expansion (Desal)-1	2020	Project Sponsor(s): Sherman	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Sherman - 10 MGD WTP Expansion (Desal)-2	2050	Project Sponsor(s): Sherman	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Sherman - 10 MGD WTP Expansion (Desal)-3	2060	Project Sponsor(s): Sherman	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Sherman - 20 MGD WTP Expansion (Desal)	2070	Project Sponsor(s): Sherman	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Anna	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Bells	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Celina	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Collinsville	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: County-Other, Collin	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: County-Other, Grayson	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	Unknown	WMS Seller: Sherman; WMS Supply Recipient: Dorchester	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2020	WMS Seller: Sherman; WMS Supply Recipient: Gunter	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Howe	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Kentuckytown WSC	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Lake Kiowa SUD	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Luella SUD	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Manufacturing, Grayson	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Marilee SUD	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Melissa	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Northwest Grayson County WCID 1	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Pilot Point	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	Unknown	WMS Seller: Sherman; WMS Supply Recipient: Pottsboro	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	Unknown	WMS Seller: Sherman; WMS Supply Recipient: Sherman	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: South Grayson SUD	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2020	WMS Seller: Sherman; WMS Supply Recipient: Southmayd	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	Unknown	WMS Seller: Sherman; WMS Supply Recipient: Steam-Electric Power, Grayson	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2050	WMS Seller: Sherman; WMS Supply Recipient: Tioga	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	Unknown	WMS Seller: Sherman; WMS Supply Recipient: Tom Bean	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Two Way SUD	Recommended WMS Supply Without WMS Project						

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C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Van Alstyne	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Whitesboro	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2040	WMS Seller: Sherman; WMS Supply Recipient: Whitewright	Recommended WMS Supply Without WMS Project						
C	Sherman - Unallocated Supply Utilization	2030	WMS Seller: Sherman; WMS Supply Recipient: Woodbine WSC	Recommended WMS Supply Without WMS Project						
C	South Freestone County WSC - New Well(s) in Carrizo-Wilcox Aquifer	2020	Project Sponsor(s): South Freestone County WSC	Recommended WMS Project	No	Project/WMS not started	No data and did not hear back from the sponsor	Other	No data and did not hear back from the sponsor	Unknown
C	Southlake - Additional Delivery Infrastructure Fort Worth	2040	Project Sponsor(s): Southlake	Recommended WMS Project						
C	Southwest Fannin Co SUD - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Southwest Fannin County SUD	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Springtown - Infrastructure Improvements- Surface Water Treatment Plant & Supply Project	2020	Project Sponsor(s): Springtown	Recommended WMS Project	No	Project/WMS not started	No data and did not hear back from the sponsor	Other	No data and did not hear back from the sponsor	Unknown
C	Sunnyvale - Additional Delivery Infrastructure from NTMWD	2030	Project Sponsor(s): Sunnyvale	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not	Shift in timeline		Unknown
C	Teague - New Wells in Carrizo-Wilcox Aquifer Q-135	2020	Project Sponsor(s): Teague	Recommended WMS Project		Project/WMS completed		Other	No data and did not hear back from the sponsor	Unknown
C	Terrell - Ground Storage Tank and Pump Station at NTWMD Delivery Point	2020	Project Sponsor(s): Terrell	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Terrell - Infrastructure Improvements to Wholesale Customer	2020	Project Sponsor(s): Terrell	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown
C	Trenton - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Trenton	Recommended WMS Project						
C	TRWD - Additional Capacity to Convey Richland Chambers Reuse (IPL)	2030	Project Sponsor(s): Tarrant Regional WD	Recommended WMS Project						
C	TRWD - Additional Transmission Pipeline	2060	Project Sponsor(s): Tarrant Regional WD	Recommended WMS Project						
C	TRWD - ASR Pilot	2020	Project Sponsor(s): Tarrant	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	TRWD - Carrizo-Wilcox Groundwater	2040	Project Sponsor(s): Tarrant Regional WD	Recommended WMS Project						
C	TRWD - Cedar Creek Wetlands Reuse	2030	Project Sponsor(s): Tarrant Regional WD	Recommended WMS Project						
C	TRWD - Reuse from TRA Central WWTP	2030	Project Sponsor(s): Tarrant Regional WD	Recommended WMS Project						
C	TRWD - Tehuacana Reservoir	2040	Project Sponsor(s): Tarrant	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Arlington	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2060	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Avalon Water Supply & Sewer Service	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2040	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Bedford	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Boyd	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2050	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Buena Vista-Bethel SUD	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Colleyville	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Community	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						

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C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2060	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: County-	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Dalworthington Gardens	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Decatur	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: East Cedar Creek FWSD	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2070	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: East	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Edgecliff	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2050	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Ennis	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2040	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Euless	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Forest Hill	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2040	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Fort Worth	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Grand	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Grapevine	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Haltom	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Haslet	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Hurst	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Irrigation,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2060	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Irrigation,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Irrigation,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Irrigation,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Irrigation,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2050	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Italy	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Keller	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Kemp	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Lake Worth	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Malakoff	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						

Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient:	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2060	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Mining,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Mining,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Mining,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2040	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Mining,	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Mountain	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: North	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Northlake	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Reno	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Rhome	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Rice Water Supply and Sewer Service	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Richland	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: River Oaks	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Roanoke	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Saginaw	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2070	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Sansom	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2070	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: South Ellis	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Ellis	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2020	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Freestone	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Henderson	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Jack	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Tarrant	Recommended WMS Supply Without WMS Project						

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Table N.2
2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Steam-Electric Power, Wise	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Trophy	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: West Cedar Creek MUD	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	Unknown	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Westlake	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Westover	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: Westworth	Recommended WMS Supply Without WMS Project						
C	TRWD - Unallocated Supply Utilization	2030	WMS Seller: Tarrant Regional WD; WMS Supply Recipient: White	Recommended WMS Supply Without WMS Project						
C	UTRWD - Additional Direct Reuse	2030	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project						
C	UTRWD - Lake Ralph Hall and Reuse	2030	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	UTRWD WTP and Treated Water Distribution System Water Management Strategies 2020-2030	2020	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	UTRWD WTP and Treated Water Distribution System Water Management Strategies 2030-2040	2030	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project						
C	UTRWD WTP and Treated Water Distribution System Water Management Strategies 2040-2050	2040	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project						
C	UTRWD WTP and Treated Water Distribution System Water Management Strategies 2050-2060	2050	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project						
C	UTRWD WTP and Treated Water Distribution System Water Management Strategies 2060-2070	2060	Project Sponsor(s): Upper Trinity Regional WD	Recommended WMS Project						
C	Van Alstyne - Water System Improvements	2040	Project Sponsor(s): Van Alstyne	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown
C	Verona SUD - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): Verona SUD	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Walnut Creek SUD - 6 MGD WTP Expansion	2020	Project Sponsor(s): Walnut Creek SUD	Recommended WMS Project	No	Project/WMS not started	Sponsor is still planning	Shift in timeline		Unknown
C	Walnut Creek SUD - New 7 MGD WTP-Eagle Mountain	2060	Project Sponsor(s): Walnut Creek SUD	Recommended WMS Project						
C	Watauga & N Richland Hills - Increase Delivery Infrastructure from Fort Worth	2020	Project Sponsor(s): North Richland Hills	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Watauga - Additional Delivery Infrastructure North Richland Hills/Fort Worth	2030	Project Sponsor(s): Watauga	Recommended WMS Project						
C	Waxahachie - 12 MGD WTP Expansion-Howard Road	2070	Project Sponsor(s): Waxahachie	Recommended WMS Project						
C	Waxahachie - 30" Raw Water Line from IPL to Howard Road WTP	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			

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2021 Regional Water Planning / 2022 State Water Plan Implementation Survey

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why	Impediments to project development	Information about project impediments	What funding type(s) are being used for the project? (Select all that apply)
C	Waxahachie - 36" Raw Water Line from IPL to Lake Waxahachie	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Waxahachie - 36" Raw Water Line from Lake Waxahachie to Howard Rd WTP	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Waxahachie - 48" TRWD Parallel Supply Line to Sokoll WTP	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project						
C	Waxahachie - 8 MGD WTP Expansion-Howard Road	2050	Project Sponsor(s): Waxahachie	Recommended WMS Project						
C	Waxahachie - Dredge Lake Waxahachie	2040	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS completed				
C	Waxahachie - Increase Delivery Infrastructure to Rockett SUD	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Waxahachie - Phase 1 Delivery Infrastructure to Customers In South Ellis County	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project						
C	Waxahachie - Phase 2 Delivery Infrastructure to Customers In South Ellis County	2050	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Waxahachie - Raw Water Intake Improvements at Lake Bardwell	2030	Project Sponsor(s): Waxahachie	Recommended WMS Project		Project/WMS completed				
C	Weatherford - 14 MGD WTP Expansion	2050	Project Sponsor(s): Weatherford	Recommended WMS Project						
C	Weatherford - 18 MGD WTP Expansion	2060	Project Sponsor(s): Weatherford	Recommended WMS Project						
C	Weatherford - 8 MGD WTP Expansion	2020	Project Sponsor(s): Weatherford	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Weatherford - Additional Indirect Reuse Phase 1	2020	Project Sponsor(s): Weatherford	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Weatherford - Additional Indirect Reuse Phase 2	2030	Project Sponsor(s): Weatherford	Recommended WMS Project						
C	Weatherford - Expand Lake Benbrook Pump Station	2020	Project Sponsor(s): Weatherford	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not	Shift in timeline		Unknown
C	West Wise SUD - 1.5 MGD WTP Expansion	2050	Project Sponsor(s): West Wise SUD	Recommended WMS Project						
C	White Shed WSC - New Well(s) in Woodbine Aquifer	2030	Project Sponsor(s): White Shed WSC	Recommended WMS Project		Project/WMS no longer being pursued	No longer needed			
C	Willow Park - Connect to Fort Worth	2020	Project Sponsor(s): Willow Park	Recommended WMS Project	Yes	Project/WMS completed				Unknown
C	Wilmer - Direct Connection to Dallas (36" Transmission Line)	2070	Project Sponsor(s): Wilmer	Recommended WMS Project		Project/WMS no longer being pursued				
C	Wilmer - Increase Capacity of Connection with Lancaster	2020	Project Sponsor(s): Wilmer	Recommended WMS Project	Yes	Project/WMS started				Unknown
C	Wise County WSD - 9 MGD WTP Expansion	2020	Project Sponsor(s): Wise County WSD	Recommended WMS Project	No	Project/WMS not started	No data and did not hear back from the sponsor	Other	No data and did not hear back from the sponsor	Unknown
C	Wright Patman Reallocation NTMWD, TRWD, and UTRWD	2070	Project Sponsor(s): North Texas MWD; Tarrant Regional WD; Upper Trinity Regional WD	Recommended WMS Project		Project/WMS not started				
C	Wylie Northeast SUD - Additional Delivery Infrastructure from NTWMD	2030	Project Sponsor(s): Wylie Northeast SUD	Recommended WMS Project	No	Project/WMS not started	Recommended online date after 2020, thus not evaluated.	Shift in timeline		Unknown

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Rural Outreach

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Rural Outreach

WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
Ables Springs SUD	Ables Springs SUD	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Aledo	City of Aledo	No	No	Yes	No	Low	Survey email, phone call.	No
Alvord	City of Alvord	No	No	Yes	No	Low	Survey email, phone call.	No
Annetta	Town of Annetta	No	No	No	No	Very Low	Survey email, phone call.	No
Arledge Ridge WSC	Arledge Ridge WSC	No	No	No	No	Very Low	Survey email, phone call.	No
Athens	City of Athens	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Aubrey	City of Aubrey	Yes	No	No	No	Low	Survey email, phone call.	No
Avalon Water Supply & Sewer Service	Avalon WSC	No	No	Yes	No	Low	Survey email, phone call.	No
B And B WSC	B & B WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Becker Jiba WSC	Becker-Jiba SUD	No	No	Yes	No	Low	Survey email, phone call.	No
Bells	City of Bells	No	No	Yes	No	Low	Survey email, phone call.	No
Bethel Ash WSC	Bethel Ash WSC Bethel Plant	No	No	Yes	No	Low	Survey email, phone call.	No
Bethel Ash WSC	Bethel Ash WSC Hawn Plant	No	No	Yes	No	Low	Survey email, phone call.	No
Bethel Ash WSC	Bethel Ash WSC Water Edge Plant	No	No	Yes	No	Low	Survey email, phone call.	No
Black Rock WSC	Black Rock WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Blooming Grove	City of Blooming Grove	No	No	Yes	No	Low	Survey email, phone call.	No
Blue Ridge	City of Blue Ridge	No	No	Yes	Yes	Moderate	Survey email, phone call.	No
Bois D Arc MUD	Bois D Arc MUD	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Bolivar WSC	Bolivar WSC	Yes	No	Yes	No	Moderate	Survey email, phone call.	No
Bonham	City of Bonham	No	No	Yes	No	Low	Survey email, phone call.	No
Boyd	City of Boyd	No	No	No	Yes	Low	Survey email, phone call.	Yes
Bridgeport	City of Bridgeport	No	No	Yes	No	Low	Survey email, phone call.	No
Butler WSC	Butler WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Callisburg WSC	City of Callisburg	No	No	Yes	No	Low	Survey email, phone call.	No
Chatfield WSC	Chatfield WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Chico	City of Chico	No	No	Yes	No	Low	Survey email, phone call.	No
Cockrell Hill	City of Cockrell Hill	No	No	Yes	No	Low	Survey email, phone call.	No
College Mound SUD	College Mound SUD	No	No	Yes	No	Low	Survey email, phone call.	No
Collinsville	City of Collinsville	No	No	Yes	No	Low	Survey email, phone call.	No
Combine WSC	Combine WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Copeville WSC	Copeville SUD	No	No	Yes	No	Low	Survey email, phone call.	No

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WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
Corbet WSC	Corbet WSC	No	No	Yes	No	Low	Survey email, phone call.	No
Corsicana	City of Corsicana	No	No	No	No	Very Low	Survey email, phone call.	No
County-Other, Collin	Weston WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Cooke	Era WSC	No	No	No	No	Very Low	Phone call.	Yes
County-Other, Cooke	Moss Lake WSC	No	No	No	No	Very Low	Phone call, number disconnected.	N/A
County-Other, Cooke	Oak Ridge Water System	No	No	No	No	Very Low	Phone call, left voicemail.	No
County-Other, Cooke	Walnut Bend Isd	No	No	No	No	Very Low	Phone call, number disconnected.	N/A
County-Other, Cooke	City of Valley View	No	No	No	No	Very Low	Phone call, left voicemail.	No
County-Other, Dallas	D Bar B Mobile Home Ranch	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Green Springs WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Town of Lakewood Village	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Stonebridge WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Red Rock WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Cripple Creek WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Denton	Hilltop Estates WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Ellis	City of Maypearl	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Ellis	City of Milford	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Ellis	City of Bardwell	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Ellis	Rural Bardwell WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	City of Dodd City	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	City of Ector	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	City of Windom	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Bartley Woods WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Dial WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Gober Mud	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Randolph WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Ravenna Nunnelee WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	City of Bailey	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Fannin	Mccraw Chapel WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Freestone	City of Streetman	No	No	No	No	Very Low	Phone call, number disconnected.	N/A

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WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
County-Other, Freestone	Turlington WSC	No	No	No	No	Very Low	Phone call, number disconnected.	N/A
County-Other, Freestone	Ward Prairie WSC	No	No	No	No	Very Low	Phone call, left voicemail.	No
County-Other, Freestone	City of Kirvin	No	No	No	No	Very Low	Phone call, left voicemail.	No
County-Other, Freestone	C H WSC	No	No	No	No	Very Low	Phone call, number disconnected.	N/A
County-Other, Grayson	City of Sadler	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Grayson	Texoma Estates WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Henderson	Payne Springs WSC	No	No	No	No	Very Low	Phone call, left voicemail.	N/A
County-Other, Henderson	City of Star Harbor	No	No	No	No	Very Low	Phone call, left voicemail.	N/A
County-Other, Henderson	C R C WSC	No	No	No	No	Very Low	Phone call, left voicemail.	N/A
County-Other, Jack	City of Bryson	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Kaufman	Lawrence WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Kaufman	Oak Grove Texas WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Kaufman	Country Club WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	City of Frost	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	City of Barry	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	Angus WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	Emhouse Water System	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	City of Richland	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	Winkler WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Navarro	City of Goodlow	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Rio Brazos WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Millsap WSC	Yes	No	No	No	Low	Survey sent to water provider.	N/A
County-Other, Parker	Whitt WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	M&L WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Highland WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Echo Valley WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Ponderosa Hills Subdivision	No	No	No	No	Very Low	Survey sent to water provider.	N/A

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Appendix O
Rural Outreach

WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
County-Other, Parker	New Progress WSC Enchanted Oaks Subdivis	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	S-Estates WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Parker	Highland Lakes	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Tarrant	Westside Rural WSC	Yes	No	No	No	Low	Survey sent to water provider.	N/A
County-Other, Tarrant	Friendly Oaks WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Wise	City of Paradise	Yes	No	No	No	Low	Survey sent to water provider.	N/A
County-Other, Wise	Slidell WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Wise	Hideaway Bay Lake Shores WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
County-Other, Wise	Grand Harbor WSC	No	No	No	No	Very Low	Survey sent to water provider.	N/A
Crandall	City of Crandall	No	No	Yes	No	Low	Survey emailed, phone call.	No
Crescent Heights WSC	Crescent Heights WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Culleoka WSC	Culleoka WSC	No	No	No	No	Very Low	Survey emailed, phone call.	No
Dalworthington Gardens	City of Dalworthington Gardens	No	No	Yes	No	Low	Survey emailed, phone call.	No
Dawson	City of Dawson	No	No	Yes	No	Low	Survey emailed, phone call.	No
Decatur	City of Decatur	No	No	Yes	No	Low	Survey emailed, phone call.	No
Desert WSC	Desert WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Dorchester	City of Dorchester	No	No	Yes	No	Low	Survey emailed, phone call.	No
East Cedar Creek FWSD	East Cedar Creek FWSD B A Mckay	No	No	No	No	Very Low	Survey emailed, phone call.	No
East Cedar Creek FWSD	East Cedar Creek FWSD Brookshire	No	No	No	No	Very Low	Survey emailed, phone call.	No
East Garrett WSC	East Garrett WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Edgecliff	Town of Edgecliff Village	No	No	No	No	Very Low	Survey emailed, phone call.	No
Elmo WSC	Elmo WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Eustace	City of Eustace	No	No	Yes	No	Low	Survey emailed, phone call.	No
Everman	City of Everman	No	No	Yes	No	Low	Survey emailed, phone call.	No
Fairfield	City of Fairfield	No	No	Yes	No	Low	Survey emailed, phone call.	No
Fairfield	City of Fairfield - Westwood Utility	No	No	Yes	No	Low	Survey emailed, phone call.	No
Fairfield	City of Fairfield Boyd Unit	No	No	Yes	No	Low	Survey emailed, phone call.	No

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Rural Outreach

WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
Fairview	Town of Fairview	No	No	Yes	No	Low	Survey emailed, phone call.	No
Farmersville	City of Farmersville	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Ferris	City of Ferris	No	No	Yes	No	Low	Survey emailed, phone call.	No
Frognot WSC	Frognot SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Gainesville	City of Gainesville	No	No	Yes	No	Low	Survey emailed, phone call.	No
Gastonia Scurry SUD	Gastonia Scurry SUD	No	No	No	No	Very Low	Survey emailed, phone call.	No
Gunter	City of Gunter	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Hackberry	City of Hackberry	No	No	Yes	No	Low	Survey emailed, phone call.	No
Haslet	City of Haslet	No	No	Yes	No	Low	Survey emailed, phone call.	No
Heath	City of Heath	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
High Point WSC	High Point Water Supply Corporation	No	No	Yes	No	Low	Survey emailed, phone call.	No
Highland Park	Town of Highland Park	No	No	No	No	Very Low	Survey emailed, phone call.	No
Honey Grove	City of Honey Grove	No	No	No	No	Very Low	Survey emailed, phone call.	No
Howe	City of Howe	No	No	Yes	No	Low	Survey emailed, phone call.	No
Hudson Oaks	City of Hudson Oaks	No	No	Yes	No	Low	Survey emailed, phone call.	No
Hutchins	City of Hutchins	No	No	Yes	No	Low	Survey emailed, phone call.	No
Italy	City of Italy	No	No	Yes	No	Low	Survey emailed, phone call.	No
Jacksboro	City of Jacksboro	No	No	Yes	No	Low	Survey emailed, phone call.	No
Josephine	City of Josephine	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Justin	City of Justin	Yes	No	No	Yes	Moderate	Survey emailed, phone call.	No
Kaufman	City of Kaufman	No	No	Yes	No	Low	Survey emailed, phone call.	No
Kaufman County Development District 1	Kaufman County FWSD 1A	No	No	Yes	No	Low	Survey emailed, phone call.	No
Kaufman County MUD 11	Kaufman County Mud 11	No	No	Yes	No	Low	Survey emailed, phone call.	No
Kemp	City of Kemp	No	No	No	No	Very Low	Survey emailed, phone call.	No
Kennedale	City of Kennedale	No	No	No	No	Very Low	Survey emailed, phone call.	No
Kentuckytown WSC	Kentuckytown WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Kerens	City of Kerens	No	No	Yes	No	Low	Survey emailed, phone call.	No
Krum	City of Krum	No	No	No	No	Very Low	Survey emailed, phone call.	No
Ladonia	City of Ladonia	No	No	Yes	No	Low	Survey emailed, phone call.	No
Lake Kiowa SUD	Lake Kiowa SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Lake Worth	City of Lake Worth	No	No	Yes	No	Low	Survey emailed, phone call.	No
Lakeside	Town of Lakeside	No	No	No	Yes	Low	Survey emailed, phone call.	No

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WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
Leonard	City of Leonard	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Lindsay	City of Lindsay	No	No	No	No	Very Low	Survey emailed, phone call.	No
Log Cabin	City of Log Cabin	No	No	No	No	Very Low	Survey emailed, phone call.	No
Lucas	City of Lucas	Yes	No	No	No	Low	Survey emailed, phone call.	No
Luella SUD	Luella SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
M E N WSC	M E N WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Mabank	City of Mabank	No	No	Yes	No	Low	Survey emailed, phone call.	No
Malakoff	City of Malakoff	No	No	Yes	No	Low	Survey emailed, phone call.	No
Mountain Peak SUD	Mountain Peak SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Mountain Springs WSC	Mountain Springs WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Muenster	City of Muenster	No	No	No	No	Very Low	Survey emailed, phone call.	No
Mustang SUD	Marilee Elmont	Yes	Yes	No	No	Moderate	Survey emailed, phone call.	No
Navarro Mills WSC	Navarro Mills WSC	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Newark	City of Newark	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
North Farmersville WSC	North Farmersville WSC	No	No	No	No	Very Low	Survey emailed, phone call.	No
North Kaufman WSC	North Kaufman WSC	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Northlake	Town of Northlake	Yes	No	No	No	Low	Survey emailed, phone call.	No
Northwest Grayson County WCID 1	Northwest Grayson County WCID 1	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Oak Ridge South Gale WSC	Oak Ridge South Gale WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Ovilla	City of Ovilla	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Palmer	City of Palmer	No	No	Yes	No	Low	Survey emailed, phone call.	No
Pantego	Town of Pantego	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Parker	City of Parker	No	No	Yes	No	Low	Survey emailed, phone call.	No
Parker County SUD	Parker County SUD Ground Water	No	No	Yes	No	Low	Survey emailed, phone call.	No
Parker County SUD	Parker County SUD Surface	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Pilot Point	City of Pilot Point	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Pink Hill WSC	Pink Hill WSC	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Pleasant Grove WSC	Pleasant Grove WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Point Enterprise WSC	Point Enterprise WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Ponder	Town of Ponder	Yes	No	Yes	Yes	High	Survey emailed, phone call.	No
Pottsboro	City of Pottsboro	No	No	No	No	Very Low	Survey emailed, phone call.	No

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Rural Outreach

WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
Providence Village WCID	Town of Providence Village	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	Yes
Red River Authority of Texas	Rra Preston Shores Water System	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	Yes
Rhome	City of Rhome	Yes	No	Yes	Yes	High	Survey emailed, phone call.	No
Rice Water Supply and Sewer Service	Rice WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Richland Hills	City of Richland Hills	No	No	Yes	No	Low	Survey emailed, phone call.	No
River Oaks	City of River Oaks	No	No	Yes	No	Low	Survey emailed, phone call.	No
RoaNoke	City of Roanoke	No	No	Yes	No	Low	Survey emailed, phone call.	No
Rose Hill SUD	Rose Hill SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Runaway Bay	City of Runaway Bay	No	No	Yes	No	Low	Survey emailed, phone call.	No
Sanger	City of Sanger	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Sansom Park	City of Sansom Park	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Savoy	City of Savoy	No	No	No	No	Very Low	Survey emailed, phone call.	No
South Ellis County WSC	South Ellis County Water Supply	No	No	Yes	No	Low	Survey emailed, phone call.	No
South Freestone County WSC	South Freestone County WSC	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
South Grayson SUD	South Grayson SUD	No	No	No	No	Very Low	Survey emailed, phone call.	No
Southmayd	City of Southmayd	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Southwest Fannin County SUD	Southwest Fannin County SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Springtown	City of Springtown	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Sunnyvale	Town of Sunnyvale	No	No	Yes	No	Low	Survey emailed, phone call.	Yes
Talty SUD	Talty SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Teague	City of Teague	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Tioga	City of Tioga	No	No	Yes	No	Low	Survey emailed, phone call.	No
Tom Bean	City of Tom Bean	No	No	Yes	No	Low	Survey emailed, phone call.	No
Trenton	City of Trenton	No	No	Yes	No	Low	Survey emailed, phone call.	No
Trinidad	City of Trinidad	No	No	Yes	No	Low	Survey emailed, phone call.	No
Two Way SUD	Two Way SUD	No	No	Yes	Yes	Moderate	Survey emailed, phone call.	No
Van Alstyne	City of Van Alstyne	Yes	No	Yes	No	Moderate	Survey emailed, phone call.	No
Verona SUD	Verona SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
West Cedar Creek MUD	West Cedar Creek Mud	No	No	Yes	No	Low	Survey emailed, phone call.	No

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Rural Outreach

WATER USER GROUP NAME	ASSOCIATED PWS NAME	ENTITY HAS SELF-REPORTED WATER USE RESTRICTIONS TO TCEQ DUE TO WATER SUPPLY ISSUES DURING THE CURRENT PLANNING CYCLE	ENTITY HAS SELF-REPORTED HAVING LESS THAN 180 DAYS of WATER SUPPLY REMAINING DURING THE CURRENT PLANNING CYCLE	ENTITY HAS NOT PREVIOUSLY ENGAGED IN THE REGIONAL PLANNING PROCESS	ENTITY HAS IDENTIFIED AS FACING SIGNIFICANT NEAR-TERM SHORAGES UNDER DROUGHT CONDITIONS IN PREVIOUS REGIONAL WATER PLANS	PRIORITY FOR OUTREACH	OUTREACH MEASURES PERFORMED	RESPONSE RECEIVED FROM ENTITY
West Leonard WSC	West Leonard WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
West Wise SUD	West Wise SUD	No	No	No	No	Very Low	Survey emailed, phone call.	No
Westlake	Town of Westlake	No	No	Yes	No	Low	Survey emailed, phone call.	No
Westminster SUD	Westminster SUD	No	No	Yes	No	Low	Survey emailed, phone call.	No
Westover Hills	Town of Westover Hills	No	No	Yes	No	Low	Survey emailed, phone call.	No
Westworth Village	City of Westworth Village	No	No	Yes	No	Low	Survey emailed, phone call.	No
White Shed WSC	White Shed WSC	No	No	Yes	No	Low	Survey emailed, phone call.	No
Whitesboro	City of Whitesboro	No	No	Yes	No	Low	Survey emailed, phone call.	No
Whitewright	City of Whitewright	No	No	No	No	Very Low	Survey emailed, phone call.	No
WilLow Park	City of Willow Park	No	No	Yes	No	Low	Survey emailed, phone call.	No
Wilmer	City of Wilmer	No	No	Yes	No	Low	Survey emailed, phone call.	No
Woodbine WSC	Woodbine Special Utility District	No	No	No	Yes	Low	Survey emailed, phone call.	No
Wortham	City of Wortham	No	No	Yes	No	Low	Survey emailed, phone call.	No

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Appendix P

Interregional Conflict

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APPENDIX P INTERREGIONAL CONFLICT

ATTACHMENT	ITEM	PAGE NUMBER
P-1	Letter from TWDB Declaring an Interregional Conflict Exists Between Region C and Region D	P-2
P-2	Mediated Agreement Between Region C and Region D	P-5
P-3	Region C and Region D Joint Informational Campaign and Statement	P-8

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Attachment P-1

Letter from TWDB Declaring an Interregional Conflict Exists Between Region C and Region D

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TEXAS WATER DEVELOPMENT BOARD

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

June 26, 2025

Mr. Dan Buhman and Mr. Jim Thompson
Region C and D Chairs
Transmitted via email: dan.buhman@trwd.com, wardk@trinityra.org and longas@trinityra.org, jimthompson@wardtimber.com, kyledooley@rwrd.org
Cc: ashley.harden@twdb.texas.gov, temple.mckinnon@twdb.texas.gov

Re: Facilitation of resolution of interregional conflict between the 2026 Initially Prepared Plans for Regions C and D

Dear Mr. Buhman and Mr. Thompson,

At their June 26, 2025 meeting, the Board found that an interregional conflict exists between the 2026 Region C and Region D Initially Prepared Plans regarding the stated impacts of the proposed Marvin Nichols Reservoir project. In accordance with 31 Texas Administrative Code (TAC) § 357.62, I am requesting that Regions C and D appoint at least one (1) representative, up to a maximum of four (4) representatives, authorized to negotiate on behalf of the planning group in accordance with your bylaws. These representatives must actively and meaningfully engage in facilitation activities, including potential mediation, in an attempt to resolve the conflict. Please submit the names and contact information of your planning group's designated representatives to me by **July 14, 2026** in writing via email to bryan.mcmath@twdb.texas.gov and courtesy copy temple.mckinnon@twdb.texas.gov. My office will designate limited staff to attend and participate in the mediation as a resource.

Our agency has an executed contract with the Center for Public Policy Dispute Resolution (CPPDR) to provide mediation services. A mediator is a neutral party who helps facilitate communication and assists the parties in finding a mutually acceptable resolution to the conflict. The mediator does not decide who is right or wrong and does not issue a judgment. The parties are decision-makers as to how the conflict should be resolved. CPPDR is located at the University of Texas School of Law but will provide up to two days of mediation services virtually.

The mediator will work with you to schedule the mediation. The mediator would also like the opportunity to talk with you before the meeting to get your perspective on the issues. Those conversations would be confidential, as are communications during the mediation itself. We believe this mediation provides an opportunity for your regions to

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find ways to address this issue and reach solutions you both can embrace. I am hopeful that you will find common ground. I anticipate mediation services to commence no later than **July 31, 2025**.

Please note that we have requested the mediator to inform TWDB, in writing, whether the parties reach agreement. Communication relating to the mediation itself is subject to the confidentiality provisions of the Texas Government Code Section 2009.054. If you cannot reach agreement, 31 TAC § 357.62 stipulates that I determine a proposed recommendation for resolution of the conflict for the Board's consideration and resolution of the conflict.

If you have any questions regarding this matter, please contact Temple McKinnon, Director of Water Supply Planning, at temple.mckinnon@twdb.texas.gov.

Regards,

Bryan McMath Digitally signed by Bryan McMath
Date: 2025.06.26 11:36:54 -05'00'

Bryan McMath
Executive Administrator

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Attachment P-2

Mediated Agreement Between Region C and Region D

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Agreement Resolving the Declared Conflict
Between the Region C and Region D 2026 Initially Prepared Water Plans

On June 26, 2025, the Texas Water Development Board (TWDB) found that an interregional conflict existed between the 2026 Region C and Region D Initially Prepared Plans and invited the regional water planning groups to engage in mediation to attempt to resolve the conflict.

On July 25, 28, 29, 30, and 31, 2025, the undersigned representatives of the regions met in mediation and discussed the issues related to the current conflict in their regional water plans relating to the proposed Marvin Nichols Reservoir.

The undersigned representatives of Region C and Region D agree to resolve the conflict that the TWDB found between their Initially Prepared Plans as follows:

1. Region C will make Toledo Bend a Recommended Strategy (alongside Marvin Nichols Reservoir) so both can be explored.

    a. Region C will advance the Marvin Nichols project to 2070 and include Toledo Bend as a recommended water management strategy in the current round of planning.

    b. Region C will seek funding from TWDB to facilitate and conduct an "Apples-to-Apples" monetary and non-monetary comparison of the Marvin Nichols and Toledo Bend projects. Study is to be conducted by firm(s) that can provide a fresh assessment, commence by March 2026, and be completed by July 2027.

    c. Neither Region will protest either regional plan; and, each Region's board and board members will serve as representatives of this agreement, refraining from activities whose aim is to adversely impact the examination of the Marvin Nichols project prior to 2030. Members may continue to express their personal preferences and opinions regarding the proposed project but agree to honor the process outlined in this agreement.

    d. No application for permitting would occur for Marvin Nichols prior to 2030.

2. Regions C and D will support an independent study to address the potential benefits and impacts of Marvin Nichols and the anticipated associated mitigation land acquisition on the economic, agricultural, and natural resources of Regions C and D.

    a. Regions C and D will jointly pursue immediate funding through TWDB with the intent to initiate the study no later than March 2026. The study must be completed by July 2027. Should state resources not be allocated, Regions C and D would work to advance this study and agree to equally share the costs of the study (not to exceed $250,000 each, unless subsequently agreed upon).

    b. Regions C and D will each identify up to 5 members to participate in an interregional working group to cooperatively participate in interregional activities related to the independent study and seek opportunities to jointly communicate about the study scoping, progress, and conclusions.

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c. The study will include consideration of economic, agricultural, and natural resource impacts in Regions C and D, including monetary and non-monetary factors, such as: water affordability, private property rights, community impacts; mitigation land scenarios (including assessment of compensation strategies for impacted landowners and industries); and unexplored economic opportunities to Region D associated with Marvin Nichols implementation.

d. Results of the study should be included in the September 2028 Technical Memoranda along with acknowledgements from Regions C and D of their participation in the study scoping and selection of the contractor(s).

3. Regions C and D will jointly seek state financial support for alternatives to Marvin Nichols that are more costly, to resolve this ongoing conflict.

4. Regions C and D will engage in a joint informational campaign to convey information considered in, and resulting from, this negotiated agreement, including: 1) a shared statement on the outcome of mediation and what is going into the Initially Prepared Plans as a result, and 2) mutually agreed upon facts from the Initially Prepared Plans that influenced the resolution of the interregional conflict.

The undersigned representatives agree to transmit this agreement to the Texas Water Development Board and further agree (1) to seek ratification of this agreement by their respective regional water planning groups, and (2) to seek inclusion of the language relating to the terms of the agreement in their region's adopted 2026 regional water plans.

For Region C

Dan Buhman (Aug 1, 2025 09:46:14 CDT)

Dan Buhman Date: 01/08/25

Jenna Covington

Jenna Covington Date: 31/07/25

Larry Patterson (Jul 31, 2025 19:30:12 CDT)

Larry Patterson Date: 31/07/25

Sarah Standifer

Sarah Standifer Date: 31/07/25

For Region D

Howdy Lisenbee

Howdy Lisenbee Date: 31/07/25

Fred Milton (Jul 31, 2025 20:28:02 CDT)

Fred Milton Date: 31/07/25

Travis Ransom
Travis Ransom (Jul 31, 2025 20:18:37 CDT)

Travis Ransom Date: 31/07/25

Jim Thompson
Jim Thompson (Aug 1, 2025 08:06:10 CDT)

Jim Thompson Date: 01/08/25

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Attachment P-3

Region C and Region D Joint Informational Campaign and Statement

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Joint Regions C&D Info Campaign and Joint Statement re: Interregional Conflict Mediated Agreement

Info Campaign Strategies:

- Post the ***mediation agreement document*** to each group's website
- Develop a ***joint statement*** and:
    - Post it to each group's respective website
    - Distribute it to local/regional/statewide media
    - Distribute it to each group's regional stakeholders / interested parties email list
    - Read it aloud at each group's next public meeting

Joint Statement from Region C and Region D Water Planning Groups:

Representatives from each region came together in a series of mediation sessions in late July to resolve the declared interregional conflict and protect the long-term interests of our respective regional stakeholders.

Through mediation, we have mutually agreed to the following action items, among others:

(1) **Region C will make the Toledo Bend Reservoir a "recommended" strategy in its 2026 Region C Water Plan, alongside the Marvin Nichols Reservoir, so both strategies can be explored.** In Region C's Initially Prepared Plan, Toledo Bend had previously been identified as an "alternative" joint strategy for several wholesale water providers: the North Texas Municipal Water District, Tarrant Regional Water District, Dallas Water Utilities and the Upper Trinity Regional Water District.

(2) **Region C will delay the recommended implementation of Marvin Nichols to 2070 in the 2026 Region C Water Plan** – one decade later than the 2060 implementation date previously recommended in Region C's Initially Prepared Plan, which was submitted to the Texas Water Development Board (TWDB) earlier this year. Additionally, **no application for Marvin Nichols project permits will be submitted prior to 2030.**

(3) **Neither region will protest the other's 2026 Regional Water Plan, and both will avoid activities that would adversely affect the examination of the Marvin Nichols project.**

(4) **Region C will seek funding from the TWDB to facilitate and conduct an "apples-to-apples" monetary and non-monetary comparison of the Marvin Nichols and Toledo Bend projects.** Such study will be conducted by firm(s) that can provide a fresh assessment, commence by March 2026, and be completed by July 2027.

(5) **Regions C and D will jointly support an independent study to address the potential benefits and impacts of the Marvin Nichols project and the anticipated, associated mitigation land acquisition on the economic, agricultural and natural resources of both regions.** This study shall begin no later than March 2026 and be completed by July 2027,

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so study results can be included in the September 2028 Technical Memoranda submitted by both regions to the TWDB as part of the next 5-year regional water planning cycle.

(6) **The two regions will form an interregional working group, consisting of up to 5 members from each region**, to cooperatively participate in activities related to the interregional study and jointly communicate about the study scoping, progress and conclusions.

Mutually agreed-upon facts that influenced the successful resolution of the interregional conflict were as follows:

1. Both regions have significant vested interests in ensuring that their stakeholders feel heard and valued in the regional water planning process, as well in any future project permitting processes that may occur.
2. Both regions acknowledge and appreciate that there are individuals, businesses, communities and rural areas that care deeply about whether the Marvin Nichols project proceeds and whether future water supply needs are met.
3. Projected future population growth and related water demand growth show that Region C will need to develop additional, future water supplies.
4. Region C has made significant investments in water conservation and reuse strategies and plans to continue and increase those efforts.
5. The uncertainties associated with the potential human, economic, agricultural and natural resource-related impacts of the Marvin Nichols project have been, and continue to be, of concern to many Region D stakeholders.
6. There is a mutual desire to continue Region C's emphasis on water conservation and reuse strategies, to the maximum extent practicable. However, regional water planning projections show that water conservation and reuse alone won't be sufficient to meet all of Region C's water needs in future decades.
7. Region C anticipates a need to develop water supplies outside of its region to meet the projected water demands.
8. Region C water providers have a fiduciary duty to their customers to develop water supplies that are economical and sustainable. Both Region C and Region D have a fiduciary as well as a legislatively mandated duty to protect the economic, agricultural and natural resources of the State and the Regions.
9. There are numerous wide-ranging impacts, both beneficial and detrimental, affecting stakeholders in both regions, that need to be clearly understood and taken into consideration with respect to any proposed water supply project of this magnitude.

The Region D Water Planning Group met on August 13, 2025, and ratified the mediation agreement. The Region C Water Planning Group met on September 5, 2025 and ratified the mediation agreement.

Both regions look forward to receiving further guidance from the TWDB about the next steps and potential state funding for the future studies identified in the mediation agreement.

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Appendix Q

Response to Comments on Initially Prepared Plan

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APPENDIX Q RESPONSE TO COMMENTS ON IPP

SECTION OUTLINE	
Section Q.1	Introduction
Section Q.2	State Agency Comments
Section Q.3	Public Comments
Section Q.4	Other Changes to WWP and/or WUG Plans
Section Q.5	Changes Resulting from the Mediated Agreement

Q.1 Introduction

This appendix contains comments on the *2026 Initially Prepared Region C Water Plan* (IPP) received by the Region C Water Planning Group (RCWPG) with corresponding responses. The original comments received are in **Attachment Q-1** through **Attachment Q-4**.

The RCWPG adopted the IPP at its public meeting on February 24, 2025, and submitted it to the TWDB before March 3, 2025. As part of the public review process and in compliance with requirements of Texas Administrative Code Title 31 Part 10 Chapter 357 Rule 357.21 (h)(7), a copy of the IPP was made available for viewing at the office of the County Clerk and at least one public library in each Region C county identified in **Table Q.1**. Copies were made available to the public at these locations 30 days prior to and 60 days following the Public Hearing held on May 19, 2025. Additionally, an electronic copy of the IPP was made available to the public on the Region C website (https://regioncwater.org/).

The Texas Water Development Board, as administrator of the regional water planning process, provided a detailed review of the plan and compliance with the rules and regulations governing regional water plans. The TWDB comments were received on July 19, 2025. Other state agencies (such as Texas Parks and Wildlife, and the Texas State Soil and Water Conservation Board) were given the opportunity to review and submit written comments on the IPP up to 60 days after the Public Hearing. Responses to these comments are in **Section Q.2**. Additionally, the public was given the opportunity to comment on the IPP at the Public Hearing as well as the opportunity to submit written comments 30 days prior to and up to 60 days following the Public Hearing. Responses to these comments are in **Section Q.3**. Any other changes made to the IPP that were not directly related to an official comment are summarized in **Section Q.4**.

TABLE Q.1 LIST OF PLACES WHERE A COPY OF THE IPP WAS AVAILABLE FOR VIEWING

COUNTY	OFFICE OR LIBRARY	ADDRESS
Collin	Collin County Clerk's Office	2300 Bloomdale Rd Ste. 2106, McKinney, TX 75071
Collin	L.E.R Schimelpfenig Library	5024 Custer Rd, Plano, TX 75023
Cooke	Cooke County Clerk's Office	112 S Dixon St, Suite 116, Gainesville, TX 76240
Cooke	Cooke County Library	200 S Weaver St, Gainesville, TX 76240
Dallas	Dallas County Law Library	600 Commerce St B40, Dallas, TX 75202
Dallas	J. Erik Jonsson Central Library	1515 Young Street Dallas, TX 75201
Denton	Denton County Clerk's Office	1450 E McKinney St, Denton, TX 76209
Denton	Lewisville Public Library	1197 W Main St, Lewisville, TX 75067
Ellis	Ellis County Clerk's Office	109 S Jackson St, Waxahachie, TX 75165
Ellis	Nicholas P Sims Library	515 W Main St, Waxahachie, TX 75165

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COUNTY	OFFICE OR LIBRARY	ADDRESS
Fannin	Fannin County Clerk's Office	800 E 2nd St, Bonham, TX 75418
Fannin	Bonham Public Library	305 E 5th St, Bonham, TX 75418
Freestone	Freestone County Clerk's Office	103 E Main St, Fairfield, TX 75840
Freestone	Fairfield Library	350 W Main St, Fairfield, TX 75840
Grayson	Grayson County Clerk's Office	100 W Houston St # 17, Sherman, TX 75090
Grayson	Denison Public Library	300 W Gandy St, Denison, TX 75020
Henderson	Henderson County Clerk's Office	125 N Prairieville St #101, Athens, TX 75751
Henderson	Clint W. Murchison Memorial Library	121 S Prairieville St, Athens, TX 75751
Jack	Jack County Clerk's Office	100 N Main St #208, Jacksboro, TX 76458
Jack	Gladys Johnson Ritchie Public Library	626 W College St, Jacksboro, TX 76458
Kaufman	Kaufman County Clerk's Office	1902 US-175, Kaufman, TX 75142
Kaufman	Kaufman County Library	3790 S Houston St, Kaufman, TX 75142
Navarro	Navarro County Clerk's Office	300 W 3rd Ave #001A, Corsicana, TX 75110
Navarro	Corsicana Public Library	100 N 12th St, Corsicana, TX 75110
Parker	Parker County Clerk's Office	1112 Santa Fe Dr, Weatherford, TX 76086
Parker	Weatherford Public Library	1014 Charles St, Weatherford, TX 76086
Rockwall	Rockwall County Clerk's Office	1111 E Yellow Jacket Ln #100, Rockwall, TX 75087
Rockwall	Rockwall County Library	1215 E Yellow Jacket Ln, Rockwall, TX 75087
Tarrant	Tarrant County Clerk's Office	100 W Weatherford St, Fort Worth, TX 76196
Tarrant	Fort Worth Public Library – Southwest Regional	4001 Library Ln, Fort Worth, TX 76109
Wise	Wise County Clerk's Office	200 N Trinity St, Decatur, TX 76234
Wise	Decatur Public Library	1700 Hwy 51 South, Decatur, TX 76234

Q.2 State Agency Comments

A summary of the agencies that provided comments are shown in **Table Q.2**.

TABLE Q.2 SUMMARY OF AGENCY COMMENTS

COUNT	NAME	REPRESENTING
1	Sarah N. Lee	Texas Water Development Board
2	Marty Kelly	Texas Parks & Wildlife Department

Q.2.1 Texas Water Development Board Comments

TWDB's original comments on the IPP are compiled and located in **Attachment Q-1**. **Table Q.3** lists TWDB's comments and the responses or action taken to address them.

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TABLE Q.3 TWDB COMMENTS AND RESPONSES

COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
Level 1 Comments: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements		
1	Appendix E. The plan states that "New area-capacity tables were developed based on the volume reduction due to sedimentation.", however it is unclear what methodology was used. Please provide additional details on the methodology used to develop the area-volume rating curve in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.1]	Additional details on the area-volume rating curve methodology were added into Appendix E.
2	Section 3.3.3. The plan appears to be missing a table describing the methodologies used for estimating non-MAG groundwater availability. Please include the methodologies for non-MAG availability, in table form, broken out by aquifer and county, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.4.2]	A table describing the methodology used for estimating non-MAG availability was added into Section 3.3.3.
3	Section 3.3.3, Table 3.5. The value in Table 3.5 for Other Aquifer in Kaufman County is a new groundwater source for the 2026 plan. The report text states that the methodology is based on a previous regional water plan and therefore appears to be inaccurate since this is a new groundwater source that was not in the previous plan. Please clarify the methodology for determining the non-MAG value for this source in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.4.2]	The non-MAG availability for Other Aquifer in Kaufman County was estimated based on TWDB historical pumping data, however this is a new groundwater source that was not in the 2021 Plan. Clarification that this is a new groundwater source was added into Section 3.3.3.
4	Section 3.5. Table 3.8 appears to present major water provider (MWP) supplies by source, but not category of use. Please ensure that existing supplies by category use, for each MWP, are included in the final, adopted regional water plan. [31 TAC § 357.32(f)]	A new table presenting MWPs existing supplies by category of use was added into Section 3.5.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
5	Section 3.6 and Chapter 5E. The plan presents existing supplies by water user group (WUG) within Chapter 5E, however existing supplies by WUG are required to be presented as part of Chapter 3. Please include at minimum, a reference in Chapter 3 to where the existing supply estimates are included within Chapter 5, in the final, adopted regional water plan. [31 TAC § 357.22(b); 31 TAC § 357.32(f); Contract SOW Task 3]	Chapter 5E of the 2026 Region C IPP shows population and demand projections, supplies, needs, and water management strategies by WUG. Chapter 5E is organized by county and discusses each WUG in detail. Chapter 5E does not split WUGs by county/basin and looks at the complete WUG (including wholesales) to provide clarity to the individual water providers that are looking to develop water for all their needs. A reference was added in Chapter 3 that existing supplies for each WUG are shown in Chapter 5E. The DB27 tables that provide detailed information by WUG are included in Appendix D.
6	Chapter 4 and Chapter 5E. The plan presents identified water needs by WUG within Chapter 5E, however needs at the WUG level are required to be presented as part of Chapter 4. Please include at minimum, a reference in Chapter 4 to where identified water needs are included within Chapter 5, in the final, adopted regional water plan. [31 TAC § 357.22(b); 31 TAC § 357.33(c); Contract SOW Task 4A]	Appendix D contains the DB27 reports that include details of water needs by WUG. A reference to Appendix D was added to Chapter 4 and the introduction of Chapter 5E. Chapter 5E shows population and demand projections, supplies, needs, and water management strategies by WUG. Chapter 5E is organized by county and discusses each WUG in detail. Chapter 5E does not split WUGs by county/basin and looks at the complete WUG (including wholesales) to provide clarity to the individual water providers that are looking to develop water for all their needs. A reference was added in Chapter 4 that a summary of needs by WUG are shown in Chapter 5E.
7	Section 4.5 and DB27. The total values for the second-tier needs presented for WUGs in Table 4.6 appear to be inconsistent with data reported in DB27. For example, Table 4.6 shows the total second-tier needs in 2080 as 1,045,839 acre-feet/year, however DB27 reports the total second-tier needs in 2080 as 1,032,758 acre-feet/year. Please review the data presented in the table and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.33(d)	Table 4.6 has been updated to be consistent with DB27.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
8	Appendix H and DB27. Table H.11D and DB27 report the "Conservation, Water Loss Control - Savoy" WMS as providing zero acre-feet of demand savings in all decades. Any recommended strategies must show a yield during drought of record conditions in at least one planning decade. Please either reassess the demand savings or remove this as a recommended strategy in the final, adopted regional water plan. [31 TAC § 357.34(d)]	Appeals were submitted in DB27 to note that the savings are less than 1 AF/Y, as several WUGs are small and have low demand projections. However, Region C still provides these WUGs with conservation recommendations that include cost and yield estimates. FNI has updated Table H.11D in the report to indicate savings of <1 AF/Y and updated DB 27 to show 1 AF/Y of savings in 2080.
9	Appendix G. The plan does not appear to include a quantitative measure for assessing reliability of water supplies for water management strategy evaluations. Reliability as presented in Table G.1 appears to correlate reliability to a qualitative reporting of low to high. Please clearly provide the quantitative basis for reliability used in the evaluations of water management strategies in the final, adopted regional water plan—ensuring that any recommended strategies provide a firm water supply throughout drought of record conditions. [31 TAC § 357.34(e)(3)(A)]	All recommended and alternative projects are 100% reliable by TWDB standards (firm yield for surface water and MAGs for groundwater). However, there are varying levels of uncertainty for different projects, such as competition for water for groundwater projects and reliance on adoption rates for conservation. FNI will state this in Appendix G and Chapter 5 and adjust the heading to be uncertainty in Table G.1.
10	Section 5F.2, page 5F-6. The plan does not include the implementation status for the Denton - Direct Potable Reuse project which meets the criteria for large projects in accordance with 31 TAC § 357.34(g) and Contract Exhibit C, Section 2.5.2.7 as direct potable reuse >5,000 AFY. Please ensure that the implementation status for this project is included within the implementation status table provided in Appendix N and that a timeline graphic is included in the final, adopted regional water plan. [31 TAC § 357.34(g)(2), Contract Exhibit C, Section 2.5.2.7]	The Direct Potable Reuse strategy was reduced to 5,000 AFY, which is below the criterion for requirements under 31 TAC 354.34(g).

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
11	Section G.2.7.6 and DB27. It is unclear in the plan whether strategy water supply volumes for the Small Aquifer Storage and Recovery for Denton, UTRWD, and NTMWD (WMSIds 6928, 6088, and 4939), were reduced to reflect the expected net water supply recovery from the aquifer. Please clearly state the expected percent of recovery for these projects and, as appropriate, the lesser volumes as the net water supply yields for these strategies. If the strategy supply volumes do not already reflect the lesser, expected share of recovered water, please modify the supply volumes as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]	The ASR discussion in Appendix G addresses recovery rates. *Successful ASR development is highly reliable. It is normally possible to achieve 90-95% recovery efficiency.* Table G.12 was updated to clearly state the recovery percentage and the expected net water supply. DB27 reflects the expected net water supply recovery.
12	Section G.6.1 and DB27. It is unclear in the plan whether strategy water supply volumes for the TRWD ASR (WMSId 4936) strategy were reduced to reflect the expected net water supply recovery from the aquifer - noted as 88 percent. Please clearly state if the volume was reduced. If the strategy supply volume does not already reflect the lesser, expected share of recovered water, please modify the supply volume as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]	Table G.12 was updated to clearly state the recovery percentage and the expected net water supply. DB27 reflects the expected net water supply recovery.
13	Appendix I, Section I.1.3, Appendix H, Table H.11.B, Chapter 5B, and DB27. The plan appears to include future conservation savings considered previously implemented as "Demand Reduction Since Base Year (already implemented)". Adjustments to GPCD from conservation savings due to previously implemented conservation measures should be applied as an upfront adjustment to the base year GPCD for demand projections rather than as a 'future' recommended water management strategy. Please note adjustments to Board-adopted demand projections may be requested but require a revision process separate from plan revisions in response to public comments. Please remove the "Residual Savings from Conservation Measures Implemented Since Baseline Year" strategies as recommended conservation strategies in in DB27. [31 TAC 357.31(e)(2); Contract Exhibit C Section 2.2.2.1]	The savings identified as "Demand Reduction Since Base Year (already implemented)" represent conservation savings from strategies implemented after the planning baseline year but prior to the 2030 planning horizon. In response to the comment, DB27 has been updated to remove these "Residual Savings from Conservation Measures Implemented Since Baseline Year" as a recommended conservation strategy and these savings are now reflected as part of the municipal conservation water management strategy. Corresponding clarifications have been added to Chapter 5B, and related costs and savings have been revised in Appendices I and H to reflect these changes.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
14	Chapter 5B, Appendix H, and DB27. For the following municipal WUGs, the whole WUG's GPCD adjusted for conservation is less than 60 GPCD in at least one planning decade: Ables Springs SUD, AMC Creekside, Denton County FWSD 11-C, Howe, North Kaufman WSC, Pelican Bay, and Reno (Parker). Please confirm the reasonableness of this anticipated low GPCDs in the final, adopted regional water plan. [31 TAC § 357.34(j)(2)(B)]	Ables Springs SUD, AMC Creekside, Denton County FWSD 11-C, North Kaufman WSC, Pelican Bay, and Reno (Parker) each have baseline GPCD values ranging from 60 to 62. The projected water conservation savings through water use reduction and water loss mitigation for these WUGs are modest, estimated at 0 to 12 percent over the planning horizon. These reductions are relatively minor when considered across a 50-year timeframe and are consistent with the scale of conservation programs typically applied to small utilities. Region C believes that achieving additional conservation is reasonable and attainable, even for systems that already have relatively low baseline usage. These WUGs are small and, as such, more susceptible to variability and uncertainty in population estimates, which can influence GPCD values. Due to this sensitivity, we do not propose to treat these WUGs differently based solely on their current GPCD. Additionally, the City of Howe has reported an average water loss of approximately 44 percent based on 2018–2022 data. The majority of the projected conservation savings for Howe are attributed to water loss mitigation efforts. These improvements are intended to bring Howe closer to the TWDB's water loss threshold, which is discussed in Appendix I. Based on this analysis, we believe the proposed savings are realistic and achievable.
15	Section 6.2.5 and DB27. The plan includes a summary of water needs by basin related to an interbasin transfer (IBT) of surface water, with the exception of the Brazos Basin, which includes WUGs in Region C receiving strategy supply from the Sulphur Basin. In the final, adopted regional water plan, please update this section to include a summary of water needs in the Brazos Basin and to acknowledge that the region includes recommended strategy supplies that propose to move water from the Sulphur Basin to multiple basins within the region. [31 TAC § 357.34(e)(6)]	There should be no water from the Sulphur Basin going to WUGs in the Brazos Basin. Strategy allocations were updated in DB27 to reflect this.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
16	Chapter 5B and DB27. TWDB Secure Agency Reporting Application (SARA) Report ID 120 'Recommended WMS with New/Amended IBT Permit & Conservation' appears to include the following WUGs in which Region C is the primary region, that receive strategy supply from a proposed IBT strategy, but that do not have any recommended conservation strategy: Irrigation, Kaufman; Mining, Tarrant; Manufacturing WUGs for counties: Collin, Dallas, Denton, Ellis, Grayson, Kaufman, Navarro, Parker, Rockwall, Tarrant, Wise; and Steam-Electric Power WUGs for counties: Dallas, Freestone, Jack, Kaufman, Tarrant, Wise. Please include a water conservation strategy for each WUG that is to obtain water from a proposed IBT to which TWC § 11.085 applies, in the final, adopted regional water plan. These conservation strategies should reflect what would be required to result in the highest practicable level of water conservation and efficiency achievable. [31 TAC § 357.34(j)(2)(C)]	The following WUGs were updated to exclude any supply from proposed IBT strategies: Irrigation, Kaufman; Mining, Tarrant; and Steam-Electric Power WUGs for counties: Dallas, Freestone, Jack, Kaufman, Tarrant, and Wise. A water conservation strategy was added for the manufacturing WUGs.
17	Appendix G.6.2, Appendix H, and DB27. The evaluation for the Marty Leonard Wetlands (Cedar Creek Wetlands) Reuse does not appear to include a balancing reservoir, however the costing table for "TRWD - Marty Leonard Wetlands (Cedar Creek Wetland)" (Table H.26) shows a balancing reservoir under capital costs and a balancing reservoir project component was included in DB27. Please confirm if a balancing reservoir is included within the project scope, and modify the plan and/or DB27, as appropriate, to clarify. [Contract Exhibit C, Section 2.5.2.15]	The Marty Leonard Wetlands project includes a balancing reservoir. This has been added to the strategy description in Appendix G.
18	Appendix H, Table H.20 and H.21. The costing tables for the "Sulphur River Basin Reservoir and Transmission System Alternatives" (i.e. Marvin Nichols (328) recommended and alternative versions) indicate that the costs were indexed to September 2021 dollars. Please correct the dollar-year reference or update Tables H.20 and H.21 and elsewhere to correctly reflect costs in September 2023 dollars instead of September 2021 dollars, and, if appropriate, update any necessary costs in DB27, and in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]	Costs for the "Sulphur River Basin Reservoir and Transmission System Alternatives" are in September 2023 dollars. The initial dollar year reference was a typo and has been corrected in Appendix H.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
19	Appendix G and Appendix H. The evaluations for new water supply reservoir water management strategies and projects do not appear to separately present the estimated mitigation land area and associated estimate of acquisition cost. Please provide an estimated separate acreage and cost related to land acquisition (or range) for both the reservoir footprint and mitigation within the appropriate section of the plan or costing sheet, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]	Mitigation costs are estimated at 2 X land costs for the reservoir. The amount and location of acreage required will not be known until the 404 process is completed. For planning purposes, the land required for large on-channel reservoirs is equal to the reservoir acreage. For off-channel reservoirs, the land required is much less. These estimates of land required for mitigation are shown in the individual cost tables in Appendix H.
20	Appendix H. Section H.7 states that debt-service for non-reservoir infrastructure is 30 years, and several costing tables show 30 year debt service, for example TRWD - Carrizo Wilcox Groundwater-Anderson County (Table H.33). For strategies other than reservoirs, the length of debt service is 20 years unless otherwise justified. Please provide a justification for revising the length of debt service from 20 to 30 years in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]	Non-reservoir debt service was estimated at 30 years to compare across all projects. Large non-reservoir projects will not be financed over 20 years. This was decided by the RWPG and respective sponsors. Justification was added into Appendix H. (Note: costs for Dallas Water Utilities followed the financing amortization period used for its Long-Range Water Supply Plan that was published in 2024.)
21	Appendix H and DB27. Unit costs have been entered into DB27 as $0 for the recommended water management strategies: WMSIds 2063, 2419, 2712, 5092, 6236, 6955, 2429, 4750, 4864, 5871, 5873, 5874, 6292, 4936, 4745, 2467, 5982, 4746, 2182, 6218, 6216, and 4767. Please include non-zero unit costs for these strategies in DB27 and include assumptions used in the costing methodology utilized, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]	Costs have been reviewed and updated.
22	Appendix H and DB27. The WMS level unit costs have been entered into DB27 as $1 for the NTMWD - Additional Lavon Watershed Reuse strategy however, the WUG level unit cost ranges up to $4,861. Please review the unit costs for this strategy and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]	The Unit costs have been reviewed and updated to ensure the right values are correctly entered into DB27.

COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
23	Appendix H and DB27. Unit costs entered into DB27 appear high for WUGs and groundwater development in relationship to the WMS level unit costs for the TRWD -Carrizo-Wilcox Groundwater strategy. For example, the WMS level unit costs are $1,222 whereas the WUG level unit costs range up to $52,397. Please review the unit costs for this strategy and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]	Unit Costs have been reviewed and updated.
24	Appendix H and DB27. The WMS level unit costs entered into DB27 appear high compared to the WUG level unit costs for the following strategies: Conservation, Water Loss Control - Lake Worth and Conservation, Water Loss Control - Bells. For example, the WMS level unit cost for Conservation, Water Loss Control - Bells is $20,570 whereas the WUG level unit costs range up to $1,460. Please review the unit costs for these strategies and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]	Yes, the unit costs have been confirmed. The higher cost for water loss mitigation is primarily due to the significant expense of water main replacement. Additionally, estimated savings are relatively low because the WUG's current water loss levels are already modest, limiting the potential for additional reductions.
25	Appendix H and DB27. The WMS level unit costs appear low compared to the WUG level unit costs for the following strategies: Frisco - Additional Direct Reuse; Conservation, Water Loss Control - Southwest Fannin County SUD; and Alternative - Euless Additional Purchase from TRA. For example, the WMS level unit costs for Conservation, Water Loss Control - Southwest Fannin County SUD is $345, whereas the WUG level unit costs range up to $24,781. Please review the unit costs for these strategies and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]	Yes, the unit costs have been confirmed. The higher cost for water loss mitigation is primarily due to the significant expense of water main replacement. Additionally, estimated savings are relatively low because the WUG's current water loss levels are already modest, limiting the potential for additional reductions.
26	Appendix G.2.4. The strategy evaluation for Increase Delivery Infrastructure states that “this strategy does not create supply” however the “transmission infrastructure enables the entity to receive the water.” Please confirm in the final, adopted regional water plan that all projects evaluated under this strategy are directly associated with delivery of additional water supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies. [Contract Exhibit C, Section 2.5.2.15]	All projects evaluated under the "Increase Delivery Infrastructure" strategy are directly associated with the delivery of additional water supplies from new water sources, more efficient use of existing supplies, or volumetric increases to existing water supplies. Clarification was added to the strategy description in Appendix G.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
27	Section 5A.1.4, page 5A-5. Reallocation of reservoir storage was identified as a feasible strategy for Bardwell Lake, however this strategy does not appear to be evaluated in the plan. Please include an evaluation for all potentially feasible strategies or include an explanation as to why this strategy was not evaluated, in the final, adopted regional water plan. [Contract Scope of Work, Task 5B]	Reallocation of reservoir storage for Lake Bardwell was not identified nor evaluated for the 2026 Plan. Reference to Bardwell Lake was removed from Chapter 5A. TWDB confirmed that this was not in the Scope of Work for Task 5B.
28	Section 5C.4.5, Appendix G.4.1, Table H.20, and DB27. The Main Stem Balancing Reservoir evaluation and map appear to include construction of an off-channel reservoir that relies on river diversions of indirect reuse water. This strategy should be classified as a “New Reservoir” for water supply planning purposes. Please coordinate with TWDB's Water Supply and Strategy Analysis team to update this strategy type in DB27, prior to adoption of the final plan and revise appropriate sections of the plan to reflect this as a new water supply reservoir. [31 TAC § 357.50(g)(2)(B)]	The Main Steam Balancing Reservoir primary source of water is return flows from DWU's wastewater treatment plants. The strategy description was updated to "new reservoir" in DB27 for water supply planning purposes.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
29	Chapter 5, Appendix G, and DB27. The online decades for several water management strategies and their associated projects appear to be inconsistently reported in the plan and DB27, including: DWU – Connect Lake Palestine (Dallas Portion of IPL & IPL to Bachman) (WMSProjectId 967); DWU – Neches River Run-of-the-River Diversions (WMSProjectId968); Blue Ridge - Connect to and Purchase Water from NTMWD (WMSProjectId 999); Ladonia – Infrastructure and Treatment for Water from Ralph Hall (UTRWD) (WMSProjectId 1059); Forney – Increase Delivery Infrastructure from NTWMD (WMSProjectId 1084); Kennedale – Additional Delivery Infrastructure from Ft. Worth (WMSProjectId 1122); Alternative – County-Other, Tarrant – DFW Airport Supply from Euless (WMSProjectId 4393); Bois d'Arc MUD – Connect to NTWMD (WMSProjectId4099); DWU – Sabine Conjunctive Use Part 1 – Carrizo Wilcox Groundwater (WMSProjectId 5303); DWU – Sabine Conjunctive Use Part 2 – Sabine River Off Channel Reservoir (WMSProjectId5304); Two Way SUD – New Well(s) in Trinity Aquifer (WMSProjectId 5337); Whitesboro – New Well(s) in Trinity Aquifer (WMSProjectId5339) For example, the online decade for the DWU – Connect Lake Palestine (Dallas Portion of IPL & IPL to Bachman) strategy and project is reported as 2030 in DB27, whereas the online decade is presented as 2040 on page G-86 of Volume 2. Please review the online decades for these strategies and projects and revise as necessary to ensure that online decades in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1); 31 TAC § 357.35(g)(3)]	As part of the final review, the Region C Water Plan was checked for consistency across the report and DB27. Corrections were made as appropriate.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
30	Chapter 5, Appendix H, and DB27. Project costing tables for the following projects present total capital costs that differ from the project capital costs reported in DB27: WMSProjectIds 3859; 5169; 5170; 5172; 5175; 5177 and 5179. For example, DB27 reports total capital cost of $67,187 for Conservation, Water Loss Control – Kaufman County MUD 14 (WMSProjectId 5172,), whereas Table H.11D (page H-28) lists total capital costs of $219,790 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	As part of the final review, the Region C Water Plan was checked for consistency across the report and DB27. Corrections were made as appropriate.
31	Chapter 5, Appendix G, and DB27. Evaluations for the following strategies and projects present total capital costs that differ from the project capital costs reported in DB27: NTMWD – Additional Lake Texoma Blend Phase 2 (WMSProjectId 957), and Melissa – Additional Delivery Infrastructure from NTMWD (WMSProjectId 1005). For example, DB27 reports a total capital cost of $997,393,000 for WMSProjectId 957. Table G.32(page G-70) lists total capital costs of $741,772,000 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Capital Cost for both projects have been updated to be consistent in the information provided on DB27 as well as the Report

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
32	Section G.4.3 and DB27. The evaluation of Neches River Basin Supply (Neches Run-of-River Supply) water management strategy on page G-90 shows Upper Neches River Municipal Water Authority as the project sponsor, however DB27 reports this sponsor as Dallas Water Utilities. Please review and revise as necessary to ensure that project sponsor in DB27 is consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	The Neches River Basin Supply strategy sponsor was updated to the Upper Neches River Municipal Water Authority in DB27.
33	Section 6.5.1 and DB27. The municipal unmet need presented in Table 6.3 appears to be inconsistent with municipal unmet needs reported in DB27. For example, Table 6.3 shows no unmet needs in 2040 for Celina, however DB27 reports unmet needs of 5,342 acre-feet/year in 2040 for Celina. Additionally, Table 6.3 does not present unmet needs for the following WUGs, which show unmet needs for the WUG splits within Region C in DB27: Hickory Creek SUD, Parker County SUD, Burleson, and Johnson County SUD. Please review the data presented in the table and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.40(c)]	Celina: The brackish groundwater strategy for GTUA was initially denied as a new source in DB27 for the IPP. The available groundwater under the current MAG is less than the supply amount. This results in unmet needs for Celina in more decades than currently shown in the 2026 Region C IPP. TWDB will allow the inclusion of brackish groundwater separate from the MAG, but this decision was too late to incorporate this supply in the 2026 Region C Water Plan. Brackish groundwater will be considered separately for the 2031 Region C Water Plan. Parker County SUD: There is less water from BRA to Parker County SUD in DB27 than assumed in the 2026 Region C IPP. This results in an unmet need for Parker County SUD in the later decades. Split WUGs: Most of these split WUGs are planned for by another region: Hickory Creek SUD (Region D primary), Burleson (Region G primary), and Johnson County SUD (Region G primary). Additionally, Burleson receives all its water from Fort Worth and should not have any unmet needs. Table 6.3 has been updated to reflect the unmet needs for Celina and Parker County SUD shown in DB27. Split WUGs primarily planned by another Region will be addressed in their respective Regional Plan.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
34	Section 6.5.1 and DB27. The plan does not appear to provide justification for the following municipal WUGs with unmet needs reported in DB27: Hickory Creek SUD, Parker County SUD, Burleson, and Johnson County SUD. Please provide adequate justification for these unmet municipal need in the final, adopted regional water plan, including: 1) documentation that all potentially feasible WMS were considered to meet the need, including drought management WMS; 2) explanations as to why additional conservation and/or drought management WMS were not recommended to address the need; 3) descriptions of how, in the event of a repeat of the drought of record, the WUG associated with the unmet need shall ensure the public health, safety, and welfare in each planning decade with an unmet need; and, 4) explanation as to whether there may be occasion, prior to the development of the next IPP, to amend the RWP to address all or a portion of the unmet municipal need. [31 TAC § 357.50(j)]	Parker County SUD: There is less water from BRA to Parker County SUD in DB27 than assumed in the 2026 Region C IPP. This results in an unmet need for Parker County SUD in the later decades. Justification for Parker County SUD unmet needs was added into Chapter 6. Split WUGs: Most of these split WUGs are planned for by another region: Hickory Creek SUD (Region D primary), Burleson (Region G primary), and Johnson County SUD (Region G primary). Additionally, Burleson receives all its water from Fort Worth and should not have any unmet needs. Split WUGs primarily planned by another Region will be addressed in their respective Regional Plan.
35	Section 7.5. Table 7.4 appears to present a summary of existing emergency interconnects, but it is unclear if the table presents any potential future emergency interconnects. Please clearly identify which emergency interconnects are existing vs future—or clarify if there are no potential future interconnects—in the final, adopted regional water plan. [31 TAC § 357.42(d)]	Table 7.4 shows a summary of existing emergency interconnections only. Clarification was added into Section 7.5.
36	Section 7.7 and Appendix M. Table M.2 appears to be missing emergency response information for the following WUGs which have an estimated 2030 population less than 7,500 and rely on a sole source of supply: Haslet, Westover Hills, and Westworth Village. Please revise the evaluation to include these WUGs in the final, adopted regional water plan. [31 TAC § 357.42(g); Exhibit C, Section 2.7.7]	Emergency response information for Haslet, Westover Hills, and Westworth Village was added into Table M.2.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
37	Section 8.3. In its unique reservoir site recommendations for the George Parkhouse II (North) site and George Parkhouse I (South) sites, the plan does not appear to include the reasons for the unique designation and the expected beneficiaries of the water supply to be developed. Please include this information within Chapter 8 or provide a specific reference to where this information is found elsewhere in the plan, in the final, adopted regional water plan. [31 TAC § 357.43(c)]	Chapters 5 and Chapter 8 were updated to include expected beneficiaries and reasons for including the two reservoirs for unique designation.
38	Section 9.3. The counts of water management strategies benefitting more than one WUG provided in Section 9.3 appears inconsistent with strategies reported in DB22 and DB27 as benefitting more than one WUG. Please review the data reported in TWDB SARA Report ID 125 and either reconcile the counts presented this section to align with the report or clarify the difference in counts reported in the final, adopted regional water plan. [31 TAC § 357.45(b)(1)]	Section 9.3 text was updated to reflect the number of strategies from each plan that benefited more than one entity.
39	The plan does not appear to meet minimum accessibility requirements. Please ensure that the final, adopted regional water plan PDF is a tagged document. See item 1d in TWDB's accessibility checklist for more information. [Contract, Article III, Paragraph G]	The final 2026 Region C Plan meets the minimum accessibility requirements.
40	The following WMS Projects are missing from the GIS data submitted. Please include the locations of every recommended and alternative WMS Project listed in the final adopted regional water plan with the final GIS files submitted. [Contract Exhibit D, Section 2.5.2, Exhibit C, Section 2.12.2(9)] WMS Project IDs and Names: 976-Alternative-DWU- Lake Texoma Desalination; 5795-Alternative- Manufacturing Grayson- Direct Reuse from Sherman; 5309- Fort Worth- Village Creek WRF Future Direct Reuse; 5775-Mansfield- New 30 MGD WTP; 5776- Melissa- Additional Delivery Infrastructure from NTMWD through Mckinney; 962- NTMWD-Alternative Lake Texoma Desal at Leonard	Locations of all recommended and alternative WMS projects identified for the final 2026 Region C Plan are in the submitted GIS files.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
Level 2 Comments: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.		
1	Section 5A.1.6. The plan states that all MWPs meet the criteria for an ASR assessment, however no ASR assessment for Fort Worth was included, yet Fort Worth is identified as a MWP in Chapter 1. Please consider adding clarification to the plan that the ASR assessment was not considered applicable to Fort Worth by the region. [Contract Exhibit C, Section 2.5.2.4]	Section 5A.1.6 of the 2026 Region C IPP states "For Region C, significant needs are considered only for municipal needs greater than 25,000 acre-feet per year. For purposes of this assessment, the Region C major water providers (MWPs) are shown to have significant needs. Customers of MWPs are not considered individually." Fort Worth receives a majority of its water from TRWD and ASR was evaluated for TRWD. ASR is not applicable to Fort Worth, as Fort Worth is a customer. Clarification that the ASR assessment was not considered applicable to Fort Worth was added to Section 5A.1.6.
2	Section 5B.4.4. The plan appears to recommend conservation for the mining water use category that includes recycling of water as the best management practice. Per Contract Exhibit D, Section 3.5.3, this type of strategy should be entered into DB27 as onsite water recycling. TWDB's Water Supply and Strategy Analysis team will update the mining conservation data to this correct data type in DB27. Please consider clarifying this strategy is not considered conservation for planning purposes in the final plan.	The strategy type has been corrected in DB 27 accordingly.
3	Section 5B.6.4. Please consider linking directly to the Region's web page with the model water conservation plan rather than the planning group home page.	An updated link directly to the model water conservation plans was added into Section 5B.6.4.
4	Appendix H. Please consider revising the titles of the cost estimate summary tables to more closely align with the Appendix H list of tables. For example, on page H-10, Table H.33 is titled "TRWD - Carrizo Wilcox Groundwater (Anderson County)", however the title of Table H.33 is "TRWD - WMS # 19 Groundwater."	The Appendix H list of tables and cost estimate summary tables were reviewed and updated accordingly for the final 2026 Region C Plan.

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COMMENT NO.	TWDB COMMENT	REGION C RESPONSE/ACTION
5	Appendix H. Please consider labeling the cost summary tables H.20 and H.21 to clearly designate Sulphur River Basin Reservoir and Transmission System Alternatives WMS as recommended and alternative scenarios for the Marvin Nichols Reservoir.	The cost summary tables have been labeled to clearly designate the Sulphur River Basin Reservoir and Transmission System Alternatives WMS as the recommended and alternative scenarios for the Marvin Nichols Reservoir.
6	Section 7.3.7. The TWDB guidance quoted on page 7-11 was guidance TWDB provided for the prior 2021 regional water plan. Please consider updating the information to reflect current requirements from Contract Exhibit C, Section 2.7.3	Section 7.3.7 was updated accordingly.
7	Section 7.8.1. Please consider removing reference to the TWDB Chapter 7 template in Section 7.8.1. TWDB did not provide a template for the 2026 Regional Water Plan drought chapter, and drought chapter requirements have been revised since the template was developed for the 2021 Regional Water Plans.	Reference to the TWDB Chapter 7 template was removed in Section 7.8.1.
8	Section 7.9. The hyperlinks on the Region C website providing model drought contingency plans are labeled only as "2026 Model Conservation Plan". Please consider updating the description on the website to clearly note these documents include model drought contingency plans as well.	A footnote has been added to section to explain these documents including both plans.
9	Please consider revising references to project names in plan so they more clearly align with project names reported in DB27 for following projects: Purchase Water from TRWD with New 2 MGD WTP, page 5E-219; 75MGD WTP Expansion, page H-89; Western WTP Expansion, page H-60; Expand Eastern WTP, page H-60; Infrastructure Improvements, page 5E-39	Project names were reviewed and where appropriate, names were modified to be consistent in the plan and DB27.

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Q.2.2 Texas Parks and Wildlife Comments

TPWD's original comment letter is located in **Attachment Q-2. Table Q.4** lists TPWD's comments and the responses or action taken to address them.

TABLE Q.4 TPWD COMMENTS AND RESPONSES

COMMENT NO.	SUMMARY OF TPWD COMMENT	REGION C RESPONSE/ACTION
1	The Plan adequately describes the natural resources in Region C and how WMS's may impact them. Chapter 1 addresses water related threats to natural resources and Chapter 6.4 discusses how the Plan is consistent with protection of the State's resources.	Region C appreciates your comment. No change needed.
2	TPWD acknowledges that quantitative reporting of environmental factors impacted by WMS's is covered in Appendix G with further discussion on MNR in Appendix J. TPWD appreciates the inclusion of potential habitat impacts and inundated stream miles by George Parkhouse I and II, and MNR reservoirs. TPWD encourages Region C to continue to update the quantitative environmental information as it becomes available.	Region C appreciates TPWD's recognition of the effort to include more quantitative environmental information within the Plan. Region C recognizes the concerns regarding impacts from new reservoir strategies and will strive to continue to update the quantitative environmental information included within the regional water plans. No change needed.
3	TPWD is encouraged to see the advancement of water conservation and reuse in Region C as it will limit the need for the development of new surface water and associated ecological impacts.	Region C appreciates TPWD's recognition of Region C's conservation and reuse efforts. Region C will continue to encourage conservation. No change needed.
4	TPWD continues to support regional water planning groups in recommending ecologically unique river and stream segments. TPWD has a goal of updating the statewide assessment of ecologically significant stream segments by 2028.	Region C appreciates the TPWD's support of Region C's efforts regarding Ecologically Significant River and Stream Segments. When the statewide assessment of ecologically significant stream segments is updated, this information will be considered in future regional water plans. No change needed.

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Q.3 Public Comments

The RCWPG considered each comment received from the public regarding the IPP and appreciates those individuals and organizations who took the time to thoughtfully consider the plan and to present ideas to improve upon the plan. A summary of the public comments received along with corresponding responses are discussed in the following sections. Comments are summarized for clarity within this section and are grouped by concern and/or topic. **Table Q.5** summarizes the comments from the public hearing and the responses made. **Table Q.6** summarizes the public comments received by letters or reports and email and the respective responses. **Attachment Q-3** contains an overview of the public hearing deposition. **Attachment Q-4** contains copies of any public comments received as letters, reports, or by email.

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Q.3.1 Public Comments Received at the IPP Public Hearing

TABLE Q.5 PUBLIC HEARING COMMENTS AND RESPONSES

COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE
Chris Wallace	North Texas Commission is in full support of the plan. They strongly oppose removing any strategies that are in the plan.	Your comment has been noted.
Ronna Hartt	Representing Upper Trinity Regional Water District, they are in support of the plan and will submit written comments separately.	UTRWD comments will be addressed separately.
Pedro Paulo	Presents a water conservation and water reduction system.	Your comment has been noted.
The following comments were received opposing the Marvin Nichols Reservoir Project (MNR). Some comments were made by multiple commentors.		
Molly Rooke	MNR will cause social, environmental, and economic destruction. It also adds to the amount of land that has been taken away from Texas farmers over the past 30 years.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir A study by Terry Clower (2020) on the economic impacts of the Marvin Nichols Reservoir found that the construction of the project would boost economic activities in Region D.
Lon Burnam	There needs to be greater water conservation efforts in DFW. Focus on this instead of taking water from the East.	Conservation and reuse water make up 33% of Region C's supplies in 2080.
Sharon Richey	She opposes taking water from the East and instead should focus on water conservation.	Conservation and reuse water make up 33% of Region C's supplies in 2080.
Tanda Rasco	Water waste is a major issue and there should be legislation limiting water use, specifically for irrigation.	Region C includes several recommended conservation strategies in the plan in Chapter 5B. Conservation and reuse water make up 33% of Region C's supplies in 2080. In Chapter 8, Section 4, Region C makes recommendations to the legislature including for state funding for conservation efforts.
David Marquis	He is in support of using filtration systems to get DFW more water instead of building a new reservoir.	Your comment has been noted.
Christine Guldi	More water conservation needs to happen because building MNR will cause economic and social losses.	Conservation and reuse water make up 33% of Region C's supplies in 2080.Economic studies have shown that the project will boost economic activity in the region.
Howdy Lisenbee	More thought needs to be given to how much East Texans are sacrificing. .	Your comment has been noted.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE
James Orenstein	Reservoirs are no longer the best solutions and alternatives need to be looked at again. DFW uses too much water and should be cut back.	There are over 170 recommended water management strategies and 38 alternatives included within the plan. There are only 4 new reservoirs recommended in the Region C plan.
Rita Beving	State Representatives oppose the building of MNR. Focus more on conservation. Make a final decision so the ranchers know if they're still going to have their property	Conservation and reuse water make up 33% of Region C's supplies in 2080.
Arthur Kuehne	DFW should not ask East Texas to give up their land if DFW is not willing	Your comment has been noted.
Diane Harrington Tasian	There is a conflict of interest since water suppliers want to sell more water. MNR will destroy historical sites and gut the economy and population. Water conservation is needed.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.
Paul Anthony Hale	Building MNR will worsen wildfires and devastate the timber industry.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.
Laura Stelljes	MNR will force families off land and devastate local economy. DFW needs to have better water conservation efforts. Region C should have aquifer storage and recovery, desalinations of brackish water.	Conservation, Aquifer Storage & Recovery, and Desalination strategies are all recommended strategies within the plan.
Claire Verchot	Asks why speakers at a legislative hearing did not acknowledge the DWU Main Stem Balancing Reservoir. Asks for this to be a part of the deliberations about MNR.	The DWU Mainstem Balancing Reservoir is a recommended strategy in the 2026 Region C Water Plan. This strategy was classified as a reuse project in the Region C IPP. The topic of the legislative hearing was focused on the MNR, not the MSBR.
James Matlock	Asks how many of the reservoirs have significantly less water in them than their capacity allows. Wells in West Texas are blowing up and flooding land.	According to TWDB's "Water Data for Texas" as of 7/22/25, New Terrell City Reservoir is the only reservoir in Region C below 30% capacity. All other reservoirs are >80% full.
Robert Vann	DFW needs better water conservation and to fix failing infrastructure. Building MNR destroys people's livelihoods. Theres a conflict of interest with the namesake of the reservoir being FNI founder.	Conservation and reuse water make up 33% of Region C's supplies in 2080.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE
Linda Hanratty	DFW growth will stall, conflict of interest with FNI being both the planners and the builders. Reduce water use.	Your comment has been noted.
Carrie Schweitzer	MNR will destroy ecosystem of human lives and wildlife. MNR projections could be overstated and use outdated assumptions.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.
Susybelle Gosslee	DFW needs water conservation and more advertising about it as well.	Conservation and reuse water make up 33% of Region C's supplies in 2080.
Michelle Spann-Rodriguez	She opposes the perception that all East Texans are uneducated. Both her and her husband have spent their careers working for the government and take great pride in their state and country. MNR is wrong because it is disrespectful to East Texans.	Your comment has been noted.
Angie Turner	MNR will forever damage East Texas. It is disrespectful to the man and women that are buried there.	Your comment has been noted.
Gary Cheatwood	Does not want MNR built, it will take his land and his home.	Your comment has been noted.
Troy Jones Jr.	People are going to lose their land and livelihood.	Your comment has been noted.
Eddie Belcher	His land is not for sale and is not willing to give up his family's land.	Your comment has been noted.
Jana Weatherall Goforth	She does not want her land taken because that's where her family is, both living and dead.	Your comment has been noted.
Stanley Jessee	It will flood the land causing loss of agriculture, forestry, and threaten endangered species. MNR will have substantial adverse effects.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.

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Q.3.2 Public Comments Received Via Email or Letter

TABLE Q.6 PUBLIC COMMENTS SUMMARIES AND RESPONSES

COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Greg Peters, City of Anna	Recommend for State legislation for:		
	Stop water waste: vanity ponds, wasteful irrigation practices	Region C advocates for water conservation practices that include reductions in water waste. This is done at the water provider level. Region C appreciates the challenges of enforcing water restrictions in unincorporated areas. Groundwater is a property right and any enforcement of restricting water waste would need to be addressed by the GCD, which has limited authority over irrigation practices. Groundwater for vanity ponds may be restricted by the GCD as wasteful.	Added recommendation to Legislature in Chapter 9 to provide greater authority to GCDs to restrict and/or prohibit wasteful use of groundwater, including use for vanity ponds.
	Prohibit regional water districts from protesting an application for a TCEQ permit	The ability to protest water rights is given to all affected parties. Restricting this right for regional water providers could have significant unintended consequences.	No changes.
	Advocate for regional water district restructuring and new requirements	This is not under the regional water planning purview.	No changes.
	Requirements for regional water districts to plan for and provide water supplies within their service area and communicate with customers	This is not under the regional water planning purview.	No changes.
	Requirements for salary disclosures for regional water districts	This is not under the regional water planning purview.	No changes.
Claire Verchot	Asked why the speakers at a legislative hearing did not acknowledge the DWU Mainstem Balancing Reservoir. She provided a map of the project with the location of her property.	The DWU Mainstem Balancing Reservoir is a recommended strategy in the 2026 Region C Water Plan. The location of the project is adjacent to but does not affect Ms. Verchot's property.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Don Watenpaugh	Advocates for the benefits of beavers in water supply. Recommends the Region C Plan include recommendations to protect beavers, including a do not kill law, enhancing beaver habitats, develop incentives and ways to optimize beaver-human co-existence.	Your comment has been noted.	No changes.
Ed McCarthy, FLG Owner, LLC	Reference to Fairfield Reservoir owner and water right holder as "Todd Interests." "Todd Interests" needs to be corrected to "FLG Owner, LLC" as supported by the Deed and separate Assignment of Certificate of Adjudication into LFG Owner LLC, and 2024 Amendment to COA 08-5040A.	Reference to Owner has been changed.	Reference to Owner has been changed.
	Table 3.2 entitled "SURFACE WATER SOURCE AVAILABILITY TO REGION C (NOT LIMITED BY INFRASTRUCTURE)" identifies Fairfield Reservoir with a "permitted" diversion right of 14,150/year but shows a lower "availability" which then decreases by decade from 6395 ac-ft in 2030 to 5315 ac-ft in 2080. Given the new ownership of Lake Fairfield and COA 08-5040, as amended, this information should be updated to eliminate the reduction in availability. The permitted consumptive use is 14,150 ac-ft/yr.	The lower availability is based on the WAM analyses during a repeat of the drought of record. During a drought, the lake cannot support a diversion rate of 14,150 acre-feet per year. This analysis does not limit the water yield based on previous operations.	No changes.
	Section 5.1.4 discusses Tarrant Regional Water District ("TRWD") as major water supplier providing water to Freestone County, including Fairfield. The Section identifies numerous water supply sources as water management strategies for TRWD, including other reservoirs and groundwater, but does not specifically	We reached out to both TRWD and the City of Fairfield to inquire if either water provider would be interested in using Lake Fairfield as a water supply. TRWD is not interested in including Lake Fairfield as a strategy in the 2026 plan. The City of Fairfield did not respond to our outreach.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	identify the Fairfield Reservoir. Lake Fairfield could be a water management strategy available to TRWD and other WUGs.	Therefore, Lake Fairfield is not shown as a water management strategy in the 2026 Plan.	
	Section 5.E7 discusses Freestone County, Fairfield being the County Seat, and the water supply sources and demands for the County, focusing on TRWD being a major supplier. The discussion includes the observation that the historic largest demand was for steam electric which is now gone due to the closure of Luminant's Big Brown Plant but suggests the potential reopening of a steam electric plant at the site despite the fact that the property, including the Fairfield Reservoir and COA 08-5040, has been sold to FLG Owner LLC and is being redeveloped. This language also fails to recognize the changes to COA 08-5040, which expressly authorize the use of up to 14,150 ac-ft/yr of the storage from Lake Fairfield for municipal, domestic, industrial and agricultural purposes.	This discussion was changed to recognize that the water source is no longer available to Luminant. Future use of water from Lake Fairfield is unknown at this time.	This discussion was changed to recognize that the water source is no longer available to Luminant. Future use of water from Lake Fairfield is unknown at this time.
Brian Waltenburg, City of Flower Mound	Denton Creek RWS reuse project is not a current supply. The project will not be online until after 2028. Also, Flower Mound's population at buildout is 118,238, which is less than projected for the City.	The Denton Creek RWS reuse is now shown as a future supply. Unfortunately, we cannot change the population numbers. We will note that the city's buildout estimate is less than the projected population in the section in Chapter 5E. We will also make that note for future water plans.	The Denton Creek RWS reuse is now shown as a future supply, and text was added to Chapter 5E noting the city's buildout estimate.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Elizabeth Borstad, City of Athens	Concerns over the reduction in population projections for the City of Athens through 2080. Their own projections show numbers much closer to the 2021 plan than the 2026 plan. They would like to have the reason for the population projection reductions communicated to them.	Region C requested population projection revisions for Athens based on discussions with the city, however the TWBD has the ultimate say. TWDB revised the population projections to use historical growth rate for 2030 and then applied the requested growth rate in the near-term and buildout population in 2080.	Acknowledgement of concerns of insufficient population has been added to Chapter 10. A recommendation for modified population projection methodology for fast-growing communities was added to Chapter 8.
Woody Patrick, Fannin County Water Supply Agency	Concerns over the population projections for Fannin County since growth rates in recent years have exceeded the 2020-22 growth rates and should be reflected in the Region C Water Plan. They would also like to include more accurate information about groundwater and water use in Fannin County. The Fannin County Water Supply Agency would like to be recognized at the state level so they can receive funding.	The Population Projections for the 2026 Region C Water Plan are final and cannot be changed for the final plan. Region C will take note and consider the more recent population growth rates for the next round of regional water planning. Region C used the Modeled Available Groundwater (MAG) estimates by the TWDB to determine available groundwater supplies.	Acknowledgement of concerns of insufficient population has been added to Chapter 10. A recommendation for modified population projection methodology for fast-growing communities was added to Chapter 8.
Haley Salazar, City of Denton	Page 5E-112 discusses Denton's WTP capacity. The Lewisville WTP currently has a rated capacity of 30 MGD. In 2030, the City of Denton, with the expansion of the Ray Roberts WTP to 50 MGD, will have the capability to treat 80 MGD or 89,611 acre-feet per year.	The rated capacity for the Lewisville WTP and Ray Roberts WTP have been updated. The rated capacity of a WTP represents the maximum daily treatment capacity. However, regional water planning typically relies on average annual flow rates to estimate water availability and usage. Region C typically uses a 2.0 peaking factor, resulting in an average annual treatment capacity of 44,840 acre-feet per year.	The rated capacities of the respective WTPs have been updated.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	Page 5E-112, states that "Denton also intends to purchase raw water from DWU in the future. This strategy includes infrastructure to convey water from Denton's intake on Lake Lewisville to the Ray Roberts WTP." Denton does not currently have a strategy to convey water from Lewisville Lake to the Ray Roberts WTP. Table H.100 details a cost estimate for Denton to purchase additional supplies from Dallas. This cost estimate details a strategy that is not in place for Denton to the degree articulated in the document. Denton has water rights in both Lewisville Lake and Ray Roberts Lake, therefore if this strategy was in place, there would be no need to transport water north from Lewisville Lake to Denton's Ray Roberts Water Treatment Plant. Denton requests this cost estimate page is removed from the plan.	The infrastructure to convey water from Denton's intake on Lake Lewisville to the Ray Roberts WTP was originally included in the Plan to provide future flexibility. This component has been removed from the Plan.	The associated text and cost estimate for the infrastructure from Denton's intake on Lake Lewisville to the Ray Roberts WTP have been removed.
	Table 5E.99 indicates Denton will purchase water from DWU. The volumes listed in this table express an increase in purchase volume, up to 29 MGD in 2080. Denton has not had discussions with Dallas for the purchase of additional water.	Your comment has been noted. For regional water planning purposes, these demands have been considered and discussed. Sales of water to other users will be subject to agreement and negotiation between the seller and the buyer. The identification of such strategies in this plan does not guarantee that agreements will be reached, nor does it obligate the water provider to supply the water.	Text discussing the sales of water to other users has been added to Denton's section in Chapter 5E.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	Table 5E.99 indicates a projected demand for County-Other, Denton to remain at 50 ac-ft/yr through 2080 and under Potential Future Customers a projected demand to remain at 1,682 ac-ft/yr through 2080. Table 5E.108 indicates a projected demand for County-Other, Denton to have supply met by Denton at a rate of 50 are-ft/yr in 2030 and 2040, then decrease each decade, down to 25 ac-ft/tr in 2080. Table 5E.108 indicates additional supplies for County-Other, Denton to be met by Denton at a rate of 1,682 are-ft/yr in 2030 and 2040, then increasing each decade, up to 1,707 ac-ft/yr in 2080. Denton requests consistency between tables 5E.99 and 5E.108.	Based on the existing supply analysis, Denton does not currently have sufficient supplies to meet all of its customers' demands. As a result, existing supplies have been proportionally allocated among Denton's customers based on availability. This is shown in Table 5E.108 under "Currently Available Water Supplies". Projected unmet needs will be met once Denton's identified water management strategies have been implemented. Denton County-Other demands on the city are fully met through a mix of currently available supplies and water management strategies (total of 1,732 ac-ft/yr for existing and potential future demands).	No changes.
	Table E.8 shows Discharge for City of Denton, Indirect Reuse volume as 1,175-acre ft. Denton's Bed and Banks permit CA 08-2348A, currently allows for up to 13,497 ac-ft/yr to be diverted per year. Denton requests the volumes in table E.8 updated to reflect permitted values.	The 1,175 ac-ft/yr listed in Table E.8 refers to direct reuse for SEP Denton. Although the plant is currently mothballed, it could be reactivated at any time and is therefore included in the SEP Denton demand projections. Reuse supplies must be based on drought-of-record conditions and associated decade-specific population and demands. These amounts are limited to the volume of water available to the utilities producing the wastewater and may differ from permitted volumes. To maximize the amount of return flows that Denton can retain, reuse supplies were distributed between existing supplies and water management strategies.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	Table H.13, Details Denton's Water Treatment Plant Expansion plans as following: 30 MGD expansion in 2040, 20 MGD Expansion in 2060, 23 MGD expansion in 2070. The same expansion intent is captured in Appendix N — Water Management Strategy Implementation Survey, but with different values. Denton's current plans are to expand by 30 MGD in 2030 and then expand by 35 MGD in 2040. Denton requests that both tables H.13 and Appendix N are updated to reflect Denton's current plans.	Appendix N provides information on the implementation status of specific water management strategies and projects recommended in the 2021 Region C Water Plan. As a result, online dates may differ between Appendix N and Table H.13. The 30 MGD expansion by 2030 is considered under existing supplies. Table H.13 has been updated to reflect a 35 MGD expansion by 2040, as well as corresponding updates to additional WTP expansions beyond 2040 to align with the updated 2040 capacity increase.	The Plan has been updated to reflect a 35 MGD WTP expansion in 2040.
	Table H.103 articulates the cost associated for Ponder to connect to the City of Denton water supply. Currently infrastructure supports several connection point options within approximately 1.5 miles. Denton requests the data in table H.103 be updated to reflect actual distance.	The cost estimate has been updated.	The cost estimate has been updated.
	Table H.99 indicates that Denton's DPR strategy would include the cost of 16.6 miles of 24-inch diameter pipeline. When Denton moves forward on implementing DPR, the effluent would travel roughly 1.8 miles from the Pecan Creek Water Reclamation plant to the Lewisville WTP. If the effluent must be transported to the Ray Roberts WTP, the effluent would travel roughly 10.5 miles. Denton requests that the data in table H.99 is updated to reflect actual distance.	The cost estimate has been updated.	The cost estimate has been updated.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	Table M.2 indicates the City of Denton as a required participant in Black Rock WSC emergency supply plan. While the table also indicated that plans are not in place, the City of Denton has not been informed of the authority and nature of this potential emergency supply option Denton does not currently have an interconnection with Black Rock, WSC, Mustang SUD, Bolivar WSC, or the City of Pilot Point.	A note has been added to Table M.2 for clarification.	The following note was added to Table M.2: Note: (a) The City of Denton is listed as a potential emergency supply participant based on regional proximity and preliminary considerations. However, Denton does not currently have interconnections with Black Rock WSC, Mustang SUD, Bolivar WSC, or the City of Pilot Point, and has not been informed or engaged in planning discussions regarding this potential arrangement. This entry does not imply an existing agreement or infrastructure and would require further coordination for feasibility.
Janice Bezanson, Texas Conservation Alliance	The 2026 Region C Plan overestimates future population growth and undercounts the available water in the future from increased urbanization.	The population projects are based on county-level estimates from the Texas Demographic Center and input from water user groups (WUGs), wholesale water providers (WWPs), and other sources. Surface water supplies must be estimated using the TCEQ WAMs. TCEQ does not consider increased runoff from urbanization in the WAMs.	No changes.
Jason Beard, City of Corsicana	Corsicana wants to provide future water supplies to Wortham and Freestone County Other. They also have concerns over the projection population and water demands for Wortham and would like them to be increased.	Wortham and Freestone County Other have been added as potential future customers of Corsicana. The population projections for the 2026 Region C Water Plan are final and cannot be revised. However, Region C will take the recent population growth trends into account during the next cycle of regional water planning.	Wortham and Freestone County Other have been added as potential future customers of Corsicana. Discussion text around insufficient population concerns has been added to Chapter 10.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Mark Patterson, Red River GCD	Red River GCD supports the position that brackish groundwater should not be considered part of the MAG. They recommend that the TWDB pursue policy changes to establish separate limits for brackish groundwater, those limits protect freshwater resources, and those limits are useable by RWP groups.	Region C acknowledges the brackish groundwater production zones were not included in the determination of the MAG. These supplies should be considered for future planning, and the Joint Planning Process is an appropriate venue to establish brackish groundwater supplies.	This was acknowledged in the discussion of the GTUA regional system that proposes to use brackish groundwater. A recommendation to include brackish groundwater production zones in the Joint Planning Process was added to Chapter 9.
Mitchell Sodek, GMA 8	GMA 8 would consider supporting brackish groundwater produced from Brackish Groundwater Production Zones (BGPZs) not being a part of the MAG if it is limited to the volume that could be produced without impacting freshwater. GMA 8 also requests that TWDB establishes clear limits for brackish groundwater produced from BGPZs, makes sure those limits protect freshwater sources, and provides the limits in a useable form by regional water planning groups.	Region C acknowledges the brackish groundwater production zones were not included in the determination of the MAG. These supplies should be considered for future planning, and the Joint Planning Process is an appropriate venue to establish brackish groundwater supplies.	This was acknowledged in the discussion of the GTUA regional system that proposes to use brackish groundwater. A recommendation to include brackish groundwater production zones in the Joint Planning Process was added to Chapter 9.
Patty Jones, City of Wortham	Corsicana wants to provide future water supplies to Wortham and Freestone County Other. They also have concerns over the projection population and water demands for Wortham and would like them to be increased.	Wortham and Freestone County Other have been added as potential future customers of Corsicana. The population projections for the 2026 Region C Water Plan are final and cannot be revised. However, Region C will take the recent population growth trends into account during the next cycle of regional water planning.	Wortham and Freestone County Other have been added as potential future customers of Corsicana. Discussion text around insufficient population concerns has been added to Chapter 10.
Maddison Dunn, City of Southlake	Provided the City of Southlake's 2024 Drought Contingency Plan.	Your comment has been noted.	Updated Chapter 7 and Appendix M to include Benbrook Water Authority's 2024 Drought Contingency Plan.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Sheila Rushing, Benbrook Water Authority	Provided the Benbrook Water Authority's 2024 Water Conservation Plan.	Your comment has been noted.	Updated Chapter 7 and Appendix M to include the city's 2024 Drought Contingency Plan.
Andrew Figueroa, City of Celina	The City of Celina appreciated that the 2026 IPP acknowledges its unmet short-term water needs but emphasized the importance of accurately reflecting current conditions. Celina noted that UTRWD is its sole water provider and that rapid growth, nearly 16,900 meters and over 2,900 new residential permits in the past year, means the city may exceed the 2040 population projection by 2030. The city expressed concern that the plan may understate the severity of immediate water supply and infrastructure challenges, potentially impacting funding and planning. Celina also encouraged exploring interim regional solutions, such as reallocating surplus water where infrastructure allows.	Region C requested population projection revisions for Celina based on feedback from the city. While the TWDB approved an increase in Celina's projections, the approved projections were lower than the revisions we requested. At this point, we are required to use the TWDB-approved projections and cannot make further changes.	Acknowledgement of concerns of insufficient population has been added to Chapter 10. A recommendation for modified population projection methodology for fast-growing communities was added to Chapter 8.
The following comments were received opposing the Marvin Nichols Reservoir Project (MNR). Some comments were made by multiple commentors.			
Alden Harris	MNR would destroy valuable bottomland habitat important to the native wildlife.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.	No changes.
Barb Glock	Uncertainty about this project has gone on too long. Don't take the resources of Northeast Texas to reward delinquent stewardship of North Texans.	Your comment has been noted.	No changes.
Carolyn Salter	MNR would threaten the ecological and economic stability and rights of East Texas communities. There is a conflict of	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	interest in Region C and DFW residents use too much water.		
Cathy Woodson	Opposes taking water from the Lake of the Pines, Caddo Lake, and the construction of MNR. DWF wastes water and more conservation needs to take place.	After connecting all available water supplies and implementing conservation and direct reuse strategies, Region C still has an over 1 million ac-ft/yr need in 2080.	No changes.
Gregory Taylor	Instead of building MNR, Region C should focus on conservation and focus on other water sources or slow down growth of water dependent businesses.	Conservation and reuse water makes up 33% of Region C's supplies in 2080.	No changes.
Jan Casner	MNR is unnecessary and DFW should focus more on conservation and other alternatives.	Conservation and reuse water makes up 33% of Region C's supplies in 2080.	No changes.
Dustin Arneson	MNR will flood irreplaceable homes and land of families.	Your comment has been noted.	No changes.
Jerilyn Arneson	Flooding land for MNR and urban developed is cultural erasure and is not a viable solution.	Your comment has been noted.	No changes.
Suzanne Tuttle	Region C should focus more on conservation and addressing water waste rather than displacing landowners and wildlife for MNR.	Conservation and reuse water makes up 33% of Region C's supplies in 2080.	No changes.
William Forbes	MNR has been an issue for too long and Region C should focus more on conservation rather than wasteful practices.	Conservation and reuse water makes up 33% of Region C's supplies in 2080.	No changes.
Lesa Dyke	MNR will have a negative impact on families, schools, and local industries. Taxpayer money should not be towards a project that they oppose. DFW citizens should focus more on conservation and water reuse.	Appendix J presents the economic, fiscal, environmental, and developmental impacts of the proposed MNR reservoir.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
Russ Toates	MNR should not be pursued until all other options have been considered. Region C focuses solely on growth.	After connecting all available water supplies and implementing conservation and direct reuse strategies, Region C still has an over 1 million ac-ft/yr need in 2080.	No changes.
Kerry Quinn	DFW should focus more on conservation and managing water misuse rather than building MNR.	Conservation and reuse water makes up 33% of Region C's supplies in 2080.	No changes.
Erika Hatfield	Region C already has an abundance of water sources to meet future demand without hurting the land and economy of Region D. There is a conflict of interest in Region C with Freese and Nichols, Inc. Encourages TWDB to create a locally controlled water district in Region D.	After connecting all available water supplies and implementing conservation and direct reuse strategies, Region C still has an over 1 million ac-ft/yr need in 2080.	No changes.
Jadell Hines	MNR would flood valuable ecosystems and habitats for important wildlife in the region.	Your comment has been noted.	No changes.
David Venhuizen	Instead of MNR, Region C should consider using building-scale rainwater harvesting.	Rainwater harvesting was considered but was ultimately not recommended as a potentially feasible water management strategy. This is due to a lack of detailed data on the quantity of supplies that would be made available from rainwater harvesting. See Chapter 5A.1.5 for an analysis.	No changes.
Randy Russell	Dam up the Trinity River instead of the Sulphur River for MNR.	Your comment has been noted.	No changes.
Patti Haney, Jana Goforth	There are fault lines within the reservoir footprint.	Previous publications, including one by the University of Texas Bureau of Economic Geology, have found that future seismic movement on the Mexia-Talco Fault Zone is extremely unlikely.	No changes.
Benjamin	Tunnel to the Rockies for water.	Your comment has been noted.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
The following comments were received in support of the Marvin Nichols Reservoir and other reservoirs in the Plan			
Ben Matthew	We need Marvin Nichols Reservoir. Conservation alone is not enough. Consider higher rates for high water users. We need to plan.	Your comment has been noted.	No changes.
David Waters	I am in favor of MNR. Water sources in Region C are drying up due to the growth in population. There is plenty of water in East Texas and it should be shared. If the people were moving to East Texas rather than North Texas, the same people would be really complaining. They don't like change.	Your comment has been noted.	No changes.
Duane George	The reservoirs as planned for North Texas should be built.	Your comment has been noted.	No changes.
Jeffery Kidd	Adopt the plan and build the projects. These projects should have been built long ago. Fort Worth needs to say no to new construction unless they can ensure there is sufficient water.	Your comment has been noted.	No changes.
Kathy Turner Jones, Prairielands Groundwater Conservation District	Strongly supports the 2026 RWP and all its water management strategies, including expanding surface water infrastructure and reuse capacity. Encourages coordination between GCD's and surface water providers to build resiliency.	Your comment has been noted.	No changes.
Dale Petroskey, Dallas Regional Chamber	Letter of support for the 2026 Region C Plan.	Your comment has been noted.	No changes.
North Texas Commission	Letter of support for the 2026 Region C Plan.	Your comment has been noted.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
North Texas Regional Chamber Coalition	Letter of support for the 2026 Region C Plan.	Your comment has been noted.	No changes.
Jason Kelliher, Greater Dallas Planning Council	Supports the entirety of the 2026 RWP. Conservation and reuse is not enough to support the projected population growth in Texas to sustain a strong economy	Your comment has been noted.	No changes.
Commentors with Questions on MNR			
Joe Boggs	If approved, what is the timeline?	The timeline is shown in Section 5F.2.1 of the Region C Plan.	No changes.
	How do I locate a map to confirm my land will be included?	A map showing the reservoir pool area is in Section 5C.1.4 and Appendix G.	No changes.
	Who will decide on Fair Market Value and how will that decision be made?	The sponsors will work with the landowners to reach an agreement on a sales price. If eminent domain is used, fair market value will be determined through the legal system.	No changes.
	What if part of my land is included in both some of it is not?	You may retain ownership of land that is not needed for the project.	No changes.
	How come we didn't just dig the existing reservoirs much deeper to hold more water?	We have evaluated that option and determined the amount of supply is small and the dredging is costly.	No changes.
	How do I stay informed?	https:/regioncwater.org	No changes.
Tommy Lovell	If MNR moves forward, how much land will be taken through condemnation and be sold off to developers for homes?	Eminent domain will not be used for areas outside of the reservoir pool area or environmental mitigation.	No changes.
Commentors with Other Questions			
Robert Miller	How do Region C's 2080 supplies for water conservation and reuse compared to current usage?	In 2022, reuse supply equaled 54,898 ac-ft or 3.5% of Region C's water supplies. By 2080, reuse and conservation supply totals to 1.28 million ac-ft/yr or 33% of Region C's water supplies.	No changes.

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COMMENTER	SUMMARY OF COMMENT	REGION C RESPONSE	CHANGES TO REGION C PLAN
	How was it determined that the region-wide municipal per capita water use would be 95 gpcd in 2080?	Each of the water conservation and reuse strategies have a predicted amount by which they would reduce gpcd. See Chapter 5B and Appendix I for how gpcd is calculated and the predicted savings from the conservation measures.	No changes.
	What is included in the plan to reach the 95 gpcd in 2080?	The implementation of Plumbing Code Savings, water loss mitigation, and other conservation measures will reduce municipal gpcd over time. See Chapter 5B.4 and Appendix I for further discussion.	No changes.

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Q.4 Other Changes to WWP and/or WUG Plans

During the review and comment period of the IPP, several requests were made by entities within Region C to make minor revisions to the plan. These changes are summarized in **Table Q.7**. Additionally, minor formatting and wording revisions were made upon further review of the IPP but are not included in the table below. These changes were made to enhance the clarity of the plan itself and did not impact content.

TABLE Q.7 SUMMARY OF CHANGES TO WWP AND/OR WUG PLANS

WWP/WUG	REQUESTER	CHANGES TO REGION C PLAN
Celina	Ronna Hart	Added in a recommended groundwater WMS in the Trinity and Woodbine aquifers. Added in an alternative joint groundwater WMS in East Texas (Wood and Smith counties). This alternative WMS may be pursued jointly with Mustang SUD or independently.
County-Other, Parker	TRWD	TRWD agreed to provide raw water to the Trinity Basin portion of Parker County-Other in 2040. Moved the "Parker County Regional Water System" WMS to be online in 2040. Parker County-Other has no unmet needs in the Trinity Basin across the planning period.
Decatur	Andrew Simonsen	Wise County WSD owns and operates the raw water pumpstation and pipeline from Lake Bridgeport and Decatur owns and operates the 3 MGD WTP. Updated Decatur's existing supply allocations/needs to reflect a current WTP capacity of 3 MGD. Added a 3 MGD WTP expansion WMS in 2030 and a 8 MGD WTP expansion WMS in 2050.
Ennis		Updated Ennis' current WTP capacity to 9 MGD and adjusted existing supply allocations/needs accordingly. Added in a 3 MGD WTP expansion WMS in 2030.
Mustang SUD	Ronna Hart	Added in a recommended groundwater WMS in the Trinity and Woodbine aquifers. Added in an alternative joint groundwater WMS in East Texas (Wood and Smith counties). This alternative WMS may be pursued jointly with Celina or independently.
Ponder	Gary Morris	Infrastructure constraints currently prevent Ponder from receiving water from UTRWD. Existing UTRWD supplies have been removed, and the Water Management Strategy has been updated to "Connect to and Purchase Water from UTRWD" once the necessary infrastructure is in place.
Red River Authority of Texas	Fabian Heaney	Updated Red River Authority of Texas' current WTP capacity to 0.55 MGD and adjusted existing supply allocations/needs accordingly. Added in a Preston Shores 1 MGD WTP expansion WMS in 2030.
TRWD	Amy Kaarlela	Added Oklahoma water as an alternative WMS. Some minor text clarification on WMSs.
Wilmer	Wayne McCurley	Pushed back the online date for the direct connection to Dallas transmission line project to 2040.
Wise County WSD	Andrew Simonsen	Wise County WSD owns and operates the raw water pumpstation and pipeline from Lake Bridgeport and Decatur owns and operates the 3 MGD WTP. Added in infrastructure improvements project to upgrade the raw water pumpstation and pipeline for Wise County WSD.

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Q.5 Changes Resulting from the Mediated Agreement

The Region C and Region D interregional conflict was resolved through mediation. The mediated agreement has several components that created changes to the *2026 Region C Initially Prepared Plan*. These changes are generally the result of delaying the Marvin Nichols Reservoir project to 2070 and the inclusion of the Toledo Bend Reservoir project as a recommended strategy for the sponsors of the recommended Marvin Nichols Reservoir. While it only seems that there are two changes, these changes affect other analyses and chapters in the plan. A summary of changes because of the mediated agreement is shown in **Table Q.8**.

TABLE Q.8 SUMMARY OF CHANGES DUE TO MEDIATED AGREEMENT

CHAPTER	CHANGES TO REGION C PLAN
Executive Summary	The Executive Summary was updated to reflect all the changes noted below.
Chapter 5C	The descriptions of the Marvin Nichols Reservoir and Toledo Bend project were updated to show the new timelines. Also, discussion was added on a new version of the Toledo Bend project that only includes the 3 sponsors (TRWD, NTMWD, and UTRWD).
Chapter 5D	Chapter 5D was updated to show the changes in recommended projects for TRWD, NTMWD, and UTRWD. These changes also result in changes in available supplies to Fort Worth. This affects changes to multiple tables in this chapter.
Chapter 5E	Customers of TRWD, NTMWD, and Fort Worth have changes in available supplies because of the mediated agreement. This affected most of the WUGs in Chapter 5E.
Chapter 5F	Chapter 5F, *Chapter 5 Summary*, was updated to reflect the changes in recommended strategies and the implementation status and timeline for Marvin Nichols. A new subsection was added for the implementation and timeline for the Toledo Bend project.
Chapter 6	The delay of the recommended Marvin Nichols Reservoir project creates unmet needs for TRWD and NTMWD in 2060. This results in unmet needs for many of these MWPs' customers. Section 6.5, *Impacts of Not Meeting Water Needs*, was updated with the new unmet needs.
Chapter 8	Chapter 8 was updated to include recommendations for funding for the studies identified in the mediated agreement.
Chapter 9	Chapter 9 was updated to reflect the changes in the recommended projects in the 2026 Plan and the changes in unmet needs.
Chapter 10	A discussion of the mediated agreement was added in Chapter 10.
Appendix G	A new strategy was developed for the recommended Toledo Bend project for TRWD, NTMWD, and UTRWD. Changes to online dates were made to the Marvin Nichols Reservoir.
Appendix H	Costs were developed for the recommended Toledo Bend project.
Appendix N	Implementation status table was updated with new timeline for the Marvin Nichols Reservoir, and the Toledo Bend project was added to the spreadsheet.
Appendix P	Addition of Appendix P – Interregional Conflict which includes 1) Letter from TWDB declaring an interregional conflict exists between Region C and Region D, 2) Mediated agreement between Region C and Region D, and 3) Region C and Region D joint informational campaign and statement.

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Attachment Q-1

Texas Water Development Board Comments Received on Initially Prepared Plan

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TEXAS WATER DEVELOPMENT BOARD

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

June 23, 2025

Dan Buhman
Region C Chair
c/o Tarrant Regional Water District
800 E. Northside Dr.
Fort Worth, TX 76102

J. Kevin Ward
General Manager
Trinity River Authority
P.O. Box 60
Arlington, TX 76004

Re: Texas Water Development Board Comments for the Region C Regional Water Planning Group Initially Prepared Plan, Contract No. 2148302555

Dear Mr. Buhman and Mr. Ward:

Texas Water Development Board (TWDB) staff have completed their review of the Initially Prepared Plan (IPP) submitted by March 3, 2025 on behalf of the Region C Regional Water Planning Group (RWPG). The attached comments follow this format:

- **Level 1:** Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and,
- **Level 2:** Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

Please note that 31 Texas Administrative Code (TAC) § 357.50(f) requires the RWPG to consider timely agency and public comment. Section 357.50(g)(1)(D) requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the region's responses to each comment must be included in the final, adopted regional water plan (Contract Exhibit C, Section 2.12.2).

Standard to all planning groups is the necessity to include certain content in the final regional water plans that was not yet available at the time that IPPs were prepared and submitted. Accordingly, the final regional water plans must incorporate the following:

1. An analysis of socioeconomic impacts of not meeting the region's identified needs (31 TAC § 357.40(a)). TWDB will provide a socioeconomic impact analysis report for

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each region by July 2025 for inclusion in the final regional water plan. Relevant sections in the plan must be updated accordingly.
2. Completed results from the 2021 Regional Water Plan implementation survey must be presented in the plan, as well as submitting an electronic version of the survey spreadsheet (31 TAC § 357.45(a)).
3. Documentation that comments received on the IPP, including but not limited to TWDB's, were considered in the development of the final plan (31 TAC § 357.50(f)).
4. Certification, in the form of a cover letter from the planning group Chair or Sponsor to the TWDB, that the final, regional water plan is complete and adopted by the RWPG (31 TAC § 357.50(h)(1)).

The following provisions apply to finalizing regional water planning data:

1. If the IPP included PDF copies of the State Water Planning Database (DB27) reports, a final, updated version of all these reports, as appropriate, must be included in the final plan. TWDB *anticipates* final versions of the reports will be available in the Secure Agency Reporting Application by **September 24, 2025**.
2. Continued review of DB27 data is still being performed. If issues arise during staff's ongoing data review, they will be communicated promptly to the planning group to resolve. Please anticipate the need to respond to additional comments regarding data integrity, including any source overallocations, prior to the adoption of the final regional water plans.
3. Please ensure that all numerical values presented in region developed tables throughout the final, adopted regional water plan are consistent with the data reported in DB27.
4. For the purpose of development and adoption of the 2027 State Water Plan, water management strategy and other data entered by the RWPG in DB27 will take precedence over any data discrepancies presented in the final regional water plan (Contract Exhibit C, Section 2.13.1).
5. Any remaining data revisions to DB27 must be communicated to rwpdataentry@twdb.texas.gov no later than **September 22, 2025**.

Additionally, the following final electronic files must be submitted alongside the final regional plan deliverable, including any remaining files that may not have been provided at the time of the submission of the IPP but that were used in developing the final plan (31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 2.12.2):

1. All hydrologic model input/output or other model files used in determining water availability.
2. Geographic Information System data deliverables in accordance with Contract Exhibit D, Section 2.5.
3. All other files on which the plan is based (e.g. spreadsheets, maps, etc).

The following standard requirements that apply to recommended water management strategies must also be adhered to in all final regional water plans:

1. Regional water plans may include:
    a. the development of additional water supply sources and supply volumes,

   b. the conveyance and delivery of additional supply volumes to a point intake at a water user group,
   c. the treatment of additional supply volumes at the front end of a water user group's retail system,
   d. additional treatment and related eligible components that are directly related to additional supplies provided through direct reuse, and
   e. infrastructure costs that are associated with development of additional water supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies beyond the existing capacity of current facilities.
2. Regional water plan may not include:
   a. any recommended strategies, projects, or costs that are associated with replacing, rehabilitating, or maintaining water supply infrastructure that already exists, or
   b. the costs of any retail distribution lines or other distribution network infrastructure costs with the narrow exception for those strategies directly associated with replacement costs that are for the primary purpose of achieving conservation savings via water loss reduction (§ 357.34(e)(3)(A), Contract Exhibit C, Sections 2.5.2.14 and 2.5.2.15).

As a reminder, the deadline to submit the final, adopted regional water plan and associated material to the TWDB is **October 20, 2025**. It is imperative that you provide the TWDB with information on how you intend to address all TWDB comments well in advance of adoption of the final regional water plan to ensure that all the Level 1 responses are sufficiently responsive for the TWDB Executive Administrator to recommend that the TWDB Board consider approval of your plan in a timely and efficient manner. Your TWDB Regional Water Planner will review and provide feedback to ensure all IPP comments and associated plan revisions have been addressed adequately. Failure to adequately address any Level 1 comments may result in the delay of the TWDB Board approval of your final regional water plan.

Additionally, if the region includes new strategies, or makes significant revisions to its strategy evaluations based on the public comment period, please ensure those significant revisions are pointed out and provided to your TWDB Regional Water Planner to preview in advance of adopting the final regional water plan to ensure that those too will meet all requirements.

Note that the electronic copy of a final report(s) or other deliverable(s) must comply with the requirements and standards specified in 1 Texas Administrative Code (TAC) Chapters 206 and 213 (related to Accessibility and Usability of State Web Sites). Web Content Accessibility Guidelines (WCAG) 2.1 Level AA Standard – WCAG 2.1 Quick Reference can be found at: https://www.w3.org/WAI/WCAG21/quickref/.

If you have any questions regarding these comments or would like to discuss your approach to addressing any of these comments, please do not hesitate to contact Kevin Smith of our Regional Water Planning staff at (512) 475-1561 or Kevin.Smith@twdb.texas.gov. TWDB

staff will be available to assist you in any way possible to ensure successful completion of your final regional water plan.

Thank you for all the time and effort that the RWPG members, the Sponsor, and your consultants have put into developing your draft regional water plan and for the additional effort that will still be required to obtain TWDB Board approval. We look forward to celebrating another successful regional water planning cycle!

Sincerely,

Temple McKinnon
Temple McKinnon (Jun 23, 2025 13:25 CDT)

Matt Nelson
Deputy Executive Administrator of Planning

Attachment

c w/att.: Alexis Long, Trinity River Authority
Simone Kiel, Freese and Nichols, Inc
Christina Gildea, Freese and Nichols, Inc
Brigit Buff, Plummer
Qiwen Zhang, Plummer
Reem Zoun, TWDB Office of Planning
Temple McKinnon, TWDB Water Supply Planning
Sarah Lee, TWDB Water Supply Planning
Kevin Smith, TWDB Water Supply Planning

DRAFT

Texas Water Development Board (TWDB) comments on the Initially Prepared 2026 Region C Regional Water Plan

Level 1: Comments, questions, and data revisions that must be satisfactorily addressed to meet statutory, agency rule, and/or contract requirements.

1. Appendix E. The plan states that "New area-capacity tables were developed based on the volume reduction due to sedimentation.", however it is unclear what methodology was used. Please provide additional details on the methodology used to develop the area-volume rating curve in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.1]

2. Section 3.3.3. The plan appears to be missing a table describing the methodologies used for estimating non-modeled available groundwater (MAG) groundwater availability. Please include the methodologies for non-MAG availability, in table form, broken out by aquifer and county, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.4.2]

3. Section 3.3.3, Table 3.5. The value in Table 3.5 for Other Aquifer in Kaufman County is a new groundwater source for the 2026 plan. The report text states that the methodology is based on a previous regional water plan and therefore appears to be inaccurate since this is a new groundwater source that was not in the previous plan. Please clarify the methodology for determining the non-MAG value for this source in the final, adopted regional water plan. [Contract Exhibit C, Section 2.3.4.2]

4. Section 3.5. Table 3.8 appears to present major water provider (MWP) supplies by source, but not category of use. Please ensure that existing supplies by category use, for each MWP, are included in the final, adopted regional water plan. [31 Texas Administrative Code (TAC) § 357.32(f)]

5. Section 3.6 and Chapter 5E. The plan presents existing supplies by water user group (WUG) within Chapter 5E, however existing supplies by WUG are required to be presented as part of Chapter 3. Please include at minimum, a reference in Chapter 3 to where the existing supply estimates are included within Chapter 5, in the final, adopted regional water plan. [31 TAC § 357.22(b); 31 TAC § 357.32(f); Contract SOW Task 3]

6. Chapter 4 and Chapter 5E. The plan presents identified water needs by WUG within Chapter 5E, however needs at the WUG level are required to be presented as part of Chapter 4. Please include at minimum, a reference in Chapter 4 to where identified water needs are included within Chapter 5, in the final, adopted regional water plan. [31 TAC § 357.22(b); 31 TAC § 357.33(c); Contract SOW Task 4A]

7. Section 4.5 and DB27. The total values for the second-tier needs presented for WUGs in Table 4.6 appear to be inconsistent with data reported in DB27. For example, Table 4.6 shows the total second-tier needs in 2080 as 1,045,839 acre-feet/year, however DB27 reports the total second-tier needs in 2080 as 1,032,758 acre-feet/year. Please review the data presented in the table and revise as

necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.33(d)]

8. Appendix H and DB27. Table H.11D and DB27 report the "Conservation, Water Loss Control - Savoy" water management strategy (WMS) as providing zero acre-feet of demand savings in all decades. Any recommended strategies must show a yield during drought of record conditions in at least one planning decade. Please either reassess the demand savings or remove this as a recommended strategy in the final, adopted regional water plan. [31 TAC § 357.34(d)]

9. Appendix G. The plan does not appear to include a quantitative measure for assessing reliability of water supplies for water management strategy evaluations. Reliability as presented in Table G.1 appears to correlate reliability to a qualitative reporting of low to high. Please clearly provide the quantitative basis for reliability used in the evaluations of water management strategies in the final, adopted regional water plan—ensuring that any recommended strategies provide a firm water supply throughout drought of record conditions. [31 TAC § 357.34(e)(3)(A)]

10. Section 5F.2, page 5F-6. The plan does not include the implementation status for the Denton - Direct Potable Reuse project which meets the criteria for large projects in accordance with 31 TAC § 357.34(g) and Contract Exhibit C, Section 2.5.2.7 as direct potable reuse >5,000 AFY. Please ensure that the implementation status for this project is included within the implementation status table provided in Appendix N and that a timeline graphic is included in the final, adopted regional water plan. [31 TAC § 357.34(g)(2), Contract Exhibit C, Section 2.5.2.7]

11. Section G.2.7.6 and DB27. It is unclear in the plan whether strategy water supply volumes for the Small Aquifer Storage and Recovery (ASR) for Denton, Upper Trinity Regional Water District (UTRWD), and North Texas Municipal Water District (NTMWD) (WMSIds 6928, 6088, and 4939), were reduced to reflect the expected net water supply recovery from the aquifer – noted as 90-95 percent. Please clearly state whether the net water supply accounts for the expected recovery rate for these strategies.. If the strategy supply volumes do not already reflect the lesser, expected share of recovered water, please modify the supply volumes as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]

12. Section G.6.1 and DB27. It is unclear in the plan whether strategy water supply volumes for the TRWD ASR (WMSId 4936) strategy were reduced to reflect the expected net water supply recovery from the aquifer - noted as 88 percent. Please clearly state whether the net water supply accounts for the expected recovery rate. If the strategy supply volume does not already reflect the lesser, expected percent of recovery, please modify the supply volume as appropriate in the final, adopted regional water plan and in DB27. [Contract Exhibit C, Section 2.5.2.4]

13. Appendix I, Section I.1.3, Appendix H, Table H.11.B, Chapter 5B, and DB27. The plan appears to include future conservation savings considered previously implemented as "Demand Reduction Since Base Year (already implemented)". Adjustments to Gallons Per Capita Per Day (GPCD) from conservation savings due to previously implemented conservation measures should be applied as an upfront adjustment to the base year GPCD for demand projections rather than as a 'future'

recommended water management strategy. Please note adjustments to Board-adopted demand projections may be requested but require a revision process separate from plan revisions in response to public comments. Please remove the "Residual Savings from Conservation Measures Implemented Since Baseline Year" strategies as recommended conservation strategies in in DB27. [31 TAC 357.31(e)(2); Contract Exhibit C Section 2.2.2.1]

14. Chapter 5B, Appendix H, and DB27. For the following municipal WUGs the whole WUG's GPCD adjusted for conservation is less than 60 GPCD in at least one planning decade: Ables Springs SUD, AMC Creekside, Denton County FWSD 11-C, Howe, North Kaufman WSC, Pelican Bay, and Reno (Parker).Please confirm the reasonableness of these anticipated low GPCDs in the final, adopted regional water plan. [31 TAC § 357.34(j)(2)(B)]

15. Section 6.2.5 and DB27. The plan includes a summary of water needs by basin related to an interbasin transfer (IBT) of surface water, with the exception of the Brazos Basin, which includes WUGs in Region C receiving strategy supply from the Sulphur Basin. In the final, adopted regional water plan, please update this section to include a summary of water needs in the Brazos Basin and to acknowledge that the region includes recommended strategy supplies that propose to move water from the Sulphur Basin to multiple basins within the region. [31 TAC § 357.34(e)(6)]

16. Chapter 5B and DB27. TWDB Secure Agency Reporting Application (SARA) Report ID 120 'Recommended WMS with New/Amended IBT Permit & Conservation' appears to include the following WUGs in which Region C is the primary region, that receive strategy supply from a proposed IBT strategy, but that do not have any recommended conservation strategy: Irrigation, Kaufman; Mining, Tarrant; Manufacturing WUGs for counties: Collin, Dallas, Denton, Ellis, Grayson, Kaufman, Navarro, Parker, Rockwall, Tarrant, Wise; and Steam-Electric Power WUGs for counties: Dallas, Freestone, Jack, Kaufman, Tarrant, Wise. Please include a water conservation strategy for each WUG that is to obtain water from a proposed IBT to which TWC § 11.085 applies, in the final, adopted regional water plan. These conservation strategies should reflect what would be required to result in the highest practicable level of water conservation and efficiency achievable. [31 TAC § 357.34(j)(2)(C)]

17. Appendix G.6.2, Appendix H, and DB27. The evaluation for the Marty Leonard Wetlands (Cedar Creek Wetlands) Reuse does not appear to include a balancing reservoir, however the costing table for "TRWD - Marty Leonard Wetlands (Cedar Creek Wetland)" (Table H.26) shows a balancing reservoir under capital costs and a balancing reservoir project component was included in DB27. Please confirm if a balancing reservoir is included within the project scope, and modify the plan and/or DB27, as appropriate, to clarify. [Contract Exhibit C, Section 2.5.2.15]

18. Appendix H, Table H.20 and H.21. The costing tables for the "Sulphur River Basin Reservoir and Transmission System Alternatives" (i.e. Marvin Nichols (328) recommended and alternative versions) indicate that the costs were indexed to September 2021 dollars. Please correct the dollar-year reference or update Tables H.20 and H.21 and elsewhere to correctly reflect costs in September 2023 dollars instead of September 2021 dollars, and, if appropriate, update any necessary costs

in DB27, and in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

19. Appendix G and Appendix H. The evaluations for new water supply reservoir water management strategies and projects do not appear to separately present the estimated mitigation land area and associated estimate of acquisition cost. Please provide an estimated separate acreage and cost related to land acquisition (or range) for both the reservoir footprint and mitigation within the appropriate section of the plan or costing sheet, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

20. Appendix H. Section H.7 states that debt-service for non-reservoir infrastructure is 30 years, and several costing tables show 30 year debt service, for example TRWD - Carrizo Wilcox Groundwater-Anderson County (Table H.33). For strategies other than reservoirs, the length of debt service is 20 years unless otherwise justified. Please provide a justification for revising the length of debt service from 20 to 30 years in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

21. Appendix H and DB27. Unit costs have been entered into DB27 as $0 for the recommended water management strategies: WMSIds 2063, 2419, 2712, 5092, 6236, 6955, 2429, 4750, 4864, 5871, 5873, 5874, 6292, 4936, 4745, 2467, 5982, 4746, 2182, 6218, 6216, and 4767. Please include non-zero unit costs for these strategies in DB27 and include assumptions used in the costing methodology utilized, in the final, adopted regional water plan. [Contract Exhibit C, Section 2.5.2.12]

22. Appendix H and DB27. The WMS level unit costs have been entered into DB27 as $1 for the NTMWD - Additional Lavon Watershed Reuse strategy however, the WUG level unit cost ranges up to $4,861. Please review the unit costs for this strategy and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]

23. Appendix H and DB27. Unit costs entered into DB27 appear high for WUGs and groundwater development in relationship to the WMS level unit costs for the TRWD - Carrizo-Wilcox Groundwater strategy. For example, the WMS level unit costs are $1,222 whereas the WUG level unit costs range up to $52,397. Please review the unit costs for this strategy and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]

24. Appendix H and DB27. The WMS level unit costs entered into DB27 appear high compared to the WUG level unit costs for the following strategies: Conservation, Water Loss Control - Lake Worth and Conservation, Water Loss Control - Bells. For example, the WMS level unit cost for Conservation, Water Loss Control - Bells is $20,570 whereas the WUG level unit costs range up to $1,460. Please review the unit costs for these strategies and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]

25. Appendix H and DB27. The WMS level unit costs appear low compared to the WUG level unit costs for the following strategies: Frisco - Additional Direct Reuse; Conservation, Water Loss Control - Southwest Fannin County SUD; and Alternative

- Euless Additional Purchase from TRA. For example, the WMS level unit costs for Conservation, Water Loss Control - Southwest Fannin County SUD is $345, whereas the WUG level unit costs range up to $24,781. Please review the unit costs for these strategies and confirm they have been entered correctly in DB27. [Contract Exhibit C, Section 2.5.2.12]

26. Appendix G.2.4. The strategy evaluation for Increase Delivery Infrastructure states that "this strategy does not create supply" however the "transmission infrastructure enables the entity to receive the water." Please confirm in the final, adopted regional water plan that all projects evaluated under this strategy are directly associated with delivery of additional water supplies from new water sources or additional supplies from more efficient use of existing supplies, or volumetric increases to existing water supplies. [Contract Exhibit C, Section 2.5.2.15]

27. Section 5A.1.4, page 5A-5. Reallocation of reservoir storage was identified as a feasible strategy for Bardwell Lake, however this strategy does not appear to be evaluated in the plan. Please include an evaluation for all potentially feasible strategies or include an explanation as to why this strategy was not evaluated, in the final, adopted regional water plan. [Contract Scope of Work, Task 5B]

28. Section 5C.4.5, Appendix G.4.1, Table H.20, and DB27. The Main Stem Balancing Reservoir evaluation and map appear to include construction of an off-channel reservoir that relies on river diversions of indirect reuse water. This strategy should be classified as a "New Reservoir" for water supply planning purposes. Please coordinate with TWDB's Water Supply and Strategy Analysis team to update this strategy type in DB27, prior to adoption of the final plan and revise appropriate sections of the plan to reflect this as a new water supply reservoir. [31 TAC § 357.50(g)(2)(B)]

29. Chapter 5, Appendix G, and DB27. The online decades for several water management strategies and their associated projects appear to be inconsistently reported in the plan and DB27, including:
    - Dallas Water Utility (DWU) – Connect Lake Palestine (Dallas Portion of Integrated Pipeline (IPL) & IPL to Bachman) (WMSProjectId 967)
    - DWU – Neches River Run-of-the-River Diversions (WMSProjectId968)
    - Blue Ridge - Connect to and Purchase Water from NTMWD (WMSProjectId 999)
    - Ladonia – Infrastructure and Treatment for Water from Ralph Hall (UTRWD) (WMSProjectId 1059)
    - Forney – Increase Delivery Infrastructure from NTWMD (WMSProjectId 1084)
    - Kennedale – Additional Delivery Infrastructure from Ft. Worth (WMSProjectId 1122)
    - Alternative – County-Other, Tarrant – DFW Airport Supply from Euless (WMSProjectId 4393)
    - Bois d'Arc MUD – Connect to NTWMD (WMSProjectId4099)
    - DWU – Sabine Conjunctive Use Part 1 – Carrizo Wilcox Groundwater (WMSProjectId 5303)
    - DWU – Sabine Conjunctive Use Part 2 – Sabine River Off Channel Reservoir (WMSProjectId5304)

- Two Way SUD – New Well(s) in Trinity Aquifer (WMSProjectId 5337)
- Whitesboro – New Well(s) in Trinity Aquifer (WMSProjectId5339)

For example, the online decade for the DWU – Connect Lake Palestine (Dallas Portion of IPL & IPL to Bachman) strategy and project is reported as 2030 in DB27, whereas the online decade is presented as 2040 on page G-86 of Volume 2. Please review the online decades for these strategies and projects and revise as necessary to ensure that online decades in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1); 31 TAC § 357.35(g)(3)]

30. Chapter 5, Appendix H, and DB27. Project costing tables for the following projects present total capital costs that differ from the project capital costs reported in DB27: WMSProjectIds 3859; 5169; 5170; 5172; 5175; 5177 and 5179. For example, DB27 reports total capital cost of $67,187 for Conservation, Water Loss Control – Kaufman County MUD 14 (WMSProjectId 5172,), whereas Table H.11D (page H-28) lists total capital costs of $219,790 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

31. Chapter 5, Appendix G, and DB27. Evaluations for the following strategies and projects present total capital costs that differ from the project capital costs reported in DB27: NTMWD – Additional Lake Texoma Blend Phase 2 (WMSProjectId 957), and Melissa – Additional Delivery Infrastructure from NTMWD (WMSProjectId 1005). For example, DB27 reports a total capital cost of $997,393,000 for WMSProjectId 957. Table G.32 (page G-70) lists total capital costs of $741,772,000 for the same project. Please review the costing information for these projects and revise as necessary to ensure that all project capital costs in DB27 are consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

32. Section G.4.3 and DB27. The evaluation of Neches River Basin Supply (Neches Run-of-River Supply) WMS on page G-90 shows Upper Neches River Municipal Water Authority as the project sponsor, however DB27 reports this sponsor as Dallas Water Utilities. Please review and revise as necessary to ensure that project sponsor in DB27 is consistent with those presented in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]

33. Section 6.5.1 and DB27. The municipal unmet need presented in Table 6.3 appears to be inconsistent with municipal unmet needs reported in DB27. For example, Table 6.3 shows no unmet needs in 2040 for Celina, however DB27 reports unmet needs of 5,342 acre-feet/year in 2040 for Celina. Additionally, Table 6.3 does not present unmet needs for the following WUGs, which show unmet needs for the WUG splits within Region C in DB27: Hickory Creek SUD, Parker County SUD, Burleson, and Johnson County SUD. Please review the data presented in the table and revise as necessary to present data consistent with DB27 in the final, adopted regional water plan. [31 TAC § 357.40(c)]

34. Section 6.5.1 and DB27. The plan does not appear to provide justification for the following municipal WUGs with unmet needs reported in DB27: Hickory Creek SUD,

Parker County SUD, Burleson, and Johnson County SUD. Please provide adequate justification for these unmet municipal need in the final, adopted regional water plan, including: 1) documentation that all potentially feasible WMS were considered to meet the need, including drought management WMS; 2) explanations as to why additional conservation and/or drought management WMS were not recommended to address the need; 3) descriptions of how, in the event of a repeat of the drought of record, the WUG associated with the unmet need shall ensure the public health, safety, and welfare in each planning decade with an unmet need; and, 4) explanation as to whether there may be occasion, prior to the development of the next IPP, to amend the RWP to address all or a portion of the unmet municipal need. [31 TAC § 357.50(j)]

35. Section 7.5. Table 7.4 appears to present a summary of existing emergency interconnects, but it is unclear if the table presents any potential future emergency interconnects. Please clearly identify which emergency interconnects are existing vs future—or clarify if there are no potential future interconnects—in the final, adopted regional water plan. [31 TAC § 357.42(d)]

36. Section 7.7 and Appendix M. Table M.2 appears to be missing emergency response information for the following WUGs which have an estimated 2030 population less than 7,500 and rely on a sole source of supply: Haslet, Westover Hills, and Westworth Village. Please revise the evaluation to include these WUGs in the final, adopted regional water plan. [31 TAC § 357.42(g); Exhibit C, Section 2.7.7]

37. Section 8.3. In its unique reservoir site recommendations for the George Parkhouse II (North) site and George Parkhouse I (South) sites, the plan does not appear to include the reasons for the unique designation and the expected beneficiaries of the water supply to be developed. Please include this information within Chapter 8 or provide a specific reference to where this information is found elsewhere in the plan, in the final, adopted regional water plan. [31 TAC § 357.43(c)]

38. Section 9.3. The counts of water management strategies benefitting more than one WUG provided in Section 9.3 appears inconsistent with strategies reported in DB22 and DB27 as benefitting more than one WUG. Please review the data reported in TWDB SARA Report ID 125 and either reconcile the counts presented this section to align with the report or clarify the difference in counts reported in the final, adopted regional water plan. [31 TAC § 357.45(b)(1)]

39. The plan does not appear to meet minimum accessibility requirements. Please ensure that the final, adopted regional water plan PDF is a tagged document. See item 1d in TWDB's accessibility checklist for more information. [Contract, Article III, Paragraph G]

40. The following WMS Projects are missing from the Geographic Information System (GIS) data submitted. Please include the locations of every recommended and alternative WMS Project listed in the final adopted regional water plan with the final GIS files submitted. [Contract Exhibit D, Section 2.5.2, Exhibit C, Section 2.12.2(9)]

WMS Project ID	WMS Project Name
976	Alternative - DWU - Lake Texoma Desalination

5795	Alternative - Manufacturing, Grayson - Direct Reuse from Sherman
5309	Fort Worth - Village Creek WRF Future Direct Reuse
5775	Mansfield - New 30 MGD WTP
5776	Melissa - Additional Delivery Infrastructure from NTMWD through Mckinney
962	NTMWD - Alternative Lake Texoma Desal at Leonard

Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

1. Section 5A.1.6. The plan states that all MWPs meet the criteria for an ASR assessment, however no ASR assessment for Fort Worth was included, yet Fort Worth is identified as a MWP in Chapter 1 . Please consider adding clarification to the plan that the ASR assessment was not considered applicable to Fort Worth by the region.. [Contract Exhibit C, Section 2.5.2.4]

2. Section 5B.4.4. The plan appears to recommend conservation for the mining water use category that includes recycling of water as the best management practice. Per Contract Exhibit D, Section 3.5.3, this type of strategy should be entered into DB27 as onsite water recycling. TWDB's Water Supply and Strategy Analysis team will update the mining conservation data to this correct data type in DB27. Please consider clarifying this strategy is not considered conservation for planning purposes in the final plan.

3. Section 5B.6.4. Please consider linking directly to the Region's web page with the model water conservation plan rather than the planning group home page.

4. Appendix H. Please consider revising the titles of the cost estimate summary tables to more closely align with the Appendix H list of tables. For example, on page H-10, Table H.33 is titled "TRWD - Carrizo Wilcox Groundwater (Anderson County)", however the title of Table H.33 is "TRWD - WMS # 19 Groundwater."

5. Appendix H. Please consider labeling the cost summary tables H.20 and H.21 to clearly designate Sulphur River Basin Reservoir and Transmission System Alternatives WMS as recommended and alternative scenarios for the Marvin Nichols Reservoir.

6. Section 7.3.7. The TWDB guidance quoted on page 7-11 was guidance TWDB provided for the prior 2021 regional water plan. Please consider updating the information to reflect current requirements from Contract Exhibit C, Section 2.7.3.

7. Section 7.8.1. Please consider removing reference to the TWDB Chapter 7 template in Section 7.8.1. TWDB did not provide a template for the 2026 Regional Water Plan drought chapter, and drought chapter requirements have been revised since the template was developed for the 2021 Regional Water Plans.

8. Section 7.9. The hyperlinks on the Region C website providing model drought contingency plans are labeled only as "2026 Model Conservation Plan". Please

consider updating the description on the website to clearly note these documents include model drought contingency plans as well.

9. Please consider revising references to project names in plan so they more clearly align with project names reported in DB27 for following projects:
    - Purchase Water from TRWD with New 2 MGD WTP, page 5E-219
    - 75MGD WTP Expansion, page H-89
    - Western WTP Expansion, page H-60
    - Expand Eastern WTP, page H-60
    - Infrastructure Improvements, page 5E-39

DRAFT

Attachment Q-2

Texas Parks and Wildlife Comments Received on Initially Prepared Plan

DRAFT

TEXAS PARKS & WILDLIFE

Life's better outside.®

Commissioners

Paul L. Foster
Chairman
El Paso

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Cleveland

Wm. Leslie Doggett
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John A. McCall, Jr., O.D.
Grapeland

Robert L. "Bobby" Patton, Jr.
Fort Worth

Travis B. "Blake" Rowling
Dallas

Dick Scott
Wimberley

Timothy "Tim" Timmerman
Austin

Lee M. Bass
Chairman-Emeritus
Fort Worth

T. Dan Friedkin
Chairman-Emeritus
Houston

David Yoskowitz, Ph.D.
Executive Director

July 19, 2025

Mr. J. Kevin Ward
Regional Planning Group Chair
Region C Regional Water Planning Group
c/o Trinity River Authority
P.O. Box 60
Arlington, Texas 76004

Re: 2026 Region C Initially Prepared Regional Water Plan

Dear Mr. Ward:

The Texas Parks and Wildlife Department (TPWD) has reviewed the 2026 Initially Prepared Regional Water Plan for Region C (IPP) and appreciated the opportunity to provide comments. Water impacts every aspect of TPWD's mission to manage and conserve the natural and cultural resources of Texas. TPWD is the agency with primary responsibility for protecting the state's fish and wildlife resources (Parks and Wildlife Code (PWC) Section (§) 12.0011) and serves as an ex officio member on each Regional Water Planning Group (Texas Water Code (TWC) §16.053(c)). The comments reflected in this letter are a continued reflection of TPWDs participation as an ex-officio member. TPWD offers these comments intending to help conserve state fish and wildlife resources as mandated in TWC §16.053(a).

TPWD understands that regional water planning groups are guided by the rules in Title 31 TAC Chapter 357 when preparing regional water plans. These water planning rules spell out requirements related to natural resources and environmental protection. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy? Does the IPP include Drought Contingency Plans?
- Does the IPP recommend any stream segments be nominated as ecologically unique?
- Does the IPP address concerns raised by TPWD in connection with the 2021 Water Plan

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To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

DRAFT

The population of the Region C continues to grow, comprising 26 percent of Texas' total population, at 7.7 million as of 2021. The 16 county region is projected to grow to over 9.1 million in 2030 and to over 15.1 million in 2080. This includes 56 cities with populations over 20,000. Providing water to the ever-growing population and stable demands of manufacturing, steam electric, irrigation, mining and livestock will need Water Management Strategies to meet projected demands of over 1.9 million acre-feet in 2030 and over 3.0 million acre-feet in 2080. Approximately 90 percent of the current water use in Region C is for municipal supply. Dry year demands are higher than normal year demands, because of increased lawn irrigation use.

The Plan adequately describes the natural resources in Region C and how Water Management Strategies may impact natural resources. Water related threats to natural resources are briefly summarized in Chapter 1, including invasive species, changes to natural flow conditions, water quality concerns, and inundation due to reservoir development. Chapter 6, Section 6.4 is referenced in Chapter 1 where further information on how the Plan is consistent with the long-term protection of the State's natural resources is presented.

Quantitative reporting of environmental factors impacted by water management strategies is covered in Appendix G and additional quantitative information in Appendix J for Marvin Nichols Reservoir. The environmental information is similar to what was included in the 2021 Region C Water IPP. TPWD appreciates the inclusion of quantitative information in the Plan including potential habitat impacts and inundated stream miles for George Parkhouse I and II, and Marvin Nichols reservoirs. Estimated environmental flow requirements based on the Trinity Basin Water Availability Model are provided for Tehuacana Creek Reservoir. The Plan acknowledges that there are no adopted environmental flows for the Sulphur Basin and contends that detailed studies for permitting will likely be required to support instream flows downstream of Marvin Nichols Reservoir. TPWD encourages Region C to continue to update and improve the quantitative environmental information as it becomes available. TPWD looks forward to continued coordination with project sponsors to avoid, minimize and mitigate impacts to fish and wildlife resources. As noted in the IPP, groundwater development and the resulting water level declines in Region C have caused many springs to disappear and greatly diminished the flow from those that remain. New groundwater supplies in the Region are limited since most groundwater has already been developed. Continued groundwater drawdown is likely to prevent any substantial increase in groundwater use in Region C and may require conversion to surface water in some areas. TWDB planning rules require that groundwater supplies not exceed the Modeled Available Groundwater (MAG) values that were determined to meet the desired future conditions (DFCs) of the groundwater source. For the primary aquifer in Region C, the Trinity, it appears as though the DFCs do not address the protection of springs. As in the 2021 IPP, TPWD would like to see DFCs adopted to protect spring flows, especially if there are any specific springs in the region that

can be identified for conservation. TPWD is amenable to helping determine if any of the springs listed in Table 1.11 have an opportunity for conservation.

Water conservation and reuse are a significant portion of the recommended Water Management Strategies, including water reclamation projects, constructed wetlands, desalination, and potentially aquifer storage and recovery in the future. TPWD is encouraged to see the advancement of water conservation and reuse in the region as it will help limit the need for the development of new surface water supplies and their associated ecological tradeoffs.

TPWD continues to support regional water planning groups in recommending ecologically unique river and stream segments. To assist with this need, a goal of updating the statewide assessment of ecologically significant stream segments by 2028 is included in the TPWD 2024 Land and Water Conservation and Recreation Plan. New information is likely available for the river and stream segments the Department has identified as well as for other segments not yet identified as candidates for the ecologically unique designation. TPWD looks forward to assisting Region C as the designation of ecologically unique steam segments is pursued, and TPWD staff are available to assist with the preparation of a recommendation packet as identified in 31 TAC § 357.43.

TPWD congratulates Region C Water Planning group for completing the 6th round of planning for the draft 2026 IPP for Region C.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop water supply strategies that not only meet the future water supply needs of the region but also preserve the ecological health of the region's aquatic resources.

If you have any questions or comments, please do not hesitate to contact me by email at Marty.Kelly@TPWD.Texas.gov or by phone at (512) 389 – 8214.

Sincerely,

Marty Kelly

Marty Kelly
Water Resources

MK:dh

cc: Mr. Robin Riechers
Mr. Tim Birdsong
Mr. Adam Whisenant

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Attachment Q-3

Initially Prepared Plan Public Hearing Deposition Overview

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Deposition Overview

Case Information

- Case Name: Region C Water Planning
- Date: May 19, 2025
- Location: Public Hearing
- Chair: Dan Buhman
- Consultant: Simone Kiel

Introduction and Agenda

- Opening Remarks by Dan Buhman, Chair of Region C Water Planning Group
- Agenda Overview: Safety video, plan overview by Simone Kiel, public comments

Overview of Water Planning in Texas

- Legislative Background: Senate Bill 1 (1997) and Senate Bill 2 (2021)
- Regional Water Planning Process: 16 planning regions, Region C in North Central Texas
- Goals: Develop a plan for water supply during droughts, 50-year planning horizon
- Water Management Strategies: Conservation, reuse, new surface water supplies
- Legal Framework: Surface water owned by the State, groundwater as a property right

Region C Water Plan Details

- Population and Economic Impact: 7.7 million people, 30% of the state's economy
- Water Supply and Demand: Predominantly surface water, major providers supply 90% of municipal water
- Projected Growth: Population expected to double by 2080, demand to increase to 3 million acre-feet per year
- Water Resources: Major and minor aquifers, river basins, and reservoirs
- Conservation and Reuse: Key components of the plan, significant savings projected
- Major Water Providers: Strategies for Dallas, North Texas Municipal Water District, Tarrant Regional Water District, Upper Trinity Regional Water District
- Cost and Unmet Needs: Plan cost nearly $50 billion, some municipal and non-municipal needs unmet

Public Comments and Concerns

- Opposition to Marvin Nichols Reservoir: Concerns about environmental impact, displacement, and economic effects
- Conservation and Infrastructure: Calls for improved water conservation and infrastructure maintenance
- Alternative Solutions: Suggestions for filtration, reuse, and other modern water supply options
- Emotional and Cultural Impact: Testimonies about personal and community loss, historical significance

Conclusion and Next Steps

- Public Comment Period: Ends July 18, 2025
- Final Plan Submission: Due October 20, 2025

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- Adjournment: Meeting concluded with thanks to participants

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Deposition Summaries

- **High-Level Summary:** A short, narrative synopsis of the deposition at a high level
- **Detailed Summary:** A longer narrative summary of the deposition.
- **Page-Line Summary:** A traditional summary separated into topics with relevant page-line references
- **Topical Summary:** A structured summary of the deposition broken into topics to make it easy to scan.

High-Level Summary

The Region C Water Planning Group held a public hearing on May 19, 2025, to discuss the initially prepared plan for addressing water supply needs in North Central Texas. The plan, developed in response to past droughts, aims to provide water during a repeat of the drought of record over a 50-year horizon. Key strategies include conservation, reuse, new surface water supplies, and connecting existing supplies. The plan faces significant opposition, particularly regarding the proposed Marvin Nichols Reservoir, which critics argue would cause environmental harm and displace communities in East Texas. Public comments highlighted concerns about water waste in the DFW area, the need for better conservation efforts, and the socioeconomic impacts of the reservoir. Supporters of the plan emphasized the necessity of a diversified approach to meet the region's growing water demands. The public comment period remains open until July 18, 2025.

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Detailed Summary

The transcript details a public hearing held on May 19, 2025, by the Region C Water Planning Group to discuss the initially prepared plan for water resource management in North Central Texas. The meeting was chaired by Dan Buhman, who outlined the agenda and emphasized the importance of public input on the plan. A safety video was played before the main presentations.

Simone Kiel, a consultant for Region C, provided an overview of the water planning process in Texas, which was established in response to the 1996 drought through Senate Bills 1 and 2. She explained the grassroots approach to water planning, dividing the state into 16 regions, with Region C covering 16 counties in North Central Texas. The plan aims to provide water during drought conditions with a 50-year planning horizon, addressing the needs of municipal and non-municipal water users.

Kiel discussed "water management strategies" as plans to develop additional water supplies to meet identified needs and shortages. She clarified the units used in water planning (acre-feet per year) and the legal framework governing water supplies in Texas, distinguishing between surface water (state-owned) and groundwater (property right). The role of groundwater conservation districts and management areas in regional water planning was also highlighted.

The Region C plan, available online and in public libraries, consists of two volumes with ten required chapters and supporting appendices. Kiel provided an overview of the region's demographics, noting a population of 7.7 million in 2021, expected to nearly double by 2080. The majority of water use in the region is municipal, supplied by surface water from five river basins and 26 reservoirs. The plan distinguishes between "total water supplies" and "connected water supplies," with the latter being used to evaluate water needs.

Kiel outlined the projected water needs for Region C, which show a shortage of over 1.3 million acre-feet by 2080. To address this, the plan recommends a variety of strategies, including conservation, reuse, connecting to existing supplies, and developing new surface water and groundwater sources. Conservation and reuse are significant components of the plan, with several large-scale reuse strategies identified.

The plan also includes a cost estimate of nearly $50 billion, with most costs associated with strategies sponsored by major water providers. Despite efforts to identify strategies for all water users, there remain unmet needs in the region. The plan evaluates the impact on water quality, rural-to-urban water transfer, third-party impacts, invasive species, and socioeconomic impacts of not meeting water needs. It also considers drought conditions worse than the drought of record for some providers.

The Region C Water Planning Group provided legislative recommendations, including the designation of seven reservoir sites and 17 policy and legislative recommendations specific to the region's needs. Public participation is encouraged, with a public comment period from April 18 to July 18, 2025.

The meeting concluded with a public comment section where several individuals expressed their views, with many opposing the inclusion of the Marvin Nichols Reservoir in the plan due

to its potential impact on East Texas communities and ecosystems. Others supported the plan for its comprehensive approach to addressing the region's water needs. The meeting was adjourned after the public comments.

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Page-Line Summary

PAGE:LINE	TOPIC	SUMMARY
2:1 - 4:22	Region C Water Planning	Overview of Texas water planning process, including legislative background, regional planning approach, and key concepts like water management strategies and acre-feet measurements.
5:1 - 7:18	Texas Water Planning Framework	Explains surface water and groundwater ownership, regional water planning process, and key components of the Region C water plan, including population, economy, and major water providers.
8:1 - 10:16	Region C Water Planning	Discusses water demand projections, groundwater and surface water resources, supply concepts, and strategies to meet future water needs in Region C, including conservation and reuse efforts.
9:9 - 13:14	Water Supply Strategies	The text discusses water conservation, reuse, and supply strategies for major water providers in Region C, including Dallas, North Texas Municipal Water District, Tarrant Regional Water District, and Upper Trinity Regional Water District.
14:1 - 16:11	Region C Water Plan	The Region C water plan identifies 170 recommended strategies providing 1.9 million acre-feet per year, with 45% from conservation and reuse. The plan costs $50 billion and addresses various impacts, including unmet needs and socioeconomic factors.
19:6 - 22:10	Water Conservation and Planning	Discussion on water conservation efforts, per capita water usage in different cities, opposition to taking water from East Texas, and support for a draft water plan for North Texas' growing needs.
26:1 - 28:12	Marvin Nichols Reservoir Opposition	Multiple speakers argue against the Marvin Nichols Reservoir, citing its repeated rejection, high cost, and environmental impact. They advocate for alternative water solutions like conservation and filtration technology.
29:1 - 31:11	Opposition to Marvin Nichols Reservoir	Speakers argue against the Marvin Nichols Reservoir project, citing concerns about land rights, environmental impact, and the need for alternative water conservation methods in the Region C water plan.

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32:1 - 34:9	Marvin Nichols Reservoir Opposition	Multiple speakers oppose the Marvin Nichols Reservoir in the 2026 water plan, citing alternatives, conservation strategies, environmental concerns, and economic impact on East Texas, particularly the timber industry.
35:1 - 37:6	Marvin Nichols Reservoir Opposition	Speakers argue against the Marvin Nichols Reservoir, citing concerns about land loss, economic impact, and environmental issues. They urge Region C to explore alternative water supply options and improve conservation efforts.
37:1 - 40:3	Marvin Nichols Reservoir Project	Discussion of testimony regarding water resources, including the Dallas Water Utilities Main Stem Balancing Reservoir project and opposition to the Marvin Nichols Reservoir due to concerns about eminent domain and potential environmental risks from old oil wells.
40:16 - 42:2	Opposition to Marvin Nichols Reservoir	Robert Vann expresses strong opposition to building Marvin Nichols Reservoir, citing wasteful water usage, destruction of land, and conflict of interest in the project's planning and engineering.
43:1 - 46:2	Marvin Nichols Reservoir Opposition	Multiple speakers express concerns about the proposed Marvin Nichols Reservoir, citing environmental impact, questionable water yield projections, and the need for alternative water conservation methods in the DFW area.
46:1 - 48:25	Water Conservation and Marvin Nichols Reservoir Opposition	Residents express opposition to the Marvin Nichols Reservoir, citing concerns about water usage, land rights, and respect for local communities. Speakers emphasize the need for water conservation and alternative solutions, such as underground water storage.
49:1 - 51:25	Water Conservation and Marvin Nichols Reservoir	The text discusses a six-step water conservation plan, potential impacts of the Marvin Nichols Reservoir project on East Texas, and criticism of Region C's water management practices.
52:1 - 54:23	Opposition to Marvin Nichols Reservoir	Residents express strong opposition to the Marvin Nichols Reservoir project, citing personal impact, wastefulness, and alternative solutions like desalination. They emphasize generational land ownership and economic concerns for local industries.

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55:1 - 57:19	Opposition to Marvin Nichols Reservoir	Local residents express strong opposition to the Marvin Nichols Reservoir project, citing generational land ownership, environmental concerns, and personal impacts on families and livelihoods.
58:1 - 60:19	Marvin Nichols Reservoir Impact	Public comments opposing the Marvin Nichols Reservoir project, citing significant environmental impacts, loss of agricultural land, threat to endangered species, and destruction of natural resources in Northeast Texas.
60:12 - 61:25	Meeting Conclusion and Certification	The public comment portion concludes, followed by meeting adjournment. A certified shorthand reporter provides an official certification of the meeting transcript's accuracy and completeness.

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Topical Summary

1. Introduction and Background Information

The deposition transcript details a public hearing conducted on May 19, 2025, by the Region C Water Planning Group. The purpose of the hearing was to discuss the initially prepared plan for water resource management in North Central Texas. The meeting was chaired by Dan Buhman, who emphasized the significance of public input on the plan. A safety video was presented before the main presentations commenced.

2. Overview of Water Planning Process

Simone Kiel, a consultant for Region C, provided an overview of the water planning process in Texas, which was established in response to the 1996 drought through Senate Bills 1 and 2. She explained the grassroots approach to water planning, which divides the state into 16 regions, with Region C covering 16 counties in North Central Texas. The plan is designed to ensure water availability during drought conditions with a 50-year planning horizon, addressing the needs of both municipal and non-municipal water users.

3. Water Management Strategies and Legal Framework

Kiel discussed "water management strategies" as plans to develop additional water supplies to meet identified needs and shortages. She clarified the units used in water planning, specifically acre-feet per year, and the legal framework governing water supplies in Texas, distinguishing between state-owned surface water and groundwater, which is considered a property right. The role of groundwater conservation districts and management areas in regional water planning was also highlighted.

4. Region C Plan Details

The Region C plan, accessible online and in public libraries, consists of two volumes with ten required chapters and supporting appendices. Kiel provided an overview of the region's demographics, noting a population of 7.7 million in 2021, expected to nearly double by 2080. The majority of water use in the region is municipal, supplied by surface water from five river basins and 26 reservoirs. The plan distinguishes between "total water supplies" and "connected water supplies," with the latter being used to evaluate water needs.

5. Projected Water Needs and Strategies

Kiel outlined the projected water needs for Region C, which indicate a shortage of over 1.3 million acre-feet by 2080. To address this, the plan recommends various strategies, including conservation, reuse, connecting to existing supplies, and developing new surface water and groundwater sources. Conservation and reuse are significant components of the plan, with several large-scale reuse strategies identified.

6. Cost Estimates and Unmet Needs

The plan includes a cost estimate of nearly $50 billion, with most costs associated with strategies sponsored by major water providers. Despite efforts to identify strategies for all water users, there remain unmet needs in the region. The plan evaluates the impact on water quality, rural-to-urban water transfer, third-party impacts, invasive species, and

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socioeconomic impacts of not meeting water needs. It also considers drought conditions worse than the drought of record for some providers.

7. Legislative Recommendations and Public Participation

The Region C Water Planning Group provided legislative recommendations, including the designation of seven reservoir sites and 17 policy and legislative recommendations specific to the region's needs. Public participation is encouraged, with a public comment period from April 18 to July 18, 2025.

8. Public Comment and Conclusion

The meeting concluded with a public comment section where various individuals expressed their views. Many opposed the inclusion of the Marvin Nichols Reservoir in the plan due to its potential impact on East Texas communities and ecosystems. Others supported the plan for its comprehensive approach to addressing the region's water needs. The meeting was adjourned following the public comments.

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Attachment Q-4

Public Comments Received on Initially Prepared Plan Via Email or Letter

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May 17, 2025

To: Bryan McMath, Exec. Admin, Texas Water Development Board, Dan Buhman, Chair, Region C Water Planning Group, all other members of the Board and Group
Subj: Conflict Between Regions C and D regarding Proposed Marvin Nichols Reservoir
Via: Email to IRCcomments@twdb.texas.gov

Dear Sirs:

Thank you for inviting public comment on this critical conflict issue. My name is Barbara Glock. I am a 43-year Texan, by choice, homeowner (Collin, now Marion), and 27-year landowner (Fannin) located south of US82… a proverbial stone's throw to Bois D'Arc Lake. Well known in advance were the plans and purpose of Bois D'Arc to supply water to Collin and Dallas. I'll spare the extensive details of the emotional/economic losses, upheavals, and hardships close friends suffered by eminent domain. I learned only recently my own coveted open space, abundantly treed, eco-friendly, livestock grazing, hunting, camping getaway may be subject to future mitigation. Disturbing to say the least. Purchase offers come weekly from other states and countries, but mostly from developers along the US75 and US45 corridors.

Multiple thousands of residents throughout NE Texas -- original settlers, pioneers, landowners, ranchers, farmers, taxpaying citizens, deeply proud, loyal Texas patriots -- have been vocally pleading their fierce opposition to the proposed Marvin Nichols Reservoir for years, many for decades. Rightfully so as they've been forced to live with the cruel uncertainty of "if, when, where, why, and what next" for too emotionally and painfully long ~ likened to a wrongfully convicted person sentenced to life in prison who's exhausted nearly all his appeals. If not ashamed, embarrassed, or empathetic for the preposterous 50+ years of agony already imposed on them (by past Board members?), sitting TWDB members should at very least duly consider and admit its original plans, data, technologies, negative environmental impacts (see list below), and financial encumbrances are absurdly outdated. While doing so, thousands of others and I, again implore the Board and specifically Region C to pause long enough to acknowledge, expose and STOP the continued unjustified water gluttony of the Dallas MEGAplex's insidiously over-developed landmass and abysmally maintained infrastructures.

Need vs greed. Please don't prostitute and destroy the lives, lands, heritages, and God-given natural resources of NE Texans to reward delinquent stewardship of N Texans, their lands and infrastructures. Before initiating discussion, deliberation, and any action on the proposed Marvin Nichols Reservoir, I very sincerely ask each Board and Group member to pause for a moment of thoughtful consideration of the following quote:

"1 Woe to those who make unjust laws, to those who issue oppressive decrees, 2 to deprive the poor of their rights and withhold justice from the oppressed of my people, making widows their prey and robbing the fatherless. 3 What will you do on the day of reckoning, when disaster comes from afar? To whom will you run for help? Where will you leave your riches? 4 Nothing will remain but to cringe among the captives or fall among the slain. Yet for all this, his anger is not turned away, his hand is still upraised. (Isaiah 10:1-4, NIV)

Thank you for your attention and respect for this strong urging that you fully and forever remove the proposed Marvin Nichols Reservoir from the list. I pray you receive God-breathed discernment. (Please continue to read the Full List of Negative Impacts below.)

Respectfully submitted,

BJGlock

Barbara J. Glock
bolo.bjglock@gmail.com
199 Michelle St., Jefferson, TX 75657

FULL LIST OF NEGATIVE IMPACTS -- MARVIN NICHOLS RESERVOIR

(Credit Angie Criss Turner for research, validation, assembly, and dissemination of impact information. Minor document alterations were made by Barbara Glock for the sole purpose of consolidating space.)

ENVIRONMENTAL IMPACTS

1. Destruction of Bottomland Hardwood Forests
   - Over 30,000–40,000 acres of rare, old-growth bottomland hardwoods will be permanently submerged.
   - These forests store carbon, filter water, and support entire ecosystems—impossible to replicate.
2. Loss of Critical Wildlife Habitat
   - Displacement or death of:
   - White-tailed deer, wild turkeys, bobcats
   - Migratory birds, including neotropical species
   - Endangered species (e.g., Texas heelsplitter mussel, alligator snapping turtle)
3. Destruction of Wetlands
   - Thousands of acres of seasonal and permanent wetlands will be flooded or degraded.
   - Loss of:
   - Flood buffering
   - Water filtration
   - Aquatic nursery areas
4. Altered River Flow and Water Quality
   - Sulphur River flow regime would be disrupted:
   - Higher sedimentation
   - Algal blooms from stagnant zones
   - Reduced oxygen levels = fish kills

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5. Reservoir-Induced Seismicity
   - The site lies atop the Mexia-Talco Fault Zone.
   - Potential for earthquakes or fault reactivation due to pressure from water weight and infiltration.
   - Even small earthquakes could crack the dam or trigger landslides.

OIL WELLS, SLUDGE PITS & TOXIC LEGACY RISKS

6. Flooding of Existing Oil and Gas Infrastructure
   - Dozens of oil and gas wells, tank batteries, and pipelines lie in the proposed footprint.
   - Many are old, abandoned, unplugged, or unknown—especially "wildcat" wells.
   - If submerged:
   - Wells could leak crude oil or brine into the reservoir.
   - Tank batteries and well pads could collapse, polluting the water.
7. Submersion of Sludge Pits and Oilfield Waste
   - Oil sludge pits, used for drilling waste and often unlined, may exist in floodplain zones.
   - These contain:
   - Heavy metals (arsenic, lead)
   - Petroleum hydrocarbons
   - Radionuclides
   - Flooding or erosion of these pits could leach toxins into:
   - Drinking water
   - Aquatic habitat
   - Groundwater aquifers
8. Threat to Drinking Water Quality
   - The reservoir may ultimately be used as a municipal water source.
   - If it is contaminated by oil, heavy metals, or industrial waste, the cost of water treatment rises dramatically—or contamination could reach tap water.

AGRICULTURAL AND LAND IMPACTS

9. Loss of Generational Farms and Ranchs
   - Over 66,000 acres flooded; 200,000+ impacted with buffer zones and mitigation areas included.
   - Multi-generational landowners will be forced to sell or be condemned.
10. Massive Use of Eminent Domain
    - Rural families lose their land so urban metro areas can expand.
    - Eminent domain used for non-essential urban growth, not true "public necessity."

ECONOMIC CONSEQUENCES

11. Collapse of Local Rural Economies
    - Local industries harmed or destroyed:
    - Timber
    - Cattle ranching
    - Deer lease operations

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- Eco-tourism and birding
- Jobs vanish, businesses close.

12. Decline in Tax Base
    - Flooded properties no longer generate taxes.
    - Timber and ag income disappears.
    - Counties face shrinking budgets but rising obligations.

13. Increased Property Taxes
    - To offset loss, local governments may raise property tax rates.
    - Schools and roads will suffer unless taxpayers shoulder the difference.

SOCIAL & COMMUNITY CONSEQUENCES

14. Population Decline
    - Families forced out.
    - Young people leave—no future in flooded lands.
    - Ghost towns become reality.

15. Cultural & Historical Destruction
    - Cemeteries, homesteads, churches, and cultural sites lost under water.
    - Burial sites may be relocated against families' wishes.

16. Damage to Rural School Districts
    - Tax base decline means less funding for education.
    - Programs, teachers, and even entire schools at risk.
    - Districts may consolidate or disappear.

INFRASTRUCTURE, SAFETY, AND LONG-TERM COSTS

17. High Construction and Maintenance Costs
    - Multi-billion-dollar build for the benefit of distant cities.
    - Maintenance, dam safety, and sediment management costs will persist for generations.

18. Evaporation Loss
    - North Texas heat will evaporate millions of gallons annually, wasting precious water.

19. Water Inefficiency Compared to Alternatives
    - Reuse, conservation, and aquifer storage cost less and do not destroy entire ecosystems.

POLITICAL AND LEGAL ISSUES

20. Overriding Local Opposition
    - Region D has repeatedly rejected the project.
    - Being overridden by Region C (DFW), who want the water.

21. Legal Uncertainty
    - Eminent domain takings are being challenged.
    - Environmental lawsuits could delay or block the project for years.

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22. Lack of Full Environmental and Seismic Study
    - No updated EIS (Environmental Impact Statement) that includes fault risk, oilfield waste, or rural displacement.

SUMMARY TABLE

Category Negative Impact

Environment Forest and wetland loss, habitat collapse, water degradation
Oil & Industrial Waste Oil well leaks, sludge pit toxins, drinking water contamination
Economy Lost industries, land devaluation, tax base collapse
Community Population decline, school cuts, cultural erasure
Safety & Infrastructure Seismic risk, dam safety, toxic legacy exposure
Legal & Political Eminent domain abuse, regional overreach, lack of scientific review

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Opposition to Marvin Nichols Reservoir Project

May 21, 2025

To the Members of the Region C Water Planning Group and Relevant Legislative Committees,

I am writing to express my strong opposition to the proposed Marvin Nichols Reservoir project on the Sulphur River. As a rural physician and the former mayor of Palestine, Texas (2005–2009), I have personally witnessed how large-scale infrastructure projects—like the defeated Fastrill Reservoir—threaten not only the ecological integrity of our region but also the economic stability and rights of East Texas communities.

The Marvin Nichols project proposes to seize over 200,000 acres of private property through eminent domain to create a $7 billion reservoir that would serve the Dallas-Fort Worth Metroplex. At least 80% of the water would be diverted away from its natural watershed to sustain unsustainable growth and lifestyle patterns in DFW, including excessive lawn irrigation and commercial development. This comes at a devastating cost to rural East Texas—displacing families, submerging hardwood forests, crippling the timber and agricultural economy, and erasing historical and cultural sites.

The 2026 Draft Region C Water Plan projects continued per capita water use 40–50% higher than other Texas cities. DFW residents already use 179 gallons of water per person per day, with nearly half of municipal use directed toward non-essential landscape watering. Viable alternatives such as water reuse, conservation, stormwater capture, and the reallocation of existing resources from Lake Texoma and Toledo Bend can meet the region's future needs without destroying our communities.

Moreover, the conflict of interest created by entrusting the same engineering firm to both design the Region C Water Plan and profit from its implementation undermines public trust. It is unethical for rural communities to bear the cost of a flawed and shortsighted strategy that benefits urban developers and outside contractors more than Texans themselves.

We urge you to stand for fairness, sustainability, and the people of East Texas. Do not support or advance the Marvin Nichols Reservoir project.

Sincerely,

Dr. Carolyn Salter
419 S. Royall St
Palestine, Texas 75801
Rural Physician and Former Mayor of Palestine, Texas (2005–2009)

DRAFT

July 17, 2025

Chairman Dan Buhman
Texas Water Development Board
Region C Water Planning Group
P.O. Box 60
Arlington, TX 76004

Dear Chairman Buhman and members of the Region C Water Planning Group:

On behalf of the Dallas Regional Chamber (DRC) and our more than 700 member companies, I am writing to express our strong support for the 2026 Region C Initially Prepared Plan (IPP) submitted by the Region C Water Planning Group. As the voice of North Texas' business community, the DRC recognizes the foundational role water security plays in sustaining our region's economic growth, public health, and long-term resilience.

Region C is home to one of the fastest growing metropolitan areas in the United States, with a population expected to nearly double by 2080. Yet despite accounting for more than 26% percent of the state's population and 30% of Texas' GDP, Region C uses less than 10% of the state's total water. This reflects a longstanding regional commitment to responsible water stewardship, including leading efforts in conservation and reuse.

The diverse and balanced portfolio of strategies listed in the IPP reflects the extensive, data-driven, and collaborative process utilized by the Region C WPG. With the focus on conservation, reuse, and maximizing the utility of existing supplies, the plan clearly emphasizes sustainable strategies to responsibly meet the growing future demand. The plan also acknowledges the difficulties of developing new surface water sources, recommending additional study and collaboration to find the best path forward to expand traditional sources to responsibly meet future demand.

As you know, Region C's water needs are not just a local concern, but a statewide imperative. North Texas is an economic engine for the state, and the business community cannot thrive without reliable and sustainable access to water. We commend the Region C Planning Group for confronting tough decisions, including the evaluation of interregional water sources, in order to serve the public interest for the next 50 years and beyond.

We urge the Texas Water Development Board to recognize the integrity, balance, and strategic foresight reflected in this plan and to support its continued development and implementation.

Thank you for your continued leadership in guiding Texas' water future.

Sincerely,

Dale Petroskey

Dale Petroskey

President & CEO

DRAFT

Don Watenpaugh, PhD
May 2025

Comments on

2026 INITIALLY PREPARED REGION C WATER PLAN

Submitted in advance of the public hearing to discuss the plan, on Monday, May 19, at 1 p.m. in Arlington, Texas

---

First, sincere thanks to all who contributed to this water plan. Clearly, a LOT of very hard work and careful thought went into the document. The importance of this plan to the future water supply and quality for our rapidly growing area can't be overstated.

The plan overlooks a key opportunity, a single factor, that could dramatically facilitate the overall goals on multiple fronts with zero monetary output. This one addition to the plan would raise groundwater levels, promote wetland formation, help stabilize reservoir levels, reduce drought impact, remove pollutants from surface waters, buffer and reduce severity of floods, increase fish and waterbird populations, increase biodiversity, and limit spread of wildfires. It's worth repeating that this single addition to the plan provides all of these benefits free of charge. This single factor is a unique animal, a "keystone" species, a consummate aquatic engineer, the beaver.

These claims sound unbelievable, impossible! Some references are included in my public comments document, but please, do your own research. You may learn of even more beaver benefits. Yet another positive is the lack of downsides to letting beavers do their thing: why not just let them help us?

So what are the calls to action? How to include beavers in our Region C Water Plan? Here are some ideas:

1. Outlaw killing of beaver. Instead, either resolve human-beaver conflicts or ensure beaver relocation to a habitable area.
2. Modify land use and waterway laws to facilitate re-establishment and maintenance of beaver populations and coexistence of humans with beaver.
3. Develop novel land use and water management strategies and policies to optimize beaver-human coexistence.
4. Establish harboring of beaver populations a carbon offset, and find other ways to encourage landowners to allow beaver populations to thrive.

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5. Educate people about the many positive impacts beaver populations have on water supplies and quality.

Including beaver in the 2026 Region C Water Plan is what might be called VERY low-hanging fruit. In fact, it's a large orchard of low-hanging fruit. I hope these ideas receive thoughtful, open-minded consideration.

Thanks again for all the hard work that went into the 2026 Plan. Thanks especially for your time and attention, and for the opportunity to provide public comments.

DRAFT

Don Watenpaugh, PhD
May 2025

Tired of Catastrophic Drought, Floods, and Wildfires?

*Leave it to **Beavers**.*

Hey, beavers INVENTED infrastructure!

Just call them *The Gnarly Corps of Engineers.*

Are beavers our survival "kits"?

Beavers limit drought by raising and stabilizing water table levels.

Relocated beaver can increase water storage and decrease stream temperature in headwater streams.
https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.4168#:~:text=Beaver%20complexes%20have%20been%20shown,and%20groundwater%20storage%20remain%20understudied.

Beaver dams and overbank floods influence groundwater–surface water interactions of a Rocky Mountain riparian area.
https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2005WR004560

Livestock management, beaver, and climate influences on riparian vegetation in a semi-arid landscape.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0208928

Eurasian beaver activity increases water storage, attenuates flow and mitigates diffuse pollution from intensively-managed grasslands
https://www.sciencedirect.com/science/article/pii/S0048969716323099

Beaver dams, ponds, and associated wetlands absorb, store, and buffer flow of floodwaters to limit catastrophic flooding.

Beaver dams attenuate flow: A multi-site study.
https://onlinelibrary.wiley.com/doi/10.1002/hyp.14017

DRAFT

Beaver Wetlands.
https://www.ecotoneinc.com/wp-content/uploads/2020/12/brown-and-fouty-2011-beaver-wetlands.pdf

Flood Reduction through Wetland Restoration: The Upper Mississippi River Basin as a Case History
https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1526-100X.1995.tb00070.x

Re-creating Urban Wetlands.
https://conservancy.umn.edu/bitstream/handle/11299/60796/1/mgs-262.pdf#page=111

Beaver ponds and associated wetlands provide natural firebreaks that limit spread of wildfires.

https://wildlife.org/beavers-create-fire-resistant-forest-patches/

https://wildfiretoday.com/2021/05/05/beavers-can-affect-wildfires/

https://www.nationalgeographic.com/animals/article/beavers-firefighters-wildfires-california-oregon

Beavers and Wildfire.
https://beaverworks.org/beavers-and-wildfire/

Smokey the Beaver: beaver-dammed riparian corridors stay green during wildfire.
https://esajournals.onlinelibrary.wiley.com/doi/pdf/10.1002/eap.2225
Webinar.
https://www.youtube.com/watch?v=39CWo2Qk7TM

Other Beaver Benefits:

They cost nothing except the land and other resources they need to exist. They work for free.

DRAFT

Beavers exert positive impact on waterbirds, fish populations, and biological diversity:
Whole-community facilitation by beaver: ecosystem engineer increases waterbird diversity
https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.2437
https://www.nature.com/articles/srep28581

Beavers can be domesticated.
https://cdnc.ucr.edu/?a=d&d=DS19660117.2.61&e=-------en--20--1--txt-txIN--------1

Beavers are intensely cute. Dare to search Internet images for "beaver kit".

This is worth repeating: The many benefits beavers provide cost nothing other than allowing them to do their thing. They will be our partners if we let them.

Calls to Action:

Educate people about beavers and how they can help us.
Use education to reverse backward thinking (for example, that found in "Identifying and Managing Mountain Beaver Damage to Forest Resources"
https://catalog.extension.oregonstate.edu/em9063
and
"Problems associated with beaver in stream or floodway management"
https://digitalcommons.unl.edu/vpcthirteen/40/)

Outlaw killing of beaver. Instead, attempt to resolve human-beaver conflicts or ensure their relocation to a habitable area.

Modify land use and waterway laws to facilitate re-establishment and maintenance of beaver populations and coexistence of humans with beaver.

Domesticate beaver to help install and support wild beaver populations.

Develop novel land use and water management strategies and policies to optimize beaver-human coexistence.

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Establish harboring of beaver populations as a carbon offset.

ALTERNATIVELY, if you ***like*** rapidly spreading wildfires, destructive flooding, and drought, then continue to ignore and deny the ecologically and economically critical role beavers could play in insulating humanity from these natural disasters.

OTHER REFERENCES

Beaver: Nature's ecosystem engineers.
https://wires.onlinelibrary.wiley.com/doi/full/10.1002/wat2.1494

Beaver-induced spatiotemporal patch dynamics affect landscape-level environmental heterogeneity.
https://iopscience.iop.org/article/10.1088/1748-9326/ab9924

https://www.resilientdesign.org/how-beavers-are-coming-to-the-rescue-in-an-age-of-climate-change/

https://pdf.wildearthguardians.org/site/DocServer/Beaver_and_Climate_Change_Final.pdf

Using Keystone Species for Restoration.
https://scholarworks.boisestate.edu/under_showcase_2020/60/

Eager: The Surprising, Secret Life of Beavers and Why They Matter.
Ben Goldfarb. 2018. Chelsea Green Publishing. ISBN 978-1-60-358739-6.

From being an engineer to researching nature's engineers. Faith Kearns.
https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=41290

Prof. Emily Fairfax
https://emilyfairfaxscience.com/

Beaver (*Castor canadensis*) mitigate the effects of climate on the area of open water in boreal wetlands in western Canada.
https://www.sciencedirect.com/science/article/abs/pii/S0006320707004557

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Environmental impacts of beavers
https://en.wikipedia.org/wiki/Environmental_impacts_of_beavers

Ecosystem engineers in the arctic.
https://www.arcus.org/witness-the-arctic/2018/1/article/28400

The Busy, Beneficial Beaver
https://daily.jstor.org/the-busy-beneficial-beaver/

Getting the Best from Beavers.
https://www.cabdirect.org/cabdirect/abstract/20173168278

DRAFT

LAW OFFICES OF

McCARTHY & McCARTHY, L.L.P.

1122 COLORADO STREET, SUITE 2399
AUSTIN, TEXAS 78701
(512) 904-2310
(512) 692-2826 (FAX)

March 10, 2025

Via **E-mail & Certified Mail, Return Receipt Requested**

Region C Water Planning Group
Attn: Dan Buhman, Chairman
c/o Tarrant Regional Water District
800 E. Northside Drive
Fort Worth, Texas 76102
Dan.buhman@trwd.com

Region C Water Planning Group
Attn: Simone Kiel, Lead Consultant
c/o Freese and Nichols
802 Cherry St., Suite 2800
Fort Worth, Texas 76102
sfk@freese.com

Region C Water Planning Group
Attn: Kevin Ward, Administrator
c/o Trinity River Authority
P.O. Box 60
Arlington, Texas 76004-0060
wardk@trinityra.org

Texas Water Development Board
Attn: Mr. Kevin Smith
Region C Coordinator
P.O. Box 13231
Austin, Texas 78711-3231
kevin.smith@twdb.texas.gov

Re: Comments on the Region C draft Regional Plan specific to Lake Fairfield Reservoir, Freeston County, Texas & COA 08-5040

Dear Chairman Buhman, Administrator Ward (Chair Emeritus), Ms. Kiel & Mr. Smith:

On behalf of FLG Owner, LLC ("FLG"), I want to thank you and all of the Region C Planning Group Members for your dedication and detailed efforts reflected in the draft Region C Plan. I am writing to bring your attention several requested clarifications to the draft Regional Plan to ensure that the water resource known as "Lake Fairfield" or "Fairfield Reservoir" in Freestone County is recognized as a viable water supply source available as a "water management strategy" for the benefit of Region C's Water User Groups ("WUGs").

In 2023, FLG closed the purchase of a 5,000-acre tract from Luminant Generation Company, LLC, Luminant Mining Company, LLC, and the Big Brown Power Company, LLC, in Freestone County (collectively "Luminant"). This tract includes Lake Fairfield and the water rights authorized by Certificate of Adjudication No. 08-5040 (collectively the "Property"). A copy of the following documents is attached hereto for your reference:

(i) Special Warranty Deed and Assignment of Easements (Appendix "A");

(ii) Assignment of Certificate of Adjudication (Appendix "B");

(iii) Certificate of Adjudication No. 08-5040 (Appendix "C"); and

(iv) Amended Certificate of Adjudication No. 08-5040A (Appendix "D").

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These four instruments give FLG the right to access and develop the property around Fairfield Lake, as well as the right to access the Lake and use the water it impounds. While Lake Fairfield was historically dedicated as a "cooling lake" for the Big Brown Steam Electric Power Plant, these instruments confirm that the beneficial use of Lake Fairfield's permitted consumptive right is now available to WUG's as a water management strategy within Region C.

As you will see from reviewing Appendices "C" and "D," the Certificate was amended last year to add the right to use the water from Lake Fairfield for municipal, industrial, domestic and recreational agricultural purposes. This is a significant change from the historic authorization in the Certificate which was limited to industrial use for steam electric power generation, which was necessary for the operation of the power plant to provide cooling water.

Pursuant to the amended Certificate, FLG controls the rights to approximately 14,000 acre-feet of water available in storage on an annual basis for diversion and consumptive use from Lake Fairfield. Pursuant to the amended Certificate, Luminant has reserved the right to use up to 500 acre-feet of the storage in the Lake for the same beneficial purposes, albeit Luminant's intent as evidenced by the Deed and Assignment is to use the water in support of its reclamation activities associated with its historic mining in the vicinity of the former Power Plant.

With respect to the Big Brown Power Plant, it has been decommissioned. Given the sale of the property around the former Plant Island, the expectation of FLG's development of the property for residential use, and the loss of access to the Lake Fairfield storage for cooling purposes, it is highly unlikely that the Power Plant will be brought back into operation.

Based upon the foregoing information, FLG requested I bring to your attention several comments on the draft Region C Plan that FLG would appreciate your updating. The specific comments are set forth in the Table attached hereto as Appendix "E." Finally, FLG would appreciate your including Lake Fairfield, and its available consumptive use authorization, in the list of available water management strategies within Region C.

Should you have any questions regarding any of the matters outlined herein, or wish to discuss water availability under the Certificate, please feel free to contact me at (512) 904-2313. Thank you for your favorable consideration of this request.

Best wishes.

Sincerely,

McCarthy & McCarthy, LLP

Edmond R. McCarthy, Jr.
Counsel for FLG Owner, LLC

cc via e-mail:
FLG Owner, LLC
Attn: Shawn Todd, President

DRAFT

Appendix "A"

Special Warranty Deed and Assignment of Easements

DRAFT

VG-1364-2023-2302271

Freestone County
Renee Reynolds
Freestone County Clerk

Instrument Number: 2302271

Real Property Recordings

SPECIAL W/D

Recorded On: June 02, 2023 01:23 PM

Number of Pages: 49

" Examined and Charged as Follows: "

Total Recording: $214.00

********** THIS PAGE IS PART OF THE INSTRUMENT **********
Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

File Information:

Document Number:	2302271
Receipt Number:	20230602000018
Recorded Date/Time:	June 02, 2023 01:23 PM
User:	Alicia D
Station:	CCLERK02

Record and Return To:

FREESTONE COUNTY TITLE COMPANY
PO BOX 517

FAIRFIELD TX 75840

STATE OF TEXAS
COUNTY OF FREESTONE

I hereby certify that this Instrument was FILED In the File Number sequence on the date/time printed hereon, and was duly RECORDED in the Official Records of Freestone County, Texas.

Renee Reynolds
Freestone County Clerk
Freestone County, TX

Renee Reynolds

DRAFT

SPECIAL WARRANTY DEED AND ASSIGNMENT OF EASEMENTS

THE STATE OF TEXAS	§	
	§	**KNOW ALL MEN BY THESE PRESENTS:**
COUNTY OF FREESTONE	§	

LUMINANT GENERATION COMPANY LLC, a Texas limited liability company, **LUMINANT MINING COMPANY LLC** , a Texas limited liability company, and **BIG BROWN POWER COMPANY LLC**, a Texas limited liability company (hereinafter collectively referred to as "**Grantor**"), for and in consideration of the sum of $10.00 and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, has **GRANTED, BARGAINED, SOLD**, and **CONVEYED**, and by these presents does **GRANT, BARGAIN, SELL**, and **CONVEY** unto **FLG OWNER, LLC**, a Texas limited liability company ("**Grantee**"), with an address at 400 North Ervay, Suite 150, Dallas, Texas 75201, Attention: Patrick S. Todd.

(i) the approximately 5,000.27 acre tract(s) or parcel(s) of land in Freestone County, Texas, described in Exhibit A attached hereto, together with all buildings, structures, improvements and fixtures thereon, including the water impoundment known as Fairfield Lake, SAVE AND EXCEPT the reservations set forth below (the "**Land**");

(ii) all rights, titles, and interests, if any, appurtenant to the Land, including, without limitation, Grantor's interest, if any, in any and all adjacent streets, alleys, rights of way, and any adjacent strips and gores.

In addition, Grantor has **SOLD, CONVEYED** and **ASSIGNED**, and by these presents does **SELL, CONVEY** and **ASSIGN** unto Grantee, all right, title and interest of Grantor in and to those easements located outside the boundaries of the Land that are used to facilitate the transportation of water between the Trinity River and Fairfield Lake, which easements are described in Exhibit A-1 attached hereto (collectively, the "**Easements**"). The Land and the Easements are hereinafter collectively referred to as the "**Property**."

This Special Warranty Deed and Assignment of Easements and the conveyance hereinabove set forth are executed by Grantor and accepted by Grantee subject to the following, in each case to the extent the same are still in force and affect or burden the Property (hereinafter referred to collectively as the "**Permitted Exceptions**"):

1. Taxes for the current year, which shall be prorated between the parties based on the date of transfer of the Property.
2. All easements, restrictions, reservations and covenants of record, including:
   A. Any prior reservations of oil, gas, lignite or other minerals;
   B. Any existing and valid oil, gas and mineral leases, or easements or rights-of-way; and
   C. Any other existing rights or encumbrances, including leases, utilities, and pipeline easements.
3. All matters that a current, accurate survey of the Property would show.

Restrictive Covenant:

1. Restrictive Covenant. Grantee covenants that the Property will not be used for the commercial production, commercial generation or commercial storage of electricity in any form, nor will it be used for the siting of a commercial power station or commercial energy storage facility of any kind. This covenant restricting any use of the Property to commercially generate, produce or store electricity or to otherwise site a commercial power station or commercial energy storage facility, in any form or of any kind, shall be a covenant running with, touching, and encumbering the Property, binding upon the Grantee and all successors in interest or title, transferees, vendees, lessees, mortgagees, and assigns who are owners and/or users of the Property.

   Each and every contract, deed, or other instrument hereafter executed conveying the Property or portion thereof (excluding instruments granting security interests) shall expressly provide that such conveyance is subject to this restrictive covenant, provided, however, that the restrictive covenant shall survive and be effective regardless of whether such contract, deed or other instrument hereafter executed conveying the Property or portion thereof provides that such conveyance is subject to the restrictive covenant.

2. Reclamation Easements. Grantor hereby reserves unto itself, and this conveyance is made subject to, non-exclusive access easements over, through and upon (i) those certain portions of the north end of the lake located on the Land that are subject to reclamation requirements of the Railroad Commission of Texas ("**RCT**") for the purpose of conducting any activities necessary or required by the RCT to release the reclamation performance bond(s) affecting such Land, which are more particularly described on Exhibit B attached hereto and made a part hereof, and (ii) that certain portion of the "State Park area" on the Land that is designated for "Long Term Stream Channel Monitoring" (as such term is commonly used by the RCT) as required by RCT, which is more particularly described on Exhibit B attached hereto and made a part hereof (collectively, the "**Reclamation Easements**"). The Reclamation Easements shall automatically terminate upon RCT's release of all reclamation performance bonds affecting the Property and/or other lands of Grantor in the vicinity of the Property requiring use of the Reclamation Easements.

Grantee acknowledges that Grantee is independently and personally familiar with and knowledgeable about the Property and has waived the opportunity to further inspect the Property, and that Grantee is acquiring the Property based upon such familiarity and knowledge. The Property is hereby conveyed to and accepted by Grantee in its present condition, **"AS-IS, WITH ALL FAULTS, AND WITHOUT ANY WARRANTY WHATSOEVER, EXPRESS OR IMPLIED."** Notwithstanding anything contained herein to the contrary, it is understood and agreed that Grantor and Grantor's agents or employees have not made and are not now making, and they specifically disclaim, any warranties, representations or guaranties of any kind or character, express or implied, oral or written, past, present or future, with respect to the Property, including, but not limited to, warranties, representations or guaranties as to (1) matters of title (other than Grantor's warranty of title set forth herein); (2) environmental matters relating to the Property or any portion thereof; (3) geological conditions, including, without limitation, subsidence, subsurface conditions, water table, underground water reservoirs, limitations regarding the withdrawal of water and earthquake faults and the resulting damage of past and/or future earthquakes; (4) whether, and to the extent to which the Property or any portion thereof is affected by any stream (surface or underground), body of water, flood prone area, flood plain, floodway or special flood hazard; (5) drainage; (6) soil conditions, including the existence of instability, past soil repairs, soil additions or conditions of soil fill, or susceptibility to landslides, or the sufficiency of any under shoring; (7) zoning to which the Property or any portion thereof may be subject; (8) the availability of any utilities to the Property or any portion thereof including, without limitation, water, sewage, gas and electric; (9) usages of adjoining property; (10) access to the Property or any portion thereof, (11) the value, compliance with the plans and

specifications, size, location, age, use, design, quality, description, suitability, structural integrity, operation, title to, or physical or financial condition of the Property or any portion thereof, or any income, expenses, charges, liens, encumbrances, rights or claims on or affecting or pertaining to the Property or any part thereof; (12) the presence of Hazardous Materials (as defined in the Contract of Sale (the "**Sale Agreement**") between Grantor and Grantee with respect to the Property) in or on, under or in the vicinity of the Property; (13) the condition or use of the Property or compliance of the Property with any or all past, present or future federal, state or local ordinances, rules, regulations or laws, building, fire or zoning ordinances, codes or other similar laws; (14) the existence or non-existence of underground storage tanks; (15) any other matter affecting the stability or integrity of the Property; (16) the potential for further development of the Property; (17) the existence of vested land use, zoning or building entitlements affecting the Property; (18) the merchantability of the Property or fitness of the Property for any particular purpose (Grantee affirming that Grantee has not relied on Grantor's or Grantor's agents' or employees' skill or judgment to select or furnish the Property for any particular purpose, and that Grantor makes no warranty that the Property is fit for any particular-purpose); or (19) tax consequences. **EXCEPT AS EXPRESSLY SET FORTH HEREIN OR IN THE SALE AGREEMENT, GRANTOR MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND TO GRANTEE, INCLUDING, WITHOUT LIMITATION, THE PHYSICAL CONDITION OF THE PROPERTY, OR THEIR SUITABILITY FOR ANY PARTICULAR PURPOSE OR OF MERCHANTABILITY. GRANTEE IS RELYING ON ITS FAMILIARITY AND KNOWLEDGE OF THE PROPERTY IN DETERMINING WHETHER TO ACQUIRE IT. THE PROVISIONS OF THIS PARAGRAPH ARE A MATERIAL PART OF THE CONSIDERATION FOR GRANTOR EXECUTING THIS SPECIAL WARRANTY DEED AND ASSIGNMENT OF EASEMENTS.**

Grantee hereby **FOREVER RELEASES AND DISCHARGES** Grantor and all of Grantor's predecessors-in-interest from all responsibility and liability relating to the physical, environmental or legal compliance status of the Property, whether arising before or after the date hereof, and liabilities under the Comprehensive Environmental Response, Compensation and Liability Act Of 1980 (42 U.S.C. Sections 9601 *et* seq.), as amended ("**CERCLA**"), regarding the condition, valuation, salability or utility of the Property, or its suitability for any purpose whatsoever (including, but not limited to, with respect to the presence in the soil, air, structures and surface and subsurface waters, of Hazardous Materials or other materials or substances that have been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Property under current or future federal, state and local laws, regulations or guidelines, and any structural and geologic conditions, subsurface soil and water conditions and solid and hazardous waste and Hazardous Materials on, under, adjacent to or otherwise affecting the Property). Grantee further hereby **WAIVES** any and all objections and complaints (including, but not limited to, federal, state and local statutory and common law based actions, and any private right of action under any federal, state or local laws, regulations or guidelines to which the Property is or may be subject, including, but not limited to, CERCLA concerning the physical characteristics and any existing conditions of the Property, whether arising before or after the date hereof. Grantee further hereby assumes the risk of changes in applicable laws and regulations relating to past, present and future environmental conditions on the Property and the risk that adverse physical characteristics and conditions, including, without limitation, the presence of Hazardous Materials or other contaminants, may not have been revealed by its investigation. For purposes hereof, "Hazardous Materials" means "Hazardous Material," "Hazardous Substance," "Pollutant or Contaminant," and "Petroleum" and "Natural Gas Liquids," as those terms are defined or used in Section 101 of CERCLA, and any other substances regulated because of their effect or potential effect on public health and the environment, including, without limitation, PCBs, lead paint, asbestos, urea formaldehyde, radioactive materials, putrescible materials, and infectious materials. THE PROVISIONS OF THIS PARAGRAPH ARE A MATERIAL PART OF THE CONSIDERATION FOR GRANTOR EXECUTING THIS SPECIAL WARRANTY DEED AND ASSIGNMENT OF EASEMENTS.

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereunto in anywise belonging, unto Grantee, its successors and assigns forever, and Grantor does hereby bind itself, its successors and assigns, to WARRANT AND FOREVER DEFEND all and singular the title to the Property unto the said Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof by, through, or under Grantor, but not otherwise, subject to the Permitted Exceptions.

Grantee's address is: 400 North Ervay, Suite 150, Dallas, Texas 75201
Attention: Patrick S. Todd.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK.]

DRAFT

EXECUTED as of the date(s) set forth below, but to be effective as of June 1, 2023.

GRANTOR:

LUMINANT GENERATION COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

LUMINANT MINING COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

BIG BROWN POWER COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

THE STATE OF TEXAS §
§
COUNTY OF DALLAS §

This instrument was acknowledged before me on May 25, 2023, by Matthew Goering, of Luminant Generation Company LLC, a Texas limited liability company, Luminant Mining Company LLC, a Texas limited liability company, and Big Brown Power Company LLC, a Texas limited liability company, on behalf of said limited liability companies and in the capacity therein stated.

_____
Notary Public, State of Texas

TONY ST CLAIR
Notary ID #130937183
My Commission Expires
December 19, 2024

DRAFT

GRANTEE:

FLG OWNER, LLC,
a Texas limited liability company

By: _____
Name: Patrick S. Todd
Title: Manager

THE STATE OF Texas §
§
COUNTY OF Dallas §

This instrument was acknowledged before me on May 30, 2023, by [Patrick S. Todd], [Manager] of FLG OWNER, LLC, a Texas limited liability company, on behalf of said limited liability company.

SHERRI A. WOODS
Notary Public, State of Texas
Comm. Expires 02-27-2026
Notary ID 7556726

_____
Notary Public, State of Texas

AFTER RECORDING RETURN TO:

DRAFT

EXHIBIT A
PROPERTY LEGAL DESCRIPTION

Tract 1: (Fee Simple)

Being a portion of tracts PI 1, PI 3, PI 5, PI 5A, PI 6, PI 10, PI 12, PI 14, PI 14A, PI 15, PI 16, PI 17, PI 19, PI 21, PI 22, PI 23, PI 28, PI 29, PI 32, PI 51, PI 52, AD 262A, AD 286, AD 291A, AD 292A, AD 294, AD 297, AD 302, AD 303, AD 307, AD 309, AD 310, MT 262, MT 266, MT 284, MT 290, MT 290A, MT 291, MT 292, MT 293, MT 295, MT 295A.

also described as:

All that certain tract, lot or parcel of land, a part of the J.N. Acosta Grant A-1, a part of the M.R. Palacios Grant A-20 and a part of the Justo Pepi and Jose de Jesus Grande Grant A-21, Freestone County, Texas and also being all or a part of those certain tracts of land listed below, which are recorded in the Deed Records or Official Public Records of Freestone County, Texas and being more completely described as follows, to wit:

Henry E. Jones, Trustee to Dallas Power and Light Company, et al, dated October 28, 1971, recorded in Volume 412, Page 540, part of called 5876.294 acres, less and except 1.86 acres for Hopewell Church, 0.96 acres for Hopewell Cemetery together with road from FM 2570 to Church and less and except Union Cemetery and County Road to same (Note: this tract is comprised of many of the following tracts which are mentioned because they offer a more thorough description of the property boundaries being surveyed)

P.I. 1 – L.L. Bonner, et ux, Catherine to Henry E. Jones, Trustee, dated April 4, 1968, recorded in Volume 378, Page 477, residue of called 220 acres (First Tract)

P.I. 1 – L.L. Bonner, et ux, Catherine to Henry E. Jones, Trustee, dated April 4, 1968, recorded in Volume 378, Page 477, all of called 40 acres (Second Tract)

P.I. 3 – Tom Lindley, et ux, Lavada to Henry E. Jones, Trustee, dated March 26, 1968, recorded in Volume 378, Page 445, all of called 27.02 acres

P.I. 5 – E.J. Folk, et ux, Ora to H.E. Jones, Trustee dated April 12, 1968, recorded in Volume 378, Page 427, all of called 11.6 acres

P.I. 5A – Ernest J. Folk, Jr., to H.E. Jones, Trustee dated April 12, 1968, recorded in Volume 378, Page 433, all of called 18.09 acres

P.I. 6 – London Jackson, et ux, Blanche Lee to Henry E. Jones, Trustee, dated April 24, 1968, recorded in Volume 380, Page 251, residue of called 10.00 acres

P.I. 10 – Edd Robinson Bonner to Henry E. Jones, Trustee, dated March 26, 1968, recorded in Volume 378, Page 443, residue of called 11.99 acres

P.I. 12 – Stanley J. Turk and Josephine Sanderson to Henry E. Jones, Trustee, dated April 16, 1968, recorded in Volume 378, Page 750, residue of called 120.45 acres

P.I. 14 – Jane Wilson to Henry E. Jones, Trustee, dated April 9, 1968, recorded in Volume 378, Page 439, all of called 77 acres

P.I. 14A – Jane Wilson to Henry E. Jones, Trustee, dated November 20, 1968, recorded in Volume 386, Page 31, all of called 24.009 acres

P.I. 15 – B.R. Goldberg to Henry E. Jones, Trustee, dated March 30, 1968, recorded in Volume 378, Page 441, all of called 38.28 acres

P.I. 16 – Moses V. Jones, Jr., to Henry E. Jones, Trustee, dated August 2, 1968, recorded in Volume 382, Page 692, residue of called 21.92 acres

P.I. 17 – Mollie F. Williams Titus to Henry E. Jones, Trustee, dated June 21, 1968, recorded in Volume 381, Page 459 et al, residue of called 66.08 acres

P.I. 19 – J.A. Hill, Trustee, to Henry E. Jones, Trustee, dated April 30, 1968, recorded in Volume 380, Page 256, all of called 9.47 acres

P.I. 21 – Charlotte R. Hemby, et al, to Henry E. Jones, Trustee, dated April 3, 1968, recorded in Volume 378, Page 450, residue of called 76.88 acres

P.I. 22 – Emily Day, et al, to Henry E. Jones, Trustee, dated April 3, 1968, recorded in Volume 378, Page 453, all of called 141.62 acres

P.I. 23 - Agnes Kent, et al, to Henry E. Jones, Trustee, dated April 5, 1968, recorded in Volume 378, Page 457, all of called 134.7 acres (Tract No. 2)

P.I. 23 - Agnes Kent, et al, to Henry E. Jones, Trustee, dated April 5, 1968, recorded in Volume 378, Page 457, residue of called 70-1/2 acres (Tract No. 3)

P.I. 28 – Minnie B. Tolliver to Henry E. Jones, Trustee, dated June 24, 1968, recorded in Volume 382, Page 712, part of called 22-1/6 acres

P.I. 29 – F.R. Hill, Trustee to Henry E. Jones, Trustee, dated March 6, 1968, recorded in Volume 378, Page 756, part of called 3728.76 acres

P.I. 32 - Hattie Mae Lee, et vir Floyd, to Henry E. Jones, Trustee, dated June 12, 1968, recorded in Volume 382, Page 715, part of called 22-1/6 acres

P.I. 51 – Blanche Lee Jackson, et al, to Texas Utilities Mining Company, dated August 9, 1994, recorded in Volume 937, Page 206, part of called 53.727 acres

P.I. 52 – Willie C. Keeton, et ux, Willie Maxine to Texas Utilities Mining Company, dated September 7, 1994, recorded in Volume 939, Page 693, part of called 13.181 acres

Tr. 262 and Tr. 262A – Bette Reed to Texas Utilities Mining Company, dated December 17, 1986, recorded in Volume 739, Page 851, part of called 90.000 acres (First Tract, Exhibit A)

Tr. 266 – Lena Mae Fryer, et vir, Francis to Texas Utilities Mining Company, dated July 25, 1994, recorded in Volume 935, Page 817, part of called 80.999 acres (Tract Three)

Tr. 284 – Peggy Gunter Thornton to Texas Utilities Mining Company, dated November 6, 1985, recorded in Volume 707, Page 309, residue of called 8.574 acres (Tract Three, Exhibit B)

Tr. 286 – Brady Gunter and Lena Fryer to Henry E. Jones, Trustee, dated July 11, 1968, recorded in Volume 381, Page 452, all of called 10.00 acres

Tr. 290 – Earnestine Bryant to Texas Utilities Mining Company, dated January 15, 1996, recorded in Volume 975, Page 207, residue of called 0.374 acres

Tr. 290A – Elector Gatson to Texas Utilities Mining Company, dated December 15, 1995, recorded in Volume 973, Page 380, residue of called 0.374 acres

Tr. 291 and Tr. 291A - Barrett Holding Company to Texas Utilities Mining Company, dated October 20, 1995, recorded in Volume 971, Page 48, residue of called 13.2 acres (First Tract)

Tr. 292 and Tr. 292A – Barrett Holding Company to Texas Utilities Mining Company, dated October 20, 1995, recorded in Volume 971, Page 48, residue of called 10.000 acres (Second Tract)

Tr. 293 – Bette Reed to Texas Utilities Mining Company, dated December 17, 1986, recorded in Volume 739, Page 851, part of called 23.000 acres (Second Tract)

Tr. 294 Bonnie Titus Hemphill, et al, to Henry E. Jones, Trustee, dated April 23, 1968, recorded in Volume 376, Page 649 et al, residue of called 80.11 acres

Tr. 295 – Wilbur T. Titus, et al, to First Security Bank of Utah, N.A., dated April 9, 1996, recorded in Volume 981, Page 795 et al, all of called 4.139 acres

Tr. 295A – Wilbur T. Titus, et al, to First Security Bank of Utah, N.A., dated April 9, 1996, recorded in Volume 981, Page 795 et al, all of called 0.967 acres

Tr. 297 – Agnes Kent, et al, to Henry E. Jones, Trustee, dated April 5, 1968, recorded in Volume 378, Page 457, residue of called 179.34 acres (Tract No. 1)

Tr. 302 – Noah Keeton, et al, to Henry E. Jones, Trustee, dated May 29, 1968, recorded in Volume 381, Page 521 et al, residue of called 78.21 acres

Tr. 303 – Blazing Lodge No. 363 to Henry E. Jones, Trustee, dated April 19, 1968, recorded in Volume 382, Page 706, all of called 0.88 acres

Tr. 307 – Hugh D. Reed, Trustee to Henry E. Jones, Trustee, dated May 17, 1968, recorded in Volume 380, Page 267, residue of called 95.56 acres

Tr. 309 – Noah Keeton to Henry E. Jones, Trustee, dated February 8, 1968, recorded in Volume 376, Page 649, residue of called 36.7 acres

Tr. 310 – L.P. Awalt, et ux, Francie Ruth to Henry E. Jones, Trustee, dated April 1, 1968, recorded in Volume 378, Page 425, all of called 55.0 acres

METES AND BOUNDS DESCRIPTION

Beginning at a 1/2 inch iron rod with a cap stamped "STANGER" found for corner at a North corner of said 5876.294 acre tract, at a North corner of said 3728.76 acres, in the Southeast line of said 53.727 acres and at the Northerly West corner of the Luminant Big Brown Mining Company LLC called 231.420 acre tract (Volume 1519 – Page 111), from which a T-Bar found at a reentrant corner of said 5876.294 acres and

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said 3728.76 acres and at the South corner of said 53.727 acres bears South 58 degrees 21 minutes and 38 seconds West, a distance of 294.25 feet and said beginning point has a Texas Central NAD 83 grid coordinate value of (N: 10,653,268.88)
(E: 3,629,996.30);

Thence along the Northeast and East line of said 5876.294 acres and said 3728.76 acres and the Southwest line of said 231.420 acres as follows:

South 30 degrees 25 minutes and 02 seconds East, for a distance of 2085.24 feet, to a T-Bar found for corner;

South 59 degrees 29 minutes and 11 seconds West, for a distance of 149.84 feet, to a T-Bar found for corner;

South 30 degrees 28 minutes and 07 seconds East, for a distance of 999.23 feet, to a T-Bar found for corner at a decayed 1/2 inch iron rod;

South 17 degrees 32 minutes and 00 seconds West, for a distance of 445.74 feet, to a point for corner;

South 17 degrees 09 minutes and 48 seconds West, for a distance of 93.83 feet, to a 2 inch iron pipe found for corner;

and South 17 degrees 06 minutes and 03 seconds West, for a distance of 28.71 feet, to a 1/2 inch iron rod found for corner at a Southwest corner of said 231.420 acres and at the Northwest corner of the Hill Toomey Farms LLC 147.6 acre tract (Volume 1751 – Page 403, see also Volume 1707 – Page 697, Tract F), from which a 6 inch wood fence corner post found for witness bears North 48 degrees 50 minutes and 39 seconds West, a distance of 0.90 feet;

Thence South 17 degrees 31 minutes and 56 seconds West, continuing along a Southeast line of said 5876.294 acres and said 3728.76 acres and the Northwest line of said 147.6 acres for a distance of 1407.11 feet, to a T-Bar found for corner at the Northeast corner of said 77 acres (P.I. 14), from which a 3 inch pipe fence corner post found for witness bears North 65 degrees 48 minutes and 49 seconds West, a distance of 1.01 feet;

Thence South 02 degrees 04 minutes and 20 seconds East, along the East line of said 77 acres and said 24.009 acres (P.I. 14A) and along the West line of said 147.6 acres, for a distance of 1692.09 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Southeast corner of said 24.009 acres and at the Northeast corner of the Hugh D. Reed, III, Trustee called 94.39 acre tract (Volume 1563 – Page 109, Tract 3, see also Volume 714 – Page 438);

Thence South 89 degrees 24 minutes and 56 seconds West, along the South line of said 24.009 acres and the North line of said 94.39 acres for a distance of 1743.27 feet, to a T-Bar found for corner at a reentrant corner of said 24.009 acres and the Northwest corner of said 94.39 acres, from which a 2-1/2 inch iron pipe fence corner post bears North 34 degrees 36 minutes and 07 seconds West, a distance of 1.01 feet;

Thence South 11 degrees 21 minutes and 03 seconds West, along the Southerly East line of said 24.009 acres and the West line of said 94.39 acres, for a distance of 1928.77 feet, to a 1 inch iron pipe found for corner in the East line of said 5876.294 acres and said 3728.76 acres, at the South corner of said 24.009 acres and at the North corner of the M.W. Butler called 22.639 acre tract (Volume 534 – Page 2, see also Volume 430 – Page 376, Tract No.85), from which a T-Bar found for witness bears North 11 degrees 59 minutes and 48 seconds East, a distance of 25.71 feet and a 4 inch iron pipe gate post found for witness

bears North 56 degrees 15 minutes and 47 seconds West, a distance of 10.52 feet;

Thence South 02 degrees 19 minutes and 16 seconds East, along the East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 22.639 acres for a distance of 1261.75 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northeast corner of said 38.28 acres (P.I. 15) and at a Southeast corner of said 3728.76 acres;

Thence South 01 degrees 32 minutes and 40 seconds East, continuing along the East line of said 5876.294 acres, the East line of said 38.28 acres and the West line of said 22.639 acres, for a distance of 1031.70 feet, to a T-Bar found for corner at the Southeast corner of said 38.28 acres, a Southeast corner of said 5876.294 acres, the Southwest corner of said 22.639 acres and in the North line of the Hugh D. Reed, III, Trustee called 74.291 acre tract (Volume 1563 – Page 109, Tract Four, see also Volume 407 – Page 432);

Thence South 87 degrees 33 minutes and 01 seconds West, along a South line of said 5876.294 acres, along the South line of said 38.28 acres and along the North line of said 74.291 acres, for a distance of 1494.60 feet, to a T-Bar found for corner at the Southwest corner of said 38.28 acres, at the Northwest corner of said 74.291 acres, in an East line of said 3728.76 acres and at a reentrant corner of said 5876.294 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 31 degrees 49 minutes and 43 seconds West, a distance of 3.02 feet;

Thence South 02 degrees 39 minutes and 56 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 74.291 acres, for a distance of 1198.76 feet, to a T-Bar found for corner at a Southwest corner of said 74.291 acres, at the Northwest corner of said 9.47 acres (P.I. 19) and at a reentrant corner of said 5876.294 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 61 degrees 06 minutes and 41 seconds West, a distance of 0.81 feet;

Thence North 87 degrees 24 minutes and 41 seconds East, along a North line of said 5876.294 acres, along the North line of said 9.47 acres and along a South line of said 74.291 acres, for a distance of 249.95 feet, to a T-Bar found for corner at the Northeast corner of said 9.47 acres, at a Northeast corner of said 5876.294 acres and at a reentrant corner of said 74.291 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 31 degrees 36 minutes and 40 seconds West, a distance of 2.08 feet;

Thence South 15 degrees 25 minutes and 10 seconds East, along an East line of said 5876.294 acres, along the East line of said 9.47 acres and along a West line of said 74.291 acres, for a distance of 1127.83 feet, to a T-Bar found for corner, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 41 degrees 19 minutes and 39 seconds West, a distance of 2.21 feet;

Thence South 87 degrees 36 minutes and 10 seconds West, along a North line of said 74.291 acres, along a South line of said 9.47 acres and along a South line of said 5876.294 acres, for a distance of 499.70 feet, to a T-Bar found for corner at the Southwest corner of said 9.47 acres, at a Northwest corner of said 74.291 acres, at a reentrant corner of said 5876.294 acres and in the East line of said 3728.76 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 50 degrees 18 minutes and 17 seconds West, a distance of 0.67 feet;

Thence South 02 degrees 23 minutes and 50 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 74.291 acres, for a distance of 759.63 feet, to a 6 inch wood fence corner post found for corner at the Southwest corner of said 74.291 acres and at the Northwest corner of the Raymond R. Ivy and Marlene R. Ivy, Trustees called 64 acre tract (Volume 1384 – Page 505, First Tract);

Thence South 03 degrees 08 minutes and 39 seconds East, continuing along said East lines and along the

West line of said 64 acres, for a distance of 371.46 feet, to a T-Bar found for corner at a Southeast corner of said 5876.294 acres and said 3728.76 acres and at the Northeast corner of the Raymond R. Ivy and Marlene R. Ivy, Trustees called 5.8 acre tract (Volume 1384 – Page 505, Third Tract);

Thence South 77 degrees 20 minutes and 16 seconds West, along a South line of said 5876.294 acres and said 3728.76 acres and along the North line of said 5.8 acres, for a distance of 306.08 feet, to a T-Bar found for corner at the Northwest corner of said 5.8 acres and at a reentrant corner of said 5876.294 acres and said 3728.76 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 75 degrees 01 minutes and 10 seconds West, a distance of 13.60 feet;

Thence South 02 degrees 38 minutes and 02 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 5.8 acres, for a distance of 879.83 feet, to a T-Bar found for corner at the Southwest corner of said 5.8 acres and at a reentrant corner of said 5876.294 acres and said 3728.76 acres;

Thence North 87 degrees 23 minutes and 13 seconds East, along a North line of said 5876.294 acres and said 3728.76 acres and along the South line of said 5.8 acres, for a distance of 300.87 feet, to a T-Bar found for corner at the Southeast corner of said 5.8 acres and at a Northeast corner of said 5876.294 acres and said 3728.76 acres and in the West line of the Raymond R. Ivy and Marlene R. Ivy, Trustees called 66 acre tract (Volume 1384 – Page 505, Second Tract);

Thence South 02 degrees 38 minutes and 31 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 66 acres, for a distance of 1408.95 feet, to a T-Bar found for corner at the Southwest corner of said 66 acres and at a reentrant corner of said 5876.294 acres and said 3728.76 acres, from which a 2-1/2 inch iron pipe fence post found for witness bears South 88 degrees 44 minutes and 19 seconds West, a distance of 8.50 feet;

Thence North 86 degrees 51 minutes and 05 seconds East, along a North line of said 5876.294 acres and said 3728.76 acres and along the South line of said 66 acres, for a distance of 161.28 feet, to a T-Bar found for corner at a Northeast corner of said 5876.294 acres and said 3728.76 acres and at the Northwest corner of the Marilyn Hill Toomey called 251.159 acre tract (Volume 1707 – Page 697), which is a part of a called 515.043 acre tract described by Certified Field Notes prepared on June 23, 1982 by R.P.S. #1611 (Volume 887 – Page 797) and said 515.043 acres is further described as 515.6 acres in Certified Field Notes prepared on September 22, 2003 by R.P.L.S. #5385, from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 64 degrees 23 minutes and 40 seconds West, a distance of 0.64 feet;

Thence South 01 degrees 42 minutes and 00 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 251.159 acres, for a distance of 3759.85 feet, to a 5/8 inch slick iron rod found for corner at a Southeast corner of said 5876.294 acres and said 3728.76 acres and at the Westerly Northeast corner of the Patrick J. Moran, et ux, Katie called 220.63 acre tract (Instrument 2020-2002247), from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 46 degrees 49 minutes and 55 seconds East, a distance of 1.68 feet;

Thence South 87 degrees 53 minutes and 58 seconds West, along a South line of said 5876.294 acres and said 3728.76 acres and along the North line of said 220.63 acres, for a distance of 894.55 feet, to a T-Bar found for corner at the Northwest corner of said 220.63 acres and at a Southerly Northeast corner of the Burnett and Sons, Inc. called 988.0 acre tract (Volume 1738 – Page 814), from which a 3-way fence intersection bears South 10 degrees 37 minutes and 04 seconds East, a distance of 5.72 feet;

Thence South 86 degrees 18 minutes and 59 seconds West, continuing along the South line of said tracts and a North line of said 988.0 acres, for a distance of 491.03 feet, to a T-Bar found for corner at a Southwest

corner of said 5876.294 acres and said 3728.76 acres, from which a 6 inch wood fence corner post found for witness bears South 78 degrees 21 minutes and 30 seconds East, a distance of 0.41 feet;

Thence North 01 degrees 47 minutes and 15 seconds West, along a West line of said 5876.294 acres and said 3728.76 acres and along the Northerly East line of said 988.0 acres, for a distance of 738.48 feet, to a T-Bar found for corner at the Northerly Northeast corner of said 988.0 acres and at a reentrant corner of said 5876.294 acres and said 3728.76 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 85 degrees 26 minutes and 41 seconds West, a distance of 0.62 feet;

Thence South 87 degrees 46 minutes and 05 seconds West, along a South line of said 5876.294 acres and said 3728.76 acres and along the North line of said 988.0 acres, for a distance of 2097.18 feet, to a T-Bar found for corner at the Northwest corner of said 988.0 acres and at a reentrant corner of said 5876.294 acres and said 3728.76 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 30 degrees 36 minutes and 00 seconds West, a distance of 1.51 feet;

Thence South 00 degrees 36 minutes and 19 seconds East, along an East line of said 5876.294 acres and said 3728.76 acres and along the West line of said 988.0 acres, at a distance of 1536.91 feet, pass a Southeast corner of said 3728.76 acres and the Northeast corner of said 27.02 acres (P.I. 3) and continue for a total distance of 3213.60 feet, to a T-Bar found for corner at the Southeast corner of said 27.02 acres, at a Southwest corner of said 988.0, at a reentrant corner of said 5876.294 acres and in a North line of the residue of said 220 acres (P.I. 1), from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 13 degrees 22 minutes and 20 seconds East, a distance of 1.82 feet;

Thence South 89 degrees 58 minutes and 50 seconds East, along a South line of said 988.0 acres, along a North line of said 5876.294 acres and along a North line of said 220 acres, for a distance of 153.53 feet, to a T-Bar found for corner at the Southerly Northeast corner of said 220 acres, at a Northeast corner of said 5876.294 acres and at a reentrant corner of said 988.0 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 36 degrees 37 minutes and 32 seconds West, a distance of 3.61 feet;

Thence South 02 degrees 49 minutes and 54 seconds East, along an East line of said 5876.294 acres, along the East line of said 220 acres and along the West line of said 988.0 acres, for a distance of 1727.10 feet, to a T-Bar found for corner at the Southeast corner of said 220 acres, at the Southeast corner of said 5876.294 acres, at a Southwest corner of said 988.0 acres and in the North line of the Rodrick C. Daniel and Robert O. Daniel called 225.026 acre tract (Volume 1104 – Page 323), from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 62 degrees 04 minutes and 22 seconds West, a distance of 7.19 feet;

Thence South 86 degrees 35 minutes and 47 seconds West, along the South line of said 5876.294 acres, along the South line of said 220 acres and along the North line of said 225.026 acres, for a distance of 2149.76 feet, to a T-Bar found for corner at the Southerly Southwest corner of said 220 acres, at a Southwest corner of said 5876.294 acres, at the Northwest corner of said 225.026 acres and in the East line of a called 147.4 acre tract (Volume 974 – Page 773), from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 43 degrees 04 minutes and 58 seconds East, a distance of 5.37 feet;

Thence North 23 degrees 00 minutes and 49 seconds East, along a West line of said 5876.294 acres and said 220 acres and along the East line of said 147.4 acres, for a distance of 836.37 feet, to a T-Bar found for corner at the Easterly Northeast corner of said 147.4 acres, at the Southeast corner of said 40 acres (P.I. 1) and at a reentrant corner of said 5876.294 acres, from which a 2-1/2 inch pipe fence corner post found for witness bears North 56 degrees 07 minutes and 15 seconds East, a distance of 4.79 feet;

Thence South 88 degrees 18 minutes and 55 seconds West, along the Easterly North line of said 147.4

acres, along the South line of said 40 acres, along a South line of said 220 acres and along a South line of said 5876.294 acres, for a distance of 1544.57 feet, to a T-Bar found for corner at a Southwest corner of said 220 acres and said 5876.294 acres and at a reentrant corner of said 147.4 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 38 degrees 36 minutes and 00 seconds East, a distance of 4.93 feet;

Thence North 01 degrees 50 minutes and 58 seconds West, along a West line of said 5876.294 acres and said 220 acres and along the middle East line of said 147.4 acres, for a distance of 1009.73 feet, to a T-Bar found for corner at a Northeast corner of said 147.4 acres and at a reentrant corner of said 220 acres and said 5876.294 acres, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 42 degrees 11 minutes and 31 seconds East, a distance of 6.88 feet;

Thence South 88 degrees 18 minutes and 26 seconds West, along a South line of said 5876.294 acres and said 220 acres and along the North line of said 147.4 acres, for a distance of 1186.33 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at a Southwest corner of said 5876.294 acres, at the Southwest corner of the residue of said 220 acres, at the Southeast corner of the Flora Hamill Crenshaw called 5.052 acre tract (Volume 404 – Page 459) and at a reentrant corner of said 147.4 acres;

Thence North 02 degrees 33 minutes and 33 seconds West, along a West line of said 5876.294 acres, along a West line of the residue of said 220 acres and along the East line of said 5.052 acres, the Northerly East line of said 147.4 acres, for a distance of 531.26 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Northeast corner of said 5.052 acres, at the Northerly Northeast corner of said 147.4 acres and at a reentrant corner of said 5876.294 acres and the residue of said 220 acres;

Thence North 61 degrees 46 minutes and 44 seconds West, along a Southwest line of said 5876.294 acres and the residue of said 220 acres and along the Northeast line of said 5.052 acres and said 147.4 acres, for a distance of 374.78 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner in the South right-of-way (ROW) line of F.M. Road No. 3285, in a curve, at the Northwest corner of said 5.052 acres, at the West corner of the residue of said 220 acres and at a Southeast corner of said 3728.76 acres;

Thence 223.09 feet, along the South ROW line of said F.M. Road and with said curve to the left, which has a radius of 1003.80 feet, a central angle of 12 degrees 44 minutes and 01 seconds, and a chord that bears South 84 degrees 42 minutes and 14 seconds East, for a chord distance of 222.63 feet, to a point for corner at the P.T. of said curve, from which a concrete ROW monument found for witness bears North 82 degrees 25 minutes and 43 seconds East, a distance of 2.49 feet;

Thence North 88 degrees 55 minutes and 46 seconds East, continuing along said ROW line, for a distance of 107.67 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Southeast corner of said F.M. ROW;

Thence North 01 degrees 04 minutes and 13 seconds West, along the East ROW line of said F.M. Road, for a distance of 100.00 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Northeast corner of said F.M. ROW;
Thence along the North ROW line of said F.M. Road. across said 5876.294 acres and across said 3728.76 acres as follows:

South 88 degrees 55 minutes and 46 seconds West, for a distance of 107.67 feet, to a ROW monument found for corner at the P.C. of a curve to the right;

Northwesterly, 407.77 feet, with said curve to the right, which has a radius of 903.80 feet, a central angle of 25 degrees 51 minutes and 00 seconds, and a chord that bears North 78 degrees 08 minutes and 44 seconds West, for a chord distance of 404.32 feet, to a point for corner at the P.T. of said curve, from which a concrete ROW monument found for witness bears North 51 degrees 38 minutes and 32 seconds West, a distance of 3.11 feet;

North 65 degrees 13 minutes and 14 seconds West, for a distance of 300.12 feet, to a point for corner at the P.C. of a curve to the left, from which a concrete ROW monument found for witness bears South 85 degrees 18 minutes and 43 seconds East, a distance of 5.22 feet and a 2-1/2 inch iron pipe fence corner post found for witness bears North 01 degrees 04 minutes and 34 seconds West, a distance of 2.22 feet;

Northwesterly, 638.05 feet, with said curve to the left, which has a radius of 1003.87 feet, a central angle of 36 degrees 25 minutes and 00 seconds, and a chord that bears North 83 degrees 25 minutes and 44 seconds West, for a chord distance of 627.36 feet to a point for corner at the P.T. of said curve, from which a concrete ROW monument found for witness bears North 15 degrees 20 minutes and 21 seconds East, a distance of 1.87 feet;

South 78 degrees 21 minutes and 46 seconds West, for a distance of 717.42 feet, to a point for corner at the P.C. of a curve to the left, from which a concrete ROW marker found for witness bears North 46 degrees 45 minutes and 00 seconds West, a distance of 1.34 feet;

Southwesterly, 506.25 feet, with said curve to the left, which has a radius of 1003.89 feet, a central angle of 28 degrees 53 minutes and 37 seconds, a radius of 1003.89 feet, and a chord that bears South 63 degrees 54 minutes and 58 seconds West, for a chord distance of 500.90 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 62 degrees 07 minutes and 46 seconds West, for a distance of 110.89 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

Southwesterly 82.09 feet, with a curve to the left, which has a radius of 1033.87 feet, a central angle of 04 degrees 32 minutes and 57 seconds, and a chord that bears South 41 degrees 11 minutes and 15 seconds West, for a chord distance of 82.07 feet, to a point for corner, from which a concrete ROW monument found for witness bears North 46 degrees 52 minutes and 52 seconds East, a distance of 9.04 feet;

South 38 degrees 54 minutes and 46 seconds West, for a distance of 224.09 feet, to a point for corner, from which a concrete ROW monument found for witness bears South 40 degrees 14 minutes and 28 seconds West, a distance of 5.88 feet;

South 22 degrees 12 minutes and 46 seconds West, for a distance of 104.33 feet, to a point for corner, from which a concrete ROW monument found for witness bears South 74 degrees 02 minutes and 00 seconds West, a distance of 0.57 feet;

South 38 degrees 54 minutes and 46 seconds West, for a distance of 170.41 feet, to a point for corner at the P.C. of a curve to the right, from which a concrete ROW monument found for witness bears North 47 degrees 02 minutes and 42 seconds East, a distance of 8.06 feet;

Southwesterly, 399.48 feet, with said curve to the right, which has a radius of 1381.60 feet, a central angle of 16 degrees 34 minutes and 00 seconds, and a chord that bears South 47 degrees 11 minutes and 46 seconds West, for a chord distance of 398.09 feet, to a point at the P.T. of said curve, from which a concrete ROW monument found for witness bears North 54 degrees 47 minutes and 07 seconds East, a distance of

4.99 feet;

South 55 degrees 28 minutes and 46 seconds West, for a distance of 814.48 feet, to a point for corner, from which a concrete ROW monument found for witness bears South 80 degrees 10 minutes and 07 seconds East, a distance of 2.65 feet and another concrete ROW monument found for witness bears South 59 degrees 51 minute and 12 seconds West, a distance of 31.20 feet;

South 62 degrees 44 minutes and 46 seconds West, for a distance of 96.76 feet, to a point for corner, from which a concrete ROW monument found for witness bears South 44 degrees 50 minutes and 06 seconds West, a distance of 4.44 feet;

South 62 degrees 30 minutes and 46 seconds West, for a distance of 93.61 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 62 degrees 27 minutes and 46 seconds West, for a distance of 37.48 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CONRER" set for corner at the East corner of the part of the Irongate Ranch Holdings, LLC called 138.00 acre tract (Volume 1721 – Page 318, Second Tract) that lies North of the North ROW line of said F.M. Road No. 3285 and in a South line of said 5876.294 acres and said 3728.76 acres;

Thence South 84 degrees 37 minutes and 04 seconds West, along the North line of said 138 acres and along a South line of said 3728.76 acres and said 5876.294 acres, for a distance of 801.84 feet, to a point for corner in said North ROW line and at the West corner of said part of 138.00 acres, from which a 1/2 inch iron rod with a cap stamped "LACY SURVEYING REF MARKER" set for reference bears North 12 degrees 56 minutes and 04 seconds West, a distance of 1.09 feet;

Thence South 89 degrees 43 minutes and 46 seconds West, along said ROW line, for a distance of 470.70 feet, to a point for corner in the West line of said 5876.294 acres and said 3728.76 acres, at the Southwest corner of a called 2.965 acre Right of Way (Volume 1648 – Page 264) and at the Southeast corner of the Eleanor Parker Swank called 39.652 acre tract (Volume 472 – Page 81, Tract No. 3), from which a concrete ROW monument found for witness bears South 89 degrees 43 minutes and 46 seconds West, a distance of 20.32 feet, a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for witness bears North 09 degrees 59 minutes and 11 seconds West, a distance of 0.89 feet and a 2 inch iron pipe fence corner post found for witness bears North 12 degrees 21 minutes and 08 seconds East, a distance of 1.41 feet;

Thence along the West line of said 5876.294 acres, said 3728.76 acres, said 2.965 acres and along the East line of said 39.652 acres as follows:

North 09 degrees 59 minutes and 11 seconds East, for a distance of 792.00 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner, from which a 5 inch wood fence corner post bears South 80 degrees 54 minutes and 23 seconds West, a distance of 6.06 feet;

North 77 degrees 09 minutes and 21 seconds West, for a distance of 230.77 feet, to a T-Bar found, broken off at the top of ground, for corner, from which a 2-1/2 inch iron pipe fence corner post found for witness bears North 66 degrees 51 minutes and 19 seconds East, a distance of 2.38 feet;

North 14 degrees 08 minutes and 57 seconds East, for a distance of 1035.08 feet, to a T-Bar found for corner;

North 20 degrees 41 minutes and 12 seconds East, for a distance of 192.79 feet, to a 5 inch wood fence post found for corner;

and North 08 degrees 46 minutes and 09 seconds East, for a distance of 1246.51 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northeast corner of said 39.652 acres, at a Northwest corner of said 3728.76 acres, at the Southwest corner of said 18.09 acres (P.I. 5A) and at the Southeast corner of part of the Jessie W. Folk and William W. Folk called 51.4 acre tract (Volume 1651 – Page 677), from which a 5 inch wood fence post found for witness bears North 06 degrees 49 minutes and 06 seconds West, a distance of 3.71 feet;

Thence North 38 degrees 44 minutes and 20 seconds East, continuing along the West line of said 5876.294 acres, along the West line of said 18.09 acres and along the East line of said Folk tract, for a distance of 869.95 feet, to a T-Bar found for corner at the Northwest corner of said 18.09 acres, form which a fence corner post found for witness bears South 53 degrees 09 minutes and 47 seconds East, a distance of 1.39 feet;

Thence North 66 degrees 53 minutes and 36 seconds East, along the North line of said 18.09 acres and said 5876.294 acres and along a South line of said Folk tract, for a distance of 899.02 feet, to a T-Bar found for corner at the Northeast corner of said 18.09 acres, at the Northerly Southeast corner of said Folk tract and in the West line of said 141.62 acres, (P.I. 22) from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 44 degrees 38 minutes and 55 seconds East, a distance of 1.27 feet;

Thence North 16 degrees 57 minutes and 44 seconds West, continuing along the West line of said 5876.294 acres, along the East line of said Folk tract and along the West line of said 141.62 acres, for a distance of 442.22 feet, to a T-Bar found for corner at a Northwest corner of said 5876.294 acres and said 141.62 acres, at the Northeast corner of said Folk tract and in the South line of the Philip Ivy called 106.5 acre tract (Volume 462 – Page 100, Tract No. 7), from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 50 degrees 18 minutes and 33 seconds East, a distance of 1.73 feet;

Thence North 86 degrees 41 minutes and 04 seconds East, along the Southerly North line of said 141.62 acres, along a North line of said 5876.294 acres and along the South line of said 106.5 acres, for a distance of 111.34 feet, to a T-Bar found for corner, from which a 2-1/2 inch iron pipe fence corner post found for witness bears South 64 degrees 27 minutes and 14 seconds East, a distance of 0.65 feet;

Thence North 02 degrees 27 minutes and 35 seconds West, continuing along the West line of said 5876.294 acres and said 141.62 acres, along the East line of said 106.5 acres and along the East line of the Philip Ivy called 38 acre tract (Volume 462 – Page 100, Tract No. 8), for a distance of 1764.71 feet, to a T-Bar found for corner at the South corner of the Philip Ivy called 15,990 sq. ft. tract (Volume 462 – Page 100, Tract No. 9), from which a 2-1/2 inch pipe fence corner post found for witness bears South 42 degrees 21 minutes and 22 seconds East, a distance of 15.87 feet;

Thence North 33 degrees 31 minutes and 47 seconds East, along the Northwest line of said 141.62 acres, along a West line of said 70-1/2 acres (P.I. 23), along the Southeast line of said 15,990 sq. ft. tract, along the Southeast line of said 38 acres and along a Northwest line of said 5876.294 acres, for a distance of 422.25 feet, to a T-Bar found for corner, from which a 2 inch iron pipe fence corner post found for witness bears South 66 degrees 23 minutes and 24 seconds East, a distance of 2.21 feet;

Thence along the West and Southwest line of said 70-1/2 acres, along a Southwest line of said 5876.294 acres and along the occupied East and Northeast line of said 38 acres as follows:

North 02 degrees 25 minutes and 15 seconds West, for a distance of 142.48 feet, to a 2-1/2 inch iron pipe fence corner post found for corner;

North 48 degrees 01 minutes and 44 seconds West, for a distance of 391.40 feet, to a 2-1/2 inch iron pipe fence post found for corner;

North 51 degrees 36 minutes and 55 seconds West, for a distance of 301.87 feet, to a 2-1/2 inch iron pipe fence post found for corner;

and North 40 degrees 25 minutes and 09 seconds West, for a distance of 318.71 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Westerly Southwest corner of the Hill Toomey Farms, LLC called 77.858 acre tract (Volume 1751 – Page 403, see also Volume 1707 – Page 697, Tract J, see also Volume 1542 – Page 478) and at the West corner of the residue of said 70-1/2 acres, from which an axle found at the Westerly Northwest corner of said 77.858 acres, the Westerly Northwest corner of said 70-1/2 acres, a Northwest corner of said 5876.294 acres and at the Northeast corner of said 38 acres bears North 38 degrees 37 minutes and 00 seconds West, a distance of 124.97 feet;

Thence South 77 degrees 14 minutes and 34 seconds East, across said 5876.294 acres, along the North line of the residue of said 70-1/2 acres and along the South line of said 77.858 acres, for a distance of 1719.46 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Southeast corner of said 77.858 acres;

Thence continuing across said 5876.294 acres and along the East line of said 77.858 acres as follows:

North 23 degrees 22 minutes and 33 seconds East, for a distance of 773.21 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 63 degrees 26 minutes and 52 seconds East, for a distance of 252.40 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 47 degrees 12 minutes and 07 seconds East, for a distance of 161.36 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 15 degrees 01 minutes and 40 seconds East, for a distance of 84.22 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 02 degrees 26 minutes and 17 seconds East, for a distance of 144.17 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and North 64 degrees 12 minutes and 36 seconds West, for a distance of 134.02 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

Thence continuing across said 5876.294 acres, continuing along the East line of said 77.858 acres and across said 3728.76 acres as follows:

North 31 degrees 04 minutes and 27 seconds West, for a distance of 178.96 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 02 degrees 10 minutes and 10 seconds East, for a distance of 172.46 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 22 degrees 35 minutes and 23 seconds East, for a distance of 408.92 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 77 degrees 56 minutes and 56 seconds East, for a distance of 278.66 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 67 degrees 34 minutes and 41 seconds East, for a distance of 143.33 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 61 degrees 15 minutes and 29 seconds East, for a distance of 227.37 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 26 degrees 07 minutes and 00 seconds East, for a distance of 711.70 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and North 01 degrees 21 minutes and 48 seconds West, for a distance of 683.99 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northeast corner of said 77.858 acres;

Thence South 89 degrees 06 minutes and 19 seconds West, along the North line of said 77.858 acres, across said 5876.294 acres and across said 3728.76 acres, for a distance of 444.71 feet, to a point for corner on the North side of a 24 inch Post Oak tree at the Southeast corner of said 76.88 acres (P.I. 21) and at a reentrant corner of said 3728.76 acres;

Thence South 87 degrees 32 minutes and 47 seconds West, continuing across said 5876.294 acres, continuing along the North line of said 77.858 acres, along the South line of said 76.88 acres and along a North line of said 3728.76 acres, for a distance of 294.85 feet, to a 1/2 inch iron rod found for corner at the Southeast corner of the Bobby J. Junior called 254.6847 acre tract (Volume 1591 – Page 64);

Thence across said 76.88 acres, across said 120.45 acres (P.I. 12), across said 5876.294 acres, along the Southerly North line and the Northerly South line of said 254.6847 acres, as follows:

North 11 degrees 13 minutes and 49 seconds West, for a distance of 286.67 feet, to a 1/2 inch iron rod found for corner;

North 68 degrees 44 minutes and 36 seconds West, for a distance of 381.89 feet, to a Cedar fence corner post found for corner;

South 76 degrees 57 minutes and 51 seconds West, for a distance of 277.30 feet, to a Cedar fence corner post found for corner

North 38 degrees 05 minutes and 14 seconds West, for a distance of 467.16 feet, to a 1/2 inch iron rod found for corner at a Cedar fence corner post;

North 61 degrees 07 minutes and 16 seconds West, for a distance of 990.66 feet, to a 1/2 inch iron rod found for corner at a Cedar fence corner post;

North 37 degrees 20 minutes and 01 seconds West, for a distance of 565.59 feet, to a 1/2 inch iron rod found for corner at a Cedar fence corner post;

North 44 degrees 58 minutes and 17 seconds East, for a distance of 771.22 feet, to a Cedar fence corner post found for corner;

South 89 degrees 41 minutes and 02 seconds East, for a distance of 640.16 feet, to a Cedar fence corner post found for corner;

South 65 degrees 33 minutes and 32 seconds East, for a distance of 896.32 feet, to a 1/2 inch iron rod found for corner at a Cedar fence corner post;

and North 85 degrees 55 minutes and 14 seconds East, for a distance of 396.54 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a Cedar fence post at the Northerly Southeast corner of said 254.6847 acres, at the Southwest corner of the Oscar Stanley Thornton and Gail M. Thornton, Trustees of the O.S. and G.M. Thornton Living Trust called 64.7371 acre tract (Instrument 2102433, Tract Seven), in the East line of said 76.88 acres and in a West line of said 3728.76 acres;

Thence along the South, Southeast and East lines of said 64.7371 acres and across said 5876.294 acres and said 3728.76 acres as follows:

North 85 degrees 52 minutes and 22 seconds East, for a distance of 477.71 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner, from which a 6 inch Cedar fence post found for witness bears North 44 degrees 13 minutes and 16 seconds West, a distance of 1.72 feet;

North 33 degrees 59 minutes and 15 seconds East, for a distance of 290.10 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner, from which a 6 inch wood fence corner post found for witness bears North 81 degrees 09 minutes and 22 seconds West, a distance of 1.16 feet;

North 22 degrees 54 minutes and 15 seconds West, for a distance of 424.80 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a T-Bar and at a 6 inch Cedar fence corner post;

North 45 degrees 27 minutes and 44 seconds East, for a distance of 408.99 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a T-Bar and at an 8 inch Cedar fence corner post;

South 64 degrees 13 minutes and 31 seconds East, for a distance of 267.61 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner, from which an 8 inch Cedar fence corner post bears North 22 degrees 51 minutes and 26 seconds West, a distance of 1.54 feet;

North 43 degrees 03 minutes and 11 seconds East, for a distance of 313.84 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a T-Bar and at a 6 inch wood fence post;

North 55 degrees 00 minutes and 42 seconds East, for a distance of 803.94 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a T-Bar, from which a 12 inch Cedar fence corner post bears North 55 degrees 40 minutes and 16 seconds West, a distance of 0.92 feet;

and North 03 degrees 14 minutes and 32 seconds West, for a distance of 538.66 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a 16 inch wood fence post at the Southwest corner of the residue of said 11.99 acres (P.I. 10) and in a North line of said 3728.76 acres;

Thence North 10 degrees 20 minutes and 11 seconds East, continuing along the East line of said 64.7371 acres, along the West line of the residue of said 11.99 acres and across said 5876.294 acres, for a distance of 976.16 feet, to a T-Bar found for corner at the North corner of said 11.99 acres, in a West line of said 3728.76 acres, at a reentrant corner of said 5876.294 acres and at a Southeast corner of the residue of the Oscar Stanley Thornton and Gail M. Thornton, Trustees of the O.S. and G.M. Thornton Living Trust called 100 acre tract (Instrument 2102433, Tract Five);

Thence North 02 degrees 11 minutes and 13 seconds West, along a West line of said 5876.294 acres, along a West line of said 3728.76 acres and along the East line of said 100 acres, for a distance of 1150.95 feet,

to an iron spike found for corner at a T-Bar and a fallen cross tie fence post, at the Northeast corner of said 100 acres, at a Northwest corner of said 5876.294 acres, at a Northwest corner of said 3728.76 acres and in the South line of the Oscar Stanley Thornton and Gail M. Thornton, Trustees of the O.S. and G.M. Thornton Living Trust called 174.592 acre tract (Instrument 2102433, Tract Six), from which a 2 inch iron pipe fence corner post found for witness bears South 52 degrees 35 minutes and 07 seconds East, a distance of 2.88 feet;

Thence North 87 degrees 02 minutes and 48 seconds East, along a North line of said 5876.294 acres, along a North line of said 3728.76 acres and along the South line of said 174.592 acres, for a distance of 300.22 feet, to a 5/8 inch iron rod found for corner at the Southeast corner of said 174.592 acres, at the West corner of said 10.00 acres (Tract 286) and at a reentrant corner of said 5876.294 acres, from which a 2 inch iron pipe fence corner post found for witness bears South 80 degrees 57 minutes and 38 seconds East, a distance of 1.10 feet;

Thence North 40 degrees 29 minutes and 26 seconds East, along the Northwest line of said 10.00 acres, along a Northwest line of said 5876.294 acres and along the Southeast line of said 174.592 acres, for a distance of 1054.34 feet, to a 1/2 inch iron rod found for corner at the North corner of said 10.00 acres, at the East corner of said 174.592 acres, in a Southwest line of said 3728.76 acres and at a reentrant corner of said 5876.294 acres, from which a 2 inch iron pipe fence corner post found witness bears North 51 degrees 38 minutes and 56 seconds East, a distance of 5.68 feet;

Thence North 31 degrees 17 minutes and 51 seconds West, along the Northeast line of said 174.592 acres, along a Southwest line of said 5876.294 acres and along a Southwest line of said 3728.76 acres, for a distance of 420.30 feet, to a 3/8 inch iron rod at a T-Bar found for corner at a West corner of said 3728.76 acres and at the South corner of the residue of said 179.34 acres (Tract 297);

Thence North 32 degrees 07 minutes and 38 seconds West, continuing along the Northeast line of said 174.592 acres, along the Southwest line of said 179.34 acres and along a Southwest line of said 5876.294 acres, for a distance of 610.54 feet, to a 1/2 inch iron rod at a T-Bar found for corner at the Northeast corner of said 174.592 acres and at the Southeast corner of said 55.0 acres (Tract 310), from which a 2 inch iron pipe fence corner post found for witness bears North 30 degrees 54 minutes and 37 seconds East, a distance of 0.92 feet;

Thence South 86 degrees 47 minutes and 55 seconds West, along the North line of said 174.592 acres and the South line of said 55.0 acres, for a distance of 2620.61 feet, to a 1/2 inch iron rod found for corner at the West corner of said 55.0 acres, at a West corner of said 5876.294 acres and in the Southeast line of said 90.000 acres (Tract 262), from which a T-Bar found for witness bears South 61 degrees 20 minutes and 47 seconds West, a distance of 17.89 feet;

Thence along the Northwest line of said 174.592 acres, along the Southeast line of said 90.000 acres, along the Southeast line of said 23.000 acres (Tract 293), along the Southeast line of the residue of said 8.574 acres (Tract 284) and along the Southeast line of part of said 80.999 acres (Tract 266) as follows:

South 61 degrees 13 minutes and 52 seconds West, for a distance of 439.89 feet, to a 3/8 inch iron rod found for corner at the Southwest corner of said 90.000 acres and at the Southeast corner of said 23.000 acres;

South 61 degrees 08 minutes and 44 seconds West, for a distance of 416.02 feet, to a fence post found for corner at the East corner of the residue of said 8.574 acres;

South 54 degrees 23 minutes and 45 seconds West, for a distance of 329.58 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 57 degrees 46 minutes and 41 seconds West, for a distance of 153.72 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 65 degrees 54 minutes and 05 seconds West, for a distance of 82.46 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 57 degrees 57 minutes and 10 seconds West, for a distance of 155.24 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and South 54 degrees 51 minutes and 20 seconds West, for a distance of 273.55 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at a reentrant corner of said 174.592 acres;

Thence North 36 degrees 31 minutes and 05 seconds West, along a Northeast line of said 174.592 acres, for a distance of 146.56 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the North corner of said 174.592 acres and in the Southeast ROW line of F.M. Road No. 2570, from which a 6 inch wood fence corner post found for witness bears South 09 degrees 20 minutes and 28 seconds East, a distance of 0.83 feet;

Thence along said Southeast ROW line, across said 80.999 acres, across said 23.000 acres, across said 90.000 acres, along the Northwest line of the residue of said 10.000 acres (Tract 292), along the Northwest line of the residue of said 0.374 acres (Tract 290A), along the Northwest line of the residue of said 0.374 acres (Tract 290), along the Northwest line of the residue of said 13.2 acres (Tract 291), along the North line of said 0.967 acres (Tract 295A) and along the North line of said 4.139 acres (Tract 295) as follows:

North 55 degrees 05 minutes and 02 seconds East, for a distance of 579.32 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post bears South 85 degrees 58 minutes and 26 seconds East, a distance of 1.10 feet;

North 57 degrees 55 minutes and 36 seconds East, for a distance of 328.49 feet, to a 5/8 inch iron rod found for corner, from which a 6 inch wood fence post found for witness bears North 73 degrees 55 minutes and 03 second West, a distance of 0.63 feet;

North 54 degrees 02 minutes and 42 seconds East, for a distance of 429.45 feet, to a 60D nail found for corner, from which a 6 inch wood fence post found for witness bears South 42 degrees 48 minutes and 51 seconds East, a distance of 1.30 feet;

North 51 degrees 56 minutes and 52 seconds East, for a distance of 438.19 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

North 37 degrees 24 minutes and 42 seconds East, for a distance of 473.24 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post found for witness bears North 66 degrees 01 minutes and 04 seconds East, a distance of 0.88 feet;

North 34 degrees 45 minutes and 23 seconds East, for a distance of 337.13 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post found for witness bears North 10 degrees 20 minutes and 18 seconds East, a distance of 1.08 feet;

North 30 degrees 39 minutes and 55 seconds East, for a distance of 333.41 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner, from which a 6 inch wood fence post found for witness bears North 55 degrees 10 minutes and 16 seconds West, a distance of 1.06

feet;

North 18 degrees 44 minutes and 04 seconds East, for a distance of 465.77 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post found for witness bears North 75 degrees 49 minutes and 46 seconds East, a distance of 0.62 feet;

North 22 degrees 48 minutes and 25 seconds East, for a distance of 1138.80 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post found for witness bears South 00 degrees 20 minutes and 23 seconds East, a distance of 0.84 feet;

North 28 degrees 44 minutes and 52 seconds East, for a distance of 354.73 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner, from which a 6 inch wood fence post found for witness bears North 32 degrees 50 minutes and 19 seconds East, a distance of 2.61 feet;

North 42 degrees 03 minutes and 35 seconds East, for a distance of 313.86 feet, to a Type II concrete ROW monument found for corner, from which a 6 inch wood fence post found for witness bears North 57 degrees 48 minutes and 30 seconds East, a distance of 1.30 feet;

North 49 degrees 57 minutes and 40 seconds East, for a distance of 315.81 feet, to a 5/8 inch iron rod with a cap stamped "SEMPCO" found for corner, from which a fence post found for witness bears South 76 degrees 26 minutes and 16 seconds East, a distance of 1.41 feet;

North 69 degrees 07 minutes and 39 seconds East, for a distance of 315.48 feet, to a Type II concrete ROW monument found for corner;

North 72 degrees 59 minutes and 02 seconds East, for a distance of 313.81 feet, to a Type II concrete ROW monument found for corner at the P.C. of a curve to the right, from which a gate post found for witness bears North 86 degrees 09 minutes and 55 seconds East, a distance of 3.69 feet;

Northeasterly, 203.90 feet, with said curve to the right, which has a radius of 3058.13 feet, a central angle of 03 degrees 49 minutes and 13 seconds, and a chord that bears North 82 degrees 45 minutes and 30 seconds East, for a chord distance of 203.87 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the P.C. of said curve;

and North 84 degrees 40 minutes and 06 seconds East, for a distance of 241.08 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Northeast corner of said 4.139 acres and at the Northwest corner of the Dorothy Hunter called 4.6 acre tract (Volume 1664 – Page 701), which is also described as 4.593 acres by Certified Plat and Field Notes prepared in March, 1996 by Joe L. Wilson, R.P.L.S. #2957;

Thence South 14 degrees 55 minutes and 30 seconds East, along the East line of said 4.139 acres and the West line of said 4.593 acres, for a distance of 512.54 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner at the Southeast corner of said 4.139 acres, at the Southwest corner of said 4.593 acres, in a Northwest line of said 5876.294 acres and in the Northwest line of said 179.34 acres (Tract 297);

Thence North 48 degrees 18 minutes and 56 seconds East, along the Northwest line of said 5876.294 acres, along the Northwest line of said 179.34 acres and along the Southeast line of said 4.593 acres, for a distance of 879.90 feet, to a T-Bar found for corner at the East corner of the residue of said 179.34 acres and at a Northwest corner of the Falcon Development called 44.14 acre tract (Instrument #2019-1904025);

Thence along the West and South line of said 44.14 acres, along the East line and Northwest line of the residue of said 179.34 acres and along the Northwest line of the residue of said 95.56 acres (Tract 307), as follows:

South 26 degrees 54 minutes and 32 seconds West, for a distance of 480.18 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 55 degrees 47 minutes and 27 seconds East, for a distance of 653.23 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 52 degrees 48 minutes and 59 seconds East, for a distance of 861.83 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 66 degrees 10 minutes and 06 seconds East, for a distance of 185.57 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 76 degrees 55 minutes and 37 seconds East, for a distance of 235.95 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and North 78 degrees 31 minutes and 38 seconds East, for a distance of 706.42 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Southeast corner of said 44.14 acres and in the West line of the Falcon Development, LLC called 813.0 acre tract (Instrument #2019-1904025, Less and Except 8.6495 acres):

Thence across said 5876.294 acres, along the common line of said 813.0 acres and the Falcon Development, LLC called 0.604 acre tract (Instrument #2020-2003916), the residue of said 95.56 acres, the residue of said 78.21 acres (Tract 302), the residue of said 66.08 acres (P.I. 17), the residue of said 36.7 acres (Tract 309), the residue of said 80.11 acres (Tract 294), the residue of said 10.00 acres (P.I. 6), the residue of said 21.92 acres (P.I. 16) and the residue of said 22-1/6 acres (P.I. 28) as follows:

South 49 degrees 18 minutes and 49 seconds East, for a distance of 100.93 feet, to a 2 inch metal post found for corner;

South 28 degrees 05 minutes and 50 seconds East, for a distance of 146.29 feet, to a 2 inch metal post found for corner;

South 28 degrees 03 minutes and 53 seconds East, for a distance of 764.76 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 65 degrees 15 minutes and 11 seconds East, for a distance of 237.03 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 27 degrees 52 minutes and 48 seconds East, for a distance of 171.58 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 76 degrees 28 minutes and 49 seconds East, for a distance of 85.72 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 53 degrees 25 minutes and 54 seconds East, for a distance of 256.17 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 29 degrees 18 minutes and 31 seconds East, for a distance of 217.14 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 35 degrees 00 minutes and 21 seconds East, for a distance of 177.43 feet, to a point for corner near a guardrail;

North 81 degrees 52 minutes and 52 seconds East, for a distance of 16.35 feet, to a point for corner near a guardrail;

North 77 degrees 00 minutes and 26 seconds East, for a distance of 49.65 feet, to a point for corner near a guardrail;

North 71 degrees 21 minutes and 11 seconds East, for a distance of 49.76 feet, to a point for corner near a guardrail;

North 61 degrees 52 minutes and 45 seconds East, for a distance of 49.81 feet, to a point for corner near a guardrail;

North 55 degrees 27 minutes and 20 seconds East, for a distance of 24.85 feet, to a point for corner near a guardrail;

North 48 degrees 37 minutes and 21 seconds East, for a distance of 49.72 feet, to a point for corner near a guardrail;

North 34 degrees 50 minutes and 28 seconds East, for a distance of 49.61 feet, to a point for corner near a guardrail;

North 24 degrees 46 minutes and 48 seconds East, for a distance of 49.86 feet, to a point for corner near a guardrail;

North 20 degrees 39 minutes and 42 seconds East, for a distance of 49.82 feet, to a point for corner near a guardrail;

North 20 degrees 55 minutes and 36 seconds East, for a distance of 50.20 feet, to a point for corner near a guardrail;

North 22 degrees 21 minutes and 20 seconds East, for a distance of 50.04 feet, to a point for corner near a guardrail;

North 23 degrees 20 minutes and 48 seconds East, for a distance of 49.93 feet, to a point for corner near a guardrail;

North 25 degrees 23 minutes and 13 seconds East, for a distance of 76.86 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 76 degrees 35 minutes and 35 seconds West, for a distance of 226.50 feet, to a point for corner;

South 88 degrees 38 minutes and 49 seconds West, for a distance of 21.48 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 03 degrees 15 minutes and 54 seconds East, for a distance of 40.41 feet, to a point for corner;

North 15 degrees 47 minutes and 04 seconds East, for a distance of 243.96 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 78 degrees 04 minutes and 08 seconds East, for a distance of 48.34 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 59 degrees 41 minutes and 40 seconds East, for a distance of 171.28 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 31 degrees 03 minutes and 26 seconds East, for a distance of 386.66 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 53 degrees 06 minutes and 42 seconds East, for a distance of 344.22 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 72 degrees 20 minutes and 48 seconds East, for a distance of 1121.91 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 89 degrees 13 minutes and 21 seconds East, for a distance of 290.77 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 74 degrees 19 minutes and 41 seconds East, for a distance of 265.23 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 63 degrees 08 minutes and 52 seconds East, for a distance of 258.54 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 28 degrees 44 minutes and 29 seconds East, for a distance of 55.57 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 09 degrees 43 minutes and 29 seconds West, for a distance of 95.09 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 23 degrees 39 minutes and 54 seconds East, for a distance of 141.33 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 20 degrees 45 minutes and 26 seconds East, for a distance of 59.28 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 62 degrees 11 minutes and 09 seconds East, for a distance of 210.03 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 35 degrees 54 minutes and 07 seconds East, for a distance of 143.01 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 38 degrees 36 minutes and 04 seconds East, for a distance of 186.86 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 37 degrees 48 minutes and 12 seconds East, for a distance of 113.12 feet, to a 1/2 inch iron rod with

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a cap stamped "RPLS 4021" found for corner;

North 32 degrees 15 minutes and 02 seconds East, for a distance of 140.65 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 33 degrees 13 minutes and 31 seconds East, for a distance of 87.57 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 23 degrees 11 minutes and 19 seconds West, for a distance of 121.14 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 02 degrees 57 minutes and 31 seconds East, for a distance of 151.99 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 09 degrees 03 minutes and 55 seconds West, for a distance of 201.53 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 35 degrees 30 minutes and 54 seconds East, for a distance of 165.94 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 28 degrees 52 minutes and 35 seconds West, for a distance of 18.82 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 69 degrees 41 minutes and 03 seconds West, for a distance of 85.26 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 52 degrees 16 minutes and 17 seconds West, for a distance of 149.97 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 49 degrees 19 minutes and 00 seconds West, for a distance of 212.46 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 10 degrees 57 minutes and 56 seconds West, for a distance of 31.02 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 65 degrees 44 minutes and 14 seconds East, for a distance of 31.02 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 75 degrees 54 minutes and 42 seconds East, for a distance of 271.33 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 79 degrees 37 minutes and 37 seconds East, for a distance of 15.78 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 14 degrees 20 minutes and 42 seconds West, for a distance of 165.27 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 10 degrees 52 minutes and 45 seconds East, for a distance of 146.12 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 09 degrees 58 minutes and 12 seconds West, for a distance of 149.30 feet, to a 1/2 inch iron rod with

a cap stamped "RPLS 4021" found for corner;

North 50 degrees 39 minutes and 51 seconds West, for a distance of 87.20 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 83 degrees 33 minutes and 17 seconds West, for a distance of 191.36 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 48 degrees 09 minutes and 40 seconds West, for a distance of 202.44 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 17 degrees 19 minutes and 32 seconds East, for a distance of 27.22 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 60 degrees 46 minutes and 32 seconds West, for a distance of 85.88 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

South 87 degrees 20 minutes and 00 seconds West, for a distance of 390.10 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and North 02 degrees 57 minutes and 12 seconds West, for a distance of 157.66 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner, from which a 1/2 inch iron rod with a cap stamped "RPLS 4021" found at a reentrant corner of said 813.0 acres bears North 02 degrees 57 minutes and 12 seconds West, a distance of 242.32 feet;

Thence across said 22-1/6 acres (P.I. 28), across said 22-1/6 acres (P.I. 32), across said 13.181 acres (P.I. 52), across said 3728.76 acres, across said 5876.294 acres and across said 53.727 acres (P.I. 51), as follows:

North 87 degrees 31 minutes and 54 seconds East, for a distance of 1131.73 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 89 degrees 12 minutes and 57 seconds East, for a distance of 217.73 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 81 degrees 10 minutes and 12 seconds East, for a distance of 268.94 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 70 degrees 48 minutes and 55 seconds East, for a distance of 471.70 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 57 degrees 02 minutes and 50 seconds East, for a distance of 495.78 feet, to a 1/2 inch iron rod with a cap stamped "LACY SURVEYING PROPERTY CORNER" set for corner;

South 56 degrees 31 minutes and 10 seconds West, for a distance of 109.14 feet, to the place of beginning and containing 5005.3 acres of land, save and except the following (2) described cemetery tracts, leaving a net acreage of 4999.67 acres of land.

HOPEWELL CEMETERY

All that certain tract, lot or parcel of land, a part of the J.N. Acosta Grant A-1, Freestone County, Texas and also being the 2.82 acre tract of land (1.86 acres and a 0.96 acres) save and excepted from the 5876.294

acre tract of land described in a deed from Henry E. Jones, Trustee to Dallas Power and Light Company, et al, dated October 28, 1971, recorded in Volume 412, Page 540 of the Deed Records of Freestone County, Texas and being more completely described as follows, to wit:

METES AND BOUNDS DESCRIPTION

Beginning at a chain link fence corner found for corner at the occupied West corner of the above mentioned 1.86 acre tract, from which a T-Bar found for corner at the most Easterly corner of said 5879.294 acres and said 3728.76 acres bears South 85 degrees 27 minutes and 04 seconds East, a distance of 5442.95 feet and said beginning point has a Texas Central NAD 83 grid coordinate value of (N: 10,650,965.08) (E: 3,626,003.97);

Thence North 22 degrees 03 minutes 25 seconds East, along the occupied Northwest boundary line of said 1.86 acres, for a distance of 254.62 feet, to a chain link fence corner found for corner at the occupied North corner of said tract;

Thence South 68 degrees 18 minutes 51 seconds East, along the occupied Northeast boundary line of said 1.86 acres, for a distance of 361.99 feet, to a chain link fence corner found for corner at the occupied East corner of said tract;

Thence South 35 degrees 13 minutes 08 seconds West, along the occupied Southeast boundary line of said 1.86 acres, for a distance of 319.65 feet, to a chain link fence corner found for corner at the occupied South corner of said 1.86 acres and being in the occupied Northeast boundary line of said 0.96 acres;

Thence South 30 degrees 52 minutes 46 seconds East, along said occupied Northeast boundary line, for a distance of 90.84 feet, to a chain link fence corner found for corner at the occupied East corner of said 0.96 acres;

Thence South 53 degrees 29 minutes 52 seconds West, along the occupied Southwest boundary line of said 0.96 acres, for a distance of 137.37 feet, to a chain link fence corner found for corner at the occupied South corner of said 0.96 acres;

Thence North 29 degrees 59 minutes 18 seconds West, along the occupied Northwest boundary line of said 0.96 acres and the occupied Northwest boundary line of said 1.86 acres, for a distance of 367.84 feet, to the place of beginning, and containing 2.85 acres.

CHANCELLOR UNION CEMETERY

All that certain tract lot or parcel of land, a part of the M.R. Palacios Grant A-20, Freestone County, Texas and also being the Union Cemetery tract saved and excepted from the 5876.294 acre tract of land described in a deed from Henry E. Jones, Trustee to Dallas Power and Light Company, et al, dated October 28, 1971, recorded in Volume 412, Page 540 of the Deed Records of Freestone County, Texas and also being that certain called 4-1/2 acre tract described in a deed dated September 29, 1995 from Regular Predestinarian Primitive Baptist Church to Chancellor Union Cemetery Association that is recorded in Volume 968, Page 347 of the Deed Records of Freestone County, Texas and shown by resurvey as 2.781 acres by Certified Plat and Field Notes prepared on April 3, 1997 by Martin James Raymond, R.P.L.S.#1858 and being more completely described as follows to wit;

METES AND BOUNDS DESCRIPTION

Beginning at a chain link fence corner found for corner at the occupied North corner of the above mentioned

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2.781 acre tract, which has a Texas Central NAD 83 grid coordinate value of (N: 10,632,660.57) (E: 3,620,167.39);

Thence South 36 degrees 10 minutes 41 seconds East, along the occupied Northeast boundary line of said tract, for a distance of 207.10 feet, to a chain link fence corner found for corner at the occupied East corner of said tract;

Thence South 32 degrees 20 minutes 57 seconds West, along the occupied Southeast line of said tract, for a distance of 381.61 feet, to a chain link fence corner found for corner at the occupied Southeast corner of said tract;

Thence South 62 degrees 24 minutes 51 seconds West, along the occupied South boundary line of said tract, for a distance of 134.46 feet, to a chain link fence corner found for corner at the occupied South corner of said tract;

Thence North 10 degrees 46 minutes 53 seconds West, along the occupied West boundary line of said tract, for a distance of 384.28 feet, to a chain link fence corner found for corner at the occupied Northwest corner of said tract;

Thence North 57 degrees 26 minutes 22 seconds East, along the occupied Northwest boundary line of said tract, for a distance of 323.91 feet, to the place of beginning, and containing 2.78 acres.

Tract 6: (Fee Simple)

Beginning at a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Southwest corner of said 0.604 acres and at a reentrant corner of the Falcon Development, LLC, called 813.0 acre tract (Instrument #1904025, Tract 3) which has a NAD 27, Texas North Central Coordinate value of (N: 58,281.46) (E: 2,449,030.84);

Thence along and East line of said 813.0 acres and the West line of said 0.604 acres as follows;

North 09 degrees 38 minutes and 26 seconds West, for a distance of 73.00 feet, to a 2-1/2 inch metal gate post found for corner;

North 01 degrees 20 minutes and 26 seconds East, for a distance of 71.33 feet, to a 60d nail with a washer stamped "RPLS 4021" found for corner;

and North 18 degrees 50 minutes and 28 seconds East, for a distance of 100.67 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner and being 25.0 feet horizontally from the 310.0 feet contour line of Lake Fairfield:

Thence along a South line of said 813.0 acres, along the North line of said 0.604 acres and 25.0 feet horizontally from and parallel to the 310.0 feet contour line of Lake Fairfield as follows:

North 76 degrees 34 minutes and 35 seconds East, for a distance of 34.19 feet, to an "x" found chiseled in concrete for corner;

North 38 degrees 13 minutes and 12 seconds East, for a distance of 31.60 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

North 70 degrees 39 minutes and 04 seconds East, for a distance of 32.24 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner;

and South 76 degrees 39 minutes and 12 seconds East, for a distance of 37.81 feet, to a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northeast corner of said 0.604 acres and at a Northwest corner of the residue of the Henry E. Jones, Trustee called 34.7 acre tract (Volume 376, Page 649), from which a 1/2 inch iron rod with a cap stamped "RPLS 4021" found in said South line bears South 76 degrees 39 minutes and 12 seconds East, 48.34 feet;

Thence along the East line of said 0.604 acres and the West line of the residue of said 34.7 acres and crossing Lake Fairfield as follows;

South 17 degrees 12 minutes and 01 seconds West, for a distance of 243.98 feet, to a point for corner;

and South 04 degrees 40 minutes and 50 seconds West, for a distance of 40.41 feet, to a point for corner at the Southeast corner of said 0.604 acres and in a North line of said 813.0 acres, from which a 1/2 inch iron rod with a cap stamped "RPLS 4021" found in said North line bears South 89 degrees 56 minutes and 14 seconds East, 21.48 feet;

Thence North 89 degrees 56 minutes and 14 seconds West, along the South line of said 0.604 acres and along a North line of said 813.0 acres, for a distance of 66.52 feet, to the place of beginning and containing **0.604 acres.**

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EXHIBIT A-1

DESCRIPTION OF WATER TRANSPORT EASEMENTS

Tract 2: (Easement)

Easements over and across 1.277 acres described in Easement dated April 4, 1968, from L.L. Bonner et ux to Henry E. Jones, Trustee, recorded in Volume 378, Page 436, Deed Records of Freestone County, Texas.

Tract 3: (Easement)

Easement over and across 21.90 acres described as Tract A in Easement dated December 24, 1968, from Hugh Bonner et ux to Henry E. Jones, Trustee, recorded in Volume 387, Page 218, Deed Records of Freestone County, Texas.

as amended by Easement over and across 3.23 acres described as Tract B in Amendment of Easement dated March 12, 1969, from Hugh Bonner et ux to Henry E. Jones, Trustee, recorded in Volume 390, Page 158, Deed Records of Freestone County, Texas.

Tract 4: (Easement)

Easement over and across 15.446 acres described in Easement dated January 2, 1969, from F.R. Hill, individually and Henry E. Jones, Trustee, recorded in Volume 387, Page 222, Deed Records of Freestone County, Texas.

Tract 5: (Easement)

Easement over and across 0.12 acres described as Tract 31-1A and 0.091 acre described as Tract 31-1B in Easement dated December 23, 1968, from L.L. Bonner et ux to Henry E. Jones, Trustee, recorded in Volume 387, Page 226, Deed Records of Freestone County, Texas.

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EXHIBIT B

DESCRIPTION OF RECLAMATION EASEMENTS

Reclamation Easement East

Being an easement upon, over and across the J.N. Acosta Grant A-1, Freestone County, Texas and also being upon, over and across those certain tracts of land listed below that are recorded in the Deed Records or Official Public Records of Freestone County, Texas and being more completely described as follows to wit;

Henry E. Jones, Trustee, to Dallas Power & Light Company, et al, dated October 28, 1971, and recorded in Volume 412, Page 540, part of called 5876.294 acres, less and except 1.86 acres for Hopewell Church, 0.96 acres for Hopewell Cemetery, together with Road from F.M. 2570 to Church and less and except Union Cemetery and County Road to same;

P.I. 29 – F.R. Hill, Trustee, to Henry E. Jones, Trustee, dated March 6, 1968, and recorded in Volume 378, Page 756, part of called 3728.76 acres;

P.I. 28 – Minnie B. Tolliver to Henry E. Jones, Trustee, dated June 24, 1968 and recorded in Volume 382, Page 712, part of called 22-1/6 acres;

P.I. 32 - Hattie Mae Lee, et vir Floyd, to Henry E. Jones, Trustee, dated June 12, 1968, and recorded in Volume 382, Page 715, part of called 22-1/6 acres;

P.I. 52 – Willie C. Keeton, et ux Willie Maxine, to Texas Utilities Mining Company dated September 7, 1994 and recorded in Volume 939, Page 693, part of called 13.181 acres;

P.I. 51 – Blanche Lee Jackson, et al, to Texas Utilities Mining Company dated August 9, 1994 and recorded in Volume 937, Page 206, part of called 53.727 acres;

METES AND BOUNDS DESCRIPTION

Beginning at a 1/2 inch iron rod with a cap stamped "Lacy Surveying Easement Corner" set for corner in an East boundary line of the above mentioned 5876.294 acres, in an East boundary line of said 3728.76 acres, in the Northerly West boundary line of the Luminant Big Brown Mining Company LLC, called 231.420 acre tract (Volume 1519 – Page 111) and also being in an East boundary line of a 4999.67 acre tract surveyed this same date and said beginning point has a Texas Central NAD 83 Grid Coordinate value of (N: 10,653,011.09) (E: 3,630,147.65);

Thence across the above mentioned tracts and said 4999.67 acres as follows;

North 58 degrees 01 minutes 37 seconds West, for a distance of 570.49 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

North 62 degrees 54 minutes 50 seconds West, for a distance of 285.23 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

North 58 degrees 26 minutes 54 seconds West, for a distance of 367.56 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

North 67 degrees 16 minutes 30 seconds West, for a distance of 264.82 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

and South 86 degrees 04 minutes 31 seconds West, for a distance of 1238.54 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner in the Northerly West boundary line of said part of 22-1/6 acres (Volume 382 – Page 712) and in the Northerly West boundary line of said 4999.67 acres, from which a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northerly Southwest corner of said 22-1/6 acres and said 4999.67 acres bears South 02 degrees 57 minutes and 12 seconds East, a distance of 61.14 feet;

Thence North 02 degrees 57 minutes 12 seconds West, along said lines, for a distance of 96.52 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner at the Northerly Northwest corner of said 4999.67 acres, from which a 1/2 inch iron rod with a cap stamped "RPLS 4021" found for corner at the Northwest corner of said 22-1/6 acres bears North 02 degrees 57 minutes and 12 seconds West, a distance of 242.32 feet;

Thence continuing across said tracts and along the North boundary line of said 4999.67 acres as follows;

Thence North 87 degrees 31 minutes 54 seconds East, for a distance of 1131.75 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner;

South 89 degrees 12 minutes 52 seconds East, for a distance of 217.72 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner;

South 81 degrees 10 minutes 17 seconds East, for a distance of 268.93 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner;

South 70 degrees 48 minutes 53 seconds East, for a distance of 471.71 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner;

and South 57 degrees 02 minutes 50 seconds East, for a distance of 495.78 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" set for corner at the Northerly Northeast corner of said 4999.67 acres, in the Southeast boundary line of said 53.727 acres and in the Northwest boundary line of said 231.420 acres;

Thence South 56 degrees 31 minutes 10 seconds West, along said lines and the Northerly Southeast boundary line of said 4999.67 acres, the Southeast boundary line of said 53.727 acres and the Northwest boundary line of said 231.420 acres, for a distance of 109.14 feet, to a 1/2 inch iron rod with cap stamped "Stanger" found for corner at a Northeast corner of said 5876.294 acres, at a Northeast corner of said 3728.76 acres, at a reentrant corner of said 4999.67 acres and being at the Northwest corner of said 231.420 acres;

Thence South 30 degrees 25 minutes 02 seconds East, along an East boundary line of said 5876.294 acres and said 3728.76 acres and an East boundary line of said 4999.67 acres and along the West boundary line of said 231.420 acres, for a distance of 298.94 feet, to the place of beginning, and containing 8.461 acres.

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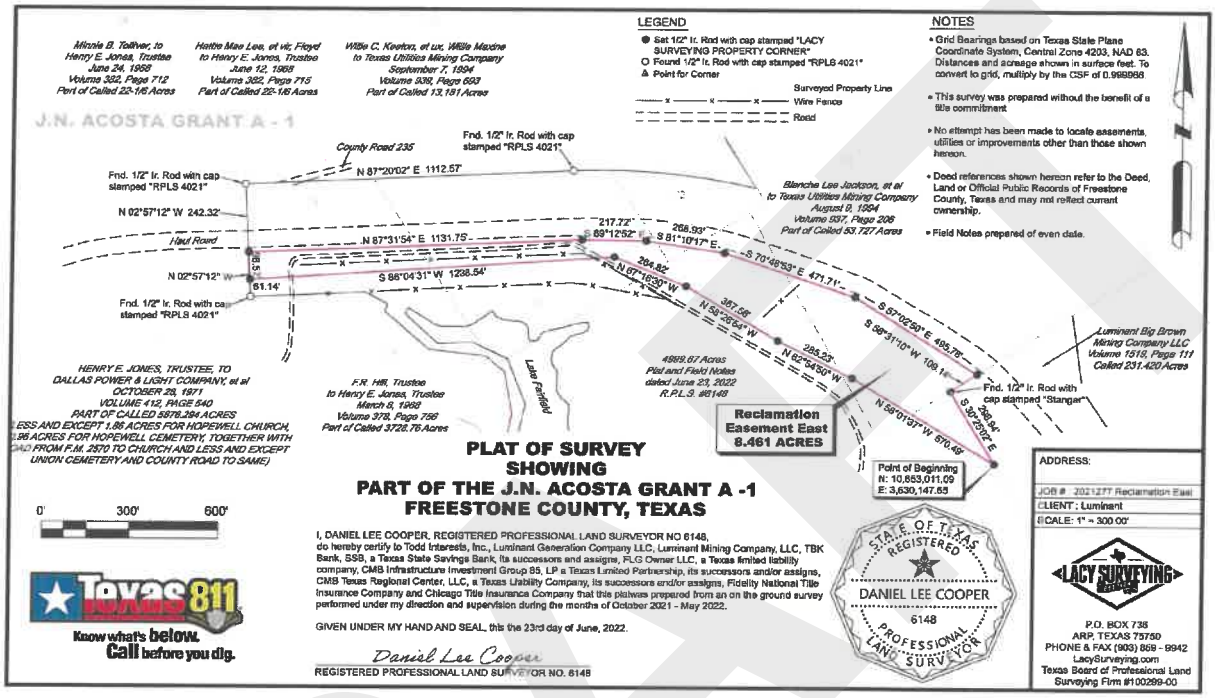
Reclamation Easement East Depiction



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Reclamation Easement West

Being an easement upon, over and across the Justo Pepi & Jose de Jesus Grande Grant A-21 and the J.N. Acosta Grant A-1, Freestone County, Texas and also being upon, over and across those certain tracts of land listed below that are recorded in the Deed Records or Official Public Records of Freestone County, Texas and being more completely described as follows to wit;

Henry E. Jones, Trustee, to Dallas Power & Light Company, et al, dated October 28, 1971 that is recorded in Volume 412, Page 540, part of called 5876.294 acres, less and except 1.86 acres for Hopewell Church, 0.96 acres for Hopewell Cemetery, together with Road from F.M. 2570 to Church and less and except Union Cemetery and County Road to same;

Tr. 262, Tr. 262A and Tr. 293 – Bette Reed to Texas Utilities Mining Company dated December 17, 1986 that is recorded in Volume 739, Page 851, part of called 90.000 acres, First Tract, Exhibit A, and part of called 23.000 acres, Second Tract;

Tr. 297 – Agnes Kent, et al, to Henry E. Jones, Trustee, dated April 5, 1968 that is recorded in Volume 378, Page 457, residue of called 179.34 acres, Tract No. 1;

Tr. 310 – L.P. Awalt, et ux Fannie Ruth, to Henry E. Jones, Trustee, dated April 4, 1968 that is recorded in Volume 378, Page 425, called 55.0 acres;

Tr. 284 – Peggy Gunter Thornton to Texas Utilities Mining Company dated November 6, 1985 that is recorded in Volume 707, Page 309, residue of called 8.574 acres, Tract Three, Exhibit B;
Tr. 266 – Lena Mae Fryer, et vir Francis, to Texas Utilities Mining Company dated July 25, 1994 that is recorded in Volume 935, Page 817, part of called 80.999 acres, Tract Three:

METES AND BOUNDS DESCRIPTION
Beginning at a 1/2 inch iron rod with a cap stamped "Lacy Surveying Easement Corner" set for corner in the East right-of-way (R.O.W.) line of F.M. Road 2570 and in the Northwest boundary line of a 4999.67 acre tract surveyed this same date, which bears South 28 degrees 44 minutes and 52 seconds West, a distance of 22.76 feet, from a 1/2 inch iron rod with a cap stamped "Lacy Surveying Property Corner" set for corner in said lines, and said beginning point has a Texas Central NAD 83 Coordinate value of (N: 10,650,553.42) (E: 3,619,499.10);

Thence across the above mentioned 5876.294 acre tract, the 90.000 acre tract, the residue of called 179.34 acre tract, and said 55.0 acre tract as follows;

South 26 degrees 32 minutes 44 seconds East, for a distance of 423.77 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 29 degrees 51 minutes 42 seconds East, for a distance of 368.03 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 24 degrees 06 minutes 42 seconds East, for a distance of 204.01 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 04 degrees 09 minutes 28 seconds West, for a distance of 428.53 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 15 degrees 36 minutes 48 seconds West, for a distance of 248.53 feet, to a 1/2 inch iron rod with cap

stamped "Lacy Surveying Easement Corner" set for corner;

South 11 degrees 53 minutes 22 seconds West, for a distance of 117.10 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 52 degrees 22 minutes 57 seconds West, for a distance of 245.04 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 56 degrees 05 minutes 09 seconds West, for a distance of 324.18 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 54 degrees 44 minutes 16 seconds West, for a distance of 295.02 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 55 degrees 29 minutes 21 seconds West, for a distance of 256.45 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 55 degrees 04 minutes 11 seconds West, for a distance of 451.54 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

and South 34 degrees 11 minutes 07 seconds West, for a distance of 407.82 feet, to a 1/2 inch iron rod found for corner at a West corner of said 5876.294 acres, at the West corner of said 55.0 acres, in the South boundary line of said part of 90.000 acres, at a Northwest corner of the O.S. & G.M. Thornton Living Trust called 174.592 acre tract (Instrument 2102433, Tract Six) and also being in a South boundary line of said 4999.67 acres, from which a t-bar found for reference bears South 61 degrees 20 minutes and 47 seconds West, a distance of 17.89 feet;

Thence South 61 degrees 13 minutes 52 seconds West, along said lines and along the North boundary line of said 174.592 acres, for a distance of 439.89 feet, to a 3/8 inch iron rod found for corner at the Southwest corner of said part of 90.000 acres and at the Southeast corner of the above mentioned part of 23.000 acre tract;

Thence South 61 degrees 08 minutes 44 seconds West, along the South boundary line of said part of 23.000 acres and continuing along the North boundary line of said 174.592 acres and the South boundary line of said 4999.67 acres, for a distance of 416.02 feet, to a fence post found for corner at the East corner of the residue of the above mentioned 8.574 acre tract;

Thence along the South boundary line of said residue of 8.574 acres and continuing along North boundary lines as follows;

South 54 degrees 23 minutes 45 seconds West, for a distance of 329.58 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner;

South 57 degrees 46 minutes 41 seconds West, for a distance of 153.72 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner;

South 65 degrees 54 minutes 05 seconds West, for a distance of 82.46 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner;

South 57 degrees 57 minutes 10 seconds West, for a distance of 155.24 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner;

and South 54 degrees 51 minutes 20 seconds West, for a distance of 273.55 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner at a reentrant corner of said 174.592 acres and at a Southwest corner of said 4999.67 acres;

Thence North 36 degrees 31 minutes 05 seconds West, along a Northeast line of said 174.592 acres and a West boundary line of said 4999.67 acres, for a distance of 146.56 feet, to a 1/2 inch iron rod with cap stamped "RPLS 4021" found for corner at a Northeast corner of said 174.592 acres, at a Northwest corner of said 4999.67 acres and also being in the Southeast R.O.W. line of F.M. Road 2570, from which a 6 inch wood fence corner post found for reference bears South 09 degrees 20 minutes and 28 seconds East, a distance of 0.83 feet;

Thence along said Southeast R.O.W line and across said 80.999 acres, and across said 23.000 acres, and across said 90.000 acres and along a Northwest boundary line of said 4999.67 acres as follows;

North 55 degrees 05 minutes 02 seconds East, for a distance of 579.32 feet, to a type II ROW monument found for corner, from which a 6 inch wood fence post found for reference bears South 85 degrees 58 minutes and 26 seconds East, a distance of 1.10 feet;

North 57 degrees 55 minutes 36 seconds East, for a distance of 328.49 feet, to a 5/8 inch iron rod found for corner, from which a 6 inch wood fence post found for reference bears North 73 degrees 55 minutes and 03 seconds West, a distance of 0.63 feet;

North 54 degrees 02 minutes 42 seconds East, for a distance of 429.45 feet, to a 60d nail found for corner, from which a 6 inch wood fence post found for reference bears South 42 degrees 48 minutes and 51 seconds East, a distance of 1.30 feet;

North 51 degrees 56 minutes 52 seconds East, for a distance of 438.19 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" found for corner;

North 37 degrees 24 minutes 42 seconds East, for a distance of 473.24 feet, to a type II R.O.W. monument found for corner, from which a 6 inch wood fence post bears North 66 degrees 01 minutes and 04 seconds East, a distance of 0.88 feet;

North 34 degrees 45 minutes 23 seconds East, for a distance of 337.13 feet, to a type II R.O.W. monument found for corner, from which a 6 inch wood fence post found for reference bears North 10 degrees 20 minutes and 18 seconds East, a distance of 1.08 feet;

North 30 degrees 39 minutes 55 seconds East, for a distance of 333.41 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Property Corner" found for corner. from which a 6 inch wood fence post found for reference bears North 55 degrees 10 minutes and 16 seconds West, a distance of 1.06 feet;

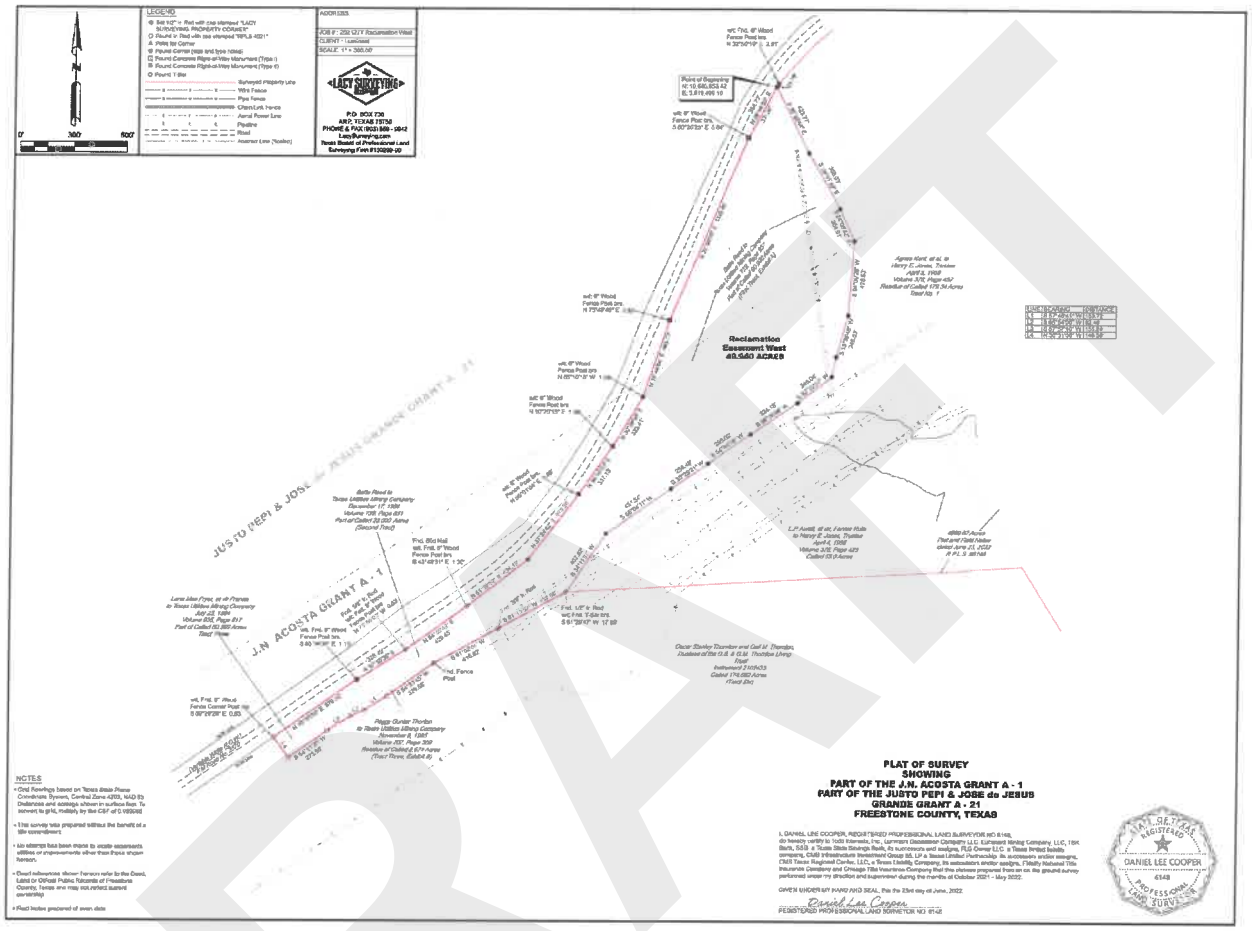
North 18 degrees 44 minutes 04 seconds East, for a distance of 465.77 feet, to a type II R.O.W. monument found for corner, from which a 6 inch wood fence post found for reference bears North 75 degrees 49 minutes and 46 seconds East, a distance of 0.62 feet;

North 22 degrees 48 minutes 25 seconds East, for a distance of 1138.80 feet, to a type II R.O.W. monument found for corner, from which a 6 inch wood fence post found for reference bears South 00 degrees 20 minutes and 23 seconds East, a distance of 0.84 feet;

and North 28 degrees 44 minutes 52 seconds East, for a distance of 331.97 feet, to the place of beginning, and containing **49.94 acres**.

DRAFT

Reclamation Easement West



DRAFT

Long Term Stream Management Easement

Being an easement upon, over and acrsoss the M.R. Palacios Grant A-20, Freestone County, Texas and also being upon, over and across that certain called 5876.294 acres, Less and Except 1.86 acres for Hopewell Church, 0.96 acres for Hopewell Cemetery, together with Road from F.M. 2570 to church, and Less and Except Union Cemetery and County Road to same, that is described in a deed dated October 28, 1971 from Henry E. Jones, Trustee, to Dallas Power & Light Company, et al, that is recorded in Volume 412, Page 540 and also being upon, over and across that certain called 3728.76 acre tract of land that is described in a deed dated March 6, 1968 from F.R. Hill. Trustee, to Henry E. Jones, Trustee, that is recorded in Volume 378, Page 756 and both of the above instruments are recorded in the Deed Records of Freestone County, Texas and being more completely described as follows to wit;

METES AND BOUNDS DESCRIPTION

Beginning at a 1/2 inch iron rod with a cap stamped "Lacy Surveying Easement Corner" set for corner, which bears North 53 degrees 39 minutes and 32 seconds West, a distance of 998.85 feet, from a 5/8 inch slick iron rod found for corner at a Southeast corner of the above mentioned 5876.294 acre tract and said 3728.76 acre tract, and also being at a Southeast corner of a 4999.67 acre tract surveyed this same date and said beginning point has a Texas Central NAD 83 Coordinate value of (N: 10,633,773.04) (E: 3,627,093.02);

Thence across said tracts as follows;

South 79 degrees 22 minutes 31 seconds West, for a distance of 42.35 feet, to a point for corner;

South 81 degrees 29 minutes 27 seconds West, for a distance of 48.78 feet, to a point for corner;

South 83 degrees 56 minutes 32 seconds West, for a distance of 51.36 feet, to a point for corner at the P.C. of a curve to the right;

Northwesterly, 147.97 feet, along said curve, which has a central angle of 12 degrees 35 minutes and 04 seconds, a radius of 673.70 feet, a chord which bears North 89 degrees 45 minutes 56 seconds West, for a chord distance of 147.67 feet, to a point for corner at the P.T. of said curve and at the P.C. of a compound curve to the right;

Northwesterly, 335.19 feet, along said compound curve, which has a central angle of 32 degrees 18 minutes and 15 seconds, a radius of 594.50 feet, a chord which bears North 65 degrees 25 minutes 32 seconds West, for a chord distance of 330.77 feet, to a point for corner at the P.T. of said curve;

North 49 degrees 16 minutes 25 seconds West, for a distance of 221.07 feet, to a point for corner;

North 52 degrees 29 minutes 08 seconds West, for a distance of 49.30 feet, to a point for corner at the P.T. of a curve to the left;

Northwesterly, 83.64 feet, along said curve, which has a central angle of 13 degrees 18 minutes and 36 seconds, a radius of 360.02 feet, a chord which bears North 59 degrees 08 minutes 26 seconds West, for a chord distance of 83.45 feet, to a 1/2 inch iron rod with a cap stamped "Lacy Surveying Easement Corner" set for corner;

North 29 degrees 28 minutes 44 seconds East, for a distance of 370.90 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

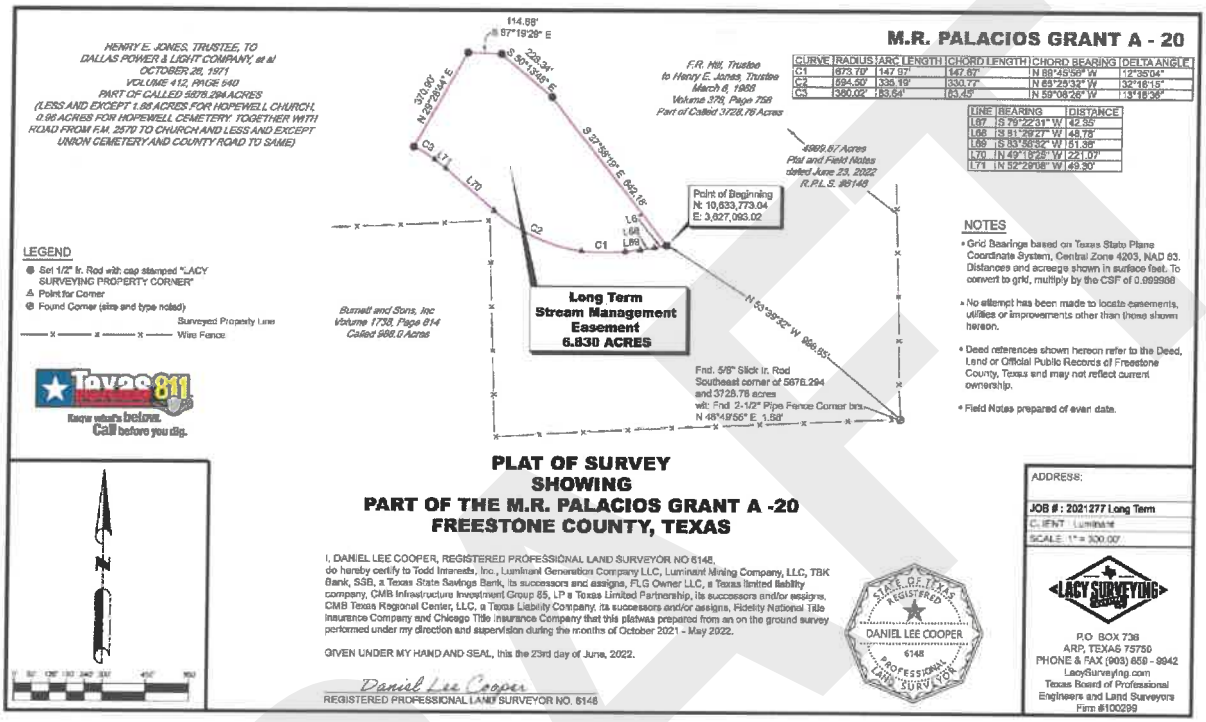
South 87 degrees 19 minutes 29 seconds East, for a distance of 114.68 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

South 50 degrees 13 minutes 48 seconds East, for a distance of 228.34 feet, to a 1/2 inch iron rod with cap stamped "Lacy Surveying Easement Corner" set for corner;

and South 37 degrees 58 minutes 19 seconds East, for a distance of 642.18 feet, to the place of beginning, and containing 6.830 acres.

DRAFT

Long Term Stream Management Easement



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	873.70'	147.97'	147.67'	N 89°45'59" W	12°39'04"
C2	594.50'	335.19'	330.77'	N 68°25'32" W	32°16'15"
C3	380.02'	83.64'	83.45'	N 59°06'26" W	12°36'36"

LINE	BEARING	DISTANCE
L67	S 79°22'31" W	42.35'
L68	S 81°29'27" W	48.75'
L69	S 83°58'52" W	51.35'
L70	N 49°18'25" W	221.07'
L71	N 52°29'08" W	49.30'

DRAFT

Access Road Easement

Being an easement, 30.00 feet in width, 15.00 feet each side of the following described line, upon, over and across the M.R. Palacios Grant A-20, Freestone County, Texas and upon over and across those certain tracts listed below which are recorded in the Deed Records or Official Public Records of Freestone County, Texas and being more completely described as follows, to wit;

Henry E. Jones, Trustee, to Dallas Power & Light Company, et al, dated October 28, 1971, that is recorded in Volume 412, Page 540, part of called 5876.294 acres, Less and Except 1.86 acres for Hopewell Church, 0.96 acres for Hopewell Cemetery, together with Road from F.M. 2570 to Church and Less and Except Union Cemetery and County Road to same;

P.I. 29 – F.R. Hill, Trustee, to Henry E. Jones, Trustee, dated March 6, 1968, that is recorded in Volume 378, Page 756, part of called 3728.76 acres;

P.I. 1 – L.L. Bonner, et ux Catherine, to Henry E. Jones, Trustee, dated April 4, 1968 that is recorded in Volume 378, Page 477, Residue of called 220 acres, First Tract and called 40 acres, Second Tract;

P.I. 3 – Tom Lindley, et ux Lavada, to Henry E. Jones dated March 26, 1968 that is recorded in Volume 378, Page 445, called 27.02 acres;

CENTERLINE DESCRIPTION FOR EASEMENT

Beginning at a point for corner in the East right-of-way (R.O.W.) line of F.M. Road 3285, which bears North 01 degrees 59 minutes and 10 seconds West, a distance of 734.64 feet, from a 1/2 inch iron rod with a cap stamped "Lacy Surveying Property Corner" set at a Southwest corner of the above mentioned 5876.294 acre tract, at the Southwest corner of the residue of the above mentioned 220 acre tract, at the Southeast corner of the Flora Hamill Crenshaw called 5.052 acre tract (Volume 404 – Page 459) and at a Southwest corner of a 4999.67 acre tract surveyed this same date, and a 1/2 inch iron rod with a cap stamped "Lacy Surveying Property Corner" set at a reentrant corner of said 4999.67 acres bears South 01 degrees 04 minutes and 13 seconds East, a distance of 44.79 feet, and a 1/2 inch iron rod with a cap stamped "Lacy Surveying Property Corner" set at a reentrant corner of said 4999.67 acres bears North 01 degrees 04 minutes and 13 seconds West, a distance of 55.21 feet, and said beginning point has a Texas Central NAD 83 Coordinate value of (N:10,631,140.00) (E: 3,620,061.30);

Thence across the above mentioned tracts and along the centerline of an existing road as follows;

South 89 degrees 46 minutes 41 seconds East, for a distance of 28.41 feet, to an angle point; South 70 degrees 59 minutes 18 seconds East, for a distance of 119.52 feet, to an angle point; North 89 degrees 45 minutes 31 seconds East, for a distance of 202.31 feet, to an angle point; North 68 degrees 32 minutes 03 seconds East, for a distance of 147.30 feet, to an angle point; North 88 degrees 38 minutes 55 seconds East, for a distance of 74.03 feet, to an angle point; South 89 degrees 29 minutes 40 seconds East, for a distance of 163.18 feet, to a point at the P.C. of a curve to the right;

Southeasterly, 242.00 feet, along said curve, which has a central angle of 53 degrees 42 minutes and 17 seconds, a radius of 258.18 feet, a chord which bears South 64 degrees 25 minutes 32 seconds East, for a chord distance of 233.24 feet, to a point at the P.T. of said curve;

South 37 degrees 34 minutes 24 seconds East, for a distance of 407.87 feet, to an angle point; South 34 degrees 27 minutes 59 seconds East, for a distance of 77.32 feet, to an angle point;

South 27 degrees 15 minutes 06 seconds East, for a distance of 124.30 feet, to an angle point;

South 20 degrees 17 minutes 43 seconds East, for a distance of 163.24 feet, to a point at the P.C. of a curve to the right;

Southeasterly, 338.76 feet, along said curve, which has a central angle of 29 degrees 38 minutes and 47 seconds, a radius of 654.70 feet, a chord which bears South 05 degrees 28 minutes 20 seconds East, for a chord distance of 334.99 feet, to a point at the P.T. of said curve;

South 09 degrees 21 minutes 04 seconds West, for a distance of 142.03 feet, to an angle point;

South 06 degrees 45 minutes 52 seconds West, for a distance of 32.76 feet, to a point at the P.C. of a curve to the left;

Southeasterly, 199.27 feet, along said curve, which has a central angle of 34 degrees 34 minutes and 58 seconds, a radius of 330.14 feet, a chord which bears South 10 degrees 31 minutes 37 seconds East, for a chord distance of 196.26 feet, to a point at the P.T. of said curve;

South 27 degrees 49 minutes 06 seconds East, for a distance of 45.66 feet, to an angle point;

South 33 degrees 41 minutes 13 seconds East, for a distance of 77.02 feet, to a point at the P.C. of a curve to the left;

Southeasterly, 296.95 feet, along said curve, which has a central angle of 70 degrees 51 minutes and 36 seconds, a radius of 240.11 feet, a chord which bears South 69 degrees 07 minutes 00 seconds East, for a chord distance of 278.38 feet, to a point at the P.T. of said curve;

North 75 degrees 27 minutes 12 seconds East, for a distance of 65.63 feet, to an angle point;

North 70 degrees 09 minutes 14 seconds East, for a distance of 83.39 feet, to an angle point;

North 67 degrees 10 minutes 55 seconds East, for a distance of 843.48 feet, to an angle point;

North 70 degrees 32 minutes 38 seconds East, for a distance of 76.25 feet, to a point at the P.C. of a curve to the right;

Southeasterly, 228.04 feet, along said curve, which has a central angle of 56 degrees 44 minutes and 57 seconds, a radius of 230.24 feet, a chord which bears South 81 degrees 04 minutes 54 seconds East, for a chord distance of 218.84 feet, to a point at the P.T. of said curve;

South 52 degrees 42 minutes 25 seconds East, for a distance of 31.68 feet, to an angle point;

South 43 degrees 39 minutes 33 seconds East, for a distance of 81.05 feet, to an angle point; South 42 degrees 37 minutes 14 seconds East, for a distance of 84.48 feet, to an angle point;

South 59 degrees 28 minutes 17 seconds East, for a distance of 53.32 feet, to a point at the P.C. of a curve to the left;

Southeasterly, 194.98 feet, along said curve, which has a central angle of 47 degrees 50 minutes and 33 seconds, a radius of 233.50 feet, a chord which bears South 83 degrees 23 minutes 34 seconds East, for a chord distance of 189.36 feet, to a point at the P.T. of said curve;

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North 72 degrees 41 minutes 10 seconds East, for a distance of 71.73 feet, to an angle point;

North 67 degrees 38 minutes 35 seconds East, for a distance of 128.75 feet, to a point at the P.C. of a curve to the right;

Northeasterly, 283.41 feet, along said curve, which has a central angle of 19 degrees 39 minutes and 02 seconds, a radius of 826.36 feet, a chord which bears North 77 degrees 28 minutes 06 seconds East, for a chord distance of 282.03 feet, to a point at the P.T. of said curve;

North 87 degrees 17 minutes 37 seconds East, for a distance of 118.48 feet, to a point at the P.C. of a curve to the left;

Northeasterly, 201.99 feet, along said curve, which has a central angle of 35 degrees 27 minutes and 31 seconds, a radius of 326.39 feet, a chord which bears North 67 degrees 50 minutes 23 seconds East, for a chord distance of 198.78 feet, to a point at the P.T. of said curve;

North 50 degrees 06 minutes 38 seconds East, for a distance of 79.30 feet, to an angle point;

North 48 degrees 34 minutes 08 seconds East, for a distance of 166.27 feet, to an angle point;

North 45 degrees 05 minutes 46 seconds East, for a distance of 71.68 feet, to a point at the P.C. of a curve to the left;

Northeasterly, 217.99 feet, along said curve, which has a radius of 251.07 feet, a chord which bears North 20 degrees 13 minutes 20 seconds East, for a chord distance of 211.21 feet, to a point at the P.T. of said curve;

North 04 degrees 39 minutes 05 seconds West, for a distance of 37.13 feet, to an angle point;

North 12 degrees 24 minutes 01 seconds West, for a distance of 79.90 feet, to an angle point;

North 14 degrees 21 minutes 14 seconds West, for a distance of 161.33 feet, to an angle point;

North 12 degrees 23 minutes 45 seconds West, for a distance of 159.29 feet, to an angle point;

North 08 degrees 32 minutes 16 seconds West, for a distance of 83.31 feet, to an angle point;

North 04 degrees 48 minutes 19 seconds West, for a distance of 129.69 feet, to an angle point;

North 01 degrees 41 minutes 47 seconds West, for a distance of 87.40 feet, to an angle point;

North 00 degrees 39 minutes 59 seconds East, for a distance of 83.91 feet, to an angle point;

North 02 degrees 50 minutes 24 seconds East, for a distance of 77.22 feet, to an angle point;

North 04 degrees 54 minutes 13 seconds East, for a distance of 83.44 feet, to an angle point;

North 05 degrees 39 minutes 08 seconds East, for a distance of 487.54 feet, to an angle point;

North 04 degrees 44 minutes 28 seconds East, for a distance of 271.77 feet, to an angle point;

North 05 degrees 15 minutes 49 seconds West, for a distance of 25.15 feet, to an angle point;

North 03 degrees 12 minutes 12 seconds West, for a distance of 98.42 feet, to at an angle point;

North 11 degrees 38 minutes 59 seconds West, for a distance of 85.78 feet, to an angle point;

North 14 degrees 31 minutes 49 seconds West, for a distance of 58.05 feet, to a point at the P.C. of a curve to the right;

Northwesterly, 177.50 feet, along said curve, which has a central angle of 31 degrees 08 minutes and 15 seconds, a radius of 326.62 feet, a chord which bears North 00 degrees 34 minutes 51 seconds West, for a chord distance of 175.33 feet, to a point at the P.T. of said curve;

North 14 degrees 59 minutes 17 seconds East, for a distance of 105.80 feet, to an angle point;

North 11 degrees 13 minutes 53 seconds East, for a distance of 53.67 feet, to an angle point;

North 04 degrees 04 minutes 05 seconds East, for a distance of 73.84 feet, to an angle point;

North 00 degrees 43 minutes 53 seconds West, for a distance of 448.38 feet, to an angle point;

North 05 degrees 46 minutes 56 seconds West, for a distance of 81.28 feet, to an angle point;

North 11 degrees 01 minutes 28 seconds West, for a distance of 248.53 feet, to a point at the P.C. of a curve to the right;

Northeasterly, 209.38 feet, along said curve, which has a central angle of 28 degrees 18 minutes and 56 seconds, a radius of 423.68 feet, a chord which bears North 03 degrees 08 minutes 00 seconds East, for a chord distance of 207.26 feet, to a point at the P.T. of said curve;

North 17 degrees 17 minutes 28 seconds East, for a distance of 91.72 feet, to an angle point;

North 23 degrees 45 minutes 52 seconds East, for a distance of 30.91 feet, to a point at the P.C. of a curve to the right;

Northeasterly, 282.81 feet, along said curve, which has a Central Angle of 61 degrees 55 minutes and 20 seconds, a radius of 261.68 feet, a chord which bears North 54 degrees 43 minutes 32 seconds East, for a chord distance of 269.24 feet, to a point at the P.T. of said curve;

North 85 degrees 41 minutes 12 seconds East, for a distance of 43.19 feet, to an angle point;

North 82 degrees 48 minutes 32 seconds East, for a distance of 74.52 feet, to an angle point;

North 75 degrees 12 minutes 10 seconds East, for a distance of 79.71 feet, to an angle point;

North 73 degrees 14 minutes 30 seconds East, for a distance of 182.89 feet, to a point at the P.C. of a curve to the right;

Southeasterly, 226.20 feet, along said curve, which has a central angle of 36 degrees 58 minutes and 56 seconds, a radius of 350.45 feet, a chord which bears South 88 degrees 16 minutes 02 seconds East, for a chord distance of 222.30 feet, to a point at the P.T. of said curve;

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South 69 degrees 46 minutes 34 seconds East, for a distance of 82.42 feet, to an angle point;

South 75 degrees 25 minutes 35 seconds East, for a distance of 55.37 feet, to an angle point;

South 86 degrees 04 minutes 37 seconds East, for a distance of 87.67 feet, to an angle point;

North 86 degrees 40 minutes 47 seconds East, for a distance of 117.25 feet, to an angle point;

North 81 degrees 21 minutes 37 seconds East, for a distance of 122.74 feet, to an angle point;

North 76 degrees 26 minutes 05 seconds East, for a distance of 73.93 feet, to an angle point;

North 70 degrees 46 minutes 52 seconds East, for a distance of 271.03 feet, to a point at the P.C. of a curve to the right;

Southeasterly, 341.64 feet, along said curve, which has a central angle of 56 degrees 44 minutes and 00 seconds, a radius of 345.02 feet, a chord which bears South 80 degrees 51 minutes 08 seconds East, for a chord distance of 327.85 feet, to a point at the P.T. of said curve;

South 52 degrees 29 minutes 08 seconds East, for a distance of 48.88 feet, to an angle point;

South 49 degrees 16 minutes 25 seconds East, for a distance of 220.65 feet, to a point at the P.C. of a curve to the left;

Southeasterly, 343.90 feet, along said curve, which has a central angle of 32 degrees 19 minutes and 39 seconds, a radius of 609.50 feet, a chord which bears South 65 degrees 26 minutes 14 seconds East, for a chord distance of 339.35 feet, to the P.T. of said curve and at the P.C. of a compound curve to the left;

Southeasterly, 151.51 feet, along said compound curve, which has a central angle of 12 degrees 36 minutes and 18 seconds, a radius of 688.70 feet, a chord which bears South 89 degrees 45 minutes 19 seconds East, for a chord distance of 151.21 feet, to a point at the P.T. of said curve;

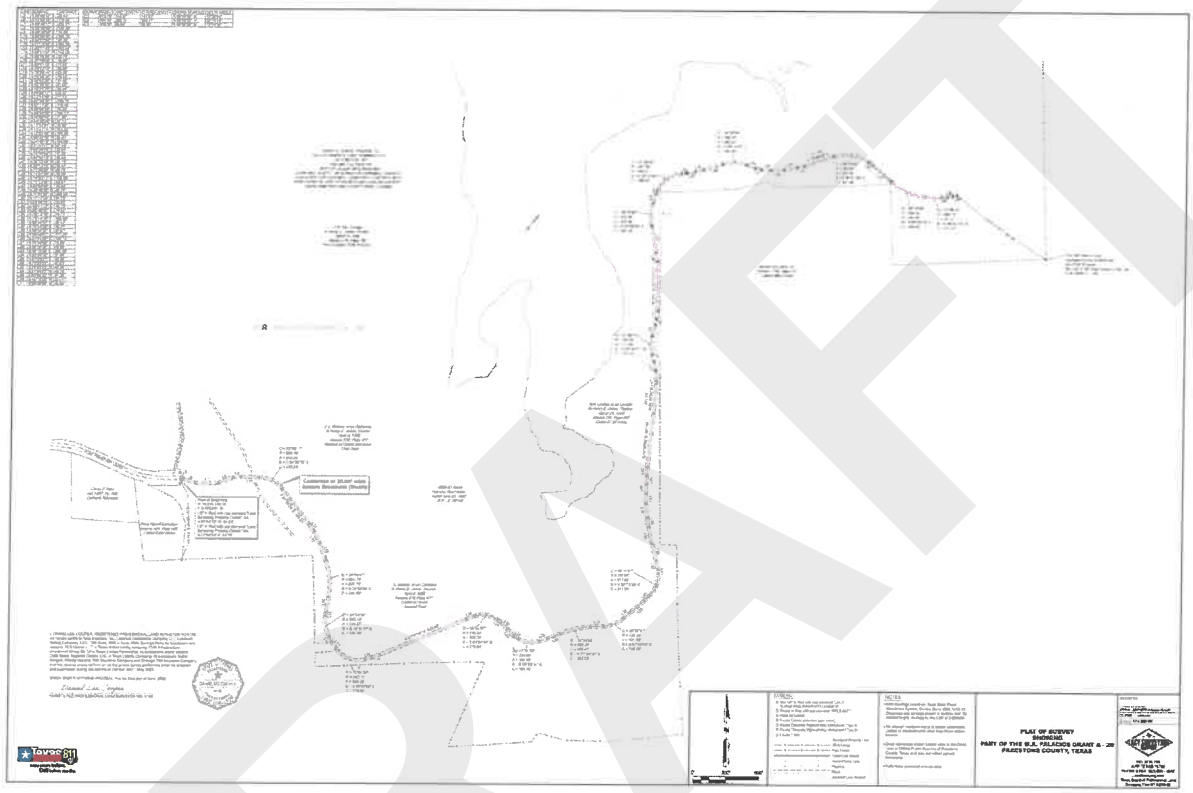
North 83 degrees 56 minutes 32 seconds East, for a distance of 51.69 feet, to an angle point;

North 81 degrees 29 minutes 27 seconds East, for a distance of 49.38 feet, to an angle point;

and North 79 degrees 22 minutes 31 seconds East, for a distance of 42.63 feet, to a point at the end of said easement, from which a 5/8 inch slick iron rod found at a Southeast corner of said 5876.294 acres and said 3728.76 acres bears South 54 degrees 15 minutes and 10 seconds East, a distance of 987.93 feet.

DRAFT

Access Road Easement Depiction



DRAFT

Appendix "B"

Assignment of Certificate of Adjudication

DRAFT

VG-232-2023-2302272

Freestone County
Renee Reynolds
Freestone County Clerk

Instrument Number: 2302272

Real Property Recordings

ASSIGNMENT

Recorded On: June 02, 2023 01:23 PM

Number of Pages: 7

" Examined and Charged as Follows: "

Total Recording: $46.00

********** THIS PAGE IS PART OF THE INSTRUMENT **********
Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

File Information:

Document Number:	2302272
Receipt Number:	20230602000018
Recorded Date/Time:	June 02, 2023 01:23 PM
User:	Alicia D
Station:	CCLERK02

Record and Return To:

FREESTONE COUNTY TITLE COMPANY
PO BOX 517

FAIRFIELD TX 75840

STATE OF TEXAS
COUNTY OF FREESTONE

I hereby certify that this Instrument was FILED In the File Number sequence on the date/time printed hereon, and was duly RECORDED in the Official Records of Freestone County, Texas.

Renee Reynolds
Freestone County Clerk
Freestone County, TX

Renee Reynolds

DRAFT

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

ASSIGNMENT OF CERTIFICATE OF ADJUDICATION

THE STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF FREESTONE §

LUMINANT GENERATION COMPANY LLC, a Texas limited liability company, **LUMINANT MINING COMPANY LLC**, a Texas limited liability company, and **BIG BROWN POWER COMPANY LLC**, a Texas limited liability company (collectively, "**Assignor**"), for and in consideration of the sum of $10.00 and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, has **GRANTED, BARGAINED, SOLD, CONVEYED, TRANSFERRED AND ASSIGNED,** and by these presents does hereby **GRANT, BARGAIN, SELL, CONVEY, TRANSFER AND ASSIGN** unto **FLG OWNER, LLC**, a Texas limited liability company ("**Assignee**") the following:

> All right, title and interest of Assignor in and to Certificate of Adjudication No. 08-5040, a copy of which is attached hereto as Exhibit A (as may have been amended from time to time, the "**Certificate of Adjudication**"), including without limitation the right to divert and beneficially use not less than 13,650, and up to 14,150, acre-feet of total consumptive water rights, together with the right to maintain and operate the existing dam and appurtenant works of improvement necessary to impound not to exceed 50,600 acre-feet of water, SAVE AND EXCEPT a small portion of the consumptive water rights under the Certificate of Adjudication, not to exceed 500 acre-feet of total consumptive water rights, which is hereby retained by Assignor, for use in its reclamation activities mandated by the Railroad Commission of Texas, under the Certificate of Adjudication (collectively, the "**Assigned Water Rights**").

TO HAVE AND TO HOLD the Assigned Water Rights unto Assignee, its successors and assigns forever, and Assignee hereby takes assignment of, and assumes for all purposes, the Assigned Water Rights, and the Assignor does hereby bind the Assignor and Assignor's successors to warrant and forever defend, all and singular, all such right, title and interest of Assignor in and to the Assigned Water Rights unto the Assignee, and Assignee's successors and assigns, against every person whomsoever lawfully claiming or to claim the same, or any part thereof, by, through and under Assignor, but not otherwise, subject to all matters of public record, including all matters that would be disclosed by a current, accurate review of any and all applicable governmental records, including the applicable records of the Texas Commission on Environmental Quality.

Assignee's address is: 400 North Ervay, Suite 150, Dallas, Texas 75201.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

EXECUTED as of the dates set forth below, but to be effective as of June 1, 2023.

ASSIGNOR:

LUMINANT GENERATION COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

LUMINANT MINING COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

BIG BROWN POWER COMPANY LLC,
a Texas limited liability company

By: _____
Name: Matthew Goering
Title: Senior Vice-President

THE STATE OF TEXAS §
§
COUNTY OF Dallas §

This instrument was acknowledged before me on May 25, 2023, by Matthew Goering, of Luminant Generation Company LLC, a Texas limited liability company, Luminant Mining Company LLC, a Texas limited liability company, and Big Brown Power Company LLC, a Texas limited liability company, on behalf of said limited liability companies and in the capacity therein stated.

_____
Notary Public, State of Texas

TONY ST CLAIR
Notary ID #130937183
My Commission Expires
December 19, 2024

DRAFT

ASSIGNEE:

FLG OWNER, LLC,
a Texas limited liability company

By: _____
Name: Patricks Todd
Title: Manager

THE STATE OF TEXAS §
§
COUNTY OF Dallas §

This instrument was acknowledged before me on May 30, 2023, by [Patricks.Todd], as [Manager] of FLG OWNER, LLC, a Texas limited liability company, on behalf of said limited liability company.

SHERRI A. WOODS
Notary Public, State of Texas
Comm. Expires 02-27-2026
Notary ID 7556726

_____
Notary Public, State of Texas

AFTER RECORDING RETURN TO:

DRAFT

EXHIBIT A

2408500000

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 08-5040

OWNER: Texas Utilities Electric Company
Attention: Environmental Services
400 North Olive Street
Lockbox 81
Dallas, Texas 75201

COUNTY: Freestone

PRIORITY DATE: December 18, 1967

WATERCOURSE: Big Brown Creek, tributary of Tawakoni Creek, tributary of the Trinity River

BASIN: Trinity River

WHEREAS, by final decree of the 66th Judicial District Court of Hill County, in Cause No. 28,952 In Re: The Adjudication of Water Rights in the Middle Trinity River Segment of the Trinity River Basin dated September 4, 1986 a right was recognized under Permit 2351A authorizing the Texas Utilities Electric Company to appropriate waters of the State of Texas as set forth below;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Trinity River Basin is issued to the Texas Utilities Electric Company, subject to the following terms and conditions:

1. IMPOUNDMENT

Owner is authorized to maintain an existing dam and reservoir on Big Brown Creek (Lake Fairfield) and impound therein not to exceed 50,600 acre-feet of water. The dam is located in the Juan Nepomuceno Acosta Grant, Abstract 1 and the Ezekiel Weaver Survey, Abstract 642, Freestone County, Texas.

2. USE

Owner is authorized to divert and consumptively use not to exceed 14,150 acre-feet of water per annum from the aforesaid reservoir for industrial (thermal-electric power generation) purposes.

3. DIVERSION

A. Location
At the perimeter of the aforesaid reservoir.

B. Maximum rate: 2680.00 cfs (1,206,000 gpm).

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4. PRIORITY

The time priority of owner's right is December 18, 1967.

5. SPECIAL CONDITIONS

A. Owner shall maintain a suitable outlet in the aforesaid dam authorized herein to allow the free passage of water that owner is not entitled to divert or impound.

B. Owner may store water to be diverted from the Trinity River as authorized by Contractual Permit 377 in the aforesaid reservoir for subsequent diversion and use.

C. The Commission shall approve any structural modifications and downstream embankment protection of the dam and the allocation of costs therefor, which may become necessary by construction of the proposed Tennessee Colony Dam and Reservoir.

D. Owner shall maintain the following: 1) A continuous reservoir content and lake level measuring station; 2) A record of all discharges through the reservoir; 3) A daily record of diversion from the Trinity River; and 4) A monthly estimate of consumptive use. All records shall be compiled monthly and reported annually to the Commission.

E. No diversions shall be made from the Trinity River when such diversion will reduce the stream flow at the Trinity River stream gage near Oakwood, Texas, below 100 cfs.

The locations of pertinent features related to this certificate are shown on Page 20 of the Middle Trinity River Segment Certificates of Adjudication Maps, copies of which are located in the office of the Texas Water Commission, Austin, Texas.

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Certificate of Adjudication 08-5040

This certificate of adjudication is issued subject to all terms, conditions and provisions in the final decree of the 66th Judicial District Court of Hill County, Texas, in Cause No. 28,952 In Re: The Adjudication of Water Rights in the Middle Trinity River Segment of the Trinity River Basin dated September 4, 1986 and supersedes all rights of the owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Trinity River Basin.

This certificate of adjudication is issued subject to the Rules of the Texas Water Commission and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

TEXAS WATER COMMISSION

Paul Hopkins

Paul Hopkins, Chairman

DATE ISSUED:

MAY 05 1987

ATTEST:

Mary Ann Hefner

Mary Ann Hefner, Chief Clerk

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Appendix "C"

Certificate of Adjudication No. 08-5040

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2408500000

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 08-5040

OWNER: Texas Utilities Electric Company
Attention: Environmental Services
400 North Olive Street
Lockbox 81
Dallas, Texas 75201

COUNTY: Freestone

PRIORITY DATE: December 18, 1967

WATERCOURSE: Big Brown Creek, tributary of Tawakoni Creek, tributary of the Trinity River

BASIN: Trinity River

WHEREAS, by final decree of the 66th Judicial District Court of Hill County, in Cause No. 28,952 In Re: The Adjudication of Water Rights in the Middle Trinity River Segment of the Trinity River Basin dated September 4, 1986 a right was recognized under Permit 2351A authorizing the Texas Utilities Electric Company to appropriate waters of the State of Texas as set forth below;

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Trinity River Basin is issued to the Texas Utilities Electric Company, subject to the following terms and conditions:

1. IMPOUNDMENT

Owner is authorized to maintain an existing dam and reservoir on Big Brown Creek (Lake Fairfield) and impound therein not to exceed 50,600 acre-feet of water. The dam is located in the Juan Nepomuceno Acosta Grant, Abstract 1 and the Ezekiel Weaver Survey, Abstract 642, Freestone County, Texas.

2. USE

Owner is authorized to divert and consumptively use not to exceed 14,150 acre-feet of water per annum from the aforesaid reservoir for industrial (thermal-electric power generation) purposes.

3. DIVERSION

A. Location
At the perimeter of the aforesaid reservoir.

B. Maximum rate: 2680.00 cfs (1,206,000 gpm).

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4. PRIORITY

The time priority of owner's right is December 18, 1967.

5. SPECIAL CONDITIONS

A. Owner shall maintain a suitable outlet in the aforesaid dam authorized herein to allow the free passage of water that owner is not entitled to divert or impound.

B. Owner may store water to be diverted from the Trinity River as authorized by Contractual Permit 377 in the aforesaid reservoir for subsequent diversion and use.

C. The Commission shall approve any structural modifications and downstream embankment protection of the dam and the allocation of costs therefor, which may become necessary by construction of the proposed Tennessee Colony Dam and Reservoir.

D. Owner shall maintain the following: 1) A continuous reservoir content and lake level measuring station; 2) A record of all discharges through the reservoir; 3) A daily record of diversion from the Trinity River; and 4) A monthly estimate of consumptive use. All records shall be compiled monthly and reported annually to the Commission.

E. No diversions shall be made from the Trinity River when such diversion will reduce the stream flow at the Trinity River stream gage near Oakwood, Texas, below 100 cfs.

The locations of pertinent features related to this certificate are shown on Page 20 of the Middle Trinity River Segment Certificates of Adjudication Maps, copies of which are located in the office of the Texas Water Commission, Austin, Texas.

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This certificate of adjudication is issued subject to all terms, conditions and provisions in the final decree of the 66th Judicial District Court of Hill County, Texas, in Cause No. 28,952 In Re: The Adjudication of Water Rights in the Middle Trinity River Segment of the Trinity River Basin dated September 4, 1986 and supersedes all rights of the owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Trinity River Basin.

This certificate of adjudication is issued subject to the Rules of the Texas Water Commission and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

TEXAS WATER COMMISSION

Paul Hopkins

Paul Hopkins, Chairman

DATE ISSUED:

MAY 05 1987

ATTEST:

Mary Ann Hefner

Mary Ann Hefner, Chief Clerk

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Appendix "D"

Amended Certificate of Adjudication No. 08-5040A

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TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AMENDMENT TO A CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 08-5040A			TYPE § 11.122
Owners:	Big Brown Power Company LLC and FLG Owner LLC	Address:	6555 Sierra Drive Irving, TX 75039-2479 400 N Ervay St. Ste 150 Dallas, TX 75201-3134
Filed:	March 26, 2024	Granted:	August 13, 2024
Purposes:	Municipal, Domestic, Industrial, Agricultural, and Recreation	County:	Freestone
Watercourse:	Big Brown Creek, tributary of Tawakoni Creek, tributary of the Trinity River	Watershed:	Trinity River Basin

WHEREAS, Certificate of Adjudication No. 08-5040 (Certificate) authorizes the maintenance of a reservoir on Big Brown Creek (Lake Fairfield), tributary of Tawakoni Creek, tributary of the Trinity River, Trinity River Basin, impounding 50,600 acre-feet of water, and authorizes the diversion and consumptive use of 14,150 acre-feet of water per year, at a maximum diversion rate of 2,680 cfs (1,206,000 gpm), from the perimeter of the reservoir for industrial (thermal-electric power generation) purposes in Freestone County; and

WHEREAS, the time priority of this right is December 18, 1967; and

WHEREAS, the Certificate contains multiple special conditions, including:

> Paragraph 5.B. which states “Owner may store water to be diverted from the Trinity River as authorized by Contractual Permit 377 in the aforesaid reservoir for subsequent diversion and use.”; and
>
> Paragraph 5. E. which states “No diversions shall be made from the Trinity River when such diversion will reduce the stream flow at the Trinity River stream gage near Oakwood Texas, below 100 cfs.”; and

WHEREAS, FLG Owner LLC (Owner/Applicant) purchased a portion of the Certificate including the right to impound 50,600 acre-feet of water in Lake Fairfield and 13,650 acre-feet of the diversion rights authorized by the Certificate; and

WHEREAS, Big Brown Power Company LLC (Owner/Applicant) retained ownership of 500 acre-feet of the diversion rights; and

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WHEREAS, Applicants seek to amend Certificate of Adjudication No. 08-5040 to add municipal, domestic, agricultural, and recreational purposes of use to their authorized water and to remove "thermal-electric power generation" limited use language from the 14,150 acre-feet of water currently authorized for industrial purposes; and

WHEREAS, Applicants further seek to revise Paragraph 5.B. to remove the reference to Contractual Permit 377 and to delete Paragraph 5.E; and

WHEREAS, the Texas Commission on Environmental Quality finds that jurisdiction over the application is established; and

WHEREAS, the Executive Director recommends special conditions be included in the amendment; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Commission on Environmental Quality in issuing this amendment;

NOW, THEREFORE, this amendment to Certificate of Adjudication No. 08-5040, designated Certificate of Adjudication No. 08-5040A, is issued to FLG Owner LLC and Big Brown Power Company LLC subject to the following terms and conditions:

1. IMPOUNDMENT

   FLG Owner LLC is authorized to maintain a dam and reservoir on Big Brown Creek (Lake Fairfield), Trinity River Basin, and impound therein 50,600 acre-feet of water in Freestone County.

2. USE

   In lieu of previous authorizations:

   A. FLG Owner LLC is authorized to divert and consumptively use not to exceed 13,650 acre-feet of water per year from Lake Fairfield for municipal, domestic, industrial, agricultural, and recreational purposes in Freestone County.

   B. Big Brown Power Company LLC is authorized to divert and consumptively use not to exceed 500 acre-feet of water per year from Lake Fairfield for municipal, domestic, industrial, agricultural, and recreational purposes in Freestone County.

3. CONSERVATION

   Owners shall implement water conservation plans that provide for the utilization of those practices, techniques, and technologies that reduce or maintain the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, and prevent the pollution of water, so that a water supply is made available for future or alternative uses. Such plans shall include a requirement that in every water supply contract entered into on or after the effective date of this amendment, including any contract extension or renewal, that each successive wholesale customer develop and implement conservation measures. If the customer intends to resell the water, then the contract for resale of the water shall have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures.

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4. SPECIAL CONDITIONS

A. Paragraph 5.E. in the original Certificate of Adjudication No. 08-5040, is hereby deleted from the certificate.

B. In lieu of Paragraph 5.B. in the original Certificate, Owners may store water to be diverted from the Trinity River in the aforesaid reservoir for subsequent diversion and use.

C. Ninety days prior to the diversion of water for industrial use, Owners or contract customer shall submit a water conservation plan to the TCEQ that meets the requirements of 30 Texas Administrative Code (TAC) §288.3.

D. Ninety days prior to the diversion of water for agricultural use, Owners or contract customer shall submit a water conservation plan to the TCEQ that meets the requirements of 30 TAC §288.4.

E. One hundred eighty days prior to the diversion of water for municipal use, Owners or contract customer shall submit a water conservation plan and drought contingency plan to the TCEQ that meets the requirements of 30 TAC Chapter 288.

F. Owners shall allow representatives of the Texas Commission on Environmental Quality reasonable access to the property to inspect the measuring device and records.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate of Adjudication No. 08-5040, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water right holders in the Trinity River Basin.

Owners agree to be bound by the terms, conditions, and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Commission on Environmental Quality and to the right of continuing supervision of State water resources exercised by the Commission.

_____
For the Commission

Date Issued: **August 13, 2024**

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Appendix "E"

Table of Comments on Draft Plan

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Appendix "E"

FLG Comments on Region C's Regional Plan Draft

Vol/Page	Comment
I/1-7	Reference to Fairfield Reservoir owner and water right holder as "Todd Interests." "Todd Interests" needs to be corrected to "FLG Owner, LLC" as supported by the Deed and separate Assignment of Certificate of Adjudication into LFG Owner LLC, and 2024 Amendment to COA 08-5040A.
I/3-7	Table 3.2 entitled "***SURFACE WATER SOURCE AVAILABILITY TO REGION C (NOT LIMITED BY INFRASTRUCTURE)***" identifies Fairfield Reservoir with a "permitted" diversion right of 14,150/year but shows a lower "availability" which then decreases by decade from 6395 ac-ft in 2030 to 5315 ac-ft in 2080. Given the new ownership of Lake Fairfield and COA 08-5040, as amended, this information should be updated to eliminate the reduction in availability. The permitted consumptive use is 14,150 ac-ft/yr.
I/5D-25	Section 5.1.4 discusses Tarrant Regional Water District ("TRWD") as major water supplier providing water to Freestone County, including Fairfield. The Section identifies numerous water supply sources as water management strategies for TRWD, including other reservoirs and groundwater, but does not specifically identify the Fairfield Reservoir. Lake Fairfield could be a water management strategy available to TRWD and other WUGs.
I/5E-215	Section 5.E7 discusses Freestone County, Fairfield being the County Seat, and the water supply sources and demands for the County, focusing on TRWD being a major supplier. The discussion includes the observation that the historic largest demand was for steam electric which is now gone due to the closure of Luminant's Big Brown Plant, but suggests the potential reopening of a steam electric plant at the site despite the fact that the property, including the Fairfield Reservoir and COA 08-5040, has been sold to FLG Owner LLC and is being redeveloped. This language also fails to recognize the changes to COA 08-5040, which expressly authorize the use of up to 14,150 ac-ft/yr of the storage from Lake Fairfield for municipal, domestic, industrial and agricultural purposes.

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I/6-19 to 6-20	Subsection on "Un-met Municipal Water Needs" discusses Lake Fairfield (COA 08-5040), and its use to meet steam electric demand at the now defunct Big Brown Power Plant. Page 904 should be updated to reflect (i) that the sale of the land, reservoir and COA 08-5040 for the Fairfield Reservoir to FLG Owner LLC as completed in 2023, and the amendment of COA 08-5040 was completed in 2024, and (ii) the fact that the water previously committed to steam electric, and the land available due to closure of the mind facilitates industrial use growth in Freestone County.

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May 15, 2025

Region C Water Planning Group
Trinity River Authority
Attn: Alexis Long

RE: 2026 Regional Water Plan – Current and Projected Populations for Henderson County and the City of Athens

Region C Planning Group:

In May of 2023, the City of Athens was contacted by Freese and Nichols to verify information for the 2026 Regional C Water Plan. During those meetings the City raised concerns specifically about the very small population projections shown through the year 2080 in the plan. Henderson County is conveniently located between Kaufman County to the west and Smith County to the east. Both counties are growing exponentially. This growth will be forced to spread into Henderson County and the City of Athens well before the year 2080.

The 2021 Region C and I Water Plan projections were more realistic for the City of Athens and Henderson County. These projections were changed significantly in the 2026 plan. The drastic difference between the adopted 2021 plan projections and the 2026 plan projections are shown below.

Table 1: Water Plan 2021 and 2026 Population Projection Comparisons

		PROJECTION YEAR				
	PLAN	**2030**	**2040**	**2050**	**2060**	**2070**
City of Athens	**2021**	16,200	17,605	19,458	33,247	49,212
	2026	13,208	15,913	20,884	25,156	30,311
	Difference	-2,992	-1,692	1,426	-8,091	-18,901
	% Difference	-18.47%	-9.61%	7.33%	-24.34%	-38.41%
Henderson County	**2021**	99,236	106,681	116,100	142,441	175,525
	2026	88,391	95,091	102,547	109,428	117,231
	Difference	-10,845	-11,590	-13,553	-33,013	-58,294
	% Difference	-10.93%	-10.86%	-11.67%	-23.18%	-33.21%

The City of Athens has developed populations projections based on the current land use density and the amount of vacant property inside the existing City limits. The following table shows the projected populations based on the assumptions that the City will develop with the same percentages of land use and land use densities with minimal annexation and a conservative 3% growth rate. If the same assumptions were applied to Henderson County, with a more conservative growth rate of 1.75% per year, the population projections more closely match the adopted 2021 Water Plan.

Table 2: City of Athens and Henderson County Population Projections Based on Land Use and Density

	CITY OF ATHENS POPULATION PROJECTIONS BY YEAR					
YEAR	**2025**	**2030**	**2040**	**2050**	**2060**	**2070**
Athens	12,857	14,905	20,031	26,920	36,178	48,620
Henderson County	86,158	93,965	111,767	132,940	158,125	188,081

Both the City and the County have substantial development taking place. In the City of Athens alone there will be 250 new homes built within the next two years. With an average household population of 2.8 residents per household, there is the potential for 700 new residents. In 2023 and 2024 two large scale apartment complexes came online providing close to 200 new units for occupancy. This is only the beginning of the growth in the City of Athens and Henderson County. The City of Chandler is on the eastern border of the County and there are several 100 lot subdivisions in the planning and development stages.

The City is very concerned with the low population projections which translates into future water demand projections. An inaccurate population projection will result in an insufficient water demand projection. The reason for the reduction in the projected populations for both the City and the County in the 2026 Regional Water Plan have not been communicated. Please consider this letter as official public comments from the City of Athens on the 2026 Regional Water Plan. Please submit these comments for review to the approving body of the Region C Water Plan with an official response being provided to the City Council of the City of Athens and Henderson County Judge Wade McKinney.

Sincerely,

Elizabeth Borstad

Elizabeth Borstad, PE
City Manager

CC: Senator Robert Nichols
Representative Keith Bell
Representative Cody Harris
Henderson County Judge Wade Mckinney
Aaron Smith, Mayor
SyTanna Freeman, Mayor Pro Tem
Ms. Katha Lawyer, Councilwoman
Mr. Cody Craig, Councilman
Mr. Bryan Barker, Councilman
Mr. Ed Gatlin, Director of Athens Municipal Water Authority

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Fannin County Water Supply Agency

Date: 6-5-25

Regarding Commentary for Region C TWDB IPP Report 2025

The report created by the TWDB for the vision of water needs for the Region C area of Texas, and specifically for Fannin County, displays a conservative current population estimation and future expected growth.

As officials within Fannin County, we are witnessing a more aggressive population growth than the algorithms have calculated.

In the August 2023 Preliminary IPP Memorandum, the following information was noted:

• Fannin – It is recommended to increase the county total in all decades. The 5-year average annual historical growth rate (1.33%) is higher than the highest annual growth rate that was used in the draft projections (0.41%). The two most recent years 2020 – 2021 (2.56%) and 2021 – 2022 (1.11%) are higher as well. Also, with the completion of Bois d'Arc Lake and the construction of Lake Ralph Hall, it is expected that this county will experience future growth at higher rates than shown in the past. This is based on economic studies conducted for these reservoirs and active development

As noted in the above memorandum, the observation of growth in the area was for 2021 and 2022. In 2023 to the present, the increase in new homes and businesses moving into Fannin County is outstripping the calculations of this study. To the point where we, in Fannin County, will be impacted by being marginalized due to the information contained within this project.

Between the population boom happening in Grayson and Collin Counties, Fannin County is already experiencing prolific developer interest and efforts.

Our water supply is almost 100% groundwater. Drilling more wells and conservation programs are short-term water solutions to an ever-approaching long-term water challenge.

The Fannin County Water Supply Agency is positioned to help provide the long-term water needs of the county, but we need funding, as we currently have none. This project should be recognized at a state level so that the allocation of resources for the infrastructure needed to reach these rural locations can be offered and procured. This is a years-long project and we need to get started as soon as possible.

With that said, We, respectfully, request that the population calculation be reviewed using more accurate data than the current information being utilized. We believe that with more accurate data the need mentioned in the previous paragraph will become clearer to the

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State of Texas decision makers. We also would propose the IPP include more accurate information on the available ground water and water use from all water systems in Fannin County. Equipped with the more accurate and more thorough data for Fannin County, the IPP Report can project the proper impactful picture of water need for Fannin County.

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CITY OF DENTON

City Manager's Office
215 E. McKinney St., Denton, TX 76201 • (940) 349-8307

July 1, 2025

Mr. Dan Buhman
Chair Region C Water Planning Group
c/o Trinity River Authority
5300 S. Collins
Arlington, Texas

Subject: Request for Corrections to the Initially Prepared Plan (IPP)

Dear Mr. Buhman,

Following a review of the Initially Prepared Plan (IPP), the City of Denton respectfully submits the following comments and requests for corrections to ensure the accuracy of the information presented:

Volume I. Main Report:

- Page 5E-112, paragraph 2, states that *"the Lewisville WTP currently has a peak capacity of 28 MGD."* Lewisville WTP currently has a rated capacity of 30 MGD.
- Page 5E-112, paragraph 2, states that *"Ray Roberts WTP will have a peak capacity of 46 MGD by 2030. Using a peaking factor of 2, Denton will be able to treat up to 41,500 acre-feet per year for municipal supplies."* In 2030, the City of Denton, with the expansion of the Ray Roberts WTP to 50 MGD, will have the capability to treat 80 MGD or 89,611 acre-feet per year.
- Page 5E-112, paragraph 2, states that *"Denton also intends to purchase raw water from DWU in the future. This strategy includes infrastructure to convey water from Denton's intake on Lake Lewisville to the Ray Roberts WTP."* Denton does not currently have a strategy to convey water from Lewisville Lake to the Ray Roberts WTP.
- Page 5E-113, table 5E.99 indicates Denton will purchase water from DWU. The volumes listed in this table express an increase in purchase volume, up to 29 MGD in 2080. Denton has not had discussion with Dallas for the purchase of additional water.
- Page 5E-113, table 5E.99 indicates a projected demand for County-Other, Denton to remain at 50 ac-ft/yr through 2080. Page 5E-122, table 5E.108 indicates a projected demand for County-Other, Denton to have supply met by Denton at a rate of 50 ar-ft/yr in 2030 and 2040, then decrease each decade, down to 25 ac-ft/tr in 2080. Denton requests consistency between tables 5E.99 and 5E.108.
- Page 5E-113, table 5E.99 indicates under Potential Future Customers, County-Other, Denton a projected demand to remain at 1,682 ac-ft/yr through 2080. Page 5E-122, table 5E.108 indicates additional supplies for County-Other, Denton to be met by Denton at a

rate of 1,682 ar-ft/yr in 2030 and 2040, then to increase each decade, up to 1,707 ac-ft/yr in 2080. Denton requests consistency between tables 5E.99 and 5E.108.

Volume II. Appendices:

- Page E-23, table E.8 shows *Discharge for City of Denton, Indirect Reuse volume as 1,175-acre ft.* Denton's Bed and Banks permit CA 08-2348A, currently allows for up to 13,497 ac-ft/yr to be diverted per year. Denton requests the volumes in table E.8 are updated to reflect permitted values. Page H-32, Table H.13 Details Denton's Water Treatment Plant Expansion plans as following: *30MGD expansion in 2040, 20 MGD Expansion in 2060, 23 MGD expansion in 2070*. The same expansion intent is captured in Appendix N – Water Management Strategy Implementation Survey, but with different values. Appendix N lists *20 MGD expansion in 2040, 25 MGD expansion in 2060 and 20 MGD in 2070*. Denton's current plans are to expand by 30 MGD in 2030, and then expand by 35 MGD in 2040. Denton requests both tables H.13 and Appendix N are updated to reflect Denton's current plans.
- Page H-125, Table H.100 details a cost estimate for Denton to purchase additional supplies from Dallas. This cost estimate details a strategy that is not in place for Denton to the degree articulated in the document. Denton has water rights in both Lewisville Lake and Ray Roberts Lake, therefore if this strategy was in place, which it is not, there would be no need to transport water north from Lewisville Lake to Denton's Ray Roberts Water Treatment Plant. Denton Requests this cost estimate page is removed from the plan.
- Page H-128, Table H.103 articulates the cost associated for Ponder to connect to the City of Denton water supply. Costs and verbiage indicate that this plan involves a *19.5-mile pipeline* to connect to Denton. Currently infrastructure supports several connection point options within approximately 1.5 miles. Denton requests the data in table H.103 is updated to reflect actual distance.
- Page H-124, Table H.99 indicates that Denton's DPR strategy would include the cost of *16.6 miles of 24-inch diameter pipeline.* When Denton moves forward on implementing DPR, the effluent would travel roughly 1.8 miles from the Pecan Creek Water Reclamation plant to the Lewisville Lake Water Treatment Plant. If the effluent must be transported to the Lake Ray Roberts Treatment Plant, the effluent would travel roughly 10.5 miles. Denton requests the data in table H.99 is updated to reflect actual distance.
- Page M-60, Table M.2 indicates the City of Denton as a required participant in Black Rock WSC emergency supply plan. While the table also indicated that plans are not in place, the City of Denton has not been informed of the authority and nature of this potential emergency supply option Denton does not currently have an interconnection with Black Rock, WSC, Mustang SUD, Bolivar WSC, or the City of Pilot Point.

If you have any questions or need additional information, please do not hesitate to contact Haley Salazar, Denton's Water Resource Administrator at (940) 349-7523 or me.

Sincerely,

Stephen Gay

General Manager

Water Utilities and Street Operations

cc: Simone Keil. P.E. Freese and Nichols, Inc.

Denis Qualls, P.E., Denton, Assistant General Manager Water Utilities and Street Operations

Haley Salazar, Denton, Water Resource Administrator

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COMMENTS ON THE 2026 REGION C INITIALLY PREPARED PLAN

By Janice Bezanson, Senior Policy Director
Texas Conservation Alliance
janice@tcatexas.org

Texas Conservation Alliance appreciates the opportunity to comment on the 2026 Region C Initially Prepared Plan (referred to herein as "the draft 2026 Region C Plan").

An analysis of the population projections and the available water supply for Region C suggests that Region C already has an adequate supply of water for the foreseeable future and possibly for the indefinite future.

As TCA will illustrate below, the draft Plan's projected population for 2080 is very likely inflated and the 2080 water supply likely higher than projected in the Plan. These factors, combined with other Texas cities' success at reducing their per capita use, paint a very different picture than the biased one in the draft 2026 Region C Plan.

Meeting Region C's Needs

Population Projections

According to the draft 2026 Region C Plan, the projected population for the year 2080 is 15.1 million[1]. The Plan projects that the region's existing water sources will supply 2.18 billion gallons per day (bgd) in 2080[2].

For this supply of 2.18 bgd to meet the demand for 15.1 million people would require a per capita water use of 144 gallons per person per day (gpcd).

[1] *2026 Region C Initially Prepared Plan*, Table 2.1
[2] Table 3.1 [2.44 afy = 2.18 bgd]

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Why the Plan's Population Projections are Too High

The Texas Demographic Center projections of future population for Region C, extended by TWDB to 2080, project a high-case 2080 population for Region C of 15.1 million and a low-case population of 10.7 million, a wide range indicative of considerable uncertainty.

The rapid growth of the Region C area over the last several decades has been driven by (1) a national birth-to death ratio well in excess of one, (2) very high immigration into the United States, and (3) the trend toward urbanization.

Taking these factors one-by-one:

Looking to the future, the surplus of births over death prevalent in the past in the U.S. is not expected to continue. In recent years births and deaths in the U.S. have been approaching the same number. For example, according to the U.S. Census Bureau, in 2022, births were 3,757,211 and deaths were 3,466,883, a difference of 290,328, a natural increase of less than a tenth of a percent. For the foreseeable future, deaths are expected to exceed births due to an aging population and continued low fertility rates.

Future immigration into the U.S. is impossible to estimate with any certainty, but at the present time it appears that illegal immigration, which has constituted roughly half of all immigration over the last few decades, is not likely to continue at the rate of recent decades.

People may continue to concentrate in urban areas, but as our rural areas are depopulating, one must assume that the movement of people from rural areas to urban will slow and at some point stop.

Given these reasons for expecting the high-case numbers to be inflated, TCA strongly urges Region C planners to project future water use based on TDC's low-case projections as well as TDC's high-case projections.

Why the Plan's Counting of Water Supply is Too Low

The draft Plan projects a 2030 water supply for Region C of 2,473,360 acre-feet per year (afy), declining to 2,438,466 afy in 2080[3]. There are three obvious reasons to regard this projection as an undercount.

1. The decision to use safe yield or "available supply", rather than firm yield, as the supply from a given reservoir is an explicit departure from the traditional definition of water supply. The fact that this is justified as a "safety factor" should not obscure

[3] Table 3.1

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the fact that under even the most extreme historical conditions, the reservoir yielded more than the safe yield.

2. While the draft Plan's projections allow for a reduction in supply due to sedimentation, they fail to count the increase in supply due to the substantial additional run-off that would result from the expansion of impervious cover consequent to population growth. As each person is added to the population, something like 1000 square feet of impervious cover (the footprint of the house and garage, a portion of the sidewalks, streets, public buildings, etc.) is added to the Region C drainage area, causing about 2,000 cubic feet of additional run-off in an average year. Not all of the additional run-off due to population growth over the coming decades will discharge into area water supply lakes, of course, but an honest effort should be made to include the increased yield in future supply projections. To motivate such a study, consider that the typical single-family house will necessitate the creation of about 4,000 square feet of additional impervious cover, which, in the average year, will produce about 8,000 cubic feet of additional run-off. Typically, houses have approximately 10,000 square feet of lawn and landscape, which will require approximately 8,000 cubic feet of water. In other words, every single-family home will tend to generate sufficient new run-off to supply its lawn-watering needs.

3. Assuming that the future supply from reuse of treated wastewater will be limited to 500,000 acre-feet is entirely arbitrary. There is no technical, economic, or environmental reason not to move toward reuse of all available wastewater. If Region C's population should approach the projected 15 million, the potential reuse supply could exceed a million acre-feet per year.

Region C Plan's Per Capita Water Use

As noted above, the draft 2026 Region C Water Plan projects a population in 2080 for the region of 15.1 million people. It projects a water usage in 2080 of 2.7 bgd[4]. This equates to a projection of Region C water use for the year 2080 of 179 gpcd.

In describing Historical Water Demand, the draft Region C Plan states that since 2001 the average water use per capita in Region C has decreased from 225 gpcd to 183 gpcd[5]. In

[4] Table 2-9 [3.03 million afy = 2.7 bgd]
[5] P. 1-27

other places, the draft Plan states that Region C used 1.24 bgd in 2021[6], to serve slightly more than 7.73 million people[7], a gpcd of approximately 160.

Whether 183 gpcd or 160 gpcd is correct for today, a projection of 179 gpcd fifty years in the future is *very* high.

Region C's Bright Water Future

Since, as illustrated above, the projected population is very likely inflated and the 2080 water supply higher than projected in the Plan, and since many Texas cities have already reduced their per capita use to 144 gpcd or below, TCA feels the case is strong that Region C already has an adequate water supply for the foreseeable future and possibly for the indefinite future.

TCA strongly urges the Region C Water Planning Group to make certain that an accurate account of Region C's current and likely future water supply include the predictable increase in stream flows consequent to increases in an increasing population. And we would strongly urge the Planning Group to consider the high degree of uncertainty in future per capita water use when determining recommended strategies.

If More Water Ever Needed, Where is Best to Get It?

If it were ever necessary to expand the Region C water supply, there are a number of affordable options that avoid the high environmental and social cost of drowning productive agricultural, timber, wildlife, and recreational lands and forcing people out of their homes.

Appendix G of the draft 2026 Region C Water Plan lists more than 30 "feasible" water strategies. The most attractive options are those which make use of the large amounts of reuse and urban run-off water that can be accessed through options like Ralph Hall Indirect Reuse, Reuse from TRA Central, Reuse from Mary's Creek WRF, the Marty Leonard Wetland, the Main Stem Balancing Reservoir, and Expanded Wetland Reuse. In assessing these options, the draft 2026 Region C Plan tends to limit the quantities of water it considers to be available from each option to the existing water rights. Any option must of course obtain the required permits, but the total quantity of water available from reuse and urban run-off far exceeds the amount of existing water rights. Significantly, it also far exceeds any conceivable future need. As a case in point, the Main Stem Balancing Reservoir option bases its cost calculation on a yield of 114,000 afy. While existing water rights may in fact restrict the supply to this figure, physically that option could produce far

[6] Table 5B.1 [1.39 afy = 1.24 bdg]
[7] P. ES-3 [2020 population]

more. For example, the reservoir could easily accommodate a flow three times the assumed value, which suggests a unit water cost of less than $1.25/thousand[8]. This option would make use of both reuse and urban run-off.

As another example, the Reuse from Mary's Creek WRF option suggests that the cheapest way to expand reuse supplies is simply to transfer water directly from wastewater treatment plants to nearby supply lakes.

Previous water supply studies have ignored the hundreds of thousands of acre-feet of urban runoff which discharge into so-called "sumps" (ponds) along the Trinity River. This water is potential water supply, and should be assessed as such. The Dallas Water Commons project could be viewed as a prototype.

Region C planners should focus their attention on the numerous opportunities close to home rather than options that require long pipelines and entail the social and environmental impacts of new impoundments.

DRAFT

[8] Table ES.1 [1/3 of cost for a yield of 114,000 afy]

CITY OF CORSICANA, TEXAS

July 17, 2025

J. Kevin Ward
RCWPG Administrator
c/o Trinity River Authority of Texas
P.O. Box 60
Arlington, TX 76004
info@regioncwater.org

Re: Public Comment
Region C IPP Public Hearing
2026 Region C Regional Water Plan

Region C Water Planning Group,

The City of Corsicana request amendments to the noted sections of the 2026 Region C Initially Prepared Plan (IPP) as it relates to the City of Corsicana providing future water supply to Freestone County. The request are as follows:

Table 5D.17, under Projected Demands column, add
Freestone County, Other
Wortham

Table 5E.191, under Water Management Strategies column, add
Corsicana with Additional Delivery Infrastructure

Table 5E.198, under Water Management Strategies column, add
Corsicana

The Projected Population and Projected Water Demand numbers for Worthan differ from the growth and development being witnessed in and surrounding the City. Requests to surrounding suppliers suggest growth and water needs. Can these projections be re-evaluated?

Thank you for the considering this request. If you have any questions, please let me know.

Jason Beard
Environmental Services Director
200 N 12th St.
Corsicana, TX 75110
903.654.4888
jbeard@corsicanatx.gov

DRAFT

PGCD
PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT
JOHNSON • ELLIS • HILL • SOMERVELL

208 Kimberly Dr
Cleburne, TX 76031
Phone: (817) 556-2299
Fax: (817) 556-2305
www.prairielandsgcd.org

May 06, 2025

Mr. J. Kevin Ward, Administrator
Region C Water Planning Group
c/o Trinity River Authority
P.O. Box 60
Arlington, Texas 76004

RE: Letter of Support – 2026 Region C Water Plan

Dear Mr. Ward and Members of the Region C Water Planning Group:

On behalf of the Prairielands Groundwater Conservation District (the "District"), I am writing to express our strong support for the draft 2026 Regional Water Plan ("RWP") developed by the Region C Water Planning Group. The comprehensive strategies proposed in this plan are essential to protecting the long-term water security of our region, which faces significant population growth and water supply challenges in the coming decades.

The RWP's emphasis on over 170 water management strategies, including the call for nearly 45% of new water supplies to come from conservation and reuse, reflects a forward-thinking and responsible approach. This aligns well with our District's own goals to promote sustainable water use and protect groundwater resources for future generations.

As a groundwater conservation district serving Ellis County, as well as Hill, Johnson, and Somervell counties, we are uniquely positioned to witness firsthand the increasing strain on local aquifers. We strongly support the RWP's message that new water supplies—particularly surface water and reuse—must be developed in tandem with strong conservation measures. Current pumping in our District is approaching the maximum annual volume permissible under Texas law and the adopted Desired Future Conditions for the Trinity and Woodbine aquifers. As a result, public water suppliers and other groundwater users must be actively working now to identify and secure alternative supplies to support future growth.

Region C's focus on expanding surface water infrastructure and reuse capacity is a crucial part of the solution. The District encourages continued coordination between groundwater conservation districts and surface water providers to build long-term resiliency into our water supply systems. We stand ready to help facilitate conversations between water suppliers and local stakeholders as part of this collaborative effort.

DRAFT

Kathy Turner Jones – General Manager
Charles Beseda – President
Paul Tischler – Vice President
Maurice Osborn – Secretary/Treasurer
Marty McPherson – Director
John Curtis – Director
Brad Daniels – Director
Barney McClure – Director
Kathy Tucker – Director

We also applaud the Region C Water Planning Group for actively engaging the public and stakeholders in the planning process, and we encourage residents and water users throughout the region to participate in the May 19 public hearing and submit comments before the July 18 deadline.

Prairielands GCD supports the RWP's goals and looks forward to continuing our role as a partner in planning and implementing sustainable water solutions across North Central Texas.

Sincerely,

Kathy Turner Jones
General Manager

KTJ

DRAFT

RED RIVER
GROUNDWATER CONSERVATION DISTRICT
FANNIN COUNTY AND GRAYSON COUNTY

July 11, 2025

Ms. Simone Kiel
Project Manager, Region C
Freese and Nichols, Inc.
801 Cherry Street, Suite 2800
Fort Worth, Texas 76102

RE: Support for Brackish Groundwater Project and Clarification on MAG Inclusion

Dear Ms. Kiel:

Thank you for your letter dated April 4, 2025, regarding the Greater Texoma Utility Authority's (GTUA) proposed development of brackish groundwater in Grayson County and its inclusion in the 2026 Region C Water Plan.

The Red River Groundwater Conservation District (Red River GCD) supports, from a conceptual standpoint, the position that brackish groundwater produced from designated Brackish Groundwater Production Zones (BGPZs) should not be considered part of the Managed Available Groundwater (MAG) under the joint planning process. As set forth in Texas Water Code § 36.1015(l), production from BGPZs is intended to be in addition to MAG values, and this distinction is critical for encouraging the responsible development of alternative water supplies in areas with limited freshwater availability.

> *Texas Water Code § 36.1015(l): Rules adopted under this section must provide that the production authorized from a designated brackish groundwater production zone is in addition to the amount of managed available groundwater provided under Section 36.108. To the extent possible, a district shall issue permits up to the point that the total volume of exempt and permitted groundwater production in a designated brackish groundwater production zone equals the amount of brackish groundwater that may be produced annually to achieve the groundwater availability described by the development board in its designation of the brackish groundwater production zone under Section 16.060(e).*

To facilitate appropriate planning and permitting, we respectfully recommend that the Texas Water Development Board (TWDB) consider pursuing policy changes that would:

(1) Establish clear and consistent limits for brackish groundwater production from BGPZs;
(2) Ensure that such limits are developed in a manner that protects freshwater resources; and
(3) Provide those limits in a format usable by regional water planning groups.

PO Box 1214
Sherman, Texas 75091
(800) 256-0935 fax: (903) 786-8211

www.redrivergcd.org

DRAFT

These steps would support the responsible development of brackish groundwater resources while preserving the integrity of freshwater aquifers and enhancing water supply resilience in rapidly growing regions such as Grayson County.

We appreciate the opportunity to provide input on this important matter and support the continued efforts of GTUA and Region C to diversify and strengthen regional water supplies.

Sincerely,

Mark Patterson
President, Board of Directors
Red River Groundwater Conservation District

cc:
Mitchell Sodek, Chair, GMA 8
Paul Sigle, GTUA
Natalie Ballew, TWDB
Dan Buhman, Region C Chair
Kevin Smith, TWDB Project Manager

DRAFT

PO Box 1214
Sherman, Texas 75091
(800) 256-0935 fax: (903) 786-8211

www.redrivergcd.org

CENTRAL TEXAS GROUNDWATER CONSERVATION DISTRICT

July 1, 2025

Ms. Simone Kiel
Project Manager, Region C
Freese and Nichols, Inc.
801 Cherry Street, Suite 2800
Fort Worth, Texas 76102

RE: Support for Brackish Groundwater Project and Clarification on MAG Inclusion

Dear Ms. Kiel:

Thank you for your letter dated April 4, 2025, regarding the Greater Texoma Utility Authority's (GTUA) proposed development of brackish groundwater in Grayson County and its inclusion in the 2026 Region C Water Plan.

The Groundwater Management Area 8 (GMA 8) met on June 24, 2025 and agreed to send a letter identifying the concerns related to the position that brackish groundwater produced from designated Brackish Groundwater Production Zones (BGPZs) should not be considered part of the Modeled Available Groundwater (MAG) under the joint planning process. Although it is critical to encourage the responsible development of alternative water supplies in areas with limited freshwater availability, the Texas Water Development Board, through the process for designating BGPZs, identified limits on the volume of water that should be produced from a BGPZ.

Many, if not all, of the BGPZs identified in North Texas occur in the deep downdip portions of the Trinity aquifer. GMA 8 has concerns about the continuity-or lack thereof- of these BGPZs being hydrologically separated from freshwater aquifers. Therefore, requirements for monitoring and for identifying the volume of water that could be produced annually without impacting freshwater sources are vital.

During discussion, GMA 8 representatives stated that they would consider supporting the concept of brackish groundwater produced from BGPZs, not being part of the MAG, if the project was limited to the volume that could be safely produced without impacting freshwater, as identified by the TWDB.

Furthermore, GMA 8 requests the Texas Water Development Board (TWDB) provide some clarity on joint planning for BGPZs that would:

1) Establish clear and consistent limits for brackish groundwater production from BGPZs;
2) Ensure that such limits are developed in a manner that protects freshwater resources;
3) Provide those limits in a format usable by regional water planning groups- for example, providing county and river basin splits for BGPZs that occur in multiple counties or river basins;

DRAFT

4) Clarify whether production associated with projects such as the one discussed for the GTUA, would be included in the pumping files for and model runs associated with the development of DFCs.
5) Clarify the procedure for situations where a proposed water management strategy exceeds the designated BGPZ limits, including whether any additional brackish groundwater needed would be accounted for within the MAG; and
6) Under Chapter 16.060(e)(2)(B), provide a basis for what TWDB will establish as "reasonable monitoring" to observe the effects of brackish groundwater production within the zone.

We appreciate your efforts in the regional water planning process and working together with GMA 8.

Sincerely,

Mitchell Sodek

Mitchell Sodek
Chairman for GMA 8
General Manager- Central Texas GCD

Cc: Harold Latham, Region C representative from GMA8
Paul Sigle, Red River GCD
Natalie Ballew, TWDB, Groundwater Science Division
Dan Buhman, Region C Chair
Kevin Smith, TWDB Project Manager

DRAFT

NORTH TEXAS COMMISSION

Dear Region C Water Planning Group Members,

As mayors representing North Central Texas cities, we are writing to voice our united, unequivocal support for the draft 2026 Region C Water Plan. Its more-than-170 recommended Water Management Strategies will thoughtfully and appropriately meet the long-term water needs of millions of North Central Texas residents, businesses and communities over the next 50 years.

We also strongly oppose any attempt to remove important Water Management Strategies from Region C's plan, as that could undermine the plan's intentional diversification, which is necessary considering future unpredictability and the massive growth coming to our vibrant region. Adequate water planning and future supplies are essential to maintaining Texans' quality of life. Our residents and businesses must know that when they turn on the taps, there will be a reliable, safe water supply to meet their daily needs.

Our communities' ability to ensure current businesses and future employers that we have enough water to sustain enterprise and attract new investment is also paramount. Texas has a well-deserved reputation for its dynamic, supportive business environment. Without enough water – along with other critical infrastructure – we could squander that hard-earned reputation and lose out on future opportunities to keep Texas prosperous and strong. These are dollars and jobs that benefit all Texans.

We commend the Region C Water Planning Group for its bottom-up approach to water planning and for listening to the needs of the region's many Water User Groups – including municipalities – in developing the draft plan for future water supplies.

We also commend and support the efforts of the Planning Group, the region's major water providers and our water customers to ensure we all use water wisely, and that we conserve and reuse water wherever possible, including through innovative new approaches.

Water conservation and reuse will meet nearly 1/3 of Region C's total 2080 water demand, and even more impressively, nearly 45% of the new water supplies called for in the draft 2026 Region C Water Plan will come from conservation and reuse.

We also proudly note that, with 26% of the state's population and 30% of the state's economic output, Region C currently accounts for less than 10% of Texas' annual water use. That is an incredible return on investment from Region C's relatively modest water use.

Of course, we can always do more, and we will continue working diligently to promote efficient water use and reduce avoidable water loss. But we absolutely must have significant new water supplies to meet the massive future demands associated with our region's and the state's continued growth.

Leading The Region's Advocacy.
8445 Freeport Parkway, Suite 640, Irving, Texas 7 5063
MAILING: P.O. Box 610246, DFW Airport, Texas 75261-0246

DRAFT

Of course, we can always do more, and we will continue working diligently to promote efficient water use and reduce avoidable water loss. But we absolutely must have significant new water supplies to meet the massive future demands associated with our region's and the state's continued growth.

Sincerely,

Alvarado Mayor Jacob Wheat
Arlington Mayor Jim Ross
Cedar Hill Mayor Stephen Mason
Coppell Mayor Wes Mays
Duncanville Mayor Greg Contreras
Fairview Mayor John Hubbard
Fate Mayor David Billings
Highland Village Mayor Charlotte Wilcox
Kaufman Mayor Jeff Jordan
Lewisville Mayor TJ Gilmore
Mansfield Mayor Michael Evans
McKinney Mayor George Fuller
Sachse Mayor Jeff Bickerstaff
Richardson Mayor Bob Dubey
Rowlett Mayor Jeff Winget
Waxahachie Mayor Billie Wallace
Westlake Mayor Kim Greaves
White Settlement Mayor Faron Young

DRAFT

May 13, 2025

Region C Water Planning Group

RE: Support for the 2026 Region C Water Plan

Dear Region C Water Planning Group Members,

On behalf of the North Texas Regional Chamber Coalition, which represents chambers of commerce across the region advocating for the strength and prosperity of our business communities, we write to express our firm support for the draft 2026 Region C Water Plan. The certainty this plan provides is essential for sustaining and expanding economic growth across North Texas.

A reliable, long-term water supply is foundational to business confidence. Employers considering expansion or relocation must know that basic infrastructure needs—especially water—will be met both now and in the decades to come. The Region C Water Plan, with its more than 170 recommended Water Management Strategies, offers that vital certainty. It enables our region to plan, build, and grow with confidence.

As business advocates, we are particularly concerned about any efforts to remove critical Water Management Strategies from the plan. Doing so would introduce unnecessary uncertainty and risk, undermining the diversified, forward-thinking approach needed to support the rapid population and economic growth projected for our region.

Water is not just a public utility but an economic development issue. Whether it's supporting industrial operations, data centers, small businesses, or housing for a growing workforce, access to water is non-negotiable. Without it, our ability to attract capital investment, retain employers, and create jobs would be severely compromised.

Region C already punches above its weight: with just over a quarter of the state's population and nearly a third of its economic output, our region accounts for less than 10% of Texas' annual water use. That's a powerful testament to the business community's commitment to efficiency and innovation—values that are echoed in the plan's emphasis on conservation and reuse. Nearly 45% of new water supplies in the draft plan will come from conservation and reuse strategies, showing that growth and sustainability can go hand in hand.

DRAFT

We commend the Region C Water Planning Group for its collaborative, data-driven approach and for listening to the needs of municipal and commercial water users alike. We also recognize the ongoing work of utilities, providers, and customers to use water wisely and invest in conservation technologies.

Still, conservation alone is not enough. To secure North Texas' economic future, we must move forward with new supply strategies that ensure our region remains competitive and resilient. The draft Region C Water Plan is critical to achieving that goal.

We urge you to adopt the plan without removing any of its key components. The continued vitality of North Texas businesses—and the jobs and opportunities they create—depends on it.

Sincerely,

Arlington Chamber of Commerce
Cleburne Chamber of Commerce
Grapevine Chamber of Commerce
Hurst-Euless-Bedford Chamber of Commerce
Irving-Las Colinas Chamber of Commerce
Kaufman Chamber of Commerce
McKinney Chamber of Commerce
Mesquite Chamber of Commerce
North Dallas Chamber of Commerce
North Texas LGBT Chamber of Commerce
Plano Chamber of Commerce
Rowlett Chamber of Commerce

DRAFT

CITY OF WORTHAM
ESTABLISHED 1871

July 14, 2025

J. Kevin Ward
RCWPG Administrator
c/o Trinity River Authority of Texas
P.O. Box 60
Arlington, TX 76004
info@regioncwater.org

Re: Public Comment
Region C IPP Public Hearing
2026 Region C Regional Water Plan

Region C Water Planning Group,

The City of Wortham request amendments to the noted sections of the 2026 Region C Initially Prepared Plan (IPP) as it relates to the City of Corsicana providing future water supply to Freestone County including the City of Wortham. The request are as follows:

Table 5D.17, under Projected Demands column, add
Freestone County, Other
Wortham

Table 5E.191, under Water Management Strategies column, add
Corsicana with Additional Delivery Infrastructure

Table 5E.198, under Water Management Strategies column, add
Corsicana

Also request that Projected Population and Projected Water Demand numbers be re-evaluated for Wortham. This population decline doesn't seem to be in line with current growth and development being witnessed in and surrounding the City.

Thank you for the considering this request. If you have any questions, please let me know.

Patty Jones
Mayor
mayorjones@worthamtx.com

DRAFT

From: Alden Harris <aldengrantharris@gmail.com>
Sent: Monday, April 21, 2025 2:04 PM
To: info@regioncwater.org
Subject: Marvin Nichols Reservoir

You don't often get email from aldengrantharris@gmail.com. Learn why this is important

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

Hello,

I am a landowner in Red River County, I vehemently oppose the proposed Marvin Nichols Reservoir.

This reservoir would destroy tens of thousands of acres of bottomland habitat. This is essential to our native flora and fauna and is also prime habitat for the restoration of Black Bears.

I kindly request the plan for the proposed Marvin Nichols Reservoir to be abandoned. Generational ownership of land should not be stripped away to fill DFW residents' pools and water their yards.

Thanks,
Alden
--

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Tuesday, May 20, 2025 8:44 PM
To: info@regioncwater.org
Subject: Public Comment Submission

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

Name: Aldon Harris
Company/Organization:
Address: 9735 Parkford Dr
Phone Number: 2146292304
Email: aldengrantharris@gmail.com
Category Interest: Other
Public Comments Characteristic: Other
Comments: I vehemently oppose the proposed Marvin Nichols reservoir.

How many swimming pools are in region Cs territory? How many manicured and over watered lawns are in Region C?

It is unethical to take people's land to fill the pools and water the yards of DFW residents.

PLEASE DO NOT BUILD THE PROPOSED MARVIN NICHOLS RESERVOIR
--
This e-mail was sent from a contact form on Region C
(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EKwbC_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS96MbzcurdPI4Ub-2BEBwgDmW9qsYpDmQ2Gh0tM-2BIplWMZerbTVKEXt0avHa2hxzZtB9ETIxhUGdYx-2BJTK9ixI4afd0eaIqeFw8LtMXJPYNZP2RvRMp5Uc-2Fv2APDEI5xv-2BdH3mu96e9AZYBa5f-2Bg59coBWjlL4zJrIal5byp6Og15Ovw-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C7c27d349a8a9474ac47c08dd9809088b%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638833886772704100%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=kPwEDflPiDdevUyg2gyrFzWkPs6lv1GC8DaFK%2FUaKXc%3D&reserved=0)

DRAFT

From: Andrew Figueroa <AFigueroa@celina-tx.gov>
Sent: Monday, February 24, 2025 5:57 PM
To: Simone Kiel; Christina Gildea
Cc: Kimberly Brawner
Subject: Region C Plan Meeting IPP 2-24-2024

You don't often get email from afigueroa@celina-tx.gov. Learn why this is important

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

Ms. Kiel,

It was a pleasure hearing your presentation on the 2026 Region C IPP during today's meeting. I wanted to follow up and ensure my comment was reflected accurately. While I appreciate that the plan acknowledges Celina's has unmet water needs, particularly in the short term, we've been working with regional providers like UTRWD, NTMWD, and GTUA to address these challenges, UTRWD is Celina sole provider at this time for supplying water. Even though the 2021 plan showed water from all these providers. It's important that these plans accurately reflect what is occurring in the Region C area.

Given the region's current water constraints, I asked what could be done from a regional approach to help meet our water demands. For example, in the past year alone, Celina issued over 2,900 new residential permits, highlighting a growing need for additional water. As of January 2025, we have 16,865 meters in our system. The 2026 IPP Plan projects our population to reach 65,403 by 2030, which we are already nearing in 2025. By 2030, we anticipate our population will exceed 100,000, potentially surpassing the 2040 projection of 112,000 if growth continues at its current pace.

While I understand the plan suggests the situation may balance out in later years, it doesn't address the immediate challenges we are facing. The way it's portrayed may give the impression that the issue isn't as severe as it really is, when in fact, it is a significant concern.

Additionally, it was mentioned that infrastructure constraints contribute to these challenges, and I asked how the region plans to assist in addressing them. If the 2026 IPP projections aren't accurate, achieving meaningful outcomes and securing funding for the necessary infrastructure will be difficult. The plan suggests that the region will meet its interim needs with proposed measures but may face a deficit in later years. It's important, however, that the plan reflects the realities of population growth and water supply needed accurately. I raised this concern when the process first started as well for the 2026 plan.

Lastly, I mentioned the possibility of regional providers on an interim basis allow those who currently have a surplus to allow additional water allocations to suppliers from there lakes if the infrastructure is in place to transport it to their treatment facilities. I know the Region C Planning group can't force this but wanted to bring this out in front of the major regional providers to look at the potential to help balance out the water supply for cities other regional providers in need in the interim. If the region is truly working

Thank you for your time and attention to this matter. If you have any questions or need further clarification, please feel free to reach out. Wishing you a wonderful day!

Best regards,

Andrew Figueroa
Director of Public Works
T: (972) 382-3176
E: AFigueroa@celina-tx.gov | www.celina-tx.gov
142 N. Ohio St | Celina, TX 75009

DRAFT

From: Benjamin <robertfrost3333331@gmail.com>
Sent: Monday, May 26, 2025 7:59 AM
To: info@regioncwater.org

You don't often get email from robertfrost3333331@gmail.com. Learn why this is important

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

Tunnel to the Rockies just the same process California 5th largest economy (globally) thank you

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Tuesday, May 20, 2025 2:59 PM
To: info@regioncwater.org
Subject: Public Comment Submission

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

Name: Ben Mathew
Company/Organization: Self
Address: 3517 Matagorda Springs Dr
Phone Number: 9729263130
Email: bmathew@yahoo.com
Category Interest: Water Districts
Public Comments Characteristic: Related to water planning documents
Comments: We need Marvin Nichols. Conservation alone isn't going to be enough with the high density of population. I am for charging higher rates to the highest consumers. But that alone isn't going to solve the projected water shortage. With worldwide water shortage cropping up, we need to plan ahead.
--
This e-mail was sent from a contact form on Region C (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgllXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0Ed7kq_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS95HAK8RHrPNru3-2BYZZvtXyWvZFhSf-2FKDX7rxL2IO9SEk-2B25fsA7689wartAmxN45HgcWuqqWoTbZ1iGcQKol9DEC-2BlEMCCau9xMOfPtvjLmUa6U7cUjq-2BYReOfE0JRNDesDQwFIn-2BDc92Kp5dM-2Bbv1AjZhF-2FTEFVNOYgUIGZU-2BhEg-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C674c81334d91421d9dad08dd97d8c721%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638833679503936830%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=DZvHdmorTgZuayWNt6Y17LZycuSpXTCl0bALROAvJi8%3D&reserved=0

DRAFT

From: Brian Waltenburg <Brian.Waltenburg@flowermound.gov>
Sent: Wednesday, June 4, 2025 12:07 PM
To: info@regioncwater.org
Subject: Region C Water Plan - Comments - Flower Mound

You don't often get email from brian.waltenburg@flowermound.gov. Learn why this is important

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The current Draft Region C water plan shows Flower Mound to be operating a Denton Creek RWS from TRA (under currently available water supplies). This project is not anticipated to come online until 2028 at the earliest. Also, our current build out popluation estimate for Flower Mound is under 120,000 (118,238).

Please let me know if you need any additional information.

Flower Mound is located in southern Denton County with a small area in northern Tarrant County. The city obtains its water supply from UTRWD, DWU, and direct reuse from TRA's Denton Creek Regional Wastewater System. Water management strategies for Flower Mound are conservation, additional water from UTRWD, additional water from DWU, and Long Prairie direct reuse. **Table 5E.110** shows the projected population and demand, the current supplies, and the water management strategies for Flower Mound.

TABLE 5E.110 SUMMARY OF WATER USER GROUP – CITY OF FLOWER MOUND

(VALUES IN AC-FT/YR)	PROJECTED POPULATION AND DEMAND					
	2030	2040	2050	2060	2070	2080
Projected Population	**95,690**	**119,876**	**145,420**	**145,481**	**145,555**	**145,555**
Projected Water Demand						
Municipal Demand	23,750	29,693	36,020	36,035	36,054	36,054
County-Other, Denton	*35*	*35*	*35*	*35*	*35*	*35*
Total Projected Demand	***23,785***	***29,728***	***36,055***	***36,070***	***36,089***	***36,089***
Currently Available Water Supplies						
Upper Trinity Regional WD	15,402	14,925	14,725	13,297	11,927	10,914
County-Other, Denton	35	25	19	17	15	14
Dallas	6,166	6,166	6,166	6,166	6,166	6,166
Direct Reuse from TRA through Denton Creek RWS	222	556	556	556	556	556
Total Current Supplies	***21,825***	***21,672***	***21,466***	***20,036***	***18,664***	***17,650***
Need (Demand - Current Supply)	***1,960***	***8,056***	***14,589***	***16,034***	***17,425***	***18,439***
Water Management Strategies						
Water Conservation	988	2,028	2,776	2,455	2,357	2,365
Additional Water from UTRWD	0	4,450	10,223	11,905	13,365	14,373
Additional Water from DWU	1,587	1,616	1,632	1,711	1,738	1,736
Long Prairie Direct Reuse	1,355	4,066	4,066	4,066	4,066	4,066
Total Water Management Strategies	***3,930***	***12,160***	***18,697***	***20,137***	***21,526***	***22,540***
Flower Mound Reserve (Shortage)	***1,970***	***4,104***	***4,108***	***4,103***	***4,101***	***4,101***

DRAFT
INITIALLY PREPARED PLAN

Brian Waltenburg, PE | Director of Public Works

E: brian.waltenburg@flower-mound.gov
2121 Cross Timbers Rd., Flower Mound, TX 75028
Authentic. Exceptional. Dedicated. Family. WE OWN IT.

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Sunday, May 25, 2025 10:52 AM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Cathy Woodson
Company/Organization: Prime Assets Financial
Address: 1461 County Road 3412
Phone Number: 9035708706
Email: woodsonc15@gmail.com
Category Interest: Public
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Related to water planning documents, General public comments
Comments: I am strongly against the Region C water plan proposal to take water from Lake of the Pines, Caddo Lake, and the proposed Marvin Nichols Reservoir. Having lived in the Dallas area, I have seen the absurd waste of water for irrigation and home and business usage, as well as the millions of gallons wasted due to pipe breakage and leaks.

It is obvious that there is a tremendous opportunity for conservation. I have not seen any serious actions by the city or county government to address this. There have been some efforts at publicity for consumers, but this is not an adequate approach. There must be serious regulation and penalties to decrease water usage across the board.

No additional supply is justified until significant regulation is implemented to reduce water usage.
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EUjXm_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS95nBIZabXouqnPLQ-2FFZKtMun1WYQhxsn88IPrvTFrKXIiCA6a4HhdlgUP7NO0xUs9tQnQxI8UvaHkep5oXVgd5rytymH27qEyeUlO03KpAOOwr4xRTT3iWcEPP9dCCMdz5APQzTWnOtoVbvavrrsq5p-2FW0K-2BPY537d3e4KflJDYtQ-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C7c82dc9cab964a7b363b08dd9ba41726%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638837851275484916%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=JPbZzSH6IfLOzSeZcB%2FttsxpC7VPnFmxbGa5Wd80ItY%3D&reserved=0)

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Thursday, May 15, 2025 2:55 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Claire Verchot
Company/Organization: TG Pritchett Farms
Address: 411 S Old Walnut
Phone Number: 2145353419
Email: c_verchot@yahoo.com
Category Interest: Agriculture
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Related to water planning documents, General public comments
Comments: I am here to speak about the meeting of the Texas House Committee on Natural Resources held on April 23, 2025. Specifically, I am hoping to see a discussion among the Region C Water Planning Group (WPG), and other interested parties, regarding answers given to Representative Erin Zwiener and Representative Trent Ashby by Chris Wallace of the North Texas Commission, and Dan Buhman, Board Chair of the Region C WPG. In Part 2 at 54:00, Rep Zwiener asks Mr Wallace "how is the DFW region doing in terms of building reuse into their system?" Mr Wallace responds "I don't know." In Part 2 at 1:16 Rep Ashby asks Mr Buhman "Do you have other proposed reservoir projects in your plan?" Mr Buhman replies "yes." Rep Ashby then asks "can you name them?" Mr Buhman's reply is "no." I found both testimonies incredible as there is a 300,000 ac/f Off Channel reservoir project planned by Dallas Water Utilities in Ellis County, 20 miles south of Dallas. The Dallas Water Utilities Main Stem Balancing Reservoir will work in tandem with the newly constructed 2000 acre John Bunker Sands Wetlands in Kaufman County. I say I find this testimony incredible because two key players in the future of water supply in Texas either do not know about this reservoir, or for some reason chose to not to be forthcoming about the reservoir's existence. I think it important to discover why Mr Buhman and Mr Wallace were not aware of this project, or would not speak of this new major off channel reuse reservoir project when questioned by House and Senate legislators in Austin.

The 300,000 ac/f Dallas Water Utilities Main Stem Balancing Reservoir plan was adopted by the City of Dallas in December of 2024 as part of the City's Long Range Water Supply Plan. The Solicitation of Qualifications for the Feasibility Study for this project closed April 11, 2025, and the contract will be awarded in June, 2025. The Feasibility Study will run no longer than 18 months, with construction to begin soon after.
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EFcC6_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS97qJkBCCsJNKg7ScXHFgTqp0zgDfpPqPQeztMbNmt6esX1wJjofaxr83-2FuT04kMN4ox-2BDETK5JY9TGb-2FmOCsbnSaapumikbSKifVp6-2BVp7mXGxG1aVN4QpIEZmeS8vtU-2FVHwpoPOJhW7-2BSM72KKUbYF54V1hQJbhxGUpXMi7aJ1Sg-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C4b075a443f1d426c95f308dd93ea70dd%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638829357309763257%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=1ILEdXeIqQcKIkEGh9qsKpw4VfUz7vhE%2B5cvqHwTIIM%3D&reserved=0

DRAFT

From: DavidVenhuizen <waterguy@ix.netcom.com>
Sent: Tuesday, May 20, 2025 11:48 AM
To: info@regioncwater.org
Cc: phil.prazan@nbcuni.com; chris@ntc-dfw.org; dawn@ntc-dfw.org; andrea@ntc-dfw.org; christopher@ntc-dfw.org; caitlyn@ntc-dfw.org; henry@ntc-dfw.org; dianalee@ntc-dfw.org; 2050@ntc-dfw.org; marc@artctx.com; jenniferrodriguez@me.com; jim@andradevdp.com; daphne@interlink-ntx.org; john.dupnik@twdb.texas.gov; matt.nelson@twdb.texas.gov; Amaris.Molina@twdb.texas.gov; Erika.Mancha@twdb.texas.gov; Melanie.Butler@twdb.texas.gov; John.Sutton@twdb.texas.gov; Shae.Luther@twdb.texas.gov; Denise.Livingston@twdb.texas.gov; Jessica.Paz@twdb.texas.gov; James.Golab@twdb.texas.gov
Subject: comment on the Marvin Nichols reservoir

You don't often get email from waterguy@ix.netcom.com. Learn why this is important

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Written over a decade ago – and apparently ignored by Region C (and D) all that time – I offer this Waterblogue post as a "comment" on the plan to include developing the Marvin Nichols reservoir in the Region C plan -- https://waterblogue.com/2014/08/07/water-for-dfw-building-scale-rainwater-harvesting-vs-marvin-nichols/. The text of that piece is pasted in below, deemed to be part and parcel of this comment. As is set forth there, before imposing on another region and attempting to "raid" their water resources, please consider the prospect of utilizing the water that falls onto the Metroplex, just as a matter of course. You do realize, I trust, that over the 9,286 sq. mi. covered by the Metroplex, at an annual rainfall depth of 25 inches -- about the lowest ever recorded in Forth Worth, per google -- you'd have about 182 QUADRILLION gallons of water falling on that area. Of course, only a small fraction of that could be reasonably harvested and effectively used for water supply, but this does indicate there is HUGE potential here, no?

Please note that if considering building-scale RWH for whole building water supply just can't be entertained, or is deemed "too costly" – although in relation to Marvin Nichols water, that does not seem likely, for all the reasons reviewed on the Waterblogue – RWH can still be used to good effect, as part of a suite of strategies that could reasonably be aimed at pretty much taking irrigation off the potable water supply. Which would by some accounts cut overall annual water supply demands by up to ONE-HALF, at least in the residential sector. This could be done using some combination of building-scale RWH, wastewater reuse, and moving to a more regionally appropriate landscaping ethic. Of course, reuse could be readily built into new development, using the decentralized concept strategy in the manner illustrated in https://waterblogue.com/2014/09/24/this-is-how-we-do-it/, providing highly cost efficient reuse of the reclaimed water, project by project, all installed on a "just in time" basis, so realizing the "time value of money" benefit, on all hinterlands and urban fringe projects going forward. SAVING MONEY as well as saving water. But there also, and indeed in already developed neighborhoods, RWH can be incorporated into the stormwater management program, in the manner reviewed in https://waterblogue.com/2014/10/14/and-stormwater-too/, to maximize the use of roof runoff to defray irrigation water demands. Here on my lot, in a long-established South Austin neighborhood, I have 2,875 gallons of cistern volume, which generally provides all the irrigation water for my veggie beds and to keep my native plant landscape vibrant through the Texas summers, so this is not at all theoretical, I live it every day.

Really, the possibilities are endless, if you could just pull your heads out of The Paradigm and take a peek down the road not taken … so far (https://waterblogue.com/2024/05/27/a-peek-down-the-road-not-taken-so-far/) as that could make all the difference. (Apologies to Robert Frost.)

David Venhuizen, P.E.
Planning & Engineering as if Water and Environmental Values Matter
website - www.venhuizen-ww.com
blog - www.waterblogue.com

Your old road is rapidly aging
Please get out of the new one
If you can't lend your hand
For the times, they are a-changin'
- Bob Dylan

Water for DFW – Building-scale rainwater harvesting vs. Marvin Nichols

In the last post we reviewed the potential of building-scale rainwater harvesting (RWH) as a water supply strategy in the high-growth area around Austin, in Central Texas. Here, we examine its potential in another high-growth area of Texas, the Dallas-Fort Worth area, commonly called the Metroplex. And then we will contrast that strategy with doubling down on the watershed-scale rainwater harvesting strategy, as may be represented by the proposed Marvin Nichols Reservoir.

To gain an appreciation for the potential of building-scale RWH in and around the Metroplex, modeling was executed for the following locations: Athens and Terrell to the east-southeast, Ferris closer in to the south, Cleburne to the southwest, Weatherford to the west, Bowie to the northwest, Sherman to the north-northeast, and Denton closer in to the north-northwest. Ringing the Metroplex, these locations offer an overview of conditions all around it.

As was the case for the modeling results of the Central Texas locations, it was seen that "right-sized" building-scale RWH systems around the Metroplex would have provided 97-99% of total interior supply through the recent drought period for houses modeled with a presumed average water usage rate of 45 gallon/person/day. But around the Metroplex, the "right-sized" systems would be somewhat smaller than would be required around Austin. Recall that the "right-sized" system there to serve a 4-person household would be a roofprint of 4,500 sq. ft. and a cistern volume of 35,000 gallons. In Bowie, Weatherford and Cleburne, the "right-sized" system for a 4-person household would require only 3,750 sq. ft. of roofprint, paired with a 25,000-gallon cistern in Cleburne and Weatherford and a 27,500-gallon cistern in Bowie. All other locations would require 3,250-3,500 sq. ft. of roofprint and 20,000-25,000 gallons of cistern capacity. It is expected that a one-story house plan with a 2-car garage plus a "typical" area of covered patios/porches could provide a roofprint of 3,000-3,500 sq. ft., so these modeling results indicate many houses in/around the Metroplex would not require any "extra" roofprint to be added on.

people even moderately attentive to conserving water. If a usage rate of 40 gallons/person/day were routinely attained around the Metroplex, the "right-sized" systems that would have provided 97-100% of total interior supply for a 4-person household through the recent drought period would require 3,000-3,500 sq. ft. of roofprint and 17,500-20,000 gallons of cistern capacity for a 4-person household.

Just as in Central Texas, with the baby boomers reaching retirement age and demographics tending toward more one and two-person households in all age groups, a significant part of the market might be made up of houses that could be "right-sized" for a 2-person occupancy. Modeling this occupancy around the Metroplex, at a water usage rate of 45 gallons/person/day the "right-sized" system that would have covered 97-99% of total interior demand would have a roofprint of 1,750-2,000 sq. ft. and a cistern capacity of 10,000-15,000 gallons. At a water usage rate of 40 gallons/person/day, a "right-sized" system covering 97-100% of interior demand would require a roofprint of 1,750 sq. ft. and a cistern capacity of only 10,000 gallons, except for Bowie where a 12,500-gallon cistern would have been required. Since it is expected that a one-story house plan — surely what seniors would prefer — plus garage or carport and modest area of covered patios/porches would provide about 2,000 sq. ft. of roofprint, this market could use building-scale RWH without requiring any "extra" roofprint, and would incur relatively modest cistern costs.

So the water supply potential of building-scale RWH around the Metroplex is pretty clear. Yet there is not a mention of this strategy in the planning documents of state planning Region C, the area around the Metroplex. Actually there is no respect shown for this strategy in any of the regional plans, and the state water plan explicitly dismisses it, stating, "While it is often a component of municipal water conservation programs, rainwater harvesting was not recommended as a water management strategy to meet needs since … the volume of water may not be available during drought conditions." Which is to say that because a "right-sized" system may need 1-3% of the total supply from alternative sources during severe drought periods, this strategy is deemed not to exist ***at all***!

This is likely due to the water planners being guided by a mental model that does not comprehend building-scale RWH as a consciously chosen broadscale strategy, as perhaps the water supply strategy in whole developments. This was the subject of an investigation, funded by the Texas Water Development Board, that I ran a couple years ago, in which it was brought out that this strategy confers a number of advantages relative to conventional – or watershed-scale RWH – water supply systems. One of the issues considered was provision of backup supply, but only on the basis of the "mechanics" of delivering it. Not fettered by the mainstream's mental model, it had not occurred to me to question the whole strategy because some small amount of backup supply would no doubt be needed – indeed, the whole idea of "right-sizing" was to cover water demands in all but the worst drought periods and plan on providing a backup supply, presuming that the relieved capacity offered by building-scale RWH would make such a supply available from the sources so relieved.

DRAFT

Building-scale RWH would divert the vast majority of the demand off of the conventional sources, so decreasing the routine drawdown of those supplies, thus leaving in them the capacity to provide the small amount of backup supply. Of course, if it is presumed that any development on building-scale RWH is ***in addition to*** rather than ***in place of*** development drawing from those conventional supplies, and that this other development would be of such extent that it would tax the available supply sources during those drought periods, then there may indeed be a question of whether the capacity to provide backup supply for building-scale RWH systems would be available. It will require another whole study to examine how a conjunctive management concept could work in practice. Until the mainstream water planners can get around their mental model and recognize the inherent potential of building-scale RWH, however, it is unlikely that any such study would get funded.

Around the Metroplex, however, modeling shows that, unless the drought gets more severe than has been experienced since 2007, essentially 100% of interior demands could be provided by upsizing the roofprint and/or cistern volume only a modest amount above what is reported above. The worst case would be in Bowie, where a roofprint of 4,000 sq. ft. and a cistern capacity of 30,000 gallons would be required for a 4-person household using water at a rate of 45 gallons/person/day.

So we ***can*** provide interior water usage with building-scale RWH, but why ***should*** we, rather than continuing to expand and perpetuate the watershed-scale RWH strategy? Consideration of the problems and hazards of building Marvin Nichols Reservoir offers some insights into that.

Marvin Nichols Reservoir would be located in northeast Texas, about 115 miles east-northeast of the Metroplex. The Region C report offers this about that project:

"As a major reservoir project, Marvin Nichols Reservoir will have significant environmental impacts. The reservoir would inundate about 68,000 acres. The 1984 U.S. Fish and Wildlife Service *Bottomland Hardwood Preservation Program* classified some of the land that would be flooded as a Priority 1 bottomland hardwood site, which is "excellent quality bottomlands of high value to key waterfowl species." … Permitting the project and developing appropriate mitigation for the unavoidable impacts will require years, and it is important that water suppliers start that process well in advance of the need for water from the project. Development of the Marvin Nichols Reservoir will require an interbasin transfer permit to bring the water from the Sulpher River Basin to the Trinity River Basin. The project will include a major water transmission system to bring the new supply to the Metroplex."

Unstated is that many people in the area that would be impacted are highly opposed to this project, due in large part to those "unavoidable impacts." This is a battle of economic interests – those in the Metroplex that purport a need for this water vs. those, such as the timber producers, that would be eliminated by the reservoir. Indeed, the official position of the planning process in planning Region D, where the reservoir would be located, is in

that would design, install and maintain the building-scale RWH systems – and no negative impacts in Region D.

As noted, utilizing in the Metroplex any of the water collected in this reservoir would require a huge investment in transmission facilities – pipelines and pump stations – and on-going operating costs to maintain them and for energy to run the pumps. Of course the water would need to be treated, also entailing considerable energy requirements. Since it takes water to make energy, this would cut into the water use efficiency from this source. And making that energy would also generate greenhouse gases, which would exacerbate the already problematic impacts of climate change on regional water resources. This contrasts with the building-scale RWH strategy, which would not require any transmission facilities and would require far less energy to treat and pressurize the water for use within the building.

As the Region C report states, it will take a long time to permit and build this reservoir and the transmission facilities, meaning delivery of the first drop of water is decades away. In contrast, the building-scale RWH strategy could begin delivering water supply immediately, and grow in lockstep with demand, one building at a time.

The passage from the Region C report refers only peripherally to the ecosystem services that flooding the land would eliminate or damage, noting only loss of habitat for "key waterfowl species", without quantifying how critical to the well-being or survival of those species that loss may be. That of course would be sorted out in the process of preparing the environmental impact analysis that will be required as part of the permitting process, another expense that would be obviated by the building-scale RWH strategy. But those ecosystem services go well beyond their impact on birds. Eliminating the timberlands loses the oxygen production and carbon sequestration they provide, along with habitat for many other plants and animals. Forests are also important to maintaining water quality and to the storage and release of water for environmental flows, which would instead need to be provided "artificially", with water from the reservoir of degraded quality, including thermal impacts. None of these "externalities" figure into the cost of water projected for this strategy, significantly "warping" the analysis.

There would also be significant losses from the watershed-scale rainwater harvesting system this reservoir would create. Huge evaporation losses from the reservoir would be incurred, and there would be significant losses in the transmission system. In contrast, the building-scale RWH strategy would suffer no such losses.

The Region C report also states, "… the unit cost [of the water supply the reservoir would provide] is less than that of most other major water management strategies." While at the end of the day the overall direct cost of Marvin Nichols Reservoir and its required infrastructure might be less than the aggregate direct cost of the number of building-scale RWH systems that would provide equivalent supply – which it is noted has not been developed in the Region C report for comparison – much of the cost of the former would need to be expended well up front of delivering the first drop of water to the Metroplex, and all that investment would be at risk. The

works with the "time value of money" to defray the global long-term cost of the building-scale RWH strategy. So it is not at all clear that the global cost of the Marvin Nichols option, even neglecting the externalities which the Region C report ignores, would be less.

In summary, broadscale implementation of building-scale rainwater harvesting may provide sufficient supply so that the conventional sources would be sufficiently "relieved", allowing growth to be sustained without requiring new reservoirs. And it may do so at a cost that would be competitive with the global costs of continuing to extend and perpetuate the watershed-scale rainwater harvesting strategy, which would require going far afield to obtain additional new supply. Yet this is, quite consciously, the road not taken by the water planners in Region C. Or, as noted, anywhere else in the state where building new reservoirs, raiding remote aquifers, and other conventional supply strategies are purported to be needed to support projected growth. Time to re-evaluate?

DRAFT

From: David Waters <dave@watersgraphics.com>
Sent: Tuesday, May 27, 2025 8:43 AM
To: info@regioncwater.org
Subject: Marvin Nichols

You don't often get email from dave@watersgraphics.com. Learn why this is important

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I am in favor of the proposed lake. I live on Eagle Mountain Lake in Northwest Tarrant County and it frequently dries up because of all the new population sucking water from it. I also maintain my mothers property in Dike, TX where White Oak Creek is the Southern boundary. It frequently overflows these days, seems like more than in the past. East Texas has an abundance of water and land. They need to be reasonable about sharing it. If all the people moving to North Texas moved to East Texas instead, they would really be complaining. They are old country folk who just don't like change, good or bad, but change we must if we are to prosper and grow.
Thanks,
Dave Waters
682-554-3428

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Wednesday, May 21, 2025 5:53 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Duane George
Company/Organization:
Address: 2819 N Fitzhugh Ave Apt 1351
Phone Number: 9519906889
Email: sierra76spartan@gmail.com
Category Interest: Water Districts
Public Comments Characteristic: Related to water planning documents
Comments: The Reservoirs as planned for North Texas need to be built to meet future demand.
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This e-mail was sent from a contact form on Region C
(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgllXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0Em1MC_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS96TwXOUlUngMTxcnMRaw4JUs8uNm2RT-2FXf15e3JlIOOFVSWogCTAEwcdsh9L-2FRbeAIY9IzidqdrCgrOiL65gFb852D7ovuRBpS-2FBvzdKDWechWgwitVVawdBBHouXwDFClLesau8t17eufsm-2F8gNe4WbuAuln2X-2BMvUdm1FmyDmTQ-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7Ca8fc4db0b54b43d9732208dd98ba34df%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638834647719963525%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=7iR7FAXL4wpDYYqeGYy%2Bq2Wn5S7Xry1VLTYF5RakEOQ%3D&reserved=0

DRAFT

From: Jerilyn <jbpatxmt@proton.me>
Sent: Monday, June 16, 2025 12:47 PM
To: info@regioncwater.org
Subject: No Marvin Nichols

You don't often get email from jbpatxmt@proton.me. Learn why this is important

This is an email from an EXTERNAL source. DO NOT click links or open attachments without positive sender verification of purpose. Never enter USERNAME, PASSWORD or sensitive information on linked pages from this email. Please report all suspicious messages using the Report Message button in Outlook.

My name is Dustin Arneson, and **I'm writing to ask for the proposed Marvin Nichols Reservoir to be removed from the water plan.**

Though I wasn't born in Texas, I chose Texas. I moved here from Montana years ago—drawn by the strength of its people, the pride in its land, and the values that reminded me of home. I married into a Northeast Texas family whose roots stretch back more than a century on the same land. Through their stories and sacrifices, I have come to understand what it means to truly belong to a place—not just geographically, but generationally.

The land we're fighting for isn't just where my wife grew up—it's where her parents and grandparents were raised, where her great-grandparents worked the soil by hand, and where her 100-year-old grandmother still smiles as her great-grandchildren play beneath the same trees that shaded her childhood. That land represents hard-won unity, perseverance, and love. And I've never seen anything like it—not even in Montana. I came here to start a life. What I found was a living legacy.

The proposed Marvin Nichols Reservoir threatens to wipe that legacy off the map. It threatens to flood not just homes and pastures—but the stories, sacrifices, and family bonds that have kept this land and families together for generations. No amount
of money could ever replace it. Because what would be lost is irreplaceable. The land teaches children where they come from and why it matters? It binds families and communities together in a way you can't measure on a blueprint or in a water study.
I've seen firsthand what it means to live with deep roots. And I've seen what it looks like to fight for something you love. These families aren't standing in the way of progress—they're standing in the way of destruction.

Please don't let this be the legacy of Texas. You can choose today to stand up for Texas. Reservoirs are outdated and not a viable solution. Please save Texas families.

Please remove the proposed Marvin Nichols Reservoir from the water plan. Help us preserve the land, the heritage, and the values that make Texas so extraordinary—and worth choosing.

Dustin Arneson

Sent with Proton Mail secure email.

DRAFT

From: Erika Hatfield <erika_hatfield@icloud.com>
Sent: Monday, June 30, 2025 5:32 AM
To: IRCcomments@twdb.texas.gov
Cc: John White; jmcclure@heathtx.com; sdodson@heathtx.com; chorne@heathtx.com; jmyers@heathtx.com; rmoorman@heathtx.com; mthurgood@heathtx.com; mownby@heathtx.com; bgallana@rockwallcountytexas.com; dmacalik@rockwallcountytexas.com; lliechty@rockwallcountytexas.com; jstacy@rockwallcountytexas.com; fnew@rockwallcountytexas.com; Katrina.Pierson@house.texas.gov; bob.hall@senate.texas.gov; dan.buhman@trwd.com; wardk@trinityra.org; Simone Kiel; kevin.smith@twdb.texas.gov; info@regioncwater.org; jthompson@regiondwater.org; rletourneau@regiondwater.org; cgwinn@regiondwater.org; jbrooks@regiondwater.org; jbumgarner@regiondwater.org
Subject: Public Comment – Oppose Marvin Nichols Reservoir and Recognize Interregional Conflict

You don't often get email from erika_hatfield@icloud.com. Learn why this is important

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To Whom It May Concern,

As a resident of Region C, I am writing to urge the Texas Water Development Board to formally recognize the interregional conflict between Region C and Region D regarding the proposed inclusion of the Marvin Nichols Reservoir in the 2026 regional water plan.

While I understand the importance of long-term water planning, I do not support a plan that requires seizing private land from unwilling Texans in another region. The proposed use of eminent domain to flood over 60,000 acres of productive East Texas timber and ranchland is land theft—plain and simple.

Region C already has access to an abundance of water resources, including:

Major Lakes and Reservoirs:

- Lake Lewisville
- Grapevine Lake
- Lake Ray Roberts
- Lake Tawakoni
- Lake Texoma
- Joe Pool Lake
- Lake Arlington
- Richland-Chambers Reservoir
- Cedar Creek Reservoir
- Benbrook Lake
- Eagle Mountain Lake
- Lake Worth
- Lake Bridgeport
- Bois d'Arc Lake (completed in 2022; water is now being pumped to the Leonard Water Treatment Facility, which is preparing for its third expansion beginning in mid to late 2026)
- Lake Ralph Hall (under construction)

Rivers and Streams:

- The Trinity River (Upper Basin)
- The East Fork Trinity River
- Elm Fork and West Fork tributaries
- Numerous additional creeks and stream systems across the region

Aquifers:

- Trinity Aquifer
- Woodbine Aquifer
- Paluxy Aquifer
- Minor aquifers supporting rural and municipal needs

Additional Resources:

DRAFT

- Major investments in reuse and return flows via the Trinity River
- Opportunities for advanced conservation, aquifer storage and recovery (ASR), and infrastructure optimization

With this wide range of resources, Region C has every opportunity to meet future demand through responsible planning—without sacrificing the land, economy, and culture of Region D.

It should also be noted that Freese and Nichols, the engineering firm consulting for Region C and closely involved in the Marvin Nichols proposal, stands to gain millions of dollars in engineering, design, and management contracts if this project moves forward. Conservative estimates suggest the firm could earn $10–30 million or more over the life of the project—money that would come at the expense of displaced landowners, destroyed ecosystems, and rural communities.

As a strategic solution, I strongly encourage the TWDB and lawmakers to support the creation of a new, locally controlled water district in Region D. Such a district could provide effective representation, protect property rights, prioritize sustainable and localized water solutions, and push back against overreach from powerful Region C interests.

I respectfully urge the TWDB to acknowledge this conflict and remove Marvin Nichols from the 2026 State Water Plan. As a Region C resident, I stand in strong opposition to this project and in full support of Region D's right to self-determination and land protection.

Sincerely,

Erika Hatfield

Rockwall County, Heath, Texas, Region C
214-536-9539

CC:
Honorable Senator Bob Hall SD2
Honorable House Representative Katrina Pierson
Heath City Council members and Mayor
Rockwall County Commissioners and County Judge

DRAFT

Kevin Ward, Administrative Agent, Trinity River Authority
Simone Kiel, Lead Consultant, Freese and Nichols
Kevin Smith, Texas Water Development Board Liaison
General inquiries, Region C Water Planning Group

Region D Water Planning Group:
Jim Thompson, Chair
Richard Letourneau, Vice Chair
Cindy Gwinn, Secretary – Treasurer
John Brooks, at large member
Joe Bumgarner, at large member

Texas GOP:
State GOP Chair, Abraham George

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Thursday, May 15, 2025 9:50 AM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Gregory Taylor
Company/Organization:
Address: 52 Timber Lane, Texarkana, Texas 75501 Phone Number: 9032781552
Email: greggtay1@aol.com
Category Interest: Water Districts
Public Comments Characteristic: Concerning an upcoming agenda item, Related to water planning documents
Comments: RE: Water District C May 19, 2025 meeting

For too long Water District C has held the Marvin Nichols water plan over the heads of multi generations of Texas families in Water District D. It is time to cancel this plan, and its time for the DFW area to look within its own resources to resolve its own problems. Options include repairing/replacing existing water line structures which are leaking millions of gallons of water, rely upon the many water resources around the DFW area metro, and consider water resources when competing for water dependent businesses such as the Data management company.
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0Eq5oJ_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS95ZFvMYNzmbwoPqxyS96odlxEC0AUuxPhqkgGuk7CtGv6G5iTwEEwv-2BuPMqwgzB5qQzoXajbtS-2BmTXYhDin3Aw2bPMf0-2B7xWqQmAJWN5aPCtdvt1muo95T-2BH7dMnQojS1Dhocu9VkOzS-2BupHjOlS2xXXjTMsv4Lc0-2B4uq6D3QkYXw-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7Cd1c0987313704481b0b308dd93bfbd9c%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638829173908954277%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=07xyzEQqjFQ9XK0XXd5Su8vZzytVM5dcPlmZCWtB%2B%2FE%3D&reserved=0

DRAFT

From: Greg Peters <gpeters@annatexas.gov>
Sent: Thursday, May 15, 2025 6:46 PM
To: info@regioncwater.org
Cc: Cole Meredith; Steven Smith
Subject: City of Anna, Texas - Water Plan Comments

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To Whom It May Concern,
Please see comments below from my review of the Initially Prepared Plan. I know that my feedback is harsh and critical, but it is honest. While I do not expect members of the water planning group to agree with me, I sincerely hope you will read through my feedback and realize that I did not reach these conclusions and suggestions in a vacuum. Rather, they are based on almost 20 years of working in the industry in a variety of roles, and repeatedly seeing these water planning initiatives dodge the real, uncomfortable conversations that need to be had. In Texas we have a culture of avoiding tough conversations. That needs to stop.

We must become much more diligent in addressing the water waste created by inefficient real estate development in Texas. Developers are creating water thirsty vanity ponds and landscaping all over our region, and the State Legislature has shown no interest in addressing this issue. Local governments attempt to implement regulations, but the State legislature is quickly stripping away any semblance of authority our local governments might have once had.

Someone has got to stop developers from destroying our water resources. As more and more developers build MUD's in rural areas, they are taking away resources from rural landowners, family farms, and future Texans in order to maximize their profits. In an effort to avoid paying for water access, they are now aggressively using bad State law to build countless water wells which are solely used to fill ponds and water plants. It is horrendous. These developers are refusing to adapt to the coming reality of a water crisis. New development needs to be much more water efficient than what we are seeing be built today. We need the Region C planning group to focus on real, meaningful legislation which addresses the real issues, and we need the politicians to begin listening to experts and acting responsibly.

We need to clean up the regional water district bloat, and anti-common-sense measures pushed by organization like NTMWD and TRWD which are solely about control and power, not preservation of water resources. We need to re-focus our efforts towards providing safe, high quality drinking water to all Texans. Furthermore, we need to strip away the outsized rights granted to regional water districts to meddle in TCEQ permitting processes. When a regional water district refuses to properly expand their system, and they are able to single-handedly kill a TCEQ permit, that is a problem.

These regional entities get further and further away from their purpose each year. When they were created, their purpose was to **SERVE** their regions with water supply. What they have become is the highest paid, least efficient organizations in our region, and they have completely lost any semblance of a servant mentality. Our regional water districts have been granted excess authority, with zero meaningful oversight. Any attempt to address the water needs of Region C without addressing the failures of our regional water districts will be a waste of our collective time.

groundwater and potable drinking water in any county with a population greater than 50,000 at the time of the 2020 census, to fill and maintain pool levels of vanity ponds for the entire region. A vanity pond should be defined as any man-made body of water which is:

a. located on a Homeowners Association Lot or private property
b. greater than 20,000 square feet in surface area
c. which has a primary use other than livestock watering, or agri-business.

2. **Anti-Bureaucracy:** North Texas Municipal Water District has (per their own statements) identified itself as the sole source of treated surface water and wastewater treatment for Collin County. If Region C concurs that they have this authority, then NTMWD **must** provide a comprehensive water distribution plan for all political subdivisions in Collin County. The plan must:
    a. Be based upon the build-out conditions of each political subdivision, based upon the most recent comprehensive plan on file with the political subdivision.
    b. The locations of all existing and proposed right-of-way and easements required for future water transmission mains.
    c. A 10-year plan for how NTMWD will secure the necessary easements and rights-of-way to create these water transmission system corridors between existing NTMWD infrastructure and the political subdivisions served by NTMWD, including member cities, customer cities, and customer conglomerates.
    d. Guidelines for all political subdivisions served by NTMWD on the process of funding, designing, and constructing the transmission infrastructure within each corridor, and what level, if any, of participation NTMWD will have in the review, approval, and funding of the infrastructure.
3. **Anti-Water Waste:** Region C **must** recommend and advocate for Texas state legislation banning the use of groundwater and potable drinking water for excess irrigation in any county with a population greater than 50,000 at the time of the 2020 census. Excess irrigation should be defined as:
    a. Any irrigation system operating less than 48 hours after the closest certified rain gauge has registered a rainfall event of 0.25" or greater.
    b. Any irrigation system found to be operating more than 2 times per week, regardless of date/time.
    c. Any irrigation system which is found to be in operation with more than two broken irrigation heads or irrigation line breaks.
    d. Any irrigation system found to be operating between the hours of 10am and 6pm.
    e. Any irrigation system operating between January 1st and March 1st in a given year.
    f. Exemptions should be granted for agricultural businesses, including farms, which are using irrigation to grow food for human and animal consumption, and agricultural items which will be commercially sold, including flowers, grass, plants, trees, etcetera.
4. **Promote Common Sense Re-use:** Region C **must** recommend and advocate for Texas state legislation prohibiting any regional water district from challenging a political subdivision's application for a TCEQ permit for the construction and implementation of re-use systems at any wastewater treatment plant owned and operated by a political subdivision. Such prohibition of challenge shall specifically apply to NTMWD, TRWD, and other regional water districts.
5. **Improve Coordination:** Region C **must** recommend and advocate for Texas state legislation requiring all regional water districts in the State of Texas, including NTMWD, TRWD, and others to provide all of their member cities, customer cities, and customer conglomerates with an annual update on water supply, water access, and the regional water district's plans for meeting the water system current and future demands of the political subdivision. Such update shall be provided to the political subdivision in writing, and publicly presented at a public hearing, held by the political subdivision at a mutually agreed upon date, time, and location.
6. **Reduce Bureaucratic Bloat:** Region C **must** recommend and advocate for Texas state legislation requiring all regional water districts in the State of Texas, including NTMWD, TRWD, and others to meet the following staffing criteria:

webpage.

b. It shall be a violation of state law for any regional water district organization to have a staff body which is comprised of more than 10% administrative staff. Administrative staff shall be defined as all staff members whom
    i. Do not have job duties involving direct monitoring, sampling, testing, maintenance, repair, and replacement of water or wastewater facilities.
    ii. Do not have an active Professional Engineering License in the State of Texas, and have not signed and sealed an engineering plan in the last 36 months (not actively practicing engineering).
    iii. Are not actively managing design and construction projects as their primary job duty.
c. It shall be a violation of state law for any regional water district organization to enter into a contract with an employee whereby upon separation the employee receives more than 20 weeks of pay.
d. It shall be a violation of state law for any regional water district to provide any full time employee an annual salary in excess of $225,000/year in 2025 dollars, adjusted annually for CPI.

7. Cost Controls: Region C **must** recommend and advocate for Texas state legislation requiring all regional water districts in the State of Texas, including NTMWD, TRWD, and others to include a statement of the portion of their rates which goes to paying staff salaries and benefits in their annual rate letters.

Thank you for considering my suggestions.

Greg Peters, P.E.
Assistant City Manager
City of Anna, Texas
(214) 831-5362

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Visit: *AnnaTexas.gov*. Like us on *Facebook*.

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Friday, July 18, 2025 10:15 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Jadell Hines
Company/Organization: Wrecker Bridge Farm, LLC
Address: 600 County Road 4670
Phone Number: 7377045008
Email: Brandonkerrfl@gmail.com
Category Interest: Environment
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Concerning an upcoming agenda item, Related to water planning documents, Other
Comments: Wrecker Bridge Farm own approximately 165 acres abutting the Sulfur River Floodplain. This property provides habitat for White Tail Deer, Turkeys, Beavers, Otters, Cougars, Mink, Black Bear We have observed a breeding population of black bear on this property. There have been multiple sightings of bears in Bowie and Red River Counties this summer. The property is crisscrossed by mature hardwood swamps and marshes, creating ecosystems for valuable Texas wildlife resources.

Given the attributes of this farm and the many farms in the area, we oppose the creation of the Marvin-Nichols Reservoir and find it reprehensible that the state would infringe upon the property rights of all the residents, the small farms, the homesteads, the families who have been here for a century to advantage the population of the Dallas-Fort Worth area, hundreds of miles from here. We find it reprehensible that you would cast a shadow of eminent domain over all of us, so the Dallas-Fort Worth area can water their lawns, their golf courses, the massive acreage of St Augustine grass.

I would be very happy to discuss this further. My number is 512-592-1820
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0Ewqwv_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS95oDS674YMVGlGQTrkDlNKw-2BAetgcemwzsjYEt9e7XgROKu0qqo7Cdd3xsO-2F6uS8O4D-2B5jhzmq-2Fvm2FXA623qINqQHNQ35h6vdC46eOn8WZkRenuG9m2E-2F-2BnoHMf6RTkcUSvc8T7NbQ9uPwnnvKBmnsuFemStoYMZuARZORuOVeUg-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C55b1c0d45e0e4d4b4f8108ddc6727529%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638884917090700666%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=9sIh4DuiARx8J%2Bf5Dkv3LxxkPbDaRZ2dIerL3sunTcE%3D&reserved=0

From: Goforth,Jana (HHSC) <jana.goforth@hhs.texas.gov>
Sent: Monday, May 19, 2025 8:41 AM
To: info@regioncwater.org
Subject: Marvin Nichols Resevoir

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I strongly OPPOSE the plan for MNR! It will take my land and my familys land. I have lived in East TEXAS my ENTIRE life and am outraged that you have other options that you do not care to venture over a land grab. OUR LAND IS NOT FOR SALE!!!!! MNR needs to be removed from the water plan IMMEDIATELY! We have fought for 57 years and we will continue to do so.
My address is 557 CR 1828
Talco Texas. Talco…where the is a fault line and your board has been told by geologists how unsafe this could be.
Work smarter!!!!!

Jana Goforth
Administrative Assistant II– Region 4
Long-Term Care Regulation | Survey Operations
Health and Human Services | 1014 N Jefferson Ave | Mount Pleasant, TX 75455
903-387-7249 (cell)

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Sunday, May 18, 2025 6:19 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Jan Casner
Company/Organization: Dallas resident
Address: 15611 Overmead Circle
Phone Number: 2146620591
Email: jancasner@sbcglobal.net
Category Interest: Other
Public Comments Characteristic: Other
Comments: I would like to comment on the North Texas Water Planning Group/Region C 2026 Draft Water Plan. I strongly object to the recommended strategy to build Marvin Nichols, as that plan is both outdated and unnecessary. I am unable to attend the public hearing on May 19 but would like for my comment to be heard. It simply isn't right to impose this devastation on the families and people of the area so that Dallas can water its St. Augustine grass. That is a major portion of our water use. I would feel very guilty watering my grass if it had to come at the cost to these people, and losing such a beautiful part of our state. There are many water conserving strategies that Dallas needs to implement now rather than kicking the can down the road by building this reservoir. The 7 1/2 acre park in our HOA uses way too much water and we are not alone. Please remove this plan and replace it with more current and sensible alternatives.
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0ElTSO_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS94nTN83Ickmc-2FdGUemOdTFF5WfNSZUDn6SxPSKOC0JRx2bBCYEcTbLbXm7MlwyVoH2UkO-2FuJx85Ilmu7KLCZEfgG-2B6CnB-2B40AiEhNIcyfOA-2Bt85gj5GCJX-2F-2FQVBxUUjKs09JFxnsYfJnjVTOKAru-2BjDYvXtidA-2Bnisj05Q1ESot9Q-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C63796dd6a16447936f8208dd96624ff4%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638832071239542154%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=kY0HYEYXnDUHvDK%2FhOdpqsLsjpezorp0g1Y7NaNdAR8%3D&reserved=0

DRAFT

From: Jason Kelliher <jkelliher@dunaway.com>
Sent: Friday, July 18, 2025 10:04 PM
To: info@regioncwater.org
Subject: Comment on the IPP

You don't often get email from jkelliher@dunaway.com. Learn why this is important

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Dear Region C Water Planning Group Members,
We, the Environmental & Natural Resources Task Force, on behalf of the Greater Dallas Planning Council, write to express our support for the 2026 Initially Prepared Plan (IPP) developed by the Region C Water Planning Group, including the continued designation of the Marvin Nichols Reservoir as a recommended water supply strategy. Our task force is comprised of professionals and advocates committed to advancing sustainable development, environmental stewardship, and resilient infrastructure solutions supporting the long-term vitality of North Texas.

The Regional Water Plans are the foundational, bottom-up planning process the TWDB utilizes to craft the State Water Plan. Each of the sixteen regional plans craft a 50-year strategy to ensure adequate and reliable water supplies.

For North Texas and its more than eight million current residents, and the millions more expected in coming decades, the Region C IPP analyzes projected demands, existing supplies, and identifies recommended strategies to address water supply shortages. This plan is key to ensure our region can sustain its vibrant economy and enable its future.

As one of the fastest-growing metropolitan regions in the nation, North Texas faces mounting pressure on its water infrastructure. The 2026 Region C IPP acknowledges that conservation and reuse remain critical to our water future. According to the planning documents, only 17% of the future water supply is tied to new surface water reservoir projects. The remaining supply will come primarily from water conservation and reuse strategies to maximize the utility of our existing and readily available resources.

However, if the anticipated population growth modeled by state demographers continues its course through 2060 and beyond, these conservation and reuse efforts alone will not meet the anticipated doubling of water demand by 2080. The IPP details a balanced portfolio of strategies, including expanded water reuse, conservation, expanding underutilized reservoirs, and lastly development of new surface water sources. This multifaceted approach is necessary to build resilience in our water supply and prepare for long-term drought conditions.

We also support the inclusion of the Marvin Nichols Reservoir in the plan. We recognize the project's complexities on numerous fronts, including its environmental, social, and economic impacts to Region D. However, the regional planning process is not the venue to dispute those impacts. Further communication and collaboration are necessary at the proper stages to evaluate the merits of the

Marvin Nichols is one of the few feasible new surface water sources capable of significantly increasing supply to the region. Including the project in the IPP while delaying implementation until 2060 allows time to develop alternative supplies which demonstrates both foresight and a commitment to balance.

The Greater Dallas Planning Council appreciates the Region C Water Planning Group's comprehensive and pragmatic planning approach. We respectfully urge the Texas Water Development Board to adopt the 2026 Region C Water Plan, including the inclusion of the Marvin Nichols Reservoir, as a necessary element of our region's long-term water supply strategy.

Sincerely,

Jason Kelliher, PE
Client Relationship Manager

DUNAWAY

T 972.392.9092 **D** 972.782.6771 **C** 432.210.6586
dunaway.com

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Wednesday, May 21, 2025 12:24 AM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Jeffrey Kidd
Company/Organization:
Address: 8813 Random Rd
Phone Number: 8176802930
Email: jeffkiddtx@gmail.com
Category Interest: Public
Public Comments Characteristic: Pertaining to the Initially Prepared Plan
Comments: Adopt it. It shouldn't have taken to 50 years. Residents had 50 years to plan, or move. Fort worth oks anything and everything someone wants to build because TRWD guarantees any amount of water they need anytime that want it. But TRWD doesn't have the water. That agreement should be changed, Fort Worth needs to say no to building anything until they can guarantee water. Fort worth won't enforce water restrictions because of this agreement and TRWD is helpless. So lets build it yesterday. I'm Lake front on Eagle Mountain paying 15k a year in property taxes too not use the lake 7 months a year.
--
This e-mail was sent from a contact form on Region C (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EAOr3_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS96eAhDDpueaaoyNhw-2Bj3daMp7QiInMBwurNxrU-2FMLnk3iw-2FEdzQzDB5mapZCwuWIY3g7UgRl5mUyyPvmgFe352g6vGu660YYHmaVMdo8A26-2BKO66CBawlpzcsfaELX3ibCUD8UChoARO4p02iCq7Qyu7IYjsOyuYGCTK7-2FBLxQ50VOm21DNQXJpk6V9gor3SPc-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C1364f0f2d9824513579108dd9827b773%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638834018545281228%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=E0cmdVGUr0n5IsMf3K85Z60vv%2Bfqpdgoy5pCrJhtnuA%3D&reserved=0

DRAFT

From: Jerilyn Pope <jpope@rpc.net>
Sent: Monday, June 16, 2025 12:35 PM
To: info@regioncwater.org
Subject: No Marvin Nichols

You don't often get email from jpope@rpc.net. Learn why this is important

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My name is Jerilyn Arneson, and I am writing as a concerned citizen, landowner, and descendant of a family with roots in
Northeast Texas date back over 100 years. I am asking you today to **remove the proposed Marvin Nichols Reservoir from the water plan.**

My family has preserved our land since the 1800's. This land that has weathered world wars, economic collapses, and social
revolutions. Through it all, this land has done more than just survive—it has held our family together. What outsiders see as acreage, we see as livelihood.

For over 50 years, our communities have been resisting this project—not because we are against progress, but because we believe
in stewardship. The land is not a disposable commodity to us—it is a sacred trust passed down through generations. And there is
no relocation, no compensation, and no justification that can replace what would be lost if this reservoir proceeds. You would be
erasing something that can never exist again. You would be erasing the last hardwood forests in Texas.

Completely demolishing rural communities for urban development is not “greater good”—it is cultural erasure. Especially for a reservoir that has already proven to be outdated
and not a viable solution. I urge you to recognize that the families of Northeast Texas are not anti-growth. We are pro-integrity, pro-heritage, and pro-accountability.

We are asking to be heard. To be respected. To be protected.
Please, remove the proposed Marvin Nichols Reservoir from the water plan. Let your legacy be one of courage, conservation, and compassion.

Thank you for your time.
Jerilyn Arneson

DRAFT

sender to enter into a contract. Any contract between the sender and recipient must be reduced to writing and executed by an authorized signatory.

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By reading this email and opening any attachments, the recipient accepts full responsibility for taking protective and remedial action about viruses and other defects.

[RPC-EC-PO-AM-2005-01-002]

DRAFT

From: JOE BOGGS <joewboggs@gmail.com>
Sent: Tuesday, May 20, 2025 10:00 PM
To: info@regioncwater.org
Subject: Proposed Marvin Nichols Resevoir

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Public comment.
I currently live in Fairview, Texas. 14 years ago I purchased 40 acres in Red River where the proposed Marvin Nichols Lake would evidently take my land via eminent domain.
I've built a cabin, shop, pond and many improvements over the past 14 years with a plan to retire, get out of DFW, and move there in 5 years. I have a Family Owned Tree Forrest designation and have been growing the hardwoods to maturity.
I'm completely against destroying a resource to provide additional water supply elsewhere and have lots of questions.

1. If approved, what is the timeline?
2. How to I locate a map to confirm my land will be included?
3. Who will decide on Fair Market Value and how will that decision be made?
4. What if part of my land is included both some of it is not?
5. How come we didn't just dig the existing reservoirs much deeper to hold more water?
6. How do I stay informed?

I appreciate any information you can provide.
Joe Boggs
(972) 578-2300

Joe W Boggs
Integrity Financial Group
Cell: 972-578-2300
JoeWBoggs@Gmail.com

DRAFT

From: Kerry Quinn <quinn.kerry123@gmail.com>
Sent: Tuesday, May 20, 2025 9:48 PM
To: info@regioncwater.org
Subject: Feedback on Marvin Nichols Reservoir

You don't often get email from quinn.kerry123@gmail.com. Learn why this is important

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Hello,

I am writing to express my opposition to the Marvin Nichols Reservoir. I have followed this initiative for many months and signed petitions. It is clear to me that the bad will outweigh the good.

It is frustrating to me to walk my neighborhood and see neighbors running their sprinklers at 3 pm without any awareness or care to the impact; that my community continues to plant not xeric plants that need to be watered constantly despite there being so many native and non native xeric plants available; that my community wastes gallons upon gallons of water right after it rains watering landscapes already watered while watching most of it hit the sidewalks and streets. The push to take water from a whole other region and take thousands of acres of land from so many families that have been there for generations to give to my city community miles away when my community is not good stewards of the water we already have does not seem fair or just.
I think of Austin who has strict and enforced watering rules and San Antonio that has a huge water wise system with Garden Style, incentives, and more. Dallas, Plano, Fort Worth, and the other cities (including mine) in the metroplex have nothing but websites to encourage people to conserve water or state rules that are not enforced. The money should be spent educating and informing DFW residents on water conservation, initiatives to encourage it, and holding residents accountable for their misuse. The fact is we shouldn't be using the amount of water that we do.

Also current research shows that reservoirs are not good at doing the job they are intended for and cause harm. "Our study shows that the solutions of the past are insufficient and can be damaging to already overstretched freshwater ecosystems." This is a direct quote from this article from https://carnegiescience.edu/news/dams-and-reservoirs-cant-meet-future-water-storage-needs . Another opportunity for water use could be a push for more graywater usage to irrigate foundations and landscapes.

We need to do better as Texans in being good stewards of Texas and its ecosystems.

Sincerely,
A Sixth Generation Texan
Sent from my iPhone

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Tuesday, May 13, 2025 8:35 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Lesa Dyke
Company/Organization:
Address: 2308 County Road 3250, Mount Pleasant, Texas 75455 Phone Number: 903-573-6838
Email: mjltdyke@yahoo.com
Category Interest: Public
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Concerning an upcoming agenda item, Related to water planning documents, General public comments
Comments: As a taxpayer and resident of Titus county, I do not believe the Marvin Nichols Reservoir is a necessity.

Do not build this reservoir and destroy our homes and disrupt our lives until the metroplex citizens have proven they have done everything possible to avoid this travesty.

The Marvin Nichols Reservoir will have a complete negative impact on Titus county and surrounding areas. Families will lose parts, if not all, of their family heritage. There will be a massive negative impact on school districts and local industries. There will be untold damages to wildlife and the environment.

Just one of the major objections I have to this reservoir is funding. How dare they ask Texas taxpayers for money. Taxpayers who are against the project and see no reasonable, feasible need for the reservoir.

At no time have I seen any report or data on how much water the Dallas/Fort Worth metroplex area is currently using that also includes information on how the area water is being used. Citizens could conserve the water they currently have access to, reuse or recycle the water used for non-essential causes, or better use the water resources they already have in place. Many technological advancements have been made in the several decades that have passed since the reservoir was first proposed.

Again, do not build the Marvin Nichols reservoir.

Do not destroy our heritage, our homes and disrupt our lives.

Citizens of the metroplex need to help themselves.
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DRAFT

From: Madisson Dunn <MEDunn@ci.southlake.tx.us>
Sent: Friday, May 30, 2025 6:52 AM
To: info@regioncwater.org
Subject: City of Southlake Water Conservation Plan
Attachments: Final Drought Contingency Plan 2024.pdf

You don't often get email from medunn@ci.southlake.tx.us. Learn why this is important

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Good morning,

A fellow TWDB Conservation Specialist made me aware that Southlake never submitted our Water Conservation Plan to the Region C Planning Group. My apologies for this oversight. Please see the City of Southlake's Water Conservation Plan.

Let me know if you have any questions!

Thanks,
Madisson Dunn
Environmental & Regulatory Supervisor, City of Southlake
817-748-8638 | 1950 E. Continental Blvd., Southlake, TX 76092

CITY OF SOUTHLAKE

DRAFT

From: AZ_Utilitarian AZ_Utilitarian <azutilitarian2015@gmail.com>
Sent: Monday, May 19, 2025 8:46 PM
To: info@regioncwater.org
Subject: North Texas Water

You don't often get email from azutilitarian2015@gmail.com. Learn why this is important

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https://www.msn.com/en-us/news/us/north-texas-needs-way-more-water-here-s-the-state-s-latest-plan-to-get-it/ar-AA1F5ldv

I've worked Power Generation & Transmission for 30 years. You guys are just a tunnel away from major energy storage, grid stability, and virtually unlimited water.

A tunnel from the Mississippi thru Oklahoma can draw water most of the time. It can recharge the Ogallala aquifer and feed North Texas. Using natural gas power plants sited every 50 miles or so allows their normal Plant Cooling Water pump load to do double duty, moving water down the tunnel and cooling the power plant condensers. The intervening 50 miles between plants acts as a radiator, reducing the tunnel water temp between plants. As the terrain isn't precisely flat, there is an energy storage opportunitiy as "Low-Head Hydro" . Renewable "energy storage" is possible using off-peak wind energy to run the plant cooling water pumps, then returning via low-head hydro during peak usage times. Water tunnels can be bored using existing tunneling machines. These run roughly $100M/mile, or about $60B for a 600 mile tunnel. Power production sites can be leased. A HVDC or 500KV-AC line provides a power conduit to South-East Power Grid markets, promoting grid stability.
Tunnels can be used to move water either way. If Texas had a flood accessible to the power stations by the pipeline, that water could be pumped to Oklahoma water storage areas and not lost.
Power Gen tech and tunneling tech can be used to create a multifunction public energy and water asset. Oklahoma would certainly be all in. The Ogallala is huge for them.
Best Regards, Mitch Smith, Ex Power Production worker.

DRAFT

From: Patti Wilburn Haney <pattihaney72@gmail.com>
Sent: Wednesday, May 21, 2025 10:23 PM
To: info@regioncwater.org
Subject: Fwd: Marvin Nichols Reservoir-An Environmental Disaster-Who Benefits?

You don't often get email from pattihaney72@gmail.com. Learn why this is important

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---------- Forwarded message ---------
From: **Patti Wilburn Haney** <pattihaney72@gmail.com>
Date: Mon, May 12, 2025 at 4:46 PM
Subject: Marvin Nichols Reservoir-An Environmental Disaster-Who Benefits?
To: <district1.vandeaver@house.texas.gov>, <todd.hunter@house.texas.gov>, <toni.rose@house.texas.gov>, <terry.canales@house.texas.gov>, <stan.gerdes@house.texas.gov>, <cody.harris@house.texas.gov>, <ana.hernandez@house.texas.gov>, <ann.johnson@house.texas.gov>, <jeff.leach@house.texas.gov>, <janie.lopez@house.texas.gov>, <carl.tepper@house.texas.gov>, <cole.hefner@house.texas.gov>
Cc: <greg.abbott@gov.texas.gov>, <dan.patrick@ltgov.texas.gov>, <glenn.hegar@cpa.texas.gov>, <ken.paxton@oag.texas.gov>, <dawn.buckingham@glo.texas.gov>, <sid.miller@texasagriculture.gov>, <news@fox4now.com>, <news12@kxii.com>, <newsteam@kten.com>, <newstips@dallasnews.com>, <newstips@nbcdfw.com>, <lockbox@washpost.com>, <editorial@nytimes.com>, <ktbcnews@fox.com>

To Whom It May Concern,

My name is Patti Haney, and I am a registered voter and landowner in Red River County, Texas. I know Y'all have taken the positions you are in because you love our great state and her people. As native Texans, we cut our teeth on this land. It is in our blood, and as with many of us, this reservoir was in a plan before I was even born. I am going to be 53 years old in June! It is cruel that this has been held over my friends' and neighbors' heads all these years. We understand our state is growing and that there are increased water needs due to increased population, technology needs, tourism needs, and lithium extraction and production.

That being said, from an environmental standpoint, all of you are intelligent people. You are Lawyers, Ranchers, Real Estate Agents, Mental Health Professionals, and Public Servants. Why in the world would you put a reservoir on top of a fault line in our region where there is DLE in the future? This makes absolutely no sense to me. There has been previous testimony from a Geologist about what a reservoir on top of it could do to trigger the Talco-Mexia Fault line. That was before the Lithium was in the picture. Do you want to have to explain to wherever you are planning on pumping this water that the chances are

fault line and DLE at the bottom of my email.. To make it a matter of public record, I have also cc'd some news outlets.

I know this matter very personally because, in all likelihood, if approved, I won't live to see the completion of the reservoir. I don't want anyone else to deal with the diseases that I have had to endure. I was born in Orange, Texas, where environmental toxins run pretty high. I have several autoimmune diseases that have proven environmental contributors, and I speak now for my grandchildren and their right to have a future. I beg you, don't destroy NE Texas! This falls to you, our elected leaders, to make the right decision for NE Texas and for all of Texas! Our state motto is "friendship". So we humbly ask you, friends, that you continue to be friends to our neighbors who don't deserve their heritage to be stolen through eminent domain, friends to our natural wetlands, and friends to our wildlife.

"Don't Mess With Texas" is another motto we are all so very proud of, and I say this with 100% certainty that history and your constituents will remember you for the decisions that you make regarding the Marvin Nichols Reservoir, HB 2109, and the protection of our great state. God bless you and may he lead you to the right choice.

Thank you,
Patti Haney
Bogata, Texas
Red River County
903-563-3636

"DLE is still in the early stages of utilization, so any environmental impact is theoretical. In fact, Standard Lithium only validated the process in November 2023.... source below....."
https://www.kuaf.com/show/ozarks-at-large/2024-03-27/assessing-the-environmental-impact-of-direct-lithium-extraction-in-south-arkansas

Marvin Nichols Reservoir and the Talco-Mexia Fault Line Disaster Potential...Expert Testimony.....
https://texnet.beg.utexas.edu/files/Media%20Coverage/2016-03/Shaken%20and%20Stirred%20Up.pdf

The beauty that will be destroyed.... (Courtesy Eddie Wayne)
https://www.facebook.com/share/v/18sUhu2rZU/

Please put HB 2109 on the calendar and remove Marvin Nichols Reservoir from the state water plan!! Thank You!!

DRAFT

From: Randy Russell <rrrussell56@gmail.com>
Sent: Tuesday, May 20, 2025 4:35 PM
To: info@regioncwater.org
Subject: Marvin Nichols

You don't often get email from rrrussell56@gmail.com. Learn why this is important

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Dam up Trinity or build your own lake somewhere near you.

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Saturday, May 17, 2025 5:59 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Robert Miller
Company/Organization: Retired
Address: 4208 Warminster Drive, Plano, Texas 75093 Phone Number: 972-786-6350
Email: butch@texasmillers.com
Category Interest: Water Utilities
Public Comments Characteristic: Concerning an upcoming agenda item
Comments: After reading about the upcoming meeting on Monday, May 19, I have questions about two items listed on page 6. Fact 3 indicates that 33% of Regions C's total 2080 water supplies and 45% of all new water supplies will come from water conversation and reuse. How do these numbers compare to current usage? And what current usage is for landscaping and lawn watering? And what is included in the plan to insure that the 2080 goals can be achieved? Also, Fact 4 indicates that factoring in all water conservation and reuse strategies in Region C's plan, region-wide municipal per capita water use falls to 95 gpcd by 2080. How was this number determined? And what is included in the plan to achieve this steep decline?
Due to a prior committment, I will not be able to attend the meeting. However, I would like to have my questions answered in the meeting.
Thank you, Robert B. Miller
--
This e-mail was sent from a contact form on Region C (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0ErWC6_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS95azsAPXtU7xOwwz0kkt7KpH6GVyQ6Dt94NEPeFLkf4-2B0ReIQnvNL2MK76Uq-2BzvC-2FBrY5UTKTneFnjh7N6SVIOXU6npJoS-2B3Kz-2FEp-2FBXvrxMD513uvThIe6kc-2BF-2FXztoVTPvccheVupISWxSUDioUCa4CBAJI-2FT151-2F9PiqJ2Hjfg-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C80264265619748f62aa708dd95967b48%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638831195749307246%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=%2BoI%2BlxaJ%2FWPjYe7vFL%2BoV7wFaqgv8IFv4LTN4lVYRGE%3D&reserved=0

DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Tuesday, May 20, 2025 12:28 PM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Russ Toates
Company/Organization: Self
Address: 6708 Lakeshore Drive, Dallas, TX 75214 Phone Number: 214.668.5793
Email: russtoates@yahoo.com
Category Interest: Public
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Related to water planning documents, General public comments
Comments: As a stakeholder/property owner in Region C, I sympathize with and support the Region D objections. Region C should not be considering this option until all other options have been considered and overruled. For example, no swimming pools or landscape irrigation/sprinklers unless you pay an extremely high price for that water, such as 10x. In Region C, i believe it is only growth that is considered, which is wrong.
--
This e-mail was sent from a contact form on Region C (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgIlXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EYBl9_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS94TXZGOmj06tQzNReJ85RGKSwHKWfxkuAD5h2CSK3I-2BIWowmqRvfFc1mGMZBwz47UPMhm0hPod7VkDsUHdFTC67VJy7o1MA-2FOSL53jjjT20r5zbPgdVSYJztvtxsMEhEfw2P8kITj75TNakJZnT3twYWtljei8pg-2BsM0qSoHkkq5A-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7Ce0f94826828245dbf32508dd97c3a58e%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638833588734584864%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=Nn3FHAV3XEibTQ94ufHW3tRiOWjYvd741abFsIMDsQ4%3D&reserved=0

DRAFT

From: Sheila Rushing <srushing@benbrookwater.com>
Sent: Tuesday, April 22, 2025 7:26 AM
To: info@regioncwater.org
Subject: WCP 2024 Updated 4-23-24.pdf
Attachments: WCP 2024 Updated 4-23-24.pdf

You don't often get email from srushing@benbrookwater.com. Learn why this is important

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Good morning,

It has been brought to my attention that perhaps this was not sent to you last year.

This is BWA's updated Water Conservation Report.

Thank you,

BENBROOK WATER AUTHORITY

Sheila Rushing
Executive Assistant

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*Teamwork *Integrity *Customer Commitment *Sustainability *Trust

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DRAFT

From: Region C <noreply@regioncwater.org>
Sent: Friday, May 2, 2025 8:23 AM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: Suzanne Tuttle
Company/Organization:
Address: 2029 Turtle Pass Trail, Fort Worth TX 76135 Phone Number: 817-845-5656
Email: troutlily57@hotmail.com
Category Interest: Public
Public Comments Characteristic: Pertaining to the Initially Prepared Plan, Related to water planning documents
Comments: I oppose the creation of the Marvin Nichols reservoir in northeast Texas. Region C's water planning efforts should focus more on conservation education, addressing waste and repairing/replacing currently obsolete infrastructure, not creating a whole new lake by displacing generations of landowners through a private land grab and destroying irreplaceable wildlife habitat.
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(https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fu25868646.ct.sendgrid.net%2Fls%2Fclick%3Fupn%3Du001.64od6B93zACN2v8eQDgllXIVOTWOVc4qqhgGPOy0OpMkniHNFN-2Bn0c1GFwn90a0EhiuQ_s5xsKn6BJaGo0DpToLMh9rd-2FCBeW2sG-2BMEvkETbTS96M4c-2FytloLsdGWpZVBfUCijRtooWMmBZuaPxtR6SvGsRF3bibcKWrYNMgAi0VFx26C01MP8gPtrm68YyU9wdbtXqNh-2BYO1qN8ZkqM3Dqgv1aslmAeya-2BUE2VDxShhAQ5kjZtL-2BHsCfwwQqwLRt-2B4lxxikZqB7e44Tw9NOBZvRfcg-3D-3D&data=05%7C02%7Cinfo%40regioncwater.org%7C7a8e17c5b1184ec4578908dd897c7817%7C191657eabcff43859d04659ef9cee515%7C0%7C0%7C638817889910475349%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=Qh29tIML%2FsQ%2FQUtpSi3gelZE0TYih5LBlv0FOWdXknQ%3D&reserved=0

DRAFT

From: Lovell, Tommy <Tommy.Lovell@marcusmillichap.com>
Sent: Wednesday, May 21, 2025 2:40 PM
To: info@regioncwater.org
Subject: North Texas water plan

You don't often get email from tommy.lovell@marcusmillichap.com. Learn why this is important

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Question. If the Marvin Nichols Reservoir moves forward and when this is built how much of the land that will have been taken through condemnation will be sold off to developers for homes and lake houses?

Thank you,

Tommy M Lovell, III
First Vice President Investments
Associate Director, National Multi Housing Group

Marcus & Millichap
5001 Spring Valley Road
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Dallas, TX 75244

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From: Region C <noreply@regioncwater.org>
Sent: Tuesday, May 6, 2025 4:23 AM
To: info@regioncwater.org
Subject: Public Comment Submission

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Name: William Forbes
Company/Organization: N/A
Address: PO Box 633136, Nacogdoches, TX 75963 Phone Number: 9402068480
Email: bforbes04@gmail.com
Category Interest: Public
Public Comments Characteristic: Related to water planning documents
Comments: I attended a Region C meeting 20 years ago, when landowner Max Shumake from the proposed Marvin Nichols Reservoir area got up and protested against the proposed reservoir. I can't believe this proposed reservoir is still on the books! As Max said in a TPWD video on Texas water, why should his family have to give up property that's been in his family for generations, just so Dallas area builders/homeowners can have their water-guzzling Bermuda grass lawns? There are better alternatives. They can install conservation practices that other Texas cities like San Antonio have done. Many of these practices such as native xeriscaping look more beautiful (and Texan) than imported grasses. To still have this reservoir in the plans is almost as absurd as the current tariffs, which the usually right-wing Wall Street Journal editorial board calls the "Dumbest Trade War in History." Even Governor Greg Abbott has come out against using eminent domain in this case. Please treat the landowners of East Texas, a group which I belong to (with 55 acres), with more respect. Take this reservoir off the books -permanently! Thank you.
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