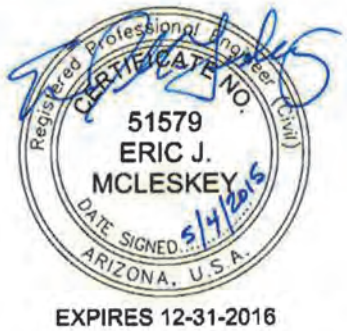
EXPIRES 09-30-2016



EXPIRES 12-31-2016

carollo

CITY OF GOODYEAR
INTEGRATED WATER RESOURCES, WATER, WASTEWATER, AND RECLAIMED WATER MASTER PLAN

TECHNICAL MEMORANDUM NO. 1
FIVE-YEAR CAPITAL IMPROVEMENT PROGRAM

FINAL
May 2015

4600 EAST WASHINGTON ST., SUITE 500 • PHOENIX, ARIZONA 85034 • P. 602.263.9500 • F. 602.265.1422

City of Goodyear
Integrated Water Resources, Water, Wastewater, and Reclaimed Water Master Plan

TECHNICAL MEMORANDUM
NO. 1
FIVE-YEAR CAPITAL IMPROVEMENT PROGRAM

TABLE OF CONTENTS

Page No.

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

A.A.C.	Arizona Administrative Code
AACE	Association for the Advancement of Cost Engineers
AADF	average annual daily flow
AD	average day
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AF	acre-feet
AFY	acre-feet per year
APP	aquifer protection permit
CAGRD	Central Arizona Groundwater Replenishment District
CAP	Central Arizona Project
CIP	Capital Improvement Program
CMOM	Capacity, Management, Operations, and Maintenance
CWA	Clean Water Act
DAWS	Designation of Assured Water Supply
DMOM	Distribution Management, Operations, and Maintenance
DU	dwelling unit
EMR	Estrella Mountain Ranch
fps	feet per second
FY	fiscal year
gal	gallon
GIS	Geographic Information System
gpd	gallon per day
gpm	gallons per minute
GRIC	Gila River Indian Community
IFC	international fire code
LF	linear foot
LTSC	long-term storage credit
M&I	Municipal and Industrial
MCESD	Maricopa County Environmental Services Department
MD	maximum day
MG	million gallon
mgd	million gallons per day
MM	maximum month
PGA	Phoenix Goodyear Airport
PH	peak hour
psi	pound per square inch
RO	reverse osmosis
RV	Rainbow Valley
SAT	soil aquifer treatment
SPC	system pressure criteria
TDS	total dissolved solids
USEPA	United States Environmental Protection Agency
VZIW	vadose zone injection well
WPA	water planning area
WRF	water reclamation facility
WSRV	West Salt River Valley

5-YEAR CIP EXECUTIVE SUMMARY

The 5-year CIP is one of the first tasks of the City's 2015 integrated water resources, water, wastewater, and reclaimed water master plan (2015 Master Plan). The purpose of the 5-year CIP is to provide an assessment of the City of Goodyear's immediate needs for their water, wastewater, and reclaimed water systems. The 5-year plan presented in this document contains recommendations for water resources, supply, treatment, storage and distribution as well as wastewater collection and treatment.

An evaluation of the water distribution system was completed to determine how well the water system is performing to meet the needs of current customers. The evaluation showed that the water system has insufficient water production, pumping, and storage capacity. Significant investment is needed to increase capacity in these areas to reduce the risk of an interruption to water supply, particularly in the summer months with peak demand times. As the master plan progresses, the hydraulic model will be used to further evaluate preferred locations for increased supply, storage, and pumping as well as pipe capacity. The top priority for the water system is to ensure a water supply that:

1. Is adequate for maximum demand days with sufficient redundancy that the water supply is not interrupted by equipment failures. This means that backup water supplies need to be available at all times so that the largest well supply can be taken offline and the City can still supply maximum day water demands.
2. Provides a water quality that meets water quality standards and does not place health and safety at risk. This priority ensures adequate treatment for water wherever the water source does not satisfy standards.

The wastewater collection system was evaluated primarily on asset condition. As a result, infrastructure rehabilitation projects are included in the 5-year CIP.

A condition assessment study has been completed that identified additional water and wastewater capital projects needed to maintain the integrity of Goodyear's water and wastewater infrastructure. The costs of the projects documented in the report, "Water and Wastewater Facilities Condition Assessment, Phase I Summary Report" are included in Appendix C so that a complete set of CIP recommendations is included in this document.

The following prioritized improvements for the water system are recommended for the 5-year Water CIP.

1. Equip Adaman Well 3 and provide associated arsenic treatment to increase water production capacity by 1,300 gpm (estimated) and connect this well to the existing transmission main on Sarival Road.

2. Conduct a groundwater siting study to determine favorable locations for new wells in the north and south planning areas.
3. Install two new wells in the north that could deliver water to Site 12 (if determined feasible in the groundwater study), and associated treatment to increase production capacity by 2,000 gpm. This will also require a new brine line to convey RO concentrate to the collection system.
4. Install 1,800 gpm of booster pumping capacity at Site 12 to provide capacity to meet peak water demands.
5. Provide an additional 1,000-gpm booster pumping capacity at Site 13 to provide required fire flow to meet current fire code in Zone 2.
6. A new 1.2 million gallon (MG) of reservoir capacity for the north service area. The location for this reservoir will be determined in the Master Plan.
7. Replace water mains in Sarival Estates to address leaks and pipe failures.
8. Develop a Distribution System Management, Operations, and Maintenance (DMOM) program to proactively maintain the distribution system.
9. Purchase CAP water for recharge to gain long-term storage credits to provide drought protection.
10. Complete well rehabilitation projects for Wells 19, 18A, and 18B.
11. Replace Well 1 and re-drill Well 3.
12. Complete a study to evaluate corrosion in pump station cans.
13. Address corrosion on the Bullard RO Campus filter assembly and SST piping.

The estimated project cost for these projects plus the condition assessment projects is $38,959,303. Appendix C contains a breakdown of costs by project and by year.

The following improvements for the wastewater system are recommended for the 5-year Wastewater CIP:

1. Complete improvements that have been identified for the Goodyear WRF.
2. Complete improvements that have been identified for the Rainbow Valley WRF.
3. Complete improvements that have been identified for the Corgett WRF.
4. Complete projects to rehabilitate manholes that are degrading from corrosion.
5. Complete projects to rehabilitate force mains and discharge manholes that are degrading from corrosion.
6. Complete upgrades to Lift Stations 2, 3, 5, 6, 7, 8, 10, and 12.
7. Complete two sewer main upsize projects to eliminate backups and excessive maintenance.

8. Replace the Wells Fargo lift station force main so it connects at a location where it will not overflow the manhole if both pumps are running simultaneously
9. Add a new screen for the Perryville grinder station to reduce clogging and keep undesirable materials out of the 157th Avenue WRF.
10. Develop a Capacity, Management, Operations and Maintenance (CMOM) program to proactively maintain the collection system as part of a new asset management program.

The estimated cost of these projects plus the condition assessment projects is $12,479,100. Appendix C contains a breakdown of costs by project and by year.

These recommended projects will address the requirements of the water and wastewater systems over the next 5 years for current customers. In addition to the projects identified in this study, the City may have additional projects that should be included in the CIP.

FIVE-YEAR CAPITAL IMPROVEMENT PROJECTS

1.0 INTRODUCTION

The City currently has a water and wastewater rate study on hold pending the outcome of this 5-year Capital Improvement Program study (5-year CIP). This expedited 5-year CIP is one of the first tasks to be completed as a part of the City's 2015 integrated water resources, water, wastewater, and reclaimed water master plan (2015 Master Plan). The results of this study will be presented to the City's Leadership Team and the Water Planning Committee. Ultimately this information will be presented to the City Council whereby those outcomes will be used to help set the utility rates, although there is a possibility that changes in water demand or wastewater flow estimates or growth projections could occur as a more rigorous evaluation of the City's water systems takes place through the comprehensive analyses for the 2015 Master Plan. In addition to this 5-year CIP, a condition assessment on existing assets has been completed to identify infrastructure that needs to be replaced or renewed in the next five years. The 5-year CIP that is presented in this document includes the infrastructure rehabilitation projects from that study. This study does not include hydraulic modeling analyses to evaluate pipe capacity. This task will be completed in the master plan.

This document is organized as follows:

- The planning framework identifies the water demands and wastewater flows upon which this study is based.
- The water system evaluation begins with the performance criteria that define the standard of measurement against which the infrastructure is evaluated. Risk prioritization criteria is presented, and results of the evaluations given.
- The wastewater system evaluation begins with the performance criteria, and then a method for evaluating risk is provided, followed by the infrastructure evaluation.
- A project costing methodology is presented to show the basis for the planning level costs that are in this document.

2.0 PLANNING FRAMEWORK

The study area for the 5-year CIP includes the City's Water Planning Areas (WPA) 1 through 3 as shown in Figure 1.1. The planning framework for the 5-year CIP includes information provided by the City describing the existing and currently planned water, wastewater and reclaimed water systems. This information includes GIS data, discussions with City operations staff, and data gathered during field visits to the City's water and wastewater sites.

Print Date: January 27, 2015
File Path: M:\Client\Goodyear\9728A00\GIS\mxd\Deliverables\TM1\Fig 01_01 Study Area.mxd

PERRYVILLE RD
CITRUS RD
COTTON LN
SARIVAL RD
REEMS RD
BULLARD AVE
LITCHFIELD RD
DYSART

CAMELBACK RD
INDIAN SCHOOL RD
THOMAS RD
MCDOWELL RD
VAN BUREN ST
YUMA RD
LOWER BUCKEYE RD
BROADWAY RD
SOUTHERN AVE
MC 85

PECOS RD
PATTERSON RD

PA

Liberty
EPCOR
WPA2
WPA3
WPA4
WPA5

WEST SALT RIVER VALLEY
MARICOPA-STANFIELD
RAINBOW VALLEY
GILA BEND

Legend

- Approx City Limit
- Groundwater Sub-basin

Water Planning Area

- EPCOR
- WPA2
- WPA3
- WPA4
- WPA5
- Liberty Utilities Service Area

N

0 2 4
Miles

STUDY AREA

Figure 1.1

CITY OF GOODYEAR

INTEGRATED WATER RESOURCES, WATER, WASTEWATER, AND RECLAIMED WATER MASTER PLAN

carollo

The City also provided documents that guided this analysis including:

- Land Use Assumptions, Infrastructure Improvements Plan, and Development Fees Study completed May 12, 2014
- The City of Goodyear FY 2015 – 24 Capital Improvement Program
- The City of Goodyear Modification of Designation of Assured Water Supply Application (November 2014)
- 2007 Integrated Water Master Plan, Black & Veatch
- The City of Goodyear 2014 General Plan

The information provided by the City was used as the basis for the 5-year CIP growth projection assumptions and the corresponding water demand, wastewater flow and reclaimed water flow projections.

2.1 Water Demand Projections

According to the City's water production records, the average annual water demand was 8.0 mgd in 2013 and 2014. The City requested that a 4.4 percent growth rate be used to project water demands from year 2014 through year 2020 as shown in Table 1.1. Water demands are projected to increase by 2.4 mgd (from 8.0 mgd to 10.4 mgd) by year 2020. The projection in Table 1.1 shows 0.4 mgd of increased water demand between 2013 and year 2015 and approximately 2 mgd in increased water demand between year 2015 and year 2020.

Table 1.1 Water Demand Projections
5-Year CIP and Southern Solutions Plan
City of Goodyear

Year	Estimated Demand[(1)] (AFY)	Estimated Average Day Demand (mgd)	Estimated Population[(2)]
2013	8,960	8.0	42,456
2014	8,960	8.0	47,475
2015	9,354	8.4	49,619
2016	9,766	8.7	52,054
2017	10,196	9.1	54,767
2018	10,644	9.5	57,679
2019	11,112	9.9	61,059
2020	11,601	10.4	64,440

Notes:
(1) Year 2013 and 2014 demand values from the City's water production records. Years 2015 – 2020 assume a 4.4% annual increase in demands.
(2) From the City's 2014 DAWS Application

The water demand and growth projections used in the 5-year CIP may be refined in the detailed 2015 Master Plan. In tables throughout this technical memorandum, infrastructure requirements to meet the year 2015 and 2020 demand projection are shown to provide a perspective on the infrastructure that may be needed in five years. **However, the CIP project list provided in this document is based only on the year 2015 demand projection.**

2.2 Wastewater Flow Projections

The City's water production records show that the 2013 average daily water demand was 8.0 mgd. The City's wastewater flow records show that the combined 2013 average annual daily flow (AADF) to the City's three water reclamation facilities (WRF) was 3.95 mgd. Therefore, 50 percent of the water produced in the City is returned as wastewater flow to the three WRFs. Approximately 0.64 mgd of the City's 2013 AADF was conveyed to the Corgett Water Reclamation Facility (WRF) or Rainbow Valley WRF and 3.31 mgd was conveyed to the Goodyear WRF. The AADF to the Corgett and Rainbow Valley WRFs between 2010 and 2013 has ranged from 0.63 to 0.66 mgd with a four-year average of 0.65 mgd. For the 5-year CIP it was assumed that the flow to the Corgett and Rainbow Valley WRFs would remain approximately 0.65 mgd through year 2020.

Table 1.2 shows the estimated wastewater flows projected for each year from 2013 through 2020 assuming a 50 percent water to wastewater ratio and a 0.65 mgd flow to the Corgett and Rainbow Valley WRFs. Wastewater flows are expected to increase overall by 2.3 mgd (from 3.95 mgd to 6.3 mgd) by year 2020. The projection in Table 1.2 shows approximately 0.9 mgd of additional wastewater flow by year 2015 and 1.4 mgd of additional wastewater flow between year 2015 and year 2020.

2.3 Reclaimed Water Flow Projections

To calculate the amount of reclaimed water available to the City it was assumed that 85 percent of the wastewater flow to the Goodyear WRF becomes reclaimed water the City can use for recharge or reuse. The reclaimed water generated at the Corgett WRF is committed to development lakes and the reclaimed water generated at the Rainbow Valley WRF is committed to golf course irrigation. Therefore, no reclaimed water from the Corgett or Rainbow Valley WRFs was assumed to be available to the City for recharge in the 5-year CIP.

Table 1.2 Wastewater Flow Projections
5-Year CIP and Southern Solutions Plan
City of Goodyear

Year	Total Estimated Flow[1] (AFY)	Total Estimated Flow[1] (mgd)	Flow to 157th Ave WRF (mgd)	Flow to Corgett/Rainbow Valley WRFs[2] (mgd)	Estimated Population[3]
2013	4,480	4.0	3.4	0.65	42,456
2014	4,480	4.0	3.4	0.65	47,475
2015	4,677	4.2	3.5	0.65	49,619
2016	4,883	4.4	3.7	0.65	52,054
2017	5,098	4.6	3.9	0.65	54,767
2018	5,322	4.8	4.1	0.65	57,679
2019	5,556	5.0	4.3	0.65	61,059
2020	5,801	5.2	4.5	0.65	64,440

Notes:

(1) Year 2013 flows from the City's wastewater flow records. Year 2014 flows are assumed to be the same as Year 2013. Years 2015 – 2020 assume a 4.4% annual increase in demands.
(2) Flow records from 2010 through 2013 show approximately 0.65 mgd total combined flow between the Corgett and Rainbow Valley WRFs. Flows were assumed to remain constant through year 2020 for the purposes of the 5-year CIP document only and will be revisited in the 2015 Master Plan.
(3) From the City's 2014 DAWS Application

Table 1.3 shows the projected reclaimed water available to the City for recharge between 2013 and 2020 assuming only the wastewater produced at the Goodyear WRF is available to the City for recharge or reuse.

Table 1.3 Reclaimed Water Projections
5-Year CIP and Southern Solutions Plan
City of Goodyear

Year	Estimated Flow (AFY)[1]	Estimated Flow (mgd)[1]	Estimated Population[2]
2013	3,189	2.8	42,456
2014	3,189	2.8	47,475
2015	3,357	3.0	49,619
2016	3,532	3.2	52,054
2017	3,714	3.3	54,767
2018	3,905	3.5	57,679
2019	4,104	3.7	61,059
2020	4,312	3.8	64,440

Notes:

(1) Assumes 85% of the wastewater to the Goodyear WRF is available as reclaimed water
(2) From the City's 2014 DAWS Application.

3.0 WATER SYSTEM

3.1 Performance Criteria

Performance criteria are used to define the level of acceptable performance of a water or wastewater system. Performance criteria are based on legal requirements and engineering best practices. The criteria in this document have been reviewed with City staff and ultimately need to represent the level of service that a community is willing to pay for water service. Some adjustments have been made to the performance criteria since the last master plan update was completed.

According to the Arizona Administrative Code (A.A.C.), public water systems shall be designed using good engineering practice (R-18-5-502). The water system performance criteria summarized in Table 1.4, includes standards from the A.A.C., Engineering Bulletin No. 10 (issued by the Arizona Department of Health Services, May 1978), water industry best practices, and performance criteria established in the City's 2007 Integrated Master Plan. These "standards of measurement" are considered good engineering practice and provide the City acceptable levels of water system performance and reliability.

Water system peaking factors are an important part of the City's performance criteria. Peaking factors are used to plan the infrastructure required to satisfy high demand conditions such as the maximum day (MD) or peak hour (PH) demand. The maximum day demand typically occurs during June or July when outdoor water use for irrigation is highest. The demand during the maximum day is generally between 1.5 and 1.8 times higher than the average day (AD) demand.

Water demands vary throughout the day. The peak hour demand represents the highest hourly demand during the maximum day. Peak hour demands are generally between 1.7 and 2.0 times higher than the maximum day demand.

Both maximum day and peak hour demands are generally determined through an analysis of water production data collected through a SCADA system. SCADA is needed to correlate hourly production data from wells, flows through booster pump stations and the changes in tank levels in order to calculate actual system demands. Because the City of Goodyear does not have a completed SCADA system it was not possible to calculate the actual maximum day or peak hour demands and the corresponding peaking factors. Therefore, the peaking factors from the 2007 Integrated Master Plan were used for the 5-year CIP. It is recommended that the City complete the installation of the install a SCADA system so that actual peaking factors can be measured. Doing this will provide the City with a better understanding of water system operations and may allow the City to refine the system performance requirements for water production, booster pumping and storage.

The City's water distribution system infrastructure recommended in the 5-year CIP is based on the performance criteria that are summarized in Table 1.4.

Table 1.4 Water System Performance Criteria 5-Year CIP and Southern Solutions Plan City of Goodyear	
Description	**Criteria**
DEMAND AND PRODUCTION CRITERIA	
Peaking Factors[1]	
Maximum Day/Average Day (MD/AD)	1.7
Maximum Month/Average Day (MM/AD)	1.36
Peak Hour/Maximum Day (PH/MD)	1.7
Peak Hour/Average Day (PH/AD)	2.89
Production[2]	Supply Maximum Day Demand
STORAGE CRITERIA[3]	
	Equal to the average daily demand during the peak month of the year (maximum month demand)
TRANSMISSION/DISTRIBUTION	
Velocity Criteria	
Maximum Day	
Pipe <36"	<5 feet per second (fps)
Pipe ≥36"	<6 fps
Peak Hour	≤7 fps
Fire Flow Condition	<10 fps, <20 psi
System Pressure Criteria (SPC)	40 psi ≤ SPC ≤ 80 psi
Size Criteria (Minimum Diameter, inches)	
Section Lines/Major Arterial	16
Minor Arterials	12
All Other Lines	8
BOOSTER PUMP STATION CRITERIA	
Without Elevated Storage[4]	The larger of 120% of Peak Hour Demand or Maximum Day plus Fire Flow of 3,500 gpm.
Firm Capacity[5]	Capacity with the largest pump out of service

Table 1.4 Water System Performance Criteria 5-Year CIP and Southern Solutions Plan City of Goodyear	
Description	**Criteria**
FIRE DEMAND CRITERIA	
Master Planning Fire Flow Requirements(3)	Residential = 1,500 gpm for 3 hrs Commercial/Industrial/Schools = 3,500 gpm for 4 hrs

Notes:

(1) Peaking factors are estimates taken from the 2007 Integrated Master Plan. These peaking factors are typical of similarly sized communities in Arizona. Without a SCADA system, it is difficult to precisely measure peaking factors.
(2) Per industry best practices, production requirements should be met with largest well out of service (Mays, Larry W. *Water Distribution Systems Handbook.* McGraw Hill, 2000, pp 3.7. For Goodyear, the largest well (Well 22) is required to use Well 20 (blending); therefore, firm capacity results in the two largest wells out of service.
(3) Arizona Administrative Code: A.A.C. R18-5-503A.
(4) 2007 Integrated Master Plan criteria & industry best practice.
(5) Engineering Bulletin No. 10, Chapter 3, Section C(1).
(6) Master Planning Fire Flow Requirements are general and applied for system planning purposes. The 2006 IFC allows reductions in fire flow requirements for structures with approved automatic sprinkler systems and installation practices, which can be granted at the discretion of the City Fire Marshall.

The City's water production criteria requires that the maximum day demands are supplied with the firm well capacity, defined as the production capacity with the largest well out of service. For Goodyear, the largest production well (Well 22) is required for use with Well 20 for blending at the Bullard Water Campus. Therefore, firm capacity for Goodyear results in the two largest wells out of service.

3.2 Risk Prioritization Criteria

Water utility systems are very capital intensive, and utilities typically have more capital projects that are needed or desired than there are funds to complete the projects. Therefore, capital projects need to be prioritized so that the most important projects are completed with the available funding sources.

The protection of public health, safety, and welfare of a water utility must be the highest priorities of a water utility in satisfying the needs of a community for water services. When funds are not available to accomplish all that a utility desires, capital improvements must be prioritized in a way that minimizes the risk that public health and safety would be compromised. The performance criteria described above identifies the level of service that customers typically expect of municipal water systems.

The priorities for new or rehabilitated water infrastructure investment are:

1. If water resources are not available for current and committed customers, then obtaining the right to a sustainable water supply is a top priority.
2. Ensure a water supply that:
    a. Is adequate for maximum demand days with sufficient redundancy that the water supply is not interrupted by equipment failures. This means that backup water supplies need to be available at all times so that the largest well supply can be taken offline and the City can still supply maximum day water demands.
    b. Provide a water quality that meets water quality standards and does not place health and safety at risk. This priority ensures adequate treatment for water wherever the water source does not satisfy standards.
3. Provide infrastructure that ensures safety and reliability for emergency events such as a fire. Infrastructure for this priority typically includes storage, pumping, and transmission in the right location, and having the right capacity.
4. Provide water supplies at a pressure that meets the City's pressure criteria so that customers experience sufficient indoor water pressures and irrigation systems operate at optimal design pressures.
5. Provide infrastructure and water resources that enable growth and development. This infrastructure and water resources goes beyond what is needed to protect existing customers and provides the means to serve new customers.

The water resource recommendations in this report correspond to priority 1. The water infrastructure improvements correspond to priorities 2 and 3. The wastewater infrastructure improvements correspond with priority 3.

3.3 Water System Capital Project Needs

3.3.1 Groundwater Resources

Currently, all of the City's physical water supplies are from groundwater. Arizona groundwater rules require sustainable pumping and/or groundwater replenishment, which can be accomplished through defined pumping allowances, annual storage and recovery of CAP or reclaimed water, use of long-term storage credits (LTSCs) or the purchase of replenishment water through the Central Arizona Groundwater Replenishment District (CAGRD). Table 1.5 summarizes the groundwater replenishment components of the City's water resources portfolio and the estimated water demands for year 2015 and year 2020. Based on this table, the City has sufficient mechanisms in place to replenish the groundwater that would need to be pumped to meet demands in each year.

Table 1.5 Water Resources Demand and Replenishment Summary
5-Year CIP and Southern Solutions Plan
City of Goodyear

Component	Year 2015 AFY	Year 2020 AFY
Water Demand	9,354	11,601
Replenishment		
Phase-in Allowance(1)	866	866
Incidental Recharge(2)	479	594
Reclaimed Water Recharge(3)	3,252	4,182
CAP Recharge for Replenishment(4)	4,757	5,959
CAP Recharge for LTSC(5)	0	0
LTSC(6)	0	0
CAGRD(7)	0	0
Total Replenishment	9,354	11,601
Surplus / (Deficit)	0	0

Notes:
(1) From 2014 Designation of Assured Water Supply (DAWS) Application.
(2) 5.12% of annual water demand.
(3) Only includes Goodyear WRF reclaimed water and assumes all reclaimed water is recharged.
(4) The City has 106,765 AF of annual storage capacity between 5 recharge facilities: Agua Fria Managed, Agua Fria Constructed, Hieroglyphic Mountain, Tonopah, and Superstition.
(5) The City has the opportunity to purchase CAP water beyond what is needed for replenishment to bank long-term storage credits (LTSC). The City's current total CAP allocation is 17,742 AF per year, meaning up to 12,985 AF could be purchased in year 2015 (17,742 AF – 4,757 AF) and up to 11,783 AF could be purchased in year 2020 (17,742 AF – 5,959 AF).
(6) LTSC = Long Term Storage Credits
(7) CAGRD = Central Arizona Groundwater Replenishment District

Table 1.5 assumes that the City would select CAP recharge to make up the required replenishment obligation prior to utilizing LTSCs or purchasing CAGRD water. The City's current total CAP water right includes 17,742 AFY with a Municipal and Industrial (M&I) component of 10,742 AFY and a lease with the Gila River Indian Community (GRIC) of 7,000 AFY. Currently, ADWR does not recognize this full CAP water resource amount in the City's 100-year Designation of Assured Water Supply (DAWS) as physically, continuously, and legally available because the City does not have the ability to directly deliver CAP water to Goodyear's customers. However, the City has over 100,000 acre-feet (AF) of annual storage capacity between 5 recharge facilities and is well positioned to recharge the CAP water required to meet its replenishment obligations in the near term including over the next 5 years. The costs associated with CAP recharge needed to meet the City's groundwater replenishment obligations is included in the City's water resources operations and maintenance budget and is therefore not included in the 5-year CIP.

The City has the opportunity in the next 10 to 15 years to purchase CAP water to recharge and bank as LTSCs for drought protection. The City's growth model shows steady growth and increases in water demands through year 2028. As demands increase and CAP water is delivered directly to customers, the City's opportunity to bank LTSCs reduces. CAP water purchases to bank LTSCs are not included in the 5-year CIP. However, the 2015 Master Plan will provide a complete analysis of the City's water resources will include recommendations for drought protection, which may include maximizing CAP recharge for LTSCs.

LTSCs are an important part of the City's water resources portfolio for long-term drought protection and for emergencies. Because of this, LTSCs were considered a lower priority for use in annual water supply replenishment obligations than CAP recharge in years when CAP water is available to the City.

CAGRD water is more expensive than CAP water and was therefore assumed to be a less desirable choice for groundwater replenishment in years when CAP water is available to the City. The City's current contract with CAGRD allows up to 10,000 acre-feet per year (AFY) of replenishment water to be purchased.

The City currently has groundwater supplies within their service area, from City wells, and outside their service area, from the Adaman Mutual Water Company (Adaman) and Liberty Utilities. The City wells are within the West Salt River Valley (WSRV) groundwater sub-basin and the annual recovery limit for these wells or other new City wells in the WSRV groundwater sub-basin is 8,724 AFY (7.8 mgd). The groundwater supplies outside the City's service area from Adaman are 4,467 AFY (4.0 mgd). The groundwater supplies from Liberty Utilities are a very small portion of the City's annual water demand (74 AFY) and are considered an emergency supply only in this analysis. Therefore, the total allowable recovery from City wells in the WSRV groundwater sub-basin and the Adaman wells is 13,191 AFY (11.8 mgd).

Table 1.6 summarizes the annual allowable groundwater recovery amounts for City well production in the WSRV groundwater sub-basin and the Adaman supplies compared to the estimated average annual demands for year 2015 and year 2020. For planning purposes, it was assumed that the demand distribution within the City's water system is 70 percent allocated to the north zones (north of the Gila River) and 30 percent allocated to the south zones (south of the Gila River).

Table 1.6 Annual Groundwater Recovery Limits and Projected Demand 5-Year CIP and Southern Solutions Plan City of Goodyear		
Component	**Year 2015 AFY**	**Year 2020 AFY**
City Well Recovery Limit(1)(2)	8,724	8,724
Adaman Mutual Water Company(2)	4,467	4,467
Total Allowable Recovery	**13,191**	**13,191**
Average Demand North(3)	6,548	8,121
Average Demand South(3)	2,806	3,480
Total Demand	**9,354**	**11,601**
Surplus / (Deficit)	3,837	1,590
Surplus / (Deficit) (mgd)	3.4	1.4

Notes:
(1) For well production in the West Salt River Valley (WSRV) groundwater sub-basin.
(2) From the City's 2014 Designation of Assured Water Supply (DAWS) Application.
(3) Assumed 70% of the total demand is allocated to the water system north of the Gila River and 30% of the total demand is allocated to the water system south of the Gila River.

Table 1.6 assumes that the full 4.0 mgd of capacity from Adaman is available. Currently the total production rate of the two Adaman wells that supply the Goodyear system is 1,840 gpm (2.6 mgd). **An additional 940 gpm (1.4 mgd) Adaman well is needed to provide Goodyear with the full 4.0 mgd water supply from Adaman.**

Table 1.6 shows the City has sufficient physical, continuous and legally available water supplies between the WSRV recovery limits (City wells) and the Adaman supplies for year 2015 through 2020. As demands increase beyond year 2020, and the City's total allowable recovery limit in the WSRV groundwater sub-basin is reached, the City will need to secure additional supplies from outside of this area.

Two options that would allow the City to do this include:

1. Develop new well supplies south of the Gila River in the Rainbow Valley (RV) groundwater sub-basin. It is estimated that there is 9,349 AFY of physical groundwater supply available to the City in the RV groundwater sub-basin (outside of the developments that have been independently designated by ADWR). The 9,349 AFY figure is pending approval by ADWR (Designation of Assured Water Supply renewal) as of the publishing of this document.
2. Treat and deliver CAP surface water. This would require an expansion of the White Tanks water treatment plant and a dedicated transmission main from the plant to Goodyear's water distribution system.

3.3.2 Surface Water Resources

The City needs to directly use its CAP water allotment in order to claim full credit for this water resource. Therefore, the City is planning to construct the infrastructure needed to fully utilize its CAP water right. This could ultimately consist of obtaining water from the White Tanks WTP and constructing a dedicated transmission main to deliver surface water into the Goodyear distribution system. Surface water delivery would need to consider the following:

1. A water treatment and delivery agreement would need to be negotiated between EPCOR and the City to establish favorable terms of the water treatment and delivery.
2. A corridor study would need to be completed to validate master planning pipeline alignment assumptions and to determine the technical feasibility of construction, crossing freeways, obtaining easements, etc.
3. Water quality strategies need to be established to correctly consider flow direction, pH levels, and blending with wells to reduce the change in water taste and odor.
4. The infrastructure needed to move surface water into the distribution system needs to be located and correctly sized.

The City has already allocated funds in the Infrastructure Improvement Plan (IIP) for a 36-inch transmission main and water treatment.

Given the additional analysis needed to prepare a complete plan to introduce CAP water into the distribution system, a complete set of CIP projects are not yet defined for CAP water use. Further planning will be completed in the master plan to complete the CAP water strategy. This 5-year CIP plan recognizes the need to construct infrastructure so that Goodyear can take CAP water, but the analysis needed to prepare a complete plan for how CAP water will be delivered needs to take place during the master plan.

3.3.3 Water Supply

Table 1.7 shows the City's well water supply in comparison with the year 2015 and year 2020 maximum daily water demands. This table shows a current firm supply of 8.6 mgd, which assumes Well 20 and Well 22 would both be out of service because the largest system well (Well 22) is treated at the Bullard RO facility and blended with water from Well 20 prior to distribution. If Well 22 is taken out of service, Well 20 cannot be used on its own because of water quality issues and if redirected to the RO Plant, pump capacity is reduced due to internal pressure created by the RO system. Table 1.7 shows a 5.7 mgd shortage in water supply capability at year 2015 and a 9.1 mgd shortage in water supply capability at year 2020.

Table 1.7 Water Supply and Demand, Alternative 1 5-Year CIP and Southern Solutions Plan City of Goodyear		
Well Production[1]	**Year 2015 (gpm)**	**Year 2020 (gpm)**
Well 1	500	500
Well 3	425	425
Well 6	455	455
Well 11	458	458
Well 12[2]	600	600
Well 18A	807	807
Well 18B[3]	325	325
Well 19[2]	540	540
Well 20	1,600	1,600
Well 22[2]	1,680	1,680
Adaman Well 1	1,340	1,340
Adaman Well 2	500	500
Total Supply	9,230	9,230
Firm Supply[4]	**5,950**	**5,950**
Firm Supply (mgd)[4]	**8.6**	**8.6**
Maximum Day Demand[5]	**14.3**	**17.7**
Surplus / (Deficit) (mgd)[6]	**(5.7)**	**(9.1)**

Notes:
(1) From 2014 Designation of Assured Water Supply (DAWS) Application.
(2) Pumping rates have been reduced by 17% to account for brine loss.
(3) Production capacity is slowly decreasing at this well site.
(4) Defined as capacity with largest well (Well 22) out of service. Well 20 would also be out of service in "Firm" capacity analysis because it requires blending with Well 22 prior to distribution.
(5) Average Day Demand x 1.7 (Year 2015: 8.4 mgd x 1.7 = 14.3 mgd, Year 2020: 10.4 mgd x 1.7 = 17.7 mgd)
(6) Maximum Day Demand compared to Firm Supply.

Providing additional water supplies is an essential part of the City's near term strategy for delivering water to customers. New well supplies may be developed at Site 12, Site 11 (the Bullard Water Campus) or in the South. Site 12 is currently supplied by one well but has sufficient storage and the capability of expanding booster pumping capacity to accommodate additional production wells. The Bullard Water Campus is an important component of the City's water distribution system. It provides 3.5 mgd of RO treatment capacity by treating water from Wells 19 and 22. Wells 1, 11 and 20 are blended at the Bullard Water Campus prior to distribution. As the City sites new or replacement wells, opportunities to select locations that would supply the Bullard Water Campus must be considered and the size of the well(s) must be sized to provide blending redundancy.

There are currently no wells in the southern service area but the City has conducted groundwater evaluations that indicate 9,349 AFY (8.3 mgd) of groundwater production is feasible in the RV groundwater sub-basin areas that are within the City and that do not belong to developments that have already established groundwater production limits with ADWR. Future study is required to site wells and corresponding treatment facilities in favorable locations. The City should partner with developers where practical to construct wells and deliver water into the distribution system, especially where water may need to be transported some distance from the well site to Site 23.

Table 1.8 shows the distribution of the projected demands between the north and south service areas. There is a projected 3.9 mgd maximum day demand deficit shown in year 2015, with 4.3 mgd estimated south of the Gila River. The 5.9 mgd deficit could be reduced by adding new well capacity in the RV groundwater sub-basin, up to the maximum demand south of the Gila River.

Table 1.8 Water Supply and Demand by Service Area
5-Year CIP and Southern Solutions Plan
City of Goodyear

	Year 2015 (mgd)	Year 2020 (mgd)
Maximum Day Demand[(1)]		
North of Gila River (70%)	10.0	12.4
South of Gila River (30%)	4.3	5.3
Total	**14.3**	**17.7**
Firm Supply[(2)]	**8.6**	**8.6**
Surplus / (Deficit)[(3)]	**(5.7)**	**(9.1)**

Notes:
(1) Average Day Demand x 1.7
(2) Defined as capacity with largest well (Well 22) out of service.
(3) Maximum Day Demand compared to Firm Supply.

Similarly, there is a projected 9.1 mgd maximum day demand deficit shown in year 2020. If this was partially addressed by adding new well capacity in the RV groundwater sub-basin and delivered to the area south of the Gila River, 5.3 mgd of additional supplies would make up the portion of demand expected to be south of the Gila River. The remaining 2.0 mgd of deficit would need to be made up with new supplies north of the Gila River.

While supplies from the north can be sent to the southern system, there are currently no mechanisms to move water in the opposite direction (from the south to the north). Therefore, if the City elects to develop groundwater supplies in the RV groundwater sub-basin, the practical maximum additional supply capacity recommended for year 2015 is 5.7 mgd.

The following water supply recommendations can be used to address the 5.7 mgd (3,958 gpm) production deficit for year 2015:

1. Add one additional 1,300 gpm (1.9 mgd) Adaman well. This well is also needed to allow the City to receive the full 4.0 mgd (4,467 AF/year) annual capacity in its water delivery agreement with the Adaman Mutual Water Company. This well will need arsenic treatment, but is assumed to not need RO treatment, which produces a brine stream.

2. Add net potable well capacity of 2,000 gpm (2.9 mgd) to Site 12 or Site 11. It was assumed that new wells in the northern service area would not have a production capacity larger than 1,200 gpm per well, therefore the additional capacity provided by two 1,200-gpm wells that require RO treatment, would result in a net potable production capacity of 1,000 gpm per well. The City will need to conduct a well siting study to identify favorable locations for new wells. The following is recommended:
    a. If it is determined through the well siting study that adding production capacity at Site 12 is feasible, add an additional well or wells at Site 12. Expanding production at Site 12 will give the City additional flexibility in meeting demands. The Site 12 reservoir has capacity for 2,000 gpm of production capacity (although additional booster pumping capacity would be needed to correlate with the increased production capacity). Site 12 currently has 1.0 mgd of RO treatment capacity. If the El Cidro well or other wells are added to Site 12, additional RO treatment capacity will likely be required. The amount of treatment capacity required will depend on the total additional well capacity and water quality. For the purposes of the 5-year CIP, it was assumed that 70 percent of the new well supply would need RO treatment and the remaining 30 percent could be blended.
    b. If it is determined through the well siting study that adding production capacity at Site 12 is not feasible, add an additional well or wells that deliver water to Site 11 for treatment or blending. Additional booster pumping capacity would be needed at Site 11 to correlate with the increased production capacity. Depending on the water quality of the new well, the RO treatment capacity at Site 11 may need to be expanded.
    c. Additional brine delivered to the Goodyear WRF from water treatment at any of these sites is likely to create challenges with the wastewater treatment process and salinity levels in the reclaimed water.

3. If the well siting study conducted in the north service area does not allow 2,000 gpm of net potable production capacity, it is recommended that the City add up to 2,000 gpm (2.9 mgd) of net potable well production capacity in the RV groundwater sub-basin to serve the areas in the south. Table 1.8 shows that the estimated 2015 demands in the south are 4.3 mgd. Water production in the south would provide benefits to the north service area by reducing the need to send supplies south. It would also increase system redundancy and reliability. As with most of the City's other wells, a well in RV will likely require treatment for arsenic, nitrates, or TDS.

Several wells in the City's system are older wells that have been rehabilitated. The capacity of the wells often decreases with rehabilitation and age. For example, the production at Well 18B is decreasing over time. If one of these wells reaches the end of its useful life, re-drilling the well in close proximity may not be an option because of the contaminated groundwater plume near the Phoenix Goodyear Airport (PGA). The City may be able to relocate wells that are near the PGA groundwater plume further than the typical 660-foot distance requirement for re-drilling wells. The City should plan to add additional water supplies prior to an existing well failure to avoid the risk of an interruption to water service.

The condition assessment study contains recommendations for several well rehabilitation and replacement projects. The change in water production capacity from these projects is not known at this time. Once the new well and well rehabilitation projects are completed, the City should reassess the water production capabilities to determine if the City still needs additional well production capacity.

3.3.4 Pumping Capacity

Table 1.9 shows the City's water pumping capability for the north service area or pressure zone. The pumping capacity in the north must be sufficient to meet the larger of maximum day plus fire flow or peak hour demands AND must also be able to supply the maximum day demand to the south. The City's pumping capacity is deficient north of the Gila River. Solutions to the pumping capability in the near term can be addressed by adding pumps at Site 12.

Table 1.9 Water System Pumping Capacity – North 5-Year CIP and Southern Solutions Plan City of Goodyear

Booster Pump Site	Year 2015 (gpm)	Year 2020 (gpm)
Site 3 (Well 3)	500	500
Site 7	1,000	1,000
Site 8	500	500
Site 10	500	500
Site 11	4,800	4,800
Site 12	1,000	1,000
Site 18	1,840	1,840
Site 21	5,200	5,200
Firm Capacity(1)	**15,340**	**15,340**
North Pumping Requirement(2)	14,161	17,533
South Pumping Requirement(3)	2,975	3,683
Total Required Pumping Capacity	**17,136**	**21,216**
Surplus / (Deficit)(4)	**(1,796)**	**(5,876)**

Notes:

(1) Defined as capacity with largest pump at each pump station out of service.
(2) Defined in the Performance Criteria as the larger of maximum day demand plus fire demands of 3,500 gpm or 120% of peak hour demands. For the North Zone, the peak hour demand criteria was the larger demand condition for year 2015 and year 2020.
(3) Southern area maximum day demands must be met under both the maximum day or peak hour condition for the North Zone because all supplies to the south originate in the North Zone.
(4) Required Pumping Capacity compared to Firm Pumping Capacity.

Table 1.10 shows the City's water pumping capability for the South Zone 1 pressure zone. As shown in the table, there is sufficient existing pumping capacity to meet the South Zone 1 pumping requirements.

Table 1.10 Water System Pumping Capacity – South Zone 1
5-Year CIP and Southern Solutions Plan
City of Goodyear

Booster Pump Site	Year 2015 (gpm)	Year 2020 (gpm)
Site 13 (EMR Zone 1)	3,450	3,450
Site 23	7,735	7,735
Firm Capacity[(1)]	**11,185**	**11,185**
Required Pumping Capacity[(2)]	**6,475**	**7,514**
Surplus / (Deficit)[(3)]	**4,710**	**3,671**

Notes:
(1) Defined as capacity with largest pump at each pump station out of service.
(2) Defined in the Performance Criteria as the larger of maximum day demands plus fire demands of 3,500 gpm or 120% of peak hour demands. For the South Zone 1 the maximum day plus fire criteria was the larger demand condition for year 2015 and the peak hour criteria was the larger demand condition for year 2020.
(3) Required Pumping Capacity compared to Firm Pumping Capacity.

Table 1.11 shows the City's water pumping capability for the South Zone 2 pressure zone. As shown in the table, there is insufficient pumping capacity to meet the year 2015 and year 2020 fire flow pumping requirements.

Table 1.11 Water System Pumping Capacity – South Zone 2
5-Year CIP and Southern Solutions Plan
City of Goodyear

Booster Pump Site	Year 2015 (gpm)	Year 2020 (gpm)
Site 13 (EMR Zone 2)	550	550
Firm Capacity[(1)]	**550**	**550**
Required Pumping Capacity[(2)]	**1,541**	**1,541**
Surplus / (Deficit)[(3)]	**(991)**	**(991)**

Notes:
(1) Defined as capacity with largest pump at each pump station out of service.
(2) Defined in the Performance Criteria as the larger of maximum day demands plus fire demands of 1,500 gpm or 120% of peak hour demands. For the South Zone 2 the maximum day plus fire demand criteria was the larger demand condition for year 2015 and year 2020.
(3) Required Pumping Capacity compared to Firm Pumping Capacity.

The following booster pumping recommendations will add the capacity required to the north and south zones to meet the 2015 pumping requirements:

1. North Zone - Add 1,800 gpm of booster pumping capacity to Site 12. It is recommended that this project correlate with the water production recommendation at Site 12.
2. South Zone (EMR Zone 2) - Add 1,000 gpm of booster pumping capacity to the Site 13, Zone 2 booster pump station.

3.3.4.1 Water Storage

Table 1.12 shows the water storage requirements and capacity for the north service area for year 2015 and year 2020. This table shows a storage deficit in both year 2015 and year 2020. For the 5-year CIP a 1.5 MG storage reservoir is recommended. Additional study is required to site this storage reservoir. The recommended location will be determined in the 2015 Master Plan.

Table 1.12 Water System Storage Capacity – North Zone
5-Year CIP and Southern Solutions Plan
City of Goodyear

Reservoir	Year 2015 (MG)	Year 2020 (MG)
Site 3	0.15	0.15
Site 7	0.56	0.56
Site 8	0.56	0.56
Site 10	0.59	0.59
Site 11	1.50	1.50
Site 12	1.50	1.50
Site 18	0.71	0.71
Site 21	1.25	1.25
Total Storage Capacity(1)	**6.82**	**6.82**
Operational Storage(2)	8.0	10.0
Total Required Storage	**8.0**	**10.0**
Surplus / (Deficit)(3)	**(1.2)**	**(3.2)**

Notes:
(1) Less than actual rated capacity of reservoir. Indicates estimate of usable capacity of reservoirs after accounting for the space needed to keep pumps from running dry.
(2) Defined in the Performance Criteria as the volume equal to the average daily demand during the peak month of the year (maximum month).
(3) Total Storage Capacity compared to Total Required Storage.

Table 1.13 shows the water storage requirements and capacity for the south service area for year 2015 and year 2020. This table shows there is adequate storage for year 2015 and year 2020.

Table 1.13 Water System Storage Capacity – South Zone 5-Year CIP and Southern Solutions Plan City of Goodyear		
Reservoir	**Year 2015 (MG)**	**Year 2020 (MG)**
Site 13	0.89	0.89
Site 23	3.44	3.44
Total Storage Capacity[(1)]	**4.33**	**4.33**
Operational Storage[(2)]	3.4	4.2
Total Required Storage	**3.4**	**4.2**
Surplus / (Deficit)[(3)]	**0.93**	**0.13**

Notes:

(1) Less than actual rated capacity of reservoir. Indicates estimate of usable capacity of reservoirs after accounting for the space needed to keep pumps from running dry.
(2) Defined in the Performance Criteria as the volume equal to the average daily demand during the peak month of the year (maximum month).
(3) Total Storage Capacity compared to Total Required Storage.

3.3.5 Water Transmission

The City's Infrastructure Improvement Plan (IIP) contains several transmission mains that are needed to serve new developments. These mains are not included in this CIP because the proposed mains primarily serve new developments and are captured in the current City CIP. Water transmission main requirements will be refined as a part of the detailed analysis in the 2015 Master Plan.

3.3.6 Water Distribution

The Sarival Estates development located at the northwest corner of Sarival Road and Lower Buckeye Road is experiencing main failures, primarily because the development water lines were constructed with non-standard pipe materials. This development experiences several main breaks per year. In addition, operations staff have noted that the quality of the pipe that has been uncovered during main break repairs has deteriorated. Water service reliability and fire flow delivery would be improved by replacing the current water system in this development with a water system that is to the City's current standard.

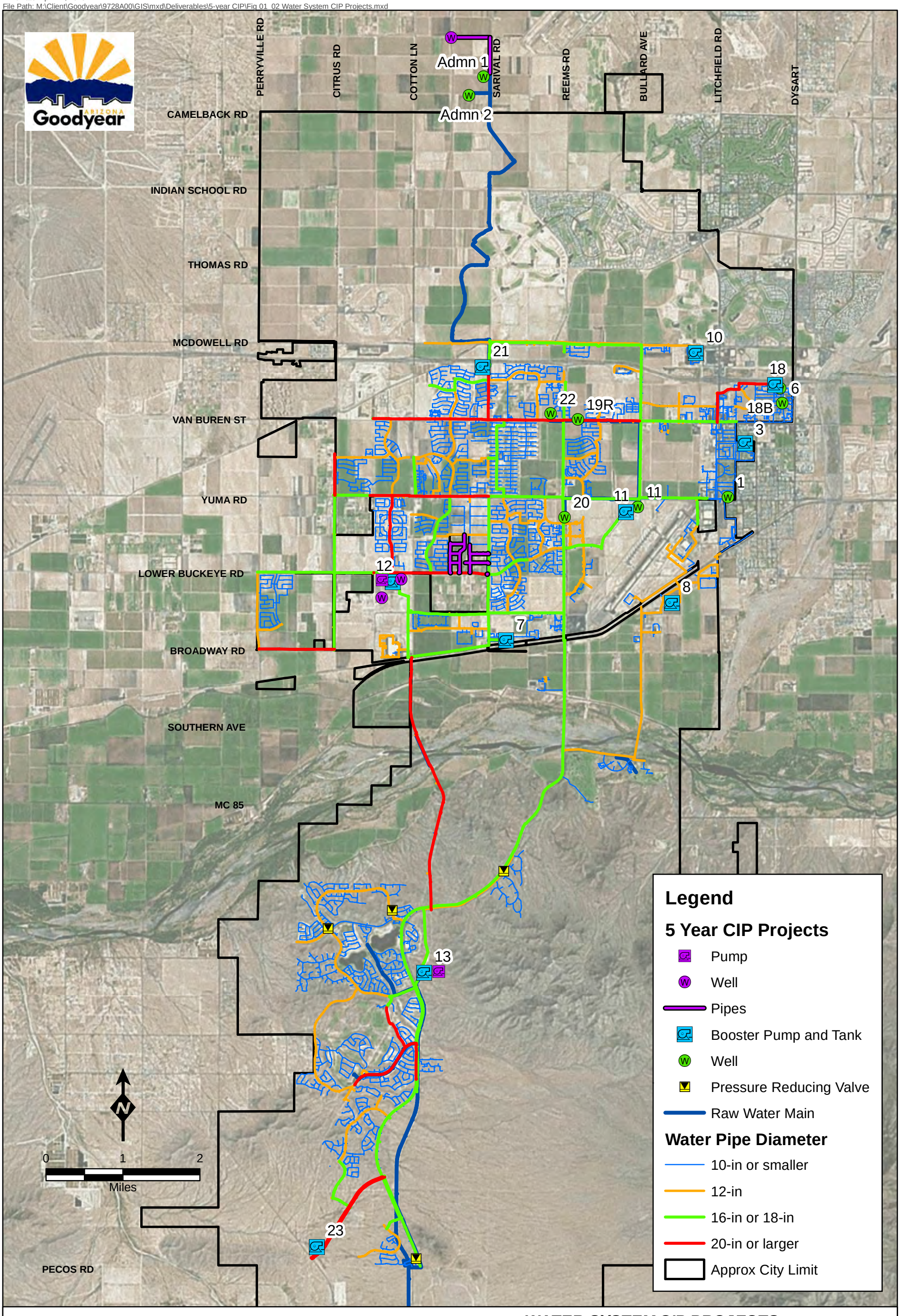
3.3.7 DMOM

The City would like to implement a Distribution Management, Operations, and Maintenance (DMOM) program to assist in maintaining and managing the water distribution system to provide desired levels of service. A DMOM project is included in the CIP.

3.3.8 Water CIP Locations

Figure 1.2 shows the City's existing water system and the locations of the recommended CIP projects for the 5-year Water CIP.

Print Date: April 22, 2015
File Path: M:\Client\Goodyear\9728A00\GIS\mxd\Deliverables\5-year CIP\Fig 01_02 Water System CIP Projects.mxd



WATER SYSTEM CIP PROJECTS

Figure 1.2

CITY OF GOODYEAR

INTEGRATED WATER RESOURCES, WATER, WASTEWATER, AND RECLAIMED WATER MASTER PLAN

4.0 WASTEWATER SYSTEM

4.1 Performance Criteria

The City's wastewater collection system infrastructure recommended in the 5-year CIP is intended to provide acceptable levels of service and reliability defined as the collection and treatment of wastewater in a manner that protects the public health and environment. The “standards of measurement” used to evaluate the capacity of the wastewater system are the wastewater system performance criteria that are summarized in Table 1.14.

4.2 Risk Prioritization Criteria

Like water systems, wastewater systems can be very capital intensive and capital projects need to be prioritized so that the most important projects are completed with the available funding sources.

The protection of public health, safety, and the environment must be the highest priorities of a wastewater utility in providing a community with wastewater services. When funds are not available to accomplish all that a utility desires, capital improvements must be prioritized in a way that minimizes the risk to public health or safety or negative impacts to the environment would occur. The performance criteria described above identifies the level of service that customers typically expect of municipal wastewater systems. Customers that want a higher level of service should expect to pay for the additional infrastructure that lowers the risk of a failure to satisfy public health, safety, and welfare.

The priorities for new or rehabilitated wastewater infrastructure are:

1. Safely convey wastewater away from customers to avoid spills that expose customers to unsanitary conditions.
2. Treat wastewater to eliminate exposure to unsanitary conditions.
3. Provide a reliable water resource from reclaimed water.
4. Comply with regulations outlined in the Clean Water Act (CWA) and rules established by the Environmental Protection Agency (USEPA), the Arizona Department of Environmental Quality (ADEQ), and the Maricopa County Environmental Services Department (MCESD).

Table 1.14 Wastewater System Performance Criteria
5-Year CIP and Southern Solutions Plan
City of Goodyear

Description		Criteria	
Pipe Size (inches)	Minimum Slope[1][2] (ft/ft)	Pipe Capacity[3] (mgd)	Pipe Capacity[3] (cfs)
8	0.0050	0.45	0.70
10	0.0025	0.70	1.09
12	0.0020	1.02	1.57
14	0.0016	1.38	2.14
15	0.0015	1.59	2.45
16	0.0014	1.80	2.79
18	0.0012	2.28	3.53
20	0.0010	2.82	4.36
21	0.0010	3.11	4.81
24	0.0008	4.06	6.28

Notes:

(1) Slopes are calculated using Manning's Equation for pipes flowing full with a minimum velocity of 2 fps for all diameters except for 8 inches for which the minimum slope corresponds to 2.5 fps.
(2) Sewers larger than 24 inches should have a slope ≥ 0.0008.
(3) Pipe Capacity based on full pipe flow.

Flow Velocity in feet per second (fps)	
Gravity Mains	2.5 fps ≤ V 10 fps
Force Mains	2 fps ≤ V ≤ 6 fps
Flow Depth, d/D, (for dry weather peak hour flows)	
d/D for new sewer pipes for dry weather flow conditions	= 0.6
d/D for new sewer pipes for wet weather conditions	= 0.65
d/D for evaluating existing mains in developed areas	= 0.90
Wet Weather Factors (applied to peak hour flows)	1.20
Headloss in Existing Pipes	
Gravity Pipes	Manning's N = 0.013
Pressure Pipes	Hazen William's C = 120
Changes in Pipe Size	
When a smaller sewer joins a larger one	Sewer crowns will be matched
Headloss at Manholes	
Manholes with pipelines intersecting at 90 degrees or greater	Provide 0.2' Invert Drop
Manholes with pipelines intersecting at less than 90 degrees	Provide 0.1' Invert Drop

4.3 Wastewater System Capital Project Needs

4.3.1 Lift Stations

The City's lift stations appear to have sufficient capacity to convey current wastewater flows, but the manholes where the force mains discharge are all in poor condition due to hydrogen sulfide (H_2S) corrosion. In some cases, the high H_2S levels are caused by low flows that can only be remedied with new development that is served by the lift stations.

The Wells Fargo lift station will require that the force main be extended perhaps as far west as Litchfield Road where it can discharge to a larger interceptor. Further study is required to determine the alternatives available to the City to address this force main.

4.3.2 Perryville Prison Pump Station Screen

Wastewater flows from the Perryville prison passes through a lift station that needs to handle large amounts of cloth and other debris from the prison. An improved screen with finer openings needs to be reconstructed to handle the debris and required flows.

4.3.3 Goodyear WRF Interceptor Capacity

The interceptors going into the Goodyear WRF are undersized for the full capacity of the plant. Evaluation of this interceptor will be done with the hydraulic model in the 2015 Master Plan and required CIP improvements will be recommended in the final report. The model is needed to evaluate the capacity of this pipeline.

4.3.4 Goodyear WRF

The Goodyear WRF is currently being upgraded and expanded. CIP costs for this expansion have been programmed. This study did not evaluate capacity requirements of the three water reclamation facilities.

4.3.5 CMOM Program

Goodyear would like to implement a Capacity, Management, Operations, and Maintenance (CMOM) program to provide the framework for effectively managing the collection system to provide the required maintenance to keep the collection system in good condition, provide capacity where needed, and avoid spills. A budget has been prepared for a project to complete a CMOM program.

5.0 RECLAIMED WATER SYSTEM

The City of Goodyear has shifted from a policy of direct reuse to recharge with regards to reclaimed water use. This will allow the City to offset groundwater pumping through annual storage and recovery of reclaimed water and may also offer the opportunity to bank LTSCs.

The reclaimed water system temporarily recharges most of its available reclaimed water to the City's Soil Aquifer Treatment (SAT) site. The SAT site is being used for a two year period while a system of vadose zone injection wells (VZIW) are constructed. The VZIWs are budgeted in the City's CIP. There are two VZIWs programmed for FY16 and two additional VZIWs programmed for FY19.

Reclaimed water quality impacts the performance of VZIWs. The Goodyear WRF improvements need to incorporate sufficient treatment to also provide reclaimed water quality that meets the City's applicable Aquifer Protection Permit (APP) requirements at the higher flow rates.

6.0 CIP PROJECT COSTS

6.1 Cost Estimate Accuracy

Unit costs have been developed for the capital improvements for each project recommended herein. This cost estimate was prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineers (AACE) International for a Class 4 estimate. Table 1.15 summarizes the AACE International cost estimate classification system, the level of project definition (percent of design), uses, cost estimating methodologies and expected accuracy of Class 1 through 5 estimates. Design work would need to be undertaken to obtain more precise cost estimates.

Table 1.15 AACE Cost Estimate Classification Summary
5-Year CIP and Southern Solutions Plan
City of Goodyear

Estimate Class	Maturity Level of Project Definition Deliverables – (Level of Engineering Design)	End Use	Typical Cost Estimating Methodology Used	Expected Accuracy Range (Low/High)
Class 5	0% to 2%	Conceptual screening	Capacity factored, parametric models, judgment or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -10% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

6.2 Project Cost Development Methodology

To develop project costs for each capital improvement project, unit costs for pipelines, pump stations, and other infrastructure are developed based on information from R.S. Means and other unit cost sources including bid tabs. When multiplied by the capacity or size of the facility, the unit construction cost is the cost that the City should expect to pay a contractor to construct the facility. The City will have other expenses including design, inspection, contingency, and project management that are included in the overall project cost. The project cost is obtained by multiplying the construction cost by a factor of 1.4. Table 1.16 contains an opinion of probable unit construction costs for the recommended projects. The unit cost development is included in Appendix A.

Table 1.16 Unit Cost Summary
5-Year CIP and Southern Solutions Plan
City of Goodyear

Component	Construction Cost (Unit)	Project Cost[(1)] (Unit)
Water System		
8-inch water main (with hydrants)	$178/LF	$249/LF
12-inch water main (no hydrants)	$174/LF	$244/LF
16-inch water main	$209/LF	$293/LF
800 gpm well	$1.7 M	$2.4 M
1,300 gpm well	$2.3 M	$3.2 M
Arsenic Treatment	$1.27/gpd	$1.79/gpd
RO Treatment	$1.43/gpd	$2.00/gpd
1,000 gpm Booster Station	$0.97/gpd	$1.36/gpd
1,800 gpm Booster Station	$0.74/gpd	$1.03/gpd
1.2 MG Reservoir	$2.4/gal	$3.4/gal
Wastewater System		
6-inch force main	$137/LF	$191/LF

Notes:
(1) Construction Cost x 1.4 (engineering design, inspection and project management)
(2) Assumes manhole insert. Cost is approximate, actual cost varies by manhole diameter and depth.

Appendix B contains a description and map of each water and wastewater CIP project. These project description maps identify the size, capacity, components, and location for each project.

Appendix C contains a prioritized list of the water and wastewater CIP projects. These projects are prioritized based on the listing in the table. The year in which the funding for the project is expected is also shown in this table. In most cases, funding for the projects can be shifted a year or two as needed to satisfy cash flow requirements.

All costs in this report are present worth costs. The unit cost tables in Appendix A contain an ENR number that can be used to escalate costs in the future.

APPENDIX A – UNIT COSTS FOR WATER AND WASTEWATER PROJECTS

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:

PROJECT : Integrated Water and Wastewate Master Plan — **LOCATION FACTOR:** 0.887

JOB # : 9264A.00 — **DATE :** October-14

CLIENT : City of Goodyear — **ENR :** 9886

ELEMENT : Water Main Construction — **BY :** SJT

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	8" Cl 52 Cldi Mj Pipe In Open Trench	1	LF	$34.05	$0.00	$ 34	$ 34	
	TOTAL PIPING (per LF)							**$34.05**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1Cy Bucket, Class B (Medium Digging), 0-16' D	0.7	CY	$4.38	$0.00	$ 4	$ 3	
	Trench Bracing, 3' W X 10' D, Wood Planks & X-Bracing	1.0	LF	$14.19	$0.00	$ 14	$ 14	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class A Material	0.2	CY	$55.55	$0.00	$ 56	$ 10	
	Native Trench Backfill/Unconfined Struct. Bf, Class A Material	0.5	CY	$11.99	$0.00	$ 12	$ 6	
	10% Site Specific Requirements	1	LS	$3.25	$0.00	$ 3	$ 3	
	TOTAL EARTHWORK (per LF)							**$35.70**
PAVING	Asphalt Pavement Cutting	8.0	inFT	$.67	$0.00	$ 1	$ 5	
DEMO &	Remove 4"-6" Asphalt Pavement	0.6	SY	$5.70	$0.51	$6.21	$ 3	
REPLACEMENT	4" Ac Paving On 8" Abc	0.6	SY	$27.94	$2.24	$30.18	$ 17	
	TOTAL PAVING (per LF)							**$25.54**
FITTINGS	8" 90° Cldi Mj Bend	2	EA	$1,157.21	$0.00	$1,157.21	$2,314.42	
& VALVES	8" Dimj Awwa Butterfly Valve, No Op	1	EA	$557.13	$0.00	$557.13	$ 557	
	C.I. Valve Box	1	EA	$436.67	$0.00	$436.67	$ 437	
	Air Release Valve Assembly	1	EA	$1,045.32	$0.00	$1,045.32	$ 1,045	
	TOTAL (per 1/4 Mile)						$ 4,354	
	TOTAL FITTING & VALVES (per LF)							**$3.30**
	TOTAL HYDRANT (per LF)							**$18.06**
	OVERHEAD (10%)							**$11.66**
	CONSTRUCTION PROFIT (6%)							**$7.00**
	SALES TAX (65% of above costs at 9.8%)							**$7.43**
	CONTINGENCY (15%)							**$17.50**
	GENERAL CONDITIONS (15%)							**$17.50**
	TOTAL CONSTRUCTION COST, LF							**$177.73**
	TOTAL PROJECT COST (1.4 times Const Cost), LF							**$248.82**

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:

PROJECT : Integrated Water and Wastewate Master Plan — **LOCATION FACTOR:** 0.887

JOB # : 9264A.00 — **DATE :** October-14

CLIENT : City of Goodyear — **ENR :** 9886

ELEMENT : Water Main Construction — **BY :** SJT

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	12" Cl 52 Cldi Mj Pipe In Open Trench	1	LF	$47.75	$0.00	$ 48	$ 48	
	TOTAL PIPING (per LF)							**$47.75**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1Cy Bucket, Class B (Medium Digging), 0-16' D	0.7	CY	$4.38	$0.00	$ 4	$ 3	
	Trench Bracing, 3' W X 10' D, Wood Planks & X-Bracing	1.0	LF	$14.19	$0.00	$ 14	$ 14	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class A Material	0.2	CY	$55.55	$0.00	$ 56	$ 11	
	Native Trench Backfill/Unconfined Struct. Bf, Class A Material	0.4	CY	$11.99	$0.00	$ 12	$ 5	
	10% Site Specific Requirements	1	LS	$3.32	$0.00	$ 3	$ 3	
	TOTAL EARTHWORK (per LF)							**$36.49**
PAVING	Asphalt Pavement Cutting	8.0	inFT	$.67	$0.00	$ 1	$ 5	
DEMO &	Remove 4"-6" Asphalt Pavement	0.6	SY	$5.70	$0.51	$6.21	$ 3	
REPLACEMENT	4" Ac Paving On 8" Abc	0.6	SY	$27.94	$2.24	$30.18	$ 17	
	TOTAL PAVING (per LF)							**$25.54**
FITTINGS	12" 90° Cldi Mj Bend	2	EA	$1,745.80	$0.00	$1,745.80	$3,491.60	
& VALVES	12" Dimj Awwa Butterfly Valve, No Op	1	EA	$799.79	$0.00	$799.79	$ 800	
	C.I. Valve Box	1	EA	$613.27	$0.00	$613.27	$ 613	
	Air Release Valve Assembly	1	EA	$1,045.32	$0.00	$1,045.32	$ 1,045	
	TOTAL (per 1/4 Mile)						$ 5,950	
	TOTAL FITTING & VALVES (per LF)							**$4.51**
	OVERHEAD (10%)							**$11.43**
	CONSTRUCTION PROFIT (6%)							**$6.86**
	SALES TAX (65% of above costs at 9.8%)							**$7.28**
	CONTINGENCY (15%)							**$17.14**
	GENERAL CONDITIONS (15%)							**$17.14**
	TOTAL CONSTRUCTION COST, LF							**$174.13**
	TOTAL PROJECT COST (1.4 times Const Cost), LF							**$243.78**

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:

PROJECT : Integrated Water and Wastewate Master Plan — **LOCATION FACTOR:** 0.887

JOB # : 9264A.00 — **DATE :** October-14

CLIENT : City of Goodyear — **ENR :** 9886

ELEMENT : Water Main Construction — **BY :** SJT

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	16" Cl 52 Cldi Mj Pipe In Open Trench	1	LF	$62.54	$0.00	$ 63	$ 63	
	TOTAL PIPING (per LF)							**$62.54**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1Cy Bucket, Class B (Medium Digging), 0-16' D	0.9	CY	$4.38	$0.00	$ 4	$ 4	
	Trench Bracing, 3' W X 10' D, Wood Planks & X-Bracing	1.0	LF	$14.19	$0.00	$ 14	$ 14	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class A Material	0.2	CY	$55.55	$0.00	$ 56	$ 13	
	Native Trench Backfill/Unconfined Struct. Bf, Class A Material	0.6	CY	$11.99	$0.00	$ 12	$ 7	
	10% Site Specific Requirements	1	LS	$3.80	$0.00	$ 4	$ 4	
	TOTAL EARTHWORK (per LF)							**$41.82**
PAVING	Asphalt Pavement Cutting	8.0	inFT	$.67	$0.00	$ 1	$ 5	
DEMO &	Remove 4"-6" Asphalt Pavement	0.6	SY	$5.70	$0.51	$6.21	$ 4	
REPLACEMENT	4" Ac Paving On 8" Abc	0.6	SY	$27.94	$2.24	$30.18	$ 18	
	TOTAL PAVING (per LF)							**$26.89**
FITTINGS	16" 90° Cldi Mj Bend	2	EA	$2,568.92	$0.00	$2,568.92	$5,137.85	
& VALVES	16" Dimj Awwa Butterfly Valve, No Op	1	EA	$1,234.48	$0.00	$1,234.48	$ 1,234	
	C.I. Valve Box	1	EA	$613.27	$0.00	$613.27	$ 613	
	Air Release Valve Assembly	1	EA	$1,045.32	$0.00	$1,045.32	$ 1,045	
	TOTAL (per 1/4 Mile)						$ 8,031	
	TOTAL FITTING & VALVES (per LF)							**$6.08**
	OVERHEAD (10%)							**$13.73**
	CONSTRUCTION PROFIT (6%)							**$8.24**
	SALES TAX (65% of above costs at 9.8%)							**$8.75**
	CONTINGENCY (15%)							**$20.60**
	GENERAL CONDITIONS (15%)							**$20.60**
	TOTAL CONSTRUCTION COST, LF							**$209.24**
	TOTAL PROJECT COST (1.4 times Const Cost), LF							**$292.94**

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:

PROJECT : Integrated Water and Wastewate Master Plan — **LOCATION FACTOR:** 0.887

JOB # : 9264A.00 — **DATE :** October-14

CLIENT : City of Goodyear — **ENR :** 9886

ELEMENT : Water Main Construction — **BY :** SJT

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	24" Cl 52 Cldi Mj Pipe In Open Trench	1	LF	$83.80	$0.00	$ 84	$ 84	
	TOTAL PIPING (per LF)							**$83.80**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1Cy Bucket, Class B (Medium Digging), 0-16' D	1.0	CY	$4.38	$0.00	$ 4	$ 5	
	Trench Bracing, 3' W X 10' D, Wood Planks & X-Bracing	1.0	LF	$14.19	$0.00	$ 14	$ 14	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class A Material	0.3	CY	$55.55	$0.00	$ 56	$ 18	
	Native Trench Backfill/Unconfined Struct. Bf, Class A Material	0.6	CY	$11.99	$0.00	$ 12	$ 7	
	10% Site Specific Requirements	1	LS	$4.41	$0.00	$ 4	$ 4	
	TOTAL EARTHWORK (per LF)							**$48.47**
PAVING	Asphalt Pavement Cutting	8.0	inFT	$.67	$0.00	$ 1	$ 5	
DEMO &	Remove 4"-6" Asphalt Pavement	0.7	SY	$5.70	$0.51	$6.21	$ 4	
REPLACEMENT	4" Ac Paving On 8" Abc	0.7	SY	$27.94	$2.24	$30.18	$ 20	
	TOTAL PAVING (per LF)							**$29.58**
FITTINGS	24" 90° Cldi Mj Bend	2	EA	$5,179.03	$0.00	$5,179.03	$10,358.06	
& VALVES	24" 150# Fxf Awwa Butterfly Valve, No	1	EA	$9,124.84	$0.00	$9,124.84	$ 9,125	
	C.I. Valve Box	1	EA	$613.27	$0.00	$613.27	$ 613	
	Air Release Valve Assembly	1	EA	$1,045.32	$0.00	$1,045.32	$ 1,045	
	TOTAL (per 1/4 Mile)						$ 21,141	
	TOTAL FITTING & VALVES (per LF)							**$16.02**
	OVERHEAD (10%)							**$17.79**
	CONSTRUCTION PROFIT (6%)							**$10.67**
	SALES TAX (65% of above costs at 9.8%)							**$11.33**
	CONTINGENCY (15%)							**$26.68**
	GENERAL CONDITIONS (15%)							**$26.68**
	TOTAL CONSTRUCTION COST, LF							**$271.02**
	TOTAL PROJECT COST (1.4 times Const Cost), LF							**$379.43**

carollo
Engineers...Working Wonders With Water™

Oct 2014	ENR PRESENT:	ENR PRESENT:

COST ESTIMATE

PROJECT: ARSENIC TREATMENT FOR 800 GPM WELL
JOB NO.: Integrated Master Plan 2014
CLIENT: City of Goodyear

ESTIMATOR: JW
DATE: 31-Oct-14

ITEM NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST	SM (Par.)
1	Existing Hypo Storage/Feed Shed	27	$	$ 5,000	$ 136,533
2	Pressure Vessel Vertical	6	$/ft-dia	$ 5,333	$ 34,133
3	Internal Inlet/Outlet Header System		%	$ 25	$ 89,557
4	Sorbtive Media		$/ft3	$ 209	$ 43,777
5	Backwash tank		$/gal	$ 4	$ 7,200
6	Hypo Chemical Tank		$/gal	$ 7	$ 15,000
7	SM Prefilters		$/gpm	$ 19	$ 41,500
8	Concrete Slab on grade (24" thick)	67	$/cy	$ 800	$ 53,218
9	Concrete Slab on grade (12" thick)	10	$/cy	$ 1,000	$ 9,907
10	Ex./backfill/compact/ABC	130	$/cy	$ 50	$ 6,475
11	Vessel Piping	4	$/filter	$ 15,000	$ 60,000
12	Yard Piping Treatment Influent / Effluent Piping	800	$/gpm	$ 150	$ 120,000
13	Yard Piping Backwash Supply Backwash Waste Piping	800	$/gpm	$ 188	$ 150,000
14	CIVIL		%	$ 10	$ 80,000
15	COATINGS		%	$ 5	$ 40,000
16	E&IC		%	$ 10	$ 80,000
17	**Sub Total**				**$ 967,000**
18					
19	**Contingency and General Conditions**		%	0.3	**$ 290,000**
20	**Contractor Overhead and Profit**		%	0.16	**$ 155,000**
21	**Sales Tax (65% of above at 9.8%)**		%	0.0637	**$ 62,000**
22	**Total Construction Cost**				**$ 1,474,000**
23					
24	**Total Project Costs (1.4 times Cons Cost)**				**$ 2,063,600**
25	**Total Project Costs (1.4 times Cons Cost), $/gal**				**$ 1.79**

Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	2 MGD INLINE BOOSTER STATION	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	8-Dec-14
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization (10%)	1	LS	$ 31,700	$ 31,700
2	Piping - 12" MJ DIP	100	LF	$ 48	$ 4,770
3	12" DIP MJ Fittings	4	EA	$ 5,900	$ 23,600
4	125 hp Horizontal split case Pump	1	EA	$ 51,400	$ 51,400
5	12" Discharge Piping FL DIP (10 FT per pump)	1	EA	$ 1,030	$ 1,030
6	12" FL Check Valve	1	EA	$ 5,800	$ 5,800
7	12" FL BFV	1	EA	$ 1,950	$ 1,950
8	12" DIP FL Fittings	2	EA	$ 2,190	$ 4,390
9	12" DIP FL Pipe - Manifold	30	LF	$ 100	$ 3,080
10	12" Reducers	2	EA	$ 580	$ 1,160
11	12" FL BFVs	2	EA	$ 3,120	$ 6,200
12	Pressure Transmitters and Instrumentation	1	LS	$ 7,700	$ 7,700
13	Piping Support Pad - (10'x10'x12")	2	CY	$ 580	$ 1,160
14	Misc Pipe Supports	1	LS	$ 1,500	$ 1,500
15	Electrical Service, Swichgear, Panels, Wiring, and Conduit	1	LS	$ 70,800	$ 70,800
16	125 hp Motor VFDs	1	EA	$ 42,400	$ 42,400
17	Electrical Pre-Cast Vault/Buidling	1	LS	$ 64,200	$ 64,200
18	RTU in NEMA Enclosure with Antenna	1	LS	$ 25,700	$ 25,700
19	Contractor Overhead & Profit (16%)				$ 55,770
20	Sales Tax (65% of above costs at 9.8%)				$ 22,200
21	Contingency (15%)				$ 52,280
22	General Conditions (15%)				$ 52,280
	TOTAL CONSTRUCTION COST				$ 531,000
	TOTAL PROJECT COST				$ 743,000

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	1,000 GPM BOOSTER STATION expansion for fire flow	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	31-Oct-14
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization	1	LS	$ 34,000	$ 34,000
2	Piping - 12" MJ DIP	300	LF	$ 48	$ 14,300
3	12" DIP MJ Fittings	4	EA	$ 5,900	$ 23,600
4	125 hp Vertical Turbine Pump w/ Pump Can	2	EA	$ 42,000	$ 84,000
5	12" Discharge Piping FL DIP (10 FT per pump)	2	EA	$ 1,030	$ 2,050
6	12" FL Check Valve	2	EA	$ 5,800	$ 11,600
7	12" FL BFV	2	EA	$ 1,950	$ 3,910
8	12" DIP FL Fittings	4	EA	$ 2,190	$ 8,800
9	12" DIP FL Pipe - Manifold	30	LF	$ 100	$ 3,080
10	12" Reducers	2	EA	$ 580	$ 1,160
11	12" FL BFVs	2	EA	$ 3,120	$ 6,200
12	Piping Support Pad - (10'x20'x12")	7.5	CY	$ 580	$ 4,330
13	Misc Pipe Supports	1	LS	$ 1,500	$ 1,500
14	Electrical Service, Swichgear, Panels, Wiring, and Conduit	1	LS	$ 32,900	$ 32,900
15	125 hp Motor VFDs	2	EA	$ 33,000	$ 66,000
16	Electrical Pre-Cast Vault/Buidling	1	LS	$ 50,000	$ 50,000
17	RTU in NEMA Enclosure with Antenna	1	LS	$ 25,700	$ 25,700
18	Pole & Base	1	LS	$ 640	$ 640
19	Contractor Overhead & Profit (16%)				$ 59,800
20	Sales Tax (65% of above costs at 9.8%)				$ 23,810
21	Contingency (15%)				$ 56,070
22	General Conditions (15%)				$ 56,070
	TOTAL CONSTRUCTION COST				$ 570,000
	TOTAL PROJECT COST				$ 798,000

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT: 1800 GPM BOOSTER STATION
JOB NO.: Integrated Master Plan 2014
CLIENT: City of Goodyear

ESTIMATOR: SJT
DATE: 27-Jan-15

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization (10%)	1	LS	$ 30,900	$ 30,900
2	Material Testing	1	LS	$ 3,210	$ 3,210
3	250hp Vertical Turbine Pump w/ Pump Can	1	EA	$ 78,200	$ 78,200
4	12" Discharge Piping FL DIP (10 FT per pump)	1	EA	$ 1,030	$ 1,030
5	12" FL Check Valve	1	EA	$ 5,800	$ 5,800
6	12" FL BFV	1	EA	$ 1,950	$ 1,950
7	12" DIP FL Fittings	2	EA	$ 2,190	$ 4,390
8	12" Reducers	1	EA	$ 580	$ 580
9	12" FL BFVs	1	EA	$ 3,120	$ 3,120
10	Pressure Transmitters and Instrumentation	2	LS	$ 7,700	$ 15,400
11	Piping Support Pad - (10'x20'x12")	10	CY	$ 580	$ 5,800
12	Misc Pipe Supports	1	LS	$ 1,500	$ 1,500
13	Electrical Service, Swichgear, Panels, Wiring, and Conduit	1	LS	$ 71,400	$ 71,400
14	Electrical Pre-Cast Vault/Buidling	1	LS	$ 64,200	$ 64,200
15	Emergency Generator w/ Fuel Tank	1	LS	$ 43,100	$ 43,100
16	Generator Pad (15'x20'x18")	17	CY	$ 580	$ 9,800
17	Contractor Overhead & Profit (16%)				$ 54,460
18	Sales Tax (65% of above costs at 9.8%)				$ 21,680
19	Contingency (15%)				$ 51,060
20	General Conditions (15%)				$ 51,060
	TOTAL CONSTRUCTION COST				$ 519,000
	TOTAL PROJECT COST				$ 727,000

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	1.2 MG RESERVOIR	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	27-Jan-15
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Material Test	1	LS	$ 3,210	$ 3,210
2	Excavation	8000	CY	$ 44	$ 353,800
3	Piping - 24" MJ DIP	300	LF	$ 110	$ 32,500
4	24" DIP MJ Fittings	8	EA	$ 5,900	$ 47,300
5	24" DIP BF Valve	3	EA	$ 6,200	$ 18,500
6	Backfill	2800	CY	$ 10	$ 28,000
7	Vapor Barrier	8000	SF	$ 0	$ 3,590
8	1.2 MG Tank Construction	1	LS	$ 1,190,000	$ 1,190,000
9	Chlorine Fiberglass Enclosure	1	LS	$ 9,000	$ 9,000
10	Chlorine Building Slab (6'x6'x8")	1	CY	$ 580	$ 580
11	Chlorine Equipment & Piping	1	LS	$ 4,490	$ 4,490
12	Shade Cover over Electrical Equipment	200	SF	$ 26	$ 5,100
13	Electrical Equipment Slab (10' x 20' x 8")	5	CY	$ 580	$ 2,890
14	Electrical Service, Panels, Wiring, and Conduit	1	LS	$ 23,100	$ 23,100
15	RTU in NEMA Enclosure with Antenna	1	LS	$ 25,700	$ 25,700
16	Pole & Base	1	LS	$ 640	$ 640
17	Level Transmitter and Instrumentation	1	LS	$ 9,600	$ 9,600
18	Security Allowance	1	LS	$ 9,600	$ 9,600
19	Site Lighting	4	EA	$ 3,590.00	$ 14,400
20	Tank Painting	3650	SF	$ 2.40	$ 8,900
21	Access Gate	1	EA	$ 1,930.00	$ 1,930
22	CMU Wall	520	LF	$ 170.00	$ 90,800
23	Site 4" ABC Finish	16700	SF	$ 0.40	$ 6,400.00
24	Concrete Drive	1	EA	$ 1,280.00	$ 1,280
25	Asphalt Driveway	1	LS	$ 2,180.00	$ 2,180
26	Contractor Overhead & Profit (16%)				$ 302,960
27	Sales Tax (65% of above costs at 9.8%)				$ 120,620
28	Contingency (15%)				$ 284,020
29	General Conditions (15%)				$ 284,020
	TOTAL CONSTRUCTION COST				$ 2,885,000
	TOTAL PROJECT COST				$ 4,039,000

Engineers...Working Wonders With Water™

ENR PRESENT:

WELL SITES

WELL SIZE FLOWRATE (gpm)	WELL DEPTH (ft)	**WELL DRILLING COST** (ENR CCI = 9886)	**WELL EQUIPING COST** (ENR CCI = 9886)	**WELL TOTAL ONSTRUCTIO COST** (ENR CCI = 9886)	**WELL TOTAL PROJECT COST** (ENR CCI = 9886)
800	700	**$732,000**	**$ 976,000**	**$ 1,708,000**	**$2,391,200**
1300	1300	**$1,089,000**	**$ 1,230,000**	**$ 2,319,000**	**$3,246,600**

Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	DRILL WELL - 1300 FT DEEP	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	27-Jan-15
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization	1	LS	$ 65,000	$ 65,000
2	Well drilling	1300	LF	$ 140	$ 183,600
3	Casing & Gravel Pack Installation	700	LF	$ 450	$ 314,600
4	Well Logging and Sampling	1	LS	$ 83,500	$ 83,500
5	Well Development and Testing	1	LS	$ 68,000	$ 68,000
6	Contractor Overhead & Profit (16%)				$ 114,350
7	Sales Tax (65% of above costs at 9.8%)				$ 45,530
8	Contingency (15%)				$ 107,210
9	General Conditions (15%)				$ 107,210
	TOTAL CONSTRUCTION COST (DRILLING)				$ 1,089,000
	TOTAL PROJECT COST (DRILLING)				$ 1,525,000

Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	WELL SITE - 400 HP, 1200 GPM	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	27-Jan-15
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization	1	LS	$ 72,700	$ 72,700
2	400HP Well Pump & 700 ft Pipe Column	1	LS	$ 137,400	$ 137,400
3	Well Pad (6' x 6' 12")	1.5	CY	$ 580	$ 870
4	Piping Support Pad - (6'x12'x8")	1.75	CY	$ 580	$ 1,010
5	Piping - 12" MJ DIP & Excavation	300	LF	$ 230	$ 69,100
6	12" DIP MJ Fittings	8	EA	$ 2,190	$ 17,600
7	12" DIP BF Valve	2	EA	$ 4,010	$ 8,000
8	12" DIP Check Valve	2	EA	$ 7,400	$ 14,900
9	Misc Pipe Supports	1	LS	$ 640	$ 640
10	Chlorine Fiberglass Enclosure	1	LS	$ 9,000	$ 9,000
11	Chlorine Building Slab (6'x6'x8")	1	CY	$ 580	$ 580
12	Chlorine Equipment & Piping	1	LS	$ 4,490	$ 4,490
13	Shade Cover over Electrical Equipment	200	SF	$ 26	$ 5,100
14	Electrical Equipment Slab (10' x 20' x 8")	5	CY	$ 510	$ 2,570
15	Electrical Serivce, Conduit & Wiring	1	LS	$ 321,000	$ 321,000
16	RTU in NEMA Enclosure with Antenna	1	LS	$ 25,700	$ 25,700
17	Pole & Base	1	LS	$ 640	$ 640
18	Flow Meter, Transmitter and Instrumentation	2	LS	$ 17,400	$ 34,900
19	Security Allowance	1	LS	$ 9,600.00	$ 9,600
20	Site Lighting	4	EA	$ 3,590.00	$ 14,400
21	Access Gate	1	EA	$ 1,930.00	$ 1,930
22	CMU Wall	300	LF	$ 140.00	$ 42,100
23	Site 4" ABC Finish	5625	SF	$ 0.40	$ 2,170
24	Concrete Drive	1	EA	$ 1,280.00	$ 1,280
25	Asphalt Driveway	1	LS	$ 2,180.00	$ 2,180
26	Equipment Testing & Start-up	1	LS	$ 7,700.00	$ 7,700
27	Contractor Overhead & Profit (16%)				$ 129,210
28	Sales Tax (65% of above costs at 9.8%)				$ 51,440
29	Contingency (15%)				$ 121,130
30	General Conditions (15%)				$ 121,130
	TOTAL CONSTRUCTION COST (EQUIPPING)				$ 1,230,000
	TOTAL PROJECT COST (EQUIPPING)				$ 1,722,000

carollo
Engineers...Working Wonders With Water™

ENR PRESENT:	9886

COST ESTIMATE

PROJECT:	WELL SITE - 400 HP, 1300 GPM	ESTIMATOR:	SJT
JOB NO.:	Integrated Master Plan 2014	DATE:	27-Jan-15
CLIENT:	City of Goodyear		

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization and Demobilization	1	LS	$ 72,700	$ 72,700
2	400HP Well Pump & 700 ft Pipe Column	1	LS	$ 137,400	$ 137,400
3	Well Pad (6' x 6' 12")	1.5	CY	$ 580	$ 870
4	Piping Support Pad - (6'x12'x8")	1.75	CY	$ 580	$ 1,010
5	Piping - 12" MJ DIP & Excavation	300	LF	$ 230	$ 69,100
6	12" DIP MJ Fittings	8	EA	$ 2,190	$ 17,600
7	12" DIP BF Valve	2	EA	$ 4,010	$ 8,000
8	12" DIP Check Valve	2	EA	$ 7,400	$ 14,900
9	Misc Pipe Supports	1	LS	$ 640	$ 640
10	Chlorine Fiberglass Enclosure	1	LS	$ 9,000	$ 9,000
11	Chlorine Building Slab (6'x6'x8")	1	CY	$ 580	$ 580
12	Chlorine Equipment & Piping	1	LS	$ 4,490	$ 4,490
13	Shade Cover over Electrical Equipment	200	SF	$ 26	$ 5,100
14	Electrical Equipment Slab (10' x 20' x 8")	5	CY	$ 510	$ 2,570
15	Electrical Serivce, Conduit & Wiring	1	LS	$ 321,000	$ 321,000
16	RTU in NEMA Enclosure with Antenna	1	LS	$ 25,700	$ 25,700
17	Pole & Base	1	LS	$ 640	$ 640
18	Flow Meter, Transmitter and Instrumentation	2	LS	$ 17,400	$ 34,900
19	Security Allowance	1	LS	$ 9,600.00	$ 9,600
20	Site Lighting	4	EA	$ 3,590.00	$ 14,400
21	Access Gate	1	EA	$ 1,930.00	$ 1,930
22	CMU Wall	300	LF	$ 140.00	$ 42,100
23	Site 4" ABC Finish	5625	SF	$ 0.40	$ 2,170
24	Concrete Drive	1	EA	$ 1,280.00	$ 1,280
25	Asphalt Driveway	1	LS	$ 2,180.00	$ 2,180
26	Equipment Testing & Start-up	1	LS	$ 7,700.00	$ 7,700
27	Contractor Overhead & Profit (16%)				$ 129,210
28	Sales Tax (65% of above costs at 9.8%)				$ 51,440
29	Contingency (15%)				$ 121,130
30	General Conditions (15%)				$ 121,130
	TOTAL CONSTRUCTION COST (EQUIPPING)				$ 1,230,000
	TOTAL PROJECT COST (EQUIPPING)				$ 1,722,000

carollo
Engineers...Working Wonders With Water™

PLANNING COST ESTIMATE

PROJECT : Integrated Water and Wastewater Master Plan — **LOCATION FACTOR:** 0.887

JOB # : 9728A.00 — **DATE :** December-14

CLIENT : City of Goodyear — **ENR :** 0

ELEMENT : Force Main Construction — **BY :** NWD

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	8" Cl 52 Cldi Mj Pipe In Open Trench	1	LF	$31.57	$0.00	$31.57	$31.57	
	TOTAL PIPING (per LF)							**$31.57**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1Cy Bucket, Class B (Medium Digging), 0-16' D	0.7	CY	$4.38	$0.00	$4.38	$2.92	
	Trench Bracing, 3' W X 10' D, Wood Planks & X-Bracing	1.0	LF	$14.19	$0.00	$14.19	$14.19	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class A Material	0.2	CY	$55.55	$0.00	$55.55	$9.57	
	Native Trench Backfill/Unconfined Struct. Bf, Class A Material	0.5	CY	$11.99	$0.00	$11.99	$5.77	
	10% Site Specific Requirements	1	LS	$3.25	$0.00	$3.25	$3.25	
	TOTAL EARTHWORK (per LF)							**$35.70**
PAVING	Asphalt Pavement Cutting	8.0	inFT	$0.67	$0.00	$0.67	$5.32	
DEMO &	Remove 4"-6" Asphalt Pavement	0.6	SY	$5.70	$0.51	$6.21	$3.45	
REPLACEMENT	4" Ac Paving On 8" Abc	0.6	SY	$27.94	$2.24	$30.18	$16.76	
	TOTAL PAVING (per LF)							**$25.54**
	OVERHEAD (10%)							**$9.28**
	CONSTRUCTION PROFIT (6%)							**$5.57**
	SALES TAX (65% of above costs at 9.8%)							**$5.91**
	CONTINGENCY (15%)							**$13.92**
	GENERAL CONDITIONS (15%)							**$13.92**
	TOTAL CONSTRUCTION COST, LF							**$141.41**
	TOTAL PROJECT COST (1.4 times Const Cost), LF							**$197.98**

APPENDIX B – WATER AND WASTEWATER CIP PROJECT MAPS

Project Number: **WA1510**

Planning Period: FY 2016

Description: Equip Adaman Well 3 (1,300 gpm) north of Camelback Rd along Sarival. Arsenic Treatment for Adaman Well 3. Assumed 70% supply treated/30% supply blended.

Trigger: Satisfy water supply performance criteria.

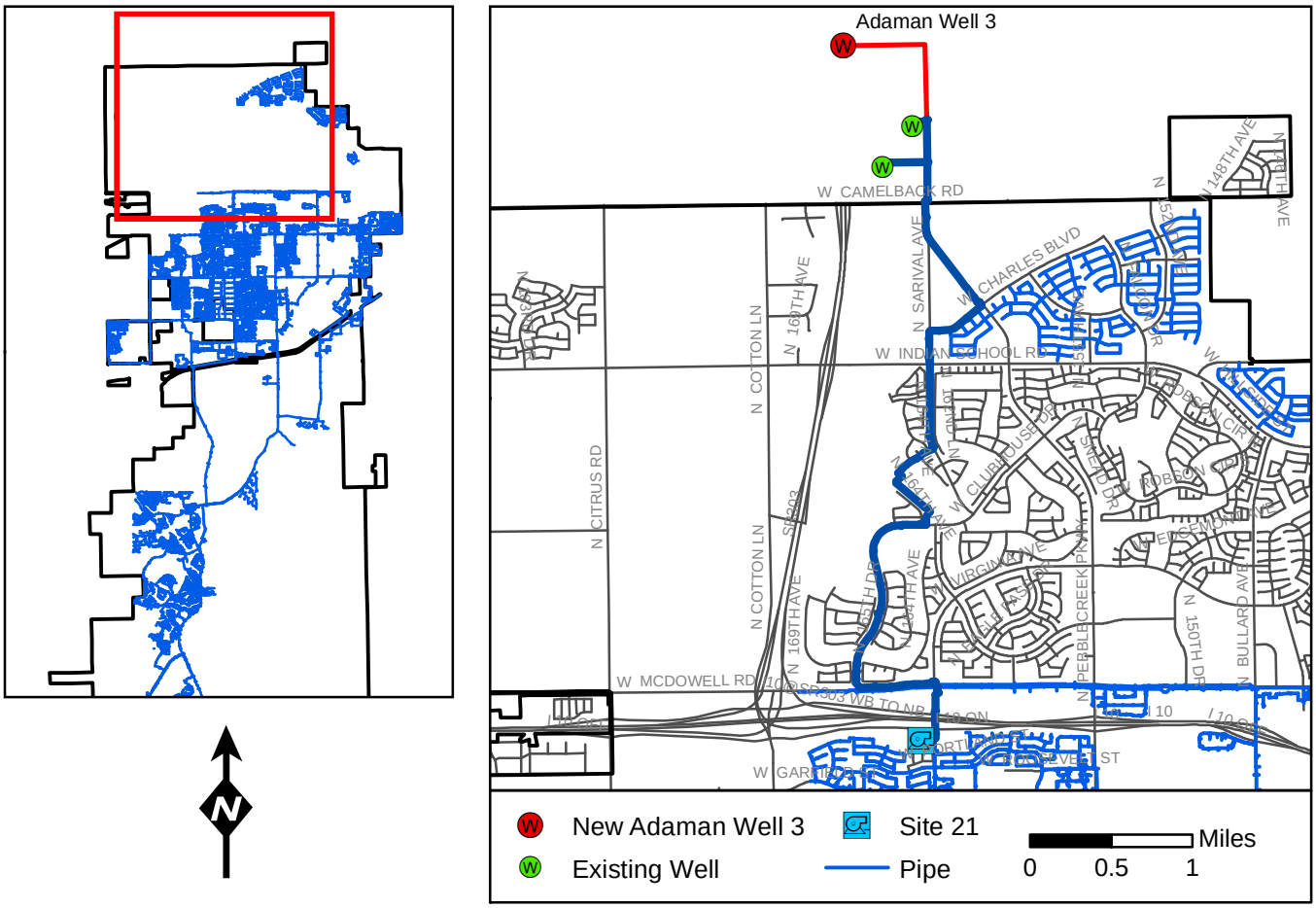
Justification: Increase water supply. Serve the employment / commercial area east of Highway 95, south and east of the Influent Pump Station. Treat for Arsenic to comply with water quality standards.

Facility Details:

	Well 3	Treatment	Pipe
Capacity, gpm / Length, ft	1,300	900	5,280

Planning Cost:

	Well 3	Treatment	Pipe
Construction Cost	$1,230,000	$1,676,000	$1,175,000
Project Cost	$1,722,000	$2,346,000	$1,645,000



Project Number: **IWMP_W1**

Planning Period: FY 2016

Description: Groundwater well siting study.

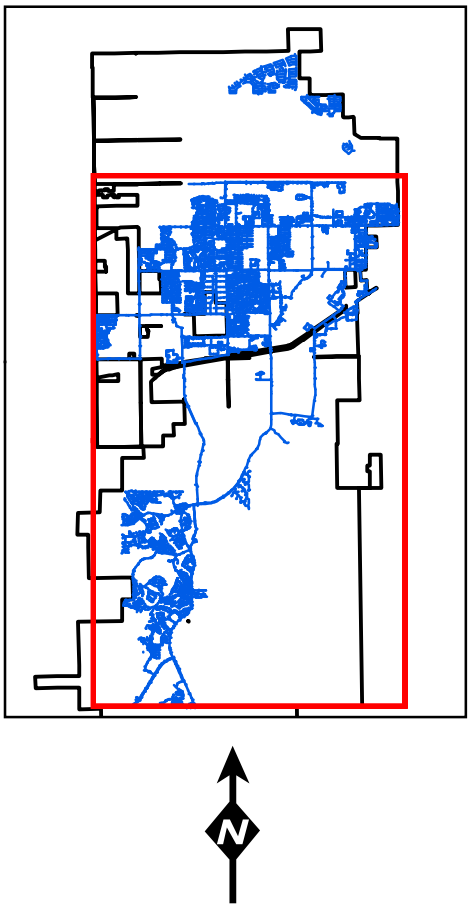
Trigger: Need for better groundwater supply.

Justification: Determine favorable locations for new groundwater wells in the north and south service areas.

Facility Details: N/A

Planning Cost:

	Study
Construction Cost	-
Project Cost	$100,000



Location: N/A

Project Number: **IWMP_W2**

Planning Period: FY 2016

Description: New well at Site 12 (1,200 gpm). Pipeline from new well to site 12. RO treatment for well, and land for well site.

Trigger: Satisfy water supply performance criteria.

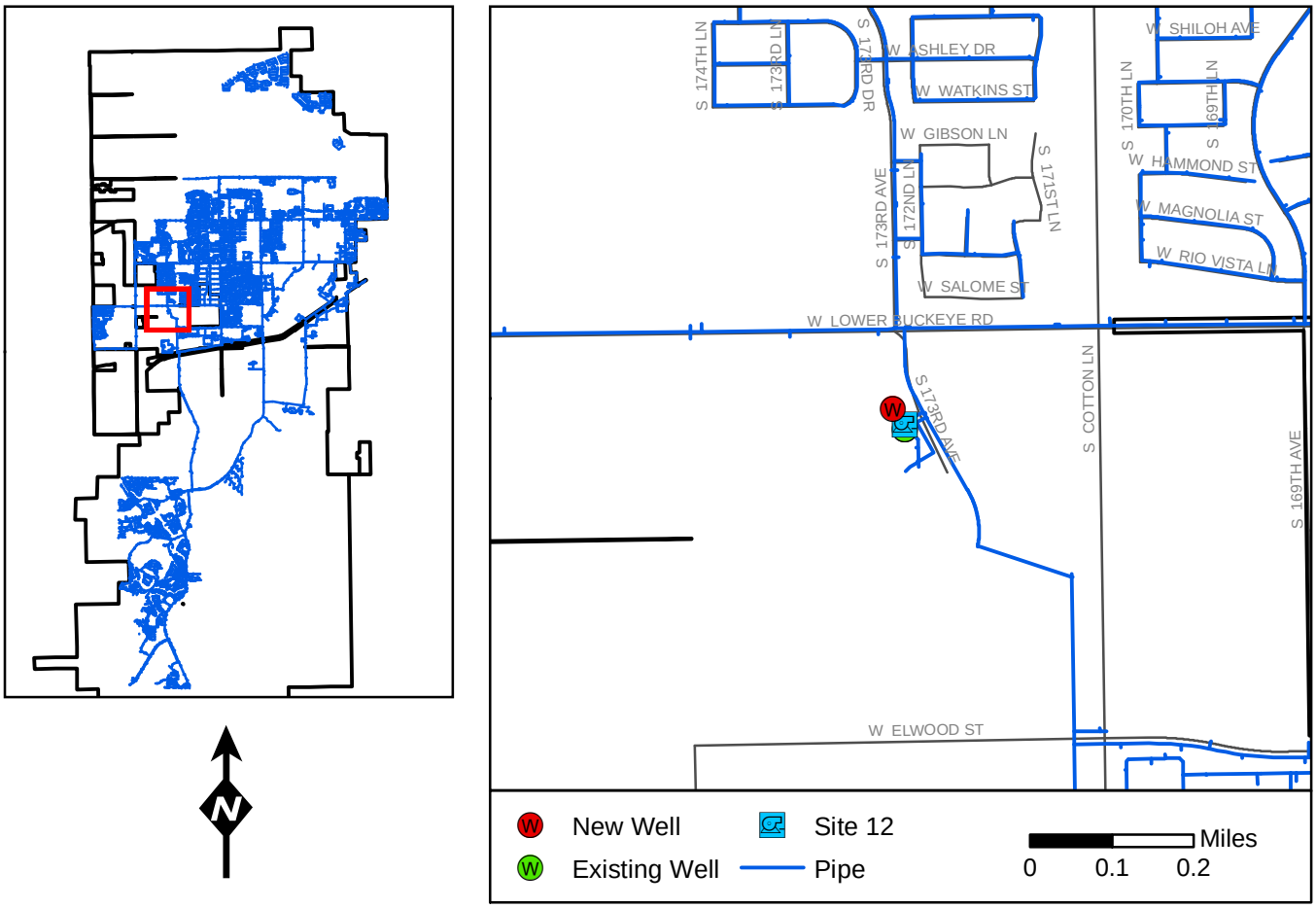
Justification: Deliver water to Site 12 for treatment, and comply with water quality standards. Increase water supply to the north and south zones.

Facility Details:

	Well	Treatment	Pipe to Site 12
Capacity, gpm	1,200	840	1,200

Planning Cost:

	Well	Treatment	Pipe to Site 12	Land
Construction Cost	$2,319,300	$1,547,900	$460,000	-
Project Cost	$3,247,000	$2,167,000	$644,000	$50,000



City of Goodyear Integrated Master Plan - Five Year CIP Plan

Print Date: January 28, 2015

File Path: M:\Client\Goodyear\9728A00\GIS\mxd\Deliverables\5-year CIP\GYCIP_W_3-IWMP_W2.mxd

Project Number: **WA1502**

Planning Period: FY 2016

Description: Install new pump (1,800 gpm) at Site 12 to increase capacity.

Trigger: Installation of new Site 12 well.

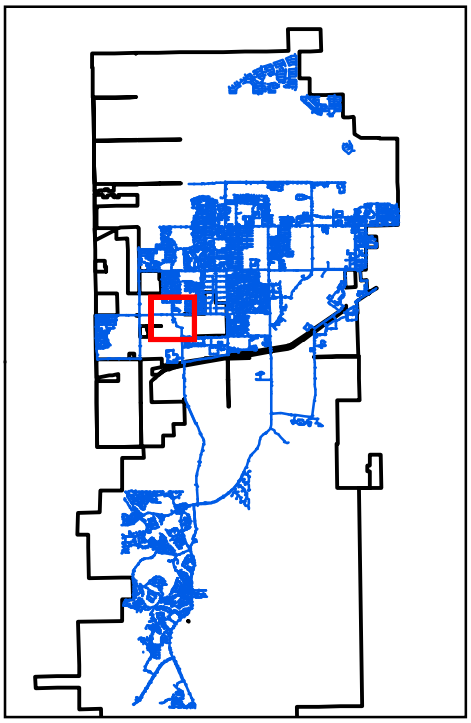
Justification: Meet peak hour pumping requirements.

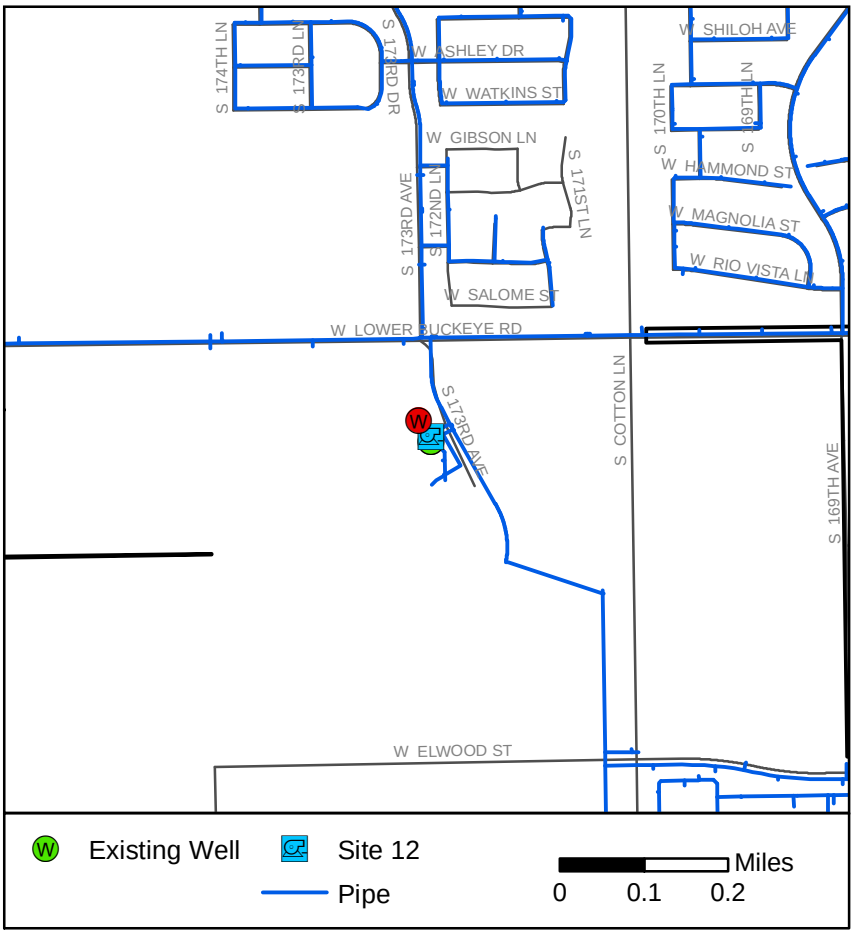
Facility Details:

	Pumps
Capacity, gpm	1,800

Planning Cost:

	Pumps
Construction Cost	$519,300
Project Cost	$727,000





Project Number: **IWMP_W3**

Planning Period: FY 2016

Description: 8-inch brine line for RO concentrate.

Trigger: Installation of new Site 12 well.

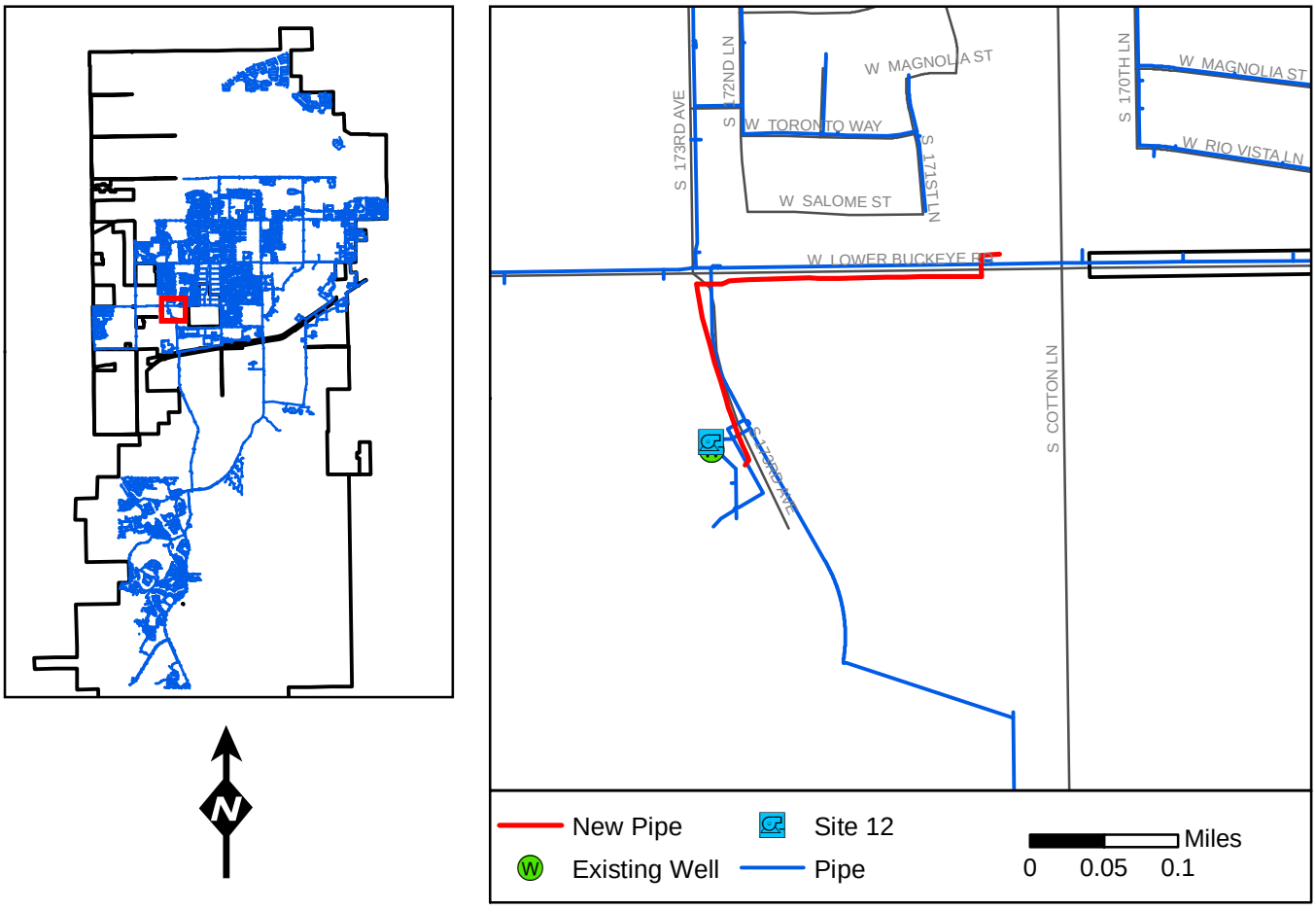
Justification: Meet water treatment requirements.

Facility Details:

	Pipe
Diameter, in	8

Planning Cost:

	Pipe
Construction Cost	$307,100
Project Cost	$430,000



Project Number: **IWMP_W4**

Planning Period: FY 2017

Description: New well at Site 12 (1,200 gpm). Pipeline from new well to site 12. RO treatment for well, and land for well site.

Trigger: Satisfy water supply performance criteria.

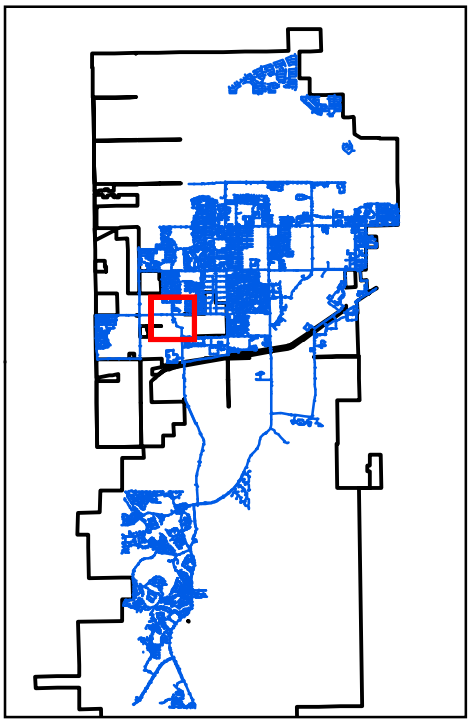
Justification: Deliver water to Site 12 for treatment, and comply with water quality standards. Increase water supply to the north and south zones.

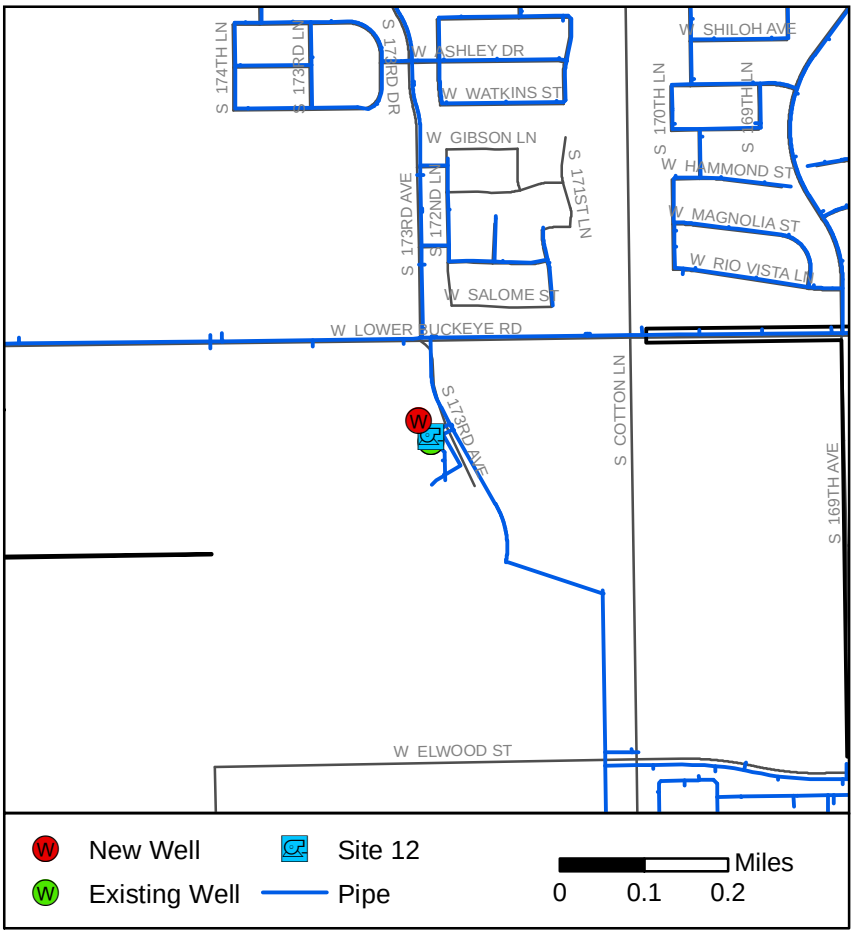
Facility Details:

	Well	Treatment	Pipe to Site 12
Capacity, gpm	1,200	840	1,200

Planning Cost:

	Well	Treatment	Pipe to Site 12	Land
Construction Cost	$2,319,300	$1,547,900	$460,000	-
Project Cost	$3,247,000	$2,167,000	$644,000	$50,000





Project Number: **IWMP_W5**

Planning Period: FY 2018

Description: Install a 1,000 gpm pump at Site 13 EMR zone 2.

Trigger: Required now to overcome inadequate pumping capacity to meet fire flow demands.

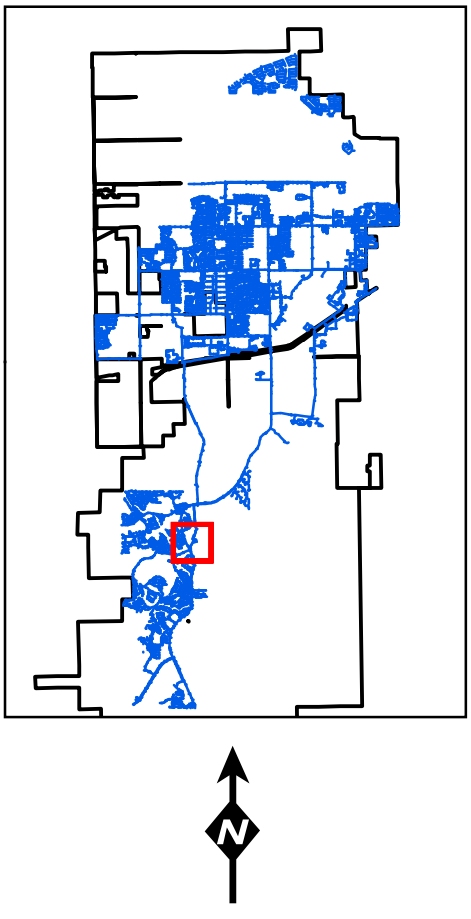
Justification: Meet fire flow requirements.

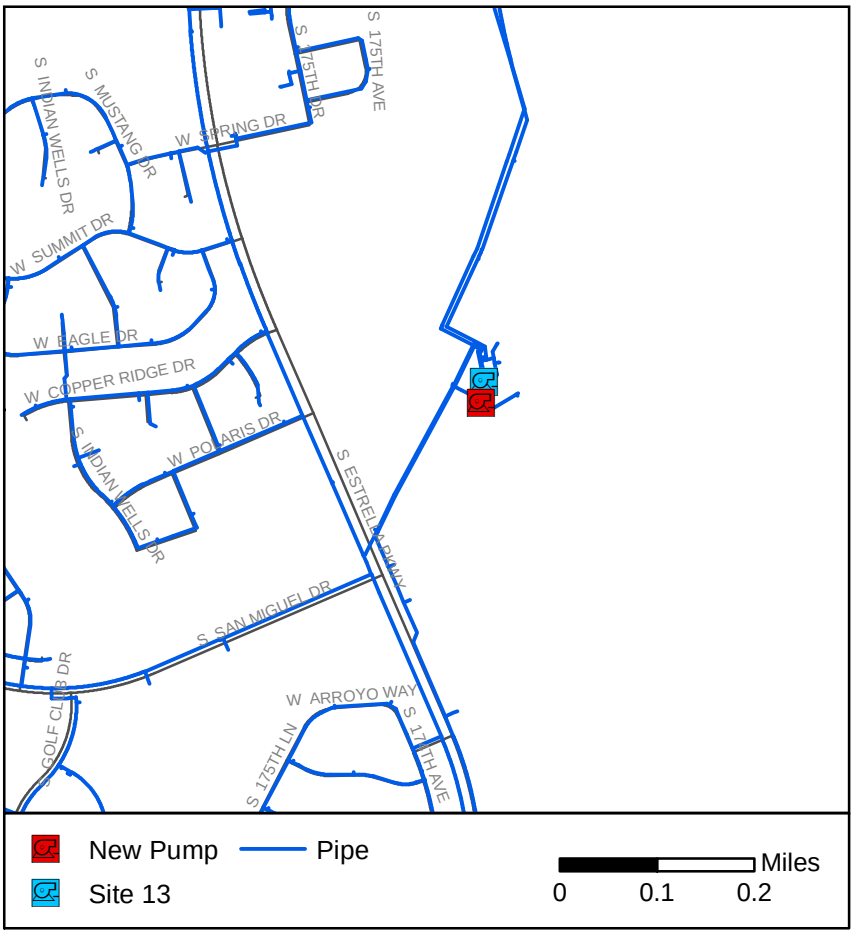
Facility Details:

	Pump
Capacity, gpm	1,000

Planning Cost:

	Pump
Construction Cost	$570,000
Project Cost	$798,000





Project Number: **IWMP_W6**

Planning Period: FY 2018

Description: Inline booster for Well 20. (2 MGD pump)

Trigger: Need for water supply redundancy.

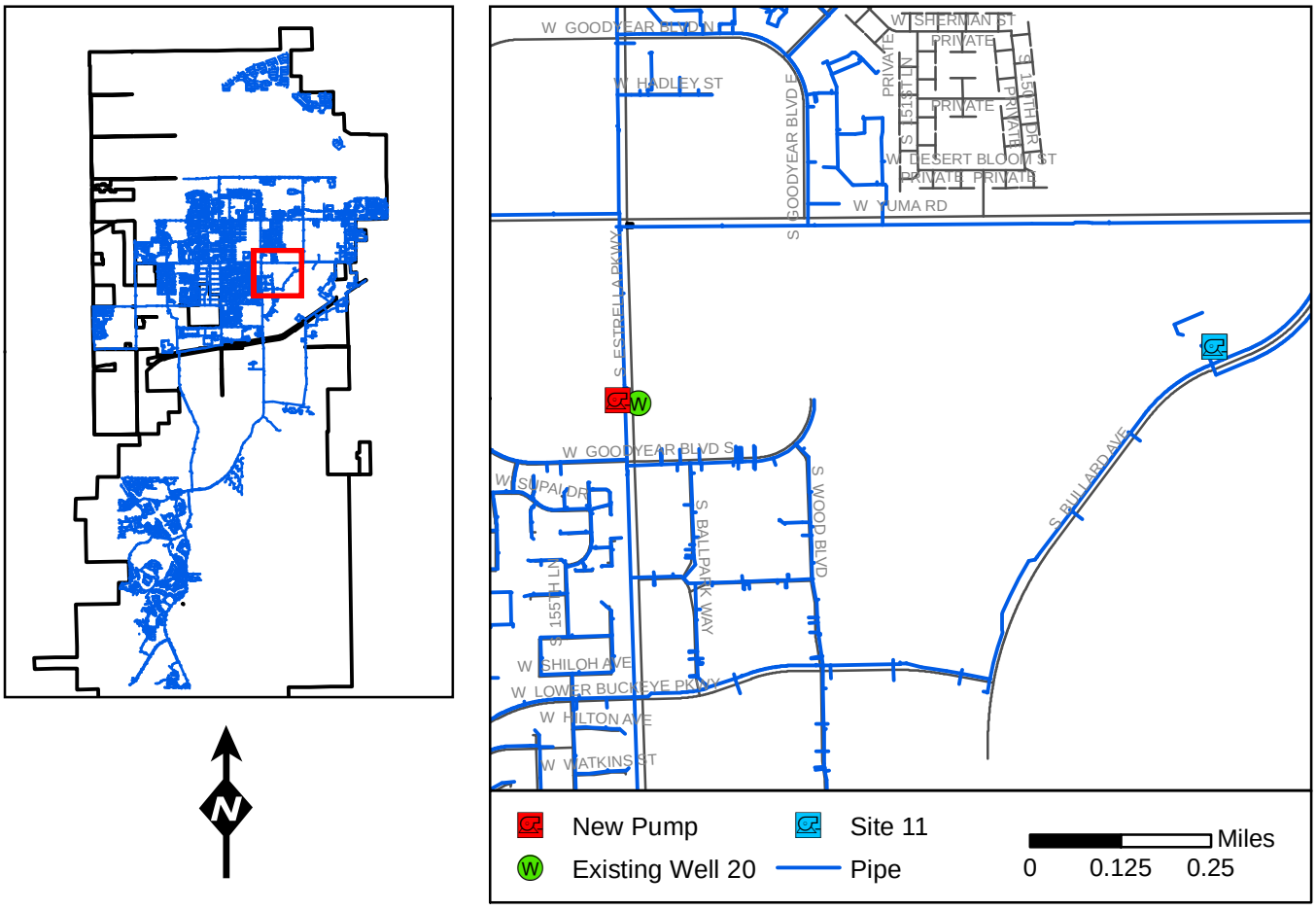
Justification: Boost pressure to go to Site 11 RO plant.

Facility Details:

	Pump
Capacity, MGD	2

Planning Cost:

	Pump
Construction Cost	$530,700
Project Cost	$743,000



Project Number: **IWMP_W7**

Planning Period: FY 2019

Description: 1.2 MG storage capacity for north service area and land.

Trigger: Serve existing customers.

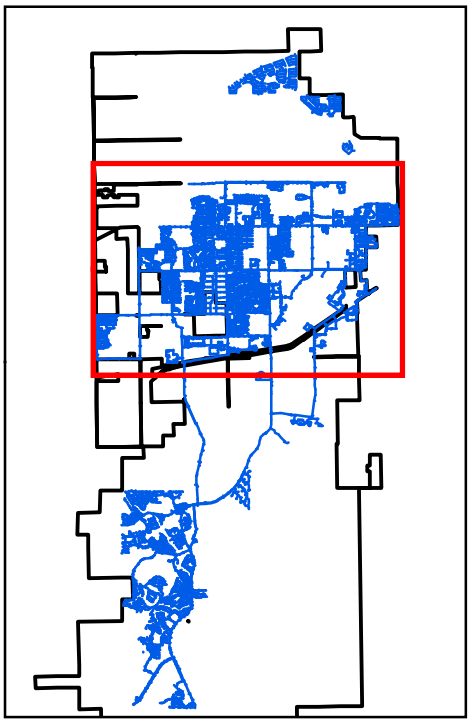
Justification: Meet system water storage requirements.

Facility Details:

	Tank
Capacity, MG	1.2

Planning Cost:

	Tank	Land
Construction Cost	$2,885,000	-
Project Cost	$4,039,000	$500,000



Location: North service area - actual location to be determined.

Project Number: **IWMP_W8**

Planning Period: FY 2020

Description: Replace 6 in water mains in Sarival Estates development with 8-in pipes.

Trigger: Complete work before a major failure causes a service disruption.

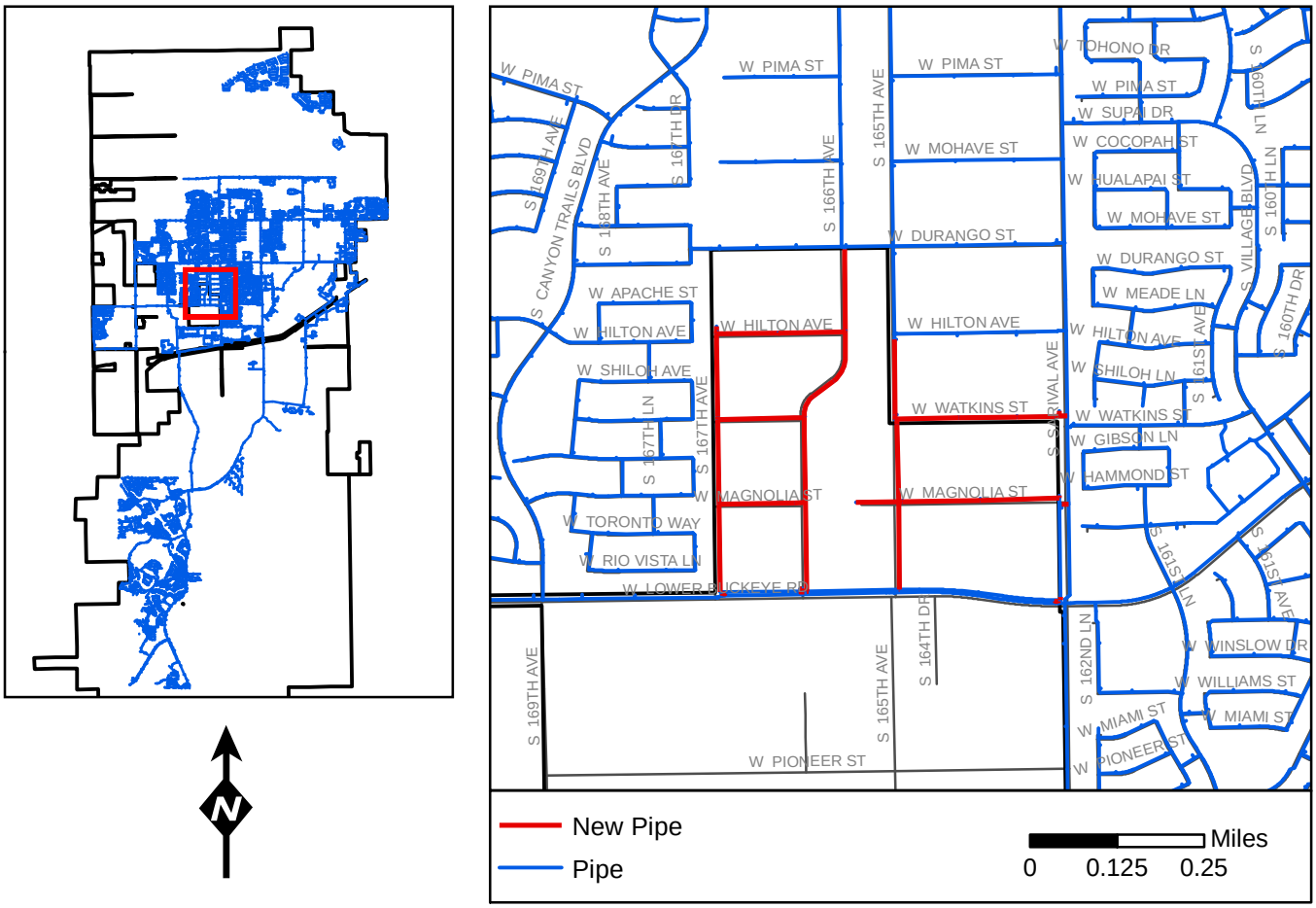
Justification: Address water main leaks/failures.

Facility Details:

	8-in Pipe
Length, ft	12,170

Planning Cost:

	8-in Pipe
Construction Cost	$2,164,300
Project Cost	$3,030,000



Project Number: **IWMP_W9**

Planning Period: FY 2020

Description: Create DMOM plan.

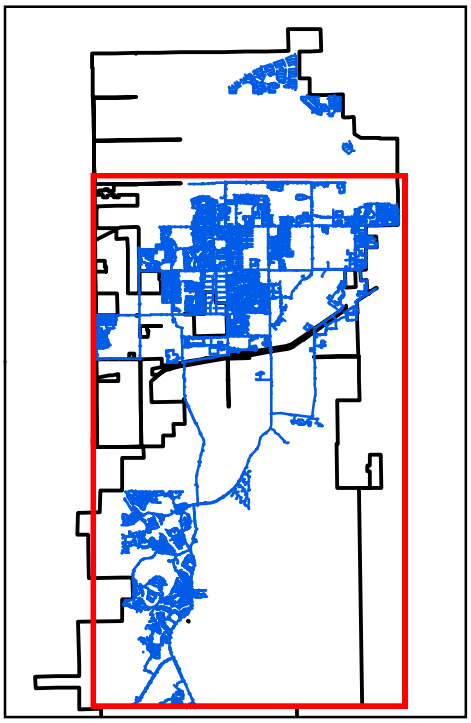
Trigger: N/A.

Justification: Proactive management of distribution system.

Facility Details: N/A

Planning Cost:

	Plan
Construction Cost	-
Project Cost	$100,000



Location: N/A

Project Number: **IWMP_WW1**

Planning Period: FY 2015

Description: Rehabilitate a manhole and extend the force main to a new location at the Wells Fargo lift station.

Trigger: Immediate. Currently only one pump can operate without causing spills.

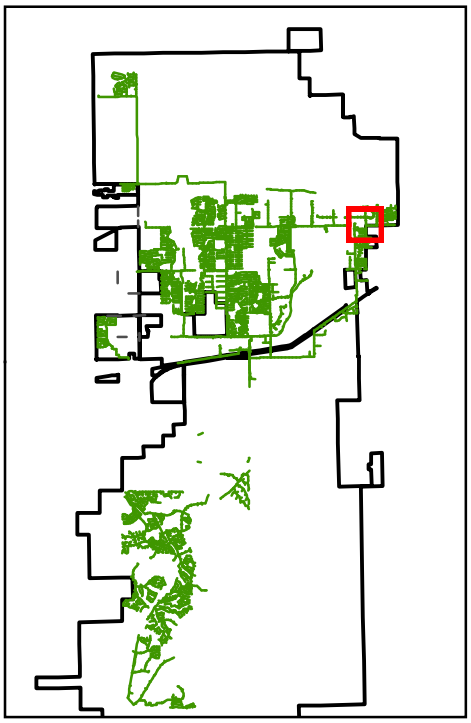
Justification: Stop overflows at the discharge manhole to the Wells Fargo lift station.

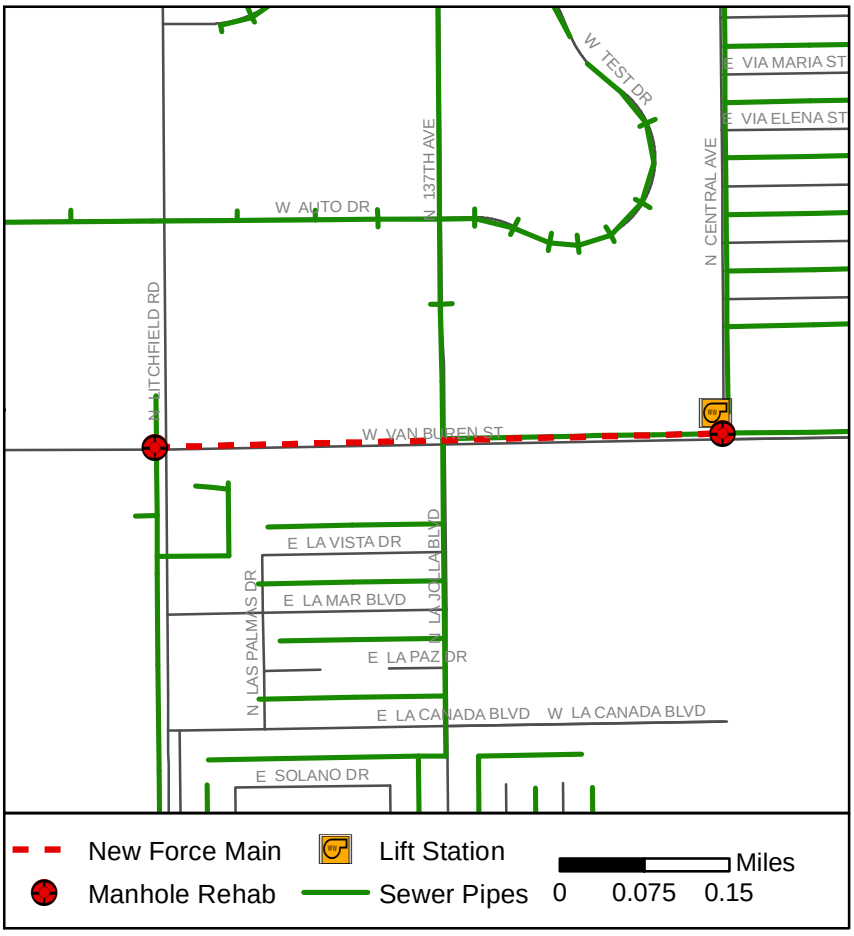
Facility Details:

	6-in Force Main	Manhole Rehabilitation
Length, ft / Depth, ft	2,761	5' & 8' Deep

Planning Cost:

	Manhole Rehabilitation	6" Force Main	Total
Construction Cost	$25,000	$372,000	$397,000
Project Cost	$35,000	$521,000	$556,000





Project Number: **IWMP_WW2**

Planning Period: FY 2016

Description: Replace gravity sewer line with larger pipe.

Trigger: Backups, deposition, and potential spills in the vicinity of Litchfield Road and Goodyear Parkway.

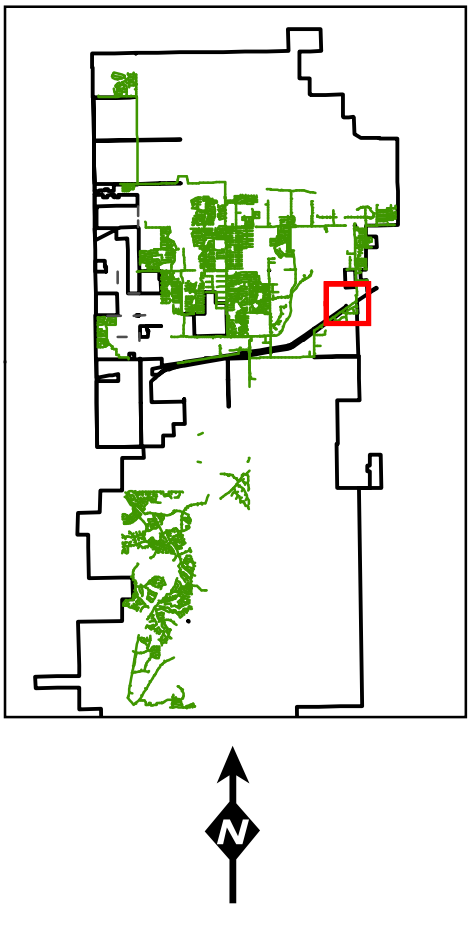
Justification: Increase capacity of the gravity sewer line.

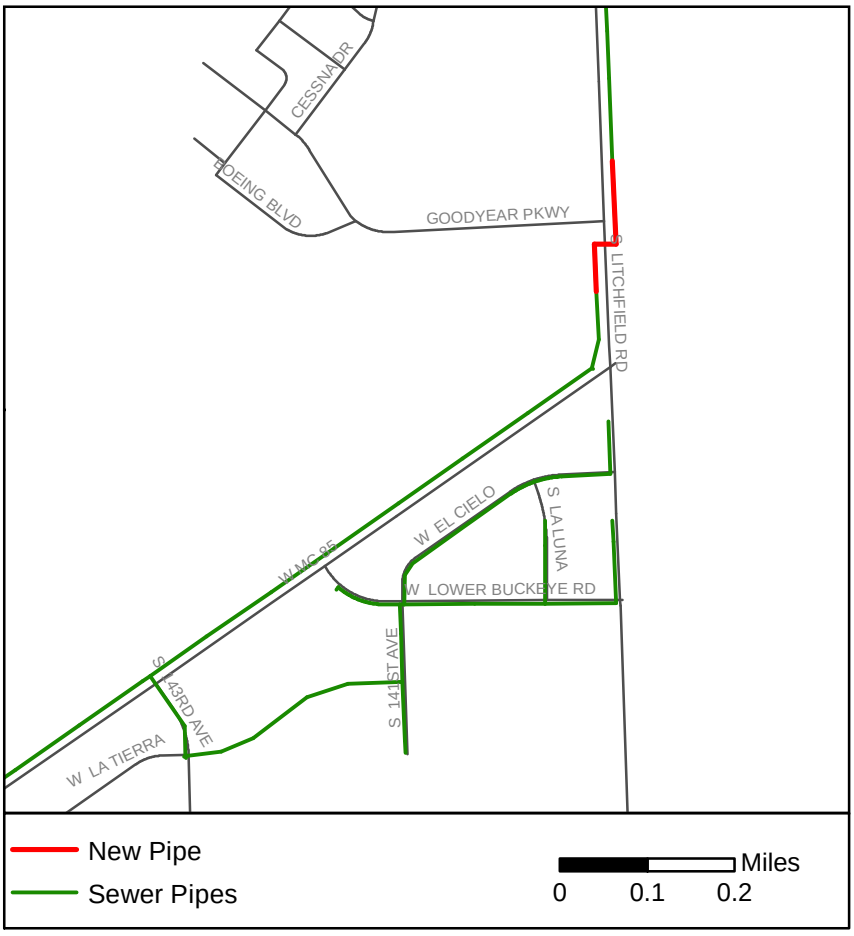
Facility Details:

	15-in Gravity Sewer
Length, ft / Number	200

Planning Cost:

	15-in Gravity Sewer
Construction Cost	$31,400
Project Cost	$44,000





Project Number: **IWMP_WW3**

Planning Period: FY 2016

Description: Replace screen at Perryville grinder station

Trigger: Funding availability.

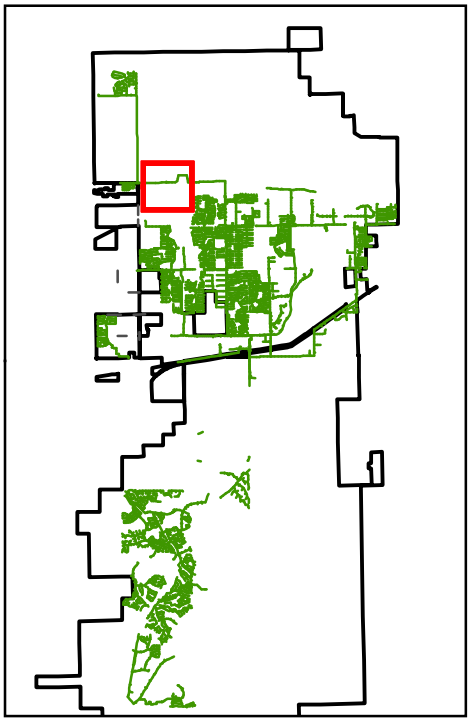
Justification: Reduce clogging and keep undesirable material out of the collection system and treatment plant

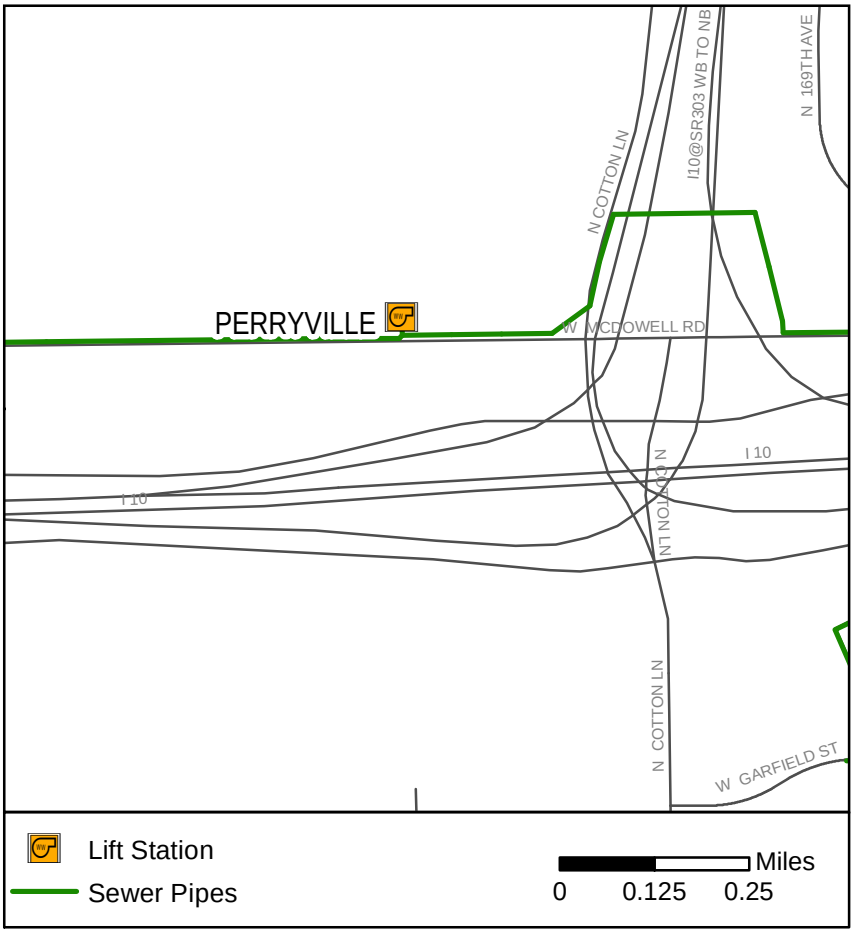
Facility Details:

	Grinder Screen
Quantity 1	1

Planning Cost:

	Grinder Screen
Construction Cost	$214,000
Project Cost	$300,000





Project Number: **IWMP_WW7**

Planning Period: FY 2016

Description: Implement CMOM Program.

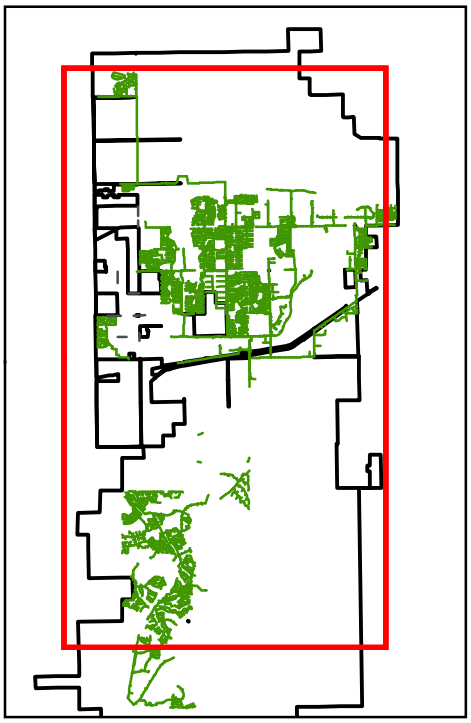
Trigger: Immediate following fund availability.

Justification: Proactively manage collection system to prevent spills and reduce lifecycle operating costs.

Facility Details: N/A

Planning Cost:

	Program
Construction Cost	-
Project Cost	$100,000



Location: N/A

APPENDIX C – WATER AND WASTEWATER CIP PROJECT SUMMARY

Water CIP Project Summary
5-Year CIP and Southern Solutions Plan
City of Goodyear

Project Number	Priority	Description	Justification	Location	Consequence of not Implementing Project	FY 2016 Costs	FY 2017 Costs	FY 2018 Costs	FY 2019 Costs	FY 2020 Costs	Total Project Cost	Summarized Total Project Cost
	-	CAP contract capital charges	Pay for CIP water supply	Goodyear City	No access to CAP water	$ 284,000	$ 284,000	$ 284,000	$ 284,000	$ 284,000	$ 1,420,000	$ 1,420,000
WA1510	1	Equip Adaman Well 3 (1,300 gpm) & As Trtmt	Increase water supply	North of Camelback Road along Sarival	Failure of other water supplies causes a failure of Goodyear's ability to deliver water on high water demand days, City fails to meet performance criteria for water supply	$ 1,722,000					$ 1,722,000	$ 5,713,000
		Connect the Adaman Well to the Sarival transmission main with 1/2 mile of 12-inch main and 1/2 mile of 24 inch main	Deliver Adaman well water	Sarival Road	Failure to use new Adaman well.	$ 1,645,000					$ 1,645,000	
		Arsenic Treatment for Adaman Well 3. Assumed 70% supply treated/30% supply blended.	Comply with water quality standards	Site 21	Water supply does not meet state and federal water quality standards.	$ 2,346,000					$ 2,346,000	
IWMP_W1	2	Groundwater well siting study	Determine favorable locations for new groundwater wells in the north and south service areas	Goodyear City	Wells may not be located to legally and physically deliver water	$ 100,000					$ 100,000	$ 100,000
IWMP_W2	3	New Site 12 Well (1,200 gpm)	Increase water supply	Assume well water can be delivered to Site 12 pending groundwater siting study	Satisfy water sypply performance criteria	$ 3,247,000					$ 3,247,000	$ 6,108,000
		Pipeline from new well to site 12	Deliver water to Site 12 for treatment	Undetermined well location to site 12	Satisfy water sypply performance criteria	$ 644,000					$ 644,000	
		RO treatment for well	Comply with water quality standards	Undetermined well location to site 12	Water supply does not meet state and federal water quality standards.	$ 2,167,000					$ 2,167,000	
		Land for well site	Increase water supply	Near site 12	Satisfy water sypply performance criteria	$ 50,000					$ 50,000	
WA1502	4	Site 12 Pumps (+ 1,800 gpm)	Meet peak hour pumping requirements	Site 12	Failure to supply peak demands	$ 727,000					$ 727,000	$ 727,000
IWMP_W3	5	8-inch brine line for RO concentrate	Water treatment requirements	Near Site 12	RO concentrate is not disposed of legally and properly	$ 430,000					$ 430,000	$ 430,000
IWMP_W4	6	Booster Pump Station 13 Reservoir Rehabilitation	Existing 1.5 MG Steel tank leaks and full use of the storage is not possible. Interior coating is failing; numerous corrosion locations on floor & walls	Booster PS 13	Loss of storage capacity can hinder fire fighting capabilities. Corrosion can lead to severe leaks and tank foundation being undermined.	$ 250,000					$ 250,000	$ 250,000
IWMP_W5	78	Well 19 production improvement	Well production has dropped from 1200 gpm in 2010, to 850 gpm in 2014.	Well 19	Loss of production here requires a makeup somewhere else - system wide. This pump operates 365 days	$ 300,000					$ 300,000	$ 300,000
IWMP_W6	8	Well 19 Block Wall	Protect integrity of Well 19	Well 19	Well 19 suseptible to damage	$ 69,303					$ 69,303	$ 69,303
IWMP_W7	9	New Site 12 Well (1,200 gpm)	Increase water supply	Assume well water can be delivered to Site 12 pending groundwater siting study	Satisfy water sypply performance criteria		$ 3,247,000				$ 3,247,000	$ 6,108,000
		Pipeline from new well to site 12	Deliver water to Site 12 for treatment	Undetermined well location to site 12	Satisfy water sypply performance criteria		$ 644,000				$ 644,000	
		RO treatment for well	Comply with water quality standards	Undetermined well location to site 12	Water supply does not meet state and federal water quality standards.		$ 2,167,000				$ 2,167,000	
		Land for well site	Increase water supply	Near site 12	Satisfy water sypply performance criteria		$ 50,000				$ 50,000	
IWMP_W8	10	Well 18A casing and screen replacement - Re-drill and equip well using municipal standards	Well production has reduced since 1998 and the Johnson screens have many holes resulting in sand and filter pack being pumped out.	Well 18A	Loss of water production to meet water demands		$ 1,000,000				$ 1,000,000	$ 1,000,000
IWMP_W9	11	Well 18B casing and screen replacement - Re-drill and equip well using municipal standards	Well production has reduced since 1998 and the Johnson screens have many holes resulting in sand and filter pack being pumped out.	Well 18B	Loss of water production to meet water demands		$ 1,000,000				$ 1,000,000	$ 1,000,000
IWMP_W10	12	Bullard RO Campus filter assembly rehabilitation or replacement	The South filter assemblies are corroding excessively due to leaks	Bullard RO Campus	Loss of filter assemblies could result in damage to RO membranes and loss of production; high O&M costs		$ 75,000				$ 75,000	$ 75,000
IWMP_W11	13	Bullard RO Campus SST piping improvements	SST influent piping has developed multiple pin holes caused by corrosion.	Bullard RO Campus	Loss of influent piping will shut down the RO process		$ 60,000				$ 60,000	$ 60,000
IWMP_W12	14	Add an additional 1000 gpm pump at Site 13	Meet fire flow requirements	Site 13	Failure to provide sufficient fire flow for emergency events			$ 798,000			$ 798,000	$ 798,000
IWMP_W13	15	Well 1 redrill and re-equip using municipal standards.	Old irrigation well with slot cuts in casing installed 1940 +/-. Past useful life	Well 1	Loss of water production to meet water demands			$ 6,108,000			$ 6,108,000	$ 6,108,000
IWMP_W14	16	1.2 MG storage capacity for north service area	Meet system water storage requirements	North service area - actual location to be determined.	Failure to satisfy storage performance criteria				$ 4,039,000		$ 4,039,000	$ 4,539,000
		Land for 1.2 MG reservoir	Land is required for a storage site	to be determined	Additional storage not possible				$ 500,000		$ 500,000	
IWMP_W15	17	Well 3 well redrill and re-equip using municipal standards	Old irrigation well with slot cuts in casing installed 1960 +/-. Casing is fragile and City does not brush to clean	Well 3	Loss of water production to meet water demands				$ 1,000,000		$ 1,000,000	$ 1,000,000
IWMP_W16	18	Replace mains in Sarival Estates	Address leaks/failures	Northwest corner of Sarival and Lower Buckeye Rd	Water leaks and pipeline failures continue to occur, with corresponsing costs.					$ 2,904,000	$ 2,904,000	$ 2,904,000
IWMP_W17	19	Create DMOM plan	Proactive management of distribution system	N/A	Water distribution system maintenance and capacity management not consistently implemented, increasing the risk of infrastructure failures and/or failure to deliver water.					$ 100,000	$ 100,000	$ 100,000
IWMP_W18	20	Booster Pump Stations "cans" corrosion evaluation study - all pump stations	Field site visits noted numerous pump stations were significant corrosion was observed at the interface of the pump "can" and the concrete. How bad is the corrosion?	At various pump stations	Loss of pumping capability to meet water demands if "cans" collapse into the pumps					$ 150,000	$ 150,000	$ 150,000
					Subtotal	$ 13,981,303	$ 8,527,000	$ 7,190,000	$ 5,823,000	$ 3,438,000	$ 38,959,303	$ 38,959,303
					WATER 5-YEAR CIP TOTAL	$ 38,959,303						

ENR CCI = 9886

Costs are not escalated in future years.

Wastewater CIP Project Summary
5-Year CIP and Southern Solutions Plan
City of Goodyear

Project Number	Priority	Description	Justification	Location	Consequence of not Implementing the Project	FY 2016 Costs	FY 2017 Costs	FY 2018 Costs	FY 2019 Costs	FY 2020 Costs	Total Project Costs
WW-1	1	Rainbow Valley WRF Influent Pump Station	Lack of instrumentation on the piping system prevents monitoring pump performance and wetwell levels	Rainbow Valley WRF	Potential spill from overflowing wetwell; premature pump failure	$ 70,100					$ 70,100
WW-2	2	Rainbow Valley WRF Sludge Holding Tanks	Significant piping and valving improvements are required to enable process operations to be efficient	Rainbow Valley WRF	Potential violations of discharge permit due to lack of process redundancy	$ 157,700					$ 157,700
WW-3	3	Goodyear WRF (157th Ave) Solids Handling Facility upgrade	Rehabilitation and upgrade of existing equipment and installation of finer screening unit for process improvement	Goodyear WRF	Potential violations of discharge permit due to lack of process redundancy, and aging equipment	$ 1,351,900					$ 1,351,900
WW-4	4	Perryville Grinder Station - screen and auger installation	Solids from Perryville Prison are not removed from the collection system and cause debris issues at the Goodyear WRF	Perryville Grinder Station	Potential for backup of collection system at prison; increased O&M at Goodyear WRF to remove debris	$ 300,000					$ 300,000
WW-5	5	Replace Wells Fargo force main	Continual problem with surcharging of wet well and pumps cannot be fully utilitzed	Wells Fargo Lift Station	Potential for backup in collection system is high	$ 556,000					$ 556,000
WW-6	6	Upsize approximately 300 LF of gravity sewer pipeline	Continual problem with surcharging and debris accumulation; O&M costs are high	Prison connection to Goodyear system	Potential for backup in collection system is high	$ 190,000					$ 190,000
WW-7	7	Lift Station 12 - Rainbow Valley Lift Station Influent piping and wetwell rehabilitation	Influent piping has corroded and fallen off its connection resulting in need to operate wet well with higher level than best practices; wet well re-coating	Rainbow Valley Lift Station	Loss of capacity in wet well for pump cycling risking potential backup in collection system	$ 148,000					$ 148,000
WW-8	8	Lift Station 7 - Ricardo LS pumps replacement, guide rails, chains and wet well coatings, Lift Station 8 - Irene LS pumps replacement, guide rails, chains and wet well coatings	Pumps need replacement along with piping and guide rails; wet well coating needs rehabilitation	Lift Station 7 and 8	Potential failure of pumps to operate and subequent spill, backup in collection system	$ 335,000					$ 335,000
WW-9	9	Implement CMOM program	Proactively manage collection system to prevent spills and reduce life cycle operating costs	Citywide	Collection system is not systematically maintained so the risk of sewer overflows increases; maintenance costs increase as repairs must be done after failures occur.	$ 225,000					$ 225,000
WW-10	10	Rehabilitation of severely corroded sewer manholes that force mains discharge into	Precast concrete manholes have been severely corroded due to high H2S and are at risk of failing	Various locations in collection system	Potential for manhole collapse causing disruption and/or injury if the manhole is located in a roadway	$ 270,000					$ 270,000
WW-11	11	Goodyear WRF (157th Ave) South Digester Rehabilitation	Aging and cracked digester needs repair or replacement to prevent leakage into the aquifer	Goodyear WRF	Potential Contamination of the Aquifer; violation of discharge permit	$ 315,000					$ 315,000
WW-12	12	Rehabilitation of QS 59 small diameter sewer pipelines and associated manholes using no-dig CIPP methods	Existing small diameter VCP sewer pipes have numerous cracks and allow significant root intrustion resulting in excesive maintenance	QS 59	Potential sewer line backup and subsequent overflow of sewage, violation of permit	$ 1,600,000					$ 1,600,000
WW-13	13	Goodyear WRF (157th Ave) Solids Handling Facility upgrade	Addition of 3rd centrigue for process redundancy	Goodyear WRF	Potential violations of discharge permit due to lack of process redundancy, and aging equipment		$ 1,204,300				$ 1,204,300
WW-14	14	Lift Station 5 - Bio Flora LS pump replacement; piping	Pumps need replacement along with piping and guide rails	Lift Station 5	Potential failure of pumps to operate and subequent spill, backup in collection system		$ 184,000				$ 184,000
WW-15	15	Corgett WRF Influent PS and Headworks Improvements	Need to address wetwell corrosion, replace grit removal and washer/compactor equipment	Corgett WRF	Potential violations of discharge permit due to aging equipment and process inefficiencies		$ 793,400				$ 793,400
WW-16	16	Rainbow Valley WRF waterline extension	Need to connect to domestic water system for supply of water at the WRF; addition of Fire Hydrant	Rainbow Valley WRF	Continue to haul potable water to site for lab and personnel use; lack of fire fighting capability on site		$ 123,500				$ 123,500
WW-17	17	Rainbow Valley WRF Aeration Basin improvements and membrane replacment	Replace failied aeration membranes, and make significant upgrades to air piping for process improvements	Rainbow Valley WRF	Potential violations of discharge permit due to lack of process redundancy, and failed equipment		$ 237,600				$ 237,600
WW-18	18	Rainbow Valley WRF RAS/WAS Pump Station improvements	Addition of VFDs on pump motors, MOV for control valve and piping from ARVs to wetwell	Rainbow Valley WRF	Potential spill from ARVs discharging to ground; potential premature equipment failure; inefficient use		$ 51,700				$ 51,700
WW-19	19	Rainbow Valley solids Handling Area improvements	Improvements to solids handling area	Rainbow Valley WRF	Potential violations from dewatered solids spilling onto the ground rather than into bin or concrete slab		$ 63,200				$ 63,200
WW-20	20	Lift Station 10 - Lum LS- pump replacement	Pumps need replacement along with ARVs and piping, wet well coatings need rehabilitation	Lift Station 10 - Lum	Potential failure of pumps to operate and subequent spill, backup in collection system		$ 167,000				$ 167,000
WW-21	21	Rehabilitation of severely corroded sewer manholes within collection system	Precast concrete manholes have been severely corroded due to high H2S and need rehabilitation	Various locations in collection system	Potential for manhole collapse causing disruption and/or injury if the manhole is located in a roadway		$ 500,000				$ 500,000
WW-22	22	Lift Station 6 - (Lost LS) - pump replacement and wet well rehabilitation	Pump station is 28 years old - pumps have outlived useful life; wet well is highly corroded; site security	Lift Station 6 (Lost LS)	Potential failure of pumps to operate and subequent spill, backup in collection system			$ 275,000			$ 275,000
WW-23	23	Lift Station 3 - Palm Valley LS pumps replacement; generator panel; wet well coating	Pumps need replacement along with piping and guide rails; wet well coating needs rehabilitation	Lift Station 3	Potential failure of pumps to operate and subequent spill, backup in collection system			$ 90,000			$ 90,000
WW-24	24	Corgett WRF Chlorine Contact Basin Improvements	Optimize chlorine dosing to ensure proper chlrine levels in effluent	Corgett WRF	Over spending chemicals, dischargin effluent with too high chlorine levels			$ 157,300			$ 157,300
WW-25	25	Lift Station 12 - Rainbow Valley Lift Station Pump Replacement	Area being served is growing and there is no redundancy at the lift station	Rainbow Valley Lift Station	Potential failure of pumps to operate and subequent spill, backup in collection system			$ 101,000			$ 101,000
WW-26	26	Rehabilitation of severely corroded sewer manholes that force mains discharge into	Precast concrete manholes have been severely corroded due to high H2S and are at risk of failing	Various locations in collection system	Potential for manhole collapse causing disruption and/or injury if the manhole is located in a roadway			$ 500,000			$ 500,000
WW-27	27	Rehabilitation of severely corroded sewer manholes within collection system	Precast concrete manholes have been severely corroded due to high H2S and need rehabilitation	Various locations in collection system	Potential for manhole collapse causing disruption and/or injury if the manhole is located in a roadway				$ 500,000		$ 500,000
WW-28	28	Rainbow Valley WRF Tertiary Filter Unit Replacement	Existing traveling bridge filter unit is at the end of its useful life and needs to be replaced	Rainbow Valley WRF	Potential violation of discharge permit				$ 552,000		$ 552,000
WW-29	29	Lift Station 13 - Las Brisas LS install 3rd 70 HP pump	Pump needed for redundancy and reliability	Lift Station 13	Loss of capacity of LS for pump cycling risking potential backup in collection system				$ 102,000		$ 102,000
WW-30	30	Lift Station 12 - Rainbow Valley Lift Station Pump Replacement	Area being served is growing and there is no redundancy at the lift station	Rainbow Valley Lift Station	Potential failure of pumps to operate and subequent spill, backup in collection system				$ 101,000		$ 101,000
WW-31	31	Corgett WRF Scum Pump Station addition/ Chemical Storage and Feed system	Scum should be sent to digesters not to influent PS; relocate chemical storage tanks	Corgett WRF	Process remains inefficient and more costly to operate; comply with Best Practices					$ 86,400	$ 86,400
WW-32	32	Lift Station 2 - Del Camino LS wet well rehabilitation	Wet well concrete strength is compromised due to corrosion	Lift Station 2	Potential to disrupt lift station operations if concrete spalls off					$ 70,000	$ 70,000
WW-33	22	Lift Station 12 - Rainbow Valley Lift Station Pump Replacement	Area being served is growing and there is no redundancy at the lift station	Rainbow Valley Lift Station	Potential failure of pumps to operate and subequent spill, backup in collection system					$ 101,000	$ 101,000
WW-34	34	Rehabilitation of severely corroded sewer manholes within collection system	Precast concrete manholes have been severely corroded due to high H2S and need rehabilitation	Various locations in collection system	Potential for manhole collapse causing disruption and/or injury if the manhole is located in a roadway					$ 1,000,000	$ 1,000,000
						$ 5,518,700	$ 3,324,700	$ 1,123,300	$ 1,255,000	$ 1,257,400	$ 12,479,100
					5-Year Wastewater CIP Grand Total	$ 12,479,100					

ENR CCI = 9886

Costs are not escalated in future years.