

2014 Water Distribution System Master Plan

City of Round Rock



ROUND ROCK, TEXAS
PURPOSE. PASSION. PROSPERITY.

December 2015



**CDM
Smith**

FINAL REPORT

2014 Water Distribution System Master Plan



City of Round Rock

December 2015

**CDM
Smith**

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Table of Contents

Executive Summary	ES-1
ES.1 Introduction.....	ES-1
ES.2 Population, Land Use, and Demand Characteristics.....	ES-1
ES.3 Water Supply and Treatment Evaluation	ES-3
ES.4 Water Distribution System Modeling.....	ES-4
ES.5 Water System Storage and Pumping Evaluation	ES-5
ES.6 Capital Improvement Plan.....	ES-5
1. Introduction	1-1
1.1 Scope of Work	1-1
1.2 Limitations of Study.....	1-1
2. Population and Demand Characteristics	2-1
2.1 Population and Land Use Projections	2-1
2.1.1 Population Projections	2-1
2.1.2 Land Use Projections.....	2-4
2.2 Historic Water Production and Demand Characteristics	2-5
2.2.1 Historic Water Production.....	2-5
2.2.2 Historic Water Consumption	2-5
2.3 City Ultimate Demand.....	2-8
2.3.1 Residential Ultimate Demand.....	2-8
2.3.2 Commercial/Industrial/Government Ultimate Demand	2-9
2.3.3 Non-Revenue Demand	2-9
2.3.4 Ultimate City Water Demand Summary	2-9
3. Water Supply and Treatment Evaluation	3-1
3.1 Water Supply Sources.....	3-1
3.2 Water Supply Evaluation and Recommendations	3-2
3.3 Treated Water Evaluation Criteria.....	3-3
3.4 Treated Water Evaluation and Recommendations	3-5
3.5 Summary	3-6
4. Water Distribution System Modeling	4-1
4.1 Model Overview	4-1
4.2 Modeled Facilities.....	4-1
4.2.1 Pipelines.....	4-1
4.2.2 Modeled Demands	4-2
4.2.3 Supply	4-2
4.3 Existing Scenario.....	4-3
4.3.1 Hydraulic Conditions of the Existing Scenario	4-3
4.3.1.1 Pressure Plane 1031	4-3
4.3.1.2 East Side Transmission Line and PP 924	4-4
4.3.1.3 PP 890 and PP 971.....	4-7
4.3.1.4 Fire Flow Analysis.....	4-7
4.3.1.5 Water Age Analysis.....	4-7

4.3.2 Specific Issues of the Existing System	4-8
4.3.2.1 Lake Creek WTP and 81 South Pump Station.....	4-8
4.3.2.2 McNeil GST and PS	4-11
4.3.2.3 Bowman GST and PS.....	4-11
4.4 System Criteria.....	4-11
4.5 2025 Scenario Improvements	4-12
4.5.1 East Side Transmission.....	4-12
4.5.2 West Side Transmission	4-12
4.5.3 Storage Improvement.....	4-12
4.6 2040 Scenario Improvements	4-13
4.6.1 Storage Improvement.....	4-13
5. Water System Storage and Pumping Evaluation	5-1
5.1 Regulatory and Industry Standards.....	5-1
5.1.1 Regulatory and Industry Standards for Storage	5-1
5.1.2 Regulatory Standards for Pumping	5-1
5.2 Existing System Capacity	5-2
5.2.1 Existing Storage Capacity.....	5-2
5.2.2 Existing Pumping Capacity.....	5-4
5.3 Water System Evaluation	5-6
5.3.1 Storage Evaluation.....	5-6
5.3.2 Pumping Evaluation.....	5-11
6. Recommended System Improvements	6-1
6.1 Storage and Pumping Compliance and Improvements	6-1
6.1.1 Storage and Pumping Improvements.....	6-1
6.2 Distribution System Improvements.....	6-5
6.2.1 Pipeline Improvements	6-5
6.2.2 Pump Station Improvements	6-7
6.2.3 Remote Telemetry System Improvements.....	6-8
7. Capital Improvement Plan	7-1

List of Figures

Figure ES-1. City of Round Rock Water Supply vs Future Water Demand	ES-3
Figure ES-2. City of Round Rock Treated Water Capacity vs Max Day Water Demand.....	ES-4
Figure ES-3. City of Round Rock 10-Year CIP (2016 – 2025).....	ES-9
Figure 2-1. City and CCN Boundaries.....	2-2
Figure 2-2. Treated Production with Max Day / Average Day Ratios per Year	2-5
Figure 2-3. Historical Water Consumption by Category.....	2-7
Figure 2-4. Monthly Historical Water Consumption Per Capita per Day	2-8
Figure 2-5. 2040 Water Demands by Customer Category	2-10
Figure 3-1. City of Round Rock Water Supply vs Future Water Demand.....	3-3
Figure 3-2. City of Round Rock Treated Water Capacity vs Max Day Water Demand	3-5
Figure 4-1. Water Distribution System Hydraulic Profile.....	4-5
Figure 4-2. Fire Flow Analysis Results	4-9

Figure 4-3. Water Age Analysis Results.....	4-10
Figure 5-1. City of Round Rock Operational Facilities.....	5-3
Figure 7-1. City of Round Rock 10-Year CIP (2016-2025)	7-1
Figure 7-2. City of Round Rock 25-Year CIP (2026-2040)	7-2

List of Tables

Table ES-1. CCN Population Projections for the City of Round Rock.....	ES-2
Table ES-2. CCN Future Land Use Projections.....	ES-2
Table ES-3. Historic Treated Water Production Per Capita.....	ES-2
Table ES-4. Modeled Demand Summary.....	ES-5
Table ES-5. City of Round Rock 10-Year Capital Improvement Plan.....	ES-6
Table 2-1. CCN Population Projections for the City of Round Rock.....	2-3
Table 2-2. Population Projections by Pressure Plane.....	2-4
Table 2-3. Future Land Use Projections	2-4
Table 2-4. Residential and Non-Residential Customer Classes.....	2-6
Table 2-5. Summary of 2040 Water Demands for Residential and Non-Residential Customers ..	2-9
Table 2-6. Historic Per Capita Treated Water Production.....	2-10
Table 3-1. City of Round Rock Water Supply Sources.....	3-2
Table 3-2. Water Demand Projection	3-2
Table 3-3. WTPs Flows that Serve the City of Round Rock.....	3-3
Table 3-4. City of Round Rock Max Day and Average Day Production.....	3-4
Table 3-5. City of Round Rock Treated Water Capacity Required	3-4
Table 3-6. City of Round Rock WTP Clearwell Capacity.....	3-5
Table 4-1. Summary of Modeled Pipes by Diameter	4-1
Table 4-2. Modeled Demand Summary.....	4-2
Table 5-1. Regulatory and Industry Standards for Storage	5-1
Table 5-2. Regulatory Standards for Pumping	5-2
Table 5-3. Pressure Plane Sections.....	5-2
Table 5-4. City of Round Rock Storage Capacity	5-4
Table 5-5. City of Round Rock Pumping Capacity	5-5
Table 5-6. Total Storage Capacity per Section.....	5-7
Table 5-7. 2015 Storage Capacity per Pressure Plane	5-8
Table 5-8. 2025 Storage Capacity per Pressure Plane	5-9
Table 5-9. 2040 Storage Capacity per Pressure Plane	5-10
Table 5-10. Total Pumping Capacity per Section.....	5-11
Table 5-11. 2015 Pumping Capacity per Pressure Plane.....	5-12
Table 5-12. 2025 Pumping Capacity per Pressure Plane.....	5-12
Table 5-13. 2040 Pumping Capacity per Pressure Plane.....	5-13
Table 6-1. System Storage and Pumping Capacity Compliance	6-2
Table 6-2. 2025 Pipeline Improvements.....	6-5
Table 6-3. 2040 Pipeline Improvements.....	6-7
Table 6-4. 2040 Pump Station Improvements.....	6-8
Table 7-1. City of Round Rock 10-Year Capital Improvement Plan.....	7-3
Table 7-2. City of Round Rock 25-Year Capital Improvement Plan.....	7-4

Appendices

- Appendix A Water Distribution System Map
- Appendix B Pumping and Storage Capacity Analysis
- Appendix C CIP Cost Information

Executive Summary

The City of Round Rock (City, CORR) is one of the fastest growing cities in Williamson County, Texas. As its population increases, an updated Water Master Plan (WMP) is needed to enable the City to continue to provide the high quality water on which its customers rely, while meeting the growing water demands of the service area. In October 2014, the City retained CDM Smith to prepare its 2014 Water Distribution System Master Plan.

ES.1 Introduction

The purpose of this study is to evaluate the future needs of the City's water system and update the City's 2011 Water Distribution Master Plan. The study includes the following tasks:

- Develop population projections, targeting 2025 (10-year horizon) and 2040 (ultimate buildout) planning timelines (**Section 2**).
- Analyze historic water production and water consumption and prepare water demand projections (**Section 2**).
- Evaluate current and future water supply and treatment capacity required to meet future demands and comply with State regulations, and develop necessary recommendations (**Section 3**).
- Update and refine the City's hydraulic model to assess the performance of the City's water distribution system, including storage, pumping, and pipeline capacities, for existing and future conditions (**Section 4**).
- Determine necessary water distribution system improvements (**Section 4**).
- Evaluate existing water system storage and pumping capacities by pressure plane based upon regulatory and recommended criteria (**Section 5**).
- Recommend system improvements for storage, pumping, pipelines, and remote communications (**Section 6**).
- Develop the City's 10-year and 25-year water distribution Capital Improvement Plan (CIP) (**Sections 6 and 7**).

ES.2 Population, Land Use, and Demand Characteristics

The estimated population of the City's water service area through build-out conditions (2040) is summarized in **Table ES-1**. The water service area is defined by the boundaries of its Certificate of Convenience and Necessity (CCN).

Table ES-1 CCN Population Projections for the City of Round Rock

Year	Estimated CCN Population Projections	Annual CCN Population Growth Rate
2010	105,157	---
2015	121,805	2.98%
2020	142,215	3.15%
2025	166,043	
2030	184,597	2.14%
2035	205,225	
2040	228,157	

In addition to population projections, CDM Smith utilized existing land use plans, vacant parcel information, and new development area information within the CCN boundaries to estimate future water demands. Using Geographical Information System (GIS) mapping tools, geospatial projections of land use by various categories were determined and estimated for each year from 2010 to 2040, as shown in **Table ES-2**.

Table ES-2 Future Land Use Projections

Year	Residential Land Use (acres)	Residential Land Use Annual Growth Rate	Commercial / Industrial / Government Land Use (acres)	Commercial / Industrial / Government Land Use Annual Growth Rate	Parking / Mining / Agriculture / Undeveloped Land Use (acres)	Parking / Mining / Agriculture / Undeveloped Land Use Annual Growth Rate
2010	8,837	---	4,019	---	17,630	---
2015	9,783	2.05%	4,839	3.79%	15,863	-2.30%
2020	10,767		5,722		13,996	-2.60%
2025	11,752		6,605		12,129	-2.99%
2030	12,736		7,488		10,262	-3.51%
2035	13,720		8,371		8,394	-4.26%
2040	14,705		9,254		6,572	-4.76%

CDM Smith analyzed both historical water production and consumption patterns to project the City's ultimate water demand. Historic treated water production from 2010-2014 is shown in **Table ES-3**.

Table ES-3 Historic Treated Water Production Per Capita

Year	Treated Production Total System (MG)	Population	Total Per Capita Production (gpcd)
2010	7,063	105,157	184.02
2011	8,703	108,294	220.18
2012	7,288	111,524	178.55
2013	6,799	114,851	162.19
2014	6,546	118,277	151.63
Average	7,280	111,621	179.31

Current water demand was set at 175gpcd, which is a conservative estimate and representing the historical 5-year average water demand. For build-out conditions, 160gpcd was used, which reflects the City's water conservation goal and results in an ultimate demand of 36.57 mgd.

ES.3 Water Supply and Treatment Evaluation

CDM Smith evaluated the City's water supply and treatment capacity required to meet the future demands and comply with Texas Commission on Environmental Quality (TCEQ) regulations, specifically from Title 30, Chapter 290 of the Texas Administrative Codes (TAC).

The City has four sources of fresh water supply: three surface water sources (Lake Stillhouse Hollow, Lake Georgetown, and Lake Travis) and one ground water source (five wells in the Edwards Aquifer), providing a total 49,700 acre feet per year (ac-ft/yr) of dependable supply. The City also has a Water Reuse Program which currently provides 1.5 mgd (1,680 ac-ft/yr) of irrigation water to offset the potable water supply needs.

As shown in **Figure ES-1**, the City's water supply exceeds demands through 2040. With this in mind, no additional water supply sources are needed at this time.

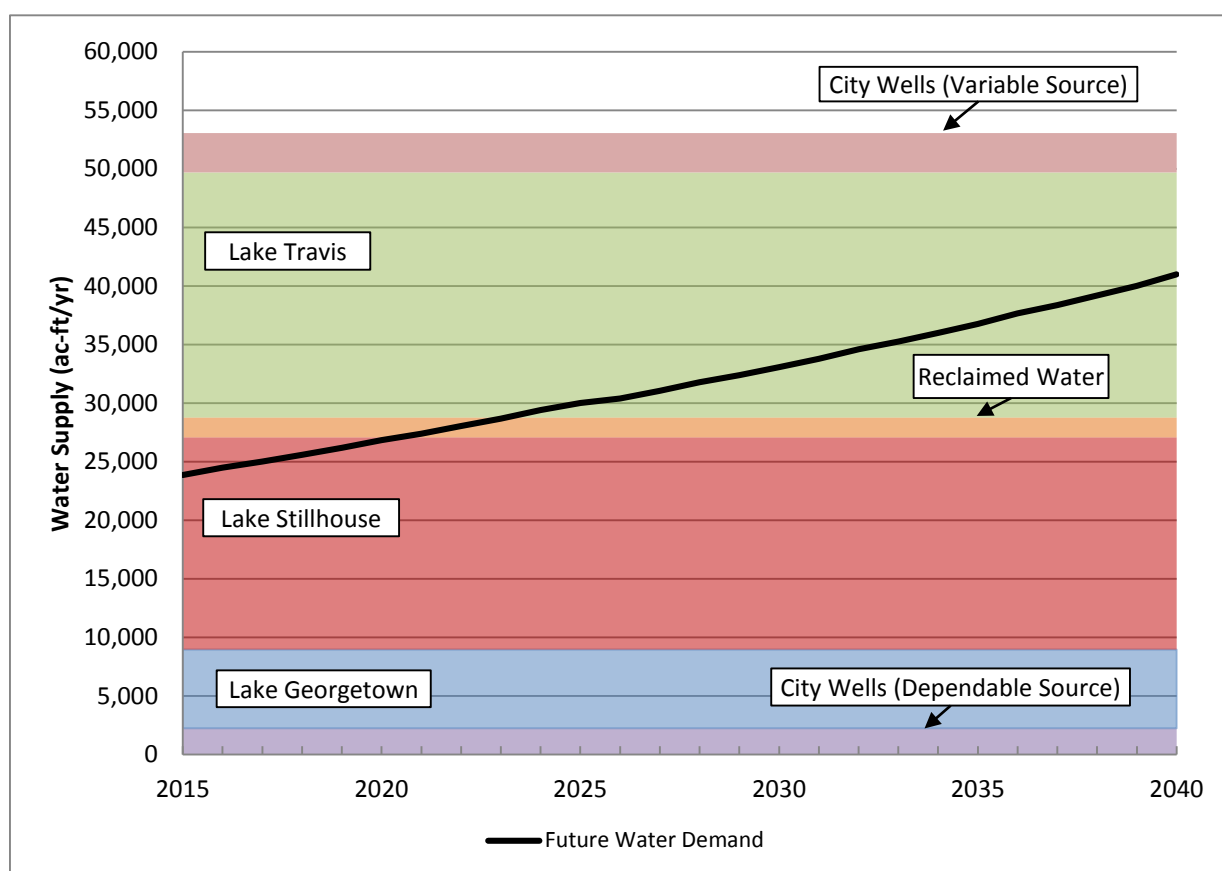


Figure ES-1
City of Round Rock Water Supply vs Future Water Demand

The City of Round Rock Water Treatment Plant (WTP) has a rated capacity of 52 mgd. The Brushy Creek Regional Water Treatment Plant (BCRWTP), which serves the cities of Round Rock, Leander, and Cedar Park, will provide 6.0 mgd to the City by 2019; the City's portion will continue

to increase for a total of 40.8 mgd by 2039. For the purposes of this Master Plan, only 85 percent of the total treatment plant capacity was used as available capacity, based on the TCEQ requirement that public water systems meet customer demands without exceeding 85 percent of total treatment plant capacity.

TCEQ requires that water treatment systems have useable capacities sufficient to meet the maximum day rate needed to meet customer demands. CDM Smith evaluated water treatment capacity based on several different criteria, including the maximum day demand and surface water treatment capacity to provide 0.6 gallons per minute (gpm) per connection. For the first criterion, a max day ratio of 2.0 was used, based on the City's historical data over the past four years. As shown in **Figure ES-2**, the City's water treatment plant capacity is sufficient to meet the TCEQ requirements through 2040 (build-out conditions) as long as the BCRWTP is expanded on the current schedule.

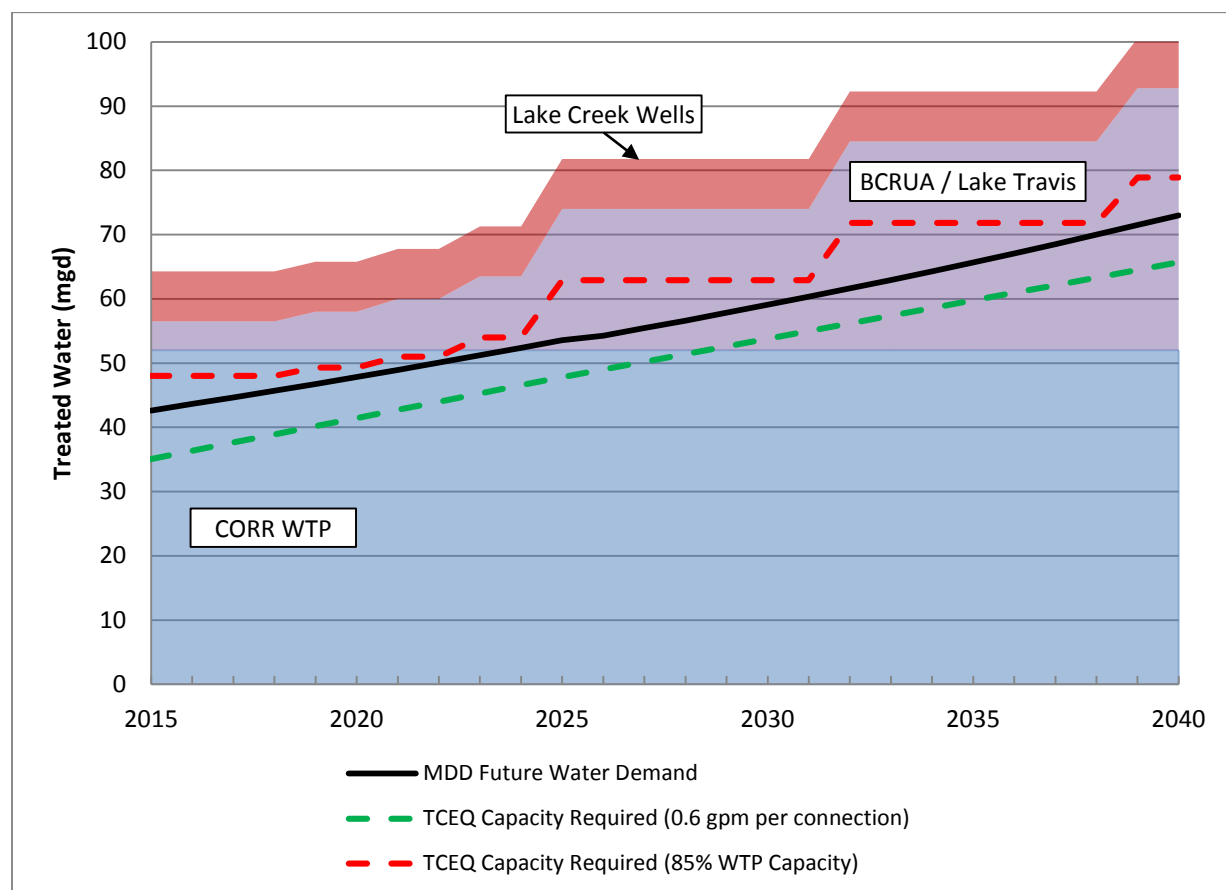


Figure ES-2
City of Round Rock Treated Water Capacity vs Max Day Water Demand

ES.4 Water Distribution System Modeling

CDM Smith updated the City's existing water distribution system hydraulic model to reflect current conditions. Specific model updates included modifying controls to represent typical tank cycling levels, confirming pump curves and valve settings to represent actual conditions, and updating system demands based on customer meter consumption data.

Using the City’s recommended production projection (described in section ES.2) and data from 2014 customer billing records, average daily demand (ADD) values, maximum daily demand (MDD) values, and peak hour values were assigned to modeled nodes and service areas within the City. The modeled demands for each timeframe scenario are summarized in **Table ES-4**.

Table ES-4 Modeled Demand Summary

Model	Unit	ADD	MDD/ADD Multiplier	MDD	Peak Hour Factor	Peak Hour on MDD
Existing	gpm	14,782	2.0	29,564	1.6	47,303
	mgd	21.3		42.6		68.2
2025	gpm	18,460	2.0	36,921	1.6	59,073
	mgd	26.6		53.2		85.1
2040	gpm	25,400	2.0	50,801	1.6	81,281
	mgd	36.6		73.2		117.1

For the existing scenario, important hydraulic conditions of the system were considered, and analyses of fire flow and water age were performed. Results are presented in **Section 4** of this document.

City-specific and industry standards, guidelines, and regulations were evaluated to determine the minimum and maximum allowable velocities and pressures within the City’s distribution system. Considering these criteria, recommended improvements to the distribution system to meet 2025 and 2040 water demands were developed, and are presented in detail in Section 4.

ES.5 Water System Storage and Pumping Evaluation

To ensure the City’s water system storage and pumping infrastructure will continue to meet state regulations, CDM Smith evaluated existing storage and pumping capacities by pressure plane (PP) with regards to regulatory and industry standards.

Title 30, Chapter 290 of the TAC outlines the regulatory requirements for elevated, ground, and total storage, as well as total pumping capacity within a water distribution system.

For this evaluation, CDM Smith evaluated elevated storage, ground storage, total storage, and pumping capacity per PP section and per individual PP, based on applicable regulatory and industry-standard recommended criteria. Further explanation and the findings of the regulatory evaluation are presented in Section 5 of this Master Plan.

ES.6 Capital Improvement Plan

Summaries of the recommended 10-year CIP projects, costs, and associated timing are shown in **Table ES-5** and **Figure ES-3**. More detailed information regarding the recommended 10-year and 25-year CIPs can be found in **Appendix A, Section 7** and **Appendix C** of this Master Plan.

Table ES-5 City of Round Rock 10-Year Capital Improvement Plan

Map ID No.	Project	Total Inflated Cost Estimate ⁽¹⁾⁽²⁾⁽³⁾
2016		
	RTU Installation and Enhancement	\$174,000
	PRV Installation Program #2, 4, 8 & 9 Improvements	\$790,000
	Filter Media Replacement Phase 3 ⁽⁴⁾	\$523,000
	Forest Creek Golf Course Reuse Rehabilitation ⁽⁴⁾	\$157,000
40	South 81 Elevated Storage Tank Pump Station Expansion ⁽⁶⁾⁽¹³⁾	\$1,413,000
5	Southeast Ground Storage Tank Pump Station Electrical Improvements ⁽⁶⁾	\$1,921,000
13	WTP High Service Pump Station Improvements ⁽⁶⁾	\$1,800,000
	Lake Creek Tank Interior Rehabilitation ⁽¹³⁾	\$267,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,046,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$523,000
2017		
18	Arterial A ⁽⁶⁾⁽¹³⁾	\$5,024,000
27	Palm Valley Phase I ⁽⁶⁾⁽¹³⁾	\$1,180,000
22	Meadow Lake Lines ⁽⁵⁾⁽⁶⁾	\$2,367,000
	CW#1 Tank Interior Rehabilitation ⁽¹²⁾	\$418,000
	Stone Oak SP Interior Rehabilitation ⁽¹²⁾	\$207,000
	Stone Oak SP Exterior Rehabilitation ⁽¹²⁾	\$257,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,070,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,070,000
	Water Distribution System Master Plan	\$138,000
2018		
41	Gattis School Rd ⁽⁶⁾⁽¹³⁾	\$5,653,000
11	Arterial H Phase II ⁽⁶⁾	\$2,941,000
	CW#1 Tank Exterior Rehabilitation ⁽¹²⁾	\$270,000
	Chandler EST Interior Rehabilitation ⁽¹²⁾	\$178,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,094,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,094,000
	Water Distribution System Master Plan Impact Fee (Update)	\$66,000
2019		
	Brushy Creek Regional Water Treatment Plant - Phase 1B ⁽⁴⁾⁽⁷⁾	\$31,000
4	Southeast Red Bud Lane Annexation ⁽⁴⁾	\$629,000
23	Saddle Brook Annexation ⁽⁴⁾	\$559,000
17	Avery Center East ⁽⁶⁾⁽¹³⁾	\$4,160,000
21	Brenda Lane Line ⁽⁵⁾⁽⁶⁾	\$2,074,000
	CW#2 Tank Interior Rehabilitation ⁽¹²⁾	\$668,000
	CW#2 Tank Exterior Rehabilitation ⁽¹²⁾	\$379,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,118,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,118,000
2020		
	Brushy Creek Regional Deep Water Intake and Raw Water Line Phase 2A, Segment 5 ⁽⁴⁾⁽⁸⁾	\$69,252,000
53	Bowman Demolition ⁽⁴⁾	\$46,000

Map ID No.	Project	Total Inflated Cost Estimate ⁽¹⁾ (2)(3)
7	McNeil Ground Storage Tank Demolition	\$46,000
26	Round Rock Glen Lines ⁽⁵⁾⁽⁶⁾	\$2,715,000
37	West Loop ⁽⁶⁾	\$17,818,000
	Barton Hill Tank Interior Rehabilitation ⁽¹²⁾	\$575,000
	Lake Creek Tank Exterior Rehabilitation ⁽¹²⁾	\$156,000
	S 81 CET Interior Rehabilitation ⁽¹²⁾	\$199,000
	SE EST Exterior Rehabilitation ⁽¹²⁾	\$463,000
	McNeil Tank Interior Rehabilitation ⁽¹²⁾	\$230,000
	McNeil Tank Exterior Rehabilitation ⁽¹²⁾	\$165,000
	High County Tank Interior Rehabilitation ⁽¹²⁾	\$199,000
	High County Tank Exterior Rehabilitation ⁽¹²⁾	\$165,000
	Fern Bluff Tank Interior Rehabilitation ⁽¹²⁾	\$530,000
	Fern Bluff Tank Exterior Rehabilitation ⁽¹²⁾	\$591,000
	1431 Hydro Tank Interior Rehabilitation ⁽¹²⁾	\$8,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,143,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,143,000
	Water Distribution System Master Plan	\$148,000
2021		
	Brushy Creek Regional Water Treatment Plant - Phase 1C ⁽⁴⁾⁽⁹⁾	\$4,464,000
6	East Loop Phase II ⁽⁶⁾	\$7,795,000
42	Palm Valley Phase II ⁽⁶⁾	\$1,002,000
28	South Creek ⁽⁶⁾	\$1,604,000
43	South Creek Phase II ⁽⁶⁾	\$2,419,000
32	Sam Bass I ⁽⁶⁾	\$14,469,000
	CW#4 Tank Exterior Rehabilitation ⁽¹²⁾	\$104,000
	Westinghouse SP Interior Rehabilitation ⁽¹²⁾	\$80,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,169,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,169,000
	Water Distribution System Master Plan Impact Fee (Update)	\$71,000
2022		
34	Sam Bass II ⁽⁶⁾	\$1,578,000
44	Old Settlers 2.0 MG Elevated Storage Tank and Old Settlers Line (PP 890) ⁽⁶⁾	\$7,138,000
	Barton Hill Tank Exterior Rehabilitation ⁽¹²⁾	\$358,000
	Chandler EST Exterior Rehabilitation ⁽¹²⁾	\$281,000
	S 81 CET Exterior Rehabilitation ⁽¹²⁾	\$173,000
	SE EST Interior Rehabilitation ⁽¹²⁾	\$216,000
	Chisholm Valley Tank Interior Rehabilitation ⁽¹²⁾	\$208,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,195,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,195,000
2023		
	Brushy Creek Regional Water Treatment Plant - Phase 1D ⁽⁴⁾⁽¹⁰⁾	\$1,127,000
	Ground Water Treatment Plant at Lake Creek	\$8,124,000
8	East Loop Phase III ⁽⁶⁾	\$7,171,000
	Westinghouse SP Exterior Rehabilitation ⁽¹²⁾	\$35,000

Map ID No.	Project	Total Inflated Cost Estimate ⁽¹⁾⁽²⁾⁽³⁾
	Bowman Rd Tank Interior Rehabilitation ⁽¹²⁾	\$207,000
	SE GST Interior Rehabilitation ⁽¹²⁾	\$554,000
	Vista Heights SP Interior Rehabilitation ⁽¹²⁾	\$201,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,222,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,222,000
	Water Distribution System Master Plan	\$158,000
2024		
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,250,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,250,000
	Water Distribution System Master Plan Impact Fee (Update)	\$75,000
2025		
	Brushy Creek Regional Water Treatment Plant - Phase 2A ⁽⁴⁾⁽¹¹⁾	\$11,478,000
	CW#3 Tank Interior Rehabilitation ⁽¹²⁾	\$58,000
	CW#3 Tank Exterior Rehabilitation ⁽¹²⁾	\$163,000
	CW#4 Tank Interior Rehabilitation ⁽¹²⁾	\$45,000
	1431 CET Interior Rehabilitation ⁽¹²⁾	\$428,000
	Bowman Rd Tank Exterior Rehabilitation ⁽¹²⁾	\$85,000
	SE GST Exterior Rehabilitation ⁽¹²⁾	\$243,000
	Chisholm Valley Tank Exterior Rehabilitation ⁽¹²⁾	\$331,000
	Vista Heights SP Exterior Rehabilitation ⁽¹²⁾	\$164,000
	Reuse Water Tank Interior Rehabilitation ⁽¹²⁾	\$197,000
	Reuse Water Tank Exterior Rehabilitation ⁽¹²⁾	\$184,000
	1431 Hydro Tank Exterior Rehabilitation ⁽¹²⁾	\$8,000
	Miscellaneous Water System Improvements ⁽⁴⁾	\$1,278,000
	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	\$1,278,000

(1) Construction cost estimate accounts for ENR (Dallas) escalation to 2015; contingency is 20% of construction cost.

(2) Professional services is 15% of construction cost.

(3) Total Inflated Cost is the estimated cost to implement the project in the future project start year; these estimates are based on an inflation rate of 2.25% per year.

(4) Project cost provided by the City.

(5) Project cost may be incurred by the Developer.

(6) Project cost estimate breakdown is provided in Appendix C.

(7) City's portion is 26.67% of total project cost estimate, \$100,000.

(8) City's portion is 28.79% of total project cost estimate, \$180M.

(9) City's portion is 31.1% of total project cost estimate, \$9,500,100.

(10) City's portion is 41.35% of total project cost estimate, \$1,982,200 (professional fees included).

(11) City's portion is 47.6% of total project cost estimate, \$18,876,607 (professional fees included).

(12) Project cost provided by Hot, Inc. No additional contingency was included.

(13) Projects shown in italics have been identified as priority projects per the City hydraulic model.

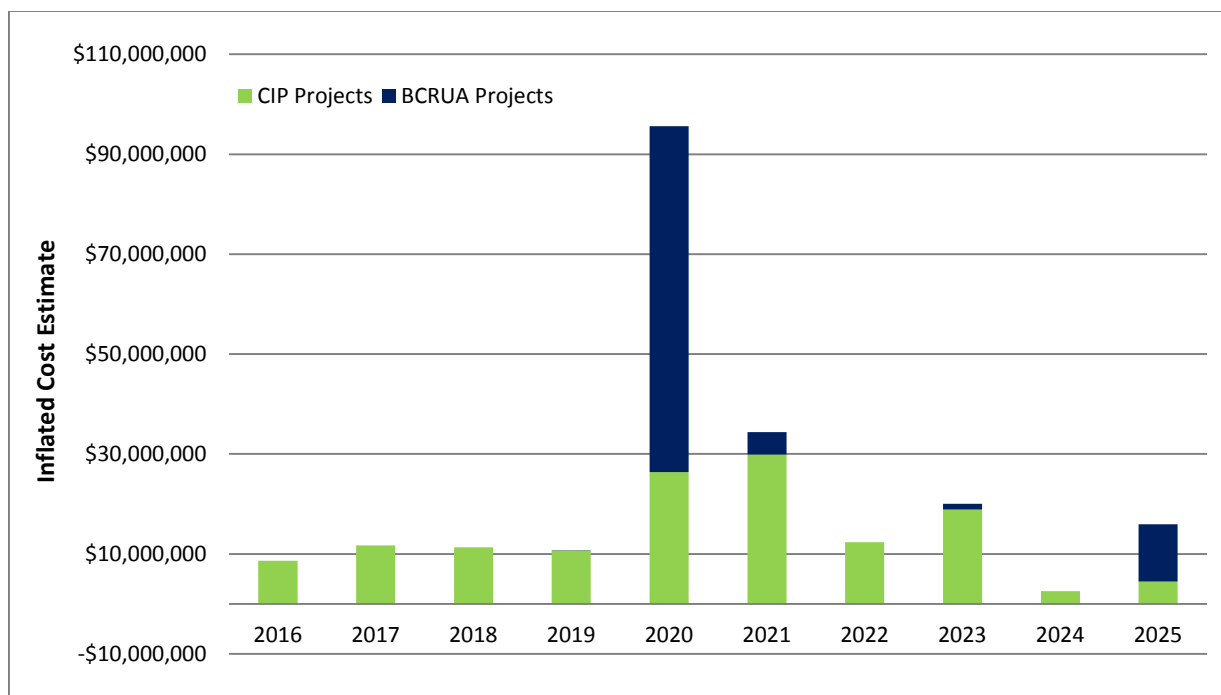


Figure ES-3
City of Round Rock 10-Year CIP (2016 – 2025)

Section 1

Introduction

The City of Round Rock (City, CORR) is one of the fastest growing cities in Williamson County, Texas. The City currently provides high quality water to nearly 122,000 customers and will almost double in size by 2040, serving approximately 230,000 water customers. As population increases, an updated Water Master Plan (WMP) is needed to enable the City to continue to provide the high quality water on which its customers rely, while meeting the growing water demands of the service area. In October 2014, the City retained CDM Smith to prepare its 2014 Water Distribution System Master Plan.

1.1 Scope of Work

The purpose of this study is to evaluate the future needs of the City's water system and update the City's 2011 Water Distribution Master Plan. The study includes the following tasks:

- Develop population projections, targeting 2025 (10-year horizon) and 2040 (ultimate buildout) planning timelines (**Section 2**).
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- Determine necessary water distribution system improvements (**Section 4**).
- Evaluate existing water system storage and pumping capacities by pressure plane based upon regulatory and recommended criteria (**Section 5**).
- Recommend system improvements for storage, pumping, pipelines, and remote communications (**Section 6**).
- Develop the City's 10-year and 25-year water distribution Capital Improvement Plan (CIP) (**Sections 6 and 7**).

1.2 Limitations of Study

The findings and recommendations contained in this study are valid as of the date of this report and based on the information referenced herein. Changes in growth and water usage patterns, results and implementations of more detailed investigations, or changes in regulations may

impact the conclusions and recommendations presented in this report. Master plans, such as presented in this report, require review every three to five years to determine if the assumptions and recommendations are still valid.

Section 2

Population and Demand Characteristics

This section discusses the methodology used in determining population and water demand projections for the City's water service area as defined by its Certificate of Convenience and Necessity (CCN).

2.1 Population and Land Use Projections

CDM Smith considered both historic population trends and land use projections to estimate water demand for residential and non-residential sectors, as discussed in the following subsections.

2.1.1 Population Projections

City population projections include the residents within the CCN boundaries and those residing in municipal utility districts (MUDs), which are provided wholesale water by the City. The MUDs are listed below:

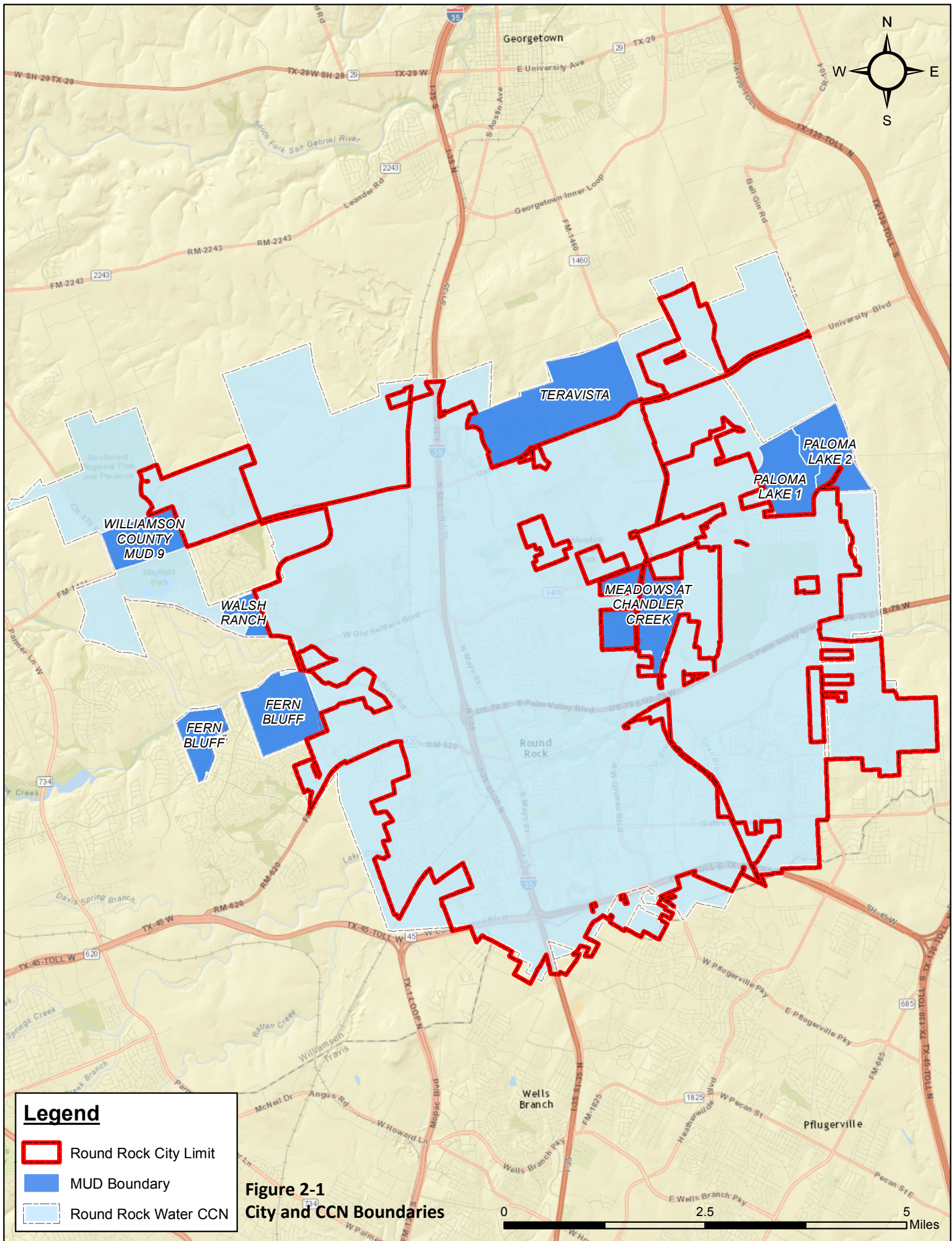
- Paloma Lake 1 MUD
- Paloma Lake 2 MUD
- Teravista MUD
- Fern Bluff MUD
- Vista Oaks MUD
- Walsh Ranch MUD
- Chandler Creek MUD

A map of the City boundaries and CCN boundaries is included in **Figure 2-1**.

Baseline population data was derived from the 2010 Census, conducted by the United States Census Bureau. CDM Smith used the City's current 2014 CCN boundary in conjunction with the 2010 Census tract population to develop the baseline population within the City's water service area.

Per the City's request, future population projections were based on traffic analysis zones (TAZ) provided by Atkins, which is concurrently completing a wastewater master plan for the City. The TAZ population data for years 2015, 2025, and build out (2040) was adjusted to reflect the City's current CCN boundaries.

As seen in **Table 2-1**, the estimated population growth within the City's CCN is expected to reach 228,157 people by 2040, the estimated year the City will reach build out conditions.



Legend

- Round Rock City Limit
- MUD Boundary
- Round Rock Water CCN

Figure 2-1
City and CCN Boundaries

Table 2-1 CCN Population Projections for the City of Round Rock

Year	Estimated CCN Population Projections	Annual CCN Population Growth Rate
2010	105,157	---
2015	121,805	2.98%
2020	142,215	3.15%
2025	166,043	
2030	184,597	2.14%
2035	205,225	
2040	228,157	

The City of Round Rock has seven pressure planes (PPs):

- Pressure Plane 1071
- Pressure Plane 1031
- Pressure Plane 971
- Pressure Plane 924
- Pressure Plane 890
- Pressure Plane 870
- Pressure Plane 860

The pressure planes are further subdivided to reflect hydraulic connectivity. **Table 2-2** presents the water connection and population broken down by pressure plane (West, East, and Southeast) for the existing water service area. It should be noted that West and East generally refer to the pressure planes to the west and east of IH-35, respectively. For the purposes of this evaluation, due to size, proximity and operational controls, PP 860 is included with PP 890.

Table 2-2 Population Projections by Pressure Plane

Pressure Plane	2015		2025		2040	
	Connections	Population	Connections	Population	Connections	Population
West						
1071	486	1,458	711	2,133	895	2,685
1031 (West)	1,946	5,837	2,847	8,541	3,648	10,943
971 (West)	10,029	30,088	13,931	41,793	19,085	57,255
Fern Bluff - West						
971 (West) Fern Bluff	1,977	5,932	1,977	5,932	1,977	5,932
East						
1031 (East)	2,027	6,080	2,585	7,755	5,893	17,680
971 (North)	1,707	5,122	3,543	10,630	5,491	16,474
924	6,048	18,143	6,824	20,473	7,280	21,841
890	13,935	41,804	20,239	60,718	28,983	86,950
870	742	2,226	742	2,227	851	2,554
Southeast						
971 (Southeast)	1,706	5,117	1,947	5,842	1,948	5,843
Total	40,602	121,805	55,348	166,043	76,052	228,157

2.1.2 Land Use Projections

CDM Smith utilized existing land use plans, vacant parcel information, and new development areas to project the total water demands within the City's CCN boundaries. Using Geographical Information System (GIS)-mapping tools, land use projections for each of the City's existing land use categories were estimated for each year from 2010 to 2040. A summary of the potential growth of each land use category is presented in **Table 2-3**.

Table 2-3 Future Land Use Projections

Year	Residential Land Use (acres)	Residential Land Use Annual Growth Rate	Commercial / Industrial / Government Land Use (acres)	Commercial / Industrial / Government Land Use Annual Growth Rate	Parking / Mining / Agriculture / Undeveloped Land Use (acres)	Parking / Mining / Agriculture / Undeveloped Land Use Annual Growth Rate
2010	8,837	---	4,019	---	17,630	---
2015	9,783	2.05%	4,839	3.79%	15,863	-2.30%
2020	10,767		5,722		13,996	-2.60%
2025	11,752		6,605		12,129	-2.99%
2030	12,736		7,488		10,262	-3.51%
2035	13,720		8,371		8,394	-4.26%
2040	14,705		9,254		6,572	-4.76%

2.2 Historic Water Production and Demand Characteristics

Water treatment plant (WTP) production data and water billing records were used to analyze the City's water production and use characteristics. These characteristics include water use (by customer category), total and residential per capita water use, and maximum day to average day peaking factors.

2.2.1 Historic Water Production

The City's monthly treated water production from 2010 through 2014 is presented in **Figure 2-2**. Also shown is the five-year monthly average production for each year. As seen in Figure 2-2, 2011 was a historically high production year; in nine of the 12 calendar months the monthly demands exceeded the five-year average. This is in sharp contrast to 2014, in which demands in only one month exceeded the five-year average. The historical maximum day to average day peaking factors for each year are also presented.

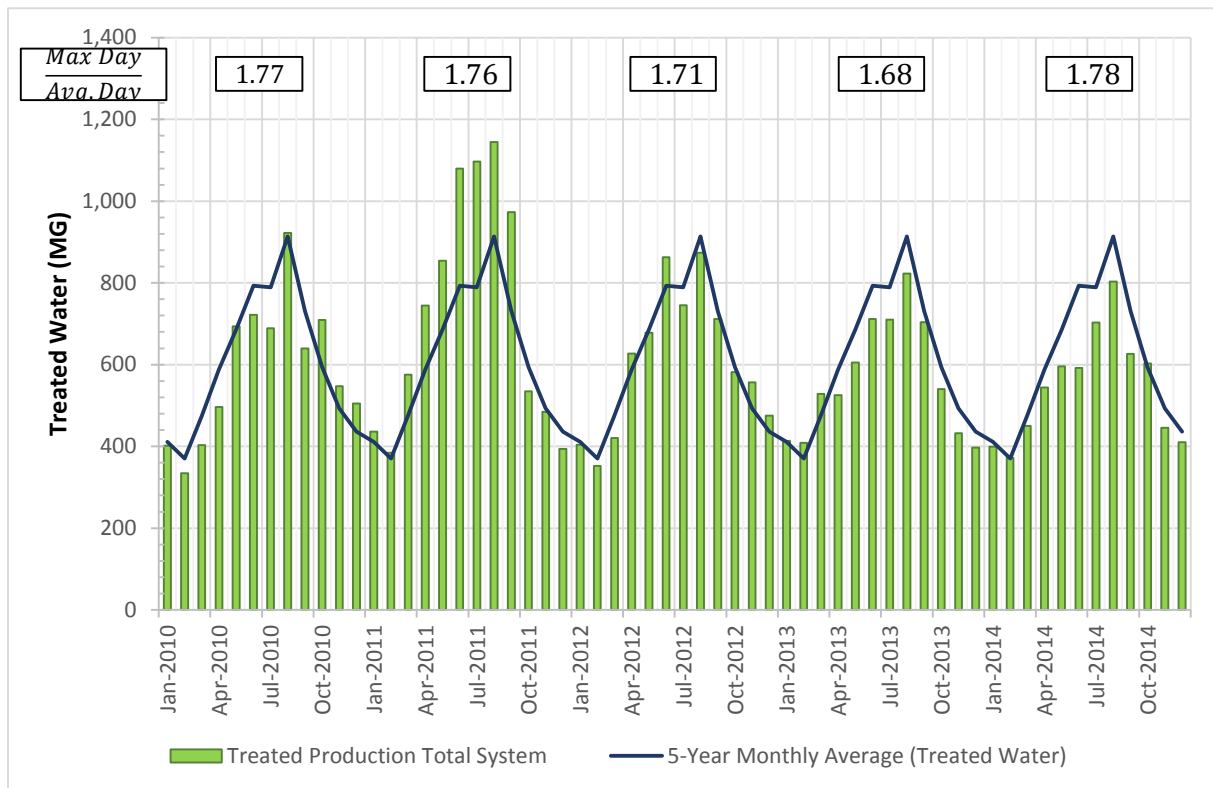


Figure 2-2
Treated Production with Max Day / Average Day Ratios per Year

2.2.2 Historic Water Consumption

The historical water billing data analyzed as part of this study included billed accounts from 2012-2014, and represents a total of 32,903 unique accounts. These accounts were separated into either residential or commercial/industrial/government categories, as shown in **Table 2-4**. Residential accounts include residential, apartments, MUDs, and residential irrigation accounts. Commercial/industrial/government (CIG) accounts include accounts for commercial, commercial irrigation, industrial, government and City entities, and fire hydrants.

Table 2-4 Residential and Non-Residential Customer Classes

Account Type	Class	Number of Accounts
Residential	Residential	28,464
	Apartment	294
	MUD	1,585
	Residential Irrigation	11
Commercial / Industrial / Government	Commercial	1,441
	Industrial	8
	Commercial Irrigation	595
	Government	89
	City	193
	Fire Hydrants	223

The historic water consumption for each category is presented in **Figure 2-3**. From 2012-2014, consumption in all four residential customer classes (residences, apartments, MUDs, and residential irrigation meters) decreased for an overall drop of 18 percent in water consumption for the residential category. Commercial/industrial/government consumption fell 11 percent over the same timeframe. It is important to note that non-revenue water increased substantially (nearly 60 percent), accounting for 9.98 percent of the total water produced in 2014.

The monthly water consumption for each customer category was determined based on the City's water billing data from December 2011 to December 2014. This information is presented in **Figure 2-4**. Because the December 2014 entry was an incomplete billing month at the time the data was acquired, this month was removed from this analysis. The remaining months were divided up into three 12-month calendar periods, beginning with December and ending in November of the following year. For the purpose of this study, the last year of a designated period represented the entire 12-month period.

As seen in Figure 2-4, although the City's population continues to grow, overall water consumption continues to decrease. The 2014 maximum month residential consumption peaked at 145 gallons per capita per day (gpcd), which is a reflection of the ongoing implementation of the City's robust water conservation program.

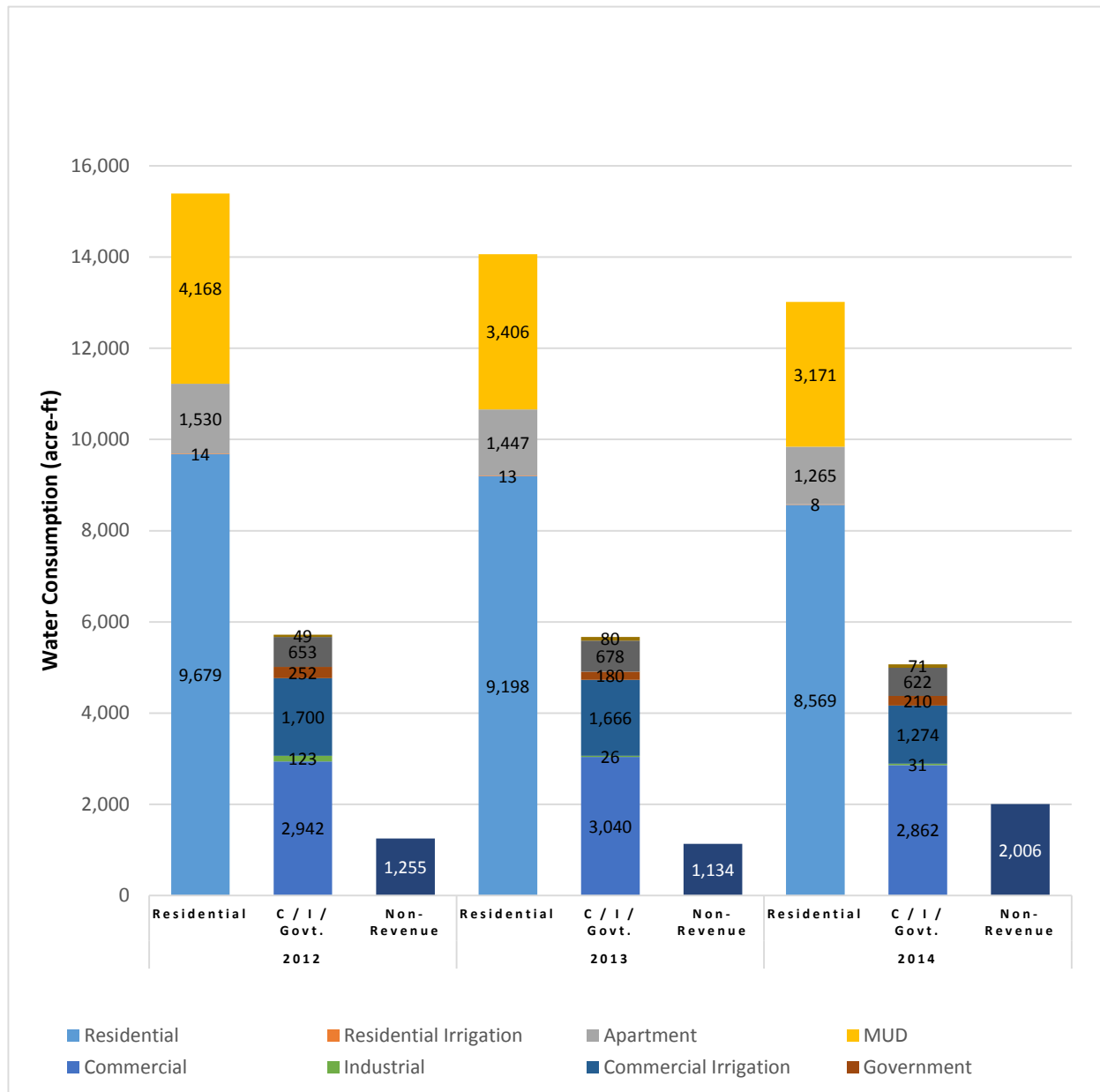


Figure 2-3
Historical Water Consumption by Category

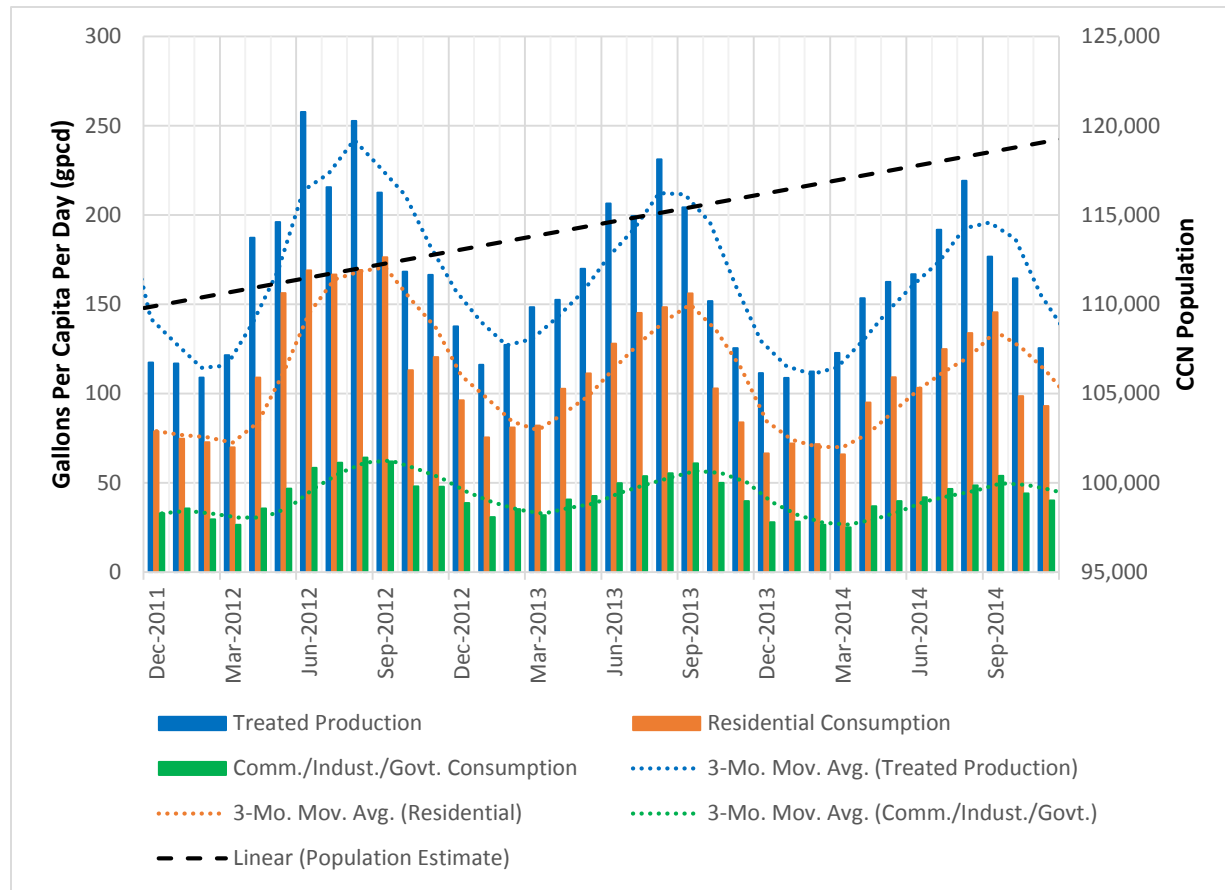


Figure 2-4
Monthly Historical Water Consumption Per Capita Per Day

2.3 City Ultimate Demand

The ultimate water demand for the City of Round Rock was determined through two methods. The first method uses residential per capita consumption combined with CIG per acreage consumption. Specifically, CDM Smith used billing data combined with population and land use data to project future residential and non-residential demands. The second method uses historic treated water production to develop a total per capita water demand for current water demands and a reduced total per capita demand was used for future demands, which reflects the City's future water conservation goals.

2.3.1 Residential Ultimate Demand

To determine the average annual residential per capita consumption, the total residential water consumption for each calendar period was divided by the estimated population of that year and averaged over the three-year period. The residential ultimate demand was calculated by multiplying the ultimate population within the City's water service area by this three-year average residential per capita use.

According to population projections, ultimate population for the CCN area is 228,157. Averaging 2012, 2013, and 2014 per capita consumption resulted in a three-year residential per capita consumption of 110 gpcd. Assuming this water demand remains constant in the future, without

any additional conservation efforts, the ultimate residential water use is projected to be 25.13 million gallons per day (mgd) or 28,225 acre-feet per year (ac-ft/yr) by 2040 (build-out).

2.3.2 Commercial/Industrial/Government Ultimate Demand

The commercial/industrial/government (CIG) ultimate demands are estimated based on future land use. Based on input from the City's Planning Department, the projected build-out land use for CIG customer classes within the CCN is 9,254 acres, resulting in a 3.79 percent annual increase from 2010 to 2040. According to the 2012, 2013, and 2014 billing data, the historical average demand for CIG classes is 1,091 gallons per acre per day (gal/acre/day). Assuming the historical average demand stays constant with no additional conservation efforts, ultimate commercial/industrial/government water use is projected to be 10.10 mgd (11,341 ac-ft/yr).

2.3.3 Non-Revenue Demand

The difference in the amounts of water sold according to the billing records and the finished water produced at the WTP is defined as non-revenue water demand. The broad term "non-revenue" refers to any water produced that is not billed. This includes errors in water meters, unauthorized consumption, and any losses due to leaks in the system. From 2012 to 2014, non-revenue water represented 7.01 percent of the total water produced. Of note, the amount of non-revenue water in 2014 (2,006 ac-ft) was nearly double that of each of the preceding years, 1,255 ac-ft and 1,134 ac-ft for 2012 and 2013, respectively.

Non-revenue water demands were projected based on the average ratio of non-revenue water demand to total City production over the three-year data period. Assuming no further conservation measures and no significant changes in maintenance patterns, the ultimate non-revenue water demand is 2.66 mgd (2,982 ac-ft/yr).

2.3.4 Ultimate City Water Demand Summary

Ultimate City water demands according to residential, commercial/industrial/government, and non-revenue demands are presented in **Table 2-5** and **Figure 2-5** by customer category.

Table 2-5 Summary of 2040 Water Demands for Residential and Non-Residential Customers

Residential Demand (mgd)	Commercial/Industrial/Government Demand (mgd)	Non-Revenue Water (mgd)	Total Demands (mgd)
25.13	10.10	2.66	37.88

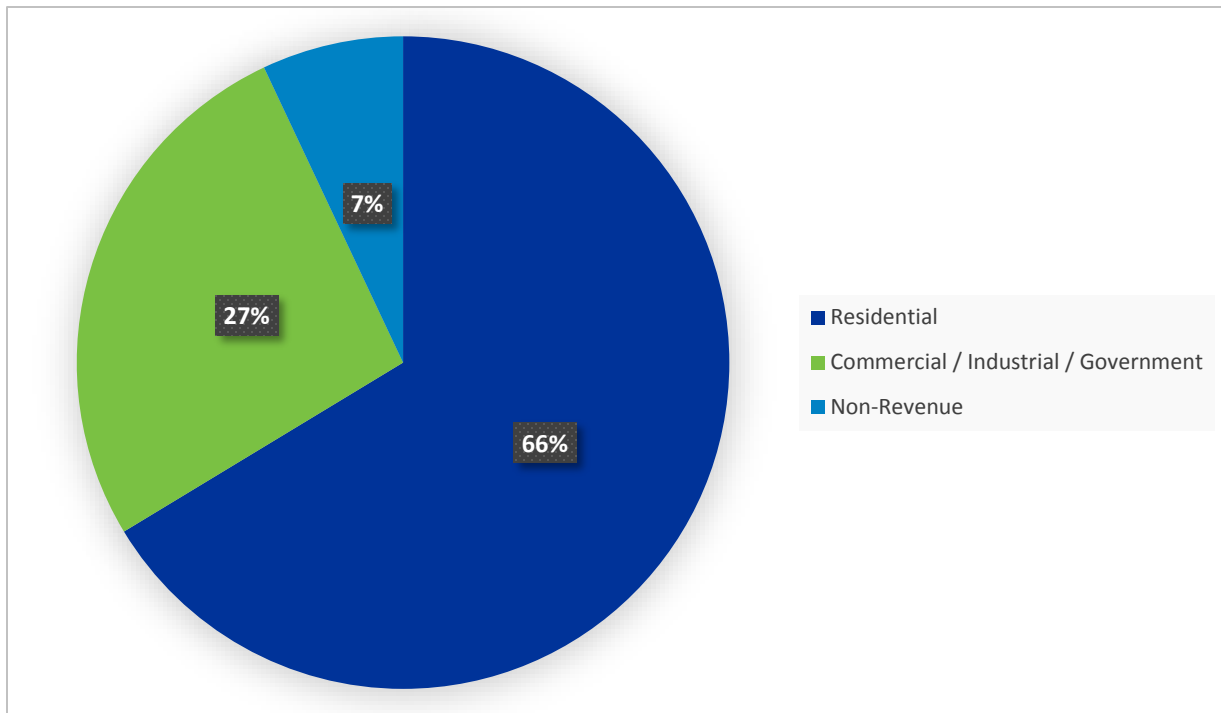


Figure 2-5
2040 Water Demands by Customer Category

Historic treated water production is shown below in **Table 2-6**.

Table 2-6 Historic Per Capita Treated Water Production

Year	Treated Production Total System (MG)	Population	Total Per Capita Production (gpcd)
2010	7,063	105,157	184.02
2011	8,703	108,294	220.18
2012	7,288	111,524	178.55
2013	6,799	114,851	162.19
2014	6,546	118,277	151.63
Average	7,280	111,621	179.31

Under the second demand methodology, the current total per capita demand was set at 175 gpcd, which reflects the historical five-year average demands. For buildout conditions (2040), the City and CDM Smith decided to use a total per capita demand of 160 gpcd, which is based on the City's ultimate water conservation goal. Using the total per capita demand methodology, this results in an ultimate water demand of 36.51 mgd. The two demand methods result in nearly identical ultimate water demands. The City-recommended approach was to use the second method, the total per capita demand method. Therefore, for the purposes of this report, the second method was used to estimate ultimate demand of 36.51 mgd.

Section 3

Water Supply and Treatment Evaluation

CDM Smith evaluated the City of Round Rock's water supply and treatment capacity required to meet the City's future demands (presented in **Section 2**) and comply with Texas Commission on Environmental Quality (TCEQ) regulations, Title 30, Chapter 290 of the Texas Administrative Codes (TAC).

3.1 Water Supply Sources

The City currently has four sources of fresh water supply: three surface water sources and one groundwater source. Of the three surface water sources, two come from lakes within jurisdiction of the Brazos River Authority (BRA): 18,134 ac-ft/yr from Lake Stillhouse Hollow and 6,720 ac-ft/year of water from Lake Georgetown. The third surface water source comes from an agreement made by the Lower Colorado River Authority (LCRA), BRA, and City of Round Rock, whereby LCRA provides 20,928 ac-ft/year from Lake Travis.

A total of five wells drilled into the Edwards Aquifer provide the City with groundwater. Three wells located near downtown Round Rock pump to the Lake Creek pumping facility. The Lake Creek Well Nos. 1, 3 and 4 lie in the City's 890-foot elevation pressure plane (PP 890) and have a combined rated capacity of 5,396 gpm. The Westinghouse North and South Wells, located on Westinghouse Road near Interstate Highway 35, lie in PP 1031 and have a combined rated capacity of 847 gpm. The Edwards Aquifer is a karst aquifer and is productive during wet periods but during droughts the water levels fall and well yields also fall. Although the total rated capacity of the groundwater wells is 6,243 gpm, for conservative purposes, only 2.0 mgd of the wells' combined capacity was considered a "dependable" water supply source, while an additional 3.0 mgd was considered a "variable" source, since this water supply depends largely on precipitation and aquifer recharge.

The final source of water for the City comes from its Water Reuse Program. First enacted in 1998, the program has been expanded to include various recreational facilities, parks, and schools around the City. Initially designed to provide the city with 4,200 gpm of irrigation water, the system potentially has capacity to serve the City up to 8,400 gpm of water for multiple uses. Based on recent City numbers, approximately 1.5 mgd, or 1,680 ac-ft/year, is attributed to water reuse. The City's water supply sources are listed below, in **Table 3-1**.

Table 3-1 City of Round Rock Water Supply Sources

Source	Water Supply
Surface Water (ac-ft/year)	
BRA - Lake Georgetown	6,720
BRA - Lake Stillhouse	18,134
LCRA - Lake Travis	20,928
Ground Water (mgd)	
Lake Creek Well No. 1	2.16
Lake Creek Well No. 3	1.87
Lake Creek Well No. 4	3.74
Lake Creek Well No. 7	2.16
Westinghouse Well N Well	0.50
Westinghouse Well S Well	0.72
Reclaimed Water (mgd)	
Water Reuse Program	1.50
Total (ac-ft/year)	
Total Dependable Supply⁽¹⁾	49,702

⁽¹⁾ Total Dependable Supply assumes only 2.0 mgd (2,240 ac-ft/year) of dependable groundwater

3.2 Water Supply Evaluation and Recommendations

To evaluate whether the City has sufficient water supply to meet future demands and regulatory requirements, the City's water sources were compared with projected water demands as shown in **Table 3-2** and in **Figure 3-1**.

Table 3-2 Water Demand Projection

Projection	Notes
Future Water Demand	<ul style="list-style-type: none"> 2015 - 2025: 175 – 160 gpcd (linearly decreasing) To 2040: 160 gpcd (constant) Based on population projections

As shown in **Figure 3-1**, the City's water supply exceeds demands through 2040. With this in mind, no additional water supply sources are needed at this time.

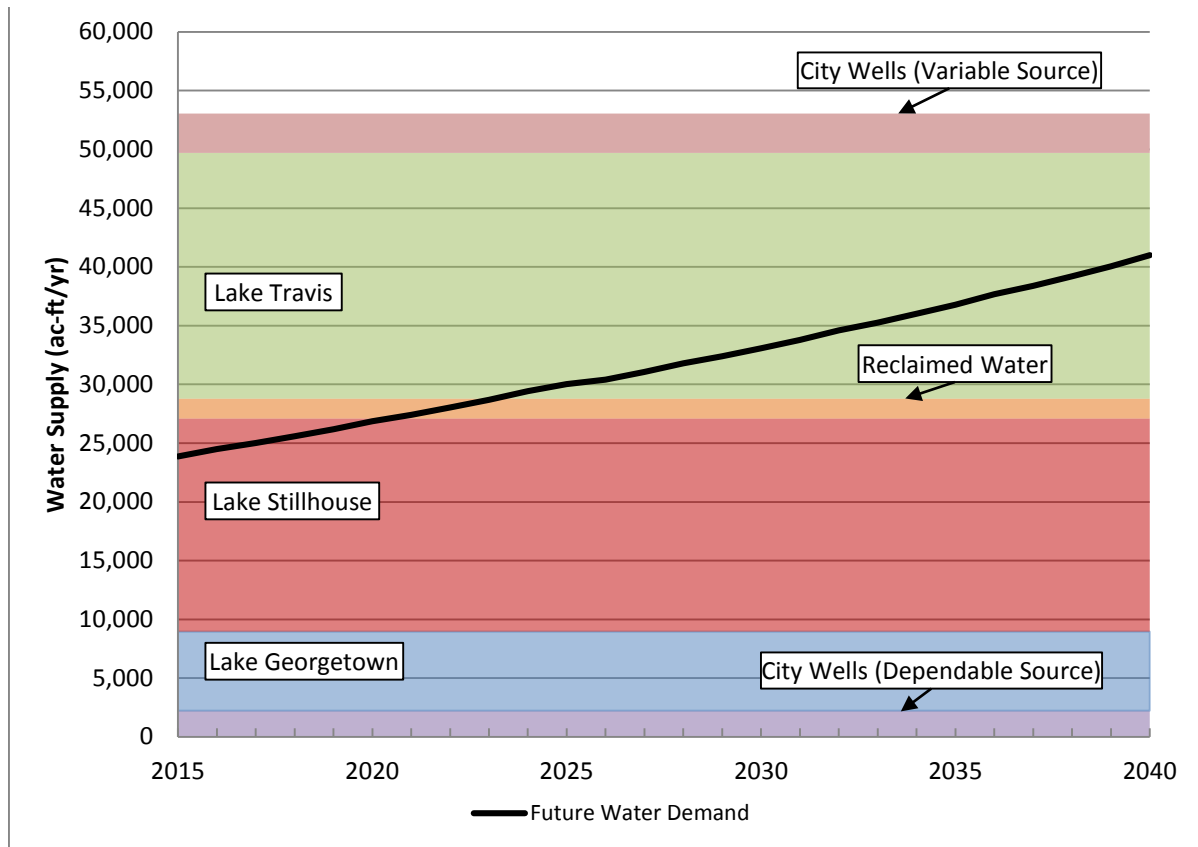


Figure 3-1
City of Round Rock Water Supply vs Future Water Demand

3.3 Treated Water Evaluation Criteria

The existing City of Round Rock WTP has a rated maximum capacity of 52 mgd. In addition, the Brushy Creek Regional Water Treatment Plant (BCRWTP), which supplies the cities of Round Rock, Leander and Cedar Park, is available to transmit an additional 6.0 mgd of treated water to the City when required; the City's portion will continue to increase in phases to a total of 40.8 mgd in 2039. The tables and graphs below are based on the latest information on the timing as sizes of the BCRWTP expansions. This information should be updated in subsequent updates to this master plan. Of note, TCEQ requires public water systems to meet customer demands without exceeding 85 percent of total treatment plant capacity. This evaluation accounted for this requirement, allocating 15 percent of treatment capacity as an untouched reserve and 85 percent as usable capacity. **Table 3-3** presents the total and 85 percent treatment capacities that serve the City.

Table 3-3 WTPs Flows that Serve the City of Round Rock

WTP	2019 Flow (mgd)		2021 Flow (mgd)		2023 Flow (mgd)		2025 Flow (mgd)		2032 Flow (mgd)		2039 Flow (mgd)	
	Total	85%	Total	85%	Total	85%	Total	85%	Total	85%	Total	85%
CORR WTP	52.0	44.2	52.0	44.2	52.0	44.2	52.0	44.2	52.0	44.2	52.0	44.2
BCRWTP	6.0	5.1	8.0	6.8	11.5	9.8	22.0	18.7	32.5	27.6	40.8	34.7
Total	58.0	49.3	60.0	51.0	63.5	54.0	74.0	62.9	84.5	71.8	92.8	78.9

Per TCEQ requirements, the water treatment system must have a (usable) capacity sufficient to meet the maximum day demand. CDM Smith analyzed the City's water treatment capacity based on several different criteria, as discussed below.

The first criterion calculated the maximum daily flow ratio to determine maximum day demand (MDD) values. Based on treated water data from 2010-2014 provided by the City, the maximum day to average day ratio was calculated as 1.74, as shown in **Table 3-4**. Based on industry experience and to provide a conservative buffer, CDM Smith raised this ratio to 2.0.

Table 3-4 City of Round Rock Max Day and Average Day Production

Year	Max Day (MG)	Average Day (MG)	Max Day / Average Day
2010	34.28	19.35	1.77
2011	42.05	23.84	1.76
2012	34.00	19.91	1.71
2013	31.33	18.63	1.68
2014	32.00	17.93	1.78
Average			1.74

Using this ratio in conjunction with the water demand projection (Table 3-2), MDD values were calculated for each target year, as shown in **Table 3-5**. Additionally public water system must comply with the TCEQ requirement that water treatment capacity of 0.6 gallons per minute (gpm) per connection be provided (also shown in the table). A graphical comparison of these required capacities to available WTP capacities is presented in Section 3.4.

Table 3-5 City of Round Rock Treated Water Capacity Required

Parameter	2015	2025	2040
Population	121,805	166,043	228,157
Future Water Demand⁽¹⁾, based on 2.0 maximum to average ratio			
MDD Water Treatment Capacity Required (mgd)	42.6	53.6	73.0
Based on TCEQ requirement (0.6 gpm/connection)			
Connections	40,602	55,348	76,052
TCEQ Surface Water Treatment Capacity Required (mgd)	35.1	47.8	65.7

⁽¹⁾ 175 gpcd from 2015-2025 and 160 gpcd from 2025-2040

Chapter 290 also requires a covered clearwell storage capacity of five percent of rated daily plant capacity for systems serving more than 250 connections. **Table 3-6** presents the capacities of the existing clearwells at the City's water treatment plant. Based on the City of Round Rock WTP's capacity of 52 mgd, the five percent clearwell capacity requirement is 2.6 mgd.

Table 3-6 City of Round Rock WTP Clearwell Capacity

Tank Name	Usable Capacity (gal)
WTP Clearwell No. 1	1,000,000
WTP Clearwell No. 2	2,000,000
WTP Clearwell No. 3	2,000,000
WTP Clearwell No. 4	1,500,000
Current Total	6,500,000
Future WTP Clearwell No. 5	1,500,000
Total	8,000,000

3.4 Treated Water Evaluation and Recommendations

The City's projected treated water capacity and required treatment capacities per regulatory criteria are presented in **Figure 3-2**. Of note, this graphical analysis only considered Lake Creek Wells No. 1, 3 and 4 as providing dependable water capacity. As seen in Figure 3-2, the City's treated water capacity exceeds TCEQ's required capacities. Therefore, the City does not require any additional treated water treatment capacity beyond what is currently planned through 2040.

As seen in **Table 3-6**, the current and future (2031) clearwell capacities of 6.5 MG and 8.0 MG more than exceed the 2.6 MG required by TCEQ regulations. No additional clearwell infrastructure is needed to meet the regulatory requirements; however, for better operational controls, the future WTP Clearwell No. 5 is recommended.

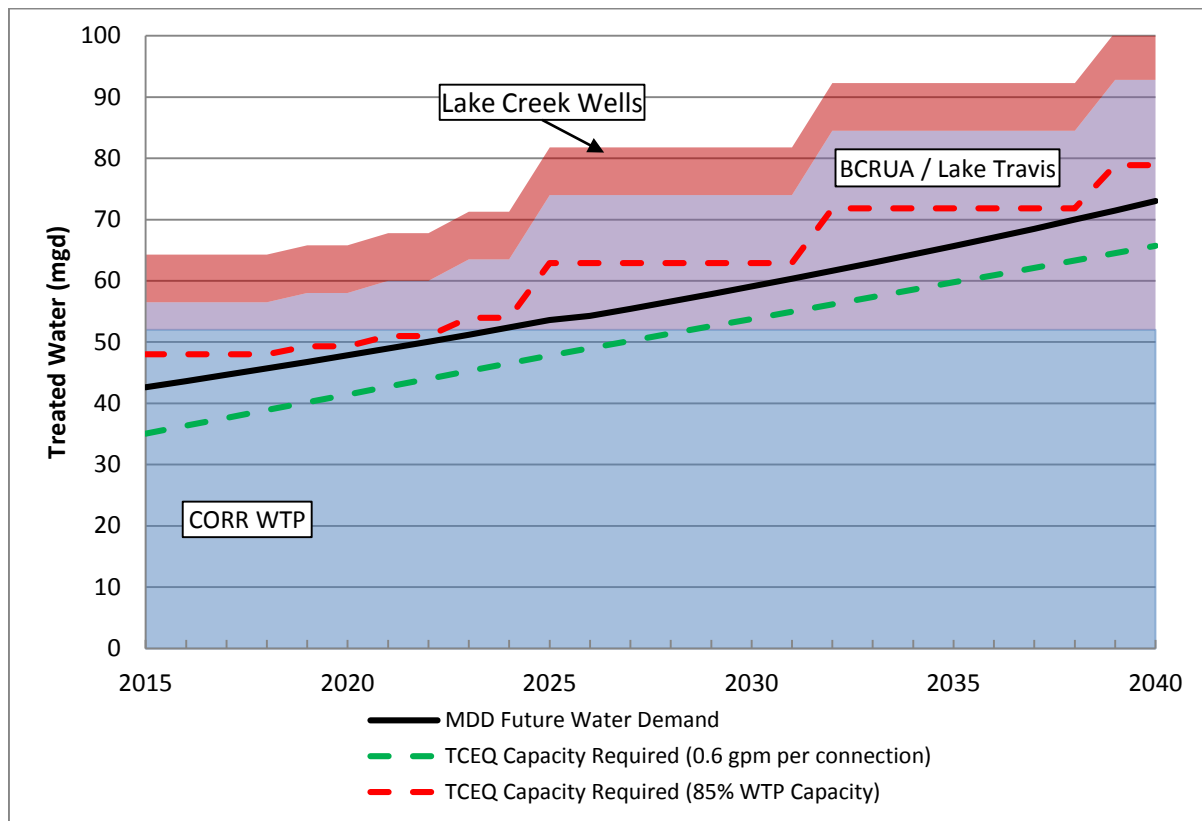


Figure 3-2
City of Round Rock Treated Water Capacity vs Max Day Water Demand

3.5 Summary

An analysis of the City of Round Rock's water supply and treatment capacity has indicated the following.

- Existing water supply sources are adequate to meet projected demands through 2040.
- Existing and future treated water treatment capacities are adequate to meet projected water treatment requirements based on both regulatory and maximum day demand criteria, given that future planned expansions of the BCRWTP take place, through 2040.

Section 4

Water Distribution System Modeling

This section discusses the updates made to the City's water distribution model to assess system performance and determine necessary improvements for existing and future system conditions.

4.1 Model Overview

To model its water distribution system, the City uses a WaterGEMS hydraulic computer model, version v8i (SELECTseries 3) by Bentley, that is compatible with ArcGIS and supports mapping of multiple layers in formats such as "Shapefiles."

CDM Smith reviewed and updated the WaterGEMS model of the City's water distribution system, including the following tasks:

- Modified controls to represent the tank cycling levels and basic operation of the system observed in the field
- Confirmed pump curves, pressure reducing valve (PRV) settings and other control parameters to represent actual conditions
- Updated system demands in the model based on customer meter consumption data
- Updated modeled piping to reflect the current distribution system

4.2 Modeled Facilities

Pipelines, water demands, and water supply were modeled in detail, as presented below.

4.2.1 Pipelines

The model includes all pipelines that are in the City's distribution system. Pipeline sizes range from one inch in the distribution system to 72 inches at the WTP. The total length of pipeline by diameter are summarized and presented in **Table 4-1**.

Table 4-1 Summary of Modeled Pipes by Diameter

Diameter (in)	Length (ft)	Diameter (in)	Length (ft)
1	800	20	19,600
2	32,700	24	54,000
4	10,600	30	50,000
6	500,000	36	68,000
8	1,440,000	42	6,500
10	15,000	48	20,000
12	612,000	54	100
14	11,700	60	700
16	226,000	72	19,000
18	32,900	78	10,500
Total		3,130,100	

4.2.2 Modeled Demands

The development of future demand projections, including the analysis of 2014 customer billing records and non-revenue water calculations, is described in greater detail in **Section 2**. The model utilizes the City’s recommended water demand production projection (175 – 160 gpcd phased demand).

CDM Smith updated existing model demands with the City’s 2014 customer billing records, which contained address locations and demand for each customer account. The street addresses for each customer account were geocoded using GIS tools and geographic data from the U.S. Geological Survey (USGS). Geocoding is the process of assigning a location, usually in the form of x and y coordinates, to an address by comparing the descriptive addresses in the billing database to those present in the GIS layer of street center lines.

After completing the geocoding process, the demand allocator tool in WaterGEMS was used to allocate average daily demand (ADD) to pipe junctions (also called nodes). Using the closest pipe method, demands were assigned to the closest node of each pipe. The geocoded meter demands represented the average “existing conditions” scenario in the model. The average existing demands were then multiplied by a factor of 2.0 to develop Max Day Demands (MDD) values (as discussed in **Section 3**).

Demands representing the 2025 and 2040 timeframes were developed using TAZ, population data. The WaterGEMS demand allocator tool was again used to distribute projected demands into the model by using the Theissen Polygon method, which delineates a “service area” for each modeled node. The service area developed for each node is then intersected with the TAZ polygons, and demands are proportionally distributed to each modeled node based on the TAZ area that lies within the node’s service area. The distributed population is multiplied by the total per capita demand to calculate an ADD for each node.

Table 4-2 summarizes the modeled demands for each timeframe scenario. The peak hour factor of 1.6 originates from a historical peak flow analysis and was used in the 2011 master plan.

Table 4-2 Modeled Demand Summary

Model	Unit	ADD	MDD/ADD Multiplier	MDD	Peak Hour Factor	Peak Hour on MDD
Existing	gpm	14,782	2.0	29,564	1.6	47,303
	mgd	21.3		42.6		68.2
2025	gpm	18,460	2.0	36,921	1.6	59,073
	mgd	26.6		53.2		85.1
2040	gpm	25,400	2.0	50,801	1.6	81,281
	mgd	36.6		73.2		117.1

4.2.3 Supply

As discussed in detail in Section 3, treated water supply originates from three major sources: the City of Round Rock WTP, BCRWTP, and the Lake Creek Wells. The City of Round Rock WTP provides the greatest amount of treated water with 52 mgd in total capacity.

The City of Round Rock WTP is represented in the model with a flow control valve set at a constant rate of up to its maximum capacity. This flow enters the modeled clearwell (which has the same total volume as the four clearwells at the WTP), and the clearwell provides suction pressure to the north and south bank of pumps at the WTP.

Once the BCRWTP comes online, the minimum amount supplied to the City will be 4.5 mgd, per contractual agreement. The maximum available supply from BCRWTP to the City is 22.0 mgd by 2025, and 40.8 mgd by 2039.

The Lake Creek Wells have produced approximately 2.0 to 3.0 mgd historically, with the capability to produce 5.0 mgd. Since treatment from the Lake Creek wells is less expensive than treating surface water at the City WTP or purchasing water from BCRWTP, modeling efforts focused on maximizing the available flow from the Lake Creek WTP, as discussed in greater detail in Section 4.3.2.

4.3 Existing Scenario

The existing scenario (i.e. current conditions) of the hydraulic model was checked and modified as required to represent consistent operation in the field. Items verified in the model include:

- Adjusted pump controls to operate in the typical way the system operators run the system
- Confirmed pump curves in the model
- Set PRVs according to the system operations and adjusted PRVs to reflect summer high demand conditions.
- Replicated typical tank cycling patterns

By simulating the existing system over an extended period, CDM Smith ensured that tanks were cycling similar to field operations. Specifically, the model was adjusted such that the tanks cycled within the top 50 percent (or less depending on the type of tank) of its storage capacity during MDD.

4.3.1 Hydraulic Conditions of the Existing Scenario

The following text presents important hydraulic conditions of the existing system, including the 1031 pressure plane (PP 1031) and PP 924, the east side transmission line, fire flow, and water age.

4.3.1.1 Pressure Plane 1031

In the existing configuration, the City of Round Rock WTP, located on the system's north side, provides the majority of the total treated water supply. The high service pumps discharge into PP 1031 and fill the two elevated storage tanks (ESTs): Barton Hill EST on the east side of I-35 and 1431 2.0 MG EST on the west side. PP 1071 is a small zone on the northwest side currently supplied by a booster pump from the PP 1071 on the west side. When the BCRUA supply is fully functional, the PP 1031 will be supplied directly from the BCRWTP. Supply to the rest of the distribution system is conveyed through PP 1031 into PPs hydraulically lower than PP1031. Typically, PPs are fed by gravity via PRVs with the following exceptions:

- PP 924 (controlled by the Southeast EST, which currently requires pumped supply from the Southeast Ground Storage Tank (GST) which is filled by gravity from PP 890, and
- the High Country EST in PP 971, which requires pumped supply from the Southeast EST in PP 924.

Much of the demand is in from the east and the south portions of the service area, and thus transmission capacity from the north to the southeast is essential.

Pressure Reducing Valves (PRVs) are either 1) set at no higher than the highest level of tanks in the PP or 2) are equipped with Remote Telemetry Units (RTU) that close the valve to prevent overflow and cycle the tanks.

Figure 4-1 illustrates the water distribution system hydraulic profile.

4.3.1.2 East Side Transmission Line and PP 924

PP 924, on the southeast side of the system, contains two ESTs, the Southeast EST and South 81 EST. This PP is primarily supplied by Southeast GST Pump Station (PS). The Southeast GST has a high water level of 717 feet in elevation and is currently filled by a pressure sustaining valve (PSV) from PP 890. The southeast pump station delivers water from the southeast GST to PP 924 and fills the Southeast EST.

Also supplying this pressure plane is PRV-34, located at Red Bud Lane and Forest Creek Drive, and the Lake Creek WTP. PRV-34 is at the end of the east side high pressure transmission line in PP 1031, which conveys water from Barton Hill along AW Grimes Boulevard, to County Road (CR) 112, CR 117, and finally along Red Bud Lane to feed PP 924 by gravity via PRV-34. The Lake Creek WTP, located in PP 890, pumps flow to PP 924 via a 16-inch and 8-inch main along South Mays Street on the western side of the PP. The South 81 EST is controlled by pumping from the Lake Creek WTP.

The east side transmission line along Red Bud Lane allows PP 924 to be fed by gravity, while the Southeast GST requires the water to be re-pumped, which is less efficient. However, the Southeast GST has 2.5 MG of storage, and the Lake Creek WTP has over 5.0 mgd in pumping capacity, which both play a significant role in meeting peak hour demands.

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ST-TANKS-V-TANKS

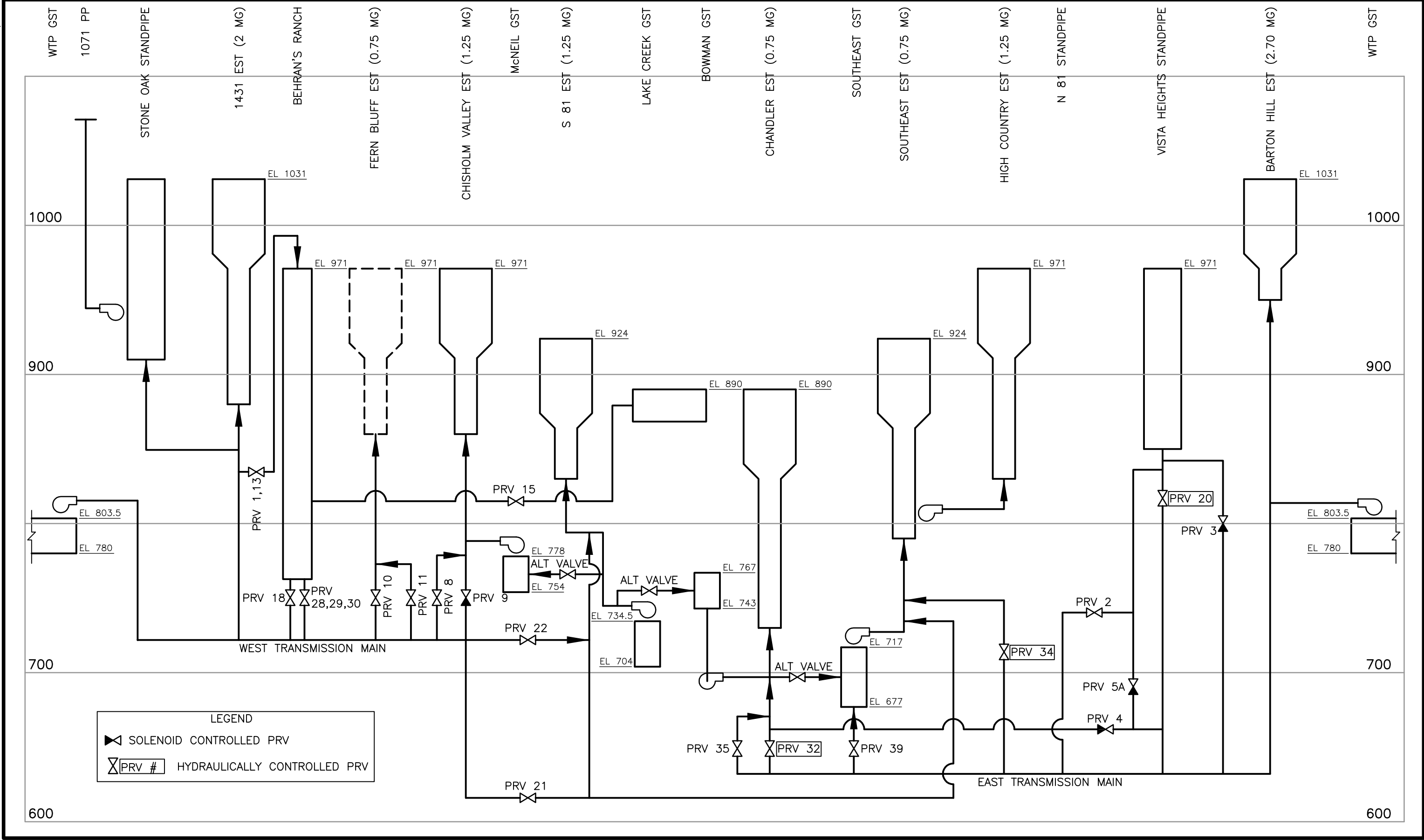


Figure No 4-1
WATER DISTRIBUTION SYSTEM HYDRAULIC PROFILE
APR 2015

4.3.1.3 PP 890 and PP 971

PP 890 is located in the center of the distribution system and receives water from a number of PRVs from neighboring pressure zones. It contains two storage tanks, the Chandler (aka Meadows) EST and the Bowman GST. The Bowman GST has a high water level of 767 feet in elevation and is currently filled by a pressure sustaining valve in PP 890. Flow from the Bowman GST is boosted by the Bowman PS which pumps back into the 890 PP. The Chandler (aka Meadows) EST has a high water level of 890 feet and is fed by PRVs reducing pressure from the neighboring PP 1031.

PP 971 is located on the southern and western edge of the distribution system and receives water through PRVs from the neighboring PP 1031 and repumped from the McNeil GST PS (high water level elevation 778) as well as from the SE EST PS located in PP 924.

While there are not significant hydraulic issues in either of these pressure planes, there are opportunities to reduce energy consumption through repumping and reduce the number of facilities that have to be maintained by the City of Round Rock. This can lead to operational and maintenance savings over time.

4.3.1.4 Fire Flow Analysis

CDM Smith performed a fire flow analysis of the system for existing maximum day condition. The fire flow model simulation draws the maximum amount of flow from a node while maintaining a minimum pressure of 20 psi both at the flowing node and elsewhere in the pressure plane.

Figure 4-2 presents the results of the fire flow evaluation. Maximum available flow out of a hydrant is represented by color and size. A larger dot represents a smaller amount of flow available at the location. As shown on the figure, lowest fire flows occur in the older part of the system near Main Street and Mays Street.

4.3.1.5 Water Age Analysis

The water age of the system for the existing average daily condition was also evaluated. The water age was simulated for a 14-day time period to indicate where water does not receive adequate turnover, either because of oversized mains, limited demands in areas, or limited turnover in storage tanks.

Figure 4-3 presents the results of the water age evaluation. Typically, a rule of thumb for water distribution systems is to maintain a water age less than 7 days old to reduce the risk of disinfection byproduct formation and loss of use disinfectant residual.

As shown on the figure, the majority of the system maintains a water age of less than 72 hours old. The pressure plane exhibiting highest water age is PP 971 which is likely due to the distance of the zone from the City of Round Rock WTP and the number of repump zones the water must travel to reach PP 971; however, the water age in PP 971 is still within an acceptable range based on the reported tank operation. A small number of mains shown on Figure 4-3 are predicted to exceed the recommended 7-day water age; however, these are primarily limited to dead-end mains which are relatively common locations to exhibit high water age. Water age can be reduced in these mains through a periodic flushing program.

4.3.2 Specific Issues of the Existing System

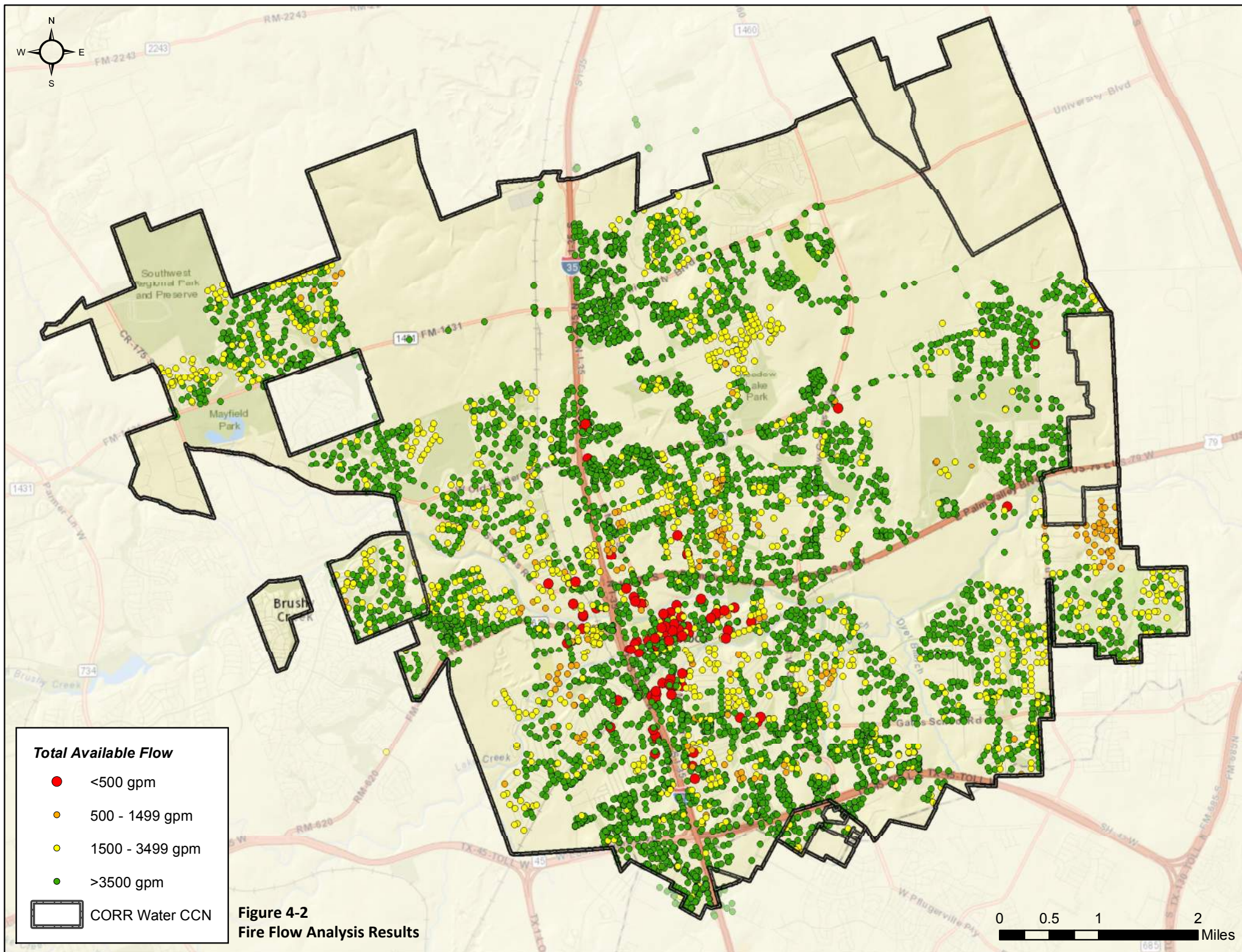
The following summarizes specific issues within the existing system and provides solutions to address such issues.

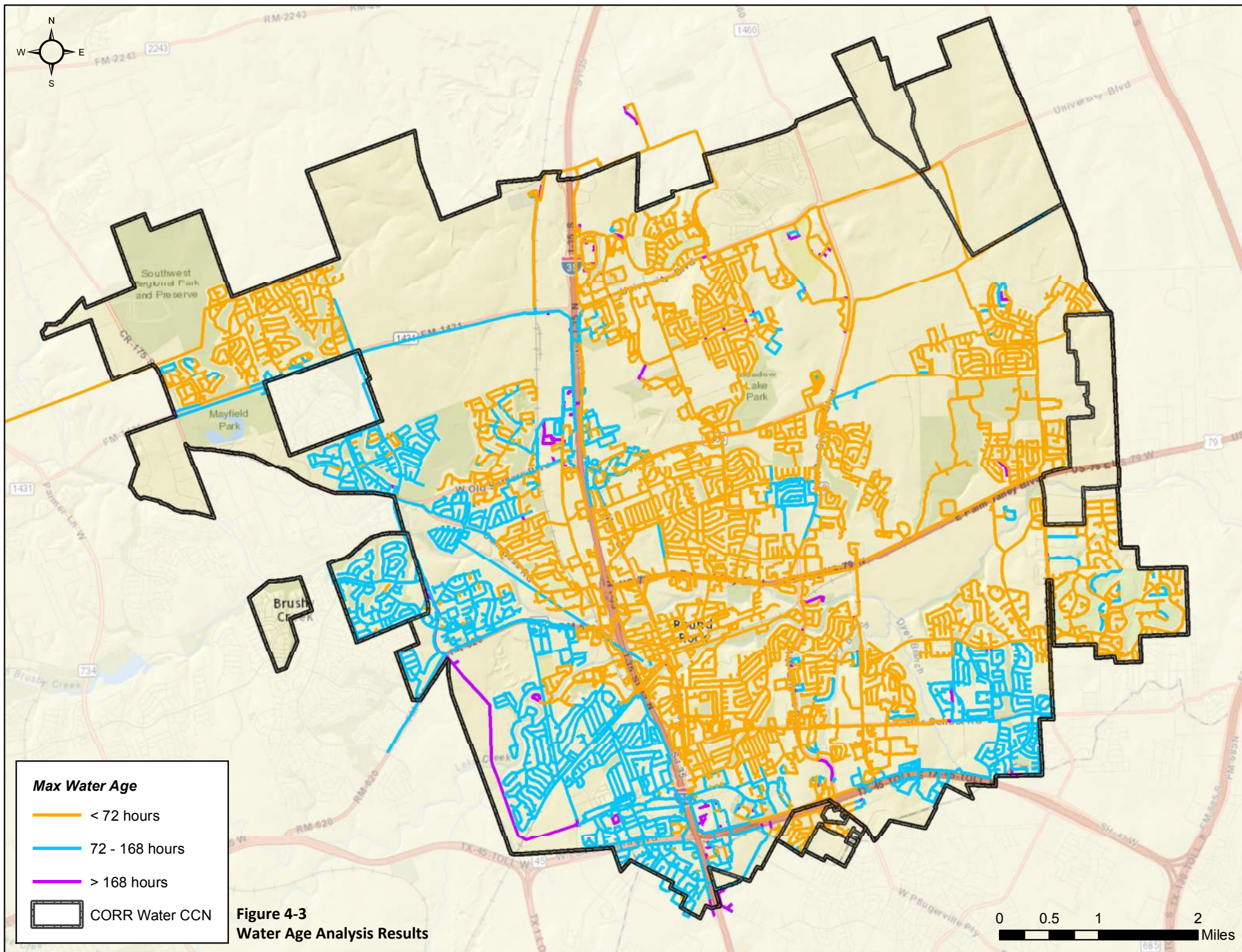
4.3.2.1 Lake Creek WTP and South 81 Pump Station

As previously mentioned, the Lake Creek WTP is the least expensive source and treatment option available, and therefore, the City requested that the hydraulic model maximize the flow available from the Lake Creek WTP. Currently, the Lake Creek WTP only pumps an average of 2.0 mgd into the system because of hydraulic limitations and pressure head from other supply sources to the area. The maximum treatment capacity of the Lake Creek WTP is 5.0 mgd.

The model was updated by adding a new PS at the South 81 EST to pump to the Chisholm Valley EST in PP 971, to analyze whether it would be possible to maximize flow out of the Lake Creek WTP and decrease energy consumption. Modeling indicated a new PS at the South 81 EST will be critical to increasing flow from the Lake Creek WTP. Based on modeling results, CDM Smith recommends constructing a new South 81 EST PS at this location, with a capacity of approximately 3,500 gpm at 80 feet of head to meet existing MDD conditions. Modeling results showed that existing piping between PP 924 and PP 971 is adequate to convey the flow between the PS location and PP 971. Additionally it is recommended that the South 81 EST PS be utilized as the primary feed to the Chisholm Valley EST. The existing PRV-9, located at CR157 and currently controlled by an RTU, should be utilized only as a secondary feed to the Chisholm Valley EST. By utilizing the PRV feed as a secondary feed to PP 971 and the South 81 EST PS as the primary feed, the service area of the Lake Creek WTP can be expanded to maximize available flow.

To further increase the available flow from the Lake Creek WTP, CDM Smith recommends limiting pumping from the Southeast GST into PP 924 and instead utilizing the reduced feed from PRV-34 to aid in supplying flow to the eastern part of PP 924. Additionally, it is recommended to install a 24-inch main along Gattis School Road from the South 81 EST to Doublecreek Drive. This main will help balance the hydraulic gradeline between the South 81 EST and Southeast EST by reducing headloss and allowing them to “float” together in PP 924 (instead of operating independently).





The Gattis School Road main could also help expand the service area of the Lake Creek WTP further east to Southeast EST rather than relying on the Southeast GST to re-pump flow. This operation scheme is recommended for low demand and ADD days rather than high demand or MDD days. As demand increases in the system, this operational scheme will struggle to maintain tank levels and will need to utilize the Southeast GST and PRV-9 to a greater extent, thus limiting the influence of the Lake Creek WTP.

By employing the operational scheme discussed above, it is estimated the Lake Creek WTP could deliver the maximum available 5.0 mgd to the distribution system under existing (2014) average daily demands.

4.3.2.2 McNeil GST and PS

The McNeil GST, with an overflow elevation of 777 feet, is currently filled by the Lake Creek WTP or PP 890 through a PSV located just upstream of the tank. The McNeil PS draws water from the GST and pumps into PP 971 to the Chisholm Valley EST.

The proposed new South 81 PS, discussed previously, will utilize less energy to pump to the Chisholm Valley EST and can take the place of the existing McNeil facility. Furthermore, the McNeil GST does not have the ability to convey flow by gravity to serve the customers in PP 890. Therefore, CDM Smith recommends that the McNeil GST and PS be decommissioned from service once the South 81 PS is operational.

4.3.2.3 Bowman GST and PS

Like the McNeil GST and PS, the Bowman GST and PS are located in PP 890. The Bowman GST has an overflow elevation of 767 feet and is filled from PP 890 through a pressure sustaining valve located upstream of the tank. The Bowman PS draws water from the Bowman GST and pumps to the Chandler (aka Meadows) EST in PP 890.

Because of redundancy provided to PP 890 through multiple PRV feeds, the Lake Creek WTP, and the BCRWTP supply, the Bowman facility does not serve a unique purpose within the distribution system and proves unnecessary in maintaining distribution system operation. For these reasons, it is recommended the Bowman GST and PS be decommissioned to reduce operation and maintenance costs for the City.

4.4 System Criteria

In designing future pipeline improvements, the following guidelines and regulations were considered. Minimum pressure during peak hour demand is 35 pounds per square inch (psi), and maximum pipeline velocity is 5 feet per second. Per City staff, the preferred minimum pressure during peak hour demand is 50 psi.

Maximum static pressure should be 100 psi or less. Customers with static pressure above 80 psi are required to have a PRV.

During fire flow, minimum pressure at the flowing hydrant or elsewhere in the pressure plane is 20 psi, and maximum velocity during fire flow is 10 feet per second.

The City of Round Rock WTP has four clearwells with a total volume of 6.5 MG. TCEQ requires that these clearwells remain at least 50 percent full to meet minimum residence time for disinfection. The other 50 percent of clearwell volume provide storage to meet peak hour demands.

4.5 2025 Scenario Improvements

The capital improvements necessary to meet the 2025 projected future water demands were determined using the hydraulic model and the criteria described above. **Section 6** summarizes these recommended improvements.

4.5.1 East Side Transmission

Large growth areas within the City's CCN include University Boulevard east of AW Grimes Boulevard, areas along AW Grimes Boulevard between University Boulevard and Old Settlers Boulevard, and on the south side of Palm Valley Road between AW Grimes Boulevard and Red Bud Lane.

A majority of 2025 capital improvements are intended to meet needs of the large growth areas while maintaining the water system criteria. The East Loop Phases II and III, Avery Center East, and Arterial A Line are all in PP 1031 and serve to convey water from Barton Hill to the east and south side of the system and tie into the recently constructed transmission mains listed in the 2011 WMP as CR 112 Phase I, Parcel 150, and University Boulevard Phase I. It is recommended to install a PRV assembly along the Avery Center East section of main, just north of Old Settlers Boulevard. It is proposed that a new Old Settlers EST, located near Old Settlers Park in PP 890 (Section 4.5.3) have a PRV assembly with RTU controls based on the level in the Old Settlers EST to aid with tank turnover.

4.5.2 West Side Transmission

By year 2025, a high pressure main (Sam Bass I, Sam Bass II and West Loop), at the same grade line as the BCRWTP point of entry, is proposed to extend southward along the west side of PP 971 West to PRV-9 on CR 172. PRV connections are recommended to PP 971 at various locations along the length of the main. Modeled PRV connections to PP 971 include at the intersection of Old Settlers Boulevard and Wyoming Springs Drive as well as at the intersection of Creek Bend Circle and Creek Bend Boulevard, with the connection to the Creek Bend area requiring a 2,000-foot length of 12-inch piping from the high pressure transmission main. This long main will help convey BCRWTP supply to growing areas of the City service area while also reducing the headloss.

4.5.3 Storage Improvement

Normal operations for ESTs involve operating within the top one-third of tank capacity and reserving two-thirds of storage for fire flow and emergency usage.

In 2025, based on modeling results, CDM Smith recommends a new 2.0 MG EST in PP 890. The City has identified the northwest corner of Old Settlers Park as the preferred site for the tank location. This location appears to receive adequate turnover, provided the PRV recommended upstream of the tank (along the Avery Center East section of main and just north of Old Settlers Boulevard) be RTU controlled based on tank level to enhance tank turnover when necessary on

lower demand days. It is also recommended that the tank tie-in with a main running between the proposed Arterial A transmission main and the existing 8-inch main along Harrel Parkway.

Appendix A presents the City's water distribution system along with recommended 2025 and 2040 improvements.

4.6 2040 Scenario Improvements

Additional capital improvements beyond 2025 and prior to build-out (2040) are presented in detail in Section 6 of this Master Plan. Pipelines and nodes were added in the undeveloped areas as follows:

- Pipelines follow streets (where possible) or parcel boundaries.
- Looped network of pipelines were created, as opposed to single branch/dead end supply lines into an area.
- Features including rivers or reservoirs (such as the "Soil Conservation Service Site" Reservoir located between CR 112 and University Blvd) were avoided to the extent possible.

During 2040 MDD projections of 73 mgd, the model showed that the service area will require majority of the WTP capacity (52 mgd) and BCRWTP point of entry capacity (40.8 mgd). The City will need to fully utilize available storage to meet peak hour demands. Per the model, the 2025 transmission main improvements adequately convey the necessary 2040 demand through the system; therefore, it is not anticipated that large scale transmission main projects will be needed in the 2040 timeframe aside from the North Loop 2 project (discharge main from the City WTP on the east side of Interstate 35). This new or paralleled length of main will reduce headloss from the WTP high service pumps to the east side transmission mains constructed in the 2025 timeframe.

4.6.1 Storage Improvement

The existing 2.7 MG of elevated storage at Barton Hill is sufficient for existing and 2025 conditions. An additional 3 MG of elevated storage is recommended to meet peak demands for 2040. Thus, Barton Hill will have a total of 5.7 MG of elevated storage by 2040.

Section 5

Water System Storage and Pumping Evaluation

This section describes the methods used in evaluating the City's water distribution system storage and pumping capacities by pressure plane. The following elements are discussed:

- Regulatory and industry standards relevant for water system storage and pumping;
- Existing water system storage and pumping capacities; and
- Existing water system storage and pumping capacities by pressure plane based upon regulatory and recommended criteria.

5.1 Regulatory and Industry Standards

Title 30, Chapter 290 of the Texas Administrative Code (TAC) outlines regulatory system requirements for elevated, ground, and total storage, as well as total pumping capacity within a system. Evaluations under Chapter 290 depend on the number of connections within the system. Traditionally, the number of connections is calculated by TCEQ as the population divided by three. Industry standard water system storage criteria were also considered in this evaluation.

5.1.1 Regulatory and Industry Standards for Storage

CDM Smith used regulatory requirements, industry standards, and previous design experience to evaluate the City's water system storage capacity. The specific information considered is presented in **Table 5-1**.

Table 5-1 Regulatory and Industry Standards for Storage

Entity	Requirement
TAC – Title 30, Chapter 290 (baseline requirement)	At least 200 gallons per connection of total storage, of which 100 gallons per connection must be elevated storage
CDM Smith Developed Criteria ⁽¹⁾	55 gallons per person of elevated storage, and 130 gallons per person of ground storage
TAC – Title 30, Chapter 290 (alternative requirement) ⁽²⁾	If system has a minimum of 200 gallons per connection of elevated storage, the pumping capacity required can be reduced to 0.6 gpm per connection

⁽¹⁾ Developed (recommended) criteria based upon industry standards and professional experience.

⁽²⁾ Alternate elevated storage requirement allows for decreased required pumping capacity.

5.1.2 Regulatory Standards for Pumping

The City's water system pumping capacity was evaluated and compared with the TCEQ requirements, as defined in **Table 5-2**, below.

Table 5-2 Regulatory Standards for Pumping

Entity	Requirement
TAC – Title 30, Chapter 290 (baseline requirement)	Total pumping capacity of 2.0 gpm per connection, or a capacity sufficient to meet the peak hour flow with one pump out of service (firm pumping capacity) ⁽²⁾
TAC – Title 30, Chapter 290 (alternative requirement) ⁽¹⁾	If system has a minimum of 200 gallons per connection of elevated storage, the total pumping capacity required can be reduced to 0.6 gpm per connection

⁽¹⁾ Alternate elevated storage requirement allows for decreased required pumping capacity.

⁽²⁾ Capacity sufficient to meet peak hour flow with one pump out of service calculated to be: 1.05 gpm per connection.

Regarding the first requirement in Table 5-2, a peak hour flow of 1.05 gpm per connection was calculated, based on values determined from a historical peak flow analysis. It should be noted that the 1.05 gpm per connection capacity includes a maximum day flow of 0.65 gpm per connection and a peak hour factor of 1.6.

5.2 Existing System Capacity

The subsequent sections summarize the existing water system storage and pumping capacity.

5.2.1 Existing Storage Capacity

Seven ESTs, five GSTs, and two standpipes (one acts as an EST, one as a GST) serve the City water service area. Additionally, four clearwells at the City's WTP can be considered as ground storage units in the system. A fifth clearwell at the City's WTP is recommended to be constructed by 2031. The BCRWTP and its EST also provide a portion of treated water and elevated storage to the City.

The City's storage facilities serve specific pressure planes within the system. Based on the hydraulic capabilities of the system, the City's PPs were divided into three separate and distinct sections, as presented in **Table 5-3**. As previously noted, due to size, proximity and operational controls, PP 860 is included with PP 890 for this evaluation.

Table 5-3 Pressure Plane Sections

Section	Pressure Plane
West	1071, 1031 (West) and 971 (West)
East	1031 (East), 971 (North), 924, 890 and 870
Southeast	971 (Southeast)

Although PPs within a section are hydraulically connected, each section (West, East, Southeast) acts as its own entity due to insufficient hydraulic connectivity between storage capacity between sections. A schematic of the operational storage units are presented in **Figure 5-1**; green units were not considered in future analyses. The names, sizes and pressure planes served for each of the City's storage facilities is presented in **Table 5-4**.

The Fern Bluff EST required its own analysis because the EST provides storage capacity solely for Fern Bluff MUD. Additionally, the North 81 and Barton Hill Standpipes are not listed in this evaluation because they have been decommissioned. Similarly, since the City has planned to decommission Bowman GST in the future (not currently online) and CDM Smith recommends decommissioning McNeil GST and pump station, this evaluation includes the Bowman and McNeil GSTs and pump stations in only the 2015 analysis (not in the 2025 and 2040 analyses).

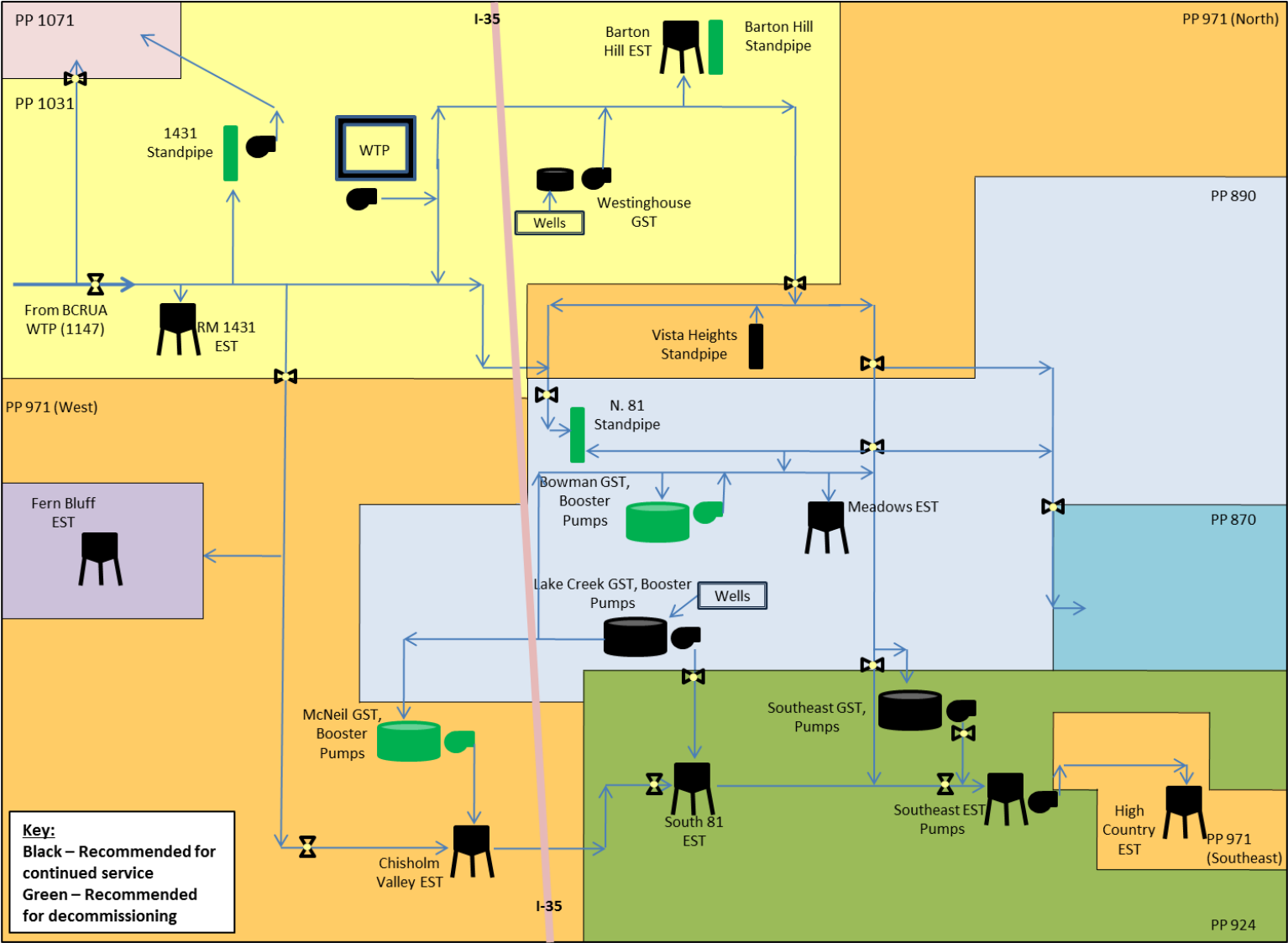


Figure 5-1
City of Round Rock Operational Facilities

Table 5-4 City of Round Rock Storage Capacity

Tank Name	Type ⁽³⁾	Usable Capacity (gal)	Pressure Plane Served
WTP Clearwell No.1	Clearwell	1,000,000	All
WTP Clearwell No.2	Clearwell	2,000,000	All
WTP Clearwell No.3	Clearwell	2,000,000	All
WTP Clearwell No.4	Clearwell	1,500,000	All
WTP Clearwell No.5 (Online by 2031)	Clearwell	1,500,000	All
West			
Stone Oak Standpipe	Standpipe (GST)	275,000	1071
RM 1431 EST	EST	2,000,000	1031 (West)
BCRWTP EST	EST	620,000	1071, 1031 (West)
McNeil ⁽²⁾	GST	730,000	971 (West)
Chisholm Valley	EST	1,250,000	971 (West)
Fern Bluff EST	EST	750,000	971 (West) – Fern Bluff MUD only
East			
Westinghouse	GST	100,000	1031 (East)
Barton Hill	EST	2,700,000	1031 (East)
Vista Heights Standpipe ⁽¹⁾	Standpipe (EST)	250,000	971 (North)
South 81	EST	1,250,000	924
Southeast EST	EST	750,000	924
Southeast Ground	GST	2,500,000	924
Bowman ⁽²⁾	GST	500,000	890
Meadows	EST	750,000	890
Lake Creek	GST	500,000	890
Southeast (PP 971)			
High Country	EST	1,250,000	971 (Southeast)

⁽¹⁾ Usable capacity for this standpipe includes only the top 30 to 40 feet which can be considered elevated storage.

⁽²⁾ Recommended for decommissioning and not included in future analyses.

⁽³⁾ During analysis, clearwells are included as ground storage.

5.2.2 Existing Pumping Capacity

Eleven high service pumps at the WTP and 25 booster pumps throughout the distribution system serve the City of Round Rock. The BCRWTP also provides water to the City via high service pumping. **Table 5-5** presents the system pumps, capacity, and corresponding pressure planes served. Figure 5-1 shows the locations of the booster pump stations. Due to the City's plan to decommission the Bowman GST and CDM Smith's recommendation to decommission McNeil GST prior to 2025, the corresponding booster pumps were not included in the 2025 and 2040 analyses.

Table 5-5 City of Round Rock Pumping Capacity

Pump Name	Capacity (gpm)	Pressure Plane Served
West		
1431 Booster Pump #1	750	1071
1431 Booster Pump #2	750	1071
1431 Booster Pump #3	750	1071
High Service Pumping from BCRWTP	18,333	1071
Additional High Service Pumping from BCRWTP in 2040	34,000	1071
WTP High Service Pump #1	2,100	1031
WTP High Service Pump #2	2,100	1031
WTP High Service Pump #3	2,100	1031
WTP High Service Pump #4	2,100	1031
WTP High Service Pump #5	4,200	1031
WTP High Service Pump #6	4,200	1031
McNeil Booster Pump #1 ⁽¹⁾	1,500	971 (West)
McNeil Booster Pump #2 ⁽¹⁾	1,500	971 (West)
McNeil Booster Pump #3 ⁽¹⁾	1,500	971 (West)
McNeil Booster Pump #4 ⁽¹⁾	1,500	971 (West)
East		
WTP High Service Pump #7	4,200	1031 (East)
WTP High Service Pump #8	5,200	1031 (East)
WTP High Service Pump #9	5,200	1031 (East)
WTP High Service Pump #10	5,200	1031 (East)
WTP High Service Pump #11	5,200	1031 (East)
Westinghouse Booster Pump #1	1,000	1031 (East)
Westinghouse Booster Pump #2	1,000	1031 (East)
SE Ground Booster Pump #1	3,000	924
SE Ground Booster Pump #2	3,000	924
SE Ground Booster Pump #3	3,000	924
Bowman Booster Pump #1 ⁽¹⁾	1,500	890
Bowman Booster Pump #2 ⁽¹⁾	1,500	890
Bowman Booster Pump #3 ⁽¹⁾	1,500	890
Bowman Booster Pump #4 ⁽¹⁾	1,500	890
Lake Creek Booster Pump #1	2,000	890
Lake Creek Booster Pump #2	2,000	890
Lake Creek Booster Pump #3	2,000	890
Lake Creek Booster Pump #4	2,000	890
Lake Creek Booster Pump #5	2,000	890
Lake Creek Booster Pump #6	2,000	890
Southeast (PP 971)		
SE Elevated Booster Pump #1	1,250	971 (Southeast)
SE Elevated Booster Pump #2	1,250	971 (Southeast)
SE Elevated Booster Pump #3	1,250	971 (Southeast)

⁽¹⁾ Recommended for decommissioning and not included in future analyses.

5.3 Water System Evaluation

TAC Chapter 290 requires that minimum water system capacity account for the total capacities for public water systems, as well as capacities per PP. Refer to Table 5-3 for more information on the PP sections: East, West, and Southeast. As stated previously, sections cannot efficiently transmit excess capacity to other sections with capacity shortages due to hydraulic limitations in the system.

For each pressure plane, the required capacity (storage or pumping) was determined and compared to the capacity available. If an overage of capacity exists within a PP, the excess capacity can be transmitted via hydraulic connection (within the same PP section) to a lower PP with a capacity shortage. A lower pressure plane cannot transmit capacity to a higher pressure plane, however.

The following sections provide an evaluation of the City's water distribution system storage and pumping capacities by pressure plane for 2015, 2025, and 2040 time frames.

5.3.1 Storage Evaluation

The City's elevated storage capacity was evaluated based on three applicable criteria (as shown in Table 5-1): 100 gallons per connection, 55 gallons per person, and 200 gallons per connection. All evaluations conducted used all three criteria, but CDM Smith recommends using the 200 gallons per connection alternative where feasible, to allow for reduced pumping within the system. For areas where this is not feasible, CDM Smith recommends utilizing the 55 gallons per person criterion (which is more conservative than the minimum regulatory rule of 100 gallons per connection).

Ground storage capacity was evaluated based on CDM Smith's recommended value of 130 gallons per person. Total storage capacity was based on two criteria: TCEQ's required 200 gallons per connection and CDM Smith's recommended 185 gallons per person (55 gallons per person elevated storage and 130 gallons per person ground storage). **Table 5-6** shows the total available and required storage per pressure plane section for each timeframe for the City.

Note that ground storage capacity is based on a recommendation, not a regulation. Therefore, when evaluating system compliance (**Section 6**), as long as the total storage capacity has a minimum of 200 gallons per connection with 100 gallons per connection of elevated storage, ground storage shortages based on 130 gallons per person and total storages based on 185 gallons per person can be disregarded.

Table 5-6 Total Storage Capacity per Section

Elevated Storage Tank Capacity (gal)				
Pressure Plane Section	Capacity Available	Capacity Required		
		100 gal per connection	55 gal per person	200 gal per connection
2015 West Side	3,870,000	1,246,082	2,056,035	2,492,163
2025 West Side	3,870,000	1,748,880	2,885,652	3,497,760
2040 West Side	3,870,000	2,362,767	3,898,565	4,725,533
2015 East Side	5,700,000	2,445,798	4,035,567	4,891,597
2025 East Side	5,700,000	3,393,433	5,599,165	6,786,867
2040 East Side	5,700,000	4,849,967	8,002,445	9,699,933
2015 Southeast (PP 971 Southeast)	1,250,000	170,567	281,435	341,133
2025 Southeast (PP 971 Southeast)	1,250,000	194,733	321,310	389,467
2040 Southeast (PP 971 Southeast)	1,250,000	194,767	321,365	389,533
2015 West - Fern Bluff MUD (PP 971 West)	750,000	197,733	326,260	395,467
2025 West - Fern Bluff MUD (PP 971 West)	750,000	197,733	326,260	395,467
2040 West - Fern Bluff MUD (PP 971 West)	750,000	197,733	326,260	395,467
Ground Storage Tank Capacity (gal)				
Pressure Plane Section	Capacity Available	Capacity Required - 130 gal per person		
2015 West Side	4,305,000	4,859,719		
2025 West Side	3,575,000	6,820,632		
2040 West Side	4,175,000	9,214,790		
2015 East Side	7,500,000	9,538,614		
2025 East Side	7,000,000	14,005,550		
2040 East Side	7,900,000	18,914,870		
2015 Southeast (PP 971 Southeast)	0	665,210		
2025 Southeast (PP 971 Southeast)	0	759,460		
2040 Southeast (PP 971 Southeast)	0	759,590		
2015 West - Fern Bluff MUD (PP 971 West)	0	771,160		
2025 West - Fern Bluff MUD (PP 971 West)	0	771,160		
2040 West - Fern Bluff MUD (PP 971 West)	0	771,160		
Total Storage Capacity (gal)				
Pressure Plane Section	Capacity Available	Capacity Required		
		200 gal per connection	185 gal per person	
2015 West Side	8,175,000	2,492,163	6,915,753	
2025 West Side	7,445,000	3,497,760	9,706,284	
2040 West Side	8,045,000	4,725,533	13,113,355	
2015 East Side	13,200,000	4,891,597	13,574,181	
2025 East Side	12,700,000	6,786,867	18,833,555	
2040 East Side	13,600,000	9,699,933	26,917,315	
2015 Southeast (PP 971 Southeast)	1,250,000	341,133	946,645	
2025 Southeast (PP 971 Southeast)	1,250,000	389,467	1,080,770	
2040 Southeast (PP 971 Southeast)	1,250,000	389,533	1,080,955	
2015 West - Fern Bluff MUD (PP 971 West)	750,000	395,467	1,097,420	
2025 West - Fern Bluff MUD (PP 971 West)	750,000	395,467	1,097,420	
2040 West - Fern Bluff MUD (PP 971 West)	750,000	395,467	1,097,420	

Tables 5-7, 5-8 and 5-9 present the analysis per PP for 2015, 2025 and 2040, respectively.

Table 5-7 2015 Storage Capacity per Pressure Plane

Elevated Storage Tank Capacity (gal)										
Pressure Plane	Capacity Available	Based on 100 gal per connection			Based on 55 gal per person			Based on 200 gal per connection		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	620,000	48,592	571,408	571,408	80,176	539,824	539,824	97,183	522,817	522,817
1031 (West)	2,000,000	194,557	1,805,443	2,376,852	321,019	1,678,982	2,218,805	389,113	1,610,887	2,133,703
971 (West)	1,250,000	1,002,933	247,067	2,623,918	1,654,840	(404,840)	1,813,965	2,005,867	(755,867)	1,377,837
Total	3,870,000	1,246,082	-	2,623,918	2,056,035	-	1,813,965	2,492,163	-	1,377,837
West – Fern Bluff										
971 (West) Fern Bluff	750,000	197,733	552,267	3,176,185	326,260	423,740	2,237,705	395,467	354,533	1,732,370
East										
1031 (East)	2,700,000	202,657	2,497,343	2,497,343	334,384	2,365,617	2,365,617	405,313	2,294,687	2,294,687
971 (North)	250,000	170,730	79,270	2,576,613	281,705	(31,705)	2,333,912	341,460	(91,460)	2,203,227
924	2,000,000	604,750	1,395,250	3,971,863	997,838	1,002,163	3,336,075	1,209,500	790,500	2,993,727
890	750,000	1,393,467	(643,467)	3,328,397	2,299,220	(1,549,220)	1,786,855	2,786,933	(2,036,933)	956,793
870	0	74,195	(74,195)	3,254,202	122,422	(122,422)	1,664,433	148,390	(148,390)	808,403
Total	5,700,000	2,445,798	-	3,254,202	4,035,567	-	1,664,433	4,891,597	-	808,403
Southeast										
971 (Southeast)	1,250,000	170,567	1,079,433	1,079,433	281,435	968,565	968,565	341,133	908,867	908,867
Ground Storage Tank Capacity (gal)					Total Storage Capacity (gal)					
Pressure Plane	Capacity Available	Based on 130 gal per person			Based on 200 gal per connection			Based on 185 gal per person		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	975,000	189,508	785,493	785,493	97,183	1,497,817	1,497,817	269,684	1,325,316	1,325,316
1031 (West)	2,600,000	758,771	1,841,229	2,626,722	389,113	4,210,887	5,708,703	1,079,790	3,520,211	4,845,527
971 (West)	730,000	3,911,440	(3,181,440)	(554,719)	2,005,867	(25,867)	5,682,837	5,566,280	(3,586,280)	1,259,247
Total	4,305,000	4,859,719	-	(554,719)	2,492,163	-	5,682,837	6,915,753	-	1,259,247
West – Fern Bluff										
971 (West) Fern Bluff	0	771,160	(771,160)	(1,325,879)	395,467	354,533	6,037,370	1,097,420	(347,420)	911,827
East										
1031 (East)	4,000,000	790,361	3,209,639	3,209,639	405,313	6,294,687	6,294,687	1,124,745	5,575,256	5,575,256
971 (North)	0	665,847	(665,847)	2,543,792	341,460	(91,460)	6,203,227	947,552	(697,552)	4,877,704
924	3,000,000	2,358,525	641,475	3,185,267	1,209,500	3,790,500	9,993,727	3,356,363	1,643,638	6,521,342
890	500,000	5,434,520	(4,934,520)	(1,749,253)	2,786,933	(1,536,933)	8,456,793	7,733,740	(6,483,740)	37,602
870	0	289,361	(289,361)	(2,038,614)	148,390	(148,390)	8,308,403	411,782	(411,782)	(374,181)
Total	7,500,000	9,538,614	-	(2,038,614)	4,891,597	-	8,308,403	13,574,181	-	(374,181)
Southeast										
971 (Southeast)	0	665,210	(665,210)	(665,210)	341,133	908,867	908,867	946,645	303,355	303,355

Table 5-8 2025 Storage Capacity per Pressure Plane

Elevated Storage Tank Capacity (gal)										
Pressure Plane	Capacity Available	Based on 100 gal per connection			Based on 55 gal per person			Based on 200 gal per connection		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	620,000	71,093	548,907	548,907	117,304	502,696	502,696	142,187	477,813	477,813
1031 (West)	2,000,000	284,700	1,715,300	2,264,207	469,755	1,530,245	2,032,941	569,400	1,430,600	1,908,413
971 (West)	1,250,000	1,393,087	(143,087)	2,121,120	2,298,593	(1,048,593)	984,348	2,786,173	(1,536,173)	372,240
Total	3,870,000	1,748,880	-	2,121,120	2,885,652	-	984,348	3,497,760	-	372,240
West – Fern Bluff										
971 (West) Fern Bluff	750,000	197,733	552,267	2,673,387	326,260	423,740	1,408,088	395,467	354,533	726,773
East										
1031 (East)	2,700,000	258,500	2,441,500	2,441,500	426,525	2,273,475	2,273,475	517,000	2,183,000	2,183,000
971 (North)	250,000	354,333	(104,333)	2,337,167	584,650	(334,650)	1,938,825	708,667	(458,667)	1,724,333
924	2,000,000	682,433	1,317,567	3,654,733	1,126,015	873,985	2,812,810	1,364,867	635,133	2,359,467
890	750,000	2,023,933	(1,273,933)	2,380,800	3,339,490	(2,589,490)	223,320	4,047,867	(3,297,867)	(938,400)
870	0	74,233	(74,233)	2,306,567	122,485	(122,485)	100,835	148,467	(148,467)	(1,086,867)
Total	5,700,000	3,393,433	-	2,306,567	5,599,165	-	100,835	6,786,867	-	(1,086,867)
Southeast										
971 (Southeast)	1,250,000	194,733	1,055,267	1,055,267	321,310	928,690	928,690	389,467	860,533	860,533
Ground Storage Tank Capacity (gal)					Total Storage Capacity (gal)					
Pressure Plane	Capacity Available	Based on 130 gal per person			Based on 200 gal per connection			Based on 185 gal per person		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	975,000	277,264	697,736	697,736	142,187	1,452,813	1,452,813	394,568	1,200,432	1,200,432
1031 (West)	2,600,000	1,110,330	1,489,670	2,187,406	569,400	4,030,600	5,483,413	1,580,085	3,019,915	4,220,347
971 (West)	0	5,433,038	(5,433,038)	(3,245,632)	2,786,173	(1,536,173)	3,947,240	7,731,631	(6,481,631)	(2,261,284)
Total	3,575,000	6,820,632	-	(3,245,632)	3,497,760	-	3,947,240	9,706,284	-	(2,261,284)
West – Fern Bluff										
971 (West) Fern Bluff	0	771,160	(771,160)	(4,016,792)	395,467	354,533	4,301,773	1,097,420	(347,420)	(2,608,704)
East										
1031 (East)	4,000,000	1,008,150	2,991,850	2,991,850	517,000	6,183,000	6,183,000	1,434,675	5,265,325	5,265,325
971 (North)	0	1,381,900	(1,381,900)	1,609,950	708,667	(458,667)	5,724,333	1,966,550	(1,716,550)	3,548,775
924	3,000,000	2,661,490	338,510	1,948,460	1,364,867	3,635,133	9,359,467	3,787,505	1,212,495	4,761,270
890	0	7,893,340	(7,893,340)	(5,944,880)	4,047,867	(3,297,867)	6,061,600	11,232,830	(10,482,830)	(5,721,560)
870	0	289,510	(289,510)	(6,234,390)	148,467	(148,467)	5,913,133	411,995	(411,995)	(6,133,555)
Total	7,000,000	14,005,550	-	(7,005,550)	6,786,867	-	5,913,133	18,833,555	-	(6,133,555)
Southeast										
971 (Southeast)	0	759,460	(759,460)	(759,460)	389,467	860,533	860,533	1,080,770	169,230	169,230

Table 5-9 2040 Storage Capacity per Pressure Plane

Elevated Storage Tank Capacity (gal)										
Pressure Plane	Capacity Available	Based on 100 gal per connection			Based on 55 gal per person			Based on 200 gal per connection		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	620,000	89,500	530,500	530,500	147,675	472,325	472,325	179,000	441,000	441,000
1031 (West)	2,000,000	364,767	1,635,233	2,165,733	601,865	1,398,135	1,870,460	729,533	1,270,467	1,711,467
971 (West)	1,250,000	1,908,500	(658,500)	1,507,233	3,149,025	(1,899,025)	(28,565)	3,817,000	(2,567,000)	(855,533)
Total	3,870,000	2,362,767	-	1,507,233	3,898,565	-	(28,565)	4,725,533	-	(855,533)
West – Fern Bluff										
971 (West) Fern Bluff	750,000	197,733	552,267	2,059,500	326,260	423,740	423,740	395,467	354,533	354,533
East										
1031 (East)	2,700,000	589,333	2,110,667	2,110,667	972,400	1,727,600	1,727,600	1,178,667	1,521,333	1,521,333
971 (North)	250,000	549,133	(299,133)	1,811,533	906,070	(656,070)	1,071,530	1,098,267	(848,267)	673,067
924	2,000,000	728,033	1,271,967	3,083,500	1,201,255	798,745	1,870,275	1,456,067	543,933	1,217,000
890	750,000	2,898,333	(2,148,333)	935,167	4,782,250	(4,032,250)	(2,161,975)	5,796,667	(5,046,667)	(3,829,667)
870	0	85,133	(85,133)	850,033	140,470	(140,470)	(2,302,445)	170,267	(170,267)	(3,999,933)
Total	5,700,000	4,849,967	-	850,033	8,002,445	-	(2,302,445)	9,699,933	-	(3,999,933)
Southeast										
971 (Southeast)	1,250,000	194,767	1,055,233	1,055,233	321,365	928,635	928,635	389,533	860,467	860,467
Ground Storage Tank Capacity (gal)					Total Storage Capacity (gal)					
Pressure Plane	Capacity Available	Based on 130 gal per person			Based on 200 gal per connection			Based on 185 gal per person		
		Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)	Capacity Required	Overage/ (Shortage) within PP	Cumulative Overage/ (Shortage)
West										
1071	975,000	349,050	625,950	625,950	179,000	1,416,000	1,416,000	496,725	1,098,275	1,098,275
1031 (West)	3,200,000	1,422,590	1,777,410	2,403,360	729,533	4,470,467	5,886,467	2,024,455	3,175,545	4,273,820
971 (West)	0	7,443,150	(7,443,150)	(5,039,790)	3,817,000	(2,567,000)	3,319,467	10,592,175	(9,342,175)	(5,068,355)
Total	4,175,000	9,214,790	-	(5,039,790)	4,725,533	-	3,319,467	13,113,355	-	(5,068,355)
West – Fern Bluff										
971 (West) Fern Bluff	0	771,160	(771,160)	(5,810,950)	395,467	354,533	3,674,000	1,097,420	(347,420)	(5,415,775)
East										
1031 (East)	4,900,000	2,298,400	2,601,600	2,601,600	1,178,667	6,421,333	6,421,333	3,270,800	4,329,200	4,329,200
971 (North)	0	2,141,620	(2,141,620)	459,980	1,098,267	(848,267)	5,573,067	3,047,690	(2,797,690)	1,531,510
924	3,000,000	2,839,330	160,670	620,650	1,456,067	3,543,933	9,117,000	4,040,585	959,415	2,490,925
890	0	11,303,500	(11,303,500)	(10,682,850)	5,796,667	(5,046,667)	4,070,333	16,085,750	(15,335,750)	(12,844,825)
870	0	332,020	(332,020)	(11,014,870)	170,267	(170,267)	3,900,067	472,490	(472,490)	(13,317,315)
Total	7,900,000	18,914,870	-	(11,014,870)	9,699,933	-	3,900,067	26,917,315	-	(13,317,315)
Southeast										
971 (Southeast)	0	759,590	(759,590)	(759,590)	389,533	860,467	860,467	1,080,955	169,045	169,045

5.3.2 Pumping Evaluation

The City's water pumping capacity was evaluated based on pumping criteria (as shown in Table 5-2): 2.0 gpm per connection, 1.05 gpm per connection, and 0.6 gpm per connection. For this system, the 1.05 gpm per connection is the peak hour flow and must be met with the largest pump out of service (firm capacity).

If the system has a minimum of 200 gallons per connection of elevated storage, the total pumping capacity required can be reduced to 0.6 gpm per connection. If EST capacity does not meet this alternate criterion, the system must meet the minimum of either 2.0 gpm total pumping per connection or the PHF (1.05 gpm per connection) at firm capacity.

Table 5-10 shows the total pumping capacity for 2015, 2025 and 2040.

Table 5-10 Total Pumping Capacity per Section

Pressure Plane Section	Total Capacity Available (gpm)	Firm Capacity Available (gpm)	Capacity Required (gpm)		
			0.6 gpm per connection	2.0 gpm per connection	1.05 gpm per connection (PHF)
2015 West Side	43,383	36,933	7,476	24,922	13,084
2025 West Side	37,383	32,433	10,493	34,978	18,363
2040 West Side	53,050	48,100	14,177	47,255	24,809
2015 East Side	54,000	44,300	14,675	48,916	25,681
2025 East Side	48,000	39,800	20,361	67,869	35,631
2040 East Side	48,000	39,800	29,100	96,999	50,925
2015 Southeast (PP 971 Southeast)	3,750	2,500	1,023	3,411	1,791
2025 Southeast (PP 971 Southeast)	3,750	2,500	1,168	3,895	2,045
2040 Southeast (PP 971 Southeast)	3,750	2,500	1,169	3,895	2,045
2015 West - Fern Bluff MUD (PP 971 West)	0	0	1,186	3,955	2,076
2025 West - Fern Bluff MUD (PP 971 West)	0	0	1,186	3,955	2,076
2040 West - Fern Bluff MUD (PP 971 West)	0	0	1,186	3,955	2,076

Tables 5-11, 5-12 and 5-13 present the analysis per pressure plane for 2015, 2025 and 2040, respectively.

Table 5-11 2015 Pumping Capacity per Pressure Plane

Pressure Plane	Capacity Available (gpm)	Firm Capacity Available (gpm)	Based on 0.6 gpm per connection			Based on 2.0 gpm per connection			Based on 1.05 gpm per connection		
			Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)
West											
1071	20,583	19,833	292	20,292	20,292	972	19,612	19,612	510	19,323	19,323
1031 (West)	16,800	12,600	1,167	15,633	35,924	3,891	12,909	32,520	2,043	10,557	29,880
971 (West)	6,000	4,500	6,018	(18)	35,907	20,059	(14,059)	18,462	10,531	(6,031)	23,849
Total	43,383	36,933	7,476	-	35,907	24,922	-	18,462	13,084	-	23,849
West – Fern Bluff											
971 (West) Fern Bluff	0	0	1,186	(1,186)	34,720	3,955	(3,955)	14,507	2,076	(2,076)	21,773
East											
1031 (East)	27,000	21,800	1,216	25,784	25,784	4,053	22,947	22,947	2,128	19,672	19,672
971 (North)	0	0	1,024	(1,024)	24,760	3,415	(3,415)	19,532	1,793	(1,793)	17,879
924	21,000	18,000	3,629	17,372	42,131	12,095	8,905	28,437	6,350	11,650	29,530
890	6,000	4,500	8,361	(2,361)	39,770	27,869	(21,869)	6,568	14,631	(10,131)	19,398
870	0	0	445	(445)	39,325	1,484	(1,484)	5,084	779	(779)	18,619
Total	54,000	44,300	14,675	-	39,325	48,916	-	5,084	25,681	-	18,619
Southeast											
971 (Southeast)	3,750	2,500	1,023	2,727	2,727	3,411	339	339	1,791	709	709

Table 5-12 2025 Pumping Capacity per Pressure Plane

Pressure Plane	Capacity Available (gpm)	Firm Capacity Available (gpm)	Based on 0.6 gpm per connection			Based on 2.0 gpm per connection			Based on 1.05 gpm per connection		
			Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)
West											
1071	20,583	19,833	427	20,157	20,157	1,422	19,161	19,161	746	19,087	19,087
1031 (West)	16,800	12,600	1,708	15,092	35,249	5,694	11,106	30,267	2,989	9,611	28,698
971 (West)	0	0	8,359	(8,359)	26,890	27,862	(27,862)	2,406	14,627	(14,627)	14,070
Total	37,383	32,433	10,493	-	26,890	34,978	-	2,406	18,363	-	14,070
West – Fern Bluff											
971 (West) Fern Bluff	0	0	1,186	(1,186)	25,704	3,955	(3,955)	(1,549)	2,076	(2,076)	11,994
East											
1031 (East)	27,000	21,800	1,551	25,449	25,449	5,170	21,830	21,830	2,714	19,086	19,086
971 (North)	0	0	2,126	(2,126)	23,323	7,087	(7,087)	14,743	3,721	(3,721)	15,365
924	21,000	18,000	4,095	16,905	40,228	13,649	7,351	22,095	7,166	10,834	26,200
890	0	0	12,144	(12,144)	28,085	40,479	(40,479)	(18,384)	21,251	(21,251)	4,948
870	0	0	445	(445)	27,639	1,485	(1,485)	(19,869)	779	(779)	4,169
Total	48,000	39,800	20,361	-	27,639	67,869	-	(19,869)	35,631	-	4,169
Southeast											
971 (Southeast)	3,750	2,500	1,168	2,582	2,582	3,895	(145)	(145)	2,045	455	455

Table 5-13 2040 Pumping Capacity per Pressure Plane

Pressure Plane	Capacity Available (gpm)	Firm Capacity Available (gpm)	Based on 0.6 gpm per connection			Based on 2.0 gpm per connection			Based on 1.05 gpm per connection		
			Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)	Capacity Required (gpm)	Overage/ (Shortage) within PP (gpm)	Cumulative Overage/ (Shortage) (gpm)
West											
1071	36,250	35,500	537	35,713	35,713	1,790	34,460	34,460	940	34,560	34,560
1031 (West)	16,800	12,600	2,189	14,611	50,324	7,295	9,505	43,965	3,830	8,770	43,330
971 (West)	0	0	11,451	(11,451)	38,873	38,170	(38,170)	5,795	20,039	(20,039)	23,291
Total	53,050	48,100	14,177	-	38,873	47,255	-	5,795	24,809	-	23,291
West – Fern Bluff											
971 (West) Fern Bluff	0	0	1,186	(1,186)	37,687	3,955	(3,955)	1,840	2,076	(2,076)	21,215
East											
1031 (East)	27,000	21,800	3,536	23,464	23,464	11,787	15,213	15,213	6,188	15,612	15,612
971 (North)	0	0	3,295	(3,295)	20,169	10,983	(10,983)	4,231	5,766	(5,766)	9,846
924	21,000	18,000	4,368	16,632	36,801	14,561	6,439	10,670	7,644	10,356	20,202
890	0	0	17,390	(17,390)	19,411	57,967	(57,967)	(47,297)	30,433	(30,433)	(10,231)
870	0	0	511	(511)	18,900	1,703	(1,703)	(48,999)	894	(894)	(11,125)
Total	48,000	39,800	29,100	-	18,900	96,999	-	(48,999)	50,925	-	(11,125)
Southeast											
971 (Southeast)	3,750	2,500	1,169	2,581	2,581	3,895	(145)	(145)	2,045	455	455

The evaluation (above) of the required storage and pumping capacities for the West, East, and Southeast pressure plane sections was used to determine the City's regulatory compliance for existing and future infrastructure. The compliance findings and recommended infrastructure improvements resulting from this storage and pumping evaluation are presented in Section 6. A summary of the pressure plane compliance is also included. **Appendix B** shows the complete analysis for the storage and pumping capacity evaluation.

Section 6

Recommended System Improvements

This section summarizes the water system storage and pumping compliance and provides recommendations based on the regulatory analysis described in **Section 5**. Additionally, this section presents recommended CIP projects for the overall distribution system based on modeling efforts and results (**Section 4**). Finally, project progression of remote telemetry improvements is also discussed.

6.1 Storage and Pumping Compliance and Improvements

Based upon the methodology and results presented in Section 5, the compliance status and required improvements for each PP are summarized in **Table 6-1**.

6.1.1 Storage and Pumping Improvements

As shown in Table 6-1, PPs 890 and 870 need additional infrastructure by 2040 to meet Title 30, Chapter 290 storage and pumping requirements. All other PPs comply with storage and pumping regulations until 2040.

PPs 890 and 870 do not meet the minimum regulatory pumping criteria of 2.0 gpm per connection, nor do PPs 890 and 870 have capacities sufficient to meet the PHF with one pump out of service (calculated as 1.05 gpm per connection, as discussed in Section 5). However, PPs 890 and 870 do comply with the reduced pumping rate of 0.6 gpm per connection, although to use the reduced pumping rate a PP must first meet the alternative elevated storage requirement of 200 gallons per connection, which neither PP does.

Consequently, CDM Smith recommends constructing additional elevated storage by 2040 to meet the alternate elevated storage requirement (200 gallons per connection) to serve PPs 890 and 870. This will allow PPs 890 and 870 to use the reduced pumping rate requirement of 0.6 gpm per connection.

PP 890 and PP 870 will require a minimum of 3.8 MG and 0.2 MG of elevated storage, respectively, by 2040 to remain in regulatory compliance. In conjunction with the findings of the modeling evaluation (Section 4), CDM Smith recommends the following elevated storage be constructed to meet the projected 2040 water demands in PPs 890 and 870:

- 2.0 MG EST in PP 890 by 2025: Old Settlers EST
- 3.0 MG EST just north of PP 1031 (East) by 2040: Barton Hill EST

Table 6-1 System Storage and Pumping Capacity Compliance

PP	EST			GST	Total Storage		Pumping			Meets Regulations	Key Notes
	100 gal per conn ⁽¹⁾	55 gal per person (2)	200 gal per conn ⁽³⁾	130 gal per person (2)	200 gal per conn ⁽¹⁾	185 gal per person (2)	2.0 gpm per conn ⁽⁴⁾	PHF ⁽⁴⁾	0.6 gpm per conn ⁽³⁾		
West											
1071											
2015	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets all regulatory and recommended criteria.No additional infrastructure needed.
2025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
1031 (West)											
2015	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets all regulatory and recommended criteria.No additional infrastructure needed.
2025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
971 (West)											
2015	✓	✓	✓		✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets minimum regulatory criteria⁽¹⁾⁽⁴⁾.Does not meet alternative regulatory criteria⁽³⁾ (EST 2040), but reduced pumping rate is not required.Does not meet all recommended criteria⁽²⁾ (EST 2040, GST 2015-2040, total storage 2025-2040).No additional infrastructure needed based on regulatory criteria.
2025	✓	✓	✓		✓		✓	✓	✓	✓	
2040	✓				✓		✓	✓	✓	✓	
971 (West) – Fern Bluff											
2015	✓	✓	✓		✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets minimum and alternative regulatory criteria⁽¹⁾⁽³⁾⁽⁴⁾.Does not meet all recommended criteria⁽²⁾ (GST 2015-2040, total storage 2025-2040).No additional infrastructure needed based on regulatory criteria.
2025	✓	✓	✓		✓		✓	✓	✓	✓	
2040	✓	✓	✓		✓		✓	✓	✓	✓	
East											
1031 (East)											
2015	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets all regulatory and recommended criteria.No additional infrastructure needed.
2025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Table 6-1 System Storage and Pumping Capacity Compliance (Continued)

PP	EST			GST	Total Storage		Pumping			Meets Regulations	Key Notes
	100 gal per conn ⁽¹⁾	55 gal per person (2)	200 gal per conn ⁽³⁾	130 gal per person (2)	200 gal per conn ⁽¹⁾	185 gal per person (2)	2.0 gpm per conn ⁽⁴⁾	PHF ⁽⁴⁾	0.6 gpm per conn ⁽³⁾		
971 (North)											
2015	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets all regulatory and recommended criteria.No additional infrastructure needed.
2025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
924											
2015	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets all regulatory and recommended criteria.No additional infrastructure needed.
2025	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2040	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
890											
2015	✓	✓	✓		✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Does not meet minimum regulatory pumping criteria⁽⁴⁾ (PHF 2040).Meets reduced regulatory pumping rate, but does not meet alternative regulatory requirement for elevated storage⁽³⁾ (EST 2025 - 2040) for reduced pumping rate to apply.Does not meet all recommended criteria⁽²⁾ (EST 2040, GST 2015-2040, total storage 2025-2040).Additional infrastructure required by 2040.
2025	✓	✓			✓			✓	✓	✓	
2040	✓				✓				✓		
870											
2015	✓	✓	✓		✓		✓	✓	✓	✓	<ul style="list-style-type: none">Does not meet minimum regulatory pumping criteria⁽⁴⁾ (PHF 2040).Meets reduced regulatory pumping rate, but does not meet alternative regulatory requirement for elevated storage⁽³⁾ (EST 2025 - 2040) for reduced pumping rate to apply.Does not meet all recommended criteria⁽²⁾ (EST 2040, GST 2015-2040, total storage 2015-2040).Additional infrastructure required by 2040.
2025	✓	✓			✓			✓	✓	✓	
2040	✓				✓				✓		

Table 6-1 System Storage and Pumping Capacity Compliance (Continued)

PP	EST			GST	Total Storage		Pumping			Meets Regulations	Key Notes
	100 gal per conn ⁽¹⁾	55 gal per person (2)	200 gal per conn ⁽³⁾	130 gal per person (2)	200 gal per conn ⁽¹⁾	185 gal per person (2)	2.0 gpm per conn ⁽⁴⁾	PHF ⁽⁴⁾	0.6 gpm per conn ⁽³⁾		
Southeast											
971 (Southeast)											
2015	✓	✓	✓		✓	✓	✓	✓	✓	✓	<ul style="list-style-type: none">Meets minimum and alternate regulatory criteria⁽¹⁾⁽³⁾⁽⁴⁾.Does not meet all recommended criteria⁽²⁾ (GST 2015-2040, total storage 2025-2040).No additional infrastructure needed based on regulatory criteria.
2025	✓	✓	✓		✓	✓		✓	✓	✓	
2040	✓	✓	✓		✓	✓		✓	✓	✓	
Key:											
Not in compliance; Needs to be addressed prior to 2025.					Not in compliance; Needs to be addressed prior to 2040.					Not in compliance; However, does/will meet minimum regulatory criteria.	
Notes: (1) Minimum regulatory storage requirement per TCEQ: 100 gal per connection of elevated storage and 200 gal per connection of total storage. (2) Recommended storage requirement based on industry standards and CDM Smith engineering and planning experience: 55 gal per person of elevated storage and 130 gal per person of ground storage. (3) Alternate regulatory storage and pumping requirement per TCEQ: If a water system has at least 200 gal per connection of elevated storage, the required pumping capacity can reduce to 0.6 gpm per connection. (4) Minimum regulatory pumping capacity per TCEQ: 2.0 gpm per connection, or a capacity sufficient to meet the peak hour flow with one pump out of service (calculated as 1.05 gpm per connection as discussed in Section 5).											

6.2 Distribution System Improvements

In addition to storage improvements listed above, CDM Smith recommends pipeline, pump station, and remote telemetry improvements to ensure that the distribution system continues to meet demands and operate efficiently. Modeling efforts and results discussed in Section 4 provided the basis for the proposed pipeline and PS improvements.

6.2.1 Pipeline Improvements

Table 6-2 presents the recommended pipeline CIP projects (including description, map ID, and expected start date) through 2025. The locations of these proposed CIP projects are presented on the map in **Appendix A. Section 7** provides cost information for these projects.

Table 6-2 2025 Pipeline Improvements

Project	Description	Map ID No.
2017		
Arterial A	10,200 linear feet of 24" water pipeline near Arterial A from Old Settlers Blvd to Palm Valley Blvd. (PP 890)	18
Palm Valley Phase I	2,400 linear feet of 24" water pipeline along Palm Valley Blvd from Arterial A to east of Old MoKan ROW, parallel to existing 18" pipeline on Palm Valley Blvd. (PP 890)	27
Meadow Lakes Lines	7,400 linear feet of 12" water pipelines in undeveloped land to east of Soil Conservation Service Site 14 Reservoir - 3,200 feet starting at Hopewell Middle School, 2,500 feet starting south of Texas A&M Health Science Center, and 1,700 feet starting at the north end of Bluff's Landing Way. (PP 890)	22
2018		
Gattis School Road	11,200 linear feet of 24" water pipeline along Gattis School Rd from Double Creek Drive to S 81 EST PS; line connects S 81 EST and SE EST. (PP 924)	41
Arterial H Phase II	6,700 linear feet of 16" water pipeline along Arterial H from near Massey Way to near Winding River Dr. (PP 1071)	11
2019		
South Red Bud Lane Annexation	Southeast Red Bud Lane tract; Install approximately 4,000 linear feet of 8" water line, 10 fire hydrants and three 16" x 8" wet tap with 8" gate valve in existing development. (PP 890)	4
Saddle Brook Annexation	Saddle Brook, Greenslopes, and Pecan Hills Subdivisions; Install approximately 4,514 linear feet of 8" water line, 8 gates valves, 8 fire hydrants, one 24"x8" wet tap with 8" gate valve in existing development. (PP 890)	23
Avery Center East	7,800 linear feet of 24" water pipeline along Arterial A from CR 112 to Old Settlers Blvd. (PP 1031)	17
Brenda Lane Lines	8,100 linear feet of 12" water pipeline from Old Settlers Blvd and Old MoKan ROW to Hyde Park Drive and Chandler Creek Blvd. (PP 890)	21

Table 6-2 2025 Pipeline Improvements (Continued)

Project	Description	Map ID No.
2020		
Round Rock Glen Lines	8,000 linear feet of 12" water pipelines along Lake Drive from CR 115 to Cheyenne Street. Lines are east of CR 115, south of Indian Meadows Drive and west of Terra Street. (PP 890)	26
West Loop	23,600 linear feet of 30" water pipeline along Wyoming Springs Drive from Sam Bass Road to PRV-9 (Hesters Crossing Rd). (PP 1071)	37
2021		
East Loop Phase II	2,800 linear feet of 48" water pipeline along Westinghouse Rd from Rabbit Hill Road parallel to existing 36" line, and 4,600 linear feet of 54" water pipeline along Westinghouse Road to North AW Grimes Blvd. (PP 1031)	6
Palm Valley Phase II	1,800 linear feet of 24" water pipeline east of Old MoKan ROW from Palm Valley Blvd to SE GST. (PP 890)	42
South Creek	2,900 linear feet of 24" water pipeline east of Old MoKan ROW from SE GST to Sweetgum Lane. (PP 924)	28
South Creek Phase II	4,100 linear feet of 24" water pipeline along Double Creek Drive from Sweetgum Lane to Gattis School Rd. (PP 924)	43
Sam Bass I	12,400 linear feet of 48" water pipeline on Sam Bass Road between 1431 and Tonkawa Trail. (PP 1071)	32
2022		
Sam Bass II	1,500 linear feet of 42" water pipeline on Sam Bass Road between Tonkawa Trail and Wyoming Springs Drive. (PP 1071)	34
Old Settlers Line	1,500 linear feet of 16" water pipeline from EST to Arterial A. (PP 890)	44
2023		
East Loop Phase III	3,200 linear feet of 54" water pipeline along North AW Grimes Blvd from Westinghouse Road to CR 186 and 3,100 linear feet of 48" water pipeline along North AW Grimes Blvd from CR186 to University Blvd. (PP 1031)	8

Table 6-3 presents the recommended pipeline improvements through 2040. The location of these improvements is shown in Appendix A and the preliminary cost estimates are presented in Section 7 of this Master Plan.

Table 6-3 2040 Pipeline Improvements

Project	Description	Map ID No.
2026		
Parcel 185	5,600 linear feet of 12" water pipeline parallel to and west of Old MoKan ROW from University Blvd to CR 112. (PP 1031)	16
North Loop 2	4,600 linear feet of 36" water pipeline near Westinghouse Road from Frontage Road east of I-35 to Rabbit Hill Road, parallel to existing 48". (PP 1031)	33
2028		
CR 112 Phase 2 - 24" Water Line	1,000 linear feet of 24" water pipelines on CR 112 east of CR 110. (PP 890)	24
CR 186 Phase I	5,200 linear feet of 12" water pipeline along CR 186 from AW Grimes, heading east. (PP 971)	36
2029		
Double Creek	10,300 linear feet of 16" water pipelines - 8,200 feet south of Palm Valley Blvd from SE GST to west of WWTP, and 2,100 feet along a private road south of Palm Valley Blvd and Harrell Parkway from southwest of Palm Valley and Harrell to new Palm Valley Development pipeline. (PP 890)	20
2030		
CR 110 Phase I	4,800 linear feet of 8" water pipeline along CR 110, between University Blvd and CR 112. (PP 890)	46
CR 186 Phase II	3,200 linear feet of 12" water pipeline from CR 186 to University Blvd. (PP 971)	47
2031		
Parcel 2610	14,300 linear feet of 16" water pipeline, west of I-35 and south of 1431 in undeveloped area. (PP 1031)	48
2033		
University Blvd Phase II	5,300 linear feet of 12" water pipeline near University Blvd from CR 117 to CR 110. (PP 971)	38
2034		
NE 1	1,400 linear feet of 8" water pipeline from near CR 186, heading north in undeveloped area. (PP 1031)	49
NE 2	3,200 linear feet of 8" water pipeline from near CR 186 to University Blvd. (PP 1031)	50
2035		
NE 3	18,600 linear feet of 8" water pipeline near CR 186 and along CR 110, and 2,300 linear feet of 12" water pipeline north of CR 117 in undeveloped area. (PP 1031)	51
2036		
NE 4	5,500 linear feet of 8" water pipeline from CR 110, south of University Blvd in undeveloped area. (PP 890)	52

6.2.2 Pump Station Improvements

CDM Smith recommends the following PS improvements, as shown in **Table 6-4**.

Table 6-4 Pump Station Improvements

Project	Description	Map ID No.
2016		
South 81 Elevated Storage Tank Pump Station Expansion	South 81 Elevated Storage Tank Vertical Turbine Pump Station - 3,500 gpm capacity. (PP 924)	40
Southeast Ground Storage Tank Pump Station Electrical Improvements	Southeast Ground Storage Tank Pump Station Electrical Improvements (PP 924)	5
WTP High Service Pump Station Improvements	WTP High Service Pump Station Improvements (PP 1031)	13
2026		
Southeast Ground Storage Tank Pump Station Expansion	Southeast Ground Storage Tank Pump Station Expansion to 15,000 gpm. (PP 924)	5

6.2.3 Remote Telemetry System Improvements

The City has 41 remote telemetry sites, each site having a remote telemetric unit (RTU), which allow data to communicate from remote sites to the City of Round Rock WTP. Improvements to the City's facilities involve replacing existing remote telemetry systems in three phases to help manage improvements efficiently.

Per discussion with City staff, Phase 1 and Phase 2 have recently been completed. Phase 1 consisted of procuring replacements of RTUs (hardware Schneider M340 PLCs and G MDS SD9 serial/Ethernet radios) for all lift stations, ESTs, pressure relief valves (PRVs), and isolation valves (IVs). Phase 2 included installation of Phase 1 RTUs and performing radio path studies for all sites. Study recommendations included improvements to the antenna system.

Phase 3 is expected to begin early 2016. This phase includes procurement and installation of the remaining RTUs (at pump stations) and implementation of antenna system improvements as recommended in Phase 2.

Section 7

Capital Improvement Plan

The recommended 10-year (2025) and 25-year (2040) water system CIP is presented in the following section. The CIP is based on the City's projected future water demands, hydraulic modeling results, regulatory requirements, and input from City staff. A summary of the projected annual capital expenditures for the 10-year CIP is presented in **Figure 7-1**. The 2025 and 2040 CIP, including project descriptions, costs, and anticipated timing, are presented in **Tables 7-1** and **7-2**, respectively. Detailed explanation regarding the cost estimates for individual elevated storage, pump station, and pipeline projects is presented in **Appendix C**.

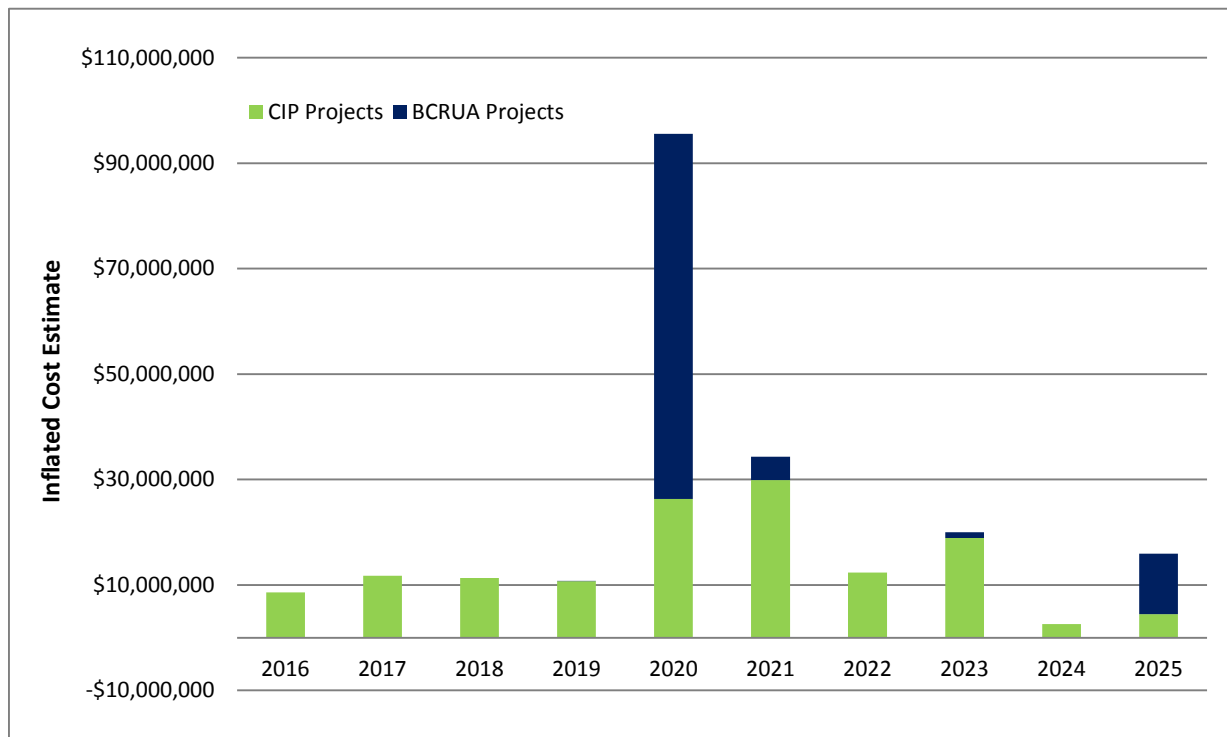


Figure 7-1
City of Round Rock 10-Year CIP (2016 – 2025)

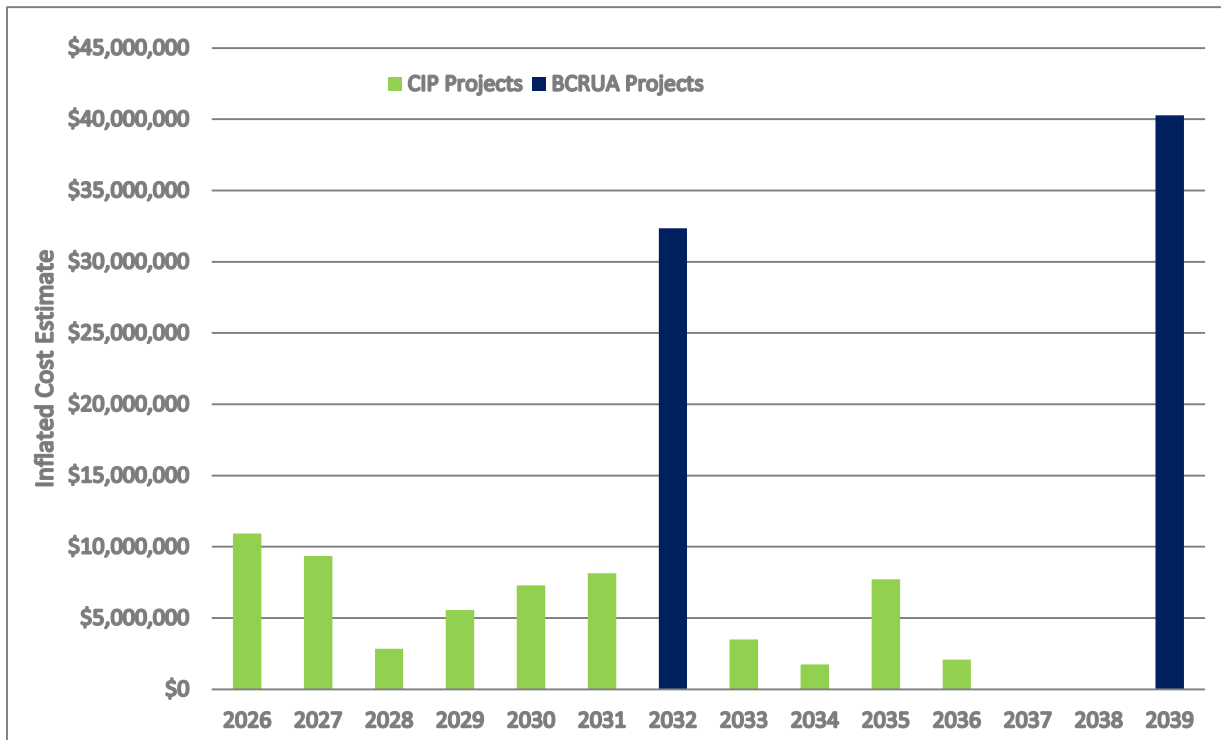


Figure 7-2
City of Round Rock 25-Year CIP (2026 – 2040)

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan

City of Round Rock Water Master Plan 10-year CIP (2016-2025)										
Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End								
2016										
	2016	2016	RTU Installation and Enhancement	RTU Installation and Enhancement	0%	\$143,500	\$21,600	\$0	\$166,000	\$174,000
	2016	2018	PRV Installation Program #2, 4, 8 & 9 Improvements	PRV Installation Program #2, 4, 8 & 9 Improvements	0%	\$674,600	\$80,300	\$0	\$755,000	\$790,000
	2016	2017	Filter Media Replacement Phase 3 ⁽⁴⁾	Filter Media Replacement Phase 3	0%	\$500,000	\$0	\$0	\$500,000	\$523,000
	2016	2017	Forest Creek Golf Course Reuse Rehabilitation ⁽⁴⁾	Forest Creek Golf Course Reuse Rehabilitation	0%	\$150,000	\$0	\$0	\$150,000	\$157,000
40	2016	2019	81 South Elevated Storage Tank Pump Station ^{(6)/(14)}	81 South Elevated Storage Tank Vertical Turbine Pump Station - 3,500 gpm capacity. (PP 924)	100%	\$1,220,200	\$130,800	\$0	\$1,351,000	\$1,413,000
5	2016	2018	Southeast Ground Storage Tank Pump Station Electrical Improvements ⁽⁶⁾	Southeast Ground Storage Tank Pump Station Electrical Improvements (PP 924)	0%	\$1,659,100	\$177,800	\$0	\$1,837,000	\$1,921,000
13	2016	2018	WTP High Service Pump Station Improvements ⁽⁶⁾	WTP High Service Pump Station Improvements (PP 1031)	0%	\$1,554,000	\$166,500	\$0	\$1,721,000	\$1,800,000
	2016	2016	Lake Creek Tank Interior Rehabilitation ⁽¹³⁾	Lake Creek Tank Interior Rehabilitation (PP 890)	0%	\$255,000	\$0	\$0	\$255,000	\$267,000
	2016	2016	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,046,000
	2016	2016	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$500,000	\$0	\$0	\$500,000	\$523,000
2017										
18	2017	2019	Arterial A ^{(6)/(14)}	10,200 linear feet of 24" water pipeline near Arterial A from Old Settlers Blvd to Palm Valley Blvd. (PP 890)	100%	\$3,679,700	\$441,600	\$577,100	\$4,699,000	\$5,024,000
27	2017	2019	Palm Valley Phase I ^{(6)/(14)}	2,400 linear feet of 24" water pipeline along Palm Valley Blvd from Arterial A to east of Old MoKan ROW, parallel to existing 18" pipeline on Palm Valley Blvd. (PP 890)	100%	\$863,800	\$103,700	\$135,500	\$1,103,000	\$1,180,000
22	2017	2019	Meadow Lake Lines ^{(5)/(6)}	7,400 linear feet of 12" water pipelines in undeveloped land to east of Soil Conservation Service Site 14 Reservoir - 3,200 feet starting at Hopewell Middle School, 2,500 feet starting south of Texas A&M Health Science Center, and 1,700 feet starting at the north end of Bluff's Landing Way. (PP 890)	100%	\$1,733,200	\$208,000	\$271,900	\$2,214,000	\$2,367,000
	2017	2017	CW#1 Tank Interior Rehabilitation ⁽¹³⁾	CW#1 Tank Interior Rehabilitation (PP 1031)	0%	\$391,000	\$0	\$0	\$391,000	\$418,000
	2017	2017	1431 SP Interior Rehabilitation ⁽¹³⁾	1431 SP Interior Rehabilitation (PP 1031)	0%	\$193,000	\$0	\$0	\$193,000	\$207,000
	2017	2017	1431 SP Exterior Rehabilitation ⁽¹³⁾	1431 SP Exterior Rehabilitation (PP 1031)	0%	\$240,000	\$0	\$0	\$240,000	\$257,000
	2017	2017	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,070,000
	2017	2017	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,070,000
	2017	2017	Water Distribution System Master Plan	Water Distribution System Master Plan	100%	\$0	\$129,000	\$0	\$129,000	\$138,000
2018										
41	2018	2020	Gattis School Rd ^{(6)/(14)}	11,200 linear feet of 24" water pipeline along Gattis School Rd from Double Creek Drive to 81 S EST PS; line connects S81 EST and SE EST. (PP 924)	20%	\$4,049,300	\$486,000	\$635,100	\$5,171,000	\$5,653,000
11	2018	2020	Arterial H Phase II ⁽⁶⁾	6,700 linear feet of 16" water pipeline along Arterial H from near Massey Way to near Winding River Dr. (PP 1071)	50%	\$2,106,000	\$252,800	\$330,300	\$2,690,000	\$2,941,000
	2018	2018	CW#1 Tank Exterior Rehabilitation ⁽¹³⁾	CW#1 Tank Exterior Rehabilitation (PP 1031)	0%	\$247,000	\$0	\$0	\$247,000	\$270,000
	2018	2018	Chandler EST Interior Rehabilitation ⁽¹³⁾	Chandler EST Interior Rehabilitation (PP 890)	0%	\$161,200	\$0	\$0	\$162,000	\$178,000
	2018	2018	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,094,000
	2018	2018	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,094,000

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan (cont.)

City of Round Rock Water Master Plan 10-year CIP (2016-2025)										
Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End								
	2018	2018	Water Distribution System Master Plan Impact Fee (Update)	Water Distribution System Master Plan Impact Fee (Update)	100%	\$0	\$60,000	\$0	\$60,000	\$66,000
2019										
	2019	2021	Brushy Creek Regional Water Treatment Plant - Phase 1B ⁽⁴⁾⁽⁷⁾	Phase 1B - Re-rating of BCRWTP Phase 1A filters from 5 gpm/sf to 7.0 gpm/sf - Capacity increase from 17 mgd to 22 mgd	100%	\$0	\$26,700	\$0	\$27,000	\$31,000
4	2019	2021	Southeast Red Bud Lane Annexation ⁽⁴⁾	Southeast Red Bud Lane tract; Install approximately 4,000 linear feet of 8" water line, 10 fire hydrants and three 16" x 8" wet tap with 8" gate valve in existing development. (PP 890)	100%	\$562,200	\$0	\$0	\$562,200	\$629,000
23	2019	2021	Saddle Brook Annexation ⁽⁴⁾	Saddle Brook, Greenslopes, and Pecan Hills Subdivisions; Install approximately 4,514 linear feet of 8" water line, 8 gates valves, 8 fire hydrants, one 24"x8" wet tap with 8" gate valve in existing development. (PP 890)	100%	\$500,000	\$0	\$0	\$500,000	\$559,000
17	2019	2021	Avery Center East ⁽⁶⁾⁽¹⁴⁾	7,800 linear feet of 24" water pipeline along Arterial A from CR 112 to Old Settlers Blvd. (PP 1031)	100%	\$2,914,600	\$349,800	\$457,100	\$3,722,000	\$4,160,000
21	2019	2021	Brenda Lane Line ⁽⁵⁾⁽⁶⁾	8,100 linear feet of 12" water pipeline from Old Settlers Blvd and Old MoKan ROW to Hyde Park Drive and Chandler Creek Blvd. (PP 890)	100%	\$1,452,500	\$174,300	\$227,800	\$1,855,000	\$2,074,000
	2019	2019	CW#2 Tank Interior Rehabilitation ⁽¹³⁾	CW#2 Tank Interior Rehabilitation (PP 1031)	0%	\$596,500	\$0	\$0	\$597,000	\$668,000
	2019	2019	CW#2 Tank Exterior Rehabilitation ⁽¹³⁾	CW#2 Tank Exterior Rehabilitation (PP 1031)	0%	\$338,500	\$0	\$0	\$339,000	\$379,000
	2019	2019	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,118,000
	2019	2019	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,118,000
2020										
	2020	2023	Brushy Creek Regional Deep Water Intake and Raw Water Line Phase 2A, Segment 5 ⁽⁴⁾⁽⁸⁾	Construction of a permanent deep water intake structure, and 84" raw water pipeline from deep water intake to Phase I raw water line.	100%	\$52,692,900	\$7,904,000	\$0	\$60,597,000	\$69,252,000
53	2020	2020	Bowman Demolition ⁽⁴⁾	Bowman Demolition	0%	\$25,000	\$15,000	\$0	\$40,000	\$46,000
7	2020	2020	McNeil Ground Storage Tank Demolition	McNeil Ground Storage Tank Demolition	0%	\$25,000	\$15,000	\$0	\$40,000	\$46,000
26	2020	2022	Round Rock Glen Lines ⁽⁵⁾⁽⁶⁾	8,000 linear feet of 12" water pipelines along Lake Drive from CR 115 to Cheyenne Street. Lines are east of CR 115, south of Indian Meadows Drive and west of Terra Street. (PP 890)	100%	\$1,859,800	\$223,200	\$291,700	\$2,375,000	\$2,715,000
37	2020	2022	West Loop ⁽⁶⁾	23,600 linear feet of 30" water pipeline along Wyoming Springs Drive from Sam Bass Road to PRV-9 (Hesters Crossing Rd). (PP 1071)	100%	\$12,210,500	\$1,465,300	\$1,914,700	\$15,591,000	\$17,818,000
	2020	2020	Barton Hill Tank Interior Rehabilitation ⁽¹³⁾	Barton Hill Tank Interior Rehabilitation (PP 1031)	0%	\$502,600	\$0	\$0	\$503,000	\$575,000
	2020	2020	Lake Creek Tank Exterior Rehabilitation ⁽¹³⁾	Lake Creek Tank Exterior Rehabilitation (PP 890)	0%	\$135,500	\$0	\$0	\$136,000	\$156,000
	2020	2020	S 81 CET Interior Rehabilitation ⁽¹³⁾	S 81 CET Interior Rehabilitation (PP 924)	0%	\$174,000	\$0	\$0	\$174,000	\$199,000
	2020	2020	SE EST Exterior Rehabilitation ⁽¹³⁾	SE EST Exterior Rehabilitation (PP 924)	0%	\$404,800	\$0	\$0	\$405,000	\$463,000
	2020	2020	McNeil Tank Interior Rehabilitation ⁽¹³⁾	McNeil Tank Interior Rehabilitation (PP 971)	0%	\$200,250	\$0	\$0	\$201,000	\$230,000
	2020	2020	McNeil Tank Exterior Rehabilitation ⁽¹³⁾	McNeil Tank Exterior Rehabilitation (PP 971)	0%	\$144,000	\$0	\$0	\$144,000	\$165,000
	2020	2020	High County Tank Interior Rehabilitation ⁽¹³⁾	High County Tank Interior Rehabilitation (PP 971)	0%	\$174,000	\$0	\$0	\$174,000	\$199,000
	2020	2020	High County Tank Exterior Rehabilitation ⁽¹³⁾	High County Tank Exterior Rehabilitation (PP 971)	0%	\$144,000	\$0	\$0	\$144,000	\$165,000
	2020	2020	Fern Bluff Tank Interior Rehabilitation ⁽¹³⁾	Fern Bluff Tank Interior Rehabilitation (PP 971)	0%	\$463,000	\$0	\$0	\$463,000	\$530,000
	2020	2020	Fern Bluff Tank Exterior Rehabilitation ⁽¹³⁾	Fern Bluff Tank Exterior Rehabilitation (PP 971)	0%	\$516,500	\$0	\$0	\$517,000	\$591,000
	2020	2020	1431 Hydro Tank Interior Rehabilitation ⁽¹³⁾	1431 Hydro Tank Interior Rehabilitation (PP 1071)	0%	\$6,500	\$0	\$0	\$7,000	\$8,000

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan (cont.)

City of Round Rock Water Master Plan 10-year CIP (2016-2025)										
Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End								
	2020	2020	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,143,000
	2020	2020	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,143,000
	2020	2020	Water Distribution System Master Plan	Water Distribution System Master Plan	100%	\$0	\$129,000	\$0	\$129,000	\$148,000
2021										
	2021	2023	Brushy Creek Regional Water Treatment Plant - Phase 1C ⁽⁴⁾⁽⁹⁾	Construction of Phase 1C of BCRWTP - Capacity increase from 22 mgd to 30 mgd	100%	\$3,321,700	\$498,300	\$0	\$3,820,000	\$4,464,000
6	2021	2023	East Loop Phase II ⁽⁶⁾	2,800 linear feet of 48" water pipeline along Westinghouse Rd from Rabbit Hill Road parallel to existing 36" line, and 4,600 linear feet of 54" water pipeline along Westinghouse Road to North AW Grimes Blvd. (PP 1031)	100%	\$5,223,700	\$626,900	\$819,200	\$6,670,000	\$7,795,000
42	2021	2023	Palm Valley Phase II ⁽⁶⁾	1,800 linear feet of 24" water pipeline east of Old MoKan ROW from Palm Valley Blvd to SE GST. (PP 890)	100%	\$671,100	\$80,600	\$105,300	\$857,000	\$1,002,000
28	2021	2023	South Creek ⁽⁶⁾	2,900 linear feet of 24" water pipeline east of Old MoKan ROW from SE GST to Sweetgum Lane. (PP 924)	100%	\$1,074,000	\$128,900	\$168,500	\$1,372,000	\$1,604,000
43	2021	2023	South Creek Phase II ⁽⁶⁾	4,100 linear feet of 24" water pipeline along Double Creek Drive from Sweetgum Lane to Gattis School Rd. (PP 924)	100%	\$1,621,100	\$194,600	\$254,300	\$2,070,000	\$2,419,000
32	2021	2023	Sam Bass I ⁽⁶⁾	12,400 linear feet of 48" water pipeline on Sam Bass Road between 1431 and Tonkawa Trail. (PP 1071)	100%	\$9,696,900	\$1,163,700	\$1,520,600	\$12,382,000	\$14,469,000
	2021	2021	CW#4 Tank Exterior Rehabilitation ⁽¹³⁾	CW#4 Tank Exterior Rehabilitation (PP 1031)	0%	\$89,000	\$0	\$0	\$89,000	\$104,000
	2021	2021	Westinghouse SP Interior Rehabilitation ⁽¹³⁾	Westinghouse SP Interior Rehabilitation (PP 1031)	0%	\$67,500	\$0	\$0	\$68,000	\$80,000
	2021	2021	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,169,000
	2021	2021	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,169,000
	2021	2021	Water Distribution System Master Plan Impact Fee (Update)	Water Distribution System Master Plan Impact Fee (Update)	100%	\$0	\$60,000	\$0	\$60,000	\$71,000
2022										
34	2022	2024	Sam Bass II ⁽⁶⁾	1,500 linear feet of 42" water pipeline on Sam Bass Road between Tonkawa Trail and Wyoming Springs Drive. (PP 1071)	100%	\$1,033,100	\$124,000	\$162,100	\$1,320,000	\$1,578,000
44	2022	2024	Old Settlers 2.0 MG Elevated Storage Tank and Old Settlers Line (PP 890) ⁽⁶⁾	(1) 2.0 MG Elevated Storage Tank to be constructed in PP 890, and 1,500 linear feet of 16" water pipeline from EST to Arterial A.	100%	\$5,329,200	\$576,500	\$67,400	\$5,974,000	\$7,138,000
	2022	2022	Barton Hill Tank Exterior Rehabilitation ⁽¹³⁾	Barton Hill Tank Exterior Rehabilitation (PP 1031)	0%	\$298,500	\$0	\$0	\$299,000	\$358,000
	2022	2022	Chandler EST Exterior Rehabilitation ⁽¹³⁾	Chandler EST Exterior Rehabilitation (PP 890)	0%	\$235,000	\$0	\$0	\$235,000	\$281,000
	2022	2022	S 81 CET Exterior Rehabilitation ⁽¹³⁾	S 81 CET Exterior Rehabilitation (PP 924)	0%	\$144,000	\$0	\$0	\$144,000	\$173,000
	2022	2022	SE EST Interior Rehabilitation ⁽¹³⁾	SE EST Interior Rehabilitation (PP 924)	0%	\$179,400	\$0	\$0	\$180,000	\$216,000
	2022	2022	Chisholm Valley Tank Interior Rehabilitation ⁽¹³⁾	Chisholm Valley Tank Interior Rehabilitation (PP 971)	0%	\$174,000	\$0	\$0	\$174,000	\$208,000
	2022	2022	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,195,000
	2022	2022	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,195,000
2023										
	2023	2025	Brushy Creek Regional Water Treatment Plant - Phase 1D ⁽⁴⁾⁽¹⁰⁾	Construction of Phase 1D of BCRWTP - Capacity increase from 30 mgd to 43 mgd	100%	\$921,500	\$0	\$0	\$922,000	\$1,127,000
	2023	2026	Ground Water Treatment Plant at Lake Creek	4.0 MGD Micro Filtration WTP, (PP 924) will be required if wells are declared under the influence.	0%	\$5,865,800	\$782,700	\$0	\$6,649,000	\$8,124,000

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan (cont.)

City of Round Rock Water Master Plan 10-year CIP (2016-2025)										
Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
Begin	End									
8	2023	2025	East Loop Phase III ⁽⁶⁾	3,200 linear feet of 54" water pipeline along North AW Grimes Blvd from Westinghouse Road to CR 186 and 3,100 linear feet of 48" water pipeline along North AW Grimes Blvd from CR186 to University Blvd. (PP 1031)	100%	\$4,596,200	\$551,600	\$720,800	\$5,869,000	\$7,171,000
	2023	2023	Westinghouse SP Exterior Rehabilitation ⁽¹³⁾	Westinghouse SP Exterior Rehabilitation (PP 1031)	0%	\$27,600	\$0	\$0	\$28,000	\$35,000
	2023	2023	Bowman Rd Tank Interior Rehabilitation ⁽¹³⁾	Bowman Rd Tank Interior Rehabilitation (PP 890)	0%	\$169,000	\$0	\$0	\$169,000	\$207,000
	2023	2023	SE GST Interior Rehabilitation ⁽¹³⁾	SE GST Interior Rehabilitation (PP 924)	0%	\$452,500	\$0	\$0	\$453,000	\$554,000
	2023	2023	Vista Heights SP Interior Rehabilitation ⁽¹³⁾	Vista Heights SP Interior Rehabilitation (PP 971)	0%	\$163,200	\$0	\$0	\$164,000	\$201,000
	2023	2023	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,222,000
	2023	2023	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,222,000
	2023	2023	Water Distribution System Master Plan	Water Distribution System Master Plan	100%	\$0	\$129,000	\$0	\$129,000	\$158,000
2024										
	2024	2024	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,250,000
	2024	2024	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,250,000
	2024	2024	Water Distribution System Master Plan Impact Fee (Update)	Water Distribution System Master Plan Impact Fee (Update)	100%	\$0	\$60,000	\$0	\$60,000	\$75,000
2025										
	2025	2027	Brushy Creek Regional Water Treatment Plant - Phase 2A ⁽⁴⁾⁽¹¹⁾	Construction of Phase 2A of BCRWTP - Capacity increase from 43 mgd to 65 mgd	100%	\$10,101,900	\$0	\$0	\$8,986,000	\$11,478,000
	2025	2025	CW#3 Tank Interior Rehabilitation ⁽¹³⁾	CW#3 Tank Interior Rehabilitation (PP 1031)	0%	\$44,500	\$0	\$0	\$45,000	\$58,000
	2025	2025	CW#3 Tank Exterior Rehabilitation ⁽¹³⁾	CW#3 Tank Exterior Rehabilitation (PP 1031)	0%	\$126,300	\$0	\$0	\$127,000	\$163,000
	2025	2025	CW#4 Tank Interior Rehabilitation ⁽¹³⁾	CW#4 Tank Interior Rehabilitation (PP 1031)	0%	\$34,600	\$0	\$0	\$35,000	\$45,000
	2025	2025	1431 CET Interior Rehabilitation ⁽¹³⁾	1431 CET Interior Rehabilitation (PP 1031)	0%	\$334,700	\$0	\$0	\$335,000	\$428,000
	2025	2025	Bowman Rd Tank Exterior Rehabilitation ⁽¹³⁾	Bowman Rd Tank Exterior Rehabilitation (PP 890)	0%	\$65,500	\$0	\$0	\$66,000	\$85,000
	2025	2025	SE GST Exterior Rehabilitation ⁽¹³⁾	SE GST Exterior Rehabilitation (PP 924)	0%	\$189,250	\$0	\$0	\$190,000	\$243,000
	2025	2025	Chisholm Valley Tank Exterior Rehabilitation ⁽¹³⁾	Chisholm Valley Tank Exterior Rehabilitation (PP 971)	0%	\$258,500	\$0	\$0	\$259,000	\$331,000
	2025	2025	Vista Heights SP Exterior Rehabilitation ⁽¹³⁾	Vista Heights SP Exterior Rehabilitation (PP 971)	0%	\$127,500	\$0	\$0	\$128,000	\$164,000
	2025	2025	Reuse Water Tank Interior Rehabilitation ⁽¹³⁾	Reuse Water Tank Interior Rehabilitation (PP 960.5)	0%	\$153,500	\$0	\$0	\$154,000	\$197,000
	2025	2025	Reuse Water Tank Exterior Rehabilitation ⁽¹³⁾	Reuse Water Tank Exterior Rehabilitation (PP 960.5)	0%	\$144,000	\$0	\$0	\$144,000	\$184,000
	2025	2025	1431 Hydro Tank Exterior Rehabilitation ⁽¹³⁾	1431 Hydro Tank Exterior Rehabilitation (PP 1071)	0%	\$5,500	\$0	\$0	\$6,000	\$8,000
	2025	2025	Miscellaneous Water System Improvements ⁽⁴⁾	Miscellaneous Water System Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,278,000
	2025	2025	Miscellaneous Water Treatment Plant Improvements ⁽⁴⁾	Miscellaneous Water Treatment Plant Improvements	0%	\$1,000,000	\$0	\$0	\$1,000,000	\$1,278,000
Past Projects										
	2005	2008	New Hope Road 72" Water Line (Segments 2A & 2B) (1147 PP)	12,000 linear feet of 72" Water Line (PP 1147) from Bagdad Road to Highway 183A, down New Hope Road (connecting Treated Water Line, Segments 1 & 2C)	-	\$5,304,348	\$795,652	\$0	\$6,100,000	\$6,100,000

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan (cont.)

City of Round Rock Water Master Plan 10-year CIP (2016-2025)										
Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End								
	2007	2012	Brushy Creek Regional Water Treatment Plant - Phase 1A	Construction of Phase 1A of BCRWTP	-	\$16,563,100	\$372,670	\$0	\$16,935,770	\$16,936,000
	2007	2008	RM 1431 West - 36" Water Line (1031 PP)	RM 1431 West - 5,600 linear feet of 36" water pipeline from the eastern edge of Vista Oaks west down RM 1431 to Sam Bass Road and across RM 1431 to Cedar Park's 16" water pipeline and Round Rock's future 48" Regional water pipeline. (PP 1031)	-	\$2,595,666	\$91,359	\$0	\$2,687,025	\$2,688,000
	2007	2009	Brushy Creek Regional Treated Water Line - Phase 1, Segment 1	Construction of 78" treated water line from BCRUA WTP to TWL, Segment 2A	-	\$3,136,833	\$470,525	\$0	\$3,608,000	\$3,608,000
	2007	2009	Brushy Creek Regional Treated Water Line - Phase 1, Segment 2A	Brushy Creek Regional Treated Water Line - Phase 1, Segment 2A	-	\$316,105	\$47,416	\$0	\$364,000	\$364,000
	2007	2011	Brushy Creek Regional Treated Water Line - Phase 1, Segment 2B	Brushy Creek Regional Treated Water Line - Phase 1, Segment 2B	-	\$4,493,696	\$674,054	\$0	\$5,168,000	\$5,168,000
	2007	2011	Brushy Creek Regional Treated Water Line - Phase 1, Segment 2C	Construction of 7,900 linear feet of 72" treated water line from TWL, Segment 2B to Ronald Reagan Blvd. and TWL, Segment 2C	-	\$2,912,250	\$436,838	\$0	\$3,350,000	\$3,350,000
	2007	2012	Brushy Creek Regional Raw Water Line and Intake Barge, Contract 2	36" raw water line under Lake Travis to Trails Ends Road	-	\$1,469,990	\$220,499	\$0	\$1,691,000	\$1,691,000
	2007	2011	Brushy Creek Regional Raw Water Line and Intake Barge, Contract 1	78" raw water line from Lake Travis up Trails Ends Road to RM 1431 to WTP	-	\$7,469,511	\$1,120,427	\$0	\$8,590,000	\$8,590,000
	2007	2012	Brushy Creek Regional Raw Water Line and Intake Barge, Contract 3	Upgrading of Cedar Park's existing intake barge	-	\$985,762	\$147,864	\$0	\$1,134,000	\$1,134,000
	2008	2010	CR 112 - 24" Water Line (890 PP)	4,000 linear feet of 24" water pipeline from Arterial "A" to CR 112 Phase 2 along northern boundary of the Paloma MUD. (PP 890)	-	\$1,049,000	\$158,000	\$0	\$1,207,000	\$1,207,000
	2008	2009	Asbestos Pipe Replacement - Greenslopes	Asbestos pipe replacement	-	\$704,348	\$105,652	\$0	\$810,000	\$810,000
	2008	2011	Clearwell	1.5 MG Prestressed Concrete Clearwell to be located at Round Rock WTP Site north of two existing 2 MG clearwells, including the 54" suction piping and 36" fill pipe	-	\$2,423,420	\$427,000	\$0	\$2,851,000	\$2,851,000
	2008	2011	HEC Campus "D" - 12" Water Line (1031 PP)	1,000 linear feet of 12" water pipeline between the 16" Seton "D" line to CR 112 Ext. 16" water pipeline. (PP 1031)	-	\$325,000	\$49,000	\$0	\$374,000	\$374,000
	2009	2010	Seton Medical Center "D" - 16" Water Line (1031 PP)	2,000 linear feet of 16" water line (PP 1031) to CR 112 and serving the Seton Medical Center	-	\$516,000	\$78,000	\$0	\$594,000	\$594,000
	2009	2015	BCRUA Phase 1A - Construction Management and Inspection Services ⁽¹²⁾	Construction Management and Inspection Services for WTP, Raw Water Line Barge/Intake Phase 1A and Treated Water Line Segments 1 and 2C	-	\$0	\$1,506,643	\$0	\$1,507,000	\$1,507,000
	2011	2011	2009 Water Distribution System Model	Update and Recalibrate; update model pipe network, land use changes, node assignments, nodal demands, recalibrate against field measurements	-	\$0	\$200,000	\$0	\$200,000	\$200,000
	2011	2011	2010 Water Distribution System Master Plan and Impact Fee (Update)	2010 Water Distribution System Master Plan and Impact Fee (Update)	-	\$0	\$120,000	\$0	\$120,000	\$120,000
	2011	2013	Brushy Creek Regional Treated Water Line - Phase 1, Segment 3	Construction of 11,500 linear feet of 48" treated water line from Ronald Reagan Blvd to CR 175 & RM 1431	-	-	-	-	\$5,725,700	\$5,725,700
	2014	2014	North 81 Standpipe Demolition	Demolition of North 81 Standpipe	-	-	-	-	\$16,400	\$16,400
	2014	2014	Barton Hill Standpipe Demolition	Demolition of Barton Hill Standpipe	-	-	-	-	\$16,400	\$16,400
	2014	2014	University Phase I	8,200 linear feet of 36" water pipeline along University Blvd from North AW Grimes Blvd to Arterial A. (PP 1031)	-	-	-	-	\$3,344,200	\$3,344,200
	2014	2014	Parcel 150	6,500 linear feet of 36" water pipeline east along Arterial A from University Blvd to CR 112. (PP 1031)	-	-	-	-	\$2,485,200	\$2,485,200
	2014	2015	2013 Asbestos Pipe Replacement- Greenslopes	Asbestos Pipe Replacement	-	\$1,200,000	\$0	\$0	\$1,200,000	\$1,403,000
	2014	2014	RTU Installation and Enhancement - Phase 1 & 2	RTU Installation and Enhancement	-	\$140,000	\$21,000	\$0	\$161,000	\$173,000
	2014	2015	Water Distribution System Master Plan (Update) ⁽¹²⁾	Water Distribution System Master Plan	-	\$0	\$129,000	\$0	\$129,000	\$129,000

Table 7-1 City of Round Rock 10-Year Capital Improvement Plan (cont.)

City of Round Rock Water Master Plan
10-year CIP (2016-2025)

Map ID No.	Project Date		Project	Description	Impact Fee Eligibility	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End								
	2015	2015	RTU Installation and Enhancement - Phase 3	RTU Installation and Enhancement (Phase 3)	-	\$140,000	\$21,000	\$0	\$161,000	\$169,000
	2015	2016	Creek Bend 12" Water Line (971 PP) ⁽¹²⁾	Creek Bend 12" Water Line (971 PP)	-	-	-	-	\$327,000	\$327,000
	2015	2017	Arterial H Phase I ⁽¹²⁾	4,900 linear feet of 16" water pipeline along Arterial H from CR 175 to near Massey Way. (PP 1071)	-	-	-	-	\$400,000	\$400,000
	2015	2016	2013 Asbestos Pipe Replacement - Eagles Nest	Asbestos Pipe Replacement	-	\$1,200,000	\$0	\$0	\$1,200,000	\$1,380,000
	2015	2015	Water Distribution System Master Plan Impact Fee (Update) ⁽¹²⁾	Water Distribution System Master Plan Impact Fee (Update)	-	\$0	\$60,000	\$0	\$60,000	\$62,000

- Notes:**
- (1) Construction cost estimate accounts for ENR (Dallas) escalation to 2015; contingency is 20% of construction cost.
 - (2) Professional services is 15% of construction cost.
 - (3) Total Inflated Cost Estimate is the estimated cost to implement the project in the future project start year. These estimates are based on an inflation rate of 2.25%.
 - (4) Project cost provided by the City of Round Rock (City). No additional contingency was included.
 - (5) Project cost may be incurred by the Developer.
 - (6) Project cost estimate breakdown is provided in Appendix C.
 - (7) City's portion is 26.67% of total project cost estimate, \$100,000.
 - (8) City's portion is 28.79% of total project cost estimate, \$180M.
 - (9) City's portion is 31.1% of total project cost estimate, \$9,500,100.
 - (10) City's portion is 41.35% of total project cost estimate, \$1,982,200 (professional fees included).
 - (11) City's portion is 47.6% of total project cost estimate, \$18,876,607 (professional fees included).
 - (12) Project is in progress.
 - (13) Project cost provided by Hot, Inc. No additional contingency was included.
 - (14) Projects shown in italics have been identified as priority projects per the City hydraulic model.

Table 7-2 City of Round Rock 25-Year Capital Improvement Plan

City of Round Rock Water Master Plan 25-year CIP (2025-2040)									
Map ID No.	Project Date		Project	Description	Construction Cost with Contingency ⁽¹⁾	Professional Services ⁽²⁾	Easements, Land Acquisition	Total Cost Estimate	Total Inflated Cost Estimate ⁽³⁾
	Begin	End							
2026									
5	2026	2028	Southeast Ground Storage Tank Pump Station Expansion ⁽⁶⁾	Southeast Ground Storage Tank Pump Station Expansion to 15,000 gpm. (PP 924)	\$3,189,200	\$341,700	\$0	\$3,531,000	\$4,612,000
16	2026	2028	Parcel 185 ⁽⁶⁾	5,600 linear feet of 12" water pipeline parallel to and west of Old MoKan ROW from University Blvd to CR 112. (PP 1031)	\$1,506,000	\$180,800	\$236,200	\$1,923,000	\$2,512,000
33	2026	2027	North Loop 2 ⁽⁶⁾	4,600 linear feet of 36" water pipeline near Westinghouse Road from Frontage Road east of I-35 to Rabbit Hill Road, parallel to existing 48". (PP 1031)	\$2,279,600	\$273,600	\$357,600	\$2,911,000	\$3,802,000
2027									
45	2027	2028	Barton Hill 3.0 MG Elevated Storage Tank ⁽⁶⁾	(1) 3.0 MGD Elevated Storage Tank to be constructed off Rabbit Hill Road, between Commerce Blvd and Clearview Drive.	\$6,335,100	\$678,800	\$0	\$7,014,000	\$9,367,000
2028									
24	2028	2029	CR 112 Phase 2 - 24" Water Line ⁽⁶⁾	1,000 linear feet of 24" water pipelines on CR 112 east of CR 110. (PP 890)	\$374,000	\$44,900	\$58,700	\$478,000	\$653,000
36	2028	2030	CR 186 Phase I ⁽⁶⁾	5,200 linear feet of 12" water pipeline along CR 186 from AW Grimes, heading east. (PP 971)	\$1,257,400	\$150,900	\$197,300	\$1,606,000	\$2,193,000
2029									
20	2029	2031	Double Creek ⁽⁵⁾⁽⁶⁾	10,300 linear feet of 16" water pipelines - 8,200 feet south of Palm Valley Blvd from SE GST to west of WWTP, and 2,100 feet along a private road south of Palm Valley Blvd and Harrell Parkway from southwest of Palm Valley and Harrell to new Palm Valley Development pipeline. (PP 890)	\$3,114,000	\$373,700	\$488,400	\$3,977,000	\$5,553,000
2030									
	2030	2031	Round Rock Water Treatment Plant - 1.5 MG Clearwell	1.5 MG Prestressed Concrete Clearwell to be located at Round Rock WTP (includes piping) adjacent to existing 1.5 MG Clearwell.	\$2,437,500	\$365,700	\$0	\$2,804,000	\$4,004,000
46	2030	2032	CR 110 Phase I ⁽⁶⁾	4,800 linear feet of 8" water pipeline along CR 110, between University Blvd and CR 112. (PP 890)	\$889,600	\$106,800	\$139,600	\$1,136,000	\$1,622,000
47	2030	2032	CR 186 Phase II ⁽⁶⁾	3,200 linear feet of 12" water pipeline from CR 186 to University Blvd. (PP 971)	\$745,400	\$89,500	\$116,900	\$952,000	\$1,360,000
	2030	2030	1431 CET Exterior Rehabilitation ⁽⁹⁾	1431 CET Exterior Rehabilitation (PP 1031)	\$206,500	\$0	\$0	\$207,000	\$296,000
2031									
48	2031	2033	Parcel 2610 ⁽⁶⁾	14,300 linear feet of 16" water pipeline, west of I-35 and south of 1431 in undeveloped area. (PP 1031)	\$4,365,600	\$523,900	\$684,600	\$5,575,000	\$8,139,000
2032									
	2032	2034	Brushy Creek Regional Water Treatment Plant - Phase 2B ⁽⁴⁾⁽⁷⁾	Construction of Phase 2B of BCRWTP - Capacity increase from 65 mgd to 87 mgd.	\$18,849,600	\$2,827,400	\$0	\$21,677,000	\$32,355,000
2033									
38	2033	2034	University Blvd Phase II ⁽⁶⁾	5,300 linear feet of 12" water pipeline near University Blvd from CR 117 to CR 110. (PP 971)	\$1,794,300	\$215,400	\$281,400	\$2,292,000	\$3,498,000
2034									
49	2034	2035	NE 1 ⁽⁶⁾	1,400 linear feet of 8" water pipeline from near CR 186, heading north in undeveloped area. (PP 1031)	\$256,100	\$30,800	\$40,200	\$328,000	\$512,000
50	2034	2035	NE 2 ⁽⁶⁾	3,200 linear feet of 8" water pipeline from near CR 186 to University Blvd. (PP 1031)	\$623,000	\$74,800	\$97,800	\$796,000	\$1,243,000
2035									
51	2035	2037	NE 3 ⁽⁶⁾	18,600 linear feet of 8" water pipeline near CR 186 and along CR 110, and 2,300 linear feet of 12" water pipeline north of CR 117 in undeveloped area. (PP 1031)	\$3,790,300	\$454,900	\$594,500	\$4,840,000	\$7,723,000
2036									
52	2036	2037	NE 4 ⁽⁶⁾	5,500 linear feet of 8" water pipeline from CR 110, south of University Blvd in undeveloped area. (PP 890)	\$1,001,500	\$120,200	\$157,100	\$1,279,000	\$2,087,000
2039									
	2039	2041	Brushy Creek Regional Water Treatment Plant - Phase 3 ⁽⁴⁾⁽⁸⁾	Construction of Phase 3 of BCRWTP - Capacity increase from 87 mgd to 105.8 mgd	\$20,078,400	\$3,011,800	\$0	\$23,091,000	\$40,275,000

Notes:

- (1) Construction cost estimate accounts for ENR (Dallas) escalation to 2015; contingency is 20% of construction cost.
- (2) Professional services is 15% of construction cost.
- (3) Total Inflated Cost Estimate is the estimated cost to implement the project in the future project start year. These estimates are based on an inflation rate of 2.25%
- (4) Project cost provided by the City of Round Rock (City). No additional contingency was included.
- (5) Project cost may be incurred by the Developer.
- (6) Project cost estimate breakdown is provided in 2015 CIP cost spreadsheets.
- (7) City's portion is 47.6% of total project cost estimate, \$33M (\$1.5/gal).
- (8) City's portion is 44.5% of total project cost estimate, \$37.6M (\$2/gal).
- (9) Project cost provided by Hot, Inc. No additional contingency was included.

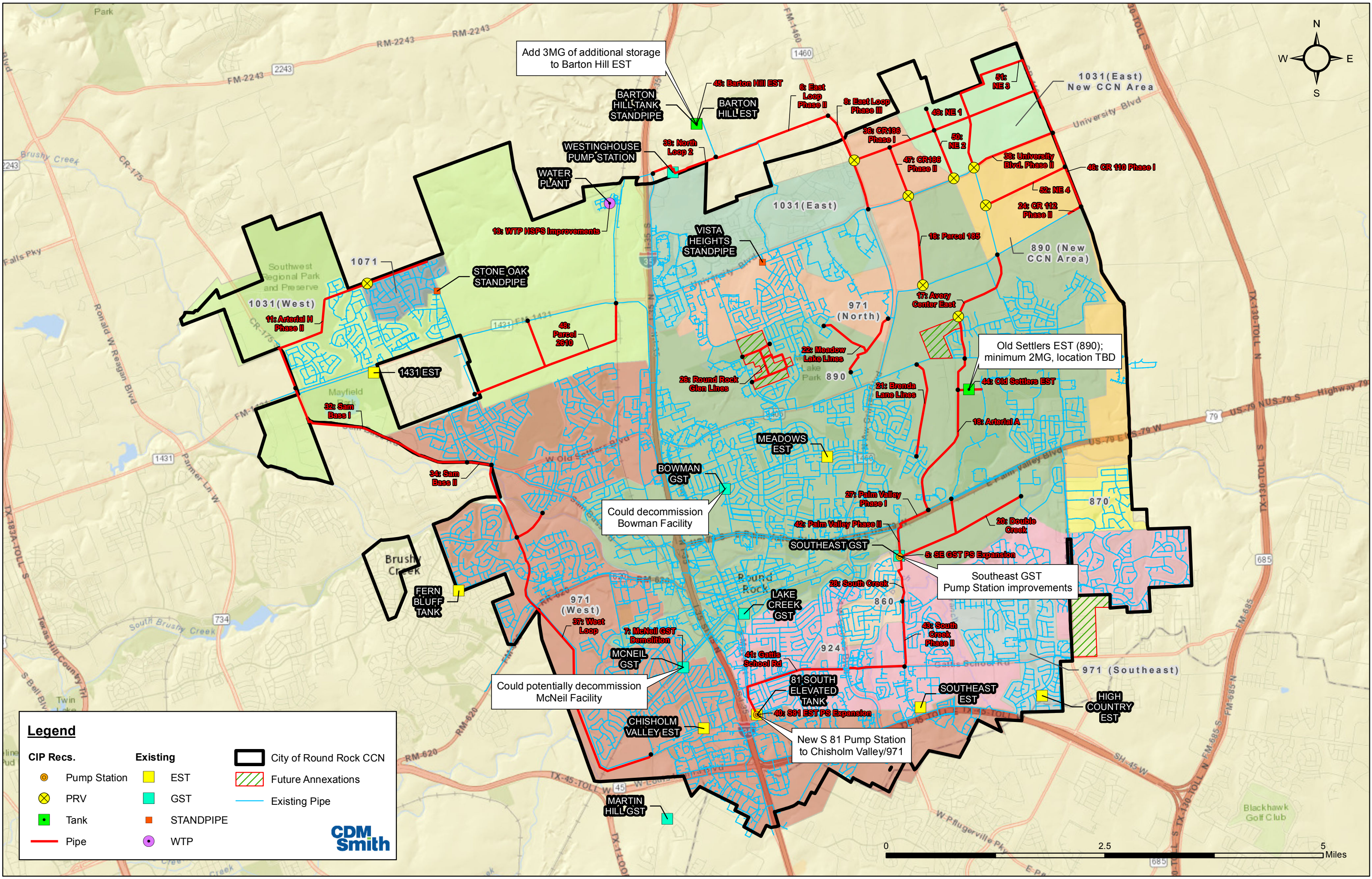
APPENDIX A

Water Distribution System Map

City of Round Rock

December 2015





Legend

CIP Recs.	Existing	
Pump Station	EST	City of Round Rock CCN
PRV	GST	Future Annexations
Tank	STANDPIPE	Existing Pipe
Pipe	WTP	



Add 3MG of additional storage to Barton Hill EST

BARTON HILL TANK STANDPIPE

45: Barton Hill EST

6: East Loop Phase II

8: East Loop Phase III

61: NE 3

1031(East) New CCN Area

University Blvd

WESTINGHOUSE PUMP STATION

39: North Loop 2

WATER PLANT

19: WTP HSPS Improvements

STONE OAK STANDPIPE

1031(West)

11: Arterial H Phase II

1431 EST

32: Sam Bass I

34: Sam Bass II

48: Parcel 2010

26: Round Rock Glen Lines

22: Meadow Lake Lines

MEADOWS EST

BOWMAN GST

Could decommission Bowman Facility

27: Palm Valley Phase I

42: Palm Valley Phase II

SOUTHEAST GST

5: SE GST PS Expansion

Southeast GST Pump Station improvements

28: South Creek

43: South Creek Phase II

SOUTHEAST EST

HIGH COUNTRY EST

971 (Southeast)

Could potentially decommission McNeil Facility

MCNEIL GST

7: McNeil GST Demolition

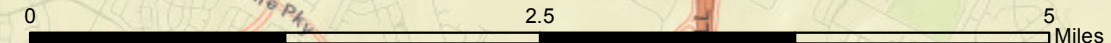
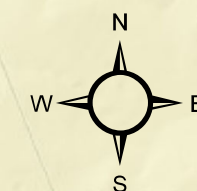
CHISHOLM VALLEY EST

MARTIN HILL GST

81 SOUTH ELEVATED TANK

40: S81 EST PS Expansion

New S 81 Pump Station to Chisholm Valley/971



APPENDIX B

Pumping and Storage Capacity Analysis

City of Round Rock

December 2015



City of Round Rock Storage Capacities
PP 1071

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
486	1,458	711	2,133	895	2,685

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
				2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)									
Brushy Creek EST (31% to CORR)	2,000,000	620,000	620,000	48,592	71,093	89,500	80,176	117,304	147,675	97,183	142,187	179,000

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
				2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)			
1431 Standpipe	975,000	975,000	975,000	189,508	277,264	349,050

Total Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
				2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)						
Brushy Creek EST (31% to CORR)	2,000,000	620,000	1,595,000	97,183	142,187	179,000	269,684	394,568	496,725
1431 Standpipe	975,000	975,000							

High Service Pumping				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
				2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)									
1431 Booster Pump #1	750	20,583	19,833	292	427	537	972	1,422	1,790	510	746	940
1431 Booster Pump #2	750											
1431 Booster Pump #3	750											
High Service Pumps from Brushy Creek	18,333											
High Service Pumps from Brushy Creek (2040)	35,500	36,250	35,500									

Capacity Required for this Pressure Plane												
Capacity Available in this Pressure Plane				Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)					
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	48,592	71,093	89,500	620,000	620,000	620,000	0	0	0	571,408	548,907	530,500
EST (55 gal/person)	80,176	117,304	147,675	620,000	620,000	620,000	0	0	0	539,824	502,696	472,325
EST (200 gal/connection)	97,183	142,187	179,000	620,000	620,000	620,000	0	0	0	522,817	477,813	441,000
GST (130 gal/person)	189,508	277,264	349,050	975,000	975,000	975,000	0	0	0	785,493	697,736	625,950
Total Storage (200 gal/connection)	97,183	142,187	179,000	1,595,000	1,595,000	1,595,000	0	0	0	1,497,817	1,452,813	1,416,000
Total Storage (185 gal/person)	269,684	394,568	496,725	1,595,000	1,595,000	1,595,000	0	0	0	1,325,316	1,200,432	1,098,275
High Service Pumping (0.6 gpm/connection)	292	427	537	20,583	20,583	36,250	0	0	0	20,292	20,157	35,713
High Service Pumping (2.0 gpm/connection)	972	1,422	1,790	20,583	20,583	36,250	0	0	0	19,612	19,161	34,460
High Service Pumping (PHF gpm/connection)	510	746	940	19,833	19,833	35,500	0	0	0	19,323	19,087	34,560

Capacity Available from Other Pressure Planes (Overages)												
Capacity Still Needed for this Pressure Plane (Shortages)				Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available to Other Pressure Planes (Overages)					
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	0	0	0	0	0	0	0	0	0	571,408	548,907	530,500
EST (55 gal/person)	0	0	0	0	0	0	0	0	0	539,824	502,696	472,325
EST (200 gal/connection)	0	0	0	0	0	0	0	0	0	522,817	477,813	441,000
GST (130 gal/person)	0	0	0	0	0	0	0	0	0	785,493	697,736	625,950
Total Storage (200 gal/connection)	0	0	0	0	0	0	0	0	0	1,497,817	1,452,813	1,416,000
Total Storage (185 gal/person)	0	0	0	0	0	0	0	0	0	1,325,316	1,200,432	1,098,275
High Service Pumping (0.6 gpm/connection)	0	0	0	0	0	0	0	0	0	20,292	20,157	35,713
High Service Pumping (2.0 gpm/connection)	0	0	0	0	0	0	0	0	0	19,612	19,161	34,460
High Service Pumping (PHF gpm/connection)	0	0	0	0	0	0	0	0	0	19,323	19,087	34,560

City of Round Rock Storage Capacities
PP 1031 (West)

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2011 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
1,946	5,837	2,847	8,541	3,648	10,943

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
RM 1431 EST	2,000,000	2,000,000	2,000,000	194,557	284,700	364,767	321,019	469,755	601,865	389,113	569,400	729,533

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Clearwells (40% to West)	6,500,000	2,600,000	2,600,000	758,771	1,110,330	1,422,590
Additional clearwell in 2030 (40% to West)	1,500,000	600,000	3,200,000			

Total Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
RM 1431 EST	2,000,000	2,000,000	4,600,000	389,113	569,400	729,533	1,079,790	1,580,085	2,024,455
Clearwells (40% to West)	6,500,000	2,600,000							
Additional clearwell in 2030 (40% to West)	1,500,000	600,000	5,200,000						

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
High Service Pump #1	2,100	16,800	12,600	1,167	1,708	2,189	3,891	5,694	7,295	2,043	2,989	3,830
High Service Pump #2	2,100											
High Service Pump #3	2,100											
High Service Pump #4	2,100											
High Service Pump #5	4,200											
High Service Pump #6	4,200											

Asset Name	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	194,557	284,700	364,767	2,000,000	2,000,000	2,000,000	0	0	0	1,805,443	1,715,300	1,635,233
EST (55 gal/person)	321,019	469,755	601,865	2,000,000	2,000,000	2,000,000	0	0	0	1,678,982	1,530,245	1,398,135
EST (200 gal/connection)	389,113	569,400	729,533	2,000,000	2,000,000	2,000,000	0	0	0	1,610,887	1,430,600	1,270,467
GST (130 gal/person)	758,771	1,110,330	1,422,590	2,600,000	2,600,000	3,200,000	0	0	0	1,841,229	1,489,670	1,777,410
Total Storage (200 gal/connection)	389,113	569,400	729,533	4,600,000	4,600,000	5,200,000	0	0	0	4,210,887	4,030,600	4,470,467
Total Storage (185 gal/person)	1,079,790	1,580,085	2,024,455	4,600,000	4,600,000	5,200,000	0	0	0	3,520,211	3,019,915	3,175,545
High Service Pumping (0.6 gpm/connection]	1,167	1,708	2,189	16,800	16,800	16,800	0	0	0	15,633	15,092	14,611
High Service Pumping (2.0 gpm/connection]	3,891	5,694	7,295	16,800	16,800	16,800	0	0	0	12,909	11,106	9,505
High Service Pumping (PHF gpm/connection)	2,043	2,989	3,830	12,600	12,600	12,600	0	0	0	10,557	9,611	8,770

Asset Name	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed for All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	571,408	548,907	530,500	0	0	0	0	0	0	2,376,852	2,264,207	2,165,733
EST (55 gal/person)	539,824	502,696	472,325	0	0	0	0	0	0	2,218,805	2,032,941	1,870,460
EST (200 gal/connection)	522,817	477,813	441,000	0	0	0	0	0	0	2,133,703	1,908,413	1,711,467
GST (130 gal/person)	785,493	697,736	625,950	0	0	0	0	0	0	2,626,722	2,187,406	2,403,360
Total Storage (200 gal/connection)	1,497,817	1,452,813	1,416,000	0	0	0	0	0	0	5,708,703	5,483,413	5,886,467
Total Storage (185 gal/person)	1,325,316	1,200,432	1,098,275	0	0	0	0	0	0	4,845,527	4,220,347	4,273,820
High Service Pumping (0.6 gpm/connection]	20,292	20,157	35,713	0	0	0	0	0	0	35,924	35,249	50,324
High Service Pumping (2.0 gpm/connection]	19,612	19,161	34,460	0	0	0	0	0	0	32,520	30,267	43,965
High Service Pumping (PHF gpm/connection)	19,323	19,087	34,560	0	0	0	0	0	0	29,880	28,698	43,330

City of Round Rock Storage Capacities
PP 971 (West)

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
10,029	30,088	13,931	41,793	19,085	57,255

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Chisholm Valley EST	1,250,000	1,250,000	1,250,000	1,002,933	1,393,087	1,908,500	1,654,840	2,298,593	3,149,025	2,005,867	2,786,173	3,817,000

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
McNeil GST	730,000	730,000	730,000	3,911,440	5,433,038	7,443,150
McNeil GST Decommissioned in 2025 and 2040						

Total Storage Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Chisholm Valley EST	1,250,000	1,250,000	1,980,000	2,005,867	2,786,173	3,817,000	5,566,280	7,731,631	10,592,175
McNeil GST	730,000	730,000							
NcNeil GST Decommissioned in 2025 and 2040									

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
McNeil GST Booster Pump #1	1,500	6,000	4,500	6,018	8,359	11,451	20,059	27,862	38,170	10,531	14,627	20,039
McNeil GST Booster Pump #2	1,500											
McNeil GST Booster Pump #3	1,500											
McNeil GST Booster Pump #4	1,500											
McNeil Pumps Decommissioned in 2025 and 2040	0	0	0									

	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	1,002,933	1,393,087	1,908,500	1,250,000	1,250,000	1,250,000	0	143,087	658,500	247,067	0	0
EST (55 gal/person)	1,654,840	2,298,593	3,149,025	1,250,000	1,250,000	1,250,000	404,840	1,048,593	1,899,025	0	0	0
EST (200 gal/connection)	2,005,867	2,786,173	3,817,000	1,250,000	1,250,000	1,250,000	755,867	1,536,173	2,567,000	0	0	0
GST (130 gal/person)	3,911,440	5,433,038	7,443,150	730,000	0	0	3,181,440	5,433,038	7,443,150	0	0	0
Total Storage (200 gal/connection)	2,005,867	2,786,173	3,817,000	1,980,000	1,250,000	1,250,000	25,867	1,536,173	2,567,000	0	0	0
Total Storage (185 gal/person)	5,566,280	7,731,631	10,592,175	1,980,000	1,250,000	1,250,000	3,586,280	6,481,631	9,342,175	0	0	0
High Service Pumping (0.6 gpm/connection)	6,018	8,359	11,451	6,000	0	0	18	8,359	11,451	0	0	0
High Service Pumping (2.0 gpm/connection)	20,059	27,862	38,170	6,000	0	0	14,059	27,862	38,170	0	0	0
High Service Pumping (PHF gpm/connection)	10,531	14,627	20,039	4,500	0	0	6,031	14,627	20,039	0	0	0

	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available to Other Pressure Planes (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	2,376,852	2,264,207	2,165,733	0	0	0	0	0	0	2,623,918	2,121,120	1,507,233
EST (55 gal/person)	2,218,805	2,032,941	1,870,460	0	0	28,565	0	0	28,565	1,813,965	984,348	0
EST (200 gal/connection)	2,133,703	1,908,413	1,711,467	0	0	855,533	0	0	855,533	1,377,837	372,240	0
GST (130 gal/person)	2,626,722	2,187,406	2,403,360	554,719	3,245,632	5,039,790	554,719	3,245,632	5,039,790	0	0	0
Total Storage (200 gal/connection)	5,708,703	5,483,413	5,886,467	0	0	0	0	0	0	5,682,837	3,947,240	3,319,467
Total Storage (185 gal/person)	4,845,527	4,220,347	4,273,820	0	2,261,284	5,068,355	0	2,261,284	5,068,355	1,259,247	0	0
High Service Pumping (0.6 gpm/connection)	35,924	35,249	50,324	0	0	0	0	0	0	35,907	26,890	38,873
High Service Pumping (2.0 gpm/connection)	32,520	30,267	43,965	0	0	0	0	0	0	18,462	2,406	5,795
High Service Pumping (PHF gpm/connection)	29,880	28,698	43,330	0	0	0	0	0	0	23,849	14,070	23,291

City of Round Rock Storage Capacities
PP 971 (West) - Fern Bluff

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
1,977	5,932	1,977	5,932	1,977	5,932

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Fern Bluff EST	1,250,000	750,000	750,000	197,733	197,733	197,733	326,260	326,260	326,260	395,467	395,467	395,467

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
		0	0	771,160	771,160	771,160

Total Storage Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Fern Bluff EST	1,250,000	750,000	750,000	395,467	395,467	395,467	1,097,420	1,097,420	1,097,420
	0	0							

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
				1,186	1,186	1,186	3,955	3,955	3,955	2,076	2,076	2,076

				Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	197,733	197,733	197,733	750,000	750,000	750,000	0	0	0	552,267	552,267	552,267			
EST (55 gal/person)	326,260	326,260	326,260	750,000	750,000	750,000	0	0	0	423,740	423,740	423,740			
EST (200 gal/connection)	395,467	395,467	395,467	750,000	750,000	750,000	0	0	0	354,533	354,533	354,533			
GST (130 gal/person)	771,160	771,160	771,160	0	0	0	771,160	771,160	771,160	0	0	0			
Total Storage (200 gal/connection)	395,467	395,467	395,467	750,000	750,000	750,000	0	0	0	354,533	354,533	354,533			
Total Storage (185 gal/person)	1,097,420	1,097,420	1,097,420	750,000	750,000	750,000	347,420	347,420	347,420	0	0	0			
High Service Pumping (0.6 gpm/connection)	1,186	1,186	1,186	0	0	0	1,186	1,186	1,186	0	0	0			
High Service Pumping (2.0 gpm/connection)	3,955	3,955	3,955	0	0	0	3,955	3,955	3,955	0	0	0			
High Service Pumping (PHF gpm/connection)	2,076	2,076	2,076	0	0	0	2,076	2,076	2,076	0	0	0			

				Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	2,623,918	2,121,120	1,507,233	0	0	0	0	0	0	3,176,185	2,673,387	2,059,500			
EST (55 gal/person)	1,813,965	984,348	0	0	0	0	0	0	28,565	2,237,705	1,408,088	423,740			
EST (200 gal/connection)	1,377,837	372,240	0	0	0	0	0	0	855,533	1,732,370	726,773	354,533			
GST (130 gal/person)	0	0	0	771,160	771,160	771,160	1,325,879	4,016,792	5,810,950	0	0	0			
Total Storage (200 gal/connection)	5,682,837	3,947,240	3,319,467	0	0	0	0	0	0	6,037,370	4,301,773	3,674,000			
Total Storage (185 gal/person)	1,259,247	0	0	0	347,420	347,420	0	2,608,704	5,415,775	911,827	0	0			
High Service Pumping (0.6 gpm/connection)	35,907	26,890	38,873	0	0	0	0	0	0	34,720	25,704	37,687			
High Service Pumping (2.0 gpm/connection)	18,462	2,406	5,795	0	1,549	0	0	1,549	0	14,507	0	1,840			
High Service Pumping (PHF gpm/connection)	23,849	14,070	23,291	0	0	0	0	0	0	21,773	11,994	21,215			

City of Round Rock Storage Capacities
PP 1031 (East)

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
2,027	6,080	2,585	7,755	5,893	17,680

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Barton Hill EST	2,700,000	2,700,000	2,700,000	202,657	258,500	589,333	334,384	426,525	972,400	405,313	517,000	1,178,667

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Westinghouse	100,000	100,000	4,000,000	790,361	1,008,150	2,298,400
Clearwells (60% to East)	6,500,000	3,900,000				
Additional clearwell in 2030 (60% to East)	1,500,000	900,000	4,900,000			

Total Capacity Recommended				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Westinghouse	100,000	100,000	6,700,000	405,313	517,000	1,178,667	1,124,745	1,434,675	3,270,800
Clearwells (60% to East)	6,500,000	3,900,000							
Additional clearwell in 2030 (60% to East)	1,500,000	900,000	7,600,000						
Barton Hill EST	2,700,000	2,700,000							

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
High Service Pump #7	4,200	27,000	21,800	1,216	1,551	3,536	4,053	5,170	11,787	2,128	2,714	6,188
High Service Pump #8	5,200											
High Service Pump #9	5,200											
High Service Pump #10	5,200											
High Service Pump #11	5,200											
Westinghouse GST Booster Pump #1	1,000											
Westinghouse GST Booster Pump #2	1,000											

Capacity Required for this Pressure Plane				Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	202,657	258,500	589,333	2,700,000	2,700,000	2,700,000	0	0	0	2,497,343	2,441,500	2,110,667
EST (55 gal/person)	334,384	426,525	972,400	2,700,000	2,700,000	2,700,000	0	0	0	2,365,617	2,273,475	1,727,600
EST (200 gal/connection)	405,313	517,000	1,178,667	2,700,000	2,700,000	2,700,000	0	0	0	2,294,687	2,183,000	1,521,333
GST (130 gal/person)	790,361	1,008,150	2,298,400	4,000,000	4,000,000	4,900,000	0	0	0	3,209,639	2,991,850	2,601,600
Total Storage (200 gal/connection)	405,313	517,000	1,178,667	6,700,000	6,700,000	7,600,000	0	0	0	6,294,687	6,183,000	6,421,333
Total Storage (185 gal/person)	1,124,745	1,434,675	3,270,800	6,700,000	6,700,000	7,600,000	0	0	0	5,575,256	5,265,325	4,329,200
High Service Pumping (0.6 gpm/connection)	1,216	1,551	3,536	27,000	27,000	27,000	0	0	0	25,784	25,449	23,464
High Service Pumping (2.0 gpm/connection)	4,053	5,170	11,787	27,000	27,000	27,000	0	0	0	22,947	21,830	15,213
High Service Pumping (PHF gpm/connection)	2,128	2,714	6,188	21,800	21,800	21,800	0	0	0	19,672	19,086	15,612

Capacity Available from Other Pressure Planes (Overages)				Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	0	0	0	0	0	0	0	0	0	2,497,343	2,441,500	2,110,667
EST (55 gal/person)	0	0	0	0	0	0	0	0	0	2,365,617	2,273,475	1,727,600
EST (200 gal/connection)	0	0	0	0	0	0	0	0	0	2,294,687	2,183,000	1,521,333
GST (130 gal/person)	0	0	0	0	0	0	0	0	0	3,209,639	2,991,850	2,601,600
Total Storage (200 gal/connection)	0	0	0	0	0	0	0	0	0	6,294,687	6,183,000	6,421,333
Total Storage (185 gal/person)	0	0	0	0	0	0	0	0	0	5,575,256	5,265,325	4,329,200
High Service Pumping (0.6 gpm/connection)	0	0	0	0	0	0	0	0	0	25,784	25,449	23,464
High Service Pumping (2.0 gpm/connection)	0	0	0	0	0	0	0	0	0	22,947	21,830	15,213
High Service Pumping (PHF gpm/connection)	0	0	0	0	0	0	0	0	0	19,672	19,086	15,612

City of Round Rock Storage Capacities
PP 971 (North)

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
1,707	5,122	3,543	10,630	5,491	16,474

* Population includes areas outside CCN

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Vista Heights Standpipe	1,000,000	250,000	250,000	170,730	354,333	549,133	281,705	584,650	906,070	341,460	708,667	1,098,267

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
				665,847	1,381,900	2,141,620

Total Storage Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Vista Heights Standpipe	1,000,000	250,000	250,000	341,460	708,667	1,098,267	947,552	1,966,550	3,047,690

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
				1,024	2,126	3,295	3,415	7,087	10,983	1,793	3,721	5,766

	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	170,730	354,333	549,133	250,000	250,000	250,000	0	104,333	299,133	79,270	0	0
EST (55 gal/person)	281,705	584,650	906,070	250,000	250,000	250,000	31,705	334,650	656,070	0	0	0
EST (200 gal/connection)	341,460	708,667	1,098,267	250,000	250,000	250,000	91,460	458,667	848,267	0	0	0
GST (130 gal/person)	665,847	1,381,900	2,141,620	0	0	0	665,847	1,381,900	2,141,620	0	0	0
Total Storage (200 gal/connection)	341,460	708,667	1,098,267	250,000	250,000	250,000	91,460	458,667	848,267	0	0	0
Total Storage (185 gal/person)	947,552	1,966,550	3,047,690	250,000	250,000	250,000	697,552	1,716,550	2,797,690	0	0	0
High Service Pumping (0.6 gpm/connection)	1,024	2,126	3,295	0	0	0	1,024	2,126	3,295	0	0	0
High Service Pumping (2.0 gpm/connection)	3,415	7,087	10,983	0	0	0	3,415	7,087	10,983	0	0	0
High Service Pumping (PHF gpm/connection)	1,793	3,721	5,766	0	0	0	1,793	3,721	5,766	0	0	0

	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	2,497,343	2,441,500	2,110,667	0	0	0	0	0	0	2,576,613	2,337,167	1,811,533
EST (55 gal/person)	2,365,617	2,273,475	1,727,600	0	0	0	0	0	0	2,333,912	1,938,825	1,071,530
EST (200 gal/connection)	2,294,687	2,183,000	1,521,333	0	0	0	0	0	0	2,203,227	1,724,333	673,067
GST (130 gal/person)	3,209,639	2,991,850	2,601,600	0	0	0	0	0	0	2,543,792	1,609,950	459,980
Total Storage (200 gal/connection)	6,294,687	6,183,000	6,421,333	0	0	0	0	0	0	6,203,227	5,724,333	5,573,067
Total Storage (185 gal/person)	5,575,256	5,265,325	4,329,200	0	0	0	0	0	0	4,877,704	3,548,775	1,531,510
High Service Pumping (0.6 gpm/connection)	25,784	25,449	23,464	0	0	0	0	0	0	24,760	23,323	20,169
High Service Pumping (2.0 gpm/connection)	22,947	21,830	15,213	0	0	0	0	0	0	19,532	14,743	4,231
High Service Pumping (PHF gpm/connection)	19,672	19,086	15,612	0	0	0	0	0	0	17,879	15,365	9,846

City of Round Rock Storage Capacities
PP 924

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
6,048	18,143	6,824	20,473	7,280	21,841

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
South 81 EST	1,250,000	1,250,000	2,000,000	604,750	682,433	728,033	997,838	1,126,015	1,201,255	1,209,500	1,364,867	1,456,067
Southeast EST	750,000	750,000										

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Southeast GST	2,500,000	2,500,000	3,000,000	2,358,525	2,661,490	2,839,330
Lake Creek GST	500,000	500,000				

Total Storage Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
South 81 EST	1,250,000	1,250,000	5,000,000	1,209,500	1,364,867	1,456,067	3,356,363	3,787,505	4,040,585
Southeast GST	2,500,000	2,500,000							
Lake Creek GST	500,000	500,000							
Southeast EST	750,000	750,000							

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
Southeast GST Booster Pump #1	3,000	21,000	18,000	3,629	4,095	4,368	12,095	13,649	14,561	6,350	7,166	7,644
Southeast GST Booster Pump #2	3,000											
Southeast GST Booster Pump #3	3,000											
Lake Creek GST Booster Pump #1	2,000											
Lake Creek GST Booster Pump #2	2,000											
Lake Creek GST Booster Pump #3	2,000											
Lake Creek GST Booster Pump #4	2,000											
Lake Creek GST Booster Pump #5	2,000											
Lake Creek GST Booster Pump #6	2,000											

Asset Name	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	604,750	682,433	728,033	2,000,000	2,000,000	2,000,000	0	0	0	1,395,250	1,317,567	1,271,967
EST (55 gal/person)	997,838	1,126,015	1,201,255	2,000,000	2,000,000	2,000,000	0	0	0	1,002,163	873,985	798,745
EST (200 gal/connection)	1,209,500	1,364,867	1,456,067	2,000,000	2,000,000	2,000,000	0	0	0	790,500	635,133	543,933
GST (130 gal/person)	2,358,525	2,661,490	2,839,330	3,000,000	3,000,000	3,000,000	0	0	0	641,475	338,510	160,670
Total Storage (200 gal/connection)	1,209,500	1,364,867	1,456,067	5,000,000	5,000,000	5,000,000	0	0	0	3,790,500	3,635,133	3,543,933
Total Storage (185 gal/person)	3,356,363	3,787,505	4,040,585	5,000,000	5,000,000	5,000,000	0	0	0	1,643,638	1,212,495	959,415
High Service Pumping (0.6 gpm/connection)	3,629	4,095	4,368	21,000	21,000	21,000	0	0	0	17,372	16,905	16,632
High Service Pumping (2.0 gpm/connection)	12,095	13,649	14,561	21,000	21,000	21,000	0	0	0	8,905	7,351	6,439
High Service Pumping (PHF gpm/connection)	6,350	7,166	7,644	18,000	18,000	18,000	0	0	0	11,650	10,834	10,356

Asset Name	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	2,576,613	2,337,167	1,811,533	0	0	0	0	0	0	3,971,863	3,654,733	3,083,500
EST (55 gal/person)	2,333,912	1,938,825	1,071,530	0	0	0	0	0	0	3,336,075	2,812,810	1,870,275
EST (200 gal/connection)	2,203,227	1,724,333	673,067	0	0	0	0	0	0	2,993,727	2,359,467	1,217,000
GST (130 gal/person)	2,543,792	1,609,950	459,980	0	0	0	0	0	0	3,185,267	1,948,460	620,650
Total Storage (200 gal/connection)	6,203,227	5,724,333	5,573,067	0	0	0	0	0	0	9,993,727	9,359,467	9,117,000
Total Storage (185 gal/person)	4,877,704	3,548,775	1,531,510	0	0	0	0	0	0	6,521,342	4,761,270	2,490,925
High Service Pumping (0.6 gpm/connection)	24,760	23,323	20,169	0	0	0	0	0	0	42,131	40,228	36,801
High Service Pumping (2.0 gpm/connection)	19,532	14,743	4,231	0	0	0	0	0	0	28,437	22,095	10,670
High Service Pumping (PHF gpm/connection)	17,879	15,365	9,846	0	0	0	0	0	0	29,530	26,200	20,202

City of Round Rock Storage Capacities
PP 890

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
13,935	41,804	20,239	60,718	28,983	86,950

* Population includes areas outside CCN

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
Meadows EST	750,000	750,000	750,000	1,393,467	2,023,933	2,898,333	2,299,220	3,339,490	4,782,250	2,786,933	4,047,867	5,796,667

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Bowman GST	500,000	500,000	500,000	5,434,520	7,893,340	11,303,500
Bowman Decommissioned in 2025 and 2040	0	0	0			

Total Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
Meadows EST	750,000	750,000	1,250,000	2,786,933	4,047,867	5,796,667	7,733,740	11,232,830	16,085,750
Bowman GST	500,000	500,000							
Bowman Decommissioned in 2025 and 2040			750,000						

High Service Pumping				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
Bowman GST Booster Pump #1	1,500	6,000	4,500	8,361	12,144	17,390	27,869	40,479	57,967	14,631	21,251	30,433
Bowman GST Booster Pump #2	1,500											
Bowman GST Booster Pump #3	1,500											
Bowman GST Booster Pump #4	1,500											
Bowman Decommissioned in 2025 and 2040	0	0	0									

Asset Name	Capacity Required for this Pressure Plane Based on Regulatory Analysis Above			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane from Previous Pressure Planes (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	1,393,467	2,023,933	2,898,333	750,000	750,000	750,000	643,467	1,273,933	2,148,333	0	0	0
EST (55 gal/person)	2,299,220	3,339,490	4,782,250	750,000	750,000	750,000	1,549,220	2,589,490	4,032,250	0	0	0
EST (200 gal/connection)	2,786,933	4,047,867	5,796,667	750,000	750,000	750,000	2,036,933	3,297,867	5,046,667	0	0	0
GST (130 gal/person)	5,434,520	7,893,340	11,303,500	500,000	0	0	4,934,520	7,893,340	11,303,500	0	0	0
Total Storage (200 gal/connection)	2,786,933	4,047,867	5,796,667	1,250,000	750,000	750,000	1,536,933	3,297,867	5,046,667	0	0	0
Total Storage (185 gal/person)	7,733,740	11,232,830	16,085,750	1,250,000	750,000	750,000	6,483,740	10,482,830	15,335,750	0	0	0
High Service Pumping (0.6 gpm/connection)	8,361	12,144	17,390	6,000	0	0	2,361	12,144	17,390	0	0	0
High Service Pumping (2.0 gpm/connection)	27,869	40,479	57,967	6,000	0	0	21,869	40,479	57,967	0	0	0
High Service Pumping (PHF gpm/connection)	14,631	21,251	30,433	4,500	0	0	10,131	21,251	30,433	0	0	0

Asset Name	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	3,971,863	3,654,733	3,083,500	0	0	0	0	0	0	3,328,397	2,380,800	935,167
EST (55 gal/person)	3,336,075	2,812,810	1,870,275	0	0	2,161,975	0	0	2,161,975	1,786,855	223,320	0
EST (200 gal/connection)	2,993,727	2,359,467	1,217,000	0	938,400	3,829,667	0	938,400	3,829,667	956,793	0	0
GST (130 gal/person)	3,185,267	1,948,460	620,650	1,749,253	5,944,880	10,682,850	1,749,253	5,944,880	10,682,850	0	0	0
Total Storage (200 gal/connection)	9,993,727	9,359,467	9,117,000	0	0		0	0	0	8,456,793	6,061,600	4,070,333
Total Storage (185 gal/person)	6,521,342	4,761,270	2,490,925	0	5,721,560	12,844,825	0	5,721,560	12,844,825	37,602	0	0
High Service Pumping (0.6 gpm/connection)	42,131	40,228	36,801	0	0	0	0	0	0	39,770	28,085	19,411
High Service Pumping (2.0 gpm/connection)	28,437	22,095	10,670	0	18,384	47,297	0	18,384	47,297	6,568	0	0
High Service Pumping (PHF gpm/connection)	29,530	26,200	20,202	0	0	10,231	0	0	10,231	19,398	4,948	0

City of Round Rock Storage Capacities
PP 870

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
742	2,226	742	2,227	851	2,554

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
			0	74,195	74,233	85,133	122,422	122,485	140,470	148,390	148,467	170,267

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
			0	289,361	289,510	332,020

Total Storage Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
				148,390	148,467	170,267	411,782	411,995	472,490

High Service Pumping				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
			0	445	445	511	1,484	1,485	1,703	779	779	894

Asset Name	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	74,195	74,233	85,133	0	0	0	74,195	74,233	85,133	0	0	0
EST (55 gal/person)	122,422	122,485	140,470	0	0	0	122,422	122,485	140,470	0	0	0
EST (200 gal/connection)	148,390	148,467	170,267	0	0	0	148,390	148,467	170,267	0	0	0
GST (130 gal/person)	289,361	289,510	332,020	0	0	0	289,361	289,510	332,020	0	0	0
Total Storage (200 gal/connection)	148,390	148,467	170,267	0	0	0	148,390	148,467	170,267	0	0	0
Total Storage (185 gal/person)	411,782	411,995	472,490	0	0	0	411,782	411,995	472,490	0	0	0
High Service Pumping (0.6 gpm/connection)	445	445	511	0	0	0	445	445	511	0	0	0
High Service Pumping (2.0 gpm/connection)	1,484	1,485	1,703	0	0	0	1,484	1,485	1,703	0	0	0
High Service Pumping (PHF gpm/connection)	779	779	894	0	0	0	779	779	894	0	0	0

Asset Name	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	3,328,397	2,380,800	935,167	0	0	0	0	0	0	3,254,202	2,306,567	850,033
EST (55 gal/person)	1,786,855	223,320	0	0	0	140,470	0	0	2,302,445	1,664,433	100,835	0
EST (200 gal/connection)	956,793	0	0	0	148,467	170,267	0	1,086,867	3,999,933	808,403	0	0
GST (130 gal/person)	0	0	0	289,361	289,510	332,020	2,038,614	6,234,390	11,014,870	0	0	0
Total Storage (200 gal/connection)	8,456,793	6,061,600	4,070,333	0	0	0	0	0	0	8,308,403	5,913,133	3,900,067
Total Storage (185 gal/person)	37,602	0	0	374,181	411,995	472,490	374,181	6,133,555	13,317,315	0	0	0
High Service Pumping (0.6 gpm/connection)	39,770	28,085	19,411	0	0	0	0	0	0	39,325	27,639	18,900
High Service Pumping (2.0 gpm/connection)	6,568	0	0	0	1,485	1,703	0	19,869	48,999	5,084	0	0
High Service Pumping (PHF gpm/connection)	19,398	4,948	0	0	0	894	0	0	11,125	18,619	4,169	0

City of Round Rock Storage Capacities
PP 971 (Southeast)

Requirements:			
Elevated Storage Tank Capacity =	100 gal/connection	Per TCEQ 290	= Input Values
Elevated Storage Tank Capacity to meet min service pump requirements per TCEQ=	200 gal/connection	Per TCEQ 290	
Total Storage Capacity =	200 gal/connection	Per TCEQ 290	
Service Pump Capacity =	2 gpm/connection	Per TCEQ 290	
Service Pump Capacity Alternate =	0.6 gpm/connection	Per TCEQ 290	
Recommended elevated storage =	55 gal/person	Per Allen Woelke	
Recommended ground storage =	130 gal/person	From industry standards	
Peak hour factor =	1.05 gpm/connection	Based on PHF from diurnal curves	

2015 Connections Per Pressure Plane	2015 Population Per Pressure Plane	2025 Connections Per Pressure Plane	2025 Population Per Pressure Plane	2040 Connections Per Pressure Plane	2040 Population Per Pressure Plane
1,706	5,117	1,947	5,842	1,948	5,843

EST Capacity				EST Capacity Required by TCEQ (100 gal/connection)			EST Capacity Recommended (55 gal/person)			EST Capacity to Meet Minimum Service Pump Requirements per TCEQ (200 gal/connection)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)
High Country EST	1,250,000	1,250,000	1,250,000	170,567	194,733	194,767	281,435	321,310	321,365	341,133	389,467	389,533

** If capacity available greater than capacity required, can use the lower alternate service pump criteria

GST Capacity Recommended				GST Capacity Recommended (130 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
			0	665,210	759,460	759,590

Total Capacity				Total Storage Capacity Required by TCEQ (200 gal/connection)			Total Storage Capacity Recommended (185 gal/person)		
Asset Name	Capacity (gal)	Useable Capacity (gal)	Total Capacity (gal)	2015 Required Capacities Based on Connections (gal)	2025 Required Capacities Based on Connections (gal)	2040 Required Capacities Based on Connections (gal)	2015 Required Capacities Based on gal/person (gal)	2025 Required Capacities Based on gal/person (gal)	2040 Required Capacities Based on gal/person (gal)
High Country EST	1,250,000	1,250,000	1,250,000	341,133	389,467	389,533	946,645	1,080,770	1,080,955

High Service Pumping Required				Based on 0.6 gpm/connection			Based on 2.0 gpm/connection			Based on 1.05 gpm/connection from PHF		
Asset Name	Capacity (gal)	Total Capacity (gpm)	Total Firm Capacity (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)	2015 Required Capacities Based on Connections (gpm)	2025 Required Capacities Based on Connections (gpm)	2040 Required Capacities Based on Connections (gpm)
Southeast EST Booster Pump #1	1,250	3,750	2,500	1,023	1,168	1,169	3,411	3,895	3,895	1,791	2,045	2,045
Southeast EST Booster Pump #2	1,250											
Southeast EST Booster Pump #3	1,250											

	Capacity Required for this Pressure Plane			Capacity Available in this Pressure Plane			Additional Capacity Needed for this Pressure Plane (Shortages)			Additional Capacity Available from this Pressure Plane (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	170,567	194,733	194,767	1,250,000	1,250,000	1,250,000	0	0	0	1,079,433	1,055,267	1,055,233
EST (55 gal/person)	281,435	321,310	321,365	1,250,000	1,250,000	1,250,000	0	0	0	968,565	928,690	928,635
EST (200 gal/connection)	341,133	389,467	389,533	1,250,000	1,250,000	1,250,000	0	0	0	908,867	860,533	860,467
GST (130 gal/person)	665,210	759,460	759,590	0	0	0	665,210	759,460	759,590	0	0	0
Total Storage (200 gal/connection)	341,133	389,467	389,533	1,250,000	1,250,000	1,250,000	0	0	0	908,867	860,533	860,467
Total Storage (185 gal/person)	946,645	1,080,770	1,080,955	1,250,000	1,250,000	1,250,000	0	0	0	303,355	169,230	169,045
High Service Pumping (0.6 gpm/connection)	1,023	1,168	1,169	3,750	3,750	3,750	0	0	0	2,727	2,582	2,581
High Service Pumping (2.0 gpm/connection)	3,411	3,895	3,895	3,750	3,750	3,750	0	145	145	339	0	0
High Service Pumping (PHF gpm/connection)	1,791	2,045	2,045	2,500	2,500	2,500	0	0	0	709	455	455

	Capacity Available from Other Pressure Planes (Overages)			Capacity Still Needed for this Pressure Plane (Shortages)			Cumulative Capacity Needed from All Pressure Planes (Shortages)			Cumulative Capacity Available for Other Pressure Planes (Overages)		
Asset Name	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity	2015 Capacity	2025 Capacity	2040 Capacity
EST (100 gal/connection)	0	0	0	0	0	0	0	0	0	1,079,433	1,055,267	1,055,233
EST (55 gal/person)	0	0	0	0	0	0	0	0	0	968,565	928,690	928,635
EST (200 gal/connection)	0	0	0	0	0	0	0	0	0	908,867	860,533	860,467
GST (gal/person)	0	0	0	665,210	759,460	759,590	665,210	759,460	759,590	0	0	0
Total Storage (200 gal/connection)	0	0	0	0	0	0	0	0	0	908,867	860,533	860,467
Total Storage (185 gal/person)	0	0	0	0	0	0	0	0	0	303,355	169,230	169,045
High Service Pumping (0.6 gpm/connection)	0	0	0	0	0	0	0	0	0	2,727	2,582	2,581
High Service Pumping (2.0 gpm/connection)	0	0	0	0	145	145	0	145	145	339	0	0
High Service Pumping (PHF gpm/connection)	0	0	0	0	0	0	0	0	0	709	455	455

APPENDIX C

CIP Cost Information

City of Round Rock

December 2015



City of Round Rock
Year 2015 Capital Improvements Program
81 South EST Pump Station

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	Site, Civil, and Concrete Work	1	LS	\$89,425	\$89,430
2	Pumping Equipment: Pumps, Motors, Cans	2	EA	\$120,000	\$240,000
3	Process/Yard Piping and Valves	1	LS	\$160,000	\$160,000
4	Electrical and I&C Equipment	1	LS	\$302,000	\$302,000
5	Electical Control Building	1	LS	\$80,000	\$80,000
				Construction Subtotal	\$871,500
		Mobilization	5%		\$43,600
		Contractor's OH&P	15%		\$130,800
		Contingency	20%		\$174,300
		Professional Services	15%		\$130,800
				Construction Total	\$1,351,000
					Project Total \$1,351,000

City of Round Rock
Year 2015 Capital Improvements Program
Arterial A

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	24" Arterial A Pipeline (dirt)	10,150	LF	\$190	\$1,928,500
2	Fire Hydrants	26	EA	\$13,600	\$353,600
3	24" Main Gate Valve (including installation)	9	EA	\$20,000	\$180,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	12	AC	\$10,000	\$116,510
6	Trench Safety/Silt Fence	10,150	LF	\$3	\$30,450
7	Revegetation	10,150	LF	\$6	\$60,900
8	Traffic Control	1	LS	\$133,500	\$133,500
9	Miscellaneous at 5%	1	LS	\$140,180	\$140,180
Construction Subtotal					\$2,943,700
	Mobilization	5%			\$147,200
	Contingency	20%			\$588,800
	Professional Services	15%			\$441,600
Construction Total					\$4,121,300
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$412,200
	Easement/Acquisition Services	1	LS		\$164,900
Easement Subtotal					\$577,100
Project Total					\$4,699,000

City of Round Rock
Year 2015 Capital Improvements Program
Avery Center East

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" Avery Center East Pipeline (dirt)	7,800	LF	\$190	\$1,482,000
2	Fire Hydrants	20	EA	\$13,600	\$272,000
3	24" Main Gate Valve (including installation)	7	EA	\$20,000	\$140,000
4	24" Pressure Relief Valve and Vault	1	EA	\$61,000	\$61,000
5	Boring	0	LF	\$760	\$0
6	Site Prep	9	AC	\$10,000	\$89,540
7	Trench Safety/Silt Fence	7,800	LF	\$3	\$23,400
8	Revegetation	7,800	LF	\$6	\$46,800
9	Traffic Control	1	LS	\$105,740	\$105,740
10	Miscellaneous at 5%	1	LS	\$111,030	\$111,030
Construction Subtotal					\$2,331,600
Mobilization 5%					\$116,600
Contingency 20%					\$466,400
Professional Services 15%					\$349,800
Construction Total					\$3,264,400
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$326,500
	Easement/Acquisition Services	1	LS		\$130,600
Easement Subtotal					\$457,100
Project Total					\$3,722,000

City of Round Rock
Year 2015 Capital Improvements Program
Gattis School Rd

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" Gattis School Rd Pipeline (dirt)	11,200	LF	\$190	\$2,128,000
2	Fire Hydrants	28	EA	\$13,600	\$380,800
3	24" Gate Valve, Main, & Connections (including installation)	10	EA	\$20,000	\$200,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	13	AC	\$10,000	\$128,560
6	Trench Safety/Silt Fence	11,200	LF	\$3	\$33,600
7	Revegetation	11,200	LF	\$6	\$67,200
8	Traffic Control	1	LS	\$146,910	\$146,910
9	Miscellaneous at 5%	1	LS	\$154,260	\$154,260
Construction Subtotal					\$3,239,400
Mobilization 5%					\$162,000
Contingency 20%					\$647,900
Professional Services 15%					\$486,000
Construction Total					\$4,535,300
Easements					
	Easement/Acquisition	1	LS		\$453,600
	Easement/Acquisition Services	1	LS		\$181,500
Easement Subtotal					\$635,100
Project Total					\$5,171,000

City of Round Rock
Year 2015 Capital Improvements Program
Palm Valley Phase I

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" Palm Valley Phase I Pipeline (dirt)	2,400	LF	\$190	\$456,000
2	Fire Hydrants	6	EA	\$13,600	\$81,600
3	24" Gate Valve, Main, & Connections (including installation)	2	EA	\$20,000	\$40,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	3	AC	\$10,000	\$27,550
6	Trench Safety/Silt Fence	2,400	LF	\$3	\$7,200
7	Revegetation	2,400	LF	\$6	\$14,400
8	Traffic Control	1	LS	\$31,340	\$31,340
9	Miscellaneous at 5%	1	LS	\$32,910	\$32,910
Construction Subtotal					\$691,000
Mobilization 5%					\$34,600
Contingency 20%					\$138,200
Professional Services 15%					\$103,700
Construction Total					\$967,500
Easements					
	Easement/Acquisition	1	LS		\$96,800
	Easement/Acquisition Services	1	LS		\$38,700
Easement Subtotal					\$135,500
Project Total					\$1,103,000

City of Round Rock
Year 2015 Capital Improvements Program
WTP High Service Pump Station - Electrical Improvements

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	Demolition	1	LS	\$200,000	\$200,000
2	Pump Motors (200 hp)	4	EA	\$15,000	\$60,000
3	Pump Motors (400 hp)	2	EA	\$30,000	\$60,000
4	Electrical Equipment	1	LS	\$290,000	\$290,000
5	Motor Control Centers	2	EA	\$225,000	\$450,000
6	Temporary Service	1	LS	\$50,000	\$50,000
Construction Subtotal					\$1,110,000
	Mobilization	5%			\$55,500
	Contractor's OH&P	15%			\$166,500
	Contingency	20%			\$222,000
	Professional Services	15%			\$166,500
Construction Total					\$1,720,500
Project Total					\$1,721,000

City of Round Rock
Year 2025 Capital Improvements Program
Arterial H Phase II

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	16" Arterial H Pipeline (rock)	6,700	LF	\$160	\$1,072,000
2	Fire Hydrants	17	EA	\$13,600	\$231,200
3	16" Main Gate Valve (including installation)	6	EA	\$8,100	\$48,600
4	16" Pressure Relief Valve and Vault	1	EA	\$39,000	\$39,000
5	Boring	0	LF	\$600	\$0
6	Site Prep	8	AC	\$10,000	\$76,910
7	Trench Safety/Silt Fence	6,700	LF	\$3	\$20,100
8	Revegetation	6,700	LF	\$6	\$40,200
9	Traffic Control	1	LS	\$76,410	\$76,410
10	Miscellaneous at 5%	1	LS	\$80,230	\$80,230
Construction Subtotal					\$1,684,700
Mobilization 5%					\$84,300
Contingency 20%					\$337,000
Professional Services 15%					\$252,800
Construction Total					\$2,358,800
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$235,900
	Easement/Acquisition Services	1	LS		\$94,400
Easement Subtotal					\$330,300
Project Total					\$2,690,000

City of Round Rock
Year 2025 Capital Improvements Program
Brenda Lane Line

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" Brenda Lane Pipeline (dirt)	5,900	LF	\$110	\$649,000
2	Fire Hydrants	15	EA	\$13,600	\$204,000
3	12" Gate Valve, Main, & Connections (including installation)	5	EA	\$4,800	\$24,000
4	Boring	110	LF	\$510	\$56,100
5	Site Prep	7	AC	\$10,000	\$67,730
6	Trench Safety/Silt Fence	5,900	LF	\$3	\$17,700
7	Revegetation	5,900	LF	\$6	\$35,400
8	Traffic Control	1	LS	\$52,700	\$52,700
9	Miscellaneous at 5%	1	LS	\$55,340	\$55,340
Construction Subtotal					\$1,162,000
Mobilization 5%					\$58,100
Contingency 20%					\$232,400
Professional Services 15%					\$174,300
Construction Total					\$1,626,800
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$162,700
	Easement/Acquisition Services	1	LS		\$65,100
Easement Subtotal					\$227,800
Project Total					\$1,855,000

City of Round Rock
Year 2025 Capital Improvements Program
East Loop Phase II

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	54" East Loop Phase II Pipeline (dirt)	4,600	LF	\$450	\$2,070,000
2	48" East Loop Phase II Pipeline (dirt)	2,800	LF	\$390	\$1,092,000
3	Fire Hydrants	19	EA	\$13,600	\$258,400
4	54" Main Butterfly Valve (including installation)	4	EA	\$33,000	\$132,000
5	48" Main Butterfly Valve (including installation)	3	EA	\$28,800	\$86,400
6	Boring for 54"	0	LF	\$1,400	\$0
7	Site Prep	8	AC	\$10,000	\$84,950
8	Trench Safety/Silt Fence	7,400	LF	\$3	\$22,200
9	Revegetation	7,400	LF	\$6	\$44,400
10	Traffic Control	1	LS	\$189,520	\$189,520
11	Miscellaneous at 5%	1	LS	\$199,000	\$199,000
Construction Subtotal					\$4,178,900
Mobilization 5%					\$209,000
Contingency 20%					\$835,800
Professional Services 15%					\$626,900
Construction Total					\$5,850,600
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$585,100
	Easement/Acquisition Services	1	LS		\$234,100
Easement Subtotal					\$819,200
Project Total					\$6,670,000

City of Round Rock
Year 2025 Capital Improvements Program
East Loop Phase III

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	54" East Loop Phase III Pipeline (dirt)	3,200	LF	\$450	\$1,440,000
2	48" East Loop Phase III Pipeline (dirt)	3,100	LF	\$390	\$1,209,000
3	Fire Hydrants	16	EA	\$13,600	\$217,600
4	54" Main Butterfly Valve (including installation)	3	EA	\$33,000	\$99,000
5	48" Main Butterfly Valve (including installation)	3	EA	\$28,800	\$86,400
6	Boring for 54"	110	LF	\$1,400	\$154,000
7	Site Prep	7	AC	\$10,000	\$72,320
8	Trench Safety/Silt Fence	6,300	LF	\$3	\$18,900
9	Revegetation	6,300	LF	\$6	\$37,800
10	Traffic Control	1	LS	\$166,760	\$166,760
11	Miscellaneous at 5%	1	LS	\$175,090	\$175,090
Construction Subtotal					\$3,676,900
Mobilization 5%					\$183,900
Contingency 20%					\$735,400
Professional Services 15%					\$551,600
Construction Total					\$5,147,800
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$514,800
	Easement/Acquisition Services	1	LS		\$206,000
Easement Subtotal					\$720,800
Project Total					\$5,869,000

City of Round Rock
Year 2025 Capital Improvements Program
Meadow Lake Lines

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" Meadow Lake Lines (dirt)	7,400	LF	\$110	\$814,000
2	Fire Hydrants	19	EA	\$13,600	\$258,400
3	12" Gate Valve, Main, & Connections (including installation)	7	EA	\$4,800	\$33,600
4	Boring	0	LF	\$510	\$0
5	Site Prep	8	AC	\$10,000	\$84,950
6	Trench Safety/Silt Fence	7,400	LF	\$3	\$22,200
7	Revegetation	7,400	LF	\$6	\$44,400
8	Traffic Control	1	LS	\$62,880	\$62,880
9	Miscellaneous at 5%	1	LS	\$66,030	\$66,030
Construction Subtotal					\$1,386,500
Mobilization 5%					\$69,400
Contingency 20%					\$277,300
Professional Services 15%					\$208,000
Construction Total					\$1,941,200
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$194,200
	Easement/Acquisition Services	1	LS		\$77,700
Easement Subtotal					\$271,900
Project Total					\$2,214,000

City of Round Rock
Year 2025 Capital Improvements Program
Old Settlers Elevated Storage Tank

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	Civil and Site Work	1	LS	\$100,000	\$100,000
2	Old Settlers Elevated Storage Tank - 2 MG	1	LS	\$3,200,000	\$3,200,000
3	Yard Piping and Valves	1	LS	\$200,000	\$200,000
Construction Subtotal					\$3,500,000
	Mobilization	5%			\$175,000
	Contractor's OH&P	15%			\$525,000
	Contingency	20%			\$700,000
	Professional Services	15%			\$525,000
Construction Total					\$5,425,000
Project Total					\$5,425,000

City of Round Rock
Year 2025 Capital Improvements Program
Old Settlers Line

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	16" Old Settlers Pipeline (dirt)	1,500	LF	\$140	\$210,000
1	Fire Hydrants	4	EA	\$13,600	\$54,400
2	16" Main Gate Valve (including installation)	2	EA	\$8,100	\$16,200
3	Boring	0	LF	\$600	\$0
4	Site Prep	2	AC	\$10,000	\$17,220
5	Trench Safety/Silt Fence	1,500	LF	\$3	\$4,500
6	Revegetation	1,500	LF	\$6	\$9,000
7	Traffic Control	1	LS	\$15,570	\$15,570
8	Miscellaneous at 5%	1	LS	\$16,350	\$16,350
Construction Subtotal					\$343,300
Mobilization 5%					\$17,200
Contingency 20%					\$68,700
Professional Services 15%					\$51,500
Construction Total					\$480,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$48,100
	Easement/Acquisition Services	1	LS		\$19,300
Easement Subtotal					\$67,400
Project Total					\$549,000

City of Round Rock
Year 2025 Capital Improvements Program
Palm Valley Phase II

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" Palm Valley Pipeline (dirt)	1,800	LF	\$190	\$342,000
2	Fire Hydrants	5	EA	\$13,600	\$68,000
3	24" Gate Valve, Main, & Connections (including installation)	2	EA	\$20,000	\$40,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	2	AC	\$10,000	\$20,670
6	Trench Safety/Silt Fence	1,800	LF	\$3	\$5,400
7	Revegetation	1,800	LF	\$6	\$10,800
8	Traffic Control	1	LS	\$24,350	\$24,350
9	Miscellaneous at 5%	1	LS	\$25,570	\$25,570
Construction Subtotal					\$536,800
Mobilization 5%					\$26,900
Contingency 20%					\$107,400
Professional Services 15%					\$80,600
Construction Total					\$751,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$75,200
	Easement/Acquisition Services	1	LS		\$30,100
Easement Subtotal					\$105,300
Project Total					\$857,000

City of Round Rock
Year 2025 Capital Improvements Program
Round Rock Glen Lines

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" Round Rock Glen Lines (dirt)	8,000	LF	\$110	\$880,000
2	Fire Hydrants	20	EA	\$13,600	\$272,000
3	12" Gate Valve, Main, & Connections (including installation)	7	EA	\$4,800	\$33,600
4	Boring	0	LF	\$510	\$0
5	Site Prep	9	AC	\$10,000	\$91,830
6	Trench Safety/Silt Fence	8,000	LF	\$3	\$24,000
7	Revegetation	8,000	LF	\$6	\$48,000
8	Traffic Control	1	LS	\$67,480	\$67,480
9	Miscellaneous at 5%	1	LS	\$70,850	\$70,850
Construction Subtotal					\$1,487,800
Mobilization 5%					\$74,400
Contingency 20%					\$297,600
Professional Services 15%					\$223,200
Construction Total					\$2,083,000
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$208,300
	Easement/Acquisition Services	1	LS		\$83,400
Easement Subtotal					\$291,700
Project Total					\$2,375,000

City of Round Rock
Year 2025 Capital Improvements Program
Sam Bass I

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	48" Sam Bass I Pipeline (rock)	12,400	LF	\$470	\$5,828,000
2	Fire Hydrants	31	EA	\$13,600	\$421,600
3	48" Main Butterfly Valve (including installation)	11	EA	\$28,800	\$316,800
4	Boring	170	LF	\$1,270	\$215,900
5	Site Prep	14	AC	\$10,000	\$142,340
6	Trench Safety/Silt Fence	12,400	LF	\$3	\$37,200
7	Revegetation	12,400	LF	\$6	\$74,400
8	Traffic Control	1	LS	\$351,820	\$351,820
9	Miscellaneous at 5%	1	LS	\$369,410	\$369,410
Construction Subtotal					\$7,757,500
Mobilization 5%					\$387,900
Contingency 20%					\$1,551,500
Professional Services 15%					\$1,163,700
Construction Total					\$10,860,600
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$1,086,100
	Easement/Acquisition Services	1	LS		\$434,500
Easement Subtotal					\$1,520,600
Project Total					\$12,382,000

City of Round Rock
Year 2025 Capital Improvements Program
Sam Bass II

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	42" Sam Bass II Pipeline (rock)	1,500	LF	\$410	\$615,000
2	Fire Hydrants	4	EA	\$13,600	\$54,400
3	42" Main Butterfly Valve (including installation)	2	EA	\$24,700	\$49,400
4	Boring	0	LF	\$1,140	\$0
5	Site Prep	2	AC	\$10,000	\$17,220
6	Trench Safety/Silt Fence	1,500	LF	\$3	\$4,500
7	Revegetation	1,500	LF	\$6	\$9,000
8	Traffic Control	1	LS	\$37,480	\$37,480
9	Miscellaneous at 5%	1	LS	\$39,350	\$39,350
Construction Subtotal					\$826,400
Mobilization 5%					\$41,400
Contingency 20%					\$165,300
Professional Services 15%					\$124,000
Construction Total					\$1,157,100
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$115,800
	Easement/Acquisition Services	1	LS		\$46,300
Easement Subtotal					\$162,100
Project Total					\$1,320,000

City of Round Rock
Year 2025 Capital Improvements Program
South Creek

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" South Creek Pipeline (dirt)	2,900	LF	\$190	\$551,000
2	Fire Hydrants	8	EA	\$13,600	\$108,800
3	24" Gate Valve, Main, & Connections (including installation)	3	EA	\$20,000	\$60,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	3	AC	\$10,000	\$33,290
6	Trench Safety/Silt Fence	2,900	LF	\$3	\$8,700
7	Revegetation	2,900	LF	\$6	\$17,400
8	Traffic Control	1	LS	\$38,960	\$38,960
9	Miscellaneous at 5%	1	LS	\$40,910	\$40,910
Construction Subtotal					\$859,100
Mobilization 5%					\$43,000
Contingency 20%					\$171,900
Professional Services 15%					\$128,900
Construction Total					\$1,202,900
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$120,300
	Easement/Acquisition Services	1	LS		\$48,200
Easement Subtotal					\$168,500
Project Total					\$1,372,000

City of Round Rock
Year 2025 Capital Improvements Program
South Creek Phase II

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" South Creek Phase II Pipeline (dirt)	4,100	LF	\$190	\$779,000
2	Fire Hydrants	11	EA	\$13,600	\$149,600
3	24" Gate Valve, Main, & Connections (including installation)	4	EA	\$20,000	\$80,000
4	Boring	110	LF	\$760	\$83,600
5	Site Prep	5	AC	\$10,000	\$47,070
6	Trench Safety/Silt Fence	4,100	LF	\$3	\$12,300
7	Revegetation	4,100	LF	\$6	\$24,600
8	Traffic Control	1	LS	\$58,810	\$58,810
9	Miscellaneous at 5%	1	LS	\$61,750	\$61,750
Construction Subtotal					\$1,296,800
Mobilization 5%					\$64,900
Contingency 20%					\$259,400
Professional Services 15%					\$194,600
Construction Total					\$1,815,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$181,600
	Easement/Acquisition Services	1	LS		\$72,700
Easement Subtotal					\$254,300
Project Total					\$2,070,000

City of Round Rock
Year 2025 Capital Improvements Program
Southeast GST Pump Station - Electrical Improvements

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	Demolition and Site Work	1	LS	\$300,000	\$300,000
2	Pump Motors (300 hp)	3	EA	\$20,000	\$60,000
3	Electrical Equipment	1	LS	\$400,000	\$400,000
4	Motor Control Center and Enclosure	1	LS	\$375,000	\$375,000
5	Temporary Service	1	LS	\$50,000	\$50,000
Construction Subtotal					\$1,185,000
	Mobilization	5%			\$59,300
	Contractor's OH&P	15%			\$177,800
	Contingency	20%			\$237,000
	Professional Services	15%			\$177,800
Construction Total					\$1,836,900
Project Total					\$1,837,000

City of Round Rock
Year 2025 Capital Improvements Program
West Loop

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	30" West Loop Pipeline (rock)	23,600	LF	\$280	\$6,608,000
2	Fire Hydrants	59	EA	\$13,600	\$802,400
3	30" Gate Valve, Main, & Connections (including installation)	20	EA	\$32,300	\$646,000
4	Boring	360	LF	\$890	\$320,400
5	Site Prep	27	AC	\$10,000	\$270,900
6	Trench Safety/Silt Fence	23,600	LF	\$3	\$70,800
7	Revegetation	23,600	LF	\$6	\$141,600
8	Traffic Control	1	LS	\$443,010	\$443,010
9	Miscellaneous at 5%	1	LS	\$465,160	\$465,160
Construction Subtotal					\$9,768,300
Mobilization 5%					\$488,500
Contingency 20%					\$1,953,700
Professional Services 15%					\$1,465,300
Construction Total					\$13,675,800
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$1,367,600
	Easement/Acquisition Services	1	LS		\$547,100
Easement Subtotal					\$1,914,700
Project Total					\$15,591,000

City of Round Rock
Year 2040 Capital Improvements Program
Barton Hill Elevated Storage Tank

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	Civil and Site Work	1	LS	\$100,000	\$100,000
2	Barton Hill Elevated Storage Tank - 3 MG	1	LS	\$4,225,000	\$4,225,000
3	Yard Piping and Valves	1	LS	\$200,000	\$200,000
Construction Subtotal					\$4,525,000
	Mobilization	5%			\$226,300
	Contractor's OH&P	15%			\$678,800
	Contingency	20%			\$905,000
	Professional Services	15%			\$678,800
Construction Total					\$7,013,900
Project Total					\$7,014,000

City of Round Rock
Year 2040 Capital Improvements Program
CR 110 Phase I

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	8" CR 110 Phase I Pipeline (dirt)	4,800	LF	\$70	\$336,000
2	Fire Hydrants	12	EA	\$13,600	\$163,200
3	8" Gate Valve, Main, & Connections (including installation)	4	EA	\$2,300	\$9,200
4	Boring	90	LF	\$430	\$38,700
5	Site Prep	6	AC	\$10,000	\$55,100
6	Trench Safety/Silt Fence	4,800	LF	\$3	\$14,400
7	Revegetation	4,800	LF	\$6	\$28,800
8	Traffic Control	1	LS	\$32,270	\$32,270
9	Miscellaneous at 5%	1	LS	\$33,890	\$33,890
Construction Subtotal					\$711,600
Mobilization 5%					\$35,600
Contingency 20%					\$142,400
Professional Services 15%					\$106,800
Construction Total					\$996,400
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$99,700
	Easement/Acquisition Services	1	LS		\$39,900
Easement Subtotal					\$139,600
Project Total					\$1,136,000

City of Round Rock
Year 2040 Capital Improvements Program
CR 112 Phase II

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	24" CR 112 Phase II Pipeline (dirt)	1,000	LF	\$190	\$190,000
2	Fire Hydrants	3	EA	\$13,600	\$40,800
3	24" Gate Valve, Main, & Connections (including installation)	1	EA	\$20,000	\$20,000
4	Boring	0	LF	\$760	\$0
5	Site Prep	1	AC	\$10,000	\$11,480
6	Trench Safety/Silt Fence	1,000	LF	\$3	\$3,000
7	Revegetation	1,000	LF	\$6	\$6,000
8	Traffic Control	1	LS	\$13,570	\$13,570
9	Miscellaneous at 5%	1	LS	\$14,250	\$14,250
Construction Subtotal					\$299,100
Mobilization 5%					\$15,000
Contingency 20%					\$59,900
Professional Services 15%					\$44,900
Construction Total					\$418,900
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$41,900
	Easement/Acquisition Services	1	LS		\$16,800
Easement Subtotal					\$58,700
Project Total					\$478,000

City of Round Rock
Year 2040 Capital Improvements Program
CR 186 Phase I

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" CR 186 Phase I Pipeline (dirt)	5,200	LF	\$110	\$572,000
2	Fire Hydrants	13	EA	\$13,600	\$176,800
3	12" Gate Valve, Main, & Connections (including installation)	5	EA	\$4,800	\$24,000
4	12" Pressure Relief Valve and Vault	1	EA	\$33,000	\$33,000
5	Boring	0	LF	\$510	\$0
6	Site Prep	6	AC	\$10,000	\$59,690
7	Trench Safety/Silt Fence	5,200	LF	\$3	\$15,600
8	Revegetation	5,200	LF	\$6	\$31,200
9	Traffic Control	1	LS	\$45,620	\$45,620
10	Miscellaneous at 5%	1	LS	\$47,900	\$47,900
				Construction Subtotal	\$1,005,900
		Mobilization	5%		\$50,300
		Contingency	20%		\$201,200
		Professional Services	15%		\$150,900
				Construction Total	\$1,408,300
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$140,900
	Easement/Acquisition Services	1	LS		\$56,400
				Easement Subtotal	\$197,300
				Project Total	\$1,606,000

City of Round Rock
Year 2040 Capital Improvements Program
CR 186 Phase II

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" CR 186 Phase II Pipeline (dirt)	3,200	LF	\$110	\$352,000
2	Fire Hydrants	8	EA	\$13,600	\$108,800
3	12" Gate Valve, Main, & Connections (including installation)	3	EA	\$4,800	\$14,400
4	Boring	0	LF	\$510	\$0
5	Site Prep	4	AC	\$10,000	\$36,740
6	Trench Safety/Silt Fence	3,200	LF	\$3	\$9,600
7	Revegetation	3,200	LF	\$6	\$19,200
8	Traffic Control	1	LS	\$27,040	\$27,040
9	Miscellaneous at 5%	1	LS	\$28,390	\$28,390
Construction Subtotal					\$596,200
Mobilization 5%					\$29,900
Contingency 20%					\$119,300
Professional Services 15%					\$89,500
Construction Total					\$834,900
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$83,500
	Easement/Acquisition Services	1	LS		\$33,400
Easement Subtotal					\$116,900
Project Total					\$952,000

City of Round Rock
Year 2040 Capital Improvements Program
Double Creek

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	16" Double Creek Pipeline (dirt)	10,300	LF	\$140	\$1,442,000
2	Fire Hydrants	26	EA	\$13,600	\$353,600
3	16" Gate Valve, Main, & Connections (including installation)	9	EA	\$8,100	\$72,900
4	Boring	300	LF	\$600	\$180,000
5	Site Prep	12	AC	\$10,000	\$118,230
6	Trench Safety/Silt Fence	10,300	LF	\$3	\$30,900
7	Revegetation	10,300	LF	\$6	\$61,800
8	Traffic Control	1	LS	\$112,980	\$112,980
9	Miscellaneous at 5%	1	LS	\$118,630	\$118,630
Construction Subtotal					\$2,491,100
Mobilization 5%					\$124,600
Contingency 20%					\$498,300
Professional Services 15%					\$373,700
Construction Total					\$3,487,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$348,800
	Easement/Acquisition Services	1	LS		\$139,600
Easement Subtotal					\$488,400
Project Total					\$3,977,000

City of Round Rock
Year 2040 Capital Improvements Program
NE 1

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	8" NE 1 Pipeline (dirt)	1,400	LF	\$70	\$98,000
2	Fire Hydrants	4	EA	\$13,600	\$54,400
3	8" Gate Valve, Main, & Connections (including installation)	2	EA	\$2,300	\$4,600
4	Boring	0	LF	\$430	\$0
5	Site Prep	2	AC	\$10,000	\$16,070
6	Trench Safety/Silt Fence	1,400	LF	\$3	\$4,200
7	Revegetation	1,400	LF	\$6	\$8,400
8	Traffic Control	1	LS	\$9,290	\$9,290
9	Miscellaneous at 5%	1	LS	\$9,750	\$9,750
Construction Subtotal					\$204,800
Mobilization 5%					\$10,300
Contingency 20%					\$41,000
Professional Services 15%					\$30,800
Construction Total					\$286,900
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$28,700
	Easement/Acquisition Services	1	LS		\$11,500
Easement Subtotal					\$40,200
Project Total					\$328,000

City of Round Rock
Year 2040 Capital Improvements Program
NE 2

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" NE 2 Pipeline (dirt)	10	LF	\$110	\$1,100
2	8" NE 2 Pipeline (dirt)	3,200	LF	\$70	\$224,000
3	Fire Hydrants	9	EA	\$13,600	\$122,400
4	12" Gate Valve, Main, & Connections (including installation)	1	EA	\$4,800	\$4,800
5	8" Gate Valve, Main, & Connections (including installation)	3	EA	\$2,300	\$6,900
6	8" Pressure Relief Valve and Vault	1	EA	\$27,000	\$27,000
7	Boring	0	LF	\$430	\$0
8	Site Prep	4	AC	\$10,000	\$36,850
9	Trench Safety/Silt Fence	3,210	LF	\$3	\$9,630
10	Revegetation	3,210	LF	\$6	\$19,260
11	Traffic Control	1	LS	\$22,600	\$22,600
12	Miscellaneous at 5%	1	LS	\$23,730	\$23,730
Construction Subtotal					\$498,300
Mobilization 5%					\$25,000
Contingency 20%					\$99,700
Professional Services 15%					\$74,800
Construction Total					\$697,800
Easements					
	Easement/Acquisition	1	LS		\$69,800
	Easement/Acquisition Services	1	LS		\$28,000
Easement Subtotal					\$97,800
Project Total					\$796,000

City of Round Rock
Year 2040 Capital Improvements Program
NE 3

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" NE 3 Pipeline (dirt)	2,300	LF	\$110	\$253,000
2	8" NE 3 Pipeline (dirt)	18,600	LF	\$70	\$1,302,000
3	Fire Hydrants	53	EA	\$13,600	\$720,800
4	12" Gate Valve, Main, & Connections (including installation)	2	EA	\$4,800	\$9,600
5	8" Gate Valve, Main, & Connections (including installation)	16	EA	\$2,300	\$36,800
6	Boring	0	LF	\$510	\$0
7	Site Prep	24	AC	\$10,000	\$239,900
8	Trench Safety/Silt Fence	20,900	LF	\$3	\$62,700
9	Revegetation	20,900	LF	\$6	\$125,400
10	Traffic Control	1	LS	\$137,510	\$137,510
11	Miscellaneous at 5%	1	LS	\$144,390	\$144,390
Construction Subtotal					\$3,032,100
Mobilization 5%					\$151,700
Contingency 20%					\$606,500
Professional Services 15%					\$454,900
Construction Total					\$4,245,200
Easements					
	Easement/Acquisition	1	LS		\$424,600
	Easement/Acquisition Services	1	LS		\$169,900
Easement Subtotal					\$594,500
Project Total					\$4,840,000

City of Round Rock
Year 2040 Capital Improvements Program
NE 4

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	8" NE 4 Pipeline (dirt)	5,500	LF	\$70	\$385,000
2	Fire Hydrants	14	EA	\$13,600	\$190,400
3	8" Gate Valve, Main, & Connections (including installation)	5	EA	\$2,300	\$11,500
4	8" Pressure Relief Valve and Vault	1	EA	\$27,000	\$27,000
5	Boring	0	LF	\$430	\$0
6	Site Prep	6	AC	\$10,000	\$63,140
7	Trench Safety/Silt Fence	5,500	LF	\$3	\$16,500
8	Revegetation	5,500	LF	\$6	\$33,000
9	Traffic Control	1	LS	\$36,330	\$36,330
10	Miscellaneous at 5%	1	LS	\$38,150	\$38,150
Construction Subtotal					\$801,100
Mobilization		5%			\$40,100
Contingency		20%			\$160,300
Professional Services		15%			\$120,200
Construction Total					\$1,121,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$112,200
	Easement/Acquisition Services	1	LS		\$44,900
Easement Subtotal					\$157,100
Project Total					\$1,279,000

City of Round Rock
Year 2040 Capital Improvements Program
North Loop 2

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	36" North Loop 2 Pipeline (dirt)	4,600	LF	\$270	\$1,242,000
2	Fire Hydrants	12	EA	\$13,600	\$163,200
3	36" Main Butterfly Valve (including installation)	4	EA	\$20,800	\$83,200
4	Boring	70	LF	\$1,020	\$71,400
5	Site Prep	5	AC	\$10,000	\$52,810
6	Trench Safety/Silt Fence	4,600	LF	\$3	\$13,800
7	Revegetation	4,600	LF	\$6	\$27,600
8	Traffic Control	1	LS	\$82,710	\$82,710
9	Miscellaneous at 5%	1	LS	\$86,840	\$86,840
Construction Subtotal					\$1,823,600
Mobilization 5%					\$91,200
Contingency 20%					\$364,800
Professional Services 15%					\$273,600
Construction Total					\$2,553,200
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$255,400
	Easement/Acquisition Services	1	LS		\$102,200
Easement Subtotal					\$357,600
Project Total					\$2,911,000

City of Round Rock
Year 2040 Capital Improvements Program
Parcel 185

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" Parcel 185 Pipeline (dirt)	5,600	LF	\$110	\$616,000
2	Fire Hydrants	14	EA	\$13,600	\$190,400
3	12" Gate Valve, Main, & Connections (including installation)	5	EA	\$4,800	\$24,000
4	12" Pressure Relief Valve and Vault	2	EA	\$33,000	\$66,000
5	Boring	160	LF	\$510	\$81,600
6	Site Prep	6	AC	\$10,000	\$64,280
7	Trench Safety/Silt Fence	5,600	LF	\$3	\$16,800
8	Revegetation	5,600	LF	\$6	\$33,600
9	Traffic Control	1	LS	\$54,640	\$54,640
10	Miscellaneous at 5%	1	LS	\$57,370	\$57,370
				Construction Subtotal	\$1,204,700
		Mobilization	5%		\$60,300
		Contingency	20%		\$241,000
		Professional Services	15%		\$180,800
				Construction Total	\$1,686,800
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$168,700
	Easement/Acquisition Services	1	LS		\$67,500
				Easement Subtotal	\$236,200
				Project Total	\$1,923,000

City of Round Rock
Year 2040 Capital Improvements Program
Parcel 2610

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	16" Parcel 2610 Pipeline (rock)	14,300	LF	\$160	\$2,288,000
2	Fire Hydrants	36	EA	\$13,600	\$489,600
3	16" Gate Valve, Main, & Connections (including installation)	12	EA	\$8,100	\$97,200
4	Boring	0	LF	\$600	\$0
5	Site Prep	16	AC	\$10,000	\$164,150
6	Trench Safety/Silt Fence	14,300	LF	\$3	\$42,900
7	Revegetation	14,300	LF	\$6	\$85,800
8	Traffic Control	1	LS	\$158,390	\$158,390
9	Miscellaneous at 5%	1	LS	\$166,310	\$166,310
Construction Subtotal					\$3,492,400
Mobilization 5%					\$174,700
Contingency 20%					\$698,500
Professional Services 15%					\$523,900
Construction Total					\$4,889,500
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$489,000
	Easement/Acquisition Services	1	LS		\$195,600
Easement Subtotal					\$684,600
Project Total					\$5,575,000

City of Round Rock
Year 2040 Capital Improvements Program
Southeast GST Pump Station Expansion

<u>Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1	Site, Civil, and Concrete Work	1	LS	\$160,000	\$160,000
2	Pumping Equipment: Pumps, Motors, Cans	4	EA	\$322,000	\$1,288,000
3	Process/Yard Piping and Valves	1	LS	\$160,000	\$160,000
4	Electrical and I&C Equipment	1	LS	\$550,000	\$550,000
5	Electical Control Building	1	LS	\$120,000	\$120,000
				Construction Subtotal	\$2,278,000
		Mobilization	5%		\$113,900
		Contractor's OH&P	15%		\$341,700
		Contingency	20%		\$455,600
		Professional Services	15%		\$341,700
				Construction Total	\$3,530,900
					Project Total \$3,531,000

City of Round Rock
Year 2040 Capital Improvements Program
University Blvd Phase II

Item No.	Item Description	Quantity	Unit	Unit Cost	Total Cost
1	12" University Blvd Phase II Pipeline (dirt)	5,300	LF	\$110	\$583,000
2	Fire Hydrants	14	EA	\$13,600	\$190,400
3	12" Gate Valve, Main, & Connections (including installation)	5	EA	\$4,800	\$24,000
4	12" Pressure Relief Valve and Vault	12	EA	\$33,000	\$396,000
5	Boring	0	LF	\$510	\$0
6	Site Prep	6	AC	\$10,000	\$60,840
7	Trench Safety/Silt Fence	5,300	LF	\$3	\$15,900
8	Revegetation	5,300	LF	\$6	\$31,800
9	Traffic Control	1	LS	\$65,100	\$65,100
10	Miscellaneous at 5%	1	LS	\$68,360	\$68,360
				Construction Subtotal	\$1,435,400
		Mobilization	5%		\$71,800
		Contingency	20%		\$287,100
		Professional Services	15%		\$215,400
				Construction Total	\$2,009,700
<u>Easements</u>					
	Easement/Acquisition	1	LS		\$201,000
	Easement/Acquisition Services	1	LS		\$80,400
				Easement Subtotal	\$281,400
				Project Total	\$2,292,000

