



City Council Agenda 6/18/2024

Notice is hereby given of a regular meeting of the City Council of City of San Angelo to be held June 18, 2024 at 8:30 AM at the McNease Convention Center – South Meeting Room, 501 Rio Concho Drive, San Angelo, Texas, for the purpose of considering the following agenda items.

1. Call to Order
2. Chaplain Prayer & Pledges
3. Proclamations/Recognitions
4. Public Comment

Issues or concerns not on the Regular Agenda may be raised by the public at this time. Citizens should speak from the podium, address all comments to the dais, begin by stating their name and address or Single Member District number, and limit their remarks to less than three minutes.

5. Consent Agenda

- a. Consider approving the June 4, 2024 City Council regular meeting minutes (Heather Stastny)
- b. Consider awarding OP-04-24 Thermoplastic Striping Project to D.I.J. Construction Inc. in the amount of \$82,330 and authorizing the City Manager to negotiate and execute all related documents (Patrick Frerich)
- c. Consider approving Change Order #3 & #4 to RFB ES-03-23 Jackson St. Improvements to Reece Albert Inc. in the amount of \$72,982.30 and authorizing the City Manager to negotiate and execute all related documents (Patrick Frerich)
- d. Consider approving a Multiple Use Agreement between the City and Texas Department of Transportation on behalf of Loop Us Together for a beautification project along Loop 306, and authorizing the City Manager to negotiate and execute all necessary documents (Patrick Frerich)
- e. Consider approving a professional services agreement with Dr. Michael Strayer to provide services as the Emergency Medical Services Director for the San Angelo Fire Department, and authorizing the City Manager to negotiate and execute all related documents (Patrick Brody)
- f. Consider amending the current contract with Bentwood Country Club Estates to allow pumping of water from Lake Nasworthy (Shane Kelton)
- g. Consider a resolution adopting the 2024 Water Conservation & Drought Contingency Plan (Shane Kelton)
- h. Consider accepting an annexation petition for 22.096 acres of land in the C. Berberich Survey No. 177, Abstract No. 52 and H. Zerbach Survey No. 178, Abstract No. 4210, Tom Green County, Texas, located east of Riveria Ln. and Club House Ln.; and setting a public hearing for July 2, 2024 (Aaron Vannoy)

- i. Consider a resolution adopting the San Angelo Regional Airport Title VI Policy, and designating Jeremy Valgardson as the Title VI Coordinator for the Airport (Jeremy Valgardson)
- j. Consider a resolution authorizing a special event known as "Wake the Desert 2024" and approving variances to City ordinances at Middle Concho Park for July 16-22, 2024 (Carl White)

6. Regular Agenda

Comments regarding items on the Regular Agenda may be made by the public when each item is discussed as outlined above. Applicants, proponents, and appellants are exempt from the time limit above and instead must limit their remarks to less than five minutes.

- a. Consider the following items related to the Solid Waste Collection Contract and authorizing the City Manager to negotiate and execute all related documents:
 - 1. Approval of an amendment to the Solid Waste Collection Contract
 - 2. First reading and public hearing of an ordinance amending Section A8.017 "Charge for Collection of Garbage and Trash" (Presentation made by Operations Director Patrick Frerich)
- b. Consider awarding the purchase of fleet and fuel management systems and authorizing the City Manager to negotiate and execute all related documents:
 - 1. Consider awarding RFB #25-04-0222 of North Carolina Sheriff's Association to Chevin Fleet Solutions LLC in the amount of \$41,650 for fleet management software implementation and \$64,467.60 annually for software maintenance and support utilizing a total of \$106,118 from Fleet Services fund balance
 - 2. Consider approval of Sourcewell Contract #02920-JFA to JF Petroleum Group in the amount of \$80,892.65 for fuel management and tank monitoring systems hardware and software installation utilizing Fleet Services fund balance (Presentation made by Senior Fleet Manager Ryan Kramer)
- c. First reading and public hearing of ordinances for the following cases:
 - 1. CP24-01, a request to amend the Comprehensive Plan, changing from "Commercial" to "Neighborhood Center" being 0.613 acres located at 816 Culwell St.; and
 - 2. Z24-03, a request to rezone from the Heavy Commercial zoning district to Neighborhood Commercial zoning district being 0.613 acres located at 816 Culwell St.; west of the Texas Pacifico RR and Culwell St. (Presentation made by Planning & Development Services Director Aaron Vannoy)
- d. First reading and public hearing of ordinances for the following cases:
 - 1. CP24-03, a request to amend the Comprehensive Plan from "Commercial" to "Neighborhood," being 0.386 acres located at 7 and 9 East 27th St.; and
 - 2. Z24-04, a request to rezone from General Commercial/Heavy Commercial zoning district to Single-Family Residential zoning district, being 0.198 acres located at 7 East 27th St. (Presentation made by Planning & Development Services Director Aaron Vannoy)
- e. First reading and public hearing of an ordinance approving Z24-10, a request to rezone from the Low Rise Multi-Family, General Commercial/Heavy Commercial, and General Commercial zoning districts to the Central Business District zoning district, on approximately 70.02 acres generally located and bounded by the 400 block of N. Emerick St., south to the 100 block of S. Emerick St., then east to the 200 and 300 blocks of E. Twohig Ave., then north up S. Main St. beginning at the teen block through the 300 block of N Main St., from the 300 block of E.

Pulliam St., west through the 100 to 300 block of E. 3rd St., as well as the 200 block of N. Magdalen beginning at College Ave and the 200 block of N. Oakes St., south to Woodrow St. to E. 3rd St., including individual properties located at 102 N. Oakes St., 105 and 107 N. Magdalen St., and 118 S. Magdalen St. (Presentation made by Planning and Development Services Director Aaron Vannoy)

7. Closed Session

Executive Session under the provision of Government Code, Title 5. Open Government; Ethics, Subtitle A. Open Government, Chapter 551. Open Meetings, Subchapter D. Exceptions to Requirement that Meetings be Open under the following sections:

8. Follow Up and Administrative Issues

- a. Consider items discussed in Executive Session, if needed
- b. Announcements and consideration of Future Agenda Items

9. Adjournment

CERTIFICATION

I hereby certify that the above notice of meeting was posted on the bulletin board at City Hall in the City of San Angelo, Texas, on the 13th day of June 2024, at 4:21 p.m.


Heather Stastny, City Clerk

All agenda items are subject to action. The City Council reserves the right to consider business out of posted order and/or adjourn into closed session on any item on this agenda and at any time during the course of this meeting to discuss matter as authorized by law or by the Open Meetings Act, Texas Government Code Sections 551.071 (Consultation with Attorney), 551.072 (Deliberations Regarding Real Property), 551.073 (Deliberations Regarding Prospective Gifts), 551.074 (Personnel Matters), 551.076 (Deliberations Regarding Security Devices or Security Audits), 551.087 (Deliberations Regarding Economic Development Negotiations), and 551.089 (Deliberations Regarding Security Devices or Security Audits). Any final action or vote on any Closed Session item will be taken in Open Session.

In compliance with the Americans with Disabilities Act, the City of San Angelo will provide for reasonable accommodations for persons attending City Council meetings. To better serve you, requests should be received 48 hours prior to the meetings. Please contact the ADA Coordinator at 325-657-4407 for request, or by completing a request form online at cosatx.us/ada.

Citizen requests to display materials on the city's monitors must submit the request 96 hours prior to the meeting by email to Heather.Stastny@cosatx.us. Time limits for discussion are as stated above and materials cannot exceed 10-pages. Citizens bringing materials for distribution to City Council members during the meeting must bring a minimum of 12 copies.

City Council regular meetings are broadcast on SATV Channel 17-Government Access at 10:30 a.m. and 7:00 p.m. every day, beginning the evening of the meeting until the evening of the next meeting.

City of San Angelo, Texas
Regular City Council Meeting
Tuesday, June 4, 2024

Present:

Mayor Brenda Gunter
Pro tem Lucy Gonzales, SMD 4
Council Member Tommy Hiebert, SMD 1
Council Member Tom Thompson, SMD 2
Council Member Harry Thomas, SMD 3
Council Member Karen Hesse Smith, SMD 5
Council Member Larry Miller, SMD 6

1. Call to Order

With a quorum of the City Council Members present, Mayor Gunter called the regular session of the San Angelo City Council to order at 8:31 a.m. on Tuesday, June 4, 2024 at the San Angelo McNease Convention Center, 501 Rio Concho Drive, San Angelo, Texas 76903.

2. Chaplain Prayer & Pledges

An invocation was provided, and pledges were led, by San Angelo Police Department Chaplain Art Mavrode.

3. Proclamations/Recognitions

Keep San Angelo Beautiful was recognized.

4. Public Comment

County resident Jackie Chesnutt spoke about elder abuse and financial exploitation.

Citizen Jamaal Schumpert (SMD 4) requested updates on Lake Nasworthy water levels, expressed concerns about ZBA, and commended KSAB for their work in the community.

County resident GL Beanes expressed concern about the dog overpopulation in and around San Angelo.

5. Consent Agenda

- a. Approval of the May 21, 2024, City Council regular meeting minutes (Heather Stastny)
- b. Approval of the sale of 0.128 acres of land out of the John McNeese Survey No. 176 1/4, Abstract 1641, to the adjacent property owner and authorizing the City Manager to negotiate and execute all related documents (Sarah Tackett-Torres)
- c. Approval of accepting a 3,903-sq. ft. sewer easement out of the G. Blum Survey No. 166, Abstract 59 and authorizing the City Manager to negotiate and execute all related documents (Sarah Tackett-Torres, Kevin Pate)
- d. Approval of HGAC contract FS12-23 for Boise Mobile Equipment Stock Unit #3495 through Siddons-Martin Emergency Group in the amount of \$338,560 and authorizing the City Manager to negotiate and execute all related documents (Patrick Brody)
- e. Approval of a request from Concho Valley Qualified Traffic Services to increase fees for funeral escort services in the City of San Angelo (Heather Stastny, David Howard)

- f. Adoption of a resolution of the City of San Angelo, Texas finding that AEP Texas, Inc.'s requested increase to its electric transmission and distribution rates and charges within the City of San Angelo should be denied (Brandon Dyson) (Pg. 159, 2024-038)
- g. Adoption of an ordinance amending the budget for the fiscal year beginning October 1, 2023, and ending September 30, 2024, for survey work at Fairmount Cemetery (Tina Dierschke) (Pg. 161, 2024-039)
- h. Adoption of an ordinance for PD24-01, a request for a Planned Development zoning district with an underlying base zoning of Low-Rise Multifamily, allowing for a transitional housing facility for women located at 4215 Armstrong St. (Aaron Vannoy) (Pg. 164, 2024-040)

Motion: Council Member Thomas made a motion, seconded by Council Member Thompson, to approve the Consent Agenda. The motion carried unanimously (7) ayes to (0) nays, with no public comment.

6. Regular Agenda

- a. Adoption of a resolution of support to end Veteran homelessness (Presentation made by Neighborhood and Family Services Director Bob Salas) (Pg. 168, 2024-041)

CVAA Executive Director Mike Burnett (SMD 1) spoke in support of the item.

Motion: Council Member Thomas made a motion, seconded by Council Member Miller, to approve the item as presented. The motion carried unanimously (7) ayes to (0) nays.

- b. First reading and public hearing of an ordinance amending Chapter 1 "General Provisions", Article 1.09 "Taxation", Division 3 "Uniform Tax Abatement Policy", Section 1.09.062 "Definitions" and Section 1.09.063 "Abatement Schedule" of the City of San Angelo Code of Ordinances (Presentation made by Economic Development Project Manager Robert Schneeman)

Consensus: Consensus of Council was to table the ordinance and bring it back at a later date with possible changes for consideration.

7. Closed Session

Executive Session under the provision of Government Code, Title 5. Open Government; Ethics, Subtitle A. Open Government, Chapter 551. Open Meetings, Subchapter D. Exceptions to Requirement that Meetings be Open under the following sections:

8. Follow Up and Administrative Issues

- a. Consideration of items discussed in Closed Session, if needed

No action taken on this item.

- b. Announcements and consideration of Future Agenda Items

No action taken on this item.

9. Adjournment

Motion: Council Member Hiebert made a motion, seconded by Council Member Thompson, to adjourn the meeting. The motion carried unanimously (7) ayes to (0) nays, with no public comment.

There being no further business, the meeting adjourned at 9:28 a.m.

THE CITY OF SAN ANGELO, TEXAS:

Brenda Gunter, Mayor

ATTEST:

Heather Stastny, City Clerk

In accordance with Chapter 2, Article 2.300, of the Official Code of the City of San Angelo, the minutes of this meeting consist of the preceding Minute Record and the Supplemental Minute Record. Details of Council meetings may be obtained from the City Clerk's Office, or a video of the entire meeting may be purchased from the Public Information Officer at 481-2727. (Portions of the Supplemental Minute Record video tape recording may be distorted due to equipment malfunction or other uncontrollable factors.)

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Pete Madrid Jr., Operations, Operations

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider awarding OP-04-24 Thermoplastic Striping Project to D.I.J. Construction Inc. in the amount of \$82,330 and authorizing the City Manager to negotiate and execute all related documents (Patrick Frerich)

Staff Recommendation:

Accept

Summary/History:

The Operations Department of the City of San Angelo requested bids for the application of roadway striping on city streets that recently received PressurePave and HA5 road maintenance applications. The project includes the application of thermoplastic striping primarily in the areas of Downtown and the Airport. Thermoplastic material is used as an alternative to paint for roadway markings. Thermoplastic is a more durable product than standard paint and provides a marking that will last approximately five to ten years versus paint's longevity of only several months.

In order to save costs, this project will only include striping that requires specialized machinery to efficiently apply such as long-line thermostriping (centerlines, left turn lanes, etc.) and parking stalls. Crosswalks, arrows, stop bars, and other special markings will be applied in-house by the Traffic Operations Division.

Bid Documents were published May 21, 2024 via the City's Bonfire bidding platform. One response was received from D.I.J. Construction, Inc.

Funding Source(s):

Fund:	Account:	Project Number:	Amount Budgeted:
101	101-3200-432-0435		\$82,330.05

Financial Impact:

Funding this project is budgeted in the current fiscal year.

Other Information/Recommendation:

Staff recommends award of RFB OP-04-24 to D.I.J. Construction, Inc.

Attachments:

1. Thermoplastic Striping Bid Tab

Thermoplastic Striping Bid Tab.pdf

Presentation:

Patrick Frerich

Approvals/Reviews:

Pete Madrid Jr.

Patrick Frerich

Shane Kelton

Brandon Dyson

Jeffrey Tomlinson

Tina Dierschke

Brandon Dyson

Heather Stastny

Created/Initiated

Approved

Approved

Approved

Approved

Approved

Approved

Final Approval

BID TAB OP-04-24

ITEM	DESCRIPTION	UNIT	Downtown	Price	Mathis Field	Price	PROJECT TOTAL	
666	REFL PAV MRK TY I 4" DBL Y 90 MIL	LF	7125	12468.75	1560	2730	8685	
666	REFL PAV MRK TY I W 8" 90 MIL	LF	1350	4725	1190	4165	2540	
666	REFL PAV MRK TY I W 4" 90 MIL	LF	17037	49407.3			17037	
666	RRFL PAV MRK TY I W 4" BRK W 90 MIL	LF			5048	8834	5048	
							82330.05	Total

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Charles Michalewicz, Engineer, Engineering Services

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider approving Change Order #3 & #4 to RFB ES-03-23 Jackson St. Improvements to Reece Albert Inc. in the amount of \$72,982.30 and authorizing the City Manager to negotiate and execute all related documents (Patrick Frerich)

Staff Recommendation:

Approve

Summary/History:

These Change Orders encompasses the following changes to the project:

Change Order 3 includes some deduct items as well as added quantities.

- Increases existing bid items to improve Jackson St pavement within the Railroad right-of-way and West of Knickerbocker Rd.

- Contrary to C.O. 002, the new 12" water main will not need to be extended underneath the railroad tracks. Exploratory excavation uncovered a 20" concrete encased steel pipe underneath the Railroad tracks in good condition. The new waterline will be connected to this existing line in lieu of boring underneath the tracks.

Change Order 4

- Adds a work item to cement stabilize areas within the Jackson St project limits where soils with high plasticity indexes are present. On 5/7/24, the Contractor brought severe pumping issues to the engineer's attention while proof rolling the subgrade in several areas on the North side of Jackson St. Upon observation, the engineer ordered a series of plasticity index tests to be performed on the questionable subgrade, most notably in front of the hotel. The tests yielded several plasticity indexes over 20, which constitutes stabilization of the subgrade. A cement series was then requested, which yielded a satisfactory compressive strength of 329 psi at 4% cement.

Funding Source(s):

Fund:	Account:	Project Number:	Amount Budgeted:
Street	53432008000730	ST0009	\$216,460.54
Water	51241008000730	ST0009	-\$143,478.24

Financial Impact:

Change Order #3 total is \$330.37 and Change Order #4 total is \$72,351.93. The new contract price will increase by \$72,982.30. The new contract total will be \$4,577,465.52.

Original Contract Amount:	\$ 4,204,152.95
Previous Change Orders:	
Change Order No. 1:	\$ (62,712.91)
Change Order No. 2	\$ 363,043.18
Change Order No. 3	\$ 630.37
Change Order No. 4	\$ 72,351.93
Revised Contract Amount:	\$ 4,577,465.52

Other Information/Recommendation:

Staff recommends approving Change Order #3 & #4 to ES-03-23.

Attachments:

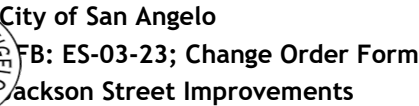
- | | | |
|----|----------------|--------------------|
| 1. | Change order 3 | Change order 3.pdf |
| 2. | Change Order 4 | Change Order 4.pdf |

Presentation:

Patrick Frerich

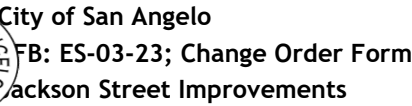
Approvals/Reviews:

Charles Michalewicz	Created/Initiated
Pete Madrid Jr.	Approved
Kevin Pate	Approved
Shane Kelton	Approved
Brandon Dyson	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval



CONTRACTOR: REECE ALBERT, INC.

Item No.	Item Description	Bid Quantity	Unit	Bid Unit Price	Proposed Unit Price (Add. Qty.)	Bid Total Price	Add Quantities	Deduct Quantities	Revised Quantities	Adjusted Total Price	Net Change (+/-)
1.02	Barricades, Signs and Traffic Handling	7	MO	\$ 17,866.24		\$ 125,063.68	1		8	\$ 142,929.92	\$ 17,866.24
3.01	Remove and Dispose of Existing Asphalt Pavement (3.75" Existing HMAC Depth)	4,480	SY	\$ 10.43		\$ 46,726.40	1,080		5,560	\$ 57,990.80	\$ 11,264.40
3.03	Excavation	1,018	CY	\$ 55.32		\$ 56,315.76	362		1,380	\$ 76,341.60	\$ 20,025.84
3.06	Road Grader Work (Density Control)	5,379	SY	\$ 5.13		\$ 27,594.27	649		6,028	\$ 30,923.64	\$ 3,329.37
3.07	Prime Coat (AE-P)	1,078	GAL	\$ 5.56		\$ 5,993.68	80		1,158	\$ 6,438.48	\$ 444.80
3.08	D-GR HMAC (TY B) (PG 70-22)	1,452	TON	\$ 227.98		\$ 331,026.96	162	441.00	1,173	\$ 267,420.54	\$ (63,606.42)
3.09	D-GR HMAC (TY D) (PG 70-22)	562	TON	\$ 251.07		\$ 141,101.34	83		645	\$ 161,940.15	\$ 20,838.81
3.10	7" Reinforced PCC Pavement (Class P)	1,211	SY	\$ 186.94		\$ 226,384.34	478		1,689	\$ 315,741.66	\$ 89,357.32
5.04	12" C900 PVC DR 18	965	LF	\$ 454.96		\$ 439,036.40	-	100.00	865	\$ 393,540.40	\$ (45,496.00)
5.10	20" Steel Casing (Bored)	220	LF	\$ 694.01		\$ 152,682.20	-	124.00	96	\$ 66,624.96	\$ (86,057.24)
C.O.2. 1.04	Additional Mobilization Cost for Utility Bore at Railroad	1	LS	\$ 11,925.00		\$ 11,925.00	-	1.00	0	\$ -	\$ (11,925.00)
C.O.2. 1.05	Extension and Relocation of Project Traffic Control Barricades	1	LS	\$ 4,950.00		\$ 4,950.00	1		2	\$ 9,900.00	\$ 4,950.00
C.O.3. 1.01	Flexible Base (CMP IN PLC)(TY A)(GR1-2)(8")		SY	\$ -	\$ 19.75	\$ -	2,007		2,007	\$ 39,638.25	\$ 39,638.25
		-		\$ -		\$ -			0	\$ -	\$ -
Contract Adjustment											
Original Contract Completion Date:		7/30/2024	Original Contract Amount:							\$ 4,204,152.95	
Original Contract Construction Days:		210	Previous Change Orders:								
Prior Days Added:		0	Change Order No. 1:							\$ (62,712.91)	
Days Added this Change Order:		90	Change Order No. 2:							\$ 300,330.27	
Revised Contract Construction Days:		300	Change Order No. 3:								
Revised Contract Completion Date:		10/28/2024	Change Order No. 4:								
			Change Order No. 5:								
			Change Order No. 6:								
			Current Change Order Amount:							\$ 630.37	
			Contingency used on Previous Change Orders:							\$ 62,712.91	
			Contingency used on Current Change Order:							\$ -	
			Revised Contract Amount:							\$ 4,505,113.59	
Comments											
This Change Order increases existing bid items to improve Jackson St pavement within the Railroad right-of-way and West of Knickerbocker Rd.											
The scope of the project excluded improvements of Jackson St within Railroad right-of-way and West of Knickerbocker Rd, however, upon a field visit, the existing pavement was in a severely deteriorated state.											
Given that there is no projects slated in the near future to address this deteriorated pavement or any streets in the near vicinity, it was determined that this work be added to the contract.											
A breakdown of the items added and removed to the contract for this extra work is listed above. The predominant work to be performed includes 7" of concrete pavement placed on top of 8" of flexible base within the railroad right-of-way and West of Knickerbocker Rd.											
Contrary to C.O. 002, the new 12" water main will not need to be extended underneath the railroad tracks. Exploratory excavation uncovered a 20" concrete encased steel pipe underneath the Railroad tracks in good condition.											
The new waterline will be connected to this existing line in lieu of boring underneath the tracks.											
General Note: The addition of this change order compensates the Contractor for all labor, material, and equipment necessary to perform all work described within the supplemental documents and herein.											



CONTRACTOR: REECE ALBERT, INC.

This Change Order adds a work item to cement stabilize areas within the Jackson St project limits where soils with high plasticity indexes are present. On 5/7/24, the Contractor brought severe pumping issues to the engineer's attention while proof rolling the subgrade in several areas on the North side of Jackson St. Upon observation, the engineer ordered a series of plasticity index tests to be performed on the questionable subgrade, most notably in front of the hotel. The tests yielded several plasticity indexes over 20, which constitutes stabilization of the subgrade. A cement series was then requested, which yielded a satisfactory compressive strength of 329 psi at 4% cement.

General Note: The addition of this change order compensates the Contractor for all labor, material, and equipment necessary to perform all work described within the supplemental documents and herein.

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Patrick Frerich, Director of Operations, Operations

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider approving a Multiple Use Agreement between the City and Texas Department of Transportation on behalf of Loop Us Together for a beautification project along Loop 306, and authorizing the City Manager to negotiate and execute all necessary documents (Patrick Frerich)

Staff Recommendation:

Approve

Summary/History:

The organization Loop Us Together has approached the City of San Angelo and the Texas Department of Transportation (TxDOT) with a proposal to provide a mural within state right-of-way. Loop Us Together is an organization whose objective is to assist in the economic development of the historic north side area of San Angelo.

The mural, to be painted on the Loop 306 retaining wall adjacent to the intersection of MLK Blvd and 7th Street, is to be the first of many future projects that provides beautification of the area, encourages reconnectivity between north and south of the loop, and inspires the community. The painting will include elements of the historic buildings and figures of the area.

Since the wall is owned by TxDOT, an agreement must be used to allow placement of this mural. The agreement must be between TxDOT and the City as a sponsor for Loop Us Together. As part of the agreement, the City will merely be the sponsor with Loop Us Together responsible for all activities and costs related to installation and maintenance.

Funding Source(s):

Financial Impact:

All costs associated with the project, including installation and on-going maintenance, will be the carried by Loop Us Together.

Other Information/Recommendation:

Staff recommends authorizing the City of San Angelo to be a sponsor for Loop Us Together and enter into a Multiple Use Agreement with TxDOT for the mural project.

Attachments:

- | | | |
|----|--|--|
| 1. | Mural Design - Loop Us | Mural Design - Loop Us.pdf |
| 2. | Mural Location - Streetview | Mural Location - Streetview.pdf |
| 3. | Multiple Joint Agreement_DRAFT 04-2024 | Multiple Joint Agreement_DRAFT 04-2024.pdf |

Presentation:

Patrick Frerich

Approvals/Reviews:

Patrick Frerich	Created/Initiated
Pete Madrid Jr.	Approved
Patrick Frerich	Approved
Shane Kelton	Approved
Brandon Dyson	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

Approximate Location of Mural

MLK Blvd



MULTIPLE USE AGREEMENT

STATE OF TEXAS §

COUNTY OF TRAVIS §

THIS AGREEMENT made by the State of Texas by and between the Texas Department of Transportation, hereinafter referred to as "State", party of the first part, and City of San Angelo _____, hereinafter called Name for Contract , party of the second part, is to become effective when fully executed by both parties.

WITNESSETH

WHEREAS, on the _____ day _____ day of _____ month of the year _____, 20 XX _____, the governing body for the Name for Contract entered into Resolution/Ordinance No. _____ Ordinance _____ hereinafter identified by reference, authorizing the Name for Contract 's participation in this agreement with the State; and

WHEREAS, the Name for Contract has requested the State to permit the construction, maintenance and operation of a public Public work to be installed on the highway right of way, (ROADWAY Highway Name CONTROL SECTION NO. Ctrl No.). (General description of area including either the control number or GPS coordinates.)

shown graphically by the preliminary conceptual site plan in Exhibit "A" and being more specifically described by metes and bounds of Exhibit "B", which are attached and made a part hereof; and

WHEREAS, the State has indicated its willingness to approve the establishment of such facilities and other uses conditioned that the Name for Contract will enter into agreements with the State for the purpose of determining the respective responsibilities of the Name for Contract and the State with reference thereto, and conditioned that such uses are in the public interest and will not damage the highway facilities, impair safety, impede maintenance or in any way restrict the operation of the highway facility, all as determined from engineering and traffic investigations conducted by the State.

AGREEMENT

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto to be by them respectively kept and performed as hereinafter set forth, it is agreed as follows:

1. DESIGN AND CONSTRUCTION

 Name for Contract will prepare or provide for the construction plans for the facility, and will provide for the construction work as required by said plans at no cost to the State. Said plans shall include the design of the access control, necessary horizontal and vertical clearances for highway structures, adequate landscape treatment, adequate detail to ensure compliance with applicable structural design standards, sufficient traffic control provisions, and general layout. They shall also delineate and define the construction responsibilities of both parties hereto. Completed plans will be submitted to State for review and approval and when approved shall be attached to the agreement and made a part thereof in all respects. Construction shall not commence until plans have been approved by the State. Any future revisions or additions shall be made after prior written approval of the State. Any sidewalks, curb ramps and other pedestrian elements to be constructed, either on site or off site, by the

 Name for Contract shall be in accordance with the requirements of Title II of the Americans With Disabilities Act (ADA) and with the Texas Accessibility Standards (TAS). Elements constructed by the Name for Contract and found not to comply with ADA or TAS shall be corrected at the entire expense of the- Name for Contract

2. INSPECTION

Ingress and egress shall be allowed at all times to such facility for Federal Highway Administration personnel and State Forces and equipment when highway maintenance operations are necessary, and for inspection purposes; and upon request, all parking or other activities for periods required for such operations will be prohibited.

3. PARKING REGULATIONS

Parking regulations shall be established limiting parking to single unit motor vehicles of size and capacity no greater than prescribed for 1½ ton trucks, such vehicles to conform in size and use to governing laws. Parking shall be permitted only in marked spaces.

Parking shall be prohibited when a security threat, as determined by TxDOT, exists.

4. PROHIBITION/SIGNS

Regulations shall be established prohibiting the parking of vehicles transporting flammable or explosive loads and prohibiting use of the area in any manner for peddling, advertising or other purposes not in keeping with the objective of a public facility. The erection of signs other than those required for proper use of the area will be prohibited. All signs shall be approved by the State prior to the actual erection.

5. RESPONSIBILITIES

Timely maintenance, repair and operation of the facility shall be entirely the responsibility of the Name for Contract . Such responsibility shall not be transferred, assigned or conveyed to a third party without the advanced written approval of the State. These responsibilities expressly include the timely maintenance and repair of any portion of the facility necessary to comply with the Americans with Disabilities Act. Further, such responsibility shall include picking up trash, mowing and otherwise keeping the facility in a clean and sanitary condition, and surveillance by police patrol to eliminate the possible creation of a nuisance or hazard to the public. Hazardous or unreasonably objectionable smoke, fumes, vapor or odors shall not be permitted to rise above the grade line of the highway, nor shall the facility subject the highway to hazardous or unreasonably objectionable dripping, droppings or discharge of any kind, including rain or snow.

If the State determines that Name for Contract has failed to comply with these responsibilities, it will perform the necessary work and charge Name for Contract the actual cost of the work.

6. FEES

Any fees levied for use of the facilities in the area shall be nominal and no more than are sufficient to defray the cost of construction, maintenance and operations thereof, and shall be subject to State approval.

A. Retention Period. The Name for Contract shall maintain all books, documents, papers, accounting records and other evidence pertaining to fees collected and costs (hereinafter called the Records). The Name for Contract shall make the records available during the term of the Agreement and for four years from the date the Agreement is terminated, until completion of all audits, or until pending litigation has been completely and fully resolved, whichever occurs last.

B. Audit Report. If fees are collected by the Name for Contract for the use of the facility under this agreement, the Name for Contract will provide the State an annual audit report detailing the fees collected for the use of the facility and the costs associated with constructing, maintaining, and operating the facility within the same period. If the report shows more fees collected than expenses for the construction, operation, or maintenance of the facility the Name for Contract must provide a multiple year plan detailing how the additional revenue will be used for construction, operation, or maintenance of the facility.

C. Availability. The State or any of its duly authorized representatives, the Federal Highway Administration, the United States Department of Transportation, Office of Inspector General, and the Comptroller General shall have access to the _____ Name for Contract 's records that are directly pertinent to this Agreement for the purpose of making audits and examinations.

7. TERMINATION UPON NOTICE

This provision is expressly made subject to the rights herein granted to both parties to terminate this agreement upon notice, and upon the exercise of any such right by either party, all obligations herein to make improvements to said facility shall immediately cease and terminate and

_____ Name for Contract _____ shall be responsible for the facility's timely removal at no cost to the State. If the State determines that _____ Name for Contract _____ has failed to timely remove the facility, it will perform the necessary work and charge _____ Name for Contract _____ the actual cost of the work.

8. MODIFICATION/TERMINATION OF AGREEMENT

If in the sole judgment of the State it is found at any future time that traffic conditions have so changed that the existence or use of the facility is impeding maintenance, damaging the highway facility, impairing safety or that the facility is not being properly operated, that it constitutes a nuisance, is abandoned, or if for any other reason it is the State's judgment that such facility is not in the public interest, this agreement under which the facility was constructed may be: (1) modified if corrective measures acceptable to both parties can be applied to eliminate the objectionable features of the facility; or (2) terminated and the use of the area as proposed herein discontinued.

9. PROHIBITION OF STORAGE OF FLAMMABLE MATERIALS

All structures located or constructed within the area covered by the agreement shall be fire resistant. The storage of flammable, explosive or hazardous materials is prohibited. Operations deemed to be a potential fire hazard shall be subject to regulation by the State.

10. RESTORATION OF AREA

The _____ Name for Contract _____ shall provide written notification to the State that such facility will be discontinued for the purpose defined herein. The _____ Name for Contract _____ shall, within thirty (30) days from the date of said notification, clear the area of all facilities that were its construction responsibility under this agreement and restore the area to a condition satisfactory to the State.

11. PREVIOUS AGREEMENTS

It is understood that this agreement in no way modifies or supersedes the terms and provisions of any existing agreements between the parties hereto.

12. INDEMNIFICATION

THE Name for Contract WILL INDEMNIFY THE STATE AGAINST ANY AND ALL DAMAGES AND CLAIMS FOR DAMAGES, INCLUDING THOSE RESULTING FROM INJURY OR DEATH OF PERSONS OR FOR LOSS OF OR DAMAGE TO PROPERTY, ARISING OUT OF, INCIDENT TO OR IN ANY MANNER CONNECTED WITH THE CONSTRUCTION, OPERATION OR MAINTENANCE OF THE FACILITY, WHICH INDEMNIFICATION SHALL EXTEND TO AND INCLUDE ANY AND ALL COURT COSTS, ATTORNEY'S FEES AND EXPENSES RELATED TO OR CONNECTED WITH ANY CLAIMS OR SUITS FOR DAMAGES AND SHALL, IF REQUESTED IN WRITING BY THE STATE TO DO SO, ASSIST THE STATE OR RELIEVE THE STATE FROM DEFENDING ANY SUCH SUITS BROUGHT AGAINST IT. THE INDEMNIFICATION OF THE STATE SHALL EXTEND FOR A PERIOD OF TWO (2) YEARS BEYOND THE DATE OF TERMINATION OF THIS AGREEMENT.

DURING EACH YEAR WHILE THERE IS ANY LIABILITY BY REASON OF THE AGREEMENT CONTAINED IN THIS SUBSECTION OF THIS RESOLUTION, INCLUDING THE CALENDAR YEAR 20XX , THE City Name (CITY) SHALL COMPUTE AND ASCERTAIN THE RATE AND AMOUNT OF AD VALOREM TAX, BASED ON THE LATEST APPROVED TAX ROLLS OF SAID ENTITY, WITH FULL ALLOWANCES BEING MADE FOR TAX DELINQUENCIES AND COSTS OF TAX COLLECTION, WHICH WILL BE SUFFICIENT TO RAISE AND PRODUCE THE MONEY REQUIRED TO PAY ANY SUMS WHICH MAY BE OR BECOME DUE DURING ANY SUCH YEAR, IN NO INSTANCE TO BE LESS THAN TWO (2%) PER CENT OF SUCH OBLIGATION, TOGETHER WITH INTEREST THEREON, BECAUSE OF THE OBLIGATION HEREIN ASSUMED.

SAID RATE AND AMOUNT OF AD VALOREM TAX IS HEREBY ORDERED TO BE LEVIED AND IS HEREBY LEVIED AGAINST ALL TAXABLE PROPERTY IN SAID ENTITY FOR EACH YEAR WHILE ANY LIABILITY EXISTS BY REASON OF THE OBLIGATION UNDERTAKEN BY THIS SUBSECTION OF THIS RESOLUTION, AND SAID AD VALOREM TAX SHALL BE ASSESSED AND COLLECTED EACH SUCH YEAR UNTIL ALL OF THE OBLIGATIONS HEREIN INCURRED SHALL HAVE BEEN DISCHARGED AND ALL LIABILITY HEREUNDER DISCHARGED.

No party to this agreement intends to waive, relinquish, limit or condition its general governmental immunity from liability in any way.

Each party agrees and acknowledges that it is not an agent, servant, or employee of the other party and that under this provision each party is responsible only for its own acts and for those of its agents, servants, independent contractors or employees. Such responsibility includes, but is not

limited to any claims or amounts arising or recovered under the "Workers Compensation Law," the Texas Tort Claims Act, Chapter 101, Texas Civil Practice and Remedies Code; or any other applicable laws or regulations, all as time to time may be amended.

Nothing in this agreement shall be construed as creating any liability in favor of any third party against the State and the Name for Contract . Additionally, this agreement shall not ever be construed as relieving any third party from any liability against the State. Furthermore, the Name for Contract shall become fully subrogated to the State's rights of recovery and shall be entitled to maintain any action over and against any third party who may be liable for damages. The State agrees to execute and deliver instruments and papers and to otherwise do that which is necessary to secure such rights.

13. INSURANCE

The Name for Contract , shall provide necessary safeguards to protect the public on State maintained highways including adequate insurance for payment of any damages which might result during the construction, maintenance, repair and operation of the facility. Name for Contract shall include TxDOT as an additional insured by endorsement in Name for Contract 's commercial general liability insurance policy. Prior to beginning work on the State's right of way, the Name for Contract 's construction contractor shall submit to the State a completed insurance form (TxDOT Form No. 1560) or appropriate certificate of self-insurance and shall maintain the required coverage during the construction of the facility.

14. USE OF RIGHT OF WAY

It is understood that the State by execution of this agreement does not impair or relinquish the State's right to use such land for highway purposes when it is required for the construction or re-construction of the traffic facility for which it was acquired, nor shall use of the land under such agreement ever be construed as abandonment by the State of such land acquired for highway purposes, and the State does not purport to grant any interest in the land described herein but merely consents to such use to the extent its authority and title permits.

15. ADDITIONAL CONSENT REQUIRED

The State asserts only that it has sufficient title for highway purposes. The Name for Contract shall be responsible for obtaining such additional consent, permits or agreement as may be necessary due to this agreement. This includes, but is not limited to, appropriate permits and clearances for environmental, ADA and public utilities.

16. FHWA ADDITIONAL REQUIREMENTS

If the Facility is located on the Federal-Aid Highway System, "ATTACHMENT A", which states additional requirements as set forth in the Federal Highway Administration's Title 23, Code of Federal Regulations, § 710, shall be attached to and become a part of this agreement.

17. CIVIL RIGHTS ASSURANCES

The Name for Contract , for itself, its personal representatives, successors and interests and assigns, as part of the consideration hereof, does hereby covenant and agree as a covenant running with the land that: (1) no persons, on the grounds of race, color, sex, age, national origin, religion or disabling condition, shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of said facility; (2) that in the construction of any improvements on, over or under such land and the furnishing of services thereon, no person on the ground of race, color, sex, age, national origin, religion or disabling condition, shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination; (3) that the Name for Contract shall use the premises in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-Assisted programs of the Department of Transportation - Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations may be amended.

That if in the event of any breach of the above non-discrimination covenants, the State shall have the right to terminate the agreement and reenter and repossess said land and the facilities thereon, and hold the same as if said agreement had never been made or issued.

18. AMENDMENTS

Any changes in the time frame, character or responsibilities of the parties hereto shall be enacted by a written amendment executed by both parties hereto.

19. LEGAL CONSTRUCTION

In case one or more of the provisions contained in this agreement shall for any reason be held invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any provision hereof and this agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained in this agreement.

20. AUDIT

The State may conduct an audit or investigation of any aspect of this agreement. The Name for Contract must provide the State with access to any information the State considers relevant to the investigation or audit. The audit can include, but is not limited to, any contract for construction or maintenance of any facility or structure authorized by this agreement or any contract to provide a service to the Name for Contract if that service is authorized by this agreement.

21. AUTHORITY OF STATE AUDITOR

The state auditor may conduct an audit or investigation of any entity receiving funds from the state directly under the contract or indirectly through a subcontract under the contract. Acceptance of funds directly under the contract or indirectly through a subcontract under this contract acts as acceptance of the authority of the state auditor, under the direction of the legislative audit committee, to conduct an audit or investigation in connection with those funds. An entity that is the subject of an audit or investigation must provide the state auditor with access to any information the state auditor considers relevant to the investigation or audit.

22. NOTICES

All notices required under this agreement shall be mailed or hand delivered to the following respective addresses:

STATE (Mailing Address)	(Name of other party) (Mailing Address)
Texas Department of Transportation	Address Name
Maintenance Division	Address Name
125 East 11th Street	Address Road/Street/Hwy
Austin, Texas 78701-2483	Address City/State/Zip

23. TIMELY PAYMENT

When required by any provision of this agreement requires a payment to be made to the State, the other party hereto shall within thirty (30) days from receipt of the State's written notification pay the State for the full cost of repairing any damages to the highway facility which may result from the other party's construction, maintenance, repair or operation of the facility.

24. WARRANTS

The signatories to this agreement warrant that each has the authority to enter into this agreement on behalf of the party represented.

List of Attached Exhibits:

- Exhibit A - General Layout
- Exhibit B - Metes and Bounds Description
- Exhibit C - Approved Construction Plans
- Exhibit D - Certificate of Insurance (TxDOT Form 1560)
- Exhibit E - Attachment A (FHWA Additional Requirements)

IN WITNESS WHEREOF, the parties have hereunto affixed their signature, the _____ on the _____ day of _____, 20____, and the State on the _____ day of _____, 20____.

STATE OF TEXAS

(Name of other party)

By: _____
Signature

Executed and approved for the Texas Transportation Commission for the purpose and effect of activating and/or carrying out the orders, and established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

Printed Name

By: _____
Director, Maintenance Division

Title

Printed Name

Agency

Date

Contact Office and Telephone No.

APPROVAL RECOMMENDED:

District Engineer

Printed Name

Date

ATTACHMENT A

Inasmuch as this project is on the Federal-Aid highway system, the following additional requirements as applicable with the Federal Highway Administration's Title 23, Code of Federal Regulations, § 710.105.

1. Any significant revision in the design or construction of the facility shall receive prior approval by the Texas Department of Transportation subject to concurrency by the FHWA.
2. Any change in the authorized use of real property interest shall receive prior approval by the Texas Department of Transportation subject to concurrence by the FHWA.
3. Real property interest shall not be transferred, assigned or conveyed to another party without prior Texas Department of Transportation approval subject to concurrence by the FHWA.
4. This agreement will be revocable in the event that the real property interest facility ceases to be used or is abandoned.

EXHIBIT E

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Patrick Brody, Fire Chief, Fire Department

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider approving a professional services agreement with Dr. Michael Strayer to provide services as the Emergency Medical Services Director for the San Angelo Fire Department, and authorizing the City Manager to negotiate and execute all related documents (Patrick Brody)

Staff Recommendation:

Approve

Summary/History:

The San Angelo Fire Department is required to have a medical director to oversee medical protocols for Emergency Medical Services. The medical director is a certified emergency room physician. Our current medical director is requesting to resign from the position effective June 30, 2024. The new medical director will be Dr. Michael Strayer. The contract pays \$2000 a month to the medical director. These funds are budgeted within our normal operational budget. The new contract will be effective from July 1, 2024-June 30, 2025.

Funding Source(s):

Financial Impact:

Cost is \$24,000 per year, budgeted in account 101-9000-422.03-20

Other Information/Recommendation:

Attachments:

Presentation:

Patrick Brody

Approvals/Reviews:

Patrick Brody
Patrick Brody

Created/Initiated
Approved

Theresa James
Jeffrey Tomlinson
Tina Dierschke
Heather Stastny

Approved
Approved
Approved
Final Approval

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Pete Madrid Jr., Operations, Public Works

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider amending the current contract with Bentwood Country Club Estates to allow pumping of water from Lake Nasworthy (Shane Kelton)

Staff Recommendation:

Approve

Summary/History:

During the ongoing construction of the Lake Nasworthy Wastewater Improvement Project, City contractors accidentally damaged a private waterline that supplies water to Bentwood Country Club L.L.C. Although initial repairs to the water line have been made where the damage occurred, restricted flows still persist in the private water line. City staff is still trying to identify the cause for the restricted flows and correct the situation. This private line is over 2 miles in length and locating the restriction is time-consuming.

The current contract with Bentwood Country Club L.L.C. allows them to pump water from a diversion point located in lake Nasworthy to utilize their upstream water rights. However, based on their current contract, they are not allowed to utilize the Nasworthy diversion point if the South Pool of Twin Buttes Reservoir drops below 1925 feet of elevation. Currently, the South Pool is at 1925.05 and will soon drop below the contractual elevation of 1925 without significant rainfall. This amendment to the existing contract with Bentwood Country Club will enable them to pump water from Lake Nasworthy, even when the water levels in the South Pool drop below the 1925 mark, to compensate for the water loss they are experiencing due to the restricted flows caused by the sewer construction.

This amendment will become null and void when both parties agree that the restriction of water flow has been alleviated or September 30, 2024, which ever comes first.

Funding Source(s):

Financial Impact:

There will not be any financial impact to the City due to this amendment.

Other Information/Recommendation:

Attachments:

- | | | |
|----|---|---|
| 1. | 20240605 DIVERSION FACILITATION AGREEMENT amendment No. 3 1 | 20240605 DIVERSION FACILITATION AGREEMENT amendment No. 3 1.pdf |
|----|---|---|

Presentation:

Shane Kelton

Approvals/Reviews:

Pete Madrid Jr.	Created/Initiated
Patrick Frerich	Approved
Shane Kelton	Approved
Brandon Dyson	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

DIVERSION FACILITATION AGREEMENT

between

THE CITY OF SAN ANGELO, TEXAS

and

BENTWOOD C.C., L.L.C.

AMENDMENT NO. 3

This amendment is entered into this _____ day of June, 2024 (the “**Amendment No. 3 Effective Date**”), by and between The City of San Angelo (the “**City**”), a Texas home-rule municipality, and Bentwood C.C., L.L.C., a domestic limited liability company with a principal place of business at 2111 Club House Lane, San Angelo, Texas 76904 (“**BCC**”) (each a “**Party**” and collectively the “**Parties**”).

RECITALS

1. On July 31, 2019, the Parties entered into the Diversion Facilitation Agreement (the “**Agreement**”) that, subject to its terms and conditions, allows water charged to Certificate of Adjudication No. 14-1313 to be diverted from a point on the perimeter of Lake Nasworthy located near 2111 Club House Lane in San Angelo, Texas.

2. The Agreement provides that none of its provisions may be amended except by a written amendment signed by an authorized representative of each Party.

3. The Parties intend to amend the Agreement only as specifically and expressly provided below.

4. BCC relies in part on water supplied by private pipeline in the amount 1,000 gallons per minute (the “**Groundwater Line**”).

5. Restrictions in flow in the Groundwater Line related to damage associated with the Lake Nasworthy Sewer Improvement Project have reduced the volume of groundwater delivered to BCC by as much as 400 gallons per minute.

6. BCC wishes to temporarily acquire water from the City at the Diversion Point an amount that offsets the loss in volumes delivered to BCC through the Groundwater Line.

7. BCC has the legal ability to be bound by this agreement, and its signatory representative below is fully authorized to enter into this agreement with the City and to bind BCC to the terms set forth below.

Each of the recitals above are true and correct and form a material part of the consideration of this amendment. Based on these recitals, and on the commitments specified below, the City and BCC agree as follows:

AMENDMENT OF THE AGREEMENT

A. Section 3.4 of the Agreement is amended to read as follows:

3.4 Notwithstanding anything in Section 1.2 to the contrary, BCC may make diversions from the Diversion Point pursuant to this Section 3.4 until the time specified below, if BCC satisfies all other terms of this Agreement.

- (a) BCC may divert from the Diversion Point an amount of water not to exceed 400 gallons per minute until the earlier of September 30, 2024, or the date that the Parties mutually agree that the flow restriction in the Groundwater Line is removed.
- (b) If flow in the Groundwater Line again becomes restricted because of damage associated with the Lake Nasworthy Sewer Improvement Project after the date that the Parties have agreed pursuant to subsection (a) above that the initial restriction has been removed, but before September 30, 2024, BBC may again divert from the Diversion Point an amount not to exceed 400 gallons per minute until the earlier of September 30, 2024, or the date that the Parties mutually agree that the subsequent flow restriction in the Groundwater Line is removed.

B. This amendment does not alter any provision of the Agreement except as expressly provided for herein. To the extent any provision of this amendment conflicts with any term or condition of the Agreement, the terms and conditions of the Agreement control. All rights, privileges, and obligations provided for pursuant to this Amendment No. 3 automatically terminate on September 30, 2024, without notice or any other action required by the City or BBC.

C. This amendment may be executed in any number of separate counterparts by the Parties, and each such counterpart shall be deemed an original instrument, but such counterparts together shall constitute one agreement for all purposes.

IN WITNESS WHEREOF, City and BCC have executed this amendment to be effective on June _____, 2024.

-- SIGNATURES APPEAR ON THE FOLLOWING PAGE --

BENTWOOD C.C., L.L.C., A DOMESTIC LIMITED
LIABILITY COMPANY

CITY OF SAN ANGELO, A TEXAS HOME RULE
MUNICIPALITY

By: _____
William Kevin Collins, Manager

By: _____
Daniel Valenzuela, City Manager

Attest:

Heather Stastny, City Clerk

Approved as to Form

Theresa James, City Attorney

Approved as to Content:

Shane Kelton, Executive Director
of Public Works

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Pete Madrid Jr., Operations, Water Utilities

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider a resolution adopting the 2024 Water Conservation & Drought Contingency Plan (Shane Kelton)

Staff Recommendation:

Approve

Summary/History:

The City of San Angelo reviews and updates the Water Conservation Plan (WCP) & Drought Contingency Plan (DCP) every five years to adjust goals and targets, and consider new technology and new best management practices - the last plan was adopted in May 2019. The purpose of a WCP & DCP is to encourage water conservation at all times and to establish a procedure for identifying, classifying, and handling a water supply and/or a water demand emergency effectively and efficiently.

The 2014 plan is the cornerstone of the proposed WCP - it has been redesigned, and we have added a section to emphasize the importance of water conservation. The plan was updated to promote the wise and responsible use of water by implementing structural programs that result in quantifiable water conservation outcomes; and supporting public education programs that inform customers about water and wastewater facility operations.

Current and Future Best Management Practices:

- In 2017, we added proactive leak investigations. Automated Meter Reading improves reading on meters and reduces "water loss" as leaks become easier to detect. A leak event report is created monthly by route - a different route is done monthly. Staff will investigate accounts on the leak event report and will notify customers of potential leaks.
- We added a comprehensive report, detailing the Water Conservation Plan (WCP) & Drought Contingency Plan (DCP), including the segment in case of a water supply emergency.
- A 5-year goal (also referred to as targets) for total per capita water use by City users is to maintain per capita water use at or below 123 gallons per capita per day (gpcd) by the end of 2029.
 - Residential water use goal: maintain per capita water use at or below 69 gpcd by the end of 2029.
 - Water loss goal: maintain per capita water loss at less than 20 gpcd by the end of 2029.

Funding Source(s):

Financial Impact:

No financial impact will be associated with the approval of the 2024 Water Conservation Plan & Drought Contingency Plan.

Other Information/Recommendation:

Attachments:

- | | | |
|----|---|---|
| 1. | San Angelo WCP-DCP | San Angelo WCP-DCP .pdf |
| 2. | RES ADOPTING 2024 WATER CONSERVATION PLAN | RES ADOPTING 2024 WATER CONSERVATION PLAN.pdf |

Presentation:

Shane Kelton

Approvals/Reviews:

Pete Madrid Jr.	Created/Initiated
Pete Madrid Jr.	Approved
Shane Kelton	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

WATER CONSERVATION PLAN AND DROUGHT CONTINGENCY PLAN

CITY OF SAN ANGELO

PWSID 2260001

APRIL 2024

Prepared for:
CITY OF SAN ANGELO
301 W. BEAUREGARD
SAN ANGELO, TEXAS 76903



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Enprotec | Hibbs & Todd

TABLE OF CONTENTS

WATER CONSERVATION PLAN

Section I	Declaration of Policy, Purpose and Intent	1
Section II	Definitions.....	1
Section III	Utility Profile Summary	4
Section IV	Water Conservation Goals.....	9
Section V	Metering Devices.....	9
Section VI	Universal Metering.....	10
Section VII	Measures to Determine and Control Unaccounted-For Uses of Water	10
Section VIII	Water Conservation Program	10
Section IX	Public Education.....	11
Section X	Water Rate Structure	11
Section XI	Means of Implementation and Enforcement	12
Section XII	Additional Wholesale Water Contract Requirements	12
Section XIII	Coordination with Brazos G Regional Water Planning Group.....	13
Section XIV	Revisions to the Water Conservation Plan	13
Section XV	Severability.....	13

DROUGHT CONTINGENCY PLAN

Section 11.05.001	Purpose	14
Section 11.05.002	Water conservation measures	14
Section 11.05.003	Drought stages and water management measures	17
Section 11.05.004	Exceptions and variances.....	19
Section 11.05.005	Implementation and service restrictions	21
Section 11.05.006	Enforcement	22

APPENDICES

Appendix A Service Area Maps

Appendix B Utility Profile for Retail Water Supplier

Appendix C Water Conservation Goals for Retail Water Supplier

Appendix D City of San Angelo Reservoir Operation Plan

**Appendix E Resolution Adopting the Water Conservation Plan and Affirming Drought
Contingency Plan Ordinance**

Appendix F Notification to Wholesale Purchasers

Appendix G City of San Angelo Water Rate Structure

CITY OF SAN ANGELO, TEXAS WATER CONSERVATION PLAN

Section I. Declaration of Policy, Purpose and Intent

The City of San Angelo (City) recognizes the importance of its water resources and seeks to protect and maximize those supplies. The City recognizes the importance of efficient use of our existing supplies to make them last as long as possible. The City has embraced water conservation and reuse as a way to maximize the longevity and sustainability of its water resources and to protect the water supplies of its citizens. The City pursues water conservation through the enactment and implementation of this Water Conservation Plan.

The purpose of the Water Conservation Plan (Plan) is to: promote the wise and responsible use of water by implementing structural programs that result in quantifiable water conservation results; develop, maintain, and enforce water conservation policies and ordinances; and support public education programs that inform customers about water and wastewater facilities operations, and water conservation.

In accordance with 30 Texas Administrative Code (TAC) Chapter 288, the City of San Angelo practices and promotes conservation of water through the implementation of practices described in the Texas Water Development Board's (TWDB's) *Best Management Practices (BMP) Guide for Municipal and Wholesale Users*. The City has implemented a number of those municipal BMPs identified by the TWDB in order to maximize its water conservation efforts.

Section II. Definitions

The following words and terms, when used in this Plan, shall have the following meanings, unless the context clearly indicates otherwise (Source: 30 TAC §288.1).

A. Agricultural or Agriculture: Any of the following activities:

1. cultivating the soil to produce crops for human food, animal feed, or planting seed or for the production of fibers;
2. the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or non-soil media by a nursery grower;
3. raising, feeding, or keeping animals for breeding purposes or for the production of food or fiber, leather, pelts, or other tangible products having a commercial value;
4. raising or keeping equine animals;
5. wildlife management; and

6. planting cover crops, including cover crops cultivated for transplantation, or leaving land idle for the purpose of participating in any governmental program or normal crop or livestock rotation procedure.
- B.** Agricultural use: Any use or activity involving agriculture, including irrigation.
- C.** Best management practices: Voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and that can be implemented within a specific time frame.
- D.** Conservation: Those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses.
- E.** Commercial use: The use of water by a place of business, such as a hotel, restaurant, or office building. This does not include multi-family residences or agricultural, industrial, or institutional users.
- F.** Drought contingency plan: A strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies. A drought contingency plan may be a separate document identified as such or may be contained within another water management document(s).
- G.** Industrial use: The use of water in processes designed to convert materials of a lower order of value into forms having greater usability and commercial value, and the development of power by means other than hydroelectric, but does not include agricultural use.
- H.** Institutional use: The use of water by an establishment dedicated to public service, such as a school, university, church, hospital, nursing home, prison or government facility. All facilities dedicated to public service are considered institutional regardless of ownership.
- I.** Irrigation: The agricultural use of water for the irrigation of crops, trees, and pastureland, including, but not limited to, golf courses and parks which do not receive water from a public water supplier.
- J.** Irrigation water use efficiency: The percentage of that amount of irrigation water which is beneficially used by agriculture crops or other vegetation relative to the amount of water diverted from the source(s) of supply. Beneficial uses of water for irrigation purposes include, but are not limited to, evapotranspiration needs for vegetative maintenance and growth, salinity management, and leaching requirements associated with irrigation.

- K.** Mining use: The use of water for mining processes including hydraulic use, drilling, washing sand and gravel, and oil field re-pressuring.
- L.** Municipal use: The use of potable water provided by a public water supplier as well as the use of sewage effluent for residential, commercial, industrial, agricultural, institutional, and wholesale uses.
- M.** Nursery grower: A person engaged in the practice of floriculture, viticulture, silviculture, and horticulture, including the cultivation of plants in containers or nonsoil media, who grows more than 50% of the products that the person either sells or leases, regardless of the variety sold, leased, or grown. For the purpose of this definition, grow means the actual cultivation or propagation of the product beyond the mere holding or maintaining of the item prior to sale or lease, and typically includes activities associated with the production or multiplying of stock such as the development of new plants from cuttings, grafts, plugs, or seedlings.
- N.** Pollution: The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to the public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.
- O.** Public water supplier: An individual or entity that supplies water to the public for human consumption.
- P.** Residential use: The use of water that is billed to single and multi-family residences, which applies to indoor and outdoor uses.
- Q.** Residential gallons per capita per day: The total gallons sold for residential use by a public water supplier divided by the residential population served and then divided by the number of days in the year.
- R.** Regional water planning group: A group established by the Texas Water Development Board to prepare a regional water plan under Texas Water Code §16.053.
- S.** Retail public water supplier: An individual or entity that for compensation supplies water to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants when that water is not resold to or used by others.
- T.** Reuse: The authorized use for one or more beneficial purposes of use of water that remains unconsumed after the water is used for the original purpose of use and before that water is either disposed of or discharged or otherwise allowed to flow into a watercourse, lake, or other body of state-owned water.

- U.** Total use: The volume of raw or potable water provided by a public water supplier to billed customer sectors or nonrevenue uses and the volume lost during conveyance, treatment, or transmission of that water.
- V.** Total gallons per capita per day (GPCD): The total amount of water diverted and/or pumped for potable use divided by the total permanent population divided by the days of the year. Diversion volumes of reuse as defined in 30 TAC Section 288.1 shall be credited against total diversion volumes for the purposes of calculating GPCD for targets and goals.
- W.** Water conservation plan: A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management document(s).
- X.** Wholesale public water supplier: An individual or entity that for compensation supplies water to another for resale to the public for human consumption. The term does not include an individual or entity that supplies water to itself or its employees or tenants as an incident of that employee service or tenancy when that water is not resold to or used by others, or an individual or entity that conveys water to another individual or entity but does not own the right to the water which is conveyed, whether or not for a delivery fee.
- Y.** Wholesale use: Water sold from one entity or public water supplier to other retail water purveyors for resale to individual customers.

Section III. Utility Profile Summary

The City supplies treated potable water to municipal, industrial, agricultural and wholesale users. The City holds Certificate of Convenience and Necessity (CCN) Number 10242. City municipal and industrial and agricultural use customers are located within City CCN area encompassing approximately 58 square miles as depicted in the service area map in Appendix A. The Upper Colorado River Authority (UCRA) is a wholesale water provider in Tom Green County and has an agreement with the City of San Angelo for San Angelo to treat up to 1,000 acre-feet per year of water from any of City sources in return for water from O.C. Fisher. The City of Miles and local rural water supply corporations in Tom Green and Concho Counties contract with UCRA to provide treated water which is transmitted through either City or the retail customer's systems. A more detailed utility profile is included in Appendix B. The utility profile is summarized as follows.

A. Population

City population in the year 2023 as estimated using information supplied by the Texas Water Development Board (TWDB) for the 2021 Regional Water Plan is estimated to be 106,677 persons in 2024 and is projected to reach 116,437 by 2030.

Table 1 provides population figures for the City of San Angelo for the previous five years.

Table 1: Population for City of San Angelo for Preceding Five Years

Year	San Angelo Population
2019	99,224
2020	99,893
2021	101,547
2022	103,229
2023	104,939
Source: US Census Data and 2021 Regional Water Plan	

Table 2 depicts projected population figures for San Angelo through the year 2070.

Table 2: Projected Population for City of San Angelo

Year	San Angelo Population
2030	116,437
2040	123,653
2050	131,315
2060	139,451
2070	148,090
Source: 2021 Regional Water Plan	

B. Customer Data and Water Use Data

On average, the City diverts approximately 15,365 acre-feet per year of raw water from its water sources to satisfy the demands of water users.

City water customers consist of a mixture of residential, commercial, industrial, wholesale, institutional and irrigation users. The City serves approximately 41,917 residential connections, 2,906 commercial connections, 473 institutional connections, and 61 industrial connections.

Treated wastewater discharged from the City's wastewater treatment plant is utilized by agricultural customers for agricultural and irrigation use.

Table 3 summarizes the expected water use figures for San Angelo municipal wholesale users over the next decade.

Table 3: Projected Water Demand for the Coming Decade

Year	San Angelo Population	San Angelo Demand (gal/yr)
2025	108,444	5,628,934,707
2026	110,240	5,784,198,387
2027	112,065	5,939,462,067
2028	113,921	6,094,725,747
2029	115,808	6,249,989,427
2030	116,437	6,405,253,107
2031	117,159	6,432,526,836
2032	117,885	6,459,800,564
2033	118,615	6,487,074,293
2034	119,350	6,514,348,022
Source: 2021 Regional Water Plan		

C. Water Supply System

1. Water Sources

The City holds numerous surface water rights in the Concho River Basin and has also contracted for surface water from other sources. Currently, the City can obtain surface water from six sources: Twin Buttes Reservoir, Lake Nasworthy, O.C. Fisher Lake, O.H. Ivie Reservoir, E.V. Spence Reservoir, and direct diversions from the South Concho River and the Concho River main stem.

The City holds water rights for up to approximately 124,688 ac-ft/yr of surface water for municipal uses. However, these water supplies are not fully reliable; during drought-of-record conditions, there will be little water available from many of these supplies. It is projected by the Region F Water planning Group that in 2030 surface water supplies available to the City will provide a safe yield of approximately 5,706 acre-feet per year.

In addition to surface water, the City also own groundwater rights in the Hickory Aquifer. The City's Hickory wellfield consists of 15 wells located in McCulloch County and transmission facilities to transport the water 62 miles to the City's Groundwater Treatment Facility (GWTF) and are capable of providing an additional 12,000 acre-feet/year of treated groundwater.

As part of an agreement with the Upper Colorado River Authority (UCRA), San Angelo treats up to 1,000 acre-feet per year water for customers of UCRA. The water delivered from the City of San Angelo treatment works are provided under UCRA water rights.

2. Water Treatment

Historically, San Angelo has relied upon its surface water sources to produce potable water. Surface water is treated at the City's conventional treatment plant located along the South Concho River, east of Metcalfe Street between East Avenue K and East Avenue H. The City's surface water treatment plant is aging, with many of the treatment process units dating back to the 1950's. With the development of the Hickory Aquifer, San Angelo constructed a groundwater treatment facility, co-located with the Surface Water Treatment Plant (SWTP), that was brought online in 2015.

Currently, the City is expanding its production of groundwater from the Hickory Aquifer which includes a corresponding expansion of the GWTF treatment capabilities.

A majority of the drinking water for the San Angelo service area originates from surface water treated at the SWTP. The SWTP utilizes a conventional treatment process that consists of coagulation, flocculation, sedimentation, and filtration followed by disinfection prior to entering the City's water distribution system. The existing SWTP is rated for approximately 42 MGD and covers nearly 20 acres.

Initially, raw surface water is pumped to the SWTP and dosed with a blended coagulant (aluminum sulfate and polymer) in any one of three rapid mix basins. Following coagulant addition, the water can be transferred to as many as five flocculation trains, each with a separate downstream sedimentation clarifier to settle the flocculated particles. The sludge from the clarifiers flows to a sludge lagoon, and the clarified water advances to filtration. The filtration equipment consists of 15 dual-media, gravity filters. Effluent from the filters flows into two intermediate clearwell storage tanks before being combined into a single large clearwell (Clearwell No. 3). Just before being combined in Clearwell No. 3, the filtered water is disinfected with chlorine followed by liquid ammonium sulfate (LAS) for continued disinfection via chloramination.

The GWTF is located adjacent to the SWTP on the south side of the property and currently treats water from 15 wells in the Hickory Aquifer. The wellfield is located approximately 62 miles southeast of the GWTF in McCulloch County (approximately 10 miles south of Melvin, TX). Water from the wellfield is pumped to the GWTF through a 30-inch transmission water line. Once at the plant, iron is first removed from the raw water via oxidative precipitation and subsequent filtration. Thereafter, the water is treated using ion exchange media to remove radionuclides such as Radium 226/228 and Gross Alpha/Beta. The water is subsequently disinfected using chlorine followed by the addition of LAS to promote further disinfection via chloramination. Finally, treated water from the GWTF is blended with

water from the SWTP

before entering the City's distribution system. Treated groundwater from the GWTF is also blended with the treated surface water in Clearwell No. 3. Finally, the combined waters are pumped into the distribution system using two high service pump stations.

3. Water Distribution

The City's water distribution system provides facilities that are capable of furnishing sufficient water at suitable pressures to San Angelo water customers. The system consists of underground water mains, pumping stations, ground storage tanks, elevated storage tanks, valves, fire hydrants, and approximately 45,000 customer water meters.

After the water is processed at the treatment plants, it is stored in ground and elevated storage tanks with a combined volume of 17.60 million gallons. The distribution network is laid out in a continuous looped system to circulate water and maintain constant system pressure. Pumping stations are located strategically throughout the system to pump water, maintain uniform pressure and maintain storage tank levels.

D. Wastewater System

1. Wastewater Collection

City wastewater collection system consists of a network of sewer mains, lift stations, and manholes serving San Angelo sewer customers. Sewage flows by gravity, aided when necessary by lift stations, through the collection system to the City's Wastewater Reclamation Facility (WRF) which is operated under a permit issued by the TCEQ.

2. Wastewater Treatment

Raw wastewater from the City's collection system enters the WRF at the raw wastewater lift station which pumps wastewater to the headworks structure. The headworks structure contains multiple treatment processes including coarse bar screens, fine screens, and a grit removal system. Wastewater then enters one of the four primary clarifiers before flowing into the aeration basins for further treatment. The WRF has two aeration basins, each containing more than 3,000 ceramic fine bubble diffusers. After secondary treatment in the aeration basins, the wastewater is then sent to one of the four final clarifiers, which allows activated sludge from the aeration basins to be removed. After final clarification, the final effluent passes through a chlorine contact basin, though no chlorine is added since the effluent is all land applied. Following the chlorine contact basin, the final effluent pump station transfers all effluent to the effluent storage reservoirs.

north of the WRF. From the storage reservoirs, the reclaimed water is either pumped to the Tom Green County Water Control and Improvement District #1 or is land applied at the City Farm adjacent to the WRF.

Sludge produced from the different treatment units is collected and sent through thickening, stabilization, and dewatering processes. Dewatered cake from the belt filter presses is sent to disposal.

Wastewater quality is protected against industrial pollution through City Industrial Pre-Treatment Program. Industrial users are required to treat wastewater to specific standards before it is released into the municipal sanitary sewer system.

Section IV. Water Conservation Goals

The 5- and 10-year goals (also referred to as targets) for total per capita water use by City users is to maintain per capita water use at or below 123 gallons per capita per day (gpcd) by the end of 2029, and at or below 122 gpcd by the end of 2034. The 5- and 10-year goal for residential per capita water use by City users is to maintain residential per capita water use at or below 69 gpcd by the end of 2029 and 68 gpcd by the end of 2034. The 5- and 10-year per capita water loss goal is to maintain per capita water loss at less than 20 gpcd by the end of 2029 and 18 gpcd by the end of 2034. These goals are set in accordance with the 2021 Regional Water Plan and City records.

Section V. Metering Devices

It is City policy to purchase meters that meet at least the minimum standards developed by the American Water Works Association. All metering devices used to meter water diverted from the source of supply are accurate to within plus or minus 5% to measure and account for water diverted from the source of supply. All service connections in the distribution system are metered. Meters are systematically tested and replaced, if necessary, to assure reliability of meter performance. The City has established the following meter maintenance and replacement programs:

<u>Meter Type</u>	<u>Calibration Period and Replacement</u>
Master Meters	Annually and replaced, as needed
1-1/2 inch and larger	Replaced as needed ^{1,2}
1-1/2 inch and smaller	Replaced as needed ^{1,2}

Notes ¹ Representative meter samples are tested annually to verify meter accuracy.

² Meters are replaced as necessary.

The wholesale water purchasers are responsible for metering device installation, maintenance and calibration for meters located within their service areas.

Section VI. Universal Metering

It is City policy to individually meter all water usage, except for fire protection and flushing to maintain a safe potable water distribution system, including all new construction within the City's CCN coverage area. Combined with an aggressive leak detection and repair program, electronic data collection devices, and a computerized billing system, City universal metering program has resulted in a water delivery accuracy rate within industry operating standards and comports with industry accepted practices.

Section VII. Measures to Determine and Control Unaccounted-For Uses of Water

The record management system utilized by the City segregates water sales and users into user classes of single-family residential, multi-family residential, commercial, public/institutional, and industrial. It is City policy to investigate customer complaints of low pressure and possible leaks. The City visually inspects suspected leaks and makes quick and timely repairs to those leaks when detected. The City utilizes a record management system which records water pumped, water delivered, water sales and water losses to track water transmission, distribution, and delivery to customers. Customer delivery is segregated by user class. This information is used to evaluate the integrity of the water delivery system from source to end user to control and minimize unaccounted-for uses of water.

Section VIII. Water Conservation Program

The City's Water Conservation Program utilizes Supply Management Methods and Demand Management Methods to work towards optimizing use of City water resources.

A. Supply Management Program Elements consist of:

1. Coordinated use of water supplies to ensure the City withdraws water from its water supply reservoirs in a manner that ensures optimum dependable yield and efficiency of operation.
2. Watershed management to ensure diversion channels, creeks, natural drainage ways, etc. discharging to local reservoirs are clean, relatively straight, and obstruction-free to increase captured water flow while minimizing flooding potential in populated areas and reducing siltation entering local reservoirs.
3. Metering all service connections to ensure maximum return for delivered water while minimizing unaccounted-for water loss.
4. Leak detection and repair to minimize unaccounted-for water loss.
5. Treated wastewater reuse and recycling to lessen the demand for raw water used to produce water for irrigation uses.

B. Demand Management Program Elements consist of:

1. Water pricing as a mechanism for encouraging water customers to conserve.
2. Regulations for conserving water via the Water Conservation Plan and the Drought Contingency Plan ordinance adopted by the City.
3. Plumbing Code for the City requires maximum standard plumbing fixture capacities not be exceeded.
4. Continuing education programs to increase public awareness of supply, treatment and conveyance systems in the City, to increase public awareness of the benefits and need for conservation, and to make information about practical cost-effective methods and technologies to achieve conservation available.
5. The City utilizes water conservation measures to restrict certain potable water use activities by all customers of the Water Utility System. Pursuant to this measure all potable water irrigation by commercial, industrial and residential customers utilizing individual sprinklers, or sprinkler systems, on lawns, gardens, landscaped areas, trees, shrubs or other plants may water only on designated day(s) and then only during designated hours as outlined in the City's Drought Contingency Plan ordinance.

Section IX. Public Education

Public education is an ongoing and integral part of City water conservation programs. A public information and education program developed and implemented by the City is an important component in the City's water conservation strategy. Water Utilities education programs have these principal objectives including:

- Increase public awareness of supply, treatment, and conveyance systems in the City, and
- Increase public awareness of the needs for and benefits of conservation.

A variety of communication techniques either have or are being utilized including: electronic information materials via City internet website; newspaper supplements; presentations at neighborhood, civic, social, and professional organizations; public service announcements; and public school and university programs.

Section X. Water Rate Structure

The City has adopted a non-promotional, inverted rate structure. Under this rate structure the billing rate increases as individual water consumption increases. This rate structure promotes conservation and shifts the cost of supplying water to those consumers using it most. A copy of the City's current water rates is provided in Appendix G.

Section XI. Means of Implementation and Enforcement

This Water Conservation Plan (Plan) has been adopted by the City. A copy of the resolution adopting this Plan is included in Appendix E. The City Manager works with the Director of Water Utilities in the implementation and enforcement of the Plan, and in the City's submission of its annual water conservation implementation report. This report is used by the City to review the effectiveness of its water conservation program.

The Director of Water Utilities designates a member of the Water Utilities Department staff as a Conservation Coordinator. The Conservation Coordinator is responsible for implementation and coordination of water conservation programs.

To support the City's Water Conservation Plan and water conservation efforts, the City maintains a Drought Contingency Plan Ordinance (see City of San Angelo Municipal Code Chapter 11, Article 11.05). This ordinance provides water conservation measures during times of water shortage or other emergency water supply conditions. The ordinance provides for enforcement of ordinance violations.

A. Enforcement Within City CCN Area

The Plan is enforced within the City's CCN coverage area by providing service taps only to customers complying with adopted ordinances, maintaining a non-declining rate structure, discontinuing service to those customers who do not pay their water bills until payment is made, and verifying new construction conforms to adopted ordinances and plumbing codes.

B. Enforcement for City Wholesale Purchasers

Wholesale customers receive written notification of Plan adoption and any subsequent Amendments. Adoption of this Plan by the City per 30 Texas Administrative Code (TAC) §288.5 obligates wholesale customers as defined in 30 TAC §288.1 to implement water conservation measures. A copy of the notification letter to wholesale users has been included in Appendix F. The City makes best efforts to ensure implementation and enforcement of the Plan by wholesale users via these contractual requirements and outreach efforts.

Section XII. Additional Wholesale Water Contract Requirements

It is City policy to include in every wholesale water supply contract entered into or renewed after official adoption of the Plan, including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using applicable elements in 30 TAC Chapter 288. If the wholesale customer intends to resell the water, then the contract between the City and the wholesale customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with 30 TAC Chapter 288.

Section XIII. Coordination with Regional Water Planning Group

All of the customers served by the City are located within the Region F Water Planning Area. The City has provided a copy of this Plan to the Regional Water Planning Group.

Section XIV. Revisions to the Water Conservation Plan

The City will review and update this water conservation plan, as appropriate, based on new or updated information. As a minimum the Plan will be updated every five (5) years.

Section XV. Severability

It is City intention that the sections, paragraphs, sentences, clauses, and phrases of this Plan are severable. If, any phrase, clause, sentence, paragraph or section shall be declared unconstitutional by a valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs or sections of this Plan, since the same would not have been enacted by the City without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph or section.

**CODE OF ORDINANCES
CHAPTER 11 UTILITIES**

ARTICLE 11.05 WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

Sec. 11.05.001 Purpose

The purpose of the water conservation and drought contingency plan is to encourage water conservation at all times and to establish a procedure for identifying, classifying and handling a water supply and/or a water demand emergency effectively and efficiently.

(Ordinance adopted 2-7-12)

Sec. 11.05.002 Water conservation measures

The city will utilize the following strategies to encourage, promote and require citizens to conserve water at all times.

- 1) *Conservation plan.* The "City of San Angelo Water Conservation Plan," as adopted by Council, on file in the office of the city clerk, and available for public inspection, is adopted and incorporated herein.
 - a. *Implementation.* The director of water utilities will act as the administrator of the water conservation plan. The administrator will oversee the execution and implementation of all elements of the program and will be responsible for supervising the promulgation and retention of records for program verification.
- 2) *Plumbing code.* The city plumbing code has provision for water-conserving plumbing devices. The city will enforce the requirements of the code to ensure the use of water-saving devices.
- 3) *Universal metering.* All users of municipal treated water, except for fire sprinkler lines, will be metered.
- 4) *Water supply meters.* The city metering devices will record water use with an accuracy of plus or minus five percent in order to measure and account for the amount of raw water diverted from the source of supply.
- 5) *Restaurants.* Restaurants shall not serve water to their customers except when specifically requested by the customer.
- 6) *Waste of water.* As defined below, shall be prohibited.
 - a. Allowing treated or raw city water, greywater, reclaimed water or well water to run off property to a gutter, street, alley, ditch or drainage facility and drain for more than 150 feet downgrade of the point of entry into such gutter, street, alley, ditch or drainage facility.

- b. Failure to repair a controllable leak.
- 7) *Prohibited watering hours.* The use of treated or raw city water, greywater or reclaimed water for watering lawns, gardens, landscape areas, trees, golf courses, shrubs or other plants being grown outdoors (not in a nursery) shall be prohibited between the hours of 12:00 noon and 6:00 p.m. daily from April 1 through October 31.
 - 8) *Watering frequency.* The use of treated or raw city water, greywater or reclaimed water for watering lawns, landscape areas, trees, gardens, golf courses (except greens), shrubs or other plants being grown outdoors (not in a nursery) shall be allowed at a frequency of twice every seven days during the period of April 1 through October 31 and once every seven days during the period of November 1 through March 31. Golf course greens may be watered once per day year-round.
 - 9) *New landscape.* Watering of newly seeded or sodded lawns or newly planted trees, shrubs or landscape plants will be allowed at the following frequency provided written notification is given to the city code compliance division or water conservation division of the watering schedule:
 - a. Days 1—14 from planting: three times per day every day of such period at any time of day.
 - b. Days 15—28 from planting: twice per day every day of such period at any time of day.
 - 10) *Allowable application rates.* The maximum amount of treated or raw city water, greywater or reclaimed water applied to established lawns, landscape plants, golf courses (except greens) or shrubs shall not exceed one inch per week.
 - 11) *Drip irrigation.* Landscape or foundation watering with a drip irrigation system such as a soaker hose, deep root watering system, drip pipe or tape, or bubbler shall be permitted on any day and at any time of day provided that the total amount of water applied shall not exceed one inch per week. For the purpose of this article, drip irrigation shall mean a water-saving irrigation system designed to emit water at low volumes and low pressures directly onto or below the soil surface without airborne streams or droplets.
 - 12) *Hand watering.* Hand watering of lawns, gardens, landscape areas, trees, shrubs or other plants being grown outdoors or foundations may be done on any day, except during the prohibited watering hours, provided the allowable application rate is not exceeded. Hand watering shall be watering with a hose that is hand-held for the duration of the irrigation event, or watering with a container of five gallons or less.
 - 13) *Excessive usage of water.* Excessive usage of water as defined below shall be prohibited and shall be a violation of the water conservation and drought contingency plan:
 - a. Any use of water by a customer in excess of the maximum allowable application rates under subsection (10) above.

- 14) Contracts with other political subdivisions, water supply corporations or water suppliers. Any political subdivision, water supply corporation, or water supplier that contracts with the city for the purchase of water shall adopt applicable provisions of the city's water conservation and drought contingency plan. Contracts for the sale of water that are already in effect will be revised to reflect the applicable provisions of the city's most current water conservation and drought contingency plan when the contracts are renewed or extended. To the extent of the city's legal authority, the city shall require the city's wholesale customers to issue a public notice advising their water customers of required drought management measures declared in the city as follows in section 11.05.003.
- a. In the event that the triggering criteria specified in section 11.05.003(f) of the plan for Water Supply Stage - Drought Level III have been met, the city manager is hereby authorized to initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code section 11.039 and according to the following water allocation policies and procedures.
 - b. A wholesale customer's monthly allocation shall be a percentage of the customer's water usage baseline. The percentage will be set by resolution of the city council based on the administrator's assessment of the severity of the water shortage condition and the need to curtail water diversions and/or deliveries and may be adjusted periodically by resolution of the city council as conditions warrant. Once pro rata allocation is in effect, water diversions by or deliveries to each wholesale customer shall be limited to the allocation established for each month.
 - c. Upon initiation of pro rata water allocation, the water utility director shall provide notice, by certified mail, to each wholesale customer informing them of their monthly water usage allocations and shall notify the news media and the executive director of the state commission on environmental quality.
- 15) Water demand emergency. In the event the quantity of water usage from the city's water distribution system reaches a level that exceeds the amount which may be treated or safely delivered through the system, the water utilities director shall notify the city manager and the city council of such an occurrence. The city council shall be authorized to limit the use of water by passage of a resolution outlining such limitations, which shall remain in effect until the water demand emergency can be met. Upon initiation of a water demand emergency, the water utility director shall provide notice, by certified mail, to the executive director of the state commission on environmental quality and shall notify the news media.
- 16) Water supply emergency. In the event of a water system failure or emergency (i.e., pressure zone deficiencies, chemical spills, broken water mains, power outages, failures of storage tanks or other equipment, treatment plant breakdown and/or water contamination) which limits the amount of water which may be treated or safely delivered through the system, the water utilities director shall notify the city manager and city council of such occurrence. The city council shall be authorized to limit the use of water by passage of a resolution outlining such limitations, which shall remain in effect until the water supply emergency can be met. Upon initiation of a water supply emergency, the water utility director shall provide notice, by certified mail, to the executive director of the state commission on environmental quality

and shall notify the news media.

- 17) *Public information.* The water utilities director will provide regular public education and information about the importance of year-round water efficiency as delineated in the plan, and will provide general information about water supply conditions and drought plan provisions on at least an annual basis. The purpose of this effort shall be to keep the citizenry informed about the drought and conservation plans and their importance to the city's water supply.

(Ordinance adopted 2-7-12; Ordinance adopted 2-21-12, § 1; Ordinance adopted 5-6-14; Ordinance adopted 11-4-14; Ordinance adopted 5-3-16, § 1; Ord. No. 2019-056 , § 1, 5-7-19)

Sec. 11.05.003 Drought stages and water management measures

- a) *Water supply sources.* The city has several water supply sources that it can draw upon to meet its needs. Local surface water sources include Lake Nasworthy, Twin Buttes Reservoir, O.C. Fisher Reservoir and the South Concho River. Nonlocal surface water supplies are available to the city from O.H. Ivie Reservoir and Spence Reservoir. The city has a groundwater source in the Hickory Aquifer. When local reservoirs are full, the city's primary water supply will be from these reservoirs along with nonlocal or groundwater sources as needed. When local reservoirs are below full but above drought trigger points, the local sources may be utilized along with water brought in from nonlocal sources or groundwater sources. During drought conditions, the primary source of supply will be nonlocal sources, subject to the maximum amount available from each source, with the remaining amount of water coming from the local sources or groundwater sources that the city may develop.
- b) *Drought trigger point.* Whenever the total amount of water available to the city falls below the minimum criteria established for each water supply stage level, the city shall be deemed to have entered a drought stage for management of its water supplies. The water utilities director shall notify the city manager and city council upon entering the threshold of a drought stage. The council shall implement each stage by resolution. A notice of such resolution shall be published one time in the local newspaper. The criteria for each stage and the water management measures which shall be enforced are as follows in subsections d) to f).
- c) *Public information.* The water utilities director will provide reports to the news media with information regarding current water supply conditions, projected water supply and demand conditions if the current drought conditions continue, and consumer information on water conservation measures and practices. Information describing each water supply stage trigger point and drought level restrictions on water use shall be prepared and published on the city's website.
- d) *Water supply stage - Drought Level I.*
 - 1) The minimum criteria for this drought stage shall be the following: The required minimum daily groundwater production coupled with the total amount of surface water available, as determined by the water utilities director, to the city from its developed water sources is less than a 24-month supply.

- 2) In addition to the conservation measures stated in section 11.05.002 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level I.
 - i. The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times; provided, however, a person may do such watering which shall be once every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March 31 except during the "prohibited watering hours" as stated in section 11.05.002.
 - ii. Golf courses greens may be watered daily except during the "prohibited watering hours" as stated in section 11.05.002.
 - iii. Watering of "new landscape" shall be allowed in accordance with the provisions as stated in section 11.05.002 for "new landscape."
- 3) A multiplier shall be assessed to the volumetric water fees as set forth in section A8.002(a)(7) of this code.

e) Water supply stage - Drought Level II.

- 1) The minimum criteria for this drought stage shall be the following: The required minimum daily groundwater production coupled with the total amount of surface water available, as determined by the water utilities director, to the city from its developed water sources is less than an 18-month supply.
- 2) In addition to the conservation measures stated in section 11.05.002 of this article, the following additional water conservation measures shall be in force during Water Supply Stage - Drought Level II:
 - i. The use of treated or raw city water for watering lawns, gardens, landscape areas, trees, shrubs, golf courses (except greens) or other plants being grown outdoors (not in a nursery) shall be prohibited at all times; provided, however, a person may do such watering which shall be once every seven days during the period of April 1 through October 31 and once every 14 days during the period of November 1 through March 31 except during the "prohibited watering hours" as stated in section 11.05.002.
 - ii. Golf course greens may be watered daily except during the "prohibited watering hours" as stated in section 11.05.002.
 - iii. Watering of "new landscape" shall not be allowed as stated in section 11.05.002 for "new landscape."

- 3) A multiplier shall be assessed to the volumetric water fees as set forth in section A8.002(a)(7) of this code.

f) *Water supply stage - Drought Level III.*

- 1) The minimum criteria for this drought stage shall be the following: The required minimum daily groundwater production coupled with the total amount of surface water available, as determined by the water utilities director, to the city from its developed water sources is less than a 12-month supply.
- 2) In addition to the water conservation measures stated in section 11.05.002 of this article, the following water conservation measures shall be in force during Water Supply Stage - Drought Level III:
 - i. The use of treated or raw city water for watering of lawns, gardens, landscape areas, golf courses (including greens), shrubs or other plants being grown outdoors is prohibited. Hand watering or drip irrigation of trees and foundations may be done on days and at times as established by the city council.
 - ii. The use of treated or raw city water to fill, refill or maintain the level of any fountain or swimming pool is prohibited.
 - iii. Washing of automobiles, trucks, trailers, boats, or other types of vehicles or mobile equipment is prohibited except, if the health, safety and welfare of the public is contingent upon vehicle cleaning, as determined by the director of city health services, then the washing of such vehicles shall be allowed.
- 3) A multiplier shall be assessed to the volumetric water fees as set forth in section A8.002(a)(7) of this code.

(Ordinance adopted 2-7-12; Ordinance adopted 2-21-12, § 2; Ordinance adopted 8-6-13; Ordinance adopted 5-3-16, § 1; Ordinance adopted 8-2-16)

Sec. 11.05.004 Exceptions and variances

- a) *Authority of city council.* The city council may allow exceptions to any of the provisions of this article. The council may place conditions on any exception.
- b) *Exceptions to watering restrictions.* There shall be an exception to the prohibitions of this article regarding watering restrictions:
 - 1) Use of water for installing, testing and repairing sprinkler systems.
 - 2) Watering frequency and schedules for public parks, athletic facilities, schools, colleges and cemeteries shall be as approved by the city council.

c) *Variances.*

- 1) A person desiring an exemption from any provision of this article shall file a petition for variance with the city manager. All petitions for variances shall be reviewed and acted upon by the city council. The petition shall include at a minimum the following information:
 - i. Name and address of the petitioner(s).
 - ii. Purpose and estimated amount of water use.
 - iii. Specific provision(s) of this article from which the petitioner is requesting an exemption.
 - iv. Detailed statement as to how the specific provision of this article adversely affects the petitioner or what damage or harm will occur to the petitioner or others if the petitioner complies with this article.
 - v. Description of the relief requested.
 - vi. Period of time for which the variance is sought.
 - vii. Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this article and the effective date of such other measures.
 - viii. Other pertinent information.
 - ix. A statement that petitioner has not within the last six months intentionally violated the current ordinance for which a variance is sought or, if such violations have occurred, a statement setting out all reasons why such ordinance was violated.
- 2) The city council may grant a variance from the requirements of this article after determining that, because of special circumstances applicable to the applicant, compliance with this article:
 - i. Cannot be technically accomplished during the expected duration of the water supply shortage or other condition for which this article is in effect;
 - ii. Will cause undue hardship on a program or service offered by a public entity; or
 - iii. Substantially threatens the applicant's primary source of income.
- 3) Additionally, the city council may grant a variance from the requirements of this article if it determines that the applicant can implement alternative water use restrictions which meet or exceed the intent of this article. The city council shall approve specific alternative water use restrictions.

- 4) Any variance granted by the city council may be revoked after a determination by the city council that revocation is necessary for the public health and safety or upon a finding that the holder of a variance allowing alternative water use restrictions has not complied with such alternative restrictions.

(Ordinance adopted 2-7-12; Ordinance adopted 9-27-12)

Sec. 11.05.005 Implementation and service restrictions

a) *Implementation.*

- 1) The water utilities director for the city will act as the administrator of the water conservation drought contingency plan. The administrator will oversee the execution and implementation of all elements of the program. The administrator will be responsible for supervising the promulgation and retention of adequate records for program verification.
- 2) The water conservation plan will be maintained for the duration of the city's financial obligation to the state under the state revolving loan fund program.

b) *Contracts with other political subdivisions, water supply corporations or water suppliers.* Any political subdivision, water supply corporation, or water supplier that contracts with the city for the purchase of water shall adopt applicable provisions of the city's water conservation and drought contingency plan. Contracts for the sale of water that are already in effect will be revised to reflect the applicable provisions of the city's most current water conservation and drought contingency plan when the contracts are renewed.

c) *Service restrictions.* The water conservation and drought contingency plan shall be enforced by the following service restrictions:

- 1) Water service taps will not be provided to customers not meeting the plan requirements.
- 2) The inclining block water rate structure should encourage retrofitting of old plumbing fixtures which use large quantities of water.
- 3) Customers who do not pay their water bills shall be subject to discontinuance or disconnection of service.
- 4) The building inspection department will not certify new construction which fails to meet the plan requirements.

(Ordinance adopted 2-7-12)

Sec. 11.05.006 Enforcement

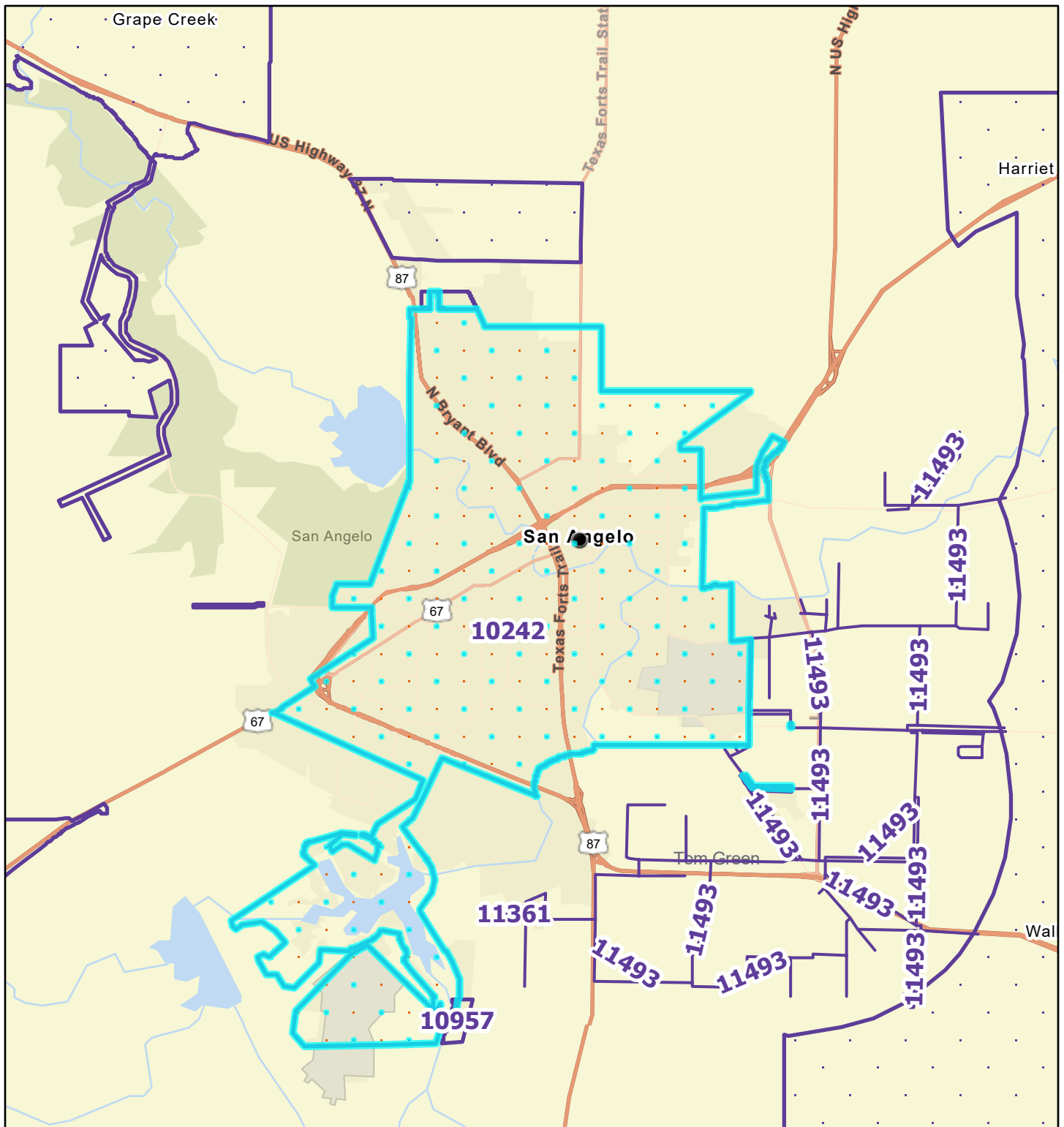
- a) Violations of any provisions of the water conservation and drought contingency plan may be enforced as follows:
- 1) *First violation.* Any person or entity as defined under this chapter may be given a verbal or written warning.
 - 2) *Second and subsequent violations.*
 - i. Violation of any provision of the water conservation and drought contingency plan constitutes a class C misdemeanor offense for which a citation may be issued.
 - ii. Second and subsequent violations shall be punishable by a maximum fine of up to \$2,000.00 per day per violation as provided by section 1.01.009 of the Code of Ordinances of the city.
 - iii. Proof of a culpable mental state is not required for a conviction of an offense under this section. Each day any person or entity fails to comply with the water conservation and drought contingency plan is a separate violation.
 - 3) *Third and subsequent violations.* For third and subsequent violations of the water conservation and drought contingency plan, the water utilities director shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued or disconnected under such circumstances shall be restored only upon payment of charges as provided for in article 11.02, division 2.
- b) Compliance with any provision of the water conservation and drought contingency plan may be enforced by civil court action as provided by state and federal law.

(Ordinance adopted 2-7-12)

Appendix A

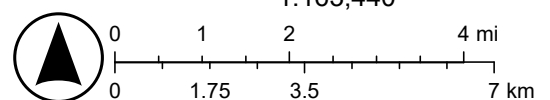
Service Area Map

City of San Angelo Water Service Area (CCN 10242)



4/20/2024, 2:56:42 PM

- Water CCN Facility Lines
- Water CCN Service Areas
- Sewer CCN Service Areas



Texas Parks & Wildlife, CONANP, Esri, TomTom, Garmin, SafeGraph, METI/
NASA, USGS, EPA, NPS, USDA, USFWS

Appendix B

Utility Profile for Retail Water Supplier

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

CONTACT INFORMATION

Name of Utility: CITY OF SAN ANGELO

Public Water Supply Identification Number (PWS ID): TX2260001

Certificate of Convenience and Necessity (CCN) Number: 10242

Surface Water Right ID Number: 88, 407, 457, 1191, 1266, 1298-B, 1318-D, 1319-C, 1323, 1325-A, 1326, 1333-A, 1337-A, 1348-B, 1357-A, 1401, 2311

Wastewater ID Number: 20097

Contact: First Name: Shane Last Name: Kelton

Title: Water Utilities Director

Address: 301 W. Beauregard City: San Angelo State: TX

Zip Code: 76903 Zip+4: Email: shane.kelton.cosatx.us

Telephone Number: 3256574209 Date:

Is this person the designated Conservation Coordinator? ☐ Yes ☒ No

Coordinator: First Name: Maria Last Name: Padilla

Title: Water Conservation Coordinator

Address: 301 W. Beauregard City: San Angelo Zip Code: 76903

Email: maria.padilla@cosatx.us Telephone Number: 325-657-4330

Regional Water Planning Group: F

Groundwater Conservation District:

Our records indicate that you:

- ☒ Received financial assistance of \$500,000 or more from TWDB
- ☒ Have 3,300 or more retail connections
- ☒ Have a surface water right with TCEQ

A. Population and Service Area Data

1. Current service area size in square miles: 60

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Attached file(s):

File Name	File Description
City of San Angelo Water Service Area.pdf	

2. Historical service area population for the previous five years, starting with the most current year.

Year	Historical Population Served By Retail Water Service	Historical Population Served By Wholesale Water Service	Historical Population Served By Wastewater Water Service
2023	107,252	7,791	94,918
2022	101,004	5,850	93,720
2021	101,400	4,425	92,537
2020	101,004	4,225	91,370
2019	100,215	1,200	88,690

3. Projected service area population for the following decades.

Year	Projected Population Served By Retail Water Service	Projected Population Served By Wholesale Water Service	Projected Population Served By Wastewater Water Service
2030	103,937	8,126	103,046
2040	112,120	8,393	109,432
2050	119,305	8,666	116,213
2060	126,371	8,940	123,414
2070	134,086	9,215	131,059

4. Described source(s)/method(s) for estimating current and projected populations.

Population figures are taken from the Texas Water Development Board Water User Group Database

Attached file(s):

File Name	File Description
Wholesale User Population pop_WUG_Search (20240131).pdf	
City of San Angelo pop_WUG_Search (20240131).pdf	

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

B. System Input

System input data for the previous five years.

Total System Input = Self-supplied + Imported– Exported

Year	Water Produced in Gallons	Purchased/Imported Water in Gallons	Exported Water in Gallons	Total System Input	Total GPCD
2023	5,348,861,616	0	285,537,500	5,063,324,116	129
2022	5,218,392,929	0	287,408,333	4,930,984,596	134
2021	4,641,770,707	0	275,755,208	4,366,015,499	118
2020	4,788,416,162	0	277,836,458	4,510,579,704	122
2019	4,524,656,566	0	216,843,299	4,307,813,267	118
Historic Average	4,904,419,596	0	268,676,160	4,635,743,436	124

C. Water Supply System

1. Designed daily capacity of system in gallons	42,000,000
2. Storage Capacity	
2a. Elevated storage in gallons:	4,250,000
2b. Ground storage in gallons:	12,900,000

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

D. Projected Demands

1. The estimated water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

Year	Population	Water Demand (gallons)
2025	103,590	5,683,981,919
2026	103,660	5,693,724,863
2027	103,730	5,703,467,808
2028	103,800	5,713,210,753
2029	103,869	5,722,953,698
2030	103,937	5,732,696,643
2031	104,755	5,775,383,124
2032	105,580	5,818,069,605
2033	106,411	5,860,756,086
2034	107,249	5,903,442,567

2. Description of source data and how projected water demands were determined.

Texas Water User Group Database and Historical Utility Records
--

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

E. High Volume Customers

1. The annual water use for the five highest volume

RETAIL customers.

Customer	Water Use Category	Annual Water Use	Treated or Raw
Goodfellow Air Force Base	Institutional	122,324,000	Treated
Robinson Premium Beef	Industrial	50,000,000	Treated
Shannon Medical Center	Institutional	50,000,000	Treated
Angelo State University	Institutional	40,000,000	Treated
Tom Green County Jail	Institutional	20,000,000	Treated

2. The annual water use for the five highest volume

WHOLESALE customers.

Customer	Water Use Category	Annual Water Use	Treated or Raw
Upper Colorado River Authority	Municipal	129,581,000	Treated
Ethicon, Inc.	Industrial	40,349,000	Treated
Red Creek MUD	Municipal	21,543,400	Treated
Valley Proteins	Industrial	1,324,000	Treated
The Water Barrel	Commercial	668,000	Treated

F. Utility Data Comment Section

Additional comments about utility data.

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

Section II: System Data

A. Retail Water Supplier Connections

1. List of active retail connections by major water use category.

Water Use Category Type	Total Retail Connections (Active + Inactive)	Percent of Total Connections
Residential - Single Family	32,134	72.67 %
Residential - Multi-Family	8,440	19.09 %
Industrial	117	0.26 %
Commercial	2,992	6.77 %
Institutional	535	1.21 %
Agricultural	4	0.01 %
Total	44,222	100.00 %

2. Net number of new retail connections by water use category for the previous five years.

	Net Number of New Retail Connections						
Year	Residential - Single Family	Residential - Multi-Family	Industrial	Commercial	Institutional	Agricultural	Total
2023	179	137	9	0	0	0	325
2022	412	0	2	11	0	0	425
2021	1,227	250	0	8	4	0	1,489
2020	4,167	7,435	57	75	1	0	11,735
2019	396	5	6	12	0	0	419

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

B. Accounting Data

The previous five years' gallons of RETAIL water provided in each major water use category.

Year	Residential - Single Family	Residential - Multi-Family	Industrial	Commercial	Institutional	Agricultural	Total
2023	2,320,181,000	420,389,000	137,235,000	489,910,000	895,267,000	362,000	4,263,344,000
2022	2,468,308,000	435,697,000	136,581,000	480,369,000	651,605,000	703,000	4,173,263,000
2021	2,163,073,000	431,415,000	130,543,000	454,604,000	487,974,000	2,339,000	3,669,948,000
2020	2,307,841,000	417,089,000	138,015,000	439,870,000	393,853,000	446,000	3,697,114,000
2019	2,081,581,000	417,787,000	129,907,000	520,914,000	405,343,000	11,217,000	3,566,749,000

C. Residential Water Use

The previous five years residential GPCD for single family and multi-family units.

Year	Total Residential GPCD
2023	88
2022	79
2021	70
2020	74
2019	68
Historic Average	76

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

D. Annual and Seasonal Water Use

1. The previous five years' gallons of treated water provided to RETAIL customers.

Month	Total Gallons of Treated Water				
	2023	2022	2021	2020	2019
January	569,571,517	342,884,001	324,190,698	321,398,521	311,240,270
February	321,545,857	320,256,093	351,353,555	299,589,332	290,729,038
March	387,169,887	381,273,021	348,894,983	315,049,680	337,719,757
April	418,611,230	430,526,876	401,465,361	365,529,358	361,068,394
May	441,382,748	511,937,419	406,720,140	423,941,899	344,472,441
June	522,366,426	552,491,607	469,694,878	493,222,927	389,570,936
July	529,065,157	623,578,607	449,236,331	535,919,861	475,265,550
August	629,788,671	572,396,843	458,581,723	555,612,045	558,366,660
September	501,839,843	455,606,298	454,104,189	424,013,009	466,947,368
October	456,007,921	429,434,938	375,460,197	421,658,458	406,581,172
November	367,637,451	347,022,595	355,154,755	355,241,177	350,683,640
December	362,800,382	344,954,355	344,589,127	341,440,039	328,895,899
Total	5,507,787,090	5,312,362,653	4,739,445,937	4,852,616,306	4,621,541,125

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

2. The previous five years' gallons of raw water provided to RETAIL customers.

Month	Total Gallons of Raw Water				
	2023	2022	2021	2020	2019
January	236,000	678,000	537,000	2,785,000	1,326,000
February	198,000	602,000	347,000	1,789,000	1,522,000
March	144,000	267,000	410,000	1,770,000	3,334,000
April	870,000	854,000	3,386,000	5,643,000	4,150,000
May	1,392,000	1,615,000	1,340,000	6,008,000	3,527,000
June	1,672,000	2,407,000	2,031,000	8,766,000	2,917,000
July	1,994,000	2,916,000	1,676,000	13,347,000	6,922,000
August	2,745,000	2,989,000	1,926,000	12,084,000	6,672,000
September	3,021,000	2,679,000	1,907,000	6,634,000	8,237,000
October	2,202,000	1,745,000	1,510,000	7,186,000	9,081,000
November	1,521,000	1,573,000	2,663,000	1,746,000	6,137,000
December	466,000	571,000	916,000	1,159,000	2,460,000
Total	16,461,000	18,896,000	18,649,000	68,917,000	56,285,000

3. Summary of seasonal and annual water use.

	Summer RETAIL (Treated + Raw)	Total RETAIL (Treated + Raw)
2023	1,687,631,254	5,524,248,090
2022	1,756,779,057	5,331,258,653
2021	1,383,145,932	4,758,094,937
2020	1,618,951,833	4,921,533,306
2019	1,439,714,146	4,677,826,125
Average in Gallons	1,577,244,444.40	5,042,592,222.20

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

E. Water Loss

Water Loss data for the previous five years.

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2023	912,565,390	23	33.29 %
2022	432,021,267	11	8.29 %
2021	479,681,651	13	10.33 %
2020	591,415,458	16	12.35 %
2019	546,619,057	15	12.08 %
Average	592,460,565	16	15.27 %

F. Peak Day Use

Average Daily Water Use and Peak Day Water Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Ratio (peak/avg)
2023	15,134,926	18343817	1.2120
2022	14,606,188	19095424	1.3074
2021	13,035,876	15034194	1.1533
2020	13,483,652	17597302	1.3051
2019	12,815,961	15649066	1.2211

G. Summary of Historic Water Use

Water Use Category	Historic Average	Percent of Connections	Percent of Water Use
Residential - Single Family	2,268,196,800	72.67 %	58.55 %
Residential - Multi-Family	424,475,400	19.09 %	10.96 %
Industrial	134,456,200	0.26 %	3.47 %
Commercial	477,133,400	6.77 %	12.32 %
Institutional	566,808,400	1.21 %	14.63 %
Agricultural	3,013,400	0.01 %	0.08 %

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

H. System Data Comment Section

Section III: Wastewater System Data

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s) in gallons per day: 13,200,000

2. List of active wastewater connections by major water use category.

Water Use Category	Metered	Unmetered	Total Connections	Percent of Total Connections
Municipal	36,661	0	36,661	92.98 %
Industrial	54	0	54	0.14 %
Commercial	2,424	0	2,424	6.15 %
Institutional	291	0	291	0.74 %
Agricultural	0	0	0	0.00 %
Total	39,430	0	39,430	100.00 %

3. Percentage of water serviced by the wastewater system: %

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

4. Number of gallons of wastewater that was treated by the utility for the previous five years.

Month	Total Gallons of Treated Water				
	2023	2022	2021	2020	2019
January	211,491,000	211,812,000	200,457,000	196,994,000	209,190,000
February	210,060,000	206,062,000	208,253,000	202,795,000	210,788,000
March	214,077,000	218,323,000	213,072,000	209,574,000	208,921,000
April	218,940,000	228,703,000	227,528,000	202,235,000	209,402,000
May	210,465,000	222,001,000	222,111,000	203,977,000	210,563,000
June	216,738,000	225,767,000	220,280,000	207,415,000	216,351,000
July	216,904,000	227,243,000	229,865,000	213,842,000	210,943,000
August	216,126,000	223,442,000	214,220,000	214,913,000	218,444,000
September	222,433,000	224,707,000	216,951,000	211,219,000	210,562,000
October	209,625,000	219,584,000	217,365,000	207,660,000	214,572,000
November	207,871,000	210,030,000	210,289,000	203,253,000	209,127,000
December	223,407,000	209,663,000	211,480,000	195,981,000	199,095,000
Total	2,578,137,000	2,627,337,000	2,591,871,000	2,469,858,000	2,527,958,000

5. Could treated wastewater be substituted for potable water?

☒ Yes
 ☐ No

B. Reuse Data

1. Data by type of recycling and reuse activities implemented during the current reporting period.

Type of Reuse	Total Annual Volume (in gallons)
On-site Irrigation	0
Plant wash down	0
Chlorination/de-chlorination	0
Industrial	0
Landscape irrigation (park,golf courses)	0
Agricultural	2,054,366,727
Discharge to surface water	0
Evaporation Pond	0
Other	0
Total	2,054,366,727

UTILITY PROFILE FOR RETAIL WATER SUPPLIER

C. Wastewater System Data Comment

Additional comments and files to support or explain wastewater system data listed below.

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Appendix C

Water Conservation Plan 5 and 10 Yr Goals for Water Savings

WATER CONSERVATION GOALS FOR RETAIL WATER SUPPLIER

CONTACT INFORMATION

Name of Utility:	CITY OF SAN ANGELO		
Public Water Supply Identification Number (PWS ID):	TX2260001		
Certificate of Convenience and Necessity (CCN) Number:	10242		
Surface Water Right ID Number:	88, 407, 457, 1191, 1266, 1298-B, 1318-D, 1319-C, 1323, 1325-A, 1326, 1333-A, 1337-A, 1348-B, 1357-A, 1401, 2311		
Wastewater ID Number:	20097		
Contact:	First Name:	Shane	Last Name: Kelton
	Title:	Water Utilities Director	
Address:	301 W. Beauregard	City:	San Angelo State: TX
Zip Code:	76903	Zip+4:	Email: shane.kelton@cosatx.org
Telephone Number:	3256574209	Date:	

Is this person the designated Conservation Coordinator? ☐ Yes ☒ No

Coordinator:	First Name:	Maria	Last Name:	Padilla
	Title:	Water Conservation Coordinator		
Address:		City:	san angelo	Zip Code: 76901
Email:	maria.padilla@cosatx.us		Telephone Number:	325-657-4330

Regional Water Planning Group: F

Groundwater Conservation District:

Our records indicate that you:

- ☒ Received financial assistance of \$500,000 or more from TWDB
- ☒ Have 3,300 or more retail connections
- ☒ Have a surface water right with TCEQ

WATER CONSERVATION GOALS FOR RETAIL WATER SUPPLIER

	Historic 5 Year Average	Baseline	5-Year Goal for Year 2029	10-Year Goal for Year 2034
Water Loss (GPCD)	124	124	123	122
Residential GPCD	73	70	69	68
Water Loss (GPCD)	16	23	20	18
Water Loss Percentage	13.00%	19.00%	16.00%	15.00%

1. Total GPCD = (Total Gallons in System ÷ Permanent Population) ÷ 365
2. Residential GPCD = (Gallons Used for Residential Use ÷ Residential Population) ÷ 365
3. Water Loss GPCD = (Total Water Loss ÷ Permanent Population) ÷ 365
4. Water Loss Percentage = (Total Water Loss ÷ Total Gallons in System) x 100; or (Water Loss GPCD ÷ Total GPCD) x 100

Appendix D

City of San Angelo Reservoir Operation Plan



City of San Angelo, Texas

WATER SUPPLY ENGINEERING FEASIBILITY STUDY

October 2018

Project #: 0858-005-01



In association with:
Leonard Rice Engineers, Inc. and WSP

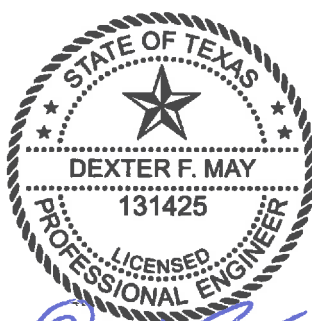


Representing Alan Plummer Associates, Inc.

Representing eHT



Ellen T. McDonald
10/9/18



Dexter F. May
10/9/18



Scott F. Hibbs
10/9/18

City of San Angelo, Texas

WATER SUPPLY ENGINEERING FEASIBILITY STUDY

October 2018

Project #: 0858-005-01



In association with:
Leonard Rice Engineers, Inc. and WSP

TABLE OF CONTENTS

EXECUTIVE SUMMARY

ES.1	Drinking Water Supplies and Demands	ES-1
ES.2	Technical Evaluation of Water Supply Strategies.....	ES-4
ES.3	Implementation Plan for Recommended Strategy.....	ES-8

CHAPTER 1 INTRODUCTION..... 1-1

1.1	Background and Purpose.....	1-1
1.2	Scope of Work	1-2
1.3	Organization of Report.....	1-2

CHAPTER 2 WATER DEMAND PROJECTIONS 2-1

2.1	Population.....	2-1
2.2	Municipal Demand	2-2
2.3	Annual Average Water Demand.....	2-3
2.4	Peak Day Water Demand	2-5

CHAPTER 3 EXISTING WATER SUPPLIES 3-1

3.1	Surface Water Supplies	3-1
3.1.1	Overview of Existing Surface Water Supplies	3-1
3.1.2	Supply Yield and Reliability.....	3-4
3.1.3	Water Quality	3-9
3.2	Groundwater Supply	3-10
3.2.1	Water Quality	3-12
3.3	Reclaimed Water	3-12
3.3.1	Reclaimed Water Authorization.....	3-13
3.3.2	Current Use of Reclaimed Water	3-13
3.4	Summary of Currently Available Water Supplies	3-13
3.4.1	Reliability of O.H. Ivie.....	3-14
3.5	Available Water Supplies Versus Projected Demand	3-14

CHAPTER 4 EXISTING TREATMENT FACILITIES 4-1

4.1	Wastewater Treatment Facility.....	4-1
4.1.1	Description, Capacity, and Permit Limits.....	4-1

TABLE OF CONTENTS

4.1.2	Influent and Effluent Water Quality.....	4-4
4.1.3	Treatment Processes.....	4-8
4.2	Water Treatment.....	4-11
4.2.1	Surface Water Treatment Plant.....	4-11
4.2.2	Groundwater Treatment Facility.....	4-14
CHAPTER 5 POTENTIAL FUTURE WATER SUPPLY STRATEGIES.....		5-1
5.1	Groundwater Strategies.....	5-1
5.1.1	Strategy 1 – Local Brackish Groundwater.....	5-1
5.1.2	Strategy 2 – Lipan Aquifer.....	5-3
5.1.3	Strategy 3 – Pecos Valley/Edwards-Trinity Aquifer.....	5-4
5.1.4	Strategy 4 – Capitan Reef Aquifer.....	5-5
5.1.5	Strategy 5 – Ellenburger Aquifer.....	5-6
5.1.6	Strategy 6 – Edwards-Trinity Plateau Aquifer.....	5-7
5.2	Purchased Water.....	5-8
5.2.1	Strategy 7 – Colorado River Municipal Water District.....	5-8
5.2.2	Strategy 8 – City of Abilene.....	5-9
5.2.3	Strategy 9 – Private Suppliers.....	5-10
5.3	Water Reuse.....	5-10
5.3.1	Strategy 10 – Augmentation of O.H. Ivie Reservoir.....	5-11
5.3.2	Strategy 11 – Augmentation of Lake Nasworthy.....	5-12
5.3.3	Strategy 12 – Augmentation of Twin Buttes Reservoir.....	5-14
5.3.4	Strategy 13 – Augmentation of O.C. Fisher Lake.....	5-16
5.3.5	Strategy 14 – Riverbank Filtration.....	5-17
5.3.6	Strategy 15 – Infiltration Basins.....	5-19
5.3.7	Strategy 16 – Direct Potable Reuse.....	5-21
5.3.8	Strategy 17 – Concho River Water Supply Project.....	5-22
5.4	Other Strategies.....	5-23
5.4.1	Strategy 18 – Non-Potable Reuse.....	5-23
5.4.2	Strategy 19 – Aquifer Storage and Recovery.....	5-24
5.4.3	Strategy 20 – Red Arroyo.....	5-25
5.4.4	Strategy 21 – Subordination.....	5-26

TABLE OF CONTENTS

5.4.5	Strategy 22 – Brush Control.....	5-27
5.4.6	Strategy 23 – Water Conservation	5-27
5.4.7	Strategy 24 – Rehabilitation of E.V. Spence Pipeline	5-28
5.4.8	Summary	5-28
 CHAPTER 6 SCREENING EVALUATION OF POTENTIAL WATER SUPPLY		
	STRATEGIES.....	6-1
6.1	Fatal Flaw Analysis	6-1
6.2	Further Development of Remaining Strategies.....	6-1
6.3	Screening Workshop.....	6-3
6.3.1	Screening Evaluation Results	6-3
 CHAPTER 7 TECHNICAL EVALUATION OF WATER SUPPLY		
	STRATEGIES.....	7-1
7.1	Edwards-Trinity Plateau Aquifer.....	7-2
7.1.1	Water Quality	7-2
7.1.2	Conveyance Facilities	7-3
7.1.3	Treatment Facilities.....	7-7
7.1.4	Regulatory Considerations.....	7-9
7.1.5	Costs	7-10
7.2	Augmentation of Lake Nasworthy	7-11
7.2.1	Historical Water Quality	7-11
7.2.2	Water Reclamation Facility Improvements	7-14
7.2.3	Advanced Treatment Facility.....	7-17
7.2.4	Conveyance Facilities	7-21
7.2.5	Regulatory Considerations.....	7-23
7.2.6	Costs	7-26
7.3	Direct Potable Reuse	7-27
7.3.1	Water Reclamation Facility Improvements	7-27
7.3.2	Advanced Treatment Facilities	7-27
7.3.3	Water Quality	7-30
7.3.4	Conveyance Facilities	7-31
7.3.5	Regulatory Considerations.....	7-32

TABLE OF CONTENTS

7.3.6	Costs	7-33
7.4	Concho River Water Supply Project.....	7-34
7.4.1	Historical Water Quality	7-34
7.4.2	Water Reclamation Facility Improvements	7-37
7.4.3	Conveyance Facilities	7-37
7.4.4	Water Treatment Plant Improvements.....	7-39
7.4.5	Regulatory Considerations.....	7-44
7.4.6	Costs	7-45
7.5	Additional Regulations of Relevance	7-46
7.5.1	Injection Well Permitting	7-46
7.5.2	Other Permitting.....	7-46
7.5.3	Construction Authorization	7-46
7.6	Comparison of Water Supply Strategies	7-51
7.6.1	Opinions of Probable Costs	7-51
7.6.2	Water Quality Following Implementation.....	7-52
7.6.3	Final Ranking Workshop with City Staff	7-53
CHAPTER 8 RECOMMENDED WATER SUPPLY IMPLEMENTATION PLAN		8-1
8.1	Initial Meeting with TCEQ.....	8-1
8.2	TPDES Discharge Permit and Bed and Banks Permit.....	8-1
8.3	Pilot and Bench-Scale Testing	8-1
8.4	Treatment and Conveyance Facilities Design and Construction.....	8-3
8.4.1	Pipeline Route Delineation and Surveying	8-3
8.4.2	Rights-of-Way Acquisition	8-3
8.4.3	Preliminary Design of Pipeline and WRF/SWTP Improvements	8-3
8.4.4	Final Design of Pipeline and WRF/SWTP Improvements.....	8-4
8.4.5	Advertising/Bidding/Contracting	8-4
8.4.6	Construction of Conveyance and Treatment Facilities	8-4
8.5	Public Outreach Program.....	8-4
8.6	System Startup	8-4
8.7	Implementation Schedule.....	8-4

LIST OF TABLES

Table ES-1: Projected Water Supplies and Demands (ac-ft/yr)	ES-2
Table ES-2: Financial Summary of Water Supply Strategies.....	ES-6
Table 2-1: Population Projections	2-2
Table 2-2: Municipal Demand Projections.....	2-4
Table 2-3: Potable Water Demand Projections (ac-ft/yr)	2-4
Table 2-4: Peak Day Water Demand.....	2-5
Table 2-5: Peak Day Water Supply and Treatment Requirements	2-5
Table 3-1: San Angelo Surface Water Rights and Contracts from TCEQ Water Rights Database.....	3-2
Table 3-2: Estimated Firm and Safe Yields for O. H. Ivie	3-5
Table 3-3: Estimated Firm and Safe Yields for the Twin Buttes/Lake Nasworthy System	3-6
Table 3-4: Estimated Firm and Safe Yields for O. C. Fisher	3-7
Table 3-5: Estimated Firm and Safe Yields for E. V. Spence.....	3-8
Table 3-6: Estimated Firm and Safe Yields for City Water Rights in the South Concho River ¹	3-8
Table 3-7: Quality of City Surface Water Sources Relative to Selected Texas Secondary Drinking Water Standards	3-9
Table 3-8: Water Quality Impairments for City Surface Water Sources	3-10
Table 3-9: San Angelo Groundwater Rights in the Hickory Aquifer.....	3-11
Table 3-10: Projected Water Supplies from Currently Available Sources	3-13
Table 3-11: Projected Drought Supplies and Demands (ac-ft/yr).....	3-14
Table 4-1: Effluent Wastewater Permit Limits.....	4-3
Table 4-2: Annual Average Daily Effluent.....	4-3
Table 4-3: WRF Daily Average Effluent Statistics.....	4-3
Table 4-4: Summary of Influent and Effluent WRF Water Quality	4-5
Table 4-5: Percent Removal at WRF of Selected Parameters.....	4-5
Table 4-6: Existing SWTP Equipment Capacities.....	4-14
Table 4-7: Phase I GWTF Capacities by Unit Process	4-15
Table 4-8: Historical Water Quality Blend of Water Produced from the SWTP and GWTF	4-16
Table 5-1: Summary of Local Brackish Groundwater Strategy	5-2
Table 5-2: Summary of the Lipan Aquifer Strategy	5-3

LIST OF TABLES

Table 5-3: Summary of Pecos Valley/Edwards-Trinity Aquifer Strategy.....	5-4
Table 5-4: Summary of Capitan Reef Aquifer Strategy.....	5-5
Table 5-5: Summary of Ellenburger Aquifer Strategy	5-6
Table 5-6: Summary of Edwards-Trinity Plateau Aquifer Strategy	5-7
Table 5-7: Summary of Augmentation of O.H. Ivie Reservoir Strategy	5-11
Table 5-8: Summary of Augmentation of Lake Nasworthy Strategy.....	5-13
Table 5-9: Summary of Augmentation of Twin Buttes Reservoir Strategy	5-15
Table 5-10: Summary of Augmentation of O.C. Fisher Lake Strategy	5-16
Table 5-11: Summary of Riverbank Filtration Strategy	5-18
Table 5-12: Summary of Infiltration Basins Strategy.....	5-20
Table 5-13: Summary of Direct Potable Reuse Strategy	5-21
Table 5-14: Summary of the Concho River Water Supply Project	5-22
Table 5-15: Summary of Aquifer Storage and Recovery Strategy	5-25
Table 5-16: Summary of Water Supply Strategies Considered.....	5-29
Table 6-1: Strategies Identified as Containing a Fatal Flaw.....	6-2
Table 6-2: Screening Criteria used to Rank Strategies.....	6-3
Table 6-3: Screening Evaluation Results.....	6-4
Table 7-1: Historical Water Quality in Edwards-Trinity Plateau Aquifer	7-2
Table 7-2: Projected Effect of Incorporating Groundwater from the ETPA on the City's Potable Water Quality	7-3
Table 7-3: Comparison of Pipeline Route Materials	7-6
Table 7-4: Potential Obstructions and Route Characteristics.....	7-6
Table 7-5: Water Quality Standards and Historical Data for Selected Parameters for Lake Nasworthy	7-13
Table 7-6: Existing WRF Effluent Quality Compared to BNR Pilot Study Effluent Quality.....	7-17
Table 7-7: Advanced Treated Water Anticipated Quality	7-21
Table 7-8: Projected Effect of Implementing IPR to Nasworthy on the City's Potable Water Quality	7-21
Table 7-9: RO Permeate Water Quality Data from DPR Pilot Study	7-30
Table 7-10: Projected Effect of Implementing DPR on the City's Potable Water Quality.....	7-30
Table 7-11: Anticipated Pathogen Inactivation Credits Received by the TCEQ	7-33
Table 7-12: Texas Surface Water Quality Standards for the Concho River	7-34

LIST OF TABLES

Table 7-13: Anticipated Concho River Water Quality at Intake	7-37
Table 7-14: Anticipated Pathogen Inactivation for the Concho River Water Supply Project.....	7-42
Table 7-15: Projected Effect of Implementing the Concho River Water Supply Project on the City's Potable Water Quality	7-42
Table 7-16: Regulatory and Permit Summary	7-47
Table 7-17: Financial Comparison of Strategies.....	7-51
Table 7-18: City-Wide Water Quality Characteristics Following Implementation.....	7-52
Table 7-19: Results of Final Ranking Workshop.....	7-53
Table 8-1: Technology-Specific Testing Considerations.....	8-2

LIST OF FIGURES

Figure ES-1: Projected Drinking Water Demands and Supplies	ES-3
Figure ES-2: Projected Water Supplies and Demands after Implementation of the Recommended Strategy.....	ES-7
Figure ES-3: Preliminary Implementation Plan for the Concho River Water Supply Project.....	ES-9
Figure 3-1: City of San Angelo Water Supplies	3-3
Figure 3-2: Historical Water Storage in O. H. Ivie	3-5
Figure 3-3: Historical Water Storage in Lake Nasworthy	3-6
Figure 3-4: Historical Water Storage in Twin Buttes	3-6
Figure 3-5: Historical Water Storage in O. C. Fisher	3-7
Figure 3-6: Historical Water Storage in E. V. Spence	3-8
Figure 3-7: Hickory Groundwater Supply and Demand	3-12
Figure 3-8: Projected Drought Supplies and Demands.....	3-15
Figure 4-1: Treatment Facility Locations	4-2
Figure 4-2: Average Daily Effluent Pumped to Effluent Storage Reservoirs	4-4
Figure 4-3: Monthly WRF Effluent Biochemical Oxygen Demand.....	4-6
Figure 4-4: Monthly WRF Effluent Total Dissolved Solids	4-7
Figure 4-5: Water Reclamation Facility	4-9
Figure 4-6: Water Reclamation Facility Existing Process Flow Diagram.....	4-10
Figure 4-7: Aerial Site Plan of Existing Surface Water Treatment Plant	4-12
Figure 4-8: Surface Water Treatment Plant Process Flow Diagram	4-13
Figure 4-9: GWTF Block Flow Diagram.....	4-15
Figure 5-1: Strategy 10 Simplified Process Flow Diagram.....	5-11
Figure 5-2: Strategy 11 Simplified Process Flow Diagram.....	5-12
Figure 5-3: Strategy 12 Simplified Process Flow Diagram.....	5-14
Figure 5-4: Strategy 13 Simplified Process Flow Diagram.....	5-16
Figure 5-5: Horizontal Collector Well Riverbank Filtration	5-17
Figure 5-6: Strategy 14 Simplified Process Flow Diagram.....	5-18
Figure 5-7: Soil Aquifer Treatment Using Infiltration Basins	5-19
Figure 5-8: Strategy 15 Simplified Process Flow Diagram.....	5-19
Figure 5-9: Strategy 15 Simplified Process Flow Diagram.....	5-21

LIST OF FIGURES

Figure 5-10: Strategy 17 Simplified Process Flow Diagram.....	5-22
Figure 7-1: Conceptual Pipeline Route No. 1	7-4
Figure 7-2: Conceptual Pipeline Route No. 2	7-5
Figure 7-3: Overview Map of Augmentation of Lake Nasworthy	7-12
Figure 7-4: Historical Concentrations of Chloride and Sulfate	7-13
Figure 7-5: Historical Concentrations of TDS and Chlorophyll a	7-14
Figure 7-6: Detailed Process Flow Diagram for Augmentation of Lake Nasworthy	7-20
Figure 7-7: Hydraulic Grade Line for Discharge Pipeline to Pecan Creek.....	7-22
Figure 7-8: Preliminary Discharge Location to Lake Nasworthy	7-24
Figure 7-9: Discharge to Pecan Creek Modeling Results	7-25
Figure 7-10: Overview Map of Direct Potable Reuse.....	7-28
Figure 7-11: Detailed Process Flow Diagram for Direct Potable Reuse.....	7-29
Figure 7-12: Transmission Pipeline from WRF to SWTP	7-31
Figure 7-13: Overview Map of the Concho River Water Supply Project.....	7-35
Figure 7-14: Historical Concho River Water Quality	7-36
Figure 7-15: Outfall Pipeline from WRF to Concho River	7-38
Figure 7-16: Transmission Pipeline from Concho River Intake to SWTP	7-39
Figure 7-17: Concho River Water Supply Project Process Flow Diagram.....	7-43
Figure 7-18: Water Quality Modeling Results in Concho River	7-45
Figure 7-19: Unit Cost Comparison of Strategies	7-52
Figure 7-20: Projected Water Supplies and Demands after Implementation of the Recommended Strategy.....	7-54
Figure 8-1: Preliminary Implementation Plan for the Concho River Water Supply Project	8-5

LIST OF APPENDICES

APPENDIX A

Riverbank Filtration Memo from LRE

APPENDIX B

Screening Workshop Results

APPENDIX C

Detailed Opinions of Cost

APPENDIX D

Results of Final Ranking Workshop

LIST OF ABBREVIATIONS

ac-ft/yr	acre-feet per year
ASR	aquifer storage and recovery
ATF	advanced treatment facility
BMP	best management practice
BNR	biological nutrient removal
BOD	biochemical oxygen demand
°C	degrees Celsius
CEC	constituents of emerging concern
cfs	cubic feet per second
City	City of San Angelo
CR	combined radium
CRMWD	Colorado River Municipal Water District
CT	concentration time
CWA	Clean Water Act
DBP	disinfection byproduct
DFC	desired future condition
DO	dissolved oxygen
DPR	direct potable reuse
ETPA	Edwards-Trinity Plateau Aquifer
FM	Farm-to-Market Road
GAC	granular activated carbon
GCD	groundwater conservation district
gpcd	gallons per capita per day
gpm	gallons per minute
GWTF	groundwater treatment facility
hp	horsepower
IPR	indirect potable reuse
L/S	lime softening

LIST OF ABBREVIATIONS

LAS	liquid ammonium sulfate
LRE	Leonard Rice Engineers
MAG	modeled available groundwater
MF	microfiltration
mg/L	milligrams per liter
MGD	million gallons per day
NH ₃	ammonia
NRCS	Natural Resource Conservation Service
NSR	new source review
O&M	operating and maintenance
OPCC	opinion of probable construction cost
psi	pounds per square inch
PUWCSD	Plateau Underground Water Conservation & Supply District
PWS	public water system
RBF	riverbank filtration
RFI	request for information
RO	reverse osmosis
ROW	right-of-way
RRS	radium removal system
SWPPP	Storm Water Pollution Prevention Plan
SWTP	Surface Water Treatment Plant
T&E	threatened and endangered species
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
TGCWCID #1	Tom Green County Water Control and Improvement District #1
TMDL	total maximum daily load
TSS	total suspended solids

LIST OF ABBREVIATIONS

TSWQS	Texas Surface Water Quality Standards
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
UCRA	Upper Colorado River Authority
UF	ultrafiltration
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UV	ultraviolet
UV/AOP	ultraviolet light/advanced oxidation processes
UVT	ultraviolet transmissivity
VFA	volatile fatty acids
WAM	water availability model
WCTMWD	West Central Texas Municipal Water District
WRF	water reclamation facility

EXECUTIVE SUMMARY

The City of San Angelo (City) is located in Tom Green County; a semi-arid region that periodically experiences severe, prolonged droughts. Regional water planning projections provided by the Texas Water Development Board (TWDB) indicate that the City will experience a water supply deficit of approximately 5,957 ac-ft/yr beginning in 2030 and growing to 12,235 ac-ft/yr in 2070. The City can obtain drinking water from six surface water supplies and a groundwater aquifer. As part of its commitment to ensure adequate water supplies for future generations, the City contracted with the Alan Plummer Associates, Inc. (APAI) and Enprotec/Hibbs & Todd, Inc. (eHT) team (Consultant Team) to perform a broad evaluation of available potable water supplies for potential incorporation into its existing water supply portfolio.

ES.1 DRINKING WATER SUPPLIES AND DEMANDS

The City of San Angelo (City or San Angelo) holds numerous surface water rights in the Concho River Basin and has also contracted for surface water from other sources. Currently, the City can obtain surface water from six sources: Twin Buttes Reservoir, Lake Nasworthy, O.C. Fisher Lake, O.H. Ivie Reservoir, E.V. Spence Reservoir, and direct diversions from the South Concho River and the Concho River main stem.

The City holds water rights for up to approximately 124,688 ac-ft/yr of surface water for municipal uses. However, these water supplies are not fully reliable; during drought-of-record conditions, there will be little water available from many of these supplies. According to the 2016 Region F Water Plan, O.H. Ivie and the Concho River are the only two surface water supplies with a safe yield greater than zero¹. Combined, these two sources are projected to have a safe yield of approximately 5,874 ac-ft/yr in 2020.

In addition to surface water, the City also own groundwater rights in the Hickory Aquifer. The City's Hickory wellfield consists of 15 wells located in McCulloch County and transmission facilities to transport the water 62 miles to the City's Groundwater Treatment Facility (GWTF).

¹ The safe yield is the estimated amount of water that can be supplied from a source each year and still maintain at least a one-year supply in storage at the critical point in the drought cycle.

The GWTF provides iron oxidation and removal, and radium removal through iron exchange. Once fully developed, the Hickory Aquifer groundwater supply will be capable of producing an average of 12,000 ac-ft/yr (10.8 MGD).

The groundwater rights allow the City to bank groundwater through 2026. The City currently has approximately 40,000 acre-feet of groundwater banked, with a peak production capacity of approximately 9,000 ac-ft/yr (8 MGD), limited by the GWTF. The City's allocation will increase to 10,000 ac-ft/yr from 2026 to 2036 and to 12,000 ac-ft/yr from 2036 onward. The City is currently pursuing a project to expand the capacity of the GWTF. Following completion of the expansion project, the City could treat up to 12,000 ac-ft/yr (10.8 MGD) of groundwater from the Hickory Aquifer during peak demands, due to the volume of banked water.

A range of potable water demand for the City was then projected through 2070 using historical demand usage patterns and Region F projections. A comparison of the City's projected drinking water supplies vs. demands is shown in Table ES-1 and Figure ES-1.

Table ES-1: Projected Water Supplies and Demands (ac-ft/yr)

Year	2020	2030	2040	2050	2060	2070
South Concho River¹	214	214	214	214	214	214
O.H. Ivie²	5,660	5,492	5,324	5,156	4,988	4,820
Hickory Aquifer	12,000 ³	12,000 ³	12,000 ⁴	12,000 ⁴	12,000 ⁴	12,000 ⁴
Total Supplies	17,874	17,706	17,538	17,370	17,202	17,034
“Low” Demand	18,775	20,963	22,257	23,591	25,041	26,585
“Low” Deficit	(901)	(3,257)	(4,719)	(6,221)	(7,839)	(9,551)
“High” Demand	21,664	23,663	24,744	26,024	27,580	29,269
“High” Deficit	(3,790)	(5,957)	(7,206)	(8,654)	(10,378)	(12,235)

1. Equal to safe yield reported in 2016 Region F Water Plan, Table 5D-13.

2. Equal to 16.54% of the safe yield of the reservoir. From the 2016 Region F Water Plan, Table 5D-13.

3. Though the City's allocation is less than 12,000 ac-ft/yr during these years, the City's volume of banked water would allow them to withdraw 12,000 ac-ft/yr for a short time.

4. Limited by the City's allocation of 12,000 ac-ft/yr.

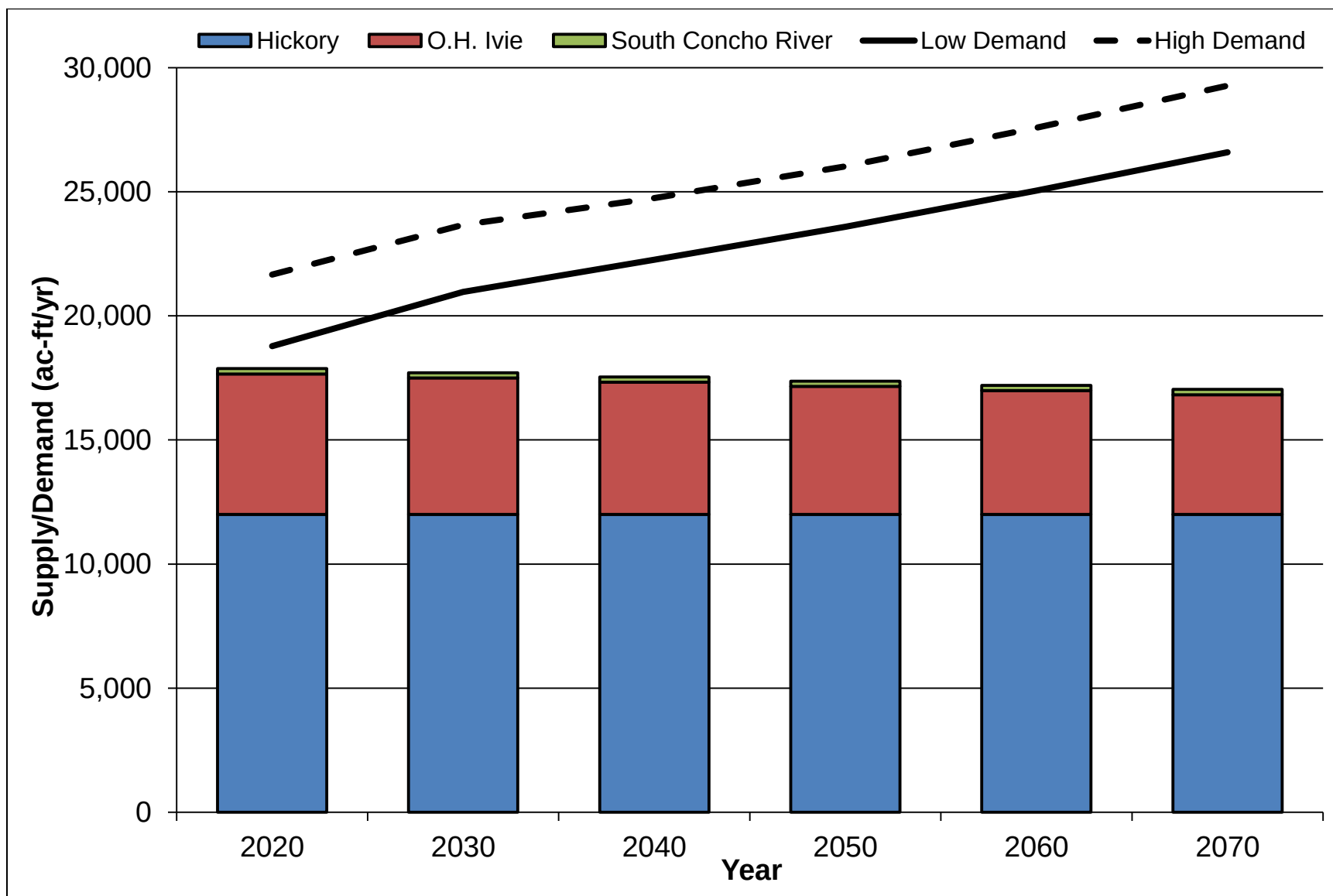


Figure ES-1: Projected Drinking Water Demands and Supplies

ES.2 TECHNICAL EVALUATION OF WATER SUPPLY STRATEGIES

The Consultant Team, in conjunction with City staff, formulated a comprehensive list of 24 water supply strategies available to the City to mitigate the anticipated water supply deficit in 2030. This list of 24 strategies was reduced down to the four most feasible strategies through a number of interactive workshops with City staff. The four most feasible strategies include groundwater from the Edwards-Trinity Plateau Aquifer, augmenting Lake Nasworthy with reclaimed water, direct potable reuse of reclaimed water, or the Concho River Water Supply project. The Consultant Team performed a detailed technical evaluation of each of these four strategies to analyze the benefits and disadvantages of each strategy. Each strategy is briefly described below followed by a comparison of the four strategies.

Edwards-Trinity Plateau Aquifer

The Edwards-Trinity Plateau Aquifer (ETPA) strategy involves the production of groundwater from the Edwards-Trinity Plateau Aquifer in the West Texas region. The estimated yield of this strategy is 4,500 ac-ft/yr (4 million gallons per day (MGD)) of fresh water with an anticipated median concentration of Total Dissolved Solids (TDS) of 280 milligrams per liter (mg/L). There is competition for this groundwater with irrigation pumping. Individual well capacities are expected to be relatively low, in the 150 – 250 gallons per minute (gpm) range. However, the aquifer has a long history of use, and reliability and sustainability are both considered to be moderate. A 20-inch pipeline would be required to transport the groundwater from the wellfield to the clearwell at the City's existing Surface Water Treatment Plant (SWTP).

Augmentation of Lake Nasworthy

The second strategy evaluated in detail would include sending reclaimed water from the City's Water Reclamation Facility (WRF) through advanced treatment processes and then discharging the water into Pecan Creek, which flows into Lake Nasworthy. This water would then flow through the South Concho River and be diverted from Lone Wolf Reservoir and treated at the SWTP. The existing WRF would be upgraded to use biological nutrient removal (BNR) processes. A newly constructed advanced treatment facility (ATF) would further treat the reclaimed water prior to discharge and would include two parallel treatment trains. One train would include reverse osmosis (RO) membrane treatment while the other train would use granular activated carbon (GAC). The ATF would be designed to treat 7.5 MGD of reclaimed water, but some water would be lost through the RO treatment process and through conveyance losses. This strategy would yield approximately 6,950 ac-ft/yr (6.2 MGD).

Direct Potable Reuse

The third water supply strategy is direct potable reuse (DPR) of the City's reclaimed water. This would include sending reclaimed water from the WRF through advanced treatment processes before blending it with raw water sources at the SWTP. Similar to the Augmentation of Lake Nasworthy strategy, the WRF would be upgraded to a BNR process and an ATF would be constructed near the WRF. For this strategy, all reclaimed water would be sent through RO membrane treatment instead of only half of the flow, as proposed in the Augmentation of Lake Nasworthy strategy. The ATF would be designed for a treatment capacity of 7.5 MGD, but there would be some losses through the RO treatment process. This strategy would have a water supply yield of 7,140 ac-ft/yr (6.4 MGD).

Concho River Water Supply Project

The final water supply strategy evaluated in detail is the Concho River Water Supply Project. The City would obtain a discharge permit to allow the WRF to discharge into the Concho River. A river intake structure would then be constructed approximately 8 miles downstream at City-owned property adjacent to the river. The water would be diverted at this location and sent to the SWTP. Additional treatment processes would be added at the SWTP to treat this new source of water, including a membrane filtration process, GAC, and ultraviolet (UV) disinfection. This strategy would yield 8,400 ac-ft/yr (7.5 MGD) of supply.

Comparison of Strategies

Opinions of probable construction and annual costs were prepared for these four strategies. A summary of the cost for each strategy and its anticipated yield is presented in Table ES-2. A unit cost was calculated based on the anticipated annual cost and yield.

Table ES-2: Financial Summary of Water Supply Strategies

Water Supply Strategy	ETPA	Nasworthy	DPR	Concho
Opinion of Probable Construction Cost (million) ¹	\$73	\$121	\$121	\$100
Total Project Cost (million) ²	\$102	\$141	\$140	\$117
Annual Debt Service (million) ³	\$7.5	\$10.4	\$10.3	\$8.6
Annual O&M (million)	\$0.9	\$4.1	\$5.3	\$2.3
Total Annual Cost (million)	\$8.4	\$14.5	\$15.6	\$10.9
Water Supply Yield (MGD)	4.0	6.2	6.4	7.5
Unit Cost with Debt Service (\$/1,000 gallons)	\$5.76	\$6.39	\$6.72	\$3.97
Unit Cost after Debt Retirement (\$/1,000 gallons)	\$0.64	\$1.82	\$2.29	\$0.83

1. All costs presented in July 2018 dollars with an ENR construction cost index of 11,116.

2. Includes engineering, permitting, and mitigation fees, and land acquisition, if applicable.

3. Assuming an annual interest rate of 4% and a loan term of 20 years.

In addition to a financial comparison, the Consultant Team and City staff rated each strategy on a number of non-cost factors during a final ranking workshop. The strategy that emerged from the final ranking workshop as most feasible was the Concho River Water Supply Project for two primary reasons: it provides the highest yield and the lowest unit cost with debt service. City staff considered these two criteria to be of utmost importance for a water supply project intended to meet demands during a period of drought. Additional benefits of this strategy are that it is sustainable, meaning that it will be available for long term use, and that the City will have ownership and oversight of the supply.

Furthermore, implementation of the recommended strategy would provide the indirect benefit of having updated treatment facilities at the WRF and the SWTP, which the City needs regardless of the option selected. The recommended membrane filtration processes at the SWTP could be the first building blocks of a plant-wide rehabilitation. During periods when the Concho River Water Supply Project is not needed to meet potable demands, the City could treat raw surface water from O.H. Ivie and/or the existing Concho River sources with the new treatment train.

The City's projected water supplies and demands after implementing this strategy are shown in Figure ES-2. It is anticipated that implementing this water supply strategy would meet the City's potable water needs through at least 2050 under the high demand projections.

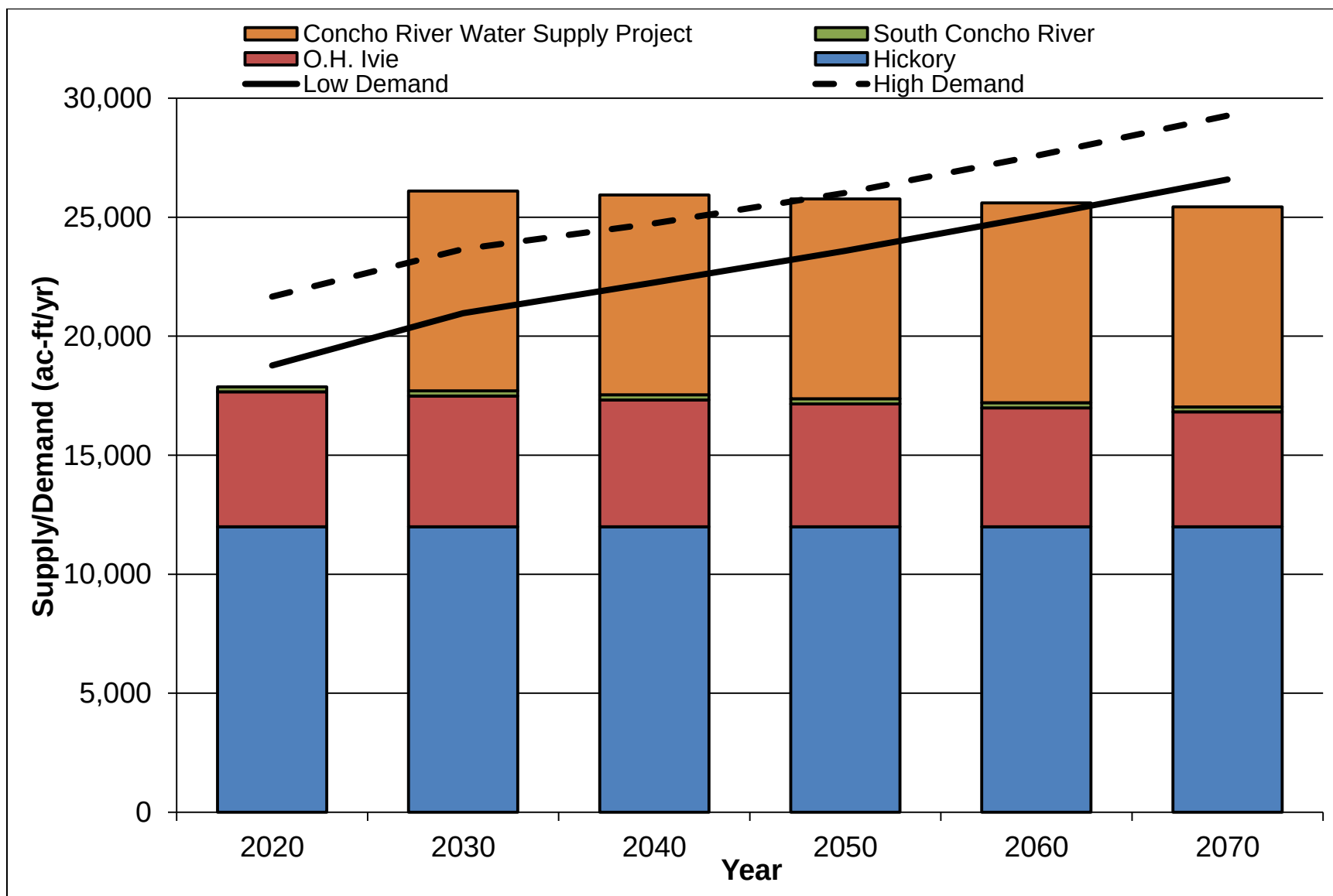


Figure ES-2: Projected Water Supplies and Demands after Implementation of the Recommended Strategy

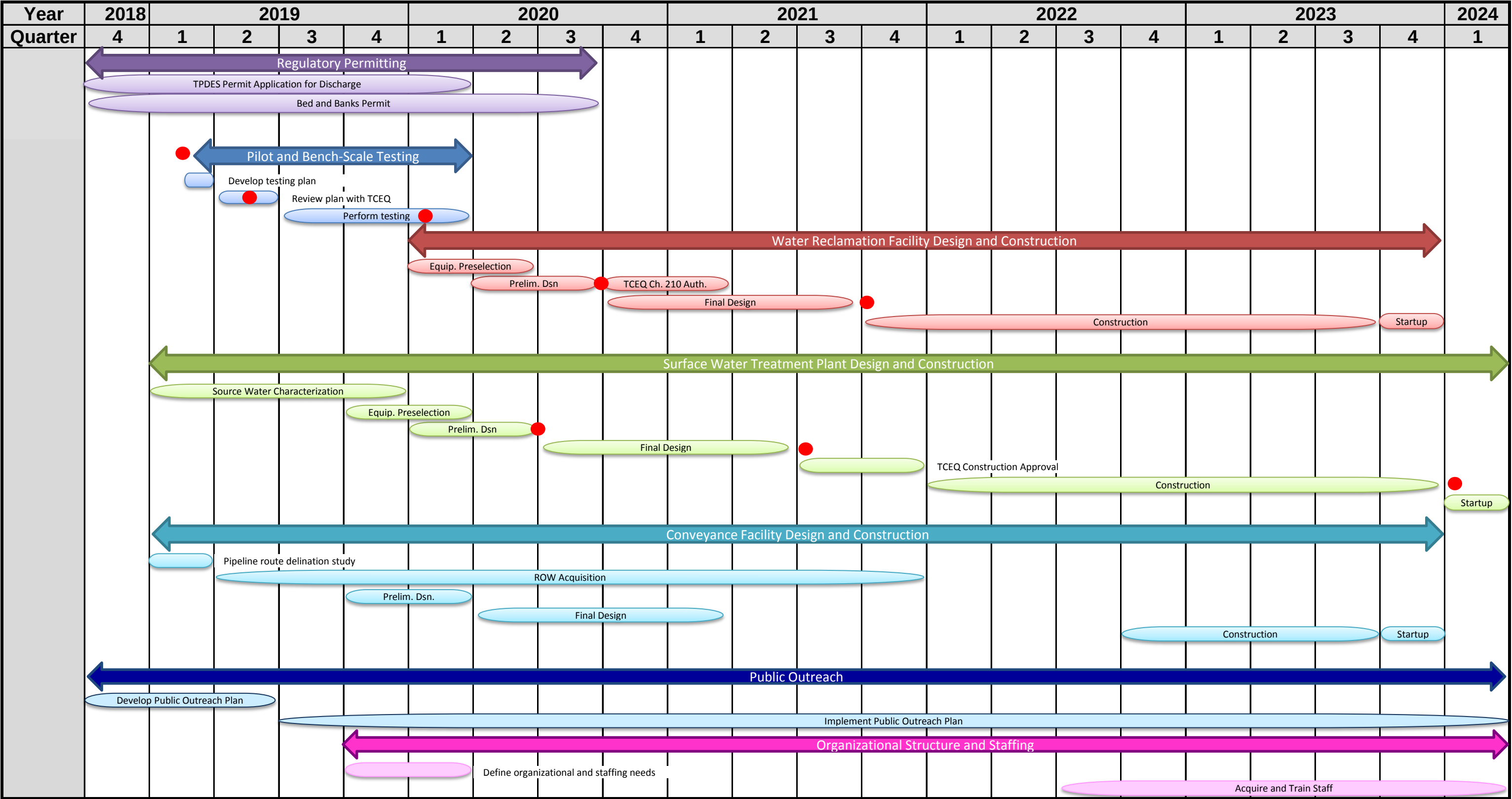
ES.3 IMPLEMENTATION PLAN FOR RECOMMENDED STRATEGY

The Concho River Water Supply Project is the recommended water supply strategy for the City. It is anticipated that development of this strategy will conservatively require between five and seven years, given the anticipated regulatory and legal hurdles to overcome. Therefore, it is imperative that the City start the process of developing this water supply as soon as possible. Successful implementation of the recommended water supply strategy will require a coordinated effort of permitting, engineering, and public outreach. Implementing the recommended strategy would include the following tasks:

1. One or more coordination meetings with the Texas Commission on Environmental Quality (TCEQ);
2. Discharge permit application and bed and banks authorization;
3. Pilot- and bench-scale testing and exception approval coordination with the TCEQ;
4. Source water characterization;
5. Pipeline route delineation and surveying;
6. Right-of-Way and/or easement acquisition;
7. Preliminary and final design of WRF and SWTP improvements;
8. Advertising, bidding, and construction of conveyance and treatment facilities; and
9. Public outreach program.

A preliminary implementation plan is presented in Figure ES-3.

Figure ES-3: Preliminary Implementation Plan for the Concho River Water Supply Project



● Anticipated meetings with TCEQ

Note: Schedule is preliminary and is subject to change following meeting with TCEQ and during preliminary engineering

CHAPTER 1

INTRODUCTION

The City of San Angelo (City or San Angelo) is located in Tom Green County; a semi-arid region that periodically experiences severe, prolonged droughts. Regional water planning projections provided by the Texas Water Development Board (TWDB) indicate that the City will experience a water supply deficit of approximately 5,957 acre-feet per year (ac-ft/yr) beginning in 2030 and growing to 12,235 ac-ft/yr in 2070. The City can obtain drinking water from six surface water supplies and a groundwater aquifer. As part of its commitment to ensure adequate water supplies for future generations, the City contracted with the Alan Plummer Associates, Inc. (APAI) and Enprotec / Hibbs & Todd, Inc. (eHT) team (Consultant Team) to perform a broad evaluation of available potable water supplies for potential incorporation into its existing supply portfolio.

1.1 BACKGROUND AND PURPOSE

This study builds on and updates the Reclaimed Water Feasibility Study², completed in 2006, and the Reclaimed Water Alternatives Evaluation³, completed in 2015. These two studies considered numerous potable reuse strategies that would enable the City to reuse its reclaimed water for potable purposes. The 2015 study was followed by a direct potable reuse (DPR) pilot study at the City's Water Reclamation Facility which was completed in December 2016.

The scopes of the previous two studies focused on the evaluation of reclaimed water strategies to meet future water supply needs. This current study considers other possible water supply strategies available to the City, including additional surface water and groundwater supplies, in addition to potable reuse.

The purpose of this study is to identify potential water supplies available to the City, evaluate their feasibility, and provide a recommended water supply implementation plan for the City.

² Alan Plummer Associates, Inc.: City of San Angelo Reclaimed Water Feasibility Study, prepared for the City of San Angelo, February 2006.

³ Alan Plummer Associates, Inc.: City of San Angelo Reclaimed Water Alternatives Evaluation, prepared for the City of San Angelo, June 2015.

1.2 SCOPE OF WORK

The project scope included the following tasks:

- Compare the City's current water supplies against projected future water demands;
- Identify potential new water sources and water management strategies to meet future demands;
- Evaluate risk factors associated with new water sources and water management strategies;
- Develop planning-level concepts of new water sources and water management strategies, including preliminary opinions of construction and annual costs;
- Prepare a Water Supply Engineering Feasibility Study report that presents a comparison of strategies for meeting existing and future water supply needs for the City and provides a plan for implementation of the recommended water supply strategy.

1.3 ORGANIZATION OF REPORT

This report is generally organized by the major tasks in the scope of work. An executive summary precedes the main body of the report. Following the current introductory chapter, the remaining chapters of the report address the topics listed below:

- CHAPTER 2: Water Demand Projections. This section presents the City's projected future water demands based on population projections and per capita usage.
- CHAPTER 3: Existing Water Supplies. The City holds water rights for six surface water sources and one groundwater source. However, not all of these water supplies are anticipated to be available during a drought year. This chapter describes the condition, quantity, and quality of the City's existing water supplies.
- CHAPTER 4: Existing Treatment Facilities. An overview of the City's water and wastewater treatment plants can be found in this chapter. It includes a discussion of each plant's capacity, treatment processes, and quality of water/wastewater produced.
- CHAPTER 5: Potential Future Water Supply. This chapter presents detailed descriptions of all 24 strategies considered in the study, including groundwater, purchased water, water reuse, and other strategies.

- CHAPTER 6: Screening Evaluation of Potential Water Supply Strategies. After the initial 24 strategies were identified, a screening workshop was conducted to reduce the number of strategies to be considered for further evaluation. This chapter presents a discussion of the strategies eliminated and the reasons for elimination.
- CHAPTER 7: Technical Evaluation of Water Supply. Four strategies were selected for detailed evaluation during the screening workshop. This chapter presents the findings of the detailed evaluation of the four strategies, which includes a water quality analysis, treatment process assessment, capital and operating opinions of probable cost, and regulatory considerations.
- CHAPTER 8: Recommended Water Supply Implementation Plan. This final chapter presents recommended steps and a schedule for implementation of the recommended water supply strategy.

CHAPTER 2

WATER DEMAND PROJECTIONS

The City of San Angelo serves a variety of municipal, light industrial, institutional and other demands including Goodfellow Air Force Base. The City is located in the Region F Water Planning Area, a region that includes 32 counties in western Texas.

Accurate water demand projections are critical when evaluating potential water management strategies. Texas has developed a robust planning effort via the regional water planning process, which occurs on a 5-year planning cycle. Regional plans are consolidated on a similar five-year cycle into the State Water Plan. The 2016 Region F Water Plan is now being updated and will be finalized in 2021, with the corresponding update to the State Water Plan in 2022.

The regional water planning process is, by design, comprehensive and conservative. Strategies identified for San Angelo in the 2016 Region F Water Plan such as subordination, brush control, municipal conservation, and desalination of brackish aquifer supplies are examples of the comprehensive nature of the planning process. Municipal demands for the 2016 Region F Water Plan were calculated by using population estimates and applying a per capita water use factor derived from 2011 as a representative hot, dry year. This methodology provides a conservative estimate of future water supply needs.

In developing demand projections for San Angelo, data developed by the Region F Water Planning Group were used. Demand projections were also developed under a less conservative methodology by using actual per capita water use with a 20% reserve capacity instead of the 2011 drought condition per capita demand. These methodologies provide upper and lower bounds for water demands used in this study.

2.1 POPULATION

Population estimates for San Angelo are shown in Table 2-1. These estimates, developed by the TWDB for the 2021 regional planning process, show the City will increase from a population of 103,243 in 2020 to 148,090 by 2070. The annual growth rate associated with this increase is approximately 0.75%.

Table 2-1: Population Projections

Year	2020	2030	2040	2050	2060	2070
San Angelo	103,243	116,437	123,653	131,315	139,451	148,090

Although many of the smaller West Texas communities are experiencing population declines, larger communities such as San Angelo have not been subject to this trend. The larger communities serve as regional business hubs, and corporations often consider relocating operations outside of the larger metropolitan areas to avoid higher property taxes, air quality concerns, and congestion. In fact, cities like San Angelo that are situated along major transportation corridors (e.g., the planned Ports to Plains Corridor) are likely candidates to attract new industry.

2.2 MUNICIPAL DEMAND

As discussed above, per capita water demands used in the regional planning process were developed using 2011 as a representative hot, dry year. These demands were then projected into the future considering savings from plumbing fixture efficiency and other conservation efforts. For San Angelo, this approach results in a municipal per capita water demand of 155 gallons per capita per day (gpcd) in 2020 with a slight downward trend to 146 gpcd in 2050. The regional planning process has the 146 gpcd remaining constant through the 2070 planning horizon.

Based on actual water usage, the current municipal per capita water demand is about 110 gpcd⁴. This demand may be partly caused by changed behavior due to drought conditions and increasing rates. Residents in West Texas cities are changing outside watering habits by reducing the use of high water need landscaping (e.g., St. Augustine grass) and through an increased use of water efficient landscaping. Additionally, increased rates to support infrastructure developed in response to recent drought events (e.g., conveyance and treatment of groundwater from the Hickory Aquifer) have served to make consumers more aware of the need for water conservation. These changes can reduce the quantity of raw water supplies needed to meet consumer demands.

⁴ Per capita water usage provided to Consultant Team by City staff.

The development of additional water supplies requires years to implement. For cities such as San Angelo, a reserve quantity of about 20% of its projected municipal demands provides available water resources for unanticipated growth or catastrophic events. Severe drought conditions are also a particular vulnerability for the City, given its reliance on O.H. Ivie as the primary surface water supply. As of August 16, 2018, the volume of water stored in O.H. Ivie was 14.1% full, with projections for the reservoir going offline in September, 2019⁵. Adopting a 20% reserve supply factor increases the 110 gpcd when calculating municipal demand to about 130 gpcd.

The municipal demand projections for the City through 2070 are summarized in Table 2-2. The table was developed using the population projections detailed in Section 2.1 and the upper and lower bound per capita demand values described in this section. Projected municipal water demand over a 30-year planning period (in 2050) ranges from a lower boundary (based on use of existing per capita usage with a 20% reserve) of 19,123 ac-ft/yr (17.1 million gallons per day (MGD)) to an upper boundary (based on Region F planning methodology) of 21,556 ac-ft/yr (19.2 MGD).

2.3 ANNUAL AVERAGE WATER DEMAND

While municipal demands make up the bulk of San Angelo's potable water needs (over 80%), the City has other potable water demands that must be met. Goodfellow Air Force Base (an institutional user served by the City) is not included in the population projections developed by the TWDB. The 2016 Region F Water Plan projected this demand at 353 ac-ft/yr in 2020, increasing to 488 ac-ft/yr in 2070. The Upper Colorado River Authority (UCRA) is contracted with San Angelo for 1,000 ac-ft/yr. Additionally, manufacturing demand in Tom Green County met by San Angelo is projected in the 2016 Region F Water Plan to be 2,387 ac-ft/yr in 2020 increasing to 3,531 ac-ft/yr in 2070.

These demands are combined with the City's municipal demand projections in Table 2-3. The City's projected total water demand in 2070 ranges between 26,585 ac-ft/yr and 29,269 ac-ft/yr (23.7 MGD and 26.1 MGD), depending on methodology used.

⁵ Projection developed by the Colorado River Municipal Water District with the assumption of no additional runoff.

Table 2-2: Municipal Demand Projections

Year	2020		2030		2040		2050		2060		2070	
Population	103,243		116,437		123,653		131,315		139,451		148,090	
Per Capita Use (gpcd)	155 ¹	130 ²	151 ¹	130 ²	148 ¹	130 ²	146 ¹	130 ²	146 ¹	130 ²	146 ¹	130 ²
Demand (ac-ft/yr)	17,924	15,035	19,657	16,957	20,494	18,007	21,556	19,123	22,847	20,308	24,250	21,566
Demand (MGD)	16.0	13.4	17.5	15.1	18.3	16.1	19.2	17.1	20.4	18.1	21.6	19.3

1. Represents the upper range of municipal demand for planning purposes. Based on the Region F water planning methodology.

2. Represents the lower range of municipal demand. Based on existing per capita usage with a 20% reserve.

Table 2-3: Potable Water Demand Projections (ac-ft/yr)

Year	2020		2030		2040		2050		2060		2070	
Municipal	17,924 ¹	15,035 ²	19,657 ¹	16,957 ²	20,494 ¹	18,007 ²	21,556 ¹	19,123 ²	22,847 ¹	20,308 ²	24,250 ¹	21,566 ²
Manufacturing³	2,387		2,615		2,839		3,034		3,273		3,531	
UCRA	1,000		1,000		1,000		1,000		1,000		1,000	
Goodfellow AFB	353		391		411		434		460		488	
Total (ac-ft/yr)	21,664	18,775	23,663	20,963	24,744	22,257	26,024	23,591	27,580	25,041	29,269	26,585

1. Represents the upper range of municipal demand for planning purposes. Based on the Region F water planning methodology.

2. Represents the lower range of municipal demand. Based on existing per capita usage with a 20% reserve.

3. Obtained from the 2016 Region F Water Plan.

2.4 PEAK DAY WATER DEMAND

Potable water demand projections presented in Section 2.3 reflect the average annual quantity needed through the planning period. However, demands on a seasonal or monthly basis vary throughout the year with higher volumes used during summer months and lower volumes during winter months. In addition to meeting these seasonal variations, the water utilities department must also respond to varying daily production needs.

Information was obtained from City staff on the peak day water demand for the past 10 years. These data are presented in Table 2-4, and are based on water entering the distribution system. Overall, there is a declining trend in peak day demand over the 10-year period, which is consistent with increased conservation resulting largely from more efficient landscaping practices and increased rates. The notable exception is 2011, which is the year used by the TWDB to represent hot, dry conditions.

Table 2-4: Peak Day Water Demand

Year	Month Highest Usage Occurred	Peak Day (MGD)	Average Day (MGD)	Ratio
2008	June	23.6	13.6	1.7
2009	June	23.8	12.7	1.9
2010	August	23.6	13.9	1.7
2011	June	26.6	15.8	1.7
2012	June	20.0	12.8	1.6
2013	June	19.0	11.8	1.6
2014	August	17.3	11.3	1.5
2015	July	18.9	11.7	1.6
2016	August	18.0	11.1	1.6
2017	September	21.7	11.5	1.9

The peak day factor ranges from a low of 1.5 up to a high of 1.9. Water conveyance and production facilities will be required to have capacity to meet peak day demands. Table 2-5 presents the peak day projections through 2070 using a peaking factor of 1.7.

Table 2-5: Peak Day Water Supply and Treatment Requirements

Year	2020		2030		2040		2050	
Demand	Average	Peak	Average	Peak	Average	Peak	Average	Peak
High (MGD)	18.9	32.1	20.7	35.2	21.6	36.7	22.8	38.8
Low (MGD)	16.3	27.7	18.3	31.1	19.4	33.0	20.6	35.0

CHAPTER 3

EXISTING WATER SUPPLIES

The City of San Angelo obtains water for municipal uses from both surface water and groundwater sources. In addition, the City provides treated effluent to the Tom Green County Water Control and Improvement District #1 (TGCWCID #1) for irrigation. Currently available water supplies are described in the following sections.

3.1 SURFACE WATER SUPPLIES

3.1.1 Overview of Existing Surface Water Supplies

The City of San Angelo holds surface water rights in the Concho River Basin and has also contracted for surface water from other sources. Currently, the City holds water rights or contracts for surface water from six sources: Twin Buttes Reservoir, Lake Nasworthy, O.C. Fisher Lake, O.H. Ivie Reservoir, E.V. Spence Reservoir, and direct diversions from the South Concho River and the Concho River main stem.

3.1.1.1 Water Rights and Contracts

Table 3-1 summarizes the water rights for the City's raw surface water supplies, and Figure 3-1 shows the location of the City's sources. Based on these water rights and existing infrastructure, the City could potentially divert up to approximately 124,688 ac-ft/yr of surface water for municipal uses. However, these water supplies are not fully reliable; during drought-of-record conditions, there will be little water available from many of these supplies. According to the 2016 Region F Water Plan, the 2020 municipal surface water supply based on the safe yield of the reservoirs is 6,173 ac-ft/yr, with about 97% of the available supply obtained from the Colorado River Municipal Water District and delivered from O.H. Ivie.⁶

⁶ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, prepared for the Region F Water Planning Group, November 2015.

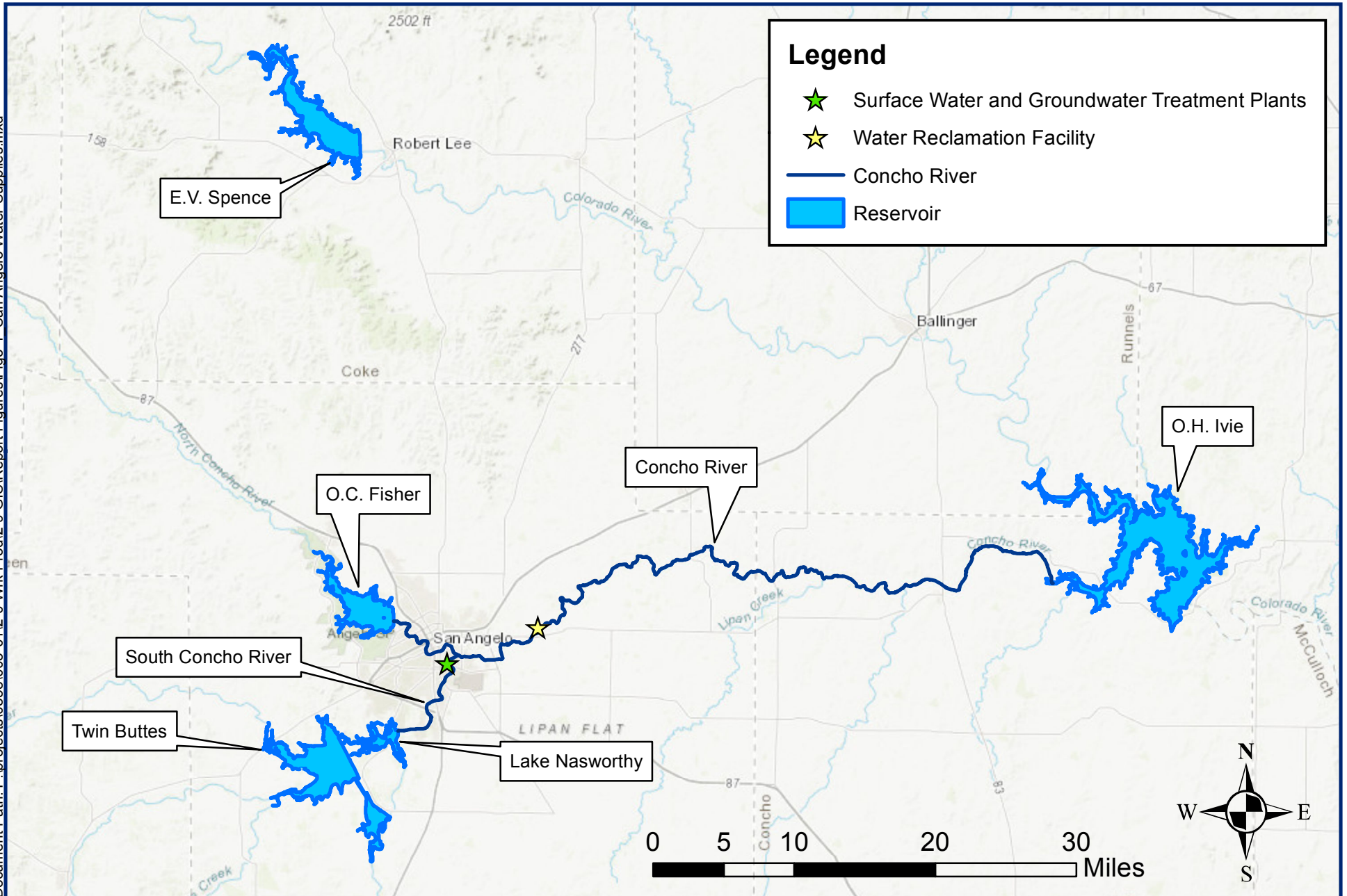
Table 3-1: San Angelo Surface Water Rights and Contracts from TCEQ Water Rights Database

Water Right No.	Owner	Authorized Annual Diversion Amount (ac-ft)¹	Allowable Annual Diversion to City (ac-ft)	Reservoir Name
1008	Colorado River Municipal Water District	38,573	3,000	<i>E.V. Spence</i>
1190	Upper Colorado River Authority	80,400	78,900 ²	<i>O.C. Fisher</i>
1298	City of San Angelo	252.1	252.1	<i>S. Concho River</i>
1318	City of San Angelo	29,000 ³	4,000	<i>Twin Buttes</i>
1319	City of San Angelo	17,000	17,000	<i>Nasworthy</i>
1325	City of San Angelo	1,534	1,534	<i>S. Concho River</i>
1401	City of San Angelo	5,000	5,000	<i>S. Concho River</i>
3676	Colorado River Municipal Water District	103,000	15,001.78	<i>O.H. Ivie</i>
Total		274,759	124,688	-

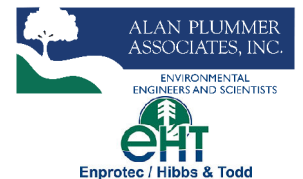
1. Indicates that the approved annual diversion to the City can be diverted and used for municipal purposes. The City either owns or has contracted for the "allowable" diversion amount and can divert up to this amount if there is sufficient water available after obligations to senior water rights are met.

2. According to an unpublished summary of San Angelo water rights compiled by R. J. Brandes Co., July 26, 2001.

3. The authorized diversion of 29,000 ac-ft/yr for municipal purposes includes the 25,000 ac-ft/yr in authorized diversions for Lake Nasworthy, so only 4,000 ac-ft/yr is shown as available to the City to divert for municipal purposes.



City of San Angelo Water Supply Engineering Feasibility Study
Figure 3-1: City of San Angelo Water Supplies



The City also has the rights to divert up to 790 ac-ft/yr from the Concho River downstream of the City, but no infrastructure is in place to convey this water to the City's water treatment plant. The Texas Commission on Environmental Quality (TCEQ) is revising the Colorado River Basin Water Availability Model (WAM), so the reliability of these supplies has not been established.

The City has contracts with the Colorado River Municipal Water District (CRMWD) for up to 16.54% of the annual safe yield of O. H. Ivie and up to 6% of the annual safe yield of E. V. Spence.

A series of contracts governs the allocation of water from Twin Buttes Reservoir between the City of San Angelo and the TGCWCID #1. In addition, the TGCWCID #1 has contracted for reclaimed water from the City. These contracts are summarized in the 2015 Reclaimed Water Alternatives Evaluation.⁷

3.1.2 Supply Yield and Reliability

Firm and safe yields have been estimated for each of the City's surface water supplies using the TCEQ's Colorado River Basin WAM. Firm yield is the estimated amount of water that can be supplied from a source each year with 100% reliability based on historical data. The safe yield is the estimated amount of water that can be supplied from a source each year and still maintain at least a one-year supply in storage at the critical point in the drought cycle. The safe yield is less than the firm yield.

Recent droughts have replaced the historical drought of record. As these droughts have been incorporated into the WAM, the estimated firm and safe yields for the City's surface water supplies have been reduced. For each of the City's surface water supplies, the following sections summarize the estimated firm and safe yields, as revised, and summarize historical water levels.

⁷ Alan Plummer Associates, Inc.: Final Report, Reclaimed Water Alternatives Evaluation, prepared for the City of San Angelo, June 2015.

3.1.2.1 O.H. Ivie Reservoir

Based on current drought conditions, the estimated firm and safe yields for O.H. Ivie have been reduced by more than half (Table 3-2). As of August 16, 2018, the reservoir was 14.1% full. O.H. Ivie has not been full in more than 20 years (Figure 3-2). In other words, O.H. Ivie remains in a persistent hydrologic drought that began in 1997. This drought will not be considered over until the conservation pool refills.

Table 3-2: Estimated Firm and Safe Yields for O. H. Ivie

Region F Water Plan	Firm Yield (ac-ft/yr)	Safe Yield (ac-ft/yr)
2001	96,169	85,890
2006	110,000	67,700
2011	85,150	67,700
2016	43,400	36,030



Figure 3-2: Historical Water Storage in O. H. Ivie

3.1.2.2 Twin Buttes Reservoir/Lake Nasworthy System

Based on current drought conditions, the estimated firm and safe yields for the Twin Buttes/Nasworthy system have been reduced to zero (Table 3-3). As of August 16, 2018, Twin Buttes was 8% full and Nasworthy was 78.7% full. The City typically releases water from Twin Buttes to maintain a relatively constant water level in Nasworthy (Figure 3-3). Twin Buttes has not been full in more than 40 years (Figure 3-4). This drought will also not be considered over until the conservation pool refills.

Table 3-3: Estimated Firm and Safe Yields for the Twin Buttes/Lake Nasworthy System

Region F Water Plan	Firm Yield (ac-ft/yr)	Safe Yield (ac-ft/yr)
2001	16,800	13,500
2006	10	0
2011	10	0
2016	0	0

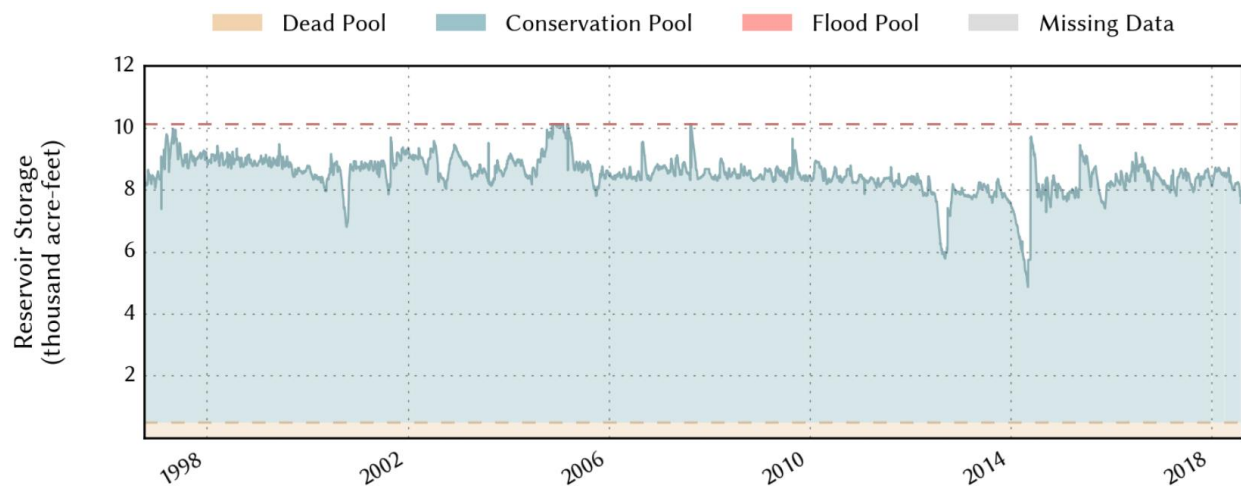


Figure 3-3: Historical Water Storage in Lake Nasworthy

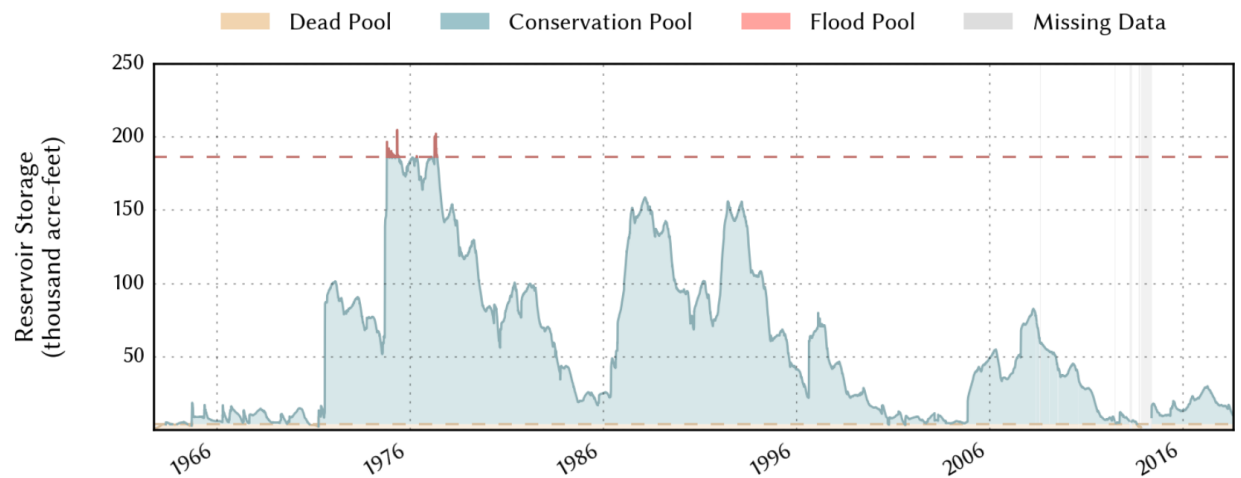


Figure 3-4: Historical Water Storage in Twin Buttes

3.1.2.3 O.C. Fisher Reservoir

Based on current drought conditions, the estimated firm and safe yields for O.C. Fisher have been reduced to zero (Table 3-4). As of August 16, 2018, O.C. Fisher was 8.1% full. The reservoir has not been full in more than 60 years (Figure 3-5). Similar to the other reservoirs, O.C. Fisher remains in a persistent drought until the storage volume recovers to the conservation pool.

Table 3-4: Estimated Firm and Safe Yields for O. C. Fisher

Region F Water Plan	Firm Yield (ac-ft/yr)	Safe Yield (ac-ft/yr)
2001	2,973	2,257
2006	0	0
2011	0	0
2016	0	0

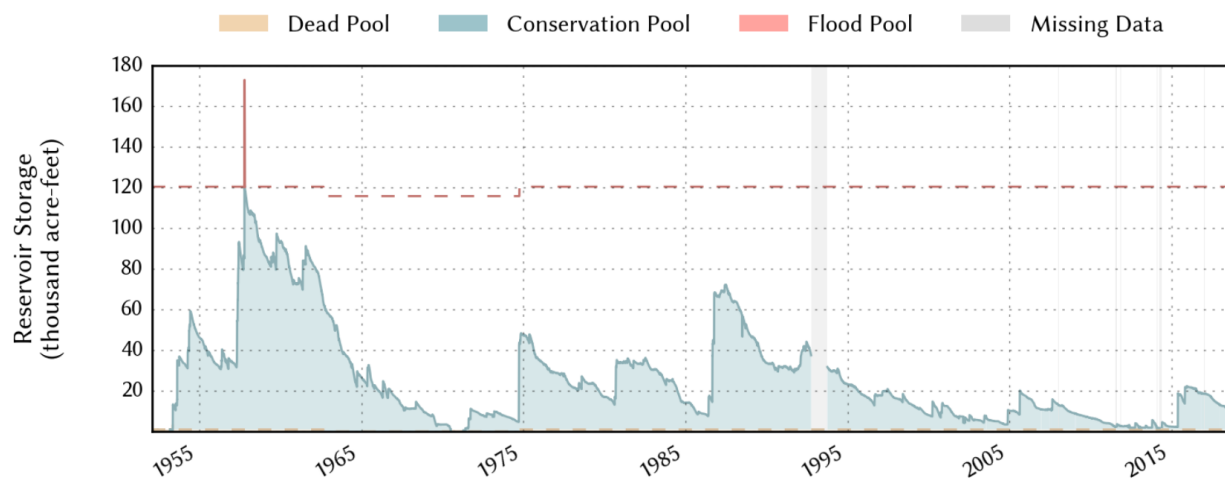


Figure 3-5: Historical Water Storage in O. C. Fisher

3.1.2.4 E.V. Spence Reservoir

Based on current drought conditions, the estimated firm and safe yields for E.V. Spence have been reduced to zero (Table 3-5). As of August 16, 2018, E.V. Spence was 11.7% full. This reservoir has never been full in its 49-year history and remains in a persistent drought (Figure 3-6).

Table 3-5: Estimated Firm and Safe Yields for E. V. Spence

Region F Water Plan	Firm Yield (ac-ft/yr)	Safe Yield (ac-ft/yr)
2001	38,776	34,450
2006	6,170 ¹	560
2011	6,170	560
2016	0	0

1. Reported as 100 ac-ft/yr, but this is not consistent with the safe yield. The correct value is most likely 6,170 ac-ft/yr, as shown in the 2011 Region F Water Plan

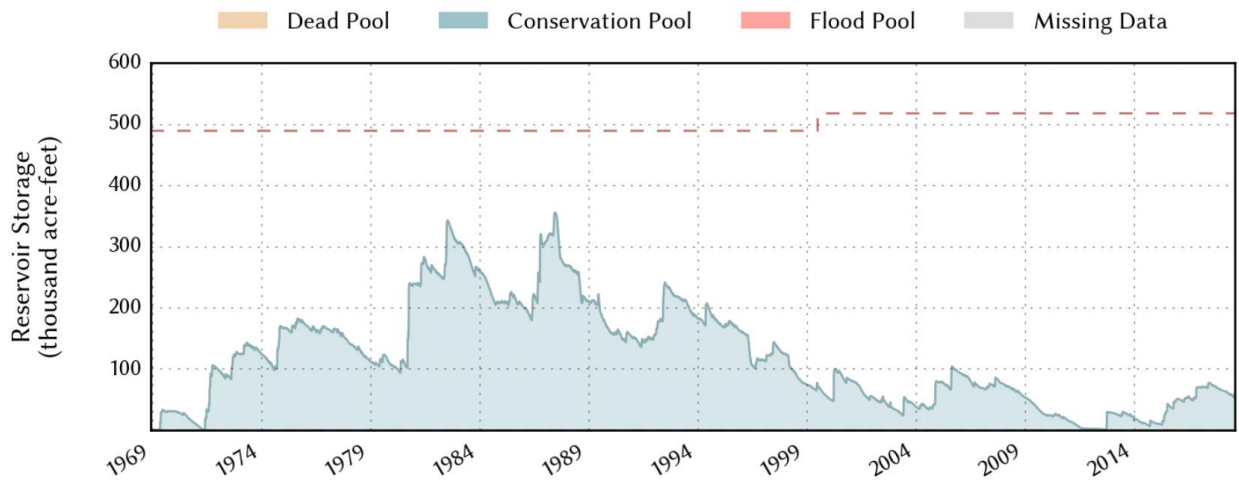


Figure 3-6: Historical Water Storage in E. V. Spence

3.1.2.5 South Concho River

Based on current drought conditions, the Region F planning team concluded that the Concho River has a run-of-river supply of 214 ac-ft/yr (Table 3-6).⁸

Table 3-6: Estimated Firm and Safe Yields for City Water Rights in the South Concho River¹

Region F Water Plan	Firm Yield (ac-ft/yr)	Safe Yield (ac-ft/yr)
2001	2,127	n/a
2006	n/a	642
2011	n/a	642
2016	n/a	214

1. Does not include downstream water rights which the City cannot divert and use with existing infrastructure.

⁸ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume II, Appendix B, Page 1, prepared for the Region F Water Planning Group, November 2015.

3.1.3 Water Quality

The surface water supplies in this region of Texas have high naturally occurring dissolved solids such as chloride and sulfate. While not a significant health concern, dissolved solids impact the aesthetic quality of water. The concentration of total dissolved solids (TDS) is the measurement of the total ions in solution, including primarily chloride and sulfate, but also calcium, magnesium, nitrate, and others, to a lesser extent. Secondary standards have been established by federal and state agencies these. The State of Texas has set secondary drinking water standards for chloride, sulfate, and TDS at 300 mg/L, 300, mg/L, and 1,000 mg/L, respectively.

The historically measured median concentrations of these three parameters in the City's surface water supplies compared with the secondary standards are presented in Table 3-7. E.V. Spence and the Concho River have the highest concentrations of these parameters with median values that exceed the secondary standards. While the median values for the other supplies do not exceed the standards, they are still elevated. For comparison, the federal secondary standards for chloride, sulfate, and TDS are 200 mg/L, 200 mg/L, and 500 mg/L, respectively.

A dissolved solids magnification effect can be observed in the Twin Buttes / Lake Nasworthy / Concho River system. Water leaves Twin Buttes with a median TDS concentration of 418 mg/L, increases to 699 mg/L in Lake Nasworthy, and is 1,275 mg/L in the Concho River.

Table 3-7: Quality of City Surface Water Sources Relative to Selected Texas Secondary Drinking Water Standards

Source	Chloride	Sulfate	TDS
Texas Secondary Drinking Water Standard (mg/L)	300	300	1,000
Median Concentrations			
E.V. Spence	765	506	2,110
Lake Nasworthy	216	86	699
Twin Buttes	98	38	418
O. C. Fisher	98	44	554
O. H. Ivie	202	225	820
Concho River	419	205	1,275

Dissolved solids in water are difficult to remove, and the treatment technologies available are typically expensive to operate and generate a waste stream that must be disposed. The available treatment methods for removing TDS include reverse osmosis, ion exchange, electrodialysis reversal, or distillation.

The TCEQ frequently reviews the water quality of Texas surface water. Table 3-8 shows reported water quality impairments from the TCEQ's 2014 Index of Water Quality Impairments.

Table 3-8: Water Quality Impairments for City Surface Water Sources

Source	Segment Number	Concern*
Twin Buttes	1423	None listed
Lake Nasworthy	1422	None listed
South Concho River	1421	None listed
O. C. Fisher	1425	Chloride (5c) TDS (5c)
E. V. Spence	1411	Chloride (5c) Sulfate (4a) TDS (4a)
O. H. Ivie	1433	None listed

* From TCEQ's 2014 Index of Water Quality Impairments.

(4a) = All Total Maximum Daily Load (TMDL) assessments have been completed and approved by EPA.

(5c) = Additional data or information will be collected and/or evaluated for one or more parameters before a management strategy is selected.

In addition to chloride, sulfate, and TDS, the Consultant Team evaluated a number of other water quality parameters when evaluating the feasibility of integrating a new water supply including nitrate, hardness, alkalinity, and total organic carbon, to name a few. The 2015 Reclaimed Water Alternatives Evaluation contains a more detailed discussion of water quality.⁹

3.2 GROUNDWATER SUPPLY

The City's Hickory Aquifer wellfield consists of 15 wells located in McCulloch County and transmission facilities to transport the water 62 miles to the City. The City's Groundwater Treatment Facility (GWTF) provides iron oxidation and removal, and radium reduction through a non-regenerable ion exchange system. Once fully developed, the Hickory Aquifer groundwater supply will be capable of producing an average of 10.8 MGD.

A Phase II project for the Hickory System is currently underway to upgrade and expand the existing well supply system, groundwater transmission system and the GWTF. Expansion of the existing wellfield will consist of the drilling of up to seven new wells, as well upgrading of the

⁹ Alan Plummer Associates, Inc.: Final Report, Reclaimed Water Alternatives Evaluation, prepared for the City of San Angelo, June 2015.

some of the oldest wells to increase operating rotational flexibility of the wells. The groundwater transmission system will be upgraded to enhance remote operational capability of the well system to maximize system online time. Improvements to the GWTF will include installation of additional oxidation contactors, iron removal filters, ion exchange radium reduction reactors, and addition of a new residuals management system. The Phase II Hickory project will also include additional improvements to the existing SWTP, such as replacement of the existing finished water clearwell.

Table 3-9 summarizes the City's groundwater rights in the Hickory Aquifer. These rights allow the City to bank groundwater through 2026. The City currently has approximately 40,000 acre-feet (ac-ft) of groundwater banked, with a peak production capacity of approximately 9,000 ac-ft/yr (8 MGD), limited by the GWTF. Beginning in the year 2022, the City can produce an average supply of 10,000 ac-ft/yr (even though their allocation will only be 5,000 ac-ft/yr) because of the amount of water that will be banked, assuming that the capacity of the GWTF has been expanded under the current project. The allocation amount will increase to 10,000 ac-ft/yr in 2026 and 12,000 ac-ft/yr in 2036. To develop the full supply, the City is currently installing more wells, upgrading the pump stations, and expanding its treatment capacity. The Hickory groundwater supply and demand is shown visually in Figure 3-7.

Table 3-9: San Angelo Groundwater Rights in the Hickory Aquifer

Begin Date	End Date	Annual Production (ac-ft/yr)	Bankable Amount (% of annual production)	Maximum Annual Use Including Withdrawals from Banked Amount (ac-ft/yr)
3/14/1996	3/13/2006	1,500	100%	10,000
3/14/2006	3/13/2021	2,750	100%	15,000
3/14/2021	3/13/2026	5,000	100%	15,000
3/14/2026	3/13/2036	10,000	0%	12,000
3/14/2036	None	12,000	0%	12,000

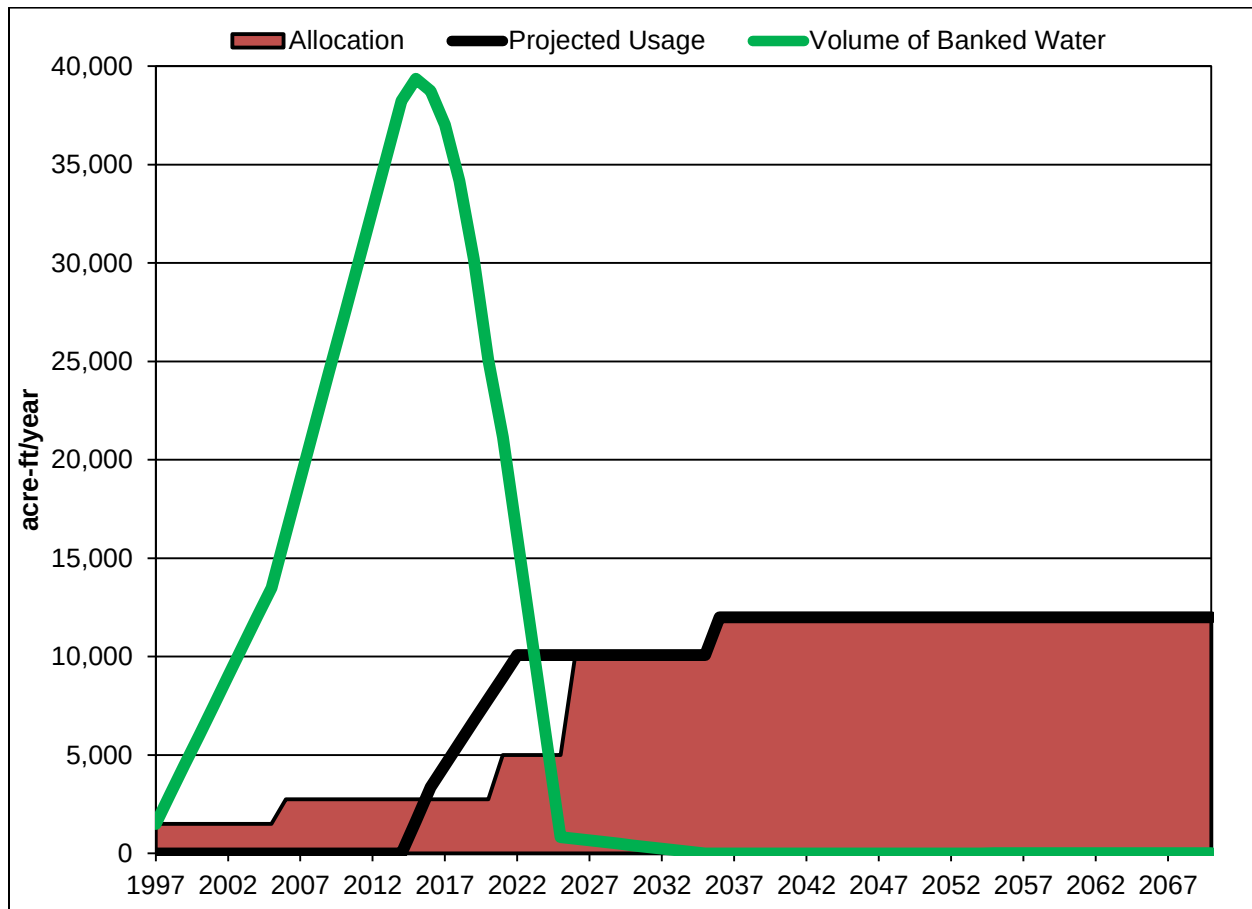


Figure 3-7: Hickory Groundwater Supply and Demand

3.2.1 Water Quality

The City's Hickory Aquifer water generally meets the Texas secondary drinking water standards, with the exception of iron and radionuclides (such as Combined Radium [Radium-226 and Radium-228 isotopes] and Gross Alpha Particles). The GWTF provides iron oxidation and removal, and radionuclide reduction through ion exchange. The mineral content of the Hickory groundwater is generally between that of Twin Buttes and Lake Nasworthy, with median chloride, sulfate, and TDS concentrations of 52 mg/L, 75 mg/L, and 519 mg/L, respectively.

3.3 RECLAIMED WATER

The City treats municipal wastewater at its WRF. The TCEQ currently permits the City to "dispose" of up to 16.3 MGD of treated wastewater effluent (or reclaimed water) through evaporation and irrigation on up to 2,787 acres of pasture and cropland located north of the WRF on the north side of the Concho River (permit WQ0010641003), known as the "City Farm".

3.3.1 Reclaimed Water Authorization

In addition, the TCEQ has authorized use of the City's reclaimed water to irrigate land within the southern service area of TGCWCID #1 (authorization R120641-003). The TCEQ has further authorized the use of reclaimed water for the following purposes in a service area that roughly corresponds to the City's Certificate of Convenience and Necessity (authorization R120641-003A):

- Irrigation of landscape, public parks, schoolyards, athletic facilities, cemeteries, golf courses, and restricted landscaped areas surrounding commercial or industrial complexes;
- Soil compaction or dust control in construction areas;
- Cooling tower makeup water; and
- Industrial process water.

3.3.2 Current Use of Reclaimed Water

Currently, all reclaimed water is used for irrigation, either by the TGCWCID #1 or at the City Farm.

3.4 SUMMARY OF CURRENTLY AVAILABLE WATER SUPPLIES

Based on information provided in the previous sections, the projected water supplies from currently available sources are shown in Table 3-10. The projected supplies are based on existing contract provisions and existing infrastructure.

Table 3-10: Projected Water Supplies from Currently Available Sources

Source	Projected Supply (ac-ft/yr)					
	2020	2030	2040	2050	2060	2070
South Concho River ¹	214	214	214	214	214	214
San Angelo System ²	0	0	0	0	0	0
O. H. Ivie ³	5,660	5,492	5,324	5,156	4,988	4,820
Hickory Aquifer	12,000 ⁴	12,000 ⁴	12,000 ⁵	12,000 ⁵	12,000 ⁵	12,000 ⁵
Total Available	17,874	17,706	17,538	17,370	17,202	17,034

1. Equal to run-of-river water rights upstream of Bell Street Reservoir reported in 2016 Region F Water Plan, Table 5D-13.

2. Twin Buttes, Lake Nasworthy, and O. C. Fisher. All these reservoirs have a safe yield of 0 ac-ft/yr.

3. Equal to 16.54% of the safe yield of the reservoir. From the 2016 Region F Water Plan, Table 5D-13.

4. The City can withdraw more than their allocation for short periods due to the volume of banked water available.

5. The City's annual allocation of Hickory groundwater increases to 12,000 ac-ft/yr from 2036 onward.

3.4.1 Reliability of O.H. Ivie

As noted above, the City's supply from O.H. Ivie, based on safe yield, is projected to be 5,660 ac-ft/yr in 2020, decreasing to 4,820 ac-ft/yr in 2070 due to sediment accumulation in the lake. However, it is recommended that the City plan for the possibility of temporarily losing O.H. Ivie as a water supply due to the persisting drought of record, and ongoing overdrafting of the reservoir.¹⁰ To mitigate the impact of potential loss of supply from O.H. Ivie, it is recommended that the City pursue contracts with the City of Abilene and/or CRMWD to secure water from other sources that can be used as a short-term emergency supply. However, for the remainder of this report, which focuses on intermediate and long-term supply needs, it is assumed that the safe yield supply from O.H. Ivie will be available to the City.

3.5 AVAILABLE WATER SUPPLIES VERSUS PROJECTED DEMAND

The projected potable water demands presented in Chapter 2 were compared against the City's currently available water supplies to determine the additional amount of water required to meet future demands. The projected supplies and demands are presented in Table 3-11 and Figure 3-8. It is anticipated that the City will experience a potable water deficit of 5,957 ac-ft/yr in 2030, growing to over 12,235 ac-ft/yr in 2070, under the high demand scenario.

Table 3-11: Projected Drought Supplies and Demands (ac-ft/yr)

Year	2020	2030	2040	2050	2060	2070
South Concho River ¹	214	214	214	214	214	214
O.H. Ivie ²	5,660	5,492	5,324	5,156	4,988	4,820
Hickory Aquifer	12,000 ³	12,000 ³	12,000 ⁴	12,000 ⁴	12,000 ⁴	12,000 ⁴
Total Supplies	17,874	17,706	17,538	17,370	17,202	17,034
"Low" Demand	18,775	20,963	22,257	23,591	25,041	26,585
"Low" Deficit	(901)	(3,257)	(4,719)	(6,221)	(7,839)	(9,551)
"High" Demand	21,664	23,663	24,744	26,024	27,580	29,269
"High" Deficit	(3,790)	(5,957)	(7,206)	(8,654)	(10,378)	(12,235)

1. Equal to safe yield reported in 2016 Region F Water Plan, Table 5D-13.

2. Equal to 16.54% of the safe yield of the reservoir. From the 2016 Region F Water Plan, Table 5D-13.

3. Though the City's allocation is less than 12,000 ac-ft/yr during these years, the City's volume of banked water would allow them to withdraw 12,000 ac-ft/yr for a short time.

4. Limited by the City's allocation of 12,000 ac-ft/yr.

¹⁰ CRMWD currently allows diversions from the reservoir in excess of those supported by existing safe yield estimates.

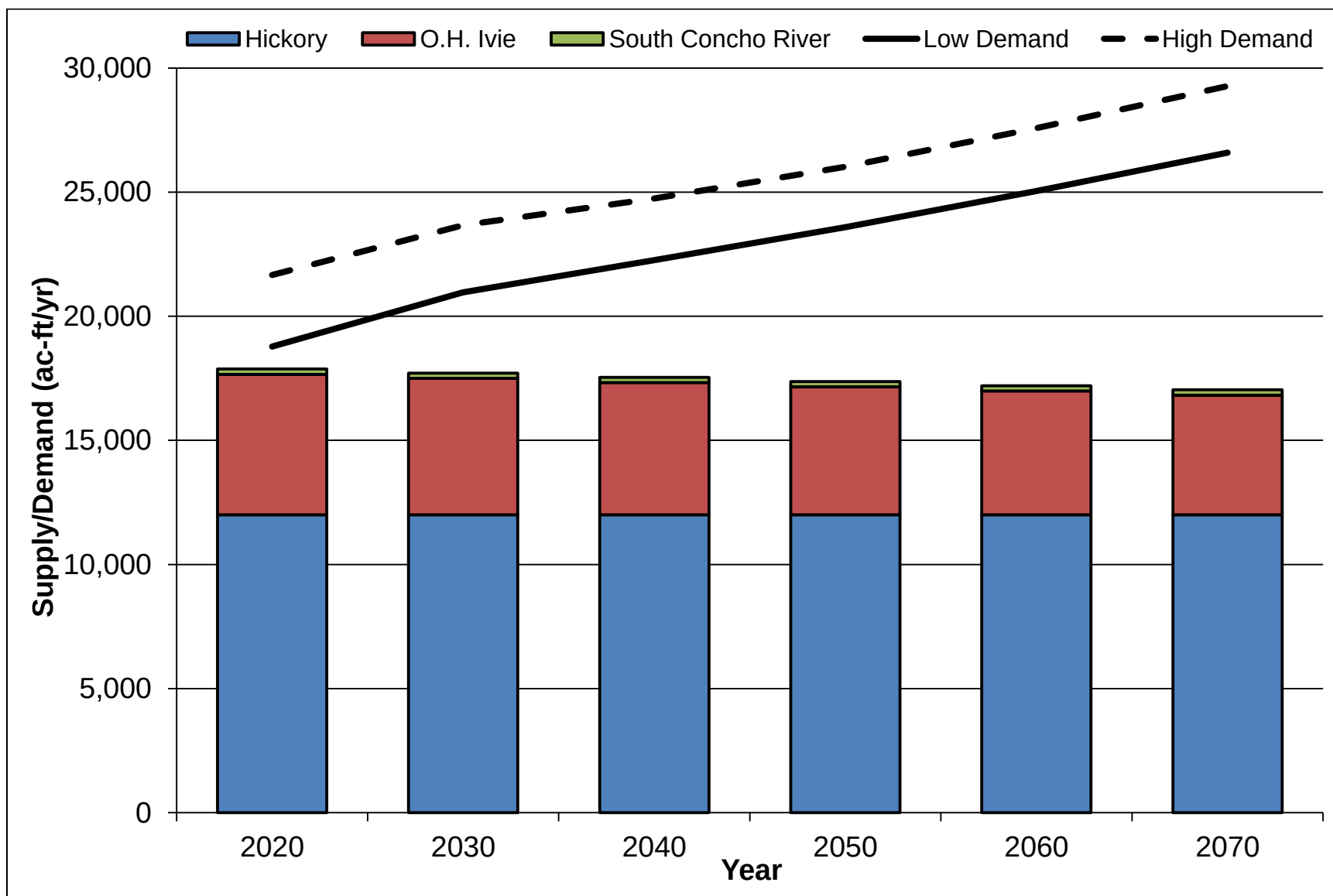


Figure 3-8: Projected Drought Supplies and Demands

CHAPTER 4

EXISTING TREATMENT FACILITIES

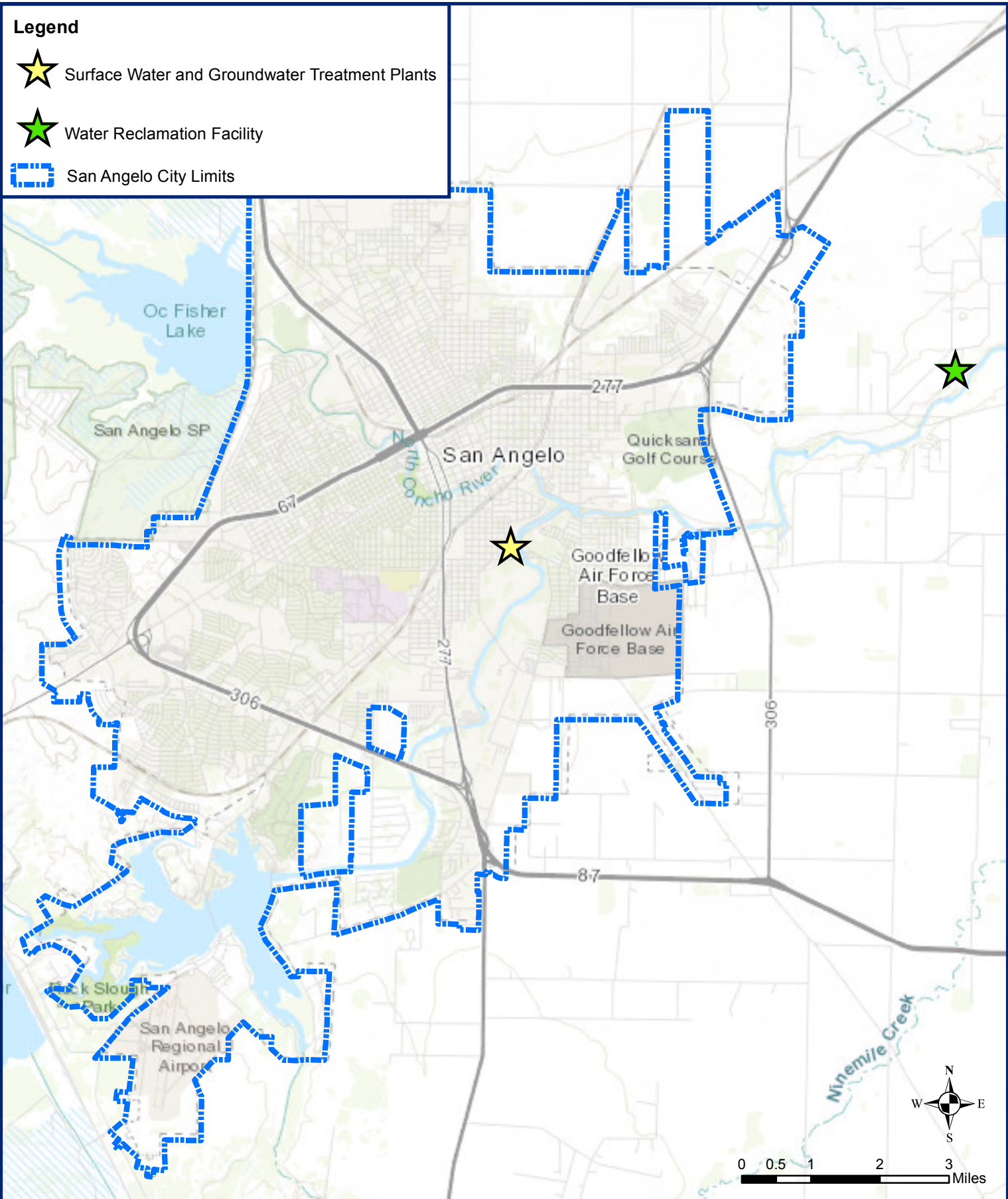
The City currently has one WRF for treating wastewater, one SWTP for treating surface water, and one GWTF for treating groundwater. The SWTP and GWTF are co-located. The possible water supply strategies discussed later in this report may require upgrades and/or expansions to these existing treatment facilities, or entirely new facilities depending on the strategy selected. The locations of the WRF, SWTP, and GWTF are shown in Figure 4-1, and detailed descriptions of these facilities are provided in the sections below.

4.1 WASTEWATER TREATMENT FACILITY

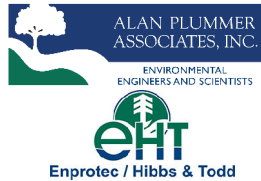
The City currently treats all of its wastewater at the WRF, which is located northeast of the City center along the Concho River. The WRF, its capacity and permit limits, influent and effluent wastewater quality, and treatment processes are described in this section.

4.1.1 Description, Capacity, and Permit Limits

Figure 4-1 displays the location of the WRF. The WRF and disposal site are approximately 3.2 miles east-northeast of the intersection of State Highway Loop 306 and Farm-to-Market Road (FM) 380. The WRF was originally constructed with one primary clarifier, one sludge thickener and two anaerobic digesters. The treatment system was expanded in 1974 to include a new primary clarifier, two aeration basins, two final clarifiers, a chlorine contact basin, and the conversion of the two anaerobic digesters to aerobic digesters. In 1992, the WRF was improved by adding bar screens, a new grit collection system, two primary clarifiers, and two final clarifiers. The City also made improvements to the solids handling facilities by adding a sludge handling building containing three belt presses. In 2001, the City made improvements to the sludge management processes by adding a gas holder, three gravity belt thickeners, converting the two aerobic digesters to holding tanks, and constructing three anaerobic digesters.



City of San Angelo Water Supply Engineering Feasibility Study
Figure 4-1: Treatment Facility Locations



The WRF is permitted for an annual average flow of 16.3 MGD. All effluent is currently land applied at the City Farm or provided to the TGCWCID#1 for irrigation water. The effluent permit limits for the facility are shown in Table 4-1. The City is required to monitor these parameters weekly and to continuously monitor the amount of effluent flow.

Table 4-1: Effluent Wastewater Permit Limits

Parameter	Description	Units	Permit Limit
BOD ₅	Maximum Single Grab	mg/L	65
pH	Minimum	S.U.	6.0
	Maximum	S.U.	9.0

The City pumps effluent to two storage reservoirs approximately 1.5 miles north of the WRF that have a combined capacity of 3,200 ac-ft. Effluent is then pumped from these reservoirs either to the City Farm or to the TGCWCID#1. The annual average flows are presented in Table 4-2, and statistics on the daily average flows are presented in Table 4-3. The average daily effluent produced from the WRF is shown in Figure 4-2.

Table 4-2: Annual Average Daily Effluent

Year	Annual Average Daily Effluent (MGD)
2009	8.40
2010	8.86
2011	8.66
2012	8.29
2013	7.94
2014	8.20
2015	8.58
2016	8.22
2017	7.63

Table 4-3: WRF Daily Average Effluent Statistics

Description	Value (MGD) ¹
10 th Percentile	7.5
25 th Percentile	7.9
50 th Percentile	8.3
75 th Percentile	8.7
90 th Percentile	8.9

1. Calculated from monthly totals collected between Jan. 2009 and Dec. 2017, dividing by the number of days in each month.

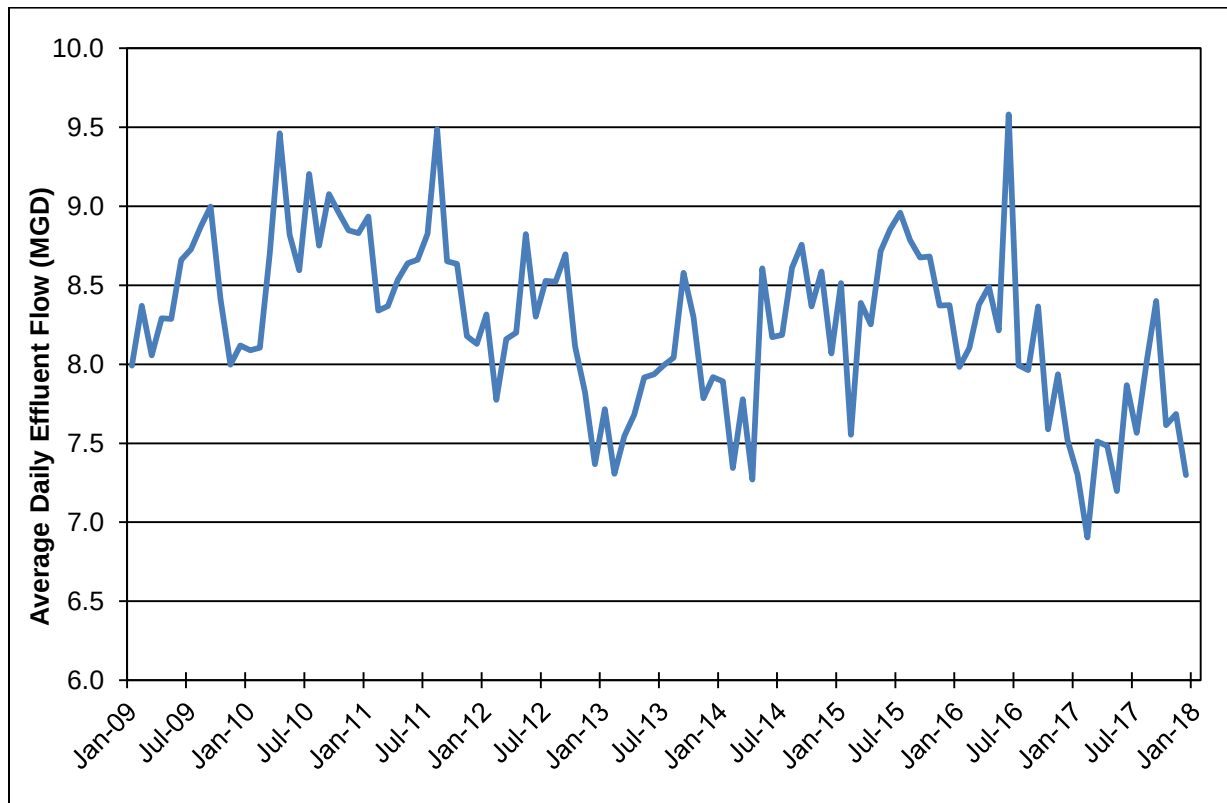


Figure 4-2: Average Daily Effluent Pumped to Effluent Storage Reservoirs

4.1.2 Influent and Effluent Water Quality

Water quality data sampled monthly at the WRF between May 2009 and April 2018 are summarized in Table 4-4. Historical percent removals of biochemical oxygen demand (BOD) and total suspended solids (TSS) at the WRF are displayed in Table 4-5. The City's WRF has not exceeded the single grab BOD permit limit of 65 milligrams per liter (mg/L) in the past nine years, with the maximum effluent concentration equal to 48 mg/L, as seen in Figure 4-3. The historical trend of effluent total dissolved solids (TDS) at the WRF is shown in Figure 4-4. The TDS trend observed at the WRF, which shows a sustained peak between 2010 and 2013, corresponds with a period of severe drought experienced by San Angelo and across the State of Texas.

Table 4-4: Summary of Influent and Effluent WRF Water Quality

Parameter	Units	Raw Influent				Treated Effluent			
		25 th %ile	Median	75 th %ile	Count	25 th %ile	Median	75 th %ile	Count
Alkalinity, Total	mg/L as CaCO ₃	320	353	368	96	140	185	260	96
Ammonia, Total	mg/L as N	29.0	32.6	36.3	95	6.4	13.4	23.1	96
Biochemical Oxygen Demand	mg/L	196	230	271	96	11.0	15.0	22.3	96
Chemical Oxygen Demand	mg/L	496	566	624	52	48.0	55.5	66.3	96
Chloride	mg/L	363	440	550	96	364	409	549	96
Hardness, Total	mg/L as CaCO ₃	471	583	742	96	452	490	584	96
Nitrate	mg/L as N	0.2	0.3	0.4	95	6.2	10.7	18.2	96
pH	S.U.	7.5	7.6	7.7	77	7.6	7.7	7.9	77
Phosphate, Ortho	mg/L as PO ₄	8.9	11.3	13.9	35	7.7	9.7	10.5	36
Phosphate, Total	mg/L as PO ₄	17.49	19.62	23.57	26	9.8	10.6	13.1	30
Sulfate	mg/L	203	234	295	96	227	254	316	96
Total Dissolved Solids	mg/L	1,520	1,540	1,632	3	1,304	1,455	1,766	85
Total Suspended Solids	mg/L	184	236	281	96	5	7	11	96

Note: Table displays summary of data collected monthly between May 2009 and April 2018.

Table 4-5: Percent Removal at WRF of Selected Parameters

Parameter	Percent Removal		
	25 th %ile	Median	75 th %ile
Biochemical Oxygen Demand	91%	93%	95%
Total Suspended Solids	95%	97%	98%

Note: Table displays summary of data collected monthly between May 2009 and April 2018.

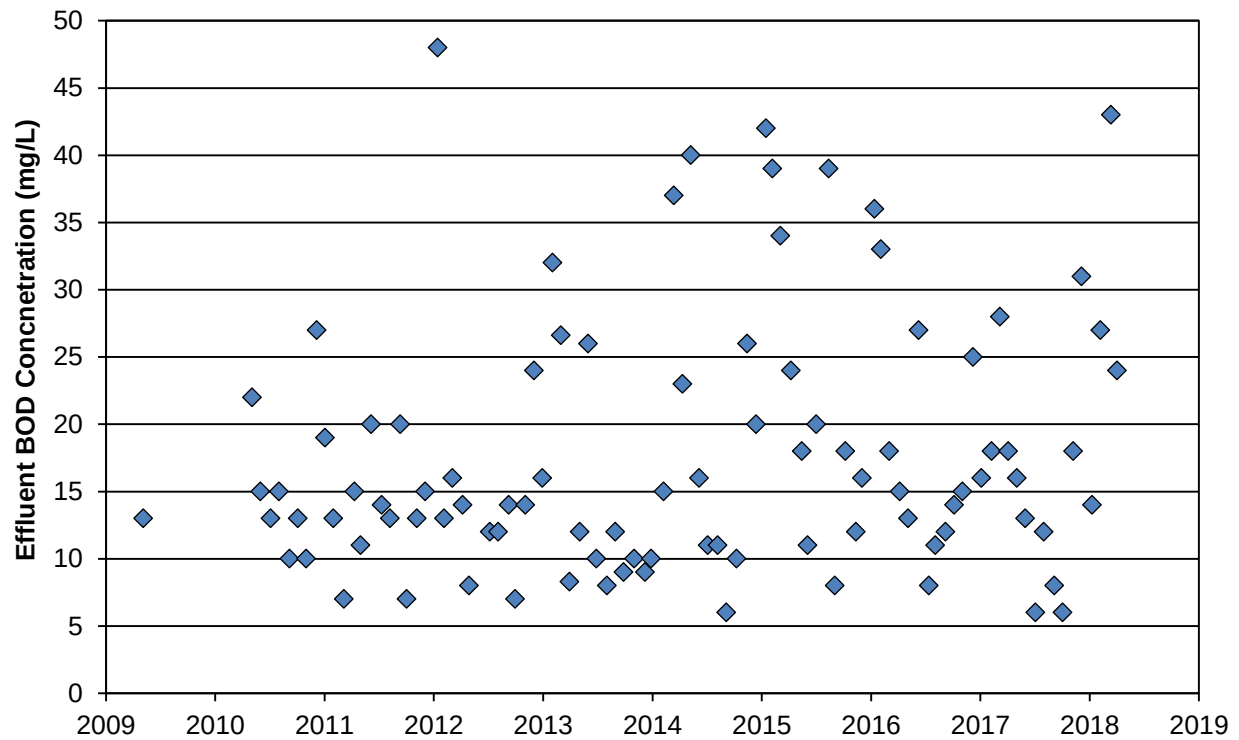


Figure 4-3: Monthly WRF Effluent Biochemical Oxygen Demand

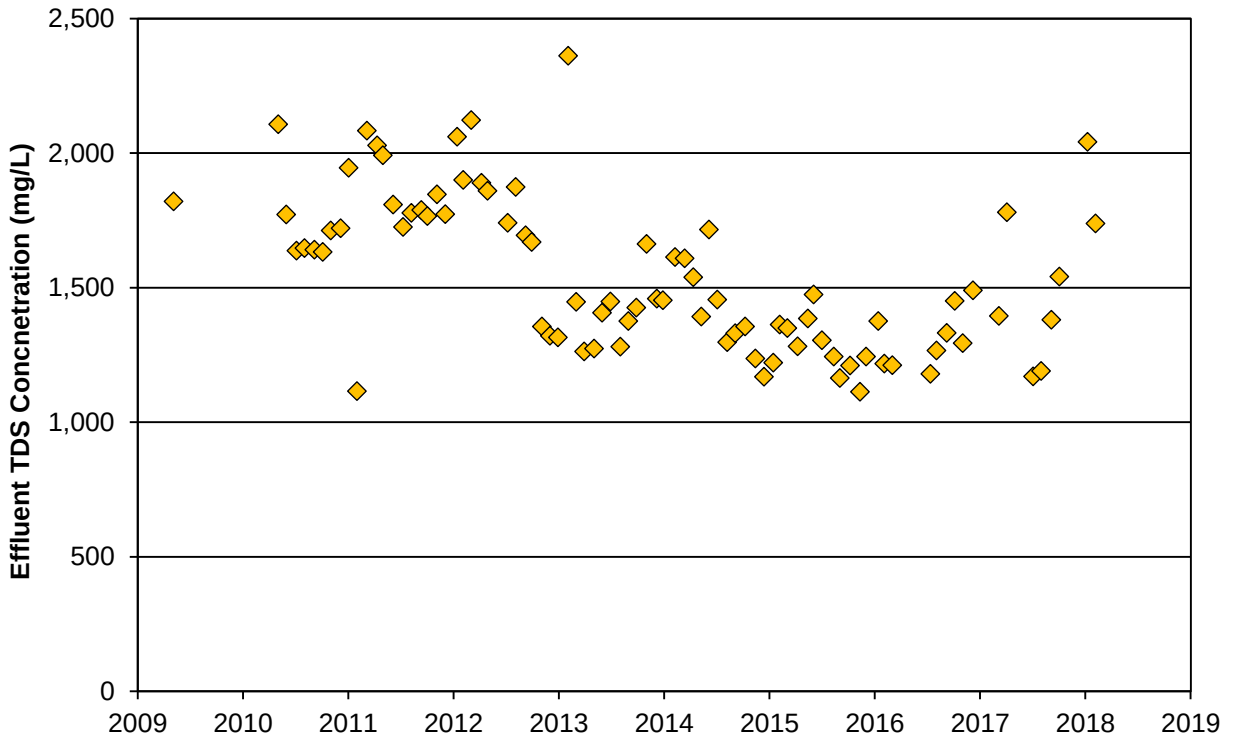
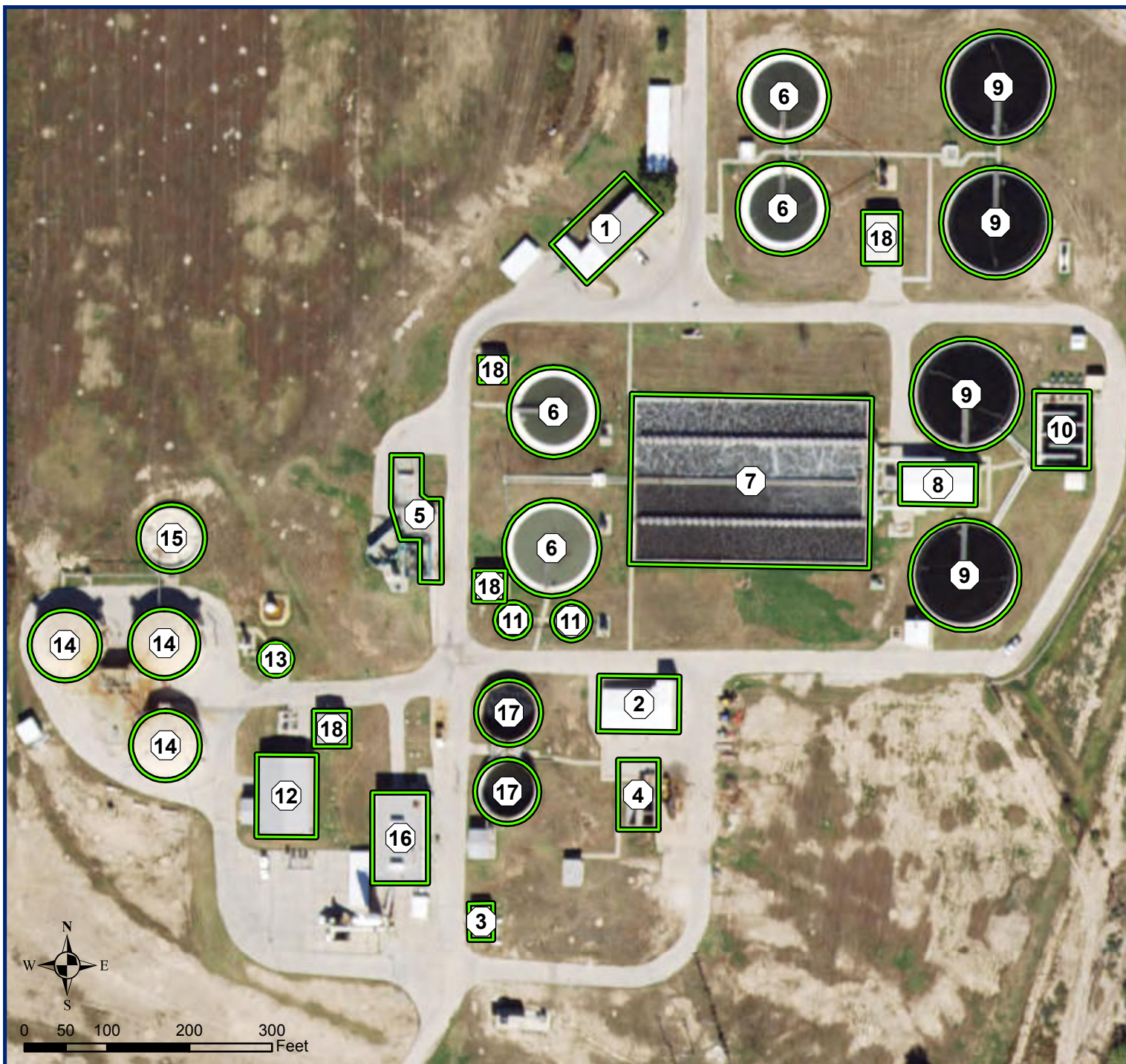


Figure 4-4: Monthly WRF Effluent Total Dissolved Solids

4.1.3 Treatment Processes

Figure 4-5 displays the WRF and the location of treatment processes within the plant. Raw wastewater from the City's collection system enters the WRF at the raw wastewater lift station which pumps wastewater to the headworks structure. The headworks structure contains multiple treatment processes including coarse bar screens, fine screens, and a grit removal system. Wastewater then enters one of the four primary clarifiers before flowing into the aeration basins for further treatment. The WRF has two aeration basins, each containing more than 3,000 ceramic fine bubble diffusers. After secondary treatment in the aeration basins, the wastewater is then sent to one of the four final clarifiers, which allows activated sludge from the aeration basins to be removed. After final clarification, the final effluent passes through a chlorine contact basin, though no chlorine is added since the effluent is all land applied. Following the chlorine contact basin, the final effluent pump station transfers all effluent to the effluent storage reservoirs north of the WRF. From the storage reservoirs, the reclaimed water is either pumped to the TGCWCID #1 or is land applied at the City Farm adjacent to the WRF.

Sludge produced from the different treatment units is collected and sent through thickening, stabilization, and dewatering processes. Sludge from the primary clarifiers is sent to one of two gravity sludge thickeners. Waste activated sludge from the final clarifiers is sent through one of three gravity belt thickeners. Following thickening, sludge from these two processes is blended together before entering one of three anaerobic digesters. Digested sludge is then sent to one of the facility's three belt filter presses for dewatering. Dewatered cake from the presses is sent to a composting facility. A simplified process flow diagram for the WRF that shows both the solids and liquids streams is provided in Figure 4-6.



- | | |
|---------------------------|--------------------------------------|
| 1 Administration Building | 10 Chlorine Contact Basin (Inactive) |
| 2 Utility Building | 11 Gravity Sludge Thickener |
| 3 Odor Control Building | 12 Gravity Belt Thickener Building |
| 4 Lift Station | 13 Sludge Blend Tank |
| 5 Headworks | 14 Anaerobic Digester |
| 6 Primary Clarifier | 15 Gas Holder |
| 7 Aeration Basin | 16 Sludge Handling Building |
| 8 Blower Building | 17 Sludge Holding Tank |
| 9 Final Clarifier | 18 Inter-Facility Pump Stations |



City of San Angelo Water Supply Engineering Feasibility Study

Figure 4-5: Water Reclamation Facility



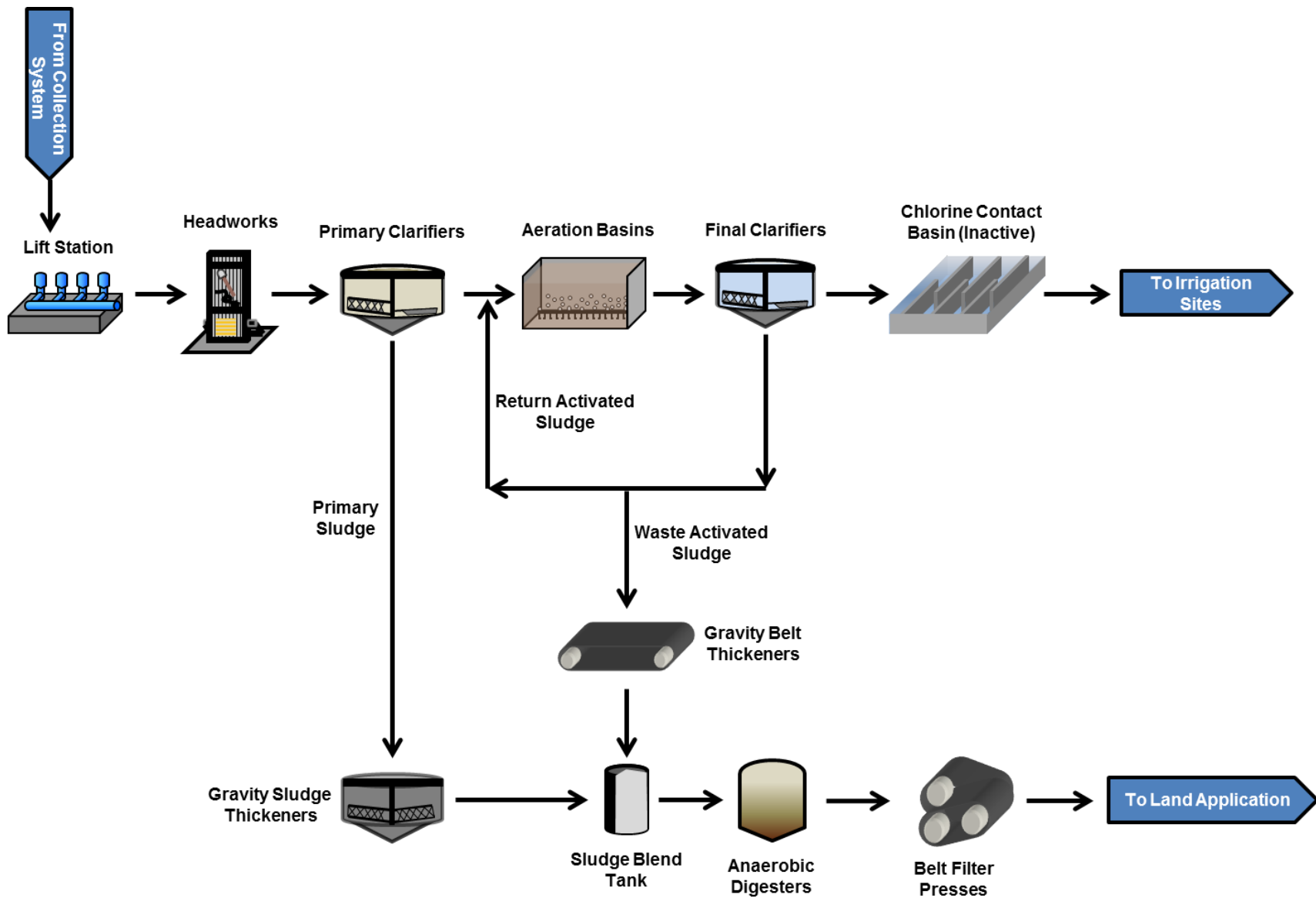


Figure 4-6: Water Reclamation Facility Existing Process Flow Diagram

4.2 WATER TREATMENT

Historically, San Angelo has relied upon its surface water sources to produce potable water. Surface water is treated at the City's conventional treatment plant located along the South Concho River, east of Metcalfe Street between East Avenue K and East Avenue H. The City's surface water treatment plant is aging, with many of the treatment process units dating back to the 1950's. With the development of the Hickory Aquifer, San Angelo constructed a groundwater treatment facility, co-located with the SWTP, that was brought online in 2015. Currently, the City is expanding its production of groundwater from the Hickory Aquifer which includes a corresponding expansion of the GWTF treatment capabilities.

4.2.1 Surface Water Treatment Plant

A majority of the drinking water for the San Angelo service area originates from surface water treated at the SWTP. The SWTP utilizes a conventional treatment process that consists of coagulation, flocculation, sedimentation, and filtration followed by disinfection prior to entering the City's water distribution system. The existing SWTP is rated for approximately 42 MGD and covers nearly 20 acres. An aerial view of the SWTP is provided in Figure 4-7.

Initially, raw surface water is pumped to the SWTP and dosed with a blended coagulant (aluminum sulfate and polymer) in any one of three rapid mix basins. Following coagulant addition, the water can be transferred to as many as five flocculation trains, each with a separate downstream sedimentation clarifier to settle the flocculated particles. The sludge underflow from the clarifiers flows to a sludge lagoon, and the clarified water advances to filtration. The filtration equipment consists of 15 dual-media, gravity filters. Effluent from the filters flows into two intermediate clearwell storage tanks before being combined into a single large clearwell (Clearwell No. 3). Just before being combined in Clearwell No. 3, the filtered water is disinfected with chlorine followed by liquid ammonium sulfate (LAS) for continued disinfection via chloramination. Treated groundwater from the GWTF is also blended with the treated surface water in Clearwell No. 3. Finally, the combined waters are pumped into the distribution system using two high service pump stations. A process flow diagram for the SWTP is shown in Figure 4-8. Capacities for clarifiers through high service pump stations are summarized in Table 4-6.



20 0 50
SCALE IN FEET

NOTES INDICATED BY NUMBER IN # :

1. DISINFECTION FACILITY
2. CLARIFIER NO. 1
3. CLARIFIER NO. 2
4. FLOCCULATOR BASINS NO. 1 & NO. 2
5. FILTERS & GALLERY
6. CLEARWELL NO.3
7. HIGH-SERVICE PUMP STATION NO.1
8. HIGH-SERVICE PUMP STATION NO.2
9. FLOCCULATOR BASINS NO. 3 & NO. 4
10. CLARIFIER NO. 3
11. CLARIFIER NO. 4
12. CHEMICAL BUILDING
13. CLARIFIER NO. 5
14. FLOCCULATOR BASIN NO. 5
15. GROUNDWATER TREATMENT FACILITY
16. SLUDGE LAGOON

NOTE:
AERIAL FROM GOOGLE EARTH
DATE OF PHOTO: 04/29/2016



City of San Angelo Water Supply Engineering Feasibility Study
**Figure 4-7: Aerial Site Plan
of the
Existing Surface Water Treatment Plant**

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PG Firm Registration No. 50103
RPLS Firm Registration Nos. 10011900 & 10007300
08/16/2018

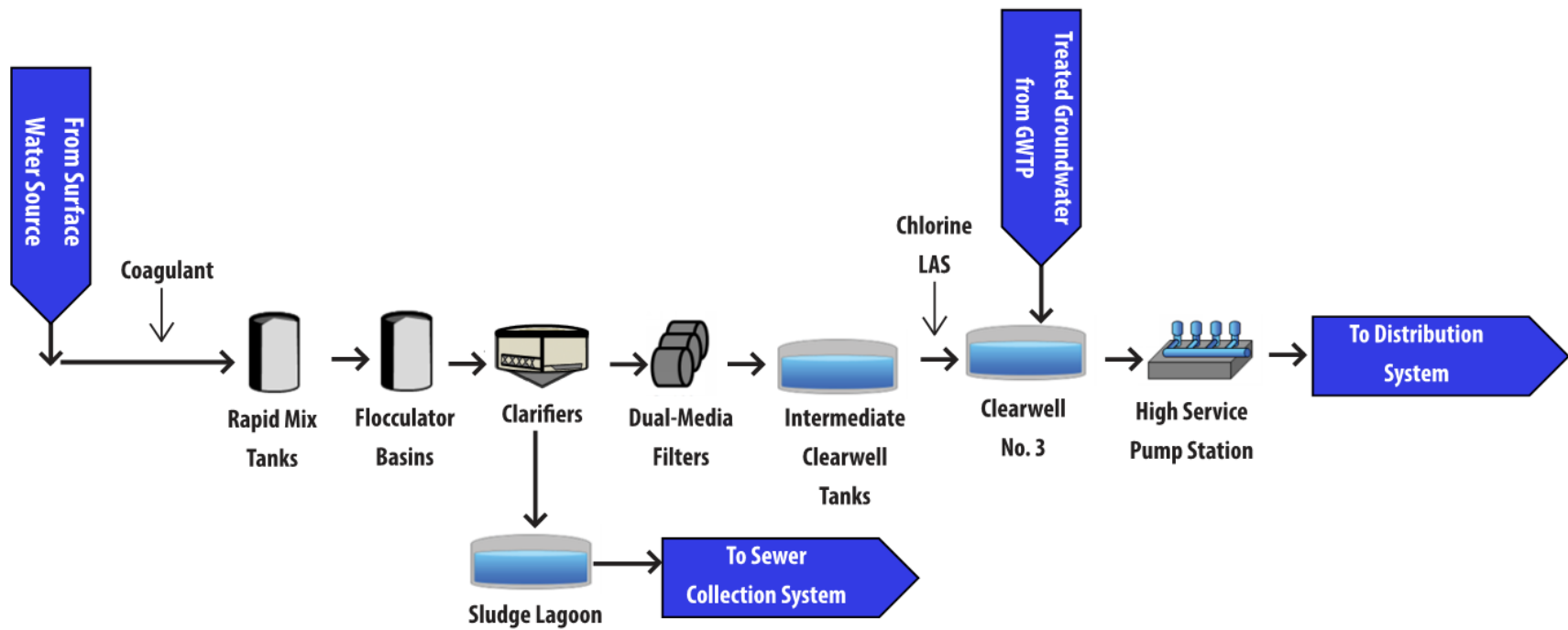


Figure 4-8: Surface Water Treatment Plant Process Flow Diagram

Table 4-6: Existing SWTP Equipment Capacities

Unit Area	Units	Total Capacity
Clarification – 5 Clarifiers	MGD	58.7 ¹
Gravity Filters – 15 Filters	MGD	55.6 ²
Disinfection - Chloramination	MGD	42 ³
Clearwell No. 3	MG	4
High Service Pump Station No. 1	MGD	26
High Service Pump Station No. 2	MGD	70

1. Based on a surface overflow rate of 0.6 gpm/ft²

2. Based on a filtration rate of 5.0 gpm/ft²

3. According to Hickory Water Supply O&M with 42 MGD maximum flow at a chlorine dose of 12 mg/L with a 4:1 chlorine to NH₃ mass ratio

4.2.2 Groundwater Treatment Facility

In 2011, the City applied for funding from the TWDB for a new GWTF and development of its wellfield in the Hickory Aquifer to help reduce the City's reliance on surface water.¹¹ That same year pilot testing was completed to explore treatment options to remove elevated concentrations of iron and radionuclides that are typical of water from the Hickory. Afterwards, conditional approval from the TCEQ was granted in 2013 to begin construction on the first phase (Phase I) of the GWTF followed by startup of operations in 2015.

The Phase I GWTF is located adjacent to the SWTP on the south side of the property and currently treats water from 15 wells in the Hickory Aquifer. The wellfield is located approximately 62 miles southeast of the GWTF in McCulloch County (approximately 10 miles south of Melvin, TX). Water from the wellfield is pumped to the GWTF through a 30-inch transmission water line. Once at the plant, iron is first removed from the raw water via oxidative precipitation and subsequent filtration. Thereafter, the water is treated using ion exchange media to remove radionuclides such as Radium 226/228 and Gross Alpha/Beta. The water is subsequently disinfected using chlorine followed by the addition of LAS to promote further disinfection via chloramination. Finally, treated water from the GWTF is blended with water from the SWTP before entering the City's distribution system. A block flow diagram of the GWTF is provided in Figure 4-9.

¹¹ http://www.twdb.texas.gov/newsmedia/featured/projects/san_angelo/index.asp

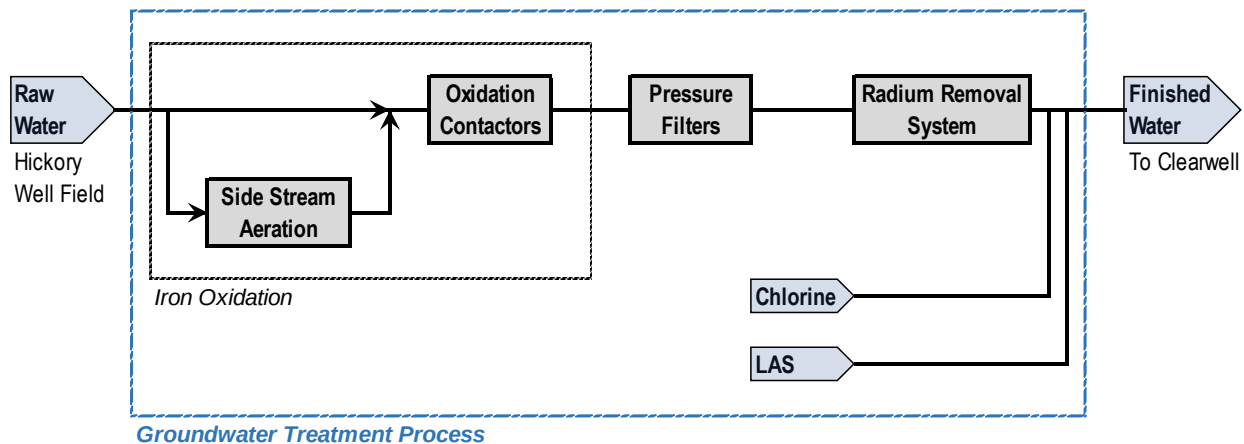


Figure 4-9: GWTF Block Flow Diagram

Phase I of the GWTF is rated for a total capacity of 8 MGD. A capacity summary by unit area for Phase I is provided in Table 4-7.

Table 4-7: Phase I GWTF Capacities by Unit Process

Unit Process	Trains	Vessels per Train	Capacity per Train (MGD)	Total Capacity (MGD)
Side Stream Aeration	4	1	4.0	16
Oxidation Contactors	4	1	2.4	9.6
Pressure Filters	3	1	3.0	9.0
Radium Reduction System	4	3	2.0	8.0
Total GWTF	-	-	-	8.0

During Phase I, the GWTF was designed and constructed to support future expansion (Phase II). In particular, the piping and floor plan at the GWTF were laid out to accept one additional oxidation contactor (5 total trains), one additional pressure filter (4 total trains), as well as six additional radium reduction system vessels (6 total trains). Based on Table 4-7, the additional equipment added in Phase II will increase the total capacity at the GWTF to 12 MGD, which is currently being pursued by the City.

From a water quality perspective, the GWTF has met all TCEQ regulatory requirements for Combined Radium (CR). Per Title 30 of the Texas Administrative Code Chapter 290.108, the maximum contaminant limit for CR is 5 pCi/L. Since October 2015, the City has sampled the treated water at the discharge of the GWTF prior to disinfection and blending with treated water from the SWTP. The samples indicate that the average CR concentration of water produced

from the GWTF has been approximately 0.9 picocuries per liter (pCi/L) with a range of 0.1 to 2.3 pCi/L. Historical water quality produced from the SWTP is presented in Table 4-8.

Table 4-8: Historical Water Quality Blend of Water Produced from the SWTP and GWTF

Parameter	Units	Minimum ¹	Average ¹	Maximum ¹
Aluminum	mg/L	0.04	0.1	0.1
Ammonia	mg/L as N	0.61	0.92	1.32
Calcium Hardness	mg/L as CaCO ₃	69	86	106
Chloride	mg/L	132	204	296
Fluoride	mg/L	0.27	0.53	0.91
Iron	mg/L	0.01	0.01	0.03
Manganese	mg/L	29	44	59
Nitrate	mg/L as N	0.23	0.40	0.84
Ortho-phosphate	mg/L as PO ₄	0.02	0.11	0.75
pH	S.U.	7.0	7.7	8.4
Potassium	mg/L	1	12	23
Sodium	mg/L	67	122	171
Sulfate	mg/L	161	238	315
Total Alkalinity	mg/L as CaCO ₃	88	139	208
TDS	mg/L	620	841	1122
Total Hardness	mg/L as CaCO ₃	324	393	488

1. Summary of samples collected monthly between Sept. 2013 and Sept. 2017.

CHAPTER 5

POTENTIAL FUTURE WATER SUPPLY STRATEGIES

The Consultant Team initially identified 24 different water supply strategies as possible solutions to reduce the deficit between future demands and current water supplies by either reducing future demand or increasing future supply. The initially identified strategies fall into one of four categories: groundwater, purchased water, water reuse, and other strategies. Each strategy is summarized in the sections below by providing information such as supply location, regulatory issues, yield and reliability, and water quality.

5.1 GROUNDWATER STRATEGIES

The Consultant Team initially identified six groundwater strategies. Each of these strategies is described below.

5.1.1 Strategy 1 – Local Brackish Groundwater

The local brackish groundwater strategy involves the production and desalination of a brackish¹² groundwater source from within Tom Green County. It is assumed an RO membrane treatment system would be used as the desalination treatment process, which would create a waste stream of highly concentrated brine that must be disposed. Because the source water is expected to have high dissolved solids content, yields after treatment are expected to be 75% or lower. Injection wells would be required to dispose of RO concentrate generated in the treatment process. The estimated yield of the strategy is 3,750 ac-ft/yr (3.3 MGD) of treated water.

The brackish groundwater formations are generally not used for agricultural or drinking water supply purposes, and little competition for the source water is expected. These formations generally have low potential well capacity, so many wells are expected to be required to supply the raw water needs of this strategy. This strategy is summarized in Table 5-1.

¹² Brackish is defined as having a concentration of total dissolved solids greater than 1,000 mg/L.

Table 5-1: Summary of Local Brackish Groundwater Strategy

Name	Local Brackish Groundwater
Description	Desalination of brackish groundwater in Tom Green County
Infrastructure Requirements	New wells for brackish source water, collection piping, transmission piping and storage, desalination plant, Injection wells for concentrate disposal
Project Yield/Yield Potential	3,750 ac-ft/yr (3.3 MGD)
Reliability	Moderate – low well capacities
Sustainability	High – little competition for this groundwater
Regulatory/Permitting Issues	Permitting wells through groundwater conservation district (GCD). Permitting for concentrate waste stream injection.
Operational Complexity	Moderate: desalination treatment efficiency can be reduced by certain water chemistries. Deep well injection of concentrate.
Water Quality	Brackish to saline, requires desalination
Schedule	3-5 years to implement

5.1.2 Strategy 2 – Lipan Aquifer

The Lipan Aquifer strategy considers the production of groundwater from the Lipan Aquifer in eastern Tom Green County. The estimated yield of this strategy is 3,000-5,000 ac-ft/yr (2.7-4.5 MGD) of fresh to brackish water. Depending on site-specific water quality, the source water may require treatment by blending or desalination. The median concentration of TDS in the Lipan is 1,978 mg/L and the median concentration of nitrate as nitrogen is 28 mg/L (nearly three times the drinking water limit of 10 mg/L).

There is significant competition from irrigation demand for this groundwater source in all productive areas of the aquifer. Reliability is therefore considered low to moderate. Groundwater availability from the Lipan Aquifer is moderate to high under normal conditions, but can become low in drought periods. Average well capacities for this strategy are expected to be in the 60 – 100 gpm range, and a large number of wells would be required to supply the estimated yield of the strategy. The Lipan-Kickapoo Water Conservation District limits the well density to 16 wells per survey section (640 acres). This strategy is summarized in Table 5-2.

Table 5-2: Summary of the Lipan Aquifer Strategy

Name	Lipan Aquifer
Description	Wellfields in Tom Green and Concho counties
Infrastructure Requirements	46 groundwater wells. Purchase 1,920 acres in wellfield. 46,000 linear feet of wellfield collection piping. 250,000 gallon ground storage tank. Wellfield pump station (300 hp, 5 MGD capacity). Transmission pipeline to SWTP (20", 12 miles). MF and RO at SWTP. Concentrate disposal wells.
Project Yield/Yield Potential	3,000-5,000 ac-ft/yr (2.7-4.5 MGD)
Reliability	Low to Moderate due to competition
Sustainability	Moderate to High under normal climate conditions; Low under drought conditions
Regulatory/Permitting Issues	Permitting wells through GCD. Permitting for concentrate injection wells
Operational Complexity	High. Groundwater will be treated through MF and RO.
Water Quality	Fresh to brackish, potential need for blending or desalination. High in nitrate.
Schedule	3-5 years to implement

5.1.3 Strategy 3 – Pecos Valley/Edwards-Trinity Aquifer

The Pecos Valley/Edwards-Trinity Aquifer strategy involves groundwater production and desalination from the Pecos Valley Alluvium and/or the Edwards-Trinity Plateau Aquifer in West Texas. The estimated yield of this strategy is 10,800 ac-ft/yr (9.6 MGD) of treated water.

Well capacities for this strategy are expected to be in the 800-1,000 gpm range. With the relatively low dissolved solids content of the water and blending, yields of treated water are expected to be over 80%.

There are currently several large wellfields completed in this source; therefore, reliability is high. Competition is also relatively high, but there are currently still areas with favorable development characteristics that have little neighboring competition. This strategy is summarized in Table 5-3.

Table 5-3: Summary of Pecos Valley/Edwards-Trinity Aquifer Strategy

Name	Pecos Valley/Edwards-Trinity Aquifer
Description	Development of wellfield in Pecos Valley Aquifer and/or Edwards-Trinity in Pecos County
Infrastructure Requirements	15 groundwater wells. Lease 1,260 acres of land above aquifer. 33,000 linear feet of wellfield collection piping. 500,000 gallon ground storage tank. Wellfield pump station (1,070 hp, 12 MGD). Transmission pipeline to SWTP (30", 186 miles). Three booster pump stations along pipeline. MF and RO side-stream at SWTP (50% of flow). Concentrate disposal wells.
Project Yield/Yield Potential	10,800 ac-ft/yr (9.6 MGD)
Reliability	High – established use and high well capacities
Sustainability	High – established use and high well capacities
Regulatory/Permitting Issues	Permitting wells through GCD. Permitting for concentrate injection wells
Operational Complexity	High: Remote wellfield, long transmission lines. Split stream treatment. Concentrate disposal.
Water Quality	Groundwater quality is variable, but TDS is anticipated to be approximately 2,000 mg/L. Half of the water will be treated through RO resulting in a treated TDS of 1,100 mg/L.
Schedule	3-5 years to implement

5.1.4 **Strategy 4 – Capitan Reef Aquifer**

The Capitan Reef Aquifer strategy involves groundwater production and desalination from the Capitan Reef Aquifer in Pecos and/or Brewster Counties. The estimated yield of this strategy is 12,000 ac-ft/yr (10.7 MGD) of treated water.

Well capacities for this strategy are expected to be in the 800-1,000 gpm range. Water quality ranges from moderately to very brackish in this aquifer. Wells are generally 2,500 – 3,000 feet deep, and a number of wells would be required to supply the estimated yield of this strategy.

There are several existing high-capacity wells completed in the Capitan-Reef Aquifer. However, the water quality has historically limited the use of the aquifer. Sustainability of this source is considered moderate due to uncertainty regarding the response of the aquifer to the demands of a large municipal wellfield. This strategy is summarized in Table 5-4.

Table 5-4: Summary of Capitan Reef Aquifer Strategy

Name	Capitan Reef Aquifer
Description	Development of wellfield in Capitan Reef Aquifer in Pecos County/Brewster County
Infrastructure requirements	New wells, collection piping, transmission piping and storage, and transmission agreement with CRMWD. Desalination plant and concentrate disposal.
Project Yield/Yield Potential	12,000 ac-ft/yr (10.7 MGD)
Reliability	High – established use and high well capacities
Sustainability	High - well capacities. Moderate – uncertain water quality response to long-term pumping.
Regulatory/Permitting Issues	Permitting wells through GCD. Permitting for concentrate disposal
Operational Complexity	High: Remote wellfield, long transmission lines, coordination with CRMWD. Concentrate disposal.
Water Quality	Fresh to brackish, potential need for blending or desalination
Schedule	3-5 years to implement

5.1.5 Strategy 5 – Ellenburger Aquifer

The Ellenburger Aquifer strategy involves the production of groundwater from the Ellenburger Aquifer in McCulloch and/or Concho County. The estimated yield of this strategy is 3,000-5,000 ac-ft/yr (2.7-4.5 MGD) of fresh to brackish water. Depending on site-specific water quality, the source water may require treatment by blending or desalination.

There is little competition from other users for this source. Individual well capacities are expected to be low to moderate. The Hickory Underground Water Conservation District (HUWCD) would likely restrict and otherwise regulate the number and location of wells, as well as the production volume from the wells. The HUWCD would also likely challenge efforts to export produced water outside of its boundaries. Additionally, oil and gas production is currently occurring in this aquifer. Table 5-5 summarizes this strategy.

Table 5-5: Summary of Ellenburger Aquifer Strategy

Name	Ellenburger Aquifer
Description	Wellfields in McCulloch County/Concho County
Infrastructure Requirements	New wells for source water, collection piping, transmission piping and storage, potential desalination or blending, concentrate disposal if desalination required
Project Yield/Yield Potential	3,000-5,000 ac-ft/yr (2.7-4.5 MGD)
Reliability	Moderate
Sustainability	Moderate
Regulatory/Permitting Issues	Permitting wells through GCD. Potential permitting for concentrate disposal
Operational Complexity	Low, unless advanced treatment is required
Water Quality	Fresh to brackish, potential need for blending or desalination
Schedule	3-5 years to implement

5.1.6 **Strategy 6 – Edwards-Trinity Plateau Aquifer**

The Edwards-Trinity Plateau Aquifer strategy involves the production of groundwater from the Edwards-Trinity Plateau Aquifer in the Plateau region. The estimated yield of this strategy is 4,500 ac-ft/yr (4 MGD) of fresh to brackish water. Depending on site-specific water quality, the source water may require treatment by blending or desalination.

There is some competition in some areas with irrigation pumping. Individual well capacities are expected to be relatively low, in the 150 – 250 gpm range. However, the aquifer has a long history of use and reliability and sustainability are both considered to be moderate. This strategy is summarized in Table 5-6.

Table 5-6: Summary of Edwards-Trinity Plateau Aquifer Strategy

Name	Edwards Trinity Plateau Aquifer
Description	Development of wellfield in Edwards-Trinity Plateau Aquifer
Infrastructure requirements	18 groundwater wells. Purchase 4,480 acres above aquifer. 46,800 linear feet of wellfield collection piping. 250,000 gallon ground storage tank. Wellfield pump station (107 hp, 4.5 MGD). Transmission pipeline (20", 50 miles)
Project Yield/Yield Potential	4,500 ac-ft/yr (4 MGD)
Reliability	Moderate – low well capacities
Sustainability	Moderate – some competition with irrigation
Regulatory/Permitting Issues	Permitting wells through GCD for export of groundwater. Potential permitting for concentrate disposal
Operational Complexity	Low, unless advanced treatment is required
Water Quality	Fresh to brackish, potential need for blending or desalination
Schedule	3-5 years to implement

5.2 PURCHASED WATER

Options to purchase water were evaluated as viable water management strategies. Entities such as the CRMWD are in the business of developing, selling and managing water resources. In recent years, private entities have entered the water market. The option for the City to purchase water from private suppliers was evaluated in addition to more traditional entities such as the CRMWD.

5.2.1 Strategy 7 – Colorado River Municipal Water District

The CRMWD owns and operates three surface water reservoirs and several groundwater wellfields. TCEQ permits CRMWD to store a combined volume of approximately 1.2 million ac-ft of surface water in J.B. Thomas, E.V. Spence, and O.H. Ivie. CRMWD's paper rights allow it to divert about 186,000 ac-ft/yr from these reservoirs. However, because of the persistence of the current multi-generational hydrologic drought plaguing the upper Colorado River basin, the combined safe yields of these water rights are a fraction of their paper value. As a chief indication of the lack of reliability of its surface water supplies, CRMWD has developed groundwater supplies in West Texas. The cities of Odessa, Big Spring, and Snyder make up the CRMWD, but CRMWD also contracts with several non-member municipalities, including San Angelo.

Prior to 2014, drought conditions depleted Thomas and E.V. Spence to less than 2% of the combined conservation capacity. O.H. Ivie is still experiencing a new drought of record, with a capacity approximately 14% as of August 2018. The CRMWD is actively seeking new water supply sources and recently completed a transaction for additional groundwater supplies.

The City contracts with the CRMWD for 16.54% of the O.H. Ivie safe yield. The City also purchased capacity in the delivery system (intake, pump stations, and pipeline) that the CRMWD operates when O.H. Ivie is used as a source of supply. In addition, the City contracts for 6% of the E.V. Spence safe yield with delivery of E.V. Spence water limited by aged infrastructure (see discussion in Section 5.4.7 below).

The recent drought for Thomas, and the ongoing drought for E.V. Spence and O.H. Ivie, has significantly reduced the CRMWD's available surface water supplies. Purchasing additional water from the CRMWD is not considered a viable source at this time for long-term water supplies for the City. However, the CRMWD should be considered as a short-term solution for

meeting raw water needs should the continued drought impacting O.H. Ivie force the reservoir offline. Under this condition, CRMWD could make modifications to the O.H. Ivie transmission system and provide short-term supplies to the City from its other surface water and groundwater supplies.

5.2.2 Strategy 8 – City of Abilene

The City of Abilene owns its primary surface water supply, Lake Fort Phantom Hill. Abilene also receives raw surface water from three other sources: Hubbard Creek Reservoir (Hubbard Creek) near Breckenridge, Texas; O.H. Ivie, and Possum Kingdom Lake. Hubbard Creek is owned and operated by the West Central Texas Municipal Water District (WCTMWD). The cities of Abilene, Albany, Anson and Breckenridge are members of the WCTMWD.

Abilene is actively seeking future water supplies to meet its current and future demands. Recently, the City of Abilene completed about \$205 million of infrastructure improvements in response to the new drought of record. These improvements included indirect reuse of about 7 MGD of advanced treated wastewater that is discharged into Lake Fort Phantom Hill. In addition, Abilene contracted with the Brazos River Authority for approximately 10 MGD of surface water from Possum Kingdom Lake. Water from Possum Kingdom Lake is high in chloride, sulfate, and TDS, which required Abilene to construct a raw water “roughing” facility in Breckenridge, Texas, designed to produce “rough treated” raw water consistent in water quality to Hubbard Creek raw water. In addition to the “roughing facility”, Abilene constructed transmission system improvements to bring Possum Kingdom Lake raw water following treatment at the “roughing facility” into its conventional surface water treatment plants. With Abilene pursuing its own future water supplies, this strategy for San Angelo to obtain water from Abilene is limited to emergency situations that would last less than five years.

In an emergency situation, Abilene could make some or all of its O.H. Ivie supplies available to San Angelo. In this scenario, Abilene would decrease its withdrawals from O.H. Ivie. There are no infrastructure improvements required for this strategy.

Should drought conditions or other emergency situations force O.H. Ivie off-line, Abilene could provide San Angelo with up to 8 MGD. Abilene recently obtained an interbasin transfer authorization of up to 3,000 ac-ft/yr (2.7 MGD) from the TCEQ to convey water from Lake Fort Phantom Hill to O.H. Ivie. Similar administrative interbasin transfer authorizations could be

obtained from two other surface water reservoirs in the Brazos Basin used by Abilene. However, significant infrastructure improvements would be needed to move water from these sources to San Angelo.

Improvements to Abilene's O.H. Ivie pipeline would be required to reverse the flow back towards O.H. Ivie, including ground storage and a pump station at Abilene's Hargesheimer water treatment plant. In addition, a new eleven mile pipeline would be required across the City of Abilene to transport raw water from Lake Fort Phantom Hill to the proposed transfer pump station located at the Hargesheimer facility. This option would also require CRMWD cooperation/consent for use of its facilities. San Angelo should consider Abilene as a viable short-term option, should the CRMWD be unable to contract and provide short-term supplies as addressed under Strategy 7 above.

5.2.3 Strategy 9 – Private Suppliers

Several private developers in West Texas are marketing potential groundwater supplies. City staff was contacted by Alpha Water Resources, a private entity offering available groundwater supplies near the City. Communication with Alpha Water Resources continued through the Consultant Team, and included a Request for Information (RFI) developed by the Consultant Team to obtain the necessary information to evaluate this offering. The City received no formal responses to the RFI.

5.3 WATER REUSE

The Consultant Team initially identified eight water supply strategies that are classified in the water reuse category. These strategies all use reclaimed water produced from the City's WRF to augment the City's drinking water supply. Some of these strategies were previously considered in the 2006 and 2015 reclaimed water feasibility studies. Information from those studies has been brought forward into this study for comparison with the other water supply strategies.

The potential yield for each of these strategies is dependent on the amount of effluent produced from the WRF, which can be variable. An effluent flow from the WRF of 7.5 MGD is assumed to be available during a period of drought, based on historical data. Normally, the WRF will produce more than 7.5 MGD, so the yields presented for each strategy are meant to represent the minimum yield that could be achieved.

5.3.1 Strategy 10 – Augmentation of O.H. Ivie Reservoir

In this first reuse strategy, reclaimed water from the City's WRF would be discharged into the Concho River and flow approximately 45 miles to the O.H. Ivie, where it could be withdrawn and sent to the SWTP. Since the City already has water rights to O.H. Ivie, the existing intake and conveyance infrastructure to the SWTP could be used in this strategy. A simplified process flow diagram is shown in Figure 5-1.

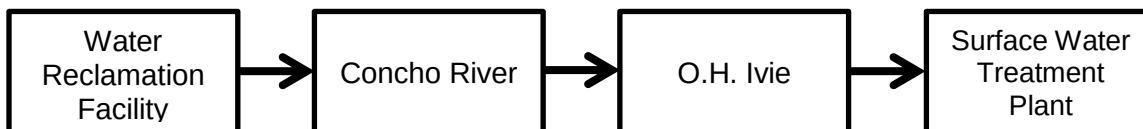


Figure 5-1: Strategy 10 Simplified Process Flow Diagram

Upgrades to the WRF would be required to produce high quality effluent to meet anticipated discharge requirements. An effluent pipeline and outfall structure to the Concho River would also need to be constructed. This reuse strategy could yield 8,400 ac-ft/yr (7.5 MGD) during drought periods, limited by the amount of water produced at the WRF. As the effluent flows grow, the treatment infrastructure could be expanded to provide a greater supply. This strategy is summarized in Table 5-7.

Table 5-7: Summary of Augmentation of O.H. Ivie Reservoir Strategy

Name	Augment O.H. Ivie
Description	Discharge reclaimed water to Concho River and let it flow to O.H. Ivie Reservoir
Infrastructure requirements	Upgrade WRF to provide high quality effluent that will meet anticipated TPDES permitting requirements; likely to include filtration and nutrient removal. Construct discharge pipeline to Concho River. Use existing infrastructure to divert from O.H. Ivie Reservoir.
Project Yield/Yield Potential	Limited by reclaimed water volume (8,400 ac-ft/yr (7.5 MGD) during drought periods) and may be subject to losses between discharge point and O.H. Ivie
Reliability	Low- Depends on availability of surface water in O.H. Ivie for blending
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit; TCEQ water right/bed and banks permit; contractual agreement with CRMWD.
Operational Complexity	Low - primarily uses existing infrastructure
Water Quality	Will not significantly change existing water quality
Schedule	3-5 years to implement

5.3.2 Strategy 11 – Augmentation of Lake Nasworthy

The second water reuse strategy would convey reclaimed water from the WRF to Lake Nasworthy. Water would then pass through Lake Nasworthy, into the South Concho River, and be sent to the SWTP from an intake in Lone Wolf Reservoir (adjacent to the SWTP). A simplified process flow diagram is shown in Figure 5-2.

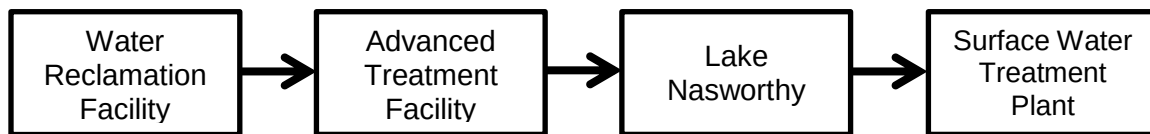


Figure 5-2: Strategy 11 Simplified Process Flow Diagram

Upgrades to the existing WRF and construction of a new advanced treatment facility would be required to meet discharge permitting requirements. Additionally, the advanced treatment facility would include side-stream treatment to reduce the concentration of TDS to maintain compliance with surface water quality standards for dissolved solids. A pump station and pipeline would be needed to deliver the reclaimed water to Lake Nasworthy. Deep injection wells to dispose of concentrate generated from the treatment process would also be required. This reuse strategy could provide an additional supply of approximately 7,770 ac-ft/yr (6.9 MGD), not including any losses that may occur between the discharge point and Lake Nasworthy.¹³ This strategy is summarized in Table 5-8.

¹³ The technical evaluation of Strategy 11, described in Chapter 7, indicated that approximately 818 ac-ft/yr would be lost in Pecan Creek due to evaporation and infiltration.

Table 5-8: Summary of Augmentation of Lake Nasworthy Strategy

Name	Augment Lake Nasworthy
Description	Delivery of reclaimed water to Lake Nasworthy to augment supply
Infrastructure Requirements	Upgrade WRF and construct advanced treatment facility to reduce TDS and meet anticipated discharge permitting requirements. Construct pump station and pipeline to deliver reclaimed water to Lake Nasworthy. Deep injection wells for concentrate disposal.
Project Yield/Yield Potential	Limited by reclaimed water volume (7,770 ac-ft/yr (6.9 MGD) during drought periods) and may be subject to losses between discharge point and Nasworthy
Reliability	Low - Lake Nasworthy has a projected firm yield of 0 ac-ft/yr in the 2016 Region F Water Plan
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit; Bed and banks permit; contract with TGCWCID#1 would need to be amended; concentrate disposal
Operational Complexity	Moderate: will require some advanced treatment to control TDS. Requires that City use water from Concho supplies which is more difficult to treat than Ivie/Hickory supplies.
Water Quality	Will be similar water quality to existing supplies
Schedule	5-7 years to implement

5.3.3 Strategy 12 – Augmentation of Twin Buttes Reservoir

This strategy accomplishes raw water augmentation similar to Strategy 11, but instead of Lake Nasworthy, the reclaimed water would be conveyed to the Twin Buttes, which flows into Lake Nasworthy, and subsequently into the South Concho River and Lone Wolf Reservoir. The City would then utilize existing infrastructure to convey the water to the SWTP. A simplified process diagram is shown in Figure 5-3.

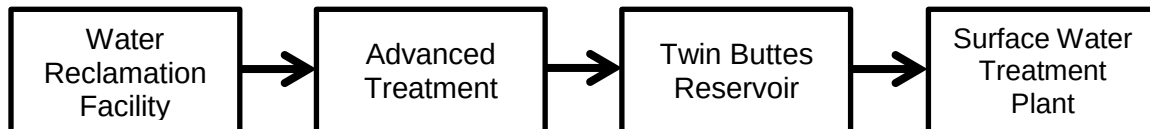


Figure 5-3: Strategy 12 Simplified Process Flow Diagram

Similar to Strategy 11, the WRF would be upgraded in this strategy and an advanced treatment facility would be constructed to meet anticipated discharge requirements and reduce TDS. Deep injection wells would be necessary to dispose of the concentrate generated in the treatment process. A pump station and pipeline would be constructed to convey advanced treated reclaimed water to Twin Buttes. The yield of this strategy is limited by the amount of water available at the WRF. This strategy would result in an additional water supply of approximately 7,770 ac-ft/yr (7.5 MGD WRF discharge with losses through RO) during periods of drought. This strategy is summarized in Table 5-9.

Table 5-9: Summary of Augmentation of Twin Buttes Reservoir Strategy

Name	Augment Twin Buttes Reservoir
Description	Delivery of reclaimed water to Twin Buttes to augment supply
Infrastructure Requirements	Upgrade WRF and construct advanced treatment facility to reduce TDS and meet anticipated discharge permitting requirements. Construct pump station and pipeline to deliver reclaimed water to Twin Buttes. Deep injection wells for concentrate disposal.
Project Yield/Yield Potential	Limited by reclaimed water volume (7,770 ac-ft/yr (6.9 MGD) during drought periods) and may be subject to losses between discharge point and Twin Buttes
Reliability	Low- impacted by contractual conditions between the City and TGCWCID#1 as well as availability of native surface water in the reservoir for blending. Twin Buttes has a projected firm yield of 0 ac-ft/yr in the 2016 Region F Water Plan.
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit; Bed and banks permit; contractual/water rights provisions must be met. There are circumstances under which TGCWCID#1 would be entitled to some of the reclaimed water; desal waste stream disposal.
Operational Complexity	Moderate: will require some advanced treatment to control TDS. Requires that City use water from Concho supplies which is more difficult to treat than Ivie/Hickory supplies.
Water Quality	Will be similar water quality to existing supplies
Schedule	5-7 years to implement

5.3.4 Strategy 13 – Augmentation of O.C. Fisher Lake

Similar to Strategies 11 and 12, this strategy accomplishes raw water augmentation by conveying advanced treated reclaimed water to O.C. Fisher. The City would then divert water to the SWTP using existing infrastructure. The WRF would be upgraded to include nutrient removal and filtration, and an advanced treatment facility would be required. Concentrate generated from the treatment process would be disposed through deep injection wells. A new pipeline and pump station would deliver reclaimed water from the WRF to O.C. Fisher. This strategy would have an anticipated yield similar to the previous two strategies: 7,770 ac-ft/yr (6.9 MGD) during drought periods. A simplified process diagram is shown in Figure 5-4 and the option is summarized in Table 5-10.

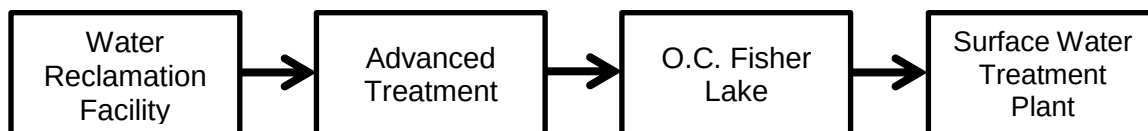


Figure 5-4: Strategy 13 Simplified Process Flow Diagram

Table 5-10: Summary of Augmentation of O.C. Fisher Lake Strategy

Name	Augmentation of O.C. Fisher Lake
Description	Delivery of reclaimed water to O.C. Fisher to augment supply
Infrastructure Requirements	Upgrade WRF and construct advanced treatment facility to reduce TDS and meet anticipated discharge permitting requirements. Construct pump station and pipeline to deliver reclaimed water to O.C. Fisher. Deep injection wells for concentrate disposal.
Project Yield/Yield Potential	Limited by reclaimed water volume (7,770 ac-ft/yr (6.9 MGD) during drought periods) and may be subject to losses between discharge point and O.C. Fisher
Reliability	Low - Impacted by availability of native surface water in the reservoir for blending. O.C. Fisher has a projected firm yield of 0 ac-ft/yr in the 2016 Region F Water Plan.
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit; water right/bed and banks permit; contractual agreement with UCRA may be needed; Concentrate injection permit.
Operational Complexity	Moderate: will require some advanced treatment to control TDS.
Water Quality	Concho supplies are difficult to treat. Water quality standards in OC Fisher will require treatment for salt removal.
Schedule	5-7 years to implement

5.3.5 Strategy 14 – Riverbank Filtration

This strategy would use reclaimed water from the Concho River withdrawn through alluvial riverbank filtration (RBF) wells. Highly treated effluent from the WRF would be discharged to the Concho River and flow approximately 8 miles downstream to an intake on City owned property. The intake would be designed utilizing the alluvial stratum of the riverbank to provide filtration, and lateral screens would be used to withdraw the water (Figure 5-5). A simplified process diagram is shown in Figure 5-6. A pump station and pipeline would be needed to convey the water from the RBF wells to the SWTP. The WRF would need to be upgraded to meet discharge requirements and some advanced treatment ahead of the SWTP may be required. Approval from the TCEQ would be required as a new water supply. If implemented, this reuse strategy could provide an additional supply of approximately 8,000 ac-ft/yr (7.1 MGD). A technical memorandum completed by Leonard Rice Engineers (LRE) regarding this strategy has been attached as Appendix A.

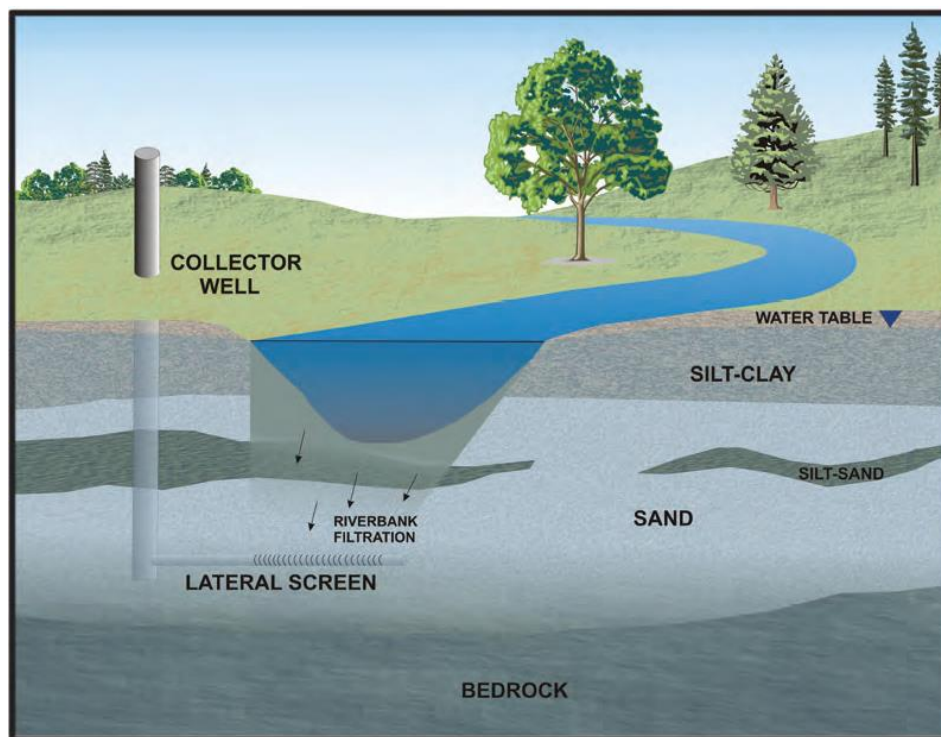


Figure 5-5: Horizontal Collector Well Riverbank Filtration¹⁴

¹⁴ Kelly, B., and Rydlund, P. J.: "Water-Quality Changes Caused by Riverbank Filtration Between the Missouri River and Three Pumping Wells of the Independence, Missouri, Well Field 2003–05", 2006.

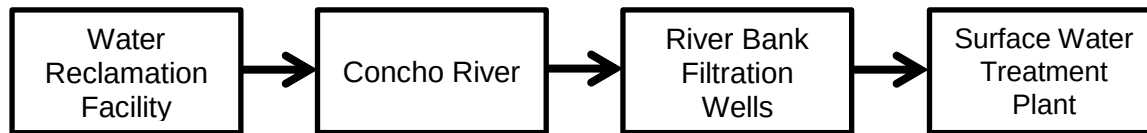


Figure 5-6: Strategy 14 Simplified Process Flow Diagram

Table 5-11: Summary of Riverbank Filtration Strategy

Name	Riverbank Filtration
Description	Discharge reclaimed water from the WRF into the Concho River with recovery of the water through downstream RBF wells.
Infrastructure Requirements	Upgrade WRF treatment process to meet discharge requirements. Outfall to Concho River. Five horizontal alluvial RBF wells at downstream City property. Purchase additional 11 acres of land. 1 MG ground storage tank. Pump Station (585 hp, 7 MGD) and pipeline (24", 16 miles) to SWTP. Membrane filtration and UV disinfection at SWTP.
Project Yield/Yield Potential	8,000 ac-ft/yr (7.1 MGD)
Reliability	Moderate- RBF performance can be decreased occasionally by recharge or well O&M challenges
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit (discharge to river); water right/bed and banks permit; Lipan/Kickapoo WCD well permits.
Operational Complexity	Medium to low. Requires horizontal wells and treatment at SWTP.
Water Quality	RBF reductions in contaminant levels are highly variable, but in most cases RBF will likely provide reductions to levels of 3 to 5 mg/L (or less) for nitrate, less than 3 mg/L for TOC, and less than laboratory detection levels for most trace organic compounds. RBF wells have historically been granted 1.0 log removal credit or better for pathogens. RBF systems require a balance of maximizing river water capture (by having wells close to the river) with maximizing water quality improvements (by moving wells away from the river).
Schedule	5-7 years to implement.

5.3.6 Strategy 15 – Infiltration Basins

Strategy 15 would use reclaimed water recovered through shallow wells near the WRF. The effluent from the WRF would be discharged into constructed infiltration basins near the WRF and collected via recovery wells down gradient of the infiltration site (Figure 5-7). The recovered water would then be conveyed to either storage or the SWTP. A simplified process flow diagram is shown in Figure 5-8. Infiltration basins or injection wells would be needed as well as recovery wells. A pump station and pipelines would be required to convey the water from the recovery wells to storage or treatment, where some advanced treatment may be needed. Approval from the TCEQ would be required as a new water supply. If implemented, this reuse strategy could provide an additional supply of approximately 8,000 ac-ft/yr (7.1 MGD). This strategy is summarized in Table 5-12.

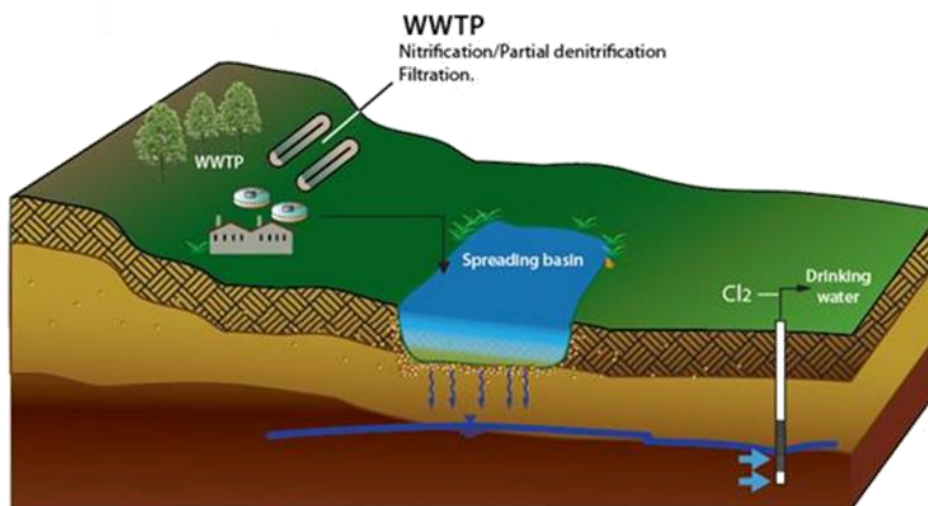


Figure 5-7: Soil Aquifer Treatment Using Infiltration Basins¹⁵

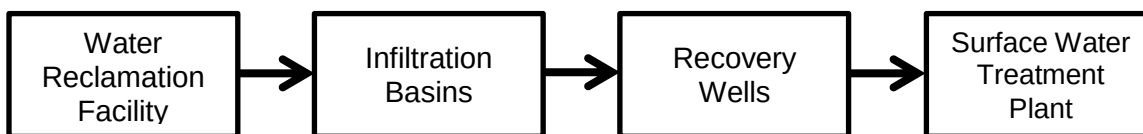


Figure 5-8: Strategy 15 Simplified Process Flow Diagram

¹⁵ National Research Council: "Water Reuse: Potential for Expanding the Nation's Water Supply through Reuse of Municipal Wastewater", 2012.

Table 5-12: Summary of Infiltration Basins Strategy

Name	Infiltration Basin
Description	Discharging effluent into infiltration basins or wells constructed near the WRF and then recovering that water downgradient from the infiltration area
Infrastructure Requirements	Improvements at the WRF for nutrient removal. Infiltration basins or injection wells for recharge into the aquifer, with recovery through wells. Construction of slurry wall will be considered. Pump stations/pipelines from the WRF to infiltration basins and from recovery wells to storage or treatment. Some advanced treatment may be needed.
Project Yield/Yield Potential	8,000 ac-ft/yr (7.1 MGD). Yield is scalable with limitations dependent on land availability and subsurface properties.
Reliability	Moderate - Recharge rates are susceptible to decline caused by difficult operations
Sustainability	High- reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES permit (discharge to basins); EPA UIC permitting (injection wells); Lipan/Kickapoo GCD well permits. Slurry wall containment, if possible, may ease permitting issues.
Operational Complexity	High - Groundwater recharge facilities are unique and relatively hard to maintain. Specialized operator training required. High risk of yield reduction due to neglect.
Water Quality	Soil Aquifer Treatment will provide pretreatment, including nutrient (Nitrogen & Phosphorus compounds) and CEC reductions. Mixing with regional groundwater may require additional treatment considerations.
Schedule	5-7 years to implement

5.3.7 Strategy 16 – Direct Potable Reuse

This potable reuse strategy differs from the other strategies in that it does not use any environmental buffer between the WRF and the SWTP. In this strategy WRF effluent would pass through additional advanced treatment processes and then be conveyed directly to the SWTP. A simplified process flow diagram is shown in Figure 5-9. Upgrades to the WRF would be needed to produce high quality effluent, and an ATF would need to be constructed. A pump station and pipeline would also be needed to deliver the advanced treated reclaimed water to the SWTP. Disposal of the RO concentrate would be accomplished via deep injection wells. Approval from the TCEQ would be required as a new water supply. The yield for the DPR strategy is limited by the amount of reclaimed water produced from the WRF. Approximately 15% of influent flow to the ATF would be lost to concentrate through the RO process. Therefore, this option would have a yield of 7,100 ac-ft/yr (6.3 MGD) during periods of drought. This strategy is summarized in Table 5-13.

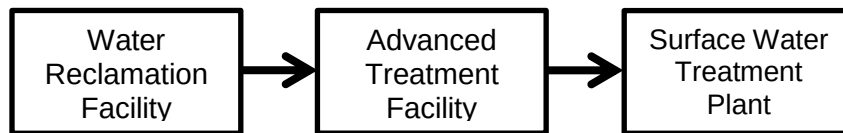


Figure 5-9: Strategy 15 Simplified Process Flow Diagram

Table 5-13: Summary of Direct Potable Reuse Strategy

Name	Direct Potable Reuse
Description	Delivery of advanced treated reclaimed water to the SWTP
Infrastructure Requirements	Upgrade WRF to provide high quality effluent, including filtration and nutrient removal. Construct ATF with membrane pretreatment and RO. Construct pump station and pipeline to deliver advanced treated reclaimed water to the SWTP. Concentrate injection wells.
Project Yield/Yield Potential	7,100 ac-ft/yr (6.3 MGD) during a drought
Reliability	High
Sustainability	High – reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	Authorization/approval through TCEQ drinking water division. Source water quality testing. Permitting may be challenging if an alternative treatment scheme to full reverse osmosis is used. Concentrate disposal permitting.
Operational Complexity	High- advanced treatment with no environmental buffer
Water Quality	Excellent. Water produced from RO is very high quality
Schedule	5-7 years to implement

5.3.8 Strategy 17 – Concho River Water Supply Project

Strategy 17 utilizes the Concho River to accomplish raw water augmentation. Highly treated effluent from the WRF would be discharged to the Concho River, flow approximately 8 miles downstream where it would be withdrawn at a new intake located on downstream City property. The water would then be conveyed to the SWTP, where additional treatment would occur before being blended with existing supplies. A simplified process flow diagram is shown in Figure 5-10. The WRF would need upgrades to ensure the effluent meets discharge permit requirements, and a short discharge pipeline from the WRF to the discharge location would need to be constructed. A pump station and pipeline would also be required to transport the water to the SWTP. If implemented, this reuse strategy could provide an additional water supply of approximately 8,400 ac-ft/yr (7.5 MGD). This strategy is summarized in Table 5-14.

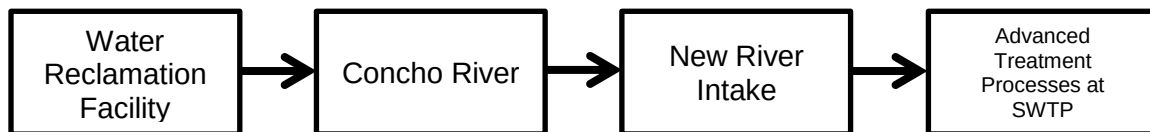


Figure 5-10: Strategy 17 Simplified Process Flow Diagram

Table 5-14: Summary of the Concho River Water Supply Project

Name	Concho River Water Supply Project
Description	Discharge of advanced treated reclaimed water to the Concho River. Divert return flows downstream and deliver to the SWTP.
Infrastructure Requirements	Upgrade WRF to provide high quality effluent, including filtration and nutrient removal. Construct discharge pipeline to Concho River. Construct intake and pump station downstream on Concho River. Construct pipeline to deliver water to SWTP. Advanced treatment at SWTP.
Project Yield/Yield Potential	8,400 ac-ft/yr (7.5 MGD) during drought conditions
Reliability	High
Sustainability	High – reclaimed water is a very sustainable supply
Regulatory/Permitting Issues	TPDES discharge permit; water right/bed and banks permit. Source water quality testing.
Operational Complexity	Moderate- will require some advanced treatment at SWTP.
Water Quality	Blending with Concho River may result in highly variable water quality. May require advanced treatment. During drought conditions, the Concho may contain up to 65% effluent
Schedule	5-7 years to implement

5.4 OTHER STRATEGIES

The 2016 Region F Water Plan included several recommended strategies¹⁶ for the City that were considered by the Consultant Team in addition to the water supply strategies discussed above. Additionally, non-potable reuse was screened as a strategy along with aquifer storage and recovery (ASR) and the rehabilitation of the City's raw water line from E.V. Spence.

5.4.1 Strategy 18 – Non-Potable Reuse

A detailed evaluation of direct, non-potable reuse alternatives was conducted for San Angelo in 2006.¹⁷ The City has a history of and commitment to conserving water, and as a potential component to the City's water management planning, the 2006 study on non-potable reuse alternatives was updated in 2015.¹⁸

The United States Environmental Protection Agency (USEPA) has documented an extensive accounting of non-potable reuse water applications.¹⁹ Of the applications presented in the USEPA document, the City has evaluated urban, industrial, and environmental/recreational opportunities for using non-potable reclaimed water. As a water management strategy, the goal of developing a non-potable reuse system is to convert users from potable or raw water sources to non-potable water sources.

The 2015 study concluded that San Angelo does not have enough potential to convert potable or raw water customers to reclaimed water to justify the cost of developing and operating a direct, non-potable reclaimed water system. Non-potable reuse reduces demand on the potable water system. However, during a drought period, the City would already be implementing potable watering restrictions, so a non-potable reuse system would not have as large of an impact on demands during a drought.

¹⁶ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 5D-25, prepared for the Region F Water Planning Group, November 2015.

¹⁷ City of San Angelo Reclaimed Water Feasibility Study, prepared by Alan Plummer Associates, Inc., February, 2006.

¹⁸ Reclaimed Water Alternatives Evaluation, prepared by Alan Plummer Associates, Inc., June, 2015.

¹⁹ U.S. EPA: Guidelines for Water Reuse, EPA/600/R-12/618, 2012.

5.4.2 Strategy 19 – Aquifer Storage and Recovery

ASR generally involves storing water available during wet periods in an aquifer for later recovery during times of lower water availability and/or higher water demand. The water is often (but not necessarily) treated surface water. ASR wells are usually permitted as Class V injection wells. Under a Class V permit, stored water cannot degrade the receiving formation water quality with respect to any constituent, so Class V ASR wells typically store water that has been treated to reduce water quality constituent levels to below the levels of the receiving formation.

The Lipan Aquifer is the most favorable aquifer for ASR near the City due to its relatively high permeability and location. The amount of storage available for ASR operations in the Lipan is dependent on site-specific hydrogeologic factors. It is likely, however, that the volume of water that could be stored and recovered is less than 80 ac-ft/yr per well.

The quality of recovered water is also dependent on site-specific factors such as groundwater velocity and receiving water quality. In areas where the groundwater velocities are low, the stored water may not move very far before recovery, and comparatively little native formation water will be mixed with the recovered water. Higher groundwater velocities increase the proportion of native water included in the recovery operation.

Under high water level conditions areas adjacent to the Concho River may discharge groundwater to the river. Many other areas of the Lipan have significant irrigation pumping, and stored water would be lost to these irrigation users.

Since the hydrogeologic properties of the Lipan can vary considerably, a testing program for ASR potential in this area should be developed if further evaluation of ASR operations near the City is contemplated. This testing program should result in a detailed description of the potentiometric surface in the area, total and saturated thickness, local estimates of specific yield, and local water quality characterization. Because of the need for a testing and characterization program, this strategy is expected to require 5-7 years to implement. This strategy is summarized in Table 5-15.

Table 5-15: Summary of Aquifer Storage and Recovery Strategy

Name	Aquifer Storage and Recovery
Description	Store reclaimed water or raw water in Lipan aquifer for subsequent use
Infrastructure requirements	ASR wells; conveyance infrastructure to/from wells; If reclaimed water is used, will required advanced treatment
Project Yield/Yield Potential	Yield is scalable depending on availability of source water and subsurface properties
Reliability	Depends on reliability of source water supply
Sustainability	Depends on reliability of source water supply, duration and volume of storage, and other factors
Regulatory/Permitting Issues	Permitting through GCD and TCEQ will be required
Operational Complexity	Moderate-high, depending on source water and amount of treatment required
Water Quality	Depends on source water quality and aquifer characteristics
Schedule	5-7 years to implement

5.4.3 Strategy 20 – Red Arroyo

The City, in conjunction with the UCRA, has evaluated the feasibility of constructing an off-channel reservoir to collect and store stormwater near the confluence of Red Arroyo and South Concho River. Under this strategy, storm water runoff from the Red Arroyo would be captured for subsequent treatment. An initial feasibility study for the Red Arroyo strategy was previously conducted in 2013.

The Red Arroyo Off-Channel Reservoir was included in the 2016 Region F Water Plan as an evaluated water management strategy for San Angelo.²⁰ The evaluation conducted by the Region F Water Planning Group concluded there is not enough unappropriated water for a new water right. The Region F evaluation also established the firm yield of any reservoir relying on storm water inflows from the Red Arroyo to be zero. Additionally, treating runoff from urban areas collected in small reservoirs (the Red Arroyo Off-Channel Reservoir was estimated by to have a capacity of about 1,840 acre-feet) would be a challenge using the conventional treatment processes at the City's SWTP. Approval from the TCEQ would be required as a new water supply. It would be expected that advanced treatment (MF, RO, GAC, etc.) would be

²⁰ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume II, Pages C-73 to C-75, prepared for the Region F Water Planning Group, November 2015.

required to meet water quality standards using the Red Arroyo Off-Channel Reservoir as a new supply.

Considering the lack of unappropriated water for a new water right, the challenges of treating urban runoff using conventional treatment processes, and a firm yield of zero (no water available during critical need times), this option is not considered a viable water management strategy for the City.

5.4.4 Strategy 21 – Subordination

In the Colorado Basin WAM, reservoirs in Region F with a priority date after 1926 do not have a firm or safe yield. To address water availability issues in the Colorado Basin associated with the WAM model, the Region F and Region K (Lower Colorado Regional Water Planning Area) Water Planning Groups participated in a joint modeling effort to evaluate a subordination strategy in which lower basin senior water rights do not make priority calls on major upstream water rights. This strategy also assumes that major water rights in Region F do not make priority calls on each other.

Subordination increases the City's supply in its reservoirs through agreements with downstream senior water rights holders to not make (or to limit) priority calls on the City's supplies. Subordination is evaluated as a municipal Water Management Strategy in the 2016 Region F Water Plan.²¹ In the 2016 Region F Water Plan, subordination is shown to increase the supplies from three of the City's surface water sources (Twin Buttes, Lake Nasworthy, and O.C. Fisher) from zero acre-feet to about 4,000 acre-feet in 2020.²²

Downstream senior rights holders have not been willing to consider subordination with the City. Additionally, subordination does not produce any "new" water; executed agreements would provide the City with increased supplies only to the extent that water is available during a critical drought. The increased focus on climate variation could also impact the availability of additional water accessed under subordination agreements.

²¹ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume II, Pages C-26 to C-33, prepared for the Region F Water Planning Group, November 2015.

²² Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 5D-22, prepared for the Region F Water Planning Group, November 2015.

Due to the uncertainty of developing agreements with downstream senior water rights holders, subordination is not considered a viable water management strategy. It is recommended that the City, working with the Region F Water Planning Group, remove this as a strategy in the upcoming 2021 Region F Water Plan currently being developed.

5.4.5 Strategy 22 – Brush Control

Water yield in a watershed can be dramatically impacted by certain native and invasive brush species. Eliminating or controlling these brush species can increase runoff to reservoirs within a watershed. There are funding programs available for brush control projects, but it must be recognized that to be effective, large areas of brush control are required and the control projects are typically conducted on private land. In addition, continual retreatment is required to maintain the benefits of any brush control project.

Region F considered the impact of brush control for the City's supplies (Twin Buttes, Lake Nasworthy, and O.C. Fisher watersheds) to be about 1,000 acre-feet per year (about 0.9 MGD).²³ Brush control is not considered a viable water management strategy for the City.

5.4.6 Strategy 23 – Water Conservation

Municipal conservation is a strategy to proactively reduce water demands through public education, outreach, outdoor watering limits, inclining rate structures, ordinances (such as high efficiency plumbing fixtures for new construction), and similar best management practices (BMPs). Municipal Conservation is addressed in the 2016 Region F Water Plan.²⁴

The recent drought (and on-going new drought of record for O.H. Ivie) has served to heighten the public's awareness for water conservation. Water conservation activities conducted by the City include public awareness and education programs, an inclining block rate structure to discourage high water use, outdoor watering restrictions, and infrastructure improvements to reduce water loss.

²³ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 5D-23, prepared for the Region F Water Planning Group, November 2015.

²⁴ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume II, Pages C-4 to C-10, prepared for the Region F Water Planning Group, November 2015.

Municipal water conservation is, and will remain, a recommended water management strategy for San Angelo under the State's water planning efforts. However, as noted in the 2016 Region F Water Plan, municipal conservation is projected to have a minimal impact (<1,000 acre-feet per year) on San Angelo's supplies.²⁵ Therefore, municipal conservation alone will not bridge the water supply deficit anticipated in the future, though it is still recommended as a supplementary way to reduce demand.

5.4.7 Strategy 24 – Rehabilitation of E.V. Spence Pipeline

The City contracts with the CRMWD for 6% of the available safe yield in E.V. Spence. Historically, the City has operated and maintained a pipeline from E.V. Spence to San Angelo. The pipeline from E.V. Spence is beyond its service life, and a new pipeline would be required for the City to access its available water supply in E.V. Spence.

The 2016 Region F Water Plan shows a permitted diversion for E.V. Spence of 50,000 acre-feet per year.²⁶ However, without subordination, the safe yield of E.V. Spence is zero.²⁷ E.V. Spence has also been historically characterized as a surface water source with high levels of chloride, sulfate, and TDS which typically require advanced (e.g., RO) treatment. The cost to rehabilitate the E.V. Spence raw water transmission line was estimated in a 2012 planning report to be between \$16 million and \$23 million (2012 dollars). The City has determined that it is not cost-effective to reconstruct the pipeline between E.V. Spence and San Angelo for a water supply that has no available yield under drought conditions.

5.4.8 Summary

A summary of the 24 initially considered water supply strategies and their anticipated yield is provided in Table 5-16. All reuse options assume a WRF effluent flow of 7.5 MGD.

²⁵ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 5D-25, prepared for the Region F Water Planning Group, November 2015.

²⁶ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 1-13, prepared for the Region F Water Planning Group, November 2015.

²⁷ Freese and Nichols, Inc. and LBG-Guyton Associates, Inc: 2016 Region F Water Plan, Volume I, Page 3-40, prepared for the Region F Water Planning Group, November 2015.

Table 5-16: Summary of Water Supply Strategies Considered

Type	#	Name	Description	Project Yield (ac-ft/yr)
Groundwater	1	Local Brackish Groundwater	Desalination of brackish groundwater in Tom Green County.	3,750
	2	Lipan Aquifer	Wellfields in Tom Green and Concho counties.	3,000 – 5,000
	3	Pecos Valley/Edwards-Trinity Aquifer	Development of wellfield in Pecos Valley Aquifer and/or Edwards-Trinity in Pecos County.	10,800
	4	Capitan Reef Aquifer	Development of wellfield in Capitan Reef Aquifer in Pecos County/Brewster County.	12,000
	5	Ellenburger Aquifer	Wellfields in McCulloch County/Concho County.	3,000 – 5,000
	6	Edwards-Trinity Plateau Aquifer	Development of wellfield in Edwards-Trinity Plateau Aquifer.	4,500
Purchased Water	7	CRMWD System	Contract for additional water from CRMWD.	6,000 – 8,000
	8	City of Abilene	Contract for water from City of Abilene.	6,000 – 8,000
	9	Private Suppliers	Contract for water from private entity.	TBD
Reuse	10	Augmentation of O.H. Ivie Reservoir	Discharge reclaimed water from WRF to Concho River and thence to O.H. Ivie Reservoir.	8,400
	11	Augmentation of Lake Nasworthy	Convey reclaimed water from WRF to Lake Nasworthy.	7,770
	12	Augmentation of Twin Buttes Reservoir	Convey reclaimed water from WRF to Twin Buttes.	7,770
	13	Augmentation of O.C. Fisher Lake	Convey reclaimed water from WRF to O.C. Fisher.	7,770
	14	Riverbank Filtration	Discharge reclaimed water from WRF into Concho River. Recover water downstream through shallow wells.	8,000
	15	Infiltration Basins	Discharge reclaimed water from WRF into infiltration basins near WRF. Recover water through shallow wells.	8,000
	16	Direct Potable Reuse	Convey reclaimed water from WRF to the SWTP.	7,100
Other	17	Concho River Water Supply Project	Discharge reclaimed water from WRF into Concho River. Divert water downstream from Concho and convey to SWTP.	8,400
	18	Non-potable Reuse	Replace potable water used for irrigation with reclaimed water from the WRF.	-
	19	Aquifer Storage and Recovery	Store reclaimed water from WRF in aquifer for withdrawal later.	Variable
	20	Red Arroyo	Capture urban storm water runoff near confluence of Red Arroyo and South Concho River. Divert to SWTP.	0
	21	Subordination	Subordination of downstream rights.	4,000
	22	Brush Control	Targeted removal of mesquite, juniper, and salt cedar vegetation to reduce water consumption.	1,000
	23	Municipal Conservation	Promotion of potable water conservation measures.	<1,000
	24	Rehabilitation of E.V. Spence Pipeline	Rehabilitation of existing pipeline from E.V. Spence to San Angelo	0

CHAPTER 6

SCREENING EVALUATION OF POTENTIAL WATER SUPPLY STRATEGIES

The Consultant Team and City representatives reviewed preliminary information for each of the strategies initially identified in Chapter 5, and used a process of elimination specifically looking at strategies which contained a fatal flaw. The elimination process is described in more detail in this chapter.

6.1 FATAL FLAW ANALYSIS

The City initially considered 24 water supply strategies across several potential water sources including groundwater, purchased water from other entities, reclaimed water, and other strategies. The City and the Consultant Team met for a workshop on November 27, 2017, reviewed the challenges each strategy posed, and eliminated any strategies containing a fatal flaw. One purpose of this water supply study is to provide resources available to the City during years of drought. An example of one fatal flaw used in determining feasible strategies was whether the strategy considered would be available to the City in a period of drought. If there was the possibility that a strategy would not be available during drought years, it was eliminated. The strategies eliminated due to a fatal flaw are shown in Table 6-1 along with a description of the flaw for which each strategy was removed from consideration. Of the initial 24 strategies originally considered, 17 were eliminated and seven were selected for further evaluation.

6.2 FURTHER DEVELOPMENT OF REMAINING STRATEGIES

Following the fatal flaw workshop, the remaining seven strategies were further developed by the Consultant Team. The yield for each strategy was refined, additional water quality information was collected, and initial planning level opinions of probable cost were produced.

Table 6-1: Strategies Identified as Containing a Fatal Flaw

#	Name	Fatal Flaw	Description
1	Local Brackish Groundwater	X	Poor water quality and low well capacity.
2	Lipan Aquifer		
3	Pecos Valley/Edwards-Trinity Aquifer		
4	Capitan Reef Aquifer	X	Very similar to Strategy 3. The City would either pursue Strategy 3 or Strategy 4, not both. The aquifer in Strategy 4 is farther away from the City than the aquifer in Strategy 3, and would be more expensive. Available information indicates potential limitations on recharge and potential long-term water quality deterioration.
5	Ellenburger Aquifer	X	Oil and gas production currently occurring in this aquifer. Water quality, availability, and safety are areas of concern.
6	Edwards-Trinity Plateau Aquifer		
7	CRMWD System	X	Short term emergency supply only. Not a sustainable long term strategy.
8	City of Abilene	X	Short term emergency supply only. Not a sustainable long term strategy.
9	Private Suppliers	X	No response from private suppliers when contacted by Consultant Team.
10	Augmentation of O.H. Ivie Reservoir	X	O.H. Ivie may not be available for blending during drought conditions.
11	Augmentation of Lake Nasworthy		
12	Augmentation of Twin Buttes Reservoir	X	Twin Buttes may not be available for blending during drought conditions.
13	Augmentation of O.C. Fisher Lake	X	O.C. Fisher may not be available for blending during drought conditions.
14	Riverbank Filtration		
15	Infiltration Basins	X	Subsurface conditions underlying the City Farm land contain significant caliche, which is not ideal for infiltration basins. It would be difficult to maintain control of infiltrated water.
16	Direct Potable Reuse		
17	Concho River Water Supply Project		
18	Non-potable Reuse	X	Would not provide significant supply during drought conditions.
19	Aquifer Storage and Recovery	X	Does not provide a viable long-term water supply.
20	Red Arroyo	X	Relies on storm water, which would not be available during drought conditions, therefore this strategy has no firm yield. Significant water quality challenges.
21	Subordination	X	Does not provide a reliable long-term supply. Unrealistic opportunity.
22	Brush Control	X	Would not provide a significant supply during drought conditions. Additionally, land access would be required in areas not owned by the City.
23	Municipal Conservation	X	Would not provide significant supply during drought conditions.
24	Rehabilitate E.V. Spence Pipeline	X	Does not provide additional supply since yield of E.V. Spence is zero ac-ft/yr.

6.3 SCREENING WORKSHOP

After the Consultant Team had further investigated the remaining seven strategies, a screening workshop with City staff was held on February 15, 2018, to reduce the number of water supply strategies that would be evaluated in detail. A decision matrix was developed that incorporates relative rankings of both quantitative categories, such as supply quantity, unit cost, and schedule, and qualitative categories such as permitting/regulatory challenges, supply quality, and public acceptance. The decision criteria used in the decision matrix are shown in Table 6-2. In addition, each category was weighted by City staff according to its relative importance in implementing a successful project. The decision matrix resulting from the screening workshop can be found in Appendix B.

Table 6-2: Screening Criteria used to Rank Strategies

Decision Criteria	Definition
Overall Confidence	Likely success of the potential project based on public perception, political climate, impact to existing infrastructure, involvement of other entities, and staff opinion.
Permitting/Regulatory Challenges	Ease of resolving the legal, regulatory, permitting, and environmental challenges before implementation.
Supply Quantity	Ultimate supply volume.
Supply Quality	Relative impact on drinking water quality.
Operational Complexity	Relative complexity and skill required to operate water supply strategy.
Ownership	Level of ownership/control by the City.
Reliability	Likelihood that supply volume is 100% available each year.
Sustainability	Likelihood that supply is available for long-term use (>50 years).
Public Acceptance	Anticipated public acceptance of project.
Schedule	Relative length of implementation schedule.
Unit Cost	Cost of strategy normalized by supply quantity.

6.3.1 Screening Evaluation Results

Of the seven water supply strategies originally considered in the decision matrix, four were selected for further detailed evaluation. The results from the second screening workshop are shown in Table 6-3.

Table 6-3: Screening Evaluation Results

#	Name	Screening Workshop Rank	Carried Forward to Detailed Evaluation	Reason for Elimination
2	Lipan Aquifer	7		Seasonal and drought reliability of the Lipan aquifer is a significant concern. It is likely to be extremely difficult to purchase enough property to protect against depletion of the supply during dry periods due to significant groundwater production from irrigation users. In addition, water quality is poor for drinking water purposes, with elevated nitrates levels, and would require advanced treatment.
3	Pecos Valley/Edwards-Trinity Aquifer	6		Strategy is cost prohibitive due to required 180+ mile pipeline. The cost born by the City as a single purchaser makes this strategy impractical.
6	Edwards-Trinity Plateau Aquifer	2	✓	
11	Indirect Potable Reuse at Lake Nasworthy	4	✓	
14	Riverbank Filtration	5		Significant uncertainty exists related to both water quantity and quality in this strategy. A detailed field investigation is needed and would be likely to cost \$1 million or more. The conclusion of the detailed evaluation would likely be that the project is not viable.
16	Direct Potable Reuse	3	✓	
17	Concho River Water Supply Project	1	✓	

CHAPTER 7

TECHNICAL EVALUATION OF WATER SUPPLY STRATEGIES

Following the screening workshop, the Consultant Team performed a detailed technical evaluation for each of the four remaining water supply strategies. The technical evaluation included the following elements (if applicable for each option):

1. The Consultant Team conducted a planning level analysis to provide a description of facilities required to implement the strategy. The analysis included interregional coordination and potential infrastructure needs, including preliminary pipeline routes and treatment plant expansions/upgrades. General engineering information and relevant data are provided for each strategy as a basis for future detailed engineering work.
2. The Consultant Team reviewed the impacts to raw water quality and treatability as it relates to the integration of the new raw water supply. The technical evaluation considered the potential additional or modified treatment processes that would be required to meet current and anticipated future water quality goals at the SWTP, GWTF, and/or WRF.
3. The Consultant Team evaluated the potential limiting factors for each strategy such as groundwater conservation district requirements, water quality, non-renewable sources, reliability, and TPDES, environmental, and water rights permitting.
4. Finally, the Consultant Team developed planning level opinions of probable construction cost and annual operating and maintenance costs for each strategy.

After completing the technical evaluation for each strategy, a final workshop was conducted where the four strategies were compared with respect to a number of cost and non-cost factors. The result of the final workshop was the selection of a recommended water supply strategy for the City. The sections below document the technical evaluation for each strategy.

7.1 EDWARDS-TRINITY PLATEAU AQUIFER

Groundwater from the Edwards-Trinity Plateau Aquifer (ETPA) was identified in the screening evaluation as a viable strategy for San Angelo to supplement its water supply portfolio. The strategy was further investigated during the technical evaluation phase of this project. The sections below discuss the anticipated water quality of the groundwater, the required treatment and conveyance facilities, and regulatory considerations.

7.1.1 Water Quality

Water produced from wells completed in the ETPA is generally fresh, with a median TDS concentration of 280 mg/L. A summary of water quality constituents from the most recent samples (197 total) collected from wells completed in the ETPA is shown in Table 7-1. These data indicate that the water produced from the aquifer generally meets drinking water standards, but a minority of samples (22%) exceed the secondary MCL for fluoride. If added to the City's water supply portfolio, the groundwater would have a positive effect on water quality in the distribution system by reducing the median blended concentration of TDS by approximately 70 mg/L (Table 7-2).

Table 7-1: Historical Water Quality in Edwards-Trinity Plateau Aquifer

Constituent	Unit	25 th Percentile	Median	75 th Percentile	Primary MCL	Secondary MCL
Calcium	mg/L	52	59	69		
Magnesium	mg/L	17	21	24		
Sodium	mg/L	11	14	20		
Potassium	mg/L	1.15	1.63	2.3		
Sulfate	mg/L	11	16	24		300
Chloride	mg/L	16	20	30		300
Fluoride	mg/L	0.7	1.2	2	4	2
Nitrate	mg/L as N	1.2	1.8	2.4	10	
pH	mg/L	7.5	7.6	7.7	> 7	
TDS	mg/L	264	280	320	1000	
Total Alkalinity	mg/L as CaCO ₃	188	205	224		
Total Hardness	mg/L as CaCO ₃	218	237	254		
Silica	mg/L	12	13	14		

Table 7-2: Projected Effect of Incorporating Groundwater from the ETPA on the City's Potable Water Quality

Source	Without ETPA in 2030		With ETPA in 2030	
	Supply (ac-ft/yr)	Median TDS (mg/L)	Supply (ac-ft/yr)	Median TDS (mg/L)
Concho River	214	1,043	214	1,043
O.H. Ivie	5,492	820	5,492	820
Hickory	12,000	519	12,000	519
ETPA	0	-	4,500	280
Combined	17,706	619	22,206	550

7.1.2 Conveyance Facilities

The ETPA area considered in this technical evaluation is located approximately 50 miles southwest of the City. As part of considering the use of ETPA groundwater, several routes have been evaluated for a pipeline that would convey produced water from a wellfield to the City's existing SWTP. Two conceptual pipeline routes were developed to support a detailed evaluation which included cost, constructability, and environmental impact considerations.

Constructability considerations evaluated the subsurface conditions and existing improvements along the pipeline routes that could impact the speed and ease of construction. This portion of the evaluation included, but was not necessarily limited to: in-situ soils, availability of rights-of-way (ROW) and utility easements, existing structures, and natural features. The constructability considerations evaluated for the conceptual pipeline routes could impact a contractor's means and methods for the construction of the pipeline improvements and will have a direct effect on construction cost and schedule.

Environmental impacts were also considered for the length of each pipeline alternative. It is anticipated that the pipeline itself will have little to no permanent environmental impacts. However, the number and types of environmental features encountered along a pipeline route could impact both cost and schedule for construction, as well as increase the risk of environmental impacts and the costs associated with obtaining environmental clearances and performing mitigation that may be required for pipeline construction.

Finally, the evaluation considered topography. The ETPA is generally uphill from the City, which allows for gravity flow if sufficient initial energy can be supplied by pumping to overcome pipeline friction losses. For each pipeline route evaluated, a single pump station located at or near the wellfield should be sufficient to convey produced groundwater to the City's SWTP.

For both pipeline routes evaluated, it was assumed that groundwater produced from operating wells would be collected and stored in a 250,000 gallon ground storage tank. Wellfield collection piping is anticipated to vary in size from 6-inch up to 20-inch, depending on the number of wells contributing to individual collection pipeline segments. It is also assumed that the ground storage tank will be located adjacent to a transmission pump station (with multiple pumps to provide redundancy), and that both will be located in close proximity to the wellfield.

7.1.2.1 Conceptual Pipeline Route 1

Pipeline Route 1 is based upon on a conceptual 56-mile route generally following public ROW along Texas Department of Transportation (TxDOT) and county roads. From the general area of groundwater supply, the topography slopes downhill toward the City. The downward slope of the ground surface along the route requires approximately 140-feet of head pressure via a pump station to convey water through the 20-inch pipeline. The anticipated hydraulic grade line for Pipeline Route 1 is shown below in Figure 7-1.

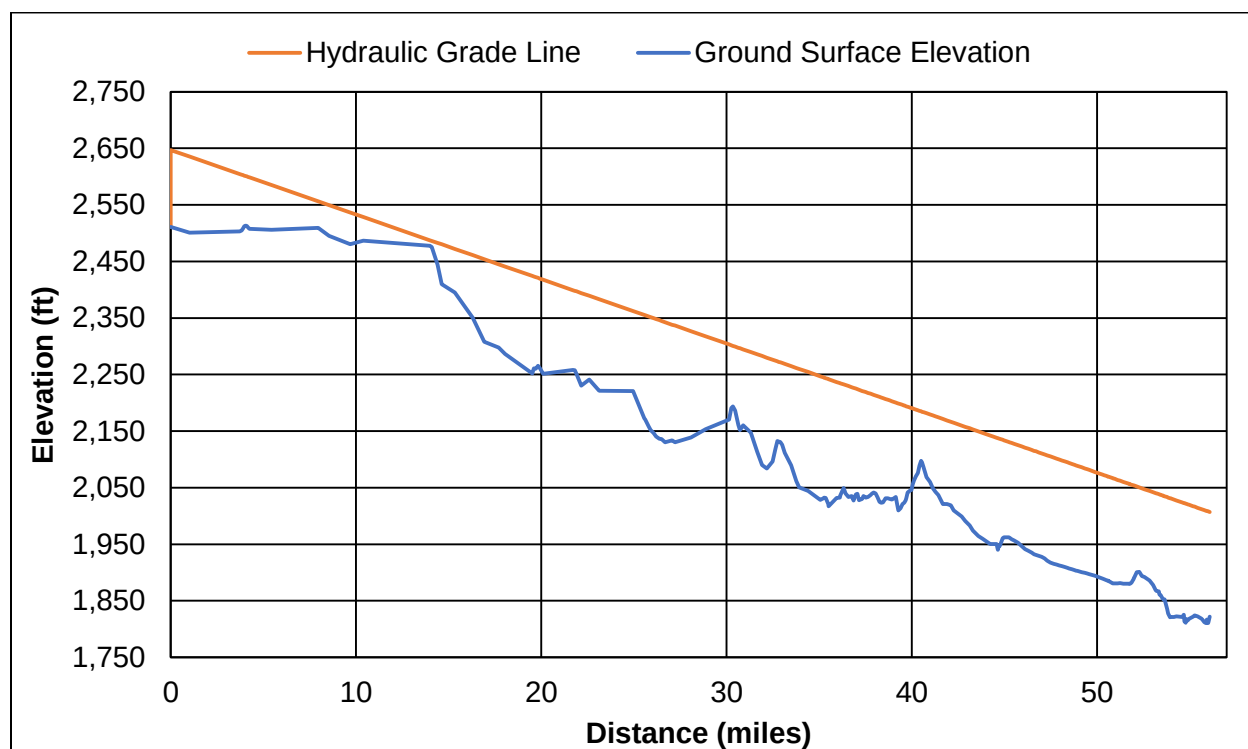


Figure 7-1: Conceptual Pipeline Route No. 1

7.1.2.2 Conceptual Pipeline Route 2

Pipeline Route 2 is based upon a conceptual 58.5-mile route generally within private property and through undisturbed land. From the general area of groundwater supply, the topography generally also slopes downhill toward San Angelo. The downward slope of the ground surface along this route requires approximately 60-feet of head pressure via a pump station (or potentially a standpipe in lieu of a ground storage tank and pump station) to convey water through the 20-inch pipeline. The anticipated hydraulic grade line for Pipeline Route 2 is shown below in Figure 7-2.

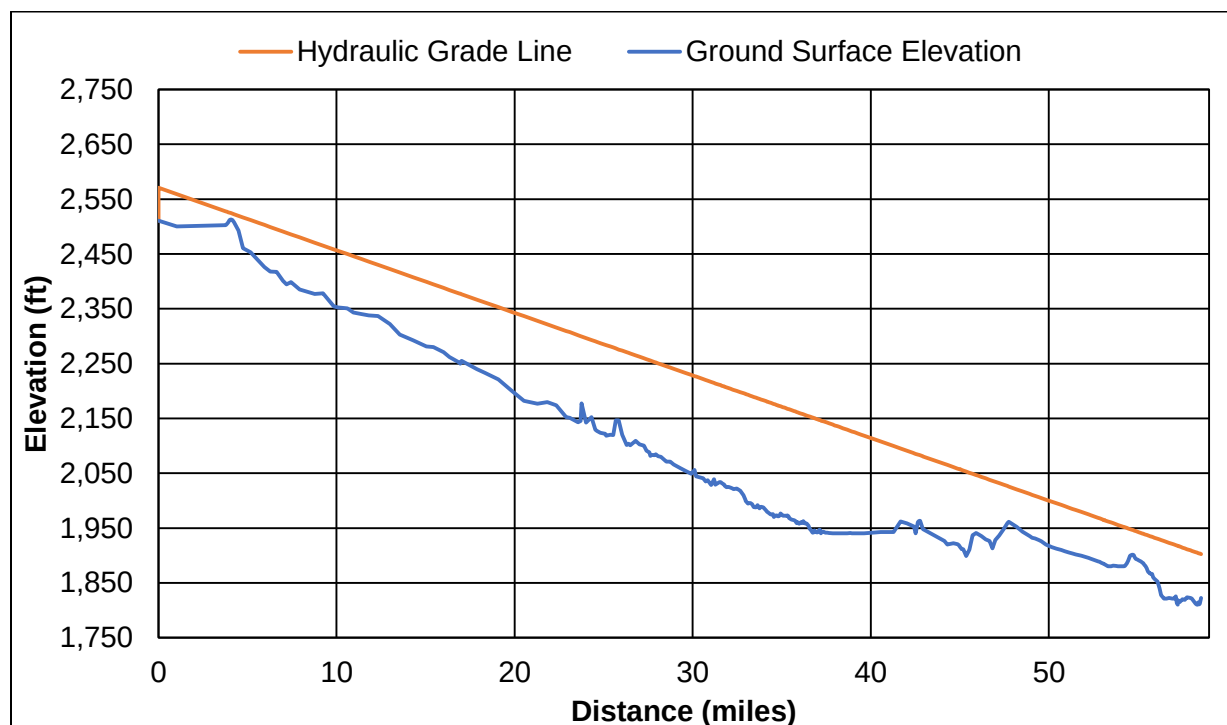


Figure 7-2: Conceptual Pipeline Route No. 2

7.1.2.3 Pipeline Route Evaluation

The soil characteristics along each conceptual route are presented in Table 7-3. Soil characteristics were obtained from the Natural Resource Conservation Service Web Soil Survey for shallow excavations. In-situ soils were evaluated as either restrictive or non-restrictive. Restrictive soils are considered layers of rock or cemented pans that increase the difficulty of construction activities within those layers. These difficulties can have a negative impact on

project schedule and costs. As can be seen in Table 7-3, Pipeline Route 1 will likely encounter approximately 10% more restrictive soils than Pipeline Route 2.

Table 7-3: Comparison of Pipeline Route Materials

Conceptual Route #	Restrictive Material		Non-Restrictive Material		Totals	
	Miles	Percentage	Miles	Percentage	Miles	Percentage
1	22.4	40%	33.7	60%	56.1	100%
2	17.6	30%	41.0	70%	58.5	100%

Potential obstructions and other physical characteristics encountered along the conceptual pipeline routes are listed and evaluated in Table 7-4. The number and type of creek and roadway crossings were quantified due to their impact to permitting requirements and pipeline construction costs. Additionally, the percentage of a pipeline route that is along public ROW and/or within urban areas will have an impact on construction costs and schedules. Construction within existing public ROW should require less clearing and grubbing as compared to construction through undisturbed areas with existing vegetation, though there may be conflicts with other utilities such as telecommunications and/or gas transmission pipelines. Additionally, public ROW should reduce necessary environmental and permitting coordination and approval for construction; private easements require additional surveying to develop easement documents and typically involve appraisal services for acquisition. However, a major benefit to installation of pipeline in easements is the minimization of owner-at-cost relocation of utilities should TxDOT determine a need to expand roadway or ROW in a given area. With this in mind, Conceptual Pipeline Route 1 has the option of being constructed within easements obtained on private property immediately adjacent to TxDOT ROW.

Table 7-4: Potential Obstructions and Route Characteristics

Conceptual Pipeline Route	1	2
Distance (Miles)	56.1	58.5
% Urban	12%	11%
% Rural	88%	89%
% Along TxDOT ROW	84%	24%
No. of TxDOT Crossings	9	10
No. of County Road Crossings	12	10
No. of Creek Crossings	15	15

As can be seen in Table 7-4, both conceptual pipeline routes encounter similar obstacles along their respective routes. The ratio of rural to urban areas and number of road and creek

crossings are very similar. The main difference between Pipeline Route 1 and Pipeline Route 2 is that Route 1 traverses along existing TxDOT ROW while Route 2 takes a path through private property and undisturbed land. The advantage to Route 2 is that there is less likelihood of encountering man-made obstacles and other utilities. The construction of Route 1 within or adjacent to TxDOT ROW would likely have to consider existing utilities and drainage structures. Alternatively, Route 2 involves traversing mostly private property where temporary and/or permanent ROW or utility easements required for pipeline construction are not readily available. Substantial effort is required to coordinate with land owners to develop and acquire necessary easements.

Environmental impacts of each conceptual route will be similar in that they both are anticipated to encounter the same number of creek crossings. Therefore, both routes will have similar costs associated with obtaining environmental clearances and mitigation efforts to allow for pipeline construction. However, due to Route 2 being proposed through large undisturbed areas, Route 2 will likely have a larger environmental impact, due to the disturbance of potential habitats for endangered species in the area.

As discussed previously, Pipeline Route 1 would require a minimum 140-feet of head pressure to convey water to the SWTP, while Pipeline Route 2 would require less than half that at 60-feet. The required head pressure translates to the size of pumps (or for Route 2, potentially a standpipe) to adequately convey water to the SWTP at the required flow rate. However, Route 1 is approximately 2 miles shorter in length than Route 2 and could be constructed within or along existing TxDOT ROW. Based on the points discussed above, Conceptual Pipeline Route 1 was selected as the preferred alternative for the conveyance of groundwater from the ETPA to the City's SWTP.

7.1.3 Treatment Facilities

Pursuant to the Groundwater Rule, any municipal well in service at the time of a routine total coliform detection in the distribution system being supplied by the groundwater facilities (including consecutive wholesale systems) must be sampled for total coliform and *E.coli* within 24-hours of notice being given of a positive routine distribution system total coliform sample (referred to as triggered source water sampling). Groundwater systems that provide 4.0-log viral inactivation of groundwater sources prior to the distribution system are exempt from triggered source water sampling under the Groundwater Rule. An important consideration to make

regarding developing a new groundwater source is how best to provide 4.0-log viral inactivation to obtain the exemption from triggered source water sampling.

To provide 4.0-log viral inactivation in the ETPA groundwater supply before it enters the City's SWTP and blends with treated surface water, either a free chlorine or chloramine residual would be established at a concentration sufficient to provide 4.0-log viral inactivation based on injection of the disinfectant at a calculated distance upstream from the blending location. To determine what the minimum distance upstream from the groundwater/surface water blend point should be, the assumption is made that the treated surface water will generally have a chloramine residual of at least 3.0 mg/L. The corresponding target for groundwater would be a 3.0 mg/L free chlorine residual for a sufficient contact time to give 4.0-log viral inactivation prior to LAS injection upstream from the groundwater/surface water blend point. Assuming the coldest water temperature in the groundwater entering the SWTP will be 12 degrees C, a pH maximum of 7.5, and 5.0 MGD groundwater flow in a 20-inch pipe, a free chlorine application point located 350 feet upstream from the LAS injection point prior to the groundwater/surface water blend point would provide 4.19-log viral inactivation.

If space limitations at the SWTP prohibit applying free chlorine at a point 350 feet upstream from the LAS injection point, then a chemical injection point could also be provided on the combined flow from the wells at a common point along the groundwater delivery system. Under this scenario, assuming a distance offsite of no less than 50 miles (minimum water temperature of 12 degrees C, maximum pH of 7.5, and 5.0 MGD groundwater flow in a 20-inch pipe), any measurable free chlorine residual at the end of the groundwater pipe at the SWTP would yield suitable viral inactivation in excess of 4.0-log. If free chlorine residual were used, 0.05 mg/L of measured free chlorine residual at the end of the groundwater line would provide 52.7-log viral inactivation, due to the length of the pipeline. Free chlorine in a long pipeline tends to break down such that a higher than anticipated injection dose may be required to achieve a measurable residual. With this constraint, the use of chloramines would be preferred in a long pipeline.

If chloramines were formed at a wellfield disinfectant injection point, then 1.0 mg/L of chloramines measured at the SWTP upstream from the groundwater/surface water blend point provides 4.06-log viral inactivation (minimum water temperature of 12 degrees C, maximum pH of 7.5, and 5.0 MGD groundwater flow in a 20-inch pipe).

The scenarios presented above are based on the TCEQ's Concentration Time Study (CT) surface water template. A TCEQ groundwater CT template is available for groundwater systems utilizing a tank for disinfection; however, the surface water CT template provides more flexibility for planning purposes. The surface water CT template is typically submitted to the TCEQ for evaluation of systems that combine both surface water and groundwater. The TCEQ would set a minimum specified residual for the groundwater system based on the selected scenario.

Another important consideration is balancing the chloramine/chlorine residual in the groundwater prior to blending with the treated surface water. Facilities should be provided to allow for matching both the disinfectant residual type (chloramines or free chlorine) and level in either source upstream from the groundwater/surface water blend point. As a minimum, such facilities at the SWTP would include chlorine gas and LAS injection points at the SWTP for the groundwater flow upstream from the groundwater/surface water blending point, as well as provisions for adequate mixing at these injection points.

7.1.4 Regulatory Considerations

With respect to state regulatory agencies, the TCEQ will review plans and/or completion information for wells, treatment, storage, and distribution facilities. These facilities will need to be designed to public water supply standards for approval. Additionally, a water stability study will be required to demonstrate that the new source will not cause corrosive effects in the distribution system.

The Plateau Underground Water Conservation & Supply District (PUWCSD) regulates groundwater wells and production in the ETPA evaluation area. If the wellfield were located in this area, permits will be required for both production and transport from the PUWCSD. The production permit will be limited to one acre-foot per acre per year for each survey section owned, so the 4,500 acre-feet annual production of this strategy would require seven survey sections to be owned by the City. It is anticipated that 18 wells will be required in the wellfield.

The PUWCSD also regulates spacing of wells from each other, as well as the areal density of wells. The minimum well spacing from existing wells is 1,320 feet. However, no more than four wells may be placed per survey section. Additionally, the PUWCSD would require a permit for transporting the water outside its boundaries. This transportation permit must be obtained from the PUWCSD before water can be transported.

7.1.5 Costs

The opinion of probable construction cost for this groundwater strategy is approximately \$72.7 million. Engineering, permitting, mitigation, and land acquisition fees would increase the cost to approximately \$102 million. This strategy would have an estimated annual operating and maintenance cost of approximately \$0.94 million. Costs for this strategy are discussed in more detailed in Section 7.6.

7.2 AUGMENTATION OF LAKE NASWORTHY

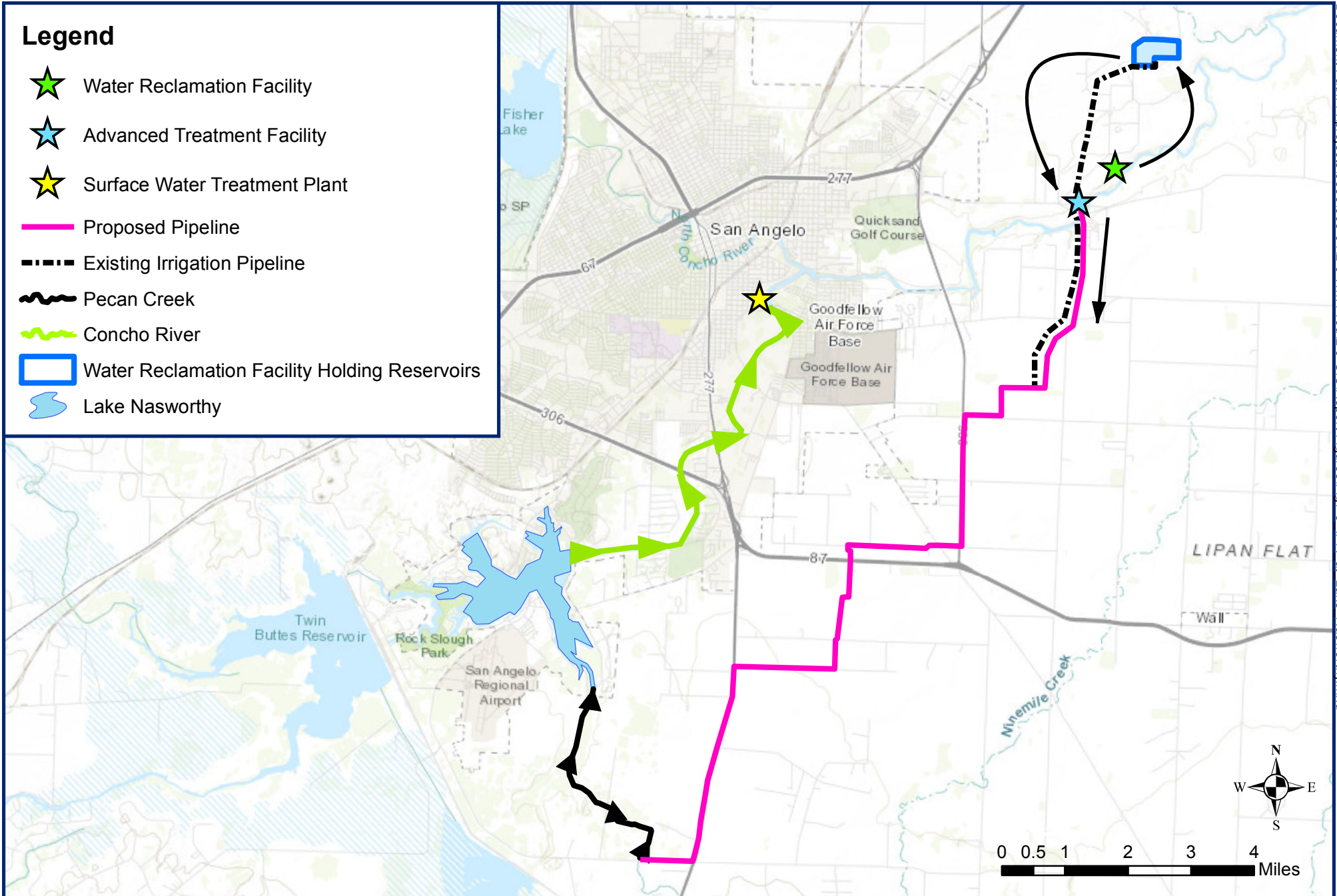
The second water supply strategy evaluated in detail was indirect potable reuse (IPR) of reclaimed water using Lake Nasworthy as an environmental buffer. Advanced treated reclaimed water from the City's WRF would be discharged into Pecan Creek, which flows into Lake Nasworthy. The reclaimed water would blend with existing water in Lake Nasworthy and flow downstream to the City's raw water intake on the South Concho River and be incorporated into the City's potable water supply. The following sections describe the anticipated water quality, required facilities, and regulatory considerations for implementing IPR at Lake Nasworthy. An overview of this strategy is provided in Figure 7-3.

7.2.1 Historical Water Quality

To protect the water quality of Texas lakes, the TCEQ, the USEPA, and other agencies have established water quality standards for a wide range of parameters in the State's surface waters. In Texas, water quality standards for the State's surface water resources are contained in the TCEQ's Texas Surface Water Quality Standards (TSWQS). The TSWQS are revised approximately every three years. They apply to all Surface Waters in the State and establish standards for many substances in the State's rivers, lakes, and estuarine water bodies.²⁸ Water quality standards are based on the designated use (e.g. Contact Recreation, High Aquatic Life, and Public Water Supply) of the water body, and on narrative criteria and numeric criteria necessary to maintain that use. This section presents the water quality standards for Lake Nasworthy and compares them against historical data from the Lake and the WRF. The TCEQ will only approve discharges into Lake Nasworthy where it can be demonstrated that the discharge will not cause a violation of the TSWQS.

Water quality standards for a number of parameters in Lake Nasworthy compared with historical data from the lake are shown in Table 7-5. This information is displayed graphically in Figure 7-4 and Figure 7-5 along with historical WRF effluent data presented in Table 4-4.

²⁸ 30 Texas Administrative Code 307.



City of San Angelo Water Supply Engineering Feasibility Study

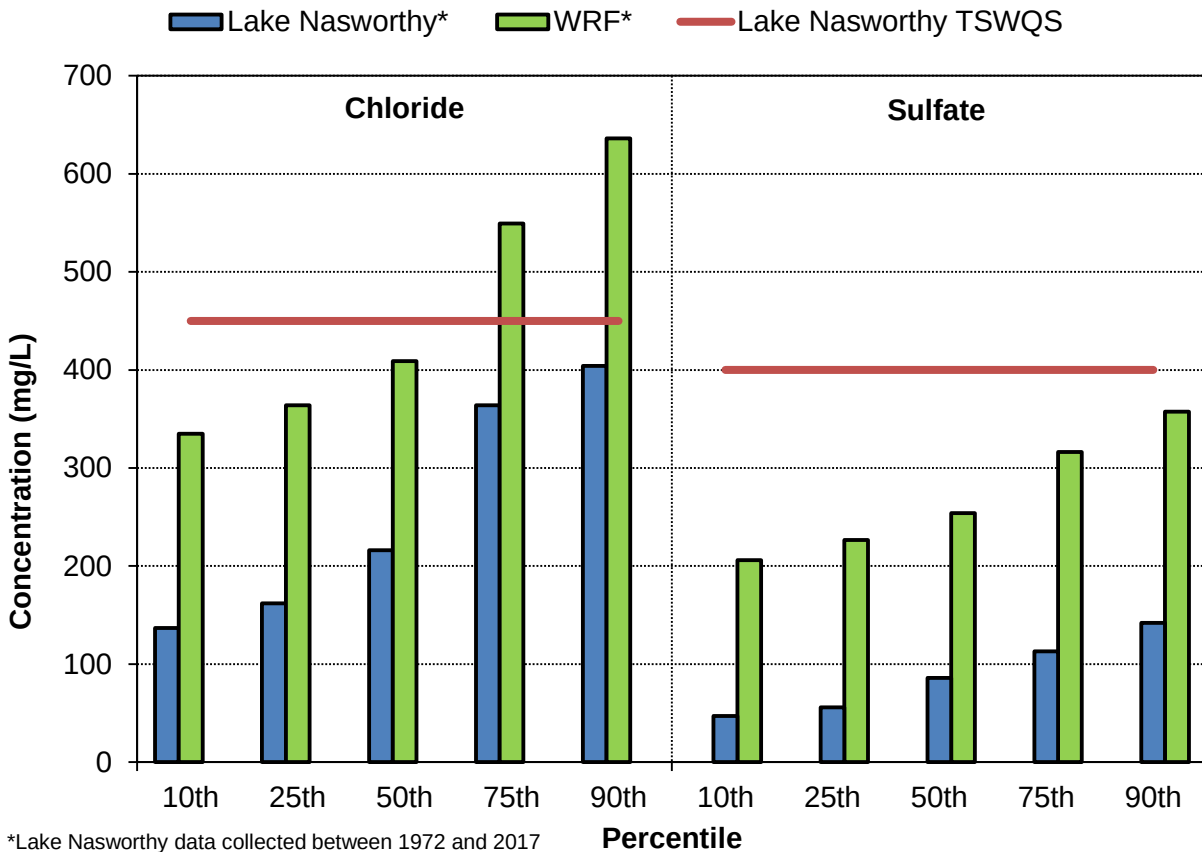
Figure 7-3: Overview Map of Augmentation of Lake Nasworthy



Table 7-5: Water Quality Standards and Historical Data for Selected Parameters for Lake Nasworthy

Parameter	Units	Water Quality Standard	Historical Data Percentiles ¹					Count
			10th	25th	50th	75th	90th	
Chloride	mg/L	450	137	162	216	364	404	309
Sulfate	mg/L	400	47	56	86	113	142	311
Total Dissolved Solids	mg/L	1,500	507	561	699	988	1,091	150
Dissolved Oxygen	mg/L	5.0	5.2	6.5	7.6	9.0	11	1,321
pH Range	S.U.	6.5-9.0	7.9	8.1	8.2	8.4	8.5	1,317
Indicator Bacteria (<i>E. coli</i>)	#/100 mL	126	1.0	3.0	10	28.5	68	155
Temperature	°F	93	46	56	68	77	80	250
Chlorophyll a	ug/L	16.91	4.2	10	11	16	23	164

1. Historical data summarized in table was collected between 1972 and 2017.



*Lake Nasworthy data collected between 1972 and 2017

*WRF data collected between May 2009 and April 2018

Figure 7-4: Historical Concentrations of Chloride and Sulfate

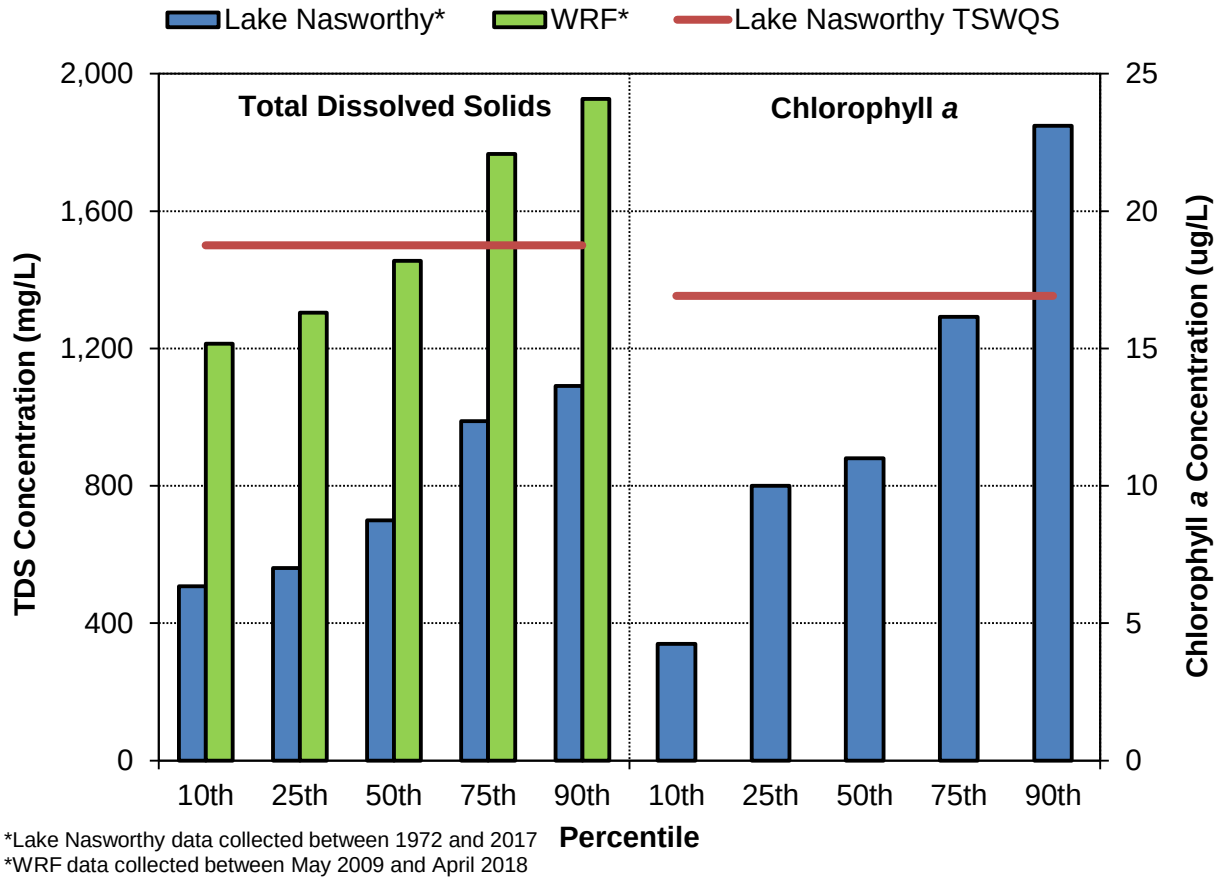


Figure 7-5: Historical Concentrations of TDS and Chlorophyll a

Of the eight parameters with surface water quality standards in Lake Nasworthy, chlorophyll a is the only parameter where the 90th percentile of historical data from Lake Nasworthy exceeds the surface water quality standard. However, historical effluent data from the City's WRF is shown to contain higher concentrations of TDS, chloride, and sulfate than water in Lake Nasworthy. The median value of TDS in WRF effluent, for example, is approximately the same as the water quality standard for Lake Nasworthy. Therefore, improvements at the WRF will be required along with advanced treatment to remove dissolved solids so that the water quality standard for TDS in Lake Nasworthy will not be violated.

7.2.2 Water Reclamation Facility Improvements

This section presents recommended WRF improvements. Goals for the WRF improvements include meeting anticipated discharge permit requirements and providing pretreatment for advanced treatment processes at the proposed ATF. For example, an RO membrane system at the ATF requires robust pretreatment to reduce the potential for membrane fouling. Membrane

feed water quality may be improved by removing constituents such as phosphorus, which can precipitate as phosphate scale on the RO membranes. It is also desirable to remove nitrogen, since nitrite and nitrate are regulated drinking water contaminants. Nutrients such as phosphorus and nitrogen may be removed through chemical and/or biological treatment processes depending upon a variety of factors, including existing treatment process configuration, space availability, and effluent quality goals.

Biological removal of nitrogen involves the conversion of ammonia to nitrates (nitrification) and then conversion of nitrates to nitrogen gas for release to the atmosphere (denitrification). Nitrification is not nitrogen removal, rather nitrogen conversion. Nitrogen removal occurs when the insoluble nitrogen gas is released to the atmosphere.

There are many configurations of biological nitrogen removal processes. The most frequently used configuration involves recycling nitrified effluent from the biological treatment process (or a portion of the process) to the beginning of a selector zone in which raw wastewater or effluent from the primary clarifiers is introduced. The wastewater provides the organic material needed for denitrification, and the nitrates in the recycle stream provide the oxygen source for the anoxic zone of the treatment process. As oxygen is stripped from the nitrate molecules, insoluble nitrogen gas is released to the atmosphere. A recycle rate of between 300% and 400% is required, depending on the biological process selected. Biological nitrogen removal from a denitrification process can typically achieve effluent nitrate levels near, and in some cases less than, 10 mg/L as nitrogen. Process treatment systems designed to achieve comparatively low effluent nitrate levels have demonstrated that effluent concentrations as low as 3 mg/L as nitrogen are possible.

BNR typically involves the uptake of soluble organics (volatile fatty acids, or VFAs) in an anaerobic zone in which the energy stored in phosphate bonds (e.g., adenosine triphosphate) is used to sequester the organics. Phosphorus is released in the process. In a subsequent aerobic zone, the same organisms become phosphorus limited as they utilize the stored compounds under aerobic conditions and utilize the phosphorus in the wastewater to re-form the phosphate bonds and produce more organisms. One of the critical factors for successful BNR is fermentation of the wastewater in the collection system so that sufficient VFAs are present for the BNR process.

Historically, BNR processes with chemical polishing and filtration have been capable of reliably achieving effluent phosphorus levels as low as 0.5 mg/L, depending on such factors as the type of process configuration, the influent wastewater characteristics, and the operation of the facility.

An equalization basin is also recommended to provide balancing of diurnal flows so that constant or nearly constant flows can be achieved which will help optimize the treatment process. An equalization basin will allow the plant operator to determine an appropriate flow or hydraulic load to consistently feed the plant since daily flows can differ significantly from day to night.

These WRF improvements would achieve nutrient removal through biological processes by converting the existing primary clarifiers into anaerobic and anoxic zones. Cloth filters would be added as a final filtering step after the final clarifiers. Because the primary clarifiers will be repurposed, an additional aeration basin and final clarifier will be necessary to treat the increased loading that will result. Readily settleable solids and organics in the influent wastewater that would normally be removed in the primary clarifiers will instead pass into the aeration basins, adding an increased loading to the biological process. In response to the increased load, the biomass inventory responsible for consuming the organics must increase as well. To maintain the same solids retention time in the aeration basins, additional volume must be added. The WRF would be permitted for an annual average daily flow of 12 MGD.

7.2.2.1 Water Quality Data Collected during BNR Pilot Study

A BNR pilot study was constructed in the inactive chlorine contact basin at the City's WRF during 2016 to simulate the same treatment processes described in the section above, only at a much smaller scale (120 gpm). Effluent water quality data collected during the pilot study provide valuable information regarding anticipated effluent quality after implementing the recommended WRF improvements. However, it must be emphasized that the treatment performance and efficiency of a full scale BNR facility is anticipated to be better than the pilot scale version. A summary of historical WRF effluent water quality compared with effluent water quality from the BNR pilot study is presented in Table 7-6. While the recommended WRF improvements are expected to improve removal of ammonia, BOD, phosphorus, and TSS, they will not provide additional removal of dissolved solids such as chloride and sulfate.

Table 7-6: Existing WRF Effluent Quality Compared to BNR Pilot Study Effluent Quality

Parameter	Units	Existing WRF ¹	BNR Pilot Study ²
Alkalinity, Total	mg/L as CaCO ₃	274	176
Ammonia, Total	mg/L as N	27	1.4
Biochemical Oxygen Demand	mg/L	27	15
Chloride	mg/L as Cl	567	509
Hardness, Total	mg/L as CaCO ₃	623	595
Nitrate	mg/L as N	21	14 ³
pH	S.U.	7.9 ⁴	7.0 ⁴
Phosphorus, Ortho	mg/L as PO ₄	12	5.7
Phosphorus, Total	mg/L as PO ₄	14	4.7
Potassium	mg/L	34	26
Sulfate	mg/L	330	309
Total Dissolved Solids	mg/L	1,829	1,738
Total Suspended Solids	mg/L	13	4 ⁵

1. Values represent average values plus one standard deviation of effluent data collected from the WRF between May 2009 and April 2018, unless otherwise noted.

2. Values represent average values plus one standard deviation of effluent data collected during BNR pilot study conducted at the City's WRF during 2016, unless otherwise noted.

3. The BNR pilot unit was specifically designed to remove phosphorus, not nitrogen. It is anticipated that the concentration of nitrate would be lower in the full scale facility.

4. Value represents 75th percentile of data.

5. TSS not collected in pilot effluent. Typical value for filtered BNR effluent from Table 11-5 of Wastewater Engineering Treatment and Resource Recovery, fifth edition.

7.2.3 Advanced Treatment Facility

After treatment at the improved WRF, reclaimed water would be conveyed to the effluent storage reservoirs north of the WRF, as currently practiced. From there, the reclaimed water could still be used for irrigation purposes by sending the water through the existing irrigation pipeline to the TGCWCID #1. The ATF would be constructed adjacent to this existing pipeline, where the pipeline crosses the Concho River. During periods of drought when the City needs to use reclaimed water for potable purposes, water would be taken out of the irrigation pipeline and sent through the advanced treatment processes at the ATF. When the City does not need the potable supply, reclaimed water would pass by the ATF for irrigation purposes, as normal.

For the application of IPR at Lake Nasworthy, advanced treatment processes are needed to produce high quality water, comply with expected TCEQ permitting requirements, and not exceed the TSWQS in Lake Nasworthy. Advanced water treatment may be accomplished by a variety of technologies to treat for pathogens and regulated contaminants, as well as constituents of emerging concern (CECs).

The treatment process at the ATF would begin with a lime softening (L/S) process that removes hardness from water by adding lime to precipitate and settle calcium and magnesium. Water is generally considered hard when the total hardness is greater than 250 mg/L as calcium carbonate (CaCO_3). Water quality data (Table 4-4) indicate that the median hardness in the WRF effluent is approximately 500 mg/L as CaCO_3 . Without a softening step the RO system recovery may be limited to 80% or less by the solubility of sparingly soluble calcium salts. The addition of a softening step, in combination with other pretreatment steps, is anticipated to improve the RO system recovery to approximately 85%. Additional benefits from lime softening include partial removal of heavy metals, iron and manganese, turbidity, and some organic compounds including natural organic matter.

Following lime softening, chlorine and LAS would be added to form chloramines, a weak disinfectant. The water would then be filtered through ultrafiltration (UF) membranes. Ultrafiltration is a membrane filtration process capable of producing low turbidity filtrate (<0.05 nephelometric turbidity units) and rejecting bacteria and some viruses. The UF process provides a physical barrier to pathogens and provides pretreatment for the RO process.

After filtration through UF membranes the flow would be split into two parallel treatment trains with half of the flow treated by RO and the remaining half treated through the use of GAC contactors.

RO is a desalting process that rejects dissolved constituents and produces a concentrated brine stream. The RO process is effective at producing low TDS permeate and rejecting pathogens as well as dissolved organic, inorganic and radioactive contaminants, and a variety of CECs. The primary functions of the RO process at the ATF are to remove salt, reduce CEC concentrations, and provide an additional barrier to bacteria and viruses.

GAC is used to treat for a variety of organic and inorganic contaminants via adsorption. GAC may be used in a contactor or filter depending on treatment goals. GAC is capable of removing taste and odor compounds, synthetic organic chemicals, color forming organics, CECs, and disinfection byproduct (DBP) precursors by adsorption into the GAC from the liquid state. Inorganic constituents such as perchlorate, arsenic, and some heavy metals can also be removed by GAC. GAC has a limited adsorption capacity before it must be regenerated. When

the adsorption capacity of the GAC is exhausted, it must be removed from the contactor and replaced with either new or regenerated GAC.

Following primary treatment with RO and GAC, the two parallel treatment trains are blended together prior to disinfection. Ultraviolet (UV) disinfection was not considered for this strategy, because the blended stream will have a lower UV transmittance than if RO membranes were used to treat the entire flow. A lower UV transmittance requires a higher power output from the UV lamps to maintain the same level of disinfection, increasing the cost. Therefore, disinfection for this strategy will be achieved using chlorination. Following the chlorine contact basin, sodium bisulfite will be added before the water is conveyed to the Pecan Creek discharge point. Sodium bisulfite will dechlorinate the finished water to meet the TCEQ chlorine residual limit for discharge into surface waters. Due to losses in the RO process, the ATF will produce approximately 6.94 MGD, or 7,770 ac-ft/yr. A detailed process flow diagram for this strategy is shown in Figure 7-6.

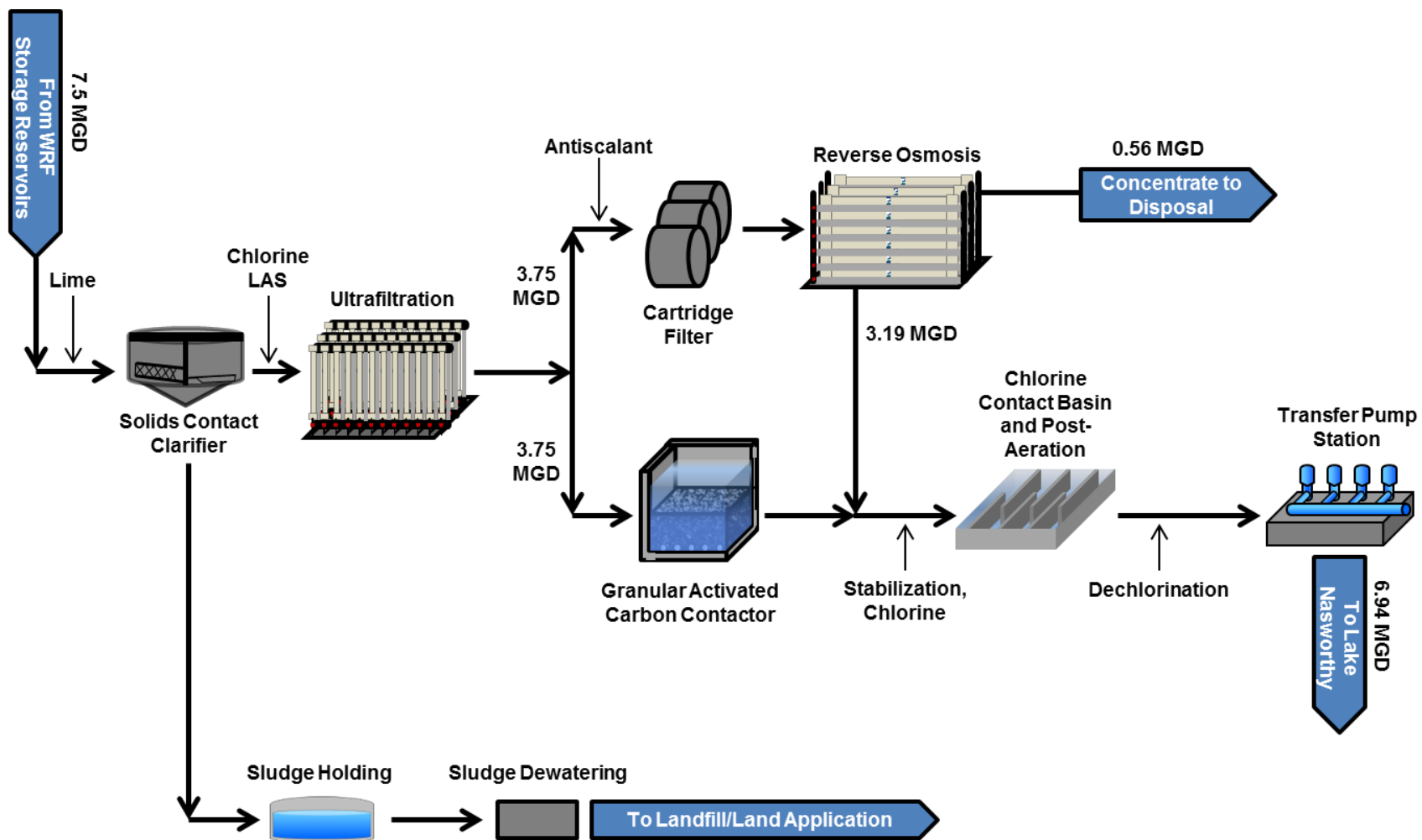


Figure 7-6: Detailed Process Flow Diagram for Augmentation of Lake Nasworthy

7.2.3.1 Advanced Treated Water Quality

The anticipated water quality entering and leaving the ATF for chloride, sulfate, and TDS is shown in Table 7-7. The water quality produced from the ATF will be similar to the water quality of the City's existing supplies, and the effect of adding the supply will be to slightly increase the concentration of TDS in the City's distribution system (Table 7-8).

Table 7-7: Advanced Treated Water Anticipated Quality

Parameter	Units	WRF Effluent/ATF Influent			Advanced Treated Water		
		25 th %ile	Median	75 th %ile	25 th %ile	Median	75 th %ile
Chloride	mg/L	364	409	549	201	226	303
Sulfate	mg/L	227	254	316	124	138	172
TDS	mg/L	1,304	1,455	1,766	717	800	971

Table 7-8: Projected Effect of Implementing IPR to Nasworthy on the City's Potable Water Quality

Source	Without Nasworthy in 2030		With Nasworthy in 2030	
	Supply (ac-ft/yr)	Median TDS (mg/L)	Supply (ac-ft/yr)	Median TDS (mg/L)
Concho River	214	1,043	214	1,043
O.H. Ivie	5,492	820	5,492	820
Hickory	12,000	519	12,000	519
Nasworthy	0	-	7,770	800
Combined	17,706	619	25,476	674

7.2.4 Conveyance Facilities

For the Augmentation of Lake Nasworthy strategy, highly treated reclaimed water would be conveyed to a discharge point into Pecan Creek, which flows into Lake Nasworthy. The conveyance facilities would include a new pump station and pipeline to transfer the advanced treated water from the ATF to the outfall. The discharge pipeline would parallel the final 3 miles of the existing irrigation line to the TGCWCID #1, before continuing for another 13.5 miles to the Pecan Creek discharge point, for a total length of approximately 16.5 miles.

A 30-inch line was selected to carry the water to Pecan Creek at the design flow of 6.94 MGD. At these design conditions, the headloss in the pipeline is expected to be 0.64 feet per thousand feet (ft/1,000 ft). A pump station will be required at the ATF to provide at least 230 ft of head. The hydraulic grade line for the discharge pipeline is shown in Figure 7-7.

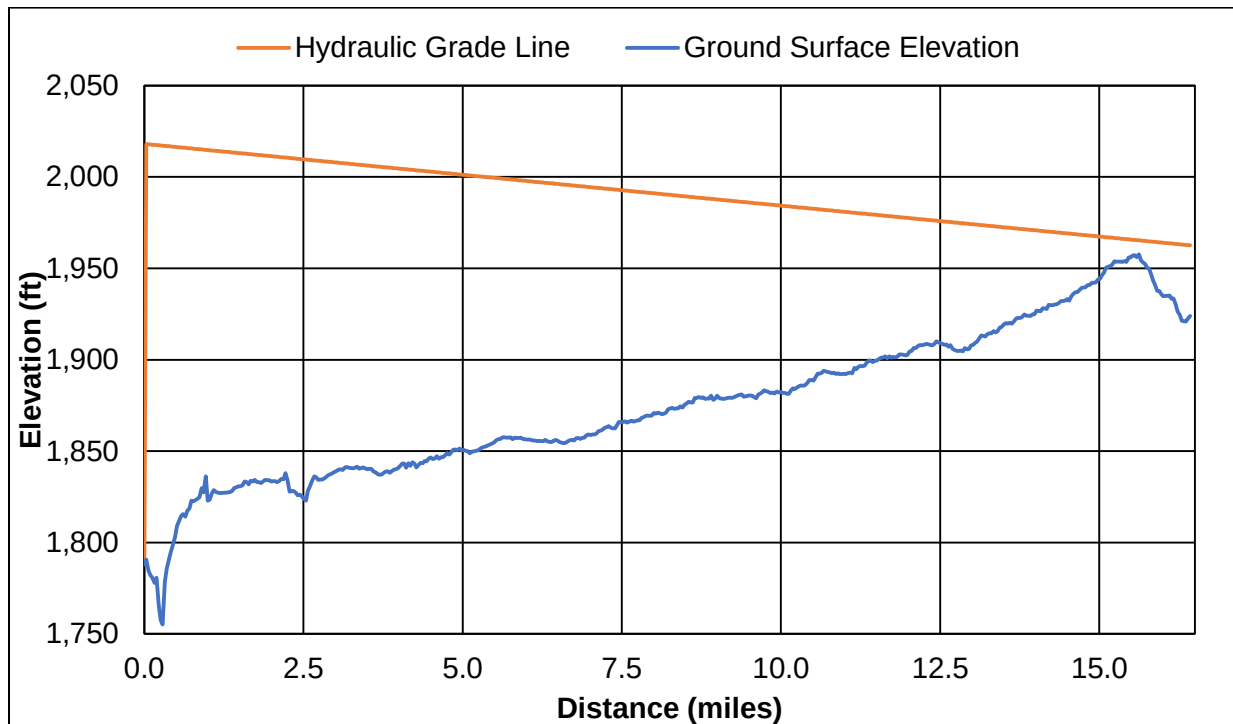


Figure 7-7: Hydraulic Grade Line for Discharge Pipeline to Pecan Creek

A discharge pipeline parallel to the existing irrigation pipeline will allow the City to continue to send reclaimed water to the TGCWCID #1 for irrigation when it is not needed as a potable water supply. Additionally, the WRF will be permitted for an annual average daily flow of 12 MGD, but the ATF will only be designed to receive 7.5 MGD. Therefore, even when the City needs to send reclaimed water to the ATF for potable purposes, some reclaimed water from the WRF may still be available for irrigation.

In addition to the discharge pipeline, a concentrate disposal pipeline, approximately 0.6 miles and 8" in diameter, would be needed to deliver RO concentrate from the WRF to deep injection wells assumed to be located in close proximity to the WRF. The concentrate stream coming off of the RO process has a relatively high pressure (~150 to 200 pounds per square (psi)). Therefore, it is assumed that the concentrate will flow to the injection location without requiring a transfer pump station. Once at the injection location, pumps may be required to inject the concentrate underground.

7.2.5 Regulatory Considerations

Any direct discharge of treated wastewater into Surface Water in the State will require authorization from the TCEQ pursuant to the Clean Water Act and Chapter 26 of the Texas Water Code. For this strategy, a TPDES permit application City's WRF will be necessary to authorize a discharge to Pecan Creek. Additionally, a bed and banks permit would be required for the City to transport treated wastewater discharges using Pecan Creek, Lake Nasworthy, and the South Concho River between the discharge point and the City's intake in Lone Wolf Reservoir, and to divert the flows at the intake structure. The City could retain the ability to land apply treated wastewater.

The TPDES discharge permit application would require the City to demonstrate that the discharge will not result in violation of the TSWQS and will not degrade the existing quality of Pecan Creek or Lake Nasworthy. To evaluate potential discharge limits, a preliminary water quality model was developed using computer software (QUAL-TX). Before creating the model, a discharge location along Pecan Creek was selected (Figure 7-8). Pecan Creek is an unclassified stream but would likely be considered either an intermittent stream or an intermittent stream with perennial pools. Based on these conditions, it was assumed that a minimum dissolved oxygen (DO) standard of 3 mg/L would apply. The DO standard in Lake Nasworthy (classified segment 1422) is 5 mg/L²⁹. The results of the water quality model are displayed in Figure 7-9. The model results indicate that the City would be able to discharge 6.94 MGD³⁰ of treated wastewater into Pecan Creek with a water quality of up to 5/1.7/6 mg/L (BOD/NH₃/DO), though water produced from the ATF will be much higher quality.

²⁹ Due to uncertainty in model accuracy and other factors, the TCEQ considers model results that demonstrate minimum DO values up to 0.2 mg/L below the standard to meet the standard. Therefore, modeled DO values of 2.8 mg/L in Pecan Creek and 4.8 mg/L in Lake Nasworthy were considered to be in compliance with the standards.

³⁰ Assumes 7.5 MGD effluent from the WRF and 0.56 MGD lost through RO.



City of San Angelo Water Supply Engineering Feasibility Study

Figure 7-8: Preliminary Dishcarge Location to Lake Nasworthy

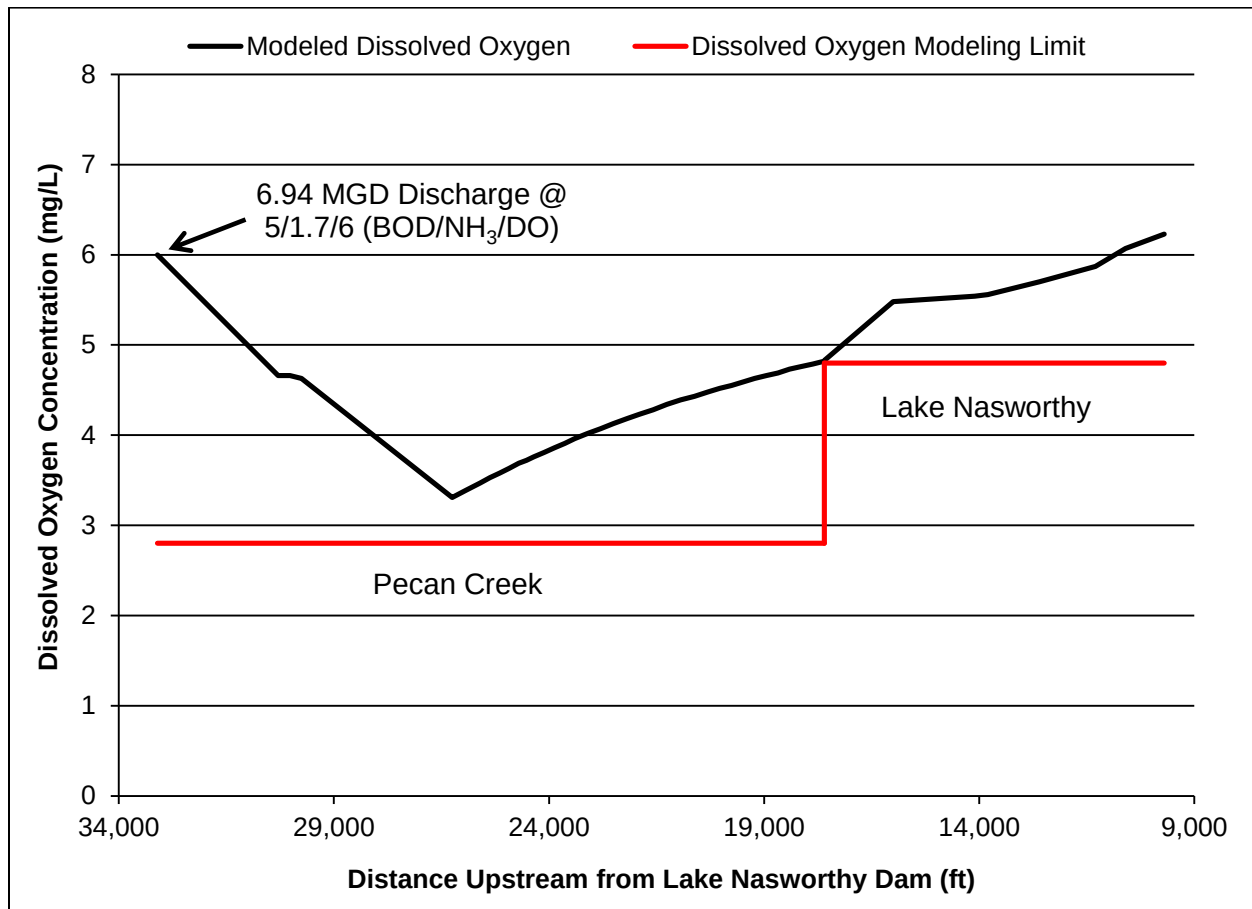


Figure 7-9: Discharge to Pecan Creek Modeling Results

Though 6.94 MGD will be discharged into Pecan Creek, it is expected that evaporative losses in the intermittent stream will decrease the amount of water available to the City as it travels to Lake Nasworthy. A stream study along the South Concho River from Christoval to a point 10 miles south of San Angelo was conducted on June 18, 1953, to evaluate losses. The study concluded that the South Concho River was losing water at a rate of 0.387 cubic feet per second (cfs) per mile. No stream study has been conducted in Pecan Creek, but the Consultant Team assumed that it would lose water at approximately the same rate as the South Concho River. From the discharge point into Pecan Creek at FM 584, the reclaimed water travels approximately 2.94 miles until it reaches the backwater of Lake Nasworthy. Travel over this distance would result in a loss of approximately 1.14 cfs, or 0.74 MGD. Therefore, the water supply yield for this option has been reduced from 6.94 MGD to 6.2 MGD, or 6,944 ac-ft/yr.

7.2.6 Costs

The opinion of probable construction cost for this augmentation strategy is approximately \$121 million. Engineering, permitting, mitigation, and land acquisition fees would increase the cost to approximately \$141 million. This strategy would have an estimated annual operating and maintenance cost of approximately \$4.1 million. Costs for this strategy are discussed in more detail in Section 7.6. It is important to note that the cost for this option does not include improvements at the SWTP, since all of the treatment will be accomplished at the ATF.

7.3 DIRECT POTABLE REUSE

The third water supply strategy evaluated in detail was direct potable reuse (DPR) of reclaimed water. Reclaimed water from the City's WRF would pass through advanced treatment processes and then be sent directly to the SWTP for blending with the City's other raw water sources. The following sections describe the recommended treatment facilities, anticipated water quality, and regulatory considerations for implementing DPR. An overview of this strategy is provided in Figure 7-10.

7.3.1 Water Reclamation Facility Improvements

The recommended upgrades to the City's WRF for this strategy are the same as those described for the Augmentation of Lake Nasworthy strategy in Section 7.2.2. The existing WRF would be upgraded to a BNR process permitted for an annual average daily flow of 12 MGD.

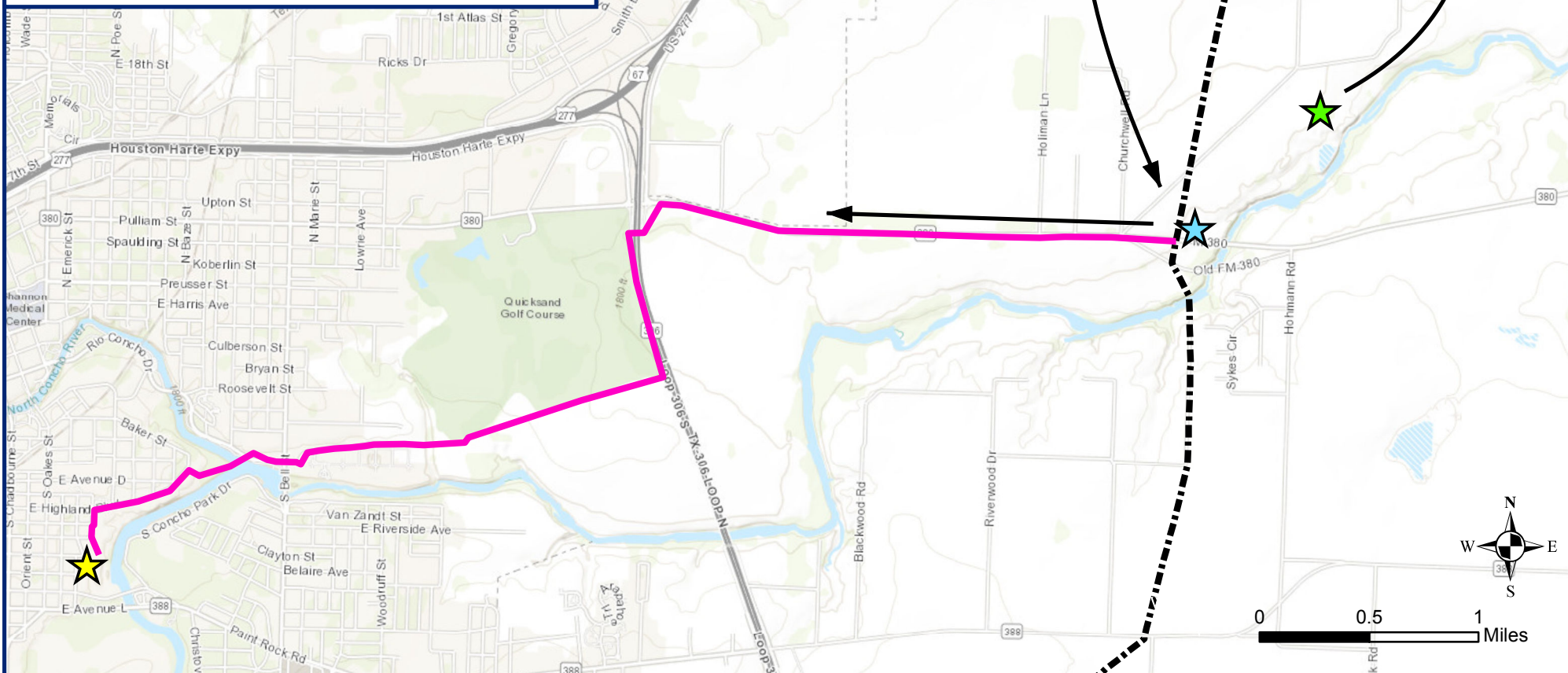
7.3.2 Advanced Treatment Facilities

The recommended advanced treatment process for the DPR strategy is similar to the advanced treatment process described for the Augmentation of Lake Nasworthy in Section 7.2.3. Effluent from the WRF stored at the effluent storage reservoirs would be sent to the ATF through the existing irrigation pipeline where the lime softening (L/S) process would be used to improve membrane recovery and reduce hardness. After the L/S process, chlorine and LAS would be added to the flow stream for chloramine pretreatment before going through UF membrane treatment. After UF, the entire flow would be sent through the RO membranes, instead of only 50% as in the Lake Nasworthy strategy.

Permeate produced from the RO system would be sent to an ultraviolet light/advanced oxidation process (UV/AOP) system for further treatment. UV/AOP reactors inactivate pathogens using electromagnetic radiation produced by UV lamps and treat for additional contaminants by adding hydrogen peroxide to achieve chemical oxidation of some CECs. Permeate from the RO process contains few constituents and is well suited for UV/AOP. Disinfection is achieved by UV/AOP and then chlorination downstream of the RO system. Since RO permeate is aggressive, chemical stabilization must also be provided. At a minimum, pH adjustment is anticipated to be required. Additional stabilization via phosphate based corrosion inhibitors may be needed if the raw water blend at the SWTP is insufficient to achieve adequate hardness and alkalinity for water stability. A detailed process flow diagram for this strategy is shown in Figure 7-11.

Legend

-  Water Reclamation Facility
-  Advanced Treatment Facility
-  Surface Water Treatment Plant
-  Proposed Pipeline
-  Existing Irrigation Pipeline
-  Water Reclamation Facility Holding Reservoirs



City of San Angelo Water Supply Engineering Feasibility Study
Figure 7-10: Overview Map of Direct Potable Reuse

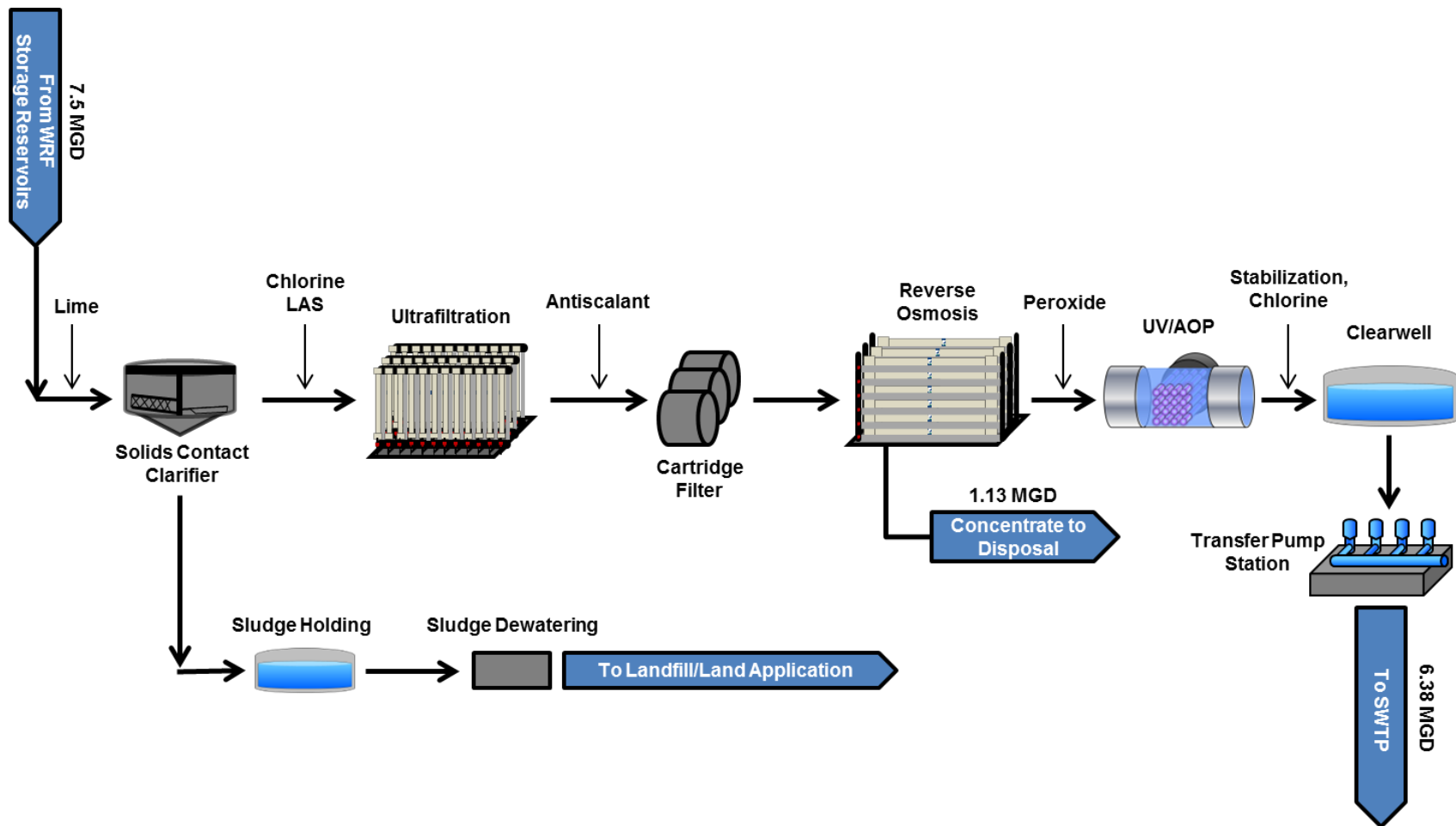


Figure 7-11: Detailed Process Flow Diagram for Direct Potable Reuse

7.3.3 Water Quality

Water produced from the ATF will be excellent in quality since all reclaimed water will be sent through RO at the ATF. An RO pilot unit was placed in service during the DPR pilot study conducted in 2016 and valuable water quality data were collected downstream of the RO system during the study. Data for dissolved parameters are compared against current WRF effluent in Figure 7-7. Advanced treated water produced from the ATF will be significantly better in quality than the City's existing sources and the other strategies that were evaluated.

Table 7-9: RO Permeate Water Quality Data from DPR Pilot Study

Parameter	Units	WRF Effluent/ATF Influent			Advanced Treated Water ¹		
		25 th %ile	Median	75 th %ile	25 th %ile	Median	75 th %ile
Chloride	mg/L	364	409	549	5.2	5.8	6.5
Nitrate	mg/L as N	6.2	10.7	18.2	0.7	0.8	1.1
Sulfate	mg/L	227	254	316	0.5	0.5	0.6
TDS	mg/L	1,304	1,455	1,766	25	29	33

1. Summary of data collected during DPR pilot study in 2016.

If the DPR strategy is implemented, advanced treated water from the ATF would be blended with the City's existing raw water supplies before entering the SWTP. Water exclusively from the ATF would not be sent directly into the distribution system. As discussed in Section 3, there will be approximately 214 ac-ft/yr available from the Concho River, 12,000 ac-ft/yr available from Hickory, and 5,492 ac-ft/yr available from Ivie during a period of drought in 2030. Even if the Ivie supply were to be completely depleted, the Hickory water would be available for blending. This DPR scenario would yield approximately 7,140 ac-ft/yr (6.38 MGD) of drinking water supply. When blended with the other supplies, advanced treated water would account for approximately 30%-42% of the water sent into the City's distribution system, depending on whether Ivie water is available. However, as shown in Table 7-10, this portion of advanced treated water could have a significant positive impact on the combined TDS in the distribution system.

Table 7-10: Projected Effect of Implementing DPR on the City's Potable Water Quality

Source	Without DPR in 2030		With DPR in 2030	
	Supply (ac-ft/yr)	Median TDS (mg/L)	Supply (ac-ft/yr)	Median TDS (mg/L)
Concho River	214	1,043	214	1,043
O.H. Ivie	5,492	820	5,492	820
Hickory	12,000	519	12,000	519
DPR	0	-	7,140	29
Combined	17,706	619	24,846	449

7.3.4 Conveyance Facilities

For the DPR strategy, reclaimed water would be conveyed to the ATF from the effluent storage reservoirs at the WRF site through the existing irrigation pipeline. After treatment at the ATF, the advanced treated water would be conveyed to the SWTP. The conveyance facilities required would include a new pump station and pipeline to transfer the advanced treated water from the ATF to the SWTP. The total length of the pipeline would be approximately 6.3 miles. Water could continue to be sent to the TCGWCID #1 for irrigation purposes through the existing irrigation line. Water would be diverted from the irrigation line when the City needed additional water supplies.

A 30-inch pipeline was selected to send water to the SWTP. At these design conditions, the headloss in the pipeline is expected to be 0.55 ft/1,000 ft at the design flow of 6.38 MGD. A pump station will be required to provide an initial increase in head of approximately 75 ft. The hydraulic grade line and ground surface elevation along the preliminary pipeline route is shown in Figure 7-12.

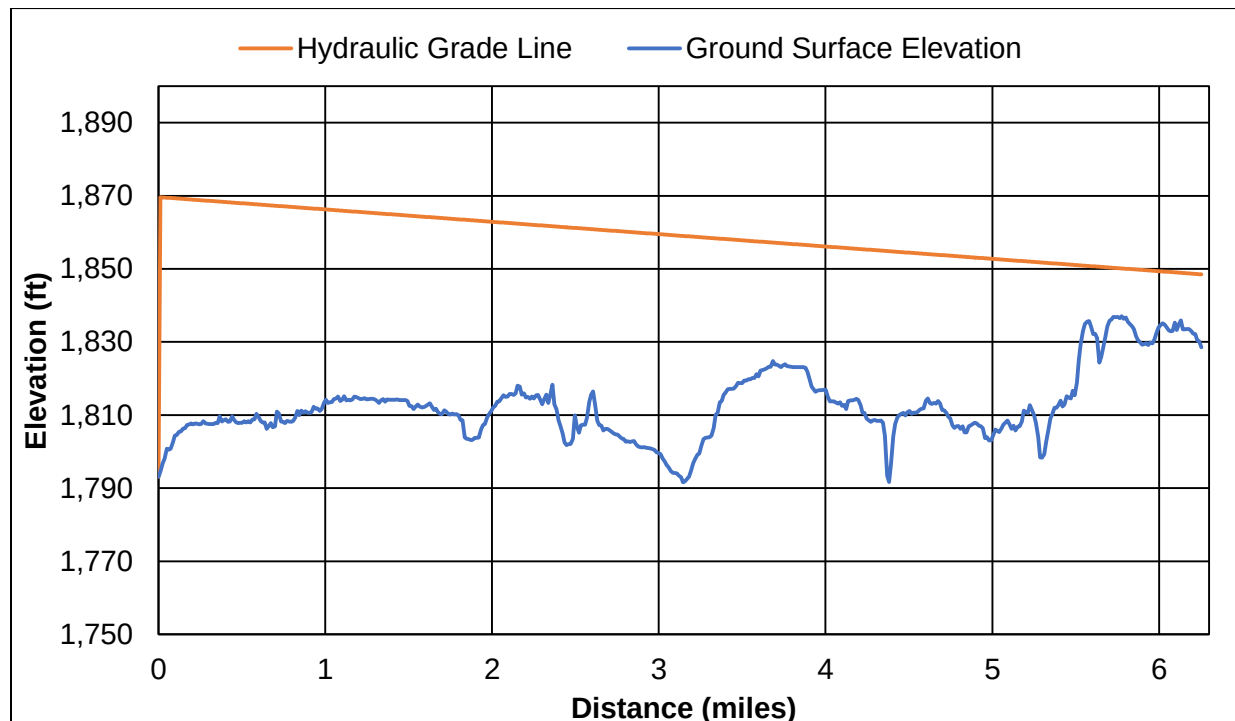


Figure 7-12: Transmission Pipeline from WRF to SWTP

A concentrate disposal pipeline, approximately 0.6 miles and 10" in diameter, would be required to deliver RO concentrate from the WRF to deep injection wells assumed to be located in close proximity to the WRF.

7.3.5 Regulatory Considerations

Currently, the TCEQ considers permit applications for DPR projects on a case-by-case basis. However, potable water supplied to consumers is required to meet federal and state drinking water standards regardless of the raw water source. The USEPA³¹ and TCEQ set drinking water standards for biological, organic, inorganic, and radioactive contaminants, including pathogens.

Pathogen removal/inactivation is often described in terms of log₁₀ removals: 1-log₁₀ removal equals 90% removal, 2-log₁₀ removal equals 99% removal, 3-log₁₀ removal equals 99.9% removal, and so on. Minimum pathogen inactivation requirements vary depending on the source water quality. For surface water or groundwater under the direct influence of surface water, the minimum pathogen inactivation requirements are 2-log *Cryptosporidium*, 3-log *Giardia*, and 4-log virus.³²

Municipal effluent would be considered to be a new water source, and Texas rules require that a water quality characterization be performed on new water sources intended for Public Water Systems. The TCEQ uses the source water characterization results to set pathogen inactivation requirements during a case-by-case DPR project evaluation that includes a risk analysis of the potential for pathogen exposure. When setting minimum pathogen inactivation requirements for two previous DPR projects in Texas (Big Spring/CRMWD and Wichita Falls), the TCEQ specifically addressed the advanced treatment systems and required a baseline (minimum) 5.5-log *Cryptosporidium*, 6-log *Giardia*, and 8-log virus inactivation inclusive of pathogen inactivation achieved at the downstream water treatment facilities.

For purposes of comparison, a DPR Resource Document³³ was completed for the TWDB in 2015, and it recommended pathogen inactivation targets of 10-log *Cryptosporidium*, 10-log

³¹ Safe Drinking Water Act and National Primary Drinking Water Regulations

³² See 30 TAC 290.104 for a summarized list of the regulated parameters in potable water. 30 TAC 290.105 summarizes the secondary water standards for Texas.

³³ Direct Potable Reuse Resource Document, Alan Plummer Associates, Inc., April 2015

Giardia, and 12-log virus that are intended to be achieved by a combination of wastewater treatment, advanced treatment, and water treatment facilities operating in series. The DPR strategy evaluated in this study will target the pathogen inactivation goals recommended in the DPR Resource Document through a multi-barrier approach, but also will meet all baseline TCEQ inactivation requirements and drinking water regulations.

A summary of the ATF processes included in the DPR strategy with their anticipated pathogen inactivation credits and the inactivation goals is shown in Table 7-11. In summary, the recommended treatment processes surpass the anticipated inactivation requirements from the TCEQ and the industry guidance provided in the DPR Resource Document.

Table 7-11: Anticipated Pathogen Inactivation Credits Received by the TCEQ

Treatment Process	<i>Crypto.</i>	<i>Giardia</i>	<i>Virus</i>
Water Reclamation Facility ¹	0	0	0
Lime Softening	0	0	0
Ultrafiltration	4	4	0
Reverse Osmosis ²	0	0	0
UV/AOP	4	4	4
Chlorine	0	1	3
Water Treatment Plant	2	3	4
Total	10	12	11
Minimum Baseline	5.5	6	8

1. The TCEQ does not grant credit for pathogen inactivation achieved at a wastewater treatment plant. However, inactivation achieved at the WRF would be considered towards the goals stated in the DPR Resource Document.

2. The TCEQ does not currently grant pathogen removal credit to RO processes; however, these processes do act as pathogen barriers when functioning properly.

7.3.6 Costs

The opinion of probable construction cost for the DPR strategy is approximately \$121 million. Engineering, permitting, mitigation, and land acquisition fees would increase the cost to approximately \$140 million. This strategy would have an estimated annual operating and maintenance cost of approximately \$5.3 million. Costs for this strategy are discussed in more detail in Section 7.6.

7.4 CONCHO RIVER WATER SUPPLY PROJECT

The final water supply strategy evaluated in detail was indirect potable reuse (IPR) of reclaimed water using the Concho River as an environmental buffer. Reclaimed water from the City's WRF would be discharged into the Concho River and flow to a downstream City property along the river. An intake would be constructed at this downstream property to divert reclaimed water blended with Concho water out of the river and convey it to the SWTP. Additional treatment processes would be added to the SWTP to treat water from this source. An overview map of this strategy is provided in Figure 7-13.

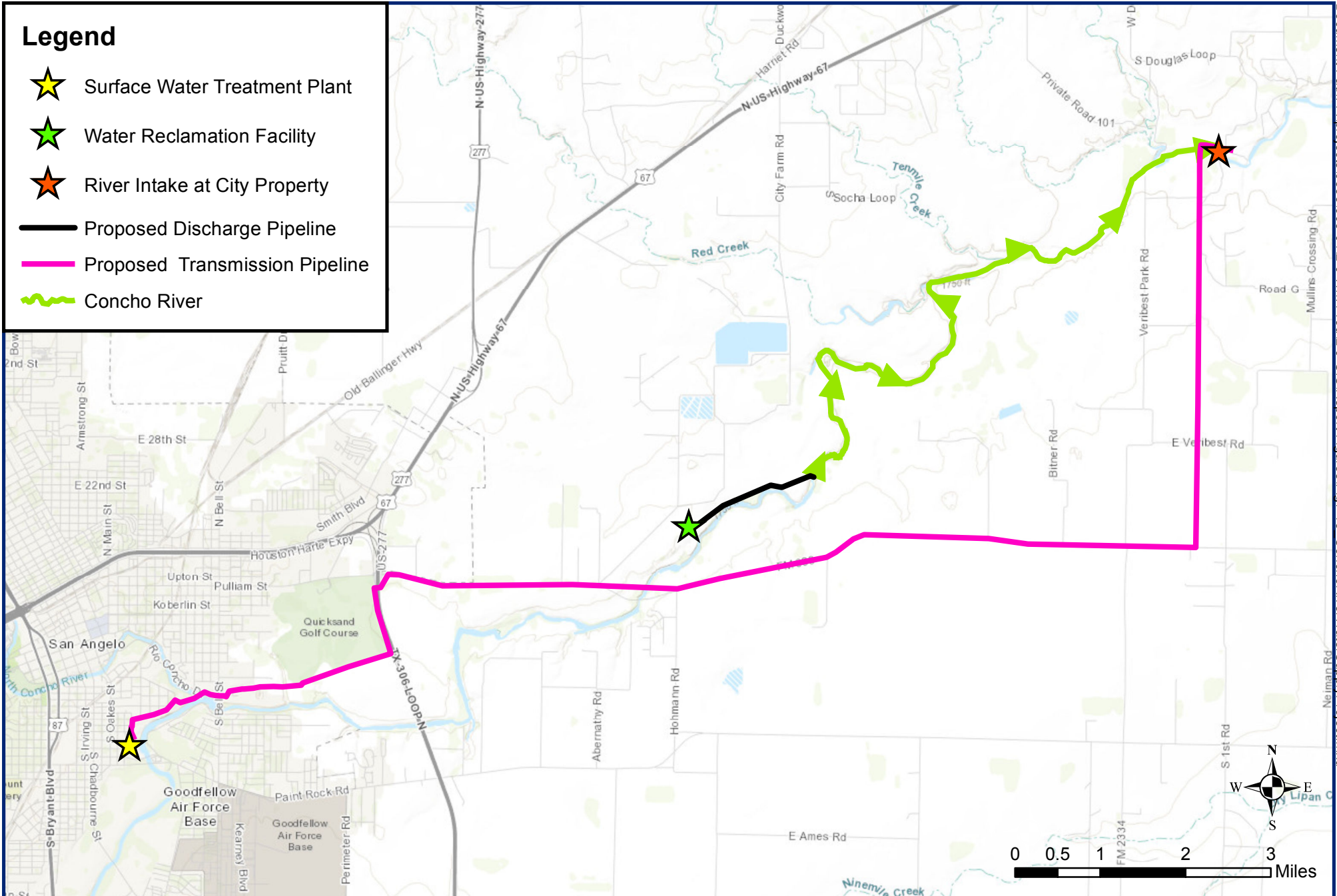
7.4.1 Historical Water Quality

This section presents the TSWQS for the Concho River and compares them against historical data from the river and the WRF. The TCEQ will only approve discharges into the Concho River where it can be demonstrated that the discharge will not result in violations of the standards. The TSWQS for the Concho River compared with historical data is shown in Table 7-12. This information is displayed graphically in Figure 7-14 along with historical WRF effluent data that was presented in Table 4-4.

Table 7-12: Texas Surface Water Quality Standards for the Concho River

Parameter	Units	TSWQS	Historical Data Percentiles ¹					Count
			10 th	25 th	50 th	75 th	90 th	
Chloride	mg/L	610	184	286	419	559	687	742
Sulfate	mg/L	420	77	117	205	310	412	684
Total Dissolved Solids	mg/L	1,730	628	864	1,275	1,640	2,080	146
Dissolved Oxygen ¹	mg/L	5.0	5.5	6.9	8.7	10.4	11.6	818
pH Range	S.U.	6.5-9.0	7.6	7.7	7.9	8.1	8.3	625
Indicator Bacteria (<i>E. coli</i>)	#/100 mL	126	7	16	40	86	190	219
Temperature	°F	90	49	55	69	79	84	103
Chlorophyll <i>a</i>	mg/L	n/a	2	9	14	31	49	211

1. Summary of data collected in the Concho River between Bell St. and Ranch Rd. 381 from 1972 to 2016.



Legend

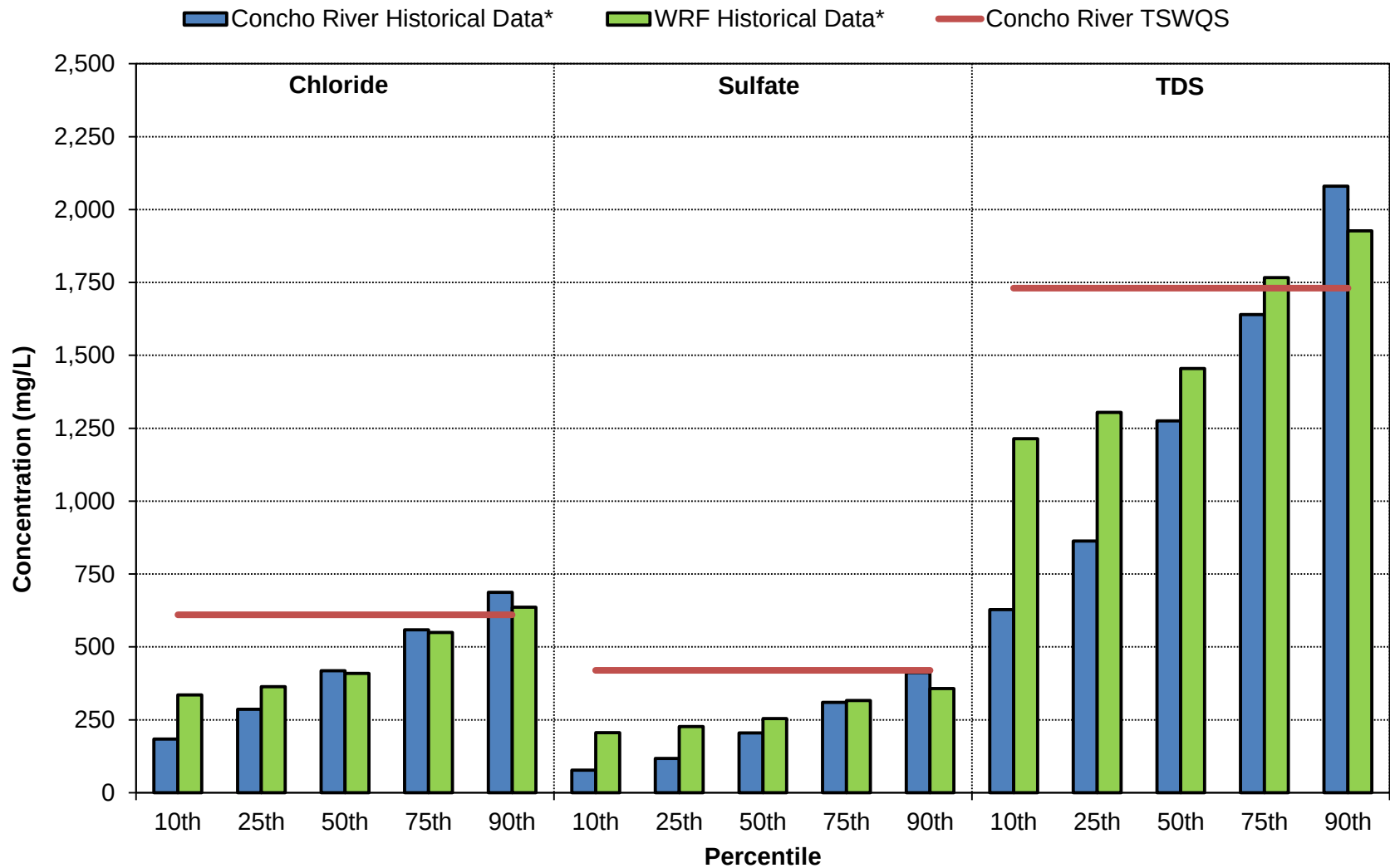
- ★ Surface Water Treatment Plant
- ★ Water Reclamation Facility
- ★ River Intake at City Property
- Proposed Discharge Pipeline
- Proposed Transmission Pipeline
- Concho River



City of San Angelo Water Supply Engineering Feasibility Study

Figure 7-13: Overview Map of the Concho River Water Supply Project





*Concho River data collected between Bell St. and Ranch Rd. 381 from 1972 to 2016. WRF data collected monthly between 5/2009 and 4/2018.

Figure 7-14: Historical Concho River Water Quality

7.4.2 Water Reclamation Facility Improvements

The recommended upgrades to the City's WRF for this strategy are the same as those for the Augmentation of Lake Nasworthy strategy described in Section 7.2.2. The existing WRF would be upgraded to a BNR process permitted for an annual average daily flow of 12 MGD. The anticipated reclaimed water quality following improvements was presented in Table 7-6. Reclaimed water from the WRF would blend with raw water in the Concho River before being diverted at the proposed intake location. The anticipated Concho River water quality at the intake location is shown in Table 7-13.

Table 7-13: Anticipated Concho River Water Quality at Intake

Parameter	Concho River¹ (mg/L)	Reclaimed Water² (mg/L)	Anticipated Blend³ (mg/L)
Chloride	419	409	412
Sulfate	205	254	237
Total Dissolved Solids	1,275	1,455	1,392

1. Reported as median values. Concho River data collected between Bell St. and Ranch Rd. 381 from 1972 to 2016.

2. Reported as median values of data collected monthly between 5/2009 and 4/2018.

3. Assuming a Concho flowrate of 4 MGD and a reclaimed water flow of 7.5 MGD

7.4.3 Conveyance Facilities

Two transmission pipelines would be required for this strategy: a discharge pipeline from the WRF to an outfall on the Concho River, and a transmission pipeline from the intake location at the downstream City property to the SWTP. This section describes the characteristics of the two proposed pipelines.

7.4.3.1 Outfall Pipeline

Due to discharge permitting concerns that will be discussed in Section 7.4.5, the full permitted flow of 12 MGD could not be discharged into the Concho River at the location of the WRF. Rather, a pipeline approximately 1.3 miles long will be required to convey the reclaimed water east of the WRF, to an outfall downstream of Kaase Reservoir. A 36-inch pipeline was selected for the design flow of 12 MGD. At these design conditions, the headloss in the pipeline is anticipated to be 0.73 ft/1,000 ft. The ground surface elevation along the proposed route drops approximately 40 feet from the WRF to the proposed outfall location. Based on the hydraulic evaluation, it is assumed that a discharge pump station should not be required. The ground surface elevation and hydraulic grade line for this proposed outfall pipeline are shown in Figure 7-15.

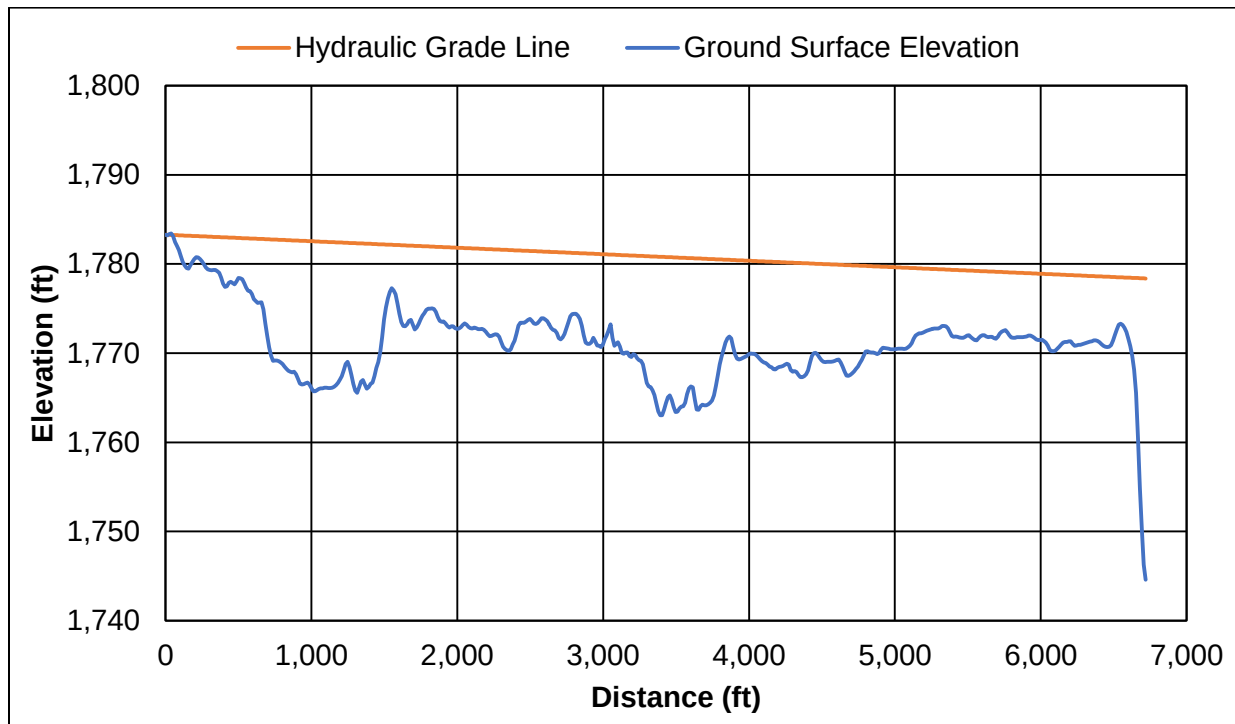


Figure 7-15: Outfall Pipeline from WRF to Concho River

7.4.3.2 Transmission Pipeline from Concho River Intake to SWTP

A 16.4 mile pipeline will be required to transport Concho River water from the proposed intake location at the downstream City property to the SWTP. A pipeline diameter of 30-inches is proposed pipeline size at the design flow of 7.5 MGD. This pipeline size is anticipated to result in a unit headloss of 0.74 ft/1,000 ft. A transfer pump station capable of adding approximately 200 ft of head will be required to convey water to the SWTP. The hydraulic grade line for this pipeline is shown in Figure 7-16.

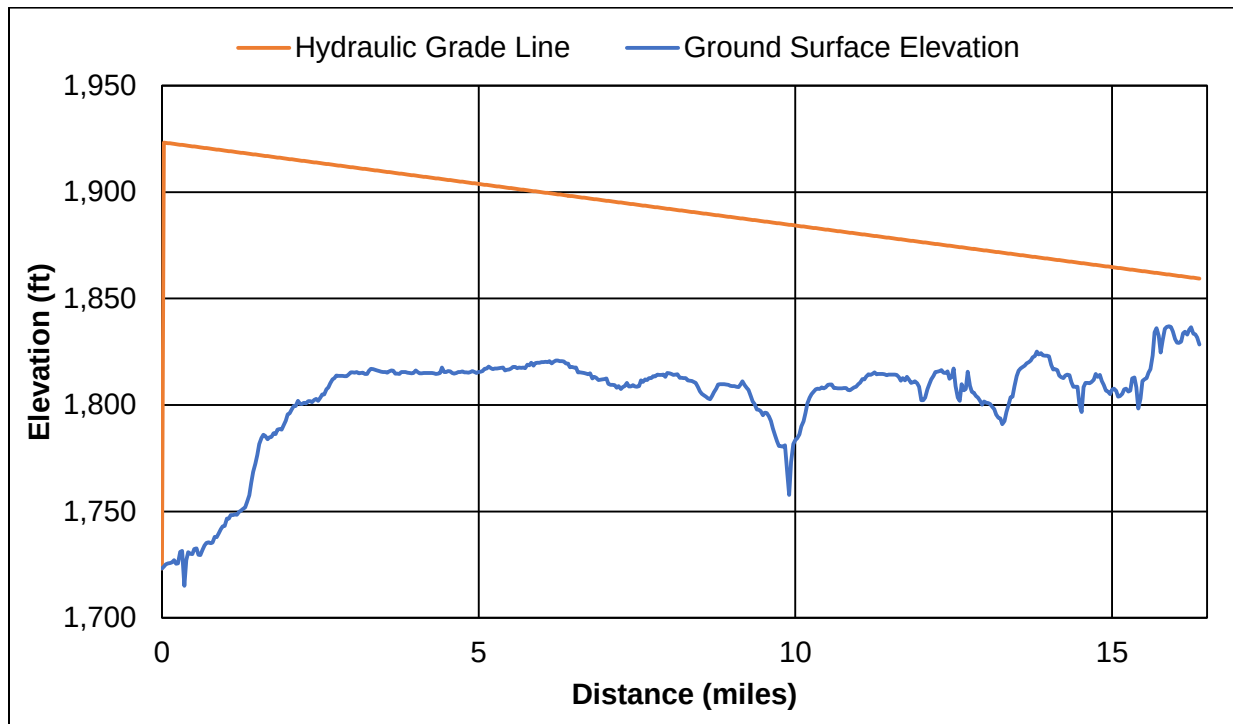


Figure 7-16: Transmission Pipeline from Concho River Intake to SWTP

7.4.4 Water Treatment Plant Improvements

The Concho River Water Supply Project will require improvements at the City's existing SWTP. This section presents the recommended SWTP improvements for the implementation of the Concho River Water Supply Project. The goal of the SWTP improvements will be to utilize as much of the existing facilities as possible, along with the construction of advanced treatment technologies, to produce drinking water which meets and exceeds TCEQ requirements and the same pathogen inactivation goals established for the DPR strategy in Section 7.3.5.

The recommended improvements to the City's SWTP will include modifications to the raw water piping which currently supplies the south treatment train, construction of a new coagulant chemical feed system, and construction of advanced treatment facilities including MF, GAC contactors, and UV disinfection. These improvements will be designed with an initial treatment capacity of 7.5 MGD, with the ability to expand that capacity as future demands require. This facility will be intended to operate while the Concho River Water Supply Project is being used or at other times when the City is using its existing intake in Lone Wolf Reservoir as a raw water supply source. Design of the new facilities will allow the flexibility for the City to either temporarily remove the advanced treatment facilities from operation or integrate these improvements into the existing treatment process when the Concho River water source is not

being used. This will allow the advanced treatment systems to serve as a “building block” for replacing a portion (over time) of the current conventional treatment components (such as the existing gravity filtration system) which are nearing the end of their useful service life.

The SWTP is currently divided into three treatment trains consisting of the north, middle, and south. The proposed SWTP improvements will be incorporated into the south treatment train and utilize Clarifier No. 5 as pretreatment for the proposed MF, GAC, and UV facilities. The south treatment train was selected as pretreatment for the proposed advanced treatment facilities because the existing systems have adequate treatment capacity, and the south treatment train is typically only placed in service when either the north or middle train cannot meet the City’s potable water demands or one of the other treatments trains is out of service. Additionally, this treatment train was constructed in anticipation of future expansion with provisions made during design and construction for future tie-ins to the existing piping.

Augmented raw water will be pumped from the raw water intake located on the Concho River to the existing influent line to Clarifier No. 5. Piping improvements will be required for the influent piping for Clarifier No. 5 to allow the south train to be fed from either the City’s existing raw water sources or from the new augmented Concho River source water. In addition to these clarifier piping improvements, a new coagulant feed system will need to be constructed which will include bulk chemical storage, chemical feed equipment, and a mixing system upstream of Clarifier No. 5. The proposed coagulant used in this strategy will be selected based upon the effectiveness with the new raw water source as well as compatibility with the proposed advanced treatment technologies.

The effluent from Clarifier No. 5 will then flow to the advanced treatment systems which will be constructed at the current SWTP. The effluent piping from Clarifier No. 5 will also require modification. The existing clarifier effluent piping supplies settled water to the existing conventional filters; the proposed effluent piping improvements will allow the City to supply settled water to either the existing conventional filters or the proposed advanced treatment facilities.

The first treatment step in the proposed advanced treatment system will be filtration via a MF system. Similar to the UF system referenced previously in the IPR and DPR source options, the MF system is a membrane filtration process capable of producing filtrate with low turbidity while

also providing a physical barrier for pathogen reduction. The MF system will be required to pass routine direct integrity tests to ensure there are no breaches in the membrane that could compromise the physical pathogen barrier and maintain the necessary log removal credits granted by the TCEQ for the advanced treatment system.

Filtrate from the MF system will then flow through GAC contactors. As previously referenced, a GAC system is capable of removing both organic and inorganic contaminants from the water through adsorption. These contaminants can contribute to taste and odor issues as well as DBP precursors. The GAC used in the contactors will have a finite amount of adsorption capacity, so periodic replacement of the media will be needed.

The final step in the advanced treatment process for the augmented Concho River source will be UV disinfection. The UV process will be used to inactivate pathogens using radiation from UV lamps. Flow from the MF and GAC systems is anticipated to have relatively high UV transmissivity (UVT) allowing for increased effectiveness of the UV System. Prior to blending with the treated water from the conventional treatment plant, the flow from the advanced treatment facilities will be disinfected with chlorine, then treated with LAS to form chloramine, ahead of the clearwell and prior to pumping into the distribution system. Free chlorine is anticipated to be used to achieve the remaining 6-log virus reduction needed for water quality goals established for this source (Table 7-14). Following free chlorine contact, LAS would be injected to form chloramines. Approval of a revised CT study for the SWTP by the TCEQ, including the advanced treatment components, will be required prior to implementing this option. The City's anticipated blended water quality after incorporating this strategy into the City's water portfolio is shown in Table 7-15. A schematic process flow diagram for treating augmented Concho River water as discussed in this section is shown in Figure 7-17. RO and/or UV/AOP could be added to this train at a later time, if the City desired, to address possible future regulatory requirements and to reduce the concentration of TDS.

Table 7-14: Anticipated Pathogen Inactivation for the Concho River Water Supply Project

Treatment Process	<i>Crypto.</i>	<i>Giardia</i>	<i>Virus</i>
Coagulation/Flocculation/Clarification and MF	4	4	2
Granular Activated Carbon	0	0	0
Ultraviolet Disinfection	2.5	2	0
Free Chlorine Disinfection	0	0	6
Total	6.5	6	8
Goal	5.5	6	8

Table 7-15: Projected Effect of Implementing the Concho River Water Supply Project on the City's Potable Water Quality

Source	Without Concho in 2030		With Concho in 2030	
	Supply (ac-ft/yr)	Median TDS (mg/L)	Supply (ac-ft/yr)	Median TDS (mg/L)
Concho River	214	1,043	214	1,043
O.H. Ivie	5,492	820	5,492	820
Hickory	12,000	519	12,000	519
Concho River Water Supply Project	0	-	8,400	1,392
Combined	17,706	619	26,106	868

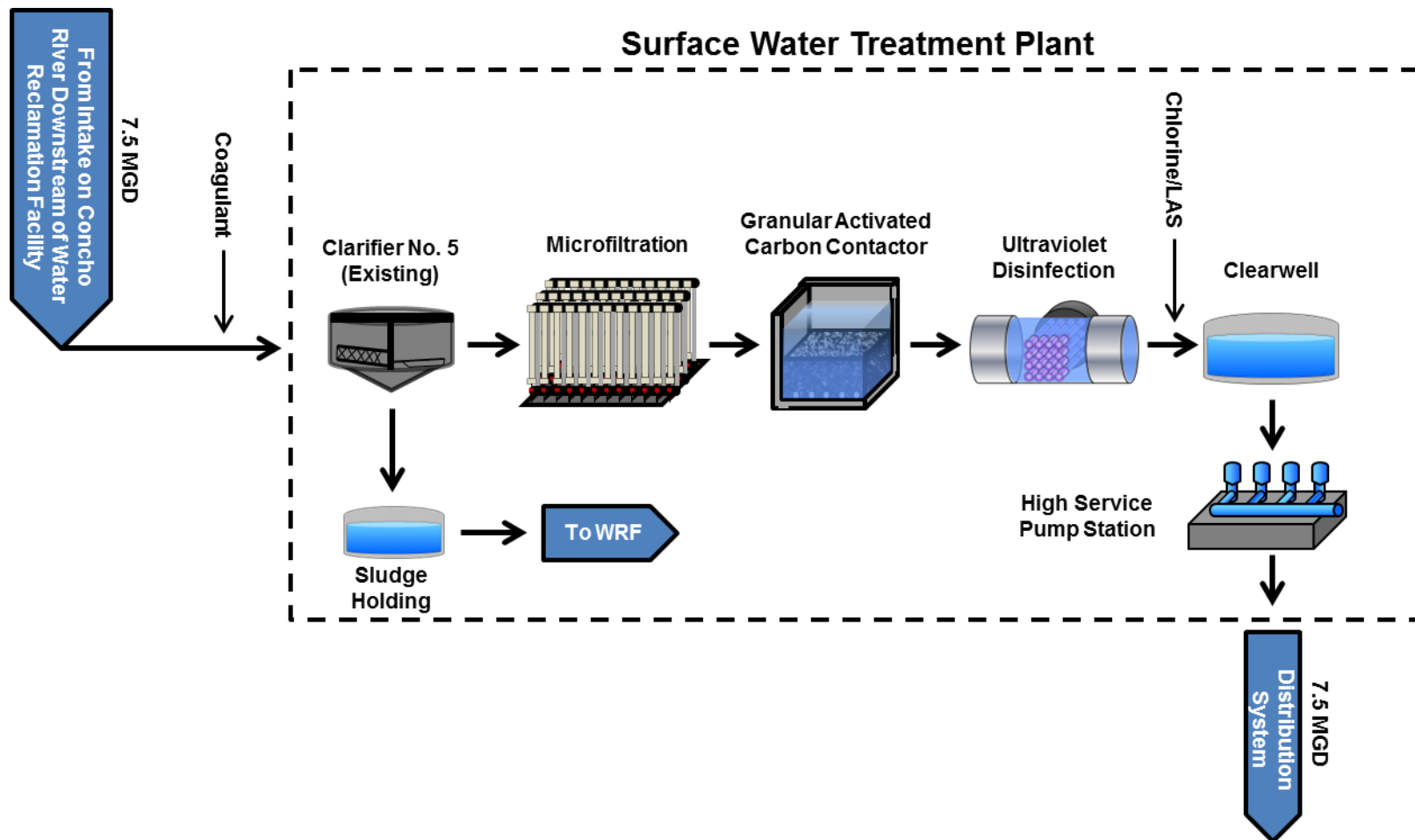


Figure 7-17: Concho River Water Supply Project Process Flow Diagram

7.4.5 Regulatory Considerations

The regulatory considerations for this strategy will be similar to the Augmentation of Lake Nasworthy strategy. At a minimum, a TDDES permit to discharge into the Concho River will be required along with a bed and banks permit to use the Concho River to transport flows from the outfall location to the intake location, and to divert the transported flows.

The TDDES permit application requires the City to demonstrate that the discharge will not result in violation of the TSWQS and will not degrade the existing quality of the Concho River. This process will require that a detailed water quality modeling study be performed. The Consultant Team developed a QUAL-TX water quality model for the discharge as a part of this evaluation, as discussed below.

Geometry information for the QUAL-TX model was obtained from a HEC-RAS model of this segment of the Concho River obtained from the U.S. Army Corps of Engineers (USACE). Additionally, the TCEQ maintains a number of water quality monitoring stations along the Concho River where water quality measurements for DO, temperature, ammonia, and other parameters are routinely collected. These data were used to establish site specific background information and parameters in the model.

The Concho River segment between the WRF and the downstream City property contains a number of channel dams, which can present a challenge for wastewater discharges since very little aeration occurs in slow-moving pooled areas. Unfortunately, the WRF is located in a pooled section of the Concho River formed by Kaase dam. The water quality model indicated that the WRF could only discharge approximately 6 MGD into this section of the Concho River without causing the DO to drop below the TSWQS of 5 mg/L.³⁴ The model demonstrated that all 12 MGD of reclaimed water could be discharged into the Concho River downstream of Kaase dam, with preliminary water quality limits of 5/1.7/6 (BOD/NH₃/DO). The results from the water quality model are shown in Figure 7-18.

³⁴ The TCEQ allows the computer modeled DO to drop to 0.2 mg/L below the limit (e.g. 4.8 mg/L)

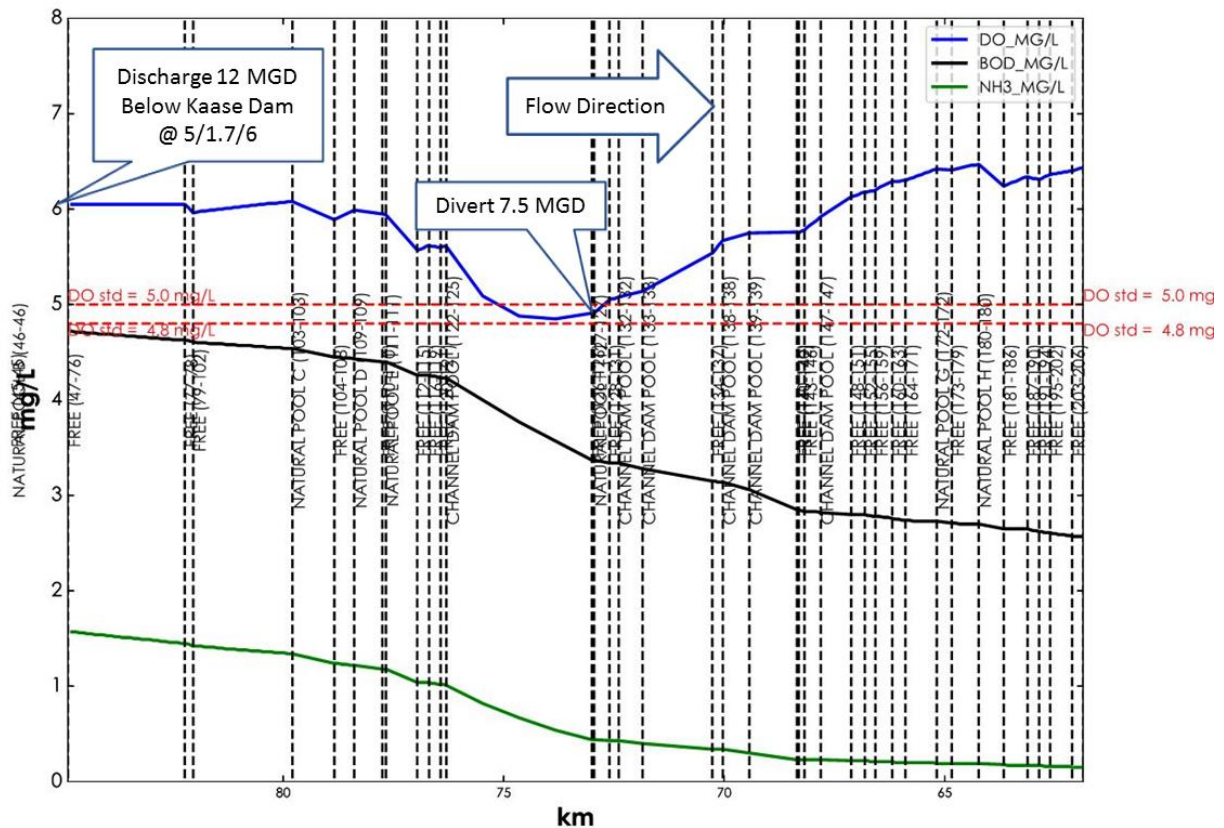


Figure 7-18: Water Quality Modeling Results in Concho River

7.4.6 Costs

The opinion of probable construction cost for Concho River Water Supply Project is approximately \$100 million. Engineering, permitting, mitigation, and land acquisition fees would increase the cost to approximately \$117 million. This strategy would have an estimated annual operating and maintenance cost of approximately \$2.3 million. Costs for this strategy are discussed in more detail in Section 7.6.

7.5 ADDITIONAL REGULATIONS OF RELEVANCE

Some of the major regulatory considerations have been listed above for each water supply strategy. In addition to those listed in the sections above, many other regulations may be applicable for each strategy. A few additional regulatory issues are listed below and a comprehensive summary of possibly applicable regulations is presented in Table 7-16.

7.5.1 Injection Well Permitting

If the City chooses to dispose of RO concentrate generated in the Nasworthy and DPR strategies with deep injection wells, these wells may be eligible for coverage under the TCEQ's Class I Underground Injection Control General Permit WDWG010000, which provides authorization for use of a Class I injection well to inject nonhazardous brine from a desalination operation or nonhazardous drinking water treatment residuals. To obtain this coverage, the City must submit a notice of intent to the TCEQ, receive authorization for coverage from the TCEQ, and notify the TCEQ of the completion of construction. Injection wells not eligible for coverage under the General Permit would require individual Class I injection well permits from the TCEQ's Underground Injection Control Program.

7.5.2 Other Permitting

Each of the alternatives may result in some discharge of dredged or fill materials into waters of the United States. Consequently it may be necessary to obtain authorization from the USACE, pursuant to Section 404 of the Clean Water Act (404 Permit). An individual 404 Permit is usually required for any activity involving the discharge of dredged or fill material into waters of the U.S. However, Nationwide 404 Permits are available for a variety of activities that have been identified as causing only minimal adverse impacts. Nationwide permits allow certain minor-impact activities to take place without the more lengthy process associated with obtaining an individual 404 Permit. Depending on the details of the final project selected, individual and/or Nationwide 404 permits will likely be required.

7.5.3 Construction Authorization

In addition to the permits described above, any project that involves construction over an area greater than one acre will require notifications pursuant to TPDES Construction General Permit No. TXR150000. As such, the City will need to file a notice of intent to begin construction, prepare pollution prevention plans, and notify TCEQ staff upon completion of construction.

Table 7-16: Regulatory and Permit Summary

	Permit / Regulation	Applicability	Analysis/ Study/ Data Needed for application	Estimated Agency Review and Approval Timeline	Notes/ Comments	Implementation Phase				Water Supply Strategy			
						Design	Pre-Construction	Construction	Post-Construction	ETPA	Nasworthy	DPR	Concho
FEDERAL	Clean Water Act (CWA) – Section 404: Standard (Individual Permit)	Impacts to waters of the US	Wetlands delineation; archaeological survey (desktop, pedestrian or intensive depending on site); threatened and endangered species report	Individual Permit – varies based on complexity. A fairly simple treatment plant would be expected to be completed within 2 years.	Current site layout avoids water features and an individual Section 404 permit not anticipated. Adjustments resulting in encroachment on waters of the US may require a 404 permit.	X	X			X	X	X	X
	Clean Water Act (CWA) – Section 404: (Nationwide Permit)	Varies by permit; generally applicable when there is loss of less than one-half acre of jurisdictional wetlands and minimal linear feet of streams	Wetlands delineation; archaeological survey (desktop, pedestrian or intensive depending on site); threatened and endangered species report	Nationwide Permit 12 or Nationwide Permit 7; 45 days after application deemed compete	Expected to be applicable to individual creek crossings and outfall	X	X			X	X	X	X
	Water Quality Certification – Section 401	Obtain a WQ Certification (Section 401) as part of compliance with Section 404	Certification from the State where construction or operation of facilities result in discharge	Varies		X	X				X		X
	Section 14 of the Rivers and Harbors Act of 1899, as amended, and codified in 33 USC 408 (Section 408)	Facilities on, or use of, land within USACE public works projects	Coordinate with USACE and file permit application and supplemental materials	18 – 30 months		X	X						
	National Historic Preservation Act	In connection with Section 404 or 408 permits or if federal funds are used	Project review by TX Historical Commission; archaeological survey (desktop, pedestrian or intensive depending on site)	Project review generally complete within 30-days; however, there is no statutory timeline	Studies needed will depend on site conditions	X	X			X	X	X	X
	U.S. Endangered Species Act	Section 10 applies when federal action (permit or funding) occurs; Section 7 applies to all activities that could harm or take federally protected species	Prepare threatened and endangered species (T&E) report following site assessment; is often conducted as part of wetlands delineation site activity	Assuming no species are observed, 30-days as part of Section 404 application review (if required)	If no species or critical habitat is observed, the report is submitted with permit application or environmental assessment conducted in association with federal funding	X	X	X	X	X	X	X	X
	Bald and Golden Eagle Protection Act	All activities that would harm bald or golden eagle	Prepare report following site assessment (generally combined with T&E report); is usually conducted as part of wetlands delineation site activity	Assuming no species are observed, part of Section 404 application review (if required)	If no species or critical habitat is observed, the report is submitted with permit application or environmental assessment conducted in association with federal funding			X	X	X	X	X	X
	Migratory Bird Treaty Act	All activities that would harm or take protected species	Prepare report following site assessment (generally combined with T&E report); is usually conducted as part of wetlands delineation site activity	Assuming no species are observed, part of Section 404 application review (if required)	If no species or critical habitat is observed, the report is submitted with permit application or environmental assessment conducted in association with federal funding			X	X	X	X	X	X

						Implementation Phase				Water Supply Strategy			
						Design	Pre-Construction	Construction	Post-Construction	ETPA	Nasworthy	DPR	Concho
Permit / Regulation		Applicability	Analysis/ Study/ Data Needed for application	Estimated Agency Review and Approval Timeline	Notes/ Comments								
STATE	TPDES Discharge Permit	Discharge to waters of the US	Plant design, water quality analysis; may vary based on discharge location	12 – 18 months		X	X				X		X
	TCEQ Water Rights Permit	Convey, and divert water using river channels	Planned amount of water discharged and diverted, including losses due to evaporation, seepage, or other channel losses	Variable. Likely to be minimum of 18-24 months. Can be significantly longer if protested		X	X				X		X
	TCEQ Injection Well Permit	Disposal of RO concentrate using deep injection wells	Class I injection well authorization			X	X				X	X	
	Plateau Underground Water Conservation and Supply District Water Well Permit	Water Well approval	Specific well information (water produced, pump size, exact location of proposed wells)		Maximum Production: one acre-ft per contiguous acre owned up to 250 acre-ft; cannot be closer than 1320 feet to an existing well, and not closer than 50 feet from the property line	X	X			X			
	Plateau Underground Water Conservation and Supply District Intent to Drill Notification	Notify District of intent to drill withdrawal wells	Basic well information (owner, location, size, drilling company)	1 week	Drilling may begin upon receipt of an approved Intent to Drill Notice		X			X			
	Plateau Underground Water Conservation and Supply District Export Permit	Transport of water out of the District	Transport information (well location, method of transport, maximum annual production)		The City of San Angelo is in the Lipan-Kickapoo Water Conservation District	X	X			X			
	Plateau Underground Water Conservation and Supply District Annual Water Use Report	Report quantity of water used	Water use/withdrawal information (well identification, hours pumped, average gpm)	No approval needed; submission of data					X	X			
	Design Criteria for Domestic Wastewater Systems and Domestic Wastewater Effluent Limitation	Public wastewater collection and treatment facilities	No application required; TCEQ plan review	Plan review time varies; however, 30-45 days is generally sufficient		X	X				X	X	X
	Public Water Supply system approval for potable water supply (30 TAC 290)	Drinking water system if developed at the plant site for personnel	Submittal of plans prepared by a licensed engineer	Plan review time varies; however, 30-45 days is generally sufficient		X	X			X	X	X	X
	Authorization for Reuse (30 TAC 210)	Required for direct use of reclaimed water (when not discharged to waters of the U.S.)	Meet general requirements, quality criteria, design, and operational requirements	Plan review time varies		X	X				X	X	X
	New Source Review (NSR) air permitting regulations for the WRF and the ATF	New emissions sources	Confirm that the facilities meet the requirements for a Permit by Rule. Additional analysis will be needed during design to confirm if both facilities can be permitted by rule.	No approval needed if PBR requirements can be met	State Air authorizations for activities that produce more than a de minimis level of emissions but less than other NSR permitting options may be permitted by rule.	X					X	X	

	Permit / Regulation	Applicability	Analysis/ Study/ Data Needed for application	Estimated Agency Review and Approval Timeline	Notes/ Comments	Implementation Phase				Water Supply Strategy			
						Design	Pre-Construction	Construction	Post-Construction	ETPA	Nasworthy	DPR	Concho
STATE	Texas Antiquities Code	Local government projects that disturb five or more acres of ground disturbance or 5,000 or more cubic yards of earth moving	Project review by TX Historical Commission; archaeological survey (desktop, pedestrian or intensive depending on site)	Project review generally complete within 30-days; however, there is no statutory timeline	Studies needed will depend on site conditions	X	X			X	X	X	X
	Texas Wildlife and Plant Conservation Code	Would apply to any area within which listed species are observed or have the potential to be located	Prepare threatened and endangered species (T&E) report following site assessment; Generally conducted as part of wetlands delineation site activity	Consultation schedule can vary if required		X	X	X		X	X	X	X
	Fish Relocation Plan	Dewatering creeks/ rivers during construction when fish passage is limited or species may be trapped	Plan includes method of collecting and moving the aquatic life and best practices to be used	Approval can take 3-4 weeks depending on TX Parks and Wildlife staff workloads	Can be prepared as part of design or included as a contractor requirement once dewatering means and methods are established, may only be required if federally funded or if requested by Texas Parks and Wildlife			X			X	X	X
	Marl, Sand, Gravel, Shell, or Mudshell Permit	Disturbance or take of materials within state-owned perennial streams or those more than 30 feet wide.	Materials and studies prepared for Section 404 permit/ Preconstruction Notice (if required) should provide needed information	30-40 days after public notice	Can be prepared as part of design or included as a contractor requirement, may only be required if federally funded or if requested by Texas Parks and Wildlife	X	X	X			X	X	X
	Construction Stormwater Discharge Permit	Construction of any facility that disturbs 1 acre or more of land.	Prepare Storm Water Pollution Prevention Plan (SWPPP) in compliance with Construction General Permit TXR150000 and submit Notice of Intent prior to construction; Notice of Termination needed when revegetation is complete	1-2 days if authorized under the general permit and submitted electronically	Can be prepared as part of design or included as a contractor requirement	X	X	X			X	X	X
	Industrial Multi-Sector Stormwater Permit (operations)	Required for sites used for industrial activity included treatment works S	Prepare SWPPP in compliance with Multi-Sector General Permit TXR050000; comply with permit terms during operations	1-2 days if authorized under the general permit and submitted electronically		X					X	X	
	TxDOT Road Crossings - Authorization to construct in state right-of-way and temporary access permits	Required if pipelines are to be constructed under a roadway or within TxDOT right-of-way or for driveway access from state road to the plant site	Application includes plan/profile sheet or standard detail showing compliance with design criteria	Approval is often less than 1 week, but is helpful to plan for 30-45 days.	Permits typically require construction to start within 6 months of issuance; Can be prepared as part of design or included as a contractor requirement	X	X			X	X	X	X
	Flood Damage Prevention Regulations / Floodplain Development Permit	Applies to all areas of special flood hazard within the jurisdiction of the County	Submit application and demonstrate no rise in base flood elevation. For pipelines, an application would be required with information showing that there is no change to elevation contours.	Varies	Current site layout avoids floodplains. Potential authorization may be needed for discharge point. Lift stations would be located outside of floodplains; but creek crossings would require authorization	X	X			X	X	X	X

						Implementation Phase				Water Supply Strategy			
						Design	Pre-Construction	Construction	Post-Construction	ETPA	Nasworthy	DPR	Concho
Permit / Regulation	Applicability	Analysis/ Study/ Data Needed for application	Estimated Agency Review and Approval Timeline	Notes/ Comments									
TOM GREEN COUNTY	Driveway Permit	For new driveways that connect to Tom Green County roads	Adhere to design criteria and submit application prior to construction	1 week	Can be prepared as part of design or included as a contractor requirement		X				X	X	X
	Building permit; Inspections	Applicable to constructed buildings	Prepare application and associated materials	Varies	Can be prepared as part of design, but is usually included as a contractor requirement		X	X			X	X	X
	County Specifications and Regulations (building codes, permits and associated inspections)	Applicable to constructed buildings and water lines	Include applicable design criteria in drawings and specifications	Varies			X	X		X	X	X	X
	Utility permits	Applies to any utility located in right-of-way	Adhere to design criteria in the County's design manual & file permit application	Varies	Can be prepared as part of design or included as a contractor requirement	X	X	X		X	X	X	X

7.6 COMPARISON OF WATER SUPPLY STRATEGIES

Following the technical evaluations of each water supply strategy, the Consultant Team held a final workshop with City staff to compare and rank the four strategies. The sections below present a comparison of the water supply strategies for several different categories. The results of the final ranking workshop are also presented in this section.

7.6.1 Opinions of Probable Costs

Opinions of probable construction cost (OPCC) and annual operating and maintenance costs (O&M) were prepared for each of the four strategies. For comparison purposes, a unit cost for each strategy was also prepared by dividing the total annual cost (debt service plus O&M) by the annual yield. The annual debt service was calculated using an interest rate of 4% and a loan term of 20 years. A financial comparison of the four strategies is shown in Table 7-17 and the unit costs of the strategies are shown in Figure 7-19.

Table 7-17: Financial Comparison of Strategies

Water Supply Strategy	ETPA	Nasworthy	DPR	Concho
Opinion of Probable Construction Cost (million) ¹	\$73	\$121	\$121	\$100
Total Project Cost (million) ²	\$102	\$141	\$140	\$117
Annual Debt Service (million) ³	\$7.5	\$10.4	\$10.3	\$8.6
Annual O&M (million)	\$0.9	\$4.1	\$5.3	\$2.3
Total Annual Cost (million)	\$8.4	\$14.5	\$15.6	\$10.9
Water Supply Yield (MGD)	4.0	6.2	6.4	7.5
Unit Cost with Debt Service (\$/1,000 gallons)	\$5.76	\$6.39	\$6.72	\$3.97
Unit Cost after Debt Retirement (\$/1,000 gallons)	\$0.64	\$1.82	\$2.29	\$0.83

1. All costs presented in July 2018 dollars with an ENR construction cost index of 11,116.

2. Includes engineering, permitting, and mitigation fees, and land acquisition, if applicable.

3. Assuming an annual interest rate of 4% and a loan term of 20 years.

The Nasworthy and DPR strategies have the highest capital cost and also the highest unit costs. The ETPA strategy has the lowest capital cost, but because it also has the smallest yield, (4 MGD) it does not have the lowest unit cost with debt service. However, after the debt has been retired, the ETPA strategy would have the lowest unit cost. The Concho River Water Supply Project resulted in the lowest unit cost (prior to retirement of debt) of the four strategies, partly because it has the highest water supply yield. After the debt on the capital cost has been retired, it will have the second lowest unit cost, though only slightly above the ETPA strategy. The detailed opinions of cost are provided in Appendix C.

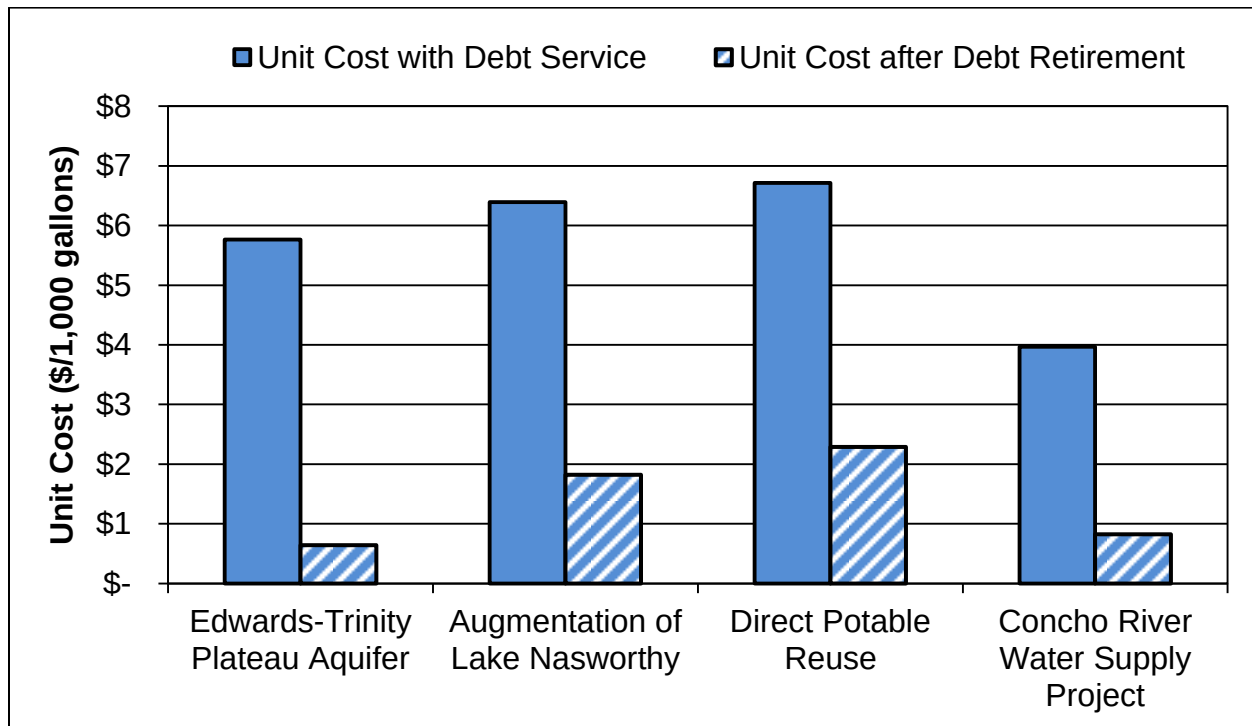


Figure 7-19: Unit Cost Comparison of Strategies

7.6.2 Water Quality Following Implementation

Water from the selected strategy would be blended with the City's existing water supplies at the SWTP. With water available from O.H. Ivie, the selected supply strategy would be approximately one third of the City's total water supply. The percentage of the City's total water supply in 2030 that each strategy would make up is shown in Table 7-18. The table also demonstrates the anticipated effect on TDS that implementing the strategy would have on the City's combined water supply. The median TDS is anticipated to remain below the secondary standard of 1,000 mg/L for all strategies. The DPR strategy would have the largest positive impact on the City's blended concentration of TDS due to its use of RO.

Table 7-18: City-Wide Water Quality Characteristics Following Implementation

Water Supply Strategy	ETPA	Nasworthy	DPR	Concho
Selected Strategy's Percentage of the City's Total Water Supplies in 2030	22%	33%	31%	35%
Median Concentration of TDS in City's Distribution System prior to Implementation	619	619	619	619
Median Concentration of TDS in City's Distribution System after Implementation	550	674	449	868

7.6.3 Final Ranking Workshop with City Staff

A final ranking workshop was held with City staff on August 1, 2018, with the goal of ranking the remaining four strategies and selecting a single strategy as the most feasible. Similar to the previous screening workshop, the Consultant Team created a decision matrix to rank each strategy for a number of cost and non-cost factors. Each factor was weighted according to City staff's appraised importance. The water supply strategy rankings resulting from the workshop are shown in Table 7-19. The detailed results of the workshop are provided in Appendix D.

Table 7-19: Results of Final Ranking Workshop

Strategy	Rank
Concho River Water Supply Project	1
Direct Potable Reuse	2
Edwards-Trinity Plateau Aquifer	3
Augmentation of Lake Nasworthy	4

The strategy that emerged from the final ranking workshop as most feasible was the Concho River Water Supply Project for two primary reasons: it provides the highest yield and the lowest unit cost with debt service. City staff considered these two criteria to be of utmost importance for a water supply project intended to meet demands during a period of drought. Additional benefits of this strategy are that it is sustainable, meaning that it will be available for long term use, and that the City will have ownership and oversight of the supply.

The City's projected water supplies and demands after implementing this strategy are shown in Figure 7-20. It is anticipated that implementing this water supply strategy would meet the City's potable water needs through at least 2050 under the high demand projections.

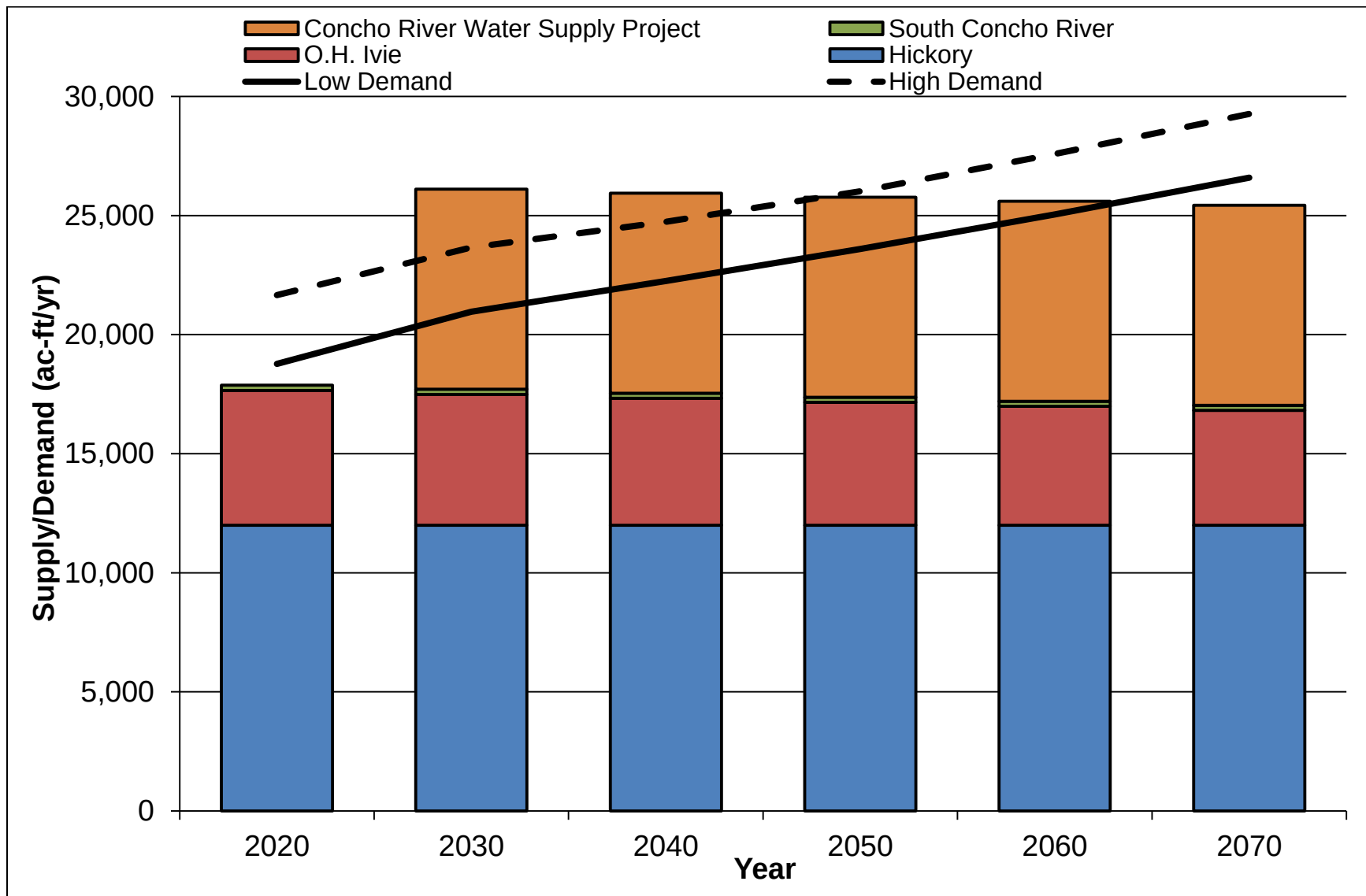


Figure 7-20: Projected Water Supplies and Demands after Implementation of the Recommended Strategy

CHAPTER 8

RECOMMENDED WATER SUPPLY IMPLEMENTATION PLAN

The Concho River Water Supply Project was selected as the most feasible option. Based on this engineering feasibility study, it is the recommended water supply strategy for the City. It is anticipated that development of this strategy could require between five and seven years to implement. Successful implementation of the recommended water supply strategy will require a coordinated effort of permitting, engineering, and public outreach.

8.1 INITIAL MEETING WITH TCEQ

The City should meet with the TCEQ Water Supply Division and Water Quality Division staffs early in the development of the project, while potential alternatives are still in the conceptual phase. Early meetings will allow the TCEQ to advise the City and its Consultant Team and make recommendations.

8.2 TPDES DISCHARGE PERMIT AND BED AND BANKS PERMIT

The City would need to submit a TPDES permit application for the WRF to discharge into the Concho River. Concurrently with the amendment application, the City would also submit an application to TCEQ for a bed and banks permit. Securing these permits could take two years or more. The City could still retain the current land application permit.

8.3 PILOT AND BENCH-SCALE TESTING

Pilot and bench-scale testing of proposed treatment processes at the SWTP would be used to verify their performance and gain TCEQ approval for the treatment scheme. Pilot and bench-scale testing can also achieve the following goals:

- Design
 - Establish design criteria and operating procedures;
 - Evaluate equipment performance;
 - Optimize treatment;
 - Determine the influence of a unit process on downstream unit processes; and
 - Evaluate opportunities to reduce operation and maintenance costs.

- Procurement
 - Obtain test data on multiple manufacturers and/or process variations for the equipment selection and bid phases of the full-scale project.
- Other
 - Provide hands-on training to plant operators and staff; and
 - Provide an opportunity for public outreach to demonstrate the technology.

The recommended strategy includes MF and UV processes at the SWTP. Specific testing considerations for these processes are shown in Table 8-1. TCEQ drinking water rules currently classify MF and UV technologies as innovative/alternative treatment processes requiring either a pilot-scale study or data from a similar full-scale facility (or a reactor validation study in the case of UV). It is anticipated that pilot testing will be required for both membrane processes and upstream processes that influence membrane feed water quality. Pilot testing should be performed for a period of 6-9 months.

Table 8-1: Technology-Specific Testing Considerations

Advanced Treatment Process	Testing Considerations
Membrane Filtration	• Pretreatment requirements • Treatment efficiency • Membrane selection and performance • Operating flux (without significant permeability loss) • Process recovery • Chemical cleaning regime and frequency • Chemical consumption • Energy usage
Ultraviolet Light (UV) ¹	• Treatment efficiency • UV lamp sleeve fouling

1. UV reactor validation studies are typically available from UV equipment manufacturers and define the needed UV dose to achieve pathogen log removal credit for Cryptosporidium, Giardia, and viruses. Consider sending water samples to potential UV equipment manufacturers to establish equipment design criteria.

The main steps in pilot and bench-scale testing are:

- Develop a testing protocol;
- Submit protocol to TCEQ for review;
- Procure pilot equipment;
- Install and startup equipment and train staff;
- Perform testing, data collection, and system monitoring;
- Decommission pilot equipment; and

- Develop final testing report.

The City conducted a DPR pilot study in 2016. While that pilot study was for a different water supply strategy, some of the data collected from the previous pilot study could still be used. The TCEQ would need to be consulted to determine how much of the existing pilot data would be applicable. However, the previous pilot study was conducted solely on effluent from the WRF, whereas the source water for this strategy would be the Concho River. It is anticipated that the TCEQ would require a full one year source water characterization for this new supply. What is uncertain is whether the TCEQ would require the WRF improvements to be constructed and reclaimed water to be flowing in the Concho River before the source water characterization could begin. If so, the schedule presented below could be delayed by a year or more.

8.4 TREATMENT AND CONVEYANCE FACILITIES DESIGN AND CONSTRUCTION

Design and construction of the WRF and SWTP improvements and the required conveyance infrastructure including the WRF discharge pipeline, downstream intake structure, and transmission pipeline to the SWTP would require the following components:

8.4.1 Pipeline Route Delineation and Surveying

A pipeline alignment study should be performed to refine the conceptual alignments proposed in this report. The alignment study should provide a detailed evaluation of each potential conveyance route, including refined OPCCs and a discussion of specific issues that may impact construction and timing of facilities. The alignment study should provide the City with the information necessary to select a recommended set of alignments for preliminary design. Following selection of the alignment, surveying should be initiated to provide information for subsequent design.

8.4.2 Rights-of-Way Acquisition

As needed, rights-of-way and/or easements should be secured for any of the required conveyance facilities.

8.4.3 Preliminary Design of Pipeline and WRF/SWTP Improvements

Preliminary design of conveyance and treatment facilities should be carried out following initial meetings and confirmation of concept with the TCEQ.

8.4.4 Final Design of Pipeline and WRF/SWTP Improvements

Final design of all facilities will occur following completion of the preliminary design, and in the case of the SWTP facilities, following completion of pilot testing, though design could proceed in parallel to the pilot testing.

8.4.5 Advertising/Bidding/Contracting

Depending on the desire of the City, a traditional advertise/bid/contracting process can be used, or an alternative delivery process such as Construction Manager at Risk could also be used, which would integrate the design and construction components of the project. The City will need to determine the desired procurement strategy prior to proceeding with design.

8.4.6 Construction of Conveyance and Treatment Facilities

Construction of facilities will begin following completion of design. Scheduling of construction will depend on the selected procurement strategy.

8.5 PUBLIC OUTREACH PROGRAM

Because the public has often been reluctant to accept potable reuse as a safe, feasible solution, a public information program is an essential element of a reclaimed water project. The City should develop a public information program that includes both outreach and participation.

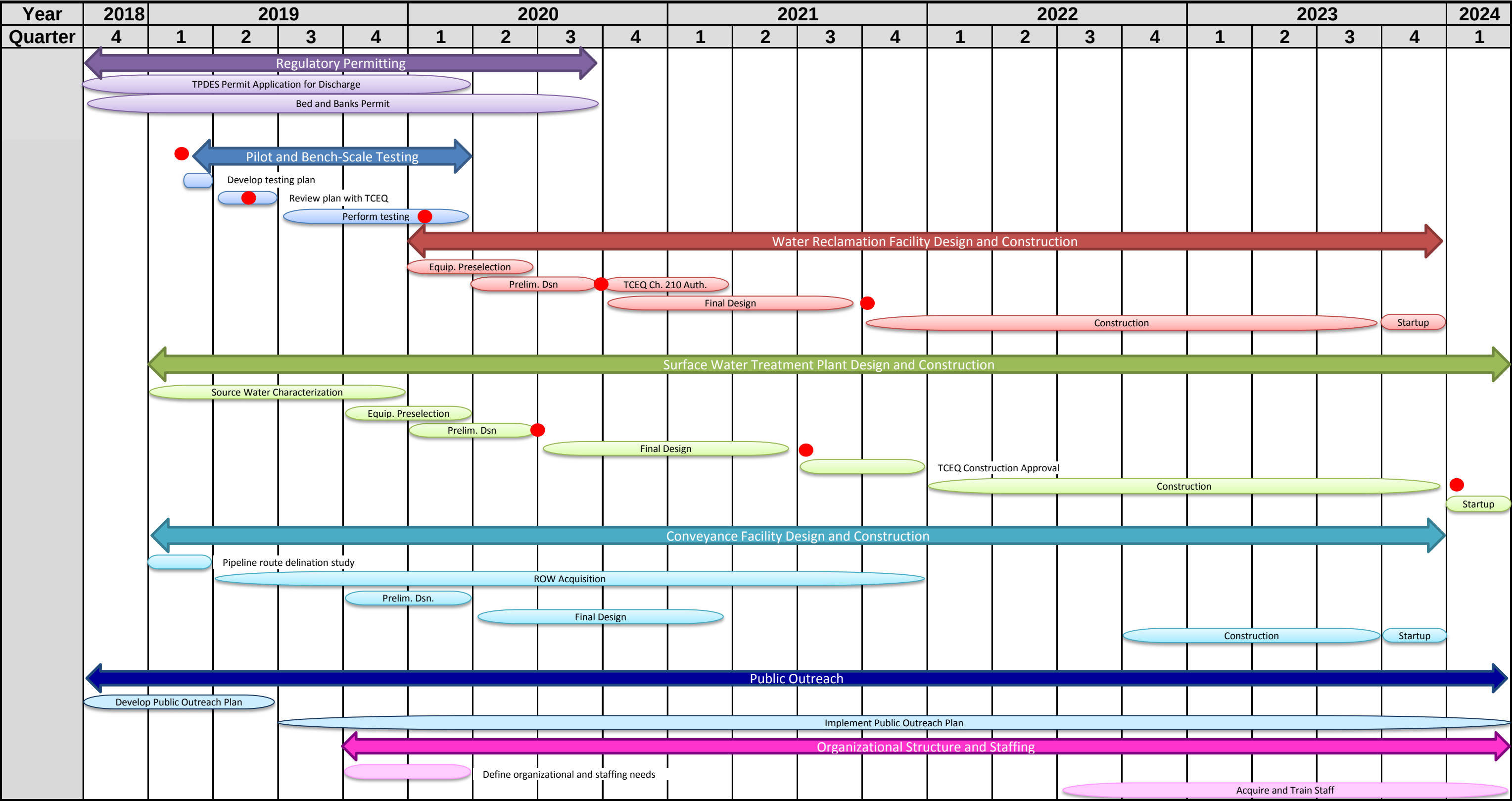
8.6 SYSTEM STARTUP

Startup of the system will occur following completion of construction and performance of water quality testing, as required by the TCEQ.

8.7 IMPLEMENTATION SCHEDULE

A preliminary implementation schedule is provided in Figure 8-1. This schedule is preliminary and should be refined following an initial meeting with TCEQ and during the preliminary engineering phase. The schedule outlined would provide for delivery of water by the beginning of 2024.

Figure 8-1: Preliminary Implementation Plan for the Concho River Water Supply Project



● Anticipated meetings with TCEQ
Note: Schedule is preliminary and is subject to change following meeting with TCEQ and during preliminary engineering

Appendix A

Riverbank Filtration Memo from LRE

Memorandum

To: Ellen McDonald, PE (APAI)
From: Dave Colvin, PG, PMP
Reviewed by: Mike Keester, PG
Date: January 19, 2018
Project: City of San Angelo
Subject: Riverbank Filtration Preliminary Feasibility Evaluation

Introduction

Alan Plummer Associates, Inc. (APAI) requested that Leonard Rice Engineers, Inc. (LRE) perform a preliminary evaluation of the hydrogeologic conditions related to Riverbank Filtration (RBF) for the City of San Angelo (City). This memorandum documents the information we compiled for “Project on a Page” slides in preparation for Workshop #2 to be held in February 2018.

The ultimate goal of a RBF project would be to use the alluvial groundwater system for pre-treatment and recovery of treated wastewater effluent. Effluent discharges average approximately eight to nine million gallons per day (MGD).

Hydrogeology

We considered two areas as conceptual RBF wellfields, the City Farm property near the water reclamation facility (WRF) and a “Downstream City Property” located approximately eight miles downstream of the WRF (**Figure 1**).

The data in the area of the WRF/City Farm indicate that most wells are drilled through approximately 30 feet of caliche underlain by limestone bedrock. In the eastern portion of the City Farm, there are layers of gravel overlaying bedrock, with less caliche present. Water levels generally occur near the bedrock surface. Some opportunities for productive RBF wells may exist in the gravel alluvium to the east of the City Farm.

Data from near the Downstream City Property indicate more favorable RBF conditions. Therefore, LRE used this site for conceptual RBF well field design. Wells in the area reported 20-35 feet of gravel overlying limestone and shale bedrock. Water level in one well was reported five feet above bedrock at 25 feet below ground surface (BGS). Wells in this area had reported yields ranging from 30 gallons per minute (GPM) to 500 GPM, although this higher rate is unlikely for wells screened primarily in the alluvium. All of the existing wells in the area are vertical wells and drilling horizontal wells will be a way to increase the yield of wells.

RBF well performance at the Downstream City Property will be controlled by aquifer characteristics, including the ability of Concho River surface water to infiltrate into the underlying alluvium. The currently available data do not provide adequate information about the aquifer near the river or the river/aquifer interaction to accurately estimate RBF well yield and performance.

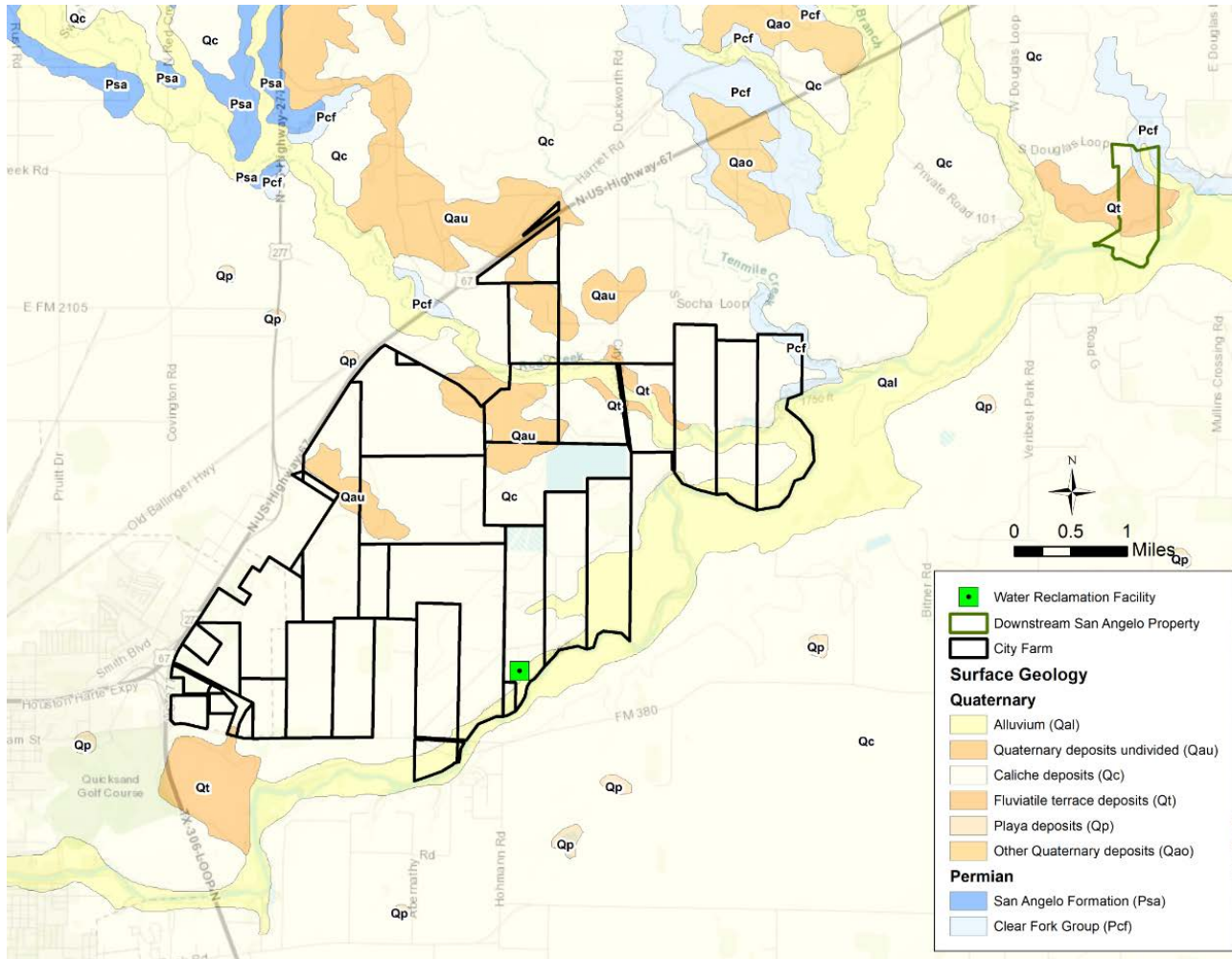


Figure 1 – Location Map of San Angelo Water Reclamation Facility, City Farm, and Downstream City Property

RBF Well Field Yield Estimates

RBF can be established using a variety of extraction methods including vertical wells, horizontal wells, and infiltration galleries. The Concho River alluvial aquifer is relatively thin in the area considered for RBF feasibility. Because of the relatively thin aquifer, horizontal wells are being planned to maximize the available yield of a well field. **Figure 2** shows a conceptual profile of a possible horizontal well configuration. The current conceptual RBF well field design was based on using horizontal directionally drilled (HDD) wells. HDD wells are drilled into the subsurface at an angle and flatten to horizontal laterals where well screens can be placed near or directly under the stream bed.

The HDD wells will likely be installed parallel to the river at a distance that maximizes well yield while creating a travel time that provides the desired water quality improvements (**Figure 3**).

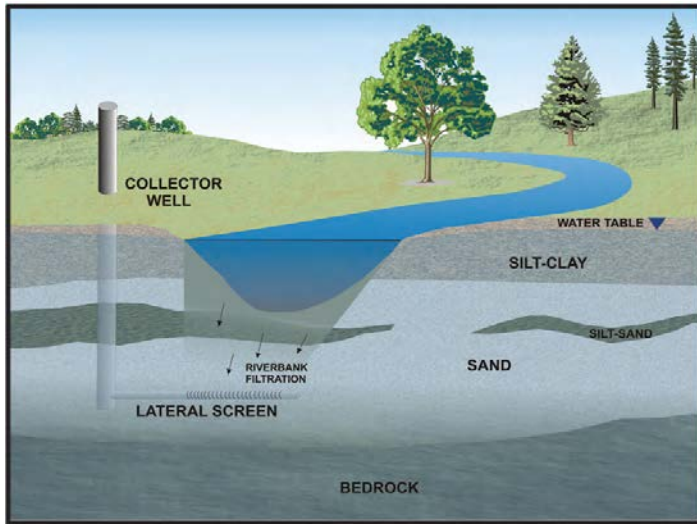


Figure 2 - Horizontal Collector Well RBF (Kelly & and Rydlund, 2006)

The conceptual design includes five HDD wells approximately 900-1,400 feet long. These wells are located nearly parallel to the Concho River on the City's Downstream Property. An additional 11 acres of riverbank property is shown on the map that will increase the yield of an RBF well field. This additional property is not currently owned by the City and would need to be acquired through purchase or easement agreements.

While there is not any local evidence of HDD well performance, we estimate that the proposed HDD well field could produce between 4,800 to 9,600 acre-feet per year (AFY), or 4.3 to 8.6 MGD. However, there is significant uncertainty in the yield due to inadequate aquifer characterization. For the purposes of cost development and comparison to other alternatives, we are assuming that an RBF well field can produce 8,000 AFY.

The RBF well field yield estimate can be improved through hydrogeologic site investigation and modeling.

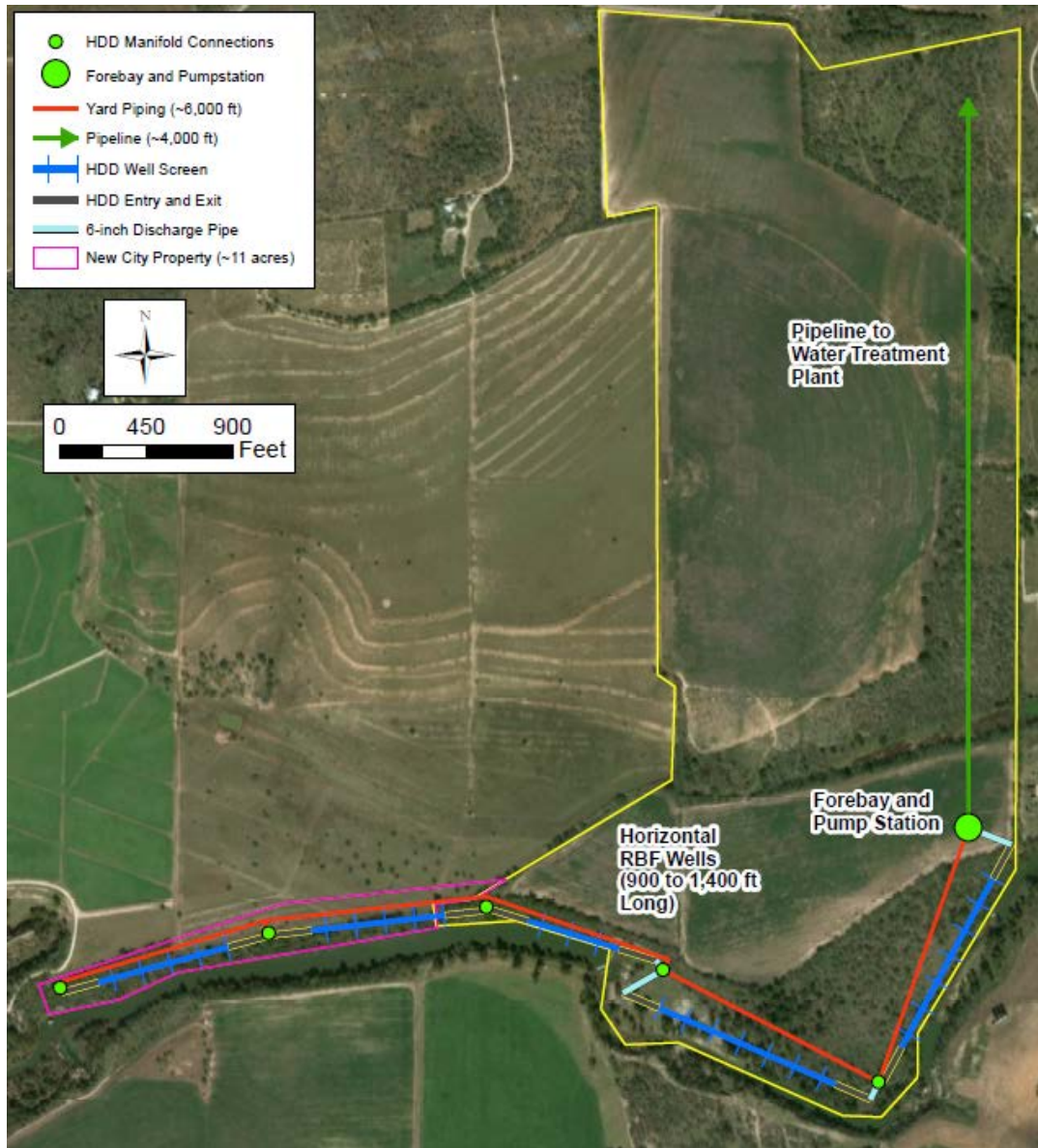


Figure 3 - Conceptual Design of an RBF Horizontal Well Field near the Concho River

RBF Water Quality Improvements

RBF is a natural purification process that happens within many wells located near rivers, whether by design or not. Surface water contaminants are treated through RBF in the river bed and within the aquifer. Mechanisms of contaminant removal include bioaccumulation, biodegradation, filtration, adsorption, chemical precipitation, and removal through redox reactions. Contaminants that are removed include nutrients, emerging contaminants, bacteria, viruses, total organic carbon, total

suspended solids, and turbidity. **Figure 4** shows some of the mechanisms of water quality improvements that are functioning in RBF systems.

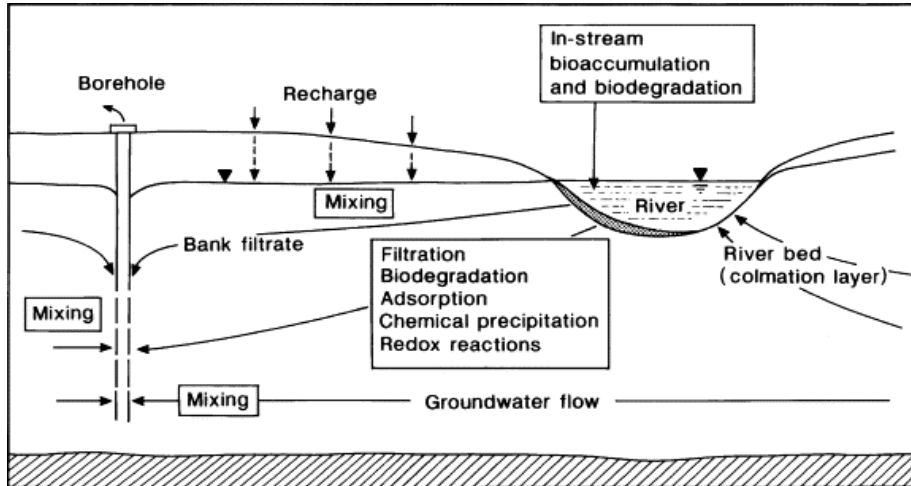


Figure 4 - RBF Natural Treatment Mechanisms (Hiscock & Grischek, 2002)

RBF water quality improvements are difficult to estimate because they vary greatly depending on the hydrogeologic conditions (aquifer materials, landside groundwater dilution), river conditions (flow rates, riverbed permeability, contaminant loads), redox conditions (oxic/anoxic), and operational conditions (distance from river, travel time, pumping induced water velocity). These site-specific conditions make it difficult to accurately estimate RBF contaminant removal effectiveness. **Table 1** below provides the results of a literature survey for nitrate and total organic compounds (TOC) removal published for RBF sites. This is not an exhaustive list, but is included to provide some real-world RBF water quality improvements for reference. Of the sites referenced, the Aurora Prairie Waters Project has the most similar site conditions to what would be expected at a San Angelo RBF well field.

Table 1 - Published RBF Water Quality Improvements

Contaminant	Source Concentration	Filtrate Concentration	Reference	Notes
TOC, mg/L	3-10	1-3.5 mg/L	(Drewes, 2009)	Aurora Prairie Water Project
TOC	2.1-4.8	0.3-0.7	(Hunt, 2009)	Louisville: Filtrate included landside groundwater dilution.
TOC	Up to 11	<3 mg/L	(Hunt, 2009)	Louisville: Filtrate included landside groundwater dilution.
TOC	3.7	2.4	(Hunt, 2009)	Parkville, MO collector wells
TOC		<3 mg/L	(Hunt, 2009)	St. Joseph, MO
Nitrate, mg/L	<5 mg-N/L	<2 mg-N/L	(Drewes, 2009)	Aurora Prairie Water Project
Nitrate	2-11	1.7	(Hunt, 2009)	Aurora Prairie Water Project
Nitrate		2-3 mg/L	(Hunt, 2009)	Cedar Rapids
Turbidity, NTU	2-1500	~0.1	C. Ray	Louisville, KY collector well

Another water quality improvement provided by RBF is pathogen reduction. Published data indicates that 4-log *Cryptosporidium* removal efficiency can be reached with RBF (Ray, 2003). The U.S. Environmental Protection Agency (EPA) Long Term 2 Enhanced Surface Water Treatment Rule provides log removal credits for *Cryptosporidium* (U.S. Environmental Protection Agency, 2018). **Table 2** provides some references for log removal credits granted by the EPA or other primacy agencies.

Table 2 - RBF Pathogen Removal References (Ray, 2003)

Site	Pathogen Removal
Sonoma County Water Agency in Santa Rosa, CA, Russian River. (Collector Wells)	California Department of Health Services assigned a 2.5-log removal credit for <i>Giardia</i> and 1.0-log removal credit for viruses.
Kearny, NE, Platte River (Vertical wells)	System was demonstrated to remove between 2 and 2.5 logs of <i>Giardia</i> . Nebraska Department of Health Services gave final approval 2-log removal of <i>Giardia</i> and 1-log removal for viruses.
The Central Wyoming Regional Water System in Casper, Wyoming, North Platte River. (Vertical wells, an infiltration gallery, and three horizontal collector wells)	Originally petitioned the EPA for removal of 3-logs of <i>Giardia</i> and 4-logs of viruses. The EPA has granted conditional approval for removal of 2-logs of <i>Cryptosporidium</i> oocysts.
Kearney, Nebraska. (Vertical wells)	Total coliform concentrations in the river between 220 and 290 MPN/100 mL reduced to between 0.8 and 1.2 MPN/100 mL in wells.

Some trace organic compounds are also removed by RBF. Drewes (2009) found that chlorinated flame retardants and antiepileptic drugs were not removed by RBF, but that most other investigated trace organic compounds were removed to below laboratory detection levels. Travel time and redox conditions were important controls on removal efficiencies.

As with the RBF well field yield estimates, there is significant uncertainty in the water quality improvements that will be realized at an RBF well field. Site specific hydrogeologic site investigation and modeling will help better understand what water quality improvements RBF will provide.

RBF Well Field Preliminary Opinions of Cost

LRE developed preliminary opinions of probable costs using input from an HDD well driller (Directed Technologies Drilling, Inc.) and the Texas Water Development Board Unified Costing Model (HDR, Freese and Nichols, 2013). These should be considered screening level, order of magnitude cost estimates that will be refined as additional information is collected. Appendix A presents the output of the TWDB Unified Costing Model for well field components leading up to, but not including, the forebay and pump station indicated on **Figure 3**.

In addition to the assumptions included in the TWDB Unified Costing Model, the list below includes some of the assumptions that were considered during cost development:

- Costs for installed wells and pumps are based on an estimate of:
 - o \$548/foot of installed well (25% over DTD cost per foot to account for extended well lengths, pumps and appurtenances, and other items associated with completing the well for production)
 - o 5,900 feet of installed horizontal wells
 - o Rounding the calculated value up to the nearest \$5,000
- Integration costs include:
 - o Connection of the well discharge pipe to manifolds
 - o Well house
 - o SCADA system and controls
- Engineering costs assumed to be 30 percent of the well field cost
- Land costs were assumed for an 11-acre area shown on **Figure 1**. A \$45,000 allowance was included to account for a combination of small parcel purchase and large parcel easements.

Table 3 presents the preliminary opinion of cost for RBF well field components leading up to, but not including, the forebay and pump station.

Table 3 - Conceptual RBF Well Field Preliminary Opinion of Cost

RBF Well Field Yield	8,000 AFY
Total Cost of Facilities	\$4.2 Million
Total Cost of Project	\$5.8 Million
Total Annual Cost	\$660,000
Annual Cost of Water	\$83/AF

Conclusions and Recommendations

The available data discussed above indicate that RBF could be a feasible alternative for recovery and pretreatment of the City's reusable WWTP effluent. While there is not any local evidence of HDD well performance, it is estimated that the proposed HDD well field could produce between 4,800 to 9,600 acre-feet per year (AFY), or 4.3 to 8.6 MGD. However, there is significant uncertainty in the yield due to inadequate aquifer characterization. For the purposes of cost development and comparison to other alternatives, it has been assumed that an RBF well field can produce 8,000 AFY.

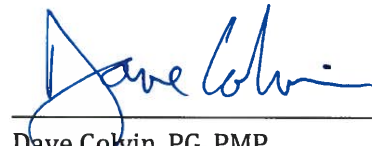
RBF reductions in contaminant levels are highly variable, but in most cases RBF will likely provide reductions to levels between 3 to 5 mg/L (or less) for nitrate, less than 3 mg/L for TOC, and less than laboratory detection levels for most trace organic compounds. RBF wells have historically been granted 1.0 log removal credit or better for pathogens.

The costs of an 8,000 AFY RBF well field with components leading up to, but not including, a forebay and pump station that would convey RBF pre-treated water to the water treatment plant were estimated. The total cost of the project is \$5.8 million, with an annual cost of \$660,000 or \$83 per acre-foot of water.

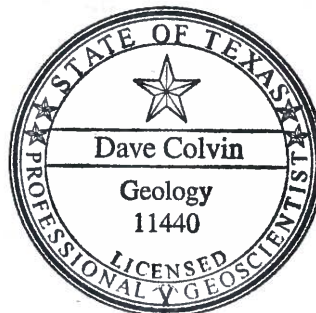
If the RBF alternative is identified as a cost-effective diversion and pretreatment option, LRE recommends a site-specific hydrogeologic investigation including geophysical surveys, pumping/monitoring well installation, aquifer testing, water quality sampling, and groundwater modeling. Evaluation of an alluvial aquifer system for reuse alternatives involves two main categories of investigation: water quantity and water quality. A full feasibility project includes a site investigation, construction of a pilot test facility, operation of the pilot test facility to evaluate surface water interaction, water quantities available, and RBF water quality improvements. Groundwater models can be used in all stages of the project to aid in test facility design and to assess results of RBF field testing. Ultimately, the model results can be scaled up to design and evaluate performance of a full-scale RBF wellfield.

Geoscientist Seal

This report documents the work of the following licensed professional geoscientist with Leonard Rice Engineers, Inc., a licensed professional geoscientist firm in the State of Texas as LRE Water, LLC (License No. 50516).

 1/19/18

Dave Colvin, PG, PMP
Groundwater Team Leader



References

- Drewes, J. H. (2009). *Removal of Bulk Organic Matter, Organic Micropollutants, and Nutrients During Riverbank Filtration*. Denver: Water Research Foundation.
- Hiscock, K., & Grischek, T. (2002). Attenuation of Groundwater Pollution by Bank Filtration. *Journal of Hydrology*, 139-144. Retrieved from [http://dx.doi.org/10.1016/S0022-1694\(02\)00158-0](http://dx.doi.org/10.1016/S0022-1694(02)00158-0)
- Hunt, H. (2009). *Riverbank Filtration in Columbia River Area*. Salem, OR: AWWA Conference - Pacific Northwest Section.
- Kelly, B., & Rydlund, P. J. (2006). *Water-Quality Changes Caused by Riverbank Filtration Between the Missouri River and Three Pumping Wells of the Independence, Missouri, Well Field 2003–05*. U.S. Geological Survey. Retrieved from <http://pubs.usgs.gov/sir/2006/5174/pdf/sir2006-5174.pdf>
- Ray, C. M. (2003). *Riverbank Filtration - Improving Source-Water Quality*. New York: Kluwer Academic Publishers.
- U.S. Environmental Protection Agency. (2018, January 18). *Long Term 2 Enhanced Surface Water Treatment Rule Documents*. Retrieved from Drinking Water Requirements for States and Public Water Systems: <https://www.epa.gov/dwreginfo/long-term-2-enhanced-surface-water-treatment-rule-documents>

Attachment A – TWDB Cost Model Output for a Conceptual RBF Well Field

Cost Estimate Summary Water Supply Project Option November 2017 Prices City of San Angelo - City of San Angelo River Bank Filtration	
Cost based on ENR CCI 10870 for November 2017 and a PPI of 193 for November 2017	
Item	Estimated Costs for Facilities
Well Fields (Wells, Pumps, and Piping)	\$3,607,000
Integration, Relocations, & Other	\$600,000
TOTAL COST OF FACILITIES	\$4,207,000
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 30% for all other facilities)	\$1,262,000
Environmental & Archaeology Studies and Mitigation	\$73,000
Land Acquisition and Surveying (11 acres)	\$45,000
Interest During Construction (4% for 1 years with a 1% ROI)	<u>\$196,000</u>
TOTAL COST OF PROJECT	\$5,783,000
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	\$484,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	\$40,000
Pumping Energy Costs (1527511 kW-hr @ 0.09 \$/kW-hr)	\$137,000
Purchase of Water (acft/yr @ \$/acft)	<u>\$0</u>
TOTAL ANNUAL COST	\$661,000
Available Project Yield (acft/yr), based on a Peaking Factor of 1	8,000
Annual Cost of Water (\$ per acft)	\$83
Annual Cost of Water (\$ per 1,000 gallons)	\$0.25
<i>Note: One or more cost element has been calculated externally</i>	
<i>M. Keester</i>	<i>01/16/2018</i>

Appendix B

Screening Workshop Results



Decision Matrix- Screening Evaluation



Table with 10 columns: Decision Factors (Criteria), 2, 3, 6, 11, 14, 16, 17, Weight, Scale/Comments. Rows include Overall Confidence, Permitting/regulatory challenges, Supply Quantity, Supply Quality, Operational Complexity, Ownership, Reliability, Sustainability, Public Acceptance, Schedule, Unit Cost, TOTALS, and Relative Rank.

Note: If zero is entered as a score in any cell this indicates a fatal flow for that option and it will not be considered further

Appendix C

Detailed Opinions of Cost

Option 6 - Edwards-Trinity Plateau Groundwater Opinion of Probable Construction Cost

Section	Title	Cost
1	Wellfield Facilities*	
1.1	Groundwater Wells (18 wells)	\$ 5,670,000
1.1.1	Fencing/SCADA/Electrical	\$ 2,196,000
1.2	Wellfield Collection Piping	
1.2.1	6-inch Pipe (38,000 LF)	\$ 2,280,000
1.2.2	8-inch Pipe (1,000 LF)	\$ 80,000
1.2.3	10-inch Pipe (3,780 LF)	\$ 378,000
1.2.4	14-inch Pipe (1,500 LF)	\$ 210,000
1.2.5	16-inch Pipe (3,780 LF)	\$ 605,000
1.2.6	20-inch Pipe (1,500 LF)	\$ 300,000
1.3	Site Roadways/Improvements	\$ 1,239,000
1.4	Wellfield Storage Tank (0.25 MG)	\$ 250,000
	Wellfield Facilities Subtotal	\$ 13,208,000
2	Conveyance Infrastructure to Water Treatment Plant*	
2.1	Transfer Pump Station to Water Treatment Plant (175 hp)	\$ 1,750,000
2.2	20-inch PVC Pipe (56 miles)	\$ 35,520,000
2.3	Utility location	\$ 296,000
2.4	Trench Safety for pipeline	\$ 592,000
2.5	38-inch Bore Casing	\$ 3,366,000
2.6	Air release valve and concrete vault	\$ 150,000
2.7	Connection modifications	\$ 12,000
2.8	20-Inch Gate Valves	\$ 60,000
2.9	Blow off Valves	\$ 60,000
2.10	Creek Crossing Erosion Protection	\$ 250,000
2.11	Storm Water Pollution Prevention Plan	\$ 150,000
2.12	Construction Site Restoration and Seeding	\$ 180,000
2.13	Traffic Control Plan and Implementation	\$ 60,000
2.14	Additional 3,000 psi concrete encasement	\$ 130,000
2.15	Additional Rock for Foundation	\$ 126,000
	Conveyance Infrastructure Subtotal	\$ 42,702,000
	SUBTOTAL	\$ 55,910,000
	CONTINGENCY 30%	\$ 16,770,000
	OPINION OF PROBABLE CONSTRUCTION COST	\$ 72,680,000
	ENGINEERING 15%	\$ 10,900,000
	PERMITTING & MITIGATION 1%	\$ 730,000
	LAND ACQUISITION AND SURVEYING - FEE SIMPLE (4,480 ACRES)	\$ 16,800,000
	LAND ACQUISITION AND SURVEYING - 40 FT. PIPELINE EASEMENTS	\$ 1,019,000
	OPCC Plus Engineering, Permitting, Mitigation, and Land Acquisition	\$ 102,100,000

* Costs already include contractor mob./demob., bonds, OHP, and insurance

Option 6 - Edwards-Trinity Plateau Groundwater Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
1	Additional Operators (Not Applicable)				
2	Annual Electricity Usage				
2.1	<i>Pumps</i>				
2.1.1	Wellfield Pumps	3,190,800	kWh	\$ 0.10	\$ 319,000
2.1.2	Transfer Pumps to Water Treatment Plant	1,146,465	kWh	\$ 0.10	\$ 115,000
	Annual Electricity Usage Subtotal				\$ 434,000
3	Annual Chemical Usage				
3.1	Chlorine Disinfection (5 mg/L)	50,593	gal	\$ 0.92	\$ 47,000
3.2	Liquid Ammonium Sulfate (1 mg/L)	121,097	lbs	\$ 0.21	\$ 26,000
	Annual Chemical Usage Subtotal				\$ 73,000
4	Annual Solids Disposal (Not Applicable)				
5	Routine Maintenance Costs				
5.4	Wellfield	1	LS	\$35,000	\$ 35,000
5.5	Transfer Pump Station to Water Treatment Plant	2.5%	-	\$1,750,000	\$ 44,000
5.6	Pipeline to Water Treatment Plant	1.0%	-	\$35,520,000	\$ 355,000
	Routine Maintenance Subtotal				\$ 434,000
6	Replacement Parts (Not Applicable)				
OPINION OF PROBABLE O&M ANNUAL COST					\$ 941,000

Total Project Cost \$ 102,100,000
 Annual Loan Payment \$ 7,510,000
 Annual O&M \$ 941,000
 Total Annual Cost \$ 8,451,000

Project Yield (ac-ft/yr) 4,500
 Unit Cost (per ac-ft/yr) \$ 1,880
 Unit Cost (per 1,000 gal) \$ 5.76

Unit Cost after Debt Retirement (per ac-ft/yr) \$ 209
 Unit Cost after Debt Retirement (per 1,000 gal) \$ 0.64

Option 11 - Indirect Potable Reuse to Lake Nasworthy

Opinion of Probable Construction Cost

Section	Title	Cost
1	Water Reclamation Facility Improvements (12 MGD)	
1.1	EQ Structure w/ Aeration System	\$ 2,006,000
1.2	Relift Pump Station	\$ 2,436,000
1.3	Convert Primary Clarifiers to Anaerobic/Anoxic Zones	\$ 513,000
1.4	Anoxic-to-Anaerobic Internal Recycle Pump Station	\$ 444,000
1.5	Aerobic-to-Anoxic Internal Recycle Pump Station	\$ 575,000
1.6	Anoxic Zone	\$ 504,000
1.7	Aeration Basin	\$ 3,455,000
1.8	Final Clarifiers (One (1) Additional Final Clarifier)	\$ 919,000
1.9	Chemical Feed System	\$ 146,000
1.10	Return Activated Sludge Pump Station	\$ 65,000
1.11	Cloth-Media Filtration System	\$ 2,099,000
1.12	Solids Handling Facility Modifications	\$ 1,115,000
1.13	Site Work and Yard Piping (7%)	\$ 999,000
1.14	Electrical and Instrumentation (20%)	\$ 2,855,000
1.15	Existing Plant SCADA System	\$ 557,000
1.16	Miscellaneous Gate/Valve Replacement Allowance	\$ 223,000
1.17	Repair Hole in Wall between Aeration Basins	\$ 39,000
1.18	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 3,790,000
	Water Reclamation Facility Improvements Subtotal	\$ 22,740,000
2	Advanced Treatment Facility (7.5 MGD influent, 6.94 MGD Yield)	
2.1	<i>Chemical Addition and Lime Softening</i>	
2.1.1	Liquid Ammonium Sulfate Chemical Injection Equipment	\$ 89,000
2.1.2	Hypochlorite Buliding, Equipment, Containment, and Piping	\$ 401,000
2.1.3	Lime Softening Building	\$ 1,070,000
2.1.4	Lime Softening Equipment	\$ 1,182,000
2.1.5	Solids Contact Clarifiers (Two)	\$ 3,184,000
2.2	<i>Solids Holding and Dewatering</i>	
2.2.1	Sludge Holding Tank (70ft dia.)	\$ 535,000
2.2.2	Dewatering Building	\$ 613,000
2.2.3	Plate and Frame Filter Press (Including installation)	\$ 1,159,000
2.2.4	Dewatering Sludge Pump Station (Structure and Pumps)	\$ 245,000
2.3	<i>Granular Activated Carbon Contactor (3.75 MGD)</i>	
2.3.1	Granular Activated Carbon Contactor Feed Pumps	\$ 412,000
2.3.2	Granular Activated Carbon Contactor Structure	\$ 647,000
2.3.3	Granular Activated Carbon Contactor Piping	\$ 591,000
2.3.4	Granular Activated Carbon Media	\$ 903,000
2.3.5	Granular Activated Carbon Contactor Underdrain	\$ 424,000
2.4	<i>Advanced Treatment Building</i>	
2.4.1	Advanced Treatment Building Structure and Electrical	\$ 5,395,000
2.4.2	Advanced Treatment Building Fittings and Piping	\$ 2,319,000
2.5	<i>Ultrafiltration Membrane Equipment (7.5 MGD)</i>	
2.4.3	Ultrafiltration Membrane Feed Tank (100,000 gallon capacity)	\$ 111,000
2.4.4	Ultrafiltration Membrane Equipment	\$ 3,467,000
2.6	<i>Reverse Osmosis Pretreatment (3.75 MGD)</i>	
2.6.1	Cartridge Filter Feed Tank (100,000 gallon capacity)	\$ 111,000
2.6.2	Cartridge Filter Booster Pumps	\$ 368,000
2.7	<i>Reverse Osmosis Membrane System (3.75 MGD)</i>	
2.7.1	Reverse Osmosis Equipment	\$ 2,859,000
2.7.2	High Pressure Reverse Osmosis Membrane Feed Pumps	\$ 725,000
2.7.3	Neutralization Tank (12,000 gallon capacity)	\$ 56,000
2.7.4	Reverse Osmosis Clean-in-Place System	\$ 89,000
2.7.5	Permeate Flush Tank (30,000 gallon capacity)	\$ 145,000

Option 11 - Indirect Potable Reuse to Lake Nasworthy

Opinion of Probable Construction Cost

Section	Title	Cost
2.8	<i>Dechlorination and Post Aeration (6.94 MGD)</i>	
2.8.1	Sodium Bisulfite Containment and Feed Equipment	\$ 201,000
2.8.2	Dechlorination Building	\$ 56,000
2.8.3	Post Aeration	\$ 111,000
2.10	<i>Site Work and Yard Piping (7%)</i>	\$ 1,923,000
2.11	<i>Electrical and Instrumentation (20%)</i>	\$ 5,494,000
2.12	<i>Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)</i>	\$ 5,476,000
	Advanced Treatment Facility Subtotal	\$ 40,361,000
3	Concentrate Disposal (0.56 MGD)	
3.1	Two Injection Wells (including one redundant)	\$ 5,045,000
3.2	Filters	\$ 109,000
3.3	Tank	\$ 422,000
3.4	Tank Accessories	\$ 6,000
3.5	Pump Building	\$ 362,000
3.6	PLC programming	\$ 72,000
3.7	Control valves and isolation valves, per well	\$ 66,000
3.8	WAMS units, per well	\$ 165,000
3.9	Injection pump (450 gpm @ 900 psi), per well	\$ 263,000
3.10	Offsite Utilities and Access	\$ 500,000
3.11	Standby Power Generation	\$ 500,000
3.12	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 1,502,000
	Concentrate Disposal Subtotal	\$ 9,012,000
4	Conveyance Infrastructure from WRF to Pecan Creek Discharge*	
4.1	Transfer Pump Station to Lake Nasworthy (350 hp, 6.94 MGD)	\$ 2,363,000
4.2	30-inch PVC Pipe (16.5 miles)	\$ 15,232,000
4.3	Utility location	\$ 87,000
4.4	Trench Safety for pipeline	\$ 172,000
4.5	48-inch Bore Casing	\$ 2,108,000
4.6	Air release valve and concrete vault	\$ 280,000
4.7	Pipeline Markers	\$ 9,000
4.8	30-Inch Gate Valves	\$ 250,000
4.9	Blow off Valves	\$ 96,000
4.10	Connection to Ex. 48-inch Pipe	\$ 32,000
4.11	Outfall Structure at Pecan Creek	\$ 75,000
4.12	Creek Crossing Erosion Protection	\$ 120,000
4.13	Pavement Repair	\$ 43,000
4.14	Storm Water Pollution Prevention Plan	\$ 36,000
4.15	Mitigation	\$ 30,000
4.16	Construction Site Restoration and Seeding	\$ 75,000
4.17	Traffic Control Plan and Implementation	\$ 25,000
4.18	Additional 3,000 psi concrete encasement	\$ 28,000
4.19	Additional Rock for Foundation	\$ 21,000
	Conveyance Infrastructure Subtotal	\$ 21,082,000
	SUBTOTAL	\$ 93,195,000
	CONTINGENCY 30%	\$ 27,959,000
	OPINION OF PROBABLE CONSTRUCTION COST	\$ 121,154,000
	ENGINEERING 15%	\$ 18,170,000
	PERMITTING & MITIGATION 1%	\$ 1,210,000
	LAND ACQUISITION AND SURVEYING - 40 FT PIPELINE EASEMENTS	\$ 300,000
	OPCC Plus Engineering, Permitting, and Mitigation	\$ 140,800,000

* Costs already include contractor mob./demob., bonds, OHP, and insurance

Option 11 - Indirect Potable Reuse to Lake Nasworthy

Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
1	Additional Operators				
1.1	Additional Operators	7	8-hr Shift	\$ 62,400	\$ 437,000
	Additional Operators Subtotal				\$ 437,000
2	Annual Electricity Usage				
2.1	<i>Advanced Treatment Facility</i>				
2.1.1	Lime Softening	35,674	kWh	\$ 0.10	\$ 4,000
2.1.2	Chemical Mixing Costs	293,955	kWh	\$ 0.10	\$ 29,000
2.1.3	Sludge Dewatering	124,084	kWh	\$ 0.10	\$ 12,000
2.1.4	Granular Activated Carbon Contactor Feed Pump	258,022	kWh	\$ 0.10	\$ 26,000
2.1.5	Ultrafiltration Membrane System	208,979	kWh	\$ 0.10	\$ 21,000
2.1.6	Cartridge Filter Feed Pump	132,421	kWh	\$ 0.10	\$ 13,000
2.1.7	Reverse Osmosis Feed Pump	2,866,915	kWh	\$ 0.10	\$ 287,000
2.1.8	Interstage Reverse Osmosis Pump	487,376	kWh	\$ 0.10	\$ 49,000
2.1.9	Post Aeration	163,308	kWh	\$ 0.10	\$ 16,000
2.1.10	Lake Nasworthy Transfer Pump	1,485,062	kWh	\$ 0.10	\$ 149,000
2.2	<i>Concentrate Disposal</i>				
2.2.1	Concentrate Injection Pumps	1,785,622	kWh	\$ 0.10	\$ 179,000
	Annual Electricity Usage Subtotal				\$ 785,000
3	Annual Chemical Usage				
3.1	<i>Advanced Treatment Facility</i>				
3.1.1	Chlorine plus Chemically Enhanced Backwash	59,270	gal	\$ 0.92	\$ 55,000
3.1.2	Reverse Osmosis Clean in Place Chemicals	12	events	\$ 3,344	\$ 40,000
3.1.3	Lime	1,296,711	lbs	\$ 0.21	\$ 278,000
3.1.4	Antiscalant	12,209	lbs	\$ 2.55	\$ 31,000
3.1.5	Sodium Bisulfate	359,014	lbs	\$ 0.38	\$ 138,000
3.1.6	Sodium Hydroxide	84,096	lbs	\$ 0.34	\$ 28,000
3.1.7	Liquid Ammonium Sulfate	113,024	lbs	\$ 0.21	\$ 24,000
3.1.8	Citric Acid	454	gal	\$ 7.00	\$ 3,000
3.2	<i>Water Treatment Plant</i>				
3.2.1	Additional Chemicals Required at Water Treatment Plant	2,532.19	MG	\$ 200	\$ 506,000
	Annual Chemical Usage Subtotal				\$ 1,103,000
4	Annual Solids Disposal				
4.1	<i>Advanced Treatment Facility</i>				
4.1.1	Solids Disposal	14,482	yd ³ /yr	\$ 17	\$ 243,000
	Annual Solids Disposal Subtotal				\$ 243,000

Option 11 - Indirect Potable Reuse to Lake Nasworthy

Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
5	Routine Maintenance Costs				
5.1	<i>Advanced Treatment Facility</i>				
5.1.1	Lime Softening at WRF	2.5%		\$ 4,366,000	\$ 109,000
5.1.2	Solids Holding and Dewatering at WRF	2.5%		\$ 1,939,000	\$ 48,000
5.1.3	Chemical Addition	2.5%		\$ 490,000	\$ 12,000
5.1.4	Granular Activated Carbon Contactor	2.5%		\$ 1,739,000	\$ 43,000
5.1.5	Advanced Treatment Building	2.5%		\$ 2,319,000	\$ 58,000
5.1.6	Ultrafiltration Membrane Equipment	2.5%		\$ 3,467,000	\$ 87,000
5.1.7	Reverse Osmosis Pretreatment	2.5%		\$ 368,000	\$ 9,000
5.1.8	Reverse Osmosis Membrane System	2.5%		\$ 3,673,000	\$ 92,000
5.1.9	Dechlorination	2.5%		\$ 201,000	\$ 5,000
5.1.10	Mechanical Post Aeration	2.5%		\$ 111,000	\$ 3,000
5.2	<i>Concentrate Disposal</i>				
5.1.1	Injection Wells	2.5%		\$ 5,045,000	\$ 126,000
5.1.2	Filters	2.5%		\$ 109,000	\$ 3,000
5.1.3	Control valves and isolation valves, per well	2.5%		\$ 66,000	\$ 2,000
5.1.4	WAMS units, per well	2.5%		\$ 165,000	\$ 4,000
5.1.5	Injection pump (450 gpm @ 900 psi), per well	2.5%		\$ 263,000	\$ 7,000
5.3	<i>Conveyance</i>				
5.3.1	Lake Nasworthy Transfer Pump Station	2.5%		\$ 2,363,000	\$ 59,000
5.3.2	Pipeline from WRF to Lake Nasworthy	1.0%		\$ 15,232,000	\$ 152,000
	Routine Maintenance Subtotal				\$ 819,000
6	Replacement Parts				
6.1	<i>Advanced Treatment Facility</i>				
6.1.1	Replacement UF Membranes (7 year replacement)				\$ 156,000
6.1.2	Replacement RO Membranes (3 year replacement)				\$ 201,000
6.1.3	Replacement Cartridge Filters (monthly replacement)				\$ 25,000
6.1.4	Replacement GAC Media (1.5 year replacement)				\$ 207,000
	Replacement Parts Subtotal				\$ 589,000
7	Compliance Monitoring				\$ 150,000
OPINION OF PROBABLE O&M ANNUAL COST					\$ 4,126,000

Total Project Cost \$140,800,000
 Annual Loan Payment \$ 10,360,000
 Annual O&M \$ 4,126,000
 Total Annual Cost \$ 14,486,000

Project Yield (ac-ft/yr) 6,952
 Unit Cost (per ac-ft/yr) \$ 2,080
 Unit Cost (per 1,000 gal) \$ 6.39

Unit Cost after Debt Retirement (per ac-ft/yr) \$ 593
 Unit Cost after Debt Retirement (per 1,000 gal) \$ 1.82

Option 16 - Direct Potable Reuse

Opinion of Probable Construction Cost

Section	Title	Cost
1	Water Reclamation Facility Improvements (12 MGD)	
1.1	EQ Structure w/ Aeration System	\$ 2,006,000
1.2	Relift Pump Station	\$ 2,436,000
1.3	Convert Primary Clarifiers to Anaerobic/Anoxic Zones	\$ 513,000
1.4	Anoxic-to-Anaerobic Internal Recycle Pump Station	\$ 444,000
1.5	Aerobic-to-Anoxic Internal Recycle Pump Station	\$ 575,000
1.6	Anoxic Zone	\$ 504,000
1.7	Aeration Basin	\$ 3,455,000
1.8	Final Clarifiers (One (1) Additional Final Clarifier)	\$ 919,000
1.9	Chemical Feed System	\$ 146,000
1.10	Return Activated Sludge Pump Station	\$ 65,000
1.11	Cloth-Media Filtration System	\$ 2,099,000
1.12	Solids Handling Facility Modifications	\$ 1,115,000
1.13	Site Work and Yard Piping (7%)	\$ 999,000
1.14	Electrical and Instrumentation (20%)	\$ 2,855,000
1.15	Existing Plant SCADA System	\$ 557,000
1.16	Miscellaneous Gate/Valve Replacement Allowance	\$ 223,000
1.17	Repair Hole in Wall between Aeration Basins	\$ 39,000
1.18	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 3,790,000
	Water Reclamation Facility Improvements Subtotal	\$ 22,740,000
2	Advanced Treatment Facility (7.5 MGD influent, 6.38 MGD permeate)	
2.1	<i>Chemical Addition and Lime Softening</i>	
2.1.1	Liquid Ammonium Sulfate and Caustic Chemical Injection Equipment	\$ 110,000
2.1.2	Hypochlorite Buliding, Equipment, Containment, and Piping	\$ 401,000
2.1.3	Lime Softening Building	\$ 1,070,000
2.1.4	Lime Softening Equipment	\$ 1,182,000
2.1.5	Solids Contact Clarifiers (Two)	\$ 3,184,000
2.2	<i>Solids Holding and Dewatering</i>	
2.2.1	Sludge Holding Tank (70 ft dia.)	\$ 535,000
2.2.2	Dewatering Building	\$ 613,000
2.2.3	Plate and Frame Filter Press (Including Installation)	\$ 1,159,000
2.2.4	Dewatering Sludge Pump Station (Structure and Pumps)	\$ 245,000
2.3	<i>Advanced Treatment Building</i>	
2.3.1	Advanced Treatment Building Structure and Electrical	\$ 6,153,000
2.3.2	Advanced Treatment Building Pippings and Fittings	\$ 2,542,000
2.4	<i>Ultrafiltration Membrane Equipment</i>	
2.4.1	Ultrafiltration Membrane Feed Tank (100,000 gallon capacity)	\$ 111,000
2.4.2	Ultrafiltration Membrane Equipment	\$ 4,672,000
2.5	<i>Reverse Osmosis Pretreatment</i>	
2.5.1	Cartridge Filter Feed Tank (100,000 gallon capacity)	\$ 111,000
2.5.2	Cartridge Filter Booster Pumps	\$ 698,000
2.6	<i>Reverse Osmosis Membrane System</i>	
2.6.1	Reverse Osmosis Equipment	\$ 5,718,000
2.6.2	High Pressure Reverse Osmosis Membrane Feed Pumps	\$ 1,202,000
2.6.3	Neutralization Tank (12,000 gallon capacity)	\$ 56,000
2.6.4	Reverse Osmosis Clean-in-Place System	\$ 89,000
2.6.5	Permeate Flush Tank (30,000 gallon capacity)	\$ 167,000
2.7	<i>Disinfection</i>	
2.7.1	Ultraviolet Light / Advanced Oxidation Process Disinfection Equipment	\$ 1,718,000
2.7.2	Clearwell after UV / AOP System (250,000 gallon capacity)	\$ 250,000

Option 16 - Direct Potable Reuse

Opinion of Probable Construction Cost

Section	Title	Cost
2.8	Site Work and Yard Piping (7%)	\$ 2,203,000
2.9	Electrical and Instrumentation (20%)	\$ 6,295,000
2.10	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 6,295,000
	Advanced Treatment Facility Subtotal	\$ 46,779,000
3	Concentrate Disposal (1.13 MGD)	
3.1	Three Injection Wells (including one redundant)	\$ 7,568,000
3.2	Filters	\$ 109,000
3.3	Tank	\$ 422,000
3.4	Tank Accessories	\$ 6,000
3.5	Pump Building	\$ 362,000
3.6	PLC programming	\$ 72,000
3.7	Control valves and isolation valves, per well	\$ 99,000
3.8	WAMS units, per well	\$ 247,000
3.9	Injection pump (450 gpm @ 900 psi), per well	\$ 395,000
3.10	Offsite Utilities and Access	\$ 500,000
3.11	Standby Power Generation	\$ 500,000
3.12	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 2,056,000
	Concentrate Disposal Subtotal	\$ 12,336,000
4.0	Conveyance Infrastructure from WRF to WTP*	
4.1	Transfer Pump Station to WTP (265 hp, 6.38 MGD)	\$ 2,100,000
4.2	30-inch PVC Pipe (6.3 miles)	\$ 5,775,000
4.3	Utility location	\$ 33,000
4.4	Trench Safety for pipeline	\$ 64,000
4.5	48-inch Bore Casing	\$ 2,088,000
4.6	Air release valve and concrete vault	\$ 165,000
4.7	Pipeline Markers	\$ 5,000
4.8	30-Inch Gate Valves	\$ 100,000
4.9	Blow off Valves	\$ 60,000
4.10	Connection to Ex. 48-inch Pipe	\$ 32,000
4.11	Creek Crossing Erosion Protection	\$ 120,000
4.12	Pavement Repair	\$ 242,000
4.13	Storm Water Pollution Prevention Plan	\$ 10,000
4.14	Mitigation	\$ 30,000
4.15	Construction Site Restoration and Seeding	\$ 50,000
4.16	Traffic Control Plan and Implementation	\$ 15,000
4.17	Additional 3,000 psi concrete encasement	\$ 28,000
4.18	Additional Rock for Foundation	\$ 21,000
	Conveyance Infrastructure Subtotal	\$ 10,938,000
	SUBTOTAL	\$ 92,793,000
	CONTINGENCY 30%	\$ 27,838,000
	OPINION OF PROBABLE CONSTRUCTION COST	\$ 120,631,000
	ENGINEERING 15%	\$ 18,090,000
	PERMITTING & MITIGATION 1%	\$ 1,210,000
	LAND ACQUISITION AND SURVEYING - PIPELINE EASEMENTS	\$ 114,000
	OPCC Plus Engineering, Permitting, and Mitigation	\$ 140,045,000

* Costs already include contractor mob./demob., bonds, OHP, and insurance

Option 16 - Direct Potable Reuse

Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
1	Additional Operators				
1.1	Additional Operators	7	8-hr Shift	\$ 62,400	\$ 437,000
	Operator Subtotal				\$ 437,000
2	Annual Electricity Usage				
2.1	<i>Advanced Treatment Facility</i>				
2.1.1	Lime Softening	35,674	kWh	\$ 0.10	\$ 4,000
2.1.2	Chemical Mixing Costs	293,955	kWh	\$ 0.10	\$ 29,000
2.1.3	Sludge Dewatering	124,084	kWh	\$ 0.10	\$ 12,000
2.1.4	Ultrafiltration Membrane System	417,959	kWh	\$ 0.10	\$ 42,000
2.1.5	Cartridge Filter Feed Pumps	264,842	kWh	\$ 0.10	\$ 26,000
2.1.6	Reverse Osmosis Feed Pumps	5,733,830	kWh	\$ 0.10	\$ 573,000
2.1.7	Interstage Reverse Osmosis Pump	974,751	kWh	\$ 0.10	\$ 97,000
2.1.8	UV/AOP	787,694	kWh	\$ 0.10	\$ 79,000
2.1.9	Post Aeration	163,308	kWh	\$ 0.10	\$ 16,000
2.1.10	Water Treatment Plant Transfer Pumps	1,705,814	kWh	\$ 0.10	\$ 171,000
2.2	<i>Concentrate Disposal</i>				
2.2.1	Concentrate Injection Pumps	3,571,244	kWh	\$ 0.10	\$ 357,000
	Annual Electricity Usage Subtotal				\$ 1,406,000
3	Annual Chemical Usage				
3.1	<i>Advanced Treatment Facility</i>				
3.1.1	Chlorine plus Chemically Enhanced Backwash	110,268	gal	\$ 0.92	\$ 101,000
3.1.2	Reverse Osmosis Clean in Place	12	events	\$ 3,344	\$ 40,000
3.1.3	Lime	2,593,421	lbs	\$ 0.21	\$ 556,000
3.1.4	Antiscalant	24,419	lbs	\$ 2.55	\$ 62,000
3.1.5	Peroxide	13,891	gal	\$ 5.00	\$ 69,000
3.1.6	Sodium Hydroxide	84,096	lbs	\$ 0.34	\$ 28,000
3.1.7	Liquid Ammonium Sulfate	226,047	lbs	\$ 0.21	\$ 48,000
3.1.8	Citric Acid	908	gal	\$ 7.00	\$ 6,000
3.2	<i>Water Treatment Plant</i>				
3.2.1	Additional Water Treatment Plant Chemicals	2,327	MG	\$ 200.00	\$ 465,000
	Annual Chemical Usage Subtotal				\$ 1,375,000
4	Annual Solids Disposal				
4.1	<i>Advanced Treatment Facility</i>				
4.1.1	Solids Disposal	28,964	yd ³ /yr	\$ 17	\$ 485,000
	Annual Solids Disposal Subtotal				\$ 485,000

Option 16 - Direct Potable Reuse

Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
5	Routine Maintenance Costs				
5.1	<i>Advanced Treatment Facility</i>				
5.1.1	Lime Softening at WRF	2.5%		\$ 4,366,000	\$ 109,000
5.1.2	Solids Holding and Dewatering at WRF	2.5%		\$ 1,939,000	\$ 48,000
5.1.3	Chemical Addition	2.5%		\$ 511,000	\$ 13,000
5.1.4	Advanced Treatment Building	2.5%		\$ 2,542,000	\$ 64,000
5.1.5	Ultrafiltration Membrane Equipment	2.5%		\$ 4,672,000	\$ 117,000
5.1.6	Reverse Osmosis Pretreatment	2.5%		\$ 698,000	\$ 17,000
5.1.7	Reverse Osmosis Membrane System	2.5%		\$ 7,009,000	\$ 175,000
5.1.8	UV/AOP Equipment	2.5%		\$ 1,718,000	\$ 43,000
5.2	<i>Concentrate Disposal</i>				
5.2.1	Injection Wells	2.5%		\$ 7,568,000	\$ 189,000
5.2.2	Filters	2.5%		\$ 109,000	\$ 3,000
5.2.3	Control valves and isolation valves, per well	2.5%		\$ 99,000	\$ 2,000
5.2.4	WAMS units, per well	2.5%		\$ 247,000	\$ 6,000
5.2.5	Injection pump (450 gpm @ 900 psi), per well	2.5%		\$ 395,000	\$ 10,000
5.3	<i>Conveyance</i>				
5.3.1	WTP Transfer Pump Station	2.5%		\$ 2,100,000	\$ 53,000
5.3.2	WTP Transfer Pipeline	1.0%		\$ 5,775,000	\$ 58,000
	Routine Maintenance Subtotal				\$ 907,000
6	Replacement Parts (Annualized Cost)				
6.1	<i>Advanced Treatment Facility</i>				
6.1.1	Replacement UF Membranes (7 year replacement)				\$ 156,000
6.1.2	Replacement RO Membranes (3 year replacement)				\$ 335,000
6.1.3	Replacement Cartridge Filters (monthly replacement)				\$ 50,000
6.1.4	Replacement UV Lamps (2 year replacement)				\$ 25,000
	Replacement Parts Subtotal				\$ 566,000
7	Compliance Monitoring	1	LS	\$ 150,000	\$ 150,000
OPINION OF PROBABLE O&M ANNUAL COST					\$ 5,326,000

Total Project Cost \$140,045,000
 Annual Loan Payment \$ 10,300,000
 Annual O&M \$ 5,326,000
 Total Annual Cost \$ 15,626,000

Project Yield (ac-ft/yr) 7,140
 Unit Cost (per ac-ft/yr) \$ 2,190
 Unit Cost (per 1,000 gal) \$ 6.72

Unit Cost after Debt Retirement (per ac-ft/yr) \$ 746
 Unit Cost after Debt Retirement (per 1,000 gal) \$ 2.29

Option 17 - Concho River Water Supply Project

Opinion of Probable Construction Cost

Section	Title	Cost
1	Water Reclamation Facility Improvements (12 MGD)	
1.1	EQ Structure w/ Aeration System	\$ 2,006,000
1.2	Relift Pump Station	\$ 2,436,000
1.3	Convert Primary Clarifiers to Anaerobic/Anoxic Zones	\$ 513,000
1.4	Anoxic-to-Anaerobic Internal Recycle Pump Station	\$ 444,000
1.5	Aerobic-to-Anoxic Internal Recycle Pump Station	\$ 575,000
1.6	Anoxic Zone	\$ 504,000
1.7	Aeration Basin	\$ 3,455,000
1.8	Final Clarifiers (One (1) Additional Final Clarifier)	\$ 919,000
1.9	Chemical Feed System	\$ 146,000
1.10	Return Activated Sludge Pump Station	\$ 65,000
1.11	Cloth-Media Filtration System	\$ 2,099,000
1.12	Solids Handling Facility Modifications	\$ 1,115,000
1.13	Site Work and Yard Piping (7%)	\$ 999,000
1.14	Electrical and Instrumentation (20%)	\$ 2,855,000
1.15	Existing Plant SCADA System	\$ 557,000
1.16	Miscellaneous Gate/Valve Replacement Allowance	\$ 223,000
1.17	Repair Hole in Wall between Aeration Basins	\$ 39,000
1.18	Concho River Outfall	\$ 50,000
1.19	Contractor Mob./Demob., Bonds, OHP, and Insurance (20%)	\$ 3,800,000
	Water Reclamation Facility Improvements Subtotal	\$ 22,800,000
2	Conveyance Infrastructure*	
2.1	<i>Discharge Pipeline from Water Reclamation Facility to Concho River</i>	
2.1.1	36-inch PVC Pipe (1.3 miles)	\$ 1,546,000
2.1.2	Utility Location	\$ 7,000
2.1.3	Trench Safety for pipeline	\$ 14,000
2.1.4	54-inch Bore Casing	\$ 112,000
2.1.5	Air release valve and concrete vault	\$ 20,000
2.1.6	Pipeline Markers	\$ 2,000
2.1.7	36-Inch Gate Valves	\$ 60,000
2.1.8	Blow off Valves	\$ 24,000
2.1.9	Outfall Structure at Concho River	\$ 75,000
2.1.10	Pavement Repair	\$ 6,000
2.1.11	Storm Water Pollution Prevention Plan	\$ 15,000
2.1.12	Mitigation	\$ 30,000
2.1.13	Construction Site Restoration and Seeding	\$ 19,000
2.1.14	Traffic Control Plan and Implementation	\$ 5,000
2.1.15	Additional 3,000 psi concrete encasement	\$ 14,000
2.1.16	Additional Rock for Foundation	\$ 11,000

Option 17 - Concho River Water Supply Project

Opinion of Probable Construction Cost

Section	Title	Cost
2.2	<i>Concho River Intake and Pipeline to Water Treatment Plant</i>	
2.2.1	Concho River Intake	\$ 300,000
2.2.2	Transfer Pump Station to WTP (585 hp, 7 MGD)	\$ 2,500,000
2.2.3	30-inch PVC Pipe (16.4 miles)	\$ 15,154,000
2.2.4	Utility location	\$ 87,000
2.2.5	Trench Safety for pipeline	\$ 167,000
2.2.6	48-inch Bore Casing	\$ 5,409,000
2.2.7	Air release valve and concrete vault	\$ 110,000
2.2.8	Pipeline Markers	\$ 5,000
2.2.9	30-Inch Gate Valves	\$ 100,000
2.2.10	Blow off Valves	\$ 75,000
2.2.11	Creek Crossing Erosion Protection	\$ 240,000
2.2.12	Pavement Repair	\$ 9,000
2.2.13	Storm Water Pollution Prevention Plan	\$ 40,000
2.2.14	Mitigation	\$ 30,000
2.2.15	Construction Site Restoration and Seeding	\$ 80,000
2.2.16	Traffic Control Plan and Implementation	\$ 25,000
2.2.17	Additional 3,000 psi concrete encasement	\$ 56,000
2.2.18	Additional Rock for Foundation	\$ 55,000
	Conveyance Infrastructure Subtotal	\$ 26,402,000
3	Water Treatment Plant Improvements (7 MGD)*	
3.1	Microfiltration/Ultrafiltration (MF/UF)	\$ 15,876,000
3.2	Granular Activated Carbon (GAC)	\$ 9,360,000
3.3	Ultraviolet Irradiation (UV)	\$ 2,846,000
	Water Treatment Plant Improvements Subtotal	\$ 28,082,000
	SUBTOTAL	\$ 77,284,000
	CONTINGENCY 30%	\$ 23,185,000
	OPINION OF PROBABLE CONSTRUCTION COST	\$ 100,469,000
	ENGINEERING 15%	\$ 15,070,000
	PERMITTING & MITIGATION 1%	\$ 1,000,000
	LAND ACQUISITION AND SURVEYING - 40 FT PIPELINE EASEMENTS	\$ 322,000
	OPCC Plus Engineering, Permitting, and Mitigation	\$ 116,861,000

* Costs already include contractor mob./demob., bonds, OHP, and insurance

Option 17 - Concho River Water Supply Project

Annual Operating and Maintenance Costs

Section	Title	Quantity	Unit	Unit Cost	Cost
1	Additional Operators (Not Applicable)				
2	Annual Electricity Usage				
2.1	Water Treatment Plant				
2.1.1	New and Existing Processes	4,662,100	kWh	\$ 0.10	\$ 466,000
Annual Electricity Usage Subtotal					\$ 466,000
3	Annual Chemical Usage (Not Applicable)				
Annual Chemical Usage Subtotal					
4	Additional Annual Solids Disposal (Included in Section 5.2.1)				
Annual Solids Disposal Subtotal					\$ -
5	Routine Maintenance Costs				
5.1	Water Reclamation Facility				
5.1.1	Discharge Pipeline Maintenance	1.0%		\$ 1,546,000	\$ 16,000
5.1.2	Transfer Pipeline to Water Treatment Plant	1.0%		\$ 15,154,000	\$ 152,000
5.1.3	Transfer Pump Station to Water Treatment Plant	2.5%		\$ 2,500,000	\$ 63,000
5.2	Water Treatment Plant				
5.2.1	General Maintenance	1	LS	\$ 605,000	\$ 605,000
Routine Maintenance Subtotal					\$ 836,000
6	Replacement Parts				
6.2	Water Treatment Plant				
6.2.1	Replacement Membranes and GAC Media				\$ 959,000
Replacement Parts Subtotal					\$ 959,000
OPINION OF PROBABLE O&M ANNUAL COST					\$ 2,261,000

Total Project Cost \$116,861,000
 Annual Loan Payment \$ 8,600,000
 Annual O&M \$ 2,261,000
 Total Annual Cost \$ 10,861,000

Project Yield (ac-ft/yr) 8,400
 Unit Cost (per ac-ft/yr) \$ 1,290
 Unit Cost (per 1,000 gal) \$ 3.97

Unit Cost after Debt Retirement (per ac-ft/yr) \$ 269
 Unit Cost after Debt Retirement (per 1,000 gal) \$ 0.83

Appendix D

Results of Final Ranking Workshop



Decision Matrix- Detailed Evaluation

Option

Edwards/Trinity Plateau
Aquifer
Augment Lake Nasworthy
with Reclaimed Water
Direct Potable Reuse
Concho River Water Supply
Project



Decision Factors (Criteria)	6	11	16	17	Weight	Scale/Comments
Permitting/regulatory challenges	2	3	4	3	6	The ease of resolving the legal, regulatory, permitting, and environmental challenges before implementation; 1= difficult to resolve regulatory issues; 5 = easy to resolve regulatory issues
Supply Quantity	1	3	3	5	20	The ultimate supply volume (in ac-ft/yr) 1: ≤ 5,000 3: ≤ 7,500 5: > 8,000
Supply Quality	4	3	5	3	8	Relative impact on drinking water quality 1: Greatest negative impact on drinking water quality 5: Greatest positive impact on drinking water quality
Operational Complexity	5	2	2	3	7	1: High complexity to operate 5: Low complexity to operate
Ownership	3	4	5	4	8	Based on objective rating of level of ownership/control SA has for the option; 5-full, 3-partial or 1-non-ownership
Reliability	3	2	5	3	9	Based on likelihood that supply volume is available 100% every year 1: Low reliability 5: High reliability
Sustainability	4	5	5	5	10	Based on likelihood that supply is available for long-term use (> 50 years) 1: Low sustainability 5: High sustainability
Public Acceptance	4	2.5	1	3.5	5	1: Low - greatest likely San Angelo citizens' concern about project 5: High - least likely San Angelo citizens' concern about project
Schedule	3	2	3	2	7	Relative length of strategy implementation schedule 1: >7 years 2: ≤ 6 years 3: ≤ 5 years 4: ≤ 4 years 5: ≤ 3 years
Unit Cost	2	1	1	4	20	1: > \$6.00/kgal 2: ≤ \$6.00/kgal 3: ≤ \$5.00/kgal 4: ≤ \$4.00/kgal 5: ≤ \$3.00/kgal
TOTALS	267.3	260.3	316.8	381		Higher scores are more favorable Lower scores are less favorable
Relative Rank	● 3	● 4	● 2	● 1		

Appendix E

Resolution Adopting the Water Conservation and Drought Contingency Plan

**RESOLUTION FOR ADOPTION OF THE
UPDATED CITY OF SAN ANGELO
WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN
RESOLUTION NO.**

A RESOLUTION OF THE CITY COUNCIL ADOPTING A
WATER CONSERVATION AND DROUGHT
CONTINGENCY PLAN FOR THE CITY OF SAN
ANGELO.

WHEREAS, the Council recognizes that the amount of water available to the City of San Angelo and its water utility customers is limited and subject to depletion during periods of extended drought; and

WHEREAS, the Council recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes; and

WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all affected public water supply systems in Texas to prepare a water conservation and drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the customers of the City of San Angelo, the Council deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY CITY COUNCIL OF THE CITY OF SAN ANGELO:

SECTION 1. That the Water Conservation and Drought Contingency Plan attached hereto as Exhibit A and made part hereof for all purposes be adopted as the official policy of the City of San Angelo.

SECTION 2. That the Mayor is hereby directed to implement, administer, and enforce the Water Conservation and Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE CITY COUNCIL OF THE CITY OF SAN ANGELO, ON THIS ___ day of _____, 20__.

Mayor

ATTESTED TO:

City Secretary

Appendix F

Example of Notification Letter to Wholesale Purchasers

(Date)

(Wholesale Customer)

(Address)

Dear (Wholesale Customer);

As you are aware, per requirements found in 30 Texas Administrative Code (TAC) Chapter 288 the City of San Angelo is required by the State of Texas to develop, implement, and maintain a Water Conservation Plan ("Plan"). We take this opportunity to remind you of the requirements pertaining to water conservation for your system.

As a wholesale water customer of the City of San Angelo your system is obligated to develop a Water Conservation Plan of your own. The requirement for your system to develop a Water Conservation Plan is found in 30 TAC Subchapter A, §288.5. We request that at the time you submit your system's plan to the State, you furnish us a copy as well. Providing us a copy of your system's plan will ensure a higher degree of accuracy as we update our Plan on a regular and prescribed basis.

Sincerely

City of San Angelo

Appendix G

City of San Angelo Water Rate Structure

Understanding Your Municipal Services Statement

The municipal services statement you receive monthly from the City of San Angelo includes fees other than water. Depending upon a household's usage, water fees can represent as little as 35 percent of the monthly bill, with charges for trash service, storm water and sewer accounting for the balance.

Here's a line-item primer for each of the charges that appear on a residential statement:

- **Trash service** - provided by Republic Services, with whom the City contracts for trash service and landfill operations.
- **Trash sales tax** - 8.25-percent sales tax applied to trash service charges.
- **Storm water fee** - determined by the amount of impervious area on a property – typically roofs, driveways, patios, walkways and sidewalks – that contribute to rainwater flowing into the storm water drainage system. The fees help fund City efforts to meet federally mandated regulations for maintaining those systems. Storm water fee rates are tiered. As impervious surface area increases, a higher rate applies. The average residential homeowner pays \$3 or \$4 per month.
- **Sewer base fee** - determined by the size of the customer's water meter. The fees fund the operation of the wastewater sewer system. Most residences have a meter that measures five-eighths of an inch and currently pays \$29.72 per month. Of that amount, \$4.64 is designated for capital improvements to the sewer system.
- **Sewer usage fee** - based upon an average monthly water usage during December, January and February. Customers who average more than 4,000 gallons per month during that span pay \$3.75 for each additional 1,000-gallon increment.
- **Water base fee** - determined by the size of the customer's meter. A residence using a five-eighths of an inch meter (the most common size) pays \$30.69 per month with \$3.32 designated for water-related capital improvements. Water main replacements, Hickory Aquifer infrastructure and fees related to exploration of other potential water sources are examples of capital improvements.
- **Water usage fees** - determined by two factors: how much water a customer uses and what drought level the city is under. The water rate structure is tiered; as a customer uses more water, they pay a higher rate.

Water customers who live outside the city limits pay 1.5 times the rate paid by city dwellers. Water usage is billed in 1,000-gallon increments. If a new customer uses 1,500 gallons of water the first month, charges are for 1,000 gallons that month. The remaining 500-gallon balance rolls forward until it reaches a 1,000-gallon increment. If the following month the customer used 1,500 gallons, the charge is for 2,000 gallons of usage. For each 1,000 gallons billed, 95 cents is allocated to the water capital improvement fund. Each mailed bill includes a memo box noting the amount dedicated to water and sewer capital projects.

Other municipal service charges you should know about:

- A 15% late fee if not paid within 25 days of the billing date. Payments made after 5 p.m. apply to the next business day.
- A \$25 fee for returned checks.
- A \$30 fee is required to re-connect service. Outstanding balances and fees are due prior to re-connection.
- A \$20 activation fee plus a deposit when an account is established. The amount of the deposit depends upon the customer's credit history with the Water Utilities Department. The minimum deposit is \$100. Deposits are refunded after a four-year period if the customer has no delinquent payments or service discontinued.

Customers who pay their bills online at cosatx.us/waterbill may note a difference between the online balance and the mailed statement balance. The online balance is a current balance and includes any changes to the account since the statement billed.

Customers who have questions regarding their statement or their service are encouraged to call the Water Customer Service Division at [325-657-4323](tel:325-657-4323); visit our offices at the City Hall Annex, first floor, 301 W. Beauregard Ave., adjacent to City Hall; or email Customer Service Manager [Petra Trevino](#).

We want all of our customers to fully understand their municipal services statement and enjoy a pleasant customer service experience.

RESOLUTION 2024-____

RESOLUTION OF THE CITY OF SAN ANGELO, TEXAS ADOPTING THE CITY OF SAN ANGELO 2024 WATER CONSERVATION PLAN

WHEREAS, The City of San Angelo reviews and updates the Water Conservation Plan (WCP) every five years in order to adjust goals and targets, and take into account new technology and new best management practices; and

WHEREAS, The last plan was adopted in May 2029, updated in September 2019, and a supplement was adopted in June 2023; and

WHEREAS, the City of San Angelo 2024 Water Conservation Plan has been prepared and is ready for adoption.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SAN ANGELO, TEXAS:

That the City of San Angelo 2024 Water Conservation Plan is hereby adopted by the City of San Angelo.

ADOPTED this the ____ day of June, 2024.

THE CITY OF SAN ANGELO, TEXAS:

Brenda Gunter, Mayor

ATTEST:

Heather Stastny, City Clerk

APPROVED AS TO FORM:

Theresa James, City Attorney

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Rae Lineberry, Planner, Planning and Development Services

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider accepting an annexation petition for 22.096 acres of land in the C. Berberich Survey No. 177, Abstract No. 52 and H. Zerbach Survey No. 178, Abstract No. 4210, Tom Green County, Texas, located east of Riveria Ln. and Club House Ln.; and setting a public hearing for July 2, 2024 (Aaron Vannoy)

Staff Recommendation:

Accept

Summary/History:

Note that this is NOT approval of the annexation, but simply begins the annexation process. This is the next phase of the Bentwood Country Club Estates master-planned residential development. Looking at the area described and comparing it to the preliminary plat approved in 2020, this should create 23 additional large RS-1 single family lots. The next steps will be two hearings on the annexation and the ability for the City to provide services to the area, including the costs to provide those services.

Funding Source(s):

Financial Impact:

N/A

Other Information/Recommendation:

The staff is recommending that the City Council accept this petition to initiate the annexation process.

Attachments:

- | | |
|--------------------------------------|---------------------------------------|
| 1. Annexation Petition & Field Notes | Annexation Petition & Field Notes.pdf |
| 2. Annexation Exhibit 22.096 Acres | Annexation Exhibit 22.096 Acres.pdf |

Presentation:

Aaron Vannoy

Approvals/Reviews:

Rae Lineberry

Created/Initiated

Aaron Vannoy
Brandon Dyson
Aaron Vannoy
Brandon Dyson
Heather Stastny

Approved
Approved
Approved
Approved
Final Approval

PETITION REQUESTING ANNEXATION BY AREA LANDOWNERS

TO THE MAYOR AND GOVERNING BODY OF THE CITY OF SAN ANGELO, TEXAS

The undersigned owner(s) of the hereinafter described tract of land, which is vacant and without residents, or on which fewer than three qualified voters reside, hereby petition(s) your honorable Body to extend the present city limits so as to include as part of the City of San Angelo, Texas, the property described in Exhibit "A", by metes and bounds and attached herein.

Bentwood JV, LLC certifies that the above described tract of land is contiguous and adjacent to the City of San Angelo, Texas, is not more than one-half mile in width, and that this petition is signed and duly acknowledged by each and every person having an interest in said land.

Signed: [Signature]

Printed Name: Kevin Collins

Title: Manager Partner Date: 4-15-24

THE STATE OF TEXAS

COUNTY OF TOM GREEN

BEFORE ME, this instrument was acknowledged on April 15th by person's name or entity.

[Signature: Kristi R. McDonald]

Notary Public, State of Texas

My commission expires: 12-13-2024



EXHIBIT "A"

**FIELD NOTES
PROPOSED ANNEXATION**

22.096 Acres

April 2, 2024
24-E-0001_22.096Ac

Being an area of 22.096 acres of land out of C. Berberich Survey No. 177, Abstract No. 52 and H. Zerbach Survey No. 178, Abstract No. 4210, Tom Green County, Texas and said 22.096 acre tract also being out of that certain 54.872 acre tract described and recorded in Instrument No. 201917169, Official Public Records of Tom Green County, Texas and said 22.096 acre tract being more particularly described by metes and bounds as follows:

Beginning at the southwest corner of this tract and southeast corner of Lot 3, Block 112, Bentwood Country Club Estates Section 44, City of San Angelo, Tom Green County, Texas as per plat recorded in Cabinet H, Slide 66, Plat Records of Tom Green County, Texas;

Thence with the west line of this tract, current city limits line, east line of said Lot 3, and crossing Club House Lane, **N. 00°04'28" E.** at a distance of 130.00 feet passing the south right of way line of said Club House Lane, in all a total distance of **190.00** feet to an angle corner;

Thence continuing with the current city limits line and with the north right of way line of said Club House Lane **N. 89°55'32" W.** a distance of **9.44** feet to the east line of a certain remainder of 18.753 acre tract described and recorded in Instrument Number 202114741, Official Public Records of Tom Green County, Texas;

Thence continuing with the current city limits line, a westerly line of this tract and easterly line of said remainder of 18.753 acre tract as follows:

N. 00°04'28" E. a distance of **627.31** feet;

N. 15°46'18" E. a distance of **102.53** feet;

N. 23°40'02" E. a distance of **326.04** feet;

N. 45°21'33" E. a distance of **110.61** feet;

N. 66°53'38" E. a distance of **306.17** feet;

N. 81°51'20" E. a distance of **140.14** feet;

N. 08°08'40" W. a distance of **19.32** feet to the southwest corner of Lot 8, Block 109, Bentwood Country Club Estates Section 45;

Thence continuing with the current city limits line and south line of said Lots 8 and Lot 7, Block 109, Bentwood Country Club Estates Section 45, **N. 81°51'20" E.** a distance of **230.00** feet to the

southeast corner of said Lot 7 and the southwest corner of Lot 6 of said Block 109;

Thence with an easterly line of this tract and crossing said remainder of 54.872 acre tract as follows:

S. 08°08'40" E. a distance of 130.00 feet;

N. 81°51'20" E. a distance of 59.94 feet;

S. 00°04'28" W. a distance of 405.09 feet;

N. 89°55'32" W. a distance of 330.00 feet;

S. 00°04'28" W. a distance of 960.00 feet to the south line of said remainder of 54.872 acre tract and on a northerly line of a certain 211.67 acre tract described and recorded in Instrument Number 607655, Official Public Records of Tom Green County, Texas;

Thence with the south line of this tract and northerly line of said 211.67 acre tract as follows:

N. 89°55'32" W. a distance of 50.34 feet;

S. 00°04'28" W. a distance of 10.00 feet;

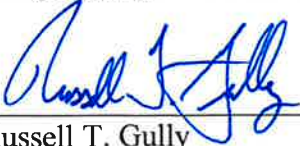
Thence crossing said remainder of 54.872 acre tract **N. 89°55'32" W. a distance of 379.44 feet;**

Thence with the south line of this tract, said remainder of 54.872 acre tract and northerly line of said 211.67 acre tract as follows:

N. 00°04'28" E. a distance of 10.00 feet;

N. 89°55'32" W. a distance of 190.56 feet to the place of beginning and containing 22.096 acres of land.

See Attached Plat of Survey.



Russell T. Gully
Registered Professional Land Surveyor No. 5636
SKG Engineering, LLC
Firm No. 10102400



REF.: Remainder of 70.870
Acre Tract (Parcel GC_07)
Instrument No. 622905

REF.: Bentwood Country
Club Estates Section
Forty-Three
Cabinet H, Slide 59, PR

REF.: Bentwood Country
Club Estates Section
Thirty-Eight
Cabinet G, Slide 383, PR

REF.: Section 45
Bentwood Country Club
Estates Cabinet H Slide 66,
PR

Block 109
8 7 6

Current
City
Limits

ENCLAVE COURT

LINVILLE LANE

RIVIERA LANE

N45°21'33"E
110.61'

22.096 Ac.

Out of remainder of
54.872 Ac.
Inst. No. 201917169, OPR

**H. ZERBACH
SURVEY NO. 178
ABSTRACT No. 4210**

N81°51'20"E
140.14'

S08°08'40"E
130.00'

405.09'
S00°04'28"W

330.00'

N89°55'32"W

**C. BERBERICH
SURVEY NO. 177
ABSTRACT No. 52**

Ref.: Remainder of
54.872 Ac.
Inst. No.
201917169, OPR

REF.: Certain 211.67 Acre Tract
Thomas W. Nasworthy et ux
To Terrell C. Sheen
Instrument Number 607655

Ref.: Remainder of 18.753 Ac.
Inst. No. 202114741, OPR

N89°55'32"W
9.44'

CLUB HOUSE LANE

N00°04'28"E
190.00'

S00°04'28"W
10.00'

Point of Beginning

379.44'

N89°55'32"W
190.56'

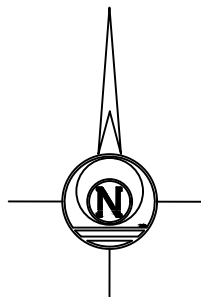
N89°55'32"W
Ref.: Remainder of
54.872 Ac.
Inst. No. 201917169, OPR

N89°55'32"W
50.34'

N00°04'28"E
10.00'

Current
City
Limits

REF.: Certain 211.67 Acre Tract
Thomas W. Nasworthy et ux
To Terrell C. Sheen
Instrument Number 607655



SCALE: 1"= 200'

0 100 200 400
GRAPHIC SCALE : FEET

NOTE : Bearings shown hereon are based on
the Texas Coordinate System -
Central Zone.
Distances shown are surface horizontal.

SKG

ENGINEERING, LLC
SURVEYING • ENVIRONMENTAL • LAB/CMT

706 SOUTH ABE STREET
SAN ANGELO, TEXAS 76903
Firm No. 10102400
www.skge.com
PHONE: 325.655.1288
FAX: 325.657.8189

**PROPOSED ANNEXATION
OF 22.096 ACRES**

Preliminary, this document shall not be recorded
for any purpose and shall not be used or viewed
or relied upon as a final survey document.

24-E-0001

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Jeremy Valgardson, Airport Director, Airport

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider a resolution adopting the San Angelo Regional Airport Title VI Policy, and designating Jeremy Valgardson as the Title VI Coordinator for the Airport (Jeremy Valgardson)

Staff Recommendation:

Adopt

Summary/History:

Federal regulations require airports to comply with Title VI requirements to receive federal funding. This updated policy statement is in compliance with all federal Title VI requirements. I am requesting to adopt the Title VI policy as drafted and designate the Airport Director (Jeremy Valgardson) as the Airport Title VI Coordinator.

Funding Source(s):

Financial Impact:

No financial impact.

Other Information/Recommendation:

Attachments:

- | | | |
|----|---|---|
| 1. | Resolution adopting airport Title VI policy | Resolution adopting airport Title VI policy.pdf |
| 2. | Exhibit A, Airport Title VI Policy | Exhibit A, Airport Title VI Policy.pdf |

Presentation:

Jeremy Valgardson

Approvals/Reviews:

Jeremy Valgardson
Jeremy Valgardson
Theresa James

Created/Initiated
Approved
Approved

Brandon Dyson
Heather Stastny

Approved
Final Approval

RESOLUTION 2024-

**A RESOLUTION OF THE CITY OF SAN ANGELO CITY COUNCIL
DESIGNATING TITLE VI COORDINATOR OF THE SAN ANGELO REGIONAL
AIRPORT**

WHEREAS, the City of San Angelo is committed to ensuring that no person shall be excluded from or discriminated against under any program or activity of the City, and

WHEREAS, the San Angelo Regional Airport assures that every effort will be made to ensure no discrimination in all airport programs and services, and

WHEREAS, the FAA requires a specific Title VI Policy Statement in order to comply with the requirements of Title VI, and

WHEREAS, the City of San Angelo has drafted a Title VI Plan in accordance with the requirements of the FAA, and

WHEREAS, upon adoption, the Airport Director shall be responsible for overseeing the Title VI compliance of the San Angelo Regional Airport.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY OF SAN ANGELO CITY COUNCIL adopts the Title VI policy found in Exhibit A to this resolution and hereby designates the Airport Director as the Title VI Coordinator for the San Angelo Regional Airport. City staff is directed to post this designation on all City websites, social media and on airport facilities as required by law.

ADOPTED this 18th day of June, 2024.

THE CITY OF SAN ANGELO, TEXAS:

Brenda Gunter, Mayor

ATTEST:

Heather Stastny, City Clerk

APPROVED AS TO FORM:

Theresa James, City Attorney

1. Title VI Policy Statement¹

The City of San Angelo (the Airport Sponsor) and the San Angelo Regional Airport assures that no person shall on the grounds of race, color, national origin (including limited English proficiency (LEP)), sex (including sexual orientation and gender identity), creed, or age, as provided by Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987 (PL 100.259), Section 520 of the Airport and Airway Improvement Act of 1982, and related authorities (hereafter, “Title VI and related requirements”), be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity that receives U.S. Department of Transportation (DOT) funding. Title VI also prohibits retaliation for asserting or otherwise participating in claims of discrimination.

The City of San Angelo and the San Angelo Regional Airport further assures every effort will be made to ensure nondiscrimination in all of its programs and activities, whether those programs are federally funded or not. The Airport Sponsor agrees, among other things, to understand the communities surrounding or in the flight path, as well as customers that use the airport. Anytime communities may be impacted by programs or activities the San Angelo Regional Airport will take action to involve them and the general public in the decision making process.

San Angelo Regional Airport requires nondiscrimination assurances, as prescribed by FAA, from each tenant, contractor, and concessionaire providing an activity, service, or facility at the airport. Assurances must be included in any related lease, contract, or franchise agreement between the San Angelo Regional Airport and each tenant, contractor, and concessionaire, as well as in any similar agreements with their own sub-tenants and sub-contractors.

Bryan Kendrick, available at (325) 657-4221 and bryan.kendrick@cosatx.us is responsible for overseeing the Airport Sponsor’s compliance with Title VI and the point of contact for all airport Title VI matters and related responsibilities, including those required by 49 CFR Part 21 shall be Jeremy Valgardson at **325-659-6409 option.3** and Jeremy.valgardson@cosatx.us.

Signature
Brenda Gunter
Mayor

June 18, 2024

Effective Date

June 18, 2027

3-Year Expiration Date

¹ This policy statement will be translated into languages other than English, upon request and based on patron and local language demographics.

2. Administration

The City of San Angelo has reviewed and adopted this Title VI Plan for the San Angelo Regional Airport. This plan will be updated no less than once every 3 years. The plan will not be re-adopted following minor changes, such as updating the Airport Director or Coordinator's name. Significant revisions to our policies or federal guidelines may warrant re-adoption by the City of San Angelo and resubmittal to FAA.

In addition to the Coordinator and airport sponsor's leadership, the following people also assist with our Title VI program requirements:

Staff Supporting Title VI Program	Airport Sponsor Program / Office
Bryan Kendrick, Director	City of San Angelo Title VI Coordinator
Theresa James, City Attorney	City Attorney's Office

The San Angelo Regional Airport engages the City Attorney's Office to ensure compliance with Title VI program requirements.

The City of San Angelo does not have any airport program sub-recipients.

As of the date of this plan, the San Angelo Regional Airport has the following pending applications for Federal financial assistance:

Federal Source	Grant Number	Amount
FAA AIP (FY2022 Entitlements, Emergency Generator)	TBD	\$1,000,000
FAA AIP (FY2023-2024 BIL AIG, South Taxilane)	TBD	\$2,086,100

The San Angelo Regional Airport does not have sub-recipients with pending federal financial assistance applications.

Updated information for pending and awarded grant applications will be available through the following methods:

Federal Source	Grant Award Information Available at:
DHS	www.DHSgrantinfo.gov
DOJ	www.USgrantsinfo.net
FAA AIP	https://www.faa.gov/airports/aip/2023_aip_grants
FAA	Texas Airport District Office

3. Grant and Procurement Assurances

49 CFR § 21.7 (a)(1); 49 CFR Part 21 Appendix C (b)

The San Angelo Regional Airport will complete standard grant assurances for Title VI and related requirements, in the form prescribed by FAA. See https://www.faa.gov/airports/aip/grant_assurances/#current-assurances.

Clauses/Covenants

- a. All contracts, leases, deeds, licenses, permits, and other similar instruments, must contain the contractual requirements and clauses, in the form prescribed by FAA. See https://www.faa.gov/airports/aip/procurement/federal_contract_provisions/. Note that unlike many other clauses, Civil Rights clauses are required in all contracts. Note also special clauses that are required for certain types of contracts, such as land acquisition.
- b. The San Angelo Regional Airport requires, Civil Rights clauses to be included in solicitations and contracts for all subcontractors, subleases, and any other agreements. The City of San Angelo publishes in its solicitations and agreements the requirements for subcontractors to comply with the Civil Rights clause as defined in base contract. The City Attorney's office drafts all agreements, contracts, covenants, deeds, leases, licenses, permits, and similar instruments for the City of San Angelo, and ensures compliance with the terms of those agreements.

Description of Oversight Methods for Subcontracts

The City of San Angelo updates its template documents upon notification from the FAA that there have been changes to the Grant Assurances and Title VI program. The Title VI airport program manager will collaborate with Legal, Purchasing, and the City of San Angelo Title VI coordinator to review subcontractor agreements on a sample basis to assure compliance to the Title VI program and contract documents.

4. Title VI Airport Coordinator Responsibilities

The Airport Coordinator is responsible for ensuring that they and other staff supporting the Title VI are trained in Title VI requirements. Essential training topics include:

- Basic Title VI requirements
- Airport language assistance resources and practices
- Collecting and assessing demographic data
- Reporting Title VI complaints and other required FAA notifications.

See Training Section for more information for expected training for all staff.

Among other responsibilities, the Airport Coordinator:

- Proactively ensures that the Airport Sponsor is in compliance with nondiscrimination requirements of Title VI and reports to San Angelo Regional Airport leadership on the status of Title VI compliances.
- Responds promptly to requests by FAA for data and records and for the scheduling of compliance reviews and other FAA meetings to determine compliance with Title VI and related requirements.
- Receives discrimination complaints covered by Title VI and related requirements, and forwards them to the FAA, within 15 days of receipt, together with any actions taken to resolve the matter.
- Provides the FAA with updates regarding its response and status of early resolution efforts to complaints concerning Title VI and related requirements (49 CFR Part 21, Appendix C(b)(3)), including resolution efforts.
- Annually reviews the airport's Title VI plan and disseminates information throughout staff and the Airport Sponsor's leadership.
- Coordinates data collection to evaluate whether racial or ethnic groups are unequally benefited or impacted by airport programs. The data will be regularly assessed and readily available upon request (49 CFR § 21.9(b) & (c)). Data collection methods will include optional demographic questions in: airport customer satisfaction surveys, customer complaints, airport event sign-in sheets, and bids/proposals for airport contracts, and other methods described in the airport Community Participation Plan (CPP).
- Maintains demographic data for members of appointed planning and advisory bodies for the airport. Identifies any disparities compared to the community. Provides information to the membership selecting official/committee, particularly when vacancies occur.
- Maintains a copy of 49 CFR Part 21 for inspection by any person asking for it during normal working hours (49 CFR 21, Appendix C (b)(2)(i)).

See Notice, Compliance reviews, Audits, Lawsuits, and Other Investigations, and Complaints Sections of this Plan.

The Airport Coordinator has requested and received access to the Title VI portion of the FAA Civil Rights Connect System (<https://faa.civilrightsconnect.com/>).

5. Notice

49 CFR Part 21 Appendix C(b)(2)(ii)

The San Angelo Regional Airport will conspicuously display the FAA-provided Unlawful Discrimination Poster in all public areas on airport property, including those with pedestrian activity. The Coordinator ensures that these posters are visible, accessible,² and maintained. The poster template is available at https://www.faa.gov/about/office_org/headquarters_offices/acr/com_civ_support/non_disc_pr/ and a completed copy is attached. See Section 15 Appendix.

The San Angelo Regional Airport has posted the above Title VI policy statement at its staff offices.

The San Angelo Regional Airport will distribute this Title VI Plan among its employees and airport contractors, concessionaires, lessees, and tenants. This plan will be distributed by July 3, 2024 by email and at our monthly tenants meeting.

Posters are displayed in the terminal and other areas on airport property, including the following public locations:

Terminal/FBO/Concessions/ Other Locations	Quantity in Pre-Security Area	Quantity in Post-Security Area	Additional Quantities
Terminal	1	1	
Administration Office			1
Ranger Aviation (FBO)			1
Skyline Aviation (FBO)			1

Outreach to Affected Communities

The San Angelo Regional Airport Administration Office ensures that notices for public meetings reach all segments of the impacted community. The Title VI airport coordinator will identify the effective media platforms to share announcement and notices. Announcements are made on the airports website, general circulation newspapers, and email broadcast. The San Angelo Regional Airport Administration Office contacts leaders and representatives in Affected Communities directly to confirm effective media platforms to reach all Affected Communities³ and provide important feedback on translated materials. The office maintains records of all such notices and the efforts made to reach each of the Affected Communities.

² For more information about website accessibility, please visit ADA.gov.

³ We will not subject any persons to discrimination based on race, color, national origin, age, sex, or creed. The term “protected communities” is used within this Title VI Plan to highlight the requirements of Title VI, 49 U.S.C. § 47123, the Age Discrimination Act of 1975, and in some instances, includes low-income populations under Executive Order 12898.

The San Angelo Regional Airport will create a detailed CPP by December 1, 2024. A copy of the plan will be available at (<https://www.cosatx.us/departments-services/airport>) and (<https://www.cosatx.us/departments-services/human-resources/title-vi-compliance>)

To ensure that the community is effectively informed of and able to participate in public hearings, public notices posted by the City of San Angelo includes direction for obtaining an interpreter, free of charge, for public hearings, consistent with 28 CFR § 42.405(d). See Limited English Proficiency (LEP) Section.

6. Community Statistics

Title VI regulations require Federal grant recipients to know their community demographics. See 49 CFR § 21.9(b). By knowing this information, the San Angelo Regional Airport will be able to identify, understand, and engage with communities. In doing so, the San Angelo Regional Airport needs to know about communities eligible to be served, actually or potentially affected, benefited or burdened by the airport program.

The San Angelo Regional Airport is located in a rural area of west-central Texas. The airport serves the surrounding areas as the primary commercial service airport.

Affected Communities⁴	Population
City of San Angelo	96,462

Source: S1701 U.S. Census 2022

(Hereafter, the above communities will be referred to collectively as “the Affected Communities”).

We have identified the following facts about the Affected Communities:

Low Income Communities⁵

A low-income area is an identifiable group of persons living in geographic proximity, whose median household income is at or below the Department of Health and Human Services poverty guidelines. Pursuant to Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” The San Angelo Regional Airport is collecting information about affected and potentially affected low-income communities. According to the *U.S. Census Report **S1701: Poverty Status in the Past 12 Months***, the overall poverty level for Tom Green County is approximately 11.6%. The poverty rate remains similar compared with the rest of the State of Texas at 14%.

⁴ “Affected communities” means any readily identifiable group potentially impacted by an airport project or operation, such as the community immediately surrounding a project or a community in the flight path.

⁵ Low-income data must be collected to assist in our compliance with Environmental Justice requirements (not Title VI requirements). For example, this data will be utilized in our Community Participation Plan (CPP) to help ensure the meaningful involvement of low income communities in airport programs and activities.

The poverty rates for the specific Affected Communities are as follows:

Affected Communities	Poverty Rate
City of San Angelo	12.4%

Source: S1701 U.S. Census 2022

Racial and Ethnic Communities.

Demographic data for race, color, and national origin was evaluated to identify racial and ethnic communities and populations in each Affected Community. The demographic composition by race, color, or national origin for the specific Affected Communities are as follows⁶:

Affected Community: **City of San Angelo**
Total Affected Community Population: **96,462**

Demographic Group within Affected Community	Number of People in Minority Group	Percent of Total Affected Community Population
White Alone	57,587	58%
Hispanic or Latino	43,313	43%
Some Other Race Alone	11,293	11%
Two or More Races	22,903	23%
White Alone, not Hispanic or Latino	45,266	45%

Source: S1701 U.S. Census 2022

Limited English Proficiency (LEP).

The goal of all language access planning and implementation is to ensure that San Angelo Regional Airport communicates effectively with limited English proficient (LEP) individuals. Effective language access requires self-assessment and planning. The next table lists non-English languages⁷ that are spoken in LEP households in the Affected Communities. The data source is the *American Community Survey (S1601)*.

The threshold we have used for identifying the languages with significant LEP populations is the DOT LEP Policy Guidance safe harbor threshold, which is 5% or 1,000, whichever is less.⁸ The safe harbor for our community is 1000. Please refer to the end of this document to find data for all languages in our community.

⁶ Recommend using demographic groups from the U.S. Census.

⁷ Recommend using language groups from the U.S. Census, and using data for the “Speak English less than ‘very well’” category for each language over the threshold.

⁸ See the DOT LEP Policy Guidance at <https://www.federalregister.gov/d/05-23972/p-133>. The safe harbor provisions apply to the translation of written documents only; however, it provides a consistent starting point for identifying significant LEP populations.

Languages Spoken by LEP Population that Meet the Safe Harbor Threshold	Number	Margin of Error
Spanish	5,611	+/-614

Source: B16001 U.S. Census 2022

Frequency of contact with LEP individuals at the airport and airport-related activities (all languages):

Languages Spoken by LEP Persons	A few times a year (12 or less days a year)	Several times a month (13 to 51 days a year)	At least once a week (52 to 364 days a year)	Every day (365 days a year)
Spanish			X	
French	X			

Additional languages spoken by significant numbers of LEP persons in the Affected Communities, local schools, emergency service providers, and others, include: NONE

This information is updated annually⁹ through checking the following resources:

Data Sources for Languages Spoken in Affected Community	Website link to Data Source
U.S. Census Bureau	https://data.census.gov/cedsci/table?q=B16001&tid=ACSDT1Y2019.B16001

Beneficiary Diversity.

Demographic information is collected from airport customers, attendees at community meetings, and businesses seeking opportunities at the airport, through voluntary disclosures.

Description of Beneficiary Demographic Information Collection Methods

- The San Angelo Regional Airport is developing an anonymous survey as a pre requisite to accessing the Airports Wi-Fi. The survey will request demographic, among other information, from all Wi-Fi users.
- Participants at airport sponsored pre-bid meetings, and other airport public meetings are asked to complete an anonymous survey that includes demographic information.

⁹ Data should be kept up-to-date, but this plan does not need to be updated for incremental data changes during the Plan's 3-year period.

Staff and Advisory Board Diversity.

Demographic information is collected from airport program employees and members of planning and advisory boards, through voluntary disclosures.

Description of Employee and Advisory Board Demographic Information Collection Methods
• Employees are asked to submit voluntary confidential demographic information at time of hiring. Job applicants are asked to submit the same information when submitting their job application through the job application website. • Every 2 years, the airport administration sends an email to all board members asking them to voluntarily and anonymously enter demographic information through a survey.

7. Potential or Known Community Impacts

Projects or services receiving federal financial assistance have the potential to touch so many aspects of American life. Thus, in general, no Airport activity must have a discriminatory disparate impact on the basis of race, color, national origin (including LEP), sex (including sexual orientation and gender identity), creed, or age. This means that policies or procedures that have a disparate impact would require a well-documented substantial legitimate nondiscriminatory justification, summarized below. Impacts to protected communities must be avoided or minimized to the extent possible. No project with a discriminatory impact on protected communities will be undertaken.¹⁰

The following airport facilities are already in use or under construction and expected to be in use within the next 3 years:

Existing Airport Facilities	Affected Community Impacted by Operation of the Facility
Runway 18-36	None
Runway 3-21	None
Runway 9-27	None
All Taxiways and Ramps	None
Commercial Terminal Building	None
Airport Lighting vault	None
FBO's and Associated Hangars	None
Firehouse and Maintenance Hangars	None
Air Traffic Control Tower	None
Rental Car Area and Terminal Parking Lots	None

¹⁰ In order to carry out an alternative with a discriminatory impact, the airport sponsor must demonstrate that there was a substantial legitimate justification for the decision. The sponsor must also show that alternatives with less discriminatory impacts were meaningfully considered and rejected for legitimate reasons.

The following airport facility projects (including all alternatives) are in construction or expected to be in construction within the next 3 years:

Airport Facility Construction Projects	Affected Community Impacted by Construction of the Facility
Runway and Taxiway Rehabilitation	None
Runway 9-27 conversion to 'Taxiway H'	None
South Taxilane Development	None
Reconstruction of the Air Traffic Control Tower	None
Terminal Building Improvements	None
Jet Bridge Replacement	None
Hangar Rehabilitation	None

We have analyzed the above existing facilities and facility construction projects for disparate impacts on the basis of race, color, or national origin (including LEP) in Affected Communities. The following have disparate impacts: NONE

8. Limited English Proficiency (LEP)

Executive Order 13166

In creating a Language Assistance Plan, the San Angelo Regional Airport will consider the volume, proportion, or frequency of contact with LEP persons in determining the appropriate language assistance to provide.

In Community Statistics section, we identified the following languages spoken by LEP persons in Affected Communities:

Language
Spanish

San Angelo Regional Airport also collects data for languages spoken by airport guests.¹¹ Data sources include:

Data Sources for Languages Spoken by Airport Guests	Website link to Data Source
Assumptions from flight origin/destination	N/A
Assistance request to airport staff and TSO's	N/A

Based on the above data, the following additional languages have been identified as likely to be spoken by LEP airport guests: NONE

¹¹ We aim to provide appropriate language assistance services to every LEP person encountered. This includes instances when LEP statistical data for a particular language was not available beforehand, or the safe harbor threshold for written translation was not met.

The Title VI Coordinator will also actively engage with community educators, community groups, places of work, business groups, social groups, and the like to confirm that translation and interpretation services are accurate and effective. Additionally, the Title VI Coordinator will inform leadership and staff of the San Angelo Regional Airport of the responsibility to provide language access. We have made the following plans to provide translation services free of charge to ensure that individuals with LEP have access to the benefits of the airport:

Translation Services:

- The San Angelo Regional Airport Website has the option to view the website in English or Spanish.
- When appropriate, written notices contain a statement in the identified language, of how to receive translated written materials.
- Written translations can be provided through Google Translate or from a volunteer multilingual staff member on an as needed basis.
- Information regarding translation services can be obtained from the San Angelo Regional Airport Administration Office.

Interpretation Services:

- Interpretation can be provided on an as needed basis.
- Interpretation can be provided through Google Translate.
- Additional interpretation services can be provided through Language Line, Inc., or another online interpretation service, on an as needed basis.
- Information regarding interpretation services can be obtained from the Airport Administration Office.

Description of Interpretation Assistance Processes

-
- Airport Customer Service Office maintains a list of multilingual employees, the languages they speak, and their associated office telephone numbers. The list indicates whether each employee is proficient to provide interpretation and/or translation services. The list is updated annually in the Public Information Handbook and provided to all airport employees. Generally, these employee volunteers are available to assist members of the public with verbal real-time interpretation, during normal business hours.
 - The airport contracts with the Language Line, Inc. to provide on-demand telephone interpretation services to airport guests. When a request for an interpreter is received, the following process is used: Airport information desk staff use I-Speak cards to identify the language spoken by the airport guest. Staff contacts Language Line, Inc. and “parks” the request in the queue for the appropriate language. Language Line, Inc. operators will coordinate connect the requesting party to an interpreter for the duration of the call. The completed call is then logged in the Language Line Service binder. This log is kept for one year.
-

9. Transportation

49 Part CFR 21 Appendix C (a)(1)(ix)

In the Community Statistics section of this plan, we identified Affected Communities and provided demographic and related data for the community populations. The minority and disadvantaged community areas located within the Affected Communities are identified below. Other minority and disadvantaged community areas that are near the airport but not within Affected Communities are also identified below.

We have coordinated with the Concho Valley Transit services and Red Ball Shuttle to encourage them to provide transit service access between the airport and these areas.

The following chart identifies existing and planned transit services connecting the airport employment centers with the identified minority and disadvantaged community areas.

Minority and/or Disadvantaged Community Areas	Transit Service	Planned or Existing
City of San Angelo	On call transit	Existing

10. Minority Businesses

49 CFR 21 Appendix C (a)(1)(x)

Bids for airport concessions and other business opportunities are solicited from area minority and woman-owned businesses through the following methods:

Airport Business Opportunity	Minority Business Outreach Methods
Concession Opportunities	Advertised through workforce development, chamber of commerce, as well as City website. Historically underutilized businesses are sought out by department director and encouraged to bid.
Construction Opportunities	Advertised through the City's website and bidding portal. Historically underutilized businesses are sought out by department director and encouraged to bid.

Selections are in compliance with Title VI, Part 21, and related requirements. Information on the award process and documentation for specific bid decisions is kept with the City of San Angelo's Purchasing Department.

11. Training

New employee orientation incorporates Title VI training. Topics include:

- Title VI and related laws prohibit discrimination on the basis of race, color, national origin (including LEP), sex (including sexual orientation and gender identity), creed, or age
- Title VI complaints must be forwarded to the Coordinator
- Protections against retaliation for filing civil rights complaints or related actions
- Title VI notices must be displayed throughout the airport public facilities
- All contracts must include Title VI clauses
- Language interpretation and translation services
- Cultural and community relations sensitivity training
- Anti-harassment training

Refresher information will be provided annually.

12. Compliance Reviews, Audits, Complaints, Lawsuits, and Other Investigations

FAA Notification. The Coordinator will notify FAA of any pending investigations and reviews, including:

- Compliance reviews or audits concerning civil rights requirements¹²
- Complaints, lawsuits, or other investigations alleging noncompliance with civil rights requirements¹³

As discussed in the Title VI Complaints Section, Title VI complaints must be forwarded to FAA contacts within 15 days of receipt. For all other civil rights investigations, the San Angelo Regional Airport must notify FAA contacts of any new investigations prior to grant execution.

At regular intervals, the Coordinator will provide FAA contacts with status updates for the investigations and reviews, until completed. For each existing investigation or review completed within 5 years of this plan, the Coordinator will also provide a statement about the outcome, unless previously provided.

¹² Includes any Title VI, ADA, Sec. 504, Title VII/EEO, or other civil rights program compliance review or audit to be performed on the airport sponsor or any of its sub-recipients by any State, local or Federal agency.

¹³ Includes allegations of discrimination based on race, color, national origin (including LEP), sex (including sexual orientation and gender identity), creed, or age, whether because of actions of the airport sponsor itself, or its employees, contractors, or tenants. Includes noncompliance with related administrative requirements under civil rights laws.

13. Title VI Complaints

49 CFR 21.11; 49 CFR 21 Appendix C (b)(3); 28 CFR 42.406(d)

Scope. These procedures are for complaints of discrimination under Title VI and related laws (hereafter “Title VI Complaints.” In order to be a Title VI Complaint, the complaint must:

1. Allege discrimination on the basis of race, color, national origin (including LEP), sex (including sexual orientation and gender identity), creed, or age or violations administrative requirements under Title VI or related laws.
2. Not only be for employment matters¹⁴
3. Allege misconduct by the San Angelo Regional Airport, including airport employees, contractors, concessionaires, lessees, or tenants.
4. Concern an airport facility or actions by the San Angelo Regional Airport, airport employees, contractors, concessionaires, lessees, or tenants.

Rights. Any person who believes that he or she has been subjected to discrimination on the basis of race, color, national origin (including LEP), sex (including sexual orientation and gender identity), creed, or age has the right to file a complaint with the San Angelo Regional Airport.¹⁵ Alternatively, they can file a formal complaint with an outside agency, such as the U.S. Departments of Justice or Transportation, or the Federal Aviation Administration (FAA), or seek other legal remedies.

Receipt of Complaint. The Coordinator will log in the complaint and promptly send copies of the complaint to the City of San Angelo’s Legal Department, the Airport Directors Office and the City of San Angelo Title VI Coordinator.

Complaints must be filed within 180 days of the discriminatory event, must be in writing, and must be delivered to:

Jeremy Valgardson, Airport Director

Jeremy.valgardson@cosatx.us

8618 Terminal Circle, Suite 101

San Angelo, Texas 76904

325-659-6409 option.3

If a complaint is initially made by phone, it must be supplemented with a written complaint before 180 days after the discriminatory event has passed. If a verbal complaint is received, the complainant should be given a copy of the Airport Discrimination Complaint Procedures and instructed to submit a written complaint. Accommodation will be provided upon request to

¹⁴ Complaints of employment discrimination must be addressed as required by EEOC and other applicable authorities with jurisdiction over employment matters. If an Airport sponsor employment activity is supported by FAA-provided financial assistance or it is alleged that the employment discrimination affects the broader airport program, complaints about that activity must also be reported to FAA.

¹⁵

individuals unable to file a written complaint due to a disability.

Initial Procedure. The airport Coordinator may meet with the complainant to clarify the issues, obtain additional information, and determine if informal resolution might be possible in lieu of an investigation. If successfully resolved, the airport Coordinator will issue a closure letter to the complainant, record the disposition in the complaints log, and report the resolution to FAA.

Discrimination Complaint Referral Procedure

Internal Complaint Referral. All Title VI complaints must be promptly forwarded to the airport Coordinator within 3 business days.

Initial FAA Notification. A copy of each Title VI complaint will be forwarded to the FAA within 15 days of initial receipt (not the date that the airport Coordinator was notified). The airport Coordinator will forward a copy of the complaint and a statement describing all actions taken to resolve the matter, and the results thereof to the FAA Civil Rights staff. (Note: complaints based on disability do not have to be forwarded to FAA.) To transmit complaint information to the FAA, the airport Coordinator will upload the complaint form to the *FAA Civil Rights Connect System*, which issues automated notifications to FAA staff. The Coordinator will also seek technical assistance from FAA, as needed, throughout complaint intake, investigation and resolution process.

Investigation Procedure

Assignment of Investigator. The airport Coordinator will immediately begin the investigation or designate an investigator.

Cooperation with FAA. The airport Coordinator will promptly investigate all Title VI complaints, including those referred by the FAA for investigation. If the FAA is investigating a complaint against the San Angelo Regional Airport, the airport Coordinator will avoid interfering with the FAA investigation, cooperate with the FAA when needed, and share factual information with the FAA.

Prompt Investigation. The airport Coordinator will make every effort to complete discrimination complaint investigations within 60 calendar days after the complaint is received. Some investigations may take longer with a justification for the delay and assurance that the investigation is being completed as quickly as possible.

Contact with Complainant. The airport Coordinator will meet with the complainant to clarify the issues and obtain additional information, and also speak with community members and potential witnesses, as appropriate.

Investigation Report. After completing the investigation, the airport Coordinator will prepare a written report.

Consultation with Legal Counsel. In each case, the airport Coordinator will consult with Legal Counsel and the City of San Angelo Title VI Coordinator regarding the investigation and the report. Airport Legal Counsel will ensure that the report is consistent with the DOT and FAA Title VI nondiscrimination requirements.

Prompt Resolution of Disputes. The airport Coordinator will emphasize voluntary compliance and quickly and fairly resolve disputes with complainants, or with contractors, tenants, or other persons, through first working informally with the parties involved to reach a dispute resolution. If a resolution cannot be reached, the parties will engage in negotiation or mediation

Forwarding Report and Response to Complainant. At the completion of the investigation, the complainant and respondent will receive a letter of findings and determination of the investigation and any applicable resolution. The letter transmitting the findings and any applicable resolution will state the San Angelo Regional Airport's conclusion regarding whether unlawful discrimination occurred, and will describe the complainant's appeal rights. A summary of the investigation report, any appeal, or follow-up actions will be sent to the FAA via *FAA Civil Rights Connect System*.

Appeal Rights. The complainant must be notified of their right to appeal the findings or determinations, and of the procedures and requirements for an appeal:

- The complainant may appeal in writing to the City of San Angelo City Manager.
- The written appeal must be received within 60 business days after receipt of the written decision.
- The written appeal must contain all arguments, evidence, and documents supporting the basis for the appeal.
- The City Manager will issue a final written decision in response to the appeal.

Avoiding Future Discrimination. In addition to taking action with respect to any specific instances of discrimination, the Airport will identify and implement measures to reduce the chances of similar discrimination in the future.

Intimidation and Retaliation Prohibited. The San Angelo Regional Airport employees, contractors, and tenants will not intimidate or retaliate against a person who has filed a complaint alleging discrimination.

For information on filing a complaint with DOT/FAA, please contact Jeremy Valgardson, Airport Director, Title VI Coordinator for the San Angelo Regional Airport.

This complaint procedure is shared with the public through the following methods:

Website, In-person, and Other Distribution Methods

1 <https://www.cosatx.us/departments-services/airport> and
<https://www.cosatx.us/departments-services/human-resources/title-vi-compliance>

2 Airport Administration Office

14. Population / Language Data

B16001 and S1701 are on the following pages

LANGUAGE SPOKEN AT HOME BY ABILITY TO SPEAK ENGLISH FOR THE POPULATION 5 YEARS AND OVER		United States [®] Census Bureau
Note: The table shown may have been modified by user selections. Some information may be missing.		
DATA NOTES		
TABLE ID:	B16001	
SURVEY/PROGRAM:	American Community Survey	
VINTAGE:	2015	
DATASET:	ACSDT5Y2015	
PRODUCT:	ACS 5-Year Estimates Detailed Tables	
UNIVERSE:	Population 5 years and over	
MLA:	U.S. Census Bureau. "LANGUAGE SPOKEN AT HOME BY ABILITY TO SPEAK ENGLISH FOR THE POPULATION 5 YEARS AND OVER." American Community Survey, ACS 5-Year Estimates Detailed Tables, Table B16001, 2015, . Accessed on June 10, 2024.	
FTP URL:	https://www2.census.gov/programs-surveys/acs/summary_file/2015/data/	
API URL:	https://api.census.gov/data/2015/acs/acs5	
USER SELECTIONS		
TABLES	B16001	
GEOS	San Angelo city, Texas	
EXCLUDED COLUMNS	None	
APPLIED FILTERS	None	
APPLIED SORTS	None	
PIVOT & GROUPING		
PIVOT COLUMNS	None	
PIVOT MODE	Off	
ROW GROUPS	None	
VALUE COLUMNS	None	
WEB ADDRESS	https://data.census.gov/table/ACSDT5Y2015.B16001?q=B16001&g=160XX00U54864472	
TABLE NOTES	Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.	
	Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.	
	Tell us what you think. Provide feedback to help make American Community Survey data more useful for you.	
	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.	
	Explanation of Symbols: * An "*****" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate. * An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution. * An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution. * An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution. * An "*****" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate. * An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate. * An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small. * An "(X)" means that the estimate is not applicable or not available.	
	Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.	
	While the 2011-2015 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.	
	Methodological changes to data collection in 2013 may have affected language data for 2013. Users should be aware of these changes when using multi-year data containing data from 2013. For more information, see: Language User Note.	
	Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.	
	Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates	
COLUMN NOTES	None	

Table: ACSDT5Y2015.B16001

	San Angelo city, Texas	
Label	Estimate	Margin of Error
Total:	90,625	±271
Speak only English	67,053	±1,096
Spanish or Spanish Creole:	22,120	±1,098
Speak English "very well"	16,509	±1,073
Speak English less than "very well"	5,611	±614
French (incl. Patois, Cajun):	90	±57
Speak English "very well"	47	±42
Speak English less than "very well"	43	±39
French Creole:	47	±46
Speak English "very well"	32	±43
Speak English less than "very well"	15	±19
Italian:	32	±44
Speak English "very well"	32	±44
Speak English less than "very well"	0	±30
Portuguese or Portuguese Creole:	19	±29
Speak English "very well"	19	±29
Speak English less than "very well"	0	±30
German:	140	±69
Speak English "very well"	140	±69
Speak English less than "very well"	0	±30
Yiddish:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Other West Germanic languages:	6	±10
Speak English "very well"	6	±10
Speak English less than "very well"	0	±30
Scandinavian languages:	12	±24
Speak English "very well"	0	±30
Speak English less than "very well"	12	±24
Greek:	26	±39
Speak English "very well"	26	±39

Table: ACSDT5Y2015.B16001

	San Angelo city, Texas	
Label	Estimate	Margin of Error
Speak English less than "very well"	0	±30
Russian:	39	±36
Speak English "very well"	24	±27
Speak English less than "very well"	15	±24
Polish:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Serbo-Croatian:	11	±20
Speak English "very well"	11	±20
Speak English less than "very well"	0	±30
Other Slavic languages:	3	±8
Speak English "very well"	3	±8
Speak English less than "very well"	0	±30
Armenian:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Persian:	8	±14
Speak English "very well"	8	±14
Speak English less than "very well"	0	±30
Gujarati:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Hindi:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Urdu:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Other Indic languages:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30

Table: ACSDT5Y2015.B16001

	San Angelo city, Texas	
Label	Estimate	Margin of Error
Other Indo-European languages:	16	±20
Speak English "very well"	16	±20
Speak English less than "very well"	0	±30
Chinese:	122	±106
Speak English "very well"	71	±72
Speak English less than "very well"	51	±80
Japanese:	17	±28
Speak English "very well"	0	±30
Speak English less than "very well"	17	±28
Korean:	221	±115
Speak English "very well"	118	±74
Speak English less than "very well"	103	±69
Mon-Khmer, Cambodian:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Hmong:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Thai:	38	±58
Speak English "very well"	10	±19
Speak English less than "very well"	28	±52
Laotian:	146	±165
Speak English "very well"	57	±68
Speak English less than "very well"	89	±117
Vietnamese:	124	±83
Speak English "very well"	97	±80
Speak English less than "very well"	27	±28
Other Asian languages:	59	±91
Speak English "very well"	59	±91
Speak English less than "very well"	0	±30
Tagalog:	201	±105
Speak English "very well"	150	±91

Table: ACSDT5Y2015.B16001

	San Angelo city, Texas	
Label	Estimate	Margin of Error
Speak English less than "very well"	51	±48
Other Pacific Island languages:	26	±32
Speak English "very well"	26	±32
Speak English less than "very well"	0	±30
Navajo:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Other Native North American languages:	18	±34
Speak English "very well"	18	±34
Speak English less than "very well"	0	±30
Hungarian:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30
Arabic:	17	±22
Speak English "very well"	17	±22
Speak English less than "very well"	0	±30
Hebrew:	1	±4
Speak English "very well"	1	±4
Speak English less than "very well"	0	±30
African languages:	13	±21
Speak English "very well"	13	±21
Speak English less than "very well"	0	±30
Other and unspecified languages:	0	±30
Speak English "very well"	0	±30
Speak English less than "very well"	0	±30

Poverty Status in the Past 12 Months		United States [®] Census Bureau
Note: The table shown may have been modified by user selections. Some information may be missing.		
DATA NOTES		
TABLE ID:	S1701	
SURVEY/PROGRAM:	American Community Survey	
VINTAGE:	2022	
DATASET:	ACSST1Y2022	
PRODUCT:	ACS 1-Year Estimates Subject Tables	
UNIVERSE:	None	
MLA:	U.S. Census Bureau. "Poverty Status in the Past 12 Months." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1701, 2022, https://data.census.gov/table/ACSST1Y2022.S1701?q=S1701&g=160XX00US4864472 . Accessed on June 10, 2024.	
FTP URL:	None	
API URL:	https://api.census.gov/data/2022/acs/acs1/subject	
USER SELECTIONS		
TABLES	S1701	
GEOS	San Angelo city, Texas	
EXCLUDED COLUMNS	None	
APPLIED FILTERS	None	
APPLIED SORTS	None	
PIVOT & GROUPING		
PIVOT COLUMNS	None	
PIVOT MODE	Off	
ROW GROUPS	None	
VALUE COLUMNS	None	
WEB ADDRESS	https://data.census.gov/table/ACSST1Y2022.S1701?q=S1701&g=160XX00US4864472	
TABLE NOTES		
	Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, the decennial census is the official source of population totals for April 1st of each decennial year. In between censuses, the Census Bureau's Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.	
	Information about the American Community Survey (ACS) can be found on the ACS website. Supporting documentation including code lists, subject definitions, data accuracy, and statistical testing, and a full list of ACS tables and table shells (without estimates) can be found on the Technical Documentation section of the ACS website. Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.	
	Source: U.S. Census Bureau, 2022 American Community Survey 1-Year Estimates	
	Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.	
	Dollar amounts are adjusted to respective calendar years. For more information, see: Change to Income Deficit.	
	The 2022 American Community Survey (ACS) data generally reflect the March 2020 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineations due to differences in the effective dates of the geographic entities.	
	Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on 2020 Census data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.	
	Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.	
COLUMN NOTES	None	

San Angelo city, Texas						
	Total		Below poverty level		Percent below poverty level	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	96,462	±3,382	11,984	±3,384	12.4%	±3.4
AGE						
Under 18 years	22,932	±1,672	3,130	±1,743	13.6%	±7.4
Under 5 years	6,238	±867	1,789	±1,049	28.7%	±16.4
5 to 17 years	16,694	±1,459	1,341	±955	8.0%	±5.6
Related children of householder under 18 years	22,932	±1,672	3,130	±1,743	13.6%	±7.4
18 to 64 years	56,883	±2,094	7,281	±1,887	12.8%	±3.2
18 to 34 years	24,859	±1,230	5,528	±1,625	22.2%	±6.3
35 to 64 years	32,024	±1,641	1,753	±879	5.5%	±2.7
60 years and over	22,624	±1,245	1,974	±794	8.7%	±3.4
65 years and over	16,647	±736	1,573	±708	9.4%	±4.2
SEX						
Male	47,882	±1,901	4,787	±1,838	10.0%	±3.7
Female	48,580	±2,033	7,197	±1,936	14.8%	±3.8
RACE AND HISPANIC OR LATINO ORIGIN						
White alone	57,587	±4,301	5,877	±2,208	10.2%	±3.6
Black or African American alone	N	N	N	N	N	N
American Indian and Alaska Native alone	N	N	N	N	N	N
Asian alone	N	N	N	N	N	N
Native Hawaiian and Other Pacific Islander alone	N	N	N	N	N	N
Some other race alone	11,293	±3,305	3,384	±2,820	30.0%	±20.3
Two or more races	22,903	±4,564	2,086	±983	9.1%	±4.1
Hispanic or Latino origin (of any race)	43,313	±2,743	6,914	±2,984	16.0%	±6.8
White alone, not Hispanic or Latino	45,266	±2,536	4,095	±1,476	9.0%	±3.2
EDUCATIONAL ATTAINMENT						
Population 25 years and over	63,065	±2,076	5,546	±1,790	8.8%	±2.8
Less than high school graduate	7,982	±1,825	2,132	±1,327	26.7%	±15.4
High school graduate (includes equivalency)	16,583	±2,213	1,160	±647	7.0%	±3.8
Some college, associate's degree	23,075	±2,653	1,739	±866	7.5%	±3.4
Bachelor's degree or higher	15,425	±2,227	515	±449	3.3%	±2.8
EMPLOYMENT STATUS						
Civilian labor force 16 years and over	45,456	±2,747	3,948	±1,232	8.7%	±2.6
Employed	44,414	±2,873	3,413	±1,171	7.7%	±2.5
Male	24,426	±2,347	1,475	±1,039	6.0%	±4.1
Female	19,988	±1,932	1,938	±733	9.7%	±3.5
Unemployed	1,042	±622	535	±441	51.3%	±28.5
Male	564	±451	241	±240	42.7%	±33.6
Female	478	±360	294	±321	61.5%	±41.6
WORK EXPERIENCE						
Population 16 years and over	76,007	±2,426	8,854	±2,085	11.6%	±2.7
Worked full-time, year-round in the past 12 months	35,957	±2,601	974	±710	2.7%	±2.0
Worked part-time or part-year in the past 12 months	13,004	±1,650	3,144	±1,322	24.2%	±8.9
Did not work	27,046	±2,083	4,736	±1,480	17.5%	±5.0
ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS						
50 percent of poverty level	6,851	±2,423	(X)	(X)	(X)	(X)
125 percent of poverty level	17,323	±3,708	(X)	(X)	(X)	(X)
150 percent of poverty level	24,420	±4,722	(X)	(X)	(X)	(X)
185 percent of poverty level	32,942	±4,910	(X)	(X)	(X)	(X)
200 percent of poverty level	36,738	±4,886	(X)	(X)	(X)	(X)
300 percent of poverty level	54,574	±5,267	(X)	(X)	(X)	(X)
400 percent of poverty level	68,731	±5,068	(X)	(X)	(X)	(X)
500 percent of poverty level	78,650	±5,201	(X)	(X)	(X)	(X)
UNRELATED INDIVIDUALS FOR WHOM POVERTY STATUS IS DETERMINED						
Male	19,124	±2,697	4,555	±1,496	23.8%	±6.3
Female	9,136	±1,407	1,471	±939	16.1%	±9.4
15 years	9,988	±1,971	3,084	±1,277	30.9%	±9.8
16 to 17 years	0	±237	0	±237	-	**
18 to 24 years	0	±237	0	±237	-	**
25 to 34 years	4,767	±1,476	2,113	±1,155	44.3%	±16.2
35 to 44 years	4,507	±1,262	1,024	±740	22.7%	±14.7
45 to 54 years	1,826	±843	88	±16	4.8%	±2.6
55 to 64 years	1,638	±719	267	±261	16.3%	±16.0
65 to 74 years	2,294	±854	257	±277	11.2%	±11.6
75 years and over	2,166	±817	547	±405	25.3%	±16.1
Mean income deficit for unrelated individuals (dollars)	1,926	±688	259	±284	13.4%	±14.4
Worked full-time, year-round in the past 12 months	9,341	±1,221	(X)	(X)	(X)	(X)
Worked less than full-time, year-round in the past 12 months	9,764	±1,736	214	±267	2.2%	±2.7
Did not work	4,049	±1,510	2,391	±1,137	59.1%	±14.1
Population in housing units for whom poverty status is determined	5,311	±1,321	1,950	±825	36.7%	±12.2
	96,195	±3,376	11,817	±3,380	12.3%	±3.4

15. Completed Unlawful Discrimination Poster

Unlawful Discrimination

It is unlawful for airport operators and their lessees, tenants, concessionaires and contractors to discriminate against any person because of race, color, national origin, sex, creed, or disability in public services and employment opportunities. Allegations of discrimination should be promptly reported to the Airport Manager or:

Federal Aviation Administration
Office of Civil Rights, ACR-1
800 Independence Avenue, S.W.
Washington, D.C. 20591

Federal regulations on unlawful discrimination are available for review in the Airport Manager's Office.

Coordinator: Jeremy Valgardson, Airport Director
Phone: 325-659-6409 Option 3
Address: 8618 Terminal Circle, Suite 101
San Angelo, TX 76904

Discriminacion Ilegal

Se prohíbe a los operadores de aeropuertos y a sus arrendatarios, inquilinos, concesionarios y contratistas discriminar contra cualquier persona por motivo de raza, color, nacionalidad de origen, sexo, creencias religiosas, impedimento físico o discapacidad en lo que respecta a servicios públicos y oportunidades de empleo. Las alegaciones de discriminación deberán ser dirigidas inmediatamente al Administrador del Aeropuerto o a:

Federal Aviation Administration
Office of Civil Rights, ACR-1
800 Independence Avenue, S.W.
Washington, D.C. 20591

Los reglamentos sobre discriminación ilegal están a la disposición de los interesados para su examen en la oficina del Administrador del Aeropuerto.

Coordinador: Jeremy Valgardson, Airport Director
Teléfono: 325-659-6409 Option 3
Dirección: 8618 Terminal Circle, Suite 101
San Angelo, TX 76904



U.S. Department of Transportation
Federal Aviation Administration

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Carlton White, Parks and Recreation Director, Parks and Recreation

Meeting Date: June 18, 2024

Item type: Consent Item

Caption:

Consider a resolution authorizing a special event known as "Wake the Desert 2024" and approving variances to City ordinances at Middle Concho Park for July 16-22, 2024 (Carl White)

Staff Recommendation:

Adopt

Summary/History:

The Wakeboard event has been held at Lake Nasworthy for the past several years. Family Powersports has submitted a special event application to host the event at Middle Concho Park at Lake Nasworthy, July 16-22, 2024.

To hold the event, Family Powersports is asking for some specific variances to be waived. These include ordinances related to: creating wake in "no wake" zones, pulling devices in "no wake" areas, leaving movable structures or special vehicles in the park, exclusive use of the park, and driving and parking on areas other than paved park roads or parking areas.

This event IS NOT asking for waiver of the noise ordinance.

The affected "no wake" areas during the event do not affect lake homeowner properties.

Funding Source(s):

Financial Impact:

There is no fiscal impact regarding this item. All attendees entering Middle Concho Park for the event must pay the required entrance fee.

Other Information/Recommendation:

Attachments:

- | | | |
|----|--|--|
| 1. | DRAFT Resolution_Wake the Desert 2024 | DRAFT Resolution_Wake the Desert 2024.docx |
| 2. | SE application wakeboard tournament 2024 | SE application wakeboard tournament 2024.pdf |

3. Wake the Desert Variance Supplemental Exhibit A 2024 Wake the Desert Variance Supplemental Exhibit A 2024.doc

Presentation:

Carlton White

Approvals/Reviews:

Carlton White	Created/Initiated
Carlton White	Approved
Brandon Dyson	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

A RESOLUTION OF THE CITY OF SAN ANGELO AUTHORIZING APPLICANT, FAMILY POWERSPORTS, TO HOLD A SPECIAL EVENT KNOWN AS “WAKE THE DESERT 2024” AND GRANTING VARIANCES FROM CITY ORDINANCES.

WHEREAS, the City Council for the City of San Angelo has approved a Special Event Application process through which individuals or groups may seek authorization to hold special events on public property; and,

WHEREAS, Chapter 9, Section 9.01.051 of the Code of Ordinances for the City of San Angelo provides that the City Council may authorize temporary variances from the prohibitions and requirements of City ordinances for such events; and,

WHEREAS, Family Powersports has requested for “Wake the Desert 2024” to take place at Middle Concho Park; and,

WHEREAS, the City Council has considered the proximity of the event to residential areas; the probability of the event causing undue disturbance to users of the city property; the ability of the organizers to ensure the safety of participants and observers; and the effect on public safety of the granting of variances for the event.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SAN ANGELO, TEXAS THAT:

Part 1: Family Powersports (hereinafter Applicant), is hereby authorized to hold a special event in Middle Concho Park, known as “WAKE THE DESERT 2024”. The event will take place from 8:00 AM Thursday, July 18, 2024, through 10:00 PM Monday, July 22, 2024. Set up will begin at 8:00 AM Tuesday, July 16, 2024, and cleanup will be complete 10:00 PM Monday, July 22, 2024.

Part 2: The event may include those activities as described on that certain “City of San Angelo-Special Event Application” and attachments thereto (hereinafter collectively referred to as “Application”) submitted by Applicant, a copy of which is attached to this Resolution as **Exhibit A** and made a part hereof for all purposes.

Part 3: The variance referred to in the Application relating to Section 9.01.032(b)(3) operating any boat or watercraft in such a manner to create a wake in areas designated with signs or buoys as “No Wake” areas and pulling devices in areas designated “No Wake” or “No Skiing” Areas of the City Code of Ordinances, is hereby granted from 8:00 AM Tuesday, July 16, 2024 through 10:00 PM Monday, July 22, 2024.

Part 4: A variance related to Section 9.01.016(b)(1) (leaving movable structures or special vehicles in the park) for the event is hereby granted from 8:00 AM Tuesday, July 16, 2024, through 10:00 PM Monday, July 22, 2024.

Part 5: A variance related to Section 9.01.008 (setting a priority on use of fireplaces, picnic tables and benches other than first come first serve) for the event is hereby granted from 8:00 AM Tuesday, July 16, 2024, through 10:00 PM Monday, July 22, 2024.

Part 6: A variance related to Section 9.01.007 (a) and (b) (driving and parking on area other than paved park roads or parking areas) for the event is hereby granted from 8:00 AM Tuesday, July 16, 2024 through 10:00 PM Monday, July 22, 2024.

Part 7: A variance related to tent permit fees for the event is hereby granted from 8:00 AM Tuesday, July 16, 2024, through 10:00 PM Monday, July 22, 2024.

PASSED and APPROVED THIS _____ DAY OF _____, 2024.

ATTEST:

CITY OF SAN ANGELO, TEXAS

Heather Stastny, City Clerk

Brenda Gunter, Mayor

APPROVED AS TO FORM

Theresa James, City Attorney

City of San Angelo – Special Event Application (ver. June 15, 2015)

Complete and return this application to the City of San Angelo Parks and Recreation Department Office at 702 South Chadbourne St. at least 30 days prior to the event for events not requesting City Support, at least 90 days for events requesting City Support.

Event Information	
Event Name: <u>Wake The Desert 2024</u>	
Event Date(s) and Hours: <u>July 19-21, 2024</u>	Event Purpose & Description: <u>Amateur/Professional Wakeboard & Surf Tournament.</u>
Event Location(s): <u>Middle Concho Park</u>	*Once approved, if you would like to make this event public on the City's website, please attach a flyer for your event.
Attendance, Estimated Daily/Overall: <u>500 / 1250</u>	
Type of Event (Check one – see Special Events Policy for additional information) ☐ Non-Profit Event ☐ For-Profit Event * for private events contact Parks & Rec. Admin. at 325-657-4279 for reservations ☐ City Operated/Sponsored Event ☐ City Co-Sponsored Event ☐ Political or Ballot Issue Event ☐ Parade, Block Party, Road Run/Walk/Etc – Specify: _____ ☒ Other (describe): <u>Tournament</u>	
Event Sponsor Information	
Legal Business Name: <u>San Angelo Powersports inc. dba Family Powersports San Angelo</u>	
Address: <u>4160 W Houston Harte Expy</u>	
Mailing Address: <u>11 325 947</u>	
Telephone: <u>325-450-3286 2453</u>	Email Address: <u>mcabrenera@familypowersports.com</u>
Contact Name: <u>Marc Cabrera</u>	Title: <u>Marketing Manager</u> ↓
Contact Number: <u>325-450-3286</u>	Email Address: _____
Event Information (continued)	
Estimated date/time for set up: <u>July 16, 2024</u>	Describe set up and clean up procedures: <u>Tents, Tables, Chairs, Signage, Flags</u>
Estimated date/time for clean up: <u>July 22, 2024</u>	<u>Throw Trash, Take down setup, etc.</u> *Sponsoring organization may be required to supply a dumpster and portable restrooms.
Will street closure and/or use be necessary? ☒ YES ☐ NO If yes, complete the street closure/use form. <u>If yes, show proposed road uses, emergency vehicle access, and barricade locations on your event map.</u> Note that the City of San Angelo does not have authority to close County and State roads.	
Describe crowd and parking control and security plans for this event: Sponsors of an event must have certified police officers present, if required. This requirement, as well as the number of officers needed, will depend on the type of event (including activities), number of anticipated attendees at the event, whether or not alcohol will be consumed at the event, as well as other factors. <u>Parking is controlled</u> <u>Crowd is controlled</u>	

Event Information (continued)

Will music be provided/included during the event? ☒ YES ☐ NO

Describe type of music proposed: ☒ Live ☐ Amplification ☒ Recorded ☒ Loudspeakers

Proposed time music will begin: 8am

Proposed time music will end: ~~9:30pm~~

Describe noise control:

Speakers face south along the shore towards the water.

Show proposed location of live band/disc jockey/loudspeakers/equipment on your attached event map

Do you plan to have special event signs and banners? ☒ YES ☐ NO Signs must conform to City Ordinances

Describe the general nature of signage used for the event:

Business Logos, Sales Promos, Sponsor Promos

Show locations for proposed placement of banners and signs on your attached event map.

Will the event have activities such as inflatables, amusement rides, climbing walls, live animals, etc?

☐ YES ☒ NO If yes, the vendor or provider of the inflatable, amusement ride, etc. will be required to provide proof of insurance naming the City of San Angelo as an additional insured on all policies, except workers' compensation, and providing a waiver of subrogation in favor of the City on all policies.

If yes, describe in detail the types of attractions and activities proposed:

Show locations for all proposed activities on your attached event map.

Will the event have food, beverage, or concessions? ☒ YES ☐ NO

See Section H of the Special Events Policy for health department approvals and temporary food license requirements.

Describe in detail the general nature and scope of food, beverage, and concessions vendors:

Food + Drink Trucks (non alcoholic)

Show locations for proposed placement of food, beverage, and concessions vendors on your attached event map.

Do you plan to have alcohol served at this event? ☐ YES ☒ NO

Public events which sell alcohol must use the services of the City's Concessionaire. The Parks & Recreation Staff can provide you with the contact information for the Concessionaire.

If alcohol is present at the event, describe measures to be taken to prohibit the sale and distribution of alcohol to minors:

Will the following be placed or located in the event area?

No stakes of any kind allowed on any walkway, roadway, or other hard surface.

Item	Quantity
☒ Booths:	5
☒ Tents*:	5
☐ Awnings:	
☐ Canopies:	
☐ Rides:	

Item	Quantity
☒ Tables:	10
☐ Rides:	
☒ Portable Toilets:	However Many are Required
(may be required depending on event)	
☐ other (describe):	

* Tents that exceed 120 square feet of area will require special permit. Contact Permits Office at 657-4421/2.

You must attach a plan of the proposed event map and layout. Include the proposed location of booths, tents, tables, portable toilets, rides, routes, etc.

Event Information (continued)

Application Check List (failure to provide necessary documentation will delay application review and approval)

I have attached the following items:

- ☐ Completed Application ☐ Application Non-Refundable Permit Fee of \$35.00 ☐ Deposit (see policy)
- ☐ Certificate of Insurance (10 business days prior to first day of event) ☐ Street use and/or closure permit (if required)
- ☐ Detailed Event Map (showing road uses, signage, vending, tent, and activity locations, etc. Maps can be found on Google earth or www.cosatx.us, look under DEPARTMENTS & SERVICES > GEOGRAPHICAL INFORMATION SYSTEMS > Online mapping > Launch interactive online map)
- ☐ Temporary Health Permit (if required)

If any document is missing, please explain:

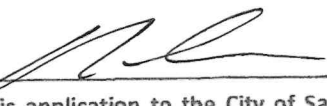
The applicant and sponsoring organization understands and agrees to:

- provide a certificate of insurance with all coverage deemed necessary for the event, name the City of San Angelo as an additional insured on all applicable policies, and submit the certificate to the City Risk Management Office no later than 10 business days prior to the event (contact the Risk Management Office at 325-657-4359);
- comply with all City and County ordinances and applicable state laws, comply with City policies, and acknowledge that the special events permit does not relieve the applicant or sponsoring organization from meeting any application requirements of law or other public bodies or agencies; and
- promptly pay any billing for City services rendered or deemed necessary as part of the event and event approval.

Applicant and sponsoring organization further understands the approval of this special event may include additional requirements and/or limitations based on the City's review of this application, in accordance with the City's Special Events Policy. The applicant and sponsoring organization understand that it may be necessary to meet with City staff during the review of this application and that City Council approval may be necessary. The applicant agrees the sponsoring organization will operate the event in conformance with the written approval.

Sponsors of events, in which food and/or beverage vendors will be present, must contact the City of San Angelo Health Department 90 days prior to the event date. Contact the City of San Angelo Health Department at 325-657-4493.

As the duly authorized agent of the sponsoring organization, I hereby apply for approval of the Special Event and affirm the above understandings. The information provided on this application is true and complete to the best of my knowledge.

Applicant Signature: 

Date: 5/8/24

Complete and return this application to the City of San Angelo Parks and Recreation Department Office at 702 South Chadbourne St. at least 30 days prior to the event for events not requesting City Support or at least 90 days prior for events requesting City Support. Contact the Parks & Recreation Department at 657-4279/4450 if you have any questions about this application, this policy, or your event.

Final
Approval:

Date:

Application
Receipt Date & Time:

EXHIBIT A
SUPPLEMENT TO SPECIAL EVENTS PERMIT
Family Powersports Wake the Desert Event
July 16-22, 2024

Permit Holder: Family Powersports

Contact Person: Name Phone
 Marc Cabrera (325) 947-2453

Location of Event: Middle Concho Park (hereinafter "Area")
Middle Concho Dr.
San Angelo, TX 76904

Name of Event: Wake the Desert 2024 (hereinafter "Event")

Date of Event: July 18 – July 22, 2024
Set up: July 16, 2024
Clean up: July 22, 2024

Anticipated
Attendance: 1,250

Hours of July 16, 2024 (setup)
Operation: 8:00 a.m. through 10:00 p.m., July 16 – July 22, 2024

This supplement to the special event permit is issued to the Family Power Sports by the City of San Angelo (hereinafter "City") subject to the conditions and requirements set forth below.

Permitted Activities

1. Family Powersports may conduct wakeboard events during the dates set out above.
2. Family Powersports may operate all-terrain vehicles and golf carts in the Area during the event.
3. Family Powersports may set up tents and signs and allow vendors in the Area subject to any regulations set out in this Permit.
4. Event participants may park on the grass at Middle Concho Park during the date set out above.
5. Family Powersports may have exclusive use of the easternmost boat ramp at Middle Concho Park during the event.

Requirements for Permit Holder ("Family Powersports")

1. Sanitation.
 - a. Event must set up at least ten (10) portable restrooms.
 - b. Event must clean up Area at the conclusion of event.
2. Insurance and Indemnification.
 - a. Event must provide insurance as required by the City of San Angelo's Risk Management office and must provide proof of such insurance before setting up.
3. Vendors.
 - a. Vendors must obtain all necessary health permits and must have appropriate liability insurance and an active Sales and Use Tax Permit.

The City Manager or his designee shall have the authority to require Family Powersports to comply with the above-listed requirements and to correct any deficiencies. In case of a threat to the public health or safety, the City Manager or his designee may suspend operations of the Event until deficiencies are corrected.

Variances: See Attachment 1 to this Exhibit.

Authority of City to Regulate Event

The City Manager or his designee shall have the authority to interpret this Permit and/or adopt new rules during the Event to ensure public health and safety and proper use of all public rights-of-way.

EVENT SPONSOR

Carl White
Parks & Recreation Director

**Attachment 1 to Exhibit A
TO THE FAMILY POWERSPORTS WAKE THE DESERT EVENT 2024**

Exhibit 1 to Event Resolution

Variances

- 1) Notwithstanding City ordinances to the contrary, event Sponsor may conduct their event activities, including skiing, wakeboarding and wake surfing in the designated event area, including “no wake” zones.
- 2) Notwithstanding City ordinances to the contrary, event Sponsor may operate all-terrain vehicles and golf carts in the designated event area.
- 2) Notwithstanding City ordinances to the contrary, event Sponsor shall not be required to pay fees for permits for tents and signs in the designated event area.
- 3) Notwithstanding City ordinances to the contrary, event participants may park on designated areas on the grass in the designated event area.
- 4) Notwithstanding City ordinances to the contrary, flags, banners, and information signs shall be allowed for the Event in the designated event area. Placement shall be coordinated with and approved by the City Manager or his designee.

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Jeremy Miller, Assistant Director of Operations, Operations

Meeting Date: June 18, 2024

Item type: Regular Item

Caption:

Consider the following items related to the Solid Waste Collection Contract and authorizing the City Manager to negotiate and execute all related documents:

1. Approval of an amendment to the Solid Waste Collection Contract
2. First reading and public hearing of an ordinance amending Section A8.017 "Charge for Collection of Garbage and Trash" (Presentation made by Operations Director Patrick Frerich)

Staff Recommendation:

Approve

Summary/History:

The current solid waste collection contract with Republic Services went into effect on August 1, 2014. The contract provides for exclusive once-a-week collection of trash and every-other-week collection of recyclables and bulk items for residential customers by the contractor. The contract also provides for exclusive non-residential collection services within the city. The current collection contract is set to expire on July 31, 2024. The proposed amendment would exercise the 8-year option to extend the terms of the current contract to July 31, 2032.

In addition to the extension of the initial contract term by eight years, the following changes are proposed:

- Assignment of a customer service center to be located in the city;
- Reallocation of prior scholarship obligations to contributions to Keep San Angelo Beautiful in the same amount;
- Deletion of the additional fee for residential recycling collections;
- Update to Appendix F for the rates for residential and non-residential collections;
- Update to Appendix H for the fuel surcharge table.

The current collection service levels being provided will not change under the proposed amendment.

Funding Source(s):

Financial Impact:

The proposed amendment would allow the current revenue stream from the collections contract to continue for a period of 8 years.

Other Information/Recommendation:

Staff recommends approving the proposed amendment to extend the terms of the waste collection contract.

Attachments:

- | | | |
|----|---|--|
| 1. | Enacting Ordinance Amendment of trash collection fees | Enacting Ordinance Amendment of trash collection fees.docx |
| 2. | Amendment 3 and Contract Extension Republic Services | Amendment 3 and Contract Extension Republic Services.docx |
| 3. | Exhbit H Final Draft | Exhbit H Final Draft.pdf |
| 4. | Exhibit F Final Draft | Exhibit F Final Draft.pdf |
| 5. | Exhibit A Charge for garbage and trash | Exhibit A Charge for garbage and trash.docx |

Presentation:

Patrick Frerich

Approvals/Reviews:

Jeremy Miller	Created/Initiated
Pete Madrid Jr.	Approved
Patrick Frerich	Approved
Shane Kelton	Approved
Brandon Dyson	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

**AN ORDINANCE REPEALING AND REPLACING APPENDIX A,
ARTICLE A8.017 "CHARGE FOR COLLECTION OF GARBAGE
AND TRASH" OF THE CODE OF ORDINANCES, CITY OF SAN
ANGELO TEXAS, IN ITS ENTIRETY, PROVIDING FOR
SEVERABILITY, AND PROVIDING FOR AN EFFECTIVE DATE**

BE IT ORDAINED BY THE CITY OF SAN ANGELO:

1) THAT, Appendix A, Article A8.017 "Charge for collection of garbage and trash" of the Code of Ordinances, City of San Angelo, Texas is hereby amended by repealing and replacing Subsection A8.017 as set out in Exhibit "A", attached hereto.

2) THAT, the following severability clause is hereby adopted with this amendment:

SEVERABILITY:

That the terms and provisions of this Ordinance shall be deemed to be severable in that if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

3) THAT, this Ordinance shall be effective on, from and after the 1st day of August 2024.

INTRODUCED on the 18th day of June , 2024, and finally PASSED, APPROVED and ADOPTED on this the 2nd day of July , 2024.

CITY OF SAN ANGELO

ATTEST:

Brenda Gunter, Mayor

Heather Stastny, City Clerk

Approved as to Form:

Theresa James
City Attorney

**AMENDMENT 3 TO THE SPECIAL EXCLUSIVE CONTRACT FOR SOLID WASTE
COLLECTION AND DISPOSAL SERVICES WITH
REPUBLIC WASTE SERVICES**

RECITALS:

WHEREAS, on July 25, 2014 the City of San Angelo (“City”) and Republic Waste Services of Texas, Ltd., a Texas limited partnership (“Provider”) entered into a Special Exclusive Contract for Solid Waste Collection and Disposal Services (the “Agreement”) for the collection and disposal of garbage and trash of residential and commercial customers; and

WHEREAS, under the Agreement the parties may agree to amendments in writing as necessary; and

WHEREAS, the Agreement provides that the parties may agree to a first extension of the contract for a period of eight years and a second extension for a period of two years through an amendment to extend at least 90 days before the expiration of the initial or extended term; and

WHEREAS, the parties wish to allow extension of the agreement at any point within the initial term of the Agreement; and

WHEREAS, this Amendment shall serve as the amendment to extend the agreement for a period of eight additional years; and

WHEREAS, for the extended term the parties desire to amend provisions related to the duties of the provider, billing and payment, and rates for services.

NOW, THEREFORE, the parties agree as follows:

PART 1: That Section 4, “OPTION TO EXTEND”, shall be modified to read as follows:

“The parties shall have two options to extend the Initial Term hereof, the first extension being for a period of eight years and the second extension being for a period of two years on the terms agreed upon by the parties, by entering into an amendment to extend this Special Contract prior to the expiration of the initial or extended term as applicable.”

PART 2: Both parties agree to extend Initial Term of the Agreement, for a period of eight years. The terms of this special contract extension shall be eight years commencing on August 1, 2024 and ending July 31, 2032, unless terminated as provided for in the Special Contract.

PART 3: That Section 8, “DUTIES OF PROVIDER”, I. “Personnel” Subsection iii. “Customer Service Center” is hereby deleted and replaced as follows:

“iii. Customer Service Center. Provider shall maintain within the city a Customer Service Center to adequately perform customer services. The Customer Service Center shall be staffed by customer service representatives who are adequately trained to address customer inquiries and

concerns in a professional and thorough manner. Provider shall monitor peak customer service hours and schedule staff to adequately maintain an appropriate level of service.”

PART 4: That Section 8, “DUTIES OF PROVIDER”, R. “Scholarships” is hereby deleted and replaced as follows:

“R. Donations. During the Term of this Special Contract, Provider shall annually provide a \$10,000 donation to the “Keep San Angelo Beautiful” non-profit organization.

PART 5: That Section 9, “BILLING AND PAYMENT”, D. “Annual Increase” is hereby deleted and replaced as follows:

“Provider shall charge the rates for service pursuant to Appendix A, Section A8.017 of the San Angelo Code of Ordinances upon approval of Council as set forth on Exhibit F and the fuel Surcharge adjustment as approved by Council and set forth on Exhibit H.”

PART 6: That Section 9 “BILLING AND PAYMENT”, G. “Adjustment for Recycling Services”, is hereby deleted.

PART 7: That Exhibit F, “RATES FOR SERVICES” and Exhibit H “Fuel Table” are hereby deleted and replaced with Exhibit “F” and “H” of this amendment.

PART 8: All other terms and conditions of the Agreement shall remain in full force and effect unless amended and changed by further amendment.

PART 9: This amendment shall be effective as of August 1, 2024.

CITY OF SAN ANGELO

**REPUBLIC WASTE SERVICES
OF TEXAS, LTD**

Daniel Valenzuela, City Manager

Modesto Dominguez, Area Vice President

ATTEST

Heather Stastny, City Clerk

APPROVED AS TO CONTENT:

APPROVED AS TO FORM:

Patrick Frerich, Director of Operations

Theresa James, City Attorney

EXHIBIT H

FUEL TABLE

Fuel Surcharge Structure			
San Angelo Fuel Surcharge Calculation			
1-Aug-24			
Benchmark Price Per Gallon		\$	4.50
Fuel as % of Revenue		6%	
Fuel Price	Price Change From Benchmark	% Adder for Fuel	
\$ 4.50			
\$ 4.60	\$ 0.10	0.13%	
\$ 4.70	\$ 0.20	0.27%	
\$ 4.80	\$ 0.30	0.40%	
\$ 4.90	\$ 0.40	0.53%	
\$ 5.00	\$ 0.50	0.67%	
\$ 5.10	\$ 0.60	0.80%	
\$ 5.20	\$ 0.70	0.93%	
\$ 5.30	\$ 0.80	1.07%	
\$ 5.40	\$ 0.90	1.20%	
\$ 5.50	\$ 1.00	1.33%	
\$ 5.60	\$ 1.10	1.47%	
\$ 5.70	\$ 1.20	1.60%	
\$ 5.80	\$ 1.30	1.73%	
\$ 5.90	\$ 1.40	1.87%	
\$ 6.00	\$ 1.50	2.00%	
\$ 6.10	\$ 1.60	2.13%	
\$ 6.20	\$ 1.70	2.27%	
\$ 6.30	\$ 1.80	2.40%	
\$ 6.40	\$ 1.90	2.53%	
\$ 6.50	\$ 2.00	2.67%	
\$ 6.60	\$ 2.10	2.80%	
\$ 6.70	\$ 2.20	2.93%	
\$ 6.80	\$ 2.30	3.07%	
\$ 6.90	\$ 2.40	3.20%	
\$ 7.00	\$ 2.50	3.33%	
\$ 7.10	\$ 2.60	3.47%	
\$ 7.20	\$ 2.70	3.60%	
\$ 7.30	\$ 2.80	3.73%	
\$ 7.40	\$ 2.90	3.87%	
\$ 7.50	\$ 3.00	4.00%	
\$ 7.60	\$ 3.10	4.13%	
\$ 7.70	\$ 3.20	4.27%	
\$ 7.80	\$ 3.30	4.40%	
\$ 7.90	\$ 3.40	4.53%	
\$ 8.00	\$ 3.50	4.67%	

Examples of Calculation:

Hypothetical Diesel Fuel Price 12 mo avg (Aug thru July)	Year Reset	Description	Period	% Impact	% Fuel Adder	
	1-Aug-25	Residential Rate				\$ 17.76
\$4.50		Fuel Surcharge	(Aug 2024 thru July 2025)	0.00%	0.00%	\$ -
						\$ 17.76
\$5.00	1-Aug-26	Residential Rate				\$ 18.38
		Fuel Surcharge	(Aug 2025 thru July 2026)	0.67%	0.67%	\$ 0.12
						\$ 18.50
\$4.50	1-Aug-27	Residential Rate				\$ 19.15
		Fuel Surcharge	(Aug 2026 thru July 2027)	0.00%	-0.67%	\$ (0.13)
						\$ 19.02
\$4.60	1-Aug-28	Residential Rate				\$ 19.69
		Fuel Surcharge	(Aug 2027 thru July 2028)	0.13%	0.13%	\$ 0.03
						\$ 19.72

Although example above is for Residential, the fuel calculation method applies to all RATES FOR SERVICES IN EXHIBIT F with the exception of Delinquent Account Fees

Look back Period: August - July

*Source: Weekly Gulf Coast No 2 Diesel Ultra Low Sulfur (0-15 ppm) Retail Prices (Dollars per Gallon)

<<<(Example Only)

EXHIBIT F

RATES FOR SERVICES

RESIDENTIAL COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
Base Collection Rate (1x week trash & every other week recycle/bulk collection)	\$19.87	\$20.57	\$21.29	\$22.03	\$22.80	\$23.60	\$24.43	\$25.28
Additional Trash Cart	\$6.47	\$6.70	\$6.93	\$7.17	\$7.42	\$7.68	\$7.95	\$8.23
Additional Recycle Cart (beyond 2 carts)	\$1.62	\$1.68	\$1.74	\$1.80	\$1.86	\$1.92	\$1.99	\$2.06
Replacement Cart	\$84.07	\$87.01	\$90.06	\$93.21	\$96.47	\$99.85	\$103.34	\$106.96
Cart Delivery	\$25.87	\$26.78	\$27.71	\$28.68	\$29.69	\$30.73	\$31.80	\$32.91

NON RESIDENTIAL COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
96 Gallon cart								
1x per week	\$29.75	\$30.79	\$31.87	\$32.98	\$34.14	\$35.33	\$36.57	\$37.85
2x per week	\$59.50	\$61.58	\$63.74	\$65.97	\$68.28	\$70.67	\$73.14	\$75.70
3x per week	\$89.25	\$92.37	\$95.61	\$98.95	\$102.42	\$106.00	\$109.71	\$113.55
Extra pick up	\$19.40	\$20.08	\$20.78	\$21.51	\$22.26	\$23.04	\$23.85	\$24.68
Extra cart	\$21.99	\$22.76	\$23.56	\$24.38	\$25.23	\$26.12	\$27.03	\$27.98
2 CY Container								
1x per week	\$94.42	\$97.72	\$101.15	\$104.69	\$108.35	\$112.14	\$116.07	\$120.13
2x per week	\$155.21	\$160.64	\$166.26	\$172.08	\$178.11	\$184.34	\$190.79	\$197.47
3x per week	\$197.57	\$204.48	\$211.64	\$219.05	\$226.72	\$234.65	\$242.86	\$251.36
4x per week	\$241.87	\$250.34	\$259.10	\$268.17	\$277.55	\$287.27	\$297.32	\$307.73
5x per week	\$280.67	\$290.49	\$300.66	\$311.18	\$322.08	\$333.35	\$345.02	\$357.09
6x per week	\$327.23	\$338.68	\$350.54	\$362.81	\$375.50	\$388.65	\$402.25	\$416.33
Extra pick up	\$29.10	\$30.12	\$31.17	\$32.26	\$33.39	\$34.56	\$35.77	\$37.02
3 CY Container								
1x per week	\$122.87	\$127.17	\$131.62	\$136.23	\$141.00	\$145.93	\$151.04	\$156.32
2x per week	\$193.69	\$200.47	\$207.49	\$214.75	\$222.26	\$230.04	\$238.09	\$246.43
3x per week	\$257.56	\$266.57	\$275.90	\$285.56	\$295.56	\$305.90	\$316.61	\$327.69
4x per week	\$324.97	\$336.34	\$348.12	\$360.30	\$372.91	\$385.96	\$399.47	\$413.45
5x per week	\$385.11	\$398.59	\$412.54	\$426.98	\$441.92	\$457.39	\$473.40	\$489.97
6x per week	\$441.38	\$456.83	\$472.82	\$489.37	\$506.49	\$524.22	\$542.57	\$561.56
Extra pick up	\$38.16	\$39.50	\$40.88	\$42.31	\$43.79	\$45.32	\$46.91	\$48.55
4 CY Container								
1x per week	\$151.33	\$156.63	\$162.11	\$167.78	\$173.65	\$179.73	\$186.02	\$192.53
2x per week	\$232.17	\$240.30	\$248.71	\$257.41	\$266.42	\$275.75	\$285.40	\$295.39
3x per week	\$317.53	\$328.64	\$340.15	\$352.05	\$364.37	\$377.13	\$390.33	\$403.99
4x per week	\$408.07	\$422.35	\$437.13	\$452.43	\$468.27	\$484.66	\$501.62	\$519.18
5x per week	\$489.56	\$506.69	\$524.43	\$542.78	\$561.78	\$581.44	\$601.79	\$622.86
6x per week	\$555.52	\$574.96	\$595.09	\$615.91	\$637.47	\$659.78	\$682.88	\$706.78
Extra pick up	\$46.56	\$48.19	\$49.88	\$51.62	\$53.43	\$55.30	\$57.23	\$59.24
6 CY Container								
1x per week	\$189.16	\$195.78	\$202.63	\$209.73	\$217.07	\$224.66	\$232.53	\$240.66
2x per week	\$320.12	\$331.32	\$342.92	\$354.92	\$367.35	\$380.20	\$393.51	\$407.28
3x per week	\$436.53	\$451.81	\$467.62	\$483.99	\$500.93	\$518.46	\$536.61	\$555.39
4x per week	\$572.98	\$593.03	\$613.79	\$635.27	\$657.51	\$680.52	\$704.34	\$728.99
5x per week	\$696.18	\$720.55	\$745.77	\$771.87	\$798.88	\$826.84	\$855.78	\$885.74

6x per week	\$816.47	\$845.05	\$874.62	\$905.23	\$936.92	\$969.71	\$1,003.65	\$1,038.78
Extra pick up	\$58.20	\$60.24	\$62.35	\$64.53	\$66.79	\$69.12	\$71.54	\$74.05
8 CY Container								
1x per week	\$226.99	\$234.93	\$243.16	\$251.67	\$260.48	\$269.59	\$279.03	\$288.79
2x per week	\$408.07	\$422.35	\$437.13	\$452.43	\$468.27	\$484.66	\$501.62	\$519.18
3x per week	\$555.52	\$574.96	\$595.09	\$615.91	\$637.47	\$659.78	\$682.88	\$706.78
4x per week	\$737.89	\$763.72	\$790.45	\$818.11	\$846.75	\$876.38	\$907.06	\$938.80
5x per week	\$902.80	\$934.40	\$967.10	\$1,000.95	\$1,035.98	\$1,072.24	\$1,109.77	\$1,148.61
6x per week	\$1,077.09	\$1,114.79	\$1,153.81	\$1,194.19	\$1,235.99	\$1,279.25	\$1,324.02	\$1,370.36
Extra pick up	\$71.14	\$73.63	\$76.21	\$78.87	\$81.63	\$84.49	\$87.45	\$90.51
Temporary Residential Use 4 CY Container (max 60 days) excludes construction debris								
Delivery/Removal	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Collection Fee - Per Collection	\$46.56	\$48.19	\$49.88	\$51.62	\$53.43	\$55.30	\$57.23	\$59.24
Container Movement Rates								
Delivery	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Swap/Exchange	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Removal	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Relocate	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Container lock bar installation	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Container Lock Bar Rental	\$12.93	\$13.38	\$13.85	\$14.34	\$14.84	\$15.36	\$15.89	\$16.45
Extra Yardage Fee	\$36.65	\$37.93	\$39.26	\$40.63	\$42.06	\$43.53	\$45.05	\$46.63

ROLL-OFF COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
15 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$177.12	\$183.32	\$189.74	\$196.38	\$203.25	\$210.36	\$217.73	\$225.35
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Rolloff dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
20 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Rolloff dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
30 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Rolloff dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
40 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Rolloff dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42

Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
Compactors								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$291.02	\$301.21	\$311.75	\$322.66	\$333.95	\$345.64	\$357.74	\$370.26
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Rolloff dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	Negotiated Between Customer and Republic							
Installation/ Maintenance	Negotiated Between Customer and Republic							
Over Weight Fee								
Industrial Charge over 10 tons (per ton)	\$61.08	\$63.22	\$65.43	\$67.72	\$70.09	\$72.54	\$75.08	\$77.71

Non Residential Delinquent & Closed Accounts Fees	
Non-Sufficient Funds (NSF)	\$35.00
Late Fees (past 30 days)	5% (\$5 minimum)
Service Interrupt	\$35.00

EXHIBIT A

Sec. A8.017 - Charge for collection of garbage and trash

- (a) *Residential service* . It shall be the duty of all residential customers to subscribe to a commercial garbage collection service which is licensed by the city. The city council may authorize an individual to dispose of his own garbage and trash where hardship is shown. The city manager shall cause an investigation to be made of the circumstances surrounding any application for exception and shall report to the city council on the results of his investigation. A list of such exempt persons shall be kept and given to any city garbage company monthly. The city council may revoke said exemption at any time.

RESIDENTIAL COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
Base Collection Rate (1x week trash & every other week recycle/bulk collection)	\$19.87	\$20.57	\$21.29	\$22.03	\$22.80	\$23.60	\$24.43	\$25.28
Additional Trash Cart	\$6.47	\$6.70	\$6.93	\$7.17	\$7.42	\$7.68	\$7.95	\$8.23
Additional Recycle Cart (beyond 2 carts)	\$1.62	\$1.68	\$1.74	\$1.80	\$1.86	\$1.92	\$1.99	\$2.06
Replacement Cart	\$84.07	\$87.01	\$90.06	\$93.21	\$96.47	\$99.85	\$103.34	\$106.96
Cart Delivery	\$25.87	\$26.78	\$27.71	\$28.68	\$29.69	\$30.73	\$31.80	\$32.91

- (b) *Commercial service* . It shall be the duty of all commercial customers to subscribe to a commercial garbage collection service which is licensed by the city. Those commercial customers that generate special types of garbage that are not covered by an exclusive contract entered into by the city shall be allowed to use any other garbage collection service duly permitted by the city.
- (1) *Exception* . Notwithstanding the foregoing, a commercial, institutional or industrial business may, by obtaining a permit from the sanitation inspector, haul its own garbage, trash and debris provided it uses its own employees and vehicles for hauling, and those vehicles conform to the requirements of vehicles used by licensed collectors as set forth in article 11.04 of the Code of Ordinances; provided, however, no business engaged in food handling, such as a restaurant, quick food or take-out food business, may haul its own garbage but must subscribe to a licensed hauler to insure the orderly and regular removal of rapidly deteriorating garbage.
 - (2) *Nonresidential service charges* .

NON RESIDENTIAL COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
96 Gallon cart								
1x per week	\$29.75	\$30.79	\$31.87	\$32.98	\$34.14	\$35.33	\$36.57	\$37.85
2x per week	\$59.50	\$61.58	\$63.74	\$65.97	\$68.28	\$70.67	\$73.14	\$75.70
3x per week	\$89.25	\$92.37	\$95.61	\$98.95	\$102.42	\$106.00	\$109.71	\$113.55
Extra pick up	\$19.40	\$20.08	\$20.78	\$21.51	\$22.26	\$23.04	\$23.85	\$24.68
Extra cart	\$21.99	\$22.76	\$23.56	\$24.38	\$25.23	\$26.12	\$27.03	\$27.98
2 CY Container								
1x per week	\$94.42	\$97.72	\$101.15	\$104.69	\$108.35	\$112.14	\$116.07	\$120.13
2x per week	\$155.21	\$160.64	\$166.26	\$172.08	\$178.11	\$184.34	\$190.79	\$197.47
3x per week	\$197.57	\$204.48	\$211.64	\$219.05	\$226.72	\$234.65	\$242.86	\$251.36
4x per week	\$241.87	\$250.34	\$259.10	\$268.17	\$277.55	\$287.27	\$297.32	\$307.73
5x per week	\$280.67	\$290.49	\$300.66	\$311.18	\$322.08	\$333.35	\$345.02	\$357.09
6x per week	\$327.23	\$338.68	\$350.54	\$362.81	\$375.50	\$388.65	\$402.25	\$416.33
Extra pick up	\$29.10	\$30.12	\$31.17	\$32.26	\$33.39	\$34.56	\$35.77	\$37.02
3 CY Container								
1x per week	\$122.87	\$127.17	\$131.62	\$136.23	\$141.00	\$145.93	\$151.04	\$156.32
2x per week	\$193.69	\$200.47	\$207.49	\$214.75	\$222.26	\$230.04	\$238.09	\$246.43
3x per week	\$257.56	\$266.57	\$275.90	\$285.56	\$295.56	\$305.90	\$316.61	\$327.69
4x per week	\$324.97	\$336.34	\$348.12	\$360.30	\$372.91	\$385.96	\$399.47	\$413.45
5x per week	\$385.11	\$398.59	\$412.54	\$426.98	\$441.92	\$457.39	\$473.40	\$489.97
6x per week	\$441.38	\$456.83	\$472.82	\$489.37	\$506.49	\$524.22	\$542.57	\$561.56
Extra pick up	\$38.16	\$39.50	\$40.88	\$42.31	\$43.79	\$45.32	\$46.91	\$48.55
4 CY Container								
1x per week	\$151.33	\$156.63	\$162.11	\$167.78	\$173.65	\$179.73	\$186.02	\$192.53
2x per week	\$232.17	\$240.30	\$248.71	\$257.41	\$266.42	\$275.75	\$285.40	\$295.39
3x per week	\$317.53	\$328.64	\$340.15	\$352.05	\$364.37	\$377.13	\$390.33	\$403.99
4x per week	\$408.07	\$422.35	\$437.13	\$452.43	\$468.27	\$484.66	\$501.62	\$519.18
5x per week	\$489.56	\$506.69	\$524.43	\$542.78	\$561.78	\$581.44	\$601.79	\$622.86
6x per week	\$555.52	\$574.96	\$595.09	\$615.91	\$637.47	\$659.78	\$682.88	\$706.78
Extra pick up	\$46.56	\$48.19	\$49.88	\$51.62	\$53.43	\$55.30	\$57.23	\$59.24
6 CY Container								
1x per week	\$189.16	\$195.78	\$202.63	\$209.73	\$217.07	\$224.66	\$232.53	\$240.66
2x per week	\$320.12	\$331.32	\$342.92	\$354.92	\$367.35	\$380.20	\$393.51	\$407.28
3x per week	\$436.53	\$451.81	\$467.62	\$483.99	\$500.93	\$518.46	\$536.61	\$555.39
4x per week	\$572.98	\$593.03	\$613.79	\$635.27	\$657.51	\$680.52	\$704.34	\$728.99
5x per week	\$696.18	\$720.55	\$745.77	\$771.87	\$798.88	\$826.84	\$855.78	\$885.74
6x per week	\$816.47	\$845.05	\$874.62	\$905.23	\$936.92	\$969.71	\$1,003.65	\$1,038.78
Extra pick up	\$58.20	\$60.24	\$62.35	\$64.53	\$66.79	\$69.12	\$71.54	\$74.05
8 CY Container								
1x per week	\$226.99	\$234.93	\$243.16	\$251.67	\$260.48	\$269.59	\$279.03	\$288.79
2x per week	\$408.07	\$422.35	\$437.13	\$452.43	\$468.27	\$484.66	\$501.62	\$519.18
3x per week	\$555.52	\$574.96	\$595.09	\$615.91	\$637.47	\$659.78	\$682.88	\$706.78
4x per week	\$737.89	\$763.72	\$790.45	\$818.11	\$846.75	\$876.38	\$907.06	\$938.80
5x per week	\$902.80	\$934.40	\$967.10	\$1,000.95	\$1,035.98	\$1,072.24	\$1,109.77	\$1,148.61
6x per week	\$1,077.09	\$1,114.79	\$1,153.81	\$1,194.19	\$1,235.99	\$1,279.25	\$1,324.02	\$1,370.36
Extra pick up	\$71.14	\$73.63	\$76.21	\$78.87	\$81.63	\$84.49	\$87.45	\$90.51
Temporary Residential Use 4 CY Container (max 60 days) excludes construction debris								
Delivery/Removal	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Collection Fee - Per Collection	\$46.56	\$48.19	\$49.88	\$51.62	\$53.43	\$55.30	\$57.23	\$59.24
Container Movement Rates								
Delivery	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Swap/Exchange	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Removal	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Relocate	\$64.67	\$66.93	\$69.28	\$71.70	\$74.21	\$76.81	\$79.50	\$82.28
Container lock bar installation	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Container Lock Bar Rental	\$12.93	\$13.38	\$13.85	\$14.34	\$14.84	\$15.36	\$15.89	\$16.45
Extra Yardage Fee	\$36.65	\$37.93	\$39.26	\$40.63	\$42.06	\$43.53	\$45.05	\$46.63

ROLL-OFF COLLECTION RATES								
	8/1/24 - 9/30/25	10/1/25 - 9/30/26	10/1/26 - 9/30/27	10/1/27 - 9/30/28	10/1/28 - 9/30/29	10/1/29 - 9/30/30	10/1/30 - 9/30/31	10/1/31 - 7/31/32
15 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$177.12	\$183.32	\$189.74	\$196.38	\$203.25	\$210.36	\$217.73	\$225.35
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Roll off dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
20 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Roll off dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
30 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Roll off dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
40 cubic yard container								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$226.35	\$234.27	\$242.47	\$250.96	\$259.74	\$268.83	\$278.24	\$287.98
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Roll off dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	\$3.88	\$4.02	\$4.16	\$4.30	\$4.45	\$4.61	\$4.77	\$4.94
Compactors								
Haul rate (does not include disposal costs, current tipping fees at landfill will apply)	\$291.02	\$301.21	\$311.75	\$322.66	\$333.95	\$345.64	\$357.74	\$370.26
Delivery	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Relocate	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Roll off dry run (container not ready for haul)	\$97.01	\$100.41	\$103.92	\$107.56	\$111.32	\$115.22	\$119.25	\$123.42
Daily rental	Negotiated Between Customer and Republic							
Installation/ Maintenance	Negotiated Between Customer and Republic							
Over Weight Fee								
Industrial Charge over 10 tons (per ton)	\$61.08	\$63.22	\$65.43	\$67.72	\$70.09	\$72.54	\$75.08	\$77.71

Non Residential Delinquent & Closed Accounts Fees	
Non-Sufficient Funds (NSF)	\$35.00
Late Fees (past 30 days)	5% (\$5 minimum)
Service Interrupt	\$35.00

(c) *Residential and nonresidential diesel fuel surcharges.*

Residential and Nonresidential Diesel Fuel Surcharge

Fuel Surcharge Structure										
San Angelo Fuel Surcharge Calculation										
1-Aug-24										
Benchmark Price Per Gallon			\$ 4.50	Examples of Calculation:						
Fuel as % of Revenue			6%							
Fuel Price	Price Change From Benchmark	% Adder for Fuel		Hypothetical Diesel Fuel Price 12 mo avg (Aug thru July)	Year Reset	Description	Period	% Impact	% Fuel Adder	
\$ 4.50					1-Aug-25	Residential Rate				\$ 17.76
\$ 4.60	\$ 0.10	0.13%		\$4.50		Fuel Surcharge	(Aug 2024 thru July 2025)	0.00%	0.00%	\$ -
\$ 4.70	\$ 0.20	0.27%								\$ 17.76
\$ 4.80	\$ 0.30	0.40%								
\$ 4.90	\$ 0.40	0.53%								
\$ 5.00	\$ 0.50	0.67%								
\$ 5.10	\$ 0.60	0.80%			1-Aug-26	Residential Rate				\$ 18.38
\$ 5.20	\$ 0.70	0.93%								
\$ 5.30	\$ 0.80	1.07%		\$5.00		Fuel Surcharge	(Aug 2025 thru July 2026)	0.67%	0.67%	\$ 0.12
\$ 5.40	\$ 0.90	1.20%								\$ 18.50
\$ 5.50	\$ 1.00	1.33%								
\$ 5.60	\$ 1.10	1.47%								
\$ 5.70	\$ 1.20	1.60%			1-Aug-27	Residential Rate				\$ 19.15
\$ 5.80	\$ 1.30	1.73%								
\$ 5.90	\$ 1.40	1.87%		\$4.50		Fuel Surcharge	(Aug 2026 thru July 2027)	0.00%	-0.67%	\$ (0.13)
\$ 6.00	\$ 1.50	2.00%								\$ 19.02
\$ 6.10	\$ 1.60	2.13%								
\$ 6.20	\$ 1.70	2.27%								
\$ 6.30	\$ 1.80	2.40%			1-Aug-28	Residential Rate				\$ 19.69
\$ 6.40	\$ 1.90	2.53%								
\$ 6.50	\$ 2.00	2.67%		\$4.60		Fuel Surcharge	(Aug 2027 thru July 2028)	0.13%	0.13%	\$ 0.03
\$ 6.60	\$ 2.10	2.80%								\$ 19.72
\$ 6.70	\$ 2.20	2.93%								
\$ 6.80	\$ 2.30	3.07%								
\$ 6.90	\$ 2.40	3.20%								
\$ 7.00	\$ 2.50	3.33%		Although example above is for Residential, the fuel calculation method applies to all RATES FOR SERVICES IN EXHIBIT F with the exception of Delinquent Account Fees						
\$ 7.10	\$ 2.60	3.47%								
\$ 7.20	\$ 2.70	3.60%		Look back Period: August - July						
\$ 7.30	\$ 2.80	3.73%								
\$ 7.40	\$ 2.90	3.87%		*Source: Weekly Gulf Coast No 2 Diesel Ultra Low Sulfur (0-15 ppm) Retail Prices (Dollars per Gallon)						
\$ 7.50	\$ 3.00	4.00%								
\$ 7.60	\$ 3.10	4.13%								
\$ 7.70	\$ 3.20	4.27%								
\$ 7.80	\$ 3.30	4.40%								
\$ 7.90	\$ 3.40	4.53%								
\$ 8.00	\$ 3.50	4.67%								

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Ryan Kramer, Sr. Fleet Manager, Fleet Services

Meeting Date: June 18, 2024

Item type: Regular Item

Caption:

Consider awarding the purchase of fleet and fuel management systems and authorizing the City Manager to negotiate and execute all related documents:

1. Consider awarding RFB #25-04-0222 of North Carolina Sheriff's Association to Chevin Fleet Solutions LLC in the amount of \$41,650 for fleet management software implementation and \$64,467.60 annually for software maintenance and support utilizing a total of \$106,118 from Fleet Services fund balance
2. Consider approval of Sourcewell Contract #02920-JFA to JF Petroleum Group in the amount of \$80,892.65 for fuel management and tank monitoring systems hardware and software installation utilizing Fleet Services fund balance (Presentation made by Senior Fleet Manager Ryan Kramer)

Staff Recommendation:

Approve

Summary/History:

Fleet Services staff has researched replacement of their current fleet management software, fuel management hardware and supporting software, and in-ground fuel tank monitoring hardware and supporting software in an effort to replace equipment and technologies that have exceeded their useful life expectancies.

FLEET MANAGEMENT SOFTWARE: Fleet management software is used by Fleet Services to perform all aspects of detailed management of the City's fleet including data generation and review, asset expense and value tracking, work order management, internal billing efforts plus many more aspects. The current software (Assetworks FA) has been in use since June of 2014, and while mainly used by Fleet Services, is accessible by other Divisions for service request inputs and work order review. Due to the lack of technological advancements and drastically rising costs to maintain Assetworks FA, Staff recommends that this software be replaced with one that has a strong core function and up-to-date development, as well as a lower annual maintenance cost over the term of the contract. Replacing the current product with FleetWave Fleet Management software by Chevin is projected to meet these needs. Compared to the renewal proposal of Assetworks FA, Fleetwave will save the City approximately \$60,000 over the proposed five-year contract.

The fleet management system shall be purchased from and configured by Chevin Fleet Solutions. The implementation of the software will include a one-time expense of \$41,650 and a license and support fee of \$64,467.60 annually. Fund balance shall be used for the implementation expenses plus the first year annual fee. Future annual fees shall be expensed from Fleet Services operating budget.

FUEL MANAGEMENT SYSTEM: Replacing Assetworks FA will require a change to Fleet Service's fuel management system as well. The current fuel management system is only supported by Assetworks FA. Additionally, Staff has been told that this system is slated for forced obsolescence in the coming years as Assetworks FA aligns with another provider for fuel services. Implemented at approximately the same time as the current fleet management software, the fuel management hardware and supporting software have served the intended purpose for the past 10 years. Emerging technologies have become available with new products on the market, and Fuelmaster by Syntech Systems has been determined to meet the City's needs. Fuelmaster is a system used by other fleets in the industry and shows to have a robust support system, low annual cost, and new available features to assist in proper transaction accounting, loss detection and more. Replacing this equipment before failure is critical in maintaining the fueling requirements of public safety and public works.

FUEL TANK MONITORING: The tank monitoring system used for the in-ground fuel tanks located on Saint Ann Street has been in place since June 2015. This computer-based system performs all of TCEQ mandatory compliance requirements. The current system has performed well for the last nine years but has recently begun having technological glitches. An upgrade is needed to ensure state regulatory compliance. The new system proposed by Omntec will continue to meet all State and Federal requirements placed on the City, plus it uses a cellular-based communication system. This makes it more reliable and more accessible by the vendor's support staff. The replacement of the current OPW tank monitoring system with Omntec's system will also allow Fleet Services to monitor fuel tank levels at the City's west fueling location (near the airport) as well as any other future locations.

The fuel management and tank monitoring systems are to be purchased and installed by JF Petroleum for a total of \$80,892.65 including labor (\$8,350) to install the hardware related to the fuel management and the tank monitoring systems as broken down on the provided quote. The implementation of Fuelmaster will have an initial hardware cost of \$54,517.45 and an annual subscription cost of \$7,881 for a perpetually continuing term. The implementation of Omntec will have an initial hardware cost of \$18,025.20, and while there is no annual subscription cost, there is a cellular connection cost of \$36 per month (\$432 annually). The noted annual or monthly costs are not included in the total cost of the project noted, and shall be purchased each year direct from the manufacturer (Fuelmaster or Omntec) until the time the City chooses to cancel the service. Fund balance shall be used for the implementation expenses, and future annual fees shall be expensed from Fleet Services operating budget.

Funding Source(s):

Fund:	Account:	Project Number:	Amount Budgeted:
Fleet Services	301-1800-500.03-32		\$187,041

Financial Impact:

The complete project implementation and hardware costs are funded through existing Fleet Services' Fund Balance. All annually occurring expenses will be funded through Fleet Services' annual operating budget.

Fleet Management Software - Total cost: \$364,033; One-time implementation cost: \$41,650; Annual subscription costs: \$64,467.60 annually fixed for a five-year term.

Fuel Management and Tank Monitoring - One-time implementation cost: \$80,892.65; Annual costs totaling \$8,313.

Other Information/Recommendation:

Staff recommends approval of the purchase of Chevin Fleetwave fleet management software, Syntech Systems Fuelmaster fuel management software and hardware, and Omntec's tank monitoring equipment and software.

Attachments:

- | | | |
|----|--|--|
| 1. | Chevin FleetWave Statement of Work for Implementation | Chevin FleetWave Statement of Work for Implementation.pdf |
| 2. | Chevin FleetWave Annual Subscription Quote | Chevin FleetWave Annual Subscription Quote.pdf |
| 3. | 06.04 VM Budget Memo | 06.04 VM Budget Memo.pdf |
| 4. | JF Petroleum Fuel Management and Tank Monitoring Quote | JF Petroleum Fuel Management and Tank Monitoring Quote.pdf |

Presentation:

Ryan Kramer

Approvals/Reviews:

Ryan Kramer	Created/Initiated
Pete Madrid Jr.	Approved
Patrick Frerich	Approved
Shane Kelton	Approved
Jeffrey Tomlinson	Approved
Tina Dierschke	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval



FleetWave Advanced Statement of Work

City of San Angelo, TX

John Davis | VP, Strategic Services Engagement | 23rd May 2024

V7

1 TABLE OF CONTENTS

2	Distribution & Review History	3
3	Document Purpose	4
4	Executive Summary	5
4.1	<i>Proposed Resources</i>	5
4.2	<i>Total Investment Estimate</i>	5
4.3	<i>Payment Schedule</i>	5
5	The Works	6
5.1	<i>Scope and Deliverables</i>	6
5.2	<i>Testing New Code Version Prior to a Production Release - Responsibilities</i>	10
5.3	<i>Resources & Responsibilities</i>	11
6	Timing	14
6.1	<i>Start Date</i>	14
6.2	<i>Term</i>	14
6.3	<i>Validity</i>	14
6.4	<i>Post Go Live Hyper-Care Period</i>	14
7	Costs	15
8	Known Risks and Assumptions	16
8.1	<i>Risks</i>	16
8.2	<i>Assumptions</i>	16
9	Client Obligations	17
9.1	<i>Client Materials</i>	17
9.2	<i>Reasonable Notice</i>	17
9.3	<i>Chargeable Expenses</i>	17
9.4	<i>Meetings and Workshops</i>	17
9.5	<i>Harassment, Bullying and Discrimination</i>	18
10	Consultant Company Obligations	18
10.1	<i>Mandatory Training and Background Checks</i>	18
10.2	<i>Consistency of Resources</i>	18
10.3	<i>Use of Subcontractors</i>	18



11	Project Onboarding	19
11.1	<i>Agreed Systems/Tools</i>	19
12	Payment Schedule	19
12.1	<i>Commercial Standard Terms and Conditions</i>	19
12.2	<i>Unsocial Hours and Weekends</i>	20
13	Approvals	21
14	Appendices	22
15	Appendix 1 Project Costs including travel and Expense	22
16	Appendix 2 Definitions/Acronyms	23
17	CHEVIN Contracting Entity, Notices, Governing Law, and Venue	24
17.1	<i>Manner of Giving Notice</i>	24
17.2	<i>Agreement to Governing Law and Jurisdiction</i>	24



2 DISTRIBUTION & REVIEW HISTORY

Change Record

Date	Version	Editor	Change Reference
June 2, 2023	1	Adam T. Rose – Account Executive	Document Creation
21 st June 2023	2	John Davis, VP Strategic Services	Standard NAPA integration added
1 st August 2023	3	John Davis, VP Strategic Services	Credited Samsara integration based on August 2023 execution
3 rd April 2024	4	John Davis, VP Strategic Services	Updated for dates due to elapsed time. Removed August 2023 signing discount.
17 th May 2024	5	John Davis, VP Strategic Services	EJ Ward updated to FuelMaster. Account Executive updated.
21 st May 2024	6	John Davis, VP Strategic Services	Modified standard ½ day remote training to three days onsite and two days onsite for go-live (travel and related expenses to be invoiced at cost) at the request of San Angelo.
23 rd May 2024	7	John Davis, VP Strategic Services	Added three days consultation for report building and automation.

Reviewers

Name	Company	Position
Dave Hendrickson	Chevin	PS Director US
Eric Fox	Chevin	Account Executive
Christopher Lloyd	Chevin	CRO



3 DOCUMENT PURPOSE

This Statement of Work (SOW) outlines the scope of services required for Chevin Fleet Solutions “Chevin” to provide software implementation services to City of San Angelo, TX (hereinafter referred to as "Client"). Chevin will perform in accordance with this SOW.

When mutually executed for implementation, this SOW becomes contractually binding on Chevin and the Client under the terms and conditions of the Master Subscription Agreement (MSA).

Upon acceptance by both Chevin and Client, any changes or modifications to the SOW will be subject to Change Control with all changes agreed with Client in writing and documented in line with the Change Management Plan (which will be established during the planning phase).

Any change requests generated against this SOW will be subject to the same terms & conditions outlined in this SOW, unless explicitly superseded in writing on the change request quotation document.

This SOW is independent of any license agreements.



4 EXECUTIVE SUMMARY

This document outlines the role of Chevin Fleet Solutions in providing consultancy services in the delivery of FleetWave (fleet management software). The provision of these resources is to satisfy the estimated scope of work in line with client requirements (see 'The Works' section) and is provided on a Time & Materials basis. The below costs are estimated. The estimates are based upon Chevin's knowledge at the time of producing the Statement of Work and on Chevin's experience of conducting similar work in the past. Estimated hours are for budgeting purposes only and not directly related to timelines for delivery. The estimates are provided in good faith. Chevin will notify the Client immediately if a change of scope from this estimate is identified and any variance will be subject to change control. The Chevin Project Manager will work closely with the Client's Project Manager to manage scheduled deliverables and monitor planned vs. actual work.

4.1 PROPOSED RESOURCES

Chevin will assign the following resources to the project:

- Project Manager
- Business Consultant
- Implementation Consultant

4.2 TOTAL INVESTMENT ESTIMATE

Total Estimate = \$41,650.00

4.3 PAYMENT SCHEDULE

To be invoiced monthly on Time & Materials actuals in hours and fractions thereof as the project progresses. Invoices will be generated with a single line item for 'Professional Services' hours used in the billing period (month in arrears). A timecard report with hours per resource is provided as part of the weekly status report.



5 THE WORKS

The section provides details on the deliverables that are covered by this SOW and the resources that will be provided to deliver them. For completeness, any items which are specifically out of scope are called out for total clarity.

5.1 SCOPE AND DELIVERABLES

5.1.1 In Scope

5.1.1.1 System Deliverables

Chevin have reviewed the Client's requirements in determining the scope of this SOW, which has been identified as below. This scope is based on Chevin's understanding of activity carried out during the procurement phase (e.g., system demos, RFP's, conversations, etc.) and represents our interpretation of this activity. This section supersedes any prior documentation, and the client should therefore pay particular attention to ensuring that this accurately reflects requirements and expectations.

Estimated hours are for budgeting purposes only and not directly related to timelines for delivery. All development and configuration work will be provided in the current version of FleetWave software and will require updating to the latest version as part of this project.

Requirement	Notes & Assumptions	Est. Days	Config	Dev	BC	PM
Implement FleetWave Advanced	- Stand up Chevin's FleetWave Advanced system with standard configuration (Screen Design, Status Codes, User Roles, Menu Options, and Combobox options) and assist with loading client data. Requested variations from the standard configuration will be addressed using the change control process. - Chevin will provide standard data loaders. The client will be responsible for extracting and normalizing data and populating data loaders provided. - Chevin will act as a consultant to determine appropriate tables and fields for data elements and assist with any questions or issues during data load. - This approach assumes that all client data will be consolidated by the client in the data loaders provided to the Chevin Project team prior to loading the data for an efficient, cost effective, single phase go-live for all data and locations. The estimate provided is based on a two-week UAT period. Extending UAT will require a separate Change Control from Chevin estimating the additional cost based on anticipated duration and resources required. There are no reports, processes, custom Forms, or integrations required other than those referenced in this Statement of Work.	6.00	3.00	0.00	0.00	3.00



Requirement	Notes & Assumptions	Est. Days	Config	Dev	BC	PM
Implement Fleetwave Driver Advanced	Implement FleetWave Driver Advanced Application with standard configuration. Forms included are Fuel Entry, Pool Request, Defect Report, Accident Report, and Daily Vehicle Inspection Report.	Incl.	Incl.	Incl.	Incl.	Incl.
Implement FleetWave Technician Application	- Implement the FleetWave Technician Application with standard configuration. - Demonstrate where to change translations (if desired), how to link user accounts to fitters/mechanics, and how to change from "parts Request" functionality to parts issued to work orders directly by fitters/mechanics. - Provide access to Zendesk help and training articles for FleetWave Technician Application.	Incl.	Incl.	Incl.	Incl.	Incl.
Provide standard FleetWave training	Chevin will provide three days of onsite System Administrator/Train the Trainer training. Access to Chevin Zendesk help and Support articles will be demonstrated and can be accessed by authorized users. A training agenda related to FleetWave operation and administration will be agreed between Chevin and client in advance of the training session. Travel and related expenses to be invoiced to San Angelo at cost.	3.00	3.00	0.00	0.00	0.00
Standard NAPA Integration	Chevin will: - Configure the standard NAPA integration with FleetWave for Stock and Job functionality. - Document necessary changes and settings for quick reference. - Testing will be performed in a lower environment before being promoted to Production.	5.00	3.00	0.00	1.00	1.00
Install and configure the Chevin standard integration with Samsara	Samsara credentials will be made available for Chevin for a single Samsara database. Integration will be based on the specification below. There are no additional requirements, reports, processes, or integrations necessary other than those specifically referenced in this Statement of Work.  Samsara Standard Integration - Techni	4.00	2.00	1.00	0.00	1.00
Import fuel transaction data from FuelMaster	Transactional data will be provided text format on a schedule to be determined and will contain transaction data (up to twenty-five columns) including but not limited to (Vehicle#, Transaction Date, Amount, Price per unit, Total cost, product code, meter reading). Fuel transactions will be imported to the FUEL_ISSUES_FW table in FleetWave. SFTP site credentials will be provided to Chevin for retrieving files from the client or data provider site.	5.00	2.00	0.00	2.00	1.00



Requirement	Notes & Assumptions	Est. Days	Config	Dev	BC	PM
Onsite go-live support	Chevin will provide two days of onsite go-live support with one Project Manager and one Implementation Consultant. Travel and related expenses to be invoiced to San Angelo at cost.	2.00	1.00	0.00	0.00	1.00
Business Consultation	Chevin will provide three non-consecutive days of consultation related to report writing and automation to be to be drawn down as needed and mutually convenient.	3.00	0.00	0.00	3.00	0.00

This SOW covers the estimated professional service hours to configure the licensed program(s) to deliver the above functionality based on information provided to date.

The detail on the above requirements will be documented during the design phase in Functional and Technical specifications as required/appropriate (see deliverables phase for an indication of which specifications apply to this SOW). These documents will require sign off by the client and will form our collective agreement on the projects definition of done.

5.1.1.2 Other Project Artefacts

Project Management Artefacts

- Setting Up Your FleetWave System (Slide Deck)
- Data loader templates

Out of Scope

Anything not addressed in this SOW is out-of-scope and not included in these services. Either party may submit a Change Request to the other party in accordance with the Change Management Plan (established during the plan phase of the project).

Specifically, out of scope is:

- Any work not explicitly defined in section 5.1.1.1 “System DeliverablesIn Scope”



-
- Production of any documentation not listed in the 'In Scope' section of this document (or in other documents referenced from it).
 - Configuration of the licensed program(s) over and above what is specified in the in-scope section above.
 - FTP/sFTP site provision. For interfaces, it will be the customer's responsibility to provide these sites. For sharing of files during the project, Chevin will set up a shared directory on SharePoint.
 - Migration of images, pictures, or other attachments unless specifically addressed in the System Deliverables section of the Statement of Work.

5.2 TESTING NEW CODE VERSION PRIOR TO A PRODUCTION RELEASE - RESPONSIBILITIES

Chevin adopt industry best practice when releasing new versions of code with responsibilities for both Chevin and the customer during each release. Before taking a code release to your production site, it is important to understand the actions required and who is responsible for them to help ensure a successful outcome with minimal impact to your business operations. The details below apply to releases of all our products.

Out of the box functionality

- In order to document test scripts appropriately and to support the build of automation testing, Chevin will complete out of the box configuration testing on all new code versions. We will only make new code versions available when we have confirmed the out of the box functionality has been verified as working as expected.

Customizations

- Bespoke functionality added to a customer's site by Chevin will be tested against the agreed use/test case by Chevin during the project. However, due to the customizable nature of our software (which allows unique configuration by Chevin and/or the customer), it is not possible for the scope of Chevin's testing prior to a production code release, to include customizations that have been implemented on a customer's unique instance. Therefore, it is vitally important that all customizations are tested by the customer. We recommend the following:
- For all business processes, document the user's interaction with the system in the form of test cases. Chevin can provide a template and sample test case to assist with this
- Test cases should cover both the 'business as usual' workflows and any alternative outcomes that are possible.
- Prior to carrying out the code release to your production environment, we will ask you to confirm that you have completed testing of customized functionality.
- If you would like Chevin to assist with test case production and execution, this can be provided by the Professional Services team. Please get in touch with us if you would like a quote for any additional support.

5.3 RESOURCES & RESPONSIBILITIES

5.3.1 Chevin

This section outlines the resources (roles) that Chevin may assign to the project and the specific activities that each will carry out to produce the deliverables of this SOW. Only those roles required for delivery of the project will be assigned.

- **Chevin** will provide a:
 - **Project Manager** to:
 - Conduct the kick-off meeting with the client, obtaining information required to produce the project artefacts listed in the objectives/scope section of this SOW.
 - Manage the project according to Chevin's Project methodology.
 - Document the specific details of how *this* project will be managed utilizing Chevin's standard set of project artefacts and obtain agreement and sign off from the client.
 - Present status of the schedule to the client on a weekly basis (or as agreed in the Communications Management Plan).
 - Arrange any calls, meetings etc. that are required to keep the project on track and facilitate where required.
 - Secure Chevin resources to the project according to the project timetable.
 - Review and approve (or challenge) the time spent by Chevin staff on the project, ensuring accurate timesheets are maintained.
 - Present the project to the Chevin Gate Review Board at phase gateways to obtain authorization for the project to move to the next phase.
 - Act as primary contact for the Chevin project team.
 - Actively monitor risks and issues and report these to the client as they occur.
 - Carry out escalations as required, in line with the Communications Management Plan.
 - Manage the project budget in terms of internal costs to Chevin as well as costs to the client, notifying relevant parties of any changes in line with the Change Management Plan.
 - Maintain an accurate Project Schedule in Microsoft Project and share this with stakeholders in the form of high-level milestones on a weekly basis.
 - Develop necessary change documents for client approval.
 - **Business Consultant** to:
 - Be responsible for leading application configuration workshops to elicit requirement details to enable the configuration of Chevin's software products according to Chevin identified best practice.
 - Produce design documentation if required for items outlined in the deliverables section.
 - Facilitate knowledge transfer to the Client Project Team.
 - Work with client's business users and project team to identify and document configuration and technical requirements.
 - Provide FleetWave application expert advice and guidance.
 - Provide business best practice advice and guidance.

- **Implementation Consultant** to:

- Review proposed solutions at the design phase and identify areas for simplification and reuse of existing functionality.
- Provide estimates on implementation work as required.
- Configure systems from Functional and Technical Specifications, using WYSIWYG editors and knowledge of SQL, HTML and JavaScript.
- Carry out unit testing against Functional and Technical specifications.
- Lead sprint demos to show the Client how the system build is progressing.
- Ensure that all systems are delivered with a clean, maintainable, and easy to understand configuration.
- Provide significant in-depth knowledge and experience on Chevin's range of products and platforms.

5.3.2 Client

This section outlines the responsibilities of the client in aiding Chevin in the provision of the deliverables of this SOW:

- **CLIENT** will:

- Own the project and assign a **Project Manager** to:
 - Manage the project.
 - Act as primary project contact for the Chevin project team.
 - Work with the Chevin Project Manager to ensure that a 'united front' between both organizations is presented to interested parties both internal and external to the project.
 - Manage Client stakeholder engagement.
 - Be responsible for communicating overall project status and any scope, schedule, or budget changes to the relevant Client stakeholders.
 - Submit changes to Executive Sponsor for approval and signature as per the Change Management Plan.
 - Participate in requirements gathering sessions to ensure scope is correctly set according to the contract.
 - Actively manage the scope of the project throughout the full life cycle.
 - Coordinate timely provision of relevant purchase orders and on time payment of any invoices.
 - Fulfil other roles as needed to achieve successful project implementation.
 - Ensure that relevant **End Users/SME's** are available to the project to:
 - Attend design workshops and elaborate contractual requirements to allow Chevin Business Consultant to produce relevant design phase documents, via:
 - Providing current business process knowledge and experience.
 - Defining and agreeing future business processes in collaboration with Chevin.
 - Providing sign off on any specifications for deliverables which they have been identified as the owner of.
 - Produce training/help material and conduct Client training sessions.
 - Work with the Chevin consultants to obtain FleetWave knowledge and expertise during the knowledge transfer process.

- Test the system, providing ultimate sign off/acceptance for deliverables that they have been identified as the owner of.
- Provide **Executive Sponsorship** to:
 - Drive the vision and objectives for the engagement.
 - Be present at executive steering committees.
 - Take appropriate action in the event of an escalation.
- Provide other **Relevant Resources as Needed** to carry out the following activities:
 - Develop test plans.
 - Extract, and cleanse data from existing systems and otherwise prepare this for import into Chevin's system.
 - Facilitate Client infrastructure set up and install of Chevin's systems on that infrastructure, on self-hosted installations.
 - Develop a training plan.
 - Develop training materials.
 - Train end users.
 - Act as super users to provide first line support once the system is transitioned into support mode, after the project has been completed and closed.
- Sign this statement in work with sufficient lead time to start the project according to the agreed timeline.
- Provide sign-off to indicate acceptance of the completion of each project phase and approval for the project to proceed to the next phase.

6 TIMING

6.1 START DATE

- Upon confirmation from the Client to proceed and if required the receipt of an accompanying Purchase Order or equivalent authorization, a provisional start date will be agreed in writing.
- Chevin will confirm the start date and appointed resources upon signature of the Master Subscription Agreement, this Statement of Work, and the acceptance of a sales invoice for the first payment.
- Any start date provided *in advance of the above conditions being met* should be treated as purely indicative on the date that it was given and subject to any degree of change thereafter.

6.2 TERM

- This Statement of Work will expire when the Client has signed an End Stage report for the 'Close' phase of the project or thirty days after delivery if there are no outstanding issues.

6.3 VALIDITY

- This statement of work is valid 30 days from the date of issue.

6.4 POST GO LIVE HYPER-CARE PERIOD

- The project team will support the project a two-week period after the go live date, after which point the project will handed over to the support team.
- Once the hyper-care period is over, no new issues will be accepted by the project team as these will be raised directly with Support.
- The project team will continue to own any defects reported during the hyper-care period until they are resolved.



7 COSTS

The below costs are estimated and represent the estimations for work to be completed by Chevin. If there are development, configuration, licensing, or other cost from a referenced supplier these should be determined between the client and that supplier. The estimates are based upon Chevin's knowledge at the time of producing the Statement of Work and on Chevin's experience of conducting similar work in the past. Estimated hours are for budgeting purposes only and not directly related to timelines for delivery. The estimates are provided in good faith.

Chevin will notify the Client immediately if a change of scope from this estimate is identified and any variance will be subject to change control. The Chevin Project Manager will work closely with the Client's Project Manager to manage scheduled deliverables and monitor planned vs. actual work.

Description	Days	Rate	Total Estimated Cost
Project Management	7.00	\$1,487.50	\$10,412.50
Business Consultation	6.00	\$1,487.50	\$8,925.00
Implementation	14.00	\$1,487.50	\$20,825.00
Development	1.00	\$1,487.50	\$1,487.50
Total	25.00		\$41,650.00

8 KNOWN RISKS AND ASSUMPTIONS

8.1 RISKS

- Unexpected changes to the scope set out in this SOW.
- Client is unable to provide sufficient resources to fulfil the responsibilities set out elsewhere in this document.
- Ineffective or incomplete stakeholder management may result in difficulties in rolling out the new software and ensuring its adoption by end users.
- Lack of the correct level of executive sponsorship for the project.

8.2 ASSUMPTIONS

- It is assumed that licenses for the software will be procured by The Client, outside of the scope of this SOW.
- Where functionality is described as 'standard' in 'The Works' section, this functionality will satisfy the Client's expressed requirements. Chevin has assessed the Client's requirements in detail and based on the information provided in these requirements, we believe this is a reasonable assumption. Any functionality which is not available 'out of the box' has been called out specifically in 'The Works.' The Client is encouraged to do due diligence to ensure out of the box functionality does indeed meet their requirements.
- The Client will be able to work with Chevin's software development and delivery processes unless an exception has been explicitly agreed to in this SOW. Any working practices which require Chevin to move away from their standard process may either be not possible, or subject to the additional charges under the change management process.
 - This includes the use of Chevin's instance of their chosen software tools (e.g., Jira) over the client's own instances.
- If relevant, it is assumed that any integrations which are being provided (and specifically referred to in 'The Works' section of this document) as out of the box functionality will be compatible with existing functionality. E.G., the file format provided by a third-party supplier will be the same as the format that Chevin's systems have been designed to consume.
- Accuracy of estimates. Assumptions have been made about the effort level required to deliver against the high-level requirements provided during the procurement process. These requirements and the level of effort required to deliver against them are provided in the in-scope section. Once we begin delivery, the requirements will naturally be elaborated and during this process, the level of effort required may differ to the estimate. In this scenario, Chevin will make the client aware via the Change Request process.

9 CLIENT OBLIGATIONS

The below section provides further rules of engagement for the Client, over and above the responsibilities listed in the 'Resources and Responsibilities' section.

9.1 CLIENT MATERIALS

- The Client agrees to provide accurate and complete documentation, data, diagrams, process maps and other relevant documentation upon request.

9.2 REASONABLE NOTICE

- The Client will give at least 2 working days' notice for in-person meetings.
- Unless there are exceptional circumstances such as illness, travel disruption, emergency or parental leave, a minimum of 24 hours' notice is required for cancellations to previously scheduled in-person meetings where attendees have had to travel for more than 1 hour.

9.3 CHARGEABLE EXPENSES

- The Client will reimburse Chevin in full for reasonable expenses incurred in performing the Works.
- Expenses incurred are subject to the Chevin expenses policy, available on request.
- The Client will reimburse Chevin in full for Visa, security clearance and background check fees where they have been specifically requested to perform the Works.
- Approved expenses will be included on a separate monthly invoice with an accompanying report detailing the breakdown of expenses.
- Chevin agrees to provide supporting documentation such as receipts and invoices for reasonable expenses on request.

9.4 MEETINGS AND WORKSHOPS

- No more than 12 hours of workshops may be scheduled for a single week, to allow for preparation, thinking time and other obligations for representatives of either party.
- Where meetings have been mutually agreed, SMEs will make every effort to attend on time.
- Whilst Chevin acknowledges that more urgent matters may arise throughout the course of the project, the Client stakeholders will prioritize project meetings or reschedule with the appropriate level of reasonable notice.
- Both parties agree to devote time and attention to the meetings in attendance.
- Each workshop will have no more than 10 representatives from the Client, to ensure maximum productivity.
- Unless otherwise agreed, meetings and workshops may be scheduled to start no earlier than 10am, to allow for parental obligations, travel disruption and delays as a result of compliance with health and safety obligations.

9.5 HARASSMENT, BULLYING AND DISCRIMINATION

- Both Chevin and the Client's representatives agree to operate in line with the Client's and Chevin's Harassment & Bullying and Equality policies. These are available on request.
- Both Chevin and the Client agree to investigate allegations of harassment, bullying and discriminatory behavior where there are complaints under the Client's and Chevin's Harassment and Bullying, and Equality policies.
- Both Chevin and the Client agree to take appropriate action in response to the outcome of an investigation, which may include, and is not limited to, removing stakeholders from the project, or acting under its Disciplinary procedure.

10 CONSULTANT COMPANY OBLIGATIONS

This section details additional obligations on Chevin, over and above those listed in the 'Resources and Responsibilities' section.

10.1 MANDATORY TRAINING AND BACKGROUND CHECKS

- Chevin agrees to conduct reasonable background checks if requested by the Client, such background checks to be defined by the Client.
- Chevin agrees to apply for security clearance if requested by the Client, the levels to be defined by the Client.

10.2 CONSISTENCY OF RESOURCES

- Where possible, Chevin will endeavor to retain a consistent team on the project. However, due to external factors, this will not always be possible.
- Chevin will notify the Client at the earliest opportunity where changes to the team are necessary and unavoidable.
- Where resources must be changed, Chevin will ensure that an adequate handover is completed.

10.3 USE OF SUBCONTRACTORS

- Subcontractors will be engaged at the discretion of Chevin, when such an arrangement is mutually beneficial for the Client, Chevin, and the project as a whole.
- Chevin is committed to paying subcontractors on time to prevent risk to the engagement, subject to the prompt payment of invoices issued for the Works.

11 PROJECT ONBOARDING

11.1 AGREED SYSTEMS/TOOLS

The below systems/tools must be used to allow Chevin to follow their delivery process. Further details will be agreed in the Communications Management Plan produced collaboratively during the plan phase.

Tool	Owner	Purpose
Jira	Chevin	Task management
Case Complete	Chevin	Requirement's management/use case authoring
Requirementmts.cc	Chevin	Online portal for specification feedback and approval
Microsoft Project	Chevin	Project Planning

12 PAYMENT SCHEDULE

To be invoiced monthly on Time & Materials actuals in hours and fractions thereof as the project progresses. Invoices will be generated with a single line item for 'Professional Services' hours used in the billing period (month in arrears). A timecard report with hours per resource is provided as part of the weekly status report.

12.1 COMMERCIAL STANDARD TERMS AND CONDITIONS

- All prices shown net i.e., exclude Sales Tax.
- Terms of this quotation are based upon current Master Subscription Agreement.
- This proposal is offered on a **Time & Materials** basis.
- This proposal **excludes** any expenses not specifically referenced in section 5.1.1.1.
- Payment Terms are monthly in arrears of delivered consultancy.
- Annual maintenance will be indexed in accordance with current support and maintenance agreements.
- This proposal is valid for 30 days.
- Cancellations or deferments of Professional Services made 11 to 15 working days in advance of the planned project or assignment start date will be subject to a charge of 50% of the estimated services, and cancellations or deferments made 10 working days or less in advance of the planned project or assignment start date will be subject to a charge of 100% of the estimated services. Chevin will use reasonable endeavors to redeploy the Professional Services personnel affected and will only charge the fee if it is unable to redeploy such personnel on other chargeable work.



12.2 UNSOCIAL HOURS AND WEEKENDS

The above rates apply to standard weekday work between 09:00 and 17:00. Below is the table of charge multiples for unsocial hours including weekends and public holidays. Any charges as referenced below will be agreed in advance and in writing.

	Mon – Fri	Saturday	Sunday and Public Holidays
9am to 5pm	–	x1.5	x2
5pm to midnight	x1.5	x2	x2.5
Midnight to 9am	X2	x2.5	x2.5



13 APPROVALS

IN WITNESS WHEREOF, the parties have executed this Statement of Work on the date or dates indicated below to be effective in accordance with this SOW. All costs are estimated. The estimates are based upon Chevin's knowledge at the time of producing the Statement of Work and on Chevin's experience of conducting similar work in the past. Estimated hours are for budgeting purposes only and not directly related to timelines for delivery. The estimates are provided in good faith. Chevin will notify the Client immediately if a change of scope from this estimate is identified and any variance will be subject to change control. The Chevin Project Manager will work closely with the Client's Project Manager to manage scheduled deliverables and monitor planned vs. actual work.

Chevin

Client

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

Date: _____

Purchase Order: _____

Chevin CEO

By: _____

Name: _____

Title: _____

Date: _____

14 APPENDICES

15 APPENDIX 1 PROJECT COSTS INCLUDING TRAVEL AND EXPENSE

Out of Pocket travel and expenses incurred by the Chevin Project Team will be re-charged to the Client at cost.

Time and Materials Estimate. Unless this Statement of Work expressly states that it is a fixed-price Statement of Work, this is time-and-materials Statement of Work, and any amounts described are solely good-faith estimates for Client's budgeting and Chevin's resource-scheduling purposes and are not a guarantee that the work will be completed for such amounts; the actual amounts may be higher or lower. Chevin will provide accumulated hours upon request. It is the responsibility of the client to track budget and communicate both internally and with Chevin as required to support the project.

Unless otherwise stated in this SOW, fees (including Expenses) associated with this statement of work will be billed monthly on a time and material basis, with terms of Net 30 days.

Scope of Work. Any scope of work described in this Statement of Work covers requirements documented during a scoping process conducted by the parties and is limited to the deliverables specified in this Statement of Work. Such scope does not cover conversations or product demonstrations that took place outside of this formal scoping process. Any requests by that are outside the scope specified in this Statement of Work will be subject to the parties' signature of a change order.

Cooperation. Client will cooperate reasonably and in good faith with Chevin in Chevin's performance of consulting services by, without limitation, (a) allocating sufficient resources and timely performing any tasks reasonably necessary to enable Chevin to perform its obligations under this Statement of Work, (b) timely delivering any materials and other obligations required under this Statement of Work, (c) timely responding to Chevin's inquiries related to the consulting services, (d) assigning an internal project manager for this Statement of Work to serve as a primary point of contact for Chevin, (e) actively participating in scheduled project meetings, (f) providing in a timely manner and at no charge to Chevin access to Clients appropriate and knowledgeable employees and agents and coordination of onsite, online and telephonic meetings all as reasonably required by Chevin and (g) providing complete, accurate and timely information, data and feedback all as reasonably required.

Time Management. Both Chevin and Client realize that Chevin's time spent in connection with this Statement of Work will incur fees, and Client and Chevin will therefore endeavor to manage the use of each other's time in a reasonable and effective manner.

Delays. Any delays in the performance of consulting services or delivery of deliverables caused by Client may result in additional charges for resource time. Chevin may terminate this Statement of Work upon 15 days written notice to Client if such delay renders Chevin unable to perform the consulting services for a period of more than 30 days.



16 APPENDIX 2 DEFINITIONS/ACRONYMS

Acronyms

The following acronyms are used throughout this Statement of Work:

“Client” is the customer Chevin is engaging.

“SOW” is “Statement of Work.”

“UAT” is User Acceptance Testing.

Definitions

Terms used in this document shall have following meanings:

Acceptance of Deliverable is written notification from Client to Chevin, signed by the responsible Client Program Manager, indicating that the Deliverable has been evaluated and satisfies the Acceptance Criteria of each Deliverable.

Deliverables are any materials procured or prepared by consultant or services provided by Consultant to Client.

“CHEVIN” means the CHEVIN FLEET SOLUTIONS company described in the “CHEVIN Contracting Entity, Notices, Governing Law, and Venue” section below.



17 CHEVIN CONTRACTING ENTITY, NOTICES, GOVERNING LAW, AND VENUE

The CHEVIN entity entering into this Agreement, the address to which Customer should direct notices under this Agreement, the law that will apply in any dispute or lawsuit arising out of or in connection with this Agreement, and the courts that have jurisdiction over any such dispute or lawsuit, depend on where Customer is domiciled.

Domiciled:	The Chevin Entity Entering into this agreement:	Notices Should be Addressed to:	Governing Law is:	Courts with Exclusive Jurisdiction are:
The United States of America	Chevin Fleet Solutions LLC, Delaware Corporation	881 Main St., P.O. Box 2203, Fitchburg, MA 01420	Texas and Controlling United States Federal Law	Texas, USA

17.1 MANNER OF GIVING NOTICE

Except as otherwise specified in this Agreement, all notices related to this Agreement will be in writing and will be effective upon (a) personal delivery, (b) the second business day after mailing, or (c), except for notices of termination or an indemnifiable claim ("Legal Notices"), which shall clearly be identifiable as Legal Notices, the day of sending by email. Billing-related notices to Customer will be addressed to the relevant billing contact designated by Customer. All other notices to Customer will be addressed to the relevant Services system administrator designated by Customer.

17.2 AGREEMENT TO GOVERNING LAW AND JURISDICTION

Each party agrees to the applicable governing law above without regard to choice or conflicts of law rules, and to the exclusive jurisdiction of the applicable courts above



SMART FLEET MANAGEMENT

Address Chevin Fleet Solutions LLC
881 Main Street
PO Box 2203
Created Date 23/05/2024
Quote Number 00001137

Fitchburg
MA 01420

Prepared By Eric Fox
Email eric.fox@chevinfleet.com

Bill To Name City of San Angelo, TX
Bill To 72 West College Avenue
San Angelo
TX
76903
United States

Product	Quantity	Sales Price	Length of Contract (Months)	Total Monthly Amount	Total Annual Amount
Advanced VPB 0-500	500.00	USD 5.75	60	USD 2,875.00	USD 34,500.00
Advanced VPB 501-2000	576.00	USD 4.05	60	USD 2,332.80	USD 27,993.60
Ancillary Equipment/Assets	350.00	USD 0.47	60	USD 164.50	USD 1,974.00
Implementation - Statement of Work					See Pricing Attached
Sandbox	1.00	USD 0.00	60	USD 0.00	USD 0.00

Length of Contract Months 60

Annual amount payable:

Annual Price USD 64,467.60

Prices Quoted are valid only through the expiration date. Implementation costs are not included. Prices shown do not include any taxes that may apply; any taxes will be shown on invoices. All pricing is based on procurement framework through NCSA. This Sales Order Form is non-cancellable before the Contract Expiration Date above, and fees paid are non-refundable, except as specified in the Master Subscription Agreement ([MSA](#))

Payment terms for the license subscriptions quote on this order form are on an annual basis.

First year invoice will be issued on the 1st of the month following contract signature. This will also act as the start date for SaaS consumption.

Unless Customer has a written and signed agreement with Chevin, the services described herein are subject to the Chevin Master Subscription Agreement which is found at <https://www.chevinfleet.com/chevin-master-subscription-agreement/>, which is incorporated to this order form in its entirety by reference. Customer shall be deemed to agree to be bound by these terms and conditions upon use of the subscribed products described herein. Any and all terms and conditions in any Customer provided documentation are expressly rejected, and such terms shall be deemed to be for Customer's reference only, and no delivery of services by Chevin shall be deemed an agreement to any Customer terms.



SMART FLEET MANAGEMENT

Purchase Order Information

Is a Purchase Order (PO) required for the purchase or payment of the products on this Order Form?

Please select: (Customer to complete)

☐ Yes

☐ No

If yes, please complete the following:

PO Number:

PO Amount:

Chevin Fleet Solutions

Client

By: _____

By:

Print Name: _____

Print Name:

Title: _____

Title:

Date: _____

Date:

Unless Customer has a written and signed agreement with Chevin, the services described herein are subject to the Chevin Master Subscription Agreement which is found at <https://www.chevinfleet.com/chevin-master-subscription-agreement/>, which is incorporated to this order form in its entirety by reference. Customer shall be deemed to agree to be bound by these terms and conditions upon use of the subscribed products described herein. Any and all terms and conditions in any Customer provided documentation are expressly rejected, and such terms shall be deemed to be for Customer's reference only, and no delivery of services by Chevin shall be deemed an agreement to any Customer terms.

Memo

To: Tina Dierschke, Finance Director
From: Ryan Kramer, Fleet Manager
Date: 05/28/2024
Re: Budget Amendment Request

Purpose of Budget Amendment Request:

Purchase fleet and fuel management hardware and software

Source of Funding:

Fleet Services Fund Balance

Funding previously approved? If so, by City Manager or City Council and when?

Project/Budget to be amended	Revenue	Expense
Fleet Management Software Implemenation		106,118
Fuel & Tank Monitoring System		80,923

Additional Comments:



Innovation that works.

**Southwest Regional Office:
PSI JF Petroleum Group, Inc.
dba JF Petroleum Group
3702 S. Expressway 281
Edinburg, TX 78542**

TCEQ LICENSE CRP000821, (PSI JF Petroleum Group, Inc.) CRP001100 (McCon)

PROPOSAL AND AGREEMENT FORM

JF PETROLEUM
QUOTE #: **12-CH-BLH3145-1**
DATE: **3/20/2024**

Local JF Petroleum Group Contact Information:	1632-B Vision Dr., Abilene, TX 79602 (325) 676-2371
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PURCHASER: City of San Angelo

WORK TO BE 2 Locations Main Fleet Office
PERFORMED AT: and Airport

CONTACT NAME: Ryan Kramer
ADDRESS: 1727 Saint Ann St.
CITY, STATE ZIP: San Angelo, TX 76905
PHONE NUMBER: 325-657-4329
CELL PHONE 1:
CELL PHONE 2:
EMAIL: ryan.kramer@cosatx.
JF ACCOUNT #:
SALES REP: Chris Hooper

ADDRESS: 5317 Stewart LN
CITY, STATE, ZIP: San Angelo, TX 76905
REFINER SITE ID:
TCEQ SITE ID:

SOURCEWELL CONTRACT #092920-JFA

Program Terms: NET 30-Days

JF Petroleum Group (hereinafter "Seller") agrees to furnish the materials and if requested labor to complete the work described below and incorporated herein by reference, subject to the general terms and conditions described below, in this agreement:

QTY	DESCRIPTION	MFG P/N	UNIT PRICE	EXTENSION
1	Omtec System Main Office		\$13,161.57	\$13,161.57
1	Omtec System Airport		\$4,863.63	\$4,863.63
Sub Total ATG System				18,025.20
WHEN ORDERING BRAVO GLUE WITHOUT SUMPS, GET FREIGHT QUOTE. CANNOT BE SHIPPED UPS				
1	Fuelmaster 3 tower System breakdown attached		\$54,517.45	\$54,517.45
Sub Total Card/Key Control:				54,517.45

PRICING NOTICE - PROPOSAL PROVIDED FOR ESTIMATE PURPOSES ONLY, PRICES MUST BE VALIDATED AT THE TIME OF EXECUTION.

PROJECT NOTES: Provide and install 2 fuellmaster systems at main office. Provide and install 1 fuellmaster system at the Airport location. Provide and install Omntec tank level gauges at each location.

The equipment included in this proposal will be shipped to a JF Petro branch warehouse for contractor pickup. Owner is responsible for any transportation costs, loading and unloading of equipment on site from the JF Petro warehouse to the the job site.

*** * * PRODUCT LEAD TIMES / DOWN TIME * * ***

1. ACCEPTANCE: This offer when accepted by Purchaser will constitute a bona fide contract subject to these terms and conditions and approval by Seller's authorized representative. Delivery of the materials/equipment herewith, installation of specified equipment, Purchaser's acceptance hereof (either in writing, in electronic format or orally in person or over the telephone), reliance on any of Seller's work (when applicable), and/or the issuance of an invoice, constitutes a binding acceptance by Purchaser of these General Terms and Conditions. This agreement is the entire undertaking of the parties for the subject matter hereof, and there are no promises, agreements, or understandings, oral or written, not specified herein.

3. PRICES; TERMS OF SALE; CREDIT:

b. Unless otherwise specified above, terms are net 7 days on delivery of equipment and due upon completion for services or installation. For equipment ordered for this project, the Purchaser will be invoiced the date the equipment is delivered (shipped from manufacturer) to Seller's warehouse for purposes of convenience or coordination and shall be considered "delivery" for billing purposes. Payment for all such equipment is due upon delivery without retainage. A deposit may be required at Seller's sole discretion. Invoices are due and payable in McAllen, Hidalgo County, Texas to PSI JF Petroleum Group, Inc., P.O. Box 676045, Dallas, Texas 75267-6045. Purchaser further agrees to pay interest on all amounts invoiced and not paid as required under this agreement at the rate of eighteen (18) percent per annum (or the maximum interest rate permitted under the applicable law), until paid.

d. In addition to the contractual relationship herein created between the Purchaser and Seller, this agreement is further intended by the parties to be a SECURITY AGREEMENT, and as such does hereby create a purchase money security interest in all those certain items of property, equipment and fixtures herein described, which is the COLLATERAL of this Security Agreement. The collateral is given to secure the payment of the agreement price described above, together with all additions thereto and modifications thereof, and all costs and expenses, including but not limited to, courts costs and reasonable attorney's fees incurred by Seller in the collection of the agreement price, or the enforcement of this Contact and Security Agreement. Purchaser further grants Seller a security interest in and to all proceeds, increases, substitutions, replacements, additions and accession to the Collateral. Purchaser agrees that it will pay the Agreement Price secured hereby in accordance with the terms and provisions hereof, and failure to so pay will be considered DEFAULT hereunder, giving rise to the remedies hereinafter set forth. Additionally, it shall be considered DEFAULT hereunder if at any time Seller believes that the prospect of payment of the obligations secured hereby, or the performance of this Agreement and Security Agreement is impaired.

e. **Bill & Hold Arrangement - Bill & Hold** is a service offering by JF Petroleum Group will provide to its customers upon request, when events that are outside of the customer's control (i.e. site not ready, weather delays, permit delays etc.) prevent the customer from accepting physical delivery of products on the scheduled date. JF Petroleum Group will provide temporary storage and custody of the products and coordinate delivery with the customer's representative when the site is ready to accept the products. **Temporary storage of dispensers will be subject to a storage fee of \$ 90 per dispenser per month once dispensers remain in storage beyond 90 days from receipt in to warehouse** . The products will be invoiced to the customer on the previously agreed upon date as stated in the original quote/sales order and title/ownership of the products will transfer to the customer at invoicing. Payment terms will not be altered or extended in connection with a **Bill & Hold** arrangement. Once products are invoiced and placed into **Bill & Hold**, they will be segregated and marked as customer owned material, be readily available for immediate delivery to the customer, and will be the sole property of the customer. JF Petroleum Group will have no entitlement to the products in **Bill & Hold**.

f. Seller shall not be bound by any provision or agreement requiring or providing Seller to waive any rights to any lien, including a mechanic's lien, or any provision conditioning Seller's right to receive payment for its work (when applicable) upon payment to Purchaser by any third party.

4. DELIVERY; SHIPMENT TERMS; FREIGHT DAMAGE CLAIMS:

a. Shipping dates are approximate; delivery assurances are based on manufacturers' material suppliers to maintain schedules. Delivery promises are contingent upon fires, strikes, accidents, lockout, work stoppages, war, riot, availability of materials, acts of God, governmental action or regulation, or for other causes beyond Seller's control. The Seller shall have no liability for any delay, failure to deliver, loss of business, liquidated damages or other loss or damages which might result therefrom. The Seller will endeavor to maintain schedules, but cannot guarantee to do so. Delivery, unless otherwise stated, does not include unloading. Seller shall not be liable for damage in transit of any materials furnished. The Purchaser shall make a secure area (the "Secured Area") available to Seller if requested by Seller. Any necessary relocation of equipment or installation materials from the Secured Area will be at Purchaser's expense.

b. The shipping terms, including the F. O. B. point (such as "shippers dock" or a designated destination), may be indicated on the face of this agreement. The shipping terms should also include whether freight is "collect" or to be "prepaid and added". If these terms are not indicated, they may be chosen by Seller at Seller's sole discretion. Whenever merchandise is delivered to the designated F.O.B. point, by common carrier (by manufacturer or Seller), or is received by Purchaser, whichever is earlier, Seller's responsibility ceases and full risk of loss (including transportation delays and losses) and title passes to Purchaser, and Purchaser shall be liable to Seller for the full price of the merchandise. Delivery to Seller's facility for purposes of convenience, coordination or price protection shall be considered "delivery" for invoice purposes.

c. If any damage is evident upon delivery, Purchaser must make a notation on the freight bill of lading and have the carrier's agent sign upon delivery for claim record. Purchaser must immediately notify Seller and file a claim with the carrier, as Seller assumes no responsibility for goods damaged in shipment. Shortages and hidden damages or defects to goods must be reported to Seller and carrier within 30 days of receipt of shipment. The quoted prices do not include the cost of unloading, which is Purchaser's responsibility.

5. INSURANCE, LIMITED WARRANTY, INDEMNITY AND HOLD HARMLESS:

a. Seller does not extend any warranties to Purchasers of materials and equipment. The products sold by Seller may be warranted by the manufacturer of the product but only to the extent of any warranty offered by the manufacturer. Purchaser shall register equipment warranties with the manufacturer. MANUFACTURERS OR SELLER HAVE NO LIABILITY WHATSOEVER FOR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, including but not limited to lost profits, down time, loss of material or product, clean up costs associated with loss of product, or damage to other equipment, unless said damage is proven to have been caused by Seller's sole negligence. No warranty is extended where equipment is improperly installed by Purchaser, its employees, agent, representative or contractor. Seller represents that it will convey good title to the items purchased, however, except as modified in the next paragraph, SELLER MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY SELLER.

b. To the extent allowed by law Purchaser agrees to hold Seller harmless from and defend and indemnify it against any of Seller's or Purchaser's losses in connection with any property damage, personal injury or death, whether same is related to any claim, penalty, or fine by government agency for pollution, environmental damage, cleanup, or otherwise, or whether any claim is made by any third party against Seller or Purchaser or said damage, personal injury or death is claimed or sustained by Purchaser or Purchaser's employee or made against Purchaser or Seller in connection therewith, including but not limited to damages, costs, expenses, and attorneys fees, except to the extent that said damage, personal injury or death is proven to have been caused by the negligence or fault, the breach or violation of a statute, ordinance, governmental regulation, standard, or rule, or the breach of the contract of the Seller, its agent or employee or any third party under the control or supervision of the Seller, other than the Seller or its agent, employee or subcontractor of any tier. Where a penalty, fine or claim for pollution damage or cleanup is made against Seller in connection with installation of materials or equipment, Purchaser agrees to hold Seller harmless from and defend and indemnify it against same, except to the extent that said fine or claims is proven to have been caused by the negligence or fault, the breach or violation of a statute, ordinance, governmental regulation, standard, or rule, or the breach of the contract of the Seller.

c. Seller shall have NO LIABILITY under this warranty if equipment malfunctions or other problems result, directly or indirectly, from accident (not caused by Seller), subsequent work on equipment by Purchaser or third party, improper operation of equipment, inadequate maintenance, and/or failure to protect properly the equipment from environmental hazards. Seller does not assume any liability and Purchaser agrees to hold Seller harmless from and defend and indemnify Seller for losses or claims for tanks(s) that emerge from their set position and/or are lost after installation due to improper ballasting, ground water, high water tables, or hydrostatic pressure, unless proper anchorage is provided for under terms of this agreement, and Purchaser shall at all times provide adequate ballast.

d. NO EMPLOYEE OR REPRESENTATIVE OF SELLER IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY.

e. Purchaser will defend and indemnify Seller against any claims for damages for profits arising from infringements of patents, designs, trade secrets, copyrights, trade names, and/or trademarks with respect to goods manufactured, either in whole or part, to Purchaser's specifications, except to the extent that said claims are proven to have been caused by the negligence or fault, the breach or violation of a statute, ordinance, governmental regulation, standard, or rule, or the breach of the contract of the Seller.. Purchaser will defend and indemnify Seller against any claims for damages for profits arising from infringements of patents, designs, trade secrets, copyrights, trade names, and/or trademarks with respect to goods manufactured, by Seller and modified by Purchaser, except to the extent that said claims are proven to have been caused by the negligence or fault, the breach or violation of a statute, ordinance, governmental regulation, standard, or rule, or the breach of the contract of the Seller. Seller assumes no liability for sales engineering or application information extended by its personnel. Purchaser agrees to hold Seller and its representatives harmless from and indemnify them against any and all claims, losses, damages, judgments, and costs, whether direct or indirect, or by reason of any reliance upon said representatives concerning sales, engineering or application information provided by Seller and/or its representatives, except to the extent that said claims, losses, damages, judgments, and costs are proven to have been caused by the negligence or fault, the breach or violation of a statute, ordinance, governmental regulation, standard, or rule, or the breach of the contract of the Seller.

f. NO ACTION OR CLAIM, WHETHER IN TORT, CONTRACT, OR OTHERWISE, MAY BE BROUGHT AGAINST SELLER, ARISING FROM OR RELATED TO THE MATERIALS OR EQUIPMENT HEREBY PURCHASED MORE THAN TWO YEARS AFTER THE DATE OF PURCHASE.

6. CANCELLATIONS AND RETURN OF GOODS: Purchaser may cancel an order only upon advance written approval of Seller and provided Purchaser pays freight charges and Seller's reasonable cancellation and restocking charges, which are based in part on manufacturer's charges. No merchandise may be returned without Seller's advance written consent, with shipping instructions furnished, and no merchandise will be accepted for credit without Seller's authorization. At the option of the Seller, the return of material prior to Purchaser receiving Seller's approval will result in the material remaining the property of Purchaser, and it will be stored at Purchaser's sole risk and expense. If such material is not picked up by Purchaser within ten (10) days from the date of the unauthorized return, Seller, may, at its sole option, declare Purchaser's interest and right to the material forfeited and retain all money Purchaser has paid as liquidated damages. This means, Purchaser shall have no further rights in the material and no money will be refunded or credit given. If Seller accepts the material in return for credit, a handling charge based in part on acceptance of the material for return by the manufacturer will be charged, and no credit shall be issued to Purchaser until credit from the manufacturer is received.

7. GOVERNMENTAL COMPLIANCE: Environmental compliance is Purchaser's responsibility. Purchaser's failure to comply strictly with applicable federal, state or local requirements, rules and/ or regulations (including but not limited to those applicable to notice) shall completely void Seller's limited warranty under this Agreement. It is Purchaser's responsibility to report any inventory shortage or suspected release to federal, state and all other authorities having jurisdiction and to Seller within 24 hours of occurrence. Purchaser agrees to hold Seller harmless from and indemnify and defend Seller against any claims or liability relating to Purchaser's failure to comply strictly with all federal, state or local environmental requirements, rules and/or regulations, including those applicable to notice. If Purchaser fails to comply strictly with any federal, state or local environmental requirements, rules and/or regulations, including those applicable to notice, Purchaser hereby releases Seller its officers, directors, employees, agents, affiliates, subsidiaries, related entities, successors and assigns (collectively "Releases") from any and all liabilities, claims, obligations, suits, proceedings, causes of action, whether known or unknown, suspected or unsuspected, both at law and in equity, which Purchaser ever had, now has or may hereafter have against any of the Releases arising out of or relating to its failure to comply strictly with all federal, state or local environmental requirements, rules and/or regulations, including those applicable to notice.

8. MANUFACTURER INFORMATION: Seller may provide manufacturer's product information and installation instructions for informational purposes, but makes no representations regarding such information. Seller may also provide manufacturer's product operating manual when available.

9. RECORD KEEPING: Purchaser is responsible to keep daily accurate inventory records on products stored in tanks, lines, and dispensing equipment. In the event of a shortage or leakage within seven (7) calendar days from date of installation, Purchaser shall immediately notify Seller. In no event shall Seller be responsible for shortages, clean-up or related costs incurred for said shortages or leakages prior to notification. Notification must be made by telephone contact, immediately followed by written confirmation within twenty-four (24) hours.

10. ENFORCEABILITY / SEVERABILITY, NON-WAIVER AND NON-ASSIGNABILITY: If any of the provisions hereof shall be deemed unenforceable by reason of law or court ruling, the remaining provisions shall be deemed enforceable. Any waiver of a breach of this agreement shall not be construed as a waiver of any other breach. Purchaser may not assign this agreement or any rights hereunder, in whole or part, without the prior written consent of Seller.

11. MANDATORY MEDIATION AND CHOICE OF LAW AND FORUM. ANY DISPUTE INVOLVING THE ENFORCEMENT OR INTERPRETATION OF THIS AGREEMENT IS SUBJECT TO MANDATORY, NON-BINDING MEDIATION UNDER THE CONSTRUCTION INDUSTRY MEDIATION RULES OF THE AMERICAN ARBITRATION ASSOCIATION, THE COST OF WHICH IS TO BE BORNE BY THE PARTIES EQUALLY, PRIOR TO EITHER PARTY PURSUING ARBITRATION AS REQUIRED UNDER THIS AGREEMENT. THE PLACE OF THE MEDIATION SHALL BE IN HIDALGO COUNTY, TEXAS. All other provisions hereof and of all resulting orders are to be governed and construed under the laws of the State of Texas, and the courts of said state shall have sole jurisdiction over any dispute concerning this agreement.

12. ENTIRE AGREEMENT: This Agreement constitutes the entire understanding of the parties, and there are no representations, warranties or undertakings made other than as set forth herein; however, this agreement is subject to revision and may not be the final project cost. This agreement is further binding between the parties for all labor performed, materials supplied and/or work completed (when applicable) between the parties whether or not such work is included within the scope of the Work as defined herein in this Agreement.

Acceptance: The above prices, specifications and conditions included and detailed above have been read are hereby accepted, including the statement concerning this project is not a "lump sum" project. Purchaser is responsible for all sales, use and other governmental taxes and charges, which are not included in the price unless expressly stated. You are authorized to do the work as specified. Payment will be made as outlined above. Seller may revoke this offer before acceptance.

IN WITNESS THEREOF, THE PARTIES HAVE CAUSED THIS AGREEMENT TO BE EXECUTED BY THEIR DULY AUTHORIZED REPRESENTATIVES. This agreement is subject to revision and may not be the final project cost. Additions or deletions as defined by the owner will reflect the final project cost.

THIS OFFER MAY BE WITHDRAWN OR REVISED BY JF PETROLEUM GROUP IF NOT ACCEPTED WITHIN 7 DAYS OF THE DATE OF JF PETROLEUM GROUPS'S SIGNATURE BELOW.

ACCEPTED FOR: PSI JF PETROLEUM GROUP INC.

SIGNATURE: By: _____
 Title: Sales Representative _____

APPROVED BY: By: _____
 Title: Branch Manager _____

ACCEPTED FOR: _____ (Company Name)

SIGNATURE

TITLE

PHONE**ADDRESS**

CITY

STATE

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Sherry Bailey, Sr. Planner, Planning and Development Services

Meeting Date: June 18, 2024

Item type: Regular Item

Caption:

First reading and public hearing of ordinances for the following cases:

1. CP24-01, a request to amend the Comprehensive Plan, changing from "Commercial" to "Neighborhood Center" being 0.613 acres located at 816 Culwell St.; and
2. Z24-03, a request to rezone from the Heavy Commercial zoning district to Neighborhood Commercial zoning district being 0.613 acres located at 816 Culwell St.; west of the Texas Pacifico RR and Culwell St. (Presentation made by Planning & Development Services Director Aaron Vannoy)

Staff Recommendation:

Adopt

Summary/History:

The project is to rezone a property next to Bethel Baptist Church to build a daycare. The area to the immediate West begins with residential areas and the area to the immediate East is Heavy Commercial and some manufacturing areas. Culwell is a main through street between Main Street and Bell Street north of the Houston Harte Expressway. We believe this specific area is able to support the rezoning and the future development of child care could be beneficial to the employees of those Heavy Commercial and Manufacturing areas.

Funding Source(s):

Financial Impact:

NA

Other Information/Recommendation:

The Planning Commission approved 6-0 on May 20, 2024, and the City Staff recommended approval of CP24-01 & Z24-03.

Attachments:

- | | |
|----------------------------------|-----------------------------------|
| 1. Staff Report CP24-01 & Z24-03 | Staff Report CP24-01 & Z24-03.pdf |
| 2. Ordinance CP24-01 | Ordinance CP24-01.docx |
| 3. Zoning Ordinance Z24-03 | Zoning Ordinance Z24-03.docx |

Presentation:

Aaron Vannoy

Approvals/Reviews:

Sherry Bailey

Aaron Vannoy

Brandon Dyson

Aaron Vannoy

Brandon Dyson

Heather Stastny

Created/Initiated

Approved

Approved

Approved

Approved

Final Approval



STAFF REPORT – CP24-01 & Z24-03

PLANNING COMMISSION

Planning Commission meeting May 20, 2024

City Council 1st reading: June 18, 2024

APPLICATION TYPE:		CASES:	
Comprehensive Plan Amendment and Rezoning		CP24-01 & Z24-03: 816 Culwell Street	
SYNOPSIS:			
The applicant has submitted a request for a Comprehensive Plan Amendment from “Commercial” to “Transitional” and for a rezoning from Heavy Commercial to Neighborhood Commercial west of the Texas Pacifico RR and Culwell Street This is an area that is north of East Houston Harte Expressway in the Paulann neighborhood between Bell St. and Main Street. The applicant wants to build a day care child center on this site.. The property is adjacent to a mixed neighborhood with single family residential next to commercial and industrial. The state child care information page does not show any child care centers in this general area even though this is an employment area as well as a residential area. Residents of the area will be able to take advantage of this service being so close to their home or workplace. There are also a few churches in the area. It is a older section of the city, with well-established smaller homes in aging neighborhoods.			
LOCATION:		LEGAL DESCRIPTION:	
816 Culwell [west of the Texas Pacifico RR tracks and east of N. Poe St.]		0.613 acres, Abstract A-1799 S-0324, Survey G. RODI	
SM DISTRICT / NEIGHBORHOOD:	ZONING:	Future Land Use	Size
SMD District #4 – Lucy Gonzales Paulann Neighborhood	Heavy Commercial (CH) to Neighborhood Commercial (NC)	Commercial to Transitional	0.613 acres
NOTIFICATIONS:			
24 notifications for CP24-01& Z24-10 were mailed within a 200-foot radius on April 24, 2024. No responses in favor or against have been received.			
STAFF RECOMMENDATION:			
Staff recommends APPROVAL of the Comprehensive Plan Amendment (CP24-01) from Commercial to Transitional and APPROVAL of the rezoning from the Heavy Commercial (CH) to Neighborhood Commercial (CN) for the property located at 816 Culwell Street.			
PROPERTY OWNER/PETITIONER:			
Applicants: Judith Idigo Bethel Baptist Church of San Angelo [land owner]			
STAFF CONTACT:			
Sherry L Bailey Principal Planner (325) 657-4210, Extension 1546 Sherry.bailey@cosatx.us			

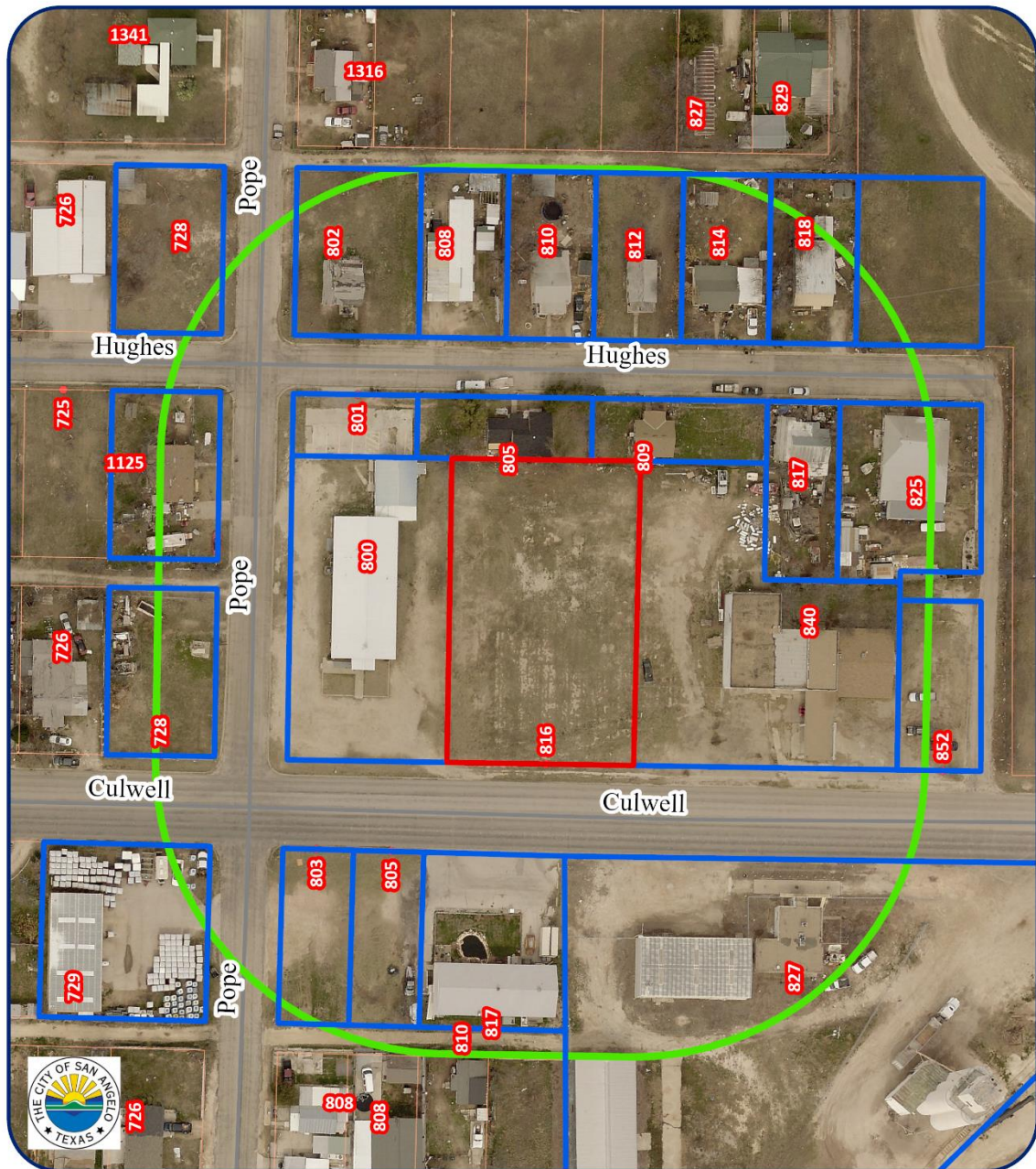
Additional Information: Staff met with the applicant's representative concerning the proposed Comprehensive Plan and rezoning at a development meeting. We are supportive of their approach to this development and are carrying the application forward. This larger area is home to many young families utilizing the aging residential stock as a starter home. It is also home to a work force made up of skilled laborers who need services provided near to their homes. There are also smaller clusters of new homes and a larger elderly home area.

1. **Compatible with Plans and Policies.** **Whether the proposed amendment is compatible with the Comprehensive Plan and any other land use policies adopted by the Planning Commission or City Council.** The Comprehensive Plan identifies this area as Transitional, the zoning on the area is Heavy Commercial and Residential (RS-1) to the north with Light Manufacturing (ML) to the south. The proposed change is for Neighborhood Commercial is a good fit for this area that can take advantage of the flexibility of the zoning in the area which lends itself to a mix of uses and residential and commercial development.
2. **Consistent with Zoning Ordinance.** **Whether and the extent to which the proposed amendment would conflict with any portion of this Zoning Ordinance.** The proposed rezoning will not conflict with the Zoning Ordinance.
3. **Compatible with Surrounding Area.** **Whether and the extent to which the proposed amendment is compatible with existing and proposed uses surrounding the subject land and is the appropriate zoning district for the land.** As noted above, the properties in this area are a mix of uses. In surveying the area, the one thing that all uses have in common is they are contributing to a mixed use area that will benefit from their availability and having this use close at hand.
4. **Changed Conditions.** **Whether and the extent to which there are changed conditions that require an amendment.** This area is constantly changing. That is part of what keeps it a vital alive area.
5. **Effect on Natural Environment.** **Whether and the extent to which the proposed amendment would result in significant adverse impacts on the natural environment, including but not limited to water and air quality, noise, storm water management, wildlife, vegetation, wetlands and the practical functioning of the natural environment.** There are no anticipated adverse effects on neighboring properties.
6. **Community Need.** **Whether and the extent to which the proposed amendment addresses a demonstrated community need.** Staff believes that this type of use in this type of area has a history of success. The single-family homes are good starter homes for young families that will benefit from this area. The church right next door can benefit from the services provided by this childcare service.
7. **Development Patterns.** **Whether and the extent to which the proposed amendment would result in a logical and orderly pattern of urban development in the community.** The property in question is part of the neighborhood.

Recommendation: Staff recommends **APPROVAL** of the Comprehensive Plan Amendment CP24-01 from Commercial to Transitional and **APPROVAL** of the rezoning from Heavy Commercial (CH) to Neighborhood Commercial at 816 Culwell Drive.

Attachments:

Aerial/Notification Map
Zoning Map
Future Land Use Map
Site Photos



200' Notification Map		
Z24-03 & CP24-01 816 Culwell St		
Council District: #4 Lucy Gonzales		
Neighborhood: Paulann		
Scale: 0 0.01 0.02 0.03 0.04 Miles	Subject Property:	
	200' Buffer:	
	Notified Properties:	



Aerial Map

Z24-03 & CP24-01 816 Culwell St

Council District: #4 Lucy Gonzales

Neighborhood: Paulann

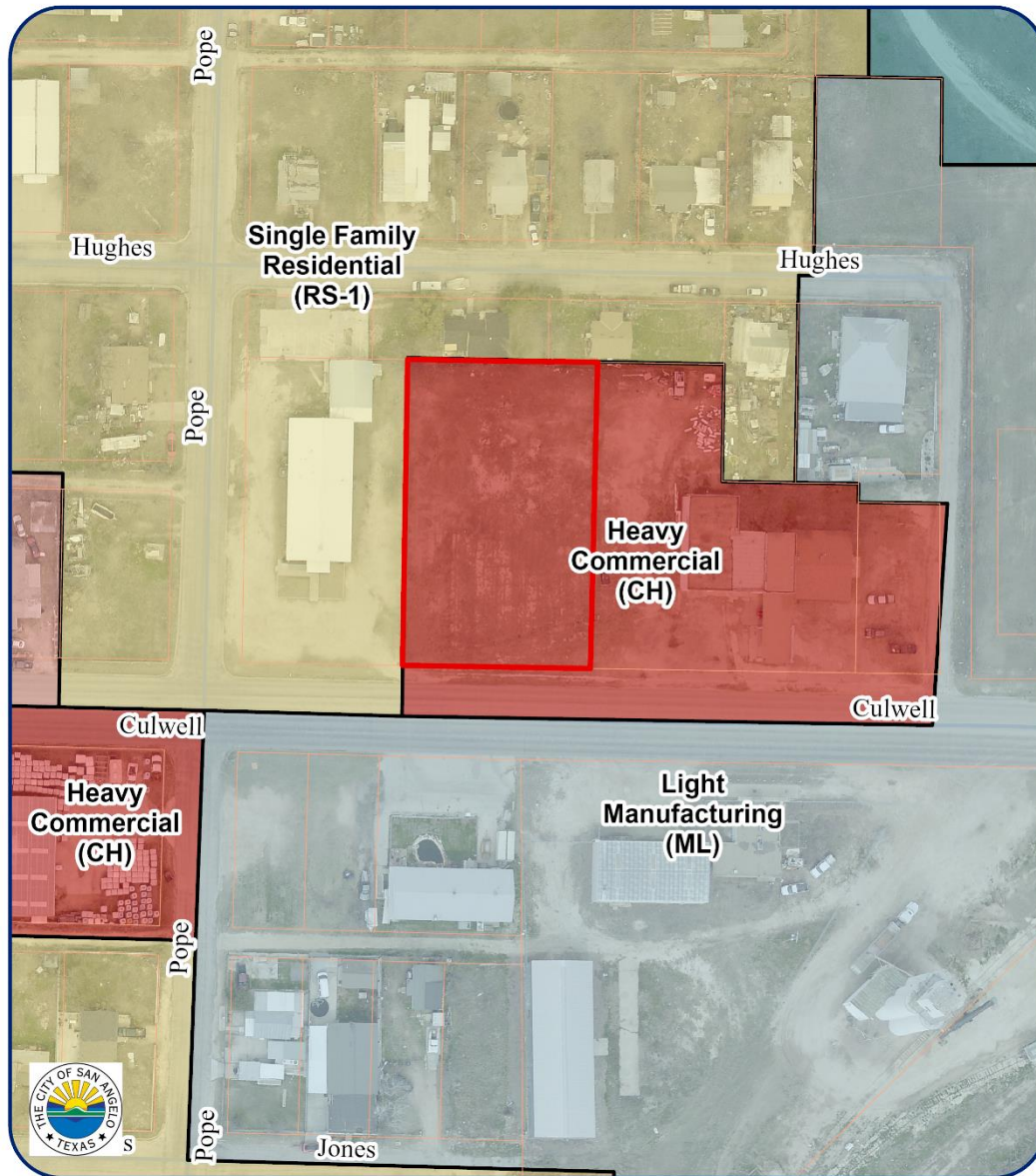
Scale: 0 0 0.01 0.01 0.02 0.02
Miles

Subject Property:

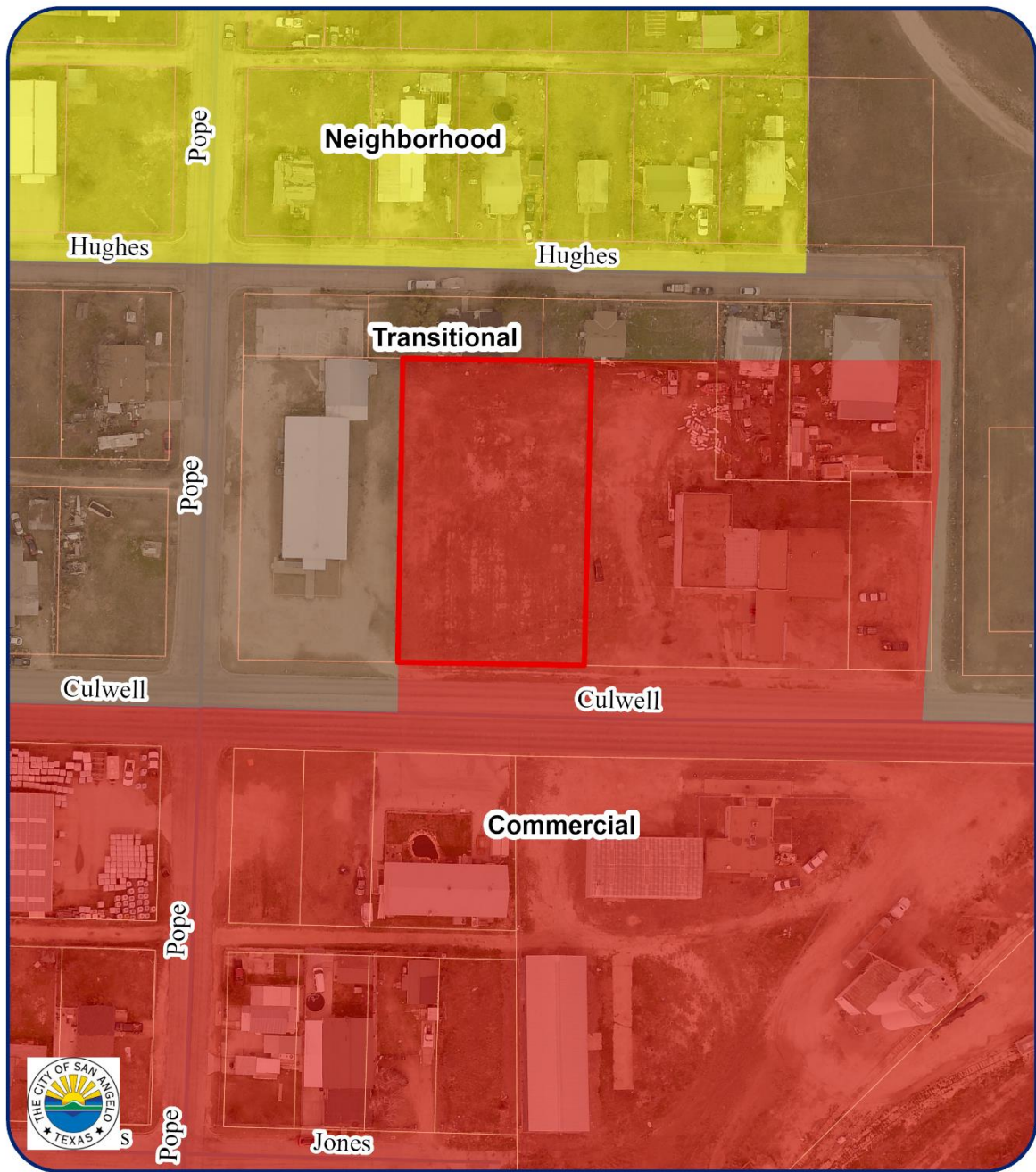


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Zoning Map
Z24-03 & CP24-01 816 Culwell St
Council District: #4 Lucy Gonzales
Neighborhood: Paulann
Scale: 0 0.01 0.02 0.03 0.03 Miles
Subject Property: —
N
▲



Vision Plan Map

Z24-03 & CP24-01 816 Culwell St

Council District: #4 Lucy Gonzales

Neighborhood: Paulann

Scale: 0 0.01 0.02 0.03 0.03
Miles

Subject Property:



N









AN ORDINANCE OF THE CITY OF SAN ANGELO, TEXAS, AMENDING THE CITY'S COMPREHENSIVE PLAN BY CHANGING THE FUTURE LAND USE PLAN MAP DESIGNATION OF CERTAIN LANDS LOCATED AT **816 CULWELL STREET**, BEING **APPROXIMATELY 0.613 ACRES**, FROM COMMERCIAL TO NEIGHBORHOOD CENTER PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE

CP24-01: 816 Culwell Street:

WHEREAS, the City Council for the City of San Angelo, Texas, in accordance with the City Charter and Chapter 213 of the Texas Local Government Code, has adopted a Comprehensive Plan (Vision Plan and Future Land Use Map within the San Angelo Strategic Plan adopted by City Council as updated on October 20, 2009) to guide the long-range development of the City, manage the future growth of the City and promote the health, safety and welfare of its citizens; and

WHEREAS, the Comprehensive Plan includes a Future Land Use Map to serve as a geographical representation of anticipated land use patterns and long range development for the City; and

WHEREAS, inconsistencies have developed between current long standing land use and development patterns and development envisioned by the Future Land Use Map, which inconsistencies call for compatible revisions to the Future Land Use Map; and

WHEREAS, the Planning Commission and the City Council for the City of San Angelo, in compliance with the City Charter and Chapter 213 of the Texas Local Government Code regarding adoption and amendment of the City's Comprehensive Plan, having given requisite notice of public hearing by publication and otherwise, and having afforded a full and fair hearing to all property owners and persons interested, including persons situated in the vicinity of the affected area, being of the opinion that revision of the Comprehensive Plan and Future Land Use Map changes should be made as set out herein;

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF SAN ANGELO:

SECTION 1: The Future Land Use Plan Map, a component of the adopted Comprehensive Plan for the City of San Angelo be and the same is hereby amended to change the Future Land Use designation of the following described parcel as outlined below:

The real property generally located at 816 Culwell Street, described as Abstract A-1799 S-0324, Survey G Rodi, 0.613 acres within the City of San Angelo, Tom Green County, Texas, from “Commercial” to “Neighborhood Center”.

SECTION 2: The Director of the Planning and Development Services Department is hereby authorized and directed to amend the Future Land Use Planning Map maintained in the Office of the Director to incorporate the foregoing amendments, as further depicted on **Exhibit “A”** of this Ordinance.

SECTION 3: The terms and provisions of this Ordinance shall be deemed to be severable in that, if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

SECTION 4: This Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the **18th day of June, 2024**, and finally ADOPTED on this the **2nd day of July, 2024**.

THE CITY OF SAN ANGELO

Brenda Gunter, Mayor

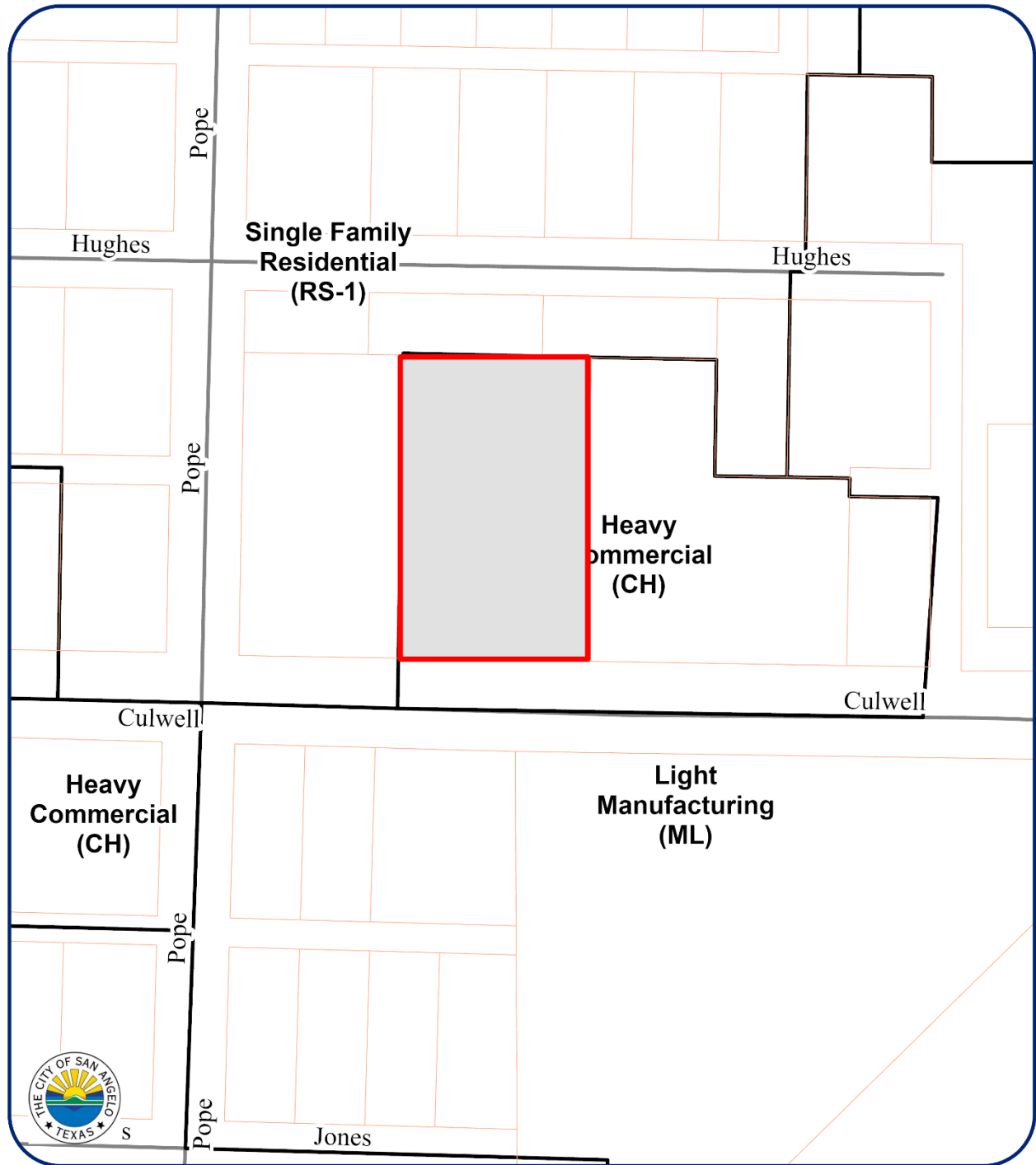
ATTEST:

APPROVED AS TO FORM:

Heather Stastny, City Clerk

Theresa James, City Attorney

Ordinance Map Exhibit "A"



Zoning and Comprehensive Plan Map

Z24-03 & CP24-01 816 Culwell St

Council District: #4 Lucy Gonzales

Neighborhood: Paulann

Scale: 0 0.01 0.02 0.03 0.03 Miles

Subject Property:



N



AN ORDINANCE AMENDING CHAPTER 12, EXHIBIT "A" OF THE CODE OF ORDINANCES, CITY OF SAN ANGELO, TEXAS, WHICH ADOPTS ZONING REGULATIONS, USE DISTRICTS AND A ZONING MAP, IN ACCORDANCE WITH A COMPREHENSIVE PLAN, BY CHANGING THE ZONING CLASSIFICATION OF THE FOLLOWING PROPERTY: **(APPROXIMATELY .613 ACRES LOCATED AT 816 CULWELL STREET, (ABSTRACT A-1799 S-0324, SURVEY G RODI);** HEAVY COMMERCIAL (CH) TO NEIGHBORHOOD COMMERCIAL ZONING DISTRICT (CN); PROVIDING FOR SEVERABILITY; AND, PROVIDING FOR AN EFFECTIVE DATE

RE: Z24-03: 816 Culwell Street

WHEREAS, on the 20th day of May 2024, the Planning Commission for the City of San Angelo in compliance with the City Charter, City ordinance and state law, and after holding a public hearing thereon, caused to be prepared and delivered a report and recommendation to City Council to approve the proposed Neighborhood Commercial (CN) Zoning District; and,

WHEREAS, on the 18th day of June, 2024, City Council held a public hearing on Z24-03 pursuant to published notice, and has considered the application, comments, reports and recommendations of the Planning Commission and staff, public testimony, and other relevant support materials.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY OF SAN ANGELO:

SECTION 1: The basic zoning ordinance for the City of San Angelo, as enacted by the governing body for the City of San Angelo effective January 4, 2000, and included within Exhibit "A" of Chapter 12 of the Code of Ordinances of the City of San Angelo, and zoning map be and the same are hereby amended to designate the following described properties permanently zoned NEIGHBORHOOD COMMERCIAL (CN) ZONING DISTRICT:

The real property generally located at 816 Culwell Street, described as Abstract A-1799 S-0324, Survey G Rodi, 0.613 acres within the City of San Angelo, Tom Green County, Texas as more particularly described and depicted on Exhibit "A" of this Ordinance.

SECTION 2: The Director of the Planning & Development Department, or his/her designee, is hereby directed to correct zoning district maps in the office of the Planning & Development

Department, to implement the zoning provision adopted herein, as further depicted on **Exhibit “A”** of this Ordinance.

SECTION 3: In all other respects, the use of the hereinabove described property shall be subject to all applicable regulations contained in Chapter 12 of the Code of Ordinances for the City of San Angelo, as amended.

SECTION 4. The remaining provisions of Chapter 12 of the Code of Ordinances of the City of San Angelo, Texas, not amended herein shall remain in full force and effect.

SECTION 5: The terms and provisions of this Ordinance shall be deemed to be severable in that, if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

SECTION 6: This Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the **18th day of June, 2024**, and finally PASSED, APPROVED AND ADOPTED on this the **2nd day of July, 2024**.

THE CITY OF SAN ANGELO

Brenda Gunter, Mayor

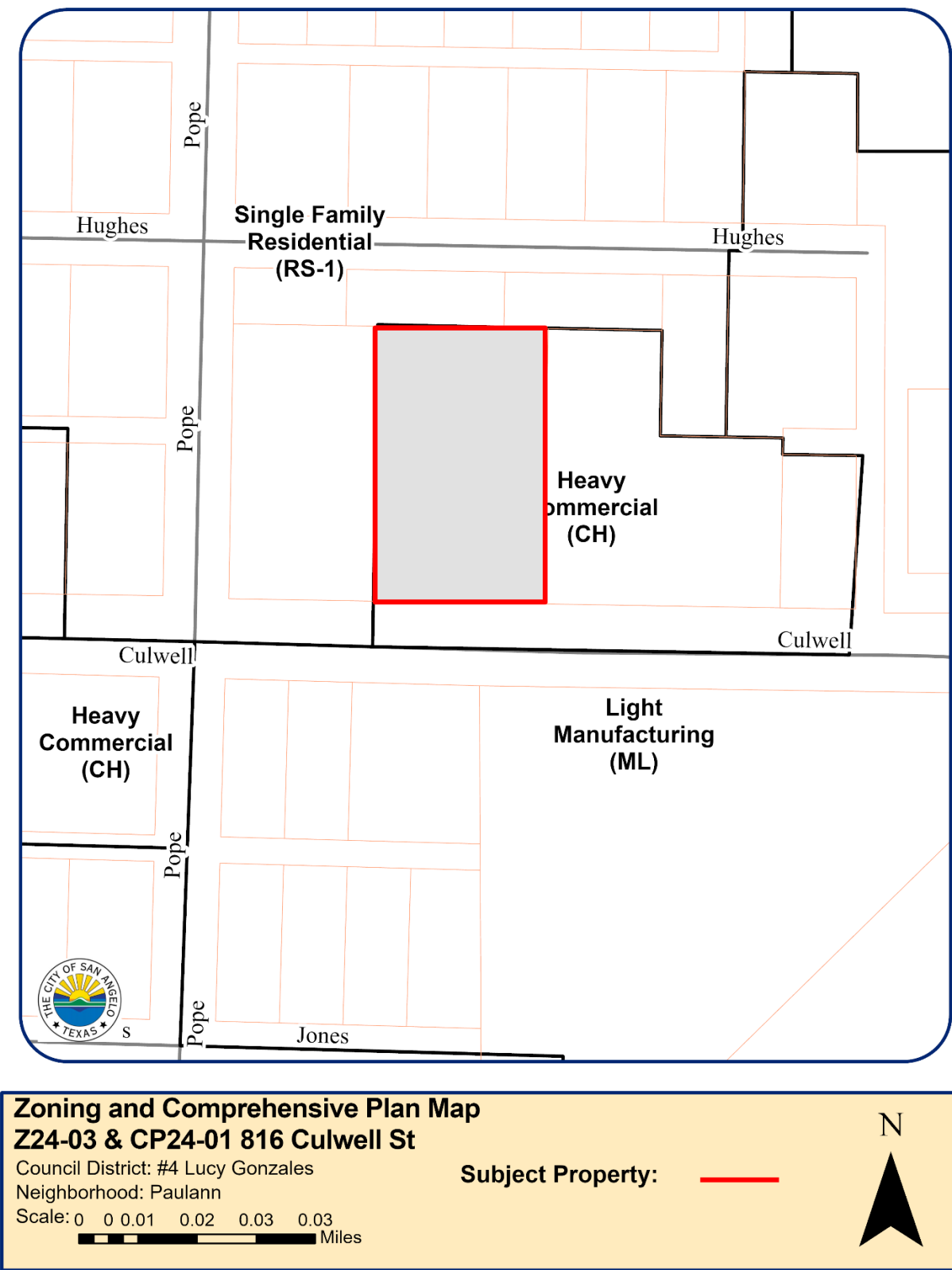
ATTEST:

Heather Stastny, City Clerk

APPROVED AS TO FORM:

Theresa James, City Attorney

Exhibit “A”



REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Austin Reed, Planning Technician, Planning and Development Services

Meeting Date: June 18, 2024

Item type: Regular Item

Caption:

First reading and public hearing of ordinances for the following cases:

1. CP24-03, a request to amend the Comprehensive Plan from "Commercial" to "Neighborhood," being 0.386 acres located at 7 and 9 East 27th St.; and
2. Z24-04, a request to rezone from General Commercial/Heavy Commercial zoning district to Single-Family Residential zoning district, being 0.198 acres located at 7 East 27th St. (Presentation made by Planning & Development Services Director Aaron Vannoy)

Staff Recommendation:

Adopt

Summary/History:

This project is to change the rezoning and comprehensive plan to accommodate the construction of a single family residence on a lot which was originally built as residential, but through the 2000 zoning ordinance update, it was zoned general commercial/heavy commercial (CG/CH) being one half block off N Chadbourne. This is a small infill development where the area is still significantly residential except for properties which face N Chadbourne. The comprehensive plan update does update the two lots to allow the residential to continue into the future.

Funding Source(s):

Financial Impact:

Other Information/Recommendation:

Attachments:

- | | | |
|----|---------------------------------|-------------------------------------|
| 1. | Z24-04 & CP24-03 - Staff Report | Z24-04 & CP24-03 - Staff Report.pdf |
| 2. | Z24-04 Ordinance | Z24-04 Ordinance.docx |
| 3. | CP24-03 Ordinance | CP24-03 Ordinance.docx |

Presentation:

Aaron Vannoy

Approvals/Reviews:

Austin Reed

Aaron Vannoy

Brandon Dyson

Aaron Vannoy

Brandon Dyson

Heather Stastny

Created/Initiated

Approved

Approved

Approved

Approved

Final Approval

STAFF REPORT
PLANNING COMMISSION – May 20, 2024
City Council First Reading – June 18, 2024

APPLICATION TYPE:		CASE:	
Rezoning & Comprehensive Plan Amendment		Z24-04 – 7 E 27 th St CP24-03 – 7 E 27 th & 9 E 27 th	
SYNOPSIS:			
The applicant is requesting a zone change for a 15-foot-wide portion of General/Heavy Commercial (CG/CH) zoning that runs along the property's west side to be Single-Family Residential (RS-1). The applicant intends to build a residence on this lot. The Comprehensive Plan envisions this lot to be "Commercial", so an amendment to "Neighborhood" is needed. The neighboring property to the east, currently a residence, is included in the Comprehensive Plan amendment.			
LOCATION:		LEGAL DESCRIPTION:	
East of N. Chadbourne along E. 27 th St.		Z24-04 & CP24-03: Acres: 0.198, Lot: 3 SEC 2, Blk: 3, Subd: REDMAN O ADDITION CP24-03: Acres: 0.188, Abst: A-0112 S-0318, Survey: F E CRAMER, 0.1720 ACRE	
SM DISTRICT / NEIGHBORHOOD:	ZONING:	FUTURE LAND USE:	SIZE:
SMD #4 – Lucy Gonzales Neighborhood: Reagan	CG/CH	Commercial	Z24-04: .198 acres CP24-03: .386 acres
THOROUGHFARE PLAN:			
East 27th Street: Local Road			
NOTIFICATIONS			
14 notices were mailed out. At the time of this report, no notices have been returned.			
STAFF RECOMMENDATION:			
Staff recommends APPROVAL of the rezoning from General/Heavy Commercial (CG/CH) to Single-Family Residential (RS-1), and APPROVAL of the Comprehensive Plan Amendment from Commercial to Neighborhood.			
PROPERTY OWNER/PETITIONER:			
Owner: Clark Wilson			
STAFF CONTACT:			
Austin Reed Planner (325) 657-4210, Extension 1550 austin.reed@cosatx.us			

Information:

This rezoning only encompasses a 15-foot-wide portion of what is currently a vacant lot. This lot is about 180 feet removed from North Chadbourne and marks the beginning of a large area of residential zoning. There are a few other existing residences in the immediate area. A Comprehensive Plan amendment is proposed to change this lot to “Neighborhood”, as well as the lot to its east as to connect it to the existing “Neighborhood.”

Planning Commission evaluation of appropriateness.

Section 213(G) of the Zoning Ordinance requires that the Planning Commission and City Council consider, at minimum, seven (7) factors in determining the appropriateness of any rezoning request as outlined in #1 through #7 below:

1. **Compatible with Plans and Policies.** *Whether the proposed amendment is compatible with the Comprehensive Plan and any other land use policies adopted by the Planning Commission or City Council.*
A Comprehensive Plan amendment is proposed as to ensure the compatibility of this request. This amendment will also help to align the preexisting residential zoning with the Comprehensive Plan by envisioning it as “Neighborhood.”
2. **Consistent with Zoning Ordinance.** *Whether and the extent to which the proposed amendment would conflict with any portion of this Zoning Ordinance.*
This lot will meet all requirements for Single-Family Residential (RS-1) zoning.
3. **Compatible with Surrounding Area.** *Whether and the extent to which the proposed amendment is compatible with existing and proposed uses surrounding the subject land and is the appropriate zoning district for the land.*
This rezoning is compatible with the surrounding area as much of the immediate vicinity is pre-existing residential and is zoned as such.
4. **Changed Conditions.** *Whether and the extent to which there are changed conditions that require an amendment.*
This lot is currently vacant but has 15-feet of commercial zoning encroaching into it. The applicant wishes to develop the land for a residence, and this request simply looks to clean up the zoning and make the lot developable.
5. **Effect on Natural Environment.** *Whether and the extent to which the proposed amendment would result in significant adverse impacts on the natural environment, including but not limited to water and air quality, noise, storm water management, wildlife, vegetation, wetlands and the practical functioning of the natural environment.*
Staff does not anticipate any adverse environmental effects.
6. **Community Need.** *Whether and the extent to which the proposed amendment addresses a demonstrated community need.*
This request comes out of the City’s Infill Area and there has been a demonstrated community need for housing.

7. Development Patterns. *Whether and the extent to which the proposed amendment would result in a logical and orderly pattern of urban development in the community.*

This request essentially cleans up the zoning remainder and will result in a usable lot, thereby promoting logical development.

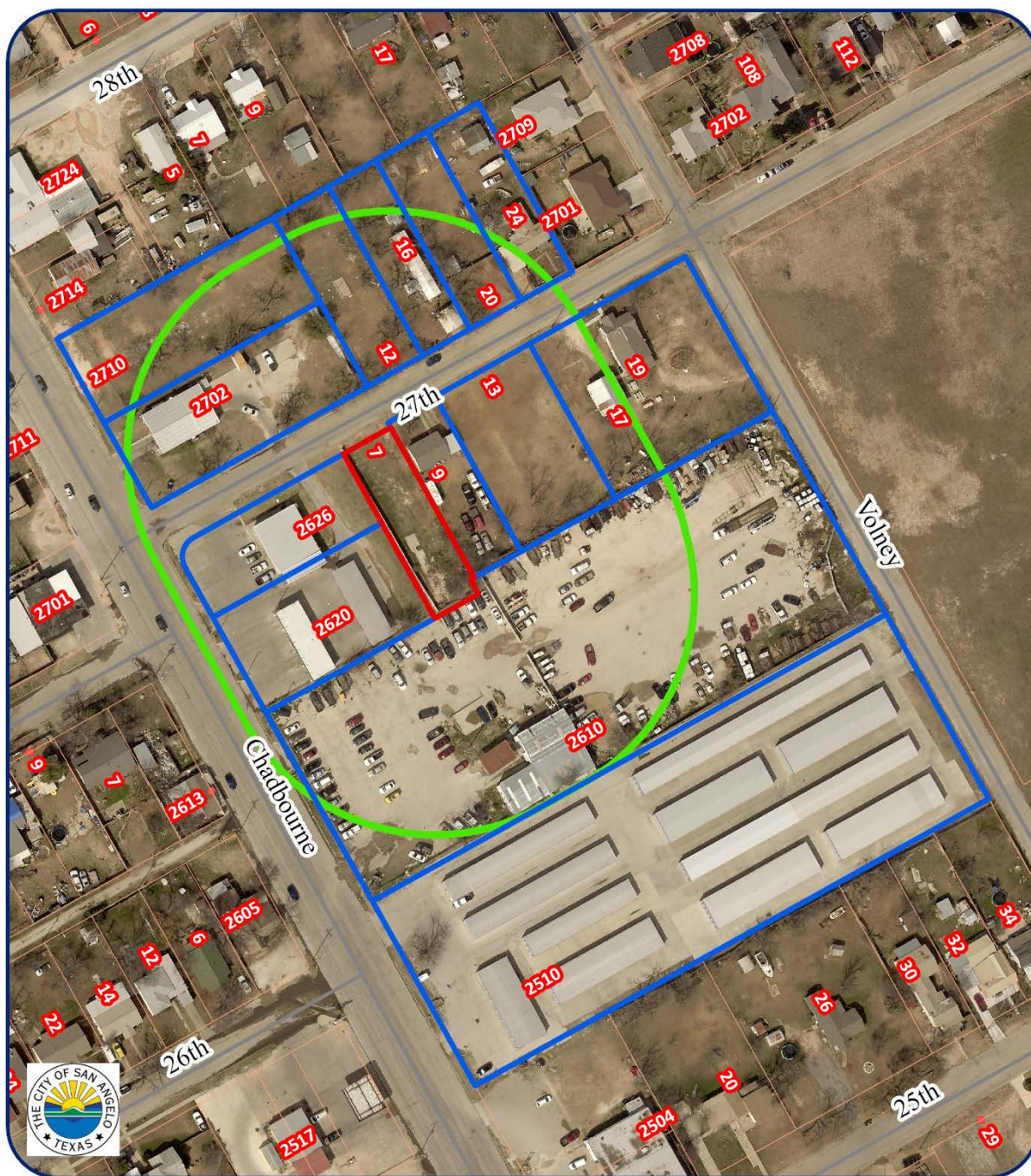
Recommendation:

Staff recommends **APPROVAL** of the rezoning from General/Heavy Commercial (CG/CH) to Single-Family Residential (RS-1), and **APPROVAL** of the Comprehensive Plan Amendment from Commercial to Neighborhood.

Attachments:

Notification Map
Aerial Map
Zoning Map

Notification Map



200' Notification Map

Z24-03 7 E 27th

Council District: #4 Lucy Gonzales

Neighborhood: Reagan

Scale: 0.0 0.01 0.02 0.03 0.04
Miles

Subject Property: ———

200' Buffer: ———

Notified Properties: ———

N



Aerial Map



Aerial Map

Z24-03 7 E 27th

Council District: #4 Lucy Gonzales

Neighborhood: Reagan

Scale: 00.00 0.01 0.02 0.03 0.04
Miles

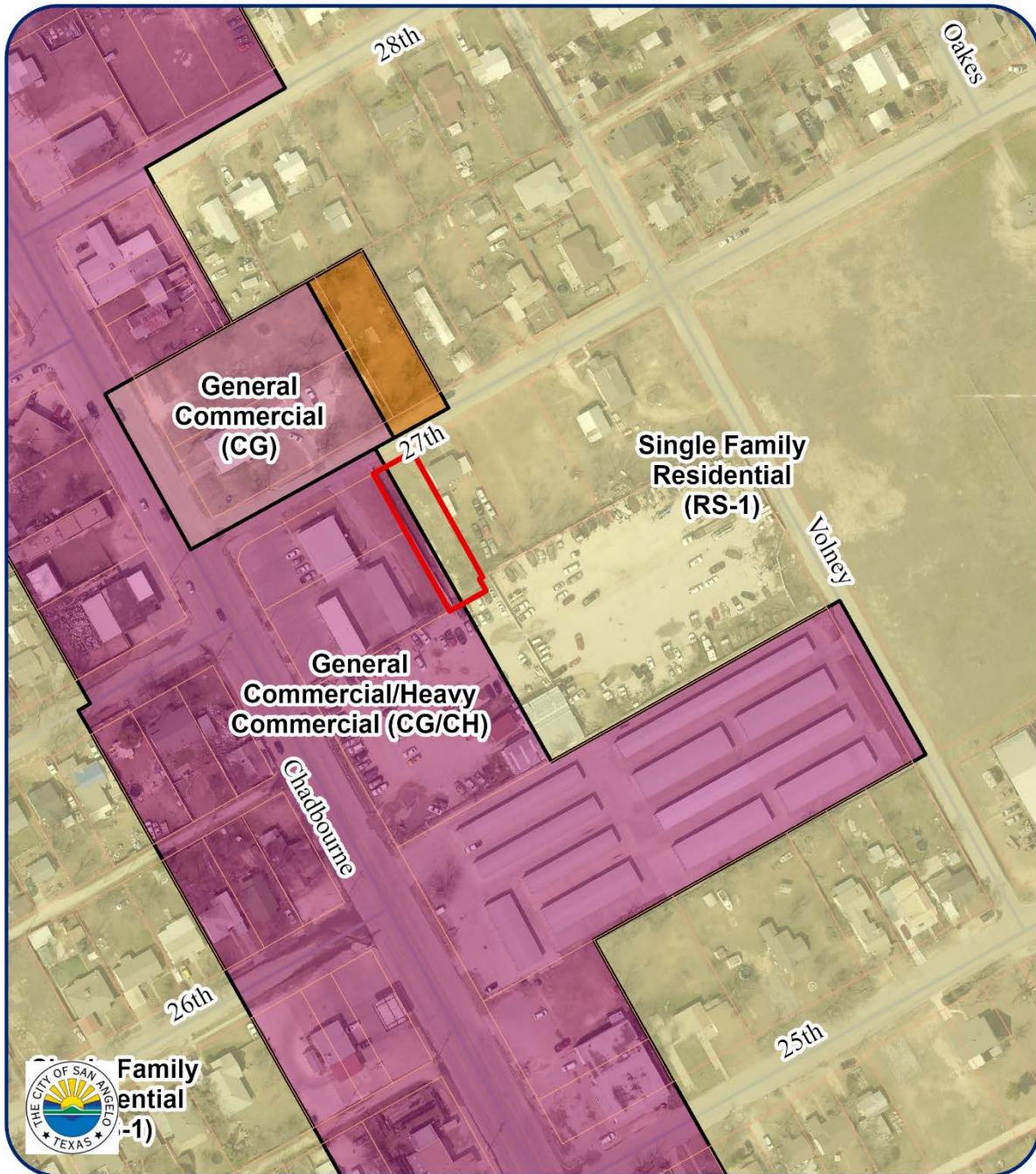
Subject Property:



N



Zoning Map



Zoning Map

Z24-03 7 E 27th

Council District: #4 Lucy Gonzales

Neighborhood: Reagan

Scale: 00.00 0.01 0.02 0.03 0.04

Miles

Subject Property:



N



AN ORDINANCE AMENDING CHAPTER 12, EXHIBIT “A” OF THE CODE OF ORDINANCES, CITY OF SAN ANGELO, TEXAS, WHICH ADOPTS ZONING REGULATIONS, USE DISTRICTS AND A ZONING MAP, IN ACCORDANCE WITH A COMPREHENSIVE PLAN, BY CHANGING THE ZONING CLASSIFICATION OF THE FOLLOWING PROPERTY: **APPROXIMATELY .198 ACRES LOCATED AT 7 EAST 27TH STREET, (LOT: 3 SEC 2, BLK: 3, SUBD: REDMAN O ADDITION); FROM GENERAL COMMERCIAL / HEAVY COMMERCIAL TO SINGLE-FAMILY RESIDENTIAL ZONING DISTRICT (RS-1), PROVIDING FOR SEVERABILITY; AND, PROVIDING FOR AN EFFECTIVE DATE**

RE: Z24-04: 7 EAST 27TH STREET

WHEREAS, on the 20th day of May, 2024, the Planning Commission for the City of San Angelo in compliance with the City Charter, City ordinance and state law, and after holding a public hearing thereon, caused to be prepared and delivered a report and recommendation to City Council to approve the Single-Family Residential (RS-1) Zoning District; and,

WHEREAS, on the 18th day of June, 2024, City Council held a public hearing on Z24-04, pursuant to published notice, and has considered the application, comments, reports and recommendations of the Planning Commission and staff, public testimony, and other relevant support materials.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY OF SAN ANGELO:

SECTION 1: The basic zoning ordinance for the City of San Angelo, as enacted by the governing body for the City of San Angelo effective January 4, 2000, and included within Exhibit “A” of Chapter 12 of the Code of Ordinances of the City of San Angelo, and zoning map be and the same are hereby amended to designate the following described properties permanently zoned Single-Family Residential (RS-1) Zoning District:

The real property generally located 7 East 27th Street, described as Section 2, Block 3, Lot 3 of Redman O Addition, 0.198 acres within the City of San Angelo, Tom Green County, Texas as more particularly described and depicted on Exhibit “A” of this Ordinance. (“Zone Change Map”).

SECTION 2: The Director of the Planning & Development Department, or his/her designee, is hereby directed to correct zoning district maps in the office of the Planning & Development Department, to implement the zoning provision adopted herein, as further depicted on **Exhibit “A”** of this Ordinance (**“Zone Change Map”**).

SECTION 3: The use of the hereinabove described property shall be subject to all applicable regulations contained in Chapter 12 of the Code of Ordinances for the City of San Angelo, as amended.

SECTION 4: The terms and provisions of this Ordinance shall be deemed to be severable in that, if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

SECTION 5: This Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the **18th day of June, 2024**, and finally PASSED, APPROVED AND ADOPTED on this the **2nd day of July, 2024**.

THE CITY OF SAN ANGELO

Brenda Gunter, Mayor

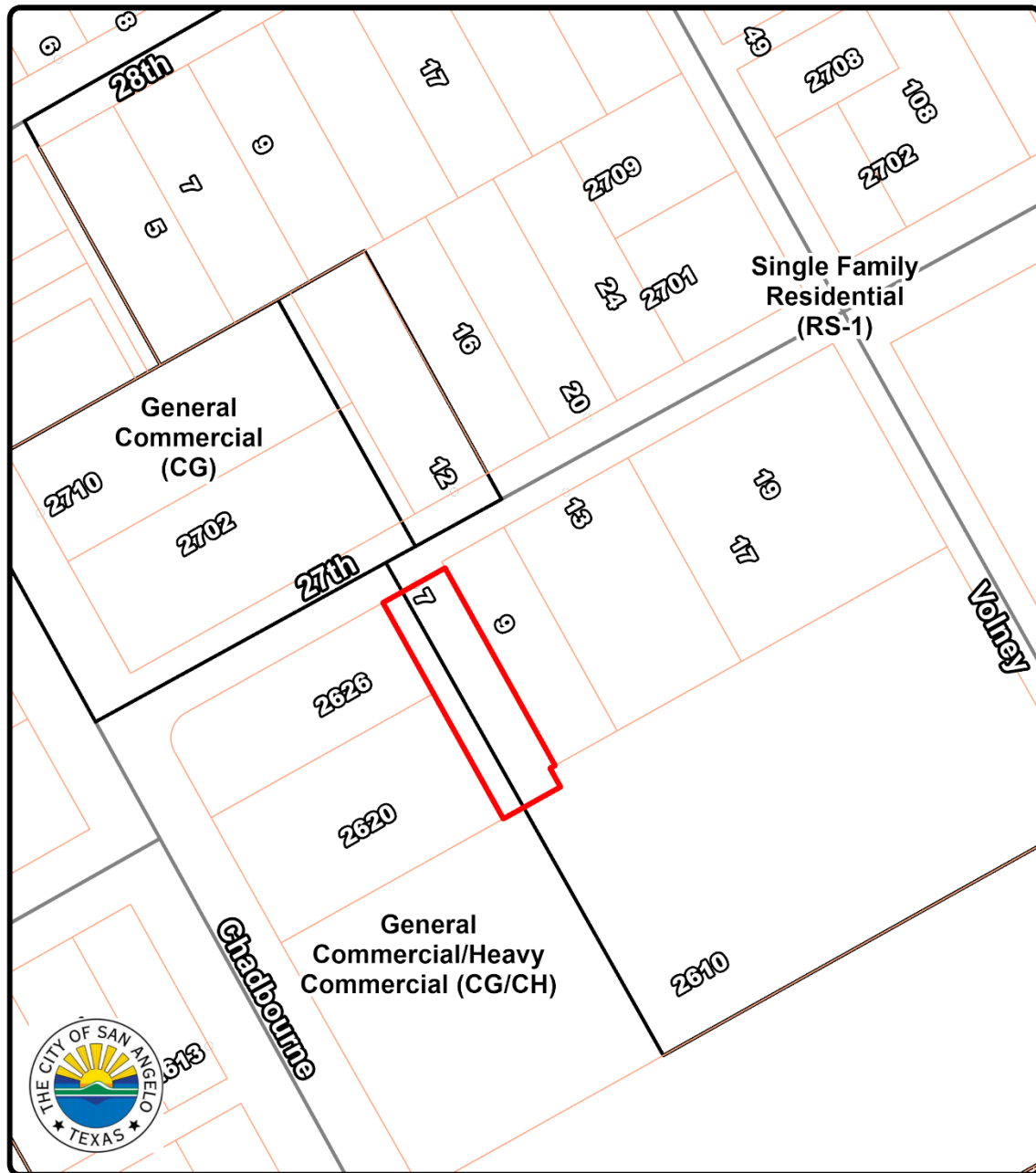
ATTEST:

APPROVED AS TO FORM:

Heather Stastny, City Clerk

Theresa James, City Attorney

Exhibit "A" (Zone Change Map)



Zoning Map

Z24-04 7 E 27th

Council District: #4 Lucy Gonzales

Neighborhood: Reagan

Subject Properties:



Scale: 0 0.010.01 0.02 0.03 0.04 Miles

N



AN ORDINANCE OF THE CITY OF SAN ANGELO, TEXAS, AMENDING THE CITY'S COMPREHENSIVE PLAN BY CHANGING THE FUTURE LAND USE PLAN MAP DESIGNATION OF CERTAIN LANDS LOCATED AT 7 AND 9 EAST 27TH STREET, BEING **APPROXIMATELY .386 ACRES**, FROM "COMMERCIAL" TO "NEIGHBORHOOD" PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE

CP24-03: LOCATED AT 7 AND 9 EAST 27TH STREET

WHEREAS, the City Council for the City of San Angelo, Texas, in accordance with the City Charter and Chapter 213 of the Texas Local Government Code, has adopted a Comprehensive Plan (Vision Plan and Future Land Use Map within the San Angelo Strategic Plan adopted by City Council as updated on October 20, 2009) to guide the long-range development of the City, manage the future growth of the City and promote the health, safety and welfare of its citizens; and

WHEREAS, the Comprehensive Plan includes a Future Land Use Map to serve as a geographical representation of anticipated land use patterns and long range development for the City; and

WHEREAS, inconsistencies have developed between current long standing land use and development patterns and development envisioned by the Future Land Use Map, which inconsistencies call for compatible revisions to the Future Land Use Map; and

WHEREAS, the Planning Commission and the City Council for the City of San Angelo, in compliance with the City Charter and Chapter 213 of the Texas Local Government Code regarding adoption and amendment of the City's Comprehensive Plan, having given requisite notice of public hearing by publication and otherwise, and having afforded a full and fair hearing to all property owners and persons interested, including persons situated in the vicinity of the affected area, being of the opinion that revision of the Comprehensive Plan and Future Land Use Map changes should be made as set out herein;

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF SAN ANGELO:

SECTION 1: The Future Land Use Plan Map, a component of the adopted Comprehensive Plan for the City of San Angelo be and the same is hereby amended to change the Future Land Use designation of the following described parcels as outlined below:

The real property generally known as 7 and 9 East 27th Street, being approximately .386 acres in Section 2, Block 3, Lot 3 of the Redman O Addition and Abst: A-0112 S-0318, Survey: F E Cramer, 0.1720 Acre within the City of San Angelo, Tom Green County, Texas as more particularly described and depicted on Exhibit “A” of this Ordinance.

SECTION 2: The Director of the Planning and Development Services Department is hereby authorized and directed to amend the Future Land Use Planning Map maintained in the Office of the Director to incorporate the foregoing amendments, from “COMMERCIAL” to “NEIGHBORHOOD” as shown on EXHIBIT “A”.

SECTION 3: The terms and provisions of this Ordinance shall be deemed to be severable in that, if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

SECTION 4: This Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the **18th day of June, 2024**, and finally ADOPTED on this the **2nd day of July, 2024**.

THE CITY OF SAN ANGELO

Brenda Gunter, Mayor

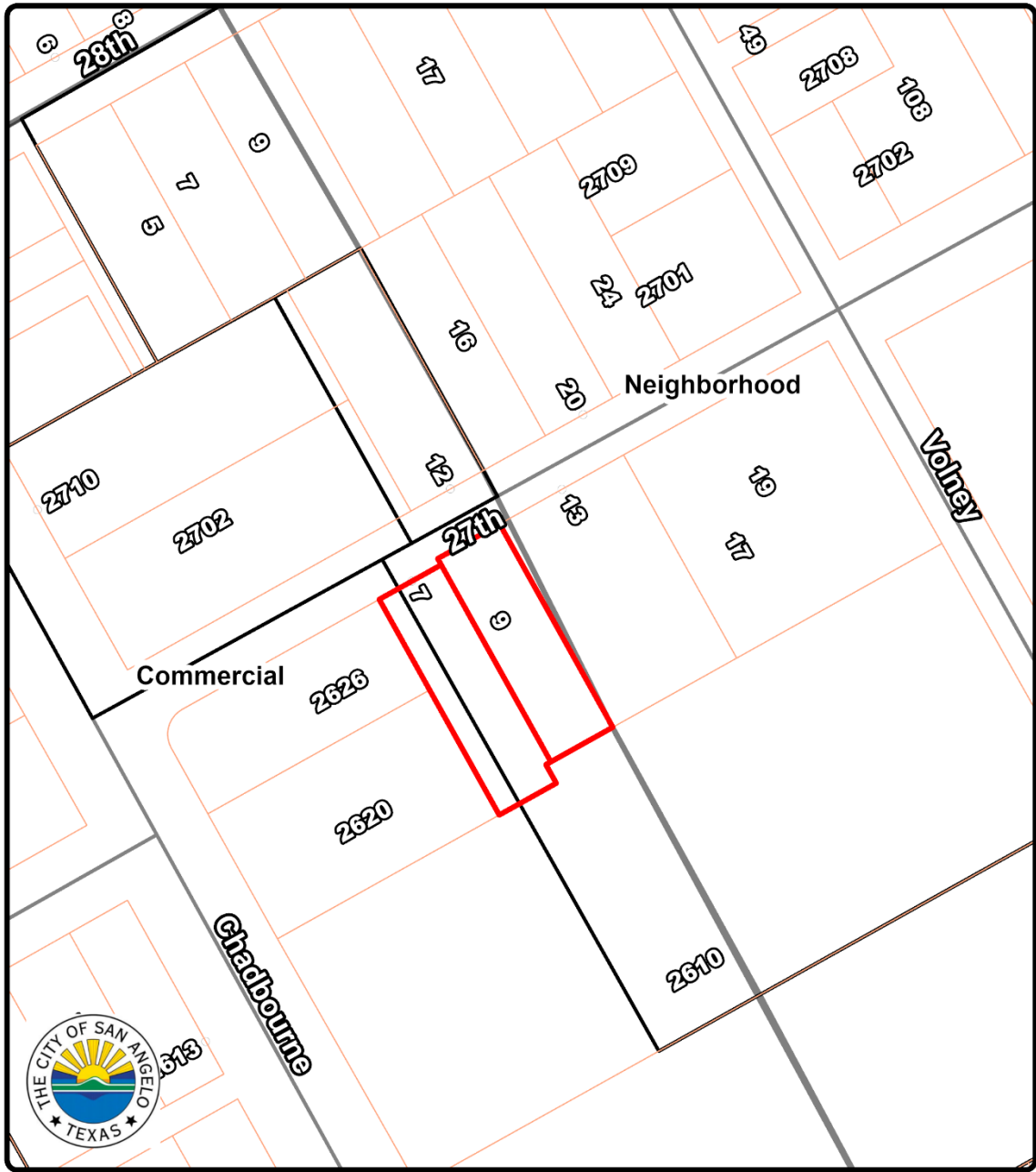
ATTEST:

APPROVED AS TO FORM:

Heather Stastny, City Clerk

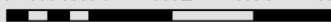
Theresa James, City Attorney

Ordinance Map Exhibit "A"



Vision Map
CP24-03: 7 & 9 E 27th St
Council District: #4 Lucy Gonzales
Neighborhood: Reagan

Subject Properties: 

Scale:  Miles

N 

REPORT TO MAYOR & MEMBERS OF CITY COUNCIL



Requestor: Sherry Bailey, Sr. Planner, Planning and Development Services

Meeting Date: June 18, 2024

Item type: Regular Item

Caption:

First reading and public hearing of an ordinance approving Z24-10, a request to rezone from the Low Rise Multi-Family, General Commercial/Heavy Commercial, and General Commercial zoning districts to the Central Business District zoning district, on approximately 70.02 acres generally located and bounded by the 400 block of N. Emerick St., south to the 100 block of S. Emerick St., then east to the 200 and 300 blocks of E. Twohig Ave., then north up S. Main St. beginning at the teen block through the 300 block of N Main St., from the 300 block of E. Pulliam St., west through the 100 to 300 block of E. 3rd St., as well as the 200 block of N. Magdalen beginning at College Ave and the 200 block of N. Oakes St., south to Woodrow St. to E. 3rd St., including individual properties located at 102 N. Oakes St., 105 and 107 N. Magdalen St., and 118 S. Magdalen St. (Presentation made by Planning and Development Services Director Aaron Vannoy)

Staff Recommendation:

Adopt

Summary/History:

The expansion of the Central Business District - East has been expected through the various downtown plans since 2009. This effort will bring properties beginning with Oakes St. east to Emmerick St and from N 3rd and Pulliam down to East Twohig; except for the planned development properties which Shannon Medical Center owns and operates. The City staff did analysis over the past 4 months to review use types and determine which properties may come into conflict with the Central Business District land uses. This list below will be allowed to continue until they do a change of occupancy in the future:

241 N. Main Street Abst. A-1848 S-0322 Survey C. Salinger 0.870 acres 32% outdoor storage

240 Pecan Street Being 65 ft. X 140 ft. NW corner of Coulter Tract Abst. A-1848 S-0322 Survey C. Salinger 0.2089 acres 18% outdoor coverage

117 N Merick St. 0.115 acres Blk. 7 Frary Addition, S 50 of Lots 7 & 8 13 % outdoor coverage

114 N Main St. 0.115 acres Blk. 7 Frary Addition North 50 ft. of the south 190 ft. of Lots 9 & 10 22% outdoor storage

211 Main St. 0.207 acres Fritz Homestead Add. Tract 1 & 2 out of the SE Corner containing 9016.7 SF 27% outdoor storage

18 E 3rd St. 0.124 acres Kleck Subdivision Blk 2 Lot 15 40% outdoor storage

112 N Main St. 0.092 Frary Addition Blk 7 South 40 ft. of the north 100 ft. of Lots 9 & 10 16% outdoor coverage

These properties will be designated by mapping and address their current status and will not change until a change of occupancy occurs.

Funding Source(s):

Financial Impact:

NA

Other Information/Recommendation:

The Planning Commission approved 6-0 on April 15th and city staff recommended approval.

Attachments:

- | | | |
|----|---|--|
| 1. | Staff Report CBD Expansion - City Council | Staff Report CBD Expansion - City Council.docx |
| 2. | Ordinance ZC24-10 CBD Expansion | Ordinance ZC24-10 CBD Expansion.docx |

Presentation:

Aaron Vannoy

Approvals/Reviews:

Sherry Bailey	Created/Initiated
Aaron Vannoy	Approved
Brandon Dyson	Approved
Heather Stastny	Final Approval

MEMO

**Meeting**

Date: April 15, 2024

To: Planning Commission

From: Sherry L. Bailey
Principal Planner, City of San Angelo

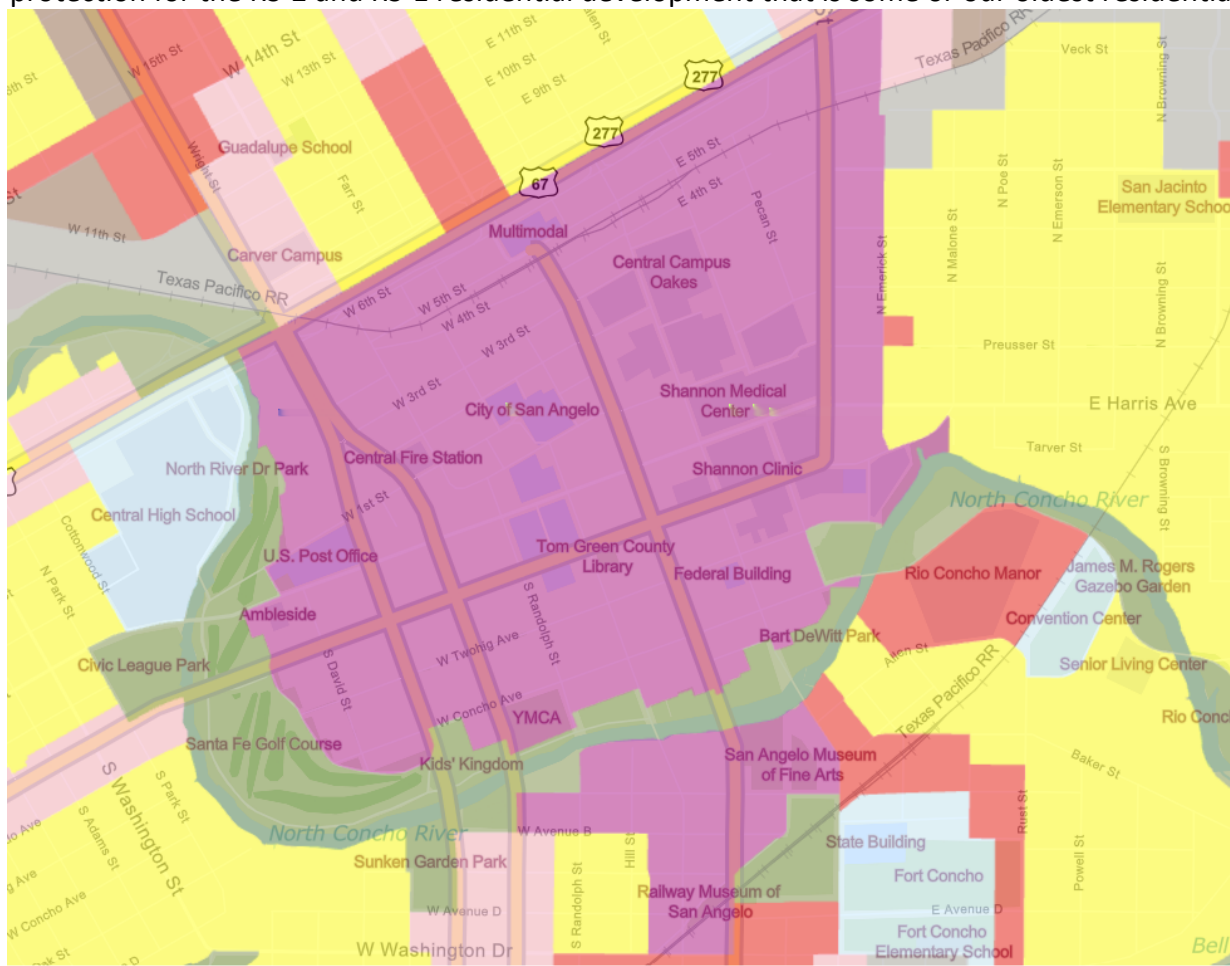
Request: Discussion and action on Central Business District Zoning Expansion

Background: The Historic District, the Downtown District and the Central Business District, were amended in 2021. This expansion was intended to be just that- a first expansion. Based on the direction given at the last Planning Commission meeting staff has moved forward with the expansion of the Central Business District in the area adjacent to BOUNDED BY THE 400 BLOCK OF N EMERICK ST. SOUTH TO THE 100 BLOCK OF S. EMERICK ST, THEN EAST TO THE 200 AND 300 BLOCKS OF E. TWOHIG AVENUE, NORTH UP S. MAIN ST. BEGINNING AT THE TEEN BLOCK THROUGH THE 300 BLOCK OF N. MAIN ST., THEN TO 300 BLOCK E. PULLIAM STREET, EAST THROUGH THE 100 TO 300 BLOCK OF E. 3RD STREET, AS WELL AS THE 200 BLOCK AND TEEN BLOCK OF N. MAGDALAN STREET, AND THE 200 BLOCK OF N. OAKES ST SOUTH TO WOODROW STREET., ALSO INCLUDED ARE INDIVIDUAL PROPERTIES LOCATED AT 102 N. OAKES ST, 105 AND 107 N. MAGDALEN ST.. This is the area that is most easily affected by the CBD change in designation since most of the buildings are flush with the front property lines and on-site parking is a major issue.

Notification: Staff held a Public Meeting on April 11, 2024, for those property owners that had questions or opinions they wanted to share. The meeting was attended by people. Their questions ranged from how this affects my property to why I should care. Overall, I think everyone appreciated the chance to ask their questions and receive information.

Information: In 2019 we identified the Historic Overlay and set up the ordinances to do just that. What we continued in 2022 was to move forward with the Development District Overlay guidelines to protect the remaining Downtown District area and then set up the Central Business District Overlay and zoned area with zoned allowed uses but the Central Business District Overlay has no guidelines. We therefore continue to use the Downtown District Guidelines. We also have several businesses along both sides of Main Street that would benefit from Central Business District zoning and would fall under the allowed uses for that district including equipment repair garages and supply companies all the way up to 6th Street and the Houston Harte Expressway. This entire area is the kind of mixed-use area that makes the Central Business District such an attractive zoning classification.

If we look beyond the Mainstreet divide over to the extent of the Downtown Development District Vision area, we see the start of larger lot development along with more industrial development that we may want to keep their zoning but look to extending the Development District Overlay Guidelines to encourage better protection for the RS-2 and RS-1 residential development that is some of our oldest residential.



development that is some of our oldest residential development areas. The benefit of the Downtown District Overlay Guidelines is they fall under the Downtown District Vision that has been there for over 20 years now. They are not onerous; they can be used over any zoning district, and they provide a cohesive approach to the areas development.

Recommendations:

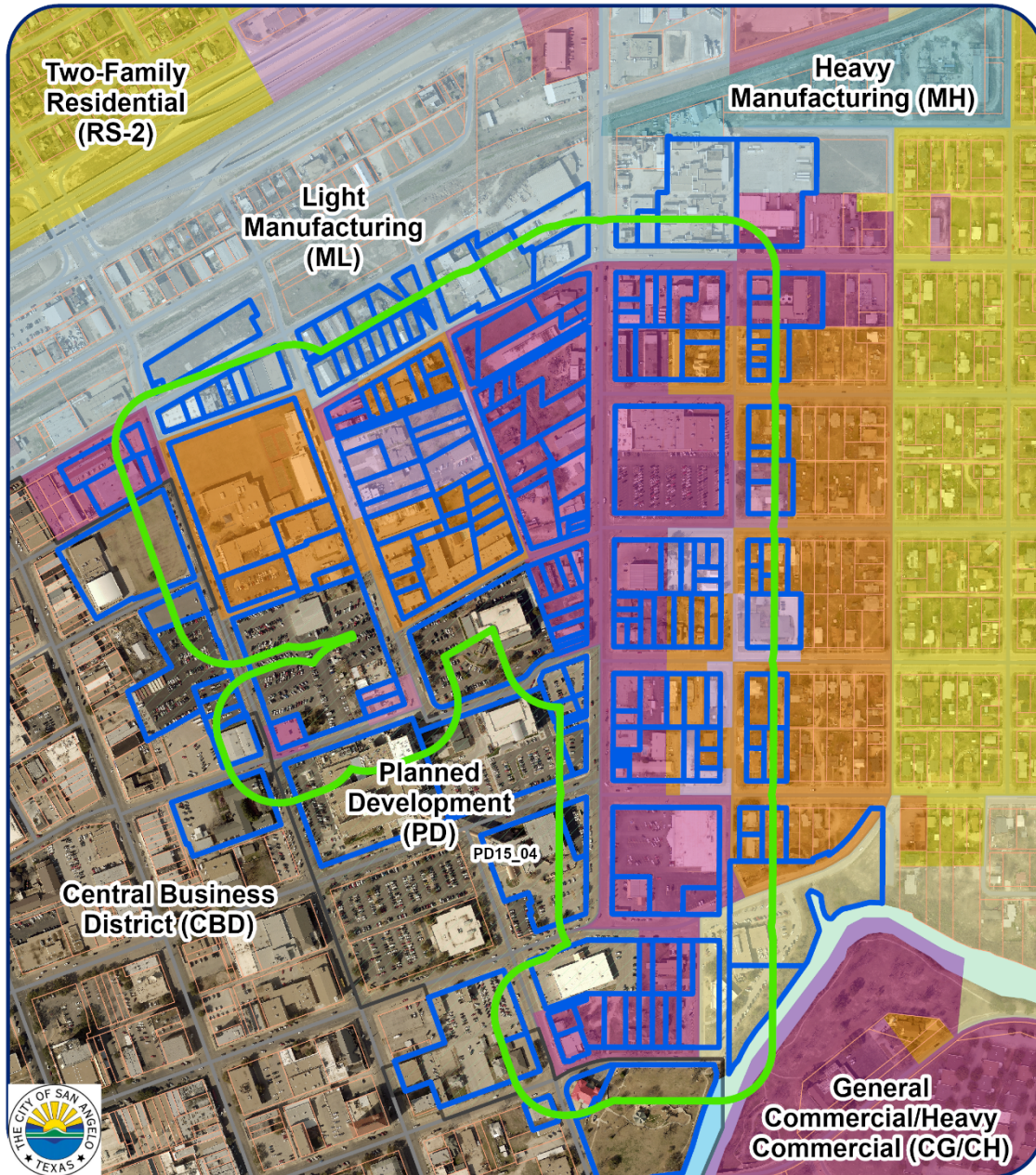
1. Approve expanding the CBD zoning east to the west side of Emerick Street. Staff will be meeting with the DHRC to discuss if there are specific areas or the entire Main Street area that they believe would benefit from expanding the Development District Overlay from 6th Street down to College Avenue and taking this time to remove the CBD Overlay on the existing area and replacing it with just the Development District Overlay.
2. Consider the Industrial area along 4th through 6th Streets as an area with real potential and over this area with the Downtown Development District Overlay and encourage opening opportunities for creative development. Work with the owners of the area and the expansion committee to include design controls and size limitations that would benefit the neighborhood. Both groups in items 1. And

2 need to give input and consideration of the needs of the area and the expansion vision and we need to make sure that their needs are addressed. This area needs to be reviewed by both the DHRC and the Planning Commission.

3. There is a area south of the river that is part of the Downtown Development District future vision that is in need of more in depth review. Staff would like to see attention focused on this area and a recommendation developed to bring back to the DHRC and the Planning Commission.

Planning Commission Requested Action:

Staff are requesting **APPROVAL** of the suggested Central Business District (CBD) zoning for this first area over to the west side of Emerick Street up to Pulliam and 3rd Streets then down to E Twohig Avenue and over to N Oakes Street.



CBD Expansion meeting

Council District: #3 Harry Thomas
Neighborhood: Ft. Concho/Downtown

Scale: 0 0.03 0.06 0.12 0.18 0.24 Miles

Notification buffer
Subject Properties:



N



AN ORDINANCE AMENDING CHAPTER 12, EXHIBIT “A” OF THE CODE OF ORDINANCES, CITY OF SAN ANGELO, TEXAS, WHICH ADOPTS ZONING REGULATIONS, USE DISTRICTS AND A ZONING MAP, IN ACCORDANCE WITH A COMPREHENSIVE PLAN, BY CHANGING THE ZONING AND CLASSIFICATION OF THE FOLLOWING PROPERTY: BEING APPROXIMATELY 70.02 ACRES GENERALLY LOCATED AND BOUNDED BY THE 400 BLOCK OF N. EMERICK ST., SOUTH TO THE 100 BLOCK OF S. EMERICK ST., THEN EAST TO THE 200 AND 300 BLOCKS OF E. TWOHIG AVE., THEN NORTH UP S. MAIN ST. BEGINNING AT THE TEEN BLOCK THROUGH THE 300 BLOCK OF N. MAIN ST., THEN FROM THE 300 BLOCK OF E. PULLIAM ST., WEST THROUGH THE 100 TO 300 BLOCK OF E. 3RD ST., AS WELL AS THE 200 BLOCK OF N. MAGDALAN ST. BEGINNING AT COLLEGE AVE., AND THE 200 BLOCK OF N. OAKES ST., SOUTH TO WOODROW ST. TO E. 3RD ST., INCLUDING INDIVIDUAL PROPERTIES LOCATED AT 102 N. OAKES ST., 105 AND 107 N. MAGDALEN ST., AND 118 S. MAGDALEN ST., FROM LOW RISE MULTI-FAMILY (RM-1), GENRAL COMMERCIAL/HEAVY COMMERCIAL (CG/CH), AND GENRAL COMMERCIAL (CG) ZONING DISTRICTS TO THE CENTRAL BUSINESS DISTRICT (CBD) ZONING DISTRICT PROVIDING FOR SEVERABILITY; AND, PROVIDING FOR AN EFFECTIVE DATE

RE: Z24-10: Central Business District Expansion

WHEREAS, on the 15th day of April, 2024, the Planning Commission for the City of San Angelo in compliance with the City Charter, City ordinance, and state law, and after holding a public hearing thereon, caused to be prepared and delivered a report and recommendation to City Council to APPROVE the proposed Central Business District Zoning District, and,

WHEREAS, on the 18th day of June 2024, City Council held a public hearing on Z24-10 pursuant to published notice, and has considered the application, comments, reports, and recommendations of the Planning Commission and staff, public testimony, and other relevant support materials.

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF SAN ANGELO:

SECTION 1: The basic zoning ordinance for the City of San Angelo, as enacted by the governing body for the City of San Angelo effective January 4, 2000, and included within Exhibit “A” of Chapter 12 of the Code of Ordinances of the City of San Angelo, and zoning map be and the same are hereby amended to designate the following described properties permanently zoned CENTRAL BUSINESS ZONING DISTRICT:

The real property being approximately 70.02 acres generally located and bounded by the 400 block of N. Emerick St., South to the 100 block of S. Emerick St., then East to the 200 and 300 blocks of E. Twohig Ave., then North up S. Main St. beginning at the teen block through the 300 block of N. Main St., then from the 300 block of E. Pulliam St., West through the 100 to 300 block of E. 3rd St., as well as the 200 block of N. Magdalen St. beginning at College Ave., and the 200 block of N. Oakes St., South to Woodrow St., to E. 3rd St., including individual properties located at 102 N. Oakes St., 105 and 107 N. Magdalen St., and 118 S. Magdalen St., in the City of San Angelo, Tom Green County, Texas and described by property address on Exhibit “A” of this Ordinance.

SECTION 2: The Director of the Planning & Development Department, or his/her designee, is hereby directed to correct zoning district maps in the office of the Planning & Development Department, to implement the zoning provision adopted herein, as further depicted on **Exhibit “B”** of this Ordinance (**“PD Boundary Map”**).

SECTION 3: Except as otherwise specified or limited herein, the use and development of the subject property shall generally conform to the Central Business District (CBD) Zoning District. With respect to outdoor storage, the properties listed on **Exhibit “C”** may continue to maintain their current percentage of outdoor storage as listed in **Exhibit “C”**, notwithstanding any limitations on the same pursuant to CBD zoning district regulations. In all other respects the use of the herein described property shall be subject to all applicable regulations contained in Chapter 12 of the Code of Ordinances for the City of San Angelo, as amended.

SECTION 4. The remaining provisions of Chapter 12 of the Code of Ordinances of the City of San Angelo, Texas, not amended herein shall remain in full force and effect.

SECTION 5: The terms and provisions of this Ordinance shall be deemed to be severable in that, if any portion of this Ordinance shall be declared to be invalid, the same shall not affect the validity of the other provisions of this Ordinance.

SECTION 6: This Ordinance shall be effective on, from and after the date of adoption.

INTRODUCED on the **18th day of June, 2024**, and finally PASSED, APPROVED AND ADOPTED on this the **2nd day of July, 2024**.

THE CITY OF SAN ANGELO

Brenda Gunter, Mayor

ATTEST:

Heather Stastny, City Clerk

APPROVED AS TO FORM:

Theresa James, City Attorney

Exhibit “A”

The properties included in this expansion and permanently zoned Central Business District pursuant to this Ordinance and depicted on Exhibit “B” are as follows:

231 N MAGDALEN	225 PECAN
212 N MAGDALEN	227 N MAIN
226 N MAGDALEN	227 N MAIN
240 N MAGDALEN	211 N MAIN
242 N MAGDALEN	207 N MAIN
246 N MAGDALEN	16 N MAIN & 18
262 N MAGDALEN	0 N MAIN
0 N MAGDALEN	12 N MAIN
221 N MAGDALEN	10 N MAIN
0 KOBERLIN	321 E BEAUREGARD & 323
220 N MAGDALEN	317 E BEAUREGARD
107 N MAIN	208 E TWOHIG
255 KOBERLIN	2 S MAIN
107 N MAGDALEN	317 N MAIN
251 KOBERLIN	321 PULLIAM
247 KOBERLIN	325 PULLIAM
105 N MAGDALEN	206 N MAIN 202,220
101 N MAIN	317 KOBERLIN
105 N MAIN	323 KOBERLIN
102 N OAKES	325 KOBERLIN & 327
219 E 3RD ST	215 PECAN
231 E 3RD ST	328 SPAULDING
272 N MAGDALEN	330 N MAIN
276 N MAGDALEN	320 N MAIN
257 PECAN	316 PREUSSER
218 N OAKES	320 PREUSSER
28 E 3RD ST	119 N EMERICK
125 N MAIN	102 N MAIN
128 S MAGDALEN	20 N MAIN
213 E 3RD ST & 215	26 N MAIN
235 E 3RD ST	324 E HARRIS
225 E 3RD ST	7 N EMERICK
19 E 4TH ST	11 N EMERICK
218 N OAKES	315 PREUSSER
307 N OAKES	327 PREUSSER
306 N CHADBOURNE	2 N MAIN
328 KOBERLIN	320 E HARRIS
252 PECAN	317 E BEAUREGARD
0 N MAIN	314 E TWOHIG
12 E 3RD ST	18 E 3RD ST
	325 N MAIN

332 PREUSSER
112 N MAIN
114 N MAIN
306 PREUSSER
314 PREUSSER
317 PREUSSER
331 PREUSSER
8 N MAIN
314 E HARRIS (316-318)
216 E TWOHIG
322 E TWOHIG
203 N MAIN
201 N MAIN
205 N MAIN
223 N MAIN & 225
219 PECAN
223 PECAN
212 KOBERLIN
232 PECAN
318 E TWOHIG & 320
310 N OAKES
241 N MAIN
118 S MAGDALEN
305 N MAIN
309 PULLIAM
302 N MAIN
315 KOBERLIN
117 N EMERICK
121 N EMERICK
12 E 4TH ST
326 PREUSSER
326 E TWOHIG
302 E BEAUREGARD
240 PECAN
239 PECAN
250 N MAGDALEN
241 PECAN
310 SPAULDING
315 N EMERICK
322 N MAIN

Exhibit “B”

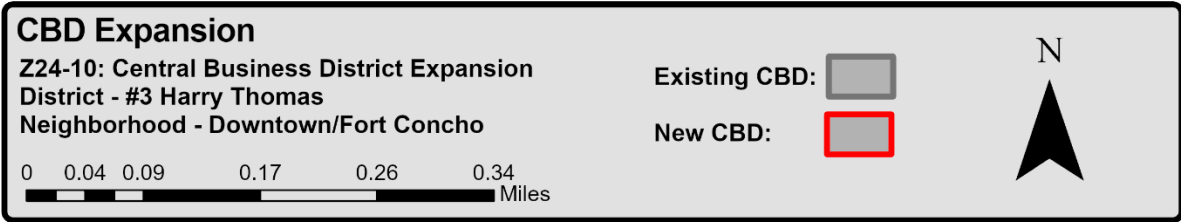
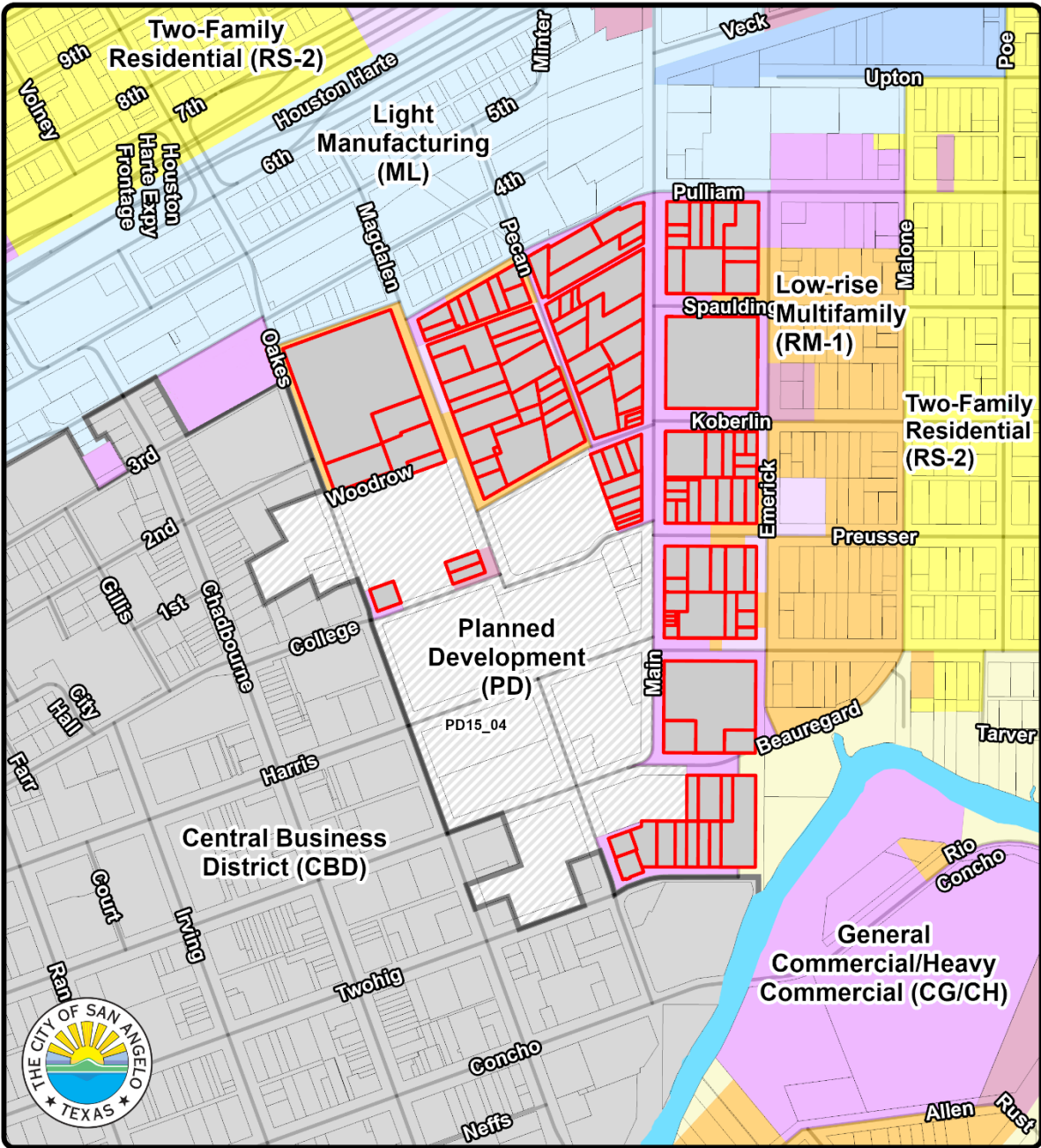


Exhibit "C"

Notwithstanding CENTRAL BUSINESS DISTRICT zoning, the following properties may maintain their current outdoor storage percentages as listed below:

241 N. Main Street Abst. A-1848 S-0322 Survey C. Salinger 0.870 acres: 32% outdoor storage

240 Pecan Street Being 65 ft. X 140 ft. NW corner of Coulter Tract Abst. A-1848 S-0322 Survey C. Salinger 0.2089 acres: 18% outdoor coverage

117 N Merick St. 0.115 acres Blk. 7 Frary Addition, S 50 of Lots 7 & 8: 13 % outdoor coverage

114 N Main St. 0.115 acres Blk. 7 Frary Addition North 50 ft. of the south 190 ft. of Lots 9 & 10: 22% outdoor storage

211 Main St. 0.207 acres Fritz Homestead Add. Tract 1 & 2 out of the SE Corner containing 9016.7 SF: 27% outdoor storage

18 E 3rd St. 0.124 acres Kleck Subdivision Blk 2 Lot 15: 40% outdoor storage

112 N Main St. 0.092 Frary Addition Blk 7 South 40 ft. of the north 100 ft. of Lots 9 & 10: 16% outdoor coverage