11.2.8 30 TAC Chapter 217 Subchapter C Requirements

Table 11-3: High Point TAC Requirements

Requirement	Reference	Satisfied (Yes/No)
Site Requirements	§217.59	No: lacks access roadway, no perimeter fence
Design Considerations	§217.60	No: lacks ventilation
Pumps	§217.61	Yes
Pipes	§217.62	Yes
Emergency Provisions	§217.63	No: lacks back-up generator, no signage

11.3 Conclusions

The following conclusions were developed from the evaluation of the High Point lift station:

- The station has poor security as indicated by the lack of perimeter fencing, gates, and signage.
- Site area itself it not well-kept; overgrown grass is evident
- There is no access roadway
- Drainage problems are evident from the pools of accumulated rainwater
- Groundwater infiltration is present in the wet well as reported by City staff
- Upgraded control panel will be installed in the coming weeks
- Site lacks back-up power capabilities
- Ventilation is required

11.4 Recommendations

- Install SCADA interface for alarms and run-status indicators
- Equip site with back-up power capability
- Construct access roadway
- Install perimeter fencing along with associated barbed wire and signage
- Landscaping is recommended to improve site area
- Install ventilation pipe

11.5 OPCC

The site and facility improvements are estimated to cost $56,900.

Table 11-4: High Point OPCC

Item Description	Quantity	Unit	Unit Cost	Total Cost
High Point				
SCADA	1	EA	$ 35,000	$ 35,000
Generator connection	1	EA	$ 2,000	$ 2,000
Access roadway	1	LS	$ 7,300	$ 7,300
Ventilation pipe	1	EA	$ 500	$ 500
Misc. (fence, barbed wire, signage, landscaping)	1	LS	$ 12,100	$ 12,100
Total				$ 56,900

12.0 Carter Ranch Phase II Lift Station

12.1 Lift Station Overview

The Carter Ranch Phase II Lift Station was constructed in 2004 and consists of a control panel, three Flygt model MP 3127 pumps, and the physical lift station structure. This lift station will be placed offline in the near future with a CIP project. The lift station services the surrounding neighborhood, which includes approximately 930 houses. It pumps to the Upper Trinity Regional Water District Doe Branch Interceptor.

12.2 Condition Assessment

12.2.1 Security

The site is located off of Preston Road and is enclosed by a chain-link perimeter fence. The fence does not contain barbed wire nor does it have signs to prevent trespassing. The access gate is secured with a padlock to restrict access and can easily accommodate a vehicle. The control panel is also secured with a padlock and a remote alarm.

Figure 12-1: Site Perimeter at Carter Ranch LS

12.2.2 Civil

The perimeter fence appears to be good condition with no signs of corrosion. The access roadway is constructed with concrete and appears to have drainage problems. This is indicated in Figure 12-2. Inside the perimeter fence, the ground is covered with grass and large aggregate. There appears to be drainage problems as indicated by the pools of rainwater and algae near the access gate.

Figure 12-2: Access Gate at Carter Ranch LS

Figure 12-3: Site Interior at Carter Ranch LS

12.2.3 Access

The site has sufficient access for maintenance as indicated by the concrete roadway, large width of the access gate, and ample space within the perimeter fence. It can easily accommodate a work truck and provide access to the wet wells. The hatch access to the top of the wet well is an aluminum hatch. It is fastened to the top of the wet well with hinges, providing adequate access to the pumps.

Figure 12-4: Site Access at Carter Ranch LS

12.2.4 Pumping and Mechanical

The lift station is comprised of three Flygt model MP 3127 pumps, two with 7.5 HP motors and one with a 10 HP motor. The piping and associated supports appear to be in good condition with no major signs of rust or leakage.

Figure 12-5: Pump Controls at Carter Ranch LS

Figure 12-6: Valve Boxes at Carter Ranch LS

12.2.5 Controls and Instrumentation

The lift station pumps are controlled by a series of mercury floats that pump the lift station wet well down according to set elevations. The floats terminate into the control panel where they activate a motor contactor to start and stop the pumps. The control panel has the following switches present: a master on/off, run status indicators, elapsed time meters, and hand/off/auto. The control panel is not connected to SCADA, thus a SCADA interface is required for alarms and run-status indicators. A red alarm beacon is present, providing a 360 degree visual check of alarm condition.

The controls are in good working condition and operate as designed and intended. The panel is secured with a padlock to ensure security. The site lacks back-up generator capabilities.

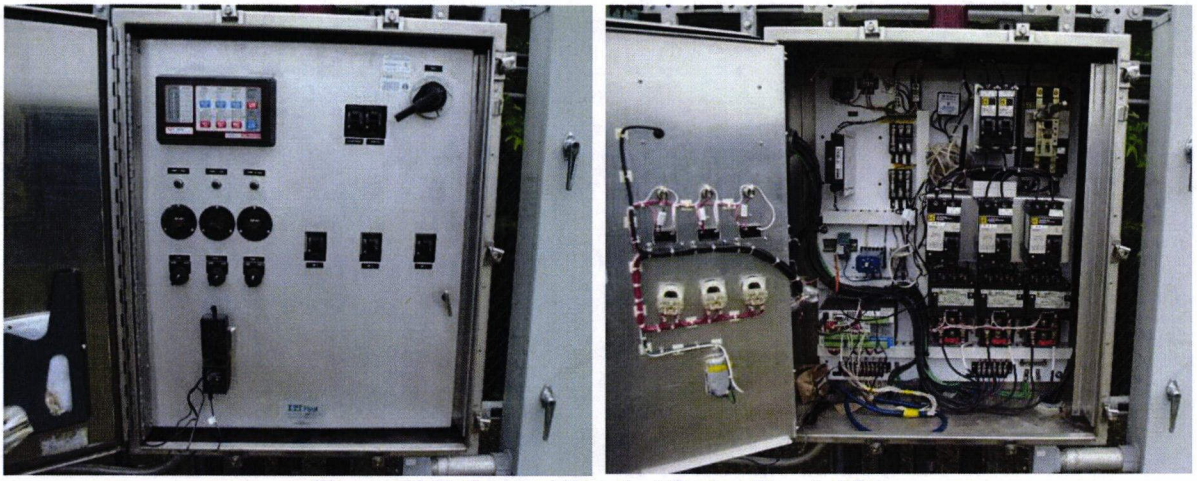


Figure 12-7: Control Panel at Carter Ranch LS

12.2.6 Condition Assessment

Table 12-1: Carter Ranch Phase II Condition Assessment Ratings

Aspect	Rating
Site Security	Fair
Site Civil	Fair
Access	Good
Pumping and Mechanical	Good
Controls and Instrumentation	Good

Based on the summary above, the overall condition is determined to have an average rating of good.

12.2.7 Lift Station Design Data

Table 12-2: Carter Ranch Phase II Design Data

Lift Station	Carter Ranch Phase II
Address	4100 S Preston Road
Year Constructed	2004
Recent Improvements	NA
Capacity one pump, gpm	133
Capacity two pumps, gpm	200 (est)
Rated Total Dynamic Head (TDH), ft	NA
Type of Pump	Submersible
Manufacturer	Flygt
Model	MP 3127
Volts/Ph/Hz	480/3/60
Motor HP	7.5 (two); 10 (one)

12.2.8 30 TAC Chapter 217 Subchapter C Requirements

Table 12-3: Carter Ranch Phase II TAC Requirements

Requirement	Reference	Satisfied (Yes/No)
Site Requirements	§217.59	No: lacks barbed wire
Design Considerations	§217.60	No: lacks ventilation
Pumps	§217.61	Yes
Pipes	§217.62	Yes
Emergency Provisions	§217.63	No: lacks back-up generator, lacks signage

12.3 Conclusions

The following conclusions were developed from the evaluation of the Carter Ranch Phase II lift station:

- The station is relatively well maintained
- Perimeter fencing is present; however lacks barbed wire
- Access gate can easily accommodate work truck and provide access to wet well
- Drainage problems are evident due to pools of rainwater and algae
- Control panel is in good operating condition and has not posed any problems for the City staff
- Site lacks back-up power capabilities
- Site lacks ventilation

12.4 Recommendations

- Install gravity bypass and upon completion of future CIP project, decommission lift station
- Demolish lift station

12.5 OPCC

Demolition is estimated to cost $25,000.

Table 12-4: Carter Ranch Phase II OPCC

Item Description	Quantity	Unit	Unit Cost	Total Cost
Carter Ranch Phase II				
Demolition	1	LS	$ 25,000	$ 25,000
Total				$ 25,000

13.0 Willock Hill Lift Station

13.1 Lift Station Overview

The Willock Hill lift station consists of a control panel, two Hydromatic model S4M750 M4-4 pumps, and the physical lift station structure. The lift station services the surrounding neighborhood.

13.2 Condition Assessment

13.2.1 Security

The site is located off of South Hillside Street. The lift station is enclosed by a chain-link perimeter fence with three strands of barbed wire. It also includes signage with emergency contact information. The access gate is secured with a padlock, but cannot accommodate a vehicle within the perimeter area. The wet well access hatch does not fully close, thereby rendering the security lock useless. This is indicated in Figure 13-3. The control panel is secured with a padlock and is equipped with a remote alarm.

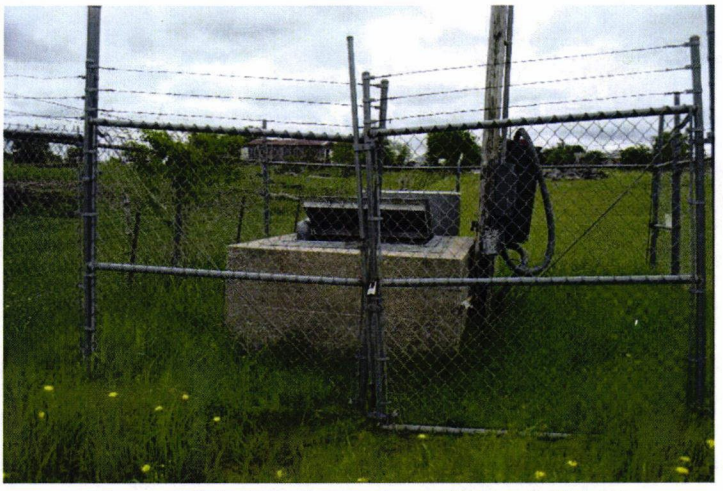


Figure 13-1: Site Perimeter at Willock Hill LS

Figure 13-2: Fencing at Willock Hill LS

13.2.2 Civil

The perimeter fence appears to be in good condition with minor signs of corrosion. However, the site area itself is in poor condition as indicated by the overgrown grass, overhung vines, and lack of landscaping. The lift station rests on a concrete pad that appears to be in fair condition. Additionally, the site area is not particularly well graded.

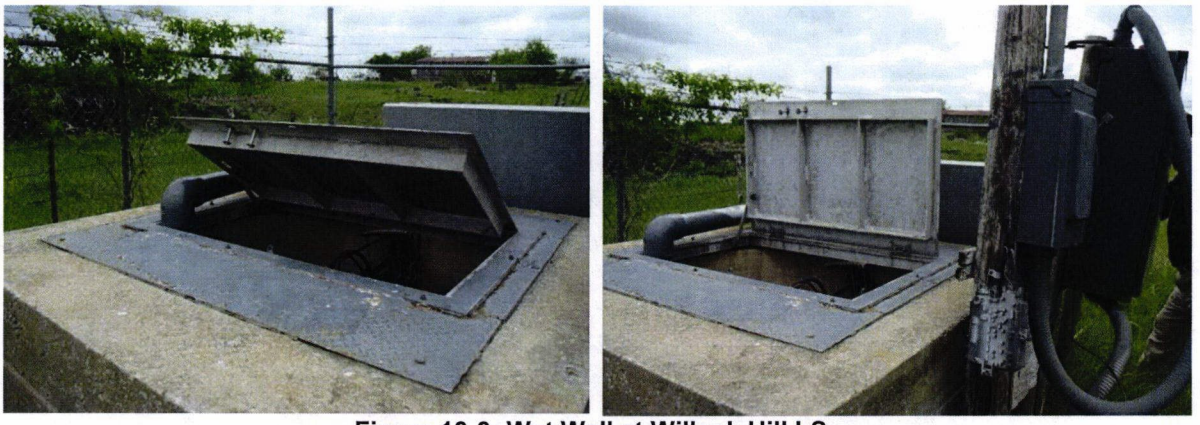


Figure 13-3: Wet Well at Willock Hill LS

13.2.3 Access

The site has poor access due to the lack of paved roadway leading to the lift station. The site area itself can accommodate a work truck and provided access to the wet well. However, the work truck cannot enter past the perimeter fence, and as previously mentioned, an access roadway is not present. This is indicated in Figure 13-4. The access hatch to top of the wet wall is an aluminum hatch and is elevated approximately 4 feet on a concrete pad. It is fastened to the top of the wet well with hinges and remains partially open at all times. It provides adequate access to the pumps. However, the access hatch is in poor condition as it remains partially open, thereby allowing rainfall, debris, and wildlife to enter the wet well.

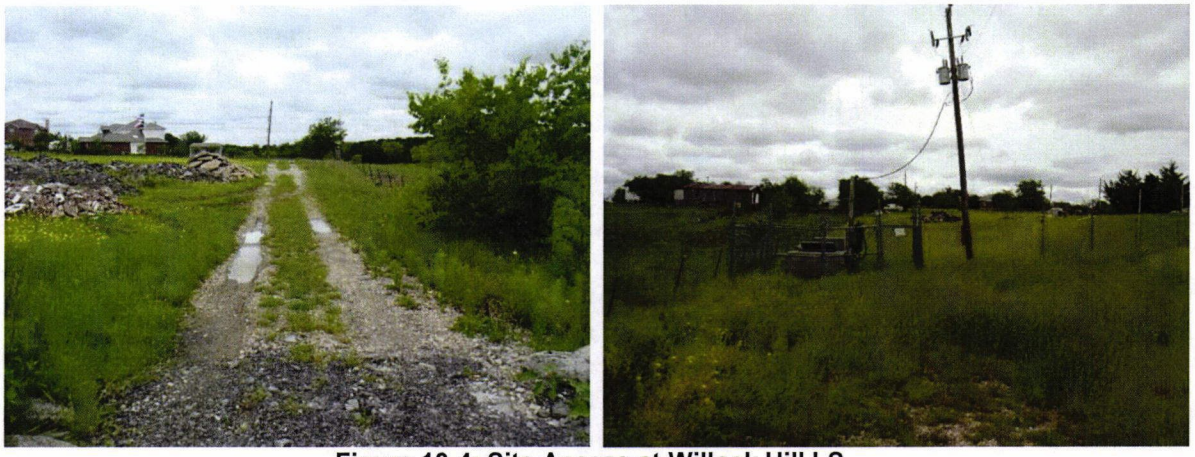


Figure 13-4: Site Access at Willock Hill LS

13.2.4 Pumping and Mechanical

The lift station is comprised of two Hydromatic model S4M750 M4-4 pumps each with a 7.5 HP motor. During the inspection, one of the pumps was not in service. A valve box cover is not provided. The piping and associated supports appear to be in fair condition as indicated by Figure 13-3 and Figure 13-5.

Figure 13-5: Pump Controls at Willock Hill LS

Figure 13-6: Valve Box at Willock Hill LS

13.2.5 Controls and Instrumentation

The lift station pumps are controlled by a series of mercury floats that pump the lift station wet well down according to set elevations. The floats terminate into the control panel where they activate a motor contactor to start and stop the pumps. The control panel is not connected to SCADA, thus a SCADA interface is preferred for alarms and run-status indicators. A red alarm beacon is present, providing a 360 degree visual check of alarm condition.

The controls are in fair condition. The panel is secured with a padlock to restrict access. However, there is no standby generator capability.

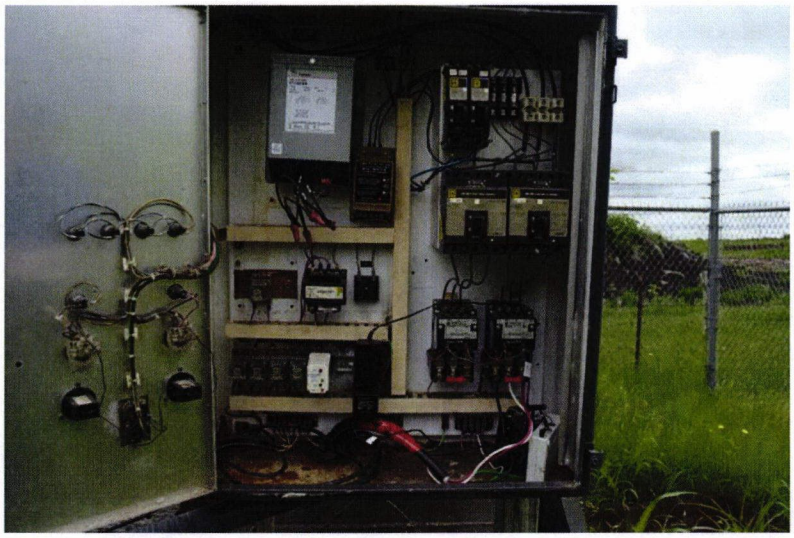


Figure 13-7: Control Panel Interior at Willock Hill LS

13.2.6 Condition Assessment

Table 13-1: Willock Hill Condition Assessment Ratings

Aspect	Rating
Site Security	Good
Site Civil	Poor
Access	Poor
Pumping and Mechanical	Good
Controls and Instrumentation	Good

Based on the summary above, the overall condition is determined to have an average rating of fair.

13.2.7 Lift Station Design Data

Table 13-2: Willock Hill Design Data

Lift Station	Willock Hill
Address	131 S Hillside Street
Recent Improvements	Upgraded control panel; generator connection; replaced pumps and valves
Capacity one pump, gpm	156
Capacity two pumps, gpm	NA
Rated Total Dynamic Head (TDH), ft	31
Type of Pump	Submersible
Manufacturer	Hydromatic
Model	S4M750 M4-4
Volts/Ph/Hz	480/3/60
Motor HP	7.5

13.2.8 30 TAC Chapter 217 Subchapter C Requirements

Table 13-3: Willock Hill TAC Requirements

Requirement	Reference	Satisfied (Yes/No)
Site Requirements	§217.59	No: lacks access roadway
Design Considerations	§217.60	No: lacks ventilation
Pumps	§217.61	Yes
Pipes	§217.62	Yes
Emergency Provisions	§217.63	Yes

13.3 Conclusions

The following conclusions were developed from the evaluation of the Willock Hill lift station:

- The station is in fair condition
- Perimeter fencing is present along with barbed wire and proper signage
- The site area is not well-kept as indicated by the overgrown grass
- Access roadway is not present
- The wet well access hatch remains partially open at all times
- There is no cover on the valve box
- Ventilation is required

13.4 Recommendations

- Install SCADA interface for alarms and run-status indicators
- Improve gravel roadway
- Rehabilitate wet well access hatch
- Improve site area landscaping
- Install ventilation pipe
- Install gravity flow bypass and upon completion of future interceptor, decommission lift station

13.5 OPCC

The site and facility improvements are estimated to cost $53,000.

Table 13-4: Willock Hill OPCC

Item Description	Quantity	Unit	Unit Cost	Total Cost
Willock Hill				
SCADA	1	EA	$ 35,000	$ 35,000
Gravel roadway	1	LS	$ 7,500	$ 7,500
Rehab access hatch	1	LS	$ 5,000	$ 5,000
Ventilation pipe	1	EA	$ 500	$ 500
Misc. (landscaping)	1	LS	$ 5,000	$ 5,000
Total				$ 53,000

14.0 Tolleson

14.1 Lift Station Overview

The Tolleson lift station consists of a control panel, pumps, and the physical lift station structure. The lift station services the surrounding neighborhood. City staff reported the lift station would be decommissioned in the near future. Therefore, a detailed site assessment was not conducted.

14.2 Conclusion/Recommendation

A field inspection for this site was not conducted. However, based on staff input, it is recommended to demolish the Tolleson lift station.

14.3 OPCC

Demolition is estimated to cost $25,000.

Table 14-1: Tolleson OPCC

Item Description	Quantity	Unit	Unit Cost	Total Cost
Tolleson				
Demolition	1	LS	$ 25,000	$ 25,000
Total				$ 25,000

15.0 Summary of Condition

Table 15-1 presents a summary of the description, size, and overall condition of the ten lift stations that were assessed.

Table 15-1: Overall Condition Summary

Lift Station	Description and Size	Overall Condition
Winn Road	Flygt (two) MP 3068 with 3.8 HP motors	Fair
Parkside	Flygt (two) MP 3068 with 10 HP motors	Good
Old Celina Park	Hydromatic (two) HPG-200 with 2 HP motors	Good
Lucy's	Hydromatic (two) HPG-200 with 2 HP motors	Poor
Business 298 #1	Hydromatic (two) HPGH-750 PC with 7.5 HP motors	Fair
Shawnee Trail #1	Dayton (two) with 2 HP motors	Fair
Shawnee Trail #2	Hydromatic (two) with 2 HP motors	Fair
High Point	Hydromatic (two) with 7.5 HP motors	Poor
Carter Ranch Phase II	Flygt Pumps (three) with 7.5 (two) and 10 (one) HP motors	Good
Willock Hill	Flygt Pump (two) with 7.5 HP motors	Fair
Tolleson	NA (Tolleson was not inspected)	NA
General Physical Condition Rating Guidelines: Good: no immediate attention required. Fair: requires some initial repair to remain in adequate working condition. Poor: requires replacement or reconstruction in the immediate future.		

16.0 Summary of Recommendations

Table 16-1 and Table 16-2 present the recommendations and cost for each of the lift stations.

Table 16-1: Summary of Recommendations

Lift Station	Recommendations	Cost
Winn Road	• Install SCADA interface • Install perimeter fencing with barbed wire and signage • Install ventilation pipe • Install gravity flow bypass and upon completion of future CIP project, decommission lift station	$45,500
Parkside	• Install SCADA interface • Equip site with back-up power capabilities • Install barbed wire and signage on perimeter wall • Widen driveway • Install chain to pull pumps	$54,600
Old Celina Park	• Install SCADA interface • Equip site with back-up generator capabilities • Install ventilation pipe • Install signage • Trim back overhanging tree limbs away from control panel	$42,600
Lucy's	• Install SCADA interface • Upgrade control panel • Equip site with back-up power capabilities • Install perimeter fence with barbed wire and signage • Improve roadway accessibility • Replace existing manhole cover with wet well access hatch • Install ventilation pipe • Consider abandoning lift station due to the condition of the site area and location of the lift station • Install gravity flow bypass and upon completion of future CIP project, decommission lift station	$82,100
Business 298 #1	• Install SCADA interface • Upgrade control panel • Equip site with back-up generator capability • Construct access roadway • Rehabilitate concrete slab and general landscaping • Install signage • Install ventilation pipe	$75,300
Shawnee Trail #1	• Install SCADA interface • Equip site with back-up generator capabilities • Install barbed wire on perimeter fence • Install ventilation pipe	$39,500

(Continued on following page)

Table 16-2: Summary of Recommendations (Continued)

Lift Station	Recommendations	Cost
Shawnee Trail #2	• Install SCADA interface • Equip site with back-up power capability • Rehabilitate concrete pad and install slab supports • Extend access roadway • Add hinges to wet well access hatch • Install barbed wire on perimeter fence • Install ventilation pipe • Landscaping to clean up area	$46,400
High Point	• Install SCADA interface • Equip site with back-up power capability • Construct access roadway • Install perimeter fencing with barbed wire and signage • Install ventilation pipe • Landscaping to improve site area	$56,900
Carter Ranch II	• Install gravity flow bypass and upon completion of future CIP project, decommission lift station • Demolish lift station	$25,000
Willock Hill	• Install SCADA interface • Construct access roadway • Rehabilitate wet well access hatch • Install ventilation pipe • Landscaping • Install gravity flow bypass and upon completion of future interceptor, decommission lift station	$53,000
Tolleson	• Demolish lift station	$25,000
Total		$545,900

Appendix C

Water & Wastewater System Improvements
Water Capital Improvements Plan

City of Celina, Texas

Prepared by:

3010 Gaylord Parkway
Suite 190
Frisco, TX 75034

September 2017

Garver Project No.: 16088050

1.0 Executive Summary

This Water Capital Improvements Plan utilizes the model criteria and simulations detailed in the Water and Wastewater Modeling Improvements to develop proposed projects from the recommended improvements. These improvements are identified for a 5-year planning horizon (2017 – 2022 fiscal years).

A summary of all proposed project costs and schedules is displayed on Page 4, while a proposed schedule is located on Page 5. Project descriptions are in order based on priority ranking following this summary.

1.1 Identification and Ranking

Each project will be initiated based on regulatory, capacity, fire flow, condition, City-directed, or operational triggers. As these triggers activated a project, alphabetical project groupings were developed in localized areas to address that need. These were then ranked numerically based on the criticality of the project and service area impacted. Project triggers are described below:

1.1.1 Capacity

This trigger is activated if a section or area of the system is unable to provide modeled flow or elevated storage needed for all meters within that portion of the system.

1.1.2 Regulatory

This trigger is activated if TCEQ regulations (e.g., minimum residual pressure, storage capacity per connection, etc.) would not be met.

1.1.3 Fire Flow

This trigger is activated if a portion of the system is unable to meet minimum required flow rates during the fire flow modeling scenario.

1.1.4 Condition

This trigger would be activated based on deteriorating conditions of existing infrastructure, as identified during field investigations.

1.1.5 City-Directed

This trigger is activated when City staff have indicated that items will be replaced, are required as part of upcoming policy changes, or are needed to manage growth.

1.1.6 Operational

This trigger is activated when an improvement will provide an operational benefit. An example would be looping and dead end requirements that would improve water quality and minimize flushing.

1.2 Timeline

This priority was then applied to an overall timeline, in order to meet a 5-year planning horizon. Each project has also been assigned a flexibility rating of low, medium, or high. Projects with higher flexibility can be extended later in the planning horizon, depending on the City's available funding or changing system conditions which may impact the need for the project (such as unexpected delays in development that delay the need for capacity improvements).

The project priority and the City's expected timeline for development dictates the trigger date. Projects with higher priority will trigger sooner than those with lower priority. The trigger date is then utilized to capture anticipated costs for the life of the project, by escalating the total estimated 2017 costs at a rate of 3% to the trigger date for the engineering and construction items.

The trigger date can also be expressed as a number of residential lots constructed. In the event that development occurs at rate faster or slower than anticipated, the City can track number of lots constructed relative to the estimated number of constructed lots as of May 2017 (4,879). For example, projects triggered in October 2018 could also be triggered by construction on 1,526 new residential lots, for a total of 6,405 constructed lots. Projects triggered in October 2019 would be triggered by construction on 3,233 residential lots (8,112 lots total).

1.3 Cost Development

Costs estimates were prepared for each individual project, based on industry standards and the 2017 bidding environment. These costs are an estimate, and should be re-evaluated as each project nears the trigger date. Each project has the following costs associated with the total OPCC:

1.3.1 Construction Costs

This cost is the estimated cost once the project has been designed and is ready for the bid phase to begin. It represents a combination of the estimated total construction costs, and includes a 20% contingency.

Costs for tanks and pumps were developed from manufacturer and contractor quotations. Pipeline installation costs were developed from a combination of recent neighboring city water and sewer project bid tabulations. Individual bid items are described as follows.

1.3.2 Engineering

The engineering estimate includes all professional services needed to bid each project, including survey, deed research (as needed), preliminary, and final design of all improvements. This cost is 20% of the estimated construction costs, including contingency. This does not include construction observation or start-up services.

1.3.3 Bid Item Descriptions:

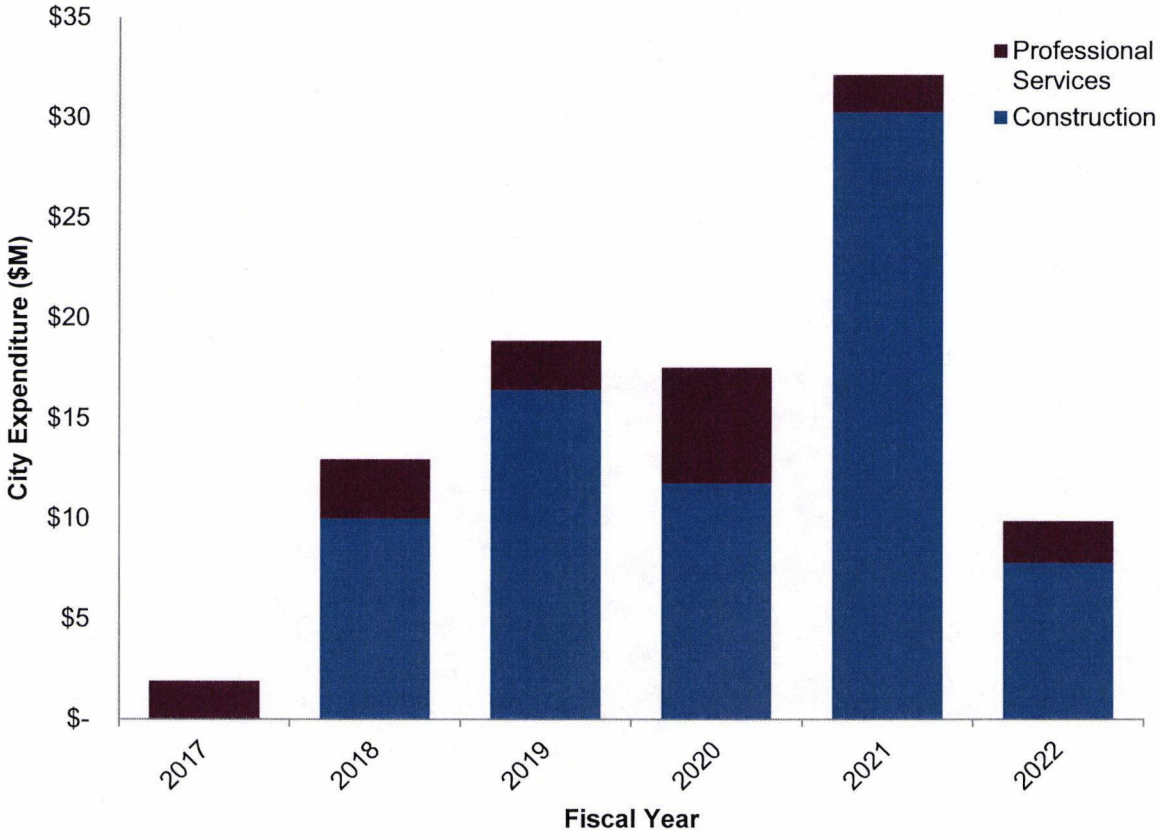
General Improvements: Anticipated sitework, backfill, erosion control, rehabilitation of existing structures, testing, easements, and contractor overhead costs.

Pipe Installation: Material and labor costs associated with pipe installation by open cut on a linear footage basis, depending on line size.

Bored Pipe Installation: Anticipated material, labor, sitework, backfill, erosion control, testing, easements, and contractor overhead costs associated with bored pipe installation on a lump sum basis. These costs are dependent on line size, length of boring, and location of boring.

Valves and Fittings: Cost for anticipated service connections and connections to existing pipes, including isolation valves.

A proposed spending schedule follows. Further refinement of this spending schedule and associated project trigger dates is available, depending upon City funding timeframes.



Proposed Spending Schedule for Water CIP

1.4 Project Descriptions

A summary of water CIP items, schedule, and individual project descriptions are provided in the following pages.

Table 1: Water CIP Summary

Project Identification					Schedule								2017 Costs ($1,000)	Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
1	B	Downtown EST shutdown and SCADA switchover	Low Plane	Low	Regulatory	Capacity	0	Feb-17	Mar-17	0	1	1	$0	$0	$0	$0
2	A	Capacity upgrades to CRPS and installation of 4 new pumps	CRPS	Low	Capacity	Regulatory	0	Feb-17	Jul-18	8	9	17	$6,305	$5,412	$1,051	$6,463
3	H	Capacity upgrades to DTPS and installation of 3 new pumps	DTPS	Low	Capacity	Operational	0	Feb-17	Jul-18	8	9	17	$5,173	$4,440	$862	$5,302
4	E	12" line and valves to switch LPP to HPP	Low to High Plane	Low	Regulatory	Fire Flow	0	Oct-17	Oct-18	6	6	12	$171	$147	$29	$176
5	F	18", 30" and 36" line along Celina Road from CRPS	CRPS; Low Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$7,939	$7,019	$1,363	$8,382
6	G	24" and 30" lines to Downtown GST	Low Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$5,588	$4,940	$959	$5,899
7	J	24" and 30" discharge lines from DTPS	High Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$3,490	$3,086	$599	$3,685
8	D	18" and 24" line to Morgan Lake area	High Plane	Medium	Regulatory	Capacity	1,526	Oct-18	Jul-20	9	12	21	$4,730	$4,307	$836	$5,143
9	C	18" line east of Light Farm EST along Cypress Creek Way	Low Plane	Medium	Capacity	Regulatory	1,526	Oct-18	May-19	3	4	7	$312	$276	$54	$329
10	L	Additional capacity upgrades to CRPS	CRPS; Low Plane	Low	Capacity	Regulatory	1,526	Oct-18	Oct-19	6	6	12	$536	$474	$95	$568
11	Z	New 6 MG GST at CRPS	Low Plane	Medium	Operational	Capacity	1,526	Oct-18	Jul-20	9	12	21	$7,619	$6,938	$1,347	$8,285
12	R	Additional capacity upgrades to DTPS	DTPS	Low	Capacity	Regulatory	2,370	Oct-18	Oct-19	6	6	12	$556	$491	$98	$589
13	K	Decommision Morgan Lake facilities	High Plane	Medium	Operational	Capacity	2,226	Mar-19	Aug-19	2	3	5	$145	$127	$27	$154
14	AB	SCADA improvements	System Wide	High	Operational	None	3,233	Oct-19	Apr-21	9	9	18	$312	$262	$79	$341
15	AA	8" line upgrades in Downtown area	System Wide	Medium	Operational	City-directed	3,233	Oct-19	Oct-21	12	12	24	$22,390	$21,000	$4,078	$25,078
16	M	12" line along Settlers Ridge	Low Plane	Medium	Capacity	Regulatory	3,233	Oct-19	Oct-21	12	12	24	$3,308	$3,102	$602	$3,705
17	Q	Additional capacity upgrades to CRPS	CRPS	Low	Capacity	Regulatory	3,233	Oct-19	Oct-20	6	6	12	$556	$506	$101	$607
18	AC	2020 5-year Master Plan	System Wide	Medium	Operational	City-directed	4,894	Oct-20	Oct-21	12	0	12	$200	$0	$225	$225
19	P	8", 12", and 18" line from Morgan Lake to DC Ranch	High Plane	Medium	Capacity	Regulatory	3,233	Oct-19	Jul-21	9	12	21	$5,119	$4,802	$932	$5,734
20	O	24" line to increase capacity in the Low Pressure Plane	Low Plane	Medium	Capacity	Regulatory	4,894	Oct-20	Jul-22	9	12	21	$5,340	$5,158	$1,002	$6,160
21	T	18" and 24" lines along Hwy. 455	High Plane	High	Fire flow	Operational	4,894	Oct-20	Jul-22	9	12	21	$2,387	$2,306	$448	$2,754
22	S	18" and 24" lines along Legacy Drive	Low Plane	High	Operational	Capacity	6,504	Oct-21	Jul-23	9	12	21	$3,353	$3,336	$648	$3,984
23	X	8" and 24" lines to connect Preston Lakes to Preston Road Corridor	Low Plane	High	Fire flow	Operational	6,504	Oct-21	Jul-23	9	12	21	$4,175	$4,154	$807	$4,961
24	W	8" and 12" line along E. Malone St. and Preston Road	High Plane	High	Fire flow	Operational	4,894	Oct-20	Oct-21	6	6	12	$612	$574	$115	$689
25	V	8" lines in the Low Pressure Plane	Low Plane	High	Fire flow	Operational	4,894	Oct-20	Oct-21	6	6	12	$547	$513	$103	$616
26	Y	18" line from the Parks at Wilson Creek to Lakes at Mustang Ranch	Low Plane	High	Fire flow	Operational	6,504	Oct-21	Jul-23	9	12	21	$2,939	$2,924	$568	$3,492
27	U	12" line from Preston Road to Morgan Lake Estates	High Plane	High	Fire flow	Operational	6,504	Oct-21	Oct-22	6	6	12	$342	$330	$66	$396
												Total 2017 OPCC:	$94,141,277	Total Forecasted OPCC:		$103,716,670

Table 2: Development Driven Projects

Project Identification					Schedule								2017 Costs ($1,000)	Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
1	B	Downtown EST shutdown and SCADA switchover	Low Plane	Low	Regulatory	Capacity	0	Feb-17	Mar-17	0	1	1	0	$0	$0	$0
2	A	Capacity upgrades to CRPS and installation of 4 new pumps	CRPS	Low	Capacity	Regulatory	0	Feb-17	Jul-18	8	9	17	$6,305	$5,412	$1,051	$6,463
3	H	Capacity upgrades to DTPS and installation of 3 new pumps	DTPS	Low	Capacity	Operational	0	Feb-17	Jul-18	8	9	17	$5,173	$4,440	$862	$5,302
4	E	12" line and valves to switch LPP to HPP	Low to High Plane	Low	Regulatory	Fire Flow	0	Oct-17	Oct-18	6	6	12	$171	$147	$29	$176
5	F	18", 30" and 36" line along Celina Road from CRPS	CRPS; Low Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$7,939	$7,019	$1,363	$8,382
6	G	24" and 30" lines to Downtown GST	Low Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$5,588	$4,940	$959	$5,899
7	J	24" and 30" discharge lines from DTPS	High Plane	Low	Capacity	Regulatory	0	Oct-17	Oct-19	12	12	24	$3,490	$3,086	$599	$3,685
8	D	18" and 24" line to Morgan Lake area	High Plane	Medium	Regulatory	Capacity	1,526	Oct-18	Jul-20	9	12	21	$4,730	$4,307	$836	$5,143
9	C	18" line east of Light Farm EST along Cypress Creek Way	Low Plane	Medium	Capacity	Regulatory	1,526	Oct-18	May-19	3	4	7	$312	$276	$54	$329
10	L	Additional capacity upgrades to CRPS	CRPS; Low Plane	Low	Capacity	Regulatory	1,526	Oct-18	Oct-19	6	6	12	$536	$474	$95	$568
11	Z	New 6 MG GST at CRPS	Low Plane	Medium	Operational	Capacity	1,526	Oct-18	Jul-20	9	12	21	$7,619	$6,938	$1,347	$8,285
12	R	Additional capacity upgrades to DTPS	DTPS	Low	Capacity	Regulatory	2,370	Oct-18	Oct-19	6	6	12	$556	$491	$98	$589
16	M	12" line along Settlers Ridge	Low Plane	Medium	Capacity	Regulatory	3,233	Oct-19	Oct-21	12	12	24	$3,308	$3,102	$602	$3,705
17	Q	Additional capacity upgrades to CRPS	CRPS	Low	Capacity	Regulatory	3,233	Oct-19	Oct-20	6	6	12	$556	$506	$101	$607
18	AC	2020 5-year Master Plan	System Wide	Medium	Operational	City-directed	4,894	Oct-20	Oct-21	12	0	12	$200	$0	$225	$225
19	P	8", 12", and 18" line from Morgan Lake to DC Ranch	High Plane	Medium	Capacity	Regulatory	3,233	Oct-19	Jul-21	9	12	21	$5,119	$4,802	$932	$5,734
20	O	24" line to increase capacity in the Low Pressure Plane	Low Plane	Medium	Capacity	Regulatory	4,894	Oct-20	Jul-22	9	12	21	$5,340	$5,158	$1,002	$6,160
													Total 2017 OPCC:	$56,940,272	Total Forecasted OPCC:	$61,253,106

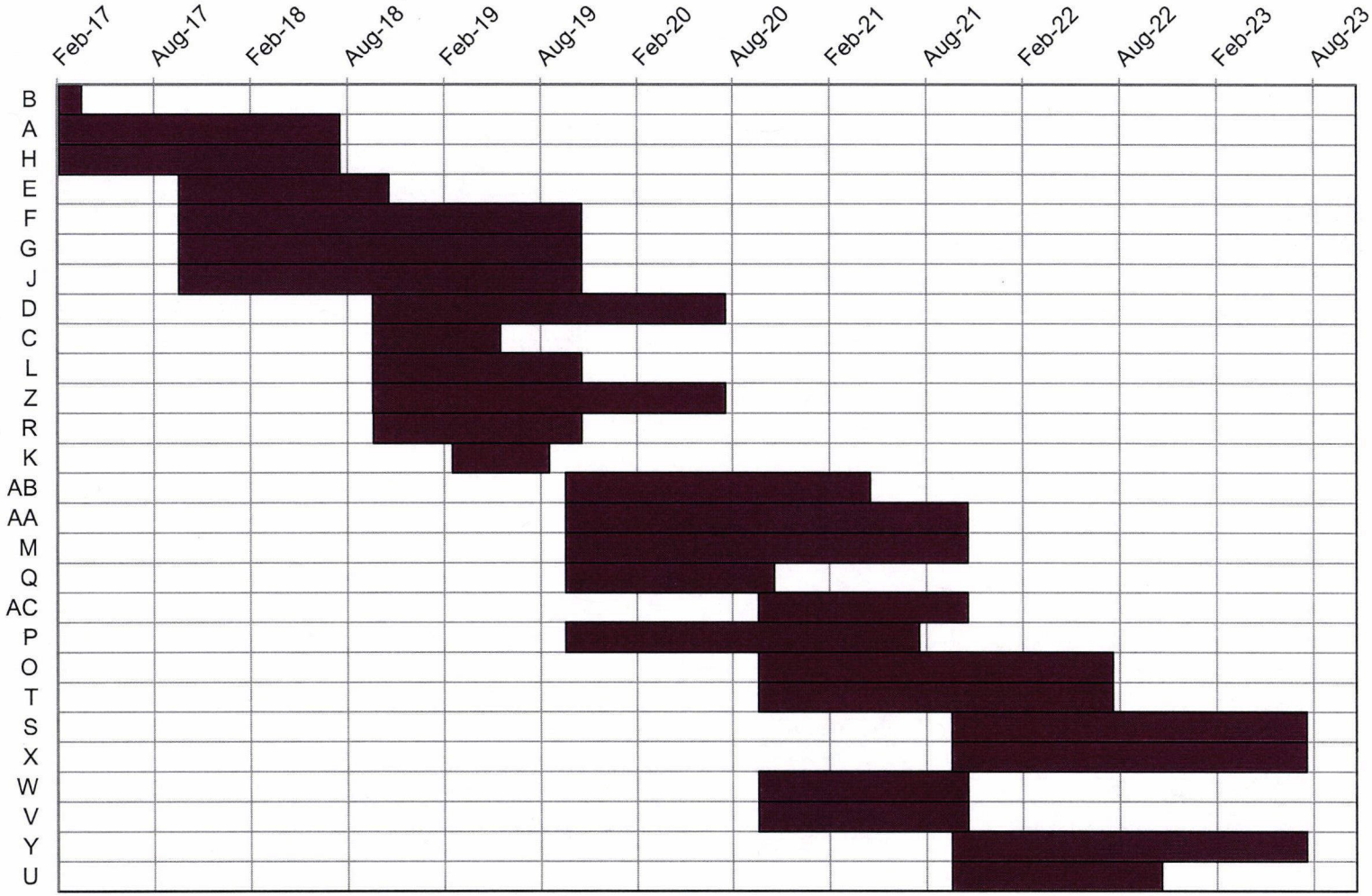
Table 3: Operational Projects

Project Identification					Schedule								2017 Costs ($1,000)	Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
13	K	Decommision Morgan Lake facilities	High Plane	Medium	Operational	Capacity	2,226	Mar-19	Aug-19	2	3	5	$145	$127	$27	$154
14	AB	SCADA improvements	System Wide	High	Operational	None	3,233	Oct-19	Apr-21	9	9	18	$312	$262,254	$79	$341
15	AA	8" line upgrades in Downtown area	System Wide	Medium	Operational	City-directed	3,233	Oct-19	Oct-21	12	12	24	$22,390	$21,000	$4,078	$25,078
22	S	18" and 24" lines along Legacy Drive	Low Plane	High	Operational	Capacity	6,504	Oct-21	Jul-23	9	12	21	$3,353	$3,336	$648	$3,984
													Total 2017 OPCC:	$26,199,874	Total Forecasted OPCC:	$29,556,640

Table 4: Fire Flow Projects

Project Identification					Schedule								2017 Costs ($1,000)	Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
21	T	18" and 24" lines along Hwy. 455	High Plane	High	Fire flow	Operational	4,894	Oct-20	Jul-22	9	12	21	$2,387	$2,306	$448	$2,754
23	X	8" and 24" lines to connect Preston Lakes to Preston Road Corridor	Low Plane	High	Fire flow	Operational	6,504	Oct-21	Jul-23	9	12	21	$4,175	$4,154	$807	$4,961
24	W	8" and 12" line along E. Malone St. and Preston Road	High Plane	High	Fire flow	Operational	4,894	Oct-20	Oct-21	6	6	12	$612	$574	$115	$689
25	V	8" lines in the Low Pressure Plane	Low Plane	High	Fire flow	Operational	4,894	Oct-20	Oct-21	6	6	12	$547	$512,928	$103	$616
26	Y	18" line from the Parks at Wilson Creek to Lakes at Mustang Ranch	Low Plane	High	Fire flow	Operational	6,504	Oct-21	Jul-23	9	12	21	$2,939	$2,924	$568	$3,492
27	U	12" line from Preston Road to Morgan Lake Estates	High Plane	High	Fire flow	Operational	6,504	Oct-21	Oct-22	6	6	12	$342	$330	$66	$396
												Total 2017 OPCC:	$11,001,131	Total Forecasted OPCC:		$12,906,925

Proposed 5 Year Water CIP Schedule



Project 1: Water Group B Capital Improvements

Project Identification	
Number:	1
Location:	Low Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Regulatory
Secondary Trigger:	Capacity
Trigger # of Lots Constructed:	0
Trigger Date:	Feb-2017
Project Complete:	Mar-2017
Project Implementation (Months)	
Engineering/Design:	0
Bid/Construction:	1
Total Project Duration:	1

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.00	$0.00
Professional Services	$0.00	$0.00
Total Project Cost	**$0.00**	**$0.00**

Project Description
This project includes decommissioning the DT EST and switching SCADA control of the CRPS from the DT EST Level to the Light Farms EST Level. No decommissioning costs are included with this project.

Justification
The DT EST has reached the end of its useful life and is in need of rehabilitation. In addition, the increasing water demand through the system is resulting in rapid turnover times within the DT EST. However, the Light Farms EST does not turn over because the CRPS is controlled off of the DT EST level. Decommissioning the DT EST and controlling the CRPS using the Light Farms EST level will allow the hydraulic grade line in the Light Farms EST to be raised to 835 ft, increasing pressures in the Low Pressure Plane and providing more stable system operation.

Unintended Consequences
Water quality will be improved in the Light Farm EST due to increased turnover. The Low Pressure Plane will have slightly less total storage, but will gain operational elevated storage due to the ability to increase the HGL in the Light Farms EST.

Special Considerations
It will be important to confirm that SCADA control has successfully been switched to control the CRPS based on the Light Farms EST level.

Potential Alternatives
The DT EST can be demolished or removed at the City's discretion. If the City prefers to maintain the use of the DT EST, extensive rehabilitation and an elevation control valve would be required.

Group B			
Description	**Unit**	**Quantity**	**Cost**
Downtown EST shutdown and SCADA switchover	LS	1	$ -
		Subtotal Test	$ -
		Contingency (20%)	$ -
		Appurtenances (electrical, SCADA, etc.)	$ -
		Professional Services	$ -
		OPCC	$ -

Project 1 – Photographs

Figure 1-1: Existing DT EST, to be decommissioned

Project 2: Water Group A Capital Improvements

Project Identification	
Number:	2
Location:	CRPS
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	0
Trigger Date:	Feb-2017
Project Complete:	Jul-2018
Project Implementation (Months)	
Engineering/Design:	8
Bid/Construction:	9
Total Project Duration:	17

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$5.25	$5.41
Professional Services	$1.05	$1.05
Total Project Cost	**$6.31**	**$6.46**

Project Description

This project consists of capacity upgrades to the CRPS, including installation of four new pumps and the associated piping. Preliminary sizing indicates that each pump should be sized to provide 3,800 gpm at 240 ft of head. Variable frequency drives will be provided for the new pumps to allow efficient operation during periods of lower demands. Three existing spare pump spaces will be utilized, and one existing pump will be demolished during this project so that the existing CRPS footprint will not have to be expanded. Design of the CRPS improvements will also include evaluation of existing chemical storage and feed equipment. Recommendations for these improvements will be made during final design, but placeholder costs have been included below. Design of backup power up to firm capacity to increase the reliability of the City's primary drinking water source will be included. However, this item may be bid as an additive alternative.

Justification

Figure 1-2 shows the expected pumping capacity needed for the CRPS through 2022. The current system's firm capacity would require approximately 2,700 gpm of additional pumping capacity by the midpoint of 2017, which would increase to approximately 6,900 gpm by 2019 if no new pumps were added. These improvements will provide pumping capacity of 1.3 times the maximum day demand until late 2019, allowing equalization of diurnal peaks without completely draining the elevated storage tanks.

Unintended Consequences

The increased horsepower of the pumps and associated electrical gear may require specialized electrical maintenance providers. In addition, maintenance will increase due to the addition of new pumps and increased pump sizing.

Special Considerations

Due to rapid growth in Celina and the limited capacity of the existing elevated storage tanks and pumps, design should start in 2017 so that these improvements can be in place as soon as possible.

Potential Alternatives

None Identified.

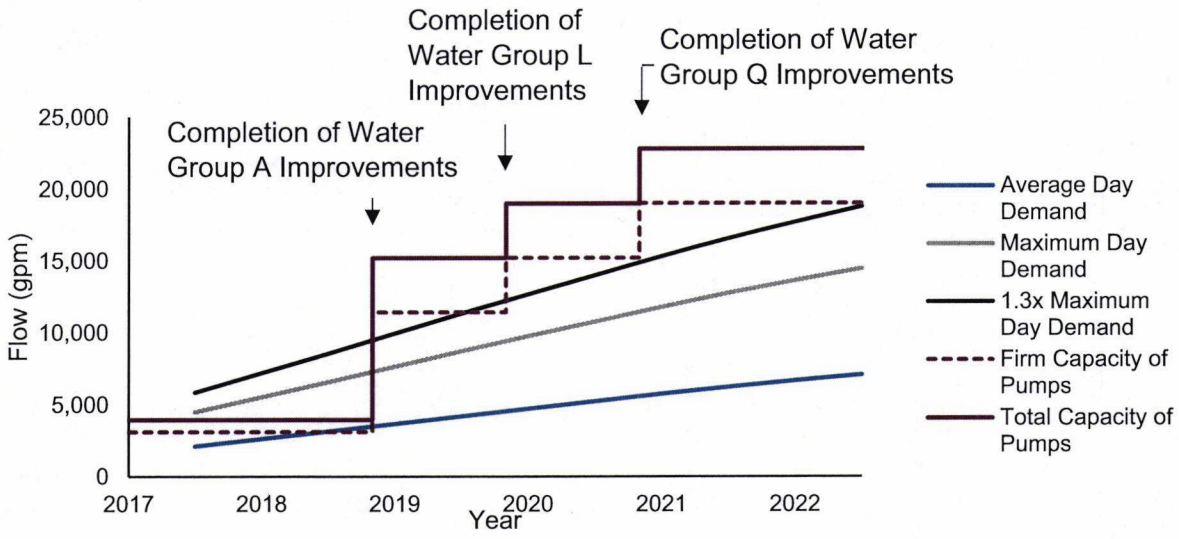


Figure 1-2: Comparison of Proposed CRPS Capacity and Demand

Group A			
Description	**Unit**	**Quantity**	**Cost**
Demo existing pump	LS	1	$ 10,000
Pump with motor	EA	4	$ 450,000
Electrical	LS	1	$ 100,000
VFDs	EA	4	$ 320,000
Valves and fittings	LS	1	$ 100,000
Interconnecting pipes	LS	1	$ 75,000
Chemical feed improvements	LS	1	$ 750,000
Firm capacity backup power	LS	1	$ 1,305,085
Diameter (in.)	**Unit Cost ($/LF)**	**Length (ft)**	**Cost**
36	683	110	$ 75,174
		Subtotal	$ 3,185,259
		Contractor's OH&P (18%)	$ 573,347
		Miscellaneous (SCADA, etc., 20%)	$ 620,017
		Contingency (20%)	$ 875,725
		Professional Services	$ 1,050,869
		OPCC	$ 6,305,217

Project 2 Schematic

Project 3: Water Group H Capital Improvements

Project Identification	
Number:	3
Location:	DTPS
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	0
Trigger Date:	Feb-2017
Project Complete:	Jul-2018
Project Implementation (Months)	
Engineering/Design:	8
Bid/Construction:	9
Total Project Duration:	17

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$4.31	$4.44
Professional Services	$0.86	$0.86
Total Project Cost	**$5.17**	**$5.30**

Project Description

This project consists of capacity upgrades to the DTPS, including installation of three new pumps and the associated piping. The three smallest existing pumps will be demolished during this project so that the existing DTPS footprint will not have to be expanded. Design of the DTPS improvements will also include evaluation of existing chemical storage and feed equipment. Recommendations for these improvements will be made during final design, but placeholder costs have been included below. Design of backup power up to firm capacity to increase the reliability of the High Pressure Plane's primary drinking water source will be included. However, this item may be bid as an additive alternative.

This project also includes installation of new fill and draw lines for the GST. The new fill line will include a level control valve, which will allow automatic filling of the GST. It is preferred to maintain the existing 12-inch fill and draw lines for redundancy. The existing clearwell is unused and will be demolished during this project.

Justification

Figure 1-3 shows the expected pumping capacity needed for the DTPS through 2022. The current system's firm capacity would require approximately 1,400 gpm of additional pumping capacity by the midpoint of 2017, which would increase to approximately 3,600 gpm by 2019 if no new pumps were added. These improvements will provide pumping capacity of 1.3 times the High Pressure Plane's maximum day demand until late 2019, allowing equalization of diurnal peaks without completely draining the elevated storage tanks.

Unintended Consequences

The increased horsepower of the pumps and associated electrical gear may require specialized electrical maintenance providers. In addition, maintenance will increase due to the addition of new pumps and increased pump sizing.

Special Considerations

Due to rapid growth in Celina and the limited capacity of the existing elevated storage tanks and pumps, design should start in 2017 so that these improvements can be in place as soon as possible.

Potential Alternatives

None identified.

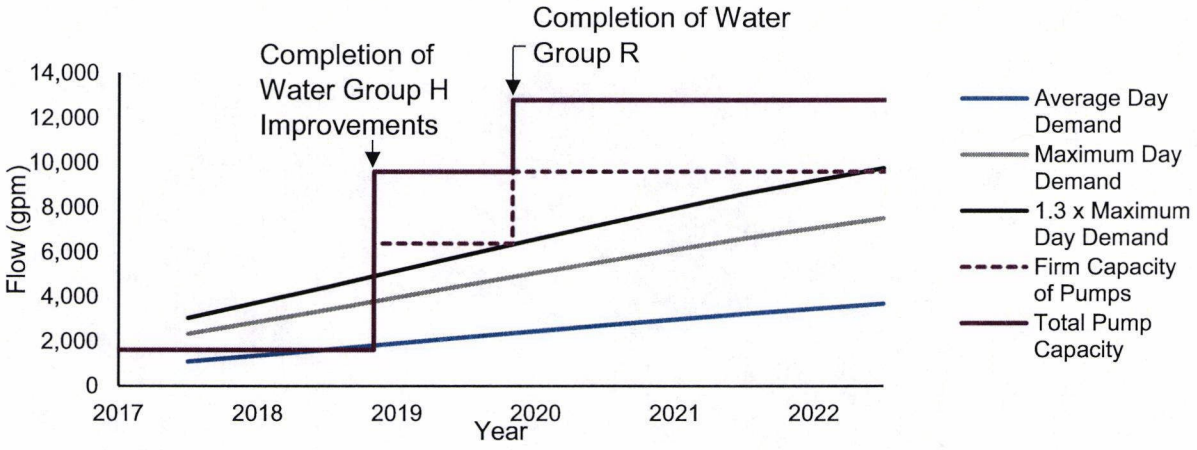
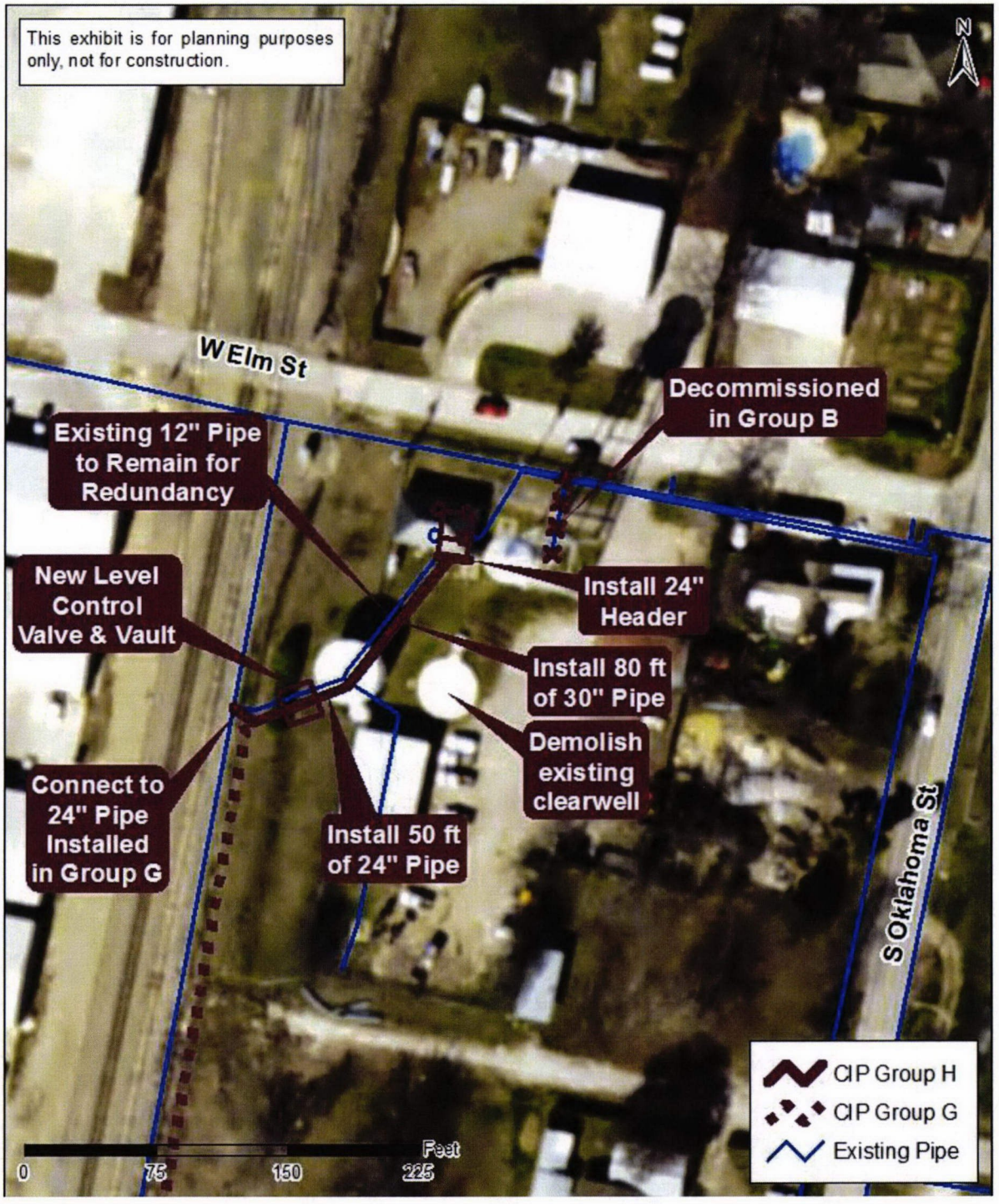


Figure 1-3: Comparison of High Pressure Plane Demands and Proposed Pump Capacity

Group H			
Description	**Unit**	**Quantity**	**Cost**
Demo existing pumps	LS	1	$ 25,000
Demo existing clearwell	LS	1	$ 50,000
New pumps with motors	EA	3	$ 337,500
Electrical	LS	1	$ 100,000
VFDs	EA	3	$ 240,000
Valves and fittings	LS	1	$ 100,000
Interconnecting pipes	LS	1	$ 150,000
Level control valve with vault	LS	1	$ 35,000
Chemical feed improvements	LS	1	$ 750,000
Firm capacity backup power	LS	1	$ 815,700
		Subtotal	$ 2,603,200
		Contractor's OH&P (18%)	$ 468,576
		Miscellaneous (SCADA, etc., 20%)	$ 520,640
		Contingency (20%)	$ 718,483
		Professional Services	$ 862,180
		OPCC	$ 5,173,079

Project 3 Schematic:



Project 4: Group E Facilities Improvements

Project Description
This project includes distribution system modifications to switch portions of downtown from the Low Pressure Plane to the High Pressure Plane. Changes include opening and closing existing isolation valves as well as installing a pressure reducing valve.

Justification
Low pressure areas have been identified in this portion of downtown. These improvements will result in adequate pressures and fire flows in the area, by utilizing the higher pressures available in the High Pressure Plane. The new pressure reducing valves will allow controlled increase in pressures to limit any adverse impacts of the new system pressure on the existing infrastructure.

Unintended Consequences
None identified.

Special Considerations
This change should occur after the DTPS improvements to minimize adjustments to the new pressure reducing valves.

Potential Alternatives
None identified.

Project Identification	
Number:	4
Location:	Low to High Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Regulatory
Secondary Trigger:	Fire Flow
Trigger # of Lots Constructed:	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2018
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.14	$0.15
Professional Services	$0.03	$0.03
Total Project Cost	**$0.17**	**$0.18**

Group E				
Description		Unit	Quantity	Cost
Pressure reducing valve with vault		LS	1	$ 25,000
Bored pipe installation		LS	1	$ 50,000
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
12	Pipe installation	180	100	$ 18,000
	General improvements	75		$ 7,500
			Subtotal	$ 100,500
			Contractor's OH&P (18%)	$ 18,090
			Contingency (20%)	$ 23,718
			Professional Services	$ 28,462
			OPCC	$ 170,770

Project 4 Schematic

Project 5: Water Group F Capital Improvements

Project Identification	
Number:	5
Location:	CRPS; Low Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2019
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	24

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$6.62	$7.02
Professional Services	$1.32	$1.36
Total Project Cost	**$7.94**	**$8.38**

Project Description
This project includes installation of a new discharge main along Celina Road from the CRPS to connect to an existing 12-inch line running along the railroad tracks, and a future 30-inch line which will be installed as part of Water Group G Improvements. The new 30-inch discharge main will parallel an existing 18-inch line, which will stay in service.

Justification
This project will reduce system discharge head for the CRPS pumps, resulting in improved pump capacities. This also improves system hydraulics in the downtown area. This pipeline is needed to supply projected flows during this five-year planning period.

Unintended Consequences
None identified.

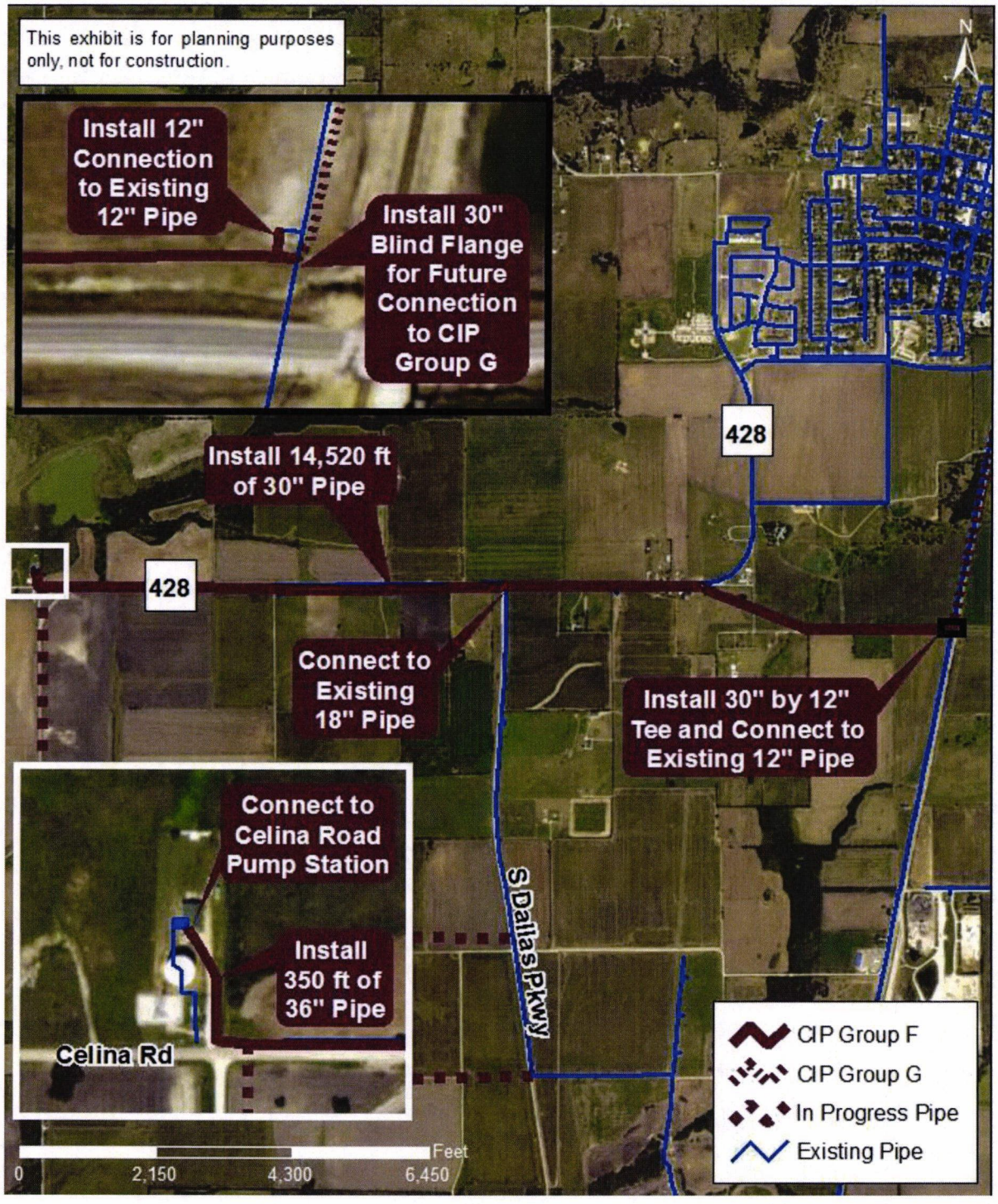
Special Considerations
TxDOT coordination and right-of-way/easement acquisition will likely be necessary for this pipeline. Portions of the alignment from Celina Road to CR 55 may need to be revised during detailed design based on right-of-way and roadway alignments.

Although a 12" line is being installed for the Glen Crossing subdivision, the entire length of the new pipeline must be 30" to keep pipe velocities within the acceptable range.

Potential Alternatives
The existing 18-inch line could be decommissioned, which would require the proposed 30-inch discharge main to be upsized.

Group F				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
30	Pipe installation	300	14,520	$ 4,356,000
	General improvements	50		$ 726,000
18	Pipe installation	225	75	$ 16,875
	General improvements	40		$ 3,000
36	Pipe installation	375	350	$ 131,250
	General improvements	50		$ 17,500
			Subtotal	$ 5,250,625
			Valves and Fittings (5%)	$ 262,531
			Contingency (20%)	$ 1,102,631
			Professional Services	$ 1,323,158
			OPCC	$ 7,938,945

Project 5 Schematic



Project 6: Water Group G Capital Improvements

Project Description
This project includes addition of a new pipeline running north northeast from the connection point of Water Group F to the DT GST location.

Justification
This pipeline will result in increased capacity and adequate pressures in the distribution system, specifically for the DTPS area. This project is necessary to provide adequate flows to the High Pressure Plane.

Unintended Consequences
None identified.

Special Considerations
The alignment follows the existing 12-inch alignment along the railroad tracks; therefore, additional easements may be necessary to accommodate this pipe. In addition, a bored pipe installation will be needed to cross the railroad tracks near Ash Street.

Potential Alternatives
None identified.

Project Identification	
Number:	6
Location:	Low Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2019
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	24

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$4.66	$4.94
Professional Services	$0.93	$0.96
Total Project Cost	**$5.59**	**$5.90**

Group G				
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
30	Pipe installation	300	5,509	$ 3,162,166
	General improvements	50		$ 275,450
24	Pipe installation	275	523	$ 143,825
	General improvements	75		$ 39,225
Description		**Unit**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 75,000
			Subtotal	$ 3,695,666
			Valves and Fittings (5%)	$ 184,783
			Contingency (20%)	$ 776,090
			Professional Services	$ 931,308
			OPCC	$ 5,587,847

Project 6 Schematic

Project 7: Water Group J Capital Improvements

Project Description
This project consists of installation of new 24- and 30-inch discharge lines from the DTPS connecting to the existing 12-inch line running parallel to Preston Road.

Justification
This project will provide pipeline capacity needed for projected flows to the High Pressure Plane.

Unintended Consequences
No unintended consequences are foreseen by the implementation of this project.

Special Considerations
TxDOT coordination and right-of-way/easement acquisition will likely be necessary for this pipeline. In addition, a bored pipe installation will be needed to cross Preston Road.

Potential Alternatives
None identified.

Project Identification	
Number:	7
Location:	High Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2019
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	24

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$2.91	$3.09
Professional Services	$0.58	$0.60
Total Project Cost	**$3.49**	**$3.68**

Group J				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
24	Pipe installation	275	2,501	$ 687,775
	General improvements	50		$ 125,050
30	Pipe installation	300	3,259	$ 977,700
	General improvements	50		$ 162,950
Description		**Unit**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 250,000
			Subtotal	$ 2,203,475
			Valves and Fittings (10%)	$ 220,348
			Contingency (20%)	$ 484,765
			Professional Services	$ 581,717
			OPCC	$ 3,490,304

Project 7 Schematic

Project 8: Water Group D Capital Improvements

Project Description
This project includes installation of new pipelines from north of the SE EST to the Morgan Lake area and within the Morgan Lake area.

Justification
This project provides necessary looping from the SE EST area to the northern portion of the distribution system. The looping is needed to meet projected flow demands for the area to ensure minimum pressures are met.

Unintended Consequences
None identified.

Special Considerations
TxDOT coordination may be required for alignments along CR 94 and CR 97. Appropriate placement of the water line along CR 97 (i.e., east vs. west of the roadway) will be determined during detailed design.

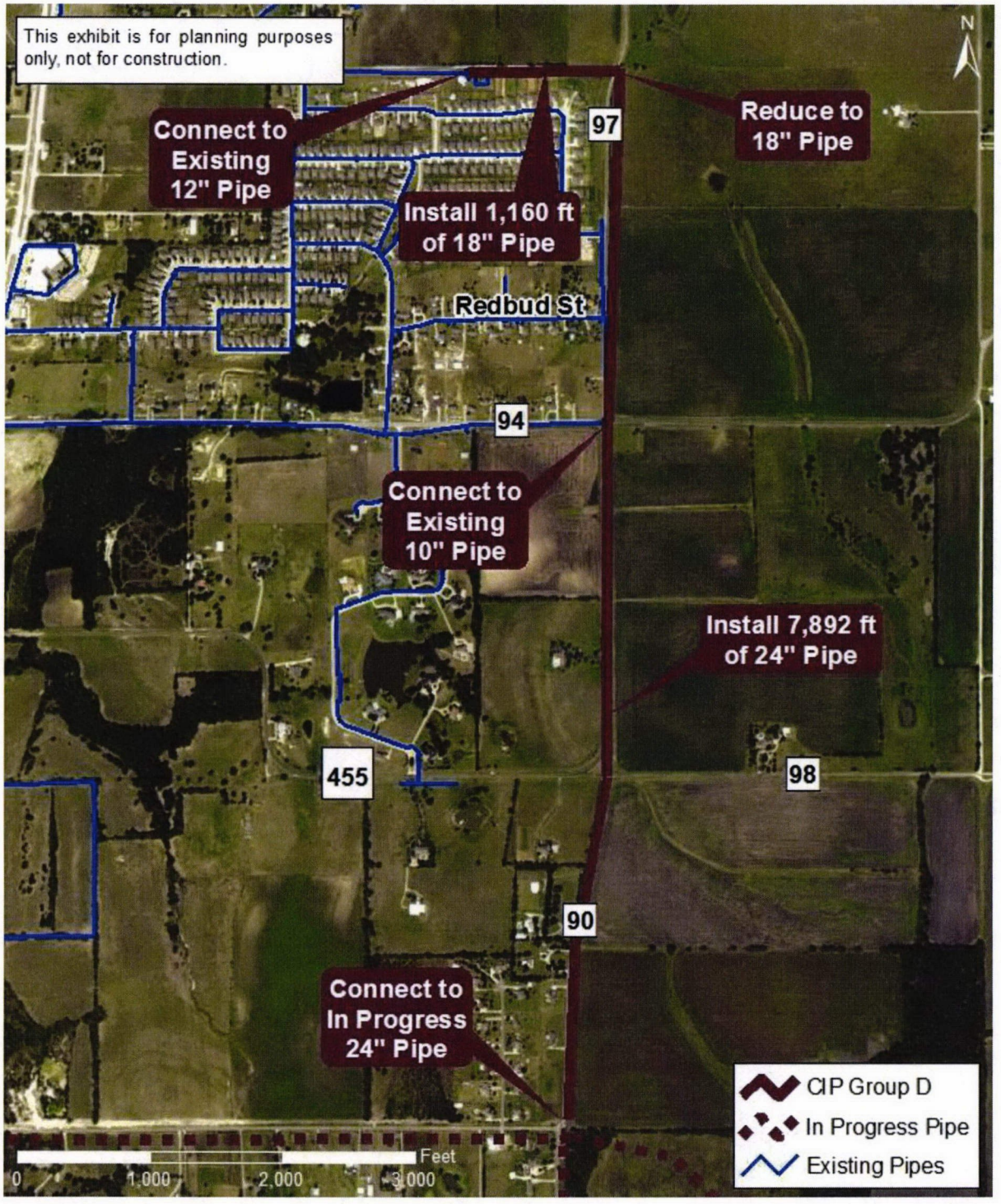
Potential Alternatives
None identified.

Project Identification	
Number:	8
Location:	High Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Regulatory
Secondary Trigger:	Capacity
Trigger # of Lots Constructed:	1,526
Trigger Date:	Oct-2018
Project Complete:	Jul-2020
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$3.94	$4.31
Professional Services	$0.79	$0.84
Total Project Cost	**$4.73**	**$5.14**

Group D				
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
24	Pipe installation	275	7,892	$ 2,170,300
	General improvements	50		$ 394,600
18	Pipe installation	225	1,182	$ 265,950
	General improvements	40		$ 47,280
Description		**Unit**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 250,000
			Subtotal	$ 3,128,130
			Valves and Fittings (5%)	$ 156,407
			Contingency (20%)	$ 656,907
			Professional Services	$ 788,289
			OPCC	$ 4,729,733

Project 8 Schematic



Project 9: Water Group C Capital Improvements

Project Description
This project includes installation of a new 18-inch pipeline east of the Light Farms EST. This will connect to larger pipelines in the area.

Justification
This line will be installed parallel to an existing 8-inch line that currently acts as a bottleneck, resulting in increased capacity and maintenance of adequate system pressures throughout this area.

Unintended Consequences
None identified.

Special Considerations
Detailed design should incorporate ongoing development in the proposed alignment.

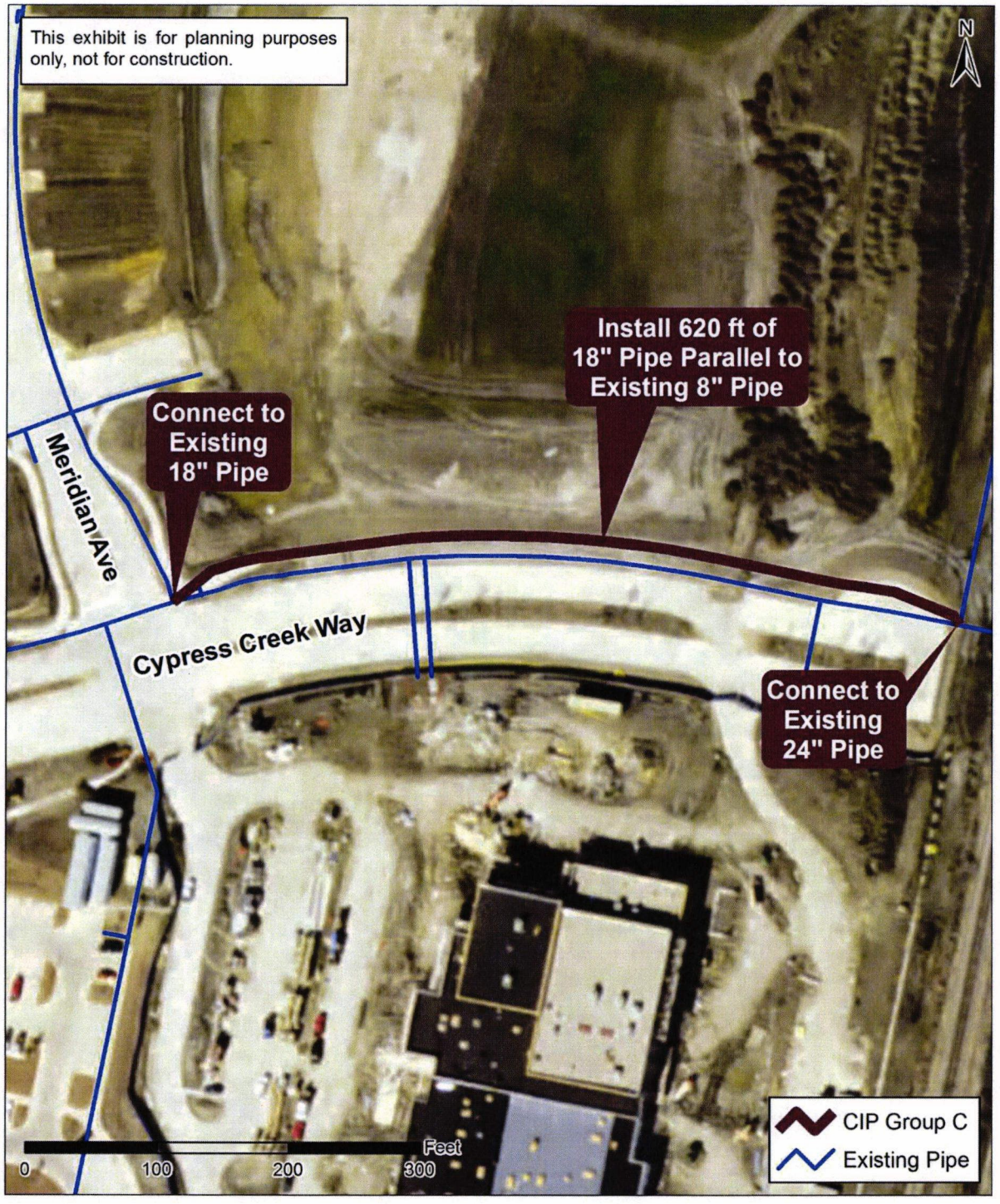
Potential Alternatives
None identified.

Project Identification	
Number:	9
Location:	Low Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	1,526
Trigger Date:	Oct-2018
Project Complete:	May-2019
Project Implementation (Months)	
Engineering/Design:	3
Bid/Construction:	4
Total Project Duration:	7

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.26	$0.28
Professional Services	$0.05	$0.05
Total Project Cost	**$0.31**	**$0.33**

Group C				
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
18	Pipe installation	225	606	$ 136,350
	General improvements	100		$ 60,600
			Subtotal	$ 196,950
			Valves and Fittings (10%)	$ 19,695
			Contingency (20%)	$ 43,329
			Professional Services	$ 51,995
			OPCC	$ 311,969

Project 9 Schematic



Project 10: Water Group L Capital Improvements

Project Identification	
Number:	10
Location:	CRPS; Low Plane
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	1,526
Trigger Date:	Oct-2018
Project Complete:	Oct-2019
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.45	$0.47
Professional Services	$0.09	$0.09
Total Project Cost	**$0.54**	**$0.57**

Project Description
This project includes installation of a new pump and a new 36-inch common suction line for the CRPS. Preliminary sizing indicates that the new pump should be sized to provide 3,800 gpm at 240 ft of head. A variable frequency drive will be provided for the new pump to allow efficient operation during periods of lower demands. One existing pump will be demolished during this project so that the existing CRPS footprint will not have to be expanded.

Justification
Figure 1-4 shows the expected pumping capacity needed for the CRPS through 2022. Demand will surpass the added firm capacity provided by the Group A improvements in 2019, leading to a deficiency in firm pumping capacity of approximately 1,100 gpm by 2020. The new pump would be installed in late 2019 and would provide pumping capacity of 1.3 times the maximum day demand through 2020, allowing equalization of diurnal peaks without completely draining the elevated storage tanks.

Unintended Consequences
Although this project will not change the number of pumps in the CRPS, maintenance cost will increase due to the increased pump sizing.

Special Considerations
Based on projected growth, this project must begin in 2018 so that the new pump can be installed in late 2019.

Potential Alternatives
None identified.

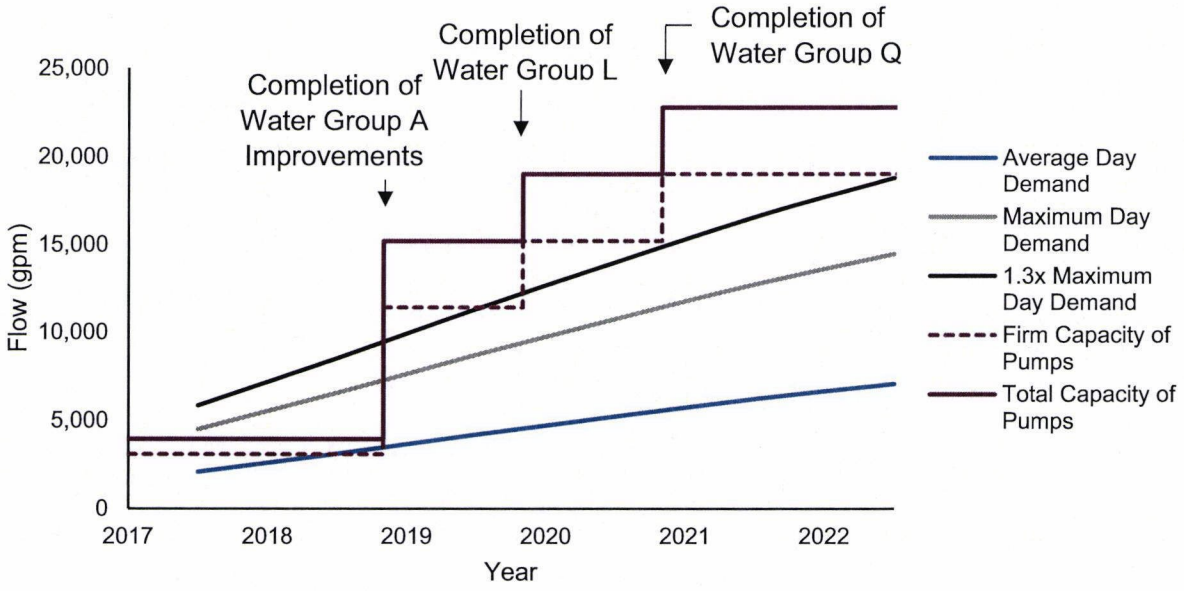
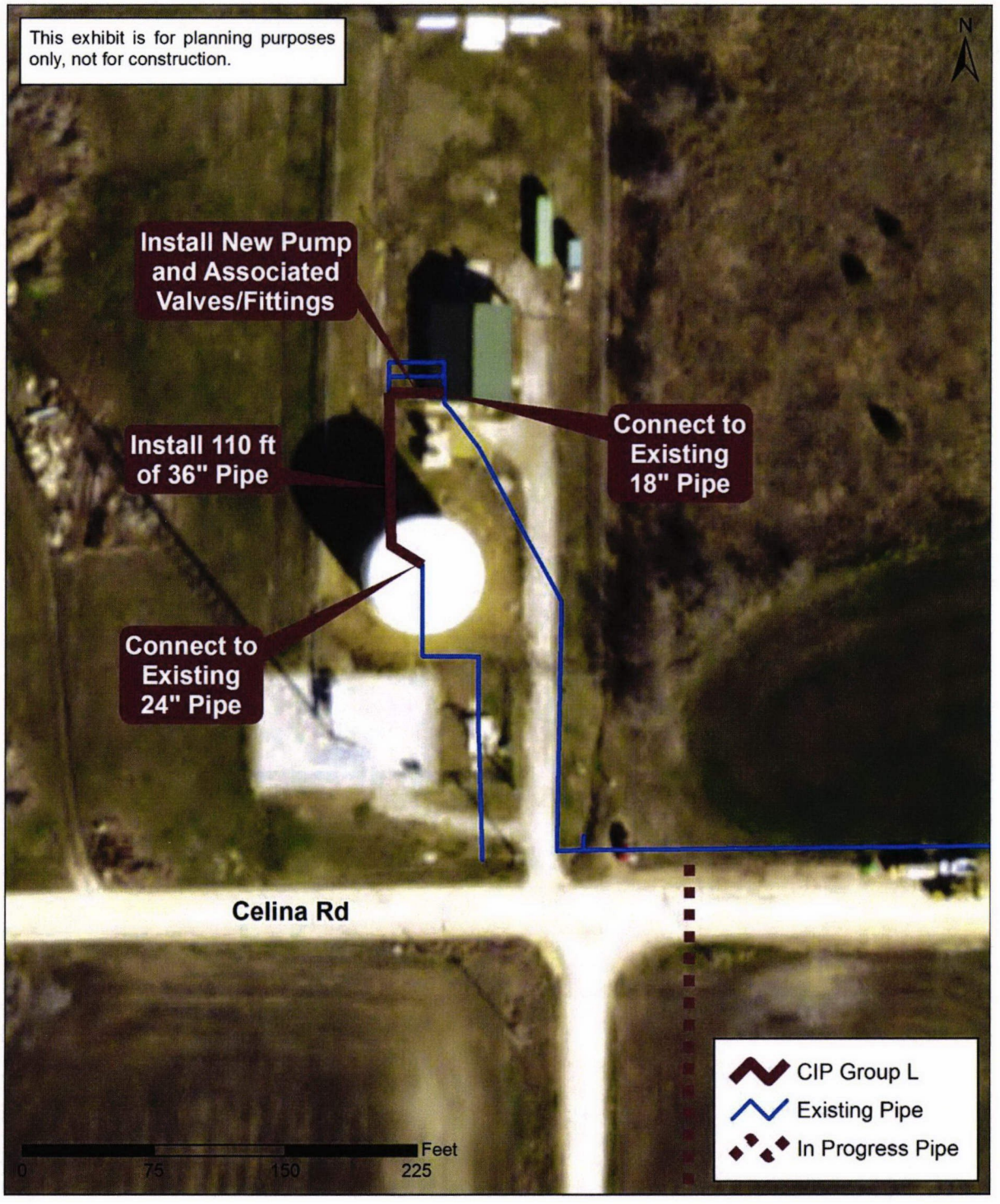


Figure 1-4: Comparison of Proposed CRPS Capacity and Demand

Group L			
Description	**Unit**	**Quantity**	**Cost**
Demo existing pump	LS	1	$ 10,000
Pump with motor	EA	1	$ 112,500
Electrical	LS	1	$ 20,000
VFDs	EA	1	$ 80,000
Valves and fittings	LS	1	$ 35,000
Interconnecting pipes	LS	1	$ 25,000
		Subtotal	$ 282,500
		Contractor's OH&P (18%)	$ 50,850
		Miscellaneous (SCADA, etc., 20%)	$ 56,500
		Contingency (20%)	$ 56,500
		Professional Services	$ 89,270
		OPCC	$ 535,620

Project 10 Schematic



Project 11: Water Group Z Capital Improvements

Project Identification	
Number:	11
Location:	Low Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed:	1,526
Trigger Date:	Oct-2018
Project Complete:	Jul-2020
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$6.35	$6.94
Professional Services	$1.27	$1.35
Total Project Cost	**$7.62**	**$8.29**

Project Description
This project consists of installation of a new, 6 MG ground storage tank and associated site improvements at the CRPS. Associated site improvements include bypass piping, SCADA level sensor, and security fencing.

Justification
Ground storage at this location provides a buffer against interruptions in Upper Trinity Regional Water District (UTRWD) water supply. Current demand projections identify a significant reduction in the amount of detention time provided by the existing GST, as shown in Figure 1-5Figure 1-4. This project will provide 16 hours of emergency storage at average day conditions in 2022 in the event of temporary water supply interruptions from UTRWD and provide additional system storage to meet TCEQ requirements. The new tank will provide steady operation of the high service pumps at the UTRWD, and will allow bypass of the existing GST during maintenance activities.

Unintended Consequences
This tank could lead to increased water age if flow demands do not increase as projected; however, this can be mitigated by controlling the level in the tank.

Special Considerations
This project will require geotechnical evaluation of the site prior to tank design. Coordination with UTRWD will be needed for tank level SCADA integration.

Potential Alternatives
A smaller GST could be constructed; however, a smaller tank would result in increased unit costs and would reduce the amount of time the system could operate without the UTRWD supply.

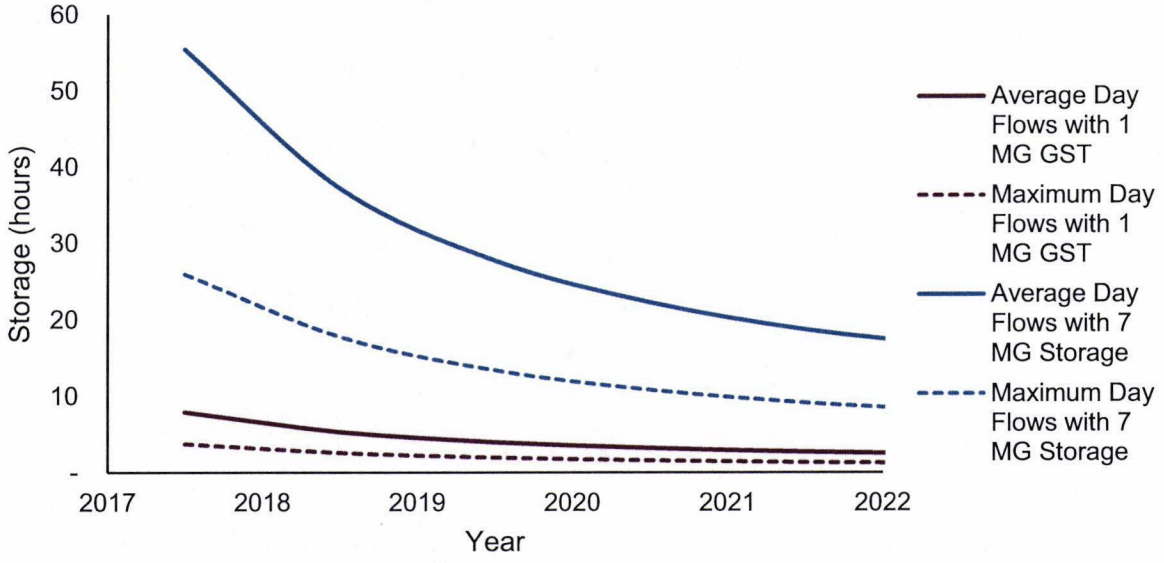
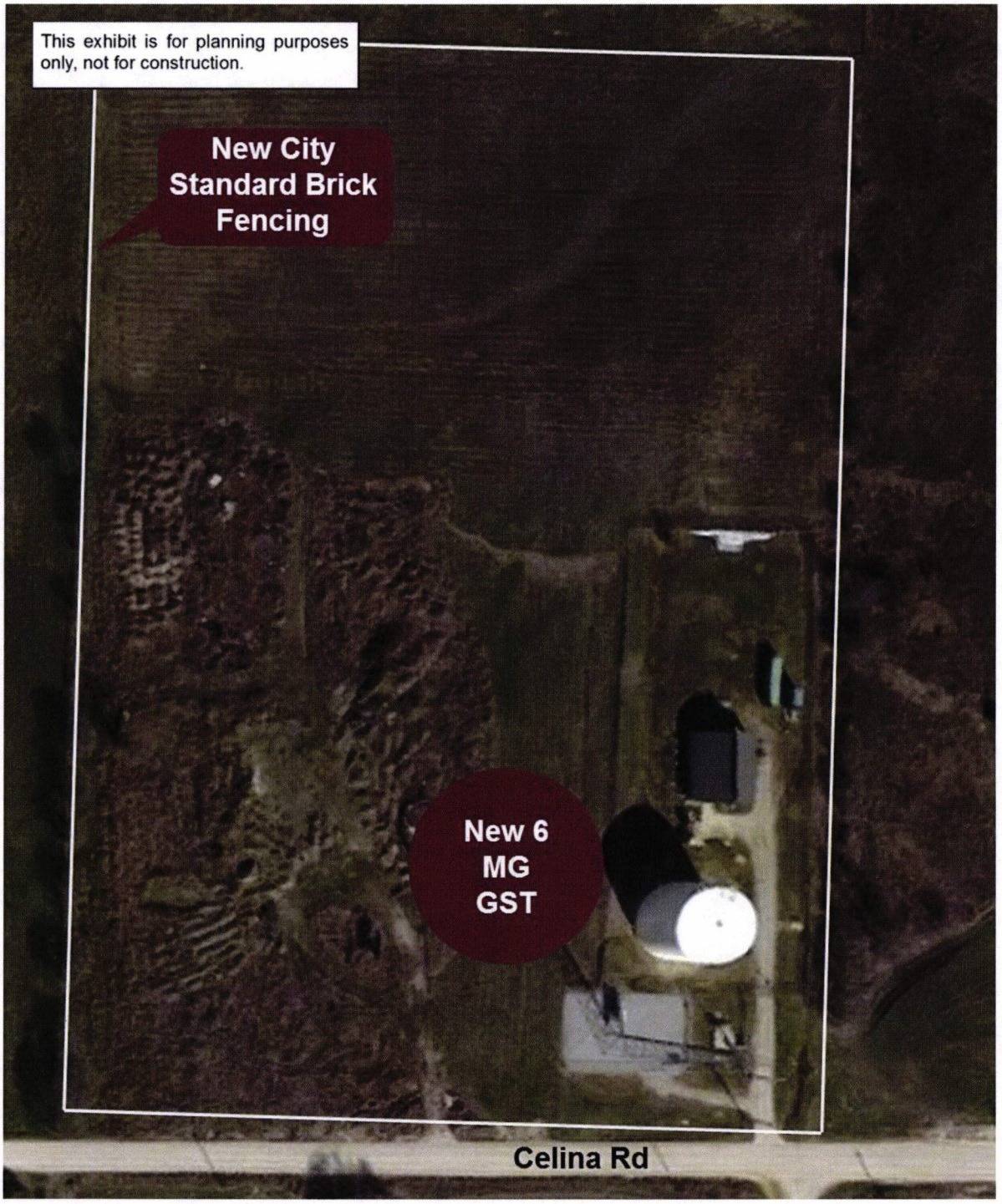


Figure 1-5: Comparison of Available Ground Storage at the CRPS with and without the 6 MG GST

Group Z				
Description	**Unit**	**Quantity**	**Cost**	
New 6 MG GST	LS	1	$	2,668,750
Piping and appurtenances	LS	1	$	150,000
Work area and subgrade preparation	LS	1	$	900,000
City standard brick fencing	LS	1	$	450,000
		Subtotal	$	4,168,750
		Contractor's OH&P (18%)	$	750,375
		Miscellaneous (SCADA, etc., 10%)	$	371,875
		Contingency (20%)	$	1,058,200
		Professional Services	$	1,269,840
		OPCC	$	7,619,040

Project 11 Schematic



Project 12: Water Group R Capital Improvements

Project Identification	
Number:	12
Location:	DTPS
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	2,370
Trigger Date:	Oct-2018
Project Complete:	Oct-2019
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.46	$0.49
Professional Services	$0.09	$0.10
Total Project Cost	**$0.56**	**$0.59**

Project Description
This project will include installation of a new pump and associated piping at the DTPS. Preliminary sizing indicates that the new pump should be sized to provide 3,200 gpm at 240 ft of head. A variable frequency drive will be provided for the new pump to allow efficient operation during periods of lower demands. The existing Pump 4 will be demolished during this project so that the existing DTPS footprint will not have to be expanded.

Justification
Figure 1-6 shows the expected pumping capacity needed for the DTPS through 2022. Demand will surpass the added firm capacity provided by the Group H improvements in 2019, leading to a deficiency in firm pumping capacity of approximately 2,800 gpm by 2022. The new pump would be installed in late 2019 and would provide pumping capacity of 1.3 times the High Pressure Plane's maximum day demand through 2022, allowing equalization of diurnal peaks without completely draining the elevated storage tanks.

Unintended Consequences
None identified.

Special Considerations
This project must begin in 2018 and be in place by June 2020.

Potential Alternatives
None identified.

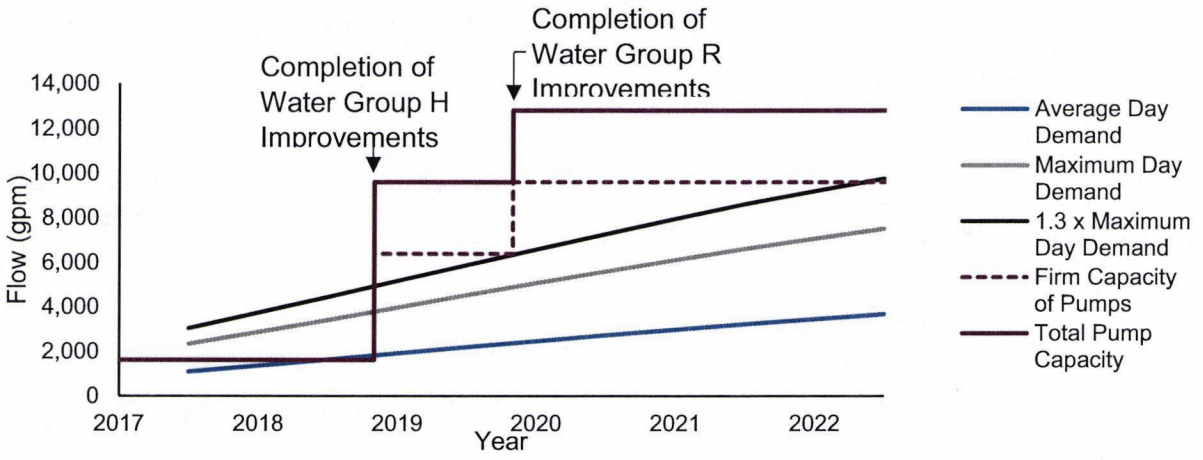


Figure 1-6: Comparison of High Pressure Plane Demands and Proposed Pump Capacity

Group R			
Description	**Unit**	**Quantity**	**Cost**
Pump with motor	EA	1	$ 112,500
Electrical	LS	1	$ 20,000
VFDs	EA	1	$ 80,000
Valves and fittings	LS	1	$ 35,000
Interconnecting pipes	LS	1	$ 25,000
Subtotal			$ 272,500
Contractor's OH&P (18%)			$ 49,050
Miscellaneous (SCADA, etc., 20%)			$ 64,310
Contingency (20%)			$ 77,172
Professional Services			$ 92,606
OPCC			$ 555,638

Project 13: Water Group K Capital Improvements

Project Identification	
Number:	13
Location:	High Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed:	2,226
Trigger Date:	Mar-2019
Project Complete:	Aug-2019
Project Implementation (Months)	
Engineering/Design:	2
Bid/Construction:	3
Total Project Duration:	5

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.12	$0.13
Professional Services	$0.03	$0.03
Total Project Cost	**$0.15**	**$0.15**

Project Description
This project includes decommissioning of the Morgan Lake facilities and an engineering study to evaluate the condition and future use of existing groundwater supply facilities.

Justification
Construction of the new SE EST will raise the High Pressure Plane HGL by 15 ft, which will render the Morgan Lake facilities inoperable.

Unintended Consequences
None identified.

Special Considerations
The new SE EST must be online prior to decommissioning Morgan Lake facilities. If the groundwater well is to remain online, additional rehabilitation may be required for the well and chemical disinfection facilities.

Potential Alternatives
These facilities could remain in use if an elevation control valve was installed; however, this would result in high water age in the existing tank. Additional alternatives for groundwater facilities will be evaluated as part of the engineering study.

Group K			
Description	**Unit**	**Quantity**	**Cost**
Tank decommissioning and demo	LS	1	$ 100,000
		Subtotal	$ 100,000
		Contingency (20%)	$ 20,000
		Engineering Study	$ 25,000
		OPCC	$ 145,000

Project 13 Photographs

Figure 1-7: Existing Morgan Lake facilities, to be decommissioned

Project 14: Water Group AB Capital Improvements

Project Description
This project will consist of SCADA improvements identified in the SCADA Master Plan.

Justification
This project will implement the improvements identified in the SCADA Master Plan and will improve consistency, reliability, and automation of operations.

Unintended Consequences
None identified.

Special Considerations
None identified.

Potential Alternatives
Alternatives will be identified during development of the SCADA Master Plan.

Project Identification	
Number:	14
Location:	System Wide
Flexibility:	High
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	None
Trigger # of Lots Constructed:	3,233
Trigger Date:	Oct-2019
Project Complete:	Apr-2021
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	9
Total Project Duration:	18

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.24	$0.26
Professional Services	$0.07	$0.08
Total Project Cost	**$0.31**	**$0.34**

Group AB			
Description	**Unit**	**Quantity**	**Cost**
SCADA improvements - water & wastewater	1	LS	$ 200,000
		Subtotal	$ 200,000
		Contingency (20%)	$ 40,000
		Engineering/Integration	$ 72,000
		OPCC	$ 312,000

Project 15: Water Group AA Capital Improvements

Project Description
This project consists of upsizing all existing lines less than 8-inch in diameter in the Downtown area, in both the High and Low Pressure Planes.

Justification
These improvements will minimize head loss in the system and prepare the older portion of the system for growth.

Unintended Consequences
None identified.

Special Considerations
This project will take place in a developed area. As such, bored pipe installations and significant pavement, sidewalk, and landscaping repairs may be required.

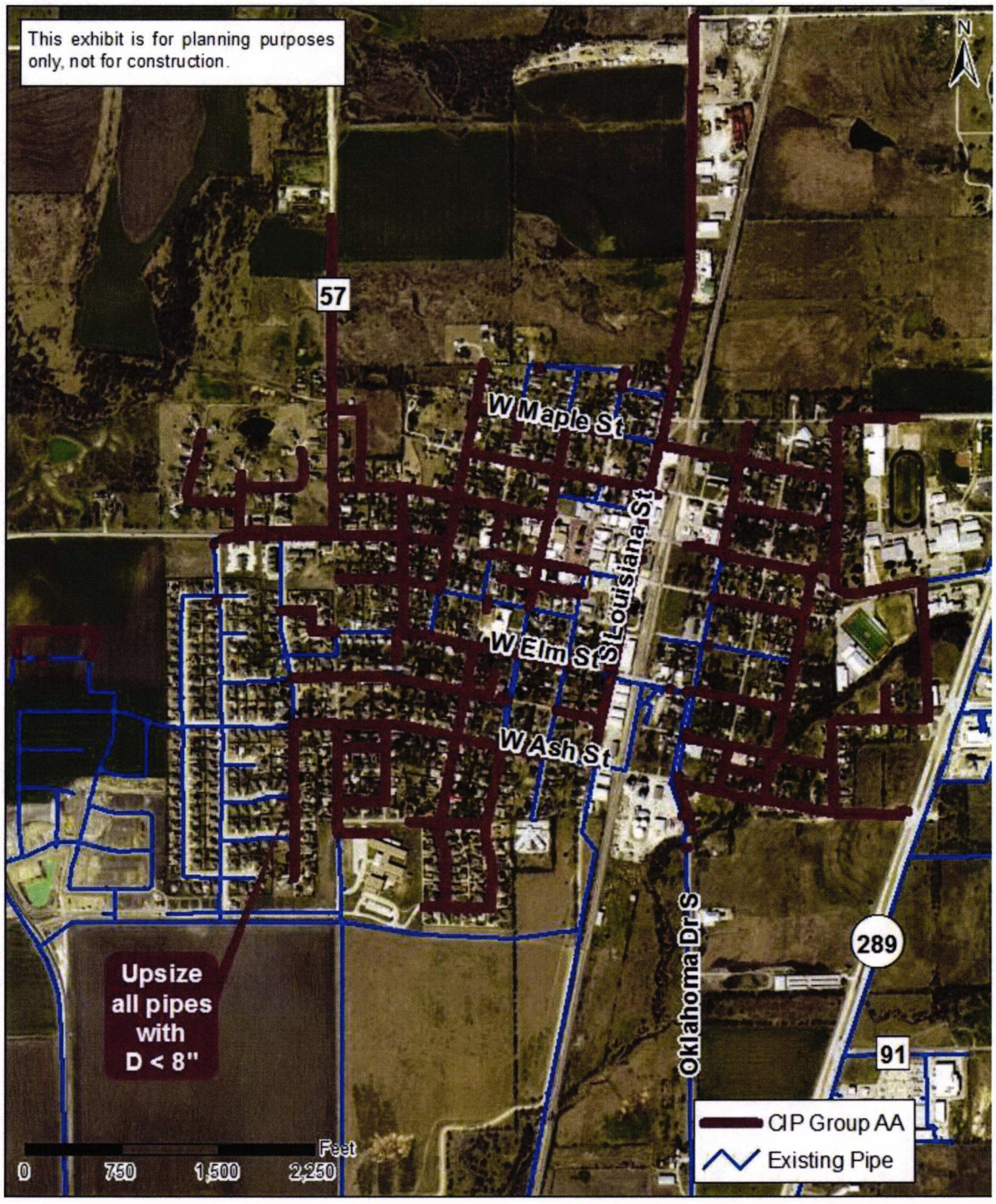
Potential Alternatives
These lines may be replaced during concurrent street rehabilitation projects, which will significantly reduce the overall general improvements cost.

Project Identification	
Number:	15
Location:	System Wide
Flexibility:	Medium
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	City-directed
Trigger # of Lots Constructed:	3,233
Trigger Date:	Oct-2019
Project Complete:	Oct-2021
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	24

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$18.66	$21.00
Professional Services	$3.73	$4.08
Total Project Cost	**$22.39**	**$25.08**

Group AA				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
8	Pipe installation	150	58,933	$ 8,839,950
	General improvements	100		$ 5,893,300
Details		**Unit Cost**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 75,000
			Subtotal	$ 14,808,250
			Valves and Fittings (5%)	$ 740,413
			Contingency (20%)	$ 3,109,733
			Professional Services	$ 3,731,679
			OPCC	$ 22,390,074

Project 15 Schematic



Project 16: Water Group M Capital Improvements

Project Description
This project includes installation of a 12-inch pipeline around the northwest side of downtown.

Justification
This project will alleviate low pressures in the areas of the Low Pressure Plane and will result in increased capacity.

Unintended Consequences
None identified.

Special Considerations
The proposed pipeline will run alongside a future thoroughfare, and coordination of easements will be required. Also, two bored piping installations will be required.

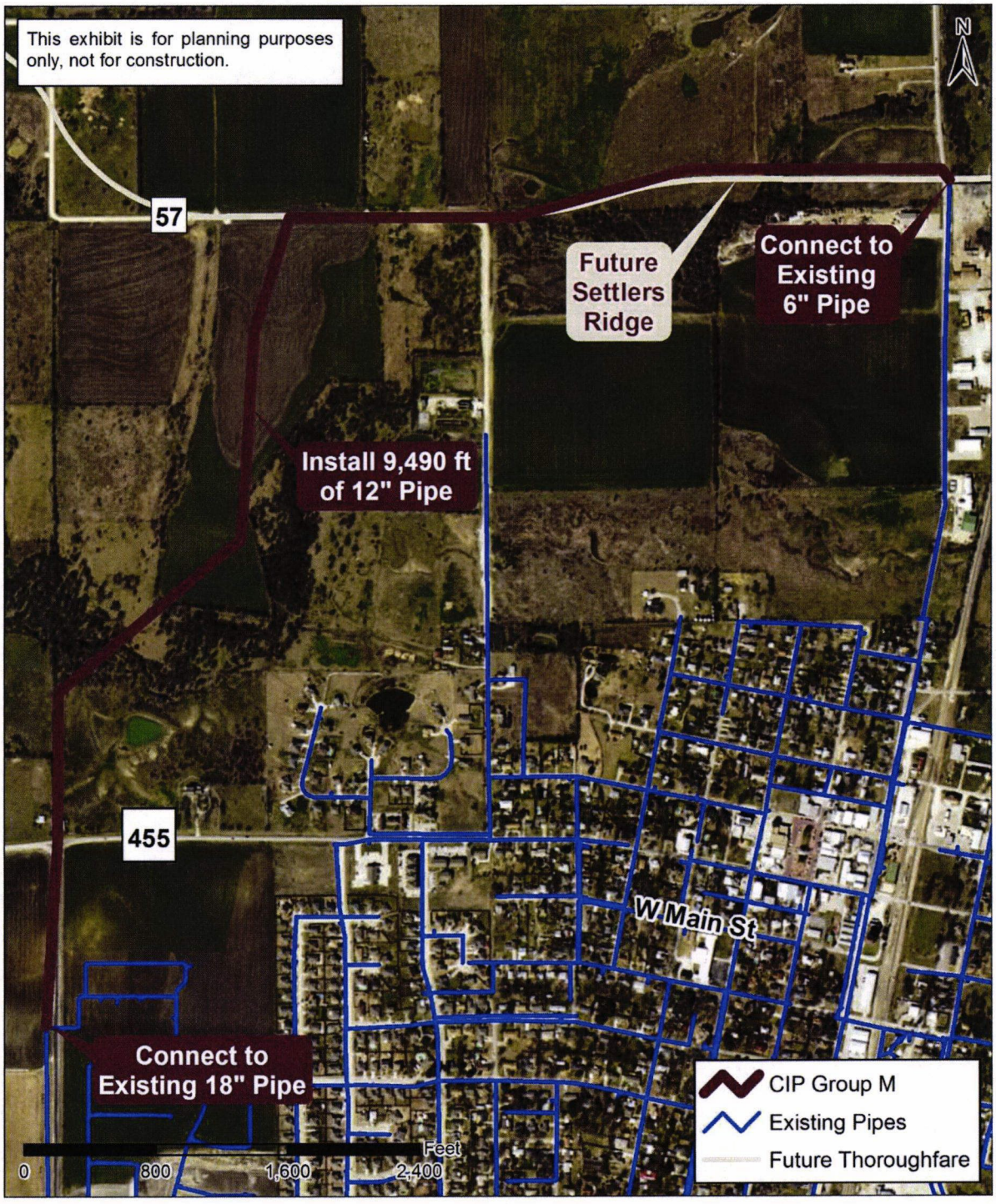
Potential Alternatives
None identified.

Project Identification	
Number:	16
Location:	Low Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	3,233
Trigger Date:	Oct-2019
Project Complete:	Oct-2021
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	24

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$2.76	$3.10
Professional Services	$0.55	$0.60
Total Project Cost	**$3.31**	**$3.70**

Group M					
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost	
12	Pipe installation	180	9,489	$	1,708,020
	General improvements	40		$	379,560
Description		Unit	Quantity	Cost	
Bored pipe installation		LS	1	$	100,000
			Subtotal	$	2,187,580
			Valves and Fittings (5%)	$	109,379
			Contingency (20%)	$	459,392
			Professional Services	$	551,270
			OPCC	$	3,307,621

Project 16 Schematic



Project 17: Water Group Q Capital Improvements

Project Identification	
Number:	17
Location:	CRPS
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	3,233
Trigger Date:	Oct-2019
Project Complete:	Oct-2020
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.46	$0.51
Professional Services	$0.09	$0.10
Total Project Cost	**$0.56**	**$0.61**

Project Description
This project consists of installation of one additional pump in the CRPS. Preliminary sizing indicates that the new pump should be sized to provide 3,800 gpm at 240 ft of head. A variable frequency drive will be provided for the new pump to allow efficient operation during periods of lower demands. One existing pump will be demolished during this project so that the existing CRPS footprint will not have to be expanded.

Justification
Figure 1-8 shows the expected pumping capacity needed for the CRPS through 2022. Demand will surpass the added firm capacity provided by the Group A and L improvements in 2021, and would lead to a deficiency in pumping capacity of approximately 2,300 gpm by 2022. These improvements will provide pumping capacity of 1.3x maximum day demand through 2022, allowing equalization of diurnal peaks without completely draining the elevated storage tanks.

Unintended Consequences
Although this project will not change the number of pumps in the CRPS, maintenance costs will increase due to the increased pump sizing.

Special Considerations
This project must begin in 2019 and be in place by August 2020 in preparation for the projected flows.

Potential Alternatives
None identified.

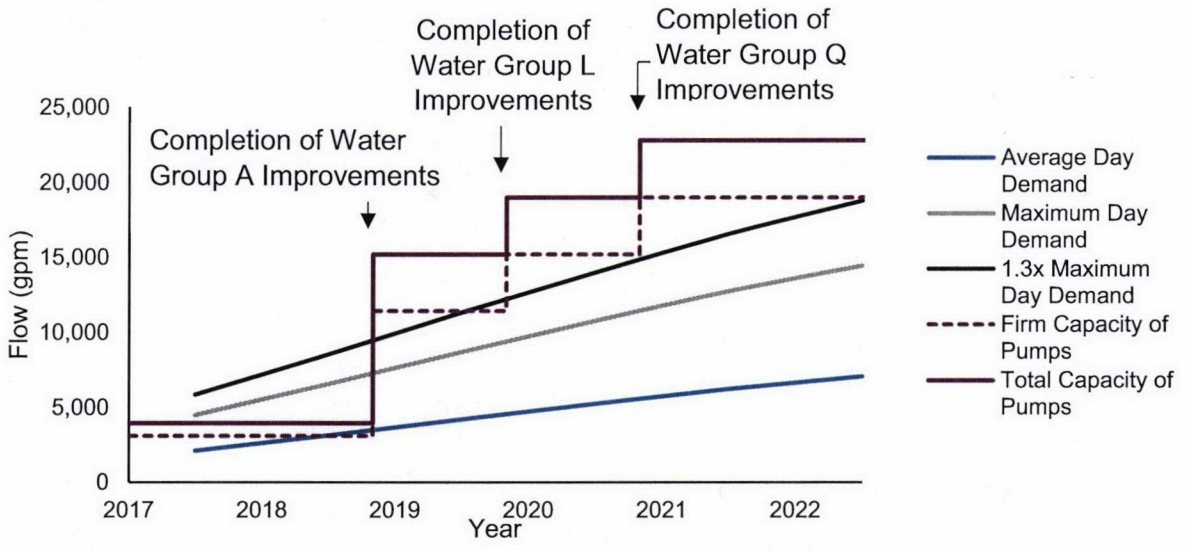


Figure 1-8: Comparison of Proposed CRPS Capacity and Demand

Group Q			
Description	**Unit**	**Quantity**	**Cost**
Pump with motor	EA	1	$ 112,500
Electrical	LS	1	$ 20,000
VFDs	EA	1	$ 80,000
Valves and fittings	LS	1	$ 35,000
Interconnecting pipes	LS	1	$ 25,000
Subtotal			$ 272,500
Contractor's OH&P (18%)			$ 49,050
Miscellaneous (SCADA, etc., 20%)			$ 64,310
Contingency (20%)			$ 77,172
Professional Services			$ 92,606
OPCC			$ 555,638

Project 18: Water Group AC Capital Improvements

Project Description
This project consists of development of a new 5-year Master Plan with associated hydraulic model updates and revisions needed for water quality monitoring plans such as the RTCR sample siting plan, and Nitrification Action Plan.

Justification
This master plan will evaluate future growth and lead to development of a new CIP.

Unintended Consequences
None identified.

Special Considerations
None identified.

Potential Alternatives
None identified.

Project Identification	
Number:	18
Location:	System Wide
Flexibility:	Medium
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	City-directed
Trigger # of Lots Constructed:	4,894
Trigger Date:	Oct-2020
Project Complete:	Oct-2021
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	0
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.00	$0.00
Professional Services	$0.20	$0.23
Total Project Cost	**$0.20**	**$0.23**

Group AC			
Description	**Unit**	**Quantity**	**Cost**
2020 5-Year Master Plan	LS	1	$ 200,000
		OPCC	**$ 200,000**

Project 19: Water Group P Capital Improvements

Project Description
This project adds an 18-inch line from Morgan Lake running north to connect to the DC Ranch development and west to Preston Road.

Justification
This project will result in increased capacity and improve pressures in the distribution system. This pipeline is needed to supply projected flows during this five-year planning period.

Unintended Consequences
None identified.

Special Considerations
This project will require completion of Water Group D improvements prior to the connection at Morgan Lake. Coordination and right-of-way/easement acquisition will likely be necessary for this pipeline.

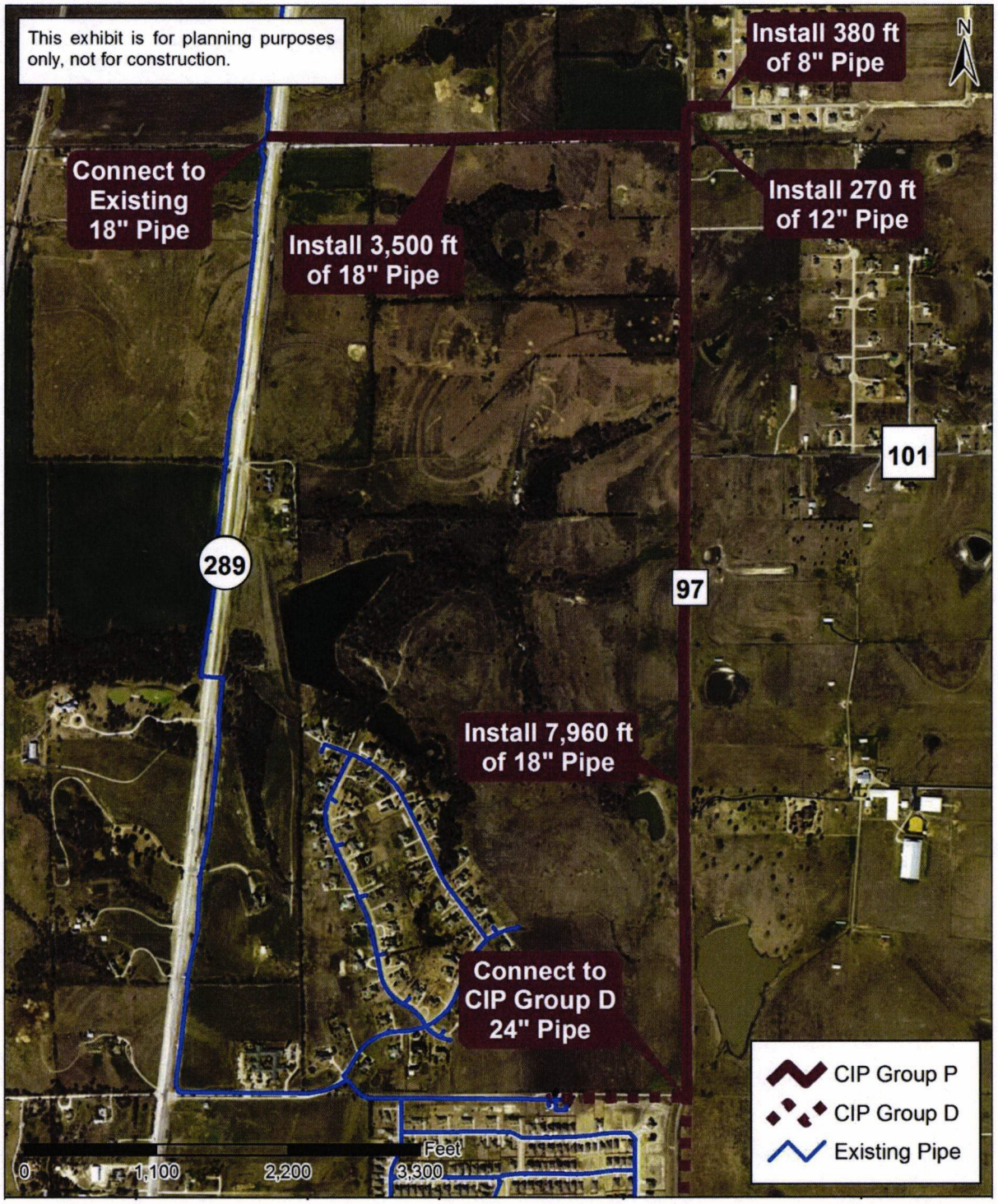
Potential Alternatives
None identified.

Project Identification	
Number:	19
Location:	High Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	3,233
Trigger Date:	Oct-2019
Project Complete:	Jul-2021
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$4.27	$4.80
Professional Services	$0.85	$0.93
Total Project Cost	**$5.12**	**$5.73**

Group P					
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost	
18	Pipe installation	225	11,453	$	2,576,925
	General improvements	40		$	458,120
12	Pipe installation	180	267	$	48,060
	General improvements	25		$	6,675
8	Pipe installation	150	384	$	57,600
	General improvements	100		$	38,400
Description		**Unit**	**Quantity**	**Cost**	
Bored pipe installation		LS	1	$	200,000
			Subtotal	$	3,385,780
			Valves and Fittings (5%)	$	169,289
			Contingency (20%)	$	711,014
			Professional Services	$	853,217
			OPCC	$	5,119,299

Project 19 Schematic



Project 20: Water Group O Capital Improvements

Project Description
This project will add a 24-inch line parallel to the railroad tracks in the Low Pressure Plane. The new 24-inch line will parallel an existing 12-inch line, which will stay in service.

Justification
This project will result in increased capacity and improve pressures in this area of the distribution system. This pipeline is needed to supply projected flows during this five-year planning period.

Unintended Consequences
None identified.

Special Considerations
None identified.

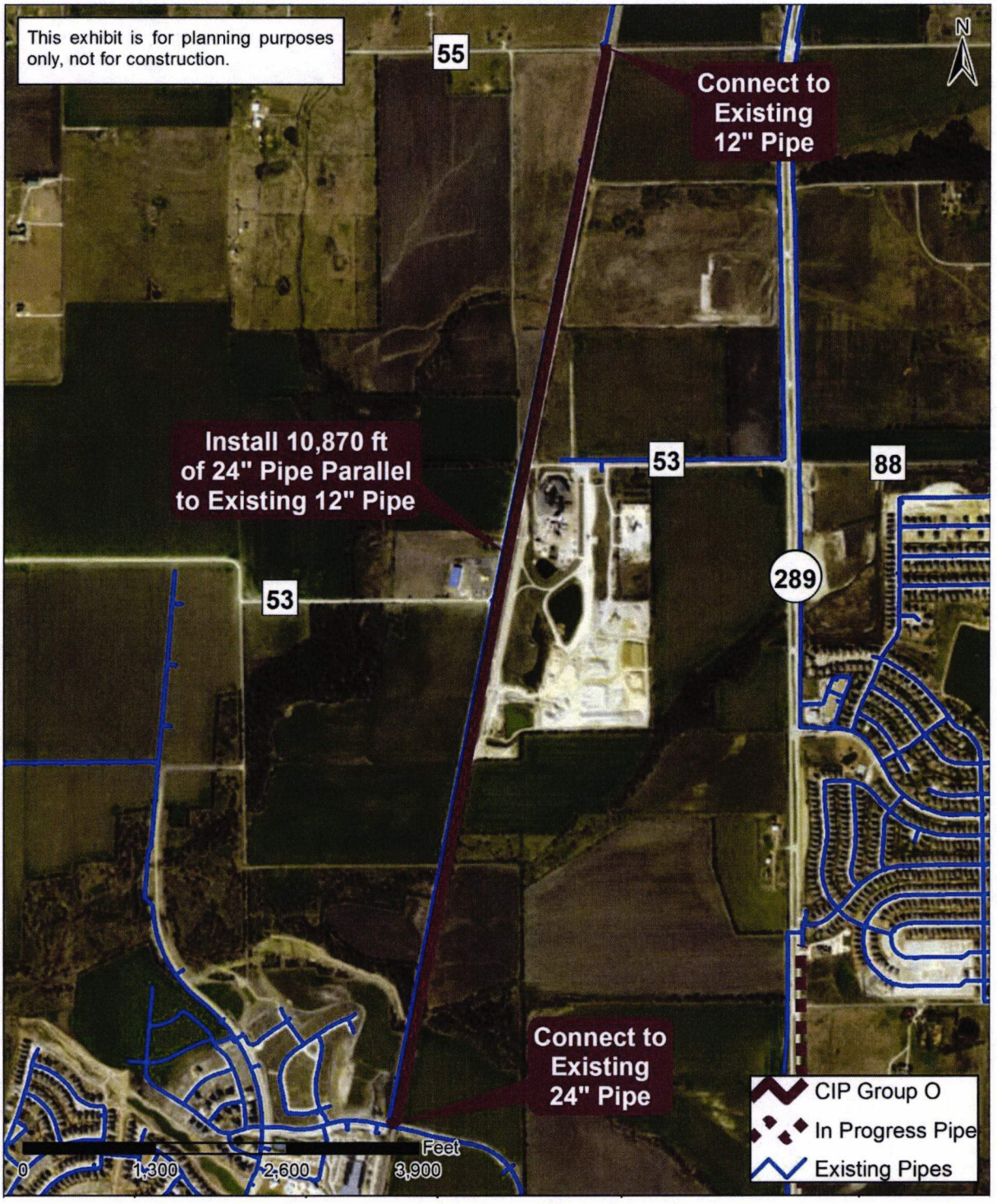
Potential Alternatives
The existing 12-inch line could be decommissioned; however, this would require the proposed 24-inch line to be upsized.

Project Identification	
Number:	20
Location:	Low Plane
Flexibility:	Medium
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed:	4,894
Trigger Date:	Oct-2020
Project Complete:	Jul-2022
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$4.45	$5.16
Professional Services	$0.89	$1.00
Total Project Cost	**$5.34**	**$6.16**

Group O					
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost	
24	Pipe installation	275	10,866	$	2,988,150
	General improvements	50		$	543,300
			Subtotal	$	3,531,450
			Valves and Fittings (5%)	$	176,573
			Contingency (20%)	$	741,605
			Professional Services	$	889,925
			OPCC	$	5,339,552

Project 20 Schematic



Project 21: Water Group T Capital Improvements

Project Description
This project includes installation of 18- and 24-inch pipelines along Hwy. 455 to the east of CVS.

Justification
This project will remove a dead end, improving fire flow in this area.

Unintended Consequences
The additional looping would improve water quality in this area.

Special Considerations
The proposed pipeline will run alongside a future thoroughfare, and coordination of easements will be required. Also, a bored pipe installation will be required to connect to the existing 6-inch pipe serving the Preston 455 development

Potential Alternatives
None identified.

Project Identification	
Number:	21
Location:	High Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	4,894
Trigger Date:	Oct-2020
Project Complete:	Jul-2022
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$1.99	$2.31
Professional Services	$0.40	$0.45
Total Project Cost	**$2.39**	**$2.75**

Group T				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
18	Pipe installation	225	3,930	$ 884,250
	General improvements	40		$ 157,200
24	Pipe installation	275	1422	$ 391,050
	General improvements	50		$ 71,100
Description		**Unit Cost**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 75,000
			Subtotal	$ 1,578,600
			Valves and Fittings (5%)	$ 78,930
			Contingency (20%)	$ 331,506
			Professional Services	$ 397,807
			OPCC	$ 2,386,843

Project 21 Schematic

Project 22: Water Group S Capital Improvements

Project Description
This project includes installation of 18- and 24-inch lines along Legacy Drive.

Justification
These lines provide a redundant feed to the Creeks of Legacy development with additional looping, improving pressure and flow rates in this area.

Unintended Consequences
The additional looping will improve water quality in this area.

Special Considerations
These improvements will require installation of a 24-inch pipe that is part of an ongoing project for the northern connection. TxDOT coordination and right-of-way/easement acquisition will likely be necessary for this pipeline.

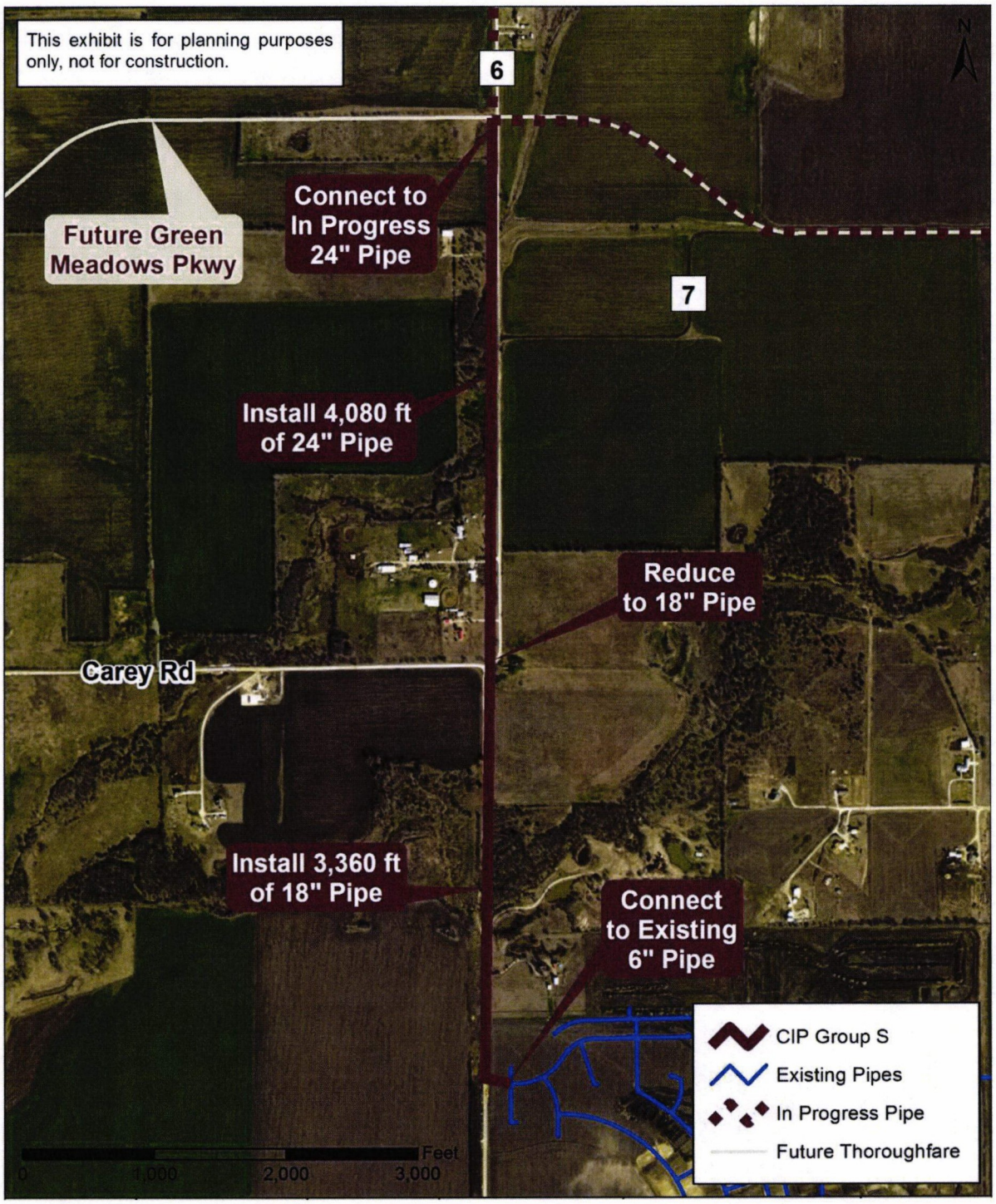
Potential Alternatives
None identified.

Project Identification	
Number:	22
Location:	Low Plane
Flexibility:	High
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed:	6,504
Trigger Date:	Oct-2021
Project Complete:	Jul-2023
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$2.79	$3.34
Professional Services	$0.56	$0.65
Total Project Cost	**$3.35**	**$3.98**

Group S					
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**	
18	Pipe installation	225	3,364	$	756,900
	General improvements	40		$	134,560
24	Pipe installation	275	4,080	$	1,122,000
	General improvements	50		$	204,000
			Subtotal	$	2,217,460
			Valves and Fittings (5%)	$	110,873
			Contingency (20%)	$	465,667
			Professional Services	$	558,800
			OPCC	$	3,352,800

Project 22 Schematic



Project 23: Water Group X Capital Improvements

Project Description
This project consists of installation of new 8-inch and 24-inch pipelines to connect the Preston Lakes development to the existing 18-inch line along the Preston Road Corridor. Another 8-inch line will be installed within the development to provide looping.

Justification
This project will result in added looping for improved fire flow in the Preston Lakes development.

Unintended Consequences
The added looping will improve water quality in this area.

Special Considerations
TxDOT coordination and right-of-way/easement acquisition will likely be necessary for this pipeline. In addition, a bored pipe installation will be needed to cross the railroad tracks.

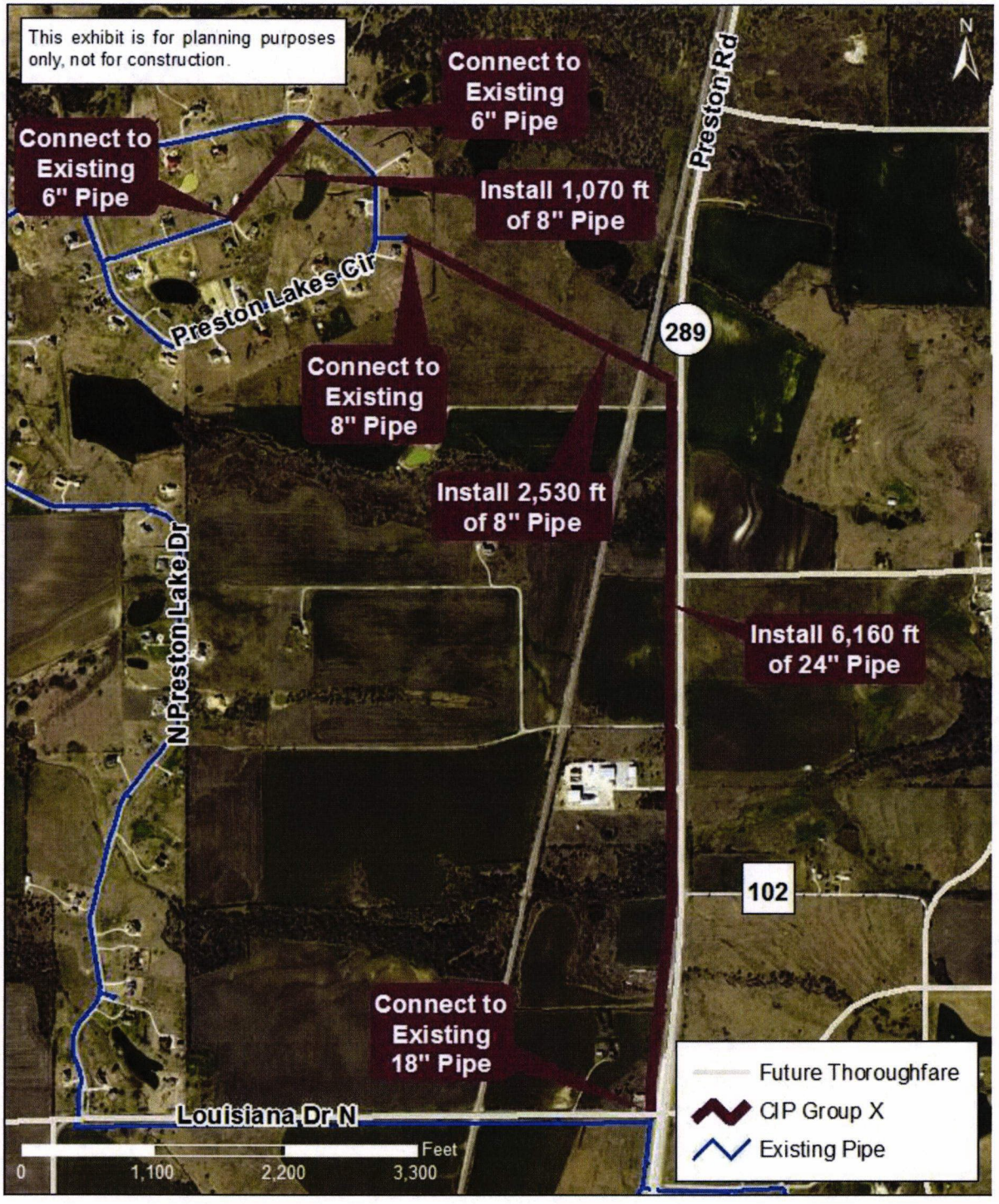
Potential Alternatives
None identified.

Project Identification	
Number:	23
Location:	Low Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	6,504
Trigger Date:	Oct-2021
Project Complete:	Jul-2023
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$3.48	$4.15
Professional Services	$0.70	$0.81
Total Project Cost	**$4.17**	**$4.96**

Group X				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
8	Pipe installation	150	3,600	$ 540,000
	General improvements	40		$ 144,000
24	Pipe installation	275	6,160	$ 1,694,000
	General improvements	50		$ 308,000
Description		**Unit Cost**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 75,000
			Subtotal	$ 2,761,000
			Valves and Fittings (5%)	$ 138,050
			Contingency (20%)	$ 579,810
			Professional Services	$ 695,772
			OPCC	$ 4,174,632

Project 23 Schematic



Project 24: Water Group W Capital Improvements

Project Description
This project includes installation of an 8-inch line along E Malone St. and a 12-inch line along Preston Road to create looping near downtown in the High Pressure Plane.

Justification
These improvements are designed to improve looping, and thus fire flow.

Unintended Consequences
The added looping will improve water quality in this area.

Special Considerations
TxDOT coordination and right-of-way/easement acquisition will likely be necessary for this pipeline.

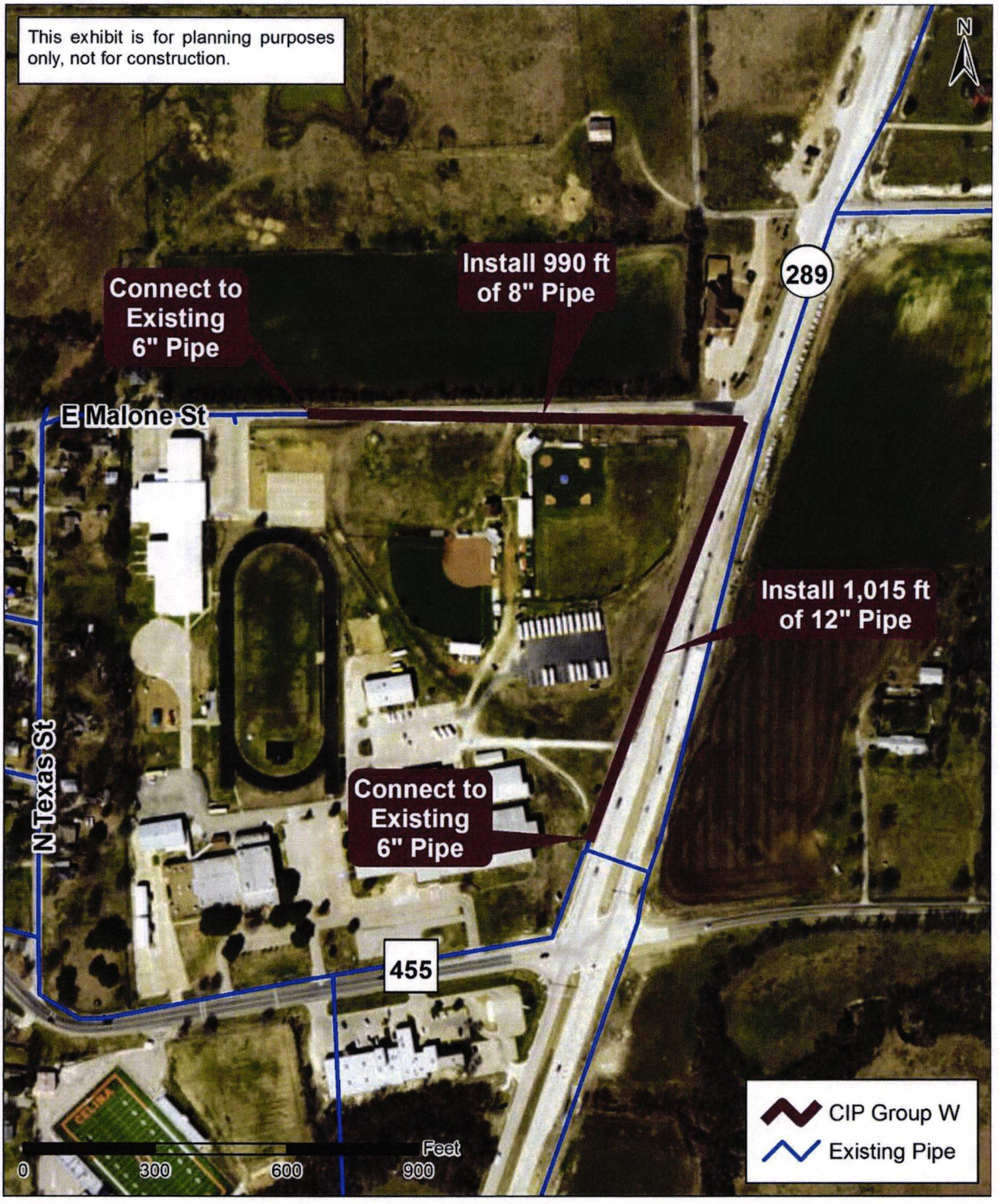
Potential Alternatives
None identified.

Project Identification	
Number:	24
Location:	High Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	4,894
Trigger Date:	Oct-2020
Project Complete:	Oct-2021
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.51	$0.57
Professional Services	$0.10	$0.11
Total Project Cost	**$0.61**	**$0.69**

Group W				
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
8	Pipe installation	150	1,685	$ 252,750
	General improvements	75		$ 126,375
12	Pipe installation	180	101	$ 18,180
	General improvements	75		$ 7,575
			Subtotal	$ 404,880
			Valves and Fittings (5%)	$ 20,244
			Contingency (20%)	$ 85,025
			Professional Services	$ 102,030
			OPCC	$ 612,179

Project 24 Schematic



Project 25: Water Group V Capital Improvements

Project Description
This project consists of installation of three 8-inch pipelines in the Low Pressure Plane near downtown.

Justification
The new 8-inch lines will connect existing pipelines, providing looping to improve fire flow and water quality in the area.

Unintended Consequences
None identified.

Special Considerations
A bored pipeline installation and easement coordination will be required.

Potential Alternatives
None identified.

Project Identification	
Number:	25
Location:	Low Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	4,894
Trigger Date:	Oct-2020
Project Complete:	Oct-2021
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.46	$0.51
Professional Services	$0.09	$0.10
Total Project Cost	**$0.55**	**$0.62**

Group V				
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost
8	Pipe installation	150	1,181	$ 177,150
	General improvements	100		$ 118,100
Description		**Unit Cost**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 50,000
			Subtotal	$ 345,250
			Valves and Fittings (10%)	$ 34,525
			Contingency (20%)	$ 75,955
			Professional Services	$ 91,146
			OPCC	$ 546,876

Project 25 Schematic

Project 26: Water Group Y Capital Improvements

Project Description
This project adds an 18-inch line to serve the Lakes at Mustang Ranch development from the Parks at Wilson Creek development.

Justification
These improvements will improve fire flows in the Lakes at Mustang Ranch development.

Unintended Consequences
This project would also result in improved water quality in the area.

Special Considerations
Construction of lines for the Parks at Wilson Creek by developers will be required before this project can be implemented. The proposed pipeline will run alongside a future thoroughfare, and coordination of easements will be required.

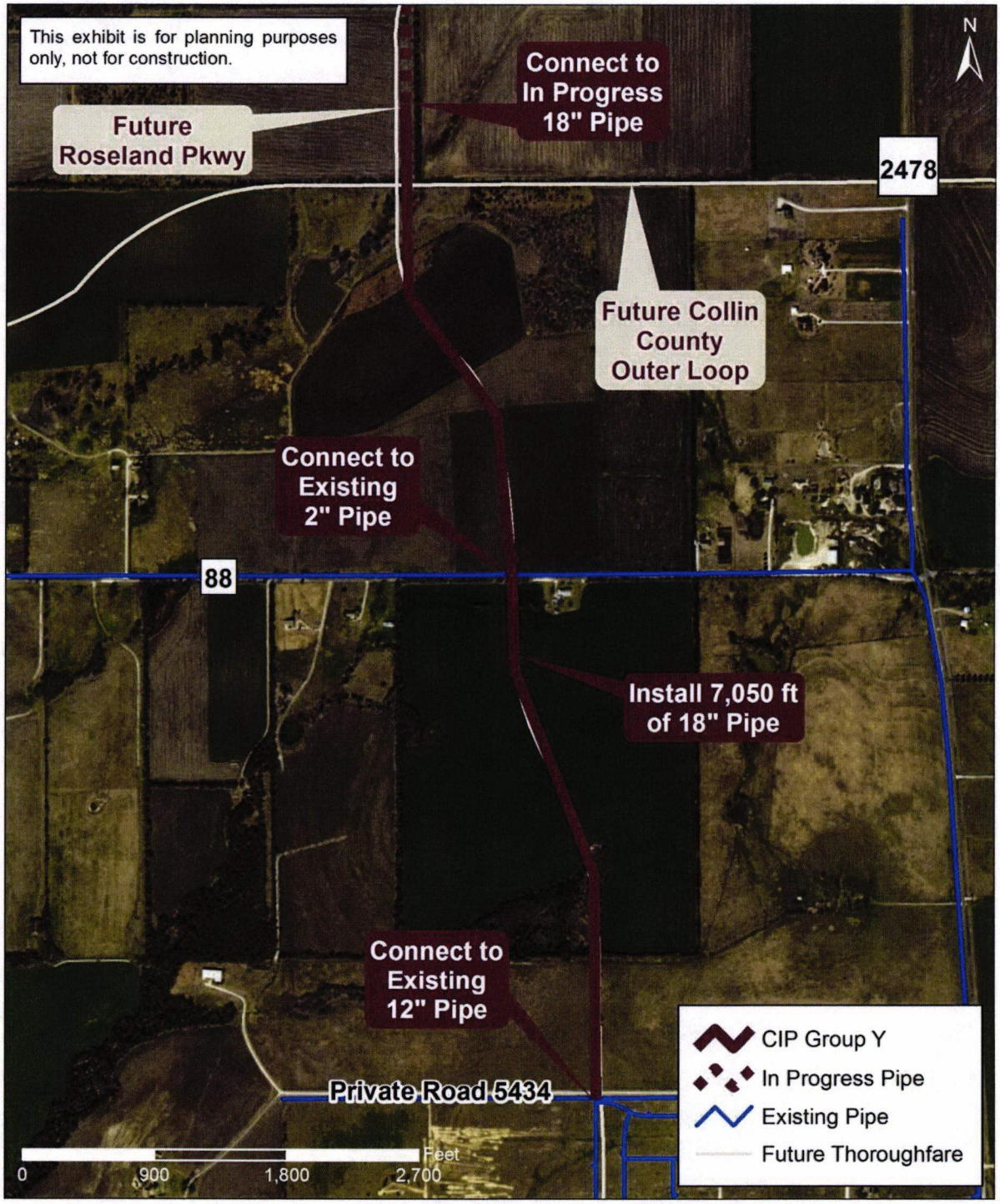
Potential Alternatives
None identified.

Project Identification	
Number:	26
Location:	Low Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	6,504
Trigger Date:	Oct-2021
Project Complete:	Jul-2023
Project Implementation (Months)	
Engineering/Design:	9
Bid/Construction:	12
Total Project Duration:	21

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$2.45	$2.92
Professional Services	$0.49	$0.57
Total Project Cost	**$2.94**	**$3.49**

Group Y				
Diameter (in.)	**Description**	**Unit Cost ($/LF)**	**Length (ft.)**	**Cost**
18	Pipe installation	225	7,052	$ 1,586,700
	General improvements	40		$ 282,080
Details		**Unit Cost**	**Quantity**	**Cost**
Bored pipe installation		LS	1	$ 75,000
			Subtotal	$ 1,943,780
			Valves and Fittings (5%)	$ 97,189
			Contingency (20%)	$ 408,194
			Professional Services	$ 489,833
			OPCC	$ 2,938,995

Project 26 Schematic



Project 27: Water Group U Capital Improvements

Project Description
This project includes installation of a new 12-inch line from Preston Road to feed the Morgan Lake Estates development.

Justification
This project will improve fire flows in the Morgan Lake Estates development.

Unintended Consequences
This project would also result in improved water quality in the area.

Special Considerations
This pipeline would run through currently undeveloped land and would require coordination of easements. Also, detailed design should incorporate ongoing development in the proposed alignment.

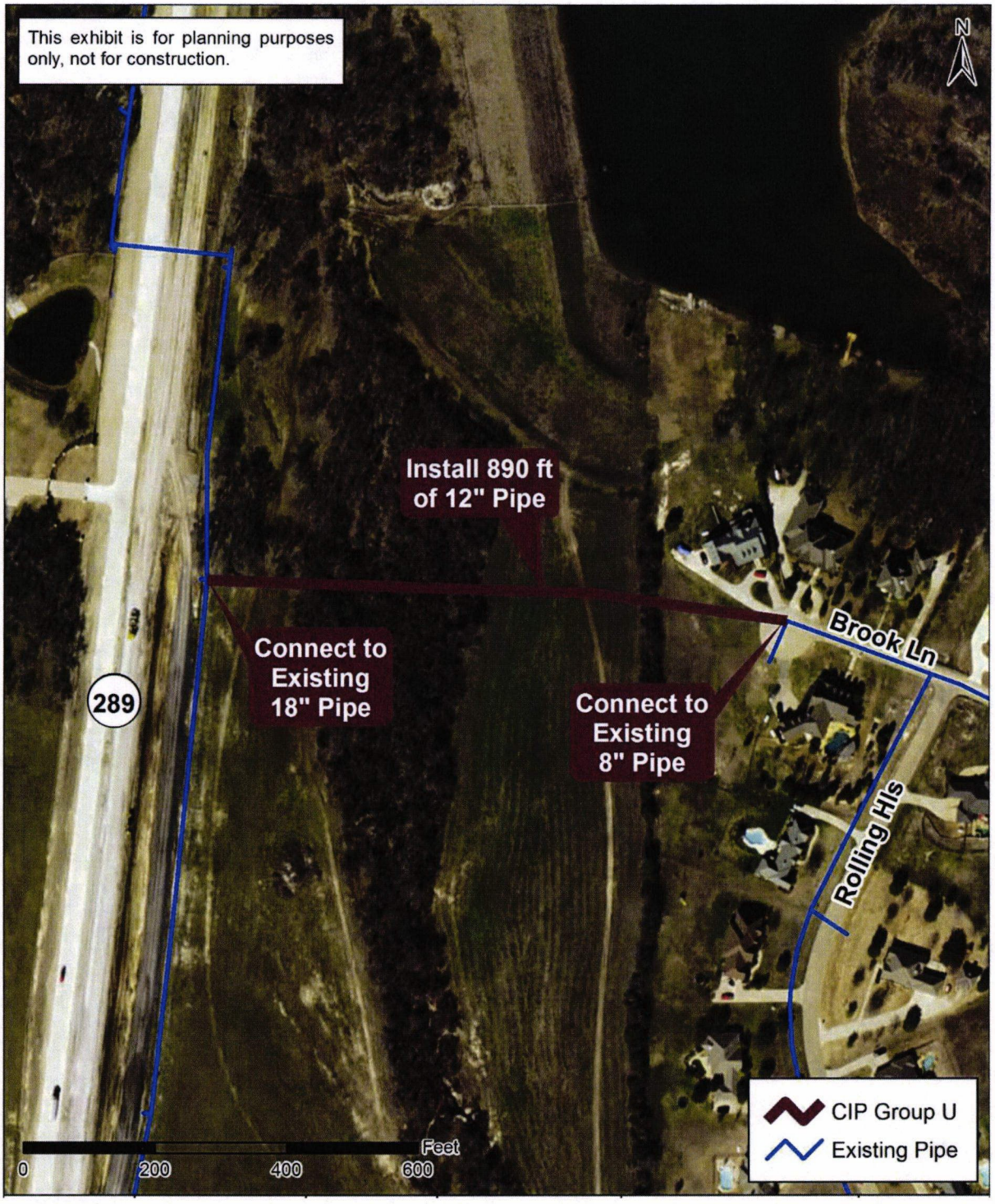
Potential Alternatives
None identified.

Project Identification	
Number:	27
Location:	High Plane
Flexibility:	High
Schedule	
Primary Trigger:	Fire flow
Secondary Trigger:	Operational
Trigger # of Lots Constructed:	6,504
Trigger Date:	Oct-2021
Project Complete:	Oct-2022
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.28	$0.33
Professional Services	$0.06	$0.07
Total Project Cost	**$0.34**	**$0.40**

Group U					
Diameter (in.)	Description	Unit Cost ($/LF)	Length (ft.)	Cost	
12	Pipe installation	180	886	$	159,480
	General improvements	75		$	66,450
			Subtotal	$	225,930
			Valves and Fittings (5%)	$	11,297
			Contingency (20%)	$	47,445
			Professional Services	$	56,934
			OPCC	$	341,606

Project 27 Schematic



Appendix D

Water & Wastewater System Improvements
Wastewater Capital Improvements Plan

City of Celina, Texas

Prepared by:

3010 Gaylord Parkway
Suite 190
Frisco, TX 75034

September 2017

Garver Project No.: 16088050

1.0 Executive Summary

This Wastewater Capital Improvements Plan utilizes the model criteria and simulations detailed in the Water and Wastewater Modeling Improvements, discussions with City staff, and the results of the 2016 Inflow and Infiltration (I/I) Study prepared by Pacheco Koch to develop proposed projects from the recommended improvements. These improvements are identified for a 5-year planning horizon (2017 – 2022 fiscal years).

A summary of all proposed project costs and schedules is displayed on Page 5, while a proposed schedule is located on Page 6. Project descriptions are in order based on priority ranking following this summary.

1.1 Identification and Ranking

Each project will be initiated based on one or more of the triggers described below:

1.1.1 Capacity

This trigger is activated if a section or segment of sewer is unable to provide the modeled flow during peak demand or is at risk of producing overflows. Trigger limits are a function of the level of expected surcharging and the available cover (i.e., the depth of the pipe).

1.1.2 Condition

This trigger would be activated if a known condition requires repair or replacement of the infrastructure. City staff input was also solicited to identify known pipe condition issues in the collection system.

1.1.3 Operational

Operational triggers are activated when an improvement will provided increased operational benefit, such as decommissioning aged infrastructure. This includes any lift station decommissioning.

1.1.4 City-Directed

This trigger is activated when City staff have indicated that items will be replaced, are required as part of upcoming policy changes, or are needed to manage growth.

In addition to these triggers, areas of the collection system not meeting minimum slope requirements were identified. Replacement of these existing lines was not recommended unless the minimum slope issue resulted in a previously listed trigger.

After triggers were identified, a modeling analysis was conducted to determine the most cost-effective improvements to implement, i.e., improvements that provided the maximum impact with minimal infrastructure for near and long term system growth. Alphabetical project groupings were developed in localized areas to address the identified improvements. The groupings were divided into three levels of flexibility based on the current condition of the need and anticipated criticality of the improvements. All groupings were then ranked numerically, with the most critical, lowest flexibility needs given the highest priority. For capacity triggers, higher priority was given to pipes with significant surcharging and low cover. The resultant project identification and rankings list provides the City with a directory of the most critical needs addressed in near-term and long-term projects.

1.2 Cost Development

Costs estimates were prepared for each individual project, based on industry standards and the 2017 bidding environment. These costs are an estimate, and should be re-evaluated as each project nears the trigger date. Each project has the following costs associated with the total OPCC:

1.2.1 Construction Costs

This cost is the estimated cost once the project has been designed and is ready for the bid phase to begin. It represents a combination of the estimated total construction costs, and includes a 20% contingency.

1.2.2 Engineering

The engineering estimate includes all professional services currently anticipated to bid each project, including survey, deed research (as needed), preliminary, and final design of all improvements. This cost is 20% of the estimated construction costs, including contingency. This does not include construction observation or start-up services.

1.2.3 Bid Item Descriptions:

Costs for manhole rehabilitation and pipeline installation costs were developed from a combination of neighboring city water and sewer project bid tabulations. Forecasted project costs are the estimated engineering and construction costs escalated by 3 percent per year to account for inflation between development of the OPCC and the midpoint of design and construction, respectively. Individual bid items are described as follows.

General Improvements: Anticipated sitework, backfill, erosion control, rehabilitation of existing structures, testing, easements, and contractor overhead costs.

Pipe Installation: Material and labor costs associated with SDR-35 pipe installation by open cut on a linear footage basis, depending on line size. Cost for all manholes, assuming an even distribution of 4-foot and 5-foot diameter installations is included, along with all sewer service wye connections and connections to existing pipes or manholes. The unit cost is also a function of pipe depth, where installations greater than or equal to 20-feet deep are subject to a 1.5x multiplier to reflect additional manhole, trench safety, and site improvements needed for the larger trenches required.

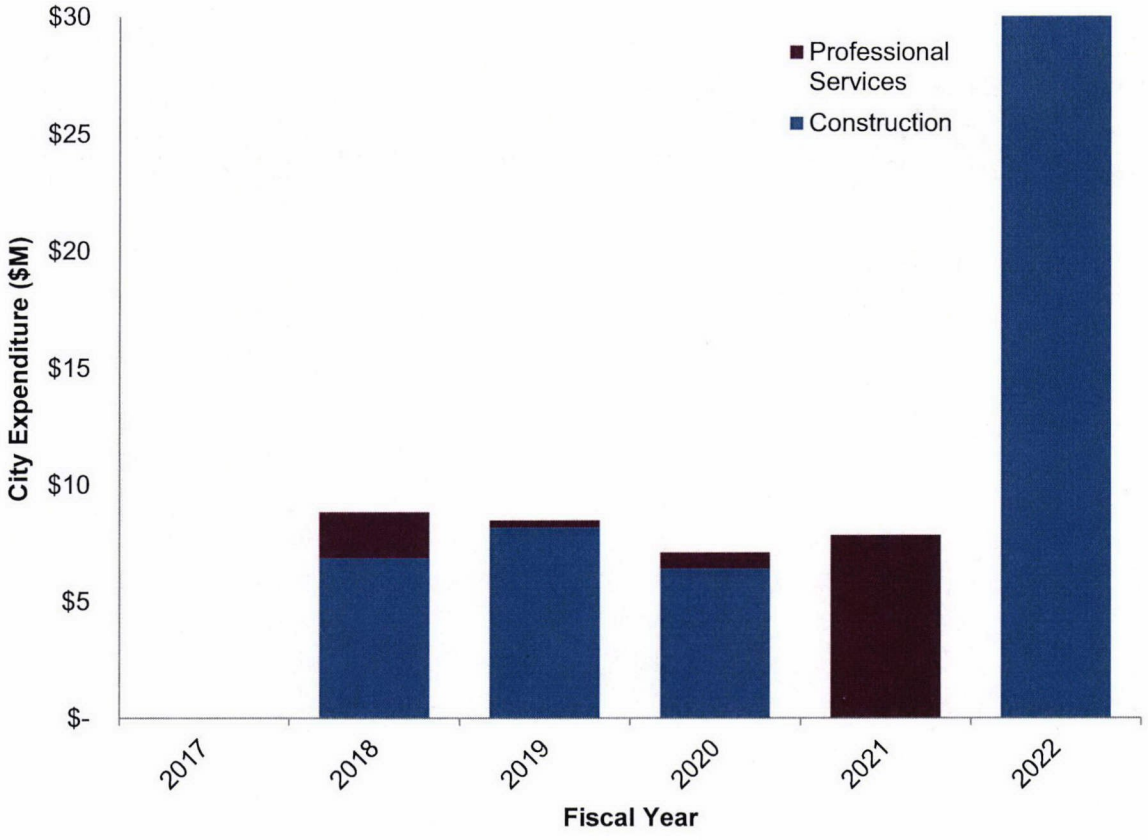
Bored Pipe Installation: Anticipated material, labor, sitework, backfill, erosion control, testing, easements, and contractor overhead costs associated with installation of pipe where boring is required, on a lump sum basis. These costs are dependent on line size, length and depth of boring, and location of boring.

A summary of pipe installation costs and typical associated general improvements is provided in Table 1. Table 1 was produced as a function of pipe diameter size and used to calculate the unit costs in $/LF. General improvements were assessed on a site-specific basis and the typical unit costs were used unless a specific project required a greater amount of general improvements. The unit price increase for pipe installation at a depth greater than 20-feet utilizing the 1.5x multiplier is also included in the table.

Table 1 - Pipe Installation Costs

	$/LF				
Size (in.)	PVC Sewer	General Improvements	Subtotal	Unit Price Increase, Depth >20'	Depth >20' Unit Price
6	$125.0	$75.0	$200.0	$62.5	$187.5
8	$150.0	$75.0	$225.0	$75.0	$225.0
10	$185.0	$75.0	$260.0	$92.5	$277.5
12	$195.0	$75.0	$270.0	$97.5	$292.5
15	$210.0	$100.0	$310.0	$105.0	$315.0
18	$225.0	$100.0	$325.0	$112.5	$337.5
21	$240.0	$100.0	$340.0	$120.0	$360.0
24	$255.0	$100.0	$355.0	$127.5	$382.5
27	$270.0	$100.0	$370.0	$135.0	$405.0
30	$275.0	$150.0	$425.0	$137.5	$412.5
36	$305.0	$150.0	$455.0	$152.5	$457.5
42	$335.0	$150.0	$485.0	$167.5	$502.5
48	$365.0	$150.0	$515.0	$182.5	$547.5
54	$400.0	$150.0	$550.0	$200.0	$600.0
60	$425.0	$150.0	$575.0	$212.5	$637.5

A proposed spending schedule is provided in . Further refinement of this spending schedule and associated project trigger dates is possible, depending upon City funding timeframes.



Proposed Spending Schedule for Wastewater CIP

1.3 Project Descriptions and Legend

A summary of Wastewater CIP items, schedule, and individual project descriptions and schematics are provided in the following pages.

Table 2: Wastewater CIP Summary

Project Identification					Schedule								Forecasted Cost ($1,000)			
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
1	AC	WWTP expansion to 0.75 MGD	WWTP	Low	Capacity	Regulatory	0	Oct-17	Oct-18	12	12	12	$8,300	$8,169	$618	$8,787
2	B	12" line to replace Carter Ranch LS	South	Medium	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$1,502	$1,289	$258	$1,547
3	P	6" line to replace Lucy's LS	Downtown	High	Operational	Capacity	0	Oct-17	Jun-18	4	4	8	$120	$103	$20	$123
4	Q	8" and 10" line to replace Shawnee Trail No. 1 LS	South	High	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$1,172	$1,006	$201	$1,207
5	C	8" line to replace Winn Road LS	Downtown	High	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$486	$417	$83	$501
6	R	10" and 12" line to provide additional capacity for the addition of the Chalk Hill LS	North	Medium	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$915	$785	$157	$943
7	AA	Manhole rehabilitation from PK I/I study	Downtown	Medium	Condition	Operational	0	Oct-17	Oct-18	6	6	12	$422	$362	$72	$434
8	AB	Pipeline rehabilitation from PK I/I study	Downtown	Medium	Condition	Operational	0	Oct-17	Oct-18	6	6	12	$761	$653	$131	$784
9	O	12" line replacement to increase capacity to Heritage	North	High	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$1,244	$1,068	$214	$1,281
10	A	24" line replacement to increase capacity along Light Farms	South	High	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$1,362	$1,169	$234	$1,403
11	AD	WWTP expansion to 0.95 MGD	WWTP	Low	Capacity	Regulatory	1,526	Oct-18	Oct-20	12	12	24	$3,000	$2,950	$318	$3,269
12	N	New 30", 36", 42", and 60" interceptor from Downtown WWTP to future WWTP; 8" interceptor to replace Willock Hills LS	South	Low	Capacity	Operational	3,233	Oct-19	Oct-22	24	12	36	$43,144	$41,680	$7,857	$49,537
13	T	18" line replacement to increase capacity Downtown	Downtown	High	Capacity	Operational	3,233	Oct-19	Oct-20	6	6	12	$3,066	$2,792	$558	$3,351
14	U	15" line along FM 455 across Preston Rd	South	High	Capacity	Operational	3,233	Oct-19	Oct-20	6	6	12	$734	$668	$134	$802
												Total 2017 OPCC:	$66,227,007	Total Forecasted OPCC:		$73,967,030

Table 3: Development Driven Projects

Project Identification					Schedule									Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
1	AC	WWTP expansion to 0.75 MGD	WWTP	Low	Capacity	Regulatory	0	Oct-17	Oct-18	12	12	12	$8,300	$8,169	$618	$8,787
6	R	10" and 12" line to provide additional capacity for the addition of the Chalk Hill LS	North	Medium	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$915	$785	$157	$943
10	A	24" line replacement to increase capacity along Light Farms	South	High	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$1,362	$1,169	$234	$1,403
11	AD	WWTP expansion to 0.95 MGD	WWTP	Low	Capacity	Regulatory	1,526	Oct-18	Oct-20	12	12	24	$3,000	$2,950	$318	$3,269
12	N	New 30", 36", 42", and 60" interceptor from Downtown WWTP to future WWTP; 8" interceptor to replace Willock Hills LS	South	Low	Capacity	Operational	3,233	Oct-19	Oct-22	24	12	36	$43,144	$41,680	$7,857	$49,537
												Total 2017 OPCC:	$56,720,948	Total Forecasted OPCC:		$63,938,025

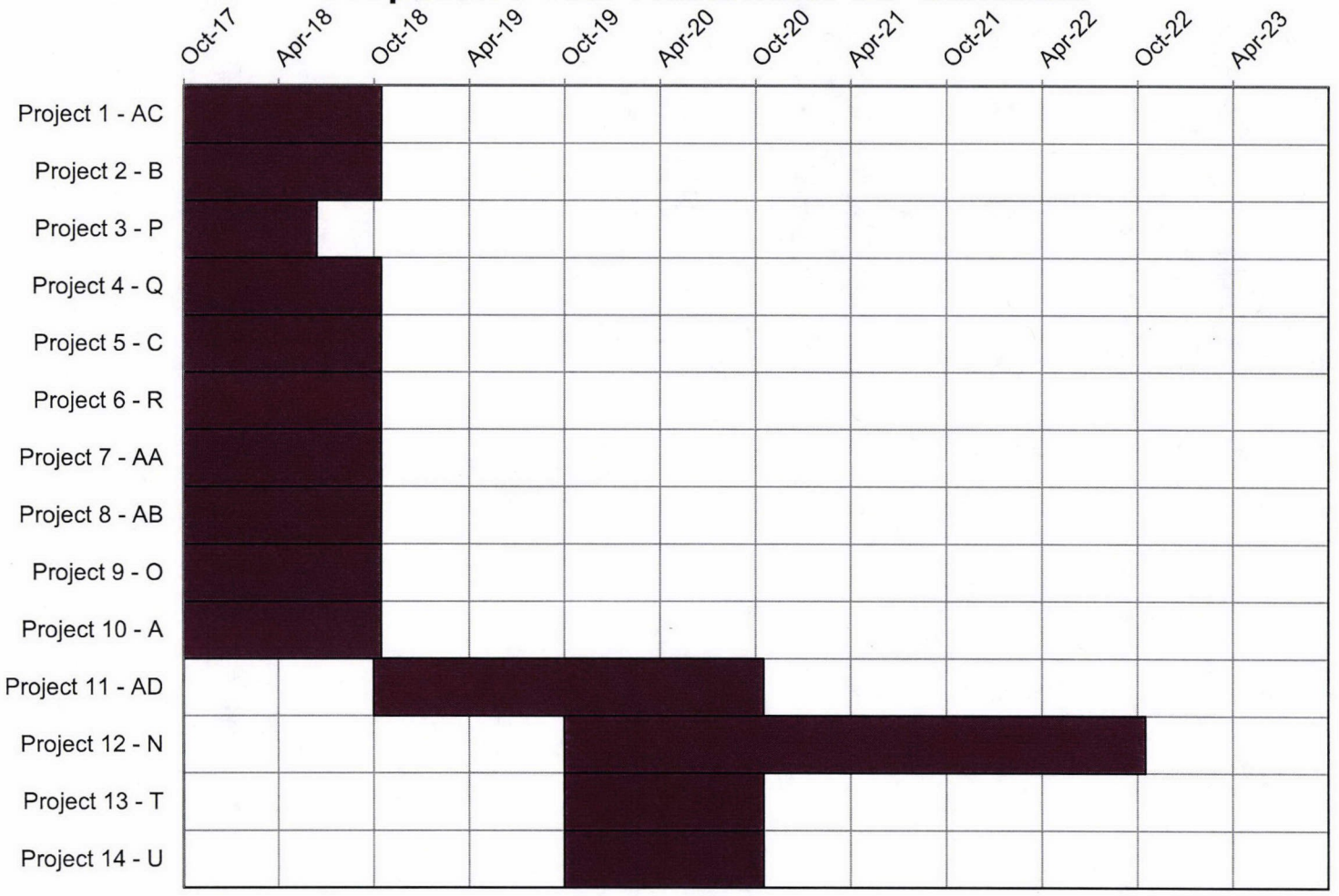
Table 4: Operational Projects

Project Identification					Schedule									Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
2	B	12" line to replace Carter Ranch LS	South	Medium	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$1,502	$1,289	$258	$1,547
3	P	6" line to replace Lucy's LS	Downtown	High	Operational	Capacity	0	Oct-17	Jun-18	4	4	8	$120	$103	$20	$123
4	Q	8" and 10" line to replace Shawnee Trail No. 1 LS	South	High	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$1,172	$1,006	$201	$1,207
5	C	8" line to replace Winn Road LS	Downtown	High	Operational	Capacity	0	Oct-17	Oct-18	6	6	12	$486	$417	$83	$501
												Total 2017 OPCC:	$3,279,312	Total Forecasted OPCC:		$3,377,092

Table 5: I/I Projects

Project Identification					Schedule									Forecasted Cost ($1,000)		
Project	Grouping	Description	Location	Flexibility	Primary Trigger	Secondary Trigger	Trigger Lots	Trigger Date	Project Complete	Engineering /Design	Bid/ Construction	Total Project Duration	OPCC	Construction	Professional Services	OPCC
7	AA	Manhole rehabilitation from PK I/I study	Downtown	Medium	Condition	Operational	0	Oct-17	Oct-18	6	6	12	$422	$362	$72	$434
8	AB	Pipeline rehabilitation from PK I/I study	Downtown	Medium	Condition	Operational	0	Oct-17	Oct-18	6	6	12	$761	$653	$131	$784
9	O	12" line replacement to increase capacity to Heritage	North	High	Capacity	Operational	0	Oct-17	Oct-18	6	6	12	$1,244	$1,068	$214	$1,281
13	T	18" line replacement to increase capacity Downtown	Downtown	High	Capacity	Operational	3,233	Oct-19	Oct-20	6	6	12	$3,066	$2,792	$558	$3,351
14	U	15" line along FM 455 across Preston Rd	South	High	Capacity	Operational	3,233	Oct-19	Oct-20	6	6	12	$734	$668	$134	$802
												Total 2017 OPCC:	$6,226,747	Total Forecasted OPCC:		$6,651,913

Proposed 5 Year Wastewater CIP Schedule



Project 1: Sewer Group AC Downtown WWTP Phase I Improvements

Project Identification	
Number:	1
Grouping:	AC
Location:	WWTP
Flexibility:	Low
Schedule	
Primary Trigger:	Capacity
Secondary Trigger:	Regulatory
Trigger # of Lots Constructed	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2018
Project Implementation (Months)	
Engineering/Design:	12
Bid/Construction:	12
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$7.70	$8.17
Professional Services	$0.60	$0.62
Total Project Cost	**$8.30**	**$8.79**

Project Description
This ongoing project involves conversion of the Downtown WWTP from a flow-through SBR and oxidation ditch plant to a conventional activated sludge plant as part of an expansion to 0.75 MGD. This project also includes upgrades to the headworks and construction of new disinfection facilities. Engineering of the improvements began in 2017.

Justification
The Downtown WWTP is currently operating at or above its permitted capacity, and flows from new developments will overwhelm the plant's capacity in the near future. These improvements will provide capacity needed for the Downtown WWTP to remain in compliance with its discharge permit.

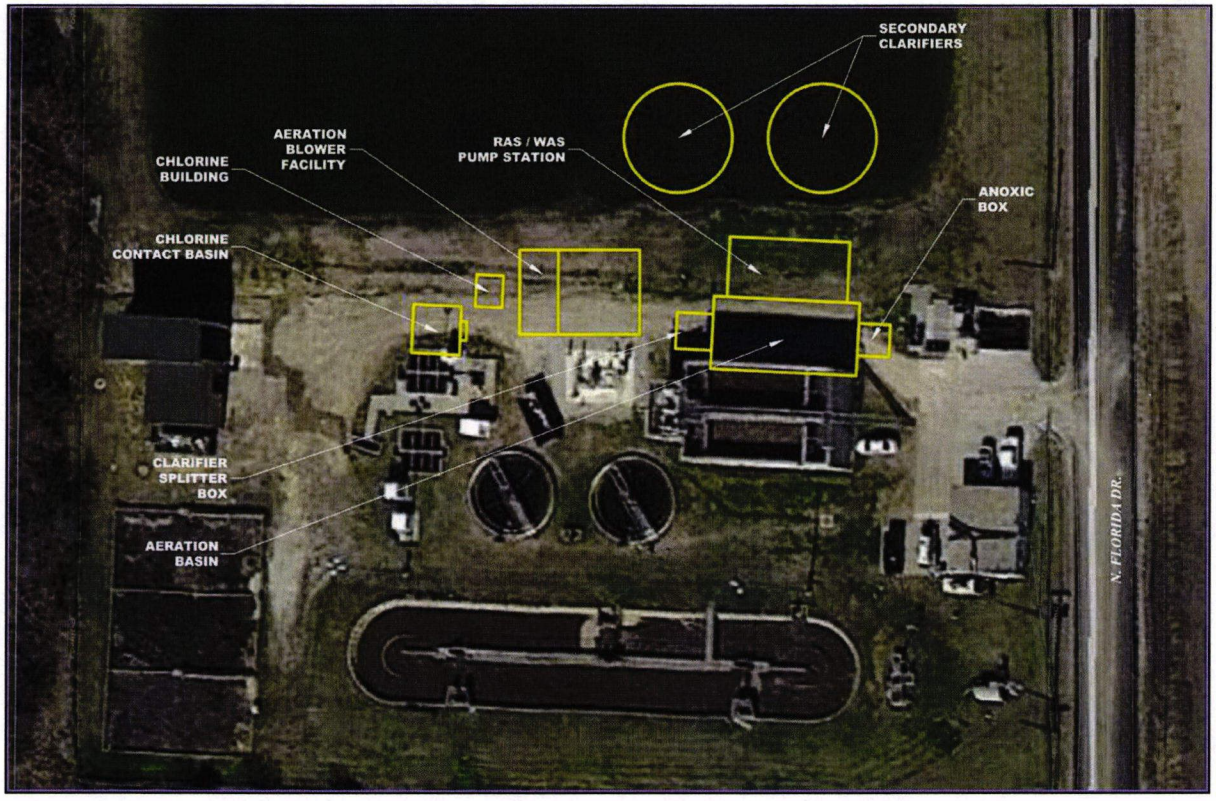
Unintended Consequences
None identified.

Special Considerations
None identified.

Potential Alternatives
The City could proceed with a package WWTP until a regional WWTP is available to take flow from the Downtown WWTP.

AC			
Description	**Unit Cost**	**Quantity**	**Cost**
WWTP improvements (0.75 MGD)	LS	1	$ 7,700,000
		Subtotal	$ 7,700,000
		Professional Services	$ 600,000
		OPCC	$ 8,300,000

Project 1 Schematic



Project 2: Sewer Group B Line Improvements

Project Description
The project includes installation of 12-inch pipe to eliminate the need for the Carter Ranch Lift Station.

Justification
This project allows decommissioning of the Carter Ranch Lift Station and provides for gravity rather than pumped flow.

Unintended Consequences
The lift station currently pumps north, then flows across Preston in a gravity sewer interceptor. That interceptor would see additional capacity by the decommissioning of the lift station, while the line interceptor that feeds the SE Sector LS will see increased flow.

Special Considerations
A bored pipe installation will be required to cross Preston Road.

Potential Alternatives
If this project is not constructed, the Carter Ranch Lift Station must remain online. Alternative alignments are also possible, depending on the development plans for the undeveloped area.

Project Identification	
Number:	2
Grouping:	B
Location:	South
Flexibility:	Medium
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2018
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$1.25	$1.29
Professional Services	$0.25	$0.26
Total Project Cost	**$1.50**	**$1.55**

Group B					
Diameter (in.)	**Description**	**Depth (ft)**	**Unit Cost ($/LF)**	**Length (ft)**	**Cost**
12	Pipe installation	<20	195	3,400	$ 663,000
	General improvements		75		$ 255,000
Description			**Unit**	**Quantity**	**Cost**
Bored pipe installation			LS	1	$ 125,000
				Subtotal	$ 1,043,000
				Contingency (20%)	$ 208,600
				Professional Services	$ 250,320
				OPCC	$ 1,501,920

Project 2 Schematic

Project 3: Sewer Group P Improvements

Project Description
This project involves replacement of the existing Lucy's Lift Station force main with a 6-inch gravity collector.

Justification
This project will allow the Lucy's Lift Station to be decommissioned.

Unintended Consequences
None identified.

Special Considerations
Utility easements may be needed in this area and the alignment may need to shift during detailed design to accommodate property lines and easements. General improvements costs have been increased due to the location of the proposed pipeline.

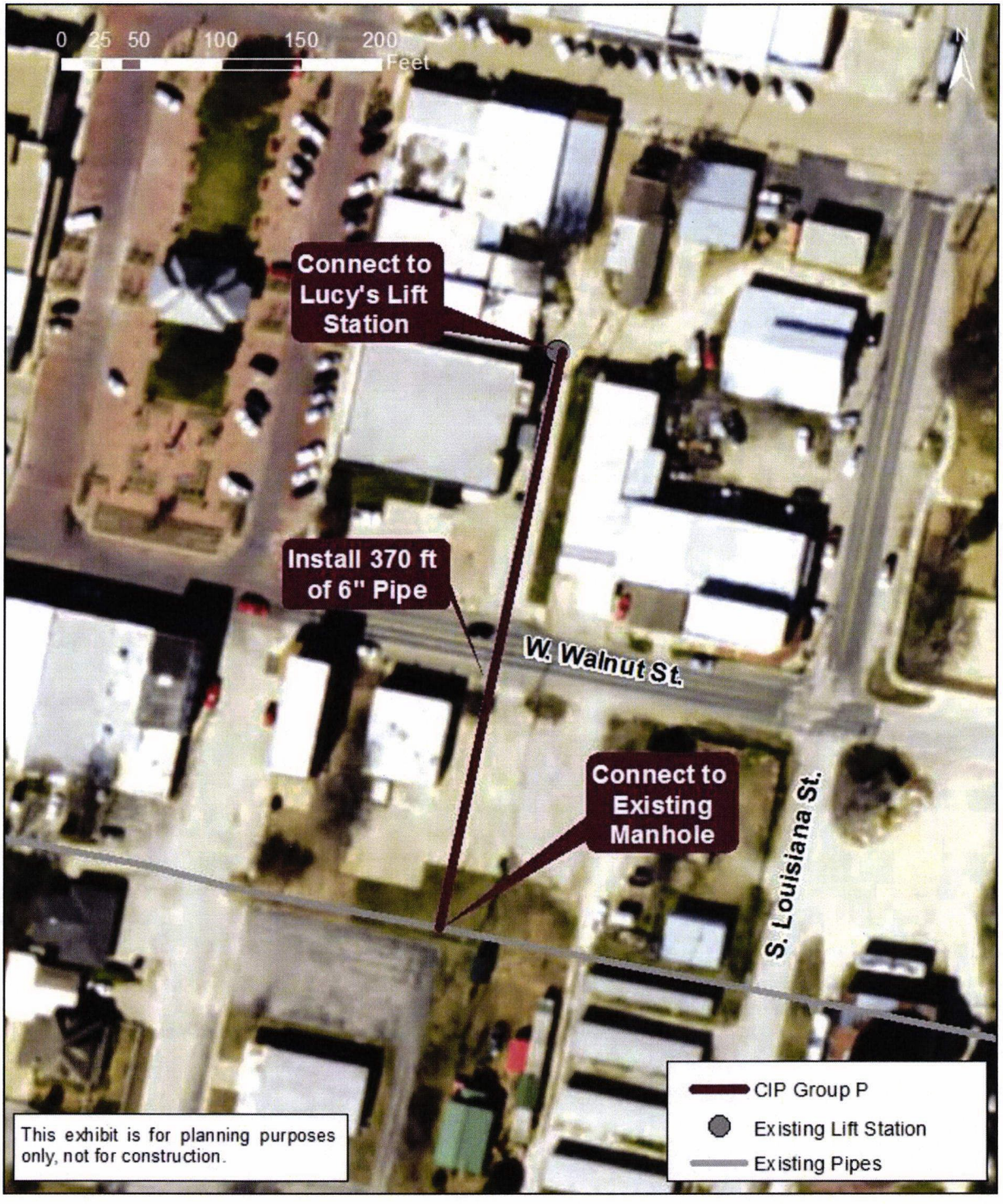
Potential Alternatives
If this project is not completed, Lucy's Lift Station would remain in service. The continued use of Lucy's Lift Station as a manhole versus installation of a new manhole and connection of existing services should be evaluated during the design of this project.

Project Identification	
Number:	3
Grouping:	P
Location:	Downtown
Flexibility:	High
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed	0
Trigger Date:	Oct-2017
Project Complete:	Jun-2018
Project Implementation (Months)	
Engineering/Design:	4
Bid/Construction:	4
Total Project Duration:	8

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.10	$0.10
Professional Services	$0.02	$0.02
Total Project Cost	**$0.12**	**$0.12**

Group P					
Diameter (in.)	Description	Depth (ft)	Unit Cost ($/LF)	Length (ft.)	Cost
6	Pipe installation	<20	125	370	$ 46,250
	General improvements		100		$ 37,000
				Subtotal	$ 83,250
				Contingency (20%)	$ 16,650
				Professional Services	$ 19,980
				OPCC	$ 119,880

Project 3 Schematic



Project 4: Sewer Group Q Improvements

Project Description
This project involves installation of new 8- and 10-inch gravity lines along Doe Branch, just south of FM 455.

Justification
This project will allow the Shawnee Trail No. 1 Lift Station to be decommissioned.

Unintended Consequences
None identified.

Special Considerations
This pipeline crosses an undeveloped area and easement acquisition is likely required. Bored pipe installation may be required to cross FM 455. The alignment is flexible and should be optimized during design to minimize the necessary installation depth. The alignment shown has an approximate depth of 10-ft, relative to the 30-ft depth required if the pipe follows the alignment of FM 455.

Potential Alternatives
If this project is not completed, Shawnee Trail No. 1 Lift Station would remain in service.

Project Identification	
Number:	4
Grouping:	Q
Location:	South
Flexibility:	High
Schedule	
Primary Trigger:	Operational
Secondary Trigger:	Capacity
Trigger # of Lots Constructed	0
Trigger Date:	Oct-2017
Project Complete:	Oct-2018
Project Implementation (Months)	
Engineering/Design:	6
Bid/Construction:	6
Total Project Duration:	12

	2017 Costs ($ Millions)	Forecasted Costs ($ Millions)
Construction	$0.98	$1.01
Professional Services	$0.20	$0.20
Total Project Cost	**$1.17**	**$1.21**

Group Q					
Diameter (in.)	Description	Depth (ft)	Unit Cost ($/LF)	Length (ft.)	Cost
8	Pipe installation	<20	150	470	$ 70,500
	General improvements		75		$ 35,250
10	Pipe installation	<20	185	2,530	$ 468,050
	General improvements		75		$ 189,750
Description			**Unit**	**Quantity**	**Cost**
Bored pipe installation			LS	1	$ 50,000
				Subtotal	$ 813,550
				Contingency (20%)	$ 162,710
				Professional Services	$ 195,252
				OPCC	$ 1,171,512

Project 4 Schematic