APPENDIX A
IPP CHECKLIST

2026 Initially Prepared Plan Checklist

2026 IPP Review Item Number	Key Requirement Citation: TWC, 31 TAC Rule, or Contract Exhibit	Corresponding Contract Guidance and SOW Task *(if applicable)*	Requirement (see published rule and other contract documents for full context)	Location(s) in Regional Plan and/or Commentary
Header	**§ 357.22**		**General Considerations for Development of Regional Water Plans**	
1	**§ 357.22(a)**		RWPGs shall consider existing local, regional, and state water planning efforts, including water plans, information and relevant local, regional , state and federal programs and goals when developing the RWP. **The RWPGs shall also consider:**	Chapters 1 - 10 consider existing local, regional, and state water planning efforts, including water plans, information and relevant local, regional, state, and federal program goals
2	**§ 357.22(a)(1)**		**[The RWPGs shall also consider:]** water conservation plans;	Subchapter 5B, Chapter 7
3	**§ 357.22(a)(2)**		**[The RWPGs shall also consider:]** drought management and drought contingency plans;	Subchapter 5B, Chapter 7
4	**§ 357.22(a)(3)**	Exhibit C, Section 2.1	**[The RWPGs shall also consider:]** information compiled by the Board from water loss audits performed by retail public utilities pursuant to § 358.6 (relating to Water Loss Audits)	Chapter 1
5	**§ 357.22(a)(4)**		**[The RWPGs shall also consider:]** publicly available plans for major agricultural, municipal, manufacturing and commercial water users;	Subchapter 5A
6	**§ 357.22(a)(5)**		**[The RWPGs shall also consider:]** local and regional water management plans;	Subchapter 5A
7	**§ 357.22(a)(6)**		**[The RWPGs shall also consider:]** water availability requirements promulgated by a county commissioners court in accordance with TWC § 35.019 (relating to Priority Groundwater Management Areas)	Chapter 3 Section 3.1.16
8	**§ 357.22(a)(7)**		**[The RWPGs shall also consider:]** the Texas Clean Rivers Program;	Chapter 1, Subchapter 5A, and Chapter 6
9	**§ 357.22(a)(8)**		**[The RWPGs shall also consider:]** the U.S. Clean Water Act;	Chapter 1 and Subchapter 5A
10	**§ 357.22(a)(9)**		**[The RWPGs shall also consider:]** water management plans;	Subchapter 5A
11	**§ 357.22(a)(10)**		**[The RWPGs shall also consider:]** other planning goals including, but not limited to, regionalization of water and wastewater services where appropriate	Subchapter 5A
12	**§ 357.22(a)(11)**		**[The RWPGs shall also consider:]** approved groundwater conservation district management plans and other plans submitted under Texas Water Code § 16.054 (relating to Local Water Planning);	Chapter 3
13	**§ 357.22(a)(12)**		**[The RWPGs shall also consider:]** approved groundwater regulatory plans;	Chapter 3 and Chapter 5
14	**§ 357.22(a)(13)**		**[The RWPGs shall also consider:]** potential impacts on public health, safety, or welfare;	Chapter 6
15	**§ 357.22(a)(14)**		**[The RWPGs shall also consider:]** water conservation best management practices available on the TWDB website; and	Chapter 5B
16	**§ 357.22(a)(15)**		**[The RWPGs shall also consider:]** any other information available from existing local or regional water planning studies.	Subchapter 5A
17	**§ 357.22(b)**	Exhibit C, Section 1.6	The RWP shall contain a separate chapter for the contents of §§357.30, 357.31, 357.32, 357.33, 357.42, 357.43, 357.45, and 357.50 of this title and shall also contain a separate chapter for the contents of §357.34 and §§357.35, 357.40 and 357.41 of this title for a total of ten separate chapters	Chapters 1-10
Header	**§ 357.30**	**SOW Task 1**	**Description of the Regional Water Planning Area**	
18	**§ 357.30(1)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** social and economic aspects of a region such as information on current population, economic activity and economic sectors heavily dependent on water resources;	Chapter 1
19	**§ 357.30(2)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** current water use and major water demand centers;	Chapter 1
20	**§ 357.30(3)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** current groundwater, surface water, and reuse supplies including major springs that are important for water supply or protection of natural resources;	Chapter 1
21	**§ 357.30(4)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** major water providers;	Chapter 1
22	**§ 357.30(5)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** agricultural and natural resources;	Chapter 1
23	**§ 357.30(6)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** identified water quality problems;	Chapter 1
24	**§ 357.30(7)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** identified threats to agricultural and natural resources due to water quantity problems or water quality problems related to water supply;	Chapter 1

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25	**§ 357.30(8)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their regional water planning area including the following:]** summary of existing local and regional water plans;	Chapter 1
26	**§ 357.30(9)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** the identified historic drought(s) of record within the planning area;	Chapter 1 and Chapter 7
27	**§ 357.30(10)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** current preparations for drought within the RWPA;	Chapter 1, Chapter 7, and regionfwater.org
28	**§ 357.30(11)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** information compiled by the Board from water loss audits performed by retail public utilities pursuant to § 358.6 of this title (relating to Water Loss Audits); and	Chapter 1
29	**§ 357.30(12)**	Exhibit C, Section 2.1; SOW Task 1	**[RWPGs shall describe their RWPA including the following:]** 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.	Chapter 1 and Chapter 6
Header	**§ 357.31**	**SOW Task 2A and 2B**	**Projected Population and Water Demands**	
30	**§ 357.31(a)**	Exhibit C, Section 2.2; SOW Task 2A and B	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.	Appendix I
31	**§ 357.31(b)**	Exhibit C, Section 2.2.3; SOW Task 2A and 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.	Attachment 2A
32	**§ 357.31(c)**	SOW Task 2A and B	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 2
33	**§ 357.31(d)**	Exhibit C, Section 2.2 and 2.5.5; SOW Task 2B	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.	Chapter 2, Appendix I
34	**§ 357.31(e)(1)**	Exhibit C, Section 2.2; SOW Task 2A and B	**[Source of population and water demands. In developing RWPs, RWPGs shall use:]** Population and water demand projections developed by the EA that shall 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.	Chapter 2
35	**§ 357.31(f)**	Exhibit C, Section 2.2; SOW Task 2A and B	Population and Water Demand projections shall be presented for each Planning Decade for WUGs and MWPs.	Chapter 2, Attachment 2A, and Appendix I
Header	**§ 357.32**	**SOW Task 3**	**Water Supply Analysis**	
36	**§ 357.32(a)(1)**	Exhibit C, Section 2.3; SOW Task 3	**[RWPGs shall evaluate:]** source water Availability during Drought of Record conditions; and	Chapter 3, Appendix B
37	**§ 357.32(a)(2)**	Exhibit C, Section 2.3; SOW Task 3	**[RWPGs shall evaluate:]** Existing Water Supplies that are legally and physically available to each WUG and WWP within the RWPA for use during the Drought of Record.	Chapter 3
38	**§ 357.32(b)**	Exhibit C, Section 2.3.6; SOW Task 3	Evaluations shall 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

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39	**§ 357.32(c)**	Exhibit C, Section 2.3.1; SOW Task 3	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.	Chapter 3, Appendix B
40	**§ 357.32(c)(1)**	Exhibit C, Section 2.3.1; SOW Task 3	Evaluation of existing stored surface water available during Drought of Record conditions shall be based on Firm Yield as defined in §357.10 of this title (relating to Definitions and Acronyms). 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, Appendix B
41	**§ 357.32(c)(2)**	Exhibit C, Section 2.3.1	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, Appendix B
42	**Contract Scope of Work Task 3**	Exhibit C, Section 2.3.1	Inclusion of sedimentation into the WAM RUN3 models (or other models) for major reservoirs is a necessary modification.	Appendix B
43	**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 B
44	**Contract Exhibit C, Section 2.3.1**		For surface water withdrawals that do not require permits, such as for domestic and livestock uses, RWPGs will estimate these local annual water availability volumes under drought of record conditions based on the most current accessible information. RWPGs shall document the methodologies utilized for these availabilities in the Technical Memorandum, IPP, and final adopted RWP.	Chapter 3
45	**Contract Exhibit C, Section 2.3.2**	SOW Task 3	For planning purposes, availability for reservoirs operated as a system may be reported as a system in lieu of reporting individual reservoir availability. Such a relationship could include reservoirs owned and operated by the same entity, so long as the operations comply with the existing permit conditions. **The firm yield of the system should be the firm yield during drought of record conditions for the system as a whole.**	Chapter 3,Appendix B
46	**Contract Exhibit C, Section 2.3.2**	SOW Task 3	System gain is the amount of permitted water a system creates that would otherwise be unavailable if the reservoirs were operated independently; and **for existing systems, this volume shall be reported separately in the RWPs in addition to the reservoir system firm yield**. For multi-reservoir systems, the minimum system gain during drought conditions may be considered additional water available, if it has already been permitted. Total existing water from a system shall not exceed the sum of the system gain plus the firm yields of individual reservoirs in that system. **To report system gain, system operations must produce a measurable system yield greater than the sum of the individual reservoir yields.** System gain for system operations that mask individual reservoir yields or that group reservoirs together without a permitted relationship shall not be allowed in the RWPs.	Chapter 3, Appendix B, DB27
47	**§ 357.32(d)**	Exhibit C, Section 2.3.4.1; SOW Task 3	RWPGs shall 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.	Chapter 3
48	**§ 357.32(d)(1)**	Exhibit C, Section 2.3.4.1; SOW Task 3	An RWP is 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, in accordance with paragraph (2) of this subsection or as modified by paragraph (3) of this subsection, if applicable. The desired future condition must be either the desired future condition adopted as of the most recent deadline for the Board to adopt the State Water Plan or, at the option of the RWPG, a desired future condition adopted on a subsequent date.	Chapter 3

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49	**§ 357.32(d)(2)**	Exhibit C, Section 2.3.4.3; SOW Task 3	If no groundwater conservation district exists within the RWPA, then the RWPG shall determine the Availability of groundwater for regional planning purposes. The Board shall review and consider approving the RWPG-Estimated Groundwater Availability, prior to inclusion in the IPP, including determining if the estimate is physically compatible with the desired future conditions for relevant aquifers in groundwater conservation districts in the co-located groundwater management area or areas. The EA shall use the Board's groundwater availability models as appropriate to conduct the compatibility review.	Chapter 3
50	**Contract Exhibit C, Section 2.3.4.3**	SOW Task 3	***[In relation to TWDB Board approved RWPG-estimated groundwater availability]***, a copy of the TWDB Board approval memorandum as well as documentation of the request process should be included in the IPP and final adopted RWP. The TWDB Board approved RWPG-estimated groundwater availabilities will be used as the planning condition in the RWP and basis of analysis in DB27. The unmodified annual MAG volume(s) must also be reported in the IPP, and final adopted RWP	N/A
51	**§ 357.32(d)(3)**	Exhibit C, Section 2.3.5.2; SOW Task 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.	N/A, no MAG peaking factors
52	**Contract Exhibit C, Section 2.3.5.2**	SOW Task 3	***[In relation to approved MAG Peak Factor requests],*** a copy of the MAG peak factor approval letter as well as documentation of variance request process should be included in the IPP, and final adopted RWP. The unmodified annual MAG volume(s)must also be reported in the Technical Memorandum, IPP, and final adopted RWP.	N/A, no MAG peaking factors
53	**Contract Exhibit C, Section 2.3.4.2**	SOW Task 3	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).**	Chapter 3
54	**Contract Exhibit C, Section 2.3.5.2**		***[In relation to approved MAG Reallocation requests]***, a copy of the MAG reallocation approval letter as well as documentation of variance request process should be included in the Technical Memorandum, IPP, and final adopted RWP. The unmodified annual MAG volume(s)must also be reported in the Technical Memorandum, IPP, and final adopted RWP.	N/A
55	**§ 357.32(e)**	SOW Task 3, Contract Exhibit C, Section 2.3.6	Water supplies based on contracted agreements shall be based on the terms of the contract, which may be assumed to renew upon contract termination if the contract contemplates renewal or extensions.	Chapter 3
56	**§ 357.32(f)**	SOW Task 3	Evaluation results shall be reported by WUG in accordance with § 357.31(a) of this title (relating to Projected Population and Water Demands) and MWP in accordance with § 357.31(b) of this title.	Chapter 2, Chapter 3, Appendix I
57	**Contract Scope of Work, Task 3**	Contract Exhibit C, Section 2.12.2	In addition to submitting all electronic model input/output files used in determining water availability (in sufficient detail for another party to replicate the resulting availability estimates that are incorporated into the plan), the Technical Memorandum, IPP, and final RWP must include a table summarizing the details of any hydrologic models used, including the model name, version date, model input/output files used, date model run, and any relevant comments	Attachment B2 in Appendix B
58	**Contract Exhibit C, 2.3.5.1**		If the use of a hydrologic variance for an alternative surface water availability evaluation is approved by the Executive Administrator, a copy of the approved alternative hydrologic assumptions and methodologies as well as documentation of variance request process must be included in the IPP and final adopted RWP.	Attachment B1 in Appendix B
59	**Contract Exhibit C, Section 2.3.5.1. Table 2**		If the use of a hydrologic variance for an alternative surface water availability evaluation is approved by the Executive Administrator, the plan must include the additional yield information specified in Exhibit C, Section 2.3.5.1; Table 2, as a value reported in IPP and final RWP.	Chapter 3 and Appendix B
60	**Contract Exhibit C, Section 2.3.3**		Reuse is considered a stand-alone water source type and RWPGs will evaluate reuse availability and supplies separately from conservation, which is classified as a demand reduction associated with a WUG.	Chapter 3

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61	**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.	Chapter 3
62	**Contract Exhibit C, Section 2.3.3**		RWPGs must classify reuse availability as either direct or indirect.	Chapter 3 and DB27
63	**Contract Exhibit C, Section 2.3.6**		For direct reuse [existing supplies], RWPGs shall base their drought of record existing direct reuse analyses on: currently installed wastewater reclamation infrastructure; and the amount of wastewater anticipated to be treated at the WWTP, based on associated decade populations/demands. These amounts shall not exceed the amounts of water available to utilities generating the wastewater.	Chapter 3
64	**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.	Chapter 3
65	**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.	Chapter 3 and electronic submittal
66	**Contract Exhibit C, Section 2.3.6**		**[The following items must also be presented in the IPP and final adopted RWP:]** For local surface water supply, plans must include a single table that lists each local surface water supply with a) an explanation for the basis of the supply itself, and b) the basis for the volume of supply. For unpermitted supplies, list the source as the sum of unpermitted surface water by county-basin split. Any unpermitted local surface water supplies must be listed individually as well with explanation and may be aggregated at the county-basin level when appropriate.	Chapter 3
67	**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.	Chapter 3
68	**Contract Exhibit C, Section 2.3.6**		An RWPG may not set existing groundwater supplies equal to demands just for convenience. If a RWPG determines groundwater supply volumes are appropriate to equal demand values, then they must provide justification within the RWP.	Groundwater supplies were not set equal to demands for convenience.
Header	**§ 357.33**	**SOW Task 4A**	**Needs Analysis: Comparison of Water Supplies and Demands**	
69	**§ 357.33(a)**	Exhibit C, Section 2.4; SOW Task 4A	RWPs shall include comparisons of existing water supplies and projected Water Demands to identify Water Needs.	Chapter 4
70	**§ 357.33(b)+§ 357.33(c)**	Exhibit C, Section 2.4; SOW Task 4A	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, Attachment 4B, DB27
71	**§ 357.33(c)**	Exhibit C, Section 2.4; SOW Task 4A	Results of evaluations shall be reported by WUG in accordance with §357.31(a) of this title and by MWP in accordance with §357.31(b) of this title.	Attachment 4A and 4B, Appendix I
72	**§ 357.33(d)**	Exhibit C, Section 2.4; SOW Task 4A	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.	Chapter 4, Attachment 4A and 4B, Appendix I
Header	**§ 357.34**	**SOW Task 5A-C**	**Identification and Evaluation of Potentially Feasible Water Management Strategies and Projects**	
73	**§ 357.34(a)**	Exhibit C, Section 2.5; SOW Task 5A and 5B	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.	Chapter 5

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74	**§ 357.34(b)**	Exhibit C, Section 2.5.1; SOW Task 5A	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.	Subchapter 5A
75	**TWC § 16.053(e)(5)+ 31 TAC § 357.34(c)(1-6)**	Exhibit C, Section 2.5.1	**Potentially feasible WMSs may include, but are not limited to:** conservation; drought management; reuse; management of existing supplies; conjunctive use; acquisition of available existing supplies; development of new water supplies; developing regional water supply facilities or providing regional management of water supply facilities; developing large-scale desalination facilities for seawater or brackish groundwater that serve local or regional brackish groundwater production zones identified and designated under TWC, 16.060(b)(5); voluntary transfer of water within the region using, but not limited to, contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements; emergency transfers of water under TWC, 11.139; interbasin transfers of surface water; system optimization; reallocation of reservoir storage to new uses; enhancements of yields; improvements to water quality; new surface water supply; new groundwater supply, brush control; precipitation enhancement; aquifer storage and recovery; cancellation of water rights; and rainwater harvesting.	Subchapters 5A.1.4 and 5C (Subordination) - Reallocation of reservoir storage is extremely limited in Region F. Due to limited supply, this strategy was not considered for Region F. Subchapters 5A.1.5, 5A1.6 (Precipitation Enhancement), and 5C (Brush Control)- RWPG did not consider water right cancellation to be a feasible strategy for Region F. Subchapters 5A1.1, 5B and Chapter 7 Subchapter 5A.1.2 There are no new interbasin strategies for Region F.
76	**Contract Scope of Work Task 5A**	Exhibit C, Section 2.5.1	The IPP and final adopted RWP must include the documented process used by the RWPG to identify potentially feasible WMS.	Subchapter 5A and Appendix C.1
77	**Contract Scope of Work Task 5A**	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.	Appendix E
78	**Contract Scope of Work, Task 5A**	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.	Subchapter 5A
79	**§ 357.34(d)**	Exhibit C, Section 2.5.2; SOW Task 5B	All recommended WMSs and WMSPs that are entered into the State Water Planning Database 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
80	**§ 357.34(e)(1)**	Exhibit C, Section 2.5.2; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include the following analyses:]** 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 a RWPG to use assumptions other than no return flows and full utilization of senior water rights.	Appendix B
81	**Contract Exhibit C, Section 2.5.2.1**		For surface water WMSs, the RWP must clearly indicate which, if any, WMSs are assumed to rely on or to mutually exclude another WMS(s) and explain how the interaction may impact both the estimated future water availability and the future water supply associated with each WMS.	N/A
82	**Contract Exhibit C, Section 2.5.2.1**		Potential future operation of multiple reservoirs as a new system, or changes to current operational procedures for existing reservoir systems, in order to provide additional yield may be evaluated as a potential WMS. Such a WMS analysis shall adequately describe methods used to calculate these future system gains (to be permitted) and shall include discussion regarding any associated permit changes that would be required.	See Subordination sections of Subchapter 5C and Appendix C. No proposed new system operations.

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83	**§ 357.34(e)(2)**	SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include the following analyses:]** An equitable comparison between and consistent evaluation and application of all WMSs the RWPGs determine to be potentially feasible for each water supply need.	Subchapter 5D, 5E and Attachment 5A
84	**§ 357.34(e)(3)(A)**	Exhibit C, Sections 2.5.2; 2.5.2.12; 2.5.2.14; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include: 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 in calculating infrastructure debt payments and may include present costs and discounted present value costs. Costs do not include costs of infrastructure associated with distribution of water within a WUG after treatment, except for specific, limited allowances for direct reuse and conservation WMSs.	Subchapters 5B, 5C, 5D, 5E, Appendices C, D, and E
85	**Contract Exhibit C, Section 2.5.2**		***[Related to § 357.34(e)(3)(A):]*** WMSs shown as providing a supply in a planning decade, must come online, with a reliable supply, in or prior to that initial decade year (31 TAC §357.10(21)).	WMSs are shown in the planning decade where they come online prior to the initial decade year
86	**Contract Exhibit C, Section 2.5.2**	SOW Task 5B	***[Related to § 357.34(e)(3)(A):]*** Water quantities produced by recommended WMSs and WMSPs must be based on water availability in accordance with Section 2.3 of Exhibit C, including firm yield under Drought of Record conditions.	Water quantities produced by recommended WMSs and WMSPs were based on water availability in accordance with Section 2.3 of Exhibit C
87	**Contract Exhibit C, Section 2.5.2.9**	SOW Task 5B	***[Related to § 357.34(e)(3)(A):]*** Estimated water losses associated with each WMS must be presented in the IPP and final adopted RWP. Water losses may be presented as a calculated percent water loss included in each strategy evaluation or a range of estimated losses by strategy type.	Losses were included when appropriate in Appendix C for WMSs using advanced treatment. Loss percentages are based on information provided by the sponsor, or based on estimates generally accepted by industry standards.
88	**§ 357.34(e)(3)(B)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include: a quantitative reporting of]** PART I: 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.	Appendix E
89	**§ 357.34(e)(3)(B)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include: a quantitative reporting of]** PART II: 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 E
90	**§ 357.34(e)(3)(C)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include: a quantitative reporting of]** impacts to agricultural resources.	Appendix E
91	**§ 357.34(e)(4)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** Discussion of the plan's impact on other water resources of the state including other WMSs and groundwater and surface water interrelationships.	Chapter 6, Appendix C
92	**§ 357.34(e)(5)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** A 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.	Chapter 6, Appendix C
93	**§ 357.34(e)(6)**	Exhibit C, Section 2.5.2.11; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** 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 shall include a summation of water needs in the basin of origin and in the receiving basin.	There are no new interbasin strategies for Region F
94	**§ 357.34(e)(7)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** 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.	Chapter 6, Appendix E

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95	**§ 357.34(e)(8)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** A description of the major impacts of recommended WMSs on key parameters of water quality identified by RWPGs as important to the use of a water resource and comparing conditions with the recommended WMSs to current conditions using best available data.	Chapter 6, Appendix C
96	**§ 357.34(e)(9)**	Exhibit C, Section 2.5.2.10; SOW Task 5B	**[Evaluations of potentially feasible WMSs and associated projects shall include:]** Other factors as deemed relevant by the RWPG including recreational impacts.	Appendix C
97	**§ 357.34(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 C and D
98	**§ 357.34(g)(1)(A)**	Exhibit C, Section 2.5.2.7; SOW Task 5B	Implementation of large recommended WMSs and associated WMSPs. **[For large recommended WMSs and associated WMSPs, RWPGs must include the following information:]** expenditures of sponsor money;	Subsection 5D, Appendix J
99	**§ 357.34(g)(1)(B)**	Exhibit C, Section 2.5.2.7; SOW Task 5B	**[For large recommended WMSs and associated WMSPs, RWPGs must include the following information:]** permit applications, including the status of a permit application; and	Subsection 5D, Appendix J
100	**§ 357.34(g)(1)(C)**	Exhibit C, Section 2.5.2.7; SOW Task 5B	**[For large recommended WMSs and associated WMSPs, RWPGs must include the following information:]** status updates on the phase of construction of a project.	Subsection 5D, Appendix J
101	**§ 357.34(g)(2)**	Exhibit C, Section 2.5.2.7; SOW Task 5B	The implementation status must be provided for the following types of recommended WMSs with any online decade: • All reservoir strategies (including major and minor reservoirs) • All seawater desalination strategies • Direct potable reuse strategies that provide greater than 5,000 acre-feet per year (AFY) of supply in any planning decade • Brackish groundwater strategies that provide greater than 10,000 AFY of supply in any planning decade • Aquifer storage and recovery strategies that provide greater than 10,000 AFY in any decade • All water transfers from out of state • Any other innovative technology projects the RWPG considers appropriate	Subsection 5D, Appendix J
102	**Contract Scope of Work, Task 5B**	Exhibit C, Section 2.5.2.7; SOW Task 5B	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.**	Subsection 5D, Appendix J
103	**§ 357.34(h)**	Exhibit C, Section 2.5.2.8; SOW Task 5B	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 and 7
104	**§ 357.34(i)**	Exhibit C, Section 2.5.2.4; SOW Task 5B	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.	Subchapters 5A and 5B
105	**Contract Exhibit C, Section 2.5.2.4**		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.	Subchapter 5A
106	**§ 357.34(j)**	Exhibit C, Section 2.5.2.5-6; SOW Task 5B and 5C	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.	Subchapter 5B, Chapter 7

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107	**§ 357.34(j)(1)**	Exhibit C, Section 2.5.2.6 and 2.5.2.8; SOW Task 5B	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.** *Drought management measures are defined in 31 TAC §357.10(9) as demand management activities to be implemented during drought that may be evaluated and included as Water Management Strategies.*	Subchapter 5A
108	**§ 357.34(j)(2)**	Exhibit C, Section 2.5.2.5; SOW Task 5B and 5C	Water conservation practices. RWPGs must consider water conservation practices, including potentially applicable best management practices, for each identified water need.	Subchapter 5B
109	**§ 357.34(j)(2)(A)**	Exhibit C, Section 2.5.2.5; SOW Task 5B and 5C	**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. *Water conservation measures (practices) are defined in 31 TAC §357.10(36) as practices, techniques, programs, and technologies that will protect water resources, reduce the consumption of water, reduce the loss or waste of water, or improve the efficiency in the use of water that may be presented as Water Management Strategies, so that a water supply is made available for future or alternative uses.*	Subchapter 5B
110	**§ 357.34(j)(2)(B)**	Exhibit C, Section 2.5.2.5 and 2.5.2.8; SOW Task 5B and 5C	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.**	Subchapter 5B
111	**§ 357.34(j)(2)(C)**	Exhibit C, Section 2.5.2.5 and Section 2.5.2.11; SOW Task 5B and Task 5C	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.	N/A, there are no IBTs in Region F
112	**§ 357.34(j)(2)(D)**	Exhibit C, Section 2.5.2.5; SOW Task 5A and 5C	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).	Subchapter 5B
113	**Contract Scope of Work, Task 5C**	Exhibit C, Section 2.5.2.5	RWPGs must develop water loss mitigation WMSs distinctly separate from water use reduction WMSs.	Subchapter 5B
114	**Contract Exhibit C, Section 2.5.2.14**		***[Related to § 357.34(e)(3)(A):]*** Regional and state water plans may not include the cost of distribution of water within a WUG service area. The exception regarding the inclusion of costs associated with Conservation - water loss mitigation projects may only include the costs specifically listed in Contract Exhibit C, Section 2.5.2.14.	The cost of distribution of water within a WUG service area was not included in the Region F Water Plan.

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115	**Contract 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.	N/A
116	**§ 357.34(j)(3)**	Exhibit C, Section 2.5.5; SOW Task 5C	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).	Attachment 5B
117	**§ 357.34(k)**	Exhibit C, Section 2.5.5; SOW Task 5C	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.	Subchapter 5B
118	**Contract Exhibit C, Section 2.5.2.3**		RWPGs must evaluate potential future sources of direct and/or indirect reuse that will require new permits and additional reclamation infrastructure as WMSs and must provide adequate justification to explain methods for estimating the amount of future direct and/or indirect reuse water available from such sources, including consideration of the population/demand projections for each decade associated with the WMS.	Appendix C
119	**Contract Exhibit C, Section 2.5.2.14**		***[Related to § 357.34(e)(3)(A):]*** Regional and state water plans may not include the cost of distribution of water within a WUG service area. The exception regarding the inclusion of costs associated with direct reuse projects may only include the costs specifically listed in Contract Exhibit C, Section 2.5.2.14.	The cost of distribution of water within a WUG service area was not included in the Region F Water Plan.
120	**Contract Exhibit C, Section 2.5.2.13**	SOW Task 5B	RWPGs must utilize this WMSP costing tool for every cost estimate presented in the RWPs [in the absence of more accurate and detailed, project-specific cost estimates], including updating project cost estimates previously developed in the 2021 RWPs. RWPGs must present the costing tool's standardized, automated cost output report for each WMSP evaluated in the IPP and final adopted RWP. If a different format is utilized, the RWPG must apply the data and procedures used in the costing tool, and present the resulting output as analogous to the costing tool, for example breaking out capital cost estimates for each project component.	Appendix D
121	**Contract Exhibit C, Section 2.5.2.12**		Costs of WMSPs must be prepared and presented separately and discretely for each separate WMSP and may not be aggregated and presented as a single capital cost representing multiple WMSPs that would actually be located in multiple locations and funded by separate sponsors or implemented separately. Each project with a capital cost should have an associated volume of water or annual capacity presented in the plan. RWPGs may not, in general, aggregate multiple facilities into a single cost estimate and then allocate shares of the resulting total cost, for example, pro rata across several entities or locations.	Appendix D
122	**Contract Exhibit C, Section 2.5.2.12**		The plan must present the following capital costs for each WMSP, as applicable: construction costs, engineering and feasibility studies, legal assistance, financing, bond counsel and contingencies (30% total for pipeline projects, 35% for other unless more detailed info available); permitting and mitigation activities, land purchase costs not associated with mitigation; easement costs; and purchases of water rights.	Appendix D
123	**Contract Exhibit C, Section 2.5.2.12**		Construction costs, if applicable, must be based on September 2023 price indices for commodities such as cement and steel as reported in the Engineering News Record (ENR) Construction Cost Index.	Appendix D
124	**Contract Exhibit C, Section 2.5.2.12**		Capital costs and land areas associated with development of reservoirs must be broken out to show separate lines items for 1) the land area of the reservoir footprint (conservation pool only) alongside the estimated land purchase cost; 2) mitigation land area and associated estimate of purchase cost; and, 3) construction costs of embankment/dam facilities (separate from transmission facilities).	N/A, there are no reservoir WMSs in Region F
125	**Contract Exhibit C, Section 2.5.2.12**		For WMSs other than reservoirs the length of debt service is 20 years unless otherwise justified. For reservoirs, the period is 40 years. Level debt service applies to all projects, and the annual interest rate for project financing is 3.5 percent. Terms of debt service must be reported in the evaluation of each project.	Appendix D

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126	**Contract Exhibit C, Section 2.5.2.12**		Operations and maintenance unit costs shall be based on the associated quantity of water supplied. Unless more accurate, project-specific data are accessible, RWPGs shall calculate annual operating and maintenance costs as 1.0 percent of total estimated construction cost for pipelines, 2.5 percent of estimated construction costs for pump stations, and 1.5 percent of estimated construction costs for dams. Costs must include labor and materials required to maintain projects such as regular repair and/or replacement of equipment. Power costs shall be calculated on an annual basis using calculated horsepower input and a power purchase cost of $0.09 per kilowatt hour; however, **each RWPG may adjust this figure based on local and regional conditions if they specify and document their reasons**. RWPGs shall include costs of water if WMSs involve purchases of raw or treated water on an annual basis (e.g. leases of water rights).	Appendix D
127	**Contract 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 D
128	**Contract Exhibit C, Section 2.5.2.12**		The RWP must present the unit costs of the net volume of water anticipated to be delivered to water users (after water losses) in dollars per acre-foot. Unit costs of WMSs must be evaluated, compared, and presented in an 'apples-to-apples' manner.	Appendix D
129	**Contract Exhibit C, Section 2.5.2.15**		If an infrastructure component is not required to increase the treated water supply volume delivered to an entity either as new supply or through demand reduction, then the component and its costs may not be included in the RWP. **Infrastructure costs that may not be included in RWP are listed in Exhibit C, Section 2.5.2.15.**	Project components or costs that do not increase treated water supplies were not included in the Region F Water Plan.
130	**Contract Scope of Work, Task 5B**	**Contract 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 C , electronic GIS deliverable
131	**Contract Scope of Work, Task 5B**	**Contract 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.	Appendix C and Appendix D
132	**Contract Scope of Work, Task 5B**		RWPGs must evaluate all WMSs that were scoped by the RWPG under Task 5B. Analyses of each of those potentially feasible WMSs must be presented in the plan; even if a WMS analysis is brief (i.e., ended up not being fully evaluated for reasons of ultimately being found infeasible.) This includes technical evaluations of all WMSs that were evaluated but not recommended.	Appendix C
Header	**§ 357.35**	**SOW Task 5B**	**Recommended and Alternative Water Management Strategies and Projects**	
133	**§ 357.35(a)**	Contract Exhibit C, Section 2.5.4; Scope of Work, Task 5B	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).	Chapter 5, Appendices C and D
134	**§ 357.35(b)**	Contract Exhibit C, Section 2.5.4; Scope of Work, Task 5B	RWPGs shall recommend specific water management strategies based upon the identification, analysis, and comparison of water management strategies by the RWPG that the RWPG determines are potentially feasible so that the cost effective water management strategies that are environmentally sensitive are considered and adopted unless a RWPG demonstrates that adoption of such strategies 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 water management strategies evaluated by the processes described in § 357.34 of this title.	Chapter 5, Appendices C and D
135	**§ 357.35(c)**	Contract Exhibit C, Section 2.5.4	Strategies shall 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.	Chapter 5, Appendices C and D

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136	**§ 357.35(d)**	Contract Exhibit C, Section 2.5.1	RWPGs shall identify and recommend water management strategies for all WUGs and WWPs with identified water needs and that meet all water needs during the drought of record except in cases where:	Chapter 5, Appendices C and D
137	**§ 357.35(d)(1)**	Contract Exhibit C, Section 2.5.1	**[Except in cases where:]** no WMS is feasible. In such cases, RWPGs must explain why no WMS are feasible; or	Chapter 5
138	**§ 357.35(d)(2)**	Contract Exhibit C, Section 2.5.1	**[Except in cases where:]** 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.	No applicable subdivisions in Region F
139	**§ 357.35(e)**		Specific recommendations of WMSs to meet an identified need shall 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.	Chapter 5, Appendices C and D
140	**§ 357.35(f)**	Contract Exhibit C, Section 2.5.2	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 5, Appendices C and D
141	**§ 357.35(g)(1)**	Contract Exhibit C, Section 2.5.2	**[RWPGs shall report:]** 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.	Appendix I
142	**§ 357.35(g)(2)**	Contract Exhibit C, Section 2.5.4.1	**[RWPGs shall report:]** 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.	Appendix I
143	**Contract 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.	N/A, no predetermined management supply factors
144	**§ 357.35(g)(3)**		**[RWPGs shall report:]** Fully evaluated Alternative WMSs and associated WMSPs included in the adopted RWP shall be presented together in one place in the RWP.	Appendix F
145	**Contract Scope of Work, Task 5B**	Contract Exhibit C, Section 2.5.4	The IPP and final adopted RWP must include documentation of the RWPG's process for selecting recommended WMSs and associated WMSPs including development of WMS evaluations matrices and other tools required to assist the RWPG in comparing and selecting recommended WMSs and WMSPs.	Chapter 5 and Appendix E
146	**Contract 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.	Appendix I
147	**Contract Exhibit C, Section 2.5.4**		RWPGs must recommend WMSs separately from WMSPs although they are often interrelated.	Appendix I
Header	**§ 357.40**	**SOW Task 6**	**Impacts of Regional Water Plan**	
148	**§ 357.40(a)**	Exhibit C, Section 2.6.4; SOW Task 6	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).	Chapter 6 and Appendix H
149	**§ 357.40(b)(1)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** Agricultural resources pursuant to § 357.34(e)(3)(C) of this title (relating to Identification and Evaluation of Potentially Feasible Water Management Strategies);	Chapter 6 and Appendix C
150	**§ 357.40(b)(2)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** Other water resources of the state including other water management strategies and groundwater and surface water interrelationships pursuant to § 357.34(e)(4) of this title;	Chapter 6 and Appendix C
151	**§ 357.40(b)(3)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** Threats to agricultural and natural resources identified pursuant to § 357.34(e)(5) of this title;	Chapter 6 and Appendix C

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152	**§ 357.40(b)(4)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** 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;	Appendix E
153	**§ 357.40(b)(5)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** Major impacts of recommended water management strategies on key parameters of water quality pursuant to § 357.34(e)(8) of this title; and	Chapter 6
154	**§ 357.40(b)(6)**	Exhibit C, Section 2.6.1; SOW Task 6	**[RWPs shall include a description of the impacts of the RWP regarding:]** Effects on navigation.	Chapter 6 - The Region F Plan does not have an impact on navigation
155	**§ 357.40(c)**	Exhibit C, Section 2.6.3; SOW Task 6	RWPs shall include a summary of the identified water needs that remain unmet by the RWP.	Chapter 6
156	**§ 357.50(j)**	Contract Exhibit C, Section 2.6.3	The RWPGs must provide adequate justification of any unmet municipal needs. **For each municipal WUG with unmet needs, the RWPG shall include**: 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.	Chapter 6
Header	**§ 357.41**	**SOW Task 6**	**Consistency with Long-Term Protection of Water Resources, Agricultural Resources, and Natural Resources**	
157	**§ 357.41**	Exhibit C, Section 2.6.2, SOW Task 6	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).	Chapter 6
Header	**§ 357.42**	**SOW Task 7**	**Drought Response Information, Activities, and Recommendations**	
158	**§ 357.42(a)**	Exhibit C, Section 2.7; SOW Task 7	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.	Chapter 7
159	**Contract Exhibit C, Section 2.7.1**	Exhibit C, Section 2.7.1; SOW Task 7	The RWP must present and summarize information regarding the current Drought(s) of Record for the region and any other relevant sub-regional or basin-specific drought of record periods that impact the existing RWPA water supplies. This summary may include relevant sub-regional, basin-based, and/or sub-basin droughts of record.	Chapter 7
160	**§ 357.42(b)(1)**	Exhibit C, Section 2.7.3; SOW Task 7	**[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]:** A description of how water suppliers in the RWPA identify and respond to the onset of drought; and	Chapter 7, Appendix G
161	**§ 357.42(b)(2)**	Exhibit C, Section 2.7.3; SOW Task 7	**[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]:** 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.	Chapter 7
162	**§ 357.42(c)(1); § 357.42(c)(3)**	Exhibit C, Section 2.7.4; SOW Task 7	**[RWPGs shall identify drought response triggers and actions regarding the management of existing groundwater and surface water sources in the RWPA designated in accordance with § 357.32, including:]** 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. *Triggers and actions developed in paragraphs (1) and (2) of this subsection may consider existing triggers and actions associated with existing drought contingency plans.*	Chapter 7, Appendix G

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163	**§ 357.42(c)(2); § 357.42(c)(3)**	Exhibit C, Section 2.7.4; SOW Task 7	**[RWPGs shall identify drought response triggers and actions regarding the management of existing groundwater and surface water sources in the RWPA designated in accordance with § 357.32, including:]** 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. *Triggers and actions developed in paragraphs (1) and (2) of this subsection may consider existing triggers and actions associated with existing drought contingency plans.*	Chapter 7, Appendix G
164	**§ 357.42(d)**	Exhibit C, Section 2.7.5; SOW Task 7	RWPGs shall collect information on existing major water infrastructure facilities that may be used for interconnections in event of an emergency shortage of water. **At a minimum, the RWP shall include a general description of the methodology used to collect the information, the number of existing and potential emergency interconnects in the RWPA, and a list of which entities are connected to each other.** In accordance with Texas Water Code §16.053(r), certain information regarding water infrastructure facilities is excepted from the Public Information Act, Texas Government Code, Chapter 552. Any excepted information collected shall be submitted separately to the EA in accordance with guidance to be provided by EA.	Chapter 7
165	**§ 357.42(e)**	Exhibit C, Section 2.7.5; SOW Task 7	RWPGs may 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.	Chapter 7
166	**§ 357.42(f)(1)**	Exhibit C, Section 2.7.6; SOW Task 7	**[RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP, including:]** 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, there are no drought water management strategies in Region F
167	**§ 357.42(f)(2)**	Exhibit C, Section 2.7.6; SOW Task 7	**[RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP, including:]** 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, there are no drought water management strategies in Region F
168	**§ 357.42(f)(3)**	Exhibit C, Section 2.7.6; SOW Task 7	**[RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP, including:]** List of all potentially feasible drought management water management strategies that were considered or evaluated by the RWPG but not recommended; and	N/A, there are no drought water management strategies in Region F
169	**§ 357.42(f)(4)**	Exhibit C, Section 2.7.8; SOW Task 7	**[RWPGs may designate recommended and alternative drought management water management strategies and other recommended drought measures in the RWP, including:]** 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, there are no drought water management strategies in Region F
170	**§ 357.42(g)**	Exhibit C, Section 2.7.7; SOW Task 7	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:**	Chapter 7
171	**§ 357.42(g)(1)**	Exhibit C, Section 2.7.7	**[Evaluation includes municipal WUGS that:]** have existing populations less than 7,500;	Chapter 7
172	**§ 357.42(g)(2)**	Exhibit C, Section 2.7.7	**[Evaluation includes municipal WUGS that:]** rely on a sole source for its water supply regardless of whether the water is provided by a WWP; and	Chapter 7
173	**§ 357.42(g)(3)**	Exhibit C, Section 2.7.7	**[Evaluation includes municipal WUGS that:]** all county-other WUGs.	Chapter 7

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174	**Contract Exhibit C, Section 2.7.7**		For the purpose of this [emergency responses to local drought conditions or loss of municipal supply] analysis, it will be assumed that the entities being evaluated have approximately 180 days or less of water supply remaining.	Chapter 7
175	**§ 357.42(h)**	Exhibit C, Section 2.7.8	RWPGs shall consider any relevant recommendations from the Drought Preparedness Council.	Chapter 7
176	**§ 357.42(i)(1)**	Exhibit C, Section 2.7.8	**[RWPGs may make drought preparation and response recommendations regarding:]** Development of, content contained within, and implementation of local drought contingency plans required by the Commission;	Chapter 7, regionfwater.org
177	**§ 357.42(i)(2)(A)**	Exhibit C, Section 2.7.8	**[RWPGs may make drought preparation and response recommendations regarding:]** Current drought management preparation in the RWPA including: drought response triggers; and	Chapter 7 and Appendix G
178	**§ 357.42(i)(2)(B)**	Exhibit C, Section 2.7.8	**[RWPGs may make drought preparation and response recommendations regarding:]** Current drought management preparation in the RWPA including: responses to drought conditions;	Chapter 7 and Appendix G
179	**§ 357.42(i)(3)**	Exhibit C, Section 2.7.8	**[RWPGs may make drought preparation and response recommendations regarding:]** The Drought Preparedness Council and the State Drought Preparedness Plan; and	Chapter 7
180	**§ 357.42(i)(4)**	Exhibit C, Section 2.7.8	**[RWPGs may make drought preparation and response recommendations regarding:]** Any other general recommendations regarding drought management in the region or state.	Chapter 7
181	**§ 357.42(j)**	Exhibit C, Section 2.7.9; SOW Task 7	The RWPGs shall develop region-specific model drought contingency plans.	Chapter 7, regionfwater.org
182	**Contract Exhibit C, Section 2.7.9**	SOW Task 7	At a minimum, **two model plans must be developed** and may be based, for example, on different water use categories, user sizes, and/or types of water source. Model plans for municipal users must address triggers for and responses to severe and critical/emergency drought conditions. It is at the discretion of the RWPG on the type of models plans developed but is recommended that RWPGs develop plans that would be of use to the types of water users within the RWPA.	Chapter 7, regionfwater.org
183	**Contract Scope of Work, Task 7**	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.	Chapter 7
184	**Contract 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.	Chapter 7
185	**Contract 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.	Chapter 7, Appendix G

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186	**Contract 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.	Chapter 7
Header	**§ 357.43**	**SOW Task 8**	**Regulatory, Administrative, or Legislative Recommendations**	
187	**§ 357.43(a)**	Exhibit C, Section 2.8.3; SOW Task 8	The RWPs shall contain any regulatory, administrative, or legislative recommendations developed by the RWPGs.	Chapter 8
188	**§ 357.43(b)**	SOW Task 8; Exhibit C, Section 2.8.1	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.	Chapter 8 - Region F WPG does not recommend the designation of any ecologically unique stream segments
189	**§ 357.43(b)(1)**	SOW Task 8; Exhibit C, Section 2.8.1	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).	Chapter 8 - Region F WPG does not recommend the designation of any ecologically unique stream segments
190	**Contract Scope of Work, Task 8**	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.	Chapter 8
191	**Contract 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.	Chapter 8 - Region F WPG does not recommend the designation of any ecologically unique stream segments
192	**Contract 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.	Chapter 8
193	**§ 357.43(b)(2)**	Exhibit C, Section 2.8.1; SOW Task 8	For every river and stream segment that has been designated as a unique river or stream segment by the legislature, including 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 8- Region F WPG does not recommend the designation of any ecologically unique river or stream segments
194	**§ 357.43(c)**	Exhibit C, Section 2.8.2; SOW Task 8	Unique Sites for Reservoir Construction. A 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.	Chapter 8 - Region F WPG does not recommend any unique sites for reservoir development
195	**Contract 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.	Chapter 8 - Region F WPG does not recommend any unique sites for reservoir development

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196	**§ 357.43(d)**	Exhibit C, Section 2.8.3; SOW Task 8	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. This may include recommendations that the RWPG believes would improve the state and regional water planning process.	Chapter 8
197	**§ 357.43(e)**	Exhibit C, Section 2.8.3	RWPGs may develop information as to the potential impacts of any proposed changes in law prior to or after changes are enacted.	Chapter 8
198	**§ 357.43(f)**	Exhibit C, Section 2.8.3	RWPGs should consider making legislative recommendations to facilitate more voluntary water transfers in the region.	Chapter 8
199	**Contract Scope of Work, Task 8**	Exhibit C, Section 2.8.3	Receive and consider recommendations from the Interregional Planning Council to the RWPGs.	Chapter 8
Header	**§ 357.45**	**SOW Task 9**	**Implementation and Comparison to Previous RWP**	
200	**§ 357.45(a)**	Exhibit C, Section 2.9.1; SOW Task 9	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.	Appendix J - Implmentation Survey
201	**§ 357.45(b)(1)**	Exhibit C, Section 2.9.2; SOW Task 9	**[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:]** The number of recommended WMSs in the previously adopted and current RWPs that serve more than one WUG;	Chapter 9
202	**§ 357.45(b)(2)**	Exhibit C, Section 2.9.2; SOW Task 9	**[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:]** 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	Chapter 9
203	**§ 357.45(b)(3)**	Exhibit C, Section 2.9.2; SOW Task 9	**[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:]** 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.	Chapter 9
204	**§ 357.45(c)(1)**	Exhibit C, Section 2.9.3, SOW Task 9	**[RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:]** Water demand projections;	Chapter 9
205	**§ 357.45(c)(2)**	Exhibit C, Section 2.9.3, SOW Task 9	**[RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:]** Drought of Record and hydrologic and modeling assumptions used in planning for the region;	Chapter 9
206	**§ 357.45(c)(3)**	Exhibit C, Section 2.9.3, SOW Task 9	**[RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:]** Groundwater and surface water availability, existing water supplies, and identified water needs for WUGs and WWPs; and	Chapter 9
207	**§ 357.45(c)(4)**	Exhibit C, Section 2.9.3, SOW Task 9	**[RWPGs shall provide a brief summary of how the RWP differs from the previously adopted RWP with regards to:]** Recommended and Alternative Water Management Strategies and Projects	Chapter 9
Header	**§ 357.50**	**SOW Task 10**	**Adoption, Submittal, and Approval of Regional Water Plans - Includes Public Participation and Notice Items relevant to IPP review**	
208	**§ 357.12(i), § 357.21(a), and § 357.21(j)**	Contract Exhibit C, Section 2.12.2	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. **Plan includes a statement confirming that the planning group met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with 31 TAC §§357.12 and 357.21**.	Chapter 10

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209	**§ 357.50(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.**	Chapter 10
210	**§ 357.50(c)**		The RWPGs shall distribute the IPP in accordance with §357.21(h)(7) of this title (relating to Notice and Public Participation).	Chapter 10
211	**§ 357.50(g)(1)(A)**	Contract Exhibit C, Section 2.12.2; SOW, Task 10	**[RWPs shall include:]** The technical report and data prepared in accordance with this chapter and the EA's specifications;	The technical report and data were prepared in accordance with Chapter 10 and the EA specifications
212	**§ 357.50(g)(1)(B)**	Contract Exhibit C, Section 2.12.2; SOW, Task 10	**[RWPs shall include:]** An executive summary that documents key RWP findings and recommendations;	An executive summary is included documenting key RWP findings and recommendations
213	**§ 357.50(g)(1)(C)**	Contract Exhibit C, Section 2.10, Section 2.12.2; SOW, Task 10	**[RWPs shall include:]** Documentation of the RWPG's interregional coordination efforts;	There are no known interregional conflicts between RWPs.
214	**Contract 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. *Please note that regions may include the DB27 reports as appendices, should they choose to, but at minimum, each Executive Summary must include the SARA access information and the report list as specified in guidance.*	Executive Summary
215	**Contract Scope of Work, Task 10**	Contract 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.	Appendix L
216	**§ 357.50(g)(2)(B)**	Contract Exhibit C, Section 2.13.2	**[RWPGs shall submit RWPs to the EA according to the following schedule:]** 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 required data has been uploaded
Header	**§ 357.60**		**Consistency of Regional Water Plans - Items relevant to IPP review**	
217	**§ 357.60(a)**		RWPGs shall submit to the development Board a RWP that is consistent with the guidance principles and guidelines outlined in § 357.20 of this title (relating to Guidance Principles for State and Regional Water Planning). Information provided shall be based on data provided or approved by the Board in a format consistent with the guidelines of Subchapters C and D of this chapter and guidance by the EA.	A RWP consistent with the required guidance principles and guidelines has been submitted to the Development Board.
218	**§ 357.60(c)**		Relation to state and local plans. RWPs shall be consistent with Chapter 358 of this title (relating to State Water Planning Guidelines) and this chapter. RWPGs shall consider and use as a guide the state water plan and local water plans provided for in the Texas Water Code § 16.054 (relating to Local Water Planning).	Region F considered and used as a guide the state water plan and local water plans
Header	**§ 358.3**		**State Water Plan Guidance Principles**	
219	**§ 358.3(1)**		The state water plan shall provide for the preparation for and response to drought conditions.	Chapters 2, 3, 5, 7
220	**§ 358.3(2)**		The regional water plans and state water plan 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.	The Region F Water Plan serves as a water supply plan under drougt of record conditions.

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221	**§ 358.3(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
222	**§ 358.3(4)**		Regional water plans 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, Appendices C and D
223	**§ 358.3(5)**		Regional water plans 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, 7 and 8
224	**§ 358.3(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
225	**§ 358.3(7)**		The RWPG shall establish terms of participation in its water planning efforts that shall be equitable and shall not unduly hinder participation.	Chapter 10
226	**§ 358.3(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.	Chapters 5 and 8
227	**§ 358.3(9)**		Consideration of all water management strategies the RWPG determined to be potentially feasible when developing plans to meet future water needs and to respond to drought so that cost effective water management strategies and water management strategy projects 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
228	**§ 358.3(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
229	**§ 358.3(11)**		Consideration of a balance of economic, social, aesthetic, and ecological viability.	Chapter 5 and Appendix E
230	**§ 358.3(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
231	**§ 358.3(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 B
232	**§ 358.3(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
233	**§ 358.3(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
234	**§ 358.3(16)**		Consideration of recommendations of river and stream segments of unique ecological value to the legislature for potential protection.	Chapter 8
235	**§ 358.3(17)**		Consideration of recommendation of sites of unique value for the construction of reservoirs to the legislature for potential protection.	Chapter 8
236	**§ 358.3(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
237	**§ 358.3(19)**		Designated water quality and related water uses as shown in the state water quality management plan shall be improved or maintained.	Chapter 6
238	**§ 358.3(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.	Entire RWP

2026 IPP Review Item Number	Key Requirement Citation: TWC, 31 TAC Rule, or Contract Exhibit	Corresponding Contract Guidance and SOW Task *(if applicable)*	Requirement (see published rule and other contract documents for full context)	Location(s) in Regional Plan and/or Commentary
239	**§ 358.3(21)**		The water management strategies and water management strategy projects 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. (also see § 357.34(f))	Chapter 5, Appendices C and D
240	**§ 358.3(22)**		The evaluation of water management strategies and water management strategy projects 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.	No new appropriations are recommended
241	**§ 358.3(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.	No new appropriations are recommended. Existing instream regulations considered
242	**§ 358.3(24)**		Planning shall be consistent with all laws applicable to water use for the state and regional water planning area.	Entire RWP
243	**§ 358.3(25)**		The inclusion of ongoing water development projects that have been permitted by the Commission or a predecessor agency.	None in Region F
244	**§ 358.3(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(e)(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(e)(3)(B) of this title.	Chapter 5, and Appendix E
245	**§ 358.3(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
246	**§ 358.3(28)**		RWPGs must consider existing regional water planning efforts when developing their plans.	Chapters 1 and 5

APPENDIX B

WATER AVAILABILITY MODEL ANALYSES OF REGION F WATER SUPPLIES

APPENDIX B

Subject: Documentation of Region F Water Availability in the Rio Grande Basin

Date: December 31, 2024

Project: CMD21867

This appendix documents the analyses for the reservoir availability and run of river supplies in the Rio Grande River Basin in Region F. The surface water supplies are based on the hydrology developed for the TCEQ Water Availability Model (WAM). Deviations from these flows were approved in a letter from the TWDB dated November 28, 2023. The letters authorize several changes to the Rio Grande WAM which are summarized below:

- Modified the Toyah Creek watershed (includes Lake Balmorhea) so that:
  - Irrigation water rights within the Red Bluff Irrigation District are met with releases from Red Bluff Reservoir and are not reliant on spring flow from San Solomon Springs or Griffing Springs
  - Direct flows are not diverted from the creek to Lake Balmorhea for storage
  - Model storage in Lake Balmorhea as backup for run-of-river diversions
- Use of safe yield

B1. TCEQ WAM Run 3

Consistent with TWDB rules and guidelines, existing water supplies in Region F were determined using the TCEQ WAM Run 3 to calculate the firm yield. The model versions used for the 2026 Region F supplies were obtained from the TCEQ website in October 2023. At that time, TCEQ had verified that all WAMs were up to date. The following sections describe the process used to determine the availability for each source.

B1.1 Lake Balmorhea

Excess water from the San Solomon and Griffin Springs in Pecos County is diverted to Lake Balmorhea for storage and diversion. This portion of the Pecos River was modeled in upstream to downstream order by changing the priority dates to the most senior in the WAM. This reflects actual operation of the basin and prevents run-of-the-river diversions on the Pecos River associated with the Red Bluff Irrigation District from making priority calls on spring flows. In actual operation, the Red Bluff Irrigation District water rights are dependent on releases from Red Bluff Reservoir and do not use or make calls on spring flow from San Solomon or Griffin Springs. Also, it is likely that a priority call on spring flow would be considered a futile call since almost all of the water would be lost before it reached the Red Bluff Irrigation District diversions.

The calculated firm yield of Lake Balmorhea is 19,600 acre-feet per year. A traditional safe yield analysis (safe yield diversion equals minimum storage) was not determined because the reservoir storage is much smaller than the yield (7,400 acre-feet). Because a traditional safe yield analysis was not used, sedimentation conditions were not updated for Lake Balmorhea.

B1.2 Red Bluff Reservoir

In 2013, the TWDB conducted a volumetric survey of Red Bluff Reservoir. However, due to the low water levels an area-capacity-elevation curve all the way to the conservation storage was not calculated. Using the published sedimentation rate in the 2013 TWDB survey and the 1986 survey, 2030 and 2080 sediment conditions were calculated.

The total permitted diversion from Red Bluff Reservoir is 292,520 acre-feet per year. This includes multiple run-of-river diversion points downstream of the reservoir. To assess the yield of Red Bluff, releases from Red Bluff were no longer modeled and only diversion directly from Red Bluff reservoir were considered. The firm and safe yields of Red Bluff Reservoir are shown in Table 1. The information used to update sediment conditions for the Red Bluff Reservoir are shown in Table 2.

Table 1:
Red Bluff Reservoir Yield

	Yield (Ac-Ft/Yr)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Firm Yield	20,350	20,314	20,278	20,242	20,206	20,170
Safe Yield	16,180	16,152	16,124	16,096	16,068	16,040

Table 2:
Red Bluff Sedimentation

Reservoir	Drainage Area (Sq mi)	Sediment Rate (af/yr)	Year of Initial Capacity	Capacities (Ac-ft)			Source (sediment rate)
				Initial	2030	2080	
Red Bluff	20,720	98	2012	289,667	285355	280,455	TWDB, 2013

B1.3 Run of River Diversions

Forty-eight (48) water right records were identified that are associated with run-of-river irrigation in Region F. Region F defines the reliable supply for irrigation from a run-of-river supply to be the minimum annual diversion. Municipal run-of-river diversions for water rights owned by the City of Balmorhea (sold to Toyah) were also determined using the minimum annual diversion. The primary source of water for these users is groundwater from the Edwards-Trinity-Plateau and Pecos Valley Aquifers and surface water, when available, is a supplement to these supplies. A summary of results is included in Table 3.

Table 3:
Pecos River Basin Run-of-River Minimum Annual Diversions

WUG	Minimum Annual Diversion (Acre-Feet)
Ward County - Irrigation	980
Pecos County - Irrigation	19,642
Reeves County - Irrigation	716
Balmorhea – Sold to Toyah	19
Total	**21,355**

APPENDIX B

Subject: Documentation of Region F Water Availability in the Colorado Basin

Date: December 31, 2024

Project: CMD21867

This appendix documents the datasets and processes used in the Water Availability Model (WAM) analyses for Region F. The first section of the memorandum pertains to firm yields calculated under the Texas Commission on Environmental Quality (TCEQ) WAM Run 3. Run 3 is the "full authorization" model in which all water rights divert their full permitted amounts and the storage capacities of reservoirs are assumed to be at their full permitted amounts. The second section of this memorandum details the modifications to the WAM as part of the subordination strategy and for determining safe yields.

B1. Updated Reservoir Sedimentation Conditions

For these analyses, the storage volume (SV) and surface area (SA) records of the WAM were modified to reflect sediment conditions in 2030, 2050 and 2080. Updated sediment conditions for 2030, 2050 and 2080 for all reservoirs in Region F except Mountain Creek, Clyde, and Junction because there was no storage volume data available for these small reservoirs. Sediment conditions only affect Lake Brownwood and Lake O.H. Ivie under currently available supplies (TCEQ WAM Run 3) because they are the only two reservoirs with yield. The updated sediment conditions were used for all the reservoirs as part of the subordination strategy.

Table 1 shows the sedimentation rate used, the source of the rate, the initial capacity and the capacity calculated for 2030, 2050 and 2080 for each reservoir in Region F.
START HERE

Table 1:
Sedimentation

Reservoir	Contributing Drainage Area (sq mi)	Sediment Rate (ac-ft/yr/sq mi)	Year of Initial Capacity	Initial Capacity (Ac-Ft)	2030 Capacity (Ac-Ft)	2050 Capacity (Ac-Ft)	2080 Capacity (Ac-Ft)
Thomas	934	0.11	1999	200,604	197,432	195,378	192,295
Champion	186	0.46	1959	42,492	36,056	34,752	32,338
Colorado City	387	0.38	1964	31,967	20,733	17,789	13,373
Spence[1]	1,954	0.13	1999	517,272	509,387	504,307	496,686
Oak Creek[2]	238	0.50	1953	39,360	30,176	27,796	24,226
Ballinger	24	0.17	1985	6,050	5,866	5,785	5,662
Elm Creek	64	0.17	2013	7,779	7,594	7,374	7,044
Twin Buttes	2,813	0.09	1962	186,200	169,081	164,017	156,422
Nasworthy	107	0.16	1993	10,108	9,477	9,135	8,621
O.C. Fisher[3]	1,383	0.23	1962	115,743	94,155	87,793	78,250
O.H. Ivie	2,792	0.68	1990	554,340	477,777	439,813	401,848
Brady Creek	523	0.08	1963	30,430	27,620	26,783	25,528
Hords Creek	48	0.36	1948	8,640	7,218	6,873	6,354
Coleman	292	0.16	2006	38,094	36,978	35,072	35,072
Brownwood	1,181	0.11	2013	131,530	129,292	126,672	122,742

1. The authorized storage in Spence Reservoir is 488,760 ac-ft
2. The authorized storage in Oak Creek Reservoir is 30,000 ac-ft.
3. The authorized storage in O.C. Fisher Reservoir is 80,400 ac-ft

B2. TCEQ WAM Run 3

Consistent with TWDB rules and guidelines, existing water supplies in Region F were determined using a version of the TCEQ WAM Run 3. The supplies were estimated by calculating the firm yield of a given reservoir. The firm yield is the maximum division that a reservoir can meet with 100% reliability during a repeat of the drought of record. The changes outlined in this section were approved by the Executive Administrator of the TWDB on November 28, 2023. A copy of the approval letter is included in Attachment B1. This model was received and downloaded from TCEQ on October 1, 2023. Freese and Nichols Inc. performed model runs in October 2023. The Colorado WAM has a 77-year hydrologic period-of-analysis from 1940-2016.

Lake Brownwood

The following firm and safe yields for Lake Brownwood were developed based on updated 2030 and 2080sediment conditions.

Table 2:
Lake Brownwood Yields

	2030	2040	2050	2060	2070	2080
2026 Plan Firm Yield	19,000	18,860	18,720	18,580	18,440	18,300
2026 Plan Safe Yield	15,550	15,420	15,290	15,160	15,030	14,900

Lake Ivie

The following firm and safe yields for Lake Ivie were developed based on updated 2030 and 2080 sediment conditions.

Table 3:
Lake Ivie Yields

	2030	2040	2050	2060	2070	2080
2026 Plan Firm Yield	33,600	32,740	31,880	31,020	30,160	29,300
2026 Plan Safe Yield	28,540	27,740	26,940	26,140	25,340	24,540

B2. Subordination

The subordination strategy (also known as the "no call" assumption) in Region F adopts the cutoff model originally developed by Region K, with a few variations. The modifications made to the WAM as well as the ways in which it differs from the version developed by Region K are outlined below. The changes to the TCEQ WAM for the subordination strategy were approved in a letter from the TWDB Executive Administrator dated November 28, 2023. This model was received from Region K on September 27, 2023 and the analyses were performed by Freese and Nichols, Inc. in October 2023.

B2.1 Base Dataset

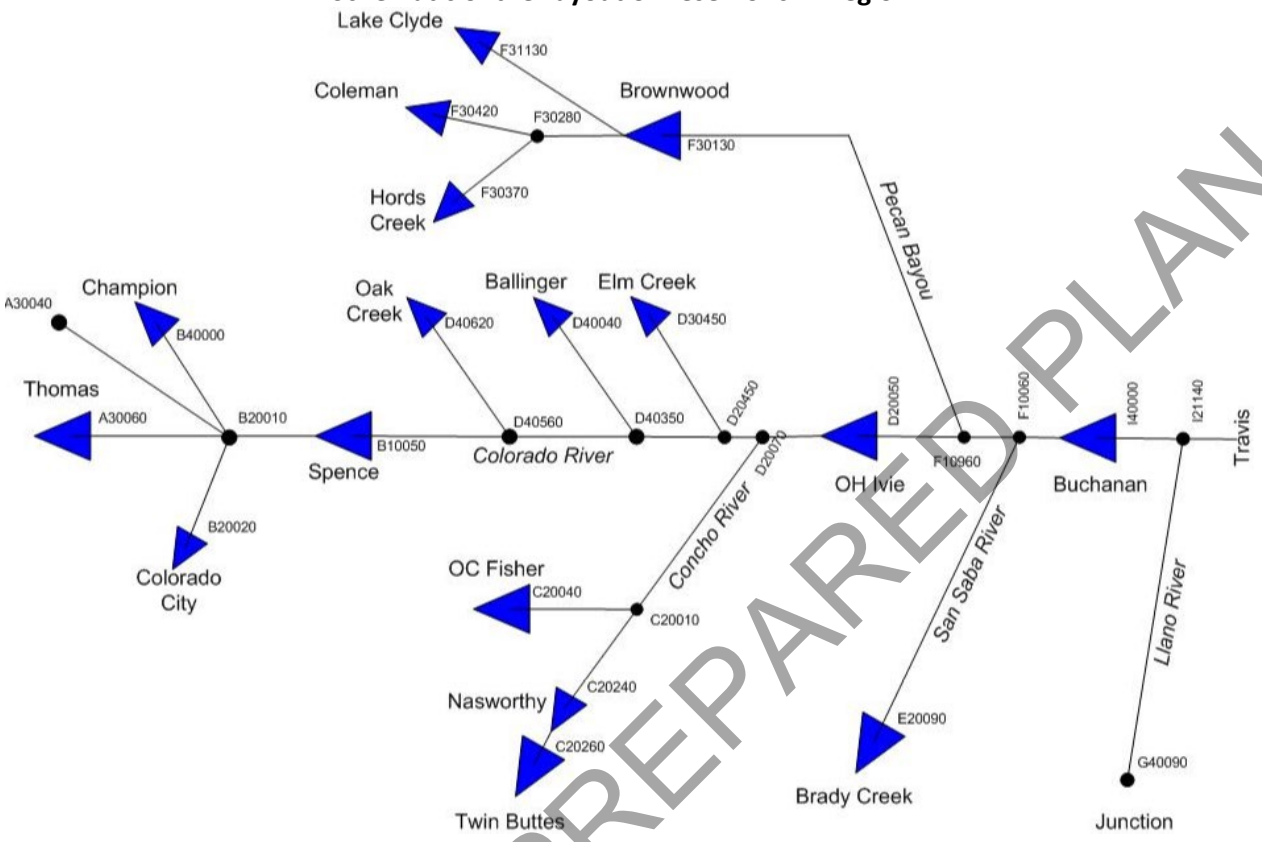
The cutoff model from Region K was used as the base dataset for the safe yield analyses. The cutoff model is a modified version of the Colorado WAM in which water rights at and downstream of Lake Buchanan are subordinated to upstream water rights. The subordination was accomplished by subtracting a value of 10,000,000 from the priority dates of subordinating water rights. For example, a water right with an original priority date of 19580521 would have a priority date of 9580521 after subtracting 10,000,000. After the priority date adjustment, water rights upstream of Lake Buchanan become senior to downstream water rights but maintain their priorities relative to one another.

B2.2 Record of Modifications

Based on the cutoff model from Region K, models were developed to simulate 2030, 2050 and 2080 sediment conditions. These models were used to develop safe yields with the subordination assumptions. The modifications are summarized below and described in greater detail in the remainder of this section.

A schematic of the layout of the reservoirs in Region F is shown in Figure 1.

Figure 1:
Schematic of the Layout of Reservoirs in Region F



The following three modifications were made to each of the major reservoirs in Region F:

- Each reservoir is diverting its safe yield. For a given reservoir, diversions for each use type in the safe yield run with the same priority are distributed proportionally to their permitted amounts. If a reservoir has diversions with different priorities, the most senior diversion are met first up to their full permitted amounts before diverting under more junior priority dates.
- Each reservoir has 2030, 2050 or 2080 sediment conditions
- Every reservoir upstream of Lake Buchanan is senior to every reservoir at or below lake Buchanan

B2.3 Modifications for Each Reservoir

The modifications made for each reservoir are described in more detail below. The reservoirs are listed in the order in which they appear in the TCEQ WAM.

Lake Thomas

- In the TCEQ WAM and the Region K WAM, there is a 7,000 ac-ft/yr municipal diversion (WR ID 61401002002) that can be met by either Lake Thomas or Spence Reservoir, and the Type 2 water right for this diversion prohibits refilling of storage.
- In the revised model, both Thomas and Spence are operating at their stand-alone safe yield so the 7,000 ac-ft/yr shared between the two reservoirs does not apply.

Champion Creek Reservoir

- In the TCEQ WAM, Champion Creek Reservoir is modeled as having 42,500 ac-ft of storage, however the reservoir is only authorized to store 40,170 ac-ft so the WAMs include 2,330 ac-ft of inactive storage.
- After adjusting the reservoir capacity for 2030, 2050 and 2080 sediment conditions, the reservoir capacity is less than the authorized amount, so the inactive storage was removed.

Lake Colorado City

- No additional changes, other than those made for all reservoirs, were made to the modeling of Lake Colorado City.

Spence Reservoir

- The authorized storage in Spence Reservoir is 488,760 ac-ft, although the calculated capacity is greater for both 2030, 2050 and 2080 sediment conditions. For this reason, dead storage was applied that limited the usable conservation storage to 488,670 ac-ft.
- Whereas in the TCEQ WAM and the Region K WAM, a 7,000 ac-ft/yr municipal diversion (WR ID 61401002002) could be met by either Lake Thomas or Spence Reservoir, this does not apply in the safe yield models because the diversions are within the authorized combined diversions from Thomas and Spence.

O.C. Fisher Reservoir

- The authorized storage in O.C. Fisher Reservoir is 80,400 ac-ft, although the calculated capacity is greater for 2030, 2050 and 2080 sediment conditions. However, because of reduced inflows into the reservoir O.C. Fisher has operated within its dead pool for many decades so a corresponding dead pool was not considered.

Twin Buttes Reservoir/Lake Nasworthy

- The TCEQ WAM has Twin Buttes Reservoir at Control Point (CP) C20260, although it makes releases for a point upstream (CP C20330). In the revised model, Twin Buttes Reservoir was reassigned to CP 20330.
- Whereas the TCEQ WAM and the Region K WAM includes operational rules enabling one of the two reservoirs to meet a given diversion based on storage contents, these records are removed in the revised modeling in favor of determining the individual safe yields of the two reservoirs. This allows for cleaner modeling of the priorities of these reservoirs. However, all diversions are assumed to occur from Lake Nas worthy to reflect actual operations.

Ivie Reservoir (OH Ivie)

- In the TCEQ WAM there is a hide-the-flows "scheme" for subordinating Lake Buchanan to Ivie Reservoir, however that scheme is not necessary in the cutoff model because the water rights upstream of Lake Buchanan are all senior to water rights at Lake Buchanan and downstream of it. Consequently, WRAP code implementing that scheme was commented out in the revised model.
- In the revised model, Ivie Reservoir is modeled as being subordinate to Lake Ballinger. Ivie Reservoir is on the mainstem of the Colorado and Lake Ballinger is located on an upstream tributary. The subordination is modeled with a backup (BU record) of Ballinger's water right 61401072302 in the second simulation of the dual simulation (i.e. PX 2).

Mountain Creek

- Mountain Creek is a tributary of the Colorado River. The revised modeling of Mountain Creek Reservoir includes only two of the overall changes discussed previously: diverting its safe yield and subtracting 10,000,000 from its priority date to make it senior to rights at and downstream of Lake Buchanan. No information is available on the storage/area characteristics of this reservoir, so reduction in storage due to

sedimentation is not applied. The reservoir is small, with only 950 ac-ft of storage according to the TCEQ WAM.

Oak Creek Reservoir

- The TCEQ and Region K WAMs model the Oak Creek Reservoir with 39,360 ac-ft of storage, but because it is only authorized to store 30,000 ac-ft, they include 9,360 ac-ft of inactive storage.
- In the 2016 Plan modeling, sedimentation was assumed to reduce the inactive pool under 2030 conditions. For example, if the 2030 capacity was estimated to be 30,176 ac-ft, then the new inactive storage would be 176 ac-ft. By 2050, the estimated storage capacity is less than 30,000 ac-ft.

Lake Ballinger

- Lake Ballinger has additional storage associated with a 1980 priority. In the TCEQ WAM, the total volume of Lake Ballinger increases to 6,050 ac-ft at the 1980 priority (at the 980 priority in the Region K cutoff model). With sedimentation, this amount is reduced to 5,866 ac-ft in 2030, 5,785 in 2050, and 5,662 in 2080.
- The revised model also includes code that subordinates Ivie Reservoir to Lake Ballinger. This is implemented with the BU record discussed previously for Ivie Reservoir combined with a PX 2 record associated with Ballinger's water right 61401072302. The PX 2 record triggers an option that excludes Ivie Reservoir's control point and all downstream control points in the determination of flow availability for Ballinger's right.
- The TCEQ WAM has additional code modeling an 800 ac-ft sediment control reservoir at a 2050 priority. The revised model changed this to a priority of 89999999 to make it the most junior in the model.
- There are three senior irrigation diversions and two senior municipal diversions backed up by Lake Ballinger that count toward Ballinger's safe yield. Because these diversions are senior, their target diversion amounts are met with 100% reliability before iterating on the 1946 diversion amount. Diversion amounts with a priority date later than 1946 are set to zero.

Lake Winters (Elm Creek)

- Lake Winters has a 560 ac-ft/yr diversion and 2,447 ac-ft of storage associated with a 1944 priority. There is an additional 600 ac-ft/yr diversion at a 1957 priority. The permitted storage capacity increases to 8,374 ac-ft at a 1979 priority. Finally, there is an additional 200 ac-ft/yr diversion at a 1983 priority. In the revised model, the full 8,374 ac-ft storage capacity is reduced to 7,549 ac-ft in 2030 due to sedimentation, 7,374 ac-ft in 2050, and to 7,044 ac-ft by 2080. The 2,447 ac-ft of storage at the 1944 priority remains the same in the revised model. The safe yield diversion is calculated for the 1944 priority; the more junior diversions are set to zero.

Brady Creek Reservoir

- The revised modeling of Brady Creek Reservoir does not include any additional changes, other than the three overall changes made for every reservoir.

Lake Clyde

- Lake Clyde is on the North Prong of Pecan Bayou, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior in priority to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Lake Clyde. This is accomplished with a PX 2 record associated with Lake Clyde's two water rights (WR IDs 61401660301 and 61401660002). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Lake Clyde's right.

- In contrast to other reservoirs, the storage capacity and area-capacity relationship for Lake Clyde for 2030, 2050 and 2080 conditions is the same as the Colorado WAM Run 8 (current conditions) due to a lack of information about the sedimentation rate for the reservoir. The storage and area records for Lake Clyde were taken from the FNI archive because Run 8 is no longer available online through the TCEQ website.

Lake Coleman

- In the revised model, Lake Coleman is modeled similarly to Lake Clyde, which was discussed previously.
- Lake Coleman is on Jim Ned Creek, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior in priority to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Lake Coleman. This is accomplished with a PX 2 record associated with Lake Coleman's two water rights (WR IDs 61401702301and 61401702302). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Lake Coleman's right.

Hords Creek Reservoir

- In the revised model, Hords Creek Reservoir is modeled similarly to Lake Clyde and Lake Coleman, which were discussed previously.
- Hords Creek Reservoir is on Hords Creek, a tributary of Pecan Bayou, which is a tributary of the Colorado River. It is located upstream of Lake Brownwood and is junior to Lake Brownwood. The revised model includes an instream flow requirement (IF record) to pass all water if Lake Brownwood is less than 50% full.
- If Lake Brownwood is greater than 50% full, then Lake Brownwood is subordinated to Hords Creek Reservoir. This is accomplished with a PX 2 record associated with Hords Creek Reservoir's water right (WR ID 61401705301). The PX 2 record triggers an option that excludes Lake Brownwood's control point and all downstream control points in the determination of flow availability for Hords Creek Reservoir's right.

Lake Brownwood

- Lake Brownwood is located on Pecan Bayou, a tributary of the Colorado River. It is downstream of Lake Clyde, Lake Coleman, and Hords Creek Reservoir, which are all junior in priority to Lake Brownwood.
- The TCEQ WAM models Lake Brownwood with 135,963 ac-ft of storage, but because it is only authorized to store 114,000 ac-ft, they include 21,963 ac-ft of inactive storage.
- In the 2016 Plan modeling, sedimentation was assumed to reduce the inactive pool under future sediment conditions in order to maintain a conservation storage of 114,000 ac-ft. For example, the 2030 capacity was estimated to be 129,292 ac-ft, so the inactive storage was set to 15,292 ac-ft.

City of Junction

- The City of Junction has a small on-channel reservoir (300 ac-ft of storage) for which the safe yield was determined. The supply is made reliable by springs located just upstream of the diversion.
- The Region K WAM has the priority of a recreational right at 11/23/1964 and an instream flow requirement and a municipal diversion at 10/14/1986, but in the revised model they are set at 11/23/964 and 10/14/986, respectively, consistent with the assumptions in the rest of the cutoff model.
- In contrast to other reservoirs in which safe yield is determined, the reservoir storage capacity remains at 300 ac-ft for all sediment conditions because of the small size of the reservoir.

B2.4 Priority Date Modification for Additional Water Rights

A value of 10,000,000 was subtracted from the priority dates for all water rights at and upstream of Junction (G40090) and Brady Creek Reservoir (E20090) using the Hoffpauir Priority Date Modification Tool. The Priority Date

Modification Tool, developed by Richard Hoffpauir, consists of an executable program named "Priority" which reads an input file. The input file includes a list of control points along with values to be added or subtracted from the priority dates. The priority dates are modified at the specified control points and all upstream control points.

B2.6 Safe Yield Analyses

A one-year "safe yield" refers to the annual rate at which water may be diverted from a reservoir such that the minimum observed reservoir storage volume through the simulation period-of-analysis is just above the annual diversion rate. The safe yields were evaluated for 17 reservoirs in the Upper Colorado River Basin for 2030, 2050 and 2080 conditions of reservoir sedimentation.

The safe yields were determined one reservoir at a time in upstream-to-downstream order, as listed in Table 4. For each reservoir, the diversion amounts for water rights at the reservoir were iteratively reduced until the minimum observed storage in the reservoir through the period-of-analysis was just above (within 100 acre-feet) the total diversion at the reservoir. The safe yield diversion amounts at the upstream reservoir were kept in place while repeating the iterative process for the next downstream reservoir. For reservoirs with multiple water rights with the same priority date, the diversion amounts at each water right were reduced simultaneously while maintaining the same relative ratios as the original authorized diversion amounts. For reservoirs with multiple water rights with varying priority dates, the diversion amount was reduced for the most junior water right first and then for the next most junior water right, and on in this pattern until the safe yield was found.

Table 4:
Results of Safe Yield Analyses for 2030 and 2080
(values in ac-ft per year)

Reservoir	Water Right	Permitted Diversion	2026 Plan Safe Yield		
			2030	2050	2080
Lake Brownwood	C2454	29,712	25,800	25,430	24,815
Lake Ivie	P3676	113,000	33,400	31,500	29,675
Spence Reservoir	C1008	34,573	21,900	21,727	21,614
Thomas Reservoir	C1002	30,000	3,710	3,655	3,591
Lake Coleman	C1702	9,000	1,900	1,786	1,638
Mountain Creek Reservoir	C1024	250	86	86	86
Brady Creek Reservoir	C1849	3,500	1,855	1,770	1,680
Ballinger/Moonen Lake [2]	C1072	1,685	820	808	790
OC Fisher Lake	C1190	80,400	1,070	810	640
Champion Creek Lake	C1009	6,750	1,164	1,130	1,080
Oak Creek Reservoir	C1031	10,000	1,055	970	850
Twin Buttes Lake [1]	C1318	29,000	1,865	1,700	1,530
Winters Lake	C1095	1,360	265	263	258
Nasworthy Lake [1]	C1319	25,000	180	150	135
Hords Creek Lake	C1705	2,240	190	160	130
Colorado City	C1009	5,500	1,760	1,626	1,480
City of Junction	C1570	1,000	269	269	269
Lake Clyde	C1660	1,200	85	84	82
Total		384,170	97,374	93,924	90,343

1. Twin Buttes and Nasworthy are operated as a system and their safe yields should be added.
2. C1130, C1075, C1129, C1073 and C174 also are associated with Lake Ballinger.

ATTACHMENT B1

TWDB APPROVED HYDROLOGIC ASSUMPTIONS FOR REGION F

ATTACHMENT B2

TABLE SUMMARIZING HYDROLOGIC MODELS USED

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

November 28, 2023

Mr. Cole Walker
General Manager
Colorado River Municipal Water District
400 E. 24th Street
Big Spring, TX 79720

Dear Mr. Walker:

I have reviewed your request dated July 20, 2023, and received on September 24, 2023, for approval of alternative water supply assumptions to be used in determining existing and future surface water availability. This letter confirms that the TWDB approves the following assumptions:

1. Use of one-year safe yield for all reservoirs in the Brazos, Colorado, and Rio Grande Basins within the region.
2. Use of the Brazos Water Availability Model (WAM) as modified by the Brazos G Planning Group (*i.e.,* the Brazos G WAM) for existing and strategy supplies from the Brazos River Basin as approved by the TWDB for Region G.
3. Use of Region K's cutoff WAM model (as approved for use by the TWDB for Region K), to model the Lower Colorado subordination strategy, including considering the City of Junction's run-of-river right and Brady Creek Reservoir's water right as senior to those downstream in Region K, and using safe yield for all reservoirs under the subordination strategy. This includes coordinating with reservoir owners in the Pecan Bayou watershed to establish mutually agreeable terms for priority calls.
4. Undertake several modifications to the Rio Grande WAM to reflect actual operations for modeling existing supply. These modifications include:
   a. Model the Toyah Creek watershed to reflect actual operations where irrigation water rights within the Red Bluff Irrigation District are met with releases from Red Bluff Reservoir and are not reliant on spring flow from San Solomon Springs or Giffin Springs.
   b. Direct flows not diverted from the creek to Lake Balmorhea for storage, and model storage at Lake Balmorhea as backup for run-of-river diversions.

Although the TWDB approves the use of a one-year safe yield for developing estimates of current water supplies, firm yield for each reservoir must still be reported to the TWDB in the online planning database and plan documents.

While the use of these modified conditions may be reasonable for planning purposes, WAM RUN3 would be utilized by the Texas Commission on Environmental Quality for analyzing permit applications. It is acceptable to use the approved modified conditions for WMS supply evaluations only if the yield produced is more conservative (less) for surface water appropriations than WAM RUN3. For the purpose of evaluating potentially feasible surface water management strategies not addressed in this request, the appropriate TCEQ WAM Run 3 is to be used unless a separate hydrologic variance request is submitted and approved by the TWDB.

While the TWDB authorizes these modifications to evaluate existing and future water supplies for development of the 2026 Region F 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 contract Exhibit C, *General Guidelines for Sixth Cycle of Regional Water Plan Development.*

Please do not hesitate to contact Heather Rose of our Regional Water Planning staff at 512-475-1558 or heather.rose@twdb.texas.gov if you have any questions.

Sincerely,

Jeff Walker
Executive Administrator

c: Audra Hoback, Colorado River Municipal Water District
Lissa Gregg, Freese & Nichols, Inc.
Tony Smith, Carollo Engineers, Inc. (Region G)
Neil Deeds, INTERA (Region K)
Heather Rose, Water Supply Planning
Nelun Fernando, Ph.D., Surface Water

Summary of Model Runs to Determine Surface Water Availability

Modified Model Root File Name	Run 3 Version Date	Description	EA Approval Date	DB27 Source Name[1]	Model	Modeler	Date
Brazos Basin							
bwam3	10/1/2023	Using WAM results provided by Region G (in progress)	11/28/2023	Run-of-river	-	Region G	-
Colorado Basin							
C3	10/1/2023	Unmodified Colorado WAM Run 3	11/28/2023	Run-of-river	WRAP	FNI	December-23
C3_RegionF_2030	10/1/2023	Modifed Colorado WAM Run 3; Reservoir conditions reflect sedimentation for 2030	11/28/2023	Ballinger/Moonen Lake/Reservoir Brady Creek Lake/Reservoir Brownwood Lake/Reservoir Coleman Lake/Reservoir Colorado City-Champion Lake/Reservoir System Colorado River MWD Lake/Reservoir System EV Spence Lake/Reservoir Non-System Portion Hords Creek Lake/Reservoir Mountain Creek Lake/Reservoir Oak Creek Lake/Reservoir OH Ivie Lake/Reservoir Non-System Portion San Angelo Lakes Lake/Reservoir System Winters Lake/Reservoir	WRAP	FNI	December-23
C3_RegionF_2050	10/1/2023	Modifed Colorado WAM Run 3; Reservoir conditions reflect sedimentation for 2050	11/28/2023				
C3_RegionF_2080	10/1/2023	Modifed Colorado WAM Run 3; Reservoir conditions reflect sedimentation for 2080	11/28/2023				
30RegFCutoffSY	10/1/2023	Modifed Colorado WAM Run 3 with Subordination Strategy; Reservoir conditions reflect sedimentation for 2030	11/28/2023	Ballinger/Moonen Lake/Reservoir Brady Creek Lake/Reservoir Brownwood Lake/Reservoir Coleman Lake/Reservoir Colorado City-Champion Lake/Reservoir System Colorado River MWD Lake/Reservoir System EV Spence Lake/Reservoir Non-System Portion Hords Creek Lake/Reservoir Mountain Creek Lake/Reservoir Oak Creek Lake/Reservoir OH Ivie Lake/Reservoir Non-System Portion San Angelo Lakes Lake/Reservoir System Winters Lake/Reservoir	WRAP	FNI	October-23
50RegFCutoffSY	10/1/2023	Modifed Colorado WAM Run 3 with Subordination Strategy; Reservoir conditions reflect sedimentation for 2050	11/28/2023				
80RegFCutoffSY	10/1/2023	Modifed Colorado WAM Run 3 with Subordination Strategy; Reservoir conditions reflect sedimentation for 2080	11/28/2023				

Rio Grande Basin							
RG3ror	10/1/2023	Modified Rio Grande WAM Run 3	11/28/2023	Run-of-river	WRAP	FNI	January-24
ERG26_RegionF_2030	10/1/2023	Modifed Rio Grande WAM Run 3; Reservoir conditions reflect sedimentation for 2030. Includes modifications to Balmorhea area water rights.	11/28/2023	Balmorhea Lake/Reservoir Red Bluff Lake/Reservoir	WRAP	FNI	January-24
ERG26_RegionF_2050	10/1/2023	Modifed Rio Grande WAM Run 3; Reservoir conditions reflect sedimentation for 2030. Includes modifications to Balmorhea area water rights.	11/28/2023		WRAP	FNI	
ERG26_RegionF_2080	10/1/2023	Modifed Rio Grande WAM Run 3; Reservoir conditions reflect sedimentation for 2030. Includes modifications to Balmorhea area water rights.	11/28/2023		WRAP	FNI	

1 Only two reservoirs in the Colorado River Basin have a yield using WAM Run 3 (OH Ivie Reservoir, Lake Brownwood). For these reservoirs, the yield in 2040 was estimated by interpolating the yields between years 2030 and 2050; reservoir yields from 2060-2070 were estimated by interpolating the yields between years 2050 and 2080.

APPENDIX C

WATER MANAGEMENT STRATEGY EVALUATION TECHNICAL MEMORANDA

APPENDIX C

C.1 INTRODUCTION, CONSERVATION, SUBORDINATION

Introduction

In accordance with TWDB rules and guidelines, the Region F Water Planning Group has adopted a standard procedure for identifying and evaluating potentially feasible water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning. These strategy categories include:

- Improved conservation
- Reuse
- Expanded use of existing supplies
- Development of new water supplies
- Desalination
- Developing regional water supply facilities or providing regional management of water supply facilities
- Voluntary transfer of water within the region using, but not limited to, regional water banks, sales, leases, options, subordination agreements and financing agreements; and
- Emergency transfer of water

The methodology for selecting potentially feasible strategies for each water user group (WUG) is in Chapter 5A. After the potentially feasible water management strategies were selected, each strategy was evaluated in accordance with Chapter 31 of the Texas Administrative Code, Sections 357.34 and 357.35. These statutes dictate that each strategy be evaluated based on:

- Quantity, reliability, and cost
- Environmental factors
- Impacts to agricultural and natural resources including impacts of moving water from rural and agricultural areas
- Impacts on key parameters of water quality
- Impacts on other water resources including other water management strategies
- Other factors as deemed relevant by the RWPG

During the course of evaluation, some of the potentially feasible strategies originally identified in the Task 5B scope of work were found to be implemented, not needed or not feasible and were not carried further into evaluation. They are included below as follows:

- UCRA – Brush Control – no longer being pursued by the sponsor. No identifiable sponsor for implementation.
- Grandfalls – Develop Additional Groundwater – no longer needed and entity not pursuing.
- Midland County Utility District – Develop Groundwater from Roark Ranch – no longer being pursued by the sponsor.
- Menard – Additional Groundwater – no longer being pursued by the sponsor.
- Sonora – Additional Groundwater – strategy was implemented.
- Irrigation – Additional Groundwater – reduced needs meant strategy is no longer needed.
- Mining – Additional Groundwater – reduced needs meant strategy is no longer needed.
- Steam Electric Power – Additional Groundwater – reduced needs meant strategy is no longer needed.
- Steam Electric Power – Reuse - reduced needs meant strategy is no longer needed.
- Manufacturing – Mitchell County – Voluntary redistribution - reduced needs meant strategy is no longer needed.

- County-Other, Multiple Voluntary redistribution - reduced needs meant strategy is no longer needed.
- Mason – Advanced Groundwater Treatment - strategy was implemented.
- San Angelo – Hickory Well Field Expansion - strategy was implemented.

This Appendix documents each potentially feasible strategy's description and evaluation in accordance with the rules as outlined above. Water management strategies were developed for water user groups to meet projected needs in the context of their current supply sources, previous supply studies and available supply within the region. Much of the water supply in Region F is from groundwater, and several of the identified needs could be met by development of new groundwater supplies. Where site-specific data was available, this information was used. When specific well fields could not be identified, assumptions regarding well capacity, depth of well and associated costs were developed based on county and aquifer. In most cases new surface water supplies are not feasible because of the lack of unappropriated water in the region.

Some strategy evaluations were performed as a group. These strategies include:

- Municipal conservation
- Irrigation conservation
- Mining reuse/recycling
- Subordination of downstream water rights
- Purchase water (voluntary transfer) strategies
- Brush control
- Weather modification

The remaining water management strategies were evaluated individually. This appendix is organized by major strategy category. Cost tables are included in Appendix D. The technical analyses for all potentially feasible strategies are summarized in a matrix in Appendix E. References are included at the end of this appendix.

WUG:	**Municipal WUGs**	**Capital Cost:**	N/A
WMS Name:	**Municipal Conservation**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Conservation	**Annual Cost** (After Amortization):	$606 per acre-foot $1.86 per 1,000 gal
WMS Yield:	2,503 – 3,965 acre-feet per year	**Implementation:**	2020 & 2030
WMS Status:	Recommended		

Strategy Description

Water conservation is a demand management strategy that proactively decreases future water needs. Conservation facilitates more efficient use of existing water supplies and may delay the need to develop new water supplies. An expected level of conservation is included in the demand projections from the Texas Water Development Board (TWDB) due to the natural replacement of inefficient plumbing fixtures with low flow fixtures, as mandated under the Plumbing Code. The TWDB also considers expected reductions in municipal water use due to energy efficiency requirements for dishwashers and clothes washers. Additional conservation savings can potentially be achieved in the region through the implementation of conservation best management practices (BMPs). These additional conservation measures were considered for all named municipal water user groups (WUGs) in Region F and three County-Other WUGs. Region F recognizes that it has no authority to implement, enforce, or regulate water conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user group supersede the recommendations in this plan and are considered to meet regulatory requirements for consistency with this plan.

Public water suppliers with 3,300 connections or more are required to update and submit a Water Conservation Plan (WCP) to the Texas Commission on Environmental Quality (TCEQ) every five years. Per Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, some conservation strategies are required to be included as part of this plan. Required strategies include a program for universal metering, measures to determine and control water loss, a program of continuing public education, and a non-promotional water rate structure. If a public water supplier serves over 5,000 people, they are additionally required to have a conservation-oriented rate structure and a program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system.

Screening of BMPs

To assess the appropriateness of conservation BMPs for Region F, 70 potential strategies were identified, and a screening level evaluation was conducted. The screening evaluation was performed both for entities with populations less than 20,000 and entities with populations greater than 20,000. If an entity's population crossed the 20,000-person threshold, the larger city strategies and assumptions were applied to the appropriate decades. The evaluation considered six criteria:

- Cost
- Potential Water Savings
- Time to Implement
- Public Acceptance
- Technical Feasibility
- Staff Resources

Each criterion was scored from 1 to 5 with 5 being the most favorable. Scores for all the criteria were added to create a composite score. The strategies were then ranked and selected based on their composite score. These strategies were selected for the purpose of estimating savings and costs for planning purposes only. Region F supports all of the 70 BMPs an individual water user group may choose to employ, and all are considered to meet regulatory requirements for consistency with this plan.

Selected Strategies for Entities under 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in Region F with less than 20,000 people:

- Education and Outreach
- Water Audits and Leak Repair
- Rate Structure
- Water Waste Ordinance

Selected Strategies for Entities over 20,000

Based on the screening level evaluation and requirements from the TCEQ, the following strategies were selected for consideration for entities in Region F with more than 20,000 people:

- Education and Outreach
- Water Audits and Leak Repair
- Rate Structure
- Water Waste Ordinance
- Landscape Ordinance
- Time of Day Watering Limit

These strategies were evaluated individually for each water user as appropriate (greater than or less than 20,000) and the water savings and costs are aggregated for the selected strategies with the exception of the water audit and leak repair strategy. This strategy was considered separately for each water user because the quantity of savings and associated cost was quite variable. For smaller cities, a robust leak detection and repair program may not be cost effective, especially if the savings are small. This strategy is discussed separately in this Appendix.

For the purposes of strategy evaluation, each household was assumed to have an average of three people. The following assumptions were used in the evaluation of the selected municipal conservation measure.

Education and Outreach

Local officials would offer water conservation education to schools and civic associations, include information in water bills, and provide pamphlets and other materials as appropriate. It was assumed that the education and outreach programs would be needed throughout the planning period in order to maintain the level of water savings.

Potential Savings Assumptions

- Education and Outreach has an assumed water savings of 5,000 gallons per household per year with 30% adoption rate (assumes that 30% of the customers respond to this measure by reducing water use).

Cost Assumptions

- Education and Outreach has a $3.19 per person per year with a maximum cost of $15,000 for entities with a population less than 20,000.
- Education and Outreach costs $2.09 per person per year for entities with a population greater than 20,000.

Rate Structure

Local officials would implement an increasing block rate structure where the unit cost of water increases as consumption increases. Increasing block rate structures discourage the inefficient use or waste of water. Many cities already have a non-promotional rate structure. This strategy assumes that the entity adopts a higher level of a non-promotional rate structure.

Potential Savings Assumptions

- Increasing block rates are projected to save 6,000 gallons per household per year with a 10% adoption rate (assumes that 10% of the customers respond to this measure by reducing water use).

Cost Assumptions

- It is likely the entity would do any rate structure modifications themselves and incur no additional costs.

Water Waste Ordinance

Local officials would implement an ordinance prohibiting water waste such as watering of sidewalks and driveways or runoff into public streets.

Potential Savings Assumptions

- The assumed savings are 3,000 gallons per household per year with a 30% adoption rate for entities with a population less than 20,000 and 50% adoption rate for entities with a population greater than 20,000.

Cost Assumptions

- Annual enforcement costs $2,900 per year for entities with a population less than 20,000.
- Annual enforcement costs $11,600 per year for entities with a population greater than 20,000.

Landscape Ordinance (Entities with a population greater than 20,000)

Local officials would implement an ordinance that would promote residential plantings that conserve water for all new construction.

Potential Savings Assumptions

- Landscape ordinances would only apply to new construction.
- Would include both residential and commercial properties.
- Assumed to save 1,000 gallons per increased number of households per year with 100% adoption rate.

Cost Assumptions

- Annual enforcement costs of $11,600 per year for entities with a population greater than 20,000.

Time of Day Watering Limit Landscape Ordinance (Entities greater than 20,000)

Local officials would implement an ordinance prohibiting outdoor watering during the hottest part of the day when most of that water is lost (wasted) through evaporation. Many ordinances limit outdoor watering to between 6 p.m. and 10 a.m. on a year-round basis.

Potential Savings Assumptions

- Savings of 1,000 gallons per household per year.
- 75 percent of the population would realize these savings (the other 25 percent is either not irrigating or already abide by this practice).

Cost Assumptions

- Annual enforcement costs of $11,600 per year for entities with a population greater than 20,000.

Time to Implement

For planning purposes, it is assumed that all but one of the BMPs identified here could be adopted and in place by 2030. The landscape ordinance, which is an identified for entities with a population of greater than 20,000, is anticipated to be in place after 2030 but before 2040.

Quantity, Reliability and Cost

Region F as a whole is expected to save around 32,500 acre-feet per year in 2030, increasing to nearly 4,000 acre-feet of savings by 2080. Individual entities are shown to save between one and 1,092 acre-feet by 2080. The larger cities show greater quantities of savings due to a larger number of people and additional BMPs. As a percentage, entities are shown to save approximately two percent of their projected municipal demand. Table C- 1 shows the potential savings from the enhanced conservation measures described above over the next 50 years.

Table C- 1
Estimated Savings from Municipal Conservation (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Airline Mobile Home Park LTD	6	6	7	8	8	9
Andrews	49	60	109	127	147	169
County-Other, Andrews	22	29	38	47	56	80
Ballinger	11	11	11	11	12	12
Balmorhea	1	1	1	2	2	2
Bangs	9	9	9	9	9	9
Barstow	1	1	1	1	1	1
Big Lake	9	9	10	10	10	10
Big Spring	118	122	124	121	119	116
Borden County Water System	1	1	1	1	1	2
Brady	17	17	16	16	15	15
Bronte	3	3	3	3	4	4
Brookesmith SUD	20	21	21	21	21	21
Brownwood	61	90	90	90	90	91
Coahoma	3	3	3	3	3	3
Coleman	11	9	8	7	5	4
Coleman County SUD[a]	8	8	8	7	7	7
Colorado City	20	20	20	20	21	21
Concho Rural Water	23	26	29	31	34	37
Corix Utilities Texas Inc[b]	16	34	36	35	35	34
Crane	11	11	11	11	11	11

Water User Group	2030	2040	2050	2060	2070	2080
Crockett County WCID 1	7	6	6	6	5	5
DADS Supported living center	1	1	1	1	1	1
Early	10	10	10	11	11	11
Ector County Utility district	102	128	147	191	209	227
Eden	5	5	5	5	5	5
Eldorado	5	4	4	3	3	2
Fort Stockton	29	29	29	31	33	35
Goodfellow Air force base	7	7	7	7	7	7
Grandfalls	1	1	2	2	2	2
Greater Gardendale WSC	15	18	21	23	25	27
Greenwood Water	3	3	3	3	3	3
Iraan	3	3	3	3	3	4
Junction	7	7	7	7	7	7
Kermit	22	25	29	31	34	38
Loraine	2	2	1	1	1	1
Madera Valley WSC	6	6	7	7	8	8
Mason	7	7	7	8	8	8
McCamey	5	5	6	6	6	6
Menard	3	3	3	3	3	3
Mertzon	2	2	2	2	2	2
Midland	646	720	789	877	977	1,092
Miles	3	3	3	3	3	3
Millersview-Doole WSC	16	18	21	24	27	31
Monahans	26	29	33	36	39	43
North Runnels WSC[a]	4	4	4	5	5	5
Odessa	530	637	745	786	838	890
Pecos	30	34	38	40	43	46
Pecos County Fresh Water	2	2	2	2	2	3
Pecos County WCID 1	7	7	8	7	7	6
Rankin	2	2	2	3	3	3
County-Other, Reeves	12	12	13	13	14	15
Richland SUD	2	2	2	2	2	2
Robert Lee	3	3	3	4	4	5
County-Other, Runnels	3	3	3	2	2	2
San Angelo	463	507	538	570	605	643
Santa Anna	3	3	3	3	3	3
Snyder	36	36	37	37	38	38
Sonora	7	6	6	5	5	4
Southwest Sandhills WSC	8	9	10	11	12	13
Stanton	8	9	10	11	12	14
Sterling City	4	6	8	10	13	16
Tom Green County FWSD 3	2	2	2	3	3	3
U & F WSC	2	2	2	2	2	2
Wickett	1	2	2	2	2	2
Wink	2	2	2	2	2	3
Winters	7	7	7	6	6	5
Zephyr WSC	12	13	13	13	13	13
Total	**2,503**	**2,843**	**3,162**	**3,411**	**3,669**	**3,965**

[a] Conservation volumes for this WUG are split between multiple regions. The amounts shown represent the total conservation volume for the whole WUG.

[b] Conservation volumes provided by Region G.

The reliability of this supply is considered medium because of the uncertainty involved in the potential for savings and the degree to which public participation is needed to realize savings. Site specific data regarding residential, commercial, industrial, and other types of use would give a better estimate of the reliable supply from this strategy.

The total average annual cost across Region F for this strategy is over $1.7 million in 2030 increasing to over $2.4 million by 2080. The average unit cost across the region is approximately $701 per acre foot in 2030 and $614 per acre foot in 2080. Unit costs vary considerably between water user groups depending on the population size. Table C- 2 below shows the projected annual cost of implementing the selected conservation strategies. Generally, conservation programs are funded through a city's annual operating budget and are not capitalized. However, in some cases, an entity may choose to capitalize a portion or all of their program. These kinds of costs are difficult to estimate for each individual entity due to the wide variety of factors at play. However, all capital expenditures for conservation are considered consistent with the Region F Plan.

Table C- 2
Annual Cost per Acre-Foot of Municipal Conservation Savings

Water User Group	2030	2040	2050	2060	2070	2080
Airline Mobile Home Park LTD	$1,555	$1,492	$1,442	$1,412	$1,385	$1,361
Andrews	$1,098	$1,087	$772	$728	$692	$662
County-Other, Andrews	$824	$612	$472	$384	$319	$712
Ballinger	$1,301	$1,299	$1,297	$1,294	$1,291	$1,286
Balmorhea	$3,456	$3,186	$2,979	$2,867	$2,757	$2,649
Bangs	$1,379	$1,373	$1,373	$1,372	$1,371	$1,369
Barstow	$4,605	$4,189	$3,835	$3,600	$3,378	$3,172
Big Lake	$1,354	$1,345	$1,342	$1,341	$1,340	$1,340
Big Spring	$665	$750	$748	$660	$665	$669
Borden County Water System	5,354	4,865	4,264	3,701	3,221	2,812
Brady	$1,048	$1,084	$1,124	$1,145	$1,168	$1,191
Bronte	$2,076	$2,011	$1,950	$1,869	$1,796	$1,729
Brookesmith SUD	$877	$863	$862	$859	$856	$853
Brownwood	$1,087	$855	$857	$856	$854	$852
Coahoma	$2,036	$2,003	$1,986	$2,009	$2,037	$2,067
Coleman	$1,313	$1,354	$1,412	$1,474	$1,571	$1,751
Coleman County SUD[a]	$1,384	$1,404	$1,425	$1,442	$1,460	$1,480
Colorado City	$884	$880	$889	$880	$871	$862
Concho Rural Water	$771	$685	$623	$571	$524	$480
Corix Utilities Texas Inc[b]	$684	$684	$684	$684	$684	$684
Crane	$1,312	$1,308	$1,307	$1,307	$1,307	$1,307
Crockett County WCID 1	$1,455	$1,488	$1,529	$1,563	$1,605	$1,655
DADS Supported living center	$3,252	$3,252	$3,252	$3,252	$3,252	$3,252
Early	$1,321	$1,316	$1,316	$1,315	$1,314	$1,313
Ector County Utility district	$795	$813	$784	$642	$627	$614
Eden	$1,567	$1,578	$1,590	$1,602	$1,612	$1,618
Eldorado	$1,658	$1,745	$1,852	$1,974	$2,160	$2,468
Fort Stockton	$624	$623	$617	$583	$549	$515

Water User Group	2030	2040	2050	2060	2070	2080
Goodfellow Air force base	$1,444	$1,444	$1,444	$1,444	$1,444	$1,444
Grandfalls	$3,425	$3,143	$2,910	$2,748	$2,601	$2,466
Greater Gardendale WSC	$1,175	$988	$859	$784	$719	$662
Greenwood Water	$2,122	$2,144	$2,158	$2,173	$2,181	$2,184
Iraan	$1,953	$1,935	$1,918	$1,896	$1,871	$1,847
Junction	$1,460	$1,468	$1,472	$1,474	$1,473	$1,469
Kermit	$812	$705	$627	$572	$522	$476
Loraine	$2,649	$2,818	$3,487	$3,579	$3,678	$3,802
Madera Valley WSC	$1,535	$1,492	$1,457	$1,436	$1,415	$1,394
Mason	$1,471	$1,447	$1,427	$1,425	$1,423	$1,422
McCamey	$1,599	$1,579	$1,562	$1,540	$1,515	$1,489
Menard	$1,883	$1,948	$2,016	$2,034	$2,054	$2,075
Mertzon	$2,477	$2,534	$2,536	$2,561	$2,580	$2,596
Midland	$505	$508	$504	$498	$494	$490
Miles	$2,157	$2,124	$2,088	$2,048	$2,006	$1,960
Millersview-Doole WSC	$1,091	$968	$856	$752	$658	$573
Monahans	$691	$611	$545	$498	$455	$416
North Runnels WSC[a]	$1,737	$1,712	$1,685	$1,658	$1,627	$1,594
Odessa	$513	$509	$501	$506	$504	$502
Pecos	$587	$522	$473	$445	$418	$393
Pecos County Fresh Water	$2,439	$2,519	$2,540	$2,372	$2,225	$2,088
Pecos County WCID 1	$1,483	$1,434	$1,413	$1,437	$1,471	$1,519
Rankin	$2,316	$2,269	$2,235	$2,190	$2,144	$2,093
County-Other, Reeves	1,288	1,275	1,263	1,254	1,245	1,219
Richland SUD	$2,606	$2,700	$2,782	$2,846	$2,892	$2,899
Robert Lee	$1,985	$1,925	$1,871	$1,797	$1,731	$1,670
County-Other, Runnels	$2,007	$2,066	$2,164	$2,261	$2,404	$2,624
San Angelo	$519	$530	$527	$524	$520	$517
Santa Anna	$2,034	$2,070	$2,101	$2,125	$2,141	$2,138
Snyder	$1,120	$1,118	$1,117	$1,116	$1,115	$1,115
Sonora	$1,474	$1,513	$1,563	$1,607	$1,663	$1,735
Southwest Sandhills WSC	$1,422	$1,377	$1,340	$1,314	$1,290	$1,268
Stanton	$1,386	$1,354	$1,324	$1,297	$1,272	$1,248
Sterling City	$1,702	$1,531	$1,411	$1,320	$1,260	$1,106
Tom Green County FWSD 3	$2,456	$2,307	$2,201	$2,111	$2,027	$1,950
U & F WSC	2,763	2,818	2,825	2,789	2,757	2,720
Wickett	$3,148	$2,899	$2,697	$2,553	$2,422	$2,302
Wink	$2,229	$2,214	$2,213	$2,208	$2,203	$2,197
Winters	$1,438	$1,456	$1,483	$1,509	$1,543	$1,591
Zephyr WSC	$1,272	$1,269	$1,268	$1,268	$1,267	$1,266
Total	**$701**	**$687**	**$659**	**$636**	**$621**	**$614**

[a] Costs for this WUG are split between multiple regions. The amounts shown represent the cost for the whole WUG.

[b] Costs provided by Region G.

Environmental Factors

There are no identified environmental issues associated with this strategy. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands.

Agricultural and Rural Impacts

Due to the limited availability of water, any municipal water user group may be competing with agricultural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

No impacts to natural resources or key parameters of water quality were identified for this strategy since it reduces demands and does not actually develop new supplies.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies. It may also reduce available supplies for reuse strategies. However, if much of the water saved is associated with outdoor water use, this impact would be negligible.

Other Issues Affecting Feasibility

This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual water user group. Site specific data will be required for a better assessment of the potential for conservation in Region F. Technical and financial assistance by the State may be required to implement this strategy.

WUG:	**Multiple Municipal WUGs**	**Capital Cost:**	$30,324,000
WMS Name:	**Water Audits and Leak Repairs**	**Annual Cost** (During Amortization):	$2,170 per acre-foot $6.67 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	308 – 358 acre-feet per year	**Annual Cost** (After Amortization):	N/A
WMS Status:	Recommended	**Implementation:**	2030, 2050, and 2070

Strategy Description

Water losses in distribution systems can account for significant portions of water demand in some cases. Water losses tend to be higher in systems with fewer users per mile of pipeline. Identifying and repairing leaks in water distribution and transmission lines can help reduce demands by reducing water waste throughout the system. As part of this strategy, local officials would perform a system wide water audit and create a program of leak detection and repair, including infrastructure replacement and repair as necessary. It was assumed that the leak detection and repair program is an ongoing activity to maintain the level of water loss reductions assumed below. Advanced Metering Infrastructure (AMI) is one potential way to enhance the ability of local officials to perform water audits. Mertzon is the only entity in Region F to have expressed interest in developing AMI at this time. However, development of this infrastructure by any WUG is considered consistent with the 2026 Region F Water Plan.

Potential Savings Assumptions

- If TWDB water loss data was available for the entity, it was utilized.
- This strategy was considered for all cities with greater than or equal to 15% losses.
- This strategy was considered for all Water Supply Corporations (WSCs) or Special Utility Districts (SUDs) with greater than or equal to 25% losses.
- It was assumed that 20% of an entity's losses could be recovered through a water audit and leak repair program.
- If no water loss data was available, this strategy was not considered for an entity, unless specifically requested by an entity.

Cost Assumptions

- Water Audits and Leak Repairs has $5,000 base cost plus $12 per person for entities with a population less than 20,000.
- Water Audits and Leak Repairs costs $12 per person for entities with a population greater than 20,000.
- Capital costs from the Water Audits and Leak Repairs strategy and applicable debt services are calculated every twenty years, i.e., the recommended debt service period for non-reservoir infrastructure from TWDB general costing guidelines.
- It is assumed that an entity would finance repairs every 20 years, resulting in a capital cost in years 2030, 2050, and 2070.

Quantity, Reliability and Cost

The estimated quantity of supply for this strategy is uncertain due to lack of detailed data. Savings range from 4 to 121 acre-feet for individual entities with a population under 20,000 throughout the planning period. No entities with a population over 20,000 met the required loss thresholds to be considered for this strategy. Across Region F, it is estimated that over 300 acre-feet of supply could be obtained

through a water audits and leak repairs program in 2030. This increases to around 360 acre-feet of savings by 2080. Table C- 3 shows the estimated savings by water user group.

The reliability of this supply is considered low due to uncertainty associated with estimated savings and the extent to which this strategy relies on individual utilities to adopt a water audits and leak repairs program, which can be costly and time intensive, especially for smaller users.

Due to the relatively high costs of implementing this strategy, especially for smaller or rural water user groups, this strategy may not be feasible. The estimated cost is shown in Table C- 4.

Table C- 3
Water Audits and Leak Repairs Savings (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Coleman	28	24	21	18	14	11
Colorado City	61	61	60	61	61	62
Concho Rural Water	41	46	50	55	60	65
Eldorado	24	21	18	16	13	10
Junction	37	36	36	36	36	36
Mertzon	4	4	4	4	4	4
Millersview-Doole WSC	64	72	81	92	105	121
North Runnels WSC*	7	7	7	8	8	8
Pecos County WCID #1	15	16	17	16	15	13
Robert Lee	11	12	13	14	15	17
Winters	16	15	14	13	12	11
Total	**308**	**314**	**321**	**333**	**343**	**358**

*Water audit and leak repair volumes for this WUG are split between multiple regions. The amount shown represent the total volume for the whole WUG.

Table C- 4
Water Audits and Leak Repairs Cost Per Acre-Foot

ter User Group	2030 Capital Cost	2050 Capital Cost	2070 Capital Cost	Cost ($/ac-ft/yr)									
				2030					2040	2050	2060	2070	20
LEMAN	$879,000	$668,000	$474,000					$2,209	$2,577	$2,237	$2,610	$2,384	$3,
LORADO CITY	$1,697,000	$1,692,000	$1,726,000					$1,957	$1,957	$1,984	$1,952	$1,991	$1,
NCHO RURAL TER	$2,041,000	$2,464,000	$2,911,000					$3,503	$3,123	$3,467	$3,152	$3,413	$3,
DORADO	$446,000	$362,000	$282,000					$1,307	$1,494	$1,416	$1,593	$1,524	$1,
CTION	$637,000	$625,000	$628,000					$1,211	$1,245	$1,222	$1,222	$1,228	$1,
RTZON	$256,000	$251,000	$247,000	$4,497	$4,497	$4,418	$4,418	$4,350					$4,
LERSVIEW-OLE WSC	$1,473,000	$1,859,000	$2,400,000	$1,619	$1,439	$1,615	$1,422	$1,608					$1,
RTH RUNNELS C*	$433,000	$461,000	$500,000					$4,350	$4,350	$4,633	$4,053	$4,394	$4,
COS COUNTY ID #1	$645,000	$691,000	$602,000					$3,026	$2,837	$2,861	$3,040	$2,823	$3,
BERT LEE	$349,000	$388,000	$446,000					$2,234	$2,048	$2,098	$1,948	$2,091	$1,
NTERS	$659,000	$599,000	$533,000					$2,900	$3,093	$3,012	$3,244	$3,124	$3,
TAL	$9,515,000	$10,060,000	$10,749,000					$2,174	$2,132	$2,205	$2,126	$2,205	$2,

*Costs for this WUG are split between multiple regions. The amounts shown represent the total costs for the whole WUG.

Environmental Factors

Environmental issues associated with this strategy are expected to be minimal since it is only the repair of infrastructure currently in place. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands.

Agricultural and Rural Impacts

Due to the limited availability of water, any municipal water user group may be competing with agricultural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

Impacts to natural resources of key parameters of water quality are expected to be minimal since it only involves the repair of existing infrastructure and no new facilities.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies.

Other Issues Affecting Feasibility

This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual water user group. Site specific data will be required for a better assessment of the potential for conservation through water audits and leak repairs in Region F. Due to high costs, many smaller and rural water user groups may find this strategy to be unfeasible. Technical and financial assistance by the State may be required to implement this strategy.

WUG:	**Irrigation WUGs**	**Capital Cost:**	$53,916,000
WMS Name:	**Irrigation Conservation**	**Annual Cost** (During Amortization):	$32.15 per acre-foot $0.10 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	22,000 – 59,000 acre-feet per year	**Annual Cost** (After Amortization):	$0 per acre-foot $0 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

Irrigation conservation is a strategy that proactively causes a decrease in future water needs by increasing the efficiency of current irrigation practices throughout the region. The adoption of irrigation conservation will help preserve the existing water resources for continued agriculture use and provide for other demands. Irrigation efficiency increases can be achieved by implementing a combination of strategies that lead to irrigation demand reductions. These may include but are not limited to:

- Changes in irrigation equipment
- Crop type changes and crop variety changes
- Conversion from irrigated to dry land farming
- Water loss reduction in irrigation canals

Region F recognizes that it has no authority to implement, enforce, or regulate irrigation conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user group superseded the recommendations in this plan and are considered to meet regulatory requirements for consistency with this plan.

Region F recommends improvements in the efficiency of irrigation equipment as an effective water conservation strategy for irrigation within Region F. This strategy replaces less efficient irrigation systems with new types of equipment with higher efficiency ratings. These can include:

- Furrow irrigation (FF) – 60 percent
- Surge flow (SF) – 75 percent
- Mid-elevation sprinkler application (MESA) – 78 percent
- Low-elevation sprinkler application (LESA) – 88 percent
- Low Energy Precision Application (LEPA) – 95 percent
- Subsurface Drip Irrigation (DRIP) – 97 percent

Any changes from a less efficient irrigation technology to a more efficient irrigation technology will save water and help the water user group reach a higher water use efficiency overall.

Crop type changes and crop variety changes

Certain crops are more water intensive than others. Shifting higher water use crops to lower water use crops could generate substantial water savings. Similarly, shifting long season to short season varieties is another water savings strategy. However, lower yields are typically associated with short season varieties (assuming the same irrigation technology). Additionally, advanced plant breeding has played a major role in increasing crop productivity and enhancing the efficiency of input such as irrigation. The adoption of drought resistant varieties with high water use efficiency can be a potential water conservation strategy.

Conversion from irrigated to dryland farming

Reducing the amount of irrigated acreage in Region F will reduce the amount of water applied to crops in the area. While converting from an irrigated to dryland cropping system may be a viable economic alternative for many Region F producers, only a limited number of dryland crops may be able to be produced profitably in the area. Region F also has an extensive dryland farming community. Further conversion may be limited.

Water loss reduction in irrigation canals

Many irrigation canals in Region F are open and unlined. This allows water to be lost both to evaporation and seepage into the ground. By lining these canals, seepage can be reduced, and a larger portion of the water can go towards the beneficial use of crop irrigation. Converting these canals to a pipe system would save larger amounts of water by eliminating seepage and evaporation losses. However, the cost of doing this is likely prohibitive.

Assumptions

Depending on the method employed to achieve irrigation conservation, the composition of crops grown, sources of water, and method of delivery, will impact the potential savings and costs of this strategy. Since Region F does not have data on county-specific irrigation equipment employed by crop type, a general approach to irrigation conservation savings was taken. For planning purposes, a 5% increase in irrigation efficiency was assumed in decades 2030, 2040 and 2050. The efficiency level was held constant for decades 2060, 2070, and 2080. A maximum regional efficiency level of 85% was assumed. For planning purposes, it was assumed that on average, irrigation conservation would have a capital cost of $920 per acre-foot saved. This is based on the Water Conservation Implementation Task Force Water Conservation Best Management Practices cost per acre for irrigation equipment changes indexed to September 2023 dollars.

Time to Implement

For planning purposes, it was assumed that these strategies would be implemented in phases over the first 3 decades of the planning period (2030, 2040, and 2050).

Quantity, Reliability and Cost

This strategy is estimated to save about 22,000 acre-feet of supply in 2030 and over 58,000 acre-feet in 2080. Savings by county are presented in Table C- 5.

The reliability of this supply is considered medium due to lack of data and uncertainty involved in estimating the amount of supply that can be saved and the extent to which this strategy relies on the behavior of each individual irrigator.

The region wide capital cost and annual cost per acre-foot and per thousand gallons are shown in Table C-6. The annual cost per acre-foot was estimated at $32.15 during amortization. This will vary greatly depending on the individual circumstances and irrigation conservation strategy employed by each individual irrigator.

Table C- 5
Irrigation Conservation Savings (acre-feet per year)

County Name	2030	2040	2050	2060	2070	2080
Andrews	878	1,756	1,756	1,756	1,756	1,756
Borden	125	250	250	250	250	250
Brown	384	615	615	615	615	615
Coke	31	62	74	74	74	74
Coleman	21	42	42	42	42	42
Concho	260	520	572	572	572	572
Crockett	4	8	12	12	12	12
Ector	38	75	113	113	113	113
Glasscock	1,737	1,737	1,737	1,737	1,737	1,737
Howard	255	510	561	561	561	561
Irion	53	105	158	158	158	158
Kimble	130	260	312	312	312	312
Martin	1,647	3,293	4,940	4,940	4,940	4,940
Mason	240	480	721	721	721	721
McCulloch	104	207	311	311	311	311
Menard	173	347	520	520	520	520
Midland	900	1,800	2,699	2,699	2,699	2,699
Mitchell	260	260	260	260	260	260
Pecos	6,884	13,767	20,651	20,651	20,651	20,651
Reagan	1,075	2,150	3,225	3,225	3,225	3,225
Reeves	3,001	6,003	9,004	9,004	9,004	9,004
Runnels	176	352	422	422	422	422
Schleicher	101	121	121	121	121	121
Scurry	349	698	908	908	908	908
Sterling	43	86	128	128	128	128
Sutton	56	112	168	168	168	168
Tom Green	2,480	4,960	5,952	5,952	5,952	5,952
Upton	421	842	1,263	1,263	1,263	1,263
Ward	217	433	650	650	650	650
Winkler	153	307	460	460	460	460
Total	**22,196**	**42,158**	**58,605**	**58,605**	**58,605**	**58,605**

Table C- 6
Irrigation Conservation Costs

	2030	2040	2050	2060	2070	2080
Region F Capital Cost	$20,420,000	$18,365,000	$15,131,000	$0	$0	$0
Annual Cost per acre-foot	$32.15	$32.15	$19.97	$9.02	$0.00	$0.00
Annual Cost per 1,000 gal	$0.10	$0.10	$0.06	$0.03	$0.00	$0.00

Environmental Factors

Most of the areas in Region F with significant irrigation needs rely on groundwater for irrigation. In areas where conserved groundwater finds expression as springs or base flow, conservation will have a positive impact. However, in most cases irrigation demand exceeds available supply even with implementation of advanced irrigation technologies. This strategy is expected to have a minimal impact on the environment, either positive or negative.

Agricultural and Rural Impacts

Irrigated agriculture is vital to the economy and culture of Region F. Implementation of water-conserving irrigation practices may be necessary to retain the economic viability of many areas that

show significant water supply needs throughout the planning period. Water conservation measures identified as part of this strategy could have positive or negative economic impacts to agricultural communities, depending on the selected BMPs. However, the BMPs selected by the individual producer would have to be economically feasible or the producer would not implement the BMP. No agricultural acreage is expected to be taken out of production with this strategy. Some producers may choose to change crop types or convert to dry land farming, but total acreage is not expected to decrease.

Impacts to Natural Resources and Key Parameters of Water Quality

In areas where conserved water can be used to enhance the environment (increase spring flow, base flow or streamflow), irrigation conservation will positively impact natural resources and water quality. However, in areas where the demand already exceeds available supply, impacts will be minimal to none.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies involving irrigation water user groups.

Other Issues Affecting Feasibility

The most significant issue associated with the implementation of this strategy is the lack of a clear sponsor for the strategy. Although the TWDB and other state and federal agencies may sponsor many irrigation programs, for most irrigation conservation measures, the actual implementation is the responsibility of the individual irrigators. Because this strategy relies largely on individual behavior, it is difficult to quantify the actual savings that can be achieved.

The economic viability of irrigation conservation is critical to its implementation. Changing crop prices can impact the ability of a producer to implement conservation practices while maintaining profitability.

Another significant factor is the lack of detailed data on both irrigation equipment in use and the quantity of water used for individual crops. The conservation calculations included in this analysis were hampered by the lack of current data for these two items.

WUG:	**Mining WUGs**	**Capital Cost:**	$172,040,000
WMS Name:	**Mining Conservation (Recycling)**	**Annual Cost** (During Amortization):	$632 per acre-foot $1.94 per 1,000 gal
WMS Type:	Conservation		
WMS Yield:	8,602 – 4,101 acre-feet per year	**Annual Cost** (After Amortization):	$0 per acre-foot $0 per 1,000 gal
WMS Status:	Recommended	Implementation:	2030

Strategy Description

Mining conservation or recycling is a demand management strategy that decreases future water needs by treating and reusing water used in mining operations. Mining conservation and recycling is possible for both oil and gas mining as well as sand and gravel mining. Mining recycling and conservation was considered for all oil and gas mining operations in Region F.

The majority of mining demand in Region F is driven by the oil and gas boom in the Permian Basin which underlies most of Region F. Therefore, much of this discussion is focused on recycling by the oil and gas industry in the Permian Basin.

The amount of water that can be reused/recycled is dependent on the amount of flowback. Flowback refers to the water-based solution that flows back to the surface during and after the completion of the hydraulic fracturing. The fluid contains clays, chemical additives, dissolved metal ions and total dissolved solids (TDS). The volume of flowback varies across plays but is generally between 20-40% in the Permian Basin. For planning purposes, it is assumed that 20% of water used for mining purposes will be available through flowback and can be reused/recycled.

The flowback water is of low quality and requires treatment or must be blended with fresh water. The process used to recycle/reuse water can employ either conventional treatment or advanced treatment technologies. Conventional treatment technologies include flocculation, coagulation, sedimentation, filtration and lime softening. Advanced treatment technologies include reverse osmosis membranes, thermal distillation, evaporation, and/or crystallization processes and often use more energy than conventional treatment. It is assumed that 30% of the flowback water will be lost during the treatment process.

As competition for water grows, and water resources become more scarce, individual mining operators may find it more attractive to implement a reuse/recycling strategy. Reusing/recycling flow back water may also reduce brine disposal costs for the operator to help offset the cost of treatment and transportation. Ultimately, the decision to implement this strategy will be based on the economics of each individual well field. If brackish water is readily available and not in demand by other users, it may be more attractive to use brackish supplies. For planning purposes, it is assumed that adoption rates of this strategy will depend on the county mining water supply availability. In this case, the following assumptions are made:

- If there is a mining water shortage, the county will adopt this strategy 50% of the time
- If there is no mining shortage, the county will adopt this strategy 30% of the time
- If there is a surplus of mining water, the county will adopt this strategy 10% of the time

Region F recognizes that it has no authority to implement, enforce, or regulate water conservation practices. These water conservation practices are intended to be guidelines. Any water management

strategies that reduce the demand for mining water are considered to meet regulatory requirements for consistency with this plan.

Quantity, Reliability and Cost

The estimated quantity available from this strategy is around 8,600 acre-feet in 2030 and over 4,100 acre-feet in 2080 when demands have decreased significantly. Estimated savings by county are shown in the table below. The actual quantity of water available from this strategy will vary. Since this strategy is largely dependent on each individual operator and economic factors specific to each mining operation, it is difficult to estimate the actual quantity of water that could be made available through this strategy.

The reliability of this supply is considered low because of the uncertainty involved in the potential for savings and the degree to which participation of mining companies is needed to realize savings.

Table C- 7
Mining Conservation (Recycling) Supplies (acre feet per year)

Mining Conservation (Recycling) Supplies						
County	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Andrews	242	242	222	182	128	81
Borden	117	117	107	88	62	39
Brown	0	0	0	0	0	0
Coke	2	2	2	2	2	2
Coleman	0	0	0	0	0	0
Concho	0	0	0	0	0	0
Crane	21	21	21	21	1	1
Crockett	423	423	78	63	45	28
Ector	24	24	22	18	12	8
Glasscock	479	479	439	359	253	160
Howard	427	427	391	320	226	142
Irion	615	615	563	92	65	41
Kimble	0	0	0	0	0	0
Loving	692	692	692	692	692	692
Martin	574	574	526	143	101	64
Mason	0	0	0	0	0	0
McCulloch	0	0	0	0	0	0
Menard	0	0	0	0	0	0
Midland	508	508	466	381	90	56
Mitchell	15	15	14	12	8	5
Pecos	931	931	931	931	186	186
Reagan	686	686	628	171	121	76
Reeves	2017	2017	2017	2017	2017	2017
Runnels	0	0	0	0	0	0
Schleicher	148	148	136	111	78	49
Scurry	18	18	16	13	9	6
Sterling	105	105	97	79	56	35
Sutton	1	1	1	1	1	1
Tom Green	34	34	31	26	18	11
Upton	183	183	168	137	97	61
Ward	227	227	227	227	227	227
Winkler	113	113	113	113	113	113
Total	**8,602**	**8,602**	**7,908**	**6,199**	**4,608**	**4,101**

The costs associated with this strategy vary based on the amount of flowback, the geographic location of the flowback, the amount of treatment required and transportation distances required. For the purposes of this plan, a $20,000 per acre-foot capital investment for the maximum amount of water saved over the planning period was assumed. This investment was amortized over 20 years. However, individual operators may plan to invest the capital with no debt service and would likely implement capital improvements at the level needed for each decade. The costs in Table C- 8 assume a single capital investment beginning in 2030. A 10 cent per barrel ($775 per acre-foot) annual savings from not having to dispose of the brine was assumed for the decades with capital cost. If an operator continued to employ this strategy in the later decades, they may realize net savings over treating and disposing of the brine. However, for planning purposes, the annual cost was assumed to be $0 after the capital investment is paid off.

Table C- 8
Mining Conservation (Recycling) Costs

County	Capital Cost	Annual Cost Per Acre-Foot					
		2030	2040	2050	2060	2070	2080
Andrews	$4,840,000	$632	$632	$0	$0	$0	$0
Borden	$2,340,000	$632	$632	$0	$0	$0	$0
Coke	$40,000	$632	$632	$0	$0	$0	$0
Crane	$420,000	$632	$632	$0	$0	$0	$0
Crockett	$8,460,000	$632	$632	$0	$0	$0	$0
Ector	$480,000	$632	$632	$0	$0	$0	$0
Glasscock	$9,580,000	$632	$632	$0	$0	$0	$0
Howard	$8,540,000	$632	$632	$0	$0	$0	$0
Irion	$12,300,000	$632	$632	$0	$0	$0	$0
Loving	$13,840,000	$632	$632	$0	$0	$0	$0
Martin	$11,480,000	$632	$632	$0	$0	$0	$0
Midland	$10,160,000	$632	$632	$0	$0	$0	$0
Mitchell	$300,000	$632	$632	$0	$0	$0	$0
Pecos	$18,620,000	$632	$632	$0	$0	$0	$0
Reagan	$13,720,000	$632	$632	$0	$0	$0	$0
Reeves	$40,340,000	$632	$632	$0	$0	$0	$0
Schleicher	$2,960,000	$632	$632	$0	$0	$0	$0
Scurry	$360,000	$632	$632	$0	$0	$0	$0
Sterling	$2,100,000	$632	$632	$0	$0	$0	$0
Sutton	$20,000	$632	$632	$0	$0	$0	$0
Tom Green	$680,000	$632	$632	$0	$0	$0	$0
Upton	$3,660,000	$632	$632	$0	$0	$0	$0
Ward	$4,540,000	$632	$632	$0	$0	$0	$0
Winkler	$2,260,000	$632	$632	$0	$0	$0	$0
Total	**$172,040,000**	**$632**	**$632**	**$0**	**$0**	**$0**	**$0**

Environmental Factors

There are no identified environmental issues associated with this strategy. This strategy may have a positive impact on the environment by reducing the quantity of water needed to meet future demands and reducing the waste disposal of flowback water.

Agricultural and Rural Impacts

Due to the limited availability of water, any mining operation may be competing with agricultural and rural users for water. Reducing the demand on limited resources could have positive impacts on water availability for agriculture and rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

No impacts to natural resources or key parameters of water quality were identified for this strategy since it reduces demands and does not develop new supplies. Positive impacts due to reduced wastewater discharges, which were likely disposed of through deep well injection, are possible.

Impacts on Other Water Resources and Management Strategies

This may reduce the demand for water from other water management strategies involving mining water user groups.

Other Issues Affecting Feasibility

Since this strategy relies largely on the behavior of each individual mining company, it is difficult to quantify the expected level of savings. This strategy is based on generic procedures and may not accurately reflect the actual costs or water savings that can be achieved by an individual mining operator. Site specific data will be required for a better assessment of the potential for mining conservation (recycling/reuse) in Region F.

WUG:	**Multiple**	**Capital Cost:**	$0
WMS Name:	**Subordination of Downstream Water Rights**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Subordination	**Annual Cost** (After Amortization):	N/A
WMS Yield:	54,110 – 52,162 acre-feet per year	**Implementation:**	2030
WMS Status:	Recommended		

Strategy Description

The TWDB requires the use of the TCEQ Water Availability Models (WAM) for regional water planning. Most of the water rights in Region F are in the Colorado River Basin. Chapter 3 discusses the use of the WAM models for water supply estimates and the impacts to the available supplies in the Upper Colorado River Basin. The Colorado WAM assumes that senior lower basin water rights would continuously make priority calls on Region F water rights. This assumption is not in line with the historical operation of the Colorado River Basin and likely underestimates the amount of surface water supplies available in Region F.

Although the Colorado WAM does not give an accurate assessment of water supplies based on the way the basin has historically been operated, TWDB requires the regional water planning groups to use the WAM to determine supplies. Therefore, several sources in Region F have no supply by definition, even though in practice their supply may be greater than indicated by the WAM. According to the WAM, the Cities of Ballinger, Brady, Coleman, Junction, and Winters and their customers have no surface water supply. The Morgan Creek power plant has no supply to generate power. The Cities of Big Spring, Bronte, Coahoma, Menard, Midland, Miles, Odessa, San Angelo, Snyder and Stanton do not have sufficient water to meet demands. Overall, the Colorado WAM shows shortages that are the result of modeling assumptions and regional water planning rules rather than the historical operation of the Colorado Basin. This would indicate Region F needs to immediately spend significant funds on new water supplies, when in reality the magnitude of the indicated water shortages are not justified. Conversely, the WAM model shows more water in Region K (Lower Colorado Basin) than may actually be available.

One way for the planning process to reserve water supplies for these communities and their customers is to assume that downstream senior water rights do not make priority calls on major Region F municipal water rights, a process referred to as subordination. This assumption is similar to the methodology used to evaluate water supplies in previous water plans.

Because this strategy impacts water supplies outside of Region F, coordination with the Lower Colorado Regional Water Planning Group (Region K) was conducted. For the development of the 2006 regional water plans, a joint modeling effort was conducted with Region K and an agreement was reached for planning purposes. In subsequent planning cycles, Region K developed its own version of this subordination strategy, called the “cutoff model” that modified the priority dates for all water rights above Lakes Ivie and Brownwood. Region F has adopted the premise of the Region K’s cutoff model with only minor variations for purposes of the subordination strategy in this plan.

Figure C- 2 shows the divide between the upper and lower basin and depict which reservoirs were included in the subordination modeling. For the 2026 Region F Plan, the approved TCEQ WAM was used for the subordination modeling and modified to adjust the priority dates in accordance with the cutoff model.

The Region F model differs from the Region K model by including the City of Junction's run-of-river rights and Brady Creek Reservoir in the upper basin. Other refinements to the subordination modeling include modifications for the Pecan Bayou. To better reflect reality, an assumption was made that the upstream reservoirs hold inflows that would have been passed to Lake Brownwood under strict priority analysis if Lake Brownwood is above 50 percent of the conservation capacity. This scenario provides additional supplies in the upper watershed while allowing Lake Brownwood to make priority calls at certain times during drought, i.e., when Lake Brownwood is below 50 percent of the conservation pool.

Two reservoirs providing water to the Brazos G planning region were included in the subordination analysis. Lake Clyde is located in Callahan County and provides water to the City of Clyde. Oak Creek Reservoir is located in Region F and supplies a small amount of water to WUGs within the region. Oak Creek Reservoir is owned and operated by the City of Sweetwater, which is in the Brazos G Region. Both Clyde and Sweetwater have other sources of water in addition to the supplies in the Colorado Basin.

The subordination strategy modeling was conducted for regional water planning purposes only. By adopting this strategy, the Region F Water Planning Group does not imply that the water rights holders have agreed to relinquish the ability to make priority calls on junior water rights. The Region F Water Planning Group does not have the authority to create or enforce subordination agreements. Such agreements must be developed by the water rights holders themselves. Region F recommends and supports ongoing discussions on water rights issues in the Colorado Basin that may eventually lead to formal agreements that reserve water for Region F water rights.

For four water suppliers, additional infrastructure was identified to fully utilize the subordinated supplies. These entities include Brady, Odessa Big Spring, and the Brown County WID #1. Brady, Big Spring, and Brown County WID #1 require a new water treatment plant or an expansion of their existing water treatment facilities to meet future demands. Odessa is implementing advanced treatment of the subordinated supplies to improve water quality. The City of Junction also has a project to dredge their river intake to secure access to their subordination supplies. Each of these improvements is discussed under Expanded Use of Existing Water Supplies in this appendix. The associated costs are shown in Appendix D.

Quantity, Reliability and Cost

Approximately 54,100 acre-feet of additional supply is available through this strategy in 2030 and around 52,200 acre-feet in 2080. Figure C- 1 compares overall Region F surface water supplies with and without the subordination strategy over the planning period. Table C-9 compares the 2030 and 2080 Region F water supply sources with and without subordination. No new water rights are required for implementation of the Subordination of Downstream Water Rights WMS and therefore environmental flow standards are not applicable and were not applied when calculating the yield available under the subordination strategy.

The reliability of this strategy is considered medium based on the uncertainty of implementing this strategy and the current ongoing drought, which could impact supplies. The subordination strategy defined for the Region F Water Plan is for planning purposes. If an entity chooses to enter into a subordination agreement with a senior downstream water right holder, the details of the agreement (including costs, if any) will be between the participating parties. Therefore, strategy costs will not be

determined for the subordination strategy. For planning purposes, capital and annual costs for the subordination strategy are assumed to be $0.

Figure C- 1
Comparison of Region F Surface Water Supplies with and without Subordination

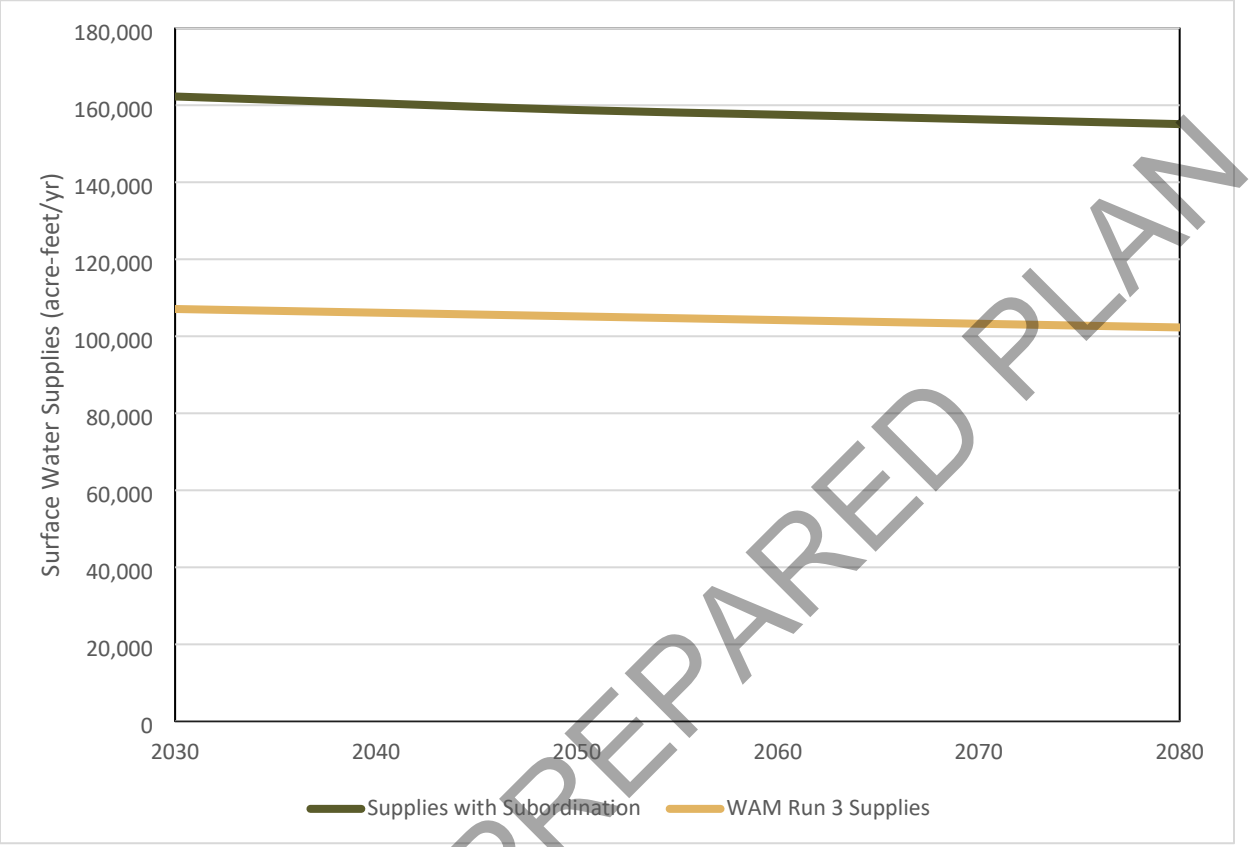


Figure C- 2
Subordination Strategy Map

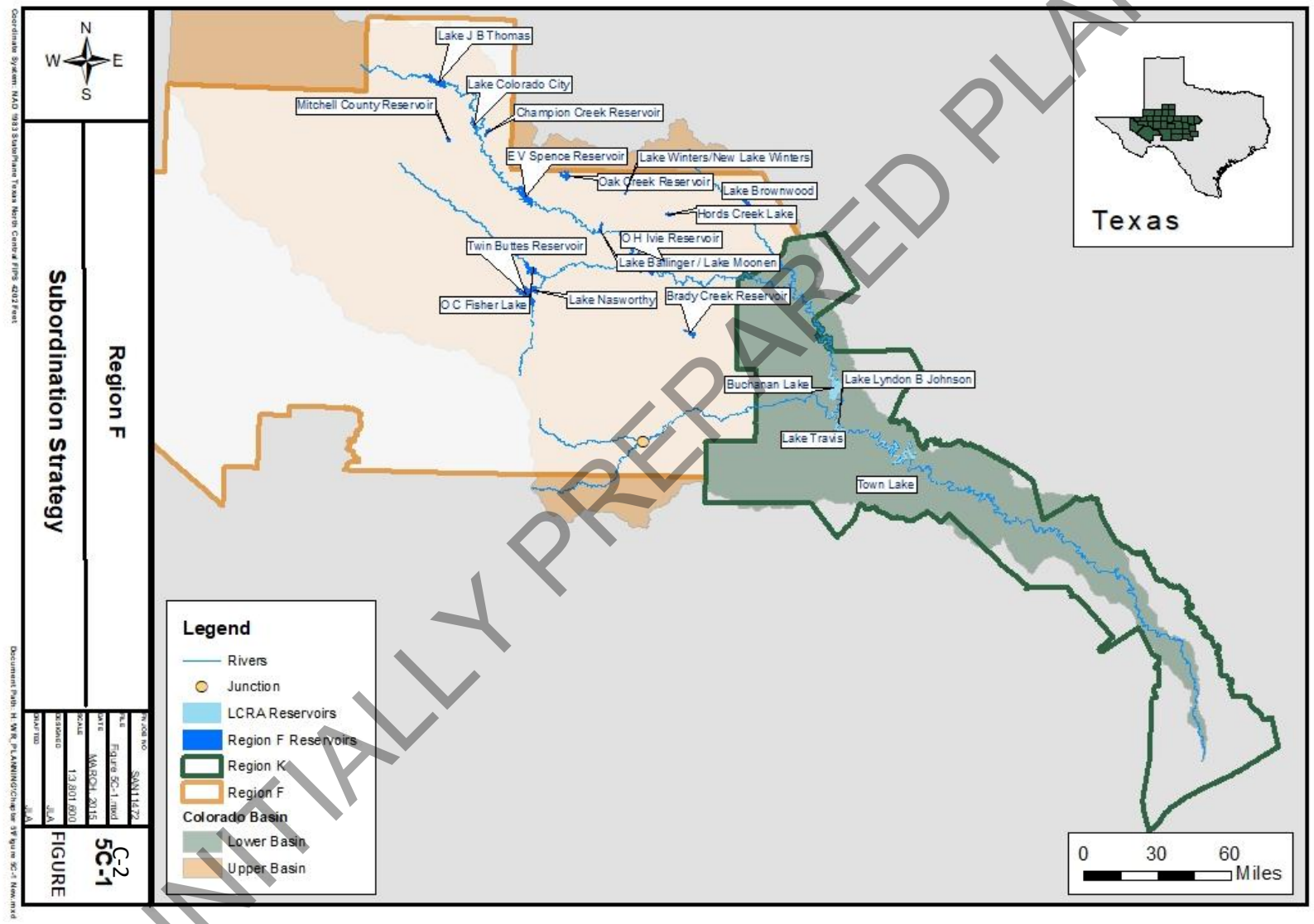


Table C- 9
Region F Surface Water Supplies with and without Subordination

Reservoir Name	2030 Supply WAM Run 3	2030 Supply Subordination	2080 Supply WAM Run 3	2080 Supply Subordination
Lake Colorado City	0	1,760	0	1,480
Champion Creek Reservoir	0	1,164	0	1,080
Colorado City/Champion System	0	2,924	0	2,560
Lake Coleman	0	1,900	0	1,638
Hords Creek Lake	0	190	0	130
Coleman System	0	2,090	0	1,768
O. C. Fisher Lake[a]	0	0	0	0
Twin Buttes Reservoir[a]	0	1,865	0	1,530
Lake Nasworthy	0	180	0	135
San Angelo System	0	2,045	0	1,665
Lake J. B. Thomas (CRMWD System)	0	3,710	0	3,591
E.V. Spence Reservoir (CRMWD System)	0	21,900	0	21,614
O.H. Ivie Reservoir (CRMWD System)	13,277	15,728	11,685	13,851
O.H. Ivie Reservoir (Non-System)	15,263	17,672	12,855	15,824
O.H. Ivie Reservoir Total	28,540	33,400	24,540	29,675
CRMWD System Total (Thomas, Spence & Ivie)	13,277	41,338	11,685	39,056
Lake Ballinger / Lake Moonen	0	820	0	790
Lake Balmorhea	19,600	19,600	19,600	19,600
Brady Creek Reservoir	0	1,855	0	1,680
Lake Brownwood	15,550	25,800	14,900	24,815
Mountain Creek Reservoir	0	86	0	86
Oak Creek Reservoir	0	1,055	0	850
Red Bluff Reservoir	16,180	16,180	16,040	16,040
Lake Winters/ New Lake Winters	0	265	0	258
Kimble County ROR	902	1,179	902	1,179
Menard County ROR	2,034	4,007	2,034	4,007
TOTAL	***82,806***	***136,916***	***78,016***	***130,178***
Increase with Subordination	***54,110***		***52,162***	

[a] Supplies are less than theoretically available from the subordination model.

Environmental Factors

The WAM models assume a perfect application of the prior appropriations doctrine. A significant assumption in the model is that junior water rights routinely bypass water to meet the demands of downstream senior water rights and fill senior reservoir storage. If a downstream senior reservoir is less than full, all junior upstream rights are assumed to cease diverting and storing water until that reservoir is full, even if that reservoir does not need to be filled for that water right to meet its diversion targets. Currently in the Region F portion of the Colorado Basin, water rights divert and store inflows until downstream senior water rights make a priority call on upstream junior water rights. Many other assumptions are made in the Colorado WAM model that may be contrary to historical operation of the Colorado Basin in Region F.

Because many of the assumptions in the Colorado WAM are contrary to the actual operation of the upper portion of the basin, the model does not give a realistic assessment of stream flows in Region F. In the WAM a substantial amount of water is passed downstream to senior water rights that would not be passed based on historical operation. The subordination analysis better represents the actual operation of the basin. Therefore, a comparison of flows with and without subordination is meaningless as an assessment of impacts on streamflow in the upper basin.

Environmental impacts should be based on an assessment of the actual conditions, not a simulation of a theoretical legal framework such as the WAM. Impacts should also be assessed for a change in actions. The subordination modeling approaches the actual operation of the upper basin. There is no change in operation or distinct action taken under this strategy. The actual impacts of implementing this strategy could occur during extreme drought when a downstream senior water rights may elect to make a priority call on upstream junior water rights. Flows from priority releases could be used beneficially for environmental purposes in the intervening stream reaches before the water is diverted by the senior water right. Priority calls are largely based on the decision of individual water rights holders, making it difficult to quantify impacts. However, the potential environmental impacts are considered low because this strategy, as modeled, assumes that operations in the basin continue as currently implemented. Existing species and habitats are established for current conditions, which will not change under this strategy.

Agricultural and Rural Impacts

The water user groups impacted the most by the Colorado WAM are small rural towns such as Ballinger, Winters, and Coleman, and the rural water supply corporations supplied by these towns. These towns have developed surface water supplies because groundwater supplies of sufficient quality and quantity are not available or have water quality concerns. This strategy reserves water for these rural communities, which provides a positive impact.

Three Region F reservoirs included in the subordination strategy are permitted to provide a significant amount of water for irrigation: the Twin Buttes Reservoir/Lake Nasworthy system and Lake Brownwood. The total authorized diversion for the Twin Buttes/Nasworthy system is 54,000 acre-feet per year. The two reservoirs have no firm or safe yield in the Colorado WAM. With the subordination analysis the current safe yield of the Twin Buttes/Nasworthy system is 2,045 acre-feet per year in 2030. Even with subordination there is not sufficient water to meet both the needs of the City of San Angelo and irrigation demands.

The reliable supply from Lake Brownwood does increase with subordination but the entire supply is not currently used. Subordination does not have an impact on rural or agricultural users of Lake Brownwood. It may have a positive impact with greater supplies. However, the occurrence of drought conditions more severe than those encountered during the historical modeling period could impact supplies available from this source.

Impacts to Natural Resources and Key Parameters of Water Quality

The subordination modeling approaches the actual operation of the upper basin. There is no change in operation or distinct action taken under this strategy. Therefore, impacts to natural resources and water quality are expected to be minimal.

Impacts on Other Water Resources and Management Strategies

All other strategies for this Plan are based on water supplies with the subordination strategy in place. The amount of water needed from some of these strategies may be higher without the subordination strategy and/or the timing for implementation may need to be sooner. Other strategies may be

indirectly impacted. Changes to the assumptions made in the subordination strategy may have a significant impact on the amount of water needed from these strategies.

Other Issues Affecting Feasibility

Water supply in the Colorado Basin involves many complex legal and technical issues, as well as a variety of perspectives on these issues. There is also a long history associated with water supply development in the Colorado Basin. Legal opinions regarding the implementation of subordination agreements under Texas water law will be a large part of assessing the feasibility of the strategy.

Before assigning costs for this strategy a definitive assessment of the impacts on senior water right holders and the benefits to junior water rights holders must be determined. This assessment should consider the existing agreements and the historical development of water supply in the basin. The analysis presented in this plan is not sufficient to make that determination.

APPENDIX C

C.2 REUSE

WUG:	**Pecos City**	**Capital Cost:**	$41,357,000
WMS Name:	**Direct Potable Reuse**	**Annual Cost** (During Amortization):	$6,184 per acre-foot $18.97 per 1,000 gal
WMS Type:	Direct Potable Reuse		
WMS Yield:	925 acre-feet per year	**Annual Cost** (After Amortization):	$3,038 per acre-foot $9.32 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

Pecos City is considering a direct potable reuse project that would be triggered if population and demand continues to grow rapidly around the City. Depending on the changing conditions in Pecos City, the size and timing may change. For planning purposes, it was assumed that a 2.2 MGD advanced treatment facility would be needed to treat wastewater to a potable water quality. This advanced treatment may include microfiltration and/or reverse osmosis. A 12-inch two-mile transmission line was assumed to connect the wastewater treatment facility to the advanced treatment facility. Concentrate from the treatment facility was assumed to be disposed of in a local water body, such as the Pecos River. If a suitable discharge location cannot be found, injection wells may be needed. The evaluation for this strategy is based on a generalized direct potable reuse strategy developed for the Region F plan. Site specific evaluations will be conducted as a part of the permitting process.

Quantity, Reliability and Cost

For Pecos City, it is estimated that a 2.2 MGD direct potable reuse plant could provide as much as 925 acre-feet per year, assuming 25 percent losses due to advanced treatment. Currently, Pecos City obtains all of its water supply from groundwater wells. By reusing the water generated by the City's wastewater treatment facility, the City will not rely as heavily on groundwater supplies. This strategy would supply a very reliable water source for additional potable water. Capital costs for this strategy are estimated at $41.3 million.

Environmental Factors

Pecos City currently discharges its wastewater that ultimately flows into the Pecos River. It is assumed that the waste stream from the treatment facility will be combined with unused treated effluent and discharged in a similar manner. The potential impacts of this discharge on the receiving stream will need to be evaluated prior to implementation of this strategy. If the impacts are unacceptable, an alternative method of disposal may be required. Alternative disposal methods may significantly increase the cost of the project.

Reuse would result in a reduction in the quantity of water discharged by the City. An analysis of the environmental impacts on the receiving stream will be required in the permitting process.

It is expected that construction of the advanced water treatment facility and transmission infrastructure should have minimal environmental impact.

Agricultural and Rural Impacts

No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

Pending the water quality of the discharge stream to the Pecos River, this strategy could increase the levels of TDS and other key water quality parameters to the stream. This would be evaluated during permitting for the project.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

Direct potable reuse plants may face public opposition. They can also be challenging to permit and operate. Further studies may be needed to evaluate the long-term impacts from multiple cycles of direct reuse.

WUG:	**Pecos City**	**Capital Cost:**	$49,782,000
WMS Name:	**Potable Reuse with Aquifer Storage and Recovery (ASR)**	**Annual Cost** (During Amortization):	$9,252 per acre-foot $28.39 per 1,000 gal
WMS Type:	Indirect Potable Reuse	**Annual Cost** (After Amortization):	$4,212 per acre-foot $12.92 per 1,000 gal
WMS Yield:	695 acre-feet per year	**Implementation:**	2040
WMS Status:	Alternative		

Strategy Description

Population and demands in Pecos City are rapidly changing; however, if water supply is not needed for immediate demands, treated water could be stored in an underlying aquifer for later recovery. As an alternative to direct potable reuse, Pecos City is considering an indirect potable reuse strategy in conjunction with aquifer storage and recovery (ASR) in a nearby aquifer, such as the Dockum or Pecos Valley aquifers. This strategy is a generalized indirect potable reuse project combined with an ASR well field. Before construction, extensive studies will need to be conducted to determine the technical and economic feasibility of ASR in this area.

For planning purposes, it was assumed that a 2.2 MGD advanced treatment facility would be needed to treat wastewater to a suitable water quality before injection. Concentrate from the facility was assumed to be disposed of in a local water body, such as the Pecos River. If a suitable discharge location cannot be found, injection wells may be needed to dispose of the concentrate.

This strategy also includes a well field consisting of 6 injection wells for storage and recovery in a nearby aquifer, as well as associated piping and land acquisition.

Quantity, Reliability and Cost

For planning purposes, it is estimated that a 2.2 MGD direct potable reuse plant could provide as much as 925 acre-feet per year of treated water. It was assumed that this entire supply could be injected into an underlying aquifer at a similar rate as local pumping wells are withdrawing water. Recovery rates from an ASR project vary depending on various factors, such as the hydrogeologic characteristics of the aquifer, storage time, pumping rate, etc. As a conservative estimate for this strategy, it was assumed that the City would be able to recover 75 percent of the water that they inject into an aquifer, which equates to 695 acre-feet per year.

By reusing, storing, and recovering the water generated by the City's wastewater treatment facility, the City may have additional supplies to accommodate higher demands. Depending upon the recovery rates from the aquifer, this strategy would supply a moderately reliable water source for additional potable water. Capital costs for this strategy are estimated at $49.8 million.

Environmental Factors

Pecos City currently discharges its wastewater that ultimately flows into the Pecos River. It is assumed that the waste stream from the treatment facility will be combined with unused treated effluent and discharged in a similar manner. The potential impacts of this discharge on the receiving stream will need to be evaluated prior to implementation of this strategy. If the impacts are unacceptable, an alternative method of disposal may be required. Alternative disposal methods may significantly increase the cost of the project.

Reuse and storage would result in a reduction in the quantity of water discharged by the City.

Environmental impacts associated with the construction and operation of the advanced water treatment facility, transmission infrastructure, and ASR well field are considered minimal and could be mitigated.

Agricultural and Rural Impacts

No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

Pending the water quality of the concentrate discharge stream to the Pecos River, this strategy could increase the levels of TDS and other key water quality parameters to the stream. This would be evaluated during permitting for the project.

Water will be treated to a level suitable for the aquifer before injection, so impacts on water quality within the aquifer are expected to be minimal to positive. Recovered water quality is dependent upon the quality of the groundwater within the aquifer and may require additional treatment before potable use.

Impacts on Other Water Resources and Management Strategies

If water demands are not immediate, ASR could provide Pecos City the ability to store water for use when needed. ASR also may increase groundwater availability for Pecos City by supplemental recharging of groundwater.

Other Issues Affecting Feasibility

The suitability of the aquifers in this area (Pecos Valley or Dockum aquifers) for ASR have not been firmly established. Extensive tests and studies will be required to evaluate hydrogeologic characteristics of the aquifer, as well as economic feasibility of the project, before implementation. Injection of water into the subsurface will require a Class V permit from TCEQ. It will likely also require that the wells be registered with the Reeves County GCD.

WUG:	**Pecos City**	**Capital Cost:**	$17,953,000
WMS Name:	**Direct Non-Potable Reuse**	**Annual Cost** (During Amortization):	$2,580 per acre-foot $7.92 per 1,000 gal
WMS Type:	Direct Non-Potable Reuse (Type I)	**Annual Cost** (After Amortization):	$325 per acre-foot $1.00 per 1,000 gal
WMS Yield:	560 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

Pecos City plans to develop a "purple pipe" system to supply reuse supplies to municipal irrigation (public spaces, athletic fields, etc.). It is estimated that this supply would provide a peak amount of 1 MGD, or on average, approximately 560 acre-feet per year. For planning purposes, this strategy assumes that ten miles of pipeline, as well as transmission infrastructure (pump station, storage tank) will be needed to convey the reuse water to the site. No international distribution network pipeline or costs are included. It was also assumed that no wastewater treatment plant improvements are needed.

Quantity, Reliability and Cost

It is estimated that Pecos City could provide a peak supply of 1 MGD of their wastewater effluent to irrigation users. This strategy would supply an extremely reliable water source for irrigation purposes and offset the user of other surface water and groundwater that irrigation users currently utilize. This cost is shown to be less because it is assumed that no wastewater treatment plant improvements are needed.

Environmental Factors

Pecos City currently discharges its wastewater into an unnamed tributary that ultimately flows into the Pecos River. Reuse would result in a reduction in the quantity of water discharged by the City. An analysis of the environmental impacts on the receiving stream will be required in the permitting process. However, because of the relatively small amount of flow reduction associated with this reuse project, the impact is not expected to be significant.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

It is assumed that the quality of the treated effluent to the Pecos River will not change significantly. Therefore, minimal impacts to the overall water quality in the Pecos River are expected.

Impacts on Other Water Resources and Management Strategies

Irrigation users in Reeves County obtain their water supplies from surface water (Lake Balmorhea, Red Bluff Reservoir, Pecos Run-of-River) and groundwater. To the extent that implementing this strategy reduces the amount of water extracted from these supplies, it may improve the reliability of this water source for agricultural and rural users.

Other Issues Affecting Feasibility

None identified.

MWP:	**San Angelo**	**Capital Cost:**	$254,550,000
WMS Name:	**Indirect Reuse – Concho River Water Project**	**Annual Cost** (During Amortization):	$4,026 per acre-foot $12.35 per 1,000 gal
WMS Type:	Indirect Potable Reuse	**Annual Cost** (After Amortization):	$1,871 per acre-foot $5.74 per 1,000 gal
WMS Yield:	8,300 acre-feet per year	**Implementation:**	2040
WMS Status:	Recommended		

Strategy Description

The City of San Angelo currently produces approximately 7.5 MGD (8,300 acre-feet per year) on average of treated wastewater. Historically, Tom Green County WCID #1 has used these reuse supplies for irrigation prior to taking their water supplies from Twin Buttes (when available). However, the City examined other potential uses for this water as part of a Long Range Water Supply Plan in October of 2018. The City ultimately decided to pursue the Concho River Water Project, which will repurpose this treated effluent as indirect reuse for municipal purposes, and Twin Buttes supplies will revert back to Tom Green WCID #1.

The Concho River Water Project involves discharging highly treated effluent water from the City's wastewater treatment plant into the Concho River. Improvements will be made to the City's existing wastewater treatment plant to facilitate this project. The water will be diverted out of the Concho River approximately 8 miles downstream and piped to the City's water treatment plant, where it will be treated to drinking water standards.

The City is currently pursuing two necessary state permits through the TCEQ: one to release water into the Concho River and the other to divert the water at the City-owned facilities downstream. Completion of the entire project could take five to ten years.

When completed, the Concho River Water Project will provide about 7.5 million gallons per day on an average annual basis (~8,300 acre-feet per year). The Concho River Project will provide supply for municipal use.

Quantity, Reliability and Cost

This strategy is expected to yield 8,300 acre-feet of reliable supply. Capital costs are estimated at $254.5 million. These costs include permitting, as well as upgrades to the water and wastewater treatment facilities. During debt service, it is estimated that the unit cost for treated water will be $12.35 per thousand gallons. After the infrastructure is fully paid for, the unit price decreases to $5.74 per thousand gallons.

Environmental Factors

The environmental impacts of indirect reuse are minimal. Wastewater will be treated to state permit standards before being discharged into the Concho River. Properly designed and maintained treatment facilities should have minimal environmental impact.

Agricultural and Rural Impacts

Implementation of this strategy will result in limited water being available to the Tom Green County Water Control and Improvement District (WCID) from this particular water supply source. However,

irrigation water needs in Tom Green County may be met through other water sources, including the Twin Buttes reservoir.

Impacts to Natural Resources and Key Parameters of Water Quality

The wastewater effluent will be highly treated, in accordance with state permits, before it is discharged into the Concho River. As a result, this should have minimal impacts on natural resources.

Impacts on Other Water Resources and Management Strategies

Implementation of this reuse strategy will make less water available for irrigation by repurposing the supply for municipal use.

Other Issues Affecting Feasibility

None identified.

APPENDIX C

C.3 EXPANDED USE OF EXISTING WATER SUPPLIES

WUG:	**Big Spring**	**Capital Cost:**	$165,625,000
WMS Name:	**New Water Treatment**	**Annual Cost** (During Amortization):	$1,737 per acre-foot $5.33 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	11,210 acre-feet per year	**Annual Cost** (After Amortization):	$697 per acre-foot $2.14 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description
The City of Big Spring currently supplies water to Coahoma, steam electric power, and some manufacturers in Howard County. Given the current projected demand levels of these entities, the City of Big Spring is nearing their treatment plant capacity. As a result, the City plans to construct a new water treatment plant by 2040.

Quantity, Reliability and Cost
The supply related to this strategy originates from CRMWD supplies and must be treated for Big Spring to use as municipal supply. The new water treatment plant strategy is for infrastructure required to access the supplies made available through the subordination strategy, which are not included in the total existing supplies for Big Spring to avoid double counting. This strategy assumes the construction of a new 20 MGD water treatment facility. The reliability of the supply treated by this strategy is considered high due CRMWD's multiple sources. The cost of this strategy is estimated to be $165.6 million.

Environmental Factors
Environmental impacts of constructing a new water treatment plant are expected to be minimal.

Agricultural and Rural Impacts
None identified.

Impacts to Natural Resources and Key Parameters of Water Quality
No impacts.

Impacts on Other Water Resources and Management Strategies
This strategy makes more treated water available to existing and any potential future customers of Big Spring in Howard County.

Other Issues Affecting Feasibility
None.

WUG:	**Brady**	**Capital Cost:**	$97,811,000
WMS Name:	**Rehabilitate and/or Build a New Surface Water Treatment Plant**	**Annual Cost** (During Amortization):	$7,622 per acre-foot $23.39 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$3,734per acre-foot $11.46 per 1,000 gal
WMS Yield:	1,770 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2050

Strategy Description

The City of Brady has obtained water from groundwater wells in the Hickory Aquifer and surface water from Brady Creek Reservoir. Both sources have impaired water quality. In the 2021 Regional Water Plan, the City of Brady had a strategy for advanced treatment of their groundwater to reduce radionuclides, which is now operational. Ongoing drought in the region has severely impacted Brady Creek Reservoir the City's Water Treatment Plant (WTP) would need to be rehabilitated or replaced in order to use supplies from Brady Creek Reservoir. Operationally, water from Brady Creek Reservoir could be used for blending with, or as a supplement to, water from the advanced groundwater treatment project.

The infrastructure needed to use Brady Creek Reservoir includes a new pump station, a new conventional treatment system, and an advanced water treatment facility capable of microfiltration and reverse osmosis with a peak day capacity of around 3.2 MGD. The reservoir intake exists and would not need to be replaced.

For planning purposes, the WTP strategy is scheduled to come online in the 2050s. The treatment plant was sized to treat 1,770 acre-feet per year, which is the estimated supply available from Brady Creek Reservoir in 2050, assuming a peaking factor of 2.

Quantity, Reliability and Cost

This strategy is estimated to provide around 1,770 acre-feet per year of supply to Brady by advanced treatment of surface water to meet overall water quality targets set by TCEQ. This supply would be used in conjunction with groundwater supplies from Hickory Aquifer. Preferentially using surface water when it is available will reserve groundwater supplies for times when surface water is unavailable. Surface water, when available, may also be used in blending operations to achieve water quality goals. This supply is considered reliable but does depend on the subordination strategy being implemented. Without the subordination strategy, the yield of Brady Creek Reservoir is zero. Total project capital costs were estimated at $97.8 million.

Environmental Factors

Construction of the treatment facility should have minimal environmental impact. The new WTP is expected to be built at the same location as the old WTP.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

Depending on the disposal method, this strategy may increase radionuclide concentrations of effluent discharge. However, this impact is expected to be minimal since the contaminants are already present in the water supply and thus, wastewater today.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
None identified.

WUG:	**Bronte**	**Capital Cost:**	$15,000,000
WMS Name:	**Water Treatment Plant Expansion**	**Annual Cost** (During Amortization):	$2,536 per acre-foot $7.78 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	729 acre-feet per year	**Annual Cost** (After Amortization):	$1,089 per acre-foot $3.34 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description
The City of Bronte currently supplies treated water to Robert Lee in Coke County. Given the current projected demand levels of these entities, the City of Bronte will exceed their water treatment plant capacity starting in 2030. To provide water to all of these entities over the planning period, a 1.3 MGD expansion of the current facility is being pursued by Bronte and is expected to be completed in 2027 or 2028.

Quantity, Reliability and Cost
The supply related to this strategy originates from other strategies being considered for Bronte but must be included for Bronte to utilize these sources as municipal supply for their residents and the residents of Robert Lee. This strategy assumes a 1.3 MGD expansion of Bronte's current facility. The reliability of the supply treated by this strategy is considered under Bronte's other strategies. The cost of this strategy is estimated at $15 million based on an OPCC provided by Bronte, which also includes the rehabilitation of a five-mile portion of Bronte's Oak Creek Pipeline.

Environmental Factors
Environmental impacts of expanding the existing water treatment plant are expected to be minimal.

Agricultural and Rural Impacts
None identified.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
This strategy makes more treated water available to Robert Lee, reducing Robert Lee's need to pursue their own treatment facilities or other supplies independently.

Other Issues Affecting Feasibility
None identified.

WUG:	**Bronte**	**Capital Cost:**	$18,637,000
WMS Name:	**Rehabilitation of Oak Creek Pipeline**	**Annual Cost** (During Amortization):	$3,225per acre-foot $9.90 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$357 per acre-foot $1.09 per 1,000 gal
WMS Yield:	457 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description
The City of Bronte has a 13-mile, 8-inch and 10-inch pipeline to Oak Creek Reservoir in Coke County. This pipeline is over 60 years old and needs to be replaced and upsized to provide adequate capacity for the municipal demands served by the City. The proposed strategy includes a new 50,000-gallon raw water ground storage tank, upgrades to the pump station at the intake, and eight miles of 14-inch pipeline (five miles is being replaced with the water treatment plant expansion project).

Quantity, Reliability and Cost
The yield from this strategy represents the Oak Creek Reservoir subordination supply (purchased from the City of Sweetwater in Region G) that the City purchases for their residents and the residents of Robert Lee. This source is considered to be of moderate reliability because of the impact of the drought on Oak Creek's reliable supply. The estimated capital cost to rehabilitate and upsize this pipeline is approximately $18.6 million.

Environmental Factors
Environmental impacts are expected to be minimal because this is a rehabilitation of an existing project.

Agricultural and Rural Impacts
No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
None identified.

Other Issues Affecting Feasibility
The most significant factor affecting rehabilitation of the pipeline is funding. The City will have to further analyze the cost versus benefit of rehabilitating the pipeline.

WUG:	**Bronte and Robert Lee**	**Capital Cost:**	$65,724,000
WMS Name:	**Purchase CRMWD Lake Spence Supplies**	**Annual Cost** (During Amortization):	$22,626 per acre-foot $69.43 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$9,075 per acre-foot $27.85 per 1,000 gal
WMS Yield:	341 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Table C- 9
Recommended Strategy - Quantity and Cost

	Units	Full WMS	Bronte's share	Robert Lee's share
Capital Cost	Sept 2023 dollars	$65,724,000	$34,844,000	$30,880,000
WMS Yield	acre-feet per year	341	140	201
Annual Cost during Amortization	$ per acre-foot	$22,626	$26,963	$19,636
Annual Cost during Amortization	$ per 1000 gallons	$69.43	$82.73	$60.25
Annual Cost after Amortization	$ per acre-foot	$9,075	$9,451	$8,827
Annual Cost after Amortization	$ per 1000 gallons	$27.85	$29.00	$27.08

Strategy Description

The City of Bronte currently supplies water to the City of Robert Lee. Robert Lee is downstream of Lake Spence and Bronte is approximately 12 miles east of Robert Lee. Given current projected demands, these towns show a need beginning in the 2030s. The City of Robert Lee previously used supplies from Lake Spence but the WTP was shuttered and is no longer usable. One strategy designed to address these needs by the 2040s is to re-connect to CRMWD supplies from Lake Spence with a new Advanced Water Treatment Plant and transmission lines to Robert Lee and Bronte.

Quantity, Reliability and Cost

This strategy supplies Robert Lee with 201 acre-feet per year (ac-ft/yr) and Bronte with 140 ac-ft/yr. The supply related to this strategy originates from CRMWD supplies, specifically Lake Spence, and would require advanced treatment with microfiltration and/or reverse osmosis technology prior to use as municipal supply. Losses from advanced treatment are estimated at 25%. The brine is assumed to be discharged locally to a stream. This strategy assumes the construction of a new 0.8 MGD water treatment facility. The strategy also requires a new intake in Lake Spence, and nearly 15 miles of transmission pipeline. Costs are in addition to the purchase cost of water from CRMWD. The reliability of this strategy is considered low because Lake Spence was unreliable during previous droughts. The cost of this strategy is estimated to be $65.7 million in total, of which Bronte's share is estimated to be about $34.8 million and Robert Lee's share is about $30.9 million.

Environmental Factors
Environmental impacts of constructing a new water treatment plant are expected to be minimal. The costs of environmental mitigation as a result of the pipeline have been included in the cost estimate.

Agricultural and Rural Impacts
None identified.

Impacts to Natural Resources and Key Parameters of Water Quality
No impacts.

Impacts on Other Water Resources and Management Strategies
This strategy relies on CRMWD supplies from Lake Spence. Supplies from Lake Spence increase following the implementation of the subordination strategy.

Other Issues Affecting Feasibility
The biggest issue facing the feasibility of this strategy is the large cost. This is likely not economically feasible for small communities like Bronte and Robert Lee without assistance from the state or other funding mechanisms.

WUG:	**Brown County WID #1 (BCWID)**	**Capital Cost:**	$38,124,000
WMS Name:	**Treatment Plant Expansion**	**Annual Cost** (During Amortization):	$4,045 per acre-foot $12.41 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	1,529 acre-feet per year	**Annual Cost** (After Amortization):	$2,290 per acre-foot $7.03 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description
Brown County WID #1 (BCWID) currently supplies treated water to the City of Bangs, the City of Brownwood, Zephyr WSC, Brookesmith SUD, and Coleman County SUD in Brown, Coleman, Runnels, Callahan and Taylor Counties. BCWID will need additional treatment to meet additional demands for their customers and to access available supplies in Lake Brownwood. To provide treated water to their customers a 3 MGD expansion in 2030 of the current facility is actively being pursued.

Quantity, Reliability and Cost
This strategy assumes a 3 MGD expansion of BCWID's current facility. The reliability of the supply treated by this strategy is considered under BCWID's subordination strategy. The cost of this strategy is estimated at $38.1 million.

Environmental Factors
Environmental impacts of expanding the existing water treatment plant are expected to be minimal.

Agricultural and Rural Impacts
No impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
This strategy will make more of BCWID's supplies from the subordination strategy in Lake Brownwood available for their treated water customers and member cities.

Other Issues Affecting Feasibility
None identified.

WUG:	**Junction**	**Capital Cost:**	$10,439,000
WMS Name:	**Dredging River Intake**	**Annual Cost** (During Amortization):	$2,936 per acre-foot $9.01 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	N/A
WMS Yield:	250 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

The City of Junction currently utilizes run-of-river supplies from the South Llano River. Without subordination, this source has no supply. When considering subordination, this is shown to have about 250 acre-feet of supply. In its current condition, the City's water treatment plant (WTP) intake structure, located on the South Llano River, is rendered inoperable due to buildup of sediment deposits carried during flood events. Obstruction of the intake prevents the WTP from supplying municipal drinking water to the City.

This strategy entails dredging the City of Junction's existing intake structure, increasing the accessibility and reliability of the subordination supply.

Quantity, Reliability and Cost

The supply associated with this strategy is already made available through the subordination strategy but dredging and intake repairs are necessary for the City of Junction to be able to fully access this water. The cost of this strategy is estimated at around $10.4 million dollars. During debt service, this is equal to $9.01 per thousand gallons. The only annual costs associated with this strategy are debt service, so once that is fully paid, there is no cost.

Environmental Factors

Environmental issues associated with dredging mainly center around the disposal of the dredged material. In some cases, it may be possible to find a beneficial use for the waste material such as sales to a sand or gravel operation. However, if this is not possible, a proper disposal location will need to be found. The City is currently evaluating its options. Finding a suitable disposal location can be a challenge and may increase the cost if one cannot be found near the dredging site.

Agricultural and Rural Impacts

None identified.

Impacts to Natural Resources and Key Parameters of Water Quality

This strategy assumes that the dredged material is relatively clean and not contaminated. If contamination is found, the impact of dredging on water quality will need to be evaluated.

Impacts on Other Water Resources and Management Strategies

This strategy is expected to have minimal impacts on other water resources and management strategies.

Other Issues Affecting Feasibility

Finding a suitable location for disposal of the dredged material is a significant hurdle and may make this strategy economically infeasible if the material must be hauled a long distance. Even if a nearby disposal location can be found, this strategy may prove to be too expensive for a small entity such as Junction.

WUG:	**Multiple**	**Capital Cost:**	$7,108,000
WMS Name:	**Purchase from Provider (Voluntary Transfer)**	**Annual Cost** (During Amortization):	Varies based on WUG
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	Varies based on WUG
WMS Yield:	1,294 acre-feet per year	**Implementation:**	Varies based on WUG
WMS Status:	Recommended		

Strategy Description

The purchase from provider strategy is part of a generalized strategy in Region F that facilitates the sale of water from one entity to another. This could either be through the sale of a water right or through the sales of raw or treated water via contract. This strategy only considers new purchases or contracts that are not currently in place. In some cases, this strategy may require infrastructure to transport the water from the seller to the buyer. In other cases, there is existing infrastructure in place and only a contract is needed.

Quantity, Reliability and Cost

The reliability of this strategy is considered medium since the purchasing entity is reliant on the provider for their water supplies. The quantity of water and associated capital costs vary depending upon the entities involved. Some entities have infrastructure in place to transport water and only a contract is needed, so no capital costs are shown. Conversely, other entities need to develop infrastructure to access the water they are purchasing from a provider, thus necessitating a capital investment. Table C-10 shows the quantity of water and capital costs (if necessary) for all entities where purchasing water is a recommended strategy.

Table C- 10
Recommended Strategy - Quantity and Cost

County	Purchaser	Provider	Capital Cost	2030	2040	2050	2060	2070	2080
Coke	Bronte	CRMWD	$34,844,000	0	100	140	201	267	341
Coke	Robert Lee	CRMWD (Bronte)	$30,880,000	0	83	103	133	166	201
Ector	Greater Gardendale WSC	Odessa	$16,285,000	0	18	100	162	216	271
Martin	Stanton	CRMWD	$0	43	91	151	215	287	372
McCulloch	Millerview-Doole WSC	CRMWD	$0	0	0	0	73	267	496
Midland	City of Midland	CRMWD	$0	11,200	11,200	11,200	11,200	11,200	11,200
Tom Green	Concho Rural WSC	UCRA (San Angelo)	$0	100	100	100	100	100	100
WMS Total			**$82,009,000**	**11,353**	**11,602**	**11,804**	**12,094**	**12,513**	**12,991**

Environmental Factors

In some instances, no new infrastructure is required to facilitate the sale of the water. In these cases, no environmental impacts are expected. Any impacts associated with new supplies developed by the provider are discussed under those individual strategies. In cases where a new infrastructure is required, the impacts from construction are expected to be temporary and minimal. Pipeline routes are assumed to be selected such that environmental impacts are minimized.

Agricultural and Rural Impacts

Many of these sales are to rural areas of a county. In these cases, having a sustainable water supply will increase the vitality of the rural area. In instances where the transfer is from irrigators to municipal or manufacturing users, the impacts may be the opposite. However, irrigators may find this option financially attractive. This strategy assumes that all sales are voluntary.

Impacts to Natural Resources and Key Parameters of Water Quality

Since this does not involve the development of any new sources of water, no impacts to natural resources and key parameters of water quality are expected.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

This strategy assumes that mutually agreeable contractual terms can be reached by the parties involved. This kind of contract negotiation is outside of the scope of regional planning, but the results will greatly impact the feasibility of this strategy.

MWP:	**Midland**	**Capital Cost:**	$192,003,000
WMS Name:	**Advanced RO Treatment, Expanded Use of Paul Davis Well Field**	**Annual Cost** (During Amortization):	$3,441 per acre-foot $10.56 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies	**Annual Cost** (After Amortization):	$1,766 per acre-foot $5.42 per 1,000 gal
WMS Yield:	8,065 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2030

Strategy Description

The City of Midland is planning to pursue the development of a 15 MGD peak day (10 MGD average day) advanced treatment (RO) facility to address water quality concerns associated with existing high TDS levels in their Paul Davis Well Field groundwater supply. For planning purposes, it was assumed that this project would produce an additional 8,065 acre-feet per year of finished water by 2080. This would enable the City to bring the total supply from their Paul Davis Well Field to about 11,200 acre-feet or 10 MGD. Treated water from this source would be blended with the rest of the City's supplies to improve the overall drinking water quality. The City currently has all of the wells and transmission infrastructure in place to transport this water for treatment and distribution.

Treatment losses from this facility were assumed to be 25 percent. A 1.5 peaking factor was used for the pipeline and treatment plant sizing. It was assumed that the reject stream from this facility would be transported from the City's water purification plant (WPP) to their wastewater treatment plant (WWTP) for treatment, which would be available for mining use. Transmission infrastructure for the brine reject stream (piping, pump stations, storage) was included in the project costs.

Quantity, Reliability and Cost

This strategy would increase the quality and accessibility of the Paul Davis Well Field supplies available to the City of Midland. The reliability of this supply is considered medium because of MAG limitations in Andrews and Martin Counites and competition for water supply. The MAG in Andrews County is limiting to all existing users in all decades, including existing supplies to the City of Midland. The MAG in Martin County is mostly adequate in the early decades but declines sharply over time, resulting in shortages for existing users in later decades. This strategy assumes existing irrigation users would make a voluntary transfer of their supplies to the City of Midland to support the expanded use from this source. The project is sized to produce up to an additional 8,065 acre-feet of finished water by 2080, which would bring the total supply produced from the Paul Davis Well Field to about 11,200 ac-ft per year (10 MGD). It is estimated that this would require around $192 million of capital investment.

Environmental Factors

The conceptual design for this project assumes that the brine waste stream would be transported to and treated at the City's WWTP for mining use. A properly designed and maintained facility should have minimal environmental impacts. Construction of the advanced treatment (RO) facility should have minimal environmental impact as well.

Agricultural and Rural Impacts

This strategy is expected to reduce available supplies to irrigation users. However, it is assumed that the transfers of water from irrigation and rural users is on a willing seller-willing buyer basis.

Impacts to Natural Resources and Key Parameters of Water Quality

It is assumed that the total amount of groundwater used from Martin County will not exceed the MAG values. Therefore, impacts to water resources should be minimal. Advanced RO treatment of groundwater from the Paul Davis Well Field will improve the water quality and availability of this supply for use by the City of Midland. The conceptual design for this project assumes that the brine waste stream would be transported to and treated at the City's WWTP, which would then be available for mining use. This is expected to have minimal effects on natural resources or water quality.

Impacts on Other Water Resources and Management Strategies

The City of Midland's water supply is currently limited by the groundwater quality it can produce from the Paul Davis Well Field. This advanced treatment (RO) facility would enable the City to produce up to 10 MGD of treated water from the Paul Davis Well Field.

Other Issues Affecting Feasibility

None identified.

MWP:	**Odessa**	**Capital Cost:**	$224,032,000
WMS Name:	**RO Treatment of Existing Supplies**	**Annual Cost** (During Amortization):	$2,145 per acre-foot $6.58 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	15,700 acre-feet per year	**Annual Cost** (After Amortization):	$1,141 per acre-foot $3.50 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

To address water quality concerns associated with existing high TDS levels in CRMWD's surface water system, the City of Odessa is planning to pursue the development of an advanced treatment (RO) facility. For planning purposes, it was assumed that the RO treatment facility would have a capacity of 20 MGD. It is anticipated that this treatment plant would produce on average, 14 MGD or 15,700 acre-feet per year. Treatment losses were assumed to be 20%, so this project would produce approximately 3,930 acre-feet per year of waste. The finished water produced from this facility would be blended with the rest of the City's supplies to improve the overall drinking water quality. The conceptual design for this project disposes of the brine waste stream into a nearby water body, such as a stream. Cost estimates for this project include infrastructure to transmit the brine waste stream, including a 16-inch pipeline, pump station, and ground storage tank.

Quantity, Reliability and Cost

This strategy would increase the quality and accessibility of the subordination supplies Odessa obtains from CRMWD. The reliability of this supply is considered medium, as discussed in further detail under the subordination strategy. The project is sized to produce 20 MGD of finished water at peak capacity and requires $224 million of capital investment. The conceptual design for this project disposes of brine waste into a nearby water body; however, the City is also considering selling its effluent to the petroleum industry.

Environmental Factors

The conceptual design for this project disposes of brine waste into a water body. Impacts to the receiving water body would need to be evaluated to ensure that environmental impacts are mitigated, and that discharges are compliant with the facility's National Pollutant Discharge Elimination System (NPDES) permits. A properly designed and maintained facility should limit environmental impacts. Construction of the treatment facility should have minimal environmental impact as well.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The current conceptual design for this project disposes of brine waste into a nearby stream. Impacts to the receiving water body would need to be evaluated to ensure that any impacts to natural resources or water quality are mitigated.

Impacts on Other Water Resources and Management Strategies

This advanced treatment (RO) facility would improve the water quality of the water that the City of Odessa provides to its customers.

Other Issues Affecting Feasibility

None identified.

WUG:	**Pecos City**	**Capital Cost:**	$91,236,000
WMS Name:	**Advanced Water Treatment Plant**	**Annual Cost** (During Amortization):	$5,467per acre-foot $16.78 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	3,360 acre-feet per year	**Annual Cost** (After Amortization):	$3,557 per acre-foot $10.91 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description
Pecos City has poor water quality in their existing North Worsham well field, which severely limits its use. At its current state, the water from this well field can only be blended at up to 5% of the total supply. This strategy involves developing an 8 MGD advanced water treatment plant, which will treat the blended supplies from all three of the City's well fields. This strategy will provide additional water supplies by increasing the usable supply from the North Worsham well field.

Quantity, Reliability and Cost
This strategy would increase the water quality of Pecos City's current water supply and enable the City to increase the usable supply from the North Worsham well field. The reliability of this supply is considered medium. The project is sized to produce 8 MGD of finished water and requires approximately $91.2 million of capital investment.

Environmental Factors
Construction of the treatment facility should have minimal environmental impact.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
This strategy is expected to increase the water quality that the City produces from its three well fields and distributes for municipal use.

Impacts on Other Water Resources and Management Strategies
This advanced water treatment plant would enable the City to blend water from all three of their well fields and will increase the supply that they can use from their North Worsham well field.

Other Issues Affecting Feasibility
None identified.

WUG:	**UCRA**	**Capital Cost:**	$178,000
WMS Name:	**Increased Runoff from Solar Farms**	**Annual Cost** (During Amortization):	$1,300 per acre-foot $3.99 per 1,000 gal
WMS Type:	Expanded Use of Existing Supplies		
WMS Yield:	10 acre-feet per year	**Annual Cost** (After Amortization):	$100 per acre-foot $0.31 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

One potential water management strategy (WMS) that requires more study is the capture of runoff from increased impermeable surfaces upstream of reservoirs. UCRA has suggested gaining a better understanding of the increased runoff generated by large solar farms near O.C. Fisher and Twin Buttes. There are 3 solar farms in the area, two north of O.C. Fisher (totaling roughly 2,516 acres) and one south of San Angelo near Twin Buttes (totaling roughly 581 acres). Approximately 40% of the farms are impermeable surface. This WMS could marginally increase the yield of the reservoir and reliability of existing water rights, but at this time there is significant uncertainty surrounding both yield and cost and additional study would be needed to determine both. During drought, the strategy may not significantly contribute additional runoff but could be used conjunctively with other sources during times it provides additional inflow in response to rain events, which could extend the availability from those other sources during drought.

This strategy is estimated to increase the safe yield of O.C. Fisher by around 10 acre-feet per year. This amount was arrived at by:

- Multiplying monthly naturalized flows into Lake O.C. Fisher from the Colorado WAM by one of 12 adjustment factors, one for each month, that corresponds to the estimated increase in flow attributable to the solar panels.
- The adjustment factor (i.e., the factor by which the pre-project naturalized flow is multiplied by) is a ratio in which the denominator is the amount of runoff predicted for the average monthly precipitation using the Curve Number (CN) method, and the numerator is the amount of runoff that would have been generated for the same watershed (same CN) if the rainfall intensity had been increased (because the same volume of rainfall is landing on a smaller number of acres).
- A CN of 73 was chosen to represent the watershed, which was multiplied by a factor of 0.748 to convert it from Condition II (average) to Condition I (dry antecedent moisture conditions) because safe yield is determined during drought of record conditions.
- Average monthly precipitation for each month was used as the rainfall depth in the CN method to determine the 12 factors. The increased rainfall intensity because of solar farm development was computed as the average monthly precipitation multiplied by the area of the watershed divided by the area of the watershed without the 40 percent impermeable surface of the solar farms. The same volume of rainfall is falling on a smaller area.
- Oftentimes, rainfall will be insufficient to generate runoff. The CN approach used here predicts that the solar panels will not generate additional runoff from November through April if the area experienced average monthly precipitation.

- Rain falling on the solar farms near Twin Buttes runs off downstream of Twin Buttes, and so any additional runoff is not captured by the reservoir. These flows were included in the WAM run because they could increase the reliability of downstream rights, but they do not contribute to the yield of O.C. Fisher.

Quantity, Reliability and Cost

This strategy is estimated to increase the safe yield of O.C. Fisher by around 10 acre-feet per year. The reliability of this strategy is considered low due to large uncertainties surrounding the amount reliably available. There could be costs associated with managing this supply including some grading and/or ditches to direct runoff to the stream and improve the stream's ability to convey the increased flow. An estimate of funding required for a hydrologic study of the impacts of solar panels on runoff for the O.C. Fisher watershed was also included in the cost estimate for the strategy. Total project capital costs are largely uncertain but were estimated at $178,000. Costs were developed by assuming five intervention points where creek improvements might be needed, each 1000 feet long. $18 per yard of cut/fill was used as the unit cost. The five points were selected based on drainage patterns under the panels near O.C. Fisher (panels near Twin Buttes were ignored because they do not contribute to yield). The actual number and length of segments that many need improvement are unknown and costs could be significantly different upon a more detailed study of the area.

Environmental Factors

The increased runoff from solar farms could lead to erosion and higher turbidity levels in the stream.

Agricultural and Rural Impacts

This strategy is expected to have no impacts on agricultural or rural users. Solar farms in the area have been used to graze sheep.

Impacts to Natural Resources and Key Parameters of Water Quality

Natural resources and key water quality parameters may be affected by increased erosion but impacts are expected to be minimal. The increased runoff can be used during wet times to offset groundwater use and encourage aquifer recharge.

Impacts on Other Water Resources and Management Strategies

Increased streamflow could increase the reliability of existing water rights.

Other Issues Affecting Feasibility

Quantification of this strategy in terms of the unit cost of water is beset by many uncertainties that make accurate estimates of yield and costs challenging.

APPENDIX C

C.4 GROUNDWATER DEVELOPMENT

MWP:	**Brown County WID #1 (BCWID)**	**Capital Cost:**	$107,758,000
WMS Name:	**Develop Groundwater in Ellenburger-San Saba Aquifer**	**Annual Cost** (During Amortization):	$3,745 per acre-foot $11.49 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,639 per acre-foot $5.03 per 1,000 gal
WMS Yield:	3,600 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

BCWID has considered developing groundwater supplies in the Ellenburger-San Saba aquifer after previously drilling a test well in the same formation. Due to the high TDS concentrations from the test well, additional treatment will be required for municipal use.

This strategy evaluates the development of 3,600 acre-feet of supply per year from the Ellenburger-San Saba aquifer in Brown County. The conceptual design for this strategy includes ten 300 gpm wells drilled to a depth of 4,000 feet, well field piping, and 2 miles of 18-inch transmission pipeline. In addition, conceptual design includes an advanced water treatment plant to treat the brackish groundwater and two injection wells for the reject water.

For planning purposes, the advanced treatment plant and injection wells are assumed to be located near the proposed well field. This strategy is sized to treat 4.28 MGD (4,800 acre-feet) of brackish groundwater. The advanced treatment processes associated with brackish water desalination are estimated to include 25 percent losses, resulting in 3.21 MGD (3,600 acre-feet) of finished water. The brackish supplies are assumed to have a salinity of 10,000 TDS.

Quantity, Reliability and Cost

The quantity expected to be obtained from this source is approximately 300 gpm per well at a 4,000 foot depth. Test wells indicate that the Ellenburger-San Saba aquifer may be a viable source, but high TDS concentrations will require advanced treatment. For this plan, 10 new wells are assumed to supply an additional 3,600 acre-feet per year of treated water. The reliability of the supply is considered to be medium because of aquifer and water quality properties. The total estimated cost of this strategy is estimated at $107.8 million. This equates to $11.49 per thousand gallons during debt service.

Environmental Factors

The well field and transmission pipeline can be located and constructed to minimize any impacts to the environment. The disposal of the brackish wastewater would be to a deep saline formation and would not impact its water quality. Care should be taken to ensure that the discharge wells are properly constructed so that the brackish discharge would not impact freshwater zones.

Agricultural and Rural Impacts

Development of groundwater is not expected to divert water that was previously used for agricultural and rural purposes due to the poor water quality and well depth. This strategy assumes that the groundwater rights are obtained on a willing buyer – willing seller basis which would minimize impacts to agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Ellenburger San-Saba at deeper depths in Brown County is generally poor, yielding small to large quantities of slightly saline to saline groundwater. Advanced treatment will be required to treat brackish groundwater to municipal standards, significantly increasing the cost of this strategy. The impacts to natural resources are expected to be minimal.

Impacts on Other Water Resources and Management Strategies

To the extent that this water source lessens the demand on Lake Brownwood, additional water from Lake Brownwood may be available for other uses.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is more acceptable. For the purposes of this plan, this strategy assumes that groundwater from this source will require advanced treatment for municipal use.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$299,500,000
WMS Name:	**Ward County Well Field Expansion and Winkler County Well Field Development**	**Annual Cost** (During Amortization):	$1,224 per acre-foot $3.76 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$245 per acre-foot $0.75 per 1,000 gal
WMS Yield:	21,480 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

CRMWD currently owns and operates a well field in Ward County in the Pecos Valley aquifer. CRMWD also owns the groundwater rights to an undeveloped well field in southern Winkler County. This well field will produce water from the Pecos Valley aquifer. For the purposes of this plan, it was assumed that the Ward County Well Field Expansion and the development of the Winkler County Well Field will happen concurrently as a single strategy. Due to MAG limitations of the Pecos Valley aquifer in Ward County, all water supply from this strategy is assumed to be from the Winkler County Well Field. However, expansion of the Ward County well field is still a recommended component of this strategy.

This strategy assumes that close to 20 MGD (21,480 acre-feet per year) will be developed from the Winkler County Well Field and then pumped to the Ward County Well Field for transmission to CRMWD customers using a new 36-inch pipeline and two new 20 MGD pump stations. This well field expansion will include 9 newly drilled wells, the replacement of 17 old wells and expanded collection line piping. The water will use the same existing transmission lines from the current Ward County Well Field to Odessa. The pumping capacity of the current transmission system will require multiple upgrades, including one new 70 MGD booster pump station and one 20 MGD pump station expansion along the existing transmission line to Odessa. An additional shared pipeline and 20 MGD pump station expansion would also be developed from Odessa to the terminal storage reservoir. There will also be three 2.0 MGD ground storage tanks and one 6.0 MGD ground storage tank along the transmission line.

Quantity, Reliability and Cost

It is estimated that this strategy could provide 21,480 acre-feet per year (close to 20 MGD) beginning in the year 2030. Water from these sources is considered very reliable. The capital cost for this strategy is estimated at $299.5 million.

Environmental Factors

Winkler County has no flowing water. Therefore, development of this source has very little potential of impacting spring flow, baseflow in rivers, or habitats. Based on the available data, it is unlikely that the proposed pumping will have impacts on aquatic or terrestrial ecosystems. It is not anticipated that groundwater development will cause subsidence.

The Ward County Well Field already exists and has enough supply to support an expansion by CRMWD without causing any major environmental impacts.

Agricultural and Rural Impacts

The Region F water supply analysis shows sufficient water supply in Winkler County to meet local agricultural and municipal needs, as well as to support well field development by CRMWD. Well field expansion in Ward County is limited by the MAG, so all water from this strategy is shown to come from Winkler County. Therefore, this strategy should have minimal effects on agriculture and rural areas. The

right-of-way for the small portion of additional transmission lines may temporarily affect a small amount of agricultural acreage during construction.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

The Region F water supply analysis shows sufficient water supply in Winkler County to meet local needs and support well field development by CRMWD. Well field expansion in Ward County is limited by the MAG, so all water from this strategy is shown to come from Winkler County. Impacts to other strategies are expected to be minimal.

Other Issues Affecting Feasibility

None identified.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$17,868,000
WMS Name:	**Ward County Well Field Well Replacement**	**Annual Cost** (During Amortization):	$160 per acre-foot $0.49 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$15 per acre-foot $0.05 per 1,000 gal
WMS Yield:	1,492 – 8,674 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

CRMWD currently owns and operates a well field in Ward County that pumps from the Pecos Valley aquifer. A detailed hydraulic model and study of the well-field by Daniel B. Stephens quantified the expected decline in supply available from the Ward County Well Field with no action. As the volume available declines, new infrastructure will be necessary to increase the volumetric supply from the project. As a result, CRMWD plans to actively rehabilitate and/or replace out-of-service wells in order to operate their Ward County well field at an optimal efficiency and supply the optimum amount of water from the well field throughout the planning horizon. The strategy infrastructure was sized for its ultimate capacity in 2080 but the MAG is a limiting factor in Ward County for regional planning, and as a result, the reported yield for this strategy is lower than the ultimate capacity the strategy was sized for. The project would likely be implemented in phases.

In this strategy, it was assumed that enough water wells and piping would need to be replaced per decade to enable CRMWD to withdraw the expected amount of groundwater from their Ward County well field. CRMWD already owns the land, water rights, and infrastructure to transport and treat this supply, so only water well and well field piping infrastructure were included in this project.

Quantity, Reliability and Cost

This strategy could optimize the amount of water that CRMWD obtains from their Ward County Well Field. It is estimated that this could provide an additional 1,492 acre-feet per year in 2040 and increase to 8,674 acre-feet per year in 2080. This strategy was sized to fully restore the capacity of the Ward County Well Field but due to MAG limitations the yield shown from this strategy in regional planning is slightly less. Water from the Ward County Well Field is considered reliable. The total capital cost for this strategy is estimated at $17.9 million.

Environmental Factors

The Ward County Well Field already exists and has enough supply to support replacement with new wells without causing any major environmental impacts. The construction of replacement wells should have minimal environmental impact.

Agricultural and Rural Impacts

The Region F water supply analysis shows sufficient water supply in Ward County to meet local agricultural and municipal needs and support the replacement of old wells with new wells by CRMWD. Therefore, this strategy should have minimal effects on agriculture and rural areas.

Impacts to Natural Resources and Key Parameters of Water Quality

None identified.

Impacts on Other Water Resources and Management Strategies

The Region F water supply analysis shows sufficient water supply in Ward Counties to meet local needs and support replacement of old wells with new wells by CRMWD. This strategy is expected to enable CRMWD to optimize the amount of groundwater that they can withdraw from their well field in Ward County.

Other Issues Affecting Feasibility

None identified.

MWP:	**Colorado River Municipal Water District**	**Capital Cost:**	$551,074,000
WMS Name:	**Develop Additional Groundwater in Pecos, Reeves, Ward, and Winkler Co.**	**Annual Cost** (During Amortization):	$2,604 per acre-foot $7.99 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,055 per acre-foot $3.24 per 1,000 gal
WMS Yield:	25,000 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

The Colorado Municipal Water District (CRMWD) plans to pursue new groundwater development as an alternative strategy. The exact location of the wells is not yet known. For the purposes of this plan, this project will seek to develop 25,000 acre-feet of supply from Pecos, Reeves, Ward, and Winkler Counties. This project is for new groundwater supplies and does not include water rights currently held by CRMWD. Region F considers development from any single or combination of these sources to be consistent with the plan. This strategy involves the development of groundwater, as well as the transmission of this groundwater to CRMWD's system. Some portions of this groundwater may be brackish and need additional treatment, but these supplies will not be needed until after the end of this Plan (post-2080).

This strategy includes the acquisition of groundwater rights and development of well infrastructure (water well, well field piping) in either Pecos, Reeves, Ward, and Winkler Counties. In addition, this strategy involves the development of transmission infrastructure, including pipelines, pump stations, and storage tanks, to transport the 25,000 acre-feet of groundwater supply developed in these four counties Region F by CRMWD. Since the exact location of the development of these supplies is still unknown, for planning purposes it was assumed that 40 miles of new transmission system would be needed to connect to CRMWD's transmission system in Ward County.

Quantity, Reliability and Cost

In total, this strategy will provide 25,000 acre-feet of supply per year. Since the location of the wellfield is not yet known, a combination of aquifers and counties was assumed.

The reliability of this strategy is considered high due to the large number of sources being employed. Additional study will be required once an exact location and source for the wellfields have been determined, and the transmission pipeline route has been defined. For planning purposes, the strategy includes the purchase of the groundwater rights, the costs to drill approximately 24 wells, and associated well field piping. In addition, the capital cost of this strategy includes the construction of 40 miles of 54-inch pipeline, 2 new pump stations and storage. The capital cost for this project is estimated at $551 million.

Environmental Factors

The well fields would be located to minimize any potential environmental impacts. The right-of-way for the transmission line may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the transmission pipeline. The pipeline may be routed to avoid environmentally sensitive areas. As such, the environmental impacts are expected to be minimal.

Agricultural and Rural Impacts

Development of groundwater may divert water that was previously used for agricultural and rural purposes. However, this strategy assumes that the groundwater rights are obtained on a willing buyer – willing seller basis which would minimize the impacts to agriculture. The right-of-way for the transmission line may temporarily affect a small amount of agricultural acreage during construction.

Impacts to Natural Resources and Key Parameters of Water Quality

The strategy proposes utilizing a sustainable level of groundwater. The impacts to natural resources are expected to be minimal when constructing the well field. No impacts to water quality are expected. Other natural resources may be temporarily impacted during construction of the pipeline. These impacts are expected to be minimal, and the mitigation of impacts will be addressed through further study once the exact pipeline route has been selected.

Impacts on Other Water Resources and Management Strategies

This strategy could impact the Expanded Ward County and Winkler County Well Fields, but it is assumed that the new wells would be located so as not to impact these well fields. No impacts on water resources or management strategies are anticipated from the transmission pipeline.

Other Issues Affecting Feasibility

Additional study will be needed to determine feasibility and potential impacts once a more specific location for the well fields and the more defined pipeline route has been selected. Some portions of this groundwater may be also brackish and need additional treatment, but these supplies will not be needed until after the end of this Plan (post-2080).

MWP:	**Odessa**
WMS Name:	**Develop Edwards-Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County**
WMS Type:	Groundwater Development
Phase 1 Yield:	11,200 acre-feet per year
Phase 2 Yield:	16,800 acre-feet per year
Total Yield:	28,000 acre-feet per year
WMS Status:	Alternative

Phase 1 Capital Cost:	$1,042,202,000
Phase 2 Capital Cost:	$529,880,000
Phase 1 Annual Cost (During Amortization):	$8,669 per acre-foot $26.60 per 1,000 gal
Phase 2 Annual Cost (During Amortization):	$3,873 per acre-foot $11.88 per 1,000 gal
Phase 1 Annual Cost (After Amortization):	$2,126 per acre-foot $6.52 per 1,000 gal
Phase 2 Annual Cost (After Amortization):	$1,658 per acre-foot $5.09 per 1,000 gal
Implementation:	2040

Strategy Description

The City of Odessa is considering developing a groundwater supply in Pecos County. This supply likely would be developed in the Edwards-Trinity and/or Capitan Reef Complex. Water quality of these formations is variable, with fresh water supplies adjacent to brackish water. Due to this uncertainty, it is assumed that the supplies from this strategy would require advanced treatment.

The proposed transmission system is sized for a peak capacity of 50 MGD. The City would develop this project in stages with an initial development of 10 MGD average annual supply and increasing to the full capacity of the transmission system by 2080. Assuming a peaking factor of 1.5 for this source, the ultimate average annual supply from the well field would be about 37,300 acre-feet per year before treatment losses. To provide approximately this amount of water, it is estimated that 54 new wells would need to be drilled between the Edwards-Trinity Plateau Aquifer and the Capitan Reef Complex Aquifer. A blended average of the aquifer and well properties were used to estimate the cost based on this assumption. These wells would produce water from approximately 2,900 feet below the surface with an expected average drawdown of about 140 feet.

This strategy assumes that well field piping will connect the water wells to a new 90–mile transmission line that would carry the water from Pecos County to the City of Odessa. The water treatment facility is assumed to be located near Odessa. Due to the large quantity of water to be developed, it is assumed that a new advanced water treatment facility would be built. The facility would be built in phases with Phase 1 sized for 20 MGD and a Phase 2 expansion of 30 MGD for a total ultimate peak day capacity of 50 MGD for raw water supplies.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 700 gpm. Historical industrial and agricultural use indicates that the Edwards-Trinity and Capitan Reef Complex aquifers may be a viable source, but high TDS will require advanced treatment. For this plan, the 54 new wells are assumed to supply an additional 37,300 acre-feet per year. Assuming a loss of 25 percent, the amount of reliable treated supply for municipal use is about 28,000 acre-feet per year for both phases. The reliability of the supply is considered medium because of the potential for competing demands and limitations of the aquifers. The total capital cost for both phases is estimated at approximately $1,572,082,000.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. There are several springs in the Fort Stockton area that could potentially be impacted by large development of groundwater. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Wells provide water for ranching, domestic and municipal supplies throughout the area. It is assumed that this project would acquire sufficient water rights to mitigate potential impacts to agricultural and rural areas. Studies may be required to evaluate potential impacts on the area.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. The water quality in the Capitan Reef Complex aquifer is generally poor, yielding small to large quantities of slightly saline to saline groundwater. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Other strategies for Pecos County may be impacted. Also, CRMWD is considering developing additional groundwater in Pecos County. It is likely that only one strategy for groundwater from Pecos County to Odessa will be developed.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is whether the strategy is economically feasible. The necessary infrastructure to pump and treat water from the Capitan Reef Complex aquifer will be a financial challenge. This strategy is not recommended for this planning cycle. However, it was analyzed as an alternative strategy to be considered for future planning periods should Odessa need additional supplies.

MWP:	**San Angelo**	**Capital Cost:**	$192,701,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher County**	**Annual Cost** (During Amortization):	$3,338 per acre-foot $10.24 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$325 per acre-foot $1.00 per 1,000 gal
WMS Yield:	4,500 acre-feet per year	**Implementation:**	2040
WMS Status:	Alternative		

Strategy Description

The Edwards-Trinity Plateau aquifer in Schleicher County has been identified as a potential source for municipal, industrial and agricultural purposes. This source is currently used for agricultural purposes and may require advanced treatment for municipal use. Groundwater studies project that approximately 4,500 acre-feet per year could be produced from this source; however, that quantity is not available under MAG limitations from this source. Therefore, for the purpose of this plan, groundwater development in Schleicher County is not a recommended strategy. However, this strategy was evaluated as a potential alternative strategy if the exportation of water outside of Schleicher County was agreed upon.

To provide approximately 4,500 acre-feet per year, 18 new wells would need to be drilled. These wells would produce water from approximately 500 feet below the surface. It was estimated that the City would need to purchase approximately 4,500 acres of land above the aquifer for well construction and piping. This strategy assumes that the wells will be connected by 49,560 linear feet of well field piping, with diameters of 6-, 8-, 10-, 14-, 16-, and 20-inches. In addition, it was assumed that the groundwater well field would include a 0.25 MGD ground storage tank.

This project also includes a transmission pipeline and pump station that will transport the water from the well field to existing infrastructure located in the City of San Angelo. It is assumed that the water produced from the new well field will be blended with the existing water supply or treated at the City's water treatment plant. Desalination of new groundwater is evaluated as a separate strategy. The transmission pipeline is assumed to be a 50-mile pipeline with a diameter of 20 inches.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be moderate to low, in the 150 – 250 gpm range for individual wells. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau aquifer may be a viable source, but high TDS will require advanced treatment. For this plan, the 18 new wells are assumed to supply an additional 4,500 acre-feet per year. The reliability of the supply is considered medium because of the potential competing demands.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Spring flows from the Edwards-Trinity Plateau supply much of the base flow of the South Concho and other flowing streams in the area. Many of these streams are used extensively for irrigation. Wells

provide water for ranching, domestic and municipal supplies throughout the area. Studies will be required to evaluate potential impacts on the area.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Other strategies that use the Edwards-Trinity aquifer in Schleicher County may be impacted.

Other Issues Affecting Feasibility

None identified.

WUG:	**Andrews**	**Capital Cost:**	$36,022,000
WMS Name:	**Develop Ogallala Aquifer Supplies**	**Annual Cost** (During Amortization):	$831 per acre-foot $2.55 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	3,634 acre-feet per year	**Annual Cost** (After Amortization):	$135 per acre-foot $0.41 per 1,000 gal
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

To provide additional supply, the City of Andrews plans to develop additional groundwater in two phases. The first phase involves developing new groundwater near the existing Florey Well Field and has been completed. The second phase is to develop groundwater located south of town and construct a new pipeline.

The next phase involves developing groundwater from a different location south of town. The City has drilled 16 test wells in this area and discovered the wells are slower producing than those located near the Florey Well Field. The next phase assumes 17 new wells, a covered ground storage tank (0.5 MG) and an 8-mile, 20-inch diameter pipeline to town. This portion is expected to be online in 2040 and the total water supply provided by the strategy is approximately 3,634 acre-feet per year.

The City recently completed a new water treatment plant to treat naturally occurring fluoride and arsenic levels found in local groundwater. It was assumed that this plant could handle any potential water quality issues that may arise. Therefore, no treatment plant was included in the evaluation and cost estimate of this strategy. If a new treatment plant is determined to be needed, the cost of this strategy will increase.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be good given the test wells and studies already performed by the City of Andrews. For this plan, the 17 new wells are assumed to supply an additional 3,634 acre-feet per year by the time the phased strategy is fully implemented. Due to limitations from the MAG, this strategy is considered alternative.

The total cost of the project will be approximately $36 million. This equates to $831per acre-foot ($2.55 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $135 per acre-foot ($0.41 per 1,000 gallons) of treated water.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Throughout much of the aquifer, groundwater withdrawals exceed the amount of recharge, and water levels have declined fairly consistently through time. However, the City has an agreement with other users in the area to minimize the impacts of drawdown near their well field. Groundwater development from this source is expected to cause minimal environmental impacts.

Agricultural and Rural Impacts

This source is currently used for agricultural purposes. This strategy would reduce the amount of water currently available to agricultural users. It is assumed that the transfer of water rights will be between a willing buyer and willing seller, and there would be minimal impacts to agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality

There are no identified impacts to natural resources.

Impacts on Other Water Resources and Management Strategies

This strategy may impact other groundwater strategies in Andrews County due to competition for available supplies.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is the planning constraints of the Modeled Available Groundwater volume amount for the County of Andrews from the Ogallala aquifer. Due to these limitations, the supply available from the Ogallala aquifer is less than proposed for this strategy. As such, this strategy cannot be recommended in the plan at the quantities shown. However, since Andrews County does not have a GCD to enforce ground restrictions, such as MAG limits, the City could pursue this strategy independently, but it could not receive State funding to construct it.

WUG:	**Andrews**	**Capital Cost:**	$56,814,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies (Antlers Formation)**	**Annual Cost** (During Amortization):	$1,785 per acre-foot $5.48 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$249 per acre-foot $0.76 per 1,000 gal
WMS Yield:	2,600 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

The Edwards-Trinity Plateau aquifer in the Antlers formation has been identified as a potential source for additional municipal purposes. Along the southern county border, there may lie groundwater supplies suitable for development. It is unclear if this formation is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This potential source is only located in the southern part of Andrews County. Further study would be needed to determine if this was a feasible strategy for the specific user depending on their location within the county and local hydrogeologic conditions. This strategy assumes that 38 new wells would need to be drilled to provide approximately 2,600 acre-feet per year. These wells are approximately 200 feet deep.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 50 gpm. Historical municipal use indicates that the Edwards-Trinity Plateau outcrops may be a viable source, but high TDS may require advanced treatment for municipal use, which would increase the cost if required. For this plan, the 38 new wells are assumed to supply an additional 2,600 acre-feet per year. It also includes 15 miles of 18-inch pipeline. The reliability of the supply is considered medium, based on the aquifer characteristics and water quality. Due to MAG limitations, this strategy is listed as Alternative. The capital costs are estimated at $56.8 million.

Environmental Factors

The aquifer is currently not used for municipal purposes in Andrews County. Wastewater discharges from this source may contain elevated TDS if the water is not treated. This strategy is not expected to have other environmental impacts. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Since this source is not currently being used to any extent in Andrews County, the strategy should not have any impacts to agricultural users. It would provide additional water to rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer can be variable, with water quality ranging from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No other water management strategies will be impacted.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is good. In addition, this project requires financing for the new facilities.

WUG:	**Andrews County Other**	**Capital Cost:**	$3,441,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$306 per acre-foot $0.94 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$47 per acre-foot $0.14 per 1,000 gal
WMS Yield:	934 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

The Edwards-Trinity Plateau aquifer has been identified as a potential source for municipal, industrial and agricultural purposes. Along the southern county border, there may lie groundwater supplies suitable for development. It is unclear if this formation is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This potential source is only located in the southern part of Andrews County. Further study would be needed to determine if this was a feasible strategy for the specific user depending on their location within the county and local hydrogeologic conditions. This is a recommended strategy for County-Other users though individual users may continue to develop Ogallala supplies beyond the MAG instead. This strategy assumes that twelve new wells would need to be drilled to provide approximately 934 acre-feet per year. These wells are approximately 200 feet deep.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 50 gpm. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau outcrops may be a viable source but high TDS may require advanced treatment for municipal use. For this plan, the twelve new wells are assumed to supply an additional 934 acre-feet per year. Since there is not a specific sponsor for this strategy, it is assumed that the water would be treated at the Point of Use if needed and the infrastructure costs for treatment and transmission are not included in the costs for this strategy. The reliability of the supply is considered medium, based on the aquifer characteristics and water quality. The capital costs are estimated at $3,441,000.

Environmental Factors

The aquifer is currently not used for municipal purposes in Andrews County. Wastewater discharges from this source may contain elevated TDS if the water is not treated. This strategy is not expected to have other environmental impacts. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Since this source is not currently being used to any extent in Andrews County, the strategy should not have any impacts to agricultural users. It would provide additional water to rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer can be variable, with water quality ranging from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy could potentially impact the development of groundwater from the Edwards-Trinity Plateau aquifer for Livestock in Andrews County if located in the same vicinity. However, the combined

supplies from these strategies do not exceed the MAG value, indicating there is sufficient supplies for both strategies. It is important to note that the City of Andrews has an alternative strategy for using Edwards-Trinity Plateau Aquifer in Andrews County and there is not enough MAG for this strategy in conjunction with other strategies utilizing this aquifer supply.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production where the water quality is good. In addition, this project requires financing for the new facilities.

WUG:	**Andrews County Livestock**	**Capital Cost:**	$1,018,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$759 per acre-foot $2.33 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$93 per acre-foot $0.28 per 1,000 gal
WMS Yield:	108 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

The Edwards-Trinity Plateau aquifer has been identified as a potential source of water for livestock in Andrews County. Water from this source ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Along the southern border of the county, there may lie undeveloped brackish groundwater supplies suitable for agricultural use. It is unclear whether supply is truly from the Edwards-Trinity Plateau or if it is fed by leakage from the overlaying Ogallala aquifer. This source is only located in the southern part of Andrews County. Further study would be needed to determine if this is a feasible strategy for the user depending on their location within the county and local hydrogeologic conditions. This strategy assumes that three new wells would need to be drilled to provide approximately 108 acre-feet per year. These wells would produce water from approximately 200 feet below the surface.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 50 gpm. For this plan, the three new wells are assumed to supply an additional 108 acre-feet per year. The reliability of the supply is considered low to medium, based on the unproven use of this source. Due to MAG limitations, this strategy is considered Alternative.

The total cost of the project will be approximately $1,018,000. This equates to $759 per acre-foot ($2.33 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $93 per acre-foot ($0.28 per 1,000 gallons) of treated water.

Environmental Factors

Environmental impacts from this strategy are expected to be low. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This source is currently not used in Andrews County. This strategy should not impact current rural users. It should provide additional water for agricultural purposes.

Impacts to Natural Resources and Key Parameters of Water Quality

Water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy could potentially impact the development of groundwater from the Edwards-Trinity Plateau aquifer for rural County-Other in Andrews County if located in the same vicinity. However, the

combined supplies from these strategies do not exceed the MAG value, indicating there is sufficient supplies for both strategies. It is important to note that the City of Andrews has an alternative strategy for using Edwards-Trinity Plateau Aquifer in Andrews County and there is not enough MAG for this strategy in conjunction with other strategies utilizing this aquifer supply.

Other Issues Affecting Feasibility

An adequate drinking water supply is an essential component of livestock production. The most significant challenge for this strategy is locating areas with sufficient well production. Generally, livestock can tolerate higher salinity levels than municipal use; however, long-term use could negatively impact overall livestock performance. This might potentially offset the positive impacts of a more reliable water supply.

WUG:	**Andrews County Manufacturing**	**Capital Cost:**	$1,392,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$412 per acre-foot $1.26 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$61 per acre-foot $0.19 per 1,000 gal
WMS Yield:	279 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2030

Strategy Description

There are undeveloped groundwater supplies in the Edwards-Trinity Plateau aquifer in Andrews County. Water from this source is not widely used because of low well yields in most areas. Some areas have poor water quality as well. However, there appears to be some areas within the county that have sufficient well yields to meet manufacturing water needs. This strategy assumes that five new wells would be drilled to provide approximately 279 acre-feet per year. These wells would produce water approximately 200 feet below the surface.

Quantity, Reliability and Cost

This strategy assumes that up to 279 acre-feet of water per year could be produced from the Edwards-Trinity Plateau aquifer. Reliability would be moderate to high, depending on well capacity. Due to MAG limitations, this strategy is considered alternative.

Environmental Factors

Many areas of good well production in the Edwards-Trinity Plateau aquifer are associated with surface water discharge from springs. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Wells provide water for ranching, industrial, domestic and municipal supplies throughout the area. This strategy assumes sufficient groundwater rights would be obtained on a willing buyer-willing seller basis, which should mitigate potential impacts to agricultural and rural water users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. This strategy is not expected to impact key parameters of water quality. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy may compete with other Andrews County strategies for limited supplies. There currently is not enough MAG available for livestock, manufacturing, and county-other users in Andrews County. The City of Andrews is also looking at pursuing a strategy using Edwards-Trinity Plateau aquifer supplies in southern Andrews County. The MAG limitations cause this strategy to be considered an alternative strategy.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production and low potential for impacts on spring flows.

WWP:	**Texland Great Plains**	**Capital Cost:**	$607,000
WMS Name:	**Develop Ogallala Aquifer Supplies**	**Annual Cost** (During Amortization):	$263 per acre-foot $0.81 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	213 acre-feet per year	**Annual Cost** (After Amortization):	$61 per acre-foot $0.19 per 1,000 gal
WMS Status:	Alternative	**Implementation:**	2030

Strategy Description
Texland Great Plains is a wholesale water provider in Andrews and Gaines counties. They currently produce water from an existing well field in the Ogallala Aquifer. The MAG limits the availability for additional development from the Ogallala under regional planning rules and guidelines. However, it is anticipated that Great Plains would develop additional wells in Andrews and/or Gaines counties. This is an alternative strategy since the MAG limits in Andrews and Gaines counties. This strategy assumes one additional 250 gpm well.

Quantity, Reliability and Cost
This strategy is anticipated to provide an average of 212 acre-feet per year. The reliability of this supply is considered medium-high because it is an addition to an existing well field in a proven aquifer. However, the MAG limitations indicate there may be competition for the water supply. The estimated cost of the additional well is $607,000.

Environmental Factors
Environmental impacts are expected to be low.

Agricultural and Rural Impacts
As some farmers cease to irrigate, Texland Great Plains may purchase their groundwater rights and drill or take over those wells as part of this strategy. It is assumed this would happen on a willing-buyer, willing-seller basis, limiting the impact on the agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality
Use of this source is not expected to impact key parameters of water quality. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies
MAG availability from the Ogallala Aquifer limits official development of strategies from this source. This strategy will increase the competition for available groundwater in the area.

Other Issues Affecting Feasibility
The most significant challenge for this strategy is MAG availability.

WUG:	**Balmorhea**	**Capital Cost:**	$6,413,000
WMS Name:	**Develop Edwards-Trinity Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$4,573 per acre-foot $14.03 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$473 per acre-foot $1.45 per 1,000 gal
WMS Yield:	110 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

The City of Balmorhea is evaluating a groundwater source in the Edwards-Trinity Plateau aquifer. This source has been identified as currently supplying water for municipal, industrial and agricultural uses. However, the long-term water availability and quality of the proposed well field should be assessed further. This strategy assumes that two new wells would be drilled to provide approximately 110 acre-feet per year. This well would produce water from approximately 600 feet below the surface.

This strategy also includes 5 miles of 6-inch diameter pipeline that will connect the well to the current infrastructure.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 100 gpm. Historical municipal and agricultural use indicates that the Edwards-Trinity Plateau may be a viable source for municipal use but may require some treatment or blending based on local groundwater conditions. For this plan, the new well is assumed to supply an additional 110 acre-feet per year. The reliability of the supply is considered high, based on the aquifer characteristics observed to contain large pools of mostly potable water. The total capital cost is estimated at $6.4 million. This strategy assumes that adequate water quality for municipal use can be reached through blending with Balmorhea's other groundwater sources. If the quality of water requires advanced treatment, costs would be higher than estimated here.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Spring flows from the Edwards-Trinity Plateau supply much of the base flow of flowing streams in the area. Many of these streams are used for irrigation. Wells provide water for ranching, domestic and municipal supplies throughout the area. It is assumed that the proposed level of additional groundwater development will not impact agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Edwards-Trinity Plateau aquifer ranges from generally fresh to slightly saline in the outcrop areas, and brackish water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer. This strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

No other water management strategies will be impacted.

Other Issues Affecting Feasibility

The economic viability of the project will depend upon the ability to locate groundwater of sufficient quality to blend with existing sources without advanced treatment.

WUG:	**Borden County Water System**	**Capital Cost:**	$24,325,000
WMS Name:	**Develop Additional Supplies from Ogallala and Edwards-Trinity-High Plains Aquifer in Dawson County**	**Annual Cost** (During Amortization):	$14,127 per acre-foot $43.35 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,358 per acre-foot $4.17 per 1,000 gal
WMS Yield:	134 acre-feet per year	**Implementation:**	2060
WMS Status:	Recommended		

Strategy Description
The Borden County Water System has two wells in the Ogallala Aquifer in Dawson County that serve to supply its customers in Borden County. Their current demand is expected to exceed their current wellfield capacity by 2060. Borden County Water System will need to expand their existing well field in order to meet the projected demands. This strategy proposes drilling two new wells at a 200-ft depth, producing around 100 gpm each to provide a total yield of 134 acre-feet per year. The produced water is expected to be of adequate quality for municipal use without advanced treatment. An estimated 22-mile, 6-inch transmission pipeline is assumed to deliver these supplies to the City.

Quantity, Reliability and Cost
This strategy is estimated to supply 134 acre-feet per year. The reliability of this supply is considered medium, but the strategy is still dependent on locating wells with adequate production and water quality. The costs are estimated at $24.3 million.

Environmental Factors
There have been some reported issues with hydrocarbon contamination in wells bordering Borden and Dawson counties. No other environmental factors were identified.

Agricultural and Rural Impacts
No agricultural and rural impacts are anticipated.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
This strategy fits within the MAG limits of Dawson County so no other strategies in Dawson County are anticipated to be impacted by this strategy.

Other Issues Affecting Feasibility
The biggest factor in feasibility for this strategy is economics. Funding construction of this infrastructure will be a significant strain on the financial resources of the Borden County Water System. If existing transmission infrastructure from the well field is adequate to support the flow from the additional wells, the project cost would be much more economically feasible.

WUG:	**Colorado City**	**Capital Cost:**	$11,428,000
WMS Name:	**Dockum Well Field Expansion**	**Annual Cost** (During Amortization):	$5,335 per acre-foot $16.37 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$606 per acre-foot $1.86 per 1,000 gal
WMS Yield:	170 acre-feet per year	**Implementation:**	2030
WMS Status:	Alternative		

Strategy Description

In compliance with the guidance and rules for regional water planning, the TWDB requires the use of Modeled Available Groundwater (MAG) in regional water planning. The MAG for the City's current well field in the Dockum aquifer is severely limiting. To meet the City's water demands, Colorado City is considering an alternative water management strategy. This strategy is not recommended for this planning cycle due to the supply volume exceeding the current MAG in the Dockum aquifer.

Colorado City currently obtains its water supply from several well fields in the Dockum aquifer. The City drilled two new well fields, but one was high in sulfides and must be blended with other supplies before use. There are concerns about potential oil field contamination and the City is seeking to expand groundwater development in the Dockum Aquifer. This source is currently used for municipal and agricultural purposes and has been identified as a potential supply to meet the City's needs. This strategy assumes that two new wells would need to be drilled to provide approximately 170 acre-feet per year. This well would produce water from approximately 200 feet below the surface. It is assumed that the water quality of the new well would be equivalent to the quality of the City's original wells and that no additional treatment will be needed. If adequate water quality cannot be found, advanced treatment may be needed, which would increase the estimated cost of this strategy.

Piping infrastructure is currently in place to transport water from the first field 9 miles east of town to the existing standpipe. An 8-mile pipeline, 6 inches in diameter, will connect water from the second field to the current pipeline running from the first field to the standpipe.

Quantity, Reliability and Cost

The quantity of water from this source is expected to be 170 acre-feet per year. For costing purposes, the wells were assumed to be 200 feet deep with a peak capacity of 150 gpm. Historical municipal and agricultural use indicates that the Dockum aquifer may be a viable source. The reliability of the supply is considered medium because of aquifer and water quality properties.

The total cost of the project is estimated to be $11.4 million. This equates to $5,335 per acre-foot ($16.37 per 1,000 gallons) of treated water during debt service. After the infrastructure is fully paid for, the cost drops to $606 per acre-foot ($1.86 per 1,000 gallons) of treated water.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

This source is currently used for agricultural purposes. There would be minimal impacts to agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Dockum aquifer is generally variable, with freshwater in outcrop areas and brine in the subsurface portions. The water tends to be very hard. Advanced treatment may be required for municipal use.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production and funding. Due to MAG limitations, this strategy is not recommended; however, it was analyzed as an alternative strategy to be considered for future use should the DFC and MAG change.

WUG:	**Greenwood Water**	**Capital Cost:**	$13,923,000
WMS Name:	**Develop Additional Ogallala Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,891 per acre-foot $5.80 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,486 per acre-foot $4.56 per 1,000 gal
WMS Yield:	2,420 acre-feet per year	**Implementation:**	2030
WMS Status:	Alternative		

Strategy Description

To provide additional supply, Greenwood Water in Midland County plans to develop more groundwater supplies in the Ogallala aquifer. Greenwood Water currently supplies water to its customers from wells in this aquifer. The conceptual design for this strategy assumes 20 new wells can be drilled to produce approximately 3,226 acre-feet per year from the aquifer. After losses from the treatment process, the supply is estimated to be 2,420 acre-feet per year. These wells would produce water from approximately 220 feet deep, which is deeper than their current wells, and be treated at Greenwood Water's Regional Water Campus (RWC) facility using advanced reverse osmosis. Greenwood Water currently sells the RO effluent for industrial purposes.

Quantity, Reliability and Cost

This strategy is estimated to supply 2,420 acre-feet per year, which comes from their goal of 2500 gpm assuming 80 percent well operating time and 25 percent losses during treatment. The strategy calls for 20 wells, each capable of producing a peak of 150 gpm. For planning purposes, these wells are assumed to be 300 feet apart, 220 feet deep and connected with wellfield piping to a 16-inch transmission pipeline to the RWC that is 2 miles away. An estimate of the costs associated with treating the additional water at the RWC is included in the annual costs for the strategy.

Supplies from the Ogallala aquifer in Midland County are limited. There is no groundwater conservation district in Midland County and therefore no enforceable Modeled Available Groundwater (MAG) limitations for the Ogallala aquifer. The reliability of the supply is considered medium. Due to MAG limitations, this strategy is listed as Alternative. The capital costs are estimated at $13.9 million.

Environmental Factors

This aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. However, the long-term water quality is unknown. Throughout much of the aquifer, groundwater withdrawals exceed the amount of recharge, and water levels have declined fairly consistently through time. Environmental impacts from this strategy are expected to be medium. The primary aquifer of use around the Greenwood Water service area is the Ogallala aquifer. Utilizing the aquifer beyond what is available could impact other users and cause minor subsidence.

Agricultural and Rural Impacts

Development of this strategy may divert water that was previously used for agricultural and rural purposes.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Ogallala aquifer ranges from fresh to moderately saline. This strategy assumes Greenwood Water will connect to their existing treatment facility.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy may impact other groundwater strategies in Midland County due to competition for available supplies.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is the planning constraints of the MAG volume amount for Midland County from the Ogallala aquifer. Due to these limitations, the supply available from the Ogallala aquifer is less than proposed for this strategy. As such, this strategy cannot be recommended and is instead included as an alternative strategy. However, since Midland County does not have a groundwater conservation district to enforce ground restrictions, such as MAG limits, Greenwood Water could pursue this strategy independently, but it could not receive State funding to construct it.

WUG:	**Junction**	**Capital Cost:**	$7,185,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,557 per acre-foot $4.78 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$192 per acre-foot $0.59 per 1,000 gal
WMS Yield:	370 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

The City of Junction is considering a groundwater source in the Edwards-Trinity Plateau aquifer to back up its current supplies but has no immediate plans for implementation. This is considered a longer-term strategy for implementation by the City in 2040. Water from this source is not widely used because of low well yields and poor water quality. This source is currently used for manufacturing.

This strategy assumes that seven new wells would be drilled to provide approximately 370 acre-feet per year. These wells are assumed to produce water from approximately 190 feet below the surface with elevated TDS levels. It is assumed that this water is blended with surface water. However, if it is determined that the water qualities of the two sources are incompatible, the groundwater may require advanced treatment. Costs for advanced treatment are not included. This strategy assumes that the new wells will be drilled within three miles of the City's existing infrastructure. This project includes 1,800 feet of 6-inch diameter well field collection piping and three miles of 8-inch transmission piping to connect to existing infrastructure.

Quantity, Reliability and Cost

The quantity and reliability of water from this source is expected to be approximately 40 gpm per well. Historical use indicates that the Edwards-Trinity Plateau may be a viable source but may contain high TDS. For this plan, the seven new wells are assumed to supply an additional 370 acre-feet per year. The reliability of the supply is considered medium because of water quantity and quality issues.

Environmental Factors

The blending of slightly brackish water with Junction's existing supplies may increase the TDS levels of treated wastewater from the City. It is expected the increase will not exceed current discharge limits. No other environmental impacts are identified.

Agricultural and Rural Impacts

Wells provide water for ranching, domestic and municipal supplies throughout the area. This strategy assumes sufficient groundwater rights would be obtained on a willing buyer-willing seller basis, which should mitigate potential impacts to agricultural and rural water users.

Impacts to Natural Resources and Key Parameters of Water Quality

Water quality in the Edwards-Trinity Plateau aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

A significant challenge for this strategy is locating areas with sufficient well production where the water quality is good.

WUG:	**Kermit**	**Capital Cost:**	$1,460,000
WMS Name:	**Develop Dockum Aquifer Supplies**	**Annual Cost** (During Amortization):	$480 per acre-foot $1.47 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$68 per acre-foot $0.21 per 1,000 gal
WMS Yield:	250 acre-feet per year	**Implementation:**	2080
WMS Status:	Recommended		

Strategy Description

The City of Kermit currently uses wells inside of the city for their municipal water supply. The projected demands for the city of Kermit are projected to exceed the capacity of their current well field by 2080. In the past the City has considered drilling a new well in order to increase their supply, however, no action has been taken. This strategy includes drilling one new well near Kermit's existing wells, drawing from the Dockum Aquifer. The well is proposed to be drilled at a 500-foot depth and produce a peak capacity of 250 gpm, to provide approximately 250 acre-feet per year of water. This well would produce water from close to 90 feet below the surface.

Quantity, Reliability and Cost

This strategy could meet the City of Kermit's water needs for 2080. This strategy assumes that up to 250 acre-feet of water per year could be produced from the Dockum aquifer. The MAG for the Dockum Aquifer in Winkler County is not a limiting factor for this strategy. Reliability would be moderate to high, depending on well capacity.

Environmental Factors

Groundwater development from this source should be evaluated for potential impacts on base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

The Dockum aquifer is not widely used for ranching or irrigation supplies, but is used for industrial, domestic and municipal supplies throughout the region. Potential impacts to agricultural and rural water users are not expected.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Dockum aquifer ranges from slightly saline to very saline in the outcrop areas, and brine water in subsurface portions. Given this aquifer is currently used by the City for its municipal water supply and this strategy will use the same aquifer in close proximity to its existing wells, this strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

None identified.

Other Issues Affecting Feasibility

The most significant issue will be funding for the City of Kermit to pay for the infrastructure required for the strategy.

WUG:	**Kimble County Manufacturing**	**Capital Cost:**	$727,000
WMS Name:	**Develop Ellenburger San Saba Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,900 per acre-foot $5.83 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$200 per acre-foot $0.61 per 1,000 gal
WMS Yield:	30 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

There are undeveloped groundwater supplies in the Ellenburger San Saba aquifer in Kimble County. Water from this source is not widely used because of low well yields in most areas. Some areas have poor water quality as well. However, there appears to be some areas within the county that have sufficient well yields to meet manufacturing water needs. This strategy assumes that 2 wells, each capable of providing a peak of 40 gpm, would be drilled 1,000 feet away from where the supply is needed to provide approximately 30 acre-feet per year. These wells would produce water from approximately 190 feet below the surface.

Quantity, Reliability and Cost

This strategy could meet Kimble County manufacturing water needs for consumptive use, but not for recirculated water. This strategy assumes that up to 30 acre-feet of water per year could be produced from the Ellenburger San Saba aquifer. Reliability would be moderate to high, depending on well capacity.

Environmental Factors

Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

The Ellenburger San Saba aquifer is not widely used for ranching, industrial, domestic and municipal supplies throughout the region so potential impacts to agricultural and rural water users are not expected.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Ellenburger San Saba aquifer ranges from fresh to slightly saline in the outcrop areas, and brine water in subsurface portions. This strategy is not expected to impact key parameters of water quality.

No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

Since this source is not widely used, other water management strategies will not be affected.

Other Issues Affecting Feasibility

The most significant challenge for this strategy is locating areas with sufficient well production. There is also uncertainty regarding the amount of water needed to meet consumptive manufacturing needs in Kimble County. The amount of surface water available for manufacturing use for recirculation is greater than the amount available for consumptive use.

WUG:	**Madera Valley WSC**	**Capital Cost:**	$15,482,000
WMS Name:	**Develop Edwards Trinity Aquifer Supplies**	**Annual Cost** (During Amortization):	$3,817 per acre-foot $11.71 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$547 per acre-foot $1.68 per 1,000 gal
WMS Yield:	333 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description
Madera Valley WSC has existing wells in the Edwards-Trinity-Plateau Aquifer. This strategy assumes that four new wells will be constructed at a depth of 600 feet to develop additional groundwater supplies. These wells are assumed to be operating at a capacity of 100 gpm.

Quantity, Reliability and Cost
This strategy would increase the supply available to Madera Valley WSC by an estimated 333 acre-feet per year. The reliability of this supply is considered low to medium because of the ongoing issues Madera Valley WSC has had drilling productive wells near their service area. The estimated total capital investment required is $15.5 million. It is assumed that wells can be located with sufficient water quality that advanced treatment is not needed. If advanced treatment is found to be needed, estimated costs would increase significantly.

Environmental Factors
The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality
The aquifer has historically been a reliable groundwater source for municipal, industrial and agricultural purposes. However, the long-term water quality is unknown. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Impacts on Other Water Resources and Management Strategies
This strategy respects the MAG values in Reeves County, such that there is sufficient supplies for all recommended strategies.

Other Issues Affecting Feasibility
None identified.

WUG:	**Midland County Other**	**Capital Cost:**	$136,737,400
WMS Name:	**Develop Ogallala Aquifer Supplies with Advanced Treatment in Midland County**	**Annual Cost** (During Amortization):	$9,885 per acre-foot $30.33 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$5,743 per acre-foot $17.62 per 1,000 gal
WMS Yield:	1,401 acre-feet per year	**Implementation:**	2030
WMS Status:	Recommended		

Strategy Description

Midland County Utility District (MCUD) is in the process of developing additional groundwater in Midland County with advanced treatment. MCUD has already purchased groundwater rights from a private property holder that previously used the water for irrigated agriculture. This strategy will involve drilling several new Ogallala wells for municipal purposes, construction of an advanced water treatment plant, and a brine discharge pipeline to connect to the City of Midland's wastewater treatment facility. This project will likely be implemented in multiple phases over time as the demand develops. For planning purposes, it is conceptually broken into the first phase planned to be online by 2030, which includes 4 wells and a 0.5 MGD WTP. The next phase or phases will include additional wells and an expansion of the WTP to up to 3 MGD by 2040. The first phase will produce 234 acre-feet per year, and after final expansion will provide 1,401 acre-feet per year. Treatment plant losses were assumed to be 20%. The RO reject will then be pumped to the City of Midland Water Reclamation Facility. This strategy is a recommended strategy for Midland County Utility District (County-Other).

Quantity, Reliability and Cost

At this time the strategy assumes 4 wells will be built for phase 1 with an expected yield of 293 acre-feet per year of water. Then an additional 3 wells will be drilled, followed by the final phase of expansion that will add another 9 wells to produce a raw water yield of 1,751 acre-feet per year. After treatment losses, the final phase yield is expected to be 1,401 acre-feet per year. The source of water for this strategy is the Ogallala Aquifer, that provides a relatively reliable source of groundwater. It should be noted that there are concerns about declining water levels in the Ogallala aquifer, and there is no GCD in Midland County to enforce pumping limits. As the aquifer is drawn down, quality diminishes, resulting in the need for advanced treatment for this strategy for municipal use. Land easements and land needed for the strategy are included in the purchased water agreement, and there is no debt service for phase 1 as MCUD has available funding for this step. Capital costs for all phases of this strategy are estimated at $136.7 million.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial, and agricultural purposes. However, the long-term water quality will require advanced treatment. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Development of groundwater will divert water that was previously used for agricultural and rural purposes. However, this strategy involves groundwater rights that were obtained on a willing buyer – willing seller basis which minimizes the impacts to agriculture.

Impacts to Natural Resources and Key Parameters of Water Quality

The impacts to natural resources are expected to be minimal. Water quality is expected to be brackish, requiring advanced treatment.

Impacts on Other Water Resources and Management Strategies

The strategy proposes to utilize a sustainable level of groundwater that does not exceed the Modeled Available Groundwater (MAG) as current agricultural use of the water is replaced with municipal use from this strategy.

Other Issues Affecting Feasibility

Since this strategy proposes using the City of Midland Water Reclamation Facility, agreements must be reached between MCUD and the City of Midland for the disposal of the brine from the advanced treatment facility.

WUG:	**Pecos City**	**Capital Cost:**	$69,404,000
WMS Name:	**Expand Pecos Valley Aquifer Supplies**	**Annual Cost** (During Amortization):	$638 per acre-foot $1.96 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	8,960 acre-feet per year	**Annual Cost** (After Amortization):	$93 per acre-foot $0.29 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

The Madera Valley WSC has an existing wellfield and 10-inch transmission line that is now under Pecos City's control via a Certificate of Convenience and Necessity (CCN) transfer. Pecos City is planning to expand the wellfield yield for an additional 6-8 MGD of average annual supply from the Pecos Valley Aquifer. This strategy assumes the full 8 MGD is developed, with 11 new 650 gpm wells. For this plan, well depth is assumed to be 350 feet deep. The project also includes a 24-inch transmission line for Pecos City to connect to the expanded well field. The strategy is assumed to connect to their existing system and does not include additional costs that may be associated with the treatment of the groundwater.

Quantity, Reliability and Cost

The Reeves County Groundwater Conservation District regulates groundwater in the county. Based on the GCD rules, the new wells were assumed to be 1,200 feet apart and limited to a maximum production of six acre-feet per contiguous acre.

This strategy would increase the supply available to Pecos City by an estimated 8,960 acre-feet per year. The reliability of this supply is considered high. The estimated total capital investment is $69.4 million.

Environmental Factors

The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

The cost estimate assumes 3,000 acres will be acquired. If the strategy is implemented, the number of acres and land use on those acres will be the subject of negotiations.

Impacts to Natural Resources and Key Parameters of Water Quality

The water quality in the Pecos Valley aquifer is highly variable. However, since this is an expansion of an existing field that is currently used for municipal use, the water quality is anticipated to be good. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy respects the MAG values in Reeves County, such that there are sufficient supplies for all recommended strategies. This strategy also follows the local GCD regulations.

Other Issues Affecting Feasibility

None identified.

WUG:	**Pecos County WCID #1**	**Capital Cost:**	$16,029,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies**	**Annual Cost** (During Amortization):	$3,063 per acre-foot $9.40 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,048 per acre-foot $3.22 per 1,000 gal
WMS Yield:	560 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description
Developing additional groundwater supplies is a recommended strategy to increase the reliability of Pecos County WCID's current system. Pecos County WCID #1 is in the process of converting two irrigation wells for municipal use. The wells are located in Pecos County and utilize water from the Edwards-Trinity Plateau Aquifer. The implementation of this strategy requires a new 23 mile long 16-inch pipeline, a 45-horsepower pump station, and 0.5 MGD ground storage tank. Pecos County WCID #1 has obtained funding for this project via the United States Department of Agriculture (USDA). They have received a loan and grant for a total of $17 million, which also includes funding for their distribution system.

Quantity, Reliability and Cost
This strategy is expected to produce an additional 560 acre-feet per year from two additional wells. This source is already in use by the WCID and the reliability is considered high. The cost for the well field expansion is estimated at $16 million.

Environmental Factors
The aquifer is a proven groundwater source for municipal, industrial and agricultural purposes. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
This strategy is expected to have no impacts on agricultural or rural users. The irrigation wells being converted were not actively being used by agricultural users.

Impacts to Natural Resources and Key Parameters of Water Quality
Since this is the conversion of existing wells that are currently used for irrigation use, the water quality is anticipated to be good. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies
Because Pecos County WCID #1 has already received approval from the Texas Commission on Environmental Quality (TCEQ) and is in the process of receiving approval from the US Department of Agriculture (USDA) to move forward with the conversion of these wells, it is assumed that impacts to other water resources is minimal, if not zero. In addition, this strategy respects the MAG values in Pecos County, such that there is sufficient supplies for all recommended strategies.

Other Issues Affecting Feasibility
None.

WUG:	**Robert Lee, Bronte**	**Capital Cost:**	$18,305,000
WMS Name:	**Develop Edwards-Trinity-Plateau Supplies in Nolan County**	**Annual Cost** (During Amortization):	$18,987 per acre-foot $58.26 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,813 per acre-foot $5.56 per 1,000 gal
WMS Yield:	75 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description
Robert Lee and/or Bronte are considering developing new groundwater wells in south central Nolan County, which is in Region G. These wells produce water from the Edwards Trinity aquifer. For the purposes of this strategy, it is assumed that five new wells and approximately 15 miles of 6-inch transmission pipeline would be needed. This strategy cannot be included in the 2026 Region F Water Plan as a recommended strategy because of water availability limitations in the Modeled Available Groundwater (MAG) in Nolan County (Region G).

Quantity, Reliability and Cost
This strategy proposes to provide 75 acre-feet per year. The reliability of this strategy is considered low to medium since it is dependent on finding adequate water quality and quantity. Based on water availability limitations from the MAG, there are no remaining supplies available from the Edwards Trinity Aquifer in Nolan County to allocate to this as a recommended strategy. Capital costs are estimated at $18.3 million.

Environmental Factors
There are no significant environmental issues associated with this strategy.

Agricultural and Rural Impacts
Robert Lee and Bronte are rural communities. Increased water security provided by this strategy will have a positive impact on the vitality of this rural community.

Impacts to Natural Resources and Key Parameters of Water Quality
None identified.

Impacts on Other Water Resources and Management Strategies
If Robert Lee is able to implement one of the alternative groundwater strategies in this plan, their need to purchase from Bronte may be reduced and Bronte may be able to develop smaller quantities of future water supply. Or if Bronte were to implement this strategy, it may reduce Robert Lee's need to find additional sources of water.

Other Issues Affecting Feasibility
Since the reliability of this supply is unknown, both WUGs should consider other alternatives to meet long-term needs as well. Funding construction of these new wells will be a significant strain on the financial resources of either city.

WUG:	**Robert Lee**	**Capital Cost:**	$20,139,000
WMS Name:	**Develop Edwards-Trinity-Plateau Aquifer Supplies in Tom Green**	**Annual Cost** (During Amortization):	$9,988 per acre-foot $30.65 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$1,131 per acre-foot $3.47 per 1,000 gal
WMS Yield:	160 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description
The City of Robert Lee is currently investigating developing groundwater in far western Tom Green County in the Edwards-Trinity Plateau aquifer. For planning purposes, this strategy includes two new 100 gpm wells and a 15-mile pipeline to Robert Lee.

Quantity, Reliability and Cost
It is assumed that each well will produce approximately 100 gpm. The reliability of this strategy is medium due to uncertainty in locating supplies of adequate quality and quantity. The total cost of the project will be approximately $20.1 million.

Environmental Factors
Environmental impacts from this strategy are expected to be low. Groundwater development from this source should be evaluated for potential impacts on spring flows and base flows of area rivers. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts
Robert Lee is a rural community. Increased water security provided by this strategy will have a positive impact on the vitality of this rural community.

Impacts to Natural Resources and Key Parameters of Water Quality
The water quality of this aquifer is uncertain, but Robert Lee is actively searching for well locations with good water quality. No significant impacts to water quality are expected from the implementation of this strategy. No impacts to natural resources were identified.

Impacts on Other Water Resources and Management Strategies
If Robert Lee is able to implement one of the alternative groundwater strategies in this plan, their need to purchase from Bronte may be reduced and Bronte may be able to develop smaller quantities of future water supply.

Other Issues Affecting Feasibility
Since the reliability of this supply is unknown, the City should consider other alternatives to meet long-term needs as well. Funding construction of these new wells will be a significant strain on the financial resources of the City.

WUG:	**Sterling City**	**Capital Cost:**	$16,804,000
WMS Name:	**Develop Edwards-Trinity Plateau Alluvium Aquifer Supplies**	**Annual Cost** (During Amortization):	$1,542 per acre-foot $4.73 per 1,000 gal
WMS Type:	Groundwater Development	**Annual Cost** (After Amortization):	$191 per acre-foot $0.59 per 1,000 gal
WMS Yield:	875 acre-feet per year		
WMS Status:	Recommended	**Implementation:**	2050

Strategy Description

Sterling City's existing water supplies come from a well field with two wells. The wells provide redundancy for one another but cannot be operated concurrently given their proximity. Given the water demand projections for the city, a need is projected by 2050 that grows to 875 acre-feet by 2080. This groundwater development strategy assumes Sterling City will drill two wells in the Edwards-Trinity (Plateau) Aquifer, connect them with necessary piping, and then transport the supplies to Sterling City through a six mile, 12-inch transmission line.

Quantity, Reliability and Cost

This strategy is estimated to supply 875 acre-feet per year from two wells, each capable of producing a peak of 800 gpm. For planning purposes, the wells were assumed to be 660 feet apart (per Sterling County Underground Water Conservation District guidelines), 160 feet deep (which is equal to the depth of Sterling City's deepest existing well), and six miles from town (which is the distance to the existing well field). The reliability of this strategy is considered high. The estimated cost of this strategy is $16.8 million.

Environmental Factors

Environmental impacts are expected to be low. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

The new wellfield is estimated to occupy one acre of land. This strategy is expected to have no other impacts on agricultural or rural users.

Impacts to Natural Resources and Key Parameters of Water Quality

This strategy proposes to use a rate of groundwater extraction that does not exceed the Modeled Available Groundwater (MAG) for the Edwards-Trinity Aquifer in Sterling County. The impacts to natural resources are expected to be minimal. No impacts to water quality are expected.

Impacts on Other Water Resources and Management Strategies

No impacts on other water management strategies are anticipated.

Other Issues Affecting Feasibility

No other issues affecting feasibility have been identified at this time.

WUG:	**UCRA**	**Capital Cost:**	$13,550,000
WMS Name:	**Develop Lipan Aquifer Supplies**	**Annual Cost** (During Amortization):	$313 per acre-foot $0.96 per 1,000 gal
WMS Type:	Groundwater Development		
WMS Yield:	5,000 acre-feet per year	**Annual Cost** (After Amortization):	$123 per acre-foot $0.38 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

This conceptual strategy for UCRA is to purchase up to 5,000 acre-feet per year of Lipan Aquifer supplies from irrigation users in Tom Green County. Purchase of irrigation water rights will be on a voluntary basis and not exceed current irrigation use in the county.

This strategy assumes the development of a new wellfield with 10 wells and collection and transmission pipelines. The wells are approximately 175 feet deep.

Quantity, Reliability and Cost

This strategy is estimated to supply 5,000 acre-feet per year from 10 wells, each capable of producing a peak of 400 gpm. Based on the distance requirements from the Lipan-Kickapoo Water Conservation District, the wells are assumed to be 330 feet apart. The wells are 175 feet deep and connected to a 20-inch transmission pipeline. For this plan, the transmission pipeline is assumed to connect into the San Angelo water system 2 miles away. The actual connection configuration to customers is unknown and may change as this project is further developed. The strategy does not account for the purchase cost for irrigation water, or any costs associated with advanced treatment. If advanced treatment is found to be needed, the costs would increase significantly. Since this strategy is reallocating current irrigation supplies it is expected to stay within the MAG limits for the Lipan Aquifer. Blending the groundwater will also help to reduce treatment costs. The reliability of the supply is considered medium. The capital costs are estimated at $13.6 million.

Environmental Factors

Environmental impacts from this strategy are expected to be low as this strategy is reallocating currently developed supplies. It is unlikely that this strategy would cause subsidence.

Agricultural and Rural Impacts

Development of this strategy may divert water that was previously used for agricultural and rural purposes, but this strategy is expected to have minimal impact as the purchase of irrigation supplies will be voluntary.

Impacts to Natural Resources and Key Parameters of Water Quality

Parts of the Lipan Aquifer can have excess nitrates and TDS concentrations which do not meet drinking water standards. This strategy will blend the groundwater with deeper Permian basin water before treatment to meet drinking water standards. This strategy is within the county MAG limitations for the aquifer. No impacts to natural resources have been identified.

Impacts on Other Water Resources and Management Strategies

This strategy would remove some supply for irrigation in Tom Green County. Since it is a voluntary program for irrigators it assumes the demand for irrigation decreases for currently allocated and developed supplies. No other water management strategies are expected to be impacted.

Other Issues Affecting Feasibility

Additional study would be needed to determine feasibility and potential impacts once a more specific location for the well field and a more defined pipeline route have been selected. The willingness of irrigators and cost of purchasing irrigation water rights will also be a consideration and this strategy is dependent upon all parties reaching mutually agreeable terms.

APPENDIX C

C.5 DESALINATION

MWP:	**San Angelo**	**Capital Cost:**	$186,030,000
WMS Name:	**Desalination of Brackish Groundwater Supplies**	**Annual Cost** (During Amortization):	$3,071 per acre-foot $9.42 per 1,000 gal
WMS Type:	Treatment of New Groundwater	**Annual Cost** (After Amortization):	$1,902 per acre-foot $5.84 per 1,000 gal
WMS Yield:	11,200 acre-feet pear year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

This strategy assumes that supply from San Angelo's groundwater strategies in Schleicher and Pecos Counties is brackish and will require additional advanced treatment to meet drinking water standards. For planning purposes, the advanced treatment plant is assumed to be located near the proposed well field. This strategy is sized to treat 15 MGD acre-feet of raw brackish supplies. The advanced treatment processes associated with brackish water desalination result in around 25 percent losses, resulting in about 10 MGD (11,200 acre-feet) of finished water. For planning purposes, the brackish supplies are assumed to have a starting salinity of 5,000 TDS. Five 1,000-gpm deep brine injection wells were also included for concentrate disposal.

Quantity, Reliability and Cost

The treated supply made available through this strategy is estimated to be 10 MGD (11,200 acre-feet per year). It should be noted that this strategy involves supplies from other potentially feasible strategies for San Angelo and is therefore not additive. Because of the uncertainty involved with development of this source for municipal water use, the reliability of this strategy is considered moderate. The capital cost for this strategy is estimated at $186.0 million. This equates to $9.42 per thousand gallons during debt service for treatment of the brackish groundwater only. After the infrastructure is fully paid for, the price for treatment drops to $5.84 per thousand gallons.

Environmental Factors

The conceptual design for this project uses deep well injection for brine disposal. A properly designed and maintained facility should have minimal environmental impact. Construction of the treatment facility should have minimal environmental impact as well.

Agricultural and Rural Impacts

Since this strategy relies on brackish supplies that are not readily usable for agricultural or municipal users, competition for the water is expected to be minimal. Therefore, agricultural and rural impacts are expected to be minimal.

Impacts to Natural Resources and Key Parameters of Water Quality

The current conceptual design for this project uses deep well injection to dispose of the brine waste stream. If this were to change and the brine was released to a stream, impacts to the receiving water body would need to be evaluated.

Impacts on Other Water Resources and Management Strategies

Since this strategy relies on brackish supplies that cannot be used without significant treatment, impacts to other strategies will be minimal.

Other Issues Affecting Feasibility

None identified.

APPENDIX C

C.6 REGIONAL WATER MANAGEMENT STRATEGIES

WUGs:	**San Angelo, BCWID #1**	**Capital Cost:**	N/A
WMS Name:	**Brush Control**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Regional	**Annual Cost** (After Amortization):	$535 per acre-foot $1.64 per 1,000 gal
WMS Yield:	490 acre-feet pear year		
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

Brush control has been identified as a potentially feasible water management strategy for Region F. It has the potential to enhance the existing supply from the region's reservoirs.

Prior to settlement, most of Texas was grassland. Along with settlement came grazing animals which, for a number of reasons, created an environment that favored shrubs and trees (brush) rather than grasslands. Brush not only increases the costs of land management and decreases the livestock carrying capacity of the land, but certain species of brush can drastically reduce water yield in a watershed. For these reasons, an effort was brought forth to control this brush and convert land back to grasslands.

In 1985, the Texas Legislature authorized the Texas State Soil and Water Conservation Board (TSSWCB) to conduct a program for the "selective control, removal, or reduction of … brush species that consume water to a degree that is detrimental to water conservation." In 1999 the TSSWCB began the Brush Control Program. In 2011, the 82nd Legislature replaced the Brush Control Program with the Water Supply Enhancement Program (WSEP). The WSEP's purpose is to increase available surface and groundwater supplies through the selective control of brush species that are detrimental to water conservation. The WSEP considers priority watersheds across the State, the need for conservation within the territory of a proposed project, and if the Regional Water Planning Group has identified brush control as a strategy in the State Water Plan as part of their competitive grant, cost sharing program. Five species are eligible for funding from the WSEP:

- Juniper
- Mesquite
- Salt cedar
- Huisache*
- Carrizo cane*

**These are classified as other species of interest and are conditionally eligible.*

Methods of Brush Control

A number of methods can be employed to control brush. They include mechanical, chemical, prescribed burning, bio-control, and range management. Mechanical brush control methods can range from selective cutting with a hand axe and chainsaw to large bulldozers.

Several herbicides are approved for chemical brush control. The herbicides may be applied from aircraft, from booms on tractor-pulled spray rigs, or from hand tanks. Some herbicides are also available in pellet form. The herbicides Triclopyr (Remedy®) and Clopyralid methyl (Reclaim®) are approved herbicides for ongoing TSSWCB brush programs. Arsenal is the herbicide typically used for removal of salt cedar. These chemicals were shown to achieve about 70 percent root kill in studies around the

State and in adjacent states. Specific soil temperature and foliage conditions must be met in order for chemical brush control to be effective.

Prescribed burning is also used to control brush. Burning is conducted under prescribed conditions to specifically target desired effects. There are some limitations, however, burning rarely affects moderate to heavy stands of mature mesquite. Burning only top kills the smooth-bark mesquite plants and they re-sprout profusely. In addition, for mesquite, fire only gives short-term suppression and it stimulates the development of heavier canopy cover than was present pre-burn. Fire is not usually an applicable tool in moderate to heavy cedar or juniper because these stands suppress production of an adequate amount of grass for fire fuel. Fire can be excellent for controlling junipers over 4 feet tall, if done correctly. Prescribed burning is often not recommended for initial clearing of some heavy brush due to the concern that the fire could become too hot and sterilize the soil. Burning is often used for maintenance of brush removal that has been initially performed through some other method.

Research has shown that the Asian leaf beetle can consume substantial quantities of salt cedar in a relatively short time period, and generally does not consume other plants. Different subspecies of the Asian beetle appear to be sensitive to varying climatic conditions, and there is ongoing research on appropriate subspecies for Texas. It is recommended that this control method be integrated with chemical and mechanical removal to best control re-growth.

Range or grazing management should follow any type of upland brush control. It allows the regrowth of desirable grasses, maintaining good groundcover that hinders establishment of woody plant seedlings. Continued maintenance is necessary to realize the long-term benefits of brush control.

Brush control is a potential water management strategy. Predicting the amount of water that would be made available by implementing a brush control program is difficult, but some estimates have been made. For a watershed to be eligible for cost-share funds from the WSEP, a feasibility study must demonstrate increases in projected post-treatment water yield as compared to the pre-treatment conditions. Feasibility studies have been conducted and published for the following watersheds in Region F[2]:

- Lake Brownwood
- North Concho River (O.C. Fisher Lake)
- O.H. Ivie Reservoir (Lake Basin)
- O.H. Ivie Reservoir (Watershed, Upper Colorado River and Concho River)
- E.V. Spence (Upper Colorado River)
- Lake J.B. Thomas (Upper Colorado River)
- Twin Buttes Reservoir (including Lake Nasworthy)
- Upper Llano River, including South and North Llano Rivers and Junction City Lake

Twin Buttes Reservoir/Lake Nasworthy Brush Control Projects

Brush control projects are on-going to enhance the amount of water flowing into the Twin Buttes Reservoir/Lake Nasworthy complex. Twin Buttes Reservoir is used to maintain sufficient water levels in Lake Nasworthy, which serves as a water supply for the City of San Angelo.

Lake Brownwood Project

There are federally funded efforts to treat mesquite and juniper in the Lake Brownwood watershed but not through the state funded WSEP.[3] Lake Brownwood provides municipal, industrial and agricultural water supply to Brown County and surrounding areas.

Although many studies have illustrated the benefits of brush control, it is difficult to quantify the benefits in the context of regional water planning. This quantification is very important because in most areas where the program is being implemented, hydrologic records indicate long term declines in reservoir watershed yields (some as much as 80%). Region F has been in critical drought conditions during most of the time that the region's brush removal programs have been in place, so the monitoring programs associated with these projects may not have shown significant gains due to the lack of rainfall events. Also, the benefits from brush control are long term; it takes time for aquifers to recharge and for watersheds to return to pre-brush conditions. This fact was recognized by the various scientists during the initial planning for the Texas Brush Control Program and the preparation of numerous feasibility studies.

The TSSWCB uses a competitive grant process to rank the most feasible projects and allocates the WSEP cost-share funds according to the project that balances the most critical water conservation need with the highest projected water yield. Once the funding has been allocated to a project, a geospatial analysis is performed to determine the acreage that has the highest potential to yield water within the watershed. The analysis will subdivide each project area into four priority zones – high, medium, low, and not eligible. Landowners who are in the high priority zone have greater support for funding. The TSSWCB then works through Soil and Water Conservation Districts (SWCDs) to provide technical and financial assistance to landowners. Cost-share funding is based on the actual cost and is not to exceed the average cost established in the project's implementation plan. Payments are determined by acreage times the cost-share rate times the actual cost to implement.

In order to be an effective and reliable long-term water production strategy, areas of brush once removed, must be maintained. Follow-up treatment is essential to the program and has been built into the TSSWCB landowner contracts. During the 10-year contract period landowners must perform any needed follow-up treatment. The landowners will be subjected to periodic reviews by their local SWCD or the TSSWCB to determine compliance. If a landowner is found out of compliance, they will not be eligible for another WSEP contract for a period of ten years. It is important to note that any follow-up brush control is entirely the landowners' financial responsibility, and they cannot receive any additional state funds for this follow-up brush control.

The Water Supply Enhancement Program for the State of Texas has not been funded since 2019 but funds may be available in future years. If funding is available, Region F supports local sponsors partnering with the WSEP to implement brush control.

Quantity, Reliability, and Cost

The quantity of supply expected from this strategy is relatively small and is shown in Table C-12 below. There are no capital costs associated with this strategy, only annual operating costs. The supply from this strategy is considered to be of low reliability since brush must be continually treated to continue to provide additional supplies and must have rainfall to produce yield.

Table C- 12
Brush Control Quantities and Cost

Sponsor	Watershed	Estimated Acres Treated[a]	Estimated Cost Per Acre (Sep 2023)[b]	Annual Cost	Enhanced Yield[a] (acre-feet/year)	Unit Cost ($/ac-ft)
San Angelo	Twin Buttes Reservoir	586	$91	$54,000	90	$600
BCWID	Lake Brownwood	958	$197	$188,000	400	$470
				Total	**490**	
					Average	**$535**

a. Estimated acres treated and enhanced water yield data come from the 2017 WSEP Annual Report.
b. Costs come from the 2017 State Water Supply Enhancement Plan. Costs were escalated from 2015 dollars to 2023 dollars using the CCI published by ENR.

Environmental Factors

The Texas Parks and Wildlife Department (TPWD) lists the potential environmental impacts of brush control as alteration of terrestrial habitat, increased sediment runoff and erosion, impacts from chemical control measures, potential for increased groundwater recharge, impacts to aquatic and terrestrial communities and ecosystem process, and influence on energy and nutrient inputs and processing.[4] Region F suggests coordinating with TPWD and other state and federal agencies regarding any brush control program.

Agricultural and Rural Impacts

Invasive brush has altered the landscape of Region F and the rest of West Texas. Restoration of much of the landscape to natural grassland conditions will benefit the ranching economy of the region as well as enhance water supplies.

Impacts to Natural Resources and Key Parameters of Water Quality

Although invasive brush has impacted water supplies and altered the natural landscape of the region and reduced runoff, in some cases the brush has provided habitat for wildlife. In addition to the environmental benefits of this habitat, some of this habitat is suitable for deer and other game. Hunting is an important part of the economy of Region F. Therefore, it may be desirable to leave portions of a watershed with brush to maintain habitat.

Impacts on Other Water Resources and Management Strategies

If the program is adequately implemented and maintained, brush control could supplement existing supplies.

Other Issues Affecting Feasibility

The most significant factor regarding the feasibility of this strategy is ongoing funding for brush control projects. Since 2019, no state funding has been made available for this program. Brush control is an ongoing process that must be constantly maintained for the water savings to be realized. Existing programs may provide funding for the initial clearing of brush but any necessary follow-up brush control is typically the landowner's financial responsibility. Further clarification is needed as to whether the landowner will be able to receive any additional state funds for ongoing brush control maintenance. Without maintenance and monitoring, brush control will not be effective as either a range management or water management strategy.

Brush control depends on the ongoing cooperation and financial contributions of individual landowners. Therefore, each program should be tailored to local conditions.

WUGs:	**Irrigation Users**	**Capital Cost:**	N/A
WMS Name:	**Weather Modification**	**Annual Cost** (During Amortization):	N/A
WMS Type:	Regional		
WMS Yield:	6,968 acre-feet per year	**Annual Cost** (After Amortization):	$0.41 per acre-foot
WMS Status:	Recommended	**Implementation:**	2030

Strategy Description

Weather modification is a water management strategy currently used in Texas to increase precipitation released from clouds over a specified area typically during the summer months. The most common form of weather modification or rainfall enhancement is cloud seeding. Early forms of weather modification began in Texas in the 1880s by firing cannons to induce convective cloud formation. Current cloud seeding techniques are used to enhance the natural process for the formation of precipitation in a select group of convective clouds.

Convective clouds, also known as cumulus clouds, are responsible for producing the bulk of rainfall during any given year in Texas.[5] The cloud seeding process increases the availability of ice crystals, which bond with moisture in the atmosphere to form raindrops. This is accomplished by injecting a target cloud with artificial crystals, such as silver iodide, and is known as glaciogenic seeding. Hygroscopic seeding, or injecting calcium chloride into target clouds, is often used in tandem with glaciogenic seeding. Specially equipped aircraft release the seeding crystals into clouds as flares that are rich in super cooled droplets. The silver iodide crystals form water droplets from available moisture in the air. Droplets then collide with droplets transforming the ice crystal into a raindrop.

Weather modification is most often utilized as a water management strategy during the dry summers in West Texas, with the season beginning in March and ending in October. The water produced by weather modification augments existing surface and groundwater supplies. It also reduces the reliance on other supplies for irrigation during times of normal and slightly below normal rainfall. However, not all of this water is available for water demands. Some of this precipitation is lost to evaporation, evapotranspiration, and local ponds. During drought years the amount of additional rainfall produced by weather modification may not be significant. However, during wet years, the amount of water produced by weather modification may be significant.

The amount of water made available to a specific entity from this strategy is difficult to quantify, yet there are regional benefits. Four major benefits associated with weather modification include:

- Improved rangeland and agriculture due to increased precipitation
- Greater runoff to streams and rivers due to higher soil moisture
- Groundwater recharge
- Hail suppression

In Region F, there are two ongoing weather modification programs: the West Texas Weather Modification Association (WTWMA) project and the Trans-Pecos Weather Modification Association (TPWMA) program.

West Texas Weather Modification Association (WTWMA) Project

The WTWMA began weather modification efforts in 1995. The intent of the rainfall enhancement program was to increase groundwater recharge, springflow, and runoff resulting in increased agricultural productivity and reduction in groundwater withdrawals. A side effect of the rain enhancement operations includes hail suppression but that is not one of the main intents of the program. WTWMA has operated in seven counties covering an area of 6.4 million acres. In 2022, a total of 54 clouds were seeded as part of the WTMA's rain enhancement efforts in 26 operational days. WTWMA estimated a 17.3 percent increase in rainfall in the target area because of their operations. Table C-13 shows a breakdown by county of the estimated increase in rainfall for the year 2022 from the annual report of the West Texas Weather Modification Association.[6]

Table C- 13
Estimated Precipitation Increase for the Year 2022 due to WTWMA Activities

County	Inches (increase)	Rain Gage (season value)	% (increase)
Crockett	0.83	4.85	17.1%
Irion	1.76	8.72	20.2%
Reagan	0.46	5.43	8.5%
Schleicher	1.47	7.50	19.6%
Sterling	1.20	7.35	16.3%
Sutton	1.76	8.81	20.0%
Tom Green	1.59	8.26	19.3%
Average	**1.30**	**7.27**	**17.3%**

Data are from the West Texas Weather Modification Association.

Trans-Pecos Weather Modification Association (TPWMA) Program

The TPWMA began operation in 2002. The TPWMA consists of the Ward County Irrigation District and other political entities from Culberson, Loving, Reeves, Ward and parts of Pecos County. The program's target area covers over 5.1 million acres along and to the west of the Pecos River from El Paso to Midland. In 2022, TPWMA estimated a 15.7 percent increase in precipitation from cloud seeding.

Table C-14 shows a breakdown by county of the estimated increase in rainfall for the year 2022 from the annual report of the Trans-Pecos Weather Modification Association.[7]

Table C- 14
Estimated Precipitation Increase for the Year 2022 due to TPWMA Activities

County	Inches (Increase)	Rain Gauge (season value)	% Increase
Loving	0.77	7.93	9.7%
Pecos	1.41	7.10	19.9%
Reeves	1.31	8.58	15.3%
Ward	1.17	6.62	17.7%
Average	**1.17**	**7.56**	**15.7%**

Data are from the Trans-Pecos Weather Modification Association and counties within Region F.

Quantity, Reliability and Cost

Benefits of the weather modification programs are widespread and are difficult to quantify in the context of regional water planning. To precisely estimate the benefit of weather modification requires an estimate of how much precipitation would have occurred naturally without weather modification, and an estimate of how much of the increase in precipitation becomes directly available to a water user. Analysis from 2004 to 2013 performed by Ruiz-Columbiè (2014)[8] which compared seeded clouds with non-seeded clouds resulted in precipitation increases of 8 to 20 percent or up to 2 inches per year. Rain gauges within and outside the target area provided confirmatory results.

For purposes of this plan, weather modification is a recommended strategy for irrigated agriculture for counties that currently participate in an active program. It is assumed that the increase in rainfall will offset irrigation water use. To determine the water savings associated with this strategy, an estimate of the increase in annual rainfall over the growing season is applied directly to the irrigated acreages. [9] These savings are shown by county in Table C-15.

Table C- 15
Water Savings due to Precipitation Enhancement per County

Weather Modification Program	County	2022 Irrigated Acreage[a] (acres)	Coverage %	Annual Increase (feet)[b]	Water Savings (ac-ft/yr)	Cost ($) (4.5 cents per acre)	Cost per Ac-Ft ($/ac-ft)
TPWMA	Pecos	15,059	100%	0.12	1,807	$678	$0.38
TPWMA	Reeves	19,783	100%	0.11	2,176	$890	$0.41
TPWMA	Ward	530	100%	0.10	53	$24	$0.45
WTWMA	Crocket	2,382	100%	0.07	167	$107	$0.64
WTWMA	Irion	1,037	100%	0.15	156	$47	$0.30
WTWMA	Reagan	6,686	100%	0.04	267	$301	$1.13
WTWMA	Schleicher	5,720	100%	0.12	686	$257	$0.38
WTWMA	Sterling	1,064	100%	0.10	106	$48	$0.45
WTWMA	Tom Green	26,497	45%	0.13	1,550	$537	$0.35
				Total	**6,968**	**$2,888**	**$0.41**

a. Irrigated acres come from the 2022 US Ag Census.
b. Annual increase values based on the 2022 Annual Evaluation Reports for the WTWMA and TPWMA.

The reliability of water supplies from precipitation enhancement is considered to be low for two reasons. First, it is uncertain how much water is made directly available per water user. Second, during drought conditions precipitation enhancement may not result in a significant increase in water supply. (The guidelines for regional water planning in TAC §357.5(a) specifies that regional water planning evaluate supplies from water management strategies during critical drought conditions.) Cloud formations suitable for seeding may not occur frequently during drought, so benefits during drought may be negligible. During the drought of 2011, the WTWMA target area averaged a precipitation increase of 1.12 inches per year, the lowest of 2004-2013. Among the counties, the increase in precipitation was between 0.77 inches per year and 1.54 inches per year, resulting in half of the counties receiving over 1 inch of rainfall from cloud seeding.

The cost of operating Texas weather modification programs is approximately 4 to 5 cents per acre[10]. For the purposes of this plan, a cost of 4.5 cents per acre was applied. On average, this results in a cost of $0.41 per acre-foot of water supply.

Environmental Factors

Weather modification should have a positive impact on the environment due to the increased rainfall from storms. Possible benefits include improved wildlife habitat and landscapes. The chemicals used in weather modification should be sufficiently diluted to minimize any threat of contamination.

Agricultural and Rural Impacts

Weather modification has a positive impact on agriculture and ranching by increasing productivity. Dry land farm production, a common means of measuring the effects of rainfall enhancement, has increased in regions participating in rainfall enhancement. Another benefit of weather modification is hail

suppression, which helps minimize damage from severe weather, but is not a primary goal of the TPWMA and WTWMA programs.

Dryland farming revenues can increase by $4.6 million for each additional one inch of rainfall created through weather modification (Johnson, 2014)[12].

Impacts to Natural Resources and Key Parameters of Water Quality

Increased rainfall over the target areas results in increased aquifer recharge. Recharge efforts are ideal in the winter months when evapotranspiration is lowest, however no programs are known to have successfully attempted such seeding.

No impacts to key parameters of water quality were identified for this strategy.

Impacts on Other Water Resources and Management Strategies

This strategy may reduce the demand for water from other water management strategies. Downwind impacts of increased precipitation to areas outside target areas is also an additional benefit.

Other Issues Affecting Feasibility

The most significant issue facing existing weather modification programs is funding. In many cases these programs rely on the cooperation of several entities and the availability of outside funding to continue operations. State funding for weather modification has been absent since 2002. Many of the programs that chose to contract out their operations instead of purchasing equipment with state funding have been discontinued. In addition, there is some local opposition to precipitation enhancement.

WUGs:	**Midland, San Angelo, Abilene**	**Capital Cost:**	$ 796,828,000
WMS Name:	**West Texas Water Partnership**	**Annual Cost** (During Amortization):	$2,267 per acre-foot $ 6.96 per 1,000 gal
WMS Type:	Regional		
WMS Yield:	28,400 acre-feet	**Annual Cost** (After Amortization):	$381 per acre-foot $1.17 per 1,000 gal
WMS Status:	Recommended	**Implementation:**	2040

Strategy Description

In December 2010, the cities of Abilene, Midland and San Angelo met to discuss cooperative strategies in response to a developing drought. As the drought intensified a cooperative response could not be timely implemented, and the cities constructed and brought on-line individual strategies to provide adequate water supplies for their customers. Recognizing the benefits of working together to address future water supplies, the three cities continued to meet and evaluate long-term water supplies for the West Texas region. Through an Interlocal Agreement, the cities formed the West Texas Water Partnership (Partnership or WTWP) to pursue water management strategies that could be jointly developed by the Partnership. In May 2020, the three cities announced a 50-year agreement with Fort Stockton Holdings (FSH) for the purchase and use of their groundwater rights in Pecos County. This agreement for untreated groundwater is based on a take-or-pay basis with each city paying their proportional share of the entire agreement volume.

The WTWP contracted for groundwater from the Edwards-Trinity Plateau Aquifer in Pecos County (GMA 7). The total contracted supply is 28,400 acre-feet per year (acft/yr), allocated as follows: Abilene – 8,400 acft/yr; Midland – 15,000 acft/yr; and San Angelo – 5,000 acft/yr.

To provide 28,400 acft/yr, nine (9) groundwater supply wells are anticipated to be constructed. Groundwater from the FSH wellfield will be transported through a 48-inch pipe from Fort Stockton to the City of Midland's Terminus Site. Abilene will receive its share of the WTWP through an exchange of contracted supplies in Lake Ivie from Midland and San Angelo. This water will be transported to Abilene through existing infrastructure. San Angelo may use additional Ivie supplies or during periods of time when Ivie water is not available, CRMWD's existing pipeline could potentially be used to transport the groundwater supplies. Use of this pipeline for the groundwater supplies would require agreements that have not yet been reached and are dependent upon all parties involved reaching mutually agreeable terms. If an agreement was not able to be made, an additional segment of pipeline from Midland to San Angelo would be needed and the estimated project costs would increase.

Advanced treatment will be required for a portion of the groundwater flow to meet regulatory standards. Preliminary evaluations indicate about 60% of the flow will undergo treatment using ultrafiltration followed by reverse osmosis. Final treatment requirements will be determined during preliminary design. To maximize use of this groundwater source, a recovery stage is proposed for both the ultrafiltration and reverse osmosis processes. Waste from the treatment process is expected to be approximately 5 percent, which is comparable to conventional treatment. Waste will be disposed using evaporation ponds. The treatment plant will be located on Midland's Terminus Site.

Quantity, Reliability and Cost

To minimize the size and cost of the transmission pipeline between Midland and San Angelo, the Partnership anticipates developing a cooperative use strategy for its collective supplies in O.H. Ivie

Reservoir (Ivie). Each of the three of the WTWP cities contract with the Colorado River Municipal Water District (CRMWD) for 16.54% of the safe yield from Ivie. Under the anticipated cooperative use strategy, Abilene would utilize the other partner's Ivie allocation in exchange for a portion of Abilene's Edwards-Trinity Plateau groundwater allocation. As discussed previously San Angelo may also use Ivie supplies when available or may receive groundwater through existing infrastructure if agreements between the parties can be reached. This approach reduces the quantity of groundwater to be transported beyond Midland and infrastructure requirements. The Partnership will need to reach agreement with CRMWD to implement a cooperative use strategy of the Partnership's collective Ivie supplies and for use of existing transmission infrastructure for groundwater supplies to San Angelo when needed. Implementation in such a manner is dependent upon all parties reaching mutually agreeable terms. The cost sharing agreement does not change, and the total project costs would be shared by the three participants.
The total quantity of supply from this strategy is 28,400 acre-feet. Elevated levels of total dissolved solids, notably chloride, will require a portion of the supply to undergo advanced treatment. It is anticipated that the reliability for this source is high.

The capital cost to fully implement this strategy is $1,205,826,000.

Environmental Factors

The environmental issues associated with this strategy are expected to be low. It is assumed that the new pipelines would be routed around sensitive environmental areas to limit potential impacts. The conceptual design for this project includes evaporation ponds for the disposal of treatment waste stream. A properly designed and maintained facility should have minimal environmental impact.

Agricultural and Rural Impacts

Construction of the pipelines may have temporary impacts on agricultural or rural users whose land is temporarily disrupted but no permanent impacts are anticipated. The treatment facility and evaporation ponds are anticipated to be built on the City of Midland's Terminus Site which is property already owned by the City so it will not cause further impacts to agricultural land.

Impacts to Natural Resources and Key Parameters of Water Quality

The current conceptual design for this project uses evaporation ponds to dispose of the brine waste stream. If this were to change and the brine was released to a stream, impacts to the receiving water body would need to be evaluated.

Impacts on Other Water Resources and Management Strategies

This strategy may also impact the need for and timing of other strategies of the participants.

Other Issues Affecting Feasibility

The strategy is conceptual in nature and will continue to develop. As with all strategies, prior to implementation, the partners will need to obtain all necessary permits.

WUGs:	**Bronte, Ballinger, Winters, Robert Lee**	**Capital Cost:**	$211,788,000
WMS Name:	**Regional System from Lake Ft. Phantom Hill to Runnels and Coke Counties**	**Annual Cost** (During Amortization):	$15,116 per acre-foot $46.38 per 1,000 gal
WMS Type:	Regional	**Annual Cost** (After Amortization):	$1,739 per acre-foot $5.34 per 1,000 gal
WMS Yield:	1,114 acre-feet per year		
WMS Status:	Alternative	**Implementation:**	2040

Strategy Description

Fort Phantom Hill Reservoir is located in Jones County in Region G. In 2013, the City of Clyde purchased a 2,500 acre-foot water right in Fort Phantom Hill Reservoir from an abandoned steam electric power generation facility. The City of Clyde amended the water right to expand its use for municipal supply and also secured an interbasin transfer to select counties including Runnels and Coke Counties. The City of Clyde does not currently receive any supply from the reservoir. For the purposes of this strategy, it is assumed that 1,114 acre-feet of water would be available to serve Ballinger, Bronte, Robert Lee, and Winters. This strategy includes the construction of a new intake on Lake Fort Phantom Hill and a new pipeline and associated infrastructure to connect to Winters, Ballinger, and Bronte. It was assumed that existing infrastructure from Bronte to Robert Lee could be used to convey supplies to Robert Lee. This strategy is for infrastructure to transport raw water and does not include additional costs associated with treatment of the water.

Quantity, Reliability and Cost

Many watersheds throughout the State are over-appropriated, i.e. not all water rights can be fully met at all times. Thus, the yields from a water right are often less than the amount shown in the water right. This is also the case for Fort Phantom Hill Reservoir. Based on water availability analyses, the City of Clyde's water right would translate into 1,114 acre-feet of safe yield in 2030. The yield is projected to decrease to 952 acre-feet of safe yield in 2070. The division of supply is shown below in Table C-18. This source is considered to be reliable. Capital costs are estimated at $211.8 million and are assumed to be split amongst the entities that would need to enter into a partnership to implement this strategy. The exact division of costs would be negotiated as part of the partnership to implement the proposed strategy.

Table C- 18
Potential Supply by User

Water User Group	Supply (%)	2030 (ac-ft)
Winters	15.1%	168
Ballinger	43.3%	482
Bronte	30.3%	338
Robert Lee	11.3%	126
Total	**100%**	**1,114**

Environmental Factors

Since this supply is from an existing reservoir and water right, the environmental impacts are expected to be minimal. The disruption from the construction of the pipeline is expected to be minor and

temporary. Specific environmental studies would be required to assess impacts at the intake location and along the pipeline. It is assumed that the pipeline would be routed to avoid environmentally sensitive areas, where possible.

Agricultural and Rural Impacts

Ballinger, Bronte, Winters and Robert Lee are rural communities. Having a sustainable water supply source will improve the vitality of the rural community. No agricultural impacts are expected.

Impacts to Natural Resources and Key Parameters of Water Quality

Since this strategy provides water from an existing reservoir and water right, no impacts to natural resources or water quality are expected.

Impacts on Other Water Resources and Management Strategies

This strategy utilizes water from Fort Phantom Hill Reservoir which is operated, maintained, and used by the City of Abilene. Coordination on use from this source would be needed to avoid impacting Abilene's water supplies.

Other Issues Affecting Feasibility

This strategy is dependent upon agreements between multiple parties that are outside the scope of regional water planning. The cost estimate does not include costs associated with any water treatment that may be necessary. The cost may be prohibitive.

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[9] United States Department of Agriculture, National Agricultural Statistics Service. "2022 Census of Agriculture, Texas State and County Data." Report. https://www.nass.usda.gov/Publications/AgCensus/2022/index.php

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APPENDIX D
COST ESTIMATES

Region F Cost Estimates

As part of the 2021 Region F Water Plan, cost estimates were developed for each of the recommended and alternative water management strategies in Region F. As appropriate, these cost estimates have been updated for the 2026 regional water plan. In accordance with the Texas Water Development Board guidance the costs for water management strategies are to be updated from September 2018 dollars to September 2023 dollars. The methodology used to develop the 2026 costs is described in the following sections and additional information can be found in the Uniform Costing Model User Guide Version 3.0 prepared for the Texas Water Development Board.

D.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 Development of the 2026 Regional Water Plans (Exhibit C)", Section 2.5.2.12. 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 that 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 Development of the 2026 Regional Water Plans (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% 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.

D.2 Assumptions for Capital Costs

The unit cost and factors shown in the Tables D-1 through D-7 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.
- 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.

Conveyance Systems

Standard pipeline costs used for these cost estimates are shown in Table D-1. Pump station costs are based on required horsepower capacity of capacity (MGD) and are listed in Table D-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).
- Peaking factor of 1.2 to 1.5 can be used if there are additional water sources and/or the water is transported to a terminal storage facility.
- The target flow velocity in pipes is 5 fps and the Hazen-Williams Factor is assumed to be 120.
- Ground storage is to be provided at each booster pump station along the transmission line unless there is a more detailed design.
- 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 D-3. Covered storage tanks are used for all strategies transporting treated water.

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 D-4. All treatment plants are to be sized for finished water capacity.

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. The TWDB costing tool contains cost estimation tables for advanced water treatment facilities (AWTF) for direct potable reuse strategies. These costs were adapted from TWDB DPR Resource Document Table 5-1 and are summarized in Table D-5. 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 construction of an entirely new plant.
- Approximately two miles of 6-inch pipeline was also included in the cost estimates for 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.

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 Tables D-6 and D-7. The costing tool differentiated the wells based upon purpose. The categories were Public Supply, Irrigation, Aquifer Storage and Recovery (ASR), and Injection Wells (for injecting reject water from various types of projects). 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 screen. 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.

Other Costs

- 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.)

- Permitting and mitigation for transmission and treatment projects are to be estimated at $30,000 per mile. For reservoirs, mitigation and permitting costs are assumed equal to the land purchase cost, unless site specific data is available.
- 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 right-of-ways (such as highways), no additional right-of-way cost may be assumed. Large pipelines will require ROW costs regardless of routing.

Interest during construction is the total of 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.

D.3 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 20 years unless otherwise justified. For reservoirs, this period is 40 years, but not longer than the life of the project. [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.
- Water purchase costs are to be based on wholesale rates reported by the selling entity when possible. In lieu of known rates, a typical regional cost for treated water and raw water will be developed.
- 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 Development of the 2026 Regional Water Plans (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 and are shown in Table D-8 and Table D-9.
- 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.

Table D-1
Pipeline Costs

Diameter	Soil		Rock	
	Rural	Urban	Rural	Urban
(Inches)	($/Foot)	($/Foot)	($/Foot)	(Feet)
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	1820	3501	2303	4694
90	2122	4082	2654	5365
96	2426	4665	3007	6040
102	2728	5246	3358	6711
108	3030	5828	3709	7382
114	3333	6409	4060	8048
120	3636	6992	4413	8719
132	4049	7787	4884	9601
144	4655	8952	5588	10942

Table D-2
Pump Station Costs

Horsepower	Intake PS Cost ($-million)	Booster PS cost ($-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
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

Note:
1. Intake PS costs include intake and pump station.

Table D-3
Ground Storage Tanks

Tank Volume (MG)	With Roof ($)	Without Roof ($)
0.05	1,061,624	604,482
0.1	1,099,666	632,123
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

Table D-4
Conventional Water Treatment Plant Costs

	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
Capacity (MGD)	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

Note: Plant is sized for finished peak day capacity.

Table D-5
Advanced Water Treatment Facility Costs

Capacity (MGD)	Scheme 1 (includes RO)	Scheme 2
0	$0	$0
1	$11,975,889	$11,402,684
5	$42,724,240	$32,079,006
10	$74,004,853	$50,974,297
25	$183,824,780	$114,743,348

Table D-6
Cost Elements for Water Wells

Public Supply Well Costs						
Well Capacity (MGD)						
Well Depth (ft)	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
3000	$1,437,600	$1,816,101	$2,190,825	$3,026,934	$3,553,723	$4,013,868
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
3000	$1,868,880	$2,360,931	$2,848,073	$3,935,014	$4,619,840	$5,218,028

Table D-7
Cost Elements for Injection Wells

Injection Well Costs						
Well Capacity (MGD)						
Well Depth (ft)	100	300	500	700	1000	1200
3500	-	-	-	-	$3,783,213	-
4000	-	-	$2,837,410	-	-	-

Table D-8
Annual Water Treatment Plant O&M Costs

	Level 0	Level 1	Level 2	Level 3 (New)	Level (Exp)	Level 4	Level 5
Capacity (MGD)	Chlorine Disinfection (GW) ($)	Iron & Manganese Removal ($)	Simple Filtration ($)	Conventional Treatment ($)	Conventional Treatment ($)	Brackish Desalination ($)	Seawater Desalination ($)
0.1	18,424	114,846	159,679	212,905	212,905	421,130	512,814
1	61,415	462,761	559,898	2,133,141	752,331	4,206,038	3,433,088
10	411,479	1,921,977	3,207,082	5,029,157	2,016,965	14,164,011	22,972,212
50	2,051,255	5,576,772	8,977,106	16,185,875	7,282,569	45,583,831	86,737,680
75	3,076,882	8,045,955	12,599,761	23,113,057	11,578,023	65,094,441	121,219,028
100	4,108,651	9,859,842	16,222,417	29,923,448	14,034,207	84,273,410	153,712,072
150	6,159,906	15,085,321	23,467,727	43,305,634	21,050,952	121,962,806	214,818,279
200	8,211,161	17,372,102	30,713,038	56,462,120	25,962,602	159,016,996	272,400,810

Table D-9
Advanced Water Treatment Facility O&M Costs

Capacity (MGD)	Scheme 1 (includes RO)	Scheme 2
1	$1,433,012	$777,921
5	$5,568,277	$2,876,261
10	$10,000,379	$5,056,487
25	$21,761,316	$10,716,885

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Andrews - Develop Ogallala Aquifer Supplies

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 Stations (6.5 MGD)	$4,955,000
Transmission Pipeline (20 in. dia., 8 miles)	$13,114,000
Well Fields (Wells, Pumps, and Piping)	$5,743,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,404,000
Integration, Relocations, Backup Generator & Other	$59,000
TOTAL COST OF FACILITIES	**$25,275,000**
- Planning (3%)	$758,000
- Design (7%)	$1,769,000
- Construction Engineering (1%)	$253,000
Legal Assistance (2%)	$506,000
Fiscal Services (2%)	$506,000
Pipeline Contingency (15%)	$1,967,000
All Other Facilities Contingency (20%)	$2,432,000
Environmental & Archaeology Studies and Mitigation	$292,000
Land Acquisition and Surveying (37 acres)	$69,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$2,195,000
TOTAL COST OF PROJECT	**$36,022,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$2,530,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$203,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$124,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (1816862 kW-hr @ 0.09 $/kW-hr)	$164,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$3,021,000**
Available Project Yield (acft/yr)	3,634
Annual Cost of Water ($ per acft), based on PF=2	$831
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$135
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$2.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.41

Aven Ault *10/30/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Andrews County, Livestock - Develop Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$717,000
TOTAL COST OF FACILITIES	**$717,000**
- Planning (3%)	$22,000
- Design (7%)	$50,000
- Construction Engineering (1%)	$7,000
Legal Assistance (2%)	$14,000
Fiscal Services (2%)	$14,000
All Other Facilities Contingency (20%)	$143,000
Environmental & Archaeology Studies and Mitigation	$14,000
Land Acquisition and Surveying (2 acres)	$4,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$33,000
TOTAL COST OF PROJECT	**$1,018,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$72,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (30383 kW-hr @ 0.09 $/kW-hr)	$3,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$82,000**
Available Project Yield (acft/yr)	108
Annual Cost of Water ($ per acft), based on PF=0	$759
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$93
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$2.33
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.28

Aven Ault *1/6/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Andrews County, Manufacturing - Develop Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$983,000
TOTAL COST OF FACILITIES	**$983,000**
- Planning (3%)	$29,000
- Design (7%)	$69,000
- Construction Engineering (1%)	$10,000
Legal Assistance (2%)	$20,000
Fiscal Services (2%)	$20,000
All Other Facilities Contingency (20%)	$197,000
Environmental & Archaeology Studies and Mitigation	$14,000
Land Acquisition and Surveying (3 acres)	$6,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$44,000
TOTAL COST OF PROJECT	**$1,392,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$98,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (72556 kW-hr @ 0.09 $/kW-hr)	$7,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$115,000**
Available Project Yield (acft/yr)	279
Annual Cost of Water ($ per acft), based on PF=0	$412
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$61
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.26
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.19

Aven Ault *1/6/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Andrews, County-Other - Develop Edwards-Trinity Plateau Aquifer

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$2,462,000
TOTAL COST OF FACILITIES	**$2,462,000**
- Planning (3%)	$74,000
- Design (7%)	$172,000
- Construction Engineering (1%)	$25,000
Legal Assistance (2%)	$49,000
Fiscal Services (2%)	$49,000
All Other Facilities Contingency (20%)	$492,000
Environmental & Archaeology Studies and Mitigation	$31,000
Land Acquisition and Surveying (7 acres)	$13,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$110,000
TOTAL COST OF PROJECT	**$3,477,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$245,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (231167 kW-hr @ 0.09 $/kW-hr)	$21,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$291,000**
Available Project Yield (acft/yr)	934
Annual Cost of Water ($ per acft), based on PF=0	$312
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$49
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.15

Aven Ault *1/6/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Brown County WID#1 (BCWID) - Develop Groundwater in Ellenburger-San Saba Aquifer

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Initial Pump Station	$1,110,000
Well Fields (Wells, Pumps, and Piping)	$35,651,000
Advanced Water Treatment Facility (4.28 MGD)	$37,190,000
Integration, Relocations, Backup Generator & Other	$17,000
TOTAL COST OF FACILITIES	**$76,989,000**
- Planning (3%)	$2,310,000
- Design (7%)	$5,389,000
- Construction Engineering (1%)	$770,000
Legal Assistance (2%)	$1,540,000
Fiscal Services (2%)	$1,540,000
All Other Facilities Contingency (20%)	$14,794,000
Environmental & Archaeology Studies and Mitigation	$315,000
Land Acquisition and Surveying (42 acres)	$266,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$3,392,000
TOTAL COST OF PROJECT	**$107,758,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$7,581,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$387,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$28,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$4,824,000
Pumping Energy Costs (7346551 kW-hr @ 0.09 $/kW-hr)	$661,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$13,481,000**
Available Project Yield (acft/yr)	3,600
Annual Cost of Water ($ per acft), based on PF=1	$3,745
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$1,639
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$11.49
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$5.03

Vince Clause *11/7/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Brown County WID#1 (BCWID) - Treatment Plant Expansion

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Advanced Water Treatment Facility (3 MGD)	$27,350,000
TOTAL COST OF FACILITIES	**$27,350,000**
- Planning (3%)	$821,000
- Design (7%)	$1,915,000
- Construction Engineering (1%)	$274,000
Legal Assistance (2%)	$547,000
Fiscal Services (2%)	$547,000
All Other Facilities Contingency (20%)	$5,470,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$1,200,000
TOTAL COST OF PROJECT	**$38,124,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$2,682,000
Reservoir Debt Service (3.5 percent, 40 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
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$3,501,000
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$6,183,000**
Available Project Yield (acft/yr)	1,529
Annual Cost of Water ($ per acft), based on PF=0	$4,045
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$2,290
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$12.41
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$7.03

Aven Ault *10/25/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Big Spring - New 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*
Water Treatment Plant (20 MGD)	$111,691,000
TOTAL COST OF FACILITIES	**$111,691,000**
- Planning (3%)	$3,351,000
- Design (7%)	$7,818,000
- Construction Engineering (1%)	$1,117,000
Legal Assistance (2%)	$2,234,000
Fiscal Services (2%)	$2,234,000
All Other Facilities Contingency (20%)	$22,338,000
Environmental & Archaeology Studies and Mitigation	$61,000
Land Acquisition and Surveying (10 acres)	$67,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$14,714,000
TOTAL COST OF PROJECT	**$165,625,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$11,654,000
Reservoir Debt Service (3.5 percent, 40 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
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$7,818,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$19,472,000**
Available Project Yield (acft/yr)	11,210
Annual Cost of Water ($ per acft), based on PF=2	$1,737
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$697
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.33
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$2.14

Angelica Huerta, Rivulous *1/13/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices

Borden County Water System - Develop Additional Supplies from Ogallala and Edwards-Trinity-High Plains Aquifer in Dawson 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*
Transmission Pipeline (6 in. dia., 22 miles)	$15,121,000
Well Fields (Wells, Pumps, and Piping)	$1,092,000
TOTAL COST OF FACILITIES	**$16,881,000**
- Planning (3%)	$506,000
- Design (7%)	$1,182,000
- Construction Engineering (1%)	$169,000
Legal Assistance (2%)	$338,000
Fiscal Services (2%)	$338,000
Pipeline Contingency (15%)	$2,268,000
All Other Facilities Contingency (20%)	$352,000
Environmental & Archaeology Studies and Mitigation	$698,000
Land Acquisition and Surveying (61 acres)	$108,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,485,000
TOTAL COST OF PROJECT	**$24,325,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,711,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$162,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$17,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (33428 kW-hr @ 0.09 $/kW-hr)	$3,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,893,000**
Available Project Yield (acft/yr)	134
Annual Cost of Water ($ per acft), based on PF=2	$14,127
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,358
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$43.35
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$4.17

Aven Ault *1/6/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Brady - Advanced 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*
Pump Station (3.2 MGD)	$1,512,000
Water Treatment Plant (3.2 MGD)	$33,679,000
Advanced Water Treatment Facility (3.2 MGD)	$28,887,000
Integration, Relocations, Backup Generator & Other	$16,000
TOTAL COST OF FACILITIES	**$64,094,000**
- Planning (3%)	$1,923,000
- Design (7%)	$4,487,000
- Construction Engineering (1%)	$641,000
Legal Assistance (2%)	$1,282,000
Fiscal Services (2%)	$1,282,000
All Other Facilities Contingency (20%)	$12,819,000
Environmental & Archaeology Studies and Mitigation	$30,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$11,253,000
TOTAL COST OF PROJECT	**$97,811,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$6,882,000
Reservoir Debt Service (3.5 percent, 40 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)	$38,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$2,841,000
Advanced Water Treatment Facility	$3,707,000
Pumping Energy Costs (254513 kW-hr @ 0.09 $/kW-hr)	$23,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$13,491,000**
Available Project Yield (acft/yr)	1,770
Annual Cost of Water ($ per acft), based on PF=2	$7,622
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,734
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$23.39
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$11.46

Spencer Schnier, Rivulous *1/6/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bronte - Oak Creek Pipeline Rehabilitation

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Station Rehabilitation and Upgrades (1.5 MGD)	$1,055,000
Transmission Pipeline (14 in. dia., 8 miles)	$11,671,000
Storage Tanks (Other Than at Booster Pump Stations)	$604,000
Integration, Relocations, Backup Generator & Other	$9,000
TOTAL COST OF FACILITIES	**$13,339,000**
- Planning (3%)	$400,000
- Design (7%)	$934,000
- Construction Engineering (1%)	$133,000
Legal Assistance (2%)	$267,000
Fiscal Services (2%)	$267,000
Pipeline Contingency (15%)	$1,751,000
All Other Facilities Contingency (20%)	$334,000
Environmental & Archaeology Studies and Mitigation	$240,000
Interest During Construction (3% for 2 years with a 0.5% ROI)	$972,000
TOTAL COST OF PROJECT	**$18,637,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,311,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$123,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$26,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (150605 kW-hr @ 0.09 $/kW-hr)	$14,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,474,000**
Available Project Yield (acft/yr)	457
Annual Cost of Water ($ per acft), based on PF=2	$3,225
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$357
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$9.90
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.09

KEK - Freese and Nichols *1/21/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bronte - Water Treatment Plant Expansion

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Water Treatment Plant Expansion and 5 miles of Oak Creek Pipeline	$10,761,000
TOTAL COST OF FACILITIES	**$10,761,000**
- Planning (3%)	$323,000
- Design (7%)	$753,000
- Construction Engineering (1%)	$108,000
Legal Assistance (2%)	$215,000
Fiscal Services (2%)	$215,000
All Other Facilities Contingency (20%)	$2,152,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$473,000
TOTAL COST OF PROJECT	**$15,000,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,055,000
Reservoir Debt Service (3.5 percent, 40 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
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$794,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,849,000**
Available Project Yield (acft/yr)	729
Annual Cost of Water ($ per acft), based on PF=2	$2,536
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,089
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.78
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.34
Note: One or more cost element has been calculated externally	

KEK - Freese and Nichols *1/21/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices

Bronte, Ballinger, Winters, and Robert Lee - Regional System from Fort Phantom Hill to Runnels and Coke Counties

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 MGD)	$12,827,000
Transmission Pipeline (8-12 in. dia., 94.6 miles)	$121,702,000
Transmission Pump Station(s) & Storage Tank(s)	$9,951,000
Integration, Relocations, Backup Generator & Other	$102,000
TOTAL COST OF FACILITIES	**$144,582,000**
- Planning (3%)	$4,337,000
- Design (7%)	$10,121,000
- Construction Engineering (1%)	$1,446,000
Legal Assistance (2%)	$2,892,000
Fiscal Services (2%)	$2,892,000
Pipeline Contingency (15%)	$18,255,000
All Other Facilities Contingency (20%)	$4,576,000
Environmental & Archaeology Studies and Mitigation	$2,898,000
Land Acquisition and Surveying (369 acres)	$974,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$18,815,000
TOTAL COST OF PROJECT	**$211,788,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$14,902,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,218,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$569,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (1671087 kW-hr @ 0.09 $/kW-hr)	$150,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$16,839,000**
Available Project Yield (acft/yr)	1,114
Annual Cost of Water ($ per acft), based on PF=2	$15,116
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,739
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$46.38
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.34

SS, Rivulous *1/19/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices

Bronte and Robert Lee - Purchase CRMWD supplies from Lake Spence

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 (0.8 MGD)	$4,881,000
Transmission Pipeline (6-8 in. dia., 14.7 miles)	$11,524,000
Water Treatment Plant (0.8 MGD)	$17,064,000
Advanced Water Treatment Facility (0.8 MGD)	$9,581,000
Integration, Relocations, Backup Generator & Other	$5,000
TOTAL COST OF FACILITIES	**$43,055,000**
- Planning (3%)	$1,292,000
- Design (7%)	$3,014,000
- Construction Engineering (1%)	$431,000
Legal Assistance (2%)	$861,000
Fiscal Services (2%)	$861,000
Pipeline Contingency (15%)	$1,729,000
All Other Facilities Contingency (20%)	$6,306,000
Environmental & Archaeology Studies and Mitigation	$471,000
Land Acquisition and Surveying (46 acres)	$143,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$7,561,000
TOTAL COST OF PROJECT	**$65,724,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$4,624,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$115,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$122,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$1,706,000
Advanced Water Treatment Facility	$1,146,000
Pumping Energy Costs (87324 kW-hr @ 0.09 $/kW-hr)	$8,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$7,721,000**
Available Project Yield (acft/yr)	341
Annual Cost of Water ($ per acft), based on PF=2	$22,626
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$9,075
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$69.43
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$27.85

SS, Rivulous *1/17/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Andrews - Develop Edwards-Trinity Plateau Aquifer Supplies (Antlers Formation)

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 (0 MGD)	$5,388,000
Transmission Pipeline (18 in. dia., 15 miles)	$26,279,000
Well Fields (Wells, Pumps, and Piping)	$8,242,000
Integration, Relocations, Backup Generator & Other	$62,000
TOTAL COST OF FACILITIES	**$39,971,000**
- Planning (3%)	$1,199,000
- Design (7%)	$2,798,000
- Construction Engineering (1%)	$400,000
Legal Assistance (2%)	$799,000
Fiscal Services (2%)	$799,000
Pipeline Contingency (15%)	$3,942,000
All Other Facilities Contingency (20%)	$2,739,000
Environmental & Archaeology Studies and Mitigation	$577,000
Land Acquisition and Surveying (66 acres)	$126,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$3,464,000
TOTAL COST OF PROJECT	**$56,814,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$3,993,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$346,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$135,000
Pumping Energy Costs (1851377 kW-hr @ 0.09 $/kW-hr)	$167,000
TOTAL ANNUAL COST	**$4,641,000**
Available Project Yield (acft/yr)	2,600
Annual Cost of Water ($ per acft), based on PF=2	$1,785
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$249
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.48
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.76

Aven Ault *10/30/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Colorado City - Dockum Well Field Expansion

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Station (0.3 MGD)	$900,000
Transmission Pipeline (6 in. dia., 8 miles)	$6,473,000
Well Fields (Wells, Pumps, and Piping)	$814,000
Integration, Relocations, Backup Generator & Other	$4,000
TOTAL COST OF FACILITIES	**$8,191,000**
- 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%)	$971,000
All Other Facilities Contingency (20%)	$344,000
Environmental & Archaeology Studies and Mitigation	$265,000
Land Acquisition and Surveying (26 acres)	$68,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$360,000
TOTAL COST OF PROJECT	**$11,428,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$804,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$73,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$22,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (85955 kW-hr @ 0.09 $/kW-hr)	$8,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$907,000**
Available Project Yield (acft/yr)	170
Annual Cost of Water ($ per acft), based on PF=2	$5,335
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$606
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$16.37
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.86

Spencer Schnier, Rivulous *1/16/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
CRMWD - Develop Additional Groundwater in Western Region F Counties

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Stations	$29,716,000
Transmission Pipeline (54 in. dia., 40 miles)	$272,170,000
Transmission Pump Station(s) & Storage Tank(s)	$34,136,000
Well Fields (Wells, Pumps, and Piping)	$33,367,000
Integration, Relocations, Backup Generator & Other	$943,000
TOTAL COST OF FACILITIES	**$370,332,000**
- Planning (3%)	$11,110,000
- Design (7%)	$25,923,000
- Construction Engineering (1%)	$3,703,000
Legal Assistance (2%)	$7,407,000
Fiscal Services (2%)	$7,407,000
Pipeline Contingency (15%)	$40,825,000
All Other Facilities Contingency (20%)	$19,632,000
Environmental & Archaeology Studies and Mitigation	$1,428,000
Land Acquisition and Surveying (22 acres)	$17,000
Interest During Construction (3.5% for 4 years with a 0.5% ROI)	$63,290,000
TOTAL COST OF PROJECT	**$551,074,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$38,708,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,109,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,486,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (103179431 kW-hr @ 0.09 $/kW-hr)	$9,286,000
Purchase of Water (25000 acft/yr @ 500 $/acft)	$12,500,000
TOTAL ANNUAL COST	**$65,089,000**
Available Project Yield (acft/yr)	25,000
Annual Cost of Water ($ per acft), based on PF=2	$2,604
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,055
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.99
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.24

AJA *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
CRMWD - Ward County Well Field Expansion and Development of Winkler County Well Field

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Initial Pump Station (20 MGD)	$19,650,000
Transmission Pipeline (36 in. dia., 5.5 miles)	$27,550,000
Transmission Pump Station(s) & Storage Tank(s)	$108,785,000
Well Fields (Wells, Pumps, and Piping)	$46,321,000
Integration, Relocations, Backup Generator & Other	$737,000
TOTAL COST OF FACILITIES	**$203,043,000**
- Planning (3%)	$6,091,000
- Design (7%)	$14,213,000
- Construction Engineering (1%)	$2,030,000
Legal Assistance (2%)	$4,061,000
Fiscal Services (2%)	$4,061,000
Pipeline Contingency (15%)	$4,133,000
All Other Facilities Contingency (20%)	$35,099,000
Environmental & Archaeology Studies and Mitigation	$227,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$26,542,000
TOTAL COST OF PROJECT	**$299,500,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$21,021,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$965,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,664,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (18202227 kW-hr @ 0.09 $/kW-hr)	$1,638,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$26,288,000**
Available Project Yield (acft/yr)	21,480
Annual Cost of Water ($ per acft), based on PF=0	$1,224
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$245
Annual Cost of Water ($ 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	$0.75
Note: One or more cost element has been calculated externally	

AJA *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
CRMWD - Ward County Well Field Well Replacement

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$12,755,000
TOTAL COST OF FACILITIES	**$12,755,000**
- Planning (3%)	$383,000
- Design (7%)	$893,000
- Construction Engineering (1%)	$128,000
Legal Assistance (2%)	$255,000
Fiscal Services (2%)	$255,000
All Other Facilities Contingency (20%)	$2,551,000
Environmental & Archaeology Studies and Mitigation	$85,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$563,000
TOTAL COST OF PROJECT	**$17,868,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,257,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$128,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,385,000**
Available Project Yield (acft/yr)	8,674
Annual Cost of Water ($ per acft), based on PF=0	$160
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$15
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.49
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.05

AJA *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Greater Gardendale WSC - Purchase Water from Midland County FWSD No. 1

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	
Pipeline	
Transmission Pipeline (12 in. dia., 0.5 miles)	$511,000
Pump Station & Ground Storage	
Pump Station (40 HP)	$870,000
Power Connection	$75,000
Storage Tank	$1,031,000
Water Treatment	
Chlorination Facilities (1 MGD)	$102,000
TOTAL COST OF FACILITIES	**$2,589,000**
Engineering:	
- Planning (3%)	$78,000
- Design (7%)	$181,000
- Construction Engineering (1%)	$26,000
Legal Assistance (2%)	$52,000
Fiscal Services (2%)	$52,000
Pipeline Contingency (15%)	$77,000
All Other Facilities Contingency (20%)	$416,000
Environmental & Archaeology Studies and Mitigation	$15,000
Land Acquisition and Surveying (7 acres)	$2,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$114,000
TOTAL COST OF PROJECT	**$3,602,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$253,000
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)	$24,000
Water Treatment Plant	$61,000
Pumping Energy Costs (97615 kW-hr @ 0.09 $/kW-hr)	$9,000
Purchase of Water (1 acft/yr @ 962290.549820804 $/acft)	$962,000
TOTAL ANNUAL COST	**$1,324,000**
Available Project Yield (acft/yr)	445
Annual Cost of Water ($ per acft), based on PF=0	$2,975
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$2,407
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$9.13
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$7.38

Aven Ault *1/7/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Greater Gardendale WSC - Purchase Treated Water from the City of Odessa

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	
Odessa Pump Station Improvements (Faudree Road)	
Other Pump Station Infrastructure	$664,000
Booster Pump	$145,000
Ground Storage Tanks (0.15 MG)	$2,070,000
Electrical Power	$87,000
Water Supply Line Improvements	
Transmission Pipeline (18 in. dia., 1.2 miles)	$1,605,000
Transmission Pipeline (12 in. dia., 4.5 miles)	$5,066,000
Other Transmission Infrastructure	$156,000
GCWSC Booster Pump Station	
Chlorination System Improvements	$72,000
Other Pump Station Infrastructure	$156,000
Ground Storage Tank (0.26 MG)	$1,043,000
TOTAL COST OF FACILITIES	**$11,064,000**
Engineering:	
- Planning (3%)	$342,000
- Design (7%)	$797,000
- Construction Engineering (1%)	$114,000
Legal Assistance (2%)	$228,000
Fiscal Services (2%)	$228,000
Pipeline Contingency (15%)	$1,072,000
All Other Facilities Contingency (20%)	$847,000
Environmental & Archaeology Studies and Mitigation	$833,000
Land Acquisition and Surveying	$236,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$524,000
TOTAL COST OF PROJECT	**$16,285,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,124,000
Reservoir Debt Service (3.5 percent, 40 years)	$29,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$103,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$12,000
Dam and Reservoir (1.5% of Cost of Facilities)	$10,000
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (247415 kW-hr @ 0.09 $/kW-hr)	$22,000
Purchase of Water (1 acft/yr @ 1410877.12191772 $/acft)	$1,411,000
TOTAL ANNUAL COST	**$2,711,000**
Available Project Yield (acft/yr)	271
Annual Cost of Water ($ per acft), based on PF=0	$10,004
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$5,749
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$30.70
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$17.64
Note: One or more cost element has been calculated externally	

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Greenwood Water - Additional Ogallala Groundwater Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$9,731,000
TOTAL COST OF FACILITIES	**$9,731,000**
- Planning (3%)	$292,000
- Design (7%)	$681,000
- Construction Engineering (1%)	$97,000
Legal Assistance (2%)	$195,000
Fiscal Services (2%)	$195,000
All Other Facilities Contingency (20%)	$1,946,000
Environmental & Archaeology Studies and Mitigation	$210,000
Land Acquisition and Surveying (22 acres)	$137,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$439,000
TOTAL COST OF PROJECT	**$13,923,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$980,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$97,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$3,375,000
Pumping Energy Costs (1387012 kW-hr @ 0.09 $/kW-hr)	$125,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$4,577,000**
Available Project Yield (acft/yr)	2,420
Annual Cost of Water ($ per acft), based on PF=2	$1,891
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,486
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.80
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$4.56

AH, Rivulous *1/15/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Junction - Develop Groundwater of Edwards-Trinity Plateau Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Initial Pump Station	$659,000
Transmission Pipeline (8 in. dia., 3 miles)	$3,144,000
Well Fields (Wells, Pumps, and Piping)	$1,223,000
Integration, Relocations, Backup Generator & Other	$1,000
TOTAL COST OF FACILITIES	**$5,027,000**
- Planning (3%)	$151,000
- Design (7%)	$352,000
- Construction Engineering (1%)	$50,000
Legal Assistance (2%)	$101,000
Fiscal Services (2%)	$101,000
Pipeline Contingency (15%)	$472,000
All Other Facilities Contingency (20%)	$376,000
Environmental & Archaeology Studies and Mitigation	$157,000
Land Acquisition and Surveying (29 acres)	$171,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$227,000
TOTAL COST OF PROJECT	**$7,185,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$505,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$44,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$16,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (125946 kW-hr @ 0.09 $/kW-hr)	$11,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$576,000**
Available Project Yield (acft/yr)	370
Annual Cost of Water ($ per acft), based on PF=1.2	$1,557
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.2	$192
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.2	$4.78
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.2	$0.59

VAC *11/27/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Kermit - Develop Dockum Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$1,029,000
TOTAL COST OF FACILITIES	**$1,029,000**
- Planning (3%)	$31,000
- Design (7%)	$72,000
- Construction Engineering (1%)	$10,000
Legal Assistance (2%)	$21,000
Fiscal Services (2%)	$21,000
All Other Facilities Contingency (20%)	$206,000
Environmental & Archaeology Studies and Mitigation	$22,000
Land Acquisition and Surveying (2 acres)	$2,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$46,000
TOTAL COST OF PROJECT	**$1,460,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$103,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (72880 kW-hr @ 0.09 $/kW-hr)	$7,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$120,000**
Available Project Yield (acft/yr)	250
Annual Cost of Water ($ per acft), based on PF=0	$480
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$68
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.47
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.21

Aven Ault *1/20/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Kimble County, Manufacturing - Develop Ellenburger San Saba Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$485,000
TOTAL COST OF FACILITIES	**$485,000**
- Planning (3%)	$15,000
- Design (7%)	$34,000
- Construction Engineering (1%)	$5,000
Legal Assistance (2%)	$10,000
Fiscal Services (2%)	$10,000
All Other Facilities Contingency (20%)	$97,000
Environmental & Archaeology Studies and Mitigation	$27,000
Land Acquisition and Surveying (2 acres)	$21,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$23,000
TOTAL COST OF PROJECT	**$727,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$51,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (9920 kW-hr @ 0.09 $/kW-hr)	$1,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$57,000**
Available Project Yield (acft/yr)	30
Annual Cost of Water ($ per acft), based on PF=0	$1,900
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$200
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$5.83
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.61

Spencer Schnier, Rivulous *1/15/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Madera Valley WSC - Develop Edwards-Trinity-Plateau Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Stations (0.6 MGD)	$699,000
Transmission Pipeline (8 in. dia., 10 miles)	$8,707,000
Well Fields (Wells, Pumps, and Piping)	$1,708,000
Water Treatment Plant (0.6 MGD)	$71,000
TOTAL COST OF FACILITIES	**$11,185,000**
- Planning (3%)	$336,000
- Design (7%)	$783,000
- Construction Engineering (1%)	$112,000
Legal Assistance (2%)	$224,000
Fiscal Services (2%)	$224,000
Pipeline Contingency (15%)	$1,306,000
All Other Facilities Contingency (20%)	$496,000
Environmental & Archaeology Studies and Mitigation	$309,000
Land Acquisition and Surveying (32 acres)	$19,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$488,000
TOTAL COST OF PROJECT	**$15,482,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,089,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$104,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$17,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$42,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (208180 kW-hr @ 0.09 $/kW-hr)	$19,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,271,000**
Available Project Yield (acft/yr)	333
Annual Cost of Water ($ per acft), based on PF=2	$3,817
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$547
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$11.71
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.68

KEK - Freese and Nichols *1/21/2025*

Water Supply Project Option
Midland County Utility District Wellfield Development Phase 1: 0.5 MGD
January 2025 Prices

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping) **0.5 MGD**	$8,800,800
TOTAL COST OF FACILITIES	**$8,800,800**
Engineering:	
- Design	$1,267,600
- Construction Engineering (3%)	$264,000
Legal Assistance (3%)	$264,000
Fiscal Services (2%)	$176,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (10.6%)	$940,000
TOTAL COST OF PROJECT	**$11,712,400**
ANNUAL COST	
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (3% of Cost of Facilities)	$264,000
Pumping Energy Costs (454000 kW-hr @ 0.09 $/kW-hr)	$40,860
Purchase of Water (747 acft/yr @ $635/acft)	$474,345
TOTAL ANNUAL COST	**$779,205**
Available Project Yield (acft/yr)	234
Annual Cost of Water ($ per acft)	$3,330
Annual Cost of Water After Debt Service ($ per acft)	$3,330
Annual Cost of Water ($ per 1,000 gallons)	$10.22
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$10.22

Kevin W. Krueger, PE *1/28/2025*

Water Supply Project Option
Midland County Utility District Avanced Water Treatment (RO) Phase 1: 0.5 MGD
January 2025 Prices

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Advanced Water Treatment Facility (MGD)	$11,741,600
TOTAL COST OF FACILITIES	**$11,741,600**
Engineering:	
- Design	$2,435,700
- Construction Engineering	$652,800
Legal Assistance (3%)	$352,000
Fiscal Services (2%)	$235,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (10%)	$1,174,000
TOTAL COST OF PROJECT	**$16,591,100**
ANNUAL COST	
Operation and Maintenance	
Advanced Water Treatment Facility	$470,000
Pumping Energy Costs (454000 kW-hr @ 0.09 $/kW-hr)	$45,000
TOTAL ANNUAL COST	**$515,000**
Available Project Yield (acft/yr)	234
Annual Cost of Water ($ per acft)	$2,201
Annual Cost of Water After Debt Service ($ per acft)	$2,201
Annual Cost of Water ($ per 1,000 gallons)	$6.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$6.75

Kevin W. Krueger, PE *1/28/2025*

Water Supply Project Option
Midland County Utility District Wellfield Development Phase 2: 1.0 MGD
January 2025 Prices

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping) **1.0 MGD**	$6,039,100
TOTAL COST OF FACILITIES	**$6,039,100**
Engineering:	
- Design	$640,600
- Construction Engineering (3%)	$181,000
Legal Assistance (3%)	$181,000
Fiscal Services (2%)	$121,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (15%)	$906,000
TOTAL COST OF PROJECT	**$8,068,700**
ANNUAL COST	
Debt Service	$432,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (3% of Cost of Facilities)	$181,000
Pumping Energy Costs (876000 kW-hr @ 0.09 $/kW-hr)	$78,840
Purchase of Water (1400 acft/yr @ $635/acft)	$889,000
TOTAL ANNUAL COST	**$1,580,840**
Available Project Yield (acft/yr)	233
Annual Cost of Water ($ per acft)	$6,785
Annual Cost of Water After Debt Service ($ per acft)	$4,931
Annual Cost of Water ($ per 1,000 gallons)	$20.82
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$15.13

Kevin W. Krueger, PE *1/28/2025*

Water Supply Project Option
Midland County Utility District Avanced Water Treatment (RO) Phase 2: 1.0 MGD
January 2025 Prices

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Advanced Water Treatment Facility **(1.0 MGD)**	$13,837,500
TOTAL COST OF FACILITIES	**$13,837,500**
Engineering:	
- Planning	$0
- Design	$1,872,800
- Construction Engineering (3%)	$767,200
Legal Assistance (3%)	$415,000
Fiscal Services (2%)	$277,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (15%)	$2,076,000
TOTAL COST OF PROJECT	**$19,245,500**
ANNUAL COST	
Debt Service	$1,030,000
Operation and Maintenance	
Advanced Water Treatment Facility	$484,000
Pumping Energy Costs (876000 kW-hr @ 0.09 $/kW-hr)	$120,000
TOTAL ANNUAL COST	**$1,634,000**
Available Project Yield (acft/yr)	233
Annual Cost of Water ($ per acft)	$7,013
Annual Cost of Water After Debt Service ($ per acft)	$2,592
Annual Cost of Water ($ per 1,000 gallons)	$21.52
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$7.95

Kevin W. Krueger, PE *1/28/2025*

Water Supply Project Option
Midland County Utility District Wellfield Development Phase 3: 3.0 MGD
January 2025 Prices

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping) **3.0 MGD**	$18,991,300
TOTAL COST OF FACILITIES	**$18,991,300**
Engineering:	
- Design	$1,928,600
- Construction Engineering (3%)	$570,000
Legal Assistance (3%)	$570,000
Fiscal Services (2%)	$380,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (20%)	$3,798,000
TOTAL COST OF PROJECT	**$26,237,900**
ANNUAL COST	
Debt Service (30 years, 3.37%)	$1,404,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (3% of Cost of Facilities)	$570,000
Pumping Energy Costs (2638000 kW-hr @ 0.09 $/kW-hr)	$236,520
Purchase of Water (4201 acft/yr @ $635/acft)	$2,667,635
TOTAL ANNUAL COST	**$4,878,155**
Available Project Yield (acft/yr)	934
Annual Cost of Water ($ per acft)	$5,223
Annual Cost of Water After Debt Service ($ per acft)	$3,720
Annual Cost of Water ($ per 1,000 gallons)	$16.03
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$11.41

Kevin W. Krueger, PE *1/28/2025*

Water Supply Project Option

Midland County Utility District Avanced Water Treatment (RO) Phase 3: 3.0 MGD

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Advanced Water Treatment Facility (MGD)	$39,008,000
TOTAL COST OF FACILITIES	**$39,008,000**
Engineering:	
- Design	$4,951,800
- Construction Engineering (3%)	$1,170,000
Legal Assistance (3%)	$1,170,000
Fiscal Services (2%)	$780,000
Pipeline Contingency (N/A)	
All Other Facilities Contingency (20%)	$7,802,000
TOTAL COST OF PROJECT	**$54,881,800**
ANNUAL COST	
Debt Service (30 Years, 3.37%)	$2,936,000
Operation and Maintenance	
Advanced Water Treatment Facility	$1,170,000
Pumping Energy Costs (2638000 kW-hr @ 0.09 $/kW-hr)	$355,000
TOTAL ANNUAL COST	**$4,461,000**
Available Project Yield (acft/yr)	934
Annual Cost of Water ($ per acft)	$4,776
Annual Cost of Water After Debt Service ($ per acft)	$1,633
Annual Cost of Water ($ per 1,000 gallons)	$14.66
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$5.01

Kevin W. Krueger, PE *1/28/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices

Odessa - Develop Edwards-Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County - Phase 1

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)	$0
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$0
Terminal Storage (Conservation Pool acft, acres)	$0
Primary Pump Station	$13,015,000
Transmission Pipeline (54 in. dia., 90 miles)	$484,681,000
Transmission Pump Station(s) & Storage Tank(s)	$15,290,000
Well Fields (Wells, Pumps, and Piping)	$94,265,000
Storage Tanks (Other Than at Booster Pump Stations)	$0
Water Treatment Plant (0 MGD)	$0
Advanced Water Treatment Facility (15 MGD)	$110,611,000
Conservation (Leaking Pipe/Meter Replacement)	$0
Integration, Relocations, Backup Generator & Other	$669,000
TOTAL COST OF FACILITIES	**$718,531,000**
Engineering:	
- Planning (3%)	$21,556,000
- Design (7%)	$50,297,000
- Construction Engineering (1%)	$7,185,000
Legal Assistance (2%)	$14,371,000
Fiscal Services (2%)	$14,371,000
Pipeline Contingency (15%)	$72,702,000
All Other Facilities Contingency (20%)	$46,770,000
Environmental & Archaeology Studies and Mitigation	$3,400,000
Land Acquisition and Surveying (611 acres)	$490,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$92,529,000
TOTAL COST OF PROJECT	**$1,042,202,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$73,284,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,819,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$651,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$13,921,000
Pumping Energy Costs (37952916 kW-hr @ 0.09 $/kW-hr)	$3,416,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$97,091,000**
Available Project Yield (acft/yr)	11,200
Annual Cost of Water ($ per acft), based on PF=1.5	$8,669
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$2,126
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$26.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$6.52

Aven Ault *10/30/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices

Odessa - Develop Edwards-Trinity and Capitan Reef Complex Aquifer Supplies in Pecos County - Phase 2

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	$15,903,000
Transmission Pump Station(s) & Storage Tank(s)	$35,562,000
Well Fields (Wells, Pumps, and Piping)	$137,023,000
Advanced Water Treatment Facility (22.5 MGD)	$165,521,000
Integration, Relocations, Backup Generator & Other	$1,131,000
TOTAL COST OF FACILITIES	**$355,140,000**
- Planning (3%)	$10,654,000
- Design (7%)	$24,860,000
- Construction Engineering (1%)	$3,551,000
Legal Assistance (2%)	$7,103,000
Fiscal Services (2%)	$7,103,000
All Other Facilities Contingency (20%)	$71,028,000
Environmental & Archaeology Studies and Mitigation	$3,467,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$46,974,000
TOTAL COST OF PROJECT	**$529,880,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$37,203,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,419,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,193,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$19,801,000
Pumping Energy Costs (60530058 kW-hr @ 0.09 $/kW-hr)	$5,448,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$65,064,000**
Available Project Yield (acft/yr)	16,800
Annual Cost of Water ($ per acft), based on PF=1.5	$3,873
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$1,658
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$11.88
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$5.09

Aven Ault *10/30/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Odessa - RO Treatment of Existing Supplies

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 (110 HP)	$1,531,000
Brine Discharge Pipeline (16 in. dia., 1 mile)	$1,381,000
Brine Discharge Pump Station(s) & Storage Tank(s)	$1,054,000
Advanced Water Treatment Facility (20 MGD)	$147,218,000
Integration, Relocations, Backup Generator & Other	$8,000
TOTAL COST OF FACILITIES	**$151,192,000**
- Planning (3%)	$4,536,000
- Design (7%)	$10,583,000
- Construction Engineering (1%)	$1,512,000
Legal Assistance (2%)	$3,024,000
Fiscal Services (2%)	$3,024,000
Pipeline Contingency (15%)	$207,000
All Other Facilities Contingency (20%)	$29,962,000
Environmental & Archaeology Studies and Mitigation	$56,000
Land Acquisition and Surveying (17 acres)	$33,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$19,903,000
TOTAL COST OF PROJECT	**$224,032,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$15,763,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$38,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$17,841,000
Pumping Energy Costs (134900 kW-hr @ 0.09 $/kW-hr)	$12,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$33,678,000**
Available Project Yield (acft/yr)	15,700
Annual Cost of Water ($ per acft), based on PF=1.5	$2,145
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$1,141
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$6.58
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$3.50
Note: One or more cost element has been calculated externally	

AJA *11/19/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos City - Direct Non-Potable Reuse (Type I)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Station(s) (1 MGD)	$1,034,000
Transmission Pipeline (10 in. dia., 10 miles)	$9,997,000
Transmission Pump Station(s) & Storage Tank(s)	$2,134,000
Integration, Relocations, Backup Generator & Other	$13,000
TOTAL COST OF FACILITIES	**$13,178,000**
- Planning (3%)	$395,000
- Design (7%)	$922,000
- Construction Engineering (1%)	$132,000
Legal Assistance (2%)	$264,000
Fiscal Services (2%)	$264,000
Pipeline Contingency (15%)	$1,500,000
All Other Facilities Contingency (20%)	$636,000
Environmental & Archaeology Studies and Mitigation	$325,000
Land Acquisition and Surveying (34 acres)	$93,000
Interest During Construction (3% for 0.5 years with a 0.5% ROI)	$244,000
TOTAL COST OF PROJECT	**$17,953,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,263,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$111,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$52,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (206742 kW-hr @ 0.09 $/kW-hr)	$19,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,445,000**
Available Project Yield (acft/yr)	560
Annual Cost of Water ($ per acft), based on PF=2	$2,580
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$325
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$7.92
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$1.00

KEK - Freese and Nichols *1/21/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos City - 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*
Pump Station(s) (2.2 MGD)	$1,915,000
Transmission Pipeline (12 in. dia., 2 miles)	$2,257,000
Disposal Pipeline (8 in. dia., 2 miles)	$1,741,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,176,000
Advanced Water Treatment Facility (2.2 MGD)	$21,200,000
Integration, Relocations, Backup Generator & Other	$24,000
TOTAL COST OF FACILITIES	**$28,313,000**
- Planning (3%)	$849,000
- Design (7%)	$1,982,000
- Construction Engineering (1%)	$283,000
Legal Assistance (2%)	$566,000
Fiscal Services (2%)	$566,000
Pipeline Contingency (15%)	$600,000
All Other Facilities Contingency (20%)	$4,863,000
Environmental & Archaeology Studies and Mitigation	$137,000
Land Acquisition and Surveying (18 acres)	$45,000
Interest During Construction (3% for 3 years with a 0.5% ROI)	$3,153,000
TOTAL COST OF PROJECT	**$41,357,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$2,910,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
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)	$48,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$2,674,000
Pumping Energy Costs (397323 kW-hr @ 0.09 $/kW-hr)	$36,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$5,720,000**
Available Project Yield (acft/yr)	925
Annual Cost of Water ($ per acft), based on PF=2	$6,184
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,038
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$18.97
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$9.32

KEK - Freese and Nichols *1/21/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos City - Advanced 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*
Water Treatment Plant (8 MGD)	$65,731,000
TOTAL COST OF FACILITIES	**$65,731,000**
- Planning (3%)	$1,972,000
- Design (7%)	$4,601,000
- Construction Engineering (1%)	$657,000
Legal Assistance (2%)	$1,315,000
Fiscal Services (2%)	$1,315,000
All Other Facilities Contingency (20%)	$13,146,000
Environmental & Archaeology Studies and Mitigation	$27,000
Land Acquisition and Surveying (4 acres)	$30,000
Interest During Construction (3% for 1 years with a 0.5% ROI)	$2,442,000
TOTAL COST OF PROJECT	**$91,236,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$6,419,000
Reservoir Debt Service (3.5 percent, 40 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
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$11,951,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$18,370,000**
Available Project Yield (acft/yr)	3,360
Annual Cost of Water ($ per acft), based on PF=2	$5,467
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$3,557
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$16.78
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$10.91

KEK - Freese and Nichols *1/21/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos City - Expand Pecos Valley Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Pump Station (325 HP)	$3,334,000
Transmission Pipeline (24 in. dia., 10 miles)	$21,946,000
Well Fields (Wells, Pumps, and Piping)	$11,971,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,632,000
Integration, Relocations, Backup Generator & Other	$101,000
TOTAL COST OF FACILITIES	**$38,984,000**
Engineering:	
- Planning (3%)	$1,170,000
- Design (7%)	$2,729,000
- Construction Engineering (1%)	$390,000
Legal Assistance (2%)	$780,000
Fiscal Services (2%)	$780,000
Pipeline Contingency (15%)	$3,292,000
All Other Facilities Contingency (20%)	$3,408,000
Environmental & Archaeology Studies and Mitigation	$7,618,000
Land Acquisition and Surveying (3052 acres)	$8,068,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$2,185,000
TOTAL COST OF PROJECT	**$69,404,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$4,883,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$356,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$83,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (4376377 kW-hr @ 0.09 $/kW-hr)	$394,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$5,716,000**
Available Project Yield (acft/yr)	8,960
Annual Cost of Water ($ per acft), based on PF=1	$638
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$93
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$1.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.29

AH, Rivulous *1/22/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos City - Potable Reuse with Aquifer Storage and 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*
Pump Station (150 HP)	$1,866,000
Transmission Pipeline (8-12 in. dia., 4 miles)	$4,179,000
Well Fields (Wells, Pumps, and Piping)	$4,956,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,176,000
Advanced Water Treatment Facility (2.2 MGD)	$21,200,000
Integration, Relocations, Backup Generator & Other	$25,000
TOTAL COST OF FACILITIES	**$33,402,000**
- Planning (3%)	$1,002,000
- Design (7%)	$2,338,000
- Construction Engineering (1%)	$334,000
Legal Assistance (2%)	$668,000
Fiscal Services (2%)	$668,000
Pipeline Contingency (15%)	$627,000
All Other Facilities Contingency (20%)	$5,845,000
Environmental & Archaeology Studies and Mitigation	$260,000
Land Acquisition and Surveying (31 acres)	$215,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$4,423,000
TOTAL COST OF PROJECT	**$49,782,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$3,503,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$103,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$47,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$2,674,000
Pumping Energy Costs (1146200 kW-hr @ 0.09 $/kW-hr)	$103,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$6,430,000**
Available Project Yield (acft/yr)	695
Annual Cost of Water ($ per acft), based on PF=2	$9,252
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$4,212
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$28.39
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$12.92

SS, Rivulous *1/22/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Pecos County WCID #1 - Develop Edwards-Trinity Plateau Aquifer Supplies

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 (45 HP)	$984,000
Transmission Pipeline (16 in. dia., 23 miles)	$8,000,000
Storage Tanks (Other Than at Booster Pump Stations)	$853,000
Water Treatment Plant (1 MGD)	$1,402,000
Integration, Relocations, Backup Generator & Other	$7,000
TOTAL COST OF FACILITIES	**$11,246,000**
- Planning (3%)	$337,000
- Design (7%)	$787,000
- Construction Engineering (1%)	$112,000
Legal Assistance (2%)	$225,000
Fiscal Services (2%)	$225,000
Pipeline Contingency (15%)	$1,200,000
All Other Facilities Contingency (20%)	$649,000
Environmental & Archaeology Studies and Mitigation	$695,000
Land Acquisition and Surveying (63 acres)	$48,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$505,000
TOTAL COST OF PROJECT	**$16,029,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,128,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$89,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$25,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$463,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (107538 kW-hr @ 0.09 $/kW-hr)	$10,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,715,000**
Available Project Yield (acft/yr)	560
Annual Cost of Water ($ per acft), based on PF=2	$3,063
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,048
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$9.40
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.22
Note: One or more cost element has been calculated externally	

KEK - Freese and Nichols *1/22/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bronte and/or Robert Lee - Develop Edwards-Trinity Plateau Supplies in Nolan Co.

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Transmission Pipeline (6 in. dia., 15.1 miles)	$12,171,000
Well Fields (Wells, Pumps, and Piping)	$984,000
TOTAL COST OF FACILITIES	**$13,155,000**
- Planning (3%)	$395,000
- Design (7%)	$921,000
- Construction Engineering (1%)	$132,000
Legal Assistance (2%)	$263,000
Fiscal Services (2%)	$263,000
Pipeline Contingency (15%)	$1,826,000
All Other Facilities Contingency (20%)	$197,000
Environmental & Archaeology Studies and Mitigation	$472,000
Land Acquisition and Surveying (40 acres)	$104,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$577,000
TOTAL COST OF PROJECT	**$18,305,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,288,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$132,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (39439 kW-hr @ 0.09 $/kW-hr)	$4,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,424,000**
Available Project Yield (acft/yr)	75
Annual Cost of Water ($ per acft), based on PF=2	$18,987
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,813
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$58.26
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$5.56

VAC *12/11/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Robert Lee - Develop Edwards-Trinity Plateau Aquifer Supplies in Tom Green 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*
Intake Pump Stations (0 MGD)	$791,000
Transmission Pipeline (6 in. dia., 15 miles)	$11,206,000
Transmission Pump Station(s) & Storage Tank(s)	$1,836,000
Well Fields (Wells, Pumps, and Piping)	$558,000
Integration, Relocations, Backup Generator & Other	$5,000
TOTAL COST OF FACILITIES	**$14,396,000**
- Planning (3%)	$432,000
- Design (7%)	$1,008,000
- Construction Engineering (1%)	$144,000
Legal Assistance (2%)	$288,000
Fiscal Services (2%)	$288,000
Pipeline Contingency (15%)	$1,681,000
All Other Facilities Contingency (20%)	$638,000
Environmental & Archaeology Studies and Mitigation	$484,000
Land Acquisition and Surveying (48 acres)	$146,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$634,000
TOTAL COST OF PROJECT	**$20,139,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,417,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$128,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$40,000
Pumping Energy Costs (146536 kW-hr @ 0.09 $/kW-hr)	$13,000
TOTAL ANNUAL COST	**$1,598,000**
Available Project Yield (acft/yr)	160
Annual Cost of Water ($ per acft), based on PF=2	$9,988
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$1,131
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$30.65
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$3.47

VAC *12/11/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
San Angelo - Concho River Water Supply Project - 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*
Pump Stations (18 MGD)	$37,878,000
Transmission Pipeline (18-30 in. dia., 17.6 miles)	$39,222,000
Two Water Treatment Plants (12 MGD and 7.5 MGD)	$95,263,000
Integration, Relocations, Backup Generator & Other	$345,000
TOTAL COST OF FACILITIES	**$172,708,000**
- Planning (3%)	$5,181,000
- Design (7%)	$12,090,000
- Construction Engineering (1%)	$1,727,000
Legal Assistance (2%)	$3,454,000
Fiscal Services (2%)	$3,454,000
Pipeline Contingency (15%)	$5,883,000
All Other Facilities Contingency (20%)	$26,697,000
Environmental & Archaeology Studies and Mitigation	$583,000
Land Acquisition and Surveying (63 acres)	$189,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$22,584,000
TOTAL COST OF PROJECT	**$254,550,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$17,886,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$396,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$947,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$13,678,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (5664765 kW-hr @ 0.09 $/kW-hr)	$510,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$33,417,000**
Available Project Yield (acft/yr)	8,300
Annual Cost of Water ($ per acft), based on PF=1.5	$4,026
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$1,871
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$12.35
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$5.74

Aven Ault *10/31/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
San Angelo - Desalination of Brackish 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*
Well Fields (Wells, Pumps, and Piping)	$20,024,000
Water Treatment Plant (15 MGD)	$105,534,000
TOTAL COST OF FACILITIES	**$125,558,000**
- Planning (3%)	$3,767,000
- Design (7%)	$8,789,000
- Construction Engineering (1%)	$1,256,000
Legal Assistance (2%)	$2,511,000
Fiscal Services (2%)	$2,511,000
All Other Facilities Contingency (20%)	$25,111,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$16,527,000
TOTAL COST OF PROJECT	**$186,030,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$13,089,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$200,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$21,107,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$34,396,000**
Available Project Yield (acft/yr)	11,200
Annual Cost of Water ($ per acft), based on PF=0	$3,071
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$1,902
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$9.42
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$5.84

AJA *10/31/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
San Angelo - Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher 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*
Primary Pump Station (6 MGD)	$5,392,000
Transmission Pipeline (20 in. dia., 50 miles)	$88,520,000
Well Fields (Wells, Pumps, and Piping)	$20,752,000
Storage Tanks (Other Than at Booster Pump Stations)	$715,000
TOTAL COST OF FACILITIES	**$115,379,000**
- Planning (3%)	$3,461,000
- 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%)	$13,278,000
All Other Facilities Contingency (20%)	$5,372,000
Environmental & Archaeology Studies and Mitigation	$14,158,000
Land Acquisition and Surveying (736 acres)	$15,445,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$11,761,000
TOTAL COST OF PROJECT	**$192,701,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$13,559,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,100,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$135,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (2525843 kW-hr @ 0.09 $/kW-hr)	$227,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$15,021,000**
Available Project Yield (acft/yr)	4,500
Annual Cost of Water ($ per acft), based on PF=1.5	$3,338
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$325
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$10.24
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$1.00
Note: One or more cost element has been calculated externally	

Aven Ault *10/31/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Sterling City - Develop Additional Edwards Trinity Alluvium Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$11,818,000
TOTAL COST OF FACILITIES	**$11,818,000**
- Planning (3%)	$355,000
- Design (7%)	$827,000
- Construction Engineering (1%)	$118,000
Legal Assistance (2%)	$236,000
Fiscal Services (2%)	$236,000
All Other Facilities Contingency (20%)	$2,364,000
Environmental & Archaeology Studies and Mitigation	$249,000
Land Acquisition and Surveying (23 acres)	$72,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$529,000
TOTAL COST OF PROJECT	**$16,804,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,182,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$118,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (549266 kW-hr @ 0.09 $/kW-hr)	$49,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,349,000**
Available Project Yield (acft/yr)	875
Annual Cost of Water ($ per acft), based on PF=2	$1,542
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$191
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$4.73
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.59

SS, Rivulous *1/8/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Texland Great Plains - Develop Ogallala Aquifer Supplies from Andrews or Gaines 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*
Well Fields (Wells, Pumps, and Piping)	$427,000
TOTAL COST OF FACILITIES	**$427,000**
- Planning (3%)	$13,000
- Design (7%)	$30,000
- Construction Engineering (1%)	$4,000
Legal Assistance (2%)	$9,000
Fiscal Services (2%)	$9,000
All Other Facilities Contingency (20%)	$85,000
Environmental & Archaeology Studies and Mitigation	$9,000
Land Acquisition and Surveying (1 acres)	$1,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$20,000
TOTAL COST OF PROJECT	**$607,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$43,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (102504 kW-hr @ 0.09 $/kW-hr)	$9,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$56,000**
Available Project Yield (acft/yr)	213
Annual Cost of Water ($ per acft), based on PF=0	$263
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$61
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.81
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.19

AJA *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UCRA - Develop Lipan Aquifer Supplies

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$8,923,000
TOTAL COST OF FACILITIES	**$9,539,000**
- Planning (3%)	$286,000
- Design (7%)	$668,000
- Construction Engineering (1%)	$95,000
Legal Assistance (2%)	$191,000
Fiscal Services (2%)	$191,000
All Other Facilities Contingency (20%)	$1,908,000
Environmental & Archaeology Studies and Mitigation	$157,000
Land Acquisition and Surveying (19 acres)	$88,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$427,000
TOTAL COST OF PROJECT	**$13,550,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$953,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$89,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$369,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (1718315 kW-hr @ 0.09 $/kW-hr)	$155,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,566,000**
Available Project Yield (acft/yr)	5,000
Annual Cost of Water ($ per acft), based on PF=2	$313
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$123
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$0.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.38

AH, Rivulous *1/16/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
UCRA - Increased Runoff from Solar Farms

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Stream Improvements and Hydrologic Studies	$130,000
TOTAL COST OF FACILITIES	**$130,000**
Engineering:	
- Planning (3%)	$4,000
- Design (7%)	$9,000
- Construction Engineering (1%)	$1,000
Legal Assistance (2%)	$3,000
Fiscal Services (2%)	$3,000
All Other Facilities Contingency (20%)	$26,000
Interest During Construction (3.5% for 0.25 years with a 0.5% ROI)	$2,000
TOTAL COST OF PROJECT	**$178,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$12,000
Operation and Maintenance	
Creek Improvements	$1,000
TOTAL ANNUAL COST	**$13,000**
Available Project Yield (acft/yr)	10
Annual Cost of Water ($ per acft), based on PF=0	$1,300
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$100
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$3.99
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.31
Note: One or more cost element has been calculated externally	

SS, Rivulous *1/19/2025*

APPENDIX E
STRATEGY EVALUATION MATRIX AND QUANTIFIED ENVIRONMENTAL IMPACT MATRIX

INTRODUCTION

In accordance with TWDB rules and guidelines, the Region F Water Planning Group has adopted a standard procedure for ranking potential water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning.

The strategies are ranked 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 and assigned a ranking from 1 to 5. With the exception of the Environmental Factors category, **Table E-1** shows the correlation between the category and the ranking. The Environmental Factors score is taken directly from the Environmental Matrix where the environmental ramifications are evaluated in more detail.

Table E-1
Evaluation Matrix Category Ranking Correlation

Rank	Quantity	Cost per Ac-Ft	Reliability	Remaining Strategy Impacts
1	Meets 0-25% Shortage	>$5,000	Low	High
2	Meets 25-50% Shortage	$1,000-$5,000	Low to Medium	Medium
3	Meets 50-75% of Shortage	$500-$1,000	Medium	Low
4	Meets 75-100% of Shortage	$0-$500	Medium to High	None
5	Exceeds Shortage	No Cost	High	Positive Impact

Environmental/Agricultural Matrix

The Environmental/Agricultural Matrix is used to quantify the impacts and determine the score of the 'Environmental Factors' and 'Agricultural Resources' categories on the Evaluation Matrix.

The Environmental Matrix 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
- Environmental Water Quality
- Agricultural Impacts (temporary and permanent)

Each category is quantitatively assessed and assigned a ranking from 1 to 5. The Overall Environmental Impacts column averages all of the rankings assigned to the strategy. This value is also illustrated in the Evaluation Matrix as the Environmental Factors rank. A single rank is assigned for agricultural impacts based on the quantified permanent impacts. **Table E-2** shows the correlation between the rank assigned within each category.

Table E-2
Environmental Matrix Category Ranking Correlation

Rank	Acres Impacted	Threatened and Endangered Species	Agricultural Impacts	All Remaining Categories
1	Greater than 500 Acres and/or Impacts Wetland Acres	Greater than 20	Greater than 2,000 acres	High Impact
2	100-500 Acres	Between 15-20	Between 50 and 2,000 acres	Medium Impact
3	50-100 Acres	Between 10-15	Between 6 and 50 acres	Low Impact
4	0-50 Acres	Between 5-10	Between 0 and 5 acres	No Impact or n/a
5	None	Between 0-5 (or n/a)	Provides water to agriculture or rural	Positive

Acres Impacted

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

Suggested land area values from the TWDB Unified Costing Model (UCM) were used for strategies that utilized the model for cost estimates. Otherwise, the following conservative assumptions were made (unless more detailed information was available);

- Each well will impact approximately 1 acre of land
- The acres impacted for 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
- Pump stations will impact approximately 5 acres
- Conservation, Precipitation Enhancement and Subordination strategies will have no impact on acres

Wetland Acres

Wetland Acres refers to how many acres that are classified as wetlands are impacted by implementation of the strategy. There were no surface water strategies in Region F during this round of planning and any

strategy infrastructure could be constructed to avoid wetlands, so it was assumed that there were no impacts on wetlands.

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 consider 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
- Subordination strategies will have a low impact because subordination assumes that downstream senior water rights do not make priority calls on major Region F municipal water rights. This means that the water will be used upstream and will decrease the amount of water that is available to the environment downstream. However, this is the current operation of the basin, so there are no changes to the current stream environment. Subordination would improve the environmental habitats in the lakes in the upper Colorado River Basin if the basin was operated in priority order.
- Reuse will also 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
- Weather Modification and Brush Control will have a positive impact on newly treated areas because both of these strategies increase the amount of water available to the environment. For areas that already employ Weather Modification and/or Brush Control, there should be minimal changes to the environmental water needs.

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

- Strategies with no infrastructure, such as conservation, will have no impact on habitat.
- Strategies with less than 100 acres impacted will have a low impact.
- Strategies above 100 acres impacted will have a medium impact.

Threatened and Endangered Species

Threatened and endangered species refers to how the strategy will 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 amount 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.

Agricultural Resources

Impacts to Agricultural Resources is 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 to agricultural lands will be used.
- If a strategy is located in a rural area of a county with significant irrigation use (>10,000 irrigated acres), it is assumed that the strategy could potentially impact agricultural lands. Since most projects will avoid direct impacts to agricultural lands, the quantity of impacts is estimated to be no more than 10% of the total area for the strategy.
- If a strategy impacts more than 2,000 acres of agricultural land, the impacts are classified as "high". If a strategy impacts between 5 and 50 acres of agricultural lands, the impacts are classified as "low". If the strategy impacts less than 5 acres, it was assumed to negligible.
- If a strategy will reduce the available water to an irrigation user (by county) by the greater of 10% current irrigation use or 5,000 ac-ft/yr, the strategy is determined to have "high" impacts. If a strategy will reduce the available water to an irrigation user (by county) by 1% of current irrigation use or 500 ac-ft/yr, the strategy is determined to have "low" impacts.
- If the entity already holds water rights for the strategy, the impacts would be "none".
- If the strategy does not impact any agricultural or rural user, "none" is selected.
- For strategies that provide water to agricultural and rural users, the strategy is rated as "positive impacts."

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):

- Only applicable to strategies implementing infrastructure.
- All transmission and groundwater strategies will have a low impact on cultural resources because these strategies can be located to avoid areas of known cultural resources.
- Treatment strategies will be evaluated on an individual basis, considering location.

Bays and Estuaries

Region F is located too far away from and bays or estuaries to have a quantifiable impact. Therefore, this category was assumed to be non-applicable for every strategy.

Environmental Water Quality

Environmental Water Quality refers to the impact that the implementation of the strategy will have on the area's applicable water quality. Specific assumptions include:

- Most strategies were assumed to have a low impact on water quality.
- If a strategy could have more than a low impact, then it was evaluated on an individual basis, considering location.
- Strategies that include conservation, weather modification, and aquifer storage and recovery, were scored as having no impact on water quality.

Table E-1
Water Management Strategy Environmental Impact Analysis

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors															
					Acres Impacted	Wetland Acres Impacted	Acres Impacted Score	Environmental Water Needs Impact	Environmental Water Needs Score	Habitat Impact	Habitat Score	Potential Number of Threatened and Endangered Species Impacted	Threatened and Endangered Species Score	Cultural Resources Impact	Cultural Resources Score	Bays & Estuaries Impact	Bays & Estuaries Score	Environmental Water Quality Impact	Environmental Water Quality Score	Overall Environmental Impacts Score
Andrews	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	66	N/A	3	Low	3	Low	3	6	4	Low	3	None	5	Low	3	3
Andrews	Andrews	Andrews	Colorado	Develop Ogallala Aquifer Supplies	37	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
Andrews	Andrews	Andrews	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	8	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
County-Other	Andrews	Andrews	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Andrews	Andrews	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Andrews	Andrews	Colorado	Mining Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Livestock	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	2	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
Manufacturing	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	3	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
Texland Great Plains	Andrews, Gaines	Andrews, Gaines	Colorado	Develop Ogallala Aquifer Supplies	1	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
Borden County Water System	Borden	Borden	Brazos	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Borden County Water System	Borden	Dawson	Brazos	Develop Ogallala Aquifer and Edwards-Trinity-High Plains Aquifer Supplies in Dawson County	61	N/A	3	Low	3	Low	3	Varies	3	Low	3	None	5	Low	3	3
Mining	Borden	Borden	Brazos	Mining Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Bangs	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
BCWID #1a	Brown	Brown	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
BCWID #1a	Brown	Brown	Colorado	Customer Water Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
BCWID #1a	Brown	Brown	Colorado	Brush Control	958	N/A	1	Positive	5	None	4	N/A	5	Low	3	None	5	Low	3	4
BCWID #1a	Brown	Brown	Colorado	Treatment Plant Expansion	2	N/A	4	Low	3	Low	3	11	5	Low	3	None	5	Low	3	4
BCWID #1a	Brown	Brown	Colorado	Develop Ellenburger-San Saba Aquifer Supplies	42	N/A	4	Low	3	Low	3	11	3	Low	3	None	5	Low	3	3
Coleman County SUD	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Coleman County SUD	Brown	Brown	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Brown	Brown	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Brookesmith SUD	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Brownwood	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Early	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Zephyr	Brown	Brown	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Bronte	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Bronte	Coke	Coke	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Bronte	Coke	Coke	Colorado	Oak Creep Pipeline Rehabilitation	7	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Bronte	Coke	Coke	Colorado	Water Treatment Plant Expansion	1	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Bronte	Coke	Coke	Colorado	Purchase CRMWD Supplies with Advanced Treatment	46	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Bronte, Robert Lee	Coke	Nolan	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Nolan County	40	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	Low	3	3
County-Other	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Coke	Coke	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Coke	Coke	Colorado	Mining Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Oak Creek (Non-allocated)	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Robert Lee	Coke	Coke	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Robert Lee	Coke	Coke	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Robert Lee	Coke	Coke	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Robert Lee	Coke	Coke	Colorado	Purchase CRMWD Supplies with Advanced Treatment	46	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Robert Lee	Coke	Coke	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Tom Green County	48	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Fort Phantom Hill	369	N/A	2	Low	3	Medium	2	10	4	Low	3	None	5	Low	3	3
Coleman	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Coleman	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Coleman	Coleman	Coleman	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	11	5	N/A	4	None	5	Low	3	4
County-Other	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Coleman	Coleman	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Manufacturing	Coleman	Coleman	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Santa Anna	Coleman	Coleman	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Eden	Concho	Concho	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Concho	Concho	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Crane	Crane	Crane	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Crane	Crane	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Crockett County WCID 1	Crockett	Crockett	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Crockett	Crockett	Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Crockett	Crockett	Rio Grande	Weather Modification	0	N/A	5	Positive	5	None	4	16	2	N/A	4	None	5	None	4	4
Mining	Crockett	Crockett	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other (Future Sales)	Ector	Ector	Colorado, Rio Grande	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Ector County Utility District	Ector	Ector	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Ector County Utility District	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Ector	Ector	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Manufacturing	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Mining	Ector	Ector	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Odessaa	Ector	Ector	Colorado	RO Treatment Plant	17	N/A	4	Low	3	Low	3	5	5	Low	3	None	5	Low	3	4
Odessaa	Ector	Ector	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Odessaa	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Odessaa	Ector	Pecos	Colorado	Develop Pecos Valley/Edwards-Trinity and Capitan Reef Complex Aquifers Supplies in Pecos County	611	N/A	1	Low	3	Medium	2	29	1	Low	3	None	5	Low	3	3
Steam Electric Power	Ector	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Greater Gardendale WSC	Ector, Midland	Ector	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Greater Gardendale WSC	Ector, Midland	Ector	Colorado	Purchase Water from Provider (Odessa's CRMWD Supplies)	0	N/A	5	Low	3	None	4	5	5	N/A	4	None	5	Low	3	4

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors														
					Acres Impacted	Wetland Acres Impacted	Acres Impacted Score	Environmental Water Needs Impact	Environmental Water Needs Score	Habitat Impact	Habitat Score	Potential Number of Threatened and Endangered Species Impacted	Threatened and Endangered Species Score	Cultural Resources Impact	Cultural Resources Score	Bays & Estuaries Impact	Bays & Estuaries Score	Environmental Water Quality Impact	Environmental Water Quality Score	Overall Environmental Impacts Score
Greater Gardendale WSC	Ector, Midland	Ector	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Glasscock	Glasscock	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Glasscock	Glasscock	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Big Spring	Howard	Howard	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Big Spring	Howard	Howard	Colorado	New Water Treatment Plant	10	N/A	4	Low	3	Low	3	5	5	Low	3	None	5	Low	3	4
Big Spring	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Coahoma	Howard	Howard	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Coahoma	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Howard	Howard	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Manufacturing	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Mining	Howard	Howard	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Steam Electric Power	Howard	Howard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Irion	Irion	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Irion	Irion	Colorado	Weather Modification	0	N/A	5	Positive	5	None	4	7	4	N/A	4	None	5	None	4	4
Mertzon	Irion	Irion	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	7	4	N/A	4	None	5	Low	3	4
Mertzon	Irion	Irion	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Irion	Irion	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Kimble	Kimble	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Junction	Kimble	Kimble	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	29	N/A	4	Low	3	Low	3	13	3	Low	3	None	5	Low	3	3
Junction	Kimble	Kimble	Colorado	Dredging River Intake	15	N/A	4	Low	3	Low	3	13	3	Low	3	None	5	Positive	5	4
Junction	Kimble	Kimble	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Junction	Kimble	Kimble	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	13	3	N/A	4	None	5	Low	3	4
Junction	Kimble	Kimble	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Manufacturing	Kimble	Kimble	Colorado	Develop Ellenburger San Saba Aquifer Supplies	2	N/A	4	Low	3	Low	3	13	3	Low	3	None	5	Low	3	3
Manufacturing	Kimble	Kimble	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Mining	Loving	Loving	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Martin	Martin	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Martin	Martin	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Stanton	Martin	Martin	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Stanton	Martin	Martin	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Stanton	Martin	Martin	Colorado	Purchase from Provider (CRMWD)	0	N/A	5	Low	3	None	4	3	5	N/A	4	None	5	Low	3	4
Mason	Mason	Mason	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Brady	McCulloch	McCulloch	Colorado	Surface Water Treatment for Brady Creek Lake/Reservoir	8	N/A	4	Low	3	Low	3	10	4	Low	3	None	5	Low	3	4
Brady	McCulloch	McCulloch	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Brady	McCulloch	McCulloch	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Mcculloch	McCulloch	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Richland SUD	McCulloch	McCulloch	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Millersview-Doole WSC	McCulloch	Concho	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Millersview-Doole WSC	McCulloch	Concho	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Millersview-Doole WSC	McCulloch	Concho	Colorado	Purchase from Provider (CRMWD)	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Millersview-Doole WSC	McCulloch	Concho	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Irrigation	Menard	Menard	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Menard	Menard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Menard	Menard	Menard	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Menard	Menard	Menard	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Airline Mobile Home Park	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Greenwood Water	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Greenwood Water	Midland	Midland	Colorado	New Groundwater Wells	22	N/A	4	Low	3	Low	3	3	5	Low	3	None	5	Low	3	4
Irrigation	Midland	Midland	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Midland	Midland	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Midland	Midland	Colorado	Voluntary Transfer to MCUD	0	N/A	5	Low	3	None	4	3	5	N/A	4	None	5	Low	3	4
Midlanda	Midland	Midland	Colorado	Advanced RO Treatment, Expanded Use of Paul Davis Well Field	37	N/A	4	Low	3	Low	3	3	5	Low	3	None	5	Low	3	4
Midlanda	Midland	Midland	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Midlanda	Midland	Midland	Colorado	Purchase from Provider (CRMWD)	0	N/A	5	Low	3	None	4	3	5	N/A	4	None	5	Low	3	4
Midlanda	Midland	Midland	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Mining	Midland	Midland	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other	Midland	Midland	Colorado	Develop Ogallala Aquifer Supplies from Midland County with Advanced Treatment (Voluntary Transfer from Irrigation)	630	N/A	1	Low	3	Medium	2	3	5	Low	3	None	5	Low	3	3
Colorado City	Mitchell	Mitchell	Colorado	Develop Dockum Aquifer Supplies	26	N/A	4	Low	3	Low	3	7	4	Low	3	None	5	Low	3	4
Colorado City	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Corix Utilities Texas Inc	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Mitchell	Mitchell	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Loraine	Mitchell	Mitchell	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Mitchell	Mitchell	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Steam Electric Power	Mitchell	Mitchell	Colorado	Subordination (Chamption Lake, Colorado City Lake)	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Midlanda	Multiple	Multiple	Colorado, Rio Grande	West Texas Water Partnership	12	N/A	4	Low	3	Low	3	31	1	Low	3	None	5	Medium	2	3
CRMWDa	Multiple	Winkler	Colorado	Develop Additional Groundwater Supplies in Reeves, Pecos, Ward, and Winkler Co.	22	N/A	4	Low	3	Low	3	Varies	3	Low	3	None	5	Low	3	3
CRMWDa	Multiple	Ward, Winkler	Colorado	Expand Ward County Well Field and Develop Winkler County Well Field	38	N/A	4	Low	3	Low	3	11	3	Low	3	None	5	Low	3	3
CRMWDa	Multiple	Multiple	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	1	N/A	4	None	5	Low	3	4
CRMWDa	Multiple	Ward	Colorado	Ward County Well Field Well Replacement	5	N/A	4	Low	3	None	4	11	1	Low	3	None	5	Low	3	3
CRMWDa	Multiple	Multiple	Colorado	Customer Water Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
San Angeloa	Multiple	Multiple	Colorado, Rio Grande	West Texas Water Partnership	12	N/A	4	Low	3	Low	3	31	1	Low	3	None	5	Medium	2	3
Fort Stockton	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Iraan	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Pecos	Pecos	Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Pecos	Pecos	Rio Grande	Weather Modification	0	N/A	5	Positive	5	None	4	29	1	N/A	4	None	5	None	4	4
Mining	Pecos	Pecos	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Pecos County Fresh Water	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	63	N/A	3	Low	3	Low	3	29	1	Low	3	None	5	Low	3	3
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	29	1	N/A	4	None	5	Low	3	4
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	1	N/A	4	None	5	None	4	4

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors															
					Acres Impacted	Wetland Acres Impacted	Acres Impacted Score	Environmental Water Needs Impact	Environmental Water Needs Score	Habitat Impact	Habitat Score	Potential Number of Threatened and Endangered Species Impacted	Threatened and Endangered Species Score	Cultural Resources Impact	Cultural Resources Score	Bays & Estuaries Impact	Bays & Estuaries Score	Environmental Water Quality Impact	Environmental Water Quality Score	Overall Environmental Impacts Score
Big Lake	Reagan	Reagan	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Reagan	Reagan	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Reagan	Reagan	Colorado	Weather Modification	0	N/A	5	Positive	5	None	4	4	5	N/A	4	None	5	None	4	5
Mining	Reagan	Reagan	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	2	N/A	4	None	5	None	4	4
Balmorhea	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	13	N/A	4	Low	3	Low	3	21	1	Low	3	None	5	Low	3	3
Balmorhea	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Reeves	Reeves	Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Reeves	Reeves	Rio Grande	Weather Modification	0	N/A	5	Positive	5	None	4	21	1	N/A	4	None	5	None	4	4
Madera Valley WSC	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Madera Valley WSC	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	32	N/A	4	Low	3	Low	3	21	1	Low	3	None	5	Low	3	3
Mining	Reeves	Reeves	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Pecos	Reeves	Reeves	Rio Grande	Advanced Water Treatment Plant	4	N/A	4	Low	3	Low	3	21	1	Low	3	None	5	Low	3	3
Pecos	Reeves	Reeves	Rio Grande	Direct Non-Potable Reuse	34	N/A	4	Medium	2	Low	3	21	1	Low	3	None	5	Medium	2	3
Pecos	Reeves	Reeves	Rio Grande	Direct Potable Reuse	18	N/A	4	Medium	2	Low	3	21	1	Low	3	None	5	Medium	2	3
Pecos	Reeves	Reeves	Rio Grande	Indirect Potable Reuse with Aquifer Storage and Recovery	31	N/A	4	Medium	2	Low	3	21	1	Low	3	None	5	Medium	2	3
Pecos	Reeves	Reeves	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Pecos	Reeves	Reeves	Rio Grande	Expand Pecos Valley Aquifer Supplies	3052	N/A	5	Low	3	Medium	2	21	1	Low	3	None	5	Low	3	3
Ballinger	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Ballinger	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
County-Other	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Runnels	Runnels	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Miles	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Miles	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
North Runnels WSC	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
North Runnels WSC	Runnels	Runnels	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	10	3	N/A	4	None	5	Low	3	4
North Runnels WSC	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Winters	Runnels	Runnels	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Winters	Runnels	Runnels	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	10	4	N/A	4	None	5	Low	3	4
Winters	Runnels	Runnels	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Eldorado	Schleicher	Schleicher	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Eldorado	Schleicher	Schleicher	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	7	4	N/A	4	None	5	Low	3	4
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Weather Modification	0	N/A	5	Positive	5	None	4	7	4	N/A	4	None	5	None	4	4
Mining	Schleicher	Schleicher	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
County-Other	Scurry	Scurry	Colorado, Brazos	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Scurry	Scurry	Colorado, Brazos	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Scurry	Scurry	Colorado, Brazos	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Snyder	Scurry	Scurry	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Snyder	Scurry	Scurry	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
U & F WSC	Scurry	Scurry	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
U & F WSC	Scurry	Scurry	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Sterling	Sterling	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Sterling	Sterling	Colorado	Weather Modification	0	N/A	5	Positive	5	None	4	4	5	N/A	4	None	5	None	4	5
Mining	Sterling	Sterling	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Sterling City	Sterling	Sterling	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Sterling City	Sterling	Sterling	Colorado	Develop Additional Edwards-Trinity Alluvium Supplies	23	N/A	5	Low	3	Low	3	4	5	Low	3	None	5	Low	3	4
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Sutton	Sutton	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Sonora	Sutton	Sutton	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Purchase from Provider (UCRA)	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Concho Rural Water	Tom Green	Tom Green	Colorado	Water Audits and Leak Repairs	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
County-Other	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
DADS Supported Living Center	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Tom Green	Tom Green	Colorado	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Tom Green	Tom Green	Colorado	Weather Modification	0	N/A	5	Positive	5	None	4	9	4	N/A	4	None	5	None	4	4
Irrigation	Tom Green	Tom Green	Colorado	Subordination (Twin Buttes after Concho River Project)	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Irrigation	Tom Green	Tom Green	Colorado	Voluntary Transfer to UCRA	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Manufacturing	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
Mining	Tom Green	Tom Green	Colorado	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	5	N/A	4	None	5	Low	3	4
San Angeloa	Tom Green	Tom Green	Colorado	Brush Control	586	N/A	1	Positive	5	None	4	N/A	3	Low	3	None	5	Low	3	3
San Angeloa	Tom Green	Tom Green	Colorado	Desalination of Brackish Groundwater	10	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
San Angeloa	Tom Green	Schleicher	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher County	736	N/A	1	Low	3	Medium	2	7	5	Low	3	None	5	Low	3	4
San Angeloa	Tom Green	Tom Green	Colorado	Concho River Water Project (Indirect Potable Reuse)	63	N/A	3	Medium	2	Low	3	9	4	Low	3	None	5	Medium	2	3
San Angeloa	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	1	N/A	4	None	5	None	4	4
San Angeloa	Tom Green	Tom Green	Colorado	Subordination	0	N/A	5	Low	3	None	4	N/A	1	N/A	4	None	5	Low	3	4
Tom Green County FWSD 3	Tom Green	Tom Green	Colorado	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Increased Runoff into Reservoirs (Solar Farms)	0	N/A	5	Low	3	None	4	9	4	N/A	4	None	5	Low	3	4
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Develop Lipan Aquifer Supplies in Tom Green County	19	N/A	4	Low	3	Low	3	9	4	Low	3	None	5	Low	3	4
Irrigation	Upton	Upton	Colorado, Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
McCamey	Upton	Upton	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Upton	Upton	Colorado, Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Rankin	Upton	Upton	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Barstow	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4

Entity	Entity County	Project County	Basin	Strategy	Environmental Factors															
					Acres Impacted	Wetland Acres Impacted	Acres Impacted Score	Environmental Water Needs Impact	Environmental Water Needs Score	Habitat Impact	Habitat Score	Potential Number of Threatened and Endangered Species Impacted	Threatened and Endangered Species Score	Cultural Resources Impact	Cultural Resources Score	Bays & Estuaries Impact	Bays & Estuaries Score	Environmental Water Quality Impact	Environmental Water Quality Score	Overall Environmental Impacts Score
Grandfalls	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Ward	Ward	Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Ward	Ward	Rio Grande	Weather Modification	0	N/A	5	Positive	5	None	4	11	5	N/A	4	None	5	None	4	4
Mining	Ward	Ward	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Monahans	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Southwest Sandhills WSC	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Wickett	Ward	Ward	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Kermit	Winker	Winker	Rio Grande	Develop Additonal Dockum Aquifer Supplies	2	N/A	4	Low	3	Low	3	6	4	Low	3	None	5	Low	3	4
Kermit	Winkler	Winkler	Rio Grande	Municipal Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Irrigation	Winkler	Winkler	Rio Grande	Irrigation Conservation	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4
Mining	Winkler	Winkler	Rio Grande	Mining Conservation (Recycling)	0	N/A	5	None	4	None	4	N/A	5	N/A	4	None	5	None	4	4

Table E-2
Water Management Strategy Evaluation Matrix

Name(s)	Name	Name	Name	Name			Total Yield						#	Unmet Needs												High, Medium, Low	$			High, Medium, Low	High, Medium, Low	High, Medium, Low	High, Medium, Low				
Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	2030	2040	2050	2060	2070	2080	Quantity (Ac-Ft/Yr)	2030	2040	2050	2060	2070	2080	Maximum Need (Ac-Ft/Yr)	Percentage of Max Need Met	% Need in 2020	% Need in 2030	% Need in 2040	% Need in 2050	% Need in 2060	% Need in 2070	Quantity Score	Reliability	Capital Cost	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on: Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors	Overall Score (5-45)	Implementation Issues	Comments
Andrews	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	0	2,600	2,600	2,600	2,600	2,600	2,600	450	1,085	2,278	3,589	4,955	6,403	6,403	41%	0%	240%	114%	72%	52%	41%	3	3	$56,814,000	$1,785	2	3	4	4	3	4	23	The most significant issue will be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
Andrews	Andrews	Andrews	Colorado	Develop Ogallala Aquifer Supplies	Alternative	Groundwater Development	0	3,634	3,634	3,634	3,634	3,634	3,634	450	1,085	2,278	3,589	4,955	6,403	6,403	57%	0%	335%	160%	101%	73%	57%	3	3	$36,022,000	$831	3	4	4	4	3	4	27	The most significant issue will be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability constraints
Andrews	Andrews	Andrews	Colorado	Municipal Conservation	Recommended	Conservation	49	60	109	127	147	169	169	450	1,085	2,278	3,589	4,955	6,403	6,403	3%	11%	6%	5%	4%	3%	3%	1	3	$0	$1,098	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	934	934	934	934	934	934	934	102	262	429	601	794	1,014	1,014	92%	916%	356%	218%	155%	118%	92%	4	3	$3,441,000	$306	4	4	4	4	3	4	30	The most significant issue will be locating areas with sufficient well production	
County-Other	Andrews	Andrews	Colorado	Municipal Conservation	Recommended	Conservation	22	29	38	47	56	80	80	102	262	429	601	794	1,014	1,014	8%	21%	11%	9%	8%	7%	8%	1	3	$0	$824	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Andrews	Andrews	Colorado	Irrigation Conservation	Recommended	Conservation	878	1,756	1,756	1,756	1,756	1,756	1,756	5,365	6,818	7,633	8,169	8,605	8,982	8,982	20%	16%	26%	23%	21%	20%	20%	1	3	$1,616,000	$32	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Livestock	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	108	108	108	108	108	108	108	74	87	95	100	104	108	108	100%	146%	124%	114%	108%	104%	100%	4	3	$1,018,000	$759	3	4	4	4	3	4	27	The most significant issue will be locating areas with sufficient well production	
Manufacturing	Andrews	Andrews	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Alternative	Groundwater Development	279	279	279	279	279	279	279	70	140	184	218	249	279	279	100%	399%	199%	152%	128%	112%	100%	4	3	$1,392,000	$412	4	4	4	4	3	4	30	The most significant issue will be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
Mining	Andrews	Andrews	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	242	242	222	182	128	81	242	1,990	2,139	1,754	899	0	0	2,139	11%	12%	11%	13%	20%	101%	101%	1	1	$4,840,000	$632	3	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Texland Great Plains	Andrews, Gaines	Andrews, Gaines	Colorado	Develop Ogallala Aquifer Supplies	Alternative	Groundwater Development	213	213	213	213	213	213	213	213	212	123	140	153	165	213	100%	100%	100%	173%	152%	139%	129%	4	3	$607,000	$263	4	4	4	4	3	4	30	The most significant issue will be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
Borden County Water System	Borden	Borden	Brazos	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	22	71	134	134	0%	101%	101%	101%	0%	0%	0%	0	3	$0	$5,354	1	4	4	4	3	5	24	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Borden County Water System	Borden	Dawson	Brazos	Develop Ogallala Aquifer and Edwards-Trinity-High Plains Aquifer Supplies in Dawson County	Recommended	Groundwater Development	0	0	0	22	71	134	134	0	0	0	22	71	134	134	100%	101%	101%	101%	101%	100%	100%	5	3	$24,325,000	$14,127	1	3	4	4	3	4	27	The most significant issue will be locating areas with sufficient well production	
Mining	Borden	Borden	Brazos	Mining Conservation (Recycling)	Recommended	Conservation	117	117	107	88	62	39	117	529	529	298	0	0	0	529	22%	22%	22%	36%	101%	101%	101%	1	1	$2,340,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Bangs	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	9	9	9	9	9	9	9	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,379	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
BCWID #1*	Brown	Brown	Colorado	Subordination	Recommended	Subordination	8,721	8,666	8,611	8,536	8,461	8,386	8,721	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
BCWID #1*	Brown	Brown	Colorado	Customer Water Conservation	Recommended	Conservation	124	153	152	153	153	153	153	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
BCWID #1*	Brown	Brown	Colorado	Brush Control	Recommended	Brush Control	400	400	400	400	400	400	400	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	2	$0	$470	4	4	4	4	2	3	4	28	Brush control is an on-going process that must be continually maintained in order to receive benefits	
BCWID #1*	Brown	Brown	Colorado	Treatment Plant Expansion	Recommended	Expanded Use of Supply	1,529	1,529	1,529	1,529	1,529	1,529	1,529	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	5	$38,124,000	$4,045	2	4	4	3	4	4	31		
BCWID #1*	Brown	Brown	Colorado	Develop Ellenburger-San Saba Aquifer Supplies	Alternative	Groundwater Development	0	3,600	3,600	3,600	3,600	3,600	3,600	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$107,756,000	$3,745	2	3	4	4	3	4	29	The most significant issue will be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
Brookesmith SUD	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	20	21	21	21	21	21	21	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$877	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brownwood	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	61	90	90	90	90	91	91	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,087	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman County SUD	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	78	76	73	70	68	65	78	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$1,384	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Early	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	10	10	10	11	11	11	11	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,321	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Brown	Brown	Colorado	Irrigation Conservation	Recommended	Conservation	384	615	615	615	615	615	615	319	319	319	319	319	319	319	193%	121%	193%	193%	193%	193%	193%	5	3	$566,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Zephyr	Brown	Brown	Colorado	Municipal Conservation	Recommended	Conservation	12	13	13	13	13	13	13	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,272	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman County SUD	Brown	Brown	Colorado	Subordination	Recommended	Subordination	78	76	73	70	68	65	78	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Bronte	Coke	Coke	Colorado	Subordination	Recommended	Subordination	199	212	213	215	216	217	217	524	560	600	661	728	802	802	27%	38%	38%	36%	33%	30%	27%	3	3	$0	$0	5	4	4	4	3	4	30		
Bronte	Coke	Coke	Colorado	Municipal Conservation	Recommended	Conservation	3	3	3	3	4	4	4	524	560	600	661	728	802	802	0%	1%	1%	1%	0%	1%	0%	1	3	$0	$2,076	2	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Bronte	*Coke*	*Coke*	*Colorado*	*Oak Creep Pipeline Rehabilitation*	*Recommended*	*Expanded Use of Supply*	*0*	*457*	*457*	*457*	*457*	*457*	*457*	*524*	*560*	*600*	*661*	*728*	*802*	*802*	-	0%	82%	76%	69%	63%	57%	3	3	*$18,637,000*	*$3,225*	2	4	4	4	4	4	28		
Bronte	*Coke*	*Coke*	*Colorado*	*Water Treatment Plant Expansion*	*Recommended*	*Expanded Use of Supply*	*729*	*729*	*729*	*729*	*729*	*729*	*444*	*524*	*560*	*600*	*661*	*728*	*802*	*448*	-	139%	130%	121%	110%	100%	91%	4	5	*$15,000,000*	*$2,536*	2	4	4	4	4	4	30		
Bronte	Coke	Coke	Colorado	Purchase CRMWD Supplies with Advanced Treatment	Recommended	Expanded Use of Supply	0	100	140	201	267	341	341	524	560	600	661	728	802	802	43%	0%	18%	23%	30%	37%	43%	1	5	$34,844,000	$26,963	1	4	4	4	3	4	26	Reliability is a concern, Lake Spence has been unreliable during previous droughts. Largest concern is high financial cost	
Bronte, Robert Lee	Coke	Coke, Nolan	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Nolan County	Alternative	Groundwater Development	0	75	75	75	75	75	75	524	560	600	661	728	802	802	9%	0%	13%	13%	11%	10%	9%	1	3	$18,305,000	$18,987	1	3	4	4	3	4	27	The most significant issue will be locating areas with sufficient well production	
County-Other	Coke	Coke	Colorado	Subordination	Recommended	Subordination	49	49	49	49	49	49	49	49	49	49	49	49	49	49	100%	100%	100%	100%	100%	100%	100%	4	3	$0	$0	5	4	4	4	3	4	31		
Irrigation	Coke	Coke	Colorado	Irrigation Conservation	Recommended	Conservation	31	62	74	74	74	74	74	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$68,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Coke	Coke	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	2	2	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$40,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Robert Lee	Coke	Coke	Colorado	Municipal Conservation	Recommended	Conservation	3	3	3	4	4	5	5	328	343	363	393	426	463	463	1%	1%	1%	1%	1%	1%	1%	1	3	$0	$1,985	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Robert Lee	Coke	Coke	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	11	12	13	14	15	17	17	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$349,000	$2,234	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Robert Lee	Coke	Coke	Colorado	Purchase from Provider (Bronte's CRMWD Supplies) with Advanced Treatment	Recommended	Purchase from Provider	0	83	103	133	166	201	201	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	1	5	$30,880,000	$19,636	1	4	4	3	4	4	26	Reliability is a concern, Lake Spence has been unreliable during previous droughts. Largest concern is high financial cost	
Robert Lee	Coke	Coke, Tom Green	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Tom Green County	Alternative	Groundwater Development	0	160	160	160	160	160	160	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$20,139,000	$9,988	1	4	4	4	3	4	29	The most significant issue will be locating areas with sufficient well production	
Oak Creek (Non-allocated)	Coke	Coke	Colorado	Subordination	Recommended	Subordination	598	556	513	473	433	393	598	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Robert Lee	Coke	Coke	Colorado	Subordination	Recommended	Subordination	199	212	213	215	216	217	217	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	Coke, Runnels	Colorado	Regional System from Lake Fort Phantom Hill	Alternative	Regional	0	1,114	1,074	1,033	993	952	1,114	1,828	1,904	2,000	2,127	2,254	2,390	2,390	47%	0%	59%	54%	49%	44%	40%	3	3	$211,788,000	$15,116	1	3	4	4	3	3	21	Still would need to reach an agreement with partners, including Abilene.	
Coleman	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,313	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	1,023	1,029	1,035	1,009	954	900	1,035	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Coleman	Coleman	Coleman	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$2,021,000	$2,209	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	17	13	10	7	4	2	17	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Coleman	Coleman	Colorado	Irrigation Conservation	Recommended	Conservation	21	42	42	42	42	42	42	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$39,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Santa Anna	Coleman	Coleman	Colorado	Municipal Conservation	Recommended	Conservation	3	3	3	3	3	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,034	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	2030	2040	2050	2060	2070	2080	Quantity (Ac-Ft/Yr)	2030	2040	2050	2060	2070	2080	Maximum Need (Ac-Ft/Yr)	Percentage of Max Need Met	% Need in 2020	% Need in 2030	% Need in 2040	% Need in 2050	% Need in 2060	% Need in 2070	Quantity Score	Reliability	Capital Cost	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
																																	Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Irrigation	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	400	400	400	400	400	400	400	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	5	4	3	4	33		
Manufacturing	Coleman	Coleman	Colorado	Subordination	Recommended	Subordination	1	1	1	1	1	1	1	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Eden	Concho	Concho	Colorado	Municipal Conservation	Recommended	Conservation	5	5	5	5	5	5	5	450	435	421	407	397	390	450	1%	1%	1%	1%	1%	1%	1%	1	3	$0	$1,567	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Concho	Concho	Colorado	Irrigation Conservation	Recommended	Conservation	260	520	572	572	572	572	572	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$526,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Millersview-Doole WSC	Concho	Concho	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	122	353	597	878	878	0%	101%	101%	0%	0%	0%	0%	0	3	$0	$1,091	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Crane	Crane	Crane	Rio Grande	Municipal Conservation	Recommended	Conservation	11	11	11	11	11	11	11	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,312	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Crane	Crane	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	21	21	21	21	1	1	21	0	0	78	299	15	191	299	7%	101%	101%	27%	7%	7%	1%	1	1	$420,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Crockett County WCID 1	Crockett	Crockett	Rio Grande	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,450	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Crockett	Crockett	Rio Grande	Irrigation Conservation	Recommended	Conservation	4	8	12	12	12	12	12	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$11,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Crockett	Crockett	Rio Grande	Weather Modification	Recommended	Regional	167	167	167	167	167	167	167	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$1	4	4	5	4	4	4	31	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Crockett	Crockett	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	423	423	78	63	45	28	423	2,275	2,196	1,610	545	0	0	2,275	19%	19%	19%	5%	12%	101%	101%	1	1	$8,460,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other (Future Sales)	Ector	Ector	Colorado, Rio Grande	Subordination	Recommended	Subordination	0	1,200	2,500	2,500	2,500	2,500	2,500	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	4	3	4	32		
Ector County Utility District	Ector	Ector	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	1,489	3,352	3,886	4,331	4,814	4,814	0%	101%	0%	0%	0%	0%	0%	0	3	$0	$795	3	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Ector County Utility District	Ector	Ector	Colorado	Subordination	Recommended	Subordination	0	289	852	1,387	1,831	2,268	2,268	0	1,489	3,352	3,886	4,331	4,814	4,814	47%	101%	19%	25%	36%	42%	47%	5	3	$0	$0	5	4	4	4	3	4	30		
Irrigation	Ector	Ector	Colorado	Irrigation Conservation	Recommended	Conservation	38	75	113	113	113	113	113	0	0	23	97	144	188	188	60%	101%	101%	491%	116%	78%	60%	3	3	$104,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Ector	Ector	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	24	24	22	18	12	8	24	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$480,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Odessa-Y	*Ector*	*Ector*	*Colorado*	*RO Treatment Plant*	*Recommended*	*Expanded Use of Supply*	*0*	*15,700*	*15,700*	*15,700*	*15,700*	*15,700*	*15,700*	*0*	*2,543*	*7,495*	*11,884*	*15,306*	*18,104*	*18,104*	*87%*	*101%*	*617%*	*209%*	*132%*	*103%*	*87%*	*4*	*5*	*$224,032,000*	*$2,144*	2	4	4	3	4	4	30		
Odessa*	Ector	Ector	Colorado	Municipal Conservation	Recommended	Conservation	530	637	745	786	838	890	890	0	2,543	7,495	11,884	15,306	18,104	18,104	5%	101%	25%	10%	7%	5%	5%	1	3	$0	$513	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Odessa*	Ector	Ector, Pecos	Colorado	Develop Pecos Valley/Edwards-Trinity and Capitan Reef Complex Aquifers Supplies in Pecos County	Alternative	Groundwater Development	0	28,000	28,000	28,000	28,000	28,000	28,000	0	2,543	7,495	11,884	15,306	18,104	18,104	155%	101%	1101%	374%	236%	183%	155%	5	3	$1,572,207,000	$5,791	1	3	4	4	3	3	26	The most signficant issue will be locating areas with sufficient well production, and ensuring all the supply is not taken from	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
Irrigation	Ector	Ector	Colorado	Subordination	Recommended	Subordination	0	60	150	224	271	308	308	0	2,543	7,495	11,884	15,306	18,104	18,104	2%	101%	2%	2%	2%	2%	2%	1	3	$0	$0	5	4	5	4	3	4	29		
Manufacturing	Ector	Ector	Colorado	Subordination	Recommended	Subordination	0	26	66	97	119	135	135	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Odessa*	Ector	Ector	Colorado	Subordination	Recommended	Subordination	0	1,822	5,642	8,999	11,612	14,024	14,024	0	2,543	7,495	11,884	15,306	18,104	18,104	77%	101%	72%	75%	76%	76%	77%	4	3	$0	$0	5	4	4	4	3	4	31		
Steam Electric Power	Ector	Ector	Colorado	Subordination	Recommended	Subordination	0	165	420	625	756	861	861	139	269	420	625	756	879	879	98%	0%	81%	100%	100%	100%	98%	4	3	$0	$0	5	4	4	4	3	4	31		
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	18	100	162	216	271	271	0%	101%	0%	0%	0%	0%	0%	0	3	$0	$1,175	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Purchase Water from Provider (Odessa's CRMWD Supplies)	Recommended	Purchase from Provider	0	18	100	162	216	271	271	0	18	100	162	216	271	271	100%	101%	100%	100%	100%	100%	100%	4	3	$16,285,000	$10,004	1	4	4	4	3	4	27		
Greater Gardendale WSC	Ector, Midland	Ector, Midland	Colorado	Subordination	Recommended	Subordination	0	18	100	162	216	266	266	0	18	100	162	216	271	271	98%	101%	100%	100%	100%	100%	98%	4	3	$0	$0	5	4	4	4	3	4	31		
Irrigation	Glasscock	Glasscock	Colorado	Irrigation Conservation	Recommended	Conservation	1,737	1,737	1,737	1,737	1,737	1,737	1,737	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$1,598,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Glasscock	Glasscock	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	479	479	439	359	253	160	479	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$9,580,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Spring	Howard	Howard	Colorado	Subordination	Recommended	Subordination	0	497	1,282	1,866	2,212	2,458	2,458	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Coahoma	Howard	Howard	Colorado	Subordination	Recommended	Subordination	0	27	72	104	122	134	134	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Big Spring	Howard	Howard	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	698	1,797	2,625	3,128	3,567	3,567	0%	101%	0%	0%	0%	0%	0%	0	3	$0	$665	3	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Spring	*Howard*	*Howard*	*Colorado*	*New Water Treatment Plant*	*Recommended*	*Expanded Use of Supply*	*0*	*11,210*	*11,210*	*11,210*	*11,210*	*11,210*	*11,210*	*0*	*698*	*1,797*	*2,625*	*3,128*	*3,567*	*3,567*	*314%*	*101%*	*1606%*	*624%*	*427%*	*358%*	*314%*	*5*	*5*	*$165,625,000*	*$1,737*	2	4	4	3	4	4	31		
Coahoma	Howard	Howard	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	27	72	104	122	137	137	0%	101%	0%	0%	0%	0%	0%	0	3	$0	$2,036	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Howard	Howard	Colorado	Irrigation Conservation	Recommended	Conservation	255	510	561	561	561	561	561	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$516,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Howard	Howard	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	427	427	391	320	226	142	427	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$8,540,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Manufacturing	Howard	Howard	Colorado	Subordination	Recommended	Subordination	0	111	281	417	505	576	576	0	111	281	417	505	587	587	98%	101%	100%	100%	100%	100%	98%	4	3	$0	$0	5	4	4	4	3	4	31		
Steam Electric Power	Howard	Howard	Colorado	Subordination	Recommended	Subordination	1	64	163	240	292	329	329	0	63	162	239	290	336	336	98%	101%	102%	101%	100%	101%	98%	4	3	$0	$0	5	4	4	4	3	4	31		
Irrigation	Irion	Irion	Colorado	Irrigation Conservation	Recommended	Conservation	53	105	158	158	158	158	158	618	618	618	618	618	618	618	26%	9%	17%	26%	26%	26%	26%	3	3	$145,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Irion	Irion	Colorado	Weather Modification	Recommended	Regional	156	156	156	156	156	156	156	618	618	618	618	618	618	618	25%	25%	25%	25%	25%	25%	25%	3	1	$0	$0	4	4	5	4	4	4	29	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mertzon	Irion	Irion	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$4,497	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mertzon	Irion	Irion	Colorado	Municipal Conservation	Recommended	Conservation	2	2	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,477	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Irion	Irion	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	615	615	563	92	65	41	615	6,015	6,006	5,272	3,803	1,857	130	6,015	10%	10%	10%	11%	2%	4%	32%	1	1	$12,300,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Kimble	Kimble	Colorado	Irrigation Conservation	Recommended	Conservation	130	260	312	312	312	312	312	1,258	1,258	1,258	1,258	1,258	1,258	1,258	25%	10%	21%	25%	25%	25%	25%	1	3	$287,000	$32	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Junction	Kimble	Kimble	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	0	370	370	370	370	370	370	523	512	506	505	506	511	523	71%	0%	72%	73%	73%	73%	72%	3	3	$7,185,000	$1,557	2	3	4	4	3	4	28	The most significant issue will be locating areas with sufficient well production	
Junction	*Kimble*	*Kimble*	*Colorado*	*Dredging River Intake*	*Recommended*	*Expanded Use of Supply*	*0*	*250*	*250*	*250*	*250*	*250*	*250*	*523*	*512*	*506*	*505*	*506*	*511*	*523*	*48%*	*0%*	*49%*	*49%*	*50%*	*49%*	*49%*	*3*	*3*	*$10,439,000*	*$2,936*	2	4	4	2	4	4	26	This strategy assumes that the dredged material is relatively clean. If contamination is found, a suitable disposal site will need to	A suitable location for disposal of the dredged material must be found.
Junction	Kimble	Kimble	Colorado	Municipal Conservation	Recommended	Conservation	7	7	7	7	7	7	7	523	512	506	505	506	511	523	1%	1%	1%	1%	1%	1%	1%	1	3	$0	$1,460	2	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Junction	Kimble	Kimble	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	37	36	36	36	36	36	37	523	512	506	505	506	511	523	7%	7%	7%	7%	7%	7%	7%	1	3	$1,900,000	$1,211	2	4	4	4	3	4	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Manufacturing	Kimble	Kimble	Colorado	Develop Ellenburger San Saba Aquifer Supplies	Recommended	Groundwater Development	30	30	30	30	30	30	30	35	35	35	35	35	35	35	86%	86%	86%	86%	86%	86%	86%	4	3	$727,000	$1,900	2	3	4	4	3	4	27	The most significant issue will be locating areas with sufficient well production	
Junction	Kimble	Kimble	Colorado	Subordination	Recommended	Subordination	269	269	269	269	269	269	269	523	512	506	505	506	511	523	51%	51%	53%	53%	53%	53%	53%	3	3	$0	$0	5	4	4	4	3	4	30		
Manufacturing	Kimble	Kimble	Colorado	Subordination	Recommended	Subordination	8	8	8	8	8	8	8	523	512	506	505	506	511	523	2%	2%	2%	2%	2%	2%	2%	1	3	$0	$0	5	4	4	4	3	4	28		

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	2030	2040	2050	2060	2070	2080	Quantity (Ac-Ft/Yr)	2030	2040	2050	2060	2070	2080	Maximum Need (Ac-Ft/Yr)	Percentage of Max Need Met	% Need in 2020	% Need in 2030	% Need in 2040	% Need in 2050	% Need in 2060	% Need in 2070	Quantity Score	Reliability	Capital Cost	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
																																	Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Mining	Loving	Loving	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	692	692	692	692	692	692	692	6,725	6,724	6,724	6,724	6,723	6,723	6,725	10%	10%	10%	10%	10%	10%	10%	1	1	$13,840,000	$632	3	4	4	4	3	5	23	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Martin	Martin	Colorado	Irrigation Conservation	Recommended	Conservation	0	0	0	0	0	0	0	437	4,029	6,076	6,515	5,832	4,881	6,515	0%	0%	0%	0%	0%	0%	0%	0	3	$4,545,000	$32	4	4	5	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Martin	Martin	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	574	574	526	143	101	64	574	144	1,328	1,793	1,473	784	259	1,793	32%	399%	43%	29%	10%	13%	25%	3	1	$11,480,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Stanton	Martin	Martin	Colorado	Municipal Conservation	Recommended	Conservation	8	9	10	11	12	14	14	51	122	219	311	403	504	504	3%	16%	8%	5%	4%	3%	3%	1	3	$0	$1,386	2	4	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Stanton	Martin	Martin	Colorado	Purchase from Provider (CRMWD)	Recommended	Purchase from Provider	43	91	151	215	287	372	372	144	1,328	1,793	1,473	784	259	1,793	21%	30%	7%	8%	15%	37%	144%	1	3	$0	$0	5	4	4	4	4	3	4	28		
Stanton	Martin	Martin	Colorado	Subordination	Recommended	Subordination	0	22	58	85	104	118	118	144	1,328	1,793	1,473	784	259	1,793	7%	0%	2%	3%	6%	13%	46%	1	3	$0	$0	5	4	4	4	4	3	4	28		
Mason	Mason	Mason	Colorado	Municipal Conservation	Recommended	Conservation	7	7	7	8	8	8	8	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,478	2	4	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Brady	McCulloch	McCulloch	Colorado	Subordination	Recommended	Subordination	0	0	1,770	1,740	1,710	1,680	1,770	144	1,328	1,793	1,473	784	259	1,793	99%	0%	0%	99%	118%	218%	649%	4	3	$0	$0	5	4	4	4	4	3	4	31		
Brady	*McCulloch*	*McCulloch*	*Colorado*	*Surface Water Treatment for Brady Creek Lake/Reservoir*	*Recommended*	*Expanded Use of Supply*	*0*	*0*	*1,770*	*1,740*	*1,710*	*1,680*	*1,770*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*101%*	*101%*	*101%*	*101%*	*101%*	*101%*	*101%*	*5*	*5*	*$7,344,000*	*$4,150*	*1*	4	4	3	4	4	30		
Brady	McCulloch	McCulloch	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,048	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Mcculloch	McCulloch	Colorado	Irrigation Conservation	Recommended	Conservation	104	207	311	311	311	311	311	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$286,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Millersview-Doole WSC	McCulloch	Concho	Colorado	Purchase from Provider (CRMWD)	Recommended	Purchase from Provider	0	0	0	73	267	496	496	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Millersview-Doole WSC	McCulloch	Concho	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	4	3	$5,732,000	$1,619	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Richland SUD	McCulloch	McCulloch	Colorado	Municipal Conservation	Recommended	Conservation	2	2	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,606	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Millersview-Doole WSC	McCulloch	Concho	Colorado	Subordination	Recommended	Subordination	0	43	110	164	198	230	230	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Menard	Menard	Colorado	Subordination	Recommended	Subordination	1,330	1,330	1,330	1,330	1,330	1,330	1,330	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	5	4	3	4	33		
Irrigation	Menard	Menard	Colorado	Irrigation Conservation	Recommended	Conservation	173	347	520	520	520	520	520	394	394	394	394	394	394	394	132%	44%	88%	132%	132%	132%	132%	5	3	$478,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Menard	Menard	Menard	Colorado	Municipal Conservation	Recommended	Conservation	3	3	3	3	3	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,883	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Menard	Menard	Menard	Colorado	Subordination	Recommended	Subordination	643	643	643	643	643	643	643	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Midland	Midland	Colorado	Subordination	Recommended	Subordination	0	60	153	227	276	314	314	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	5	4	3	4	33		
Irrigation (to MCUD)	Midland	Midland	Colorado	Voluntary Transfer to MCUD	Recommended	Purchase from Provider	(293)	(1,751)	(1,751)	(1,751)	(1,751)	(1,751)	-293	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	N/A	N/A	1	4	5	4	3	4	29	Agreements will need to be made with irrigators for use of their water rights	
Airline Mobile Home Park	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	6	6	7	8	8	9	9	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,555	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Midland	Midland	Colorado	Develop Ogallala Aquifer Supplies from Midland County with Advanced Treatment (Voluntary Transfer from Irrigation)	Recommended	Groundwater Development	234	1,401	1,401	1,401	1,401	1,401	1,401	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	5	$136,737,000	$4,776	2	3	2	3	4	4	28	Site specific data needed. May require financial and technical assistance and agreements with City of Midland.	
Greenwood Water	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	3	3	3	3	3	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,122	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Greenwood Water	Midland	Midland	Colorado	Develop Ogallala Aquifer Supplies	Recommended	Groundwater Development	2,420	2,420	2,420	2,420	2,420	2,420	2,420	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$13,923,000	$1,891	2	4	4	4	3	4	29	The most significant issue willl be locating areas with sufficient well production	
Irrigation	Midland	Midland	Colorado	Irrigation Conservation	Recommended	Conservation	900	1,800	2,699	2,699	2,699	2,699	2,699	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$2,483,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Midland*	Midland	Midland	Colorado	Advanced RO Treatment, Expanded Use of Paul Davis Well Field	Alternative	Expanded Use of Supply	6,628	7,147	7,514	7,757	7,932	8,065	8,065	0	0	2,698	6,085	9,848	14,087	14,087	57%	101%	101%	279%	127%	81%	57%	3	5	$192,003,000	$3,441	2	4	4	3	4	4	29	Would require agreements with willing irrigation users. May require financial and technical assistance	
Midland*	Midland	Midland	Colorado	Municipal Conservation	Recommended	Conservation	646	720	789	877	977	1,092	1,092	0	0	2,698	6,085	9,848	14,087	14,087	8%	101%	101%	29%	14%	10%	8%	1	3	$0	$505	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Midland*	Midland	Midland	Colorado	Purchase from Provider (CRMWD)	Recommended	Purchase from Provider	11,200	11,200	11,200	11,200	11,200	11,200	1,000	0	0	2,698	6,085	9,848	14,087	14,087	7%	101%	101%	415%	184%	114%	80%	1	3	$0	$0	5	4	4	4	3	4	28		
Mining	Midland	Midland	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	508	508	466	381	90	56	508	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$10,160,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Midland*	Midland	Midland	Colorado	Subordination	Recommended	Subordination	803	1,605	2,860	3,907	4,598	5,149	5,149	0	0	2,698	6,085	9,848	14,087	14,087	37%	101%	101%	106%	64%	47%	37%	3	3	$0	$0	5	4	4	4	3	4	30		
Colorado City	Mitchell	Mitchell	Colorado	Develop Dockum Aquifer Supplies	Alternative	Groundwater Development	170	170	170	170	170	170	170	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$11,428,000	$5,335	1	4	4	4	3	4	29	The most significant issue willl be locating areas with sufficient well production	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
Colorado City	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$884	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Corix Utilities Texas Inc	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	16	34	36	35	35	34	36	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$684	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Mitchell	Mitchell	Colorado	Irrigation Conservation	Recommended	Conservation	0	0	0	0	0	0	0	1,812	1,529	1,819	1,788	1,742	1,705	1,829	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$32	4	4	5	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Loraine	Mitchell	Mitchell	Colorado	Municipal Conservation	Recommended	Conservation	2	2	1	1	1	1	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,649	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Mitchell	Mitchell	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	15	15	14	12	8	5	15	51	50	47	38	26	16	52	29%	29%	29%	30%	32%	31%	31%	3	1	$300,000	$632	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Steam Electric Power	Mitchell	Mitchell	Colorado	Subordination (Chamption Lake, Colorado City Lake)	Recommended	Subordination	2,924	2,840	2,756	2,690	2,626	2,560	2,924	6,725	6,725	6,725	6,725	6,725	6,725	6,725	43%	43%	42%	41%	40%	39%	38%	3	3	$0	$0	5	4	4	4	3	4	30		
CRMWD*	Multiple	Multiple	Colorado	Subordination	Recommended	Subordination	28,060	23,516	15,551	9,011	4,228	0	28,060	0	4,273	11,926	18,401	23,162	27,929	27,929	100%	101%	550%	130%	49%	18%	0%	5	3	$0	$0	5	4	4	4	3	4	32		
CRMWD*	Multiple	Winkler	Colorado	Develop Additional Groundwater Supplies in Reeves, Pecos, Ward, and Winkler Co.	Alternative	Groundwater Development	0	25,000	25,000	25,000	25,000	25,000	25,000	0	4,273	11,926	18,401	23,162	27,929	27,929	90%	101%	585%	210%	136%	108%	90%	4	5	$551,074,000	$2,604	2	3	4	4	3	3	28		
CRMWD*	Multiple	Ward, Winkler	Colorado	Expand Ward County Well Field and Develop Winkler County Well Field	Recommended	Groundwater Development	21,480	20,412	19,319	18,398	17,523	16,735	21,480	0	4,273	11,926	18,401	23,162	27,929	27,929	77%	101%	478%	162%	100%	76%	60%	4	5	$299,500,000	$1,224	2	3	4	4	3	3	28		
CRMWD*	Multiple	Ward	Colorado	Ward County Well Field Well Replacement	Recommended	Groundwater Development	0	1,492	2,831	5,958	7,327	8,674	8,674	0	4,273	11,926	18,401	23,162	27,929	27,929	31%	101%	35%	24%	32%	32%	31%	3	5	$17,868,000	$160	4	3	4	4	3	3	29		
CRMWD*	Multiple	Multiple	Colorado	Customer Water Conservation	Recommended	Conservation	813	956	1,089	1,174	1,245	1,317	1,317	0	4,273	11,926	18,401	23,162	27,929	27,929	5%	101%	22%	9%	6%	5%	5%	1	3	$0	$0	5	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Midland*	Multiple	Multiple	Colorado, Rio Grande	West Texas Water Partnership	Recommended	Regional	0	15,000	15,000	15,000	15,000	15,000	15,000	0	0	2,698	6,085	9,848	14,087	14,087	106%	101%	101%	556%	247%	152%	106%	5	3	$636,880,000	$2,267	2	3	4	4	2	3	26	Follow up discussions will be conducted to explore necessary methodologies and agreements to implement this cooperative	Additional study will be needed once a more specific details for this strategy have been determined.
San Angelo*	Multiple	Multiple	Colorado, Rio Grande	West Texas Water Partnership	Recommended	Regional	0	5,000	5,000	5,000	5,000	5,000	5,000	3,740	2,995	4,353	5,692	7,142	8,711	8,711	57%	0%	167%	115%	88%	70%	57%	3	3	$212,293,000	$0	5	3	4	4	4	2	3	27	Follow up discussions will be conducted to explore necessary methodologies and agreements to implement this cooperative	Additional study will be needed once a more specific details for this strategy have been determined.
Fort Stockton	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	29	29	29	31	33	35	35	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$624	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Iraan	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	3	3	3	3	3	4	4	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,953	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Pecos	Pecos	Rio Grande	Irrigation Conservation	Recommended	Conservation	6,884	13,767	20,651	20,651	20,651	20,651	20,651	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$18,999,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Pecos	Pecos	Rio Grande	Weather Modification	Recommended	Regional	1,807	1,807	1,807	1,807	1,807	1,807	1,807	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$0	4	4	5	4	4	4	31	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Pecos	Pecos	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	931	931	931	931	186	186	931	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$18,620,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	2030	2040	2050	2060	2070	2080	Quantity (Ac-Ft/Yr)	2030	2040	2050	2060	2070	2080	Maximum Need (Ac-Ft/Yr)	Percentage of Max Need Met	% Need in 2020	% Need in 2030	% Need in 2040	% Need in 2050	% Need in 2060	% Need in 2070	Quantity Score	Reliability	Capital Cost	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
																																	Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Pecos County Fresh Water	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	2	2	2	2	2	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,439	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	560	560	560	560	560	560	560	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$16,029,000	$3,063	2	3	4	4	3	4	25	The most significant issue willl be locating areas with sufficient well production	
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$1,938,000	$3,026	2	4	4	4	3	4	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos County WCID #1	Pecos	Pecos	Rio Grande	Municipal Conservation	Recommended	Conservation	7	7	8	7	7	6	8	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,483	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Big Lake	Reagan	Reagan	Colorado	Municipal Conservation	Recommended	Conservation	9	9	10	10	10	10	10	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,354	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reagan	Reagan	Colorado	Irrigation Conservation	Recommended	Conservation	1,075	2,150	3,225	3,225	3,225	3,225	3,225	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$2,967,000	$32	4	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reagan	Reagan	Colorado	Weather Modification	Recommended	Regional	267	267	267	267	267	267	267	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$1	4	5	5	4	4	4	32	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Reagan	Reagan	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	686	686	628	171	121	76	686	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Balmorhea	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	0	110	110	110	110	110	110	16	39	62	76	91	109	109	101%	0%	282%	177%	145%	121%	101%	5	3	$6,413,000	$4,573	2	3	4	4	3	4	29	The most significant issue willl be locating areas with sufficient well production	
Balmorhea	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	1	1	1	2	2	2	2	16	39	62	76	91	109	109	2%	7%	3%	2%	2%	2%	2%	1	3	$0	$3,456	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,288	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reeves	Reeves	Rio Grande	Irrigation Conservation	Recommended	Conservation	3,001	6,003	9,004	9,004	9,004	9,004	9,004	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$8,784,000	$32	4	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Reeves	Reeves	Rio Grande	Weather Modification	Recommended	Regional	2,176	2,176	2,176	2,176	2,176	2,176	2,176	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$0	4	4	4	5	4	4	4	31	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Madera Valley WSC	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	6	6	7	7	8	8	8	13	91	165	219	277	341	341	2%	45%	7%	4%	3%	3%	2%	1	3	$0	$1,535	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Madera Valley WSC	Reeves	Reeves	Rio Grande	Develop Edwards-Trinity Plateau Aquifer Supplies	Recommended	Groundwater Development	0	333	333	333	333	333	333	13	91	165	219	277	341	341	98%	0%	366%	202%	152%	120%	98%	4	3	$15,482,000	$3,817	2	3	4	4	3	4	27	The most significant issue willl be locating areas with sufficient well production	
Mining	Reeves	Reeves	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	2,017	2,017	2,017	2,017	2,017	2,017	2,017	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$40,340,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos	Reeves	Reeves	Rio Grande	Advanced Water Treatment Plant	Recommended	Expanded Use of Supply	0	3,360	3,360	3,360	3,360	3,360	250	1,326	1,820	2,291	2,606	2,951	3,328	3,328	8%	0%	185%	147%	129%	114%	101%	1	5	$0	$5,467	1	3	4	3	4	4	25		
Pecos	Reeves	Reeves	Rio Grande	Direct Non-Potable Reuse	Recommended	Reuse	0	560	560	560	560	560	560	1,326	1,820	2,291	2,606	2,951	3,328	3,328	17%	0%	31%	24%	21%	19%	17%	1	5	$17,953,000	$2,580	2	3	4	3	4	4	26		
Pecos	Reeves	Reeves	Rio Grande	Direct Potable Reuse	Recommended	Reuse	0	925	925	925	925	925	925	1,326	1,820	2,291	2,606	2,951	3,328	3,328	28%	0%	51%	40%	35%	31%	28%	3	5	$41,357,000	$6,184	1	3	4	3	4	4	27		
Pecos	Reeves	Reeves	Rio Grande	Indirect Potable Reuse with Aquifer Storage and Recovery	Alternative	Reuse	0	695	695	695	695	695	695	1,326	1,820	2,291	2,606	2,951	3,328	3,328	21%	0%	38%	30%	27%	24%	21%	1	5	$49,782,000	$9,252	1	3	4	4	3	4	25		
Pecos	Reeves	Reeves	Rio Grande	Municipal Conservation	Recommended	Conservation	30	34	38	40	43	46	46	1,326	1,820	2,291	2,606	2,951	3,328	3,328	1%	2%	2%	2%	2%	1%	1%	1	3	$0	$587	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Pecos	Reeves	Reeves	Rio Grande	Develop Pecos Valley Aquifer Supplies	Recommended	Groundwater Development	0	8,960	8,960	8,960	8,960	8,960	8,960	1,326	1,820	2,291	2,606	2,951	3,328	3,328	269%	0%	492%	391%	344%	304%	269%	5	3	$69,404,000	$638	3	3	2	4	3	4	27	The most significant issue willl be locating areas with sufficient well production	
Ballinger	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	792	822	872	910	935	959	959	1,326	1,820	2,291	2,606	2,951	3,328	3,328	29%	60%	45%	38%	35%	32%	29%	3	3	$0	$0	5	4	4	4	3	4	30		
County-Other	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	28	28	28	28	26	23	28	1,326	1,820	2,291	2,606	2,951	3,328	3,328	1%	2%	2%	1%	1%	1%	1%	1	3	$0	$0	5	4	4	4	3	4	28		
Miles	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	21	9	8	10	7	8	21	1,326	1,820	2,291	2,606	2,951	3,328	3,328	1%	2%	0%	0%	0%	0%	0%	1	3	$0	$0	5	4	4	4	3	4	28		
Ballinger	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	393	418	460	497	525	553	553	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$1,301	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	28	28	28	28	26	23	28	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$2,007	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Runnels	Runnels	Colorado	Irrigation Conservation	Recommended	Conservation	176	352	422	422	422	422	422	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$388,000.00	$32.15	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Miles	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	6	14	14	14	0%	101%	101%	101%	101%	0%	0%	0	3	$0	$2,157	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
North Runnels WSC	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	227	241	256	273	292	314	314	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$1,737	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
North Runnels WSC	Runnels	Runnels	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	227	241	256	273	292	314	314	0%	0%	0%	0%	0%	0%	0%	0	3	$1,393,000	$4,350	2	4	4	4	3	4	24	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
North Runnels WSC	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	103	109	117	124	132	142	142	227	241	256	273	292	314	314	45%	45%	45%	46%	45%	45%	45%	3	3	$0	$0	5	4	4	4	3	4	30		
Winters	Runnels	Runnels	Colorado	Municipal Conservation	Recommended	Conservation	0	0	0	0	0	0	0	586	583	577	576	575	572	586	0%	0%	0%	0%	0%	0%	0%	0	3	$0	$1,438	2	4	4	4	3	5	25	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Winters	Runnels	Runnels	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	586	583	577	576	575	572	586	0%	0%	0%	0%	0%	0%	0%	0	3	$1,792,000	$2,900	2	4	4	4	3	4	24	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Winters	Runnels	Runnels	Colorado	Subordination	Recommended	Subordination	162	155	146	137	128	116	162	586	583	577	576	575	572	586	28%	28%	27%	25%	24%	22%	20%	3	3	$0	$0	5	4	4	4	3	4	30		
Eldorado	Schleicher	Schleicher	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$1,090,000	$1,307	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Eldorado	Schleicher	Schleicher	Colorado	Municipal Conservation	Recommended	Conservation	5	4	4	3	3	2	5	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,658	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	101	121	121	121	121	121	121	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$111,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Schleicher	Schleicher	Colorado, Rio Grande	Weather Modification	Recommended	Regional	686	686	686	686	686	686	686	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$0	4	4	5	4	4	4	31	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Schleicher	Schleicher	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	148	148	136	111	78	49	148	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$2,960,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Scurry	Scurry	Colorado, Brazos	Subordination	Recommended	Subordination	0	7	17	25	31	34	34	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Scurry	Scurry	Colorado, Brazos	Irrigation Conservation	Recommended	Conservation	349	698	908	908	908	908	908	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$835,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Scurry	Scurry	Colorado, Brazos	Mining Conservation (Recycling)	Recommended	Conservation	18	18	16	13	9	6	18	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$360,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Snyder	Scurry	Scurry	Colorado	Municipal Conservation	Recommended	Conservation	36	36	37	37	38	38	38	0	154	395	589	721	843	843	5%	101%	24%	9%	6%	5%	5%	1	3	$0	$1,120	2	4	4	4	3	5	28	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Snyder	Scurry	Scurry	Colorado	Subordination	Recommended	Subordination	0	127	331	498	609	701	701	0	154	395	589	721	843	843	83%	101%	82%	84%	85%	84%	83%	4	3	$0	$0	5	4	4	4	3	4	31		
U & F WSC	Scurry	Scurry	Colorado	Municipal Conservation	Recommended	Conservation	2	2	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,763	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
U & F WSC	Scurry	Scurry	Colorado	Subordination	Recommended	Subordination	0	1	1	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Sterling	Sterling	Colorado	Irrigation Conservation	Recommended	Conservation	43	86	128	128	128	128	128	0	0	0	0	0	143	143	90%	101%	101%	101%	101%	101%	90%	4	3	$118,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Sterling	Sterling	Colorado	Weather Modification	Recommended	Regional	106	106	106	106	106	106	106	0	0	0	0	0	143	143	74%	101%	101%	101%	101%	101%	74%	3	1	$0	$0	4	5	5	4	4	4	30	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Sterling	Sterling	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	105	105	97	79	56	35	105	1,537	1,682	1,659	1,481	1,189	847	1,682	6%	7%	6%	6%	5%	5%	4%	1	1	$2,100,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Sterling City	Sterling	Sterling	Colorado	Municipal Conservation	Recommended	Conservation	4	6	8	10	13	16	16	0	0	88	325	586	875	875	2%	101%	101%	9%	3%	2%	2%	1	3	$0	$1,702	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	Entity County	Project County	Basin Used	Strategy	Recommended or Alternative	Strategy Type	2030	2040	2050	2060	2070	2080	Quantity (Ac-Ft/Yr)	2030	2040	2050	2060	2070	2080	Maximum Need (Ac-Ft/Yr)	Percentage of Max Need Met	% Need in 2020	% Need in 2030	% Need in 2040	% Need in 2050	% Need in 2060	% Need in 2070	Quantity Score	Reliability	Capital Cost	Cost ($/Ac-Ft)	Cost Score	Impacts of Strategy on:					Overall Score (5-45)	Implementation Issues	Comments
																																	Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors			
Sterling City	Sterling	Sterling	Colorado	Develop Edwards-Trinity Alluvium Supplies	Recommended	Groundwater Development	0	0	875	875	875	875	875	0	0	88	325	586	875	875	100%	101%	101%	994%	269%	149%	100%	4	3	$16,804,000	$1,542	2	4	4	4	3	4	29	The most significant issue will be locating areas with sufficient well production	
Irrigation	Sutton	Sutton	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	56	112	168	168	168	168	168	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$155,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Sutton	Sutton	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	1	1	1	1	1	1	1	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$20,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Sonora	Sutton	Sutton	Rio Grande	Municipal Conservation	Recommended	Conservation	7	6	6	5	5	4	7	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,474	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
County-Other	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	126	106	102	102	101	99	126	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	93	43	37	34	32	30	93	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Irrigation	Tom Green	Tom Green	Colorado	Subordination (Twin Buttes after Concho River Project)	Recommended	Subordination	0	1,782	1,700	1,643	1,587	1,530	1,782	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	5	4	3	4	33		
Manufacturing	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	78	38	34	32	31	29	78	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
San Angelo*	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	3,471	1,757	1,604	1,581	1,561	1,534	3,471	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
Concho Rural Water	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	23	26	29	31	34	37	37	5	0	7	18	27	36	36	104%	464%	101%	411%	174%	127%	104%	5	3	$0	$771	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Concho Rural Water	Tom Green	Tom Green	Colorado	Purchase from Provider (UCRA)	Recommended	Purchase from Provider	100	100	100	100	100	100	100	5	0	7	18	27	36	36	278%	2000%	101%	1429%	556%	370%	278%	5	3	$0	$0	5	4	4	4	3	4	32		
Concho Rural Water	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	35	17	14	13	12	10	35	5	0	7	18	27	36	36	97%	700%	101%	200%	72%	44%	28%	4	3	$0	$0	5	4	4	4	3	4	31		
Concho Rural Water	Tom Green	Tom Green	Colorado	Water Audits and Leak Repairs	Recommended	Conservation	0	0	0	0	0	0	0	5	0	7	18	27	36	36	0%	0%	101%	0%	0%	0%	0%	0	3	$0	$3,503	2	4	4	4	3	4	24	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
DADS Supported Living Center	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	1	1	1	1	1	1	1	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$3,252	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Goodfellow Air Force Base	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	7	7	7	7	7	7	7	93	69	94	117	139	160	160	4%	8%	10%	8%	6%	5%	4%	1	3	$0	$1,444	2	4	4	4	3	5	26	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Tom Green	Tom Green	Colorado	Irrigation Conservation	Recommended	Conservation	2,480	4,960	5,952	5,952	5,952	5,952	5,952	0	7,342	7,761	8,096	8,417	8,785	8,785	68%	101%	68%	77%	74%	71%	68%	3	3	$5,476,000	$32	4	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Tom Green	Tom Green	Colorado	Weather Modification	Recommended	Regional	1,550	1,550	1,550	1,550	1,550	1,550	1,550	0	7,342	7,761	8,096	8,417	8,785	8,785	18%	101%	21%	20%	19%	18%	18%	1	1	$0	$0	4	4	4	5	4	4	4	27	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Irrigation	Tom Green	Tom Green	Colorado	Voluntary Transfer to UCRA	Recommended	Purchase from Provider	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)	-5,000	93	69	94	117	139	160	160	-3125%	-5376%	-7246%	-5319%	-4274%	-3597%	-3125%	0	3	N/A	N/A	1	4	4	5	4	3	4	24	Agreements will need to be made with irrigators for use of their water rights	
Mining	Tom Green	Tom Green	Colorado	Mining Conservation (Recycling)	Recommended	Conservation	34	34	31	26	18	11	34	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$680,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Tom Green	Tom Green	Colorado	Subordination	Recommended	Subordination	2	1	2	0	0	0	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$0	5	4	4	4	3	4	32		
San Angelo*	Tom Green	Tom Green	Colorado	Brush Control	Recommended	Regional	90	90	90	90	90	90	90	3,740	2,995	4,353	5,692	7,142	8,711	8,711	1%	2%	3%	2%	2%	1%	1%	1	2	$0	$600	3	3	4	2	3	4	22	Brush control is an on-going process that must be continually maintained in order to receive benefits	
San Angelo*	Tom Green	Tom Green	Colorado	Desalination of Brackish Groundwater	Alternative	Desalination	0	11,200	11,200	11,200	11,200	11,200	11,200	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$186,030,000	$3,071	2	4	4	3	3	4	28		
San Angelo*	Tom Green	Schleicher	Colorado	Develop Edwards-Trinity Plateau Aquifer Supplies in Schleicher County	Alternative	Groundwater Development	0	4,500	4,500	4,500	4,500	4,500	4,500	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$192,701,000	$3,338	2	4	4	4	3	4	29	Largest implementation issue is MAG constraints to the Edwards-Trinity Plateau Aquifer in Schleicher County.	This entity can pursue this strategy independently but cannot receive state funding to do so due to modeled availability
San Angelo*	Tom Green	Tom Green	Colorado	Concho River Water Project (Indirect Potable Reuse)	Recommended	Reuse	0	8,300	8,300	8,300	8,300	8,300	8,300	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	5	$254,550,000	$4,026	2	3	4	3	4	4	30	Possible public resistance to reuse of water	Adequate monitoring and oversight will be required to protect public health and safety.
San Angelo*	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	463	507	538	570	605	643	643	3,740	2,995	4,353	5,692	7,142	8,711	8,711	7%	12%	17%	12%	10%	8%	7%	1	3	$0	$519	3	4	4	4	3	5	27	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Tom Green County FWSD 3	Tom Green	Tom Green	Colorado	Municipal Conservation	Recommended	Conservation	2	2	2	3	3	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,456	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Increased Runoff into Reservoirs (Solar Farms)	Recommended	Expanded Use of Supply	0	10	10	10	10	10	10	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$178,000	$1,300	2	4	4	4	3	4	29	Site specific data needed. May require financial and technical assistance.	
Upper Colorado River Authority	Tom Green	Tom Green	Colorado	Develop Lipan Aquifer Supplies in Tom Green County	Recommended	Groundwater Development	0	5,000	5,000	5,000	5,000	5,000	5,000	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$13,550,000	$313	4	4	4	4	3	4	31		
Irrigation	Upton	Upton	Colorado, Rio Grande	Irrigation Conservation	Recommended	Conservation	421	842	1,263	1,263	1,263	1,263	1,263	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$1,162,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
McCamey	Upton	Upton	Rio Grande	Municipal Conservation	Recommended	Conservation	5	5	6	6	6	6	6	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,599	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Upton	Upton	Colorado, Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	183	183	168	137	97	61	183	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$3,660,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Rankin	Upton	Upton	Rio Grande	Municipal Conservation	Recommended	Conservation	2	2	2	3	3	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,316	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Barstow	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	1	1	1	1	1	1	1	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$4,605	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Grandfalls	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	1	1	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$3,425	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Ward	Ward	Rio Grande	Irrigation Conservation	Recommended	Conservation	217	433	650	650	650	650	650	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$598,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Irrigation	Ward	Ward	Rio Grande	Weather Modification	Recommended	Regional	53	53	53	53	53	53	53	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$0	$0	4	4	5	4	4	4	31	Local opposition has caused some programs to shut down, and other programs have readjusted target areas	
Mining	Ward	Ward	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	227	227	227	227	227	227	227	1,394	1,461	1,528	1,586	1,645	1,706	1,706	13%	16%	16%	15%	14%	14%	13%	1	1	$4,540,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Monahans	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	26	29	33	36	39	43	43	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$691	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Southwest Sandhills WSC	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	8	9	10	11	12	13	13	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$1,422	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Wickett	Ward	Ward	Rio Grande	Municipal Conservation	Recommended	Conservation	1	2	2	2	2	2	2	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$3,148	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Kermit	Winker	Winker	Rio Grande	Develop Additonal Dockum Aquifer Supplies	Recommended	Groundwater Development	0	0	0	0	0	250	250	0	0	0	0	0	284	284	88%	101%	101%	101%	101%	101%	88%	4	3	$1,460,000	$480	4	4	4	4	3	4	30		
Irrigation	Winkler	Winkler	Rio Grande	Irrigation Conservation	Recommended	Conservation	153	307	460	460	460	460	460	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$423,000	$32	4	4	5	4	3	5	33	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Kermit	Winkler	Winkler	Rio Grande	Municipal Conservation	Recommended	Conservation	22	25	29	31	34	38	38	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$812	3	4	4	4	3	5	31	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Mining	Winkler	Winkler	Rio Grande	Mining Conservation (Recycling)	Recommended	Conservation	113	113	113	113	113	113	113	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	1	$2,260,000	$632	3	4	4	4	3	5	29	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Wink	Winkler	Winkler	Rio Grande	Municipal Conservation	Recommended	Conservation	2	2	2	2	2	3	3	0	0	0	0	0	0	0	101%	101%	101%	101%	101%	101%	101%	5	3	$0	$2,229	2	4	4	4	3	5	30	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
a. Wholesale water provider or water user group strategy that supplies to multiple customers, including potential future customers.																																							
Note: Grey Italics indicates projects that are needed to access supplies from other strategies and are not included in supply totals to avoid double counting.																																							

APPENDIX F
TABLE OF RECOMMENDED AND ALTERNATIVE WATER MANAGEMENT STRATEGIES

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Brush Control											
BCWID	Multiple	2030	$0	$470	400	400	400	400	400	400	$470
San Angelo	Multiple	2030	$0	$600	90	90	90	90	90	90	$600
Develop Dockum Aquifer Supplies											
Kermit	Winkler	2080	$1,460,000	$480	0	0	0	0	0	250	$68
Develop Edwards-Trinity Plateau Alluvium Aquifer Supplies											
Sterling City	Sterling	2050	$16,804,000	$1,542	0	0	875	875	875	875	$191
Develop Edwards-Trinity Plateau Aquifer Supplies											
County-Other	Andrews	2030	$3,441,000	$306	934	934	934	934	934	934	$47
Livestock	Andrews	2030	$1,018,000	$759	108	108	108	108	108	108	$93
Junction	Kimble	2040	$7,185,000	$1,557	0	370	370	370	370	370	$192
Pecos County WCID #1	Pecos	2030	$16,029,000	$3,063	560	560	560	560	560	560	$1,048
Balmorhea	Reeves	2040	$6,413,000	$4,573	0	110	110	110	110	110	$473
Madera Valley WSC	Reeves	2040	$15,482,000	$3,817	0	333	333	333	333	333	$547
Develop Ellenberger San Saba Aquifer Supplies											
Manufacturing	Kimble	2030	$727,000	$1,900	30	30	30	30	30	30	$200
Develop Lipan Aquifer Supplies											
UCRA	Tom Green	2040	$13,550,000	$313	0	5,000	5,000	5,000	5,000	5,000	$123
Develop Ogallala Aquifer Supplies											
Borden County Water System	Dawson	2060	$24,325,000	$14,127	0	0	0	22	71	134	$1,358
Greenwood Water	Midland	2030	$13,923,000	$1,891	2,420	2,420	2,420	2,420	2,420	2,420	$1,486
Develop Pecos Valley Aquifer Supplies											
Pecos	Reeves	2040	$69,404,000	$638	0	8,960	8,960	8,960	8,960	8,960	$93
Dredging River Intake											
Junction	*Kimble*	*2040*	*$10,439,000*	*$2,936*	*0*	*250*	*250*	*250*	*250*	*250*	*$0*
Groundwater Strategies											
Borden County Water System	Dawson	2060	$24,325,000	$14,127	0	0	0	22	71	134	$1,358
CRMWD	Ward, Winkler	2030	$299,500,000	$1,224	21,480	20,412	19,319	18,398	17,523	16,735	$245
County-Other (MCUD)	Midland	2030	$136,737,000	$5,531	234	1,401	1,401	1,401	1,401	1,401	$5,743
Increased Runoff Strategies											
UCRA	Tom Green	2040	$178,000	$1,300	0	10	10	10	10	10	$100

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Irrigation Conservation											
Irrigation	Andrews	2030	$1,616,000	$32	878	1,756	1,756	1,756	1,756	1,756	$0
Irrigation	Borden	2030	$230,000	$32	125	250	250	250	250	250	$0
Irrigation	Brown	2030	$566,000	$32	384	615	615	615	615	615	$0
Irrigation	Coke	2030	$68,000	$32	31	62	74	74	74	74	$0
Irrigation	Coleman	2030	$39,000	$32	21	42	42	42	42	42	$0
Irrigation	Concho	2030	$526,000	$32	260	520	572	572	572	572	$0
Irrigation	Crockett	2030	$11,000	$32	4	8	12	12	12	12	$0
Irrigation	Ector	2030	$104,000	$32	38	75	113	113	113	113	$0
Irrigation	Glasscock	2030	$1,598,000	$32	1,737	1,737	1,737	1,737	1,737	1,737	$0
Irrigation	Howard	2030	$516,000	$32	255	510	561	561	561	561	$0
Irrigation	Irion	2030	$145,000	$32	53	105	158	158	158	158	$0
Irrigation	Kimble	2030	$287,000	$32	130	260	312	312	312	312	$0
Irrigation	Martin	2030	$4,545,000	$32	1,647	3,293	4,940	4,940	4,940	4,940	$0
Irrigation	Mason	2030	$663,000	$32	240	480	721	721	721	721	$0
Irrigation	McCulloch	2030	$286,000	$32	104	207	311	311	311	311	$0
Irrigation	Menard	2030	$478,000	$32	173	347	520	520	520	520	$0
Irrigation	Midland	2030	$2,483,000	$32	900	1,800	2,699	2,699	2,699	2,699	$0
Irrigation	Mitchell	2030	$239,200	$32	260	260	260	260	260	260	$0
Irrigation	Pecos	2030	$18,999,000	$32	6,884	13,767	20,651	20,651	20,651	20,651	$0
Irrigation	Reagan	2030	$2,967,000	$32	1,075	2,150	3,225	3,225	3,225	3,225	$0
Irrigation	Reeves	2030	$8,284,000	$32	3,001	6,003	9,004	9,004	9,004	9,004	$0
Irrigation	Runnels	2030	$388,000	$32	176	352	422	422	422	422	$0
Irrigation	Schleicher	2030	$111,000	$32	101	121	121	121	121	121	$0
Irrigation	Scurry	2030	$835,000	$32	349	698	908	908	908	908	$0
Irrigation	Sterling	2030	$118,000	$32	43	86	128	128	128	128	$0
Irrigation	Sutton	2030	$155,000	$32	56	112	168	168	168	168	$0
Irrigation	Tom Green	2030	$5,476,000	$32	2,480	4,960	5,952	5,952	5,952	5,952	$0
Irrigation	Upton	2030	$1,162,000	$32	421	842	1,263	1,263	1,263	1,263	$0
Irrigation	Ward	2030	$598,000	$32	217	433	650	650	650	650	$0
Irrigation	Winkler	2030	$423,000	$32	153	307	460	460	460	460	$0

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Mining Conservation (Recycling)											
Mining	Andrews	2030	$4,840,000	$632	242	242	222	182	128	81	$0
Mining	Borden	2030	$2,340,000	$632	117	117	107	88	62	39	$0
Mining	Coke	2030	$40,000	$632	2	2	2	2	2	2	$0
Mining	Crane	2030	$420,000	$632	21	21	21	21	1	1	$0
Mining	Crockett	2030	$8,460,000	$632	423	423	78	63	45	28	$0
Mining	Ector	2030	$480,000	$632	24	24	22	18	12	8	$0
Mining	Glasscock	2030	$9,580,000	$632	479	479	439	359	253	160	$0
Mining	Howard	2030	$8,540,000	$632	427	427	391	320	226	142	$0
Mining	Irion	2030	$12,300,000	$632	615	615	563	92	65	41	$0
Mining	Loving	2030	$13,840,000	$632	692	692	692	692	692	692	$0
Mining	Martin	2030	$11,480,000	$632	574	574	526	143	101	64	$0
Mining	Midland	2030	$10,160,000	$632	508	508	466	381	90	56	$0
Mining	Mitchell	2030	$300,000	$632	15	15	14	12	8	5	$0
Mining	Pecos	2030	$18,620,000	$632	931	931	931	931	186	186	$0
Mining	Reagan	2030	$13,720,000	$632	686	686	628	171	121	76	$0
Mining	Reeves	2030	$40,340,000	$632	2,017	2,017	2,017	2,017	2,017	2,017	$0
Mining	Schleicher	2030	$2,960,000	$632	148	148	136	111	78	49	$0
Mining	Scurry	2030	$360,000	$632	18	18	16	13	9	6	$0
Mining	Sterling	2030	$2,100,000	$632	105	105	97	79	56	35	$0
Mining	Sutton	2030	$20,000	$632	1	1	1	1	1	1	$0
Mining	Tom Green	2030	$680,000	$632	34	34	31	26	18	11	$0
Mining	Upton	2030	$3,660,000	$632	183	183	168	137	97	61	$0
Mining	Ward	2030	$4,540,000	$632	227	227	227	227	227	227	$0
Mining	Winkler	2030	$2,260,000	$632	113	113	113	113	113	113	$0
Municipal Conservation											
Andrews	Andrews	2030	$0	$1,098	49	60	109	127	147	169	$662
County-Other	Andrews	2030	$0	$824	22	29	38	47	56	80	$712
Borden County Water System	Borden	2030	$0	$5,354	1	1	1	1	1	2	$2,812
Bangs	Brown	2030	$0	$1,379	9	9	9	9	9	9	$1,369
Coleman County SUD	Brown	2030	$0	$1,384	8	8	8	7	7	7	$1,480
Brookesmith SUD	Brown	2030	$0	$877	20	21	21	21	21	21	$853
Brownwood	Brown	2030	$0	$1,087	61	90	90	90	90	91	$852
Early	Brown	2030	$0	$1,321	10	10	10	11	11	11	$1,313
Zephyr WSC	Brown	2030	$0	$1,272	12	13	13	13	13	13	$1,266
Bronte	Coke	2030	$0	$2,076	3	3	3	3	4	4	$1,729

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Robert Lee	Coke	2030	$0	$1,985	3	3	3	4	4	5	$1,670
Coleman	Coleman	2030	$0	$1,313	11	9	8	7	5	4	$1,751
Santa Anna	Coleman	2030	$0	$2,034	3	3	3	3	3	3	$2,138
Eden	Concho	2030	$0	$1,567	5	5	5	5	5	5	$1,618
Millersview-Doole WSC	Concho	2030	$0	$1,091	16	18	21	24	27	31	$573
Crane	Crane	2030	$0	$1,312	11	11	11	11	11	11	$1,307
Crockett County WCID 1	Crockett	2030	$0	$1,455	7	6	6	6	5	5	$1,655
Ector County Utility District	Ector	2030	$0	$795	102	128	147	191	209	227	$614
Odessa	Ector	2030	$0	$513	530	637	745	786	838	890	$502
Greater Gardendale WSC	Ector, Midland	2030	$0	$1,175	15	18	21	23	25	27	$662
Big Spring	Howard	2030	$0	$665	118	122	124	121	119	116	$669
Coahoma	Howard	2030	$0	$2,036	3	3	3	3	3	3	$2,067
Mertzon	Irion	2030	$0	$2,477	2	2	2	2	2	2	$2,596
Junction	Kimble	2030	$0	$1,460	7	7	7	7	7	7	$1,469
Stanton	Martin	2030	$0	$1,386	8	9	10	11	12	14	$1,248
Mason	Mason	2030	$0	$1,471	7	7	7	8	8	8	$1,422
Brady	McCulloch	2030	$0	$1,048	17	17	16	16	15	15	1,191
Richland SUD	McCulloch	2030	$0	$2,606	2	2	2	2	2	2	$2,899
Menard	Menard	2030	$0	$1,883	3	3	3	3	3	3	$2,075
Airline Mobile Home Park	Midland	2030	$0	$1,555	6	6	7	8	8	9	$1,361
Greenwood Water	Midland	2030	$0	$2,122	3	3	3	3	3	3	$2,184
Midland	Midland	2030	$0	$505	646	720	789	877	977	1,092	$490
Colorado City	Mitchell	2030	$0	$884	20	20	20	20	21	21	$862
Corix Utilities Texas Inc	Mitchell	2030	$0	$684	16	34	36	35	35	34	$684
Loraine	Mitchell	2030	$0	$2,649	2	2	1	1	1	1	$3,802
Fort Stockton	Pecos	2030	$0	$624	29	29	29	31	33	35	$515
Iraan	Pecos	2030	$0	$1,953	3	3	3	3	3	4	$1,847
Pecos County Fresh Water	Pecos	2030	$0	$2,439	2	2	2	2	2	3	$2,088
Pecos County WCID #1	Pecos	2030	$0	$1,483	7	7	8	7	7	6	$1,519
Big Lake	Reagan	2030	$0	$1,354	9	9	10	10	10	10	$1,340
Balmorhea	Reeves	2030	$0	$3,456	1	1	1	2	2	2	$2,649
County-Other	Reeves	2030	$0	$1,288	12	12	13	13	14	15	$1,219
Madera Valley WSC	Reeves	2030	$0	$1,535	6	6	7	7	8	8	$1,394
Pecos	Reeves	2030	$0	$587	30	34	38	40	43	46	$393

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Ballinger	Runnels	2030	$0	$1,301	11	11	11	11	12	12	$1,286
County-Other	Runnels	2030	$0	$2,007	3	3	3	2	2	2	$2,624
Miles	Runnels	2030	$0	$2,157	3	3	3	3	3	3	$1,960
North Runnels WSC	Runnels	2030	$0	$1,737	4	4	4	5	5	5	$1,594
Winters	Runnels	2030	$0	$1,438	7	7	7	6	6	5	$1,591
Eldorado	Schleicher	2030	$0	$1,658	5	4	4	3	3	2	$2,468
Snyder	Scurry	2030	$0	$1,120	36	36	37	37	38	38	$1,115
U & F WSC	Scurry	2030	$0	$2,763	2	2	2	2	2	2	$2,720
Sterling City	Sterling	2030	$0	$1,702	4	6	8	10	13	16	$1,106
Sonora	Sutton	2030	$0	$1,474	7	6	6	5	5	4	$1,735
Concho Rural WSC	Tom Green	2030	$0	$771	23	26	29	31	34	37	$480
DADS Supported Living Center	Tom Green	2030	$0	$3,252	1	1	1	1	1	1	$3,252
Goodfellow Air Force Base	Tom Green	2030	$0	$1,444	7	7	7	7	7	7	$1,444
San Angelo	Tom Green	2030	$0	$519	463	507	538	570	605	643	$517
Tom Green County FWSD 3	Tom Green	2030	$0	$2,456	2	2	2	3	3	3	$1,950
McCamey	Upton	2030	$0	$1,599	5	5	6	6	6	6	$1,489
Rankin	Upton	2030	$0	$2,316	2	2	2	3	3	3	$2,093
Barstow	Ward	2030	$0	$4,605	1	1	1	1	1	1	$3,172
Grandfalls	Ward	2030	$0	$3,425	1	1	2	2	2	2	$2,466
Monahans	Ward	2030	$0	$691	26	29	33	36	39	43	$416
Southwest Sandhills WSC	Ward	2030	$0	$1,422	8	9	10	11	12	13	$1,268
Wickett	Ward	2030	$0	$3,148	1	2	2	2	2	2	$2,302
Kermit	Winkler	2030	$0	$812	22	25	29	31	34	38	$476
Wink	Winkler	2030	$0	$2,229	2	2	2	2	2	3	$2,197

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
New or Additional Treatment											
BCWID #1	*Brown*	*2030*	*$38,124,000*	*$4,045*	*1,529*	*1,529*	*1,529*	*1,529*	*1,529*	*1,529*	*$2,290*
Bronte	*Coke*	*2030*	*$15,000,000*	*$2,536*	*729*	*729*	*729*	*729*	*729*	*729*	*$1,089*
Odessa	*Ector*	*2040*	*$224,032,000*	*$2,145*	*0*	*15,700*	*15,700*	*15,700*	*15,700*	*15,700*	*$1,141*
Big Spring	*Howard*	*2040*	*$165,625,000*	*$1,737*	*0*	*11,210*	*11,210*	*11,210*	*11,210*	*11,210*	*$697*
Brady	*McCulloch*	*2050*	*$97,811,000*	*$7,622*	*0*	*0*	*1,770*	*1,740*	*1,710*	*1,680*	*$3,734*
Pecos	Reeves	2040	$91,236,000	$5,467	0	3,360	3,360	3,360	3,360	3,360	$3,557
Rehabilitation/Replacement of Infrastructure											
Bronte	*Coke*	*2040*	*$18,637,000*	*$3,225*	*0*	*457*	*457*	*457*	*457*	*457*	*$357*
CRMWD	Ward	2040	$17,868,000	$160	0	1,492	2,831	5,958	7,327	8,674	$15
Reuse											
Pecos	Reeves	2040	$17,953,000	$2,580	0	560	560	560	560	560	$325
Pecos	Reeves	2040	$41,357,000	$6,184	0	925	925	925	925	925	$3,038
San Angelo	Tom Green	2040	$254,550,000	$4,026	0	8,300	8,300	8,300	8,300	8,300	$1,871
Subordination											
BCWID #1	Brown	2030	$0	$0	8,721	8,666	8,611	8,536	8,461	8,386	$0
Coleman County SUD	Brown	2030	$0	$0	78	76	73	70	68	65	$0
Bronte	Coke	2030	$0	$0	199	212	213	215	216	217	$0
County-Other	Coke	2030	$0	$0	49	49	49	49	49	49	$0
Oak Creek	Coke	2030	$0	$0	598	556	513	473	433	393	$0
Robert Lee	Coke	2030	$0	$0	199	212	213	215	216	217	$0
Coleman	Coleman	2030	$0	$0	1,023	1,029	1,035	1,009	954	900	$0
County-Other	Coleman	2030	$0	$0	17	13	10	7	4	2	$0
Irrigation	Coleman	2030	$0	$0	400	400	400	400	400	400	$0
Manufacturing	Coleman	2030	$0	$0	1	1	1	1	1	1	$0
County-Other (Future Sales)	Ector	2030	$0	$0	0	1,200	2,500	2,500	2,500	2,500	$0
Ector County Utility District	Ector	2040	$0	$0	0	289	852	1,387	1,831	2,268	$0
Irrigation	Ector	2040	$0	$0	0	60	150	224	271	308	$0
Manufacturing	Ector	2040	$0	$0	0	26	66	97	119	135	$0
Odessa	Ector	2040	$0	$0	0	1,822	5,642	8,999	11,612	14,024	$0
Steam Electric Power	Ector	2040	$0	$0	0	165	420	625	756	861	$0
Greater Gardendale WSC	Ector	2040	$0	$0	0	18	100	162	216	266	$0
Big Spring	Howard	2040	$0	$0	0	497	1,282	1,866	2,212	2,458	$0

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Coahoma	Howard	2040	$0	$0	0	27	72	104	122	134	$0
Manufacturing	Howard	2040	$0	$0	0	111	281	417	505	576	$0
Steam Electric Power	Howard	2040	$0	$0	1	64	163	240	292	329	$0
Junction	Kimble	2030	$0	$0	269	269	269	269	269	269	$0
Manufacturing	Kimble	2030	$0	$0	8	8	8	8	8	8	$0
Stanton	Martin	2040	$0	$0	0	22	58	85	104	118	$0
Brady	McCulloch	2040	$0	$0	0	0	1,770	1,740	1,710	1,680	$0
Millersview-Doole WSC	Concho	2040	$0	$0	0	43	110	164	198	230	$0
Irrigation	Menard	2030	$0	$0	1,330	1,330	1,330	1,330	1,330	1,330	$0
Menard	Menard	2030	$0	$0	643	643	643	643	643	643	$0
Irrigation	Midland	2040	$0	$0	0	60	153	227	276	314	$0
Midland[a]	Midland	2030	$0	$0	803	1,605	2,860	3,907	4,598	5,149	$0
Steam Electric Power	Mitchell	2030	$0	$0	2,924	2,840	2,756	2,690	2,626	2,560	$0
CRMWD[a]	Multiple	2030	$0	$0	28,060	23,516	15,551	9,011	4,228	0	$0
Ballinger	Runnels	2030	$0	$0	792	822	872	910	935	959	$0
County-Other	Runnels	2030	$0	$0	28	28	28	28	26	23	$0
Miles	Runnels	2030	$0	$0	21	9	8	10	7	8	$0
North Runnels WSC	Runnels	2030	$0	$0	103	109	117	124	132	142	$0
Winters	Runnels	2030	$0	$0	162	155	146	137	128	116	$0
County-Other	Scurry	2040	$0	$0	0	7	17	25	31	34	$0
Snyder	Scurry	2040	$0	$0	0	127	331	498	609	701	$0
U & F WSC	Scurry	2040	$0	$0	0	1	1	2	2	2	$0
County-Other	Tom Green	2030	$0	$0	126	106	102	102	101	99	$0
Goodfellow Air Force Base	Tom Green	2030	$0	$0	93	43	37	34	32	30	$0
Irrigation	Tom Green	2040	$0	$0	0	1,782	1,700	1,643	1,587	1,530	$0
Manufacturing	Tom Green	2030	$0	$0	78	38	34	32	31	29	$0
San Angelo[a]	Tom Green	2030	$0	$0	3,471	1,757	1,604	1,581	1,561	1,534	$0
Concho Rural WSC	Tom Green	2030	$0	$0	35	17	14	13	12	10	$0
Mining	Tom Green	2030	$0	$0	2	1	2	0	0	0	$0
Voluntary Transfer (Purchase)											
Bronte, Robert Lee	Coke	2040	$65,724,000	$22,626	0	183	243	334	433	542	$9,075
Greater Gardendale WSC	Ector, Midland	2040	$16,285,000	$10,004	0	18	100	162	216	271	$5,749
Stanton	Martin	2030	$0	$0	43	91	151	215	287	372	$0
Millersview-Doole WSC	McCulloch	2040	$0	$0	0	0	0	73	267	496	$0
Irrigation (to MCUD)	Midland	2030	NA	NA	(293)	(1,751)	(1,751)	(1,751)	(1,751)	(1,751)	NA

Table F-1
Summary of Recommended Strategies

Entity	County Used	Expected Online	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Midland	Midland	2030	$0	$0	11,200	11,200	11,200	11,200	11,200	11,200	$0
Concho Rural WSC	Tom Green	2030	$0	$0	100	100	100	100	100	100	$0
Irrigation (to UCRA)	Tom Green	2030	NA	NA	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)	NA
Water Audits and Leak Repairs											
Robert Lee	Coke	2030	$1,183,000	$2,234	11	12	13	14	15	17	$1,845
Coleman	Coleman	2030	$2,021,000	$2,209	28	24	21	18	14	11	$3,034
Mertzon	Irion	2030	$754,000	$4,497	4	4	4	4	4	4	$4,350
Junction	Kimble	2030	$1,891,000	$1,211	37	36	36	36	36	36	$1,228
Millersview-Doole WSC	Concho	2030	$5,732,000	$1,619	64	72	81	92	105	121	$1,395
Colorado City	Mitchell	2030	$5,114,000	$1,957	61	61	60	61	61	62	$1,958
Pecos County WCID #1	Pecos	2030	$1,938,000	$3,026	15	16	17	16	15	13	$3,258
North Runnels WSC	Runnels	2030	$1,393,000	$4,350	7	7	7	8	8	8	$4,394
Winters	Runnels	2030	$1,792,000	$2,900	16	15	14	13	12	11	$3,408
Eldorado	Schleicher	2030	$1,090,000	$1,307	24	21	18	16	13	10	$1,981
Concho Rural WSC	Tom Green	2030	$7,416,000	$3,503	41	46	50	55	60	65	$3,151
Weather Modification											
Irrigation	Crockett	2030	$0	$0.64	167	167	167	167	167	167	$0.64
Irrigation	Irion	2030	$0	$0.30	156	156	156	156	156	156	$0.30
Irrigation	Pecos	2030	$0	$0.38	1,807	1,807	1,807	1,807	1,807	1,807	$0.38
Irrigation	Reagan	2030	$0	$1.13	267	267	267	267	267	267	$1.13
Irrigation	Reeves	2030	$0	$0.41	2,176	2,176	2,176	2,176	2,176	2,176	$0.41
Irrigation	Schleicher	2030	$0	$0.38	686	686	686	686	686	686	$0.38
Irrigation	Sterling	2030	$0	$0.45	106	106	106	106	106	106	$0.45
Irrigation	Tom Green	2030	$0	$0.35	1,550	1,550	1,550	1,550	1,550	1,550	$0.35
Irrigation	Ward	2030	$0	$0.45	53	53	53	53	53	53	$0.45
West Texas Water Partnership[b]											
Abilene	Multiple	2040	$796,828,000	$2,267	0	8,400	8,400	8,400	8,400	8,400	$381
Midland					0	15,000	15,000	15,000	15,000	15,000	
San Angelo					0	5,000	5,000	5,000	5,000	5,000	

Note: Grey italics indicates projects that are needed to access supplies from other strategies and are not included in the total to avoid double counting.

a. Subordination supply is based on a contract for 16.54% of the safe yield of Lake Ivie. This supply changes with the implementation of the West Texas Water Partnership strategy. As part of this strategy, the Lake Ivie supplies may be reallocated among the cities of Abilene, Midland, and San Angelo. However, this has not yet occurred, so the current subordination yields from these contract amounts are shown in the table above. The Partnership will follow up on initial conversations with the CRMWD to explore necessary methodologies and agreements to implement a cooperative use strategy of the Partnership's collective Ivie supplies. Meetings between the parties are anticipated in the late fall/early winter of 2020/2021.

b. Capital and unit costs for the West Texas Water Partnership will be shared between the partnership (Abilene, Midland, and San Angelo).

Table F-2
Summary of Alternative Strategies

Entity	County Used	Expected Implementation Date	Capital Cost	First Decade Unit Cost ($/ac-ft/yr)	Total Yield						Last Decade Unit Cost ($/ac-ft/yr)
					2030	2040	2050	2060	2070	2080	
Desalination											
San Angelo	Tom Green	2040	$186,030,000	$3,071	0	11,200	11,200	11,200	11,200	11,200	$1,902
Develop Dockum Aquifer Supplies											
Colorado City	Mitchell	2030	$11,428,000	$5,335	170	170	170	170	170	170	$606
Develop Edwards-Trinity Plateau Aquifer Supplies											
Andrews	Andrews	2040	$56,814,000	$1,785	0	2,600	2,600	2,600	2,600	2,600	$249
Manufacturing	Andrews	2030	$1,392,000	$412	279	279	279	279	279	279	$61
Bronte, Robert Lee	Coke	2040	$18,305,000	$18,987	0	75	75	75	75	75	$1,813
Robert Lee	Coke	2040	$20,139,000	$9,988	0	160	160	160	160	160	$1,131
San Angelo	Tom Green	2040	$192,701,000	$3,338	0	4,500	4,500	4,500	4,500	4,500	$325
Develop Ellenburger-San Saba Aquifer Supplies											
BCWID #1	Brown	2040	$107,758,000	$3,745	0	3,600	3,600	3,600	3,600	3,600	$1,639
Develop Ogallala Aquifer Supplies											
Andrews	Andrews	2040	$36,022,000	$831	0	3,634	3,634	3,634	3,634	3,634	$135
Texland Great Plains	Andrews, Gaines	2030	$607,000	$263	213	213	213	213	213	213	$61
Develop Additional Groundwater Supplies											
Odessa	Ector	2040	$1,572,207,000	$5,791	0	28,000	28,000	28,000	28,000	28,000	$1,845
CRMWD	Multiple	2040	$551,074,000	$2,604	0	25,000	25,000	25,000	25,000	25,000	$1,055
New or Additional Water Treatment											
Midland	Midland	2030	$192,003,000	$3,441	6,628	7,147	7,514	7,757	7,932	8,065	$1,766
Indirect Potable Reuse with Aquifer Storage and Recovery											
Pecos	Reeves	2040	$49,782,000	$9,252	0	695	695	695	695	695	$4,212
Regional Water Management Strategies											
Bronte, Ballinger, Winters, Robert Lee	Coke, Runnels	2040	$211,788,000	$15,116	0	1,114	1,074	1,033	993	952	$1,739

Note: Grey italics indicates projects that are needed to access supplies from other strategies and are not included in the total to avoid double counting.

APPENDIX G
DROUGHT TRIGGERS AND ACTIONS

Table G-1
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 Mild Drought Trigger	Stage 1 Mild Drought Response	Stage 2 Moderate Drought Trigger	Stage 2 Moderate Drought Response	Stage 3 Severe Drought Trigger	Stage 3 Severe Drought Response	Stage 4 Critical Drought Trigger	Stage 4 Critical Drought Response	Stage 5 Emergency Drought Trigger	Stage 5 Emergency Drought Response
Balmorhea	City Well Field	Groundwater level drops below 140 feet from ground surface.	Achieve voluntary 60% reduction in total water use for nonessential purposes and practice water conservation. Contact wholesale water customers to initiate voluntary water use restrictions. Publicize drought conditions, water conservation measures and practices.	Groundwater level drops below 145 feet from ground surface.	Achieve 85% reduction in daily water demand. Request wholesale water customers to initiate mandatory water use restrictions for nonessential water use. Consider and prepare pro rata curtailments with wholesale water customers. Publicize drought conditions, water conservation measures and practices.	Groundwater level drops below 150 feet from ground surface.	Achieve 90% reduction in total water usage. Prohibit all outdoor water use, close all unnecessary meters wasting water or no longer in service. Flushing prohibited except on main lines. Request wholesale water customers initiate additional mandatory water use restrictions and pro rata curtailment. Publicize drought conditions, water conservation measures and practices.	Groundwater level drops below 155 feet from ground surface. Major water line breaks, or pump or system failures occur. Natural or man-made contamination of water supply source.	Assess severity of the problem and identify actions needed and time required to solve the problem. Inform appropriate parties. Undertake necessary actions and prepare a post-event assessment report.	N/A	N/A
Big Spring	Sales from CRMWD	Begins every April 1st and ends September 30th. CRMWD initiates drought Stage I. Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event.	Public notification and customer awareness to encourage efficient water use. Voluntary watering restrictions. Visually inspect lines and repair leaks regularly. Reduce or discontinue flushing of water mains, and reduce/discontinue irrigation of public landscaped areas.	CRMWD initiates drought Stage II. Water demand as % of capacity >= 85% on a rolling 3-day average. Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event.	Achieve 5% reduction in total water use. Visually inspect lines and repair leaks. Retail/public customers to initiate mandatory watering restrictions. Wholesale customers to initiate voluntary measures to reduce water use.	CRMWD initiates Stage III. Water demand as % of capacity >= 90% on a rolling 3-day average. Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event.	Achieve 10% reduction in total water use. Visually inspect lines and repair leaks regularly. Reduce or discontinue flushing of water mains except for dead end mains, and reduce/discontinue irrigation of public landscaped areas. Implement mandatory retail customers/public and wholesale customer restrictions.	CRMWD initiates drought Stage IV. Water demand as % of capacity =95% on a single day. Water levels in storage reservoirs are low enough to hinder fire protection. Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event.	Achieve a minimum 35% reduction in total water use. Inspect lines and repair leaks daily. Reduce or discontinue flushing of water mains. Begin water rationing if needed. Implement mandatory retail customers/public and wholesale customer restrictions.	N/A	N/A
Brookesmith SUD (Retail)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day. BCWID #1 requests initiation of drought Stage 1.	Achieve a voluntary 5% reduction in water use. Reduce or discontinue the flushing of water mains. Voluntary water use restrictions.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive days or 4 MG on a single day. BCWID #1 requests initiation of drought Stage 2.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Water use restrictions, including watering schedule and prohibition of nonessential water uses.	BCWID #1 requests initiation of drought Stage 3. When imminent or actual failure of major system component would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. May reduce or discontinue the flushing of water mains. Same mandatory water use restrictions as Stage 2, except more limited water schedule, prohibition of water uses, no applications for additional water connections. Water Allocation Plan may be implemented by General Manager.	Emergency water shortage when major water line breaks or pump /system failure occurs and causes loss of capability. Contamination of supply.	Achieve a 50% reduction in water use. BMPs to manage critical water shortage conditions. Same mandatory water use restrictions as Stage 2 and 3, except more limited water schedule, prohibition of further water uses, no applications for additional water connections.	N/A	N/A
Brookesmith SUD (Wholesale)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day. BCWID #1 requests initiation of drought Stage 1.	Achieve a voluntary 5% reduction in water use. Reduce or discontinue the flushing of water mains. Contact wholesale water customers. Request initiation of voluntary measures. Weekly report to news media.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive days or 4 MG on a single day. BCWID #1 requests initiation of drought Stage 2.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Request wholesale water customers to initiate mandatory measures. General Manager will prepare for implementation of pro rata curtailment. Weekly report to news media.	BCWID #1 requests initiation of drought Stage 3. When imminent or actual failure of major system component would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. May reduce or discontinue the flushing of water mains. Request wholesale water customers to initiate additional mandatory measures. General Manager will initiate pro rata curtailment. Weekly report to news media.	Emergency water shortage when major water line breaks or pump /system failure occurs and causes loss of capability.	Assess severity of the problem and identify actions needed and time required to solve the problem. Inform appropriate parties. Undertake necessary actions and prepare a post-event assessment report.	N/A	N/A

Table G-1
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 Mild Drought Trigger	Stage 1 Mild Drought Response	Stage 2 Moderate Drought Trigger	Stage 2 Moderate Drought Response	Stage 3 Severe Drought Trigger	Stage 3 Severe Drought Response	Stage 4 Critical Drought Trigger	Stage 4 Critical Drought Response	Stage 5 Emergency Drought Trigger	Stage 5 Emergency Drought Response
Brown County WID 1 (BCWID #1)	Lake Brownwood	Lake Brownwood is below elevation 1,420 feet msl (76% capacity). Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event. Direction of the BCWID General Manager or Board of Directors.	Achieve a 5% reduction in water use. Advise customer of early conditions. Require customers to initiate Stage I of Drought Contingency Plans. Increase public education. Request voluntary conservation measures.	Lake Brownwood is below elevation 1,417 feet msl (64% capacity). Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event. Direction of the BCWID General Manager or Board of Directors.	Achieve a 15% reduction in water use. Request decrease in water usage. Implement outdoor watering restrictions. May reduce water delivery in accordance with pro rata curtailment.	Lake Brownwood is below elevation 1,414 feet msl (52% capacity). Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event. Direction of the BCWID General Manager or Board of Directors.	Achieve a 30% reduction in water use. Request to severely reduce water usage. An increase in outdoor watering restrictions. District may reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,411 feet msl (43% capacity). Water supply system failure, damage, contamination, power outage, grid failure, natural disaster, or extreme weather event. Direction of the BCWID General Manager or Board of Directors.	Achieve a 50% reduction in water use. District may call an emergency meeting with customers. Completely restrict outdoor watering. May evaluate the need to discontinue delivery of water for second crops and nonessential uses. May reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,408 feet msl. (34% of reservoir capacity). Mechanical or system failures occur. Natural or man-made contamination. Discretion of BCWID General Manager or Board of Directors.	Declaration of an emergency water shortage condition. District will assess severity of the problem and identify actions and time to solve it. May call an emergency meeting with customers. May reduce or eliminate water delivery in accordance with pro rata. May utilize alternative water sources with TCEQ Director approval.
Brownwood	Sales from BCWID #1	BCWID #1 declares Stage 1 Drought. High demand on system. Drought monitor indicates drought conditions.	Achieve a 5% reduction in total water use. Voluntary watering schedule and water use restrictions for nonessential water. Notify major commercial and industrial water users. Increase leak detection and repair efforts. Daily evaluations of SCADA system and/or operations. May consider water rate increase or water use surcharge.	BCWID #1 declares Stage 2 Drought. Inability to maintain 70% storage capacity overnight due to high demand. Demand exceeds 85% capacity for 3 consecutive days. Demand exceeds 90% capacity for 1 day.	Achieve 15% reduction in total water use. Mandatory watering schedule. Voluntary water use restrictions for nonessential water. Initiate 50% reduction in irrigation of parks and landscapes. Reduce commercial and purchased wholesale use by 10%. Increase utility oversight of water waste. May consider water rate increase or water use surcharge.	BCWID #1 declares Stage 3 Drought. Inability to maintain 50% storage capacity overnight due to high demand. Demand exceeds 90% capacity for 3 consecutive days. Demand exceeds 95% capacity for 1 day.	Achieve 30% reduction in total water use. Mandatory watering schedule and water use restrictions. Nonessential commercial water reduced by 20%. Require wholesale customers to reduce purchased water use by 30%. Implement utility enforcement of watering schedule and water waste. May consider water rate increase or water use surcharge.	BCWID #1 declares Stage 4 Drought. Inability to maintain 35% storage capacity overnight due to high demand. Demand exceeds 95% capacity for 3 consecutive days. Demand exceeds 100% capacity for 1 day. Major limitations of water system components.	Achieve 50% reduction in total water use. Mandatory watering schedule. Reduce nonessential commercial water use by 50% to 100%. Require wholesale customers to reduce purchased water use by 50%. Increase utility enforcement of water schedule and water waste. May consider water rate increase or water use surcharge.	Same triggers as Stage 4 with addition of one or more secondary triggers: Lake levels are less than one year supply. Inability to achieve Stage 4 goals. System outage/limitations due to failure or damage of system components such as a major water line break, pump or system failure. Natural or man-made contamination of supply source.	Achieve 50% or greater reduction in total water use. Prohibit water use according to a watering schedule. Reduce nonessential commercial use by 75% to 100%. Require wholesale customers to maintain a reduction in purchased water use by 50%. Increase utility enforcement of water schedule and water waste. May consider water rate increase or water use surcharge.
Coleman County SUD*	Sales from City of Coleman & Brookesmith SUD, Lake Coleman, Hords Creek Lake	Lake Coleman lake level is equal to or less than 1705.5 ft elevation. USACE curtails the amount of water that the City can obtain from Hords Creek Lake. Daily water demand for City of Coleman equals or exceeds 3.3 MGD for 5 consecutive days.	Achieve a voluntary 10% reduction in daily water demand. General Manager will monitor limited water supplies and/or reduce water demand. GM will contact City and Brookesmith SUD. Lawn watering schedule restriction. Weekly news report.	Lake Coleman lake level is equal to or less than 1702 ft elevation. USACE significantly curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 20% reduction in daily water demand. Confer with City and Brookesmith SUD. City may modify reservoir operations. Water use restrictions and penalties. Fines for violations.	Lake Coleman lake level is equal to or less than 1700 ft elevation. USACE completely curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 30% reduction in total water use. Meet weekly with City and Brookesmith SUD. Consider tapping reserves in Lake Scarborough. More stringent water use restrictions and penalties.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply source(s).	Assess severity and identify actions needed and time required to solve. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed. Prepare post-event assessment report.	N/A	N/A
Colorado River Municipal Water District (CRMWD)	O.H. Ivie Reservoir	O.H. Ivie Reservoir capacity is less than 184,936 ac-ft or System capacity is less than 92,122 ac-ft.	Achieve a 2% reduction in total water use. Begin 'pump back' operation as needed. Initiate studies to evaluate alternative actions if conditions worsen. Request any or all WUGs to implement Stage 1 of their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 138,702 ac-ft or System capacity is less than 69,092 ac-ft.	Achieve a 5% reduction in total water use. Notify TCEQ within 5 business days of any mandatory measures to be implemented. Request any or all WUGs to implement Stage 2 of their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 92,468 ac-ft or System capacity is less than 46,061 ac-ft.	Achieve a 10% reduction in total water use. Initiate Ward County Well Field System pipeline expansion project. Initiate additional studies if conditions worsen. Request any or all WUGs to implement stage 3 of their drought contingency plan. Implement viable alternative water supplies.	Emergency water shortage when a pipeline break, equipment failure, or contamination severely limits distribution capacity.	Assess severity and identify actions needed and time required to solve. As appropriate, inform utility directors of WUGs to alleviate problem. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed.	N/A	N/A

Table G-1
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 Mild Drought Trigger	Stage 1 Mild Drought Response	Stage 2 Moderate Drought Trigger	Stage 2 Moderate Drought Response	Stage 3 Severe Drought Trigger	Stage 3 Severe Drought Response	Stage 4 Critical Drought Trigger	Stage 4 Critical Drought Response	Stage 5 Emergency Drought Trigger	Stage 5 Emergency Drought Response
Ector County Utility District (ECUD)*	Sales from Odessa	Daily water demands exceed 90% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a voluntary 1 to 5% reduction in daily water demand. Raise public awareness of water conservation, request voluntary reductions in nonessential water use.	Daily water demands exceed 95% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a 5 to 10% reduction in daily water demand. Implement mandatory restrictions on nonessential water uses. Reduce fire hydrant flushing except where needed to maintain water quality. Irrigation watering schedule, mandatory water restrictions, prohibit nonessential water uses.	Daily water demands exceed 98% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days or moderate conditions have remained in effect for an extended period.	Achieve a 10 to 15% reduction in daily water demand. Implement bans on certain types of nonessential water uses. Discontinue fire hydrant flushing except where needed to maintain water quality. Prohibit watering of landscaped areas and nonessential uses. Other limits on industrial, commercial, or residential customers deemed necessary by the Administrator.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Contact large water users to require they cease landscape irrigation and reduce all other water uses. Implement Severe Condition restriction as needed. Implement Emergency Response Program. City Council may implement a surcharge system for water use over specified volume.	N/A	N/A
Eden*	City Well Field	Distribution system tank storage levels remain below 75 percent for a continuous three day period.	Achieve a voluntary 10% reduction in daily water demand. Reduce flushing of water mains. Voluntary water use restrictions.	Distribution system tank storage levels remain below 60 percent for a continuous three day period.	Achieve a 25% reduction in total daily water use. Reduce flushing of water mains, reduce park water. Irrigation watering schedule, limit hydrant use, prohibit nonessential water uses.	Distribution system tank storage levels remain below 50 percent for a continuous three day period.	Achieve a 35% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation watering schedule and limitations on irrigation watering use. Unmetered water for construction under special permit is discontinued.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achieve a 50% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation of landscaped areas is prohibited. Other outdoor uses are prohibited. Administrator authorized to allocate water according to water allocation plan.	N/A	N/A
Fort Stockton*	City Well Field	Annually May 1 through September 30. Demand equals or exceeds 5 MG for 3 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Voluntary water use restrictions.	Demand equals or exceeds 5MG for 7 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Irrigation watering schedule, mandatory water use restrictions, prohibit nonessential water uses.	Demand equals or exceeds 6 MG for 7 consecutive days or 7 MG on a single day.	Achieve voluntary 33% reduction in total water use. Lower to 4MG daily demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Demand equals and exceeds 7 MG for 1 consecutive days or when static water level in the City of Fort Stockton water supply well(s) is equal to or greater than 300 feet.	Achieve voluntary 43% reduction in total water use, and reduce daily water demand to an acceptable daily demand of 4 MG. Requirements of Stage 2 and 3 shall remain in effect. Irrigation watering schedule is further limited. Prohibition of water outdoor and nonessential water uses.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination.	Achieve a voluntary 70 percent reduction in total water use, reduce daily water demand to 2 MG. Requirements of Stage 2, 3, and 4 shall remain in effect. Irrigation of landscaped areas is prohibited. Use of water for vehicle washing is prohibited.
Grandfalls*	Sales from CRMWD	Annually May 1 through September 30. Pursuant to wholesale contract, CRMWD requests initiation of Stage 1 of the Drought Contingency Plan.	Achieve a reduction in both total water use and daily water demand. Voluntary water use restrictions.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 2 of the Drought Contingency Plan. Total daily water demand equals or exceeds 300,000 gal for 3 consecutive days, demand for 500,000 gal for a single day, continually falling treated water reservoir levels do not refill to 100% overnight.	Achieve a reduction in both total water use and daily water demand. Irrigation watering schedule, mandatory water use restrictions, prohibit nonessential water uses.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 3 of the Drought Contingency Plan. Total daily water demand equals or exceeds 400,000 gal for 3 consecutive days, demand for 600,000 gal for a single day, continually falling treated water reservoir levels do not refill to 75% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 4 of the Drought Contingency Plan. Total daily water demand equals or exceeds 500,000 gal for 3 consecutive days, demand for 700,000 gal for a single day, continually falling treated water reservoir levels do not refill to 50% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 and 3 shall remain in effect except: irrigation watering schedule is further limited, prohibition of outdoor and nonessential water uses, no applications for new, additional, expanded, or increased water connections.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination. Continually falling treated water reservoir levels do not refill above 25% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.

Table G-1
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 Mild Drought Trigger	Stage 1 Mild Drought Response	Stage 2 Moderate Drought Trigger	Stage 2 Moderate Drought Response	Stage 3 Severe Drought Trigger	Stage 3 Severe Drought Response	Stage 4 Critical Drought Trigger	Stage 4 Critical Drought Response	Stage 5 Emergency Drought Trigger	Stage 5 Emergency Drought Response
Millersview-Doole*	Sales from CRMWD, Groundwater	Average daily water use reaches 1.56 MGD (currently 60% of system capacity) for three consecutive days. Consideration will be given to weather conditions, time of year, and customer complaints of low water pressure.	Reduce usage by 10%. Inform the public. Implement mandatory lawn watering schedule; water restrictions; pipe insulation; monitoring water pressure in distribution system and water levels in storage tanks.	Average daily water use reaches 1.95 MGD (currently 60% of system capacity) for three consecutive days. Net storage in water usage is continually decreasing on a daily basis and falls below 720,000 gal (60% capacity) for 48 hours. Water pressures reach 35 psi in distribution system.	Reduce usage by 15%. Inform the public. Continue actions from Stage 1. Prohibit outdoor water use. Prohibit nonessential water uses (water line flushing, washing corporation vehicles). Surcharge customers for non-compliance to curtailment measures.	Imminent or actual failure of major component of the system which would cause an immediate health or safety hazard. Water demand exceeding 1.95 MGD (currently 75% of system capacity) for three consecutive days. Failure of supplier to deliver contracted water. Available water supply is so low that pumps cannot pump daily water demand.	Reduce usage by 25%. Inform the public. Prohibit water use certain commercial water users which are not essential to health and safety of the community.	N/A	N/A	N/A	N/A
Midland	Sales from CRMWD, City Well Fields, O.H. Ivie Reservoir	CRMWD initiates Stage 1. Request from CRMWD due to limitation in available supplies or transmission. Request from Midland County Fresh Water Supply District #1 due to limitation in available supplies or transmission. Total daily demand reaches 94% of the water treatment plant capacity for 5 consecutive days.	Achieve a 10% reduction in daily water demand. Reduced flushing of water mains and increased use of alternative supply source(s) if available. Voluntary water use restrictions. Request for customers to practice water conservation and minimize or discontinue nonessential water use.	CRMWD initiates Stage 2. Request from CRMWD due to limitation in available supplies or their transmission lines. Request from Midland County Fresh Water Supply District #1 due to limitation in available supplies or transmission. Total daily demand reaches or exceeds 95% of the water treatment plant capacity for 5 consecutive days.	Achieve 15% reduction in daily water demand. Implement reduced flushing of water mains, reduced irrigation of public landscapes, and increased use of alternative supply source(s). Mandatory water use restrictions. Irrigation watering schedule. Prohibit nonessential water uses.	CRMWD or Midland County Fresh Water Supply District #1 requests to initiate Stage 3. Failure or threatening failure of a major system component will result in immediate health or safety hazard. Total daily water demand reaches the system limit.	Achieve 20% reduction in daily water demand. Reduced flushing of water mains, reduced irrigation of public landscaped areas to a minimum required to avoid vegetation loss, increased use of alternative supply source(s). A 20% increase in water rates for use >2,000 gallons. Mandatory water use restrictions of Stage 2 except: a more stringent irrigation watering schedule, prohibit watering of golf course tees.	CRMWD or Midland County Fresh Water Supply District #1 requests to initiate Stage 4. Treated water storage levels do no restore overnight.	Achieve a 25% reduction in daily water demand. Reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas, increased use of alternative supply source(s). A 40% increase in water rates for use >2,000 gallons. Mandatory water use restrictions of Stage 2 and 3 except: more stringent outdoor watering schedules, prohibit various outdoor water uses, no applications for new, additional, expanded, or increased-in-size water connections.	Major water line breaks, or pump or system failure occurs, which cause unprecedented loss of capability to provide water service. Natural or man-made contamination of water supply sources.	Achieve a 75% reduction in daily water demand. Discontinued flushing of water mains, discontinued irrigation of public landscaped areas. Mandatory water use restrictions of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.
Odessa	Sales from CRMWD	Daily demand >90% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve voluntary 1-5% reduction in daily water demand. Raise public awareness of need to conserve water supply. Request voluntary reductions in nonessential water use. Notify major industrial users and request voluntary water use restrictions.	Daily demand >95% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve 5-10% reduction in daily water demand. Implement mandatory restrictions on nonessential water. Reduce fire hydrant flushing except where needed to maintain water quality. Irrigation watering schedule.	Daily demand >98% of treatment plant's capacity to produce or pump water for three consecutive days or the moderate conditions have remained in effect for an extended period.	Achieve 10-15% reduction in daily water demand. Implement ban on certain types of nonessential water uses. Consider implementation of a surcharge for excess water usage. Discontinue all fire hydrant flushing except where critical to maintaining water quality. Reduce or discontinue irrigation of public landscaped areas irrigated with the raw or potable water sources. Prohibit nonessential water uses.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Reduce water usage as deemed necessary by the Administrator to alleviate the emergency conditions, maintain fire flows, and/or state requirements for the maintenance of distribution systems. Implement emergency response appropriate for the type and anticipated duration of the emergency. Contact all large water users to require they cease landscape irrigation and reduce water uses. Implement Emergency Response Program.	N/A	N/A
Red Bluff Power Control District*	Red Bluff Lake	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Angelo	Sales from CRMWD, O.C. Fisher Lake, Twin Buttes Reservoir, Lake Nasworthy, City Well Field	Minimum daily groundwater production coupled with the total amount of surface water available is less than a 24-month supply.	Various outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than an 18-month supply.	Additional outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than a 12-month supply.	Further prohibitions on outdoor watering use restrictions. Water usage fee. City Manager initiates allocation of water supplies to wholesale customers on a pro rata basis.	N/A	N/A	N/A	N/A

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Water Provider	Water Sources	Stage 1 Mild Drought Trigger	Stage 1 Mild Drought Response	Stage 2 Moderate Drought Trigger	Stage 2 Moderate Drought Response	Stage 3 Severe Drought Trigger	Stage 3 Severe Drought Response	Stage 4 Critical Drought Trigger	Stage 4 Critical Drought Response	Stage 5 Emergency Drought Trigger	Stage 5 Emergency Drought Response
Snyder	Sales from CRMWD	Begin April 1st to Sept 30th.	Voluntarily limit the use of water for nonessential purposes and to practice water conservation.	Average daily water use exceeds the plant capacity for three consecutive days. CRMWD is unable to supply the daily raw water demand.	Achieve 15% reduction in daily water demand. Reduce landscape irrigation to half the normal irrigation schedule. Voluntary outdoor water use reductions and watering schedule.	Imminent or actual failure of a major component of the system, which would cause an immediate health or safety hazard. Water demand is exceeding the firm system capacity of 8 MGD for 3 consecutive days. Average daily water use exceeds the plant capacity for 3 consecutive days. CRMWD is unable to supply the daily water demand.	Achieve 30% reduction in daily water demand. Visually inspect lines and repair leaks on a regular basis. Irrigation watering schedule. Mandatory water use restrictions. Prohibit nonessential water uses.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achieve a maximum reduction as possible to maintain potable water delivery. All outdoor water use is prohibited. Irrigation of landscaped areas is absolutely prohibited. Use of water to wash vehicles in prohibited.	N/A	N/A
Sonora*	City Well Field	Average daily water consumption reaches 80% of production capacity of water system (2.01 MGD). Consumption (80%) has existed for 3 days. Weather conditions are considered to be in a drought classification determination.	Develop Information Center and designate Information Person. Advice public. Encourage voluntary reduction of water use. Contact wholesale, commercial, and industrial users and explain initiation. Implementation of system oversight and make adjustments needed.	Average daily water consumption reaches 85% of production capacity of water system (2.13 MGD). Weather conditions indicate mild drought for 5 or more days. One GST or well is taken out of service. Storage capacity (water level) is not 100% maintained during period of 85% production. Existence of any listed condition in Stage 1 for 36 hours.	Outdoor residential use (washing vehicles, landscape or recreational sprinklers, etc.) of water will be permitted only on specified days. City Administrator will monitor system function and establish hours for outside use. Information Center will keep public advised. Commercial and industrial users will be notified to insure mandatory conservation initiation.	Average daily water consumption reaches 90% of production capacity of water system (2.26 MGD). Average daily water consumption will not enable storage level to maintained and/or recover fully during low demand periods. System demand meets or exceeds 90% max. daily average. Any two conditions listed in Stage 2 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commercial users not listed and industrial users will be controlled to the extent dictated by the City Administrator.	Average daily water consumption reaches 95% of production capacity of water system (2.39 MGD). Average daily water consumption will not enable storage level to maintained above 90% of normal water storage capacity. System demand exceeds max. daily average. Any two conditions listed in Stage 3 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commercial users not listed and industrial users will be controlled to the extent dictated by the City Administrator. Wholesale customers shall be notified and initiate curtailment procedures for mandatory DCP measures (if none, follow Sonora's DCP).	Average daily water consumption reaches 100% of production capacity of water system (2.51 MGD). Average daily water consumption will not enable storage level to maintained above 75% of normal water storage capacity. System demand exceeds peak daily average. Any two conditions listed in Stage 4 occur at same time during 24-hour period. Water system is contaminated. Water system fails (act of God, natural disaster, man).	The City Administrator will ban use of water for all water use, except for water needed for health and human consumption.
Upper Colorado River Authority (UCRA)*	Sales from City of San Angelo	The amount of water available, to the City of San Angelo and its developed water sources is less than a 24-month supply.	Achieve a voluntary 10% reduction in daily water demand. Outdoor watering schedule and restrictions.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 18-month supply.	Achieve a 15% reduction in daily water demand. Outdoor watering schedule and restrictions. Prepare for implementation of pro rata curtailment.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 12-month supply.	Achieve a 20% reduction in daily water demand. Outdoor watering is prohibited. Other water uses are prohibited. UCRA Director will contact water customers. If City of San Angelo curtails water delivery to UCRA, they will initiate pro rate curtailment.	City of San Angelo's water distribution system reaches a level that exceeds the amount which may be treated or safely delivered through the system. Water system failure or emergency which limits the amount of water that may be treated or safely delivered through the City of San Angelo's system.	Assess the severity of the problem and communicate with City of San Angelo regarding any water use restriction resolutions(s) passed by the San Angelo City Council.	N/A	N/A
Winters	Lake Winters	Total storage in Elm Creek Reservoir is at or below 50% of total water storage capacity.	Achieve a voluntary 10% reduction in total water use. Outdoor watering schedule and restrictions. Contact wholesale customers to initiate voluntary measures to reduce water use. City Administrator will provide weekly report to media.	Total storage in Elm Creek Reservoir is at or below 40% of total water storage capacity.	Achieve 30% reduction in daily water demand. City Administrator will request wholesale customers to initiate mandatory measures for nonessential water use; begin weekly contact with wholesale customers to begin pro rata curtailment. Provide weekly report to media. Outdoor watering schedule and restrictions. All outdoor water use, with the exception of livestock, are prohibited.	Total storage in Elm Creek Reservoir is at or below 30% of total water storage capacity.	Achieve 60% reduction in daily water demand. City Administrator will request wholesale customers initiate additional mandatory measures and pro rata curtailment; continue weekly contact with wholesale customers to discuss water supply and/or demand conditions. Provide weekly report to media. All outdoor water use is prohibited. City Administrator may grant exception for livestock. Consumption will be limited to a maximum number of gallons per meter per week.	Total storage in Elm Creek Reservoir is at or below 20% of total water storage capacity; demand on the system exceeds production or storage capabilities over a 24-hour period and refilling of facilities is at a critical stage and demand for water is expected to continue to exceed supply. A major water line breaks, pump or system failures occur. Natural or man-made contamination of the water supply source.	Assess severity of the problem and identify actions needed and time required to solve the problem. Inform appropriate parties. Undertake necessary actions and prepare a post-event assessment report.	N/A	N/A

*Data from 2021 RWP

Table G-2
Source, Manager, and User

Source	Manager	User
Ballinger/Moonen Lake	Ballinger	Ballinger
		County-Other (Runnels County)
		Manufacturing (Runnels County)
		North Runnels WSC
Lake Balmorhea	Reeves County WCID #1	Irrigation (Reeves County)
Brady Creek Reservoir	Brady	Brady
		County-Other (McCulloch County)
Lake Brownwood	Brown County WID #1	Bangs
		Brookesmith SUD
		Brownwood
		Coleman County SUD
		Early
		Irrigation (Brown County)
		Manufacturing (Brown County)
		Mining (Brown County)
		Santa Anna
		Zephyr WSC
Champion Lake	Texas Electric Service Company	Steam Electric Power (Mitchell County)
Lake Coleman	Coleman	Coleman
		Coleman County SUD
		County-Other (Coleman County)
		Irrigation (Coleman County)
		Manufacturing (Coleman County)
Colorado River MWD Reservoir System	CRMWD	Big Spring
		Coahoma
		County-Other (Scurry County)
		Ector County Utility District
		Greater Gardendale WSC
		Irrigation (Ector County)
		Irrigation (Midland County)
		Manufacturing (Ector County)
		Manufacturing (Howard County)
		Midland
		Odessa
		Rotan
		Snyder
		Stanton
		Steam Electric Power (Ector County)
		Steam Electric Power (Howard County)
		U & F WSC

Table G-2
Source, Manager, and User

Source	Manager	User
Colorado River MWD Reservoir (O.H. Ivie) Non-System	CRMWD	Abilene
		Ballinger
		Midland
		Millersview-Doole WSC
		San Angelo
Hords Creek Lake	USACE	Coleman
		Coleman County SUD
		County-Other (Coleman County)
		Manufacturing (Coleman County)
Oak Creek	Sweetwater	Bronte
		County-Other (Coke County)
		Robert Lee
		Steam Electric Power (Coke County)
		Sweetwater
O.C. Fisher	San Angelo	Goodfellow Air Force Base
		Manufacturing (Tom Green County)
		San Angelo
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green))
Red Bluff Lake	Red Bluff Water Power Control District	Irrigation (Pecos County)
		Irrigation (Reeves County)
		Irrigation (Ward County)
San Angelo System (Twin Buttes, Nasworthy)	San Angelo	Goodfellow Air Force Base
		Manufacturing (Tom Green County)
		San Angelo
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
Lake Winters		North Runnels WSC
		Winters
Colorado Run-of-River - Brown County		Irrigation (Brown County)
Colorado Run-of-River - Coke County		Irrigation (Coke County)
Colorado Run-of-River - Coleman County		Irrigation (Coleman County)
Colorado Run-of-River - Concho County		County-Other (Concho County)
		Irrigation (Concho County)
Colorado Run-of-River - Irion County		Irrigation (Irion County)
Colorado Run-of-River - Kimble County		Irrigation (Kimble County)
		Manufacturing (Kimble County)
		Mining (Kimble County)

Table G-2
Source, Manager, and User

Source	Manager	User
Colorado Run-of-River - Kimble County	Junction	Junction
Colorado Run-of-River - McCulloch County		Irrigation (McCulloch County)
Colorado Run-of-River - Menard County		Irrigation (Menard County)
		Menard
Colorado Run-of-River - Mitchell County		Irrigation (Mitchell County)
Colorado Run-of-River - Runnels County		Irrigation (Runnels County)
Colorado Run-of-River - Sterling County		Irrigation (Sterling County)
Colorado Run-of-River - Sutton County		Irrigation (Sutton County)
Colorado Run-of-River - Tom Green County		Irrigation (Tom Green County)
Concho Run-of River - Tom Green County	San Angelo	Goodfellow Air Force Base
		Manufacturing (Tom Green County)
		San Angelo
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
		Irrigation (Concho County)
Rio Grande Run-Of-River - Jeff Davis County (Region E)		County-Other (Reeves County)
Rio Grande Run-of-River - Pecos County		Irrigation (Pecos County)
Capitan Reef Complex Aquifer - Pecos County		Irrigation (Pecos County)
		Livestock (Pecos County)
Cross Timbers Aquifer - Brown County		County-Other (Brown County)
		Irrigation (Brown County)
		Livestock (Brown County)
Cross Timbers Aquifer - Coleman County		Irrigation (Coleman County)
Dockum Aquifer - Andrews County		Livestock (Andrews County)
Dockum Aquifer - Borden County		Livestock (Borden County)
Dockum Aquifer - Crane County		Manufacturing (Crane County)
Dockum Aquifer - Ector County		County-Other (Ector County)
		Mining (Ector County)
Dockum Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
Dockum Aquifer - Irion County		Mining (Irion County)
Dockum Aquifer - Loving County		Livestock (Loving County)
		Mining (Loving County)
Dockum Aquifer - Mitchell County		Colorado City
		County-Other (Mitchell County)
		Irrigation (Mitchell County)
		Livestock (Mitchell County)

Table G-2
Source, Manager, and User

Source	Manager	User
Dockum Aquifer - Mitchell County		Loraine
		Manufacturing (Mitchell County)
		Mining (Mitchell County)
		Mitchell County Utility
Dockum Aquifer - Reagan County		Irrigation (Reagan County)
Dockum Aquifer - Reeves County		Livestock (Reeves County)
		Pecos (Reeves County)
Dockum Aquifer - Scurry County		County-Other (Scurry County)
		Irrigation (Scurry County)
		Livestock (Scurry County)
		Manufacturing (Scurry County)
		Mining (Scurry County)
		U & F WSC
Dockum Aquifer - Upton County		Irrigation (Upton County)
		Manufacturing (Upton County)
Dockum Aquifer - Ward County		County-Other (Ward County)
		Irrigation (Ward County)
		Livestock (Ward County)
Dockum Aquifer - Winkler County		County-Other (Winkler County)
		Kermit
		Livestock (Winkler County)
		Manufacturing (Winkler County)
		Mining (Winkler Other)
Edwards-Trinity (Plateau) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Coke County		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Mining (Coke County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Concho County		County-Other (Concho County)
		Livestock (Concho County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Crockett County		County-Other (Crockett County)
		Crockett County WCID #1
		Irrigation (Crockett County)
		Livestock (Crockett County)
		Manufacturing (Crockett County)
		Mining (Crockett County)

Table G-2
Source, Manager, and User

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Ector County		County-Other (Ector County)
		Greater Gardendale WSC
		Irrigation (Ector County)
		Livestock (Ector County)
		Manufacturing (Ector County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Glasscock County		County-Other (Glasscock County)
		Irrigation (Glasscock County)
		Livestock (Glasscock County)
		Manufacturing (Glasscock County)
		Mining (Glasscock County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Irion County		County-Other (Irion County)
		Irrigation (Irion County)
		Livestock (Irion County)
		Manufacturing (Irion County)
		Mertzon
		Mining (Irion County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Kimble County		County-Other (Kimble County)
		Irrigation (Kimble County)
		Livestock (Kimble County)
		Manufacturing (Kimble County)
		Mining (Kimble County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - McCulloch County		Livestock (McCulloch County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Menard County		County-Other (Menard County)
		Irrigation (Menard County)
		Livestock (Menard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Irrigation (Midland County)
		Livestock (Midland County)
		Manufacturing (Midland County)
		Mining (Midland County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Pecos County		County-Other (Pecos County)
		Fort Stockton
		Iraan
		Irrigation (Pecos County)
		Livestock (Pecos County)
		Manufacturing (Pecos County)
		Mining (Pecos County)
		Pecos County Fresh Water

Table G-2
Source, Manager, and User

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Reagan County		Big Lake
		County-Other (Reagan County)
		Irrigation (Reagan County)
		Livestock (Reagan County)
		Mining (Reagan County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Schleicher County		County-Other (Schleicher County)
		El Dorado
		Irrigation (Schleicher County)
		Livestock (Schleicher County)
		Mining (Schleicher County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sterling County		County-Other (Sterling County)
		Irrigation (Sterling County)
		Livestock (Sterling County)
		Mining (Sterling County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sutton County		County-Other (Sutton County)
		Irrigation (Sutton County)
		Livestock (Sutton County)
		Manufacturing (Sutton County)
		Mining (Sutton County)
		Sonora
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Tom Green County		Concho Rural WSC
		County-Other (Tom Green County)
		Irrigation (Tom Green County)
		Livestock (Tom Green County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Upton County		County-Other (Upton County)
		Irrigation (Upton County)
		Livestock (Upton County)
		Manufacturing (Upton County)
		McCamey
		Mining (Upton County)
		Rankin
Ellenburger-San Saba Aquifer - Mason County		County-Other (Mason County)
		Livestock (Mason County)
Ellenburger - San Saba Aquifer - McCulloch County		Livestock (McCulloch County)
Ellenburger - San Saba Aquifer - Menard County		County-Other (Menard County)
		Livestock (Menard County)
		Mining (Menard County)
Ellenburger - San Saba Aquifer - San Saba County (Region K)		Richland SUD

Table G-2
Source, Manager, and User

Source	Manager	User
Hickory Aquifer - Concho County		Eden
Hickory Aquifer - Kimble County		Irrigation (Kimble County)
Hickory Aquifer - Mason County		County-Other (Mason County)
		Irrigation (Mason County)
		Livestock (Mason County)
		Mason
		Mining (Mason County)
Hickory Aquifer - McCulloch County		Brady
		County-Other (McCulloch County)
		Irrigation (McCulloch County)
		Livestock (McCulloch County)
		Manufacturing (McCulloch County)
		Millersview-Doole WSC
		Mining (McCulloch County)
Hickory Aquifer - Menard County		Irrigation (Menard County)
Igneous Aquifer - Reeves County		Irrigation (Reeves County)
		Livestock (Reeves County)
Lipan Aquifer - Concho County		Irrigation (Concho County)
Lipan Aquifer - Irion County		Mining (Irion County)
Lipan Aquifer - Runnels County		Livestock (Runnels County)
		Miles
Lipan Aquifer - Sterling County		Sterling City
Lipan Aquifer - Tom Green County		Concho Rural WSC
		County-Other (Tom Green County)
		DADS Supported Living Center
		Irrigation (Tom Green County)
		Livestock (Tom Green County)
		Manufacturing (Tom Green County)
		Mining (Tom Green County)
		Tom Green County FWSD 3
Marble Falls Aquifer - Kimble County		County-Other (Kimble County)
Marble Falls Aquifer - McCulloch County		Irrigation (McCulloch County)
Ogallala Aquifer - Ector County		County-Other (Ector County)
		Irrigation (Ector County)
		Livestock (Ector County)
Ogallala Aquifer - Glasscock County		Livestock (Glasscock County)
		Irrigation (Glasscock County)
Ogallala Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Greenwood Water

Table G-2
Source, Manager, and User

Source	Manager	User
Ogallala Aquifer - Midland County		Irrigation (Midland County)
		Livestock (Midland County)
		Manufacturing (Midland County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Andrews County		Andrews
		County-Other (Andrews County)
		Irrigation (Andrews County)
		Manufacturing (Andrews County)
		Midland
		Livestock (Andrews County)
	Great Plains Water System Inc.	County-Other (Ector County)
		Mining (Ector County)
		Steam Electric Power (Ector County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
		Livestock (Borden County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Dawson County		Borden County Water System
Ogallala and Edwards-Trinity (High Plains) Aquifer - Gaines County		Steam Electric Power (Ector County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
		Mining (Howard County)
		Steam Electric Power (Howard County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Martin County		Big Spring
		Coahoma
		County-Other (Martin County)
		County-Other (Scurry County)
		Ector County Utility District
		Irrigation (Ector County)
		Irrigation (Martin County)
		Irrigation (Midland County)
		Livestock (Martin County)
		Manufacturing (Ector County)
		Manufacturing (Howard County)
		Mining (Martin County)
		Odessa
		Steam Electric (Ector County)
		Steam Electric Power (Howard County)

Table G-2
Source, Manager, and User

Source	Manager	User
Ogallala and Edwards-Trinity (High Plains) Aquifer - Martin County		Snyder
	CRMWD	CRMWD system customers
	University Lands	Midland
	Stanton	Stanton
Other Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
		Mining (Borden County)
Other Aquifer - Coke County		Bronte
		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Robert Lee
Other Aquifer - Coleman County		Livestock (Coleman County)
Other Aquifer - Concho County		Irrigation (Concho County)
		Livestock (Concho County)
		Mining (Concho County)
Other Aquifer - Mason County		County-Other (Mason County)
Other Aquifer - McCulloch County		Livestock (McCulloch County)
		County-Other (McCulloch County)
Other Aquifer - Mitchell County		Livestock (Mitchell County)
Other Aquifer - Pecos County		Livestock (Pecos County)
Other Aquifer - Runnels County		County-Other (Runnels County)
		Irrigation (Runnels County)
		Livestock (Runnels County)
Other Aquifer - Scurry County		County-Other (Scurry County)
		Livestock (Scurry County)
Pecos Valley Aquifer - Andrews County		County-Other (Andrews County)
		Livestock (Andrews County)
		Irrigation (Andrews County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Crane County		County-Other (Crane County)
		Crane
		Livestock (Crane County)
		Manufacturing (Crane County)
		Mining (Crane County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Jeff Davis County		Balmorhea
		County-Other (Reeves County)
		Madera Valley WSC
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Loving County		County-Other (Loving County)
		Livestock (Loving County)
		Mining (Loving County)

Table G-2
Source, Manager, and User

Source	Manager	User
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Pecos County		Irrigation (Pecos County)
		Pecos County WCID #1
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Reeves County		Balmorhea
		Madera Valley WSC
		County-Other (Reeves County)
		Irrigation (Reeves County)
		Livestock (Reeves County)
		Manufacturing (Reeves County)
		Mining (Reeves County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Ward County		Big Spring
		Coahoma
		County-Other (Scurry County)
		County-Other (Ward County)
		Crane
		Ector County Utility District
		Grandfalls
		Irrigation (Ector County)
		Irrigation (Midland County)
		Irrigation (Ward County)
		Livestock (Ward County)
		Manufacturing (Ector County)
		Manufacturing (Howard County)
		Midland
		Mining (Ward County)
		Monahans
		Odessa
		Pecos
		Stanton
		Steam Electric Power (Howard County)
		Steam Electric Power (Ward County)
		Snyder
		Southwest Sandhills WSC
		Wickett
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Winkler County		Irrigation (Winkler County)
		Livestock (Winkler County)
		Midland
		Mining (Winkler County)
		Monahans
		Wink
Rustler Aquifer - Loving County		Mining (Loving County)

Table G-2
~~Source, Manager, and User~~

Source	Manager	User
Rustler Aquifer - Pecos County		Irrigation (Pecos County)
		Livestock (Pecos County)
Rustler Aquifer - Reeves County		Irrigation (Reeves County)
Trinity Aquifer - Brown County		County-Other (Brown County)
		Irrigation (Brown County)
		Livestock (Brown County)

Table G-3
Drought Triggers and Actions by Source

Source Name	Type (sw/ gw)	Factor considered	Source Manager Trigger - Mild	Source Manager Trigger - Severe	Source Manager Trigger - Critical/ Emergency	User Trigger - Mild	User Trigger - Severe	User Trigger - Critical/ Emergency	Source Manager Action - Mild	Source Manager Action - Severe	Source Manager Action - Critical/ Emergency	User Action - Mild	User Action - Severe	User Action - Critical/ Emergency
Ballinger/ Moonen Lake*	sw	Water Level	1666 ft	1662 ft	1658 ft	1666 ft	1662 ft	1658 ft	outside watering limits; request voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines	outside watering limits; voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines
Lake Balmorhea*	sw	Capacity/ Rainfall	<70% intake pond capacity; or no rainfall for 15 consecutive days	<50% intake pond capacity; or no rainfall for 20 consecutive days	<70% intake pond capacity; or no rainfall for 15 consecutive days	<70% intake pond capacity; or no rainfall for 15 consecutive days	<50% intake pond capacity; or no rainfall for 20 consecutive days	<70% intake pond capacity; or no rainfall for 15 consecutive days	Achieve voluntary 60% reduction of use for nonessential purposes; water conservation	Achieve 85% reduction in daily water demand. Implement BMPs for supply management.	Achieve 90% reduction in total water usage. Implement BMPs for supply management.	Achieve voluntary 60% reduction of use for nonessential purposes; water conservation	Achieve 85% reduction in daily water demand. Implement BMPs for supply management.	Achieve 90% reduction in total water usage. Implement BMPs for supply management.
Lake Brownwood	sw	Water Level	1420 ft	1417 ft	1411 ft	1420 ft	1417 ft	1411 ft	Initiate stage 1 of DCP; increase public education; request voluntary reduction of use	Initiate stage 2 of DCP; request decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; request to severely reduce use; may curtail usage and discontinue nonessential uses	Initiate stage 1 of DCP; voluntary reduction of use	Initiate stage 2 of DCP; decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; severely reduce use; may have reduced deliveries; discontinue all nonessential uses
Brady Creek Reservoir*	sw	Supply as % of Demand	supply <= 80% of consumptive needs	supply <= 70% of consumptive needs	supply <= 60% of consumptive needs	supply <= 80% of consumptive needs	supply <= 70% of consumptive needs	supply <= 60% of consumptive needs	voluntary 10% reduction of use	20% reduction of use; outdoor watering limits	30% reduction of use; prohibit outdoor water use	voluntary 10% reduction of use	20% reduction of use; outdoor watering limits	30% reduction of use; prohibit outdoor water use
Lake Coleman	sw	Water Level	1705 ft or demand => 3.3 MGD for 5 consecutive days	1702 ft	1700 ft	1705 ft or demand => 3.3 MGD for 5 consecutive days	1702 ft	1700 ft	voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions
Champion Creek Reservoir*	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
E.V. Spence	sw	Water Level	1,847	1,842	1,836	1,847	1,842	1,836	initiate engineering studies; implement alt supplies; request initiation of Stage 1 of DCPs by San Angelo and Robert Lee and other users	initiate engineering studies; implement alt supplies; request initiation of Stage 1 of DCPs by San Angelo and Robert Lee and other users	initiate engineering studies; implement alt supplies; request initiation of Stage 1 of DCPs by San Angelo and Robert Lee and other users	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP

Table G-3
Drought Triggers and Actions by Source

Source	Type (sw/	Factor	Source Manager	Source Manager	Source Manager Trigger -	User Trigger	User Trigger	User Trigger - Critical/	Source Manager Action -	Source Manager Action -	Source Manager Action - Critical/	User Action - Mild	User Action -	User Action - Critical/
CRMWD System	sw	Reservoir Storage	< 92,122 ac-ft capacity	< 69,092 ac-ft capacity	< 46,061 ac-ft capacity	< 92,122 ac-ft capacity	< 69,092 ac-ft capacity	< 46,061 ac-ft capacity	initiate studies to evaluate alternative actions; begin 'pump back' operation as needed; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate Ward County Well Field System pipeline expansion project; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs; implement alternative supplies	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Hords Creek Lake*	sw	Demand/ Curtailment	USACE curtails usage or demand => 3.3 MGD for 5 consecutive days	USACE significantly curtails usage	USACE completely curtails usage	USACE curtails usage or demand => 3.3 MGD for 5 consecutive days	USACE significantly curtails usage	USACE completely curtails usage	voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions
J.B. Thomas	sw	Water Level	2,216	2,213	2,211	2,216	2,213	2,211	Discontinue pumping at Big Spring/Odessa intake; initiate engineering studies; implement alt supplies; request initiation of Stage 1 of DCPs by Snyder and other users	Begin operation of Snyder well field; initiate engineering studies; implement alt supplies; request initiation of Stage 2 of DCPs by Snyder and other users	Begin pump back operation from Ivie or Spence if available; initiate engineering studies; implement alt supplies; request initiation of Stage 3 of DCPs by Snyder and other users	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Nasworthy	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	< 24 months supply	< 18 months supply	< 12 months supply	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees
Oak Creek*	sw	Water Level	10 ft. below the spillway (51.5% of capacity)	18 ft. below the spillway	19.7 ft. below the spillway	10 ft. below the spillway (51.5% of capacity)	18 ft. below the spillway	19.7 ft. below the spillway	voluntary reduction of non-essential use	limited outdoor watering; fines for violators	no outside watering; increased rates; pro rata curtailment	voluntary reduction of non-essential use	limited outdoor watering; fines for violators	no outside watering; increased rates; pro rata curtailment
O.C. Fisher	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	< 24 months supply	< 18 months supply	< 12 months supply	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees

Table G-3
Drought Triggers and Actions by Source

Source	Type (sw/	Factor	Source Manager	Source Manager	Source Manager Trigger -	User Trigger	User Trigger	User Trigger - Critical/	Source Manager Action -	Source Manager Action -	Source Manager Action - Critical/	User Action - Mild	User Action -	User Action - Critical/
O.H. Ivie	sw	Reservoir Storage	< 184,936 ac-ft capacity	< 138,702 ac-ft capacity	< 92,468 ac-ft capacity	< 184,936 ac-ft capacity	< 138,702 ac-ft capacity	< 92,468 ac-ft capacity	initiate studies to evaluate alternative actions; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Red Bluff Lake*	sw	Reservoir Storage	100,000 acre-feet	75,000 acre-feet	50,000 acre-feet	100,000 acre-feet	75,000 acre-feet	50,000 acre-feet	reduce amount available to users	reduce amount available to users	reduce amount available to users	reduce irrigated acreage	reduce irrigated acreage	stop irrigation
Twin Buttes	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	< 24 months supply	< 18 months supply	< 12 months supply	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees
Lake Winters	sw	Reservoir Storage	<= 50% storage	<= 40% storage	<= 20% storage	<= 50% storage	<= 40% storage	<= 20% storage	voluntary 10% reduction of use; watering restrictions	30% reduction, contact customers, weekly report to media, prohibit all nonessential outdoor water use, except for livestock use	60% reduction, contact customers, weekly report to media, prohibit all water uses, including livestock use, water usage fees	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3/4 of DCP
Colorado Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Concho Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Rio Grande Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Capitan Reef Complex Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies

Table G-3
Drought Triggers and Actions by Source

Source	Type (sw/	Factor	Source Manager	Source Manager	Source Manager Trigger -	User Trigger	User Trigger	User Trigger - Critical/	Source Manager Action -	Source Manager Action -	Source Manager Action - Critical/	User Action - Mild	User Action -	User Action - Critical/
Cross Timbers Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Dockum Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Ellenburger -San Saba Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Hickory Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Igneous Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Lipan Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Marble Falls Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies

Table G-3
Drought Triggers and Actions by Source

Source	Type (sw/	Factor	Source Manager	Source Manager	Source Manager Trigger -	User Trigger	User Trigger	User Trigger - Critical/	Source Manager Action -	Source Manager Action -	Source Manager Action - Critical/	User Action - Mild	User Action -	User Action - Critical/
Ogallala & Edwards-Trinity (High Plains) Aquifers	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Other Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Rustler Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies
Seymour Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement, if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	Review DCP; Initiate actions; consider additional supplies

*Data from 2021 RWP

APPENDIX H
SOCIOECONOMIC IMPACTS REPORT

Placeholder for Socioeconomic Impacts Report

(Provided by TWDB after the IPP)

APPENDIX I
DATABASE REPORTS (DB27)

Region F's required database (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.

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

The tables available for access in DB27 are listed below.

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

In Region F, 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.'

APPENDIX J
IMPLEMENTATION SURVEY

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	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 by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
F	Additional Treatment - Mason	2020	Project Sponsor(s): Mason	Recommended WMS Project	2557	Yes	Project/WMS completed	NA	NA	NA	Unknown	None
F	Advanced Groundwater Treatment - Brady	2020	Project Sponsor(s): Brady	Recommended WMS Project	2577	Yes	Project/WMS completed	NA	NA	NA	Unknown	None
F	Advanced Groundwater Treatment - Pecos City	2030	Project Sponsor(s): Pecos	Recommended WMS Project	3936	No	Project/WMS not started	Staff changes resulting in delayed project start.	Shift in timeline	NA	Unknown	None
F	Advanced Treatment (RO) of Paul Davis Well Field Supplies - Midland	2040	Project Sponsor(s): Midland	Recommended WMS Project	1226	Yes	Project/WMS started	NA	Water supply constraints	MAG is limiting recommendation in 2026 Plan	Unknown	None
F	BRA System Operation--Surplus	2020	WMS Seller: Abilene; WMS Supply Recipient: North Runnels WSC	Recommended WMS Supply Without WMS Project	106237	No	Project/WMS no longer being pursued	Winters (who sells to North Runnels WSC) has not approached Abilene about a sale of water.	Other	Sponsor is not pursing any strategies	Unknown	None
F	Bronte - Develop Edwards Trinity Plateau Aquifer Supplies in Nolan Co	2030	Project Sponsor(s): Bronte	Recommended WMS Project	4341	No	Project/WMS not started	Needs additional study to determine feasibility	Water supply constraints	Economic feasibility is also a constraint	Unknown	None
F	Brush Control - San Angelo	2020	WMS Seller: San Angelo; WMS Supply Recipient: San Angelo	Recommended WMS Supply Without WMS Project	31923	Yes	Project/WMS started	NA	NA	NA	Unknown	None
F	Concho River Water Project - San Angelo	2020	Project Sponsor(s): San Angelo	Recommended WMS Project	3929	Yes	Project/WMS started	NA	Contract/permit constraints	NA	Unknown	TCEQ permit processing wait times
F	CRMWD - Ward County Well Field Expansion and Development of Winkler County Well Field	2050	Project Sponsor(s): Colorado River MWD	Recommended WMS Project	947	No	Project/WMS not started	NA	Other	Project was not recommended until later in the planning horizon and action not yet needed.	Unknown	None
F	CRMWD - Ward County Well Replacement	2030	Project Sponsor(s): Colorado River MWD	Recommended WMS Project	3925	Yes	Project/WMS started	NA	NA	NA	Unknown	On-going
F	Develop Additional Edwards-Trinity-Plateau Aquifer Supplies - Sonora	2020	Project Sponsor(s): Sonora	Recommended WMS Project	3942	Yes	Project/WMS completed	NA	NA	NA	Unknown	None
F	Develop Additional Ellenburger San Saba Aquifer Supplies - Kimble County Manufacturing	2020	Project Sponsor(s): Manufacturing (Kimble)	Recommended WMS Project	1211	No	Project/WMS not started	Was to meet an inflated need in the 2021 plan due to demand being based on diversions instead of consumptive use.	Project sponsor not identified		Unknown	None
F	Develop Additional Pecos Valley Aquifer Supplies - Reeves County Mining	2020	Project Sponsor(s): Mining (Reeves)	Recommended WMS Project	3940	No	Project/WMS not started		Project sponsor not identified		Unknown	No specific project sponsor. Assumed mining developed supplies to meet needs as necessary.
F	Develop Alluvial Well Supplies - Menard	2020	Project Sponsor(s): Menard	Recommended WMS Project	4367	No	Project/WMS no longer being pursued	Risk of radium and significant expense. Plan to use existing wells only and not pursue additional.	Economic feasibility/financing	NA	Unknown	None
F	Develop Cross Timbers Aquifer Supplies - Brown County, Mining	2020	Project Sponsor(s): Mining (Brown)	Recommended WMS Project	3922	No	Project/WMS not started		Project sponsor not identified		Unknown	No specific project sponsor. Assumed mining developed supplies to meet needs as necessary.
F	Develop Edwards-Trinity Plateau Aquifer Supplies - Junction	2030	Project Sponsor(s): Junction	Recommended WMS Project	1209	No	Project/WMS not started	Junction is a small community with limited resources.	Economic feasibility/financing	NA	Unknown	None
F	Develop Edwards-Trinity Plateau Aquifer Supplies - Pecos County WCID 1	2020	Project Sponsor(s): Pecos County WCID 1	Recommended WMS Project	1215	Yes	Project/WMS started		Shift in timeline	NA	Unknown	None
F	Develop Edwards-Trinity-Plateau Aquifer Supplies - Balmorhea	2030	Project Sponsor(s): Balmorhea	Recommended WMS Project	3935	Yes	Project/WMS completed	NA	NA	NA	Unknown	None
F	Develop Other Aquifer Supplies - Scurry County Manufacturing	2020	Project Sponsor(s): Manufacturing (Scurry)	Recommended WMS Project	3941	No	Project/WMS not started	Limited info on manufacturing	Project sponsor not identified		Unknown	None
F	Develop Pecos Valley Aquifer Supplies - Grandfalls	2050	Project Sponsor(s): Grandfalls	Recommended WMS Project	3944	No	Project/WMS no longer being pursued	No longer needed	Other	No longer needed	Unknown	None
F	Develop Pecos Valley Aquifer Supplies - Pecos, Mining	2020	Project Sponsor(s): Mining (Pecos)	Recommended WMS Project	4008	No	Project/WMS not started		Project sponsor not identified		Unknown	No specific project sponsor. Assumed mining developed supplies to meet needs as necessary.
F	Develop Pecos Valley Aquifer Supplies from Roark Ranch In Winkler Co - Midland County Other	2030	Project Sponsor(s): Municipal county-other (Midland)	Recommended WMS Project	1222	No	Project/WMS no longer being pursued	Project did not pan out and is not being pursued further.	NA	NA	Unknown	None
F	Direct Non-Potable Reuse - Pecos City	2020	Project Sponsor(s): Pecos	Recommended WMS Project	3938	No	Project/WMS not started	Staff changes resulting in delayed project start.	Shift in timeline	NA	Unknown	None
F	Direct Potable Reuse - Pecos City	2030	Project Sponsor(s): Pecos	Recommended WMS Project	3939	No	Project/WMS not started	Staff changes resulting in delayed project start.	Shift in timeline	NA	Unknown	None
F	Dredge River Intake - Junction	2020	Project Sponsor(s): Junction	Recommended WMS Project	1225	No	Project/WMS not started	Delayed project start	Shift in timeline	Economic feasibility and limited resources are also constraints	Unknown	None
F	Drought Management	2020	WUG Reducing Demand: Brookesmith SUD	Recommended Demand Reduction Strategy Without WMS Project	30796	No	Project/WMS not started	Only applicable during drought	Other	NA	Unknown	Does not fit into implementation framework since these are temporary measures only used when needed.
F	Hickory Well Field Expansion in McCulloch County - San Angelo	2030	Project Sponsor(s): San Angelo	Recommended WMS Project	1272	Yes	Project/WMS completed	NA	NA	NA	Unknown	None
F	Irrigation Conservation - Andrews County	2020	Project Sponsor(s): Irrigation (Andrews)	Recommended WMS Project	732	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Borden County	2020	Project Sponsor(s): Irrigation (Borden)	Recommended WMS Project	738	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Brown County	2020	Project Sponsor(s): Irrigation (Brown)	Recommended WMS Project	740	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Coke County	2020	Project Sponsor(s): Irrigation (Coke)	Recommended WMS Project	741	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Coleman County	2020	Project Sponsor(s): Irrigation (Coleman)	Recommended WMS Project	742	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Concho County	2020	Project Sponsor(s): Irrigation (Concho)	Recommended WMS Project	743	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Crockett County	2020	Project Sponsor(s): Irrigation (Crockett)	Recommended WMS Project	744	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Ector County	2020	Project Sponsor(s): Irrigation (Ector)	Recommended WMS Project	745	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Glasscock County	2020	Project Sponsor(s): Irrigation (Glasscock)	Recommended WMS Project	746	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Howard County	2020	Project Sponsor(s): Irrigation (Howard)	Recommended WMS Project	747	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Irion County	2020	Project Sponsor(s): Irrigation (Irion)	Recommended WMS Project	748	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Kimble County	2020	Project Sponsor(s): Irrigation (Kimble)	Recommended WMS Project	749	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Martin County	2020	Project Sponsor(s): Irrigation (Martin)	Recommended WMS Project	751	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Mason County	2020	Project Sponsor(s): Irrigation (Mason)	Recommended WMS Project	752	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - McCulloch County	2020	Project Sponsor(s): Irrigation (McCulloch)	Recommended WMS Project	750	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Menard County	2020	Project Sponsor(s): Irrigation (Menard)	Recommended WMS Project	753	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Midland County	2020	Project Sponsor(s): Irrigation (Midland)	Recommended WMS Project	754	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Mitchell County	2020	Project Sponsor(s): Irrigation (Mitchell)	Recommended WMS Project	755	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Pecos County	2020	Project Sponsor(s): Irrigation (Pecos)	Recommended WMS Project	756	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Reagan County	2020	Project Sponsor(s): Irrigation (Reagan)	Recommended WMS Project	757	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Reeves County	2020	Project Sponsor(s): Irrigation (Reeves)	Recommended WMS Project	758	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Runnels County	2020	Project Sponsor(s): Irrigation (Runnels)	Recommended WMS Project	759	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Schleicher County	2020	Project Sponsor(s): Irrigation (Schleicher)	Recommended WMS Project	760	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Scurry County	2020	Project Sponsor(s): Irrigation (Scurry)	Recommended WMS Project	761	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Sterling County	2020	Project Sponsor(s): Irrigation (Sterling)	Recommended WMS Project	762	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Sutton County	2020	Project Sponsor(s): Irrigation (Sutton)	Recommended WMS Project	763	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Tom Green County	2020	Project Sponsor(s): Irrigation (Tom Green)	Recommended WMS Project	764	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Upton County	2020	Project Sponsor(s): Irrigation (Upton)	Recommended WMS Project	765	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Ward County	2020	Project Sponsor(s): Irrigation (Ward)	Recommended WMS Project	767	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Irrigation Conservation - Winkler County	2020	Project Sponsor(s): Irrigation (Winkler)	Recommended WMS Project	768	No	Project/WMS started	NA	Project sponsor not identified	Limited and outdated data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Andrews County	2020	Project Sponsor(s): Mining (Andrews)	Recommended WMS Project	796	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Borden County	2020	Project Sponsor(s): Mining (Borden)	Recommended WMS Project	797	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Brown County	2020	Project Sponsor(s): Mining (Brown)	Recommended WMS Project	798	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Coke County	2020	Project Sponsor(s): Mining (Coke)	Recommended WMS Project	799	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	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 by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
F	Mining Conservation - Coleman County	2020	Project Sponsor(s): Mining (Coleman)	Recommended WMS Project	800	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Concho County	2020	Project Sponsor(s): Mining (Concho)	Recommended WMS Project	801	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Crane County	2020	Project Sponsor(s): Mining (Crane)	Recommended WMS Project	802	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Crockett County	2020	Project Sponsor(s): Mining (Crockett)	Recommended WMS Project	803	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Ector County	2020	Project Sponsor(s): Mining (Ector)	Recommended WMS Project	804	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Glasscock County	2020	Project Sponsor(s): Mining (Glasscock)	Recommended WMS Project	805	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Howard County	2020	Project Sponsor(s): Mining (Howard)	Recommended WMS Project	806	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Irion County	2020	Project Sponsor(s): Mining (Irion)	Recommended WMS Project	807	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Kimble County	2020	Project Sponsor(s): Mining (Kimble)	Recommended WMS Project	808	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Loving County	2020	Project Sponsor(s): Mining (Loving)	Recommended WMS Project	809	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Martin County	2020	Project Sponsor(s): Mining (Martin)	Recommended WMS Project	810	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Mason County	2020	Project Sponsor(s): Mining (Mason)	Recommended WMS Project	811	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - McCulloch County	2020	Project Sponsor(s): Mining (McCulloch)	Recommended WMS Project	812	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Menard County	2020	Project Sponsor(s): Mining (Menard)	Recommended WMS Project	813	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Midland County	2020	Project Sponsor(s): Mining (Midland)	Recommended WMS Project	814	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Mitchell County	2020	Project Sponsor(s): Mining (Mitchell)	Recommended WMS Project	815	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Pecos County	2020	Project Sponsor(s): Mining (Pecos)	Recommended WMS Project	816	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Reagan County	2020	Project Sponsor(s): Mining (Reagan)	Recommended WMS Project	817	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Reeves County	2020	Project Sponsor(s): Mining (Reeves)	Recommended WMS Project	818	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Runnels County	2020	Project Sponsor(s): Mining (Runnels)	Recommended WMS Project	819	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Schleicher County	2020	Project Sponsor(s): Mining (Schleicher)	Recommended WMS Project	820	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Scurry County	2020	Project Sponsor(s): Mining (Scurry)	Recommended WMS Project	821	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Sterling County	2020	Project Sponsor(s): Mining (Sterling)	Recommended WMS Project	822	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Sutton County	2020	Project Sponsor(s): Mining (Sutton)	Recommended WMS Project	823	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Tom Green County	2020	Project Sponsor(s): Mining (Tom Green)	Recommended WMS Project	824	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Upton County	2020	Project Sponsor(s): Mining (Upton)	Recommended WMS Project	825	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Ward County	2020	Project Sponsor(s): Mining (Ward)	Recommended WMS Project	826	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Mining Conservation - Winkler County	2020	Project Sponsor(s): Mining (Winkler)	Recommended WMS Project	827	No	Project/WMS started	NA	Project sponsor not identified	Limited data. No specific project sponsor.	Unknown	None
F	Municipal Conservation - Airline Mobile Home Park Ltd	2020	WUG Reducing Demand: Airline Mobile Home Park Ltd	Recommended Demand Reduction Strategy Without WMS Project	22927	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Andrews	2020	WUG Reducing Demand: Andrews	Recommended Demand Reduction Strategy Without WMS Project	2733	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Andrews County Other	2020	WUG Reducing Demand: County-Other, Andrews	Recommended Demand Reduction Strategy Without WMS Project	22932	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Ballinger	2020	WUG Reducing Demand: Ballinger	Recommended Demand Reduction Strategy Without WMS Project	2737	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Balmorhea	2020	WUG Reducing Demand: Balmorhea	Recommended Demand Reduction Strategy Without WMS Project	22939	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Bangs	2020	WUG Reducing Demand: Bangs	Recommended Demand Reduction Strategy Without WMS Project	2741	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Barstow	2020	WUG Reducing Demand: Barstow	Recommended Demand Reduction Strategy Without WMS Project	22944	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Big Lake	2020	WUG Reducing Demand: Big Lake	Recommended Demand Reduction Strategy Without WMS Project	2745	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Big Spring	2020	WUG Reducing Demand: Big Spring	Recommended Demand Reduction Strategy Without WMS Project	2749	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Brady	2020	WUG Reducing Demand: Brady	Recommended Demand Reduction Strategy Without WMS Project	2759	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Bronte	2020	WUG Reducing Demand: Bronte	Recommended Demand Reduction Strategy Without WMS Project	2763	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Brookesmith SUD	2020	WUG Reducing Demand: Brookesmith SUD	Recommended Demand Reduction Strategy Without WMS Project	2767	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Brownwood	2020	WUG Reducing Demand: Brownwood	Recommended Demand Reduction Strategy Without WMS Project	2775	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Coahoma	2020	WUG Reducing Demand: Coahoma	Recommended Demand Reduction Strategy Without WMS Project	2779	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Coleman	2020	WUG Reducing Demand: Coleman	Recommended Demand Reduction Strategy Without WMS Project	2783	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Coleman County Other	2020	WUG Reducing Demand: County-Other, Coleman	Recommended Demand Reduction Strategy Without WMS Project	23066	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Coleman County SUD	2020	WUG Reducing Demand: Coleman County SUD	Recommended Demand Reduction Strategy Without WMS Project	2787	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Colorado City	2020	WUG Reducing Demand: Colorado City	Recommended Demand Reduction Strategy Without WMS Project	2800	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Concho County Other	2020	WUG Reducing Demand: County-Other, Concho	Recommended Demand Reduction Strategy Without WMS Project	22949	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Concho Rural WSC	2020	WUG Reducing Demand: Concho Rural Water	Recommended Demand Reduction Strategy Without WMS Project	2804	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Crane	2020	WUG Reducing Demand: Crane	Recommended Demand Reduction Strategy Without WMS Project	2812	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Crockett County WCID	2020	WUG Reducing Demand: Crockett County WCID 1	Recommended Demand Reduction Strategy Without WMS Project	2808	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Dads Supported Living Center	2020	WUG Reducing Demand: DADS Supported Living Center	Recommended Demand Reduction Strategy Without WMS Project	22954	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Early	2020	WUG Reducing Demand: Early	Recommended Demand Reduction Strategy Without WMS Project	2816	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Ector County UD	2020	WUG Reducing Demand: Ector County Utility District	Recommended Demand Reduction Strategy Without WMS Project	2820	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Eden	2020	WUG Reducing Demand: Eden	Recommended Demand Reduction Strategy Without WMS Project	2825	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - El Dorado	2020	WUG Reducing Demand: Eldorado	Recommended Demand Reduction Strategy Without WMS Project	2829	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Fort Stockton	2020	WUG Reducing Demand: Fort Stockton	Recommended Demand Reduction Strategy Without WMS Project	2833	Yes	Project/WMS started	NA	Other	NA	Unknown	

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F	Municipal Conservation - Goodfellow Air Force Base	2020	WUG Reducing Demand: Goodfellow Air Force Base	Recommended Demand Reduction Strategy Without WMS Project	22959	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Grandfalls	2020	WUG Reducing Demand: Grandfalls	Recommended Demand Reduction Strategy Without WMS Project	22964	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Greater Gardendale WSC	2020	WUG Reducing Demand: Greater Gardendale WSC	Recommended Demand Reduction Strategy Without WMS Project	2837	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Greenwood Water	2020	WUG Reducing Demand: Greenwood Water	Recommended Demand Reduction Strategy Without WMS Project	22969	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Iraan	2020	WUG Reducing Demand: Iraan	Recommended Demand Reduction Strategy Without WMS Project	2843	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Junction	2020	WUG Reducing Demand: Junction	Recommended Demand Reduction Strategy Without WMS Project	2847	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Kermit	2020	WUG Reducing Demand: Kermit	Recommended Demand Reduction Strategy Without WMS Project	2851	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Loraine	2020	WUG Reducing Demand: Loraine	Recommended Demand Reduction Strategy Without WMS Project	2855	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Madera Valley WSC	2020	WUG Reducing Demand: Madera Valley WSC	Recommended Demand Reduction Strategy Without WMS Project	2859	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Mason	2020	WUG Reducing Demand: Mason	Recommended Demand Reduction Strategy Without WMS Project	2863	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - McCamey	2020	WUG Reducing Demand: McCamey	Recommended Demand Reduction Strategy Without WMS Project	2871	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Menard	2020	WUG Reducing Demand: Menard	Recommended Demand Reduction Strategy Without WMS Project	2875	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Mertzon	2020	WUG Reducing Demand: Mertzon	Recommended Demand Reduction Strategy Without WMS Project	2883	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Midland	2020	WUG Reducing Demand: Midland	Recommended Demand Reduction Strategy Without WMS Project	2879	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Miles	2020	WUG Reducing Demand: Miles	Recommended Demand Reduction Strategy Without WMS Project	2891	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Millersview-Doole WSC	2020	WUG Reducing Demand: Millersview-Doole WSC	Recommended Demand Reduction Strategy Without WMS Project	2900	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Mitchell County Utility	2020	WUG Reducing Demand: Mitchell County Utility	Recommended Demand Reduction Strategy Without WMS Project	22974	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Monahans	2020	WUG Reducing Demand: Monahans	Recommended Demand Reduction Strategy Without WMS Project	2910	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - North Runnels WSC	2020	WUG Reducing Demand: North Runnels WSC	Recommended Demand Reduction Strategy Without WMS Project	22979	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Odessa	2020	WUG Reducing Demand: Odessa	Recommended Demand Reduction Strategy Without WMS Project	2914	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Pecos	2020	WUG Reducing Demand: Pecos	Recommended Demand Reduction Strategy Without WMS Project	2920	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Pecos County Fresh Water	2020	WUG Reducing Demand: Pecos County Fresh Water	Recommended Demand Reduction Strategy Without WMS Project	22986	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Pecos WCID	2020	WUG Reducing Demand: Pecos County WCID 1	Recommended Demand Reduction Strategy Without WMS Project	2924	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Rankin	2020	WUG Reducing Demand: Rankin	Recommended Demand Reduction Strategy Without WMS Project	2932	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Robert Lee	2020	WUG Reducing Demand: Robert Lee	Recommended Demand Reduction Strategy Without WMS Project	2942	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Runnels County Other	2020	WUG Reducing Demand: County-Other, Runnels	Recommended Demand Reduction Strategy Without WMS Project	22991	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - San Angelo	2020	WUG Reducing Demand: San Angelo	Recommended Demand Reduction Strategy Without WMS Project	2946	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Santa Anna	2020	WUG Reducing Demand: Santa Anna	Recommended Demand Reduction Strategy Without WMS Project	2954	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Scurry County Other	2020	WUG Reducing Demand: County-Other, Scurry	Recommended Demand Reduction Strategy Without WMS Project	22996	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Snyder	2020	WUG Reducing Demand: Snyder	Recommended Demand Reduction Strategy Without WMS Project	2950	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Sonora	2020	WUG Reducing Demand: Sonora	Recommended Demand Reduction Strategy Without WMS Project	2958	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Southwest Sandhills WSC	2020	WUG Reducing Demand: Southwest Sandhills WSC	Recommended Demand Reduction Strategy Without WMS Project	23003	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Stanton	2020	WUG Reducing Demand: Stanton	Recommended Demand Reduction Strategy Without WMS Project	2962	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Sterling City	2020	WUG Reducing Demand: Sterling City	Recommended Demand Reduction Strategy Without WMS Project	2967	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Tom Green County FWSD 3	2020	WUG Reducing Demand: Tom Green County FWSD 3	Recommended Demand Reduction Strategy Without WMS Project	23008	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Wickett	2020	WUG Reducing Demand: Wickett	Recommended Demand Reduction Strategy Without WMS Project	23013	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Wink	2020	WUG Reducing Demand: Wink	Recommended Demand Reduction Strategy Without WMS Project	2979	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Winters	2020	WUG Reducing Demand: Winters	Recommended Demand Reduction Strategy Without WMS Project	2983	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	Municipal Conservation - Zephyr WSC	2020	WUG Reducing Demand: Zephyr WSC	Recommended Demand Reduction Strategy Without WMS Project	2987	Yes	Project/WMS started	NA	Other	NA	Unknown	
F	New Water Treatment Plant - Big Spring	2030	Project Sponsor(s): Big Spring	Recommended WMS Project	948	No	Project/WMS not started	Delayed project start	Shift in timeline	NA	Unknown	None
F	Partner with Madera Valley WSC & Expand Well Field - Pecos City	2030	Project Sponsor(s): Pecos	Recommended WMS Project	3937	No	Project/WMS started	Project is being pursued in a different manner. Pecos City took on some of Madera Valley WSC's CCN and pursuing the project independently	Other	Staff changes resulted in some project delays/shift in timeline. Adjusted project configuration between parties also took time.	Unknown	None
F	Purchase from Provider - Winters	2020	Project Sponsor(s): Winters	Recommended WMS Project	1249	No	Project/WMS no longer being pursued	Winters has not approached Abilene about a sale of water.	Other	Sponsor is not pursing any strategies	Unknown	None
F	Purchase Treated Water from City of Odessa - Greater Gardendale WSC	2030	Project Sponsor(s): Greater Gardendale WSC	Recommended WMS Project	3924	Yes	Project/WMS started		Shift in timeline	NA	Unknown	Currently in progress
F	Rehabilitation of Oak Creek Pipeline - Bronte	2030	Project Sponsor(s): Bronte	Recommended WMS Project	1227	Yes	Project/WMS started		Economic feasibility/financing	NA	State	Project is currently being partially implemented with the WTP project
F	RO Treatment of Existing Supplies - Odessa	2030	Project Sponsor(s): Odessa	Recommended WMS Project	1181	No	Project/WMS not started	Delayed project start	Shift in timeline	NA	Unknown	None
F	Subordination - Ballinger/Moonen Lake	2020	WMS Seller: Ballinger; WMS Supply Recipient: Ballinger	Recommended WMS Supply Without WMS Project	1694	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Ballinger/Moonen Lake	2020	WMS Seller: Ballinger; WMS Supply Recipient: County-Other, Runnels	Recommended WMS Supply Without WMS Project	1685	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS

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F	Subordination - Ballinger/Moonen Lake	2020	WMS Seller: Ballinger; WMS Supply Recipient: North Runnels WSC	Recommended WMS Supply Without WMS Project	55740	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Brady Creek Reservoir	2020	WMS Seller: Brady; WMS Supply Recipient: Brady	Recommended WMS Supply Without WMS Project	5598	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Coahoma	Recommended WMS Supply Without WMS Project	20851	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2030	WMS Seller: Colorado River MWD; WMS Supply Recipient: County-Other, Ector	Recommended WMS Supply Without WMS Project	85556	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: County-Other, Scurry	Recommended WMS Supply Without WMS Project	20857	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Ector County Utility District	Recommended WMS Supply Without WMS Project	20830	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Irrigation, Ector	Recommended WMS Supply Without WMS Project	20789	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Irrigation, Midland	Recommended WMS Supply Without WMS Project	55698	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Manufacturing, Ector	Recommended WMS Supply Without WMS Project	20832	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Manufacturing, Howard	Recommended WMS Supply Without WMS Project	20852	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Midland	Recommended WMS Supply Without WMS Project	20790	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Snyder	Recommended WMS Supply Without WMS Project	20795	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Stanton	Recommended WMS Supply Without WMS Project	20796	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Steam-Electric Power, Ector	Recommended WMS Supply Without WMS Project	61244	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS

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F	Subordination - CRMWD System	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Steam-Electric Power, Howard	Recommended WMS Supply Without WMS Project	55671	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Hords Creek Lake	2020	WMS Seller: Coleman; WMS Supply Recipient: Coleman	Recommended WMS Supply Without WMS Project	5516	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Hords Creek Lake	2020	WMS Seller: Coleman; WMS Supply Recipient: Coleman County SUD	Recommended WMS Supply Without WMS Project	55730	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Hords Creek Lake	2020	WMS Seller: Coleman; WMS Supply Recipient: County-Other, Coleman	Recommended WMS Supply Without WMS Project	55737	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Kimble County RoR	2020	WMS Supply Recipient: Manufacturing, Kimble	Recommended WMS Supply Without WMS Project	64037	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Coleman	2020	WMS Seller: Coleman; WMS Supply Recipient: Coleman	Recommended WMS Supply Without WMS Project	1637	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Coleman	2020	WMS Seller: Coleman; WMS Supply Recipient: Coleman County SUD	Recommended WMS Supply Without WMS Project	1626	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Coleman	2020	WMS Seller: Coleman; WMS Supply Recipient: County-Other, Coleman	Recommended WMS Supply Without WMS Project	1624	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Coleman	2020	WMS Seller: Coleman; WMS Supply Recipient: Irrigation, Coleman	Recommended WMS Supply Without WMS Project	1640	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Coleman	2020	WMS Seller: Coleman; WMS Supply Recipient: Manufacturing, Coleman	Recommended WMS Supply Without WMS Project	1625	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Lake Colorado City and Champion Lake System	2020	WMS Seller: Steam-Electric Power, Mitchell; WMS Supply Recipient: Steam-Electric Power, Mitchell	Recommended WMS Supply Without WMS Project	5607	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Menard County Irrigation	2020	WMS Supply Recipient: Irrigation, Menard	Recommended WMS Supply Without WMS Project	106697	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Mountain Creek Reservoir	2020	WMS Seller: Upper Colorado River Authority; WMS Supply Recipient: County-Other, Tom Green	Recommended WMS Supply Without WMS Project	63895	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - OH Ivie Non System Portion	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Ballinger	Recommended WMS Supply Without WMS Project	55727	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	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 by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
F	Subordination - OH Ivie Non System Portion	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Midland	Recommended WMS Supply Without WMS Project	55701	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - OH Ivie Non System Portion	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: Millersview-Doole WSC	Recommended WMS Supply Without WMS Project	55707	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - OH Ivie Non System Portion	2020	WMS Seller: Colorado River MWD; WMS Supply Recipient: San Angelo	Recommended WMS Supply Without WMS Project	55704	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: Concho Rural Water	Recommended WMS Supply Without WMS Project	63886	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: County-Other, Concho	Recommended WMS Supply Without WMS Project	63889	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: County-Other, Tom Green	Recommended WMS Supply Without WMS Project	31914	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: Goodfellow Air Force Base	Recommended WMS Supply Without WMS Project	61272	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: Manufacturing, Tom Green	Recommended WMS Supply Without WMS Project	31908	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: Miles	Recommended WMS Supply Without WMS Project	31917	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - San Angelo System	2020	WMS Seller: San Angelo; WMS Supply Recipient: San Angelo	Recommended WMS Supply Without WMS Project	31920	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Winters Lake	2020	WMS Seller: Winters; WMS Supply Recipient: North Runnels WSC	Recommended WMS Supply Without WMS Project	55681	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Subordination - Winters Lake	2020	WMS Seller: Winters; WMS Supply Recipient: Winters	Recommended WMS Supply Without WMS Project	5504	No	Project/WMS started	NA	Other	This WMS adjusts modeling assumptions to reflect actual historical operation of surface water in the basin. Supplies already functionally operate this way but a WMS is needed to show the supplies under the regional water planning framework.	Unknown	Zero cost WMS
F	Transmission Pipeline Replacement - Pecos County WCID 1	2020	Project Sponsor(s): Pecos County WCID 1	Recommended WMS Project	3934	Yes	Project/WMS started		Shift in timeline	NA	Unknown	None
F	Water Audits and Leak - Brookesmith SUD 2020	2020	Project Sponsor(s): Brookesmith SUD	Recommended WMS Project	2876	No	Project/WMS not started	Unknown	Economic feasibility/financing	NA	Unknown	None
F	Water Audits and Leak - Brookesmith SUD 2040	2040	Project Sponsor(s): Brookesmith SUD	Recommended WMS Project	2877	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Brookesmith SUD 2060	2060	Project Sponsor(s): Brookesmith SUD	Recommended WMS Project	2878	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Coleman 2020	2020	Project Sponsor(s): Coleman	Recommended WMS Project	2879	No	Project/WMS not started	Unknown	Economic feasibility/financing	NA	Unknown	None
F	Water Audits and Leak - Coleman 2040	2040	Project Sponsor(s): Coleman	Recommended WMS Project	2880	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Coleman 2060	2060	Project Sponsor(s): Coleman	Recommended WMS Project	2881	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Millersview-Doole WSC 2020	2020	Project Sponsor(s): Millersview-Doole WSC	Recommended WMS Project	2882	No	Project/WMS not started	Unknown	Economic feasibility/financing	NA	Unknown	None
F	Water Audits and Leak - Millersview-Doole WSC 2040	2040	Project Sponsor(s): Millersview-Doole WSC	Recommended WMS Project	2883	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Millersview-Doole WSC 2060	2060	Project Sponsor(s): Millersview-Doole WSC	Recommended WMS Project	2884	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	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 by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
F	Water Audits and Leak - Sonora 2020	2020	Project Sponsor(s): Sonora	Recommended WMS Project	849	No	Project/WMS not started	Unknown	Economic feasibility/financing	NA	Unknown	None
F	Water Audits and Leak - Sonora 2040	2040	Project Sponsor(s): Sonora	Recommended WMS Project	2874	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Sonora 2060	2060	Project Sponsor(s): Sonora	Recommended WMS Project	2875	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Zephyr WSC 2020	2020	Project Sponsor(s): Zephyr WSC	Recommended WMS Project	2885	No	Project/WMS not started	Unknown	Economic feasibility/financing	NA	Unknown	None
F	Water Audits and Leak - Zephyr WSC 2040	2040	Project Sponsor(s): Zephyr WSC	Recommended WMS Project	2886	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Audits and Leak - Zephyr WSC 2060	2060	Project Sponsor(s): Zephyr WSC	Recommended WMS Project	2887	No	Project/WMS not started	Unknown	Other	Not recommended until later in the planning horizon	Unknown	None
F	Water Treatment Plant Expansion - Bronte	2030	Project Sponsor(s): Bronte	Recommended WMS Project	2578	Yes	Project/WMS started	NA	NA	NA	State	None
F	Weather Modification	2020	WMS Seller: Irrigation, Crockett; WMS Supply Recipient: Irrigation, Crockett	Recommended WMS Supply Without WMS Project	28864	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Irion; WMS Supply Recipient: Irrigation, Irion	Recommended WMS Supply Without WMS Project	28868	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Pecos; WMS Supply Recipient: Irrigation, Pecos	Recommended WMS Supply Without WMS Project	28871	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Reagan; WMS Supply Recipient: Irrigation, Reagan	Recommended WMS Supply Without WMS Project	28877	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Reeves; WMS Supply Recipient: Irrigation, Reeves	Recommended WMS Supply Without WMS Project	28880	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Schleicher; WMS Supply Recipient: Irrigation, Schleicher	Recommended WMS Supply Without WMS Project	28891	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Sterling; WMS Supply Recipient: Irrigation, Sterling	Recommended WMS Supply Without WMS Project	28895	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Sutton; WMS Supply Recipient: Irrigation, Sutton	Recommended WMS Supply Without WMS Project	28898	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Tom Green; WMS Supply Recipient: Irrigation, Tom Green	Recommended WMS Supply Without WMS Project	28902	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	Weather Modification	2020	WMS Seller: Irrigation, Ward; WMS Supply Recipient: Irrigation, Ward	Recommended WMS Supply Without WMS Project	28905	Yes	Project/WMS started	NA	NA	NA	Unknown	This is an on-going project by active weather modification programs. Does not fit into the implementation framework.
F	West Texas Water Partnership	2030	Project Sponsor(s): San Angelo; Abilene; Midland	Recommended WMS Project	4363	Yes	Project/WMS started	NA	NA	NA	Unknown	None

REGIONAL WATER PLAN WMS/PROJECT DATA						ANTICIPATED/ESTIMATED (OR ACTUAL[1]) IMPLE									
						SPONSOR AUTHORIZATION	PERMITTING STATUS (as applicable)								
							STATE WATER RIGHT STATUS				FEDERAL 404 PERMIT STATUS (if applicable)		DESALINATION PERMIT STATUS		OTHER KEY PERMITS
Water Management Strategy/Project Name	Project Sponsor	WMS Project Sponsor Region	Online Decade	Capital Cost	Anticipated Footprint Acreage (acres)	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))	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)
West Texas Water Partnership	Midland, San Angelo, Abilene	F	2040	$796,828,000	Unknown	May-20	NA	NA	NA	NA	2030	2032	NA	NA	Permits from Pecos County GCD already obtained.

FOOTNOTE 1 : ANY DATE ENTERED THAT IS PRIOR TO ADOPTION OF THE REGIONAL WATER PLAN IS ASSUMED TO BE AN 'ACTUAL' DATE

REGIONAL WATER PLAN WMS/PROJECT DATA						MENTATION ACTIVITIES AND DATES							
						PLANNING, DESIGN, AND CONSTRUCTION STATUS						TOTAL FUNDS EXPENDED TO DATE	Other significant activities completed (summary)
						GEOTECH/DESIGN	LAND ACQUISITION		CONSTRUCTION				
Water Management Strategy/Project Name	Project Sponsor	WMS Project Sponsor Region	Online Decade	Capital Cost	Anticipated Footprint Acreage (acres)	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)	
West Texas Water Partnership	Midland, San Angelo, Abilene	F	2040	$796,828,000	Unknown	Feasibility pipeline route study complete. Design work not yet initiated.	0	2036	2035	0%	2040	$ 13,811,000	

FOOTNOTE 1 : ANY DATE ENTERED THAT IS PRIOR TO ADOPTION OF THE REGIONAL WATER PLAN IS

APPENDIX K
METHODOLOGY TO IDENTIFY POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

TO:	Region F Water Planning Group
CC:	File
FROM:	Lissa Gregg, P.E.
SUBJECT:	Methodology to Identify Potentially Feasible Water Management Strategies
DATE:	October 6, 2023
PROJECT:	CMD21867

The Regional Water Planning rules requires each region to develop and document the process to identify potentially feasible water management strategies (PFWMS). This process is in addition to the process set forth by the TWDB to evaluate each PFWMS. This memorandum presents the proposed process to be used by Region F.

For Region F, the identification process for PFWMS will follow the sequence below:

1. Identify entities with needs
2. Review recommended strategies in previous Regional Water Plan (RWP)
3. Review new studies/ reports
4. Determine if new or changed strategies are needed
5. Review strategy types appropriate for Region F
6. Contact entity for input
7. Contact RWPG representative for county-wide WUGs
8. Verify recommendations

As required by TWC §16.053(e)(3), and 31 TAC §357.34(c) the RWPG shall consider a specified list of strategy types. This list includes 24 water management strategy types that require screening as part of the process for identifying PFWMS.[1]

While the TWDB list is comprehensive, each strategy type is not appropriate for every need, and some strategy types may not be appropriate for Region F water users. To determine whether a strategy is potentially feasible, the first considerations are:

- A strategy must use proven technology and must be technically feasible.
- A strategy should have an identifiable sponsor.
- A strategy must consider end use. This includes water quality, economics, geographic constraints, etc. For example, long transmission systems to move water for agricultural use is not economically feasible.

[1] Second Amended General Guidelines for the Development of the 2026 Regional Water Plans, September 2023. https://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2026/projectdocs/2026RWP_ExhibitC.pdf

- A strategy must meet existing regulations.

The second consideration is whether a strategy would provide sufficient water to meet a projected need or a sizeable portion of the need. Considerations at this juncture include:

- Is there available existing supply that is not already allocated to another user?
- Can new water be developed? If yes, identify the potential sources.
- Does the water quality meet the end use requirements? If not, can it be treated?
- Are there any technical considerations that would preclude the feasibility of the strategy type? For example, are there suitable geologic formations for aquifer storage and recovery?

Strategy types that will be reviewed for consideration as potentially feasible for Region F include:

- Water conservation
  - Review for applicability and consider for all WUGs with a need
  - Consider water conservation for all municipal WUGs
  - Consider the TWDB Water Loss Audit Report and conservation best management practices as part of this review
- Subordination
  - Consider for Colorado River Basin surface water users
- Reuse
  - Consider for WUGs with needs that generate a waste stream. This includes municipal, manufacturing and mining WUGs.
- Management of existing water supplies/System optimization
  - Consider for WUGs/WWPs that operate multiple water supply sources
- Conjunctive use
  - Consider for WUGs/WWPs that use or will use both surface water and groundwater sources
- Acquisition of available existing water supplies
  - Includes purchase of surface water and groundwater rights
- Developing regional water supply facilities or providing regional management of water supply facilities
- Developing large-scale desalination facilities for brackish groundwater that serve local or regional brackish groundwater production zones identified and designated under TWC §16.060(b)(5)
  - Consider for WUGs/WWPs that intend to develop large scale brackish groundwater for municipal use
- Voluntary transfer of water within the region using, but not limited to, contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements
- Emergency transfer of water under TWC §11.139
- Reallocation of reservoir storage to new uses
  - Consider for reservoirs that are no longer being used for the permitted purpose
- Improvements to water quality
- New groundwater supply
- Interbasin transfers of surface water
  - This would likely be considered as part of a voluntary transfer of water strategy

- Brush control
    - Consider for areas with a brush control program
- Precipitation enhancement
    - Consider for areas with a precipitation enhancement program
- Aquifer storage and recovery

There are several strategy types that likely are not appropriate for Region F water users. However, they may be considered if a project sponsor requests a specific strategy.

- Drought management. Drought management is an emergency measure and is generally not recommended for long-term supply.
- New surface water supply. There are limited opportunities to develop new surface water supplies in Region F.
- Enhancements of yields. The sources of water for yield enhancement are limited in Region F.

Three strategy types identified by the TWDB are not appropriate for Region F. These include:

- Developing large-scale desalination facilities for marine seawater that serve local or regional entities. Region F does not have access to seawater.
- Cancellation of water rights. The water rights in the Colorado River Basin have no reliability except Lakes Brownwood and Ivie. Cancellation of water rights in Region F would not provide additional water.
- Rainwater harvesting. The average rainfall over Region F from west to east ranges from 11 to 30 inches per year. During drought there is very little rainfall. This is not a reliable strategy for Region F.

APPENDIX L
RURAL OUTREACH

For the 2026 Regional Water Plans, planning groups were asked to do additional rural outreach in support of plan development. TWDB provided a list of 129 entities which qualify as rural political subdivisions per definition per Texas Water Code 15.001(14) in Region F. Seventy of these entities are already named water user groups (WUGs) and were surveyed and called as part of standard outreach procedures for plan development. In accordance with TWDB guidelines, outreach for the remaining entities was prioritized for those entities which have:

1. Self-reported water use restriction to TCEQ due to water supply issues during the current planning cycle,
2. self-report to TCEQ having less than 180 days of water supply remaining during the current planning cycle,
3. have not previously engaged in the regional planning process, and
4. have already been identified as facing significant near-term shortages under drought conditions in previous regional water plans.

Table L-1 documents each entity provided by TWDB and if they meet any of the four criteria for prioritization. If an entity was found to have all four criteria, it was given a 'very high' priority for outreach. If an entity met three of the criteria, it was considered 'high' priority. If an entity met two criteria, it was classified as 'moderate' priority. If an entity met a single criterion, it was assigned a priority of 'low'. If an entity met none of the criteria provided by TWDB, it was ranked as 'very low' priority for outreach. If an entity was not reached out to as part of the standard planning process as a WUG, and they ranked as very high, high, or moderate priority, Region F consultants attempted to reach them by phone as documented in Table L-1. If an entity was not a WUG and ranked as low or very low priority, no contact was attempted.

Table L-1
Region F Rural Outreach Prioritization and Documentation

WUG Related Planning Region(s)	Water User Group Name	PWS Name	1. Entity has self-reported water use restrictions to TCEQ due to water supply issues during the current planning cycle	2. Entity has self-reported having less than 180 days of water supply remaining during the current planning cycle	3. Entity has not previously engaged in the regional planning process	4. Entity has identified as facing significant near-term shortages under drought conditions in previous regional water plans	Priority for Outreach	Outreach Measures Performed	Response Received from Entity
F	Airline Mobile Home Park Ltd	Airline Crossing	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Andrews	City Of Andrews	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Ballinger	City Of Ballinger	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Balmorhea	City Of Balmorhea	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Bangs	City Of Bangs	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Barstow	City Of Barstow	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Big Lake	City Of Big Lake	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Big Spring	City Of Big Spring	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Borden County Water System	Borden County Water System	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Brady	City Of Brady Water System	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Bronte	City Of Bronte	yes	no	no	no	low	Survey sent and phone call made to entity	yes
F	Brookesmith SUD	Brookesmith Special Utility District	yes	no	no	yes	moderate	Survey sent and phone call made to entity	yes
F	Brownwood	City Of Brownwood	yes	no	no	yes	moderate	Survey sent and phone call made to entity	yes
F	Coahoma	City Of Coahoma	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Coleman	City Of Coleman	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Colorado City	City Of Colorado City	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Concho Rural Water	Concho Rural Water Grape Creek	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Concho Rural Water	Concho Rural Water North Concho Lake Est	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Concho Rural Water	Concho Rural Water Pecan Creek	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Concho Rural Water	Concho Rural Water Water Valley	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Concho Rural Water	Concho Rural Water Deer Valley Estates	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Concho Rural Water	Concho Rural Water The Oaks	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Corix Utilities Texas Inc	Mitchell County Utility	yes	no	no	no	low	Survey sent and phone call made to entity	no
F	County-Other, Andrews	Deys Rv And Mobile Park	no	no	yes	no	low	none	no
F	County-Other, Borden	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Brown	City Of Blanket	no	no	yes	no	low	none	no
F	County-Other, Brown	May WSC	no	no	yes	no	low	none	no
F	County-Other, Brown	Thunderbird Bay Subdivision	yes	no	yes	no	moderate	Phone call made to entity	no
F	County-Other, Coke	McWhorters Live Oak Lodge	no	no	yes	no	low	none	no
F	County-Other, Coke	Coke County WSC	no	no	yes	no	low	none	no
F	County-Other, Coleman	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Concho	Eola WSC	no	no	yes	no	low	none	no
F	County-Other, Concho	City Of Paint Rock	no	no	no	no	very low	none	no

WUG Related Planning Region(s)	Water User Group Name	PWS Name	1. Entity has self-reported water use restrictions to TCEQ due to water supply issues during the current planning cycle	2. Entity has self-reported having less than 180 days of water supply remaining during the current planning cycle	3. Entity has not previously engaged in the regional planning process	4. Entity has identified as facing significant near-term shortages under drought conditions in previous regional water plans	Priority for Outreach	Outreach Measures Performed	Response Received from Entity
F	County-Other, Crane	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Crockett	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Ector	City Of Goldsmith	no	no	no	no	very low	none	no
F	County-Other, Ector	Northgate Mobile Home Park 1	no	no	yes	no	low	none	no
F	County-Other, Ector	Canyon Dam Mobile Home Park	no	no	yes	no	low	none	no
F	County-Other, Ector	Huber Garden Estates	no	no	yes	no	low	none	no
F	County-Other, Glasscock	Garden City Water System Glasscock County	no	no	yes	no	low	none	no
F	County-Other, Howard	City Of Forsan	no	no	yes	no	low	none	no
F	County-Other, Irion	Barnhart WSC	no	no	yes	no	low	none	no
F	County-Other, Kimble	London Water System	yes	no	yes	no	moderate	Phone call made to entity	yes
F	County-Other, Loving	Loving County Water System	no	no	yes	no	low	none	no
F	County-Other, Martin	Martin County FWSD 1	no	no	yes	no	low	none	no
F	County-Other, Mason	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, McCulloch	Lohn WSC	no	no	yes	no	low	none	no
F	County-Other, McCulloch	City Of Melvin	no	no	yes	no	low	none	no
F	County-Other, McCulloch	Rochelle WSC	no	no	yes	no	low	none	no
F	County-Other, McCulloch	Lakeland Services	no	no	yes	no	low	none	no
F	County-Other, McCulloch	Live Oak Hills Subdivision	no	no	yes	no	low	none	no
F	County-Other, Menard	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Midland	Pecan Grove Mobile Home Park	no	no	yes	no	low	none	no
F	County-Other, Midland	Westgate Manufactured Townhome Community	no	no	yes	no	low	none	no
F	County-Other, Midland	Greenwood Terrace M H Subdivision	no	no	yes	no	low	none	no
F	County-Other, Midland	Twin Oaks Mhp Midland	no	no	yes	no	low	none	no
F	County-Other, Midland	Spring Meadow Mobile Home Park	no	no	yes	no	low	none	no
F	County-Other, Midland	South Midland County Water Systems	no	no	yes	no	low	none	no
F	County-Other, Midland	Warren Road Subdivision Water Supply	no	no	yes	no	low	none	no
F	County-Other, Midland	Country Village Mobile Home Estates	no	no	yes	no	low	none	no
F	County-Other, Mitchell	City Of Westbrook	no	no	yes	no	low	none	no
F	County-Other, Pecos	Sheffield WSC	no	no	yes	no	low	none	no
F	County-Other, Reagan	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Reeves	City Of Toyah	no	no	yes	no	low	none	no
F	County-Other, Runnels	Rowena WSC	no	no	yes	no	low	none	no
F	County-Other, Schleicher	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Scurry	Hermleigh Water System	yes	no	yes	no	moderate	Phone call made to entity	no

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F	County-Other, Scurry	Ira WSC	no	no	yes	no	low	none	no
F	County-Other, Scurry	Key Mobile Home Park	no	no	yes	no	low	none	no
F	County-Other, Scurry	Royal Community And Rv Park	no	no	yes	no	low	none	no
F	County-Other, Sterling	No Associated Pws	no	no	yes	no	low	none	no
F	County-Other, Sutton	No Associated Pws	no	no	yes	no	low	none	no
F	County-Other, Tom Green	Tom Green County FWSD 1 Carlsbad	no	no	yes	yes	moderate	none	no
F	County-Other, Tom Green	Tom Green County FWSD 2 Christoval	no	yes	yes	yes	high	Phone call made to entity	yes
F	County-Other, Tom Green	Browns Pool And Park	no	no	yes	yes	moderate	Phone call made to entity	no
F	County-Other, Tom Green	Twin Buttes Water System	no	no	yes	yes	moderate	Phone call made to entity	no
F	County-Other, Tom Green	West Texas Boys Ranch	no	no	yes	yes	moderate	Phone call made to entity	no
F	County-Other, Tom Green	Red Creek Mud	no	no	yes	yes	moderate	Phone call made to entity	no
F	County-Other, Tom Green	The Haciendas At Christoval Ranch	no	no	yes	yes	moderate	Phone call made to entity	no
F	County-Other, Upton	No Associated PWS	no	no	yes	no	low	none	no
F	County-Other, Ward	City Of Pyote	no	no	yes	no	low	none	no
F	County-Other, Winkler	No Associated PWS	no	no	yes	no	low	none	no
F	Crane	City Of Crane	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Crockett County WCID 1	Crockett County WCID 1 Ozona	yes	no	no	no	low	Survey sent and phone call made to entity	no
F	DADS Supported Living Center	Hhsc San Angelo State Supported Living C	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Early	City Of Early	yes	no	no	no	low	Survey sent and phone call made to entity	no
F	Ector County Utility District	Ector County Utility District	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Eden	City Of Eden	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Eldorado	City Of Eldorado	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Fort Stockton	City Of Fort Stockton	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Goodfellow Air Force Base	Goodfellow Air Force Base	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Grandfalls	City Of Grandfalls	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Greater Gardendale WSC	Greater Gardendale WSC	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Greenwood Water	Greenwood Water System	no	yes	no	no	low	Survey sent and phone call made to entity	yes
F	Iraan	City Of Iraan	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Junction	City Of Junction	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Kermit	City Of Kermit	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Loraine	City Of Loraine	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Madera Valley WSC	Madera Valley WSC	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Mason	City Of Mason	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	McCamey	City Of Mccamey	no	no	no	no	very low	Survey sent and phone call made to entity	no

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F	Menard	City Of Menard	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Mertzon	City Of Mertzon	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Midland	City Of Midland Water Purification Plant	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Miles	City Of Miles	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Millersview-Doole WSC	Millersview-Doole WSC	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Monahans	City Of Monahans	no	no	no	yes	low	Survey sent and phone call made to entity	yes
F	Odessa	City Of Odessa	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Pecos	City Of Pecos	no	no	no	yes	low	Survey sent and phone call made to entity	yes
F	Pecos County Fresh Water	Pecos County Fresh Water	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Pecos County WCID 1	Pecos County WCID 1	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Rankin	City Of Rankin	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Robert Lee	City Of Robert Lee	yes	no	no	no	low	Survey sent and phone call made to entity	no
F	San Angelo	City Of San Angelo	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Santa Anna	City Of Santa Anna	yes	no	no	no	low	Survey sent and phone call made to entity	no
F	Snyder	City Of Snyder	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Sonora	City Of Sonora	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Southwest Sandhills WSC	Southwest Sandhills WSC	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Stanton	City Of Stanton	no	no	no	yes	low	Survey sent and phone call made to entity	yes
F	Sterling City	City Of Sterling City	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Tom Green County FWSD 3	Tom Green County FWSD 3	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	U & F WSC	U & F WSC	no	no	no	no	very low	Survey sent and phone call made to entity	yes
F	Wickett	City Of Wickett	no	no	no	yes	low	Survey sent and phone call made to entity	no
F	Wink	City Of Wink	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Winters	City Of Winters	no	no	no	no	very low	Survey sent and phone call made to entity	no
F	Zephyr WSC	Zephyr WSC	yes	no	no	no	low	Survey sent and phone call made to entity	yes
F; G	Coleman County SUD	Coleman County SUD	no	no	no	no	very low	Survey sent and phone call made to entity	no
F; G	North Runnels WSC	North Runnels WSC	no	no	no	no	very low	Survey sent and phone call made to entity	no
F; K	Richland SUD	Richland SUD	no	no	no	yes	low	Survey sent and phone call made to entity	no

APPENDIX M
COMMENTS ON THE INITIALLY PREPARED PLAN

Placeholder for Comments on the IPP