



*CITY OF PFLUGERVILLE
WASTEWATER MASTER PLAN AND
CAPITAL IMPROVEMENTS PLAN*





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CITY OF PFLUGERVILLE

***WASTEWATER MASTER PLAN AND
CAPITAL IMPROVEMENTS PLAN***

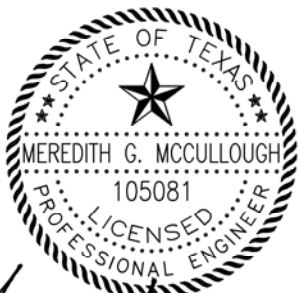
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*ALL SECTIONS (EXCLUDING 2.3, 4.3)
APPENDIX A AND APPENDIX C*



Meredith McCullough 9/4/2013

*SECTIONS 2.3, 4.3 AND
APPENDIX B*



*Paul Wood
9/4/2013*



**Lockwood, Andrews
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1.0 Executive Summary

1.1 Objectives

The City of Pflugerville wanted to update its wastewater master plan in order to properly plan and prioritize its capital expenditures over the next 10 years. The City has experienced tremendous growth over the past decade, and that growth is anticipated to continue well beyond the next decade. This master plan should serve as a tool to be used by the City in ensuring that its wastewater system develops in a systematic and prioritized manner.

1.2 Background

The City of Pflugerville, located in Travis and Williamson Counties, is approximately 22.3 square miles in area and consists of a population of just over 50,000 residents. The City of Pflugerville treats its wastewater at the existing Central Wastewater Treatment Plant (WWTP) located in the Gilleland natural drainage basin.

During the development of the Water Master Plan and impact fees the City determined that an updated wastewater master plan would be required to more accurately depict the City's future wastewater infrastructure needs to satisfy the growth.

The previous 2008 Master Plan was developed considering the three service areas of Cottonwood Creek, Wilbarger, and Central. It capped the flow to the Central WWTP at 5.3 million gallons per day (MGD), based on full build-out flow analysis of the future service area for Central, and recommended the construction of a new wastewater plant in the Wilbarger basin.

LAN was contracted by the City of Pflugerville to update the City's wastewater master plan and capital improvements plan on July 25, 2012. The study includes an analysis of the City's existing system and a determination of the City's future development and wastewater treatment needs. The master plan developed by LAN utilizes the concept of diverting more flow to the existing WWTP in the Central Service Area and increasing its capacity to further defer the expense of a new plant and associated interceptors.

1.3 Future System Overview

The master plan was focused on projects required to serve development that will occur within the next 10 years. However, it is prudent to review not just the anticipated growth in the next decade, but the ultimate growth predicted in the service area to ensure that the recommended infrastructure is sized appropriately. Therefore LAN developed 5-year, 10-year and ultimate development wastewater models that were used to determine the size and timing of projects. The following core principles guided the development of projects:

- Capacity expansion
- Removal of lift stations from collection system, and
- Development-driven improvements

The master plan anticipates a Central WWTP capacity of 8.3 MGD in the 10-year planning horizon, with an ultimate capacity of 9.0 MGD. An additional WWTP will be required to serve additional development sometime beyond 2034. It is recommended that the location of the future plant be determined in a future update to this master plan, based on actual growth rates and patterns.

1.4 Capital Improvements Plan

Based on the capital improvements projects for the 5- and 10-year, it is estimated that the City could expect to spend approximately \$55 million in wastewater infrastructure projects over the next ten years. These projects include many new gravity interceptors, expansions to the Central WWTP and the decommissioning of multiple existing lift stations.

The estimated cost for CIP projects in the 5-year planning is approximately \$17.9 million and \$37.2 million for the 5- to 10-year planning period.

2.0 Existing Wastewater System

2.1 Overview

The existing wastewater system is located within the Gilleland and Wilbarger natural drainage basins areas. All wastewater is currently, conveyed through gravity and pressurized collection methods to the 5.85 MGD Central WWTP located on Gilleland Creek south of Pecan Street. The Central WWTP permit has a three phased permit (4.4, 5.3, and 5.85 MGD). The plant currently operates under the 4.4 MGD provisions. There are currently three wholesale wastewater customers, the City of Hutto, Boulder Ridge South Subdivision and Chisholm Point.

2.2 Collection System

The existing collection system conveys wastewater to the Central WWTP screw pump lift station. The gravity collection system ranges from 4-inches to 36-inches. The collection system model includes interceptors 18-inches and above, and key 12-inch and 16-inch wastewater gravity lines along with all major lift stations and force mains. Exhibit 2.1 shows the existing wastewater system and the current service area.

Currently, there are seventeen lift stations in the system, some of which are abandoned and used as pass-through structures. These lift stations vary in size and importance to the conveyance of wastewater in the system. Table 2.0 shows the capacities of the existing lift stations infrastructure for the City of Pflugerville.

Table 2.0: Existing Pflugerville Lift Station Capacities

Lift Station #	Facility Name	Natural Drainage Basin	Pumps			Force Main		Wet Well	
			No of Pumps	Capacity (gpm)	TDH (ft)	Size (inches)	Capacity ¹ (gpm)	Diameter (ft)	Volume (gal)
1	Central WWTP On-Site	Gilleland	2	12,100	26	n/a	n/a	n/a	23,064
2	Falcon Pointe	Wilbarger	2	334	110	10	1,470	8	2,632
3	Kennemer	Wilbarger	2	1,718	165	12	2,120	20	72,847
4	Eagle Point	Wilbarger	2	522	186	8	940	12x28	25,133
5	Weiss	Wilbarger	3	2,700	119	24	8,460	25	33,046
6	Pfluger Lane	Wilbarger	2	950	65	12	2,120	8	1,983

**Wastewater Master Plan and Capital Improvements Plan
City of Pflugerville**

Lift Station #	Facility Name	Natural Drainage Basin	Pumps			Force Main		Wet Well	
			No of Pumps	Capacity (gpm)	TDH (ft)	Size (inches)	Capacity ¹ (gpm)	Diameter (ft)	Volume (gal)
7	Highland Park South	Wilbarger	3	300	76	16&8	3,760	12x33	41,469
8	Boulder Ridge	Gilleland	2 ²	226	66	6	530	8	2,632
9	Steed's Crossing	Wilbarger	2	339	111	6	530	8	3,008
10	Highland Park North	Wilbarger	Abandoned					8	N/A
11	Renewable Energy	Gilleland	2 ²	1,640 & 2,700	72 & 80	16	3,760	10	6,462
12	Lakeside	Wilbarger	Abandoned					N/A	N/A
13	Dunes	Wilbarger	2	620	64	8	940	8x20	unknown
14	Bohls	Gilleland	2	226	66	4	240	6	846
15	Club	Gilleland	2	200	70	6	530	8	unknown
16	Villamora	Wilbarger	2	120	72	8	940	unknown	unknown
17	Falcon Pointe South	Wilbarger	2	535	47	8	940	7	2,199

Notes:

- 1) Based on 6 fps
- 2) Station currently has two pumps but has space of three pumps

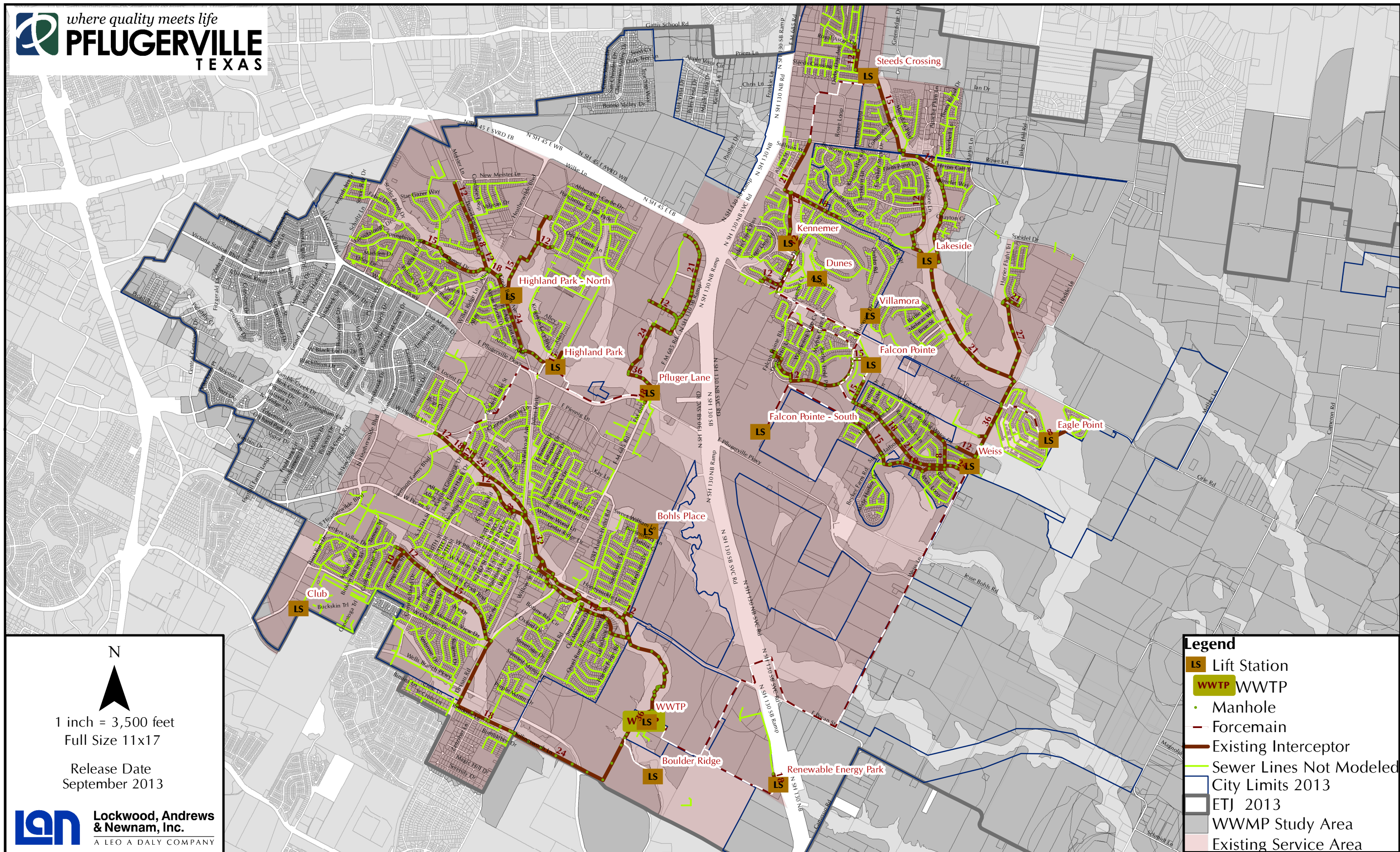
Several stations are currently being by-passed and/or abandoned due to interceptor construction, including Highland Park North and Lakeside Lift Station. The Steed's Crossing Lift Station will be decommissioned after completion of the Rowe Loop Interceptor scheduled for construction for 2013. Additionally, Falcon Pointe South Lift Station was under design and construction during the preparation of the Master Plan study and was included in the final report but not modeled during the study.

2.3 Central Wastewater Treatment Plant

The Central WWTP is located in the southeastern portion of the Gilleland drainage basin. The Central WWTP currently treats flows from all of the Gilleland drainage basin and the upper portion of the Wilbarger drainage basin.

The Central Wastewater Treatment Plant operates under a phased permit. The average daily flow amounts permitted in each phase are 4.4 MGD, 5.3 MGD and 5.85 MGD. The plant currently has capacity to treat 5.85 MGD of flow. No additional changes to the plant processes or equipment size will need to be undertaken to increase capacity. The plant currently operates under the lower permit limits, because at the higher limits, more frequent testing is required for self-monitoring, which increases operating costs.

Exhibit 2.1 - City of Pflugerville - Existing Wastewater System



Legend

- LS Lift Station
- WWTP WWTP
- Manhole
- - - Forcemain
- Existing Interceptor
- Sewer Lines Not Modeled
- ▭ City Limits 2013
- ▭ ETJ 2013
- ▭ WWMP Study Area
- ▭ Existing Service Area

N

 1 inch = 3,500 feet
 Full Size 11x17
 Release Date
 September 2013



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The plant uses the following equipment and process steps for wastewater treatment:

- Influent pumping via two enclosed screw pumps
- Headworks – Screening via two step screens
- Biological treatment and chemical phosphorous removal – BOD and nitrogen control via two Ovivo (Eimco) Carrousel® units with four aerators. Chemical phosphorous removal is achieved by adding alum prior to secondary clarification
- Secondary clarification via two hydraulic suction lift clarifiers
- Chlorination via gaseous chlorination in two basins in series, the first circular with a form of baffle, and the second serpentine
- Tertiary filtration required to achieve permit limits (phosphorous) via cloth media filtration units using an outside in flow configuration
- De-chlorination using liquid sodium bisulfite.
- Re-aeration using fine bubble diffused air
- Effluent flow monitoring and constituent monitoring
- Reclaimed water pumping for park irrigation
- Solids dewatering using tow centrifuges
- Solids composting to achieve a Class A bio-solids product.

2.3.1 Lift Station

The existing lift station has two enclosed screw lift pumps. Each pump is rated at 12,125 gallon per minute (gpm) slightly in excess of the peak plant capacity under all phases of the permit of 12,083 gpm (17.40 MGD).

2.3.2 Headworks

The vendor has provided confirmation that the maximum flow per screen is 8.7 MGD, which with two screens operating corresponds to the current peak flow of 12,083 gpm. This is the peak flow that the equipment itself is capable of handling. Operations staff has expressed dissatisfaction with the current units.

2.3.3 Biological Treatment/Carrousel Units

Based on a statistical analysis of the plant BOD and NH₃ loading, the current unit can handle up to 6.9 MGD average daily flow (ADF). This is based on a BOD plus one standard deviation concentration of 239 mg/l, and on an NH₃ plus one standard deviation concentration of 33.7 mg/l, and the manufacturer's transfer efficiency of 3.5 lb O₂/HP yielding 450.6 HP required. There are currently four aerators installed, each at 150 HP. Three installed aerators can supply 450 HP which is close enough to the 450.6 HP to be adequate.

Currently however, there is no ability to appropriately split flow to the two existing aeration basins should one aerator fail. Theoretically the basin with an aerator down should be loaded at 33% of the total plant load. The two weir gates at the headworks can equally split flow between the Carrousel Units, while they are at the same elevation; however when manually adjusted to two different elevations, they will only be able to split flow at a 2:1 ratio at one particular flow. Weirs only split

flow proportionally over a varying flow range when the lengths are proportional, and their elevations are the same.

It should be noted that there was significant variation in influent BOD and ammonia concentrations. For this reason, the data were evaluated using statistical methods. Some data were eliminated based on the assumption that the BOD samples would follow a normal distribution with a 95% confidence interval.

Values of BOD and NH₃ concentrations lying outside the 95% confidence interval of a normal distribution were therefore eliminated per the method of F. Grubbs and an average BOD of 191mg/L was determined from the remaining data, with a standard deviation of 48.4 giving a design BOD value of 239 mg/L. Similarly, an average NH₃ concentration of 29.7 mg/L was determined with a standard deviation of 4.0 giving a design NH₃ value of 33.7 mg/L.

2.3.4 Clarifiers

Based on the diameter of 115-ft, each clarifier has a maximum capacity of 12.46 MGD assuming a rise rate of 1,200 GPD/SQ ft. Therefore a peak flow of 24.92 MGD (17,305 gpm) can be handled with both clarifiers on line. With an assumed design flow rate of 6.9 MGD, this would yield a peaking factor of 3.61. This can be compared to the maximum permit limit of 5.85 MGD and a two hour peak flow limit of 12,083 gpm which yield a peaking factor of 2.97.

2.3.5 Disc Filters

There are currently three twelve (12) disc filters in service at the WWTP. Each disc filter is capable of handling 0.25 MGD per disc at average flow and 0.5 MGD at maximum flow. This equates to 6.0 MGD average flow and 12.0 MGD peak flow assuming one redundant unit. The units therefore do not presently meet the current Texas Commission on Environmental Quality (TCEQ) Chapter 217 requirements, excerpted below:

“217.190 Filtration

b. Redundancy.

1. A facility using filtration to provide tertiary treatment for a permit requirement must have a minimum of two filter units.
2. A design must specify the required filter surface area based on peak flow through the filters with the largest filter unit out of service.”

With three units in service, the capacity would be 18.0 MGD. Please note that the current plant was designed under the previous TCEQ Chapter 317 rules, and disc filters were not specifically covered.

2.3.6 Chlorination

The chlorination basin consists of a converted clarifier and a serpentine channel in series. The volume of the converted clarifier is 152,400 gallons; the volume associated with the serpentine channel is 102,900 gallons. The total volume is 255,300 gallons. Based on volume alone, this would appear to provide capacity for 12,765 gpm to achieve a contact time of 20 minutes. However, the design of circular contact basins do not provide perfect mixing and short circuiting may occur.

Standard baffle factors are normally applied to contact basins based on geometries if tracer studies or computational fluid dynamic modeling (CFD Modeling) have not been undertaken to establish actual contact times. The contact time was determined using two different baffling factors: 0.3 for the clarifier, which is considered a poorly baffled tank; and 0.7 for the serpentine channel which is considered a well baffled tank. Using these baffling factors the contact time of 9.7 minutes was determined for the current permitted peak flow rate of 12,083 gpm, or 17.4 MGD. The current peak flow that can be handled and still achieve 20 minutes of contact time is 5,888 gpm, or 8.48 MGD.

The existing converted clarifier, while providing some baffling in the form of the existing scum ring, cannot adequately prevent short circuiting. Standard designs for circular tanks used as contact basins generally include some sort of serpentine baffling to increase performance. Performance can be measured as the actual time it takes a tracer to exit a tank compared to the theoretical time that it would take a tracer to exit a tank. This performance is the baffling factor. Models could be undertaken to determine a more effective baffling arrangement. A rectangular tank with serpentine baffles and proper length to width ratios are considered well baffled tanks, and generally are allowed baffling factors on the order of 0.7. Achieving a baffling factor of 65% may be possible in a circular tank based on available literature, but would still produce a total contact time less than required by TCEQ.

3.0 Sanitary Collection System Model

3.1 Land Use and Population Projections Methodology

Utilizing GIS, a population and land use study was performed to determine projected population growth within the 5-year, 10-year and ultimate planning periods for the City’s extraterritorial jurisdiction (ETJ). The study considered the future land use of each parcel within the service area and converted land use to population as described in detail in the sections below.

This analysis used a combination of the Future Land Use Maps from Scenarios 1 and 4 within the City’s 2030 Comprehensive Plan as an indicator for future development within each parcel of the designated service area. Scenario 1 was applied to the area west of SH 130, while Scenario 4 was applied to the areas east of SH 130. When multiple future land uses existed on a single parcel, the parcel was subdivided for density calculation purposes. Each future land use was assigned a density for the purposes of this wastewater study based upon averages from the Comprehensive Plan. When a parcel was located within a neighborhood center, commercial center, or regional center, the densities were adjusted to reflect the type of development that is anticipated. Table 3.0 below summarizes the densities used for each land use.

Table 3.0: Parcel Density Calculation Table

Land Use	Base Land Use		Center	
	% of Area	Density	% of Area	Density
Mixed Use	20%	25 DU/AC*	100%	Non-Residential
	80%	Non-Residential		
Med-High	20%	20 DU/AC	15%	20 DU/AC
	80%	10 DU/AC	75%	10 DU/AC
			10%	Non-Residential
Low-Med	10%	20 DU/AC	10%	10 DU/AC
	90%	4 DU/AC	80%	4 DU/AC
			10%	Non-Residential
Employment	10%	20 DU/AC	10%	20 DU/AC
	90%	Non-Residential	90%	Non-Residential
Agriculture (Service Area)	100%	0.2 DU/AC	95%	0.2 DU/AC
			5%	Non-Residential
Agriculture (Outside Service Area)	100%	0.05 DU/AC	95%	0.05 DU/AC
			5%	Non-Residential

*DU/AC = Dwelling Unit per Acre

An example of how this information was applied to the GIS analysis is provided in Table 3.1. The result was a potential development density for each parcel.

Table 3.1: Land Use Example

Parcel	AC	Future Land Use	Density	Potential Parcel Density DU/Parcel
Example Parcel A	0.5	Low-Med	5.6 DU/AC	2.8 units
Example Parcel B	10	Low-Med Center	4.2 DU/AC	42 units
Example Parcel C	2	Mixed Use	5 DU/AC	10 units

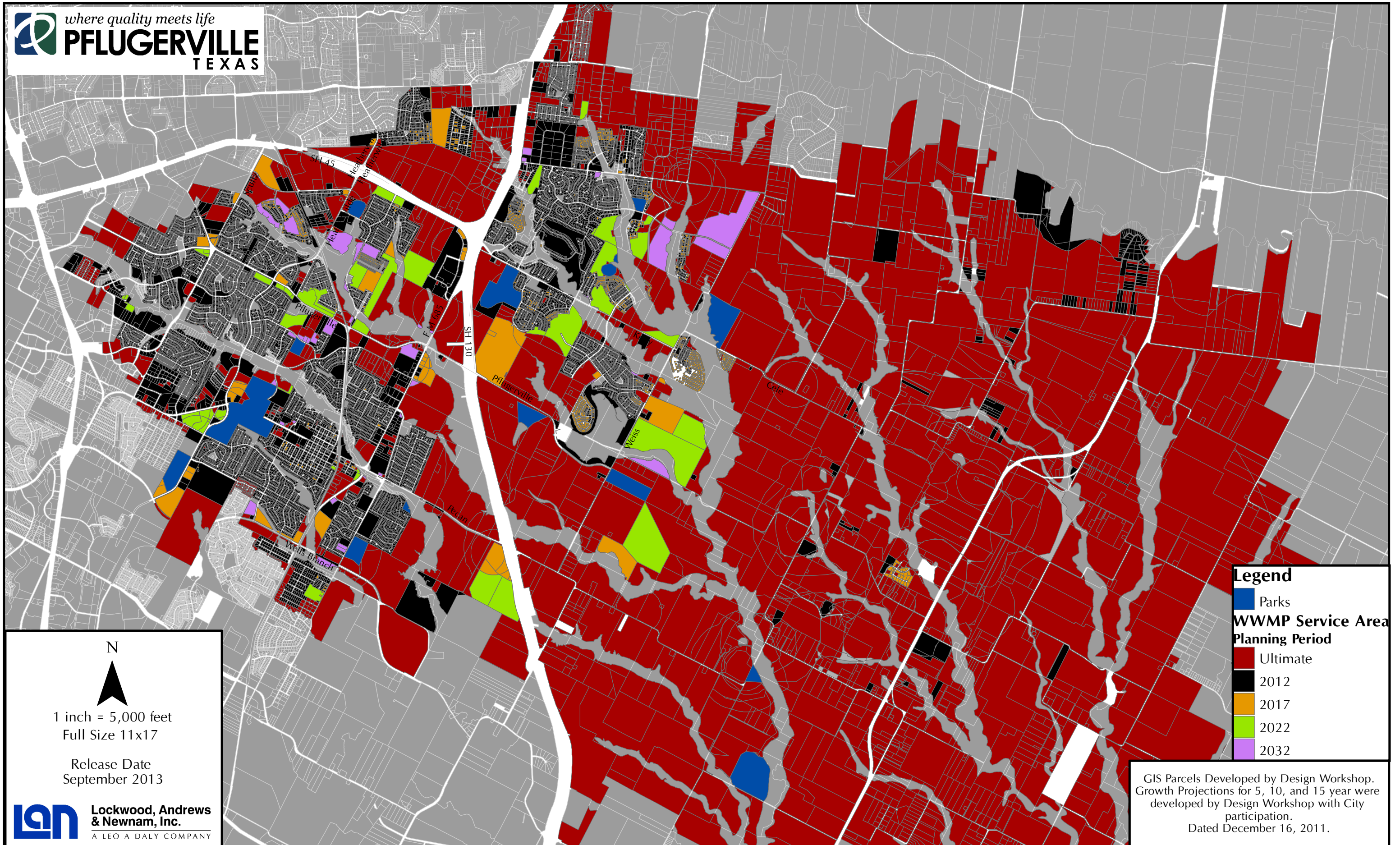
The City also identified estimates of when Preliminary Plats would develop based upon the GIS information provided in Table 3.2. These were categorized by the City Planning Department as either potential 2017 development, 2022 development, or future development based upon the existing knowledge of the staff.

Table 3.2: Planned Developments

	Dwelling Units Projected for 2017	Dwelling Units Projected for 2022	Dwelling Units Projected for Future
Sorento	140	674	147
Carmel	200	604	404
Blackhawk Far East	-	-	637
Penley Park Amended	161		
Highland Park	300	388	
Village of Hidden Lake	119		
Stone Hill Town Center - Section 2	200	560	

After determining the future land use and dwelling unit equivalent of each parcel within the service area, it was then converted to population. Based upon the 2010 census, a people-per-household total of 2.8 were used as the starting point. Based on data from the City's 2030 Comprehensive Plan, as well as the City's Water Master Plan, the people per household total was increased to 2.96. This factor was used to convert the dwelling unit equivalents to population. By using the projected development dates determined for each parcel, a population growth was then determined for 5-year, 10-year and beyond planning periods. Exhibit 3.1 shows the projected planning year in which parcels are developed in the City's ETJ.

Exhibit 3.1 - City of Pflugerville Growth Pattern Analysis for Wastewater Master Plan



Legend

- Parks
- WWMP Service Area**
- Planning Period**
- Ultimate
- 2012
- 2017
- 2022
- 2032

N

 1 inch = 5,000 feet
 Full Size 11x17

Release Date
 September 2013

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GIS Parcels Developed by Design Workshop.
 Growth Projections for 5, 10, and 15 year were developed by Design Workshop with City participation.
 Dated December 16, 2011.

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3.2 Sewer Flow Projections

Wastewater flow per parcel was determined based on multiplying potential parcel density (DU/Parcel, Table 3.1) by average daily flow (ADF) 270 gal/day/LUE from the City’s Engineering Design Criteria. The peak dry weather flow (PDWF) was calculated using the Equation 3.0.

$$PDWF = \frac{18+(0.0206(F))^{0.5}}{4+(0.0206((F))^{0.5}} * F \quad \text{Equation 3.0}$$

Where: F=average dry-weather flow = 270 gal/day/LUE

The peak wet weather flow (PWWF) was determined by adding PDWF to the Inflow and Infiltration (I/I) for each service area. Based on the City’s Design Criteria Manual the I/I was assumed to be 750 gpd/acre of the drainage area in the service area.

Once sewer flow was calculated per parcel the wastewater flows were then imported into the hydraulic model using GIS and allocated based on the location of the parcel to nearest wastewater interceptor manhole in the model. Wastewater flow scenarios were simulated for ADF, PDWF, PWWF for all planning periods.

Table 3.3 below shows the ADF Wastewater flow per service area given the selected revised wastewater alternative and service areas.

Table 3.3 Wastewater Flow per Service Area

Planning Period	Service Area Wastewater Flow Projections (MGD)		
	Central	New Sweden	Cottonwood/Wilbarger
Existing	4.32	n/a	n/a
5-year	5.31	0.28	n/a
10-year	6.8	0.33	n/a
15-year	7.28	0.57	n/a
Ultimate	9.0	0.91	24.62

3.3 Model Building Methodology

Existing wastewater infrastructure was imported into the model using existing GIS information. Gravity lines above 18-inch and system critical 12 to 16-inch interceptors were used for the analysis of the wastewater system. System critical lift stations were also included in the model to determine lift station capacity and pump start/stops.

After the existing infrastructure was added to the model, the interceptors and manholes were checked to determine accuracy on manhole inverts. Invert elevations were manually adjusted in model, where adverse slopes occurred, due to approximate values with some GIS data points. After the existing infrastructure was checked for correctness, ADF per parcel GIS file was imported into the model. A 24-hour extended simulation model was run to determine accuracy of the model comparing existing Central WWTP data with the model results.

For proposed infrastructure, existing-proposed interceptor GIS data was used to begin the model build. Manholes were placed at strategic locations on the proposed routes and were given a rim elevation based on CAPCOG contour information. Once rim elevation was assigned to manholes, a model building tool assigned inverts on the manholes. The inverts were manually checked for correctness. ADF, PDWF, and PWWF per parcel GIS files were inputted into the model corresponding with the correct model scenario and planning period. The results for ADF at the WWTP were checked for accuracy with GIS raw data, to determine if the inflows were allocated properly in the model.

3.4 Criteria for Interceptor Capacity Evaluation

The City of Pflugerville Engineering Design Guidelines and Construction Standards were used to evaluate the capacity of the interceptors. PDWF and PWWF steady state simulations were used in the four planning models to determine existing interceptor capacity and to size future interceptors. Below is an excerpt from the City’s Engineering Design Guidelines.

“Gravity sewer lines shall be designed so that peak dry weather flow (PDWF) do not exceed 50% of the pipe capacity and peak wet weather flows (PWWF) do not exceed 75% of the pipe capacity.”

Excerpt from City of Pflugerville Engineering Design
Guidelines and Construction Standards (DG6.1 (G))

3.5 Planning and Model Assumptions (All Scenarios)

Four planning scenarios models were constructed based on existing 2012, 5-year, 10-year and Ultimate conditions The Ultimate or full build-out model was developed to determine the capacities of interceptors. In each of the four models the three simulations were run for ADF, PDWF and PWWF. ADF was run as an extended period simulation (24-hr) to determine base wastewater flows at the plants and to determine flow capacity at the lift stations. PDWF and PWWF simulations were run at a steady state simulation to determine pipe capacity. Table 3.4 on the next page shows a summary of the models developed and the information analyzed in each model.

The model uses the Manning’s equation to calculate the flow capacity of the interceptors in the models. Manning’s equation is an industry standard for calculation of gravity flow. Equation 3.1 below is the equation used in the model.

$$Q = \frac{k}{n} * A * R^{2/3} * S^{1/2} \qquad \text{Equation 3.1}$$

Where:

- Q = Wastewater Flow (cfs)
- k = Constant (1.49 ft^{1/3}/sec)
- n = Manning’s roughness coefficient (0.013 unitless)
- A = Flow area (ft²)
- R = Hydraulic Radius (ft)
- S = Friction slope (ft/ft)

Table 3.4 Model Scenarios and Simulations

Model Scenario	Model Simulation		
	EPS	Steady State Models	
	ADF	PDWF Flows not to exceed 50% full pipe flow	PWWF Flows not to exceed 75% full pipe flow
Existing	WWTP flow, Existing Calibration, and Lift Station Capacities	Existing Interceptor Capacity	Existing Interceptor Capacity
5-year	WWTP Flows & Lift Station Capacity	Existing & 5-year Interceptor Capacity	Existing & 5-year Interceptor Capacity
10-year	WWTP Flows & Lift Station Capacity	Existing, 5-year, & 10- year Interceptor Capacity	Existing, 5-year, & 10- year Interceptor Capacity
Ultimate	Full Build-Out WWTP Flows	Ultimate Size of the Interceptors	Ultimate Size of the Interceptors

The model uses the Hazen-Williams equation to calculate pressurized flow or capacities calculated in force mains in the models. Similar to the Manning’s equation, the Hazen-Williams equation is the industry standard for calculation of pressurized flow and is shown below.

$$Q = k * C * A * R^{0.63} * S^{0.54} \qquad \text{Equation 3.2}$$

Where:

- Q = Flow (cfs)
- C = Hazen Williams coefficient (130)
- A = Flow area (ft²)
- R = Hydraulic Radius (ft)
- S = Friction slope (ft/ft)
- K = Constant (1.32)

Below is a summary of the assumptions used to develop the models.

- Development assumptions and flow projections assumptions as presented in the section above.
- Interceptors modeled were greater than or equal to 18-inches and critical 12 to 16-inch interceptors crucial for providing services to future developments and system analysis in the model.
- System critical lift stations and force-mains were modeled.
- Windermere wastewater flows were excluded from the flow analysis
- The interceptors were sized for full build out conditions to prevent rebuild of interceptor as flow increases.
- All future locations of facilities are approximate.
- Gravity flow calculations are based on Manning’s formula utilizing an “n” factor of 0.013. The n-factor 0.013 is an industry standard n-factor for concrete pipe, which yields conservative results.

- Pressurized flow calculation are based on Hazen-Williams formula utilizing a C-factor of 130. The C-factor 130, is an industry standard C-factor for cast iron pipe, which yields conservative results.
- The model's nodal elevation is based on Capital Area Council of Governments (CAPCOG) elevation contours and imported into the model using GIS.
- Flow line elevations for new interceptors is approximate for planning purposes and assumed to be finalized during final design.
- Friction losses due to turbulent flow at manholes was considered minimal for planning purposes, a friction minor loss factor of 1 was applied to all manholes for consistency.
- Lift station information including dimensions, pump on/off elevations and run times were provided by the City. If information was missing approximate values were added in order to converge the model.
- City of Hutto wastewater was assumed to be treated at the Hutto Wastewater Treatment Plant after the five year planning period.

3.6 Model Results

The model was analyzed for both existing and future interceptor capacities. The existing lines were analyzed to determine if wastewater flows exceeded 75% of the pipe capacity (full flow) at PWWF and proposed lines were sized to provide enough capacity to meet the 75 percent rule during all planning periods. Results summary Table 3.5 shows the PWWF/Pipe Design Capacity percentage of the PWWF simulations for the planning periods.

Interceptor capacity is dependent on many variables including slope, friction loss, manhole losses and minor losses, as shown in Equation 3.1. After all the lines were analyzed and sized to meet the criteria for PWWF, the model results for interceptor sizes and depths for the proposed lines was used to develop cost numbers for the projects. Unit prices for wastewater interceptors were taken from City of Austin bid tabs.

Table 3.5 Model Results Summary

Interceptor	Existing/ Proposed	Diameter inch	PWWF/Pipe Capacity %			
			Existing	5-year	10-year	Ultimate
Gilleland	Existing	32	29.4	29.6	18.3	22.5
Hidden Lake	Existing	24	46.7	48.3	48.8	51.8
Highland Park	Existing	24	16.6	20.2	24	34.6
Kennemer	Existing	27	13.2	6.9	9.3	26.4
Lakeside East	Existing	21	17.6	35	32	51
Southern	Existing	24	38	42.1	43.3	72.8
Stone Hill	Existing	24	11.6	13.2	20	46
Weiss	Existing	36	33.6	47.8	45.8	46.6
CIP# 2014-1 Pfluger Lane	Proposed	24	-	2.1	31	59.2
CIP# 2014-3 Sorento	Proposed	36	-	0.2	1.5	64.9
CIP# 2016-1 Carmel	Proposed	18	-	2.4	9	49.9
CIP# 2016-2 Lakeside 1	Proposed	18	-	0.2	0.8	11.2
CIP# 2016-3 SH-45 1	Proposed	18	-	-	9.1	65.1
CIP# 2017-1 New Sweden	Proposed	27	-	1	1	41.7
CIP# 2019-1 West SH-130 1	Proposed	42	-	-	20.9	51
CIP# 2019-2 West SH-130 2	Proposed	36	-	-	16	32.8
CIP#2019-3 Highland Park	Proposed	24	-	-	27	46.3
CIP# 2019-4 Pfluger Lane	Proposed	36	-	-	33	68.7
CIP# 2022-1 Lakeside 2	Proposed	12	-	-	0.3	19.9
CIP# 2020-1 SH-45 2	Proposed	18			5.0	35.2

4.0 Future Wastewater System

4.1 Overview

The primary goal of the wastewater master plan was to provide an effective, sustainable, efficient and environmentally responsible, wastewater system for the City at a reasonable cost. An alternatives analysis (refer to Appendix A) was performed in the beginning of the study to determine a basis of design for the wastewater master plan. From the study, it was determined that the most economical system, displayed the City operating only two wastewater treatment plants and associated cost of those interceptors. To achieve this goal the focus was the expansion of the Central WWTP in order to delay the construction of a second WWTP.

The future wastewater system will include an expanded 9.0 MGD Central WWTP treating flows from the Wilbarger natural drainage basin for the 5-year and 10-year planning periods. The plant is anticipated to be expanded to a capacity of 6.9 MGD in the next six years and possibly to 8.3 MGD by 2024. An interim 0.475 MGD packaged WWTP will be built to treat flows in the Cottonwood natural drainage area for the New Sweden developments. It is not feasible to treat the flows generated in this basin at the Central WWTP, therefore the packaged WWTP is recommended. In the ultimate wastewater system, Central WWTP will treat all wastewater flows west of SH-130, excluding Windermere flows. Exhibit 4.1 shows the overall wastewater flows per service area and the WWTP capacities.

4.2 Collection System

The goal for determining the future collection system infrastructure needed to convey wastewater to the treatment plants was to create a cost effective and sustainable system with low operational costs. Proposed interceptors were routed along or beside creeks, in order to reduce lift stations. For proposed cross-basin interceptors deep tunneled interceptors will be required to gravity wastewater to other natural drainage basins.

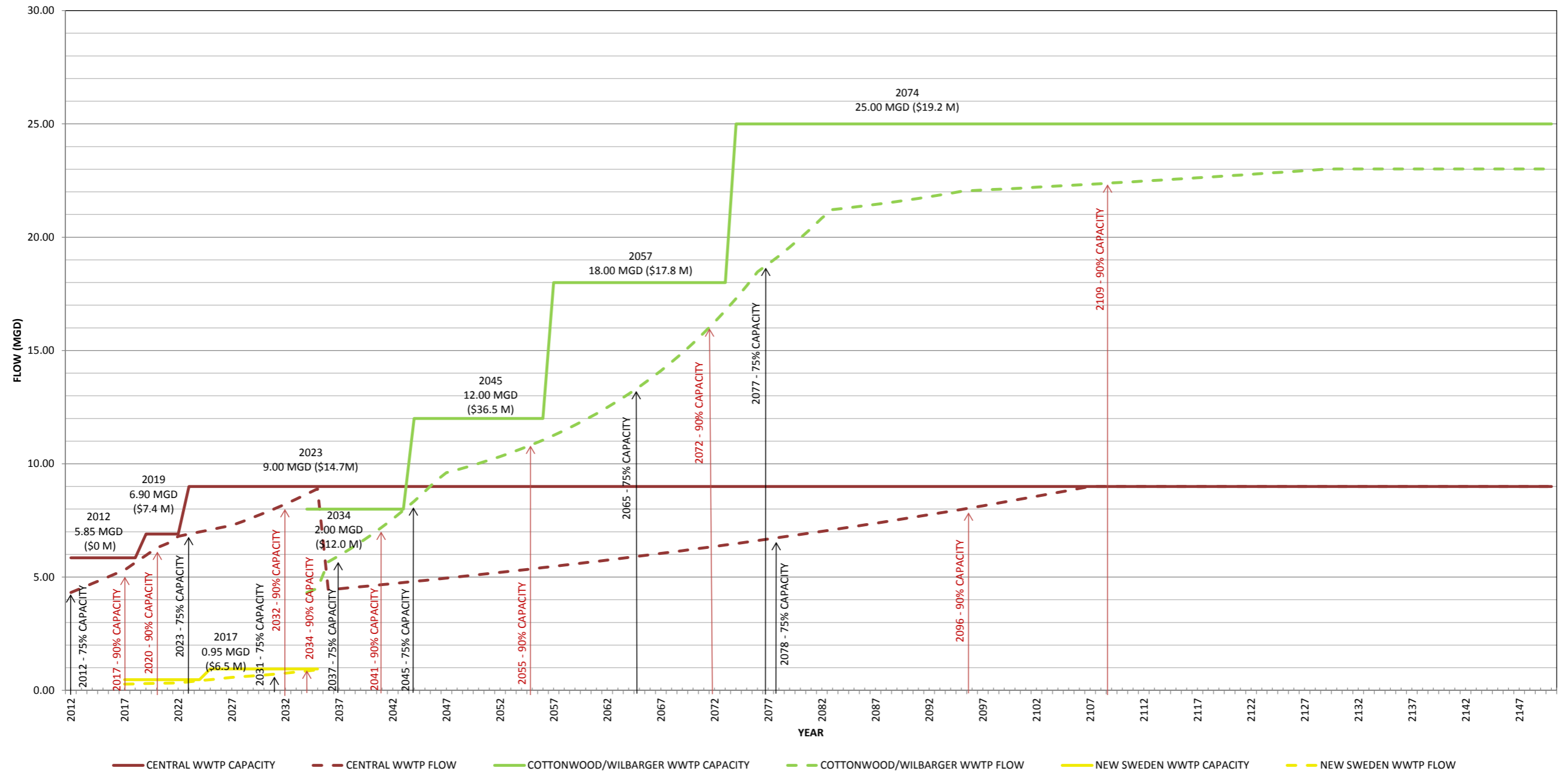
4.2.1 Central WWTP Service Area

The Ultimate Central Service Area includes areas west of SH-130 in the city limits. The area does not include the Windermere area. All wastewater generated in the service area will be treated by the Central WWTP.

The Central WWTP will be expanded to 9.0 MGD to treat wastewater from the Wilbarger natural drainage basin until 2034, when a new treatment plant will be needed in the Cottonwood or Wilbarger natural drainage basins. Once the Cottonwood or Wilbarger WWTPs is built, the Weiss Lane lift station will be taken off line and flows will be diverted to the new WWTP. The full build-out for the ultimate Central wastewater service area is 9.0 MGD.

The primary proposed collection system interceptors planned in this service area are the cross-basin interceptor west of SH-130, Highland Park and Pfluger Lane interconnector and the interceptor proposed to connect the area north and west of SH-45 and SH-130. The SH-130 interceptor and the Highland Park and Pfluger Lane interconnector interceptors will allow for the decommissioning of the Pfluger Lane and Highland Park lift stations. The SH-45 interceptor will provide wastewater service to major potential commercial development north of SH-45. These interceptors are planned to be built within the 5-year and 10-year CIP. Below is a summary of the planned interceptors:

EXHIBIT 4.1 MASTER PLAN WASTEWATER FLOW CHART AND TREATMENT PLANT CAPACITIES
EXPAND CENTRAL WWTP, BUILD NEW SWEDEN WWTP, BUILD COTTONWOOD/WILBARGER WWTP



- 1,610 LF of 24-inch Highland Park and Pfluger Lane Interconnector Phase 1 (2014)
- 1,540 LF of 18- inch SH-45 Connector Interceptor Phase 1 (2016)
- 12,440 LF of 36-42 -inch West SH-130 Interceptor Phase 1 (2019)
- 5,220 LF of 36-inch West SH-130 Interceptor Phase 2 (2019)
- 2,180 LF of 24-inch Highland Park and Pfluger Lane Interconnector Phase 2 (2019)
- 1,360 LF of 36- inch Highland Park and Pfluger Lane Interconnector Upsize (2019)
- 6,030 LF of 18-inch West SH-45 Connector Interceptor Phase 2 (2020)

Lift stations planned for decommissioning based on construction of new interceptors and WWTPs include the Pfluger Lane Lift Station and the Highland Park Lift Station. The decommissioning of the lift stations is anticipated to occur in 2018 and 2019, respectively.

4.2.2 Cottonwood and Wilbarger WWTP Service Areas

The Ultimate Cottonwood and Wilbarger Service Area includes areas east of SH-130 in the city limits and ETJ. Wastewater generated in the service area will be treated by the Central WWTP until 2034 or 90 percent capacity at the Central WWTP.

The Central WWTP will be expanded to 9.0 MGD to treat wastewater from the Wilbarger natural drainage basin until Central WWTP influent flow reaches 90 percent of the design capacity, triggering construction of the Cottonwood or Wilbarger WWTP. Once the Cottonwood or Wilbarger treatment plant is built, the Weiss Lane lift station will be taken off line and flows will be diverted to the new WWTP. The full build-out for the Ultimate Cottonwood and Wilbarger wastewater service area is 25 MGD. The 9.0 MGD Central WWTP capacity equals the Ultimate build-out in the Central Service Area.

Interceptors planned in this service area will be connected to the Central Service Area within the 5-year and 10-year planning periods through the interim Sorento/Carmel lift station and 12-inch force main. This station will tie into the existing 24-inch Weiss Lane force main. The main interceptors planned for the conveyance of wastewater to the lift station are the Carmel, Sorento, Northeast Sorento, and Lakeside interceptors. The Sorento, Carmel, and Lakeside interceptor are planned for construction in the 5-year and 10-year CIP. The Northeast interceptor and portions of the Sorento and Carmel interceptor are planned outside the 10-year planning period. Below is a summary of the planned infrastructure for this portion of the service area.

- 8,100 LF of 12-inch force main Sorento/Carmel Force main (2014)
- Sorento/Carmel Lift Station (2014)
- 4,870 LF of 36-inch Sorento Interceptor Phase 1 (2014)
- 8,660 LF of 18-inch Carmel Interceptor Phase 1 (2016)
- 3,300 LF of 18-inch Lakeside Interceptor Phase 1 (2016)
- 2,690 LF of 12-inch Lakeside Interceptor Phase 2 (2022)

After the 10-year planning, approximately 2034, the Sorento/Carmel Lift Station will be decommissioned and wastewater flows will be diverted to the Cottonwood or Wilbarger WWTP. The main interceptor planned to convey wastewater to the WWTP is the Cottonwood cross-basin interceptor. Below is a summary of this interceptor.

- 26,541 LF of 48-inch Cottonwood Cross Basin Interceptor (Ultimate)

In the Cottonwood Service Area an interim packaged WWTP for the New Sweden area will be built in the 5-year planning period in 2017. This project will treat wastewater flows for the New Sweden development, prior to the construction completion of the Cottonwood or Wilbarger WWTP. The major interceptor planned to convey wastewater flow is the New Sweden/Cottonwood Interceptor. Portions of this interceptor will be built outside of the 10-year CIP as new subdivisions develop. Below is the only interceptor in this basin included in the 10-year CIP:

- 2,740 LF of 27-inch New Sweden/Cottonwood Interceptor Phase 1 (2017)

Lift stations planned for decommissioning based on construction of new interceptors and a new WWTP include the Sorento/Carmel lift station, Weiss Lane, and the Eagle Pointe lift stations. The decommissioning of the lift stations in Cottonwood and Wilbarger service area occur in planning periods outside of the 10 year CIP planning horizon.

4.3 Wastewater Treatment Plants

The updated master plan recommends one WWTP in the combined Cottonwood and Wilbarger natural drainage basins. The three treatment plants recommended in the master plan are summarized in Table 4.0 below:

Table 4.0. Wastewater Master Plan Treatment Plants

Planning Year	WWTP Permit Capacity		
	Permanent	Interim	Permanent
	Central	New Sweden	Cottonwood/Wilbarger
Existing	5.85 MGD	n/a	n/a
5-year	6.9 MGD	0.95	n/a
10-year	6.9 MGD ⁽¹⁾	0.95	n/a
Ultimate	9.0 MGD	removed	12:18:25 MGD

(1) Upgrade to 9.0 MGD in the following year

In addition to the planned wastewater treatment plants, the City currently holds two additional permits with TCEQ, the Wilke WWTP and Wilbarger WWTP. The Wilke WWTP is permitted for 0.3 MGD and is currently off-line. The Wilbarger plant is a three phase permit for up to 15.75 MGD. The first phase is permitted for 4.0 MGD. Additionally, there is another plant permit for the Carmel subdivision, the Wildflower WWTP. The permit is owned by a private developer. It is recommended that the City continue to renew the Wilke and Wilbarger permits until such time as the ultimate permits for these service areas are sought.

4.3.1 Central Treatment Plant

In Section 2.3, the individual process units that make up the Central WWTP do not have consistency in their capacity. Modeling has shown that the ultimate design capacity required at build out is 9.0 MGD. With an assumed required peaking factor of 3.0 the maximum hydraulic capacity is 27.0 MGD. Currently no part of the plant has the ability to treat this ultimate design capacity.

The projected growth rate does not require an immediate expansion to 9.0 MGD, yet the current plant capacity is expected to reach the 75% of permitted flow capacity mark sometime in 2017. When the 75%

capacity milestone is reached, planning for expansion must begin. Construction for the plant expansion must begin when the plant reaches 90% of design capacity which is expected to occur in 2019.

The City expressed two factors that it considered paramount in deciding the intermediate capacity. First was that based on the projected growth, an additional expansion would not be required relatively soon after the intermediate expansion was finished. The second was to reduce and delay capital expenditures for expansion to the greatest degree possible.

The biological unit (Ovivo (Eimco) Carrousel® units) can support loadings associated with a flow rate of 6.9 MGD based on the BOD and ammonia concentrations historically seen at the plant (see section 2.3). Other process units which currently do not have the capacity to achieve this flow rate - the lift station, headworks, tertiary filtration, and chlorination units – would be upgraded to support a future maximum design flow rate of 9.0 MGD and a peak flow rate of 27.0 MGD. The present outfall is also limited by the size of the existing Parshall flume, and must be replaced.

The secondary clarifier has a peak flow capacity of 24.92 MGD (17,305 gpm). With a peaking factor of 3.0 this would equate to an ADF of 8.3 MGD. 90% of 8.3 MGD is 7.47 MGD. Therefore a third clarifier would be needed in 2028. The permit would therefore be phased to have interim flows of 6.9 MGD and 8.3 MGD, and an ultimate flow of 9.0 MGD.

As stated above, with the projected flows, construction for the first expansion would be required to be underway in 2019 and online by 2021. The expansion of the biological unit could be delayed further still but must be on line by 2023 based on the projected growth rates. For consistency, it is expected that a Carrousel® unit of the same size as the two existing units would be built even though this would provide slightly more capacity than the 9.0 MGD required. Construction of an additional clarifier could also be delayed, but must be on-line by approximately 2028. Again, for consistency, a clarifier of the same type and diameter would be constructed even though this would provide somewhat more capacity than required by TCEQ Chapter 217 Design Criteria.

Order of magnitude cost estimates were developed for various expansion scenarios based on plant costing data published by the United States Environmental Protection Agency (USEPA) or recent project data for similar sized units. The USEPA cost curves are based on plant capacity. The historical costs were adjusted to current cost by using Engineering News Record (ENR) construction cost index. Future values were calculated based on an assumed constant annual inflation rate of 3.0%. The first phase expansion (expansion of the lift station, headworks, filtration, disinfection, and outfall, along with mobilization, site work, electrical, instrumentation and yard piping) was determined to be \$21.52 million (no engineering) and will bring the plant capacity up to 6.9 MGD, and is limited by the biological unit. This cost is based on building these units to handle the ultimate flow of 9.0 MGD with the assumption that no part of the existing units can be reused. The second phase of the expansion, to be complete by 2023, is the addition of one Carrousel® unit and will bring the plant capacity up to 8.3 MGD. At this point the plant capacity will be limited by the clarifiers. The estimated cost for this second phase of expansion is estimated to cost \$3.56 million.

4.3.2 New Sweden Treatment Plant

The New Sweden WWTP will be located in the upper half of the Cottonwood drainage basin. This wastewater treatment plant has already been permitted, but has not yet been constructed. Under the current concept, this plant will be temporary, serving the upper reaches of the Cottonwood drainage basin prior to the construction of the Cottonwood or Wilbarger WWTP. With current growth projections, this plant will need to be on-line by 2017 and will treat flows only from the upper reaches of the Cottonwood

drainage basin. It is envisioned that this plant will be needed for approximately 19 years, prior to the construction of the Cottonwood or Wilbarger WWTP.

Currently this plant is permitted with four phases: a limit of 0.15 MGD ADF, a limit of 0.475 MGD ADF, a limit of 0.95 MGD ADF and a limit of 3.0 MGD ADF. Current plans do not envision the plant expanding further than 0.95 MGD prior to the construction of a permanent WWTP, either in the Cottonwood or Wilbarger basins, whereupon the New Sweden WWTP would be shut down and its flow diverted to the permanent WWTP. The rate of growth in flow expected to this plant makes the initial phase of 0.15 MGD impractical as the initial projected flow will be in excess of this.

Due to the limited life span expected for this plant, a temporary packaged plant is envisioned. One type of packaged plant utilizes modular units for biological treatment and can be configured for biological nutrient removal (BNR). The New Sweden permit has discharge concentration parameters of 5 mg/L CBOD, 5 mg/L TSS, 2.0 mg/L NH₃-N, and 1.0 mg/L Total P. The modular nature allows configuration as a 0.475 MGD plant and future expansion to 0.95 MGD with the addition of more modular units. It is estimated that the first phase of the New Sweden plant will cost \$3.68 million, and the second phase will cost an additional \$3.68 million dollars. It should be noted that plants of this type can be purchased outright, or rented. Rental is often an attractive option for structuring bond financing for Municipal Utilities Districts (MUDs), but this may not be a consideration for the City. Rental will allow the transfer of expenses from capital budgets to operating budgets.

4.3.3 Cottonwood or Wilbarger Treatment Plant

The Central WWTP is anticipated to reach its full capacity of 9.0 MGD by approximately 2034. After that a second wastewater plant will be required to serve the continued growth, primarily in the Wilbarger and Cottonwood basins. Current projections indicate that a total capacity of 25.0 MGD will be required to satisfy the ultimate build-out. It is recommended that future updates to the master plan review actual growth patterns and determine the appropriate location for the future treatment plant.

5.0 Conclusions and Recommendations

The projects listed below were identified as part of the modeling effort. The projects are divided between those anticipated to be required in the next 5 years (2014-2018) and those required within 10 years (2019-2023). The projects are heavily dependent on actual growth rates and development locations; therefore it is recommended that the City undertake an update to the master plan every five years to reassess actual growth patterns. The following principles guided the development of the CIP:

- Capacity Expansion
- Removal of lift stations from collection system, and
- Development-driven improvements

This master plan recommends that the existing Central WWTP be expanded to its maximum capacity of 9.0 MGD. Growth rates indicate that a second treatment plant will be required to serve the full development area. The second treatment plant is not projected to be needed until after 2030. Two locations have been identified for a possible future plant – either in the Wilbarger basin or in the Cottonwood basin. As part of a future update to the master plan, the location of the future plant should be determined, taking into account actual growth patterns. In addition, it is recommended that the City retain all existing WWTP permits for the Wilke, and Wilbarger WWTP until a decision on the future plant location is determined.

Below are details on the recommended 5-year and 10-year capital projects.

5.1 Five Year Wastewater CIP

The 5-year CIP addresses the immediate needs of new developments and expansion at the Central WWTP. Table 5.1 has been provided showing project costs by year for each project. Table 5.2 shows projects listed by development factor and a more detailed project description. Exhibit 5.1 shows the locations of the projects with respect to the City’s sewer system.

Individual project CIP project sheets are located in Appendix C. The CIP list is grouped by fiscal year to budget yearly expense; however projects are also categorized by the above principles. Project costs include ROW acquisition costs. Design services are included and calculated for consistency at 15 percent of construction cost. The total amount of CIP cost in the 5-year planning period is \$23.9 million.

The unique identification numbers (ID) uses the following system:

XXXX-Y

Where:

XXXX = Year in Service
Y = Numerical number for Interceptor Projects, or
Y = Alphabetical letter for Facility Projects

**Wastewater Master Plan and Capital Improvements Plan
City of Pflugerville**

Table 5.1 5-year CIP Summary

ID	Wastewater Projects	Cost	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
2014-1	Highland Park and Pfluger Lane Interconnector Phase 1	\$460,000	\$460,000				
2014-2	Sorento /Carmel Forcemain	\$1,134,000	\$1,134,000				
2014-3	Sorento Interceptor Phase 1	\$1,647,000	\$1,647,000				
2014-A	Sorento/Carmel Lift Station	\$2,571,000	\$2,571,000				
2016-1	Carmel Interceptor Phase 1	\$2,079,000			\$2,079,000		
2016-2	Lakeside Interceptor Phase 1	\$995,000			\$995,000		
2016-3	SH-45 Connector Interceptor Phase 1	\$901,000			\$901,000		
2017-1	New Sweden/Cottonwood Interceptor Phase 1	\$896,000				\$896,000	
2017-A	New Sweden Package WWTP 0.475 MGD	\$3,680,000				\$3,680,000	
2017-B	Design of Central WWTP Capacity Upgrades 6.9 MGD	\$3,122,000				\$3,122,000	
2017-C	Update Master Plan and CIP	\$374,000				\$374,000	
Sub-Total		\$17,895,000	\$5,812,000	\$0	\$3,975,000	\$8,072,000	\$0

Notes:

(1) Route may change based on development in the area.

Table 5.2: Detail of Five Year CIP

Year	Project Label	Project Name	Service Area	Ultimate Service Area	Natural Drainage Basin	Project Driver	Type	Project Description	Total Project Cost
2014	1	Highland Park and Pfluger Lane Interconnector Phase 1	Central	Central	Wilbarger	Development	Interceptor	1,610 LF of 24-inch gravity interceptor to convey wastewater from developments along Pflugerville Parkway and Pfluger Farms. Ultimately this line will interconnect Highland Park lift station and Pfluger Lane lift station.	\$ 460,000
2014	2	Sorento /Carmel Forcemain	Central	Cottonwood	Wilbarger	Development	Interceptor	8,100 LF of 12-inch forcemain to convey wastewater from Sorento/Carmel lift station to the 24-inch Weiss Lane forcemain.	\$ 1,134,000
2014	3	Sorento Interceptor Phase 1	Central	Cottonwood	Wilbarger	Development	Interceptor	4,870 LF of 36-inch gravity interceptor to convey wastewater from the Sorento developments along Weiss Lane. Conveys wastewater to the Sorento/Carmel lift station.	\$ 1,647,000
2014	A	Sorento/Carmel Lift Station	Central	n/a	Wilbarger	Development	Facility	2 - 500-1,000 gpm pump interim lift station to convey wastewater to the Central WWTP.	\$ 2,571,000
2016	1	Carmel Interceptor Phase 1	Central	Cottonwood	Wilbarger	Development	Interceptor	8,660 LF of 18-inch gravity interceptor to convey wastewater from the Carmel subdivision to the Sorento/Carmel lift station	\$ 2,079,000
2016	2	Lakeside Interceptor Phase 1	Central	Cottonwood	Wilbarger	Development	Interceptor	3,300 LF of 18-inch gravity interceptor to convey wastewater from the Lakeside WCID to the Weiss Lane lift station.	\$ 995,000
2016	3	SH-45 Connector Interceptor Phase 1	Central	Central	Wilbarger	Development	Interceptor	1,540 LF of 18-inch gravity interceptor to convey wastewater from the parcels just North of SH-45 to the Pfluger Lane lift station.	\$ 901,000
2017	1	New Sweden/Cottonwood Interceptor Phase 1	New Sweden	New Sweden	Cottonwood	Development	Interceptor	2,740 LF of 27-inch gravity interceptor to convey wastewater from the New Sweden subdivisions to the New Sweden packaged plant.	\$ 896,000
2017	A	New Sweden Package WWTP 0.475 MGD	New Sweden	Cottonwood	Cottonwood	Capacity Expansion	Facility	Construction complete of a 0.475 MGD packaged plant.	\$ 3,680,000
2017	B	Design of Central WWTP Capacity Upgrades 6.9 MGD	Central	Central	Wilbarger	Capacity Expansion	Facility	Design Construction plans and specifications for the 6.90 MGD expansion to the Central WWTP	\$ 3,122,000
2017	C	Update Master Plan and CIP	n/a	n/a	All	Development	Study	Update the master plan based on the latest developments and growth patterns.	\$ 374,000

Exhibit 5.1 - City of Pflugerville Wastewater Master Plan 5 Year Capital Improvements Projects



Capital Improvements Not Shown:
2017-C Update WWMP and CIP

SH-45 Connector
Phase 1
CIP # 2016-3

Lakeside Interceptor
Phase 1
CIP # 2016-2

Highland Park and Pluger Lane
Interconnector Phase 1
CIP # 2014-1

New Sweden and Cottonwood Interceptor
Phase 1
CIP # 2017-1

Sorento Interceptor
Phase 1
CIP # 2014-3

New Sweden Package WWTP
0.475 MGD
CIP # 2017-A

Design Upgrade Central
WWTP to 6.9 MGD
CIP # 2017-B

Carmel Interceptor
Phase 1
CIP # 2016-1

Sorento/Carmel Lift Station
CIP # 2014-A

Sorento/Carmel Force Main
CIP # 2014-2

Legend

- WWTP
- LS
- Manhole
- Five Year Interceptors
- Conduit Existing
- Five Year Forcemains
- Forcemain Existing
- City Limits 2013
- ETJ 2013
- New Sweden
- Central
- WWMP Study Area

N

 1 inch = 5,000 feet
 Full Size 11x17
 Release Date
 September 2013



Lockwood, Andrews & Newnam Inc. makes no representations or warranties regarding accuracy or completeness of the information depicted on this map or the data from which it was produced. This map is NOT suitable for survey purposes and does not purport to depict or establish boundaries between land owners or locations of utility infrastructure where survey data is available and field locations have been established.

5.2 Ten Year Wastewater CIP

The 10-year CIP addresses the needs of lift station removal and expansion at the Central WWTP. Table 5.3 has been provided showing project costs by year. Table 5.4 shows projects listed by development factor and project description. Exhibit 5.2 shows the 10-year CIP.

Table 5.3 10-year CIP Summary

ID	Wastewater Projects	Cost	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
2019-1	West SH-130 Interceptor Phase 1	\$6,059,000	\$6,059,000				
2019-2	West SH-130 Interceptor Phase 2	\$1,889,000	\$1,889,000				
2019-3	Highland Park and Pfluger Lane Interceptor Upsize	\$422,000	\$422,000				
2019-4	Highland Park and Pfluger Lane Interconnector Phase 2	\$704,000	\$704,000				
2019-A	Construction of Central WWTP Capacity Upgrades 6.9 MGD	\$21,516,000	\$21,516,000				
2020-1	SH-45 Connector Interceptor Phase 2	\$1,644,000		\$1,644,000			
2020-A	Decommission Pfluger Lane LS	\$180,000		\$180,000			
2020-B	Decommission Highland Park LS	\$180,000		\$180,000			
2022-1	Lakeside Interceptor Phase 2	\$599,000				\$599,000	
2022-A	Update Master Plan and CIP	\$423,000				\$423,000	
2023-A	Central WWTP Capacity Upgrade 8.3 MGD (New Carrousel® unit)	\$3,564,000					\$3,564,000
Sub-Total		\$37,180,000	\$30,590,000	\$2,004,000	\$0	\$1,022,000	\$3,564,000

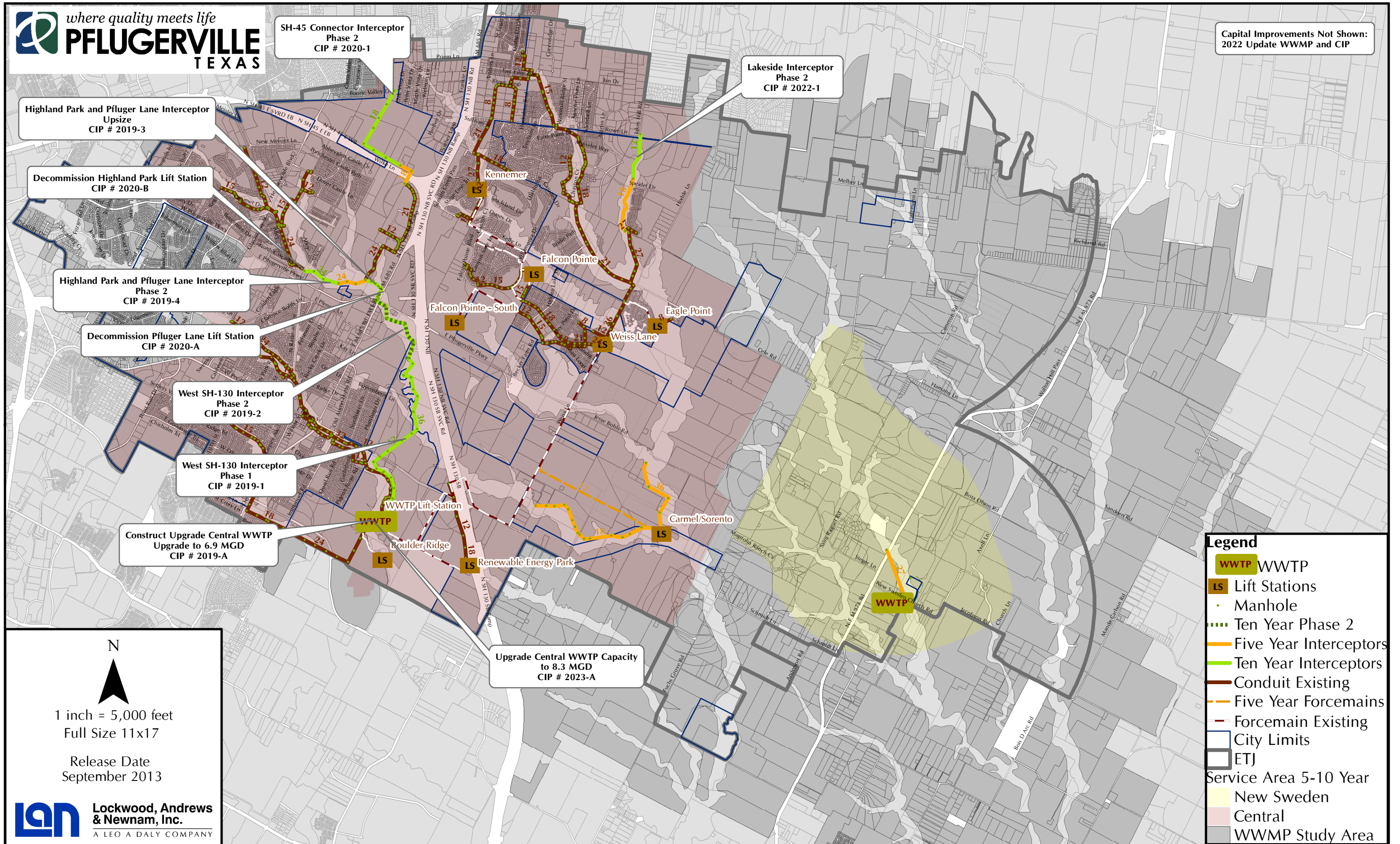
In addition individual projects CIP project sheets are located in Appendix C. The CIP list is grouped by fiscal year to budget yearly expense; however projects are also categorized by the above principles. Project costs include ROW acquisition costs. Engineering services are included and calculated for consistency at 15 percent of construction costs. The total amount of CIP cost in the 10-year planning period is approximately \$54.9 million.

END

Table 5.4: Detail of 10 Year CIP

Year	Project Label	Project Name	Service Area	Ultimate Service Area	Natural Drainage Basin	Project Driver	Type	Project Description	Total Project Cost
2019	1	West SH-130 Interceptor Phase 1	Central	Central	Gilleland / Wilbarger	Lift Station Removal	Interceptor	12,440 LF of 36-42-inch gravity interceptor to convey wastewater from developments along SH-130 and will ultimately allow for decommissioning of Pfluger Lane and Highland Park lift station.	\$ 6,059,000
2019	2	West SH-130 Interceptor Phase 2	Central	Central	Gilleland / Wilbarger	Lift Station Removal	Interceptor	5,220 LF of 36-inch gravity interceptor to convey wastewater from the Stone Hill and Highland Park areas. This interceptor will ultimately allow for decommissioning of Pfluger Lane and Highland Park lift station.	\$ 1,889,000
2019	3	Highland Park and Pfluger Lane Interceptor Upsize	Central	Central	Wilbarger	Lift Station Removal	Interceptor	1,360 LF of 36-inch capacity increase to existing gravity interceptor to convey wastewater to the SH-130 interceptor. This interceptor will increase capacity of the existing interceptor and allow for the decommissioning of the Highland Park lift station.	\$ 422,000
2019	4	Highland Park and Pfluger Lane Interconnector Phase 2	Central	Central	Wilbarger	Lift Station Removal	Interceptor	2,180 LF of 24-inch gravity interceptor to convey wastewater from Highland Park lift station and the decommissioning of the Highland Park lift station.	\$ 704,000
2019	A	Construction of Central WWTP Capacity Upgrades 6.9 MGD	Central	Central	Gilleland	Capacity Expansion	Facility	Increase capacity at Central WWTP to 6.9 MGD.	\$ 21,516,000
2020	1	SH-45 Connector Interceptor Phase 2	Central	Central	Wilbarger	Development	Interceptor	6,030 LF of 18-inch gravity interceptor to convey wastewater from developments north of SH-45.	\$ 1,644,000
2020	A	Decommission Pfluger Lane LS	Central	n/a	Wilbarger	Lift Station Removal	Facility	Decommission the Pfluger Lane lift station after completion of the SH-130 interceptors.	\$ 180,000
2020	B	Decommission Highland Park LS	Central	n/a	n/a	Lift Station Removal	Facility	Decommission the Highland Park lift station after completion of the SH-130 interceptor and the Highland Park interceptor.	\$ 180,000
2022	1	Lakeside Interceptor Phase 2	Central	Cottonwood	Wilbarger	Development	Interceptor	2,690 LF of 12-inch gravity interceptor to convey wastewater from the Lakeside WCID to the Weiss Lane lift station.	\$ 599,000
2022	A	Update Master Plan and CIP	Cottonwood	n/a	All	Development	Study	Update the master plan based on the latest developments and growth patterns.	\$ 423,000
2023	A	Central WWTP Capacity Upgrade 8.3 MGD (New Carrousel® unit)	Central	Central	Wilbarger	Capacity Expansion	Facility	Phase 1 of the expansion of the Central WWTP to 9.0 MG. Construction of new Carrousel® unit to 8.3 MGD.	\$ 3,564,000

Exhibit 5.2 - City of Pflugerville Wastewater Master Plan 10 Year Capital Improvements Projects



Lockwood, Andrews & Newnam Inc. makes no representations or warranties regarding accuracy or completeness of the information depicted on this map or the data from which it was produced. This map is NOT suitable for survey purposes and does not purport to depict or establish boundaries between land owners or locations of utility infrastructure where survey data is available and field locations have been established.

Appendix A

Alternative Analysis

Growth Projections and Alternatives Analysis

Overview

The wastewater master plan study began with a high level alternatives analysis between the 2008 existing and future service areas (Existing Service Areas) and the proposed and future revised service areas (Revised Service Areas). A flow study was performed on the Existing and Revised Service Areas for Ultimate, 10-year and 5-year planning periods, based on land use assumptions and City flow criteria, presented in Section 3.0. Five alternatives for each service area plan were evaluated for treatment plant timing, capacity, and cost. A net present worth evaluation was performed using high level costs for treatment plants and major interceptors, to determine which service area delineation plan (Existing or Revised) is most feasible for the City with respect to plant and interceptor timing and associated costs. Both study results and City input to the analysis were used as a basis of design for the wastewater master plan.

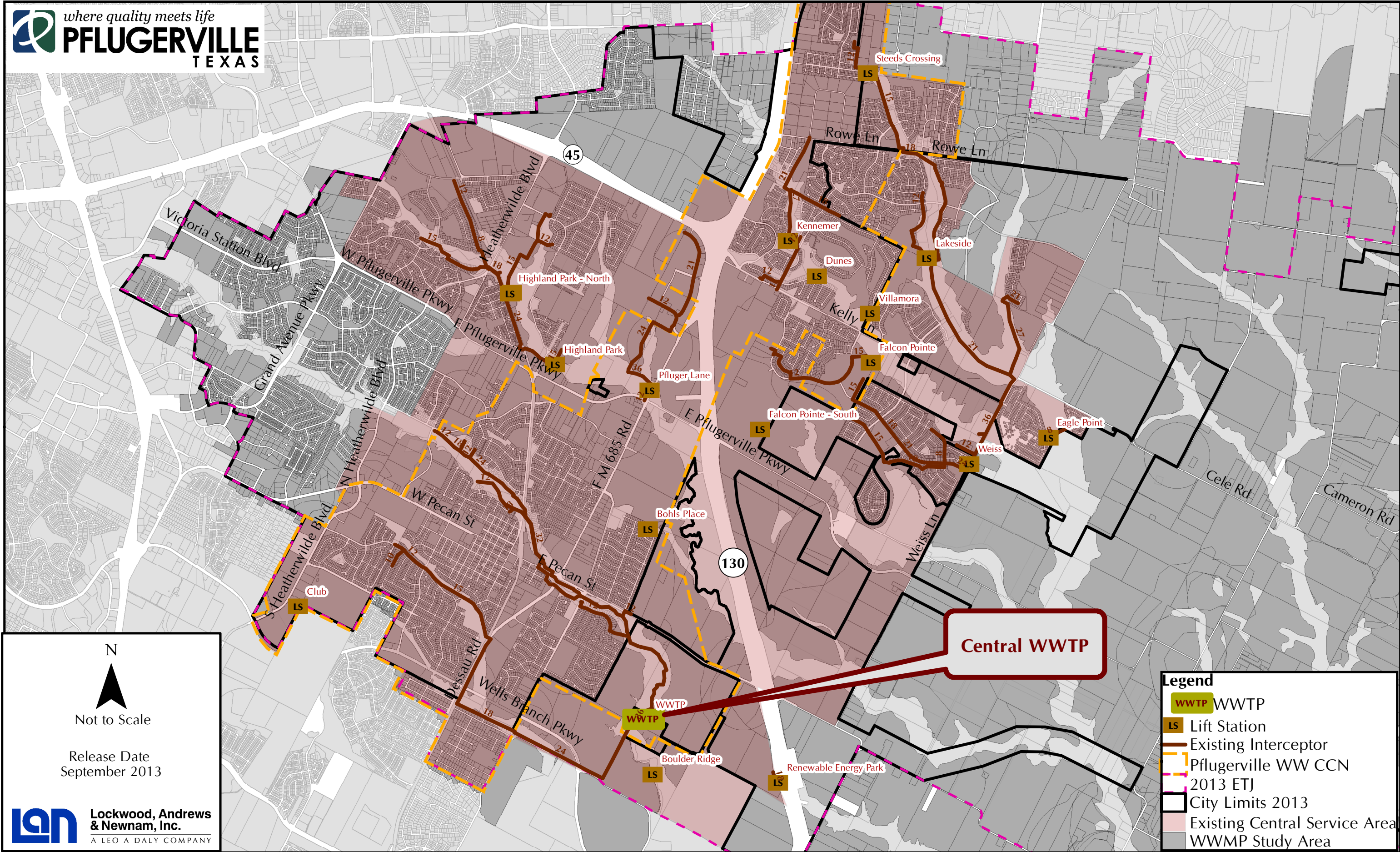
Service Area Delineations

Currently, there is one service area in the City and all the wastewater is conveyed to the Central WWTP, refer to Exhibit A-1. This area included portions of Wilbarger and Gilleland natural drainage basins. The 2008 wastewater master plan utilized three treatment plants with three service areas located within the natural drainage basin of the major creeks in the City's ETJ. The three major plants and service areas planned for the City were, Central (Gilleland), Wilbarger, and Cottonwood. Exhibit A-1 shows the existing service area and Exhibit A-2 shows the Ultimate Existing Service Area from the 2008 wastewater master plan.

After the 2008 wastewater master plan was developed SH-130 was built through the middle of the future Wilbarger service area, thus making a challenging design effort to cross the toll road for the future interceptor needed to convey wastewater to Wilbarger. Additionally, since Wilbarger WWTP is a grass-roots plant, significant costs would be needed within 10-year to build the plant and construct interceptors to convey wastewater to the plant.

Based on the extents of the water master plan, the 10-year CIP, and other City projects, the City requested an analysis to optimize costs on the wastewater master plan by expanding the Central WWTP, reducing the number of treatment plants for the city to operate and including portions of Wilbarger's natural drainage basin in the Gilleland Ultimate service area. The expansion of Central would delay the completion of Wilbarger WWTP, and the added capacity would be utilized by the Central expanded service area once the Wilbarger or Cottonwood treatment plant is commissioned, and flows are diverted from Central to the regional plant. Exhibit A-3 shows the Ultimate revised service area delineations with two treatment plants and two service areas, including the Central expanded service area.

Exhibit A-1 - City of Pflugerville - Current Wastewater Service Area



N



Not to Scale

Release Date
September 2013

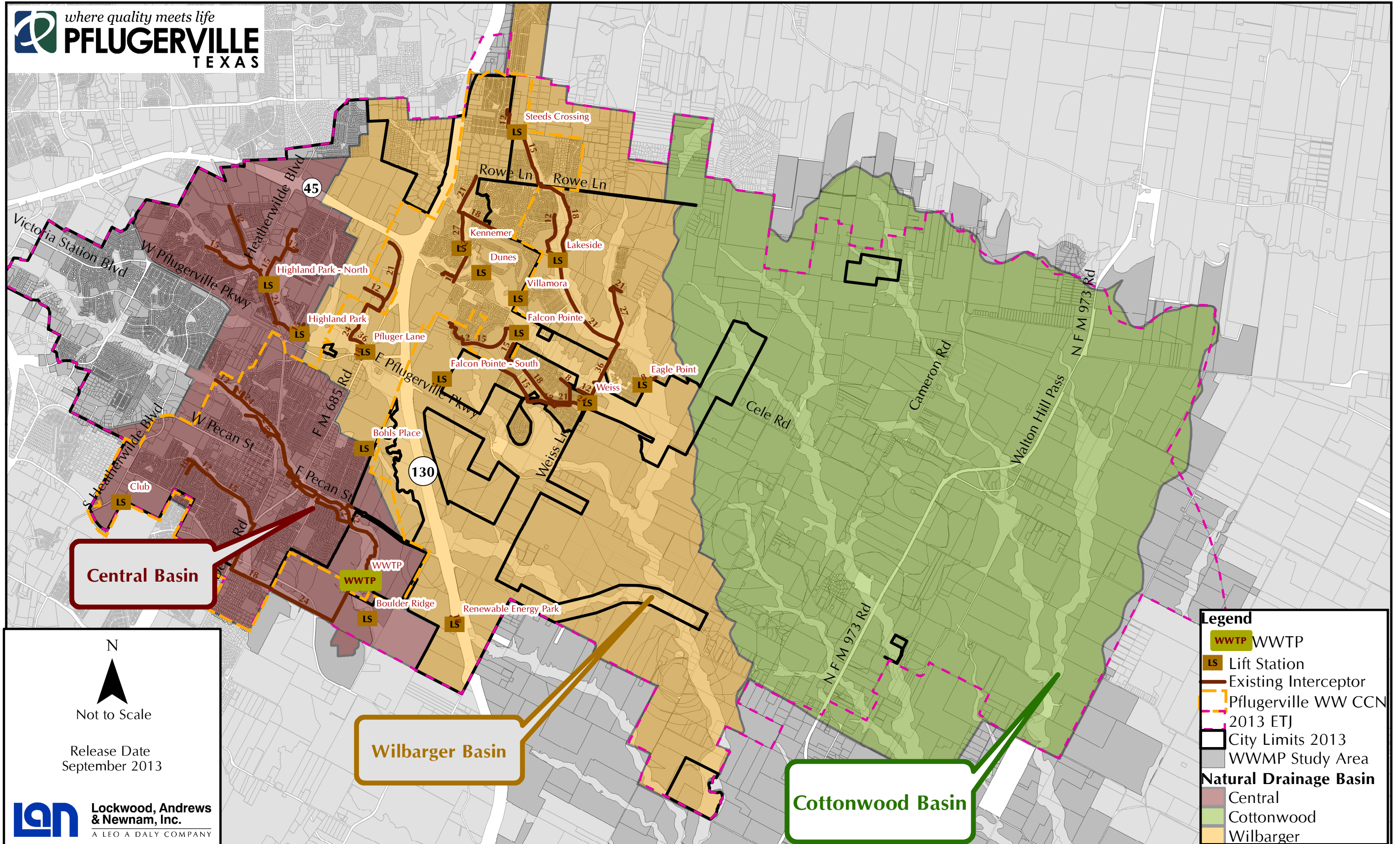


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Legend

- WWTTP
- LS
- Existing Interceptor
- Pflugerville WW CCN
- 2013 ETJ
- City Limits 2013
- Existing Central Service Area
- WWMP Study Area

Exhibit A-2 - City of Pflugerville - 2008 Ultimate Wastewater Service Areas



Central Basin

Wilbarger Basin

Cottonwood Basin

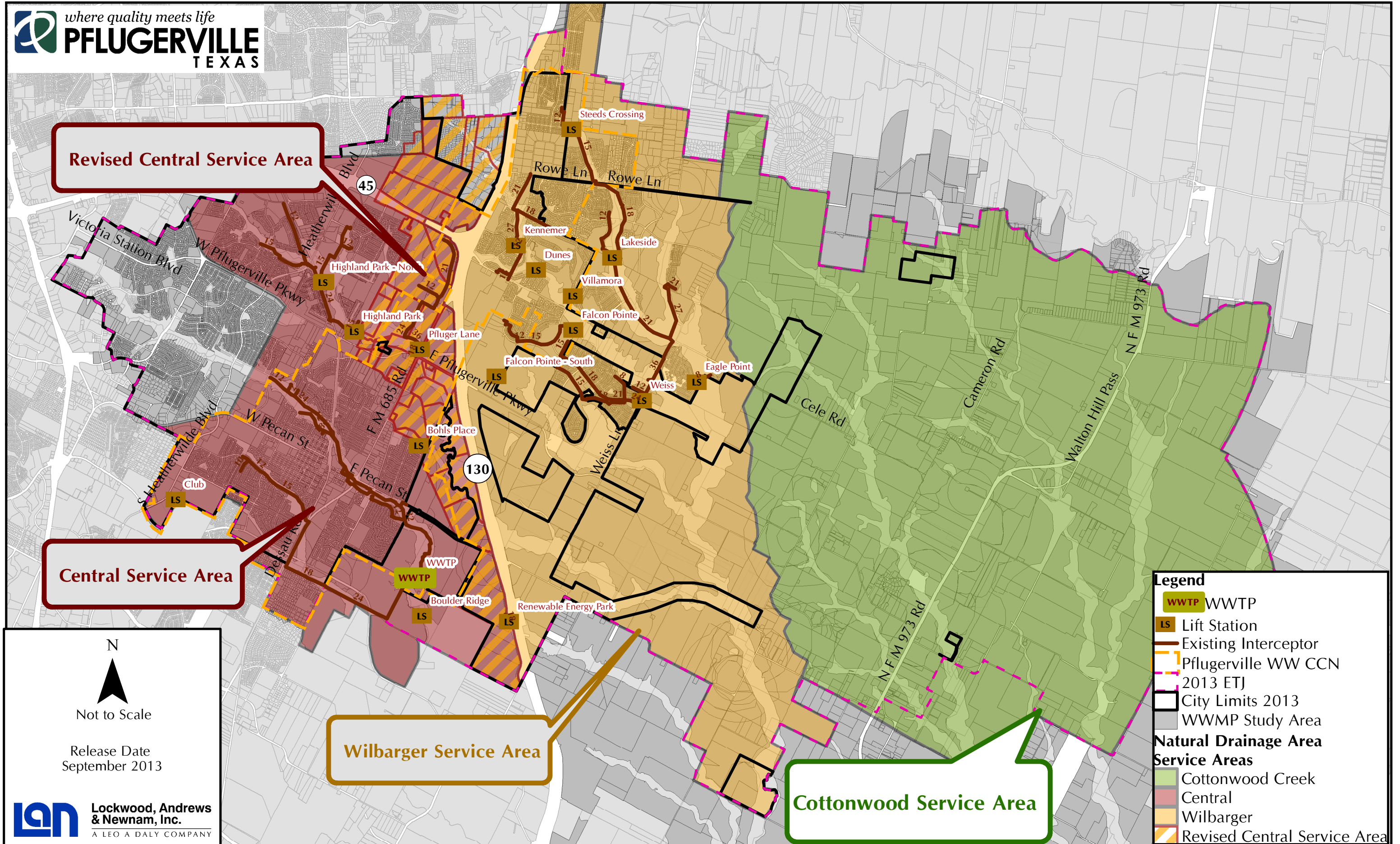
- Legend**
- WWTP
 - LS
 - Existing Interceptor
 - Pflugerville WW CCN
 - 2013 ETJ
 - City Limits 2013
 - WWMP Study Area
 - Natural Drainage Basin**
 - Central
 - Cottonwood
 - Wilbarger

N
 Not to Scale
 Release Date
 September 2013



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Exhibit A-3 - City of Pflugerville - Revised Ultimate Wastewater Service Areas



Legend

- WWTP
- Lift Station
- Existing Interceptor
- Pflugerville WW CCN 2013 ETJ
- City Limits 2013
- WWMP Study Area
- Natural Drainage Area Service Areas**
- Cottonwood Creek
- Central
- Wilbarger
- Revised Central Service Area

Revised Central Service Area

Central Service Area

Wilbarger Service Area

Cottonwood Service Area

N

 Not to Scale

Release Date
September 2013



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Flow and Population Projections

Flow and population projections for each planning period were developed using future land use projections discussed in Section 3.0. Dwelling units per parcel were determined based on the land use type and acreage. Some parcels had a predetermined number of parcels based on subdivision development agreements with the City. Population numbers were developed based on 2.9 people per dwelling unit for parcels with a residential type of land use. Population was counted as zero for all non-residential parcels, however wastewater flow was applied to these parcels based on acreage and density. Once flow and population were calculated for each parcel in the study area, an analysis was performed to determine flow, population, and dwelling units, for each service area and sub-service area.

Table A-1 is a flow summary of the study. Table A-2 shows the full results of the flow and population study for the wastewater master plan.

Table A-1 Wastewater Flow per Service Area Delineations

Planning Period	Service Area Wastewater Flow Projections (MGD)					
	Central Existing	Wilbarger Existing	Cottonwood Existing	Central Revised	Wilbarger Revised	Cottonwood Revised
Existing	2.5	1.68	0.19	2.66	1.52	0.19
5-year	2.82	2.36	0.28	3.05	2.14	0.28
10-year	3.24	3.55	0.33	3.77	3.03	0.33
15-year	3.53	3.75	0.57	4.06	3.22	0.57
Ultimate	6.48	13.19	12.35	9	10.68	12.35

Table A-2 Population and Flow Projections Summary Sheet

YEAR	Study Unit	2008 WWMP Service Areas											Revised Service Areas												
		ETJ (including Windermere and Round Rock)	Cottonwood (inside ETJ)	Cottonwood (outside ETJ)	Cottonwood	Central Existing	Wilbarger Existing (inside ETJ & City Limits)	Wilbarger Existing (inside ETJ & outside City Limits)	Wilbarger Existing (outside ETJ)	Wilbarger	Windermere	Hutto	Round Rock	ETJ (including Windermere and Round Rock)	Cottonwood (inside ETJ)	Cottonwood (outside ETJ)	Cottonwood	Central Revised	Wilbarger Revised (inside ETJ & City Limits)	Wilbarger Revised (inside ETJ & outside City Limits)	Wilbarger Revised (outside ETJ)	Wilbarger	Windermere	Hutto	Round Rock
2012	DU	22,317	270	437	707	9,266	3,218	2,985	33	6,237	6,104	473		22,317	270	437	707	9,860	2,624	2,985	33	5,643	6,104	473	
	Population	57,061	339	1,268	1,607	22,780	6,162	8,271	96	14,529	15,634	1,372	2,503	57,061	339	1,268	1,607	22,780	6,162	8,271	96	14,529	15,634	1,372	2,503
	Flow (MGD)	6.03	0.07	0.12	0.19	2.50	0.87	0.81	0.01	1.68	1.65	0.13		6.03	0.07	0.12	0.19	2.66	0.71	0.81	0.01	1.52	1.65	0.13	
2017	DU	26,273	437	585	1,022	10,459	4,222	4,488	44	8,754	6,194	473		26,273	437	585	1,022	11,297	3,384	4,488	44	7,916	6,194	473	
	Population	66,415	582	1,697	2,279	25,607	7,957	12,628	128	20,714	15,767	1,372	2,503	66,415	582	1,697	2,279	26,074	7,490	12,628	128	20,247	15,767	1,372	2,503
	Flow (MGD)	7.09	0.12	0.16	0.28	2.82	1.14	1.21	0.01	2.36	1.67	0.13		7.09	0.12	0.16	0.28	3.05	0.91	1.21	0.01	2.14	1.67	0.13	
2022	DU	31,836	437	783	1,220	12,009	6,403	6,698	59	13,160	6,290			31,836	437	783	1,220	13,964	4,447	6,698	59	11,204	6,290		
	Population	78,501	582	2,271	2,853	29,425	11,476	18,607	172	30,255	15,908		2,503	78,501	582	2,271	2,853	31,525	9,377	18,607	172	28,156	15,908		2,503
	Flow (MGD)	8.60	0.12	0.21	0.33	3.24	1.73	1.81	0.02	3.55	1.70			8.60	0.12	0.21	0.33	3.77	1.20	1.81	0.02	3.03	1.70		
2027	DU	34,244	1,074	1,048	2,122	13,060	6,518	7,303	79	13,900	6,290			34,244	1,074	1,048	2,122	15,024	4,554	7,303	79	11,936	6,290		
	Population	85,433	2,429	3,039	5,468	32,445	11,786	20,362	230	32,378	15,908		2,503	85,433	2,429	3,039	5,468	34,544	9,687	20,362	230	30,279	15,908		2,503
	Flow (MGD)	9	0	0.28	0.57	3.53	1.76	1.97	0.02	3.75	1.70			9.25	0.29	0.28	0.57	4.06	1.23	1.97	0.02	3.22	1.70		
Ultimate	DU	103,591	27,685	18,050	45,735	24,005	21,938	23,009	3,920	48,866	7,428			103,591	27,685	18,050	45,735	33,333	12,609	23,009	3,920	39,538	7,428		
	Population	245,783	66,365	33,748	100,113	58,058	36,708	61,362	7,428	105,498	18,060		9,104	245,783	66,365	33,748	100,113	70,696	24,071	61,362	7,428	92,861	18,060		9,104
	Flow (MGD)	27.97	7.47	4.87	12.35	6.48	5.92	6.21	1.06	13.19	2.01			27.97	7.47	4.87	12.35	9.00	3.40	6.21	1.06	10.68	2.01		

Alternatives Analysis

Five alternatives for each the existing and revised service areas were evaluated for treatment plant timing, capacity, and cost, based on the service area flow during the planning periods. A flow chart for each of the ten scenarios was evaluated with respect to plant capacity and flow. Table A-3 below shows the five alternatives evaluated for each service area plan.

Table A-3. Alternatives

ALT.	DESCRIPTION	EXISTING SERVICE AREAS	REVISED SERVICE AREAS
		WWTP & INTERCEPTORS	WWTP & INTERCEPTORS
1	Expand Central and Delay Building Wilbarger (No Cottonwood)	Central: 5.85, 6.9 (2019) MGD Wilbarger: 5.5 (2023), 12.0, 18.0, 25.5 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	Central: 5.85, 6.9(2019), 9.0 (2022) MGD Wilbarger: 12.0 (2036), 18.0, 22.0, 25.0 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger
2	Delay Central Expansion and Build Wilbarger (No Cottonwood)	Central: 5.85, 6.9 MGD Wilbarger: 6.0 (2019), 12.0 (2040), 18.0, 24.0, 25.5 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	Central: 5.85, 6.9, 9.0 MGD Wilbarger: 6.0 (2019), 12.0 (2038), 18.0, 22.0, 25 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger
3	Build Wilbarger and Eliminate Central (No Cottonwood)	Central: 5.85, 6.9, 0 MGD Wilbarger: 10.0, 20.0, 30.0, 32 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Central to Wilbarger. & Cottonwood To Wilbarger	Central: 5.85, 6.9, 0.0 MGD Wilbarger: 20.0, 30.0, 32 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Central to Wilbarger & Cottonwood To Wilbarger
4	Expand Central and Delay Building Cottonwood (No Wilbarger)	Central: 5.85, 6.9 (2019) MGD Wilbarger: 0 Cottonwood: 6 (2020) 12.0 (2036), 24.0, 25.5 MGD Interceptors: Cross-Basin Wilbarger To Cottonwood	Central: 5.85, 6.9 (2019), 9.0 (2023) MGD Wilbarger: 0.0 MGD Cottonwood: 8.0 (2034), 12.0 (2045), 18.0, 25.0 MGD Interceptors: Cross-Basin Wilbarger To Cottonwood
5	Delay Central Expansion, Build Wilbarger, Build Cottonwood	Central: 5.85, 6.9 MGD Wilbarger: 4.0 (2019), 8.0 (2029), 12.0, 14.0 MGD Cottonwood: 4.0 (2027), 8.0, 12.5 MGD Interceptors: No Cross-Basin	Central: 5.85, 6.9, 9.0 MGD Wilbarger: 4.0 (2019), 8.0 (2033), 12.5 MGD Cottonwood: 4.0 (2036), 8.0, 12.5 MGD Interceptors: No Cross-Basin

Note:

(xxxx) Indicates the year capacity would be required.

Flow Charts and Plant Timing

Plant expansions and/or construction timing was determined based on the TCEQ 75/90 rule with respect to treatment effluent flow. The rule states that when a plant reaches 75 percent capacity for three consecutive months, the owners are required to start planning the plant’s next expansion and/or new plant capacity. At 90 percent capacity the plant should be under construction for the new expansion to treat the wastewater.

Flow charts were developed utilizing the 5-year and 10-year planning periods. An additional planning period for the 15-year growth was added to the study. Interpolation of flow numbers was used between the 5-, 10-, and 15-year planning periods to determine flow in the immediate years. Between the 15-year and Ultimate planning period a 6 percent growth rate was applied to areas outside the City limit and a 1 percent growth rate was applied to areas inside the City Limits. The growth factor was assumed to continue until the numbers reached the “full build-out” ultimate value. The charts show expected plant flow with respect to plant permit capacity and the 75/90 trigger points for planning and expansion for each alternative. Exhibit A-4 through A-13 show the flow charts for each alternative.

EXHIBIT A-4 ALTERNATIVE 1 (EXISTING SERVICE AREAS) EXPAND CENTRAL WWTP AND DELAY BUILDING WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)

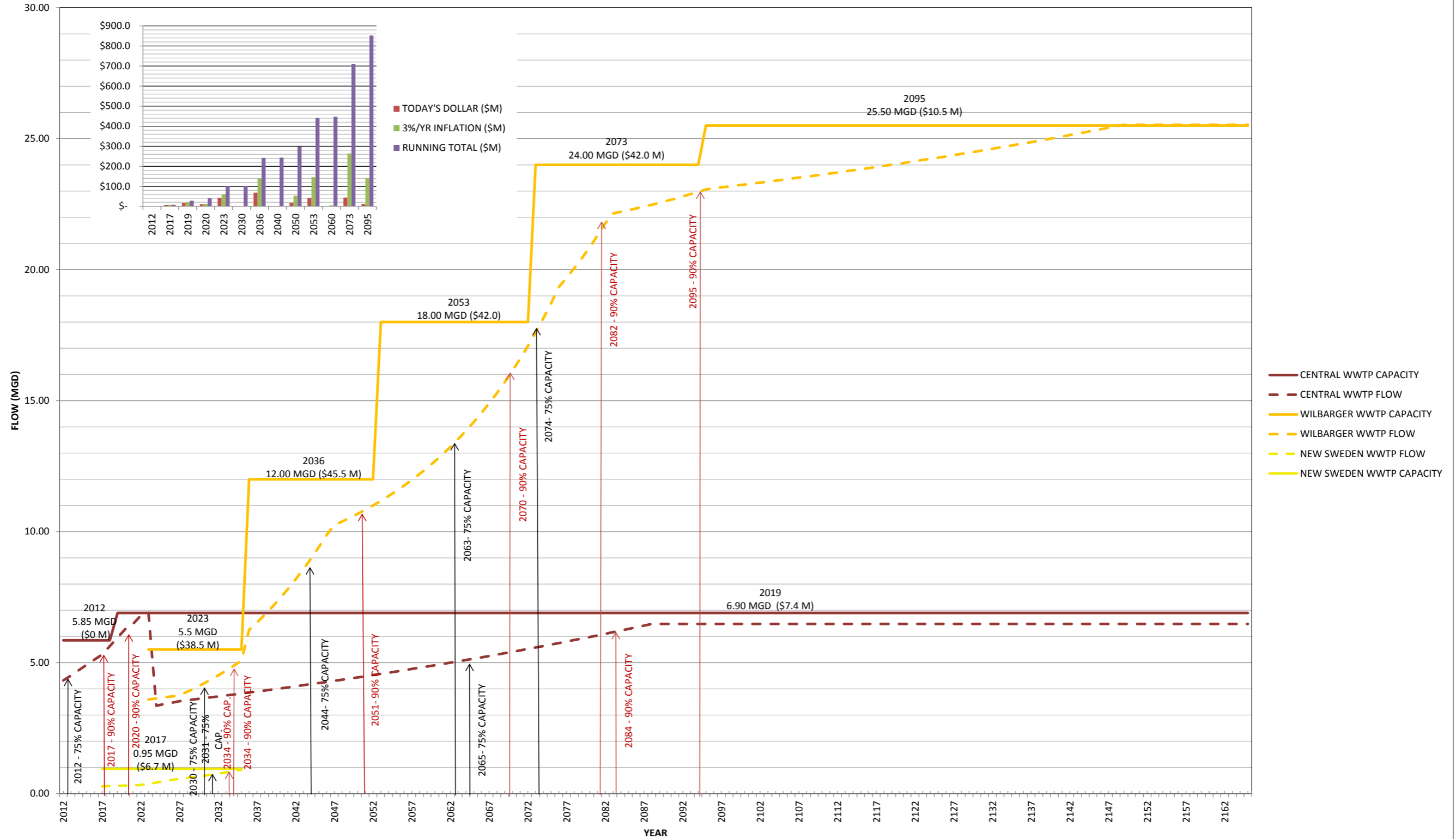


EXHIBIT A-5 ALTERNATIVE 2 (EXISTING SERVICE AREAS) DELAY CENTRAL WWTP AND BUILD WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)

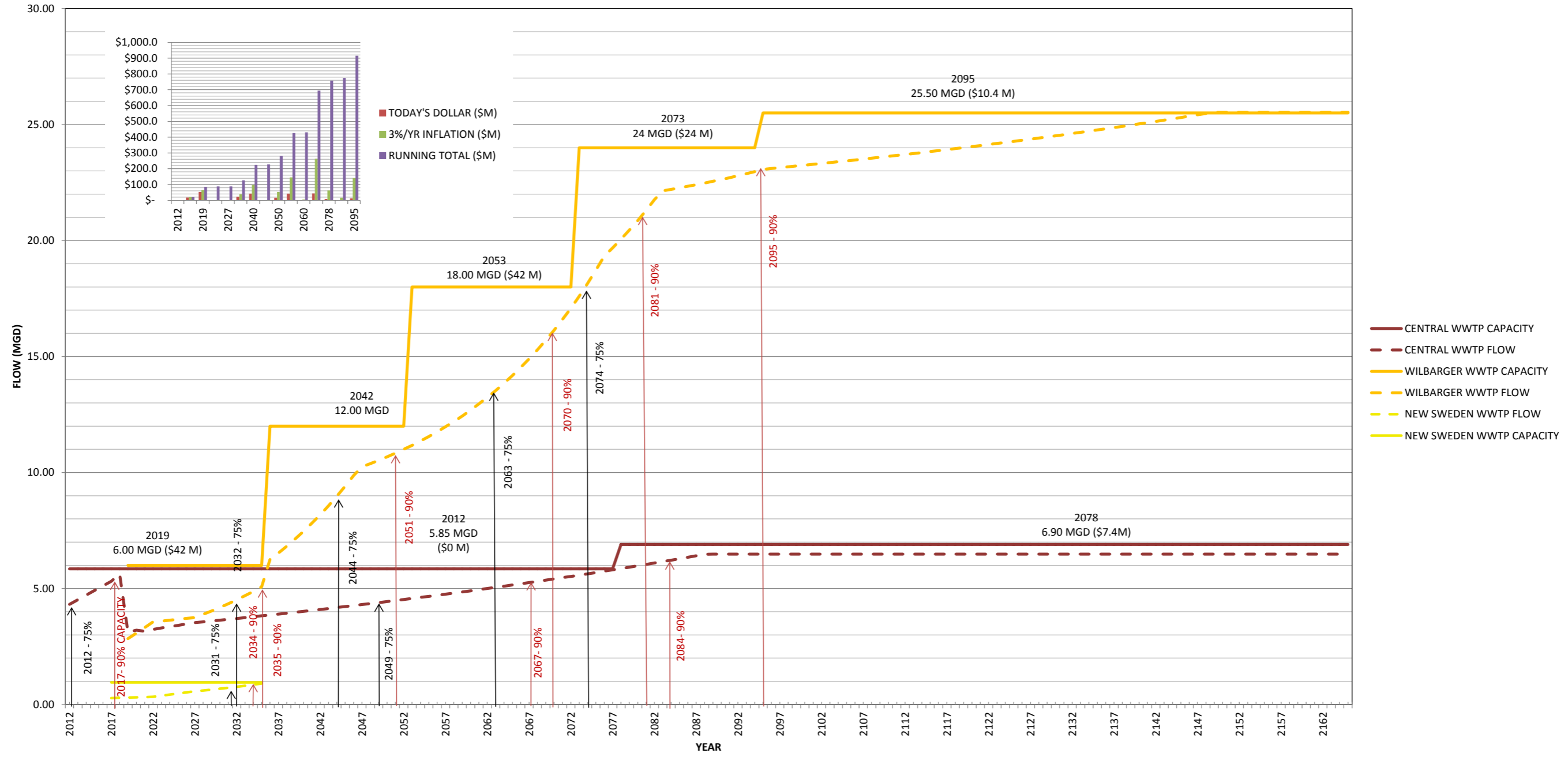


EXHIBIT A-6 ALTERNATIVE 3 (EXIST) BUILD WILBARGER REGIONAL WWTP AND ELIMINATE CENTRAL WWTP (NO COTTONWOOD WWTP)

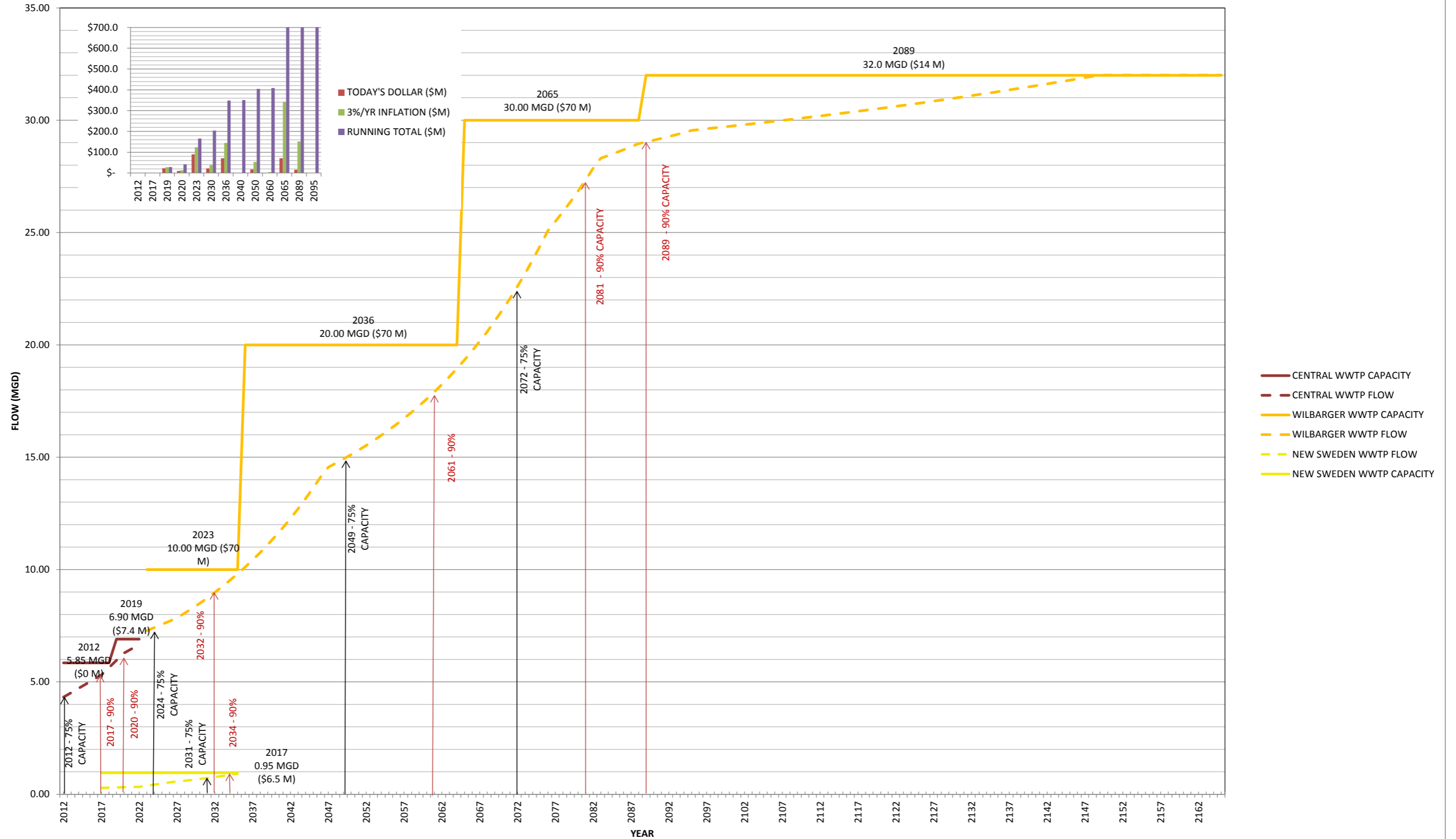


EXHIBIT A-7 ALTERNATIVE 4 (EXISTING SERVICE AREAS) EXPAND CENTRAL WWTP, BUILD COTTONWOOD REGIONAL WWTP (NO WILBARGER WWTP)

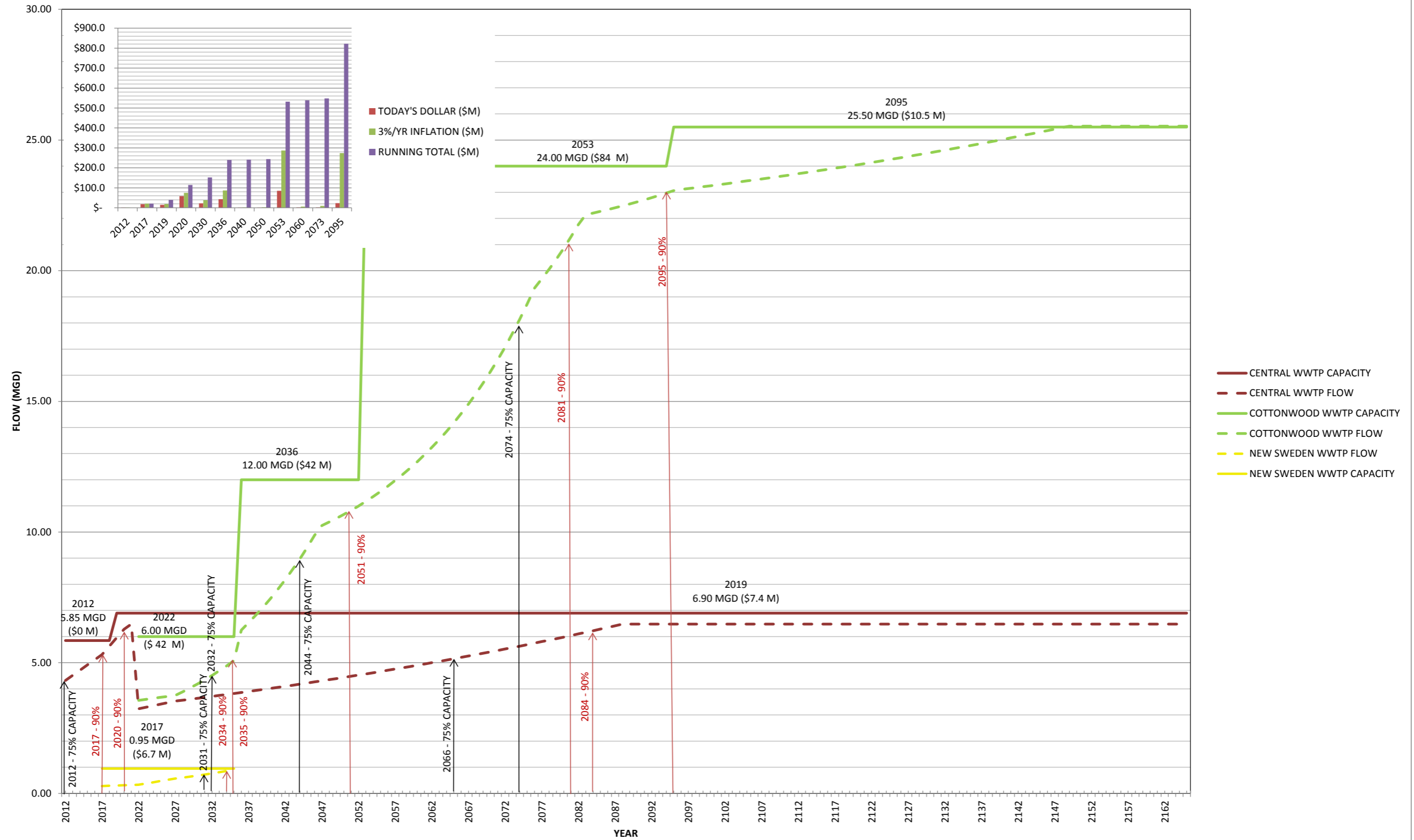


EXHIBIT A-8 ALTERNATIVE 5 (EXIST) EXPAND CENTRAL WWTP, BUILD WILBARGER WWTP, BUILD COTTONWOOD REGIONAL WWTP

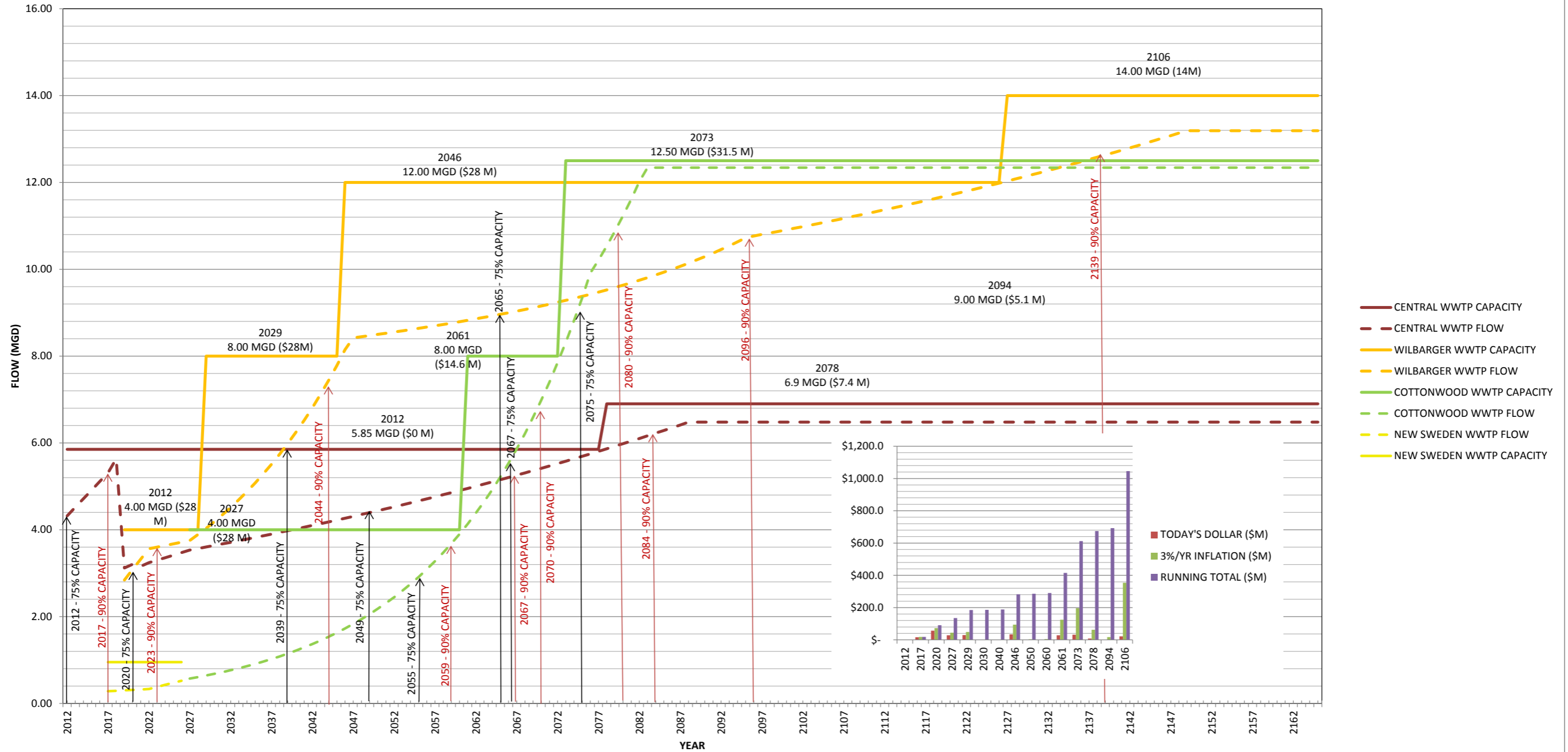


EXHIBIT A-9 ALTERNATIVE 1 (REVISED)

EXPAND CENTRAL WWTP AND DELAY BUILDING WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)

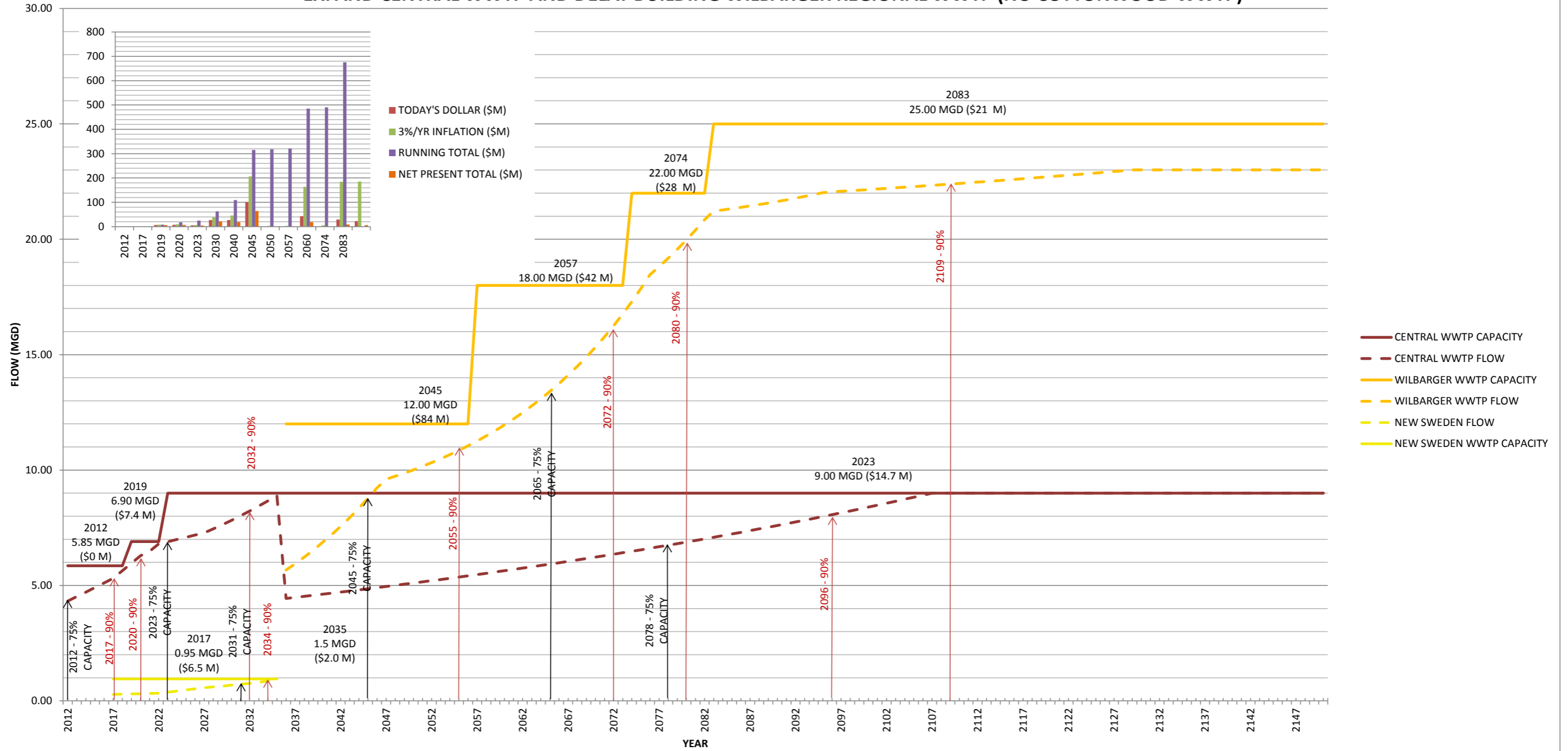


EXHIBIT A-10 ALTERNATIVE 2 (REVISED)
DELAY CENTRAL WWTP INITIAL EXPANSION AND BUILD WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)

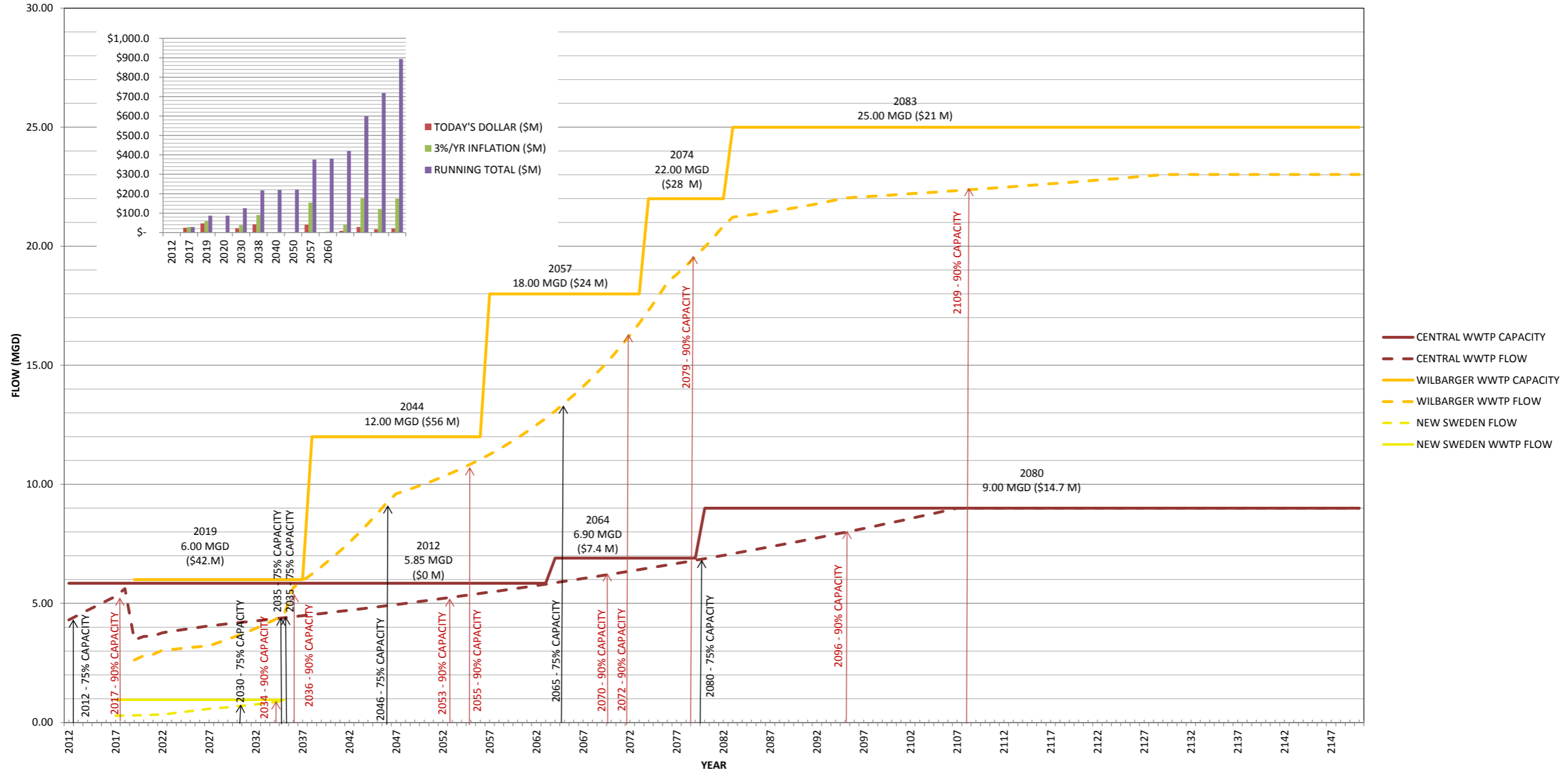


EXHIBIT A-11 ALTERNATIVE 3 (REVISED)

BUILD WILBARGER REGIONAL WWTP AND ELIMINATE CENTRAL WWTP (NO COTTONWOOD WWTP)

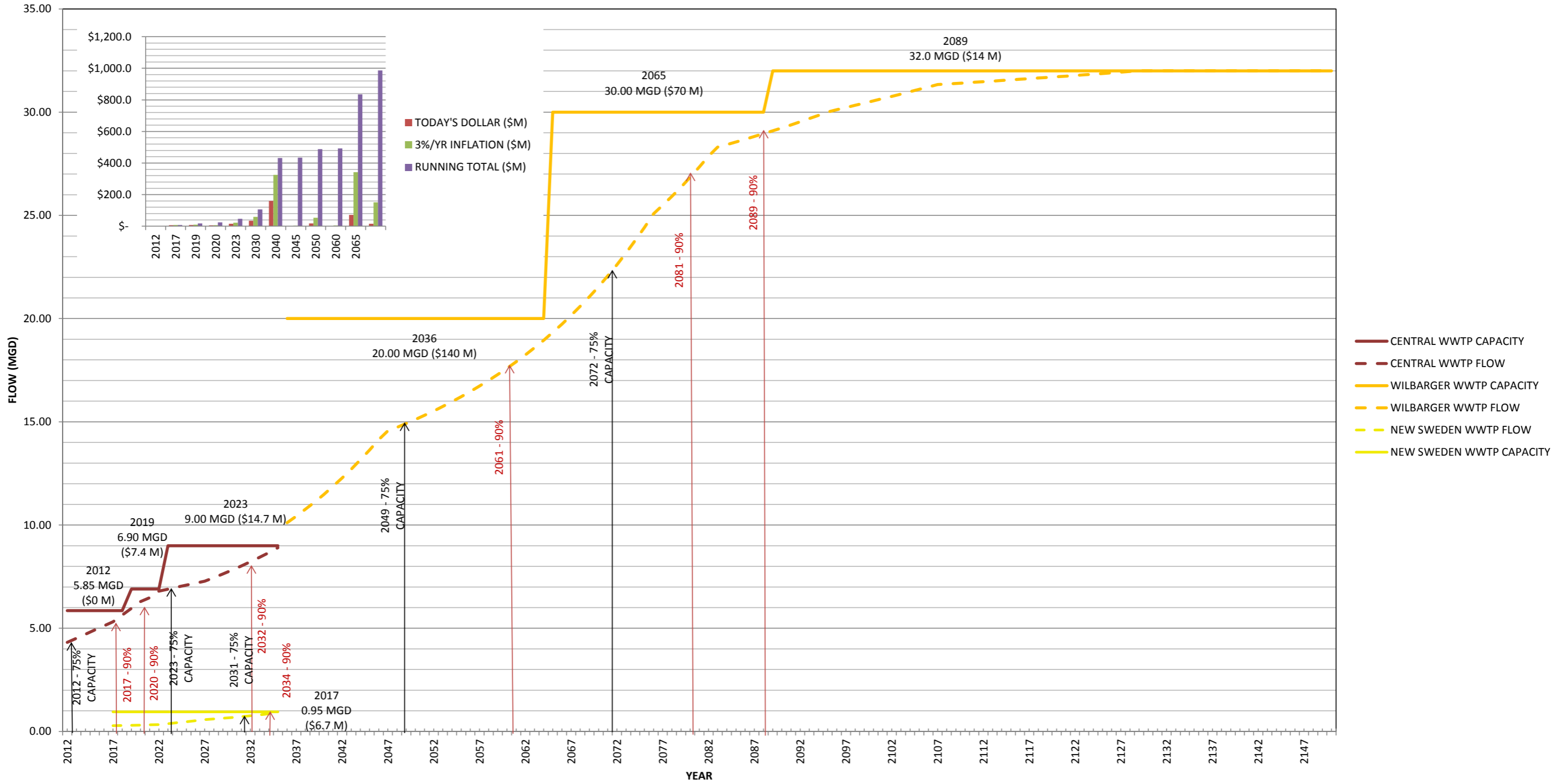


EXHIBIT A-12 ALTERNATIVE 4 (REVISED)
EXPAND CENTRAL WWTP, BUILD NEW SWEDEN WWTP, BUILD COTTONWOOD WWTP (NO WILBARGER WWTP)

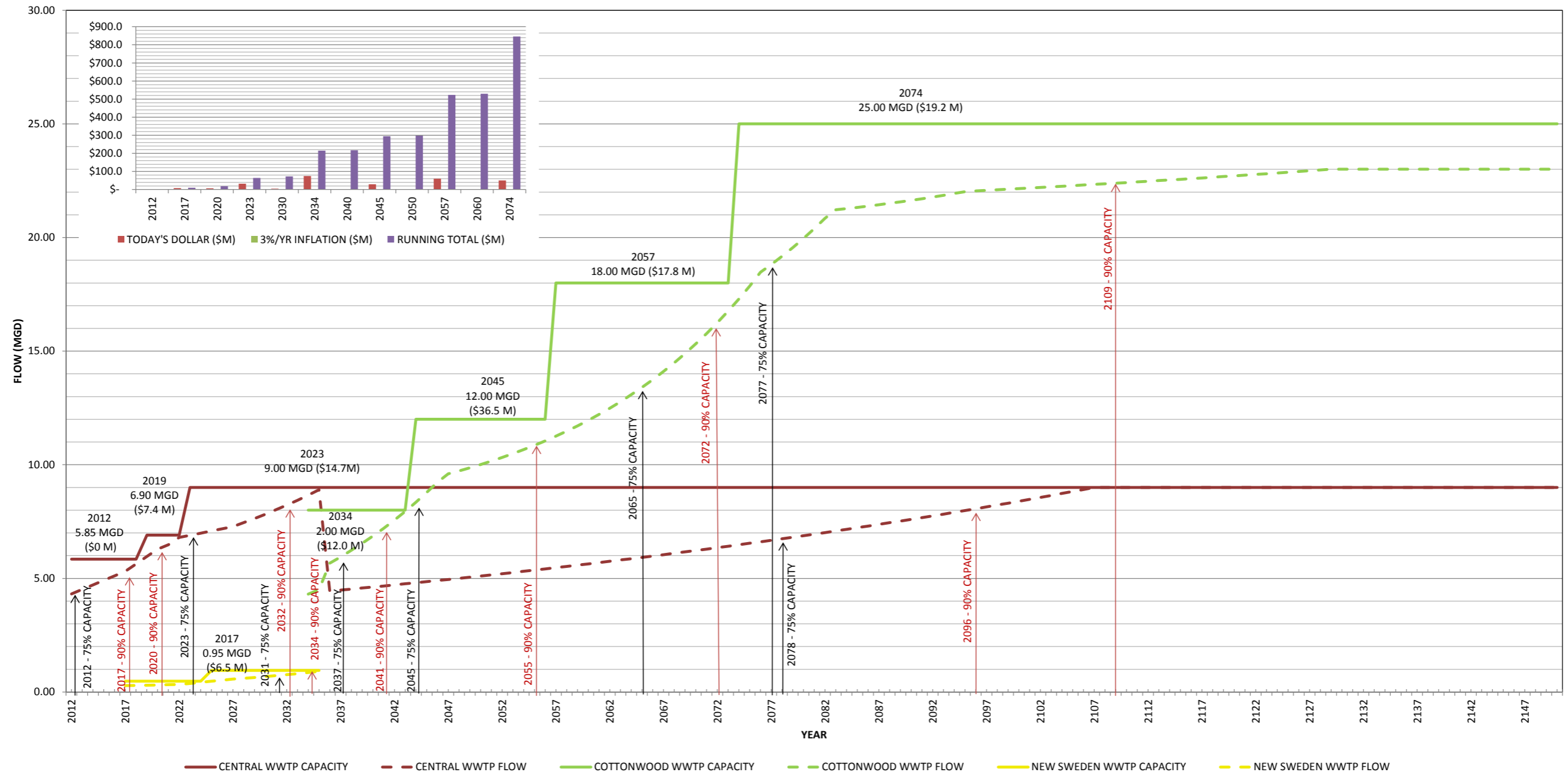
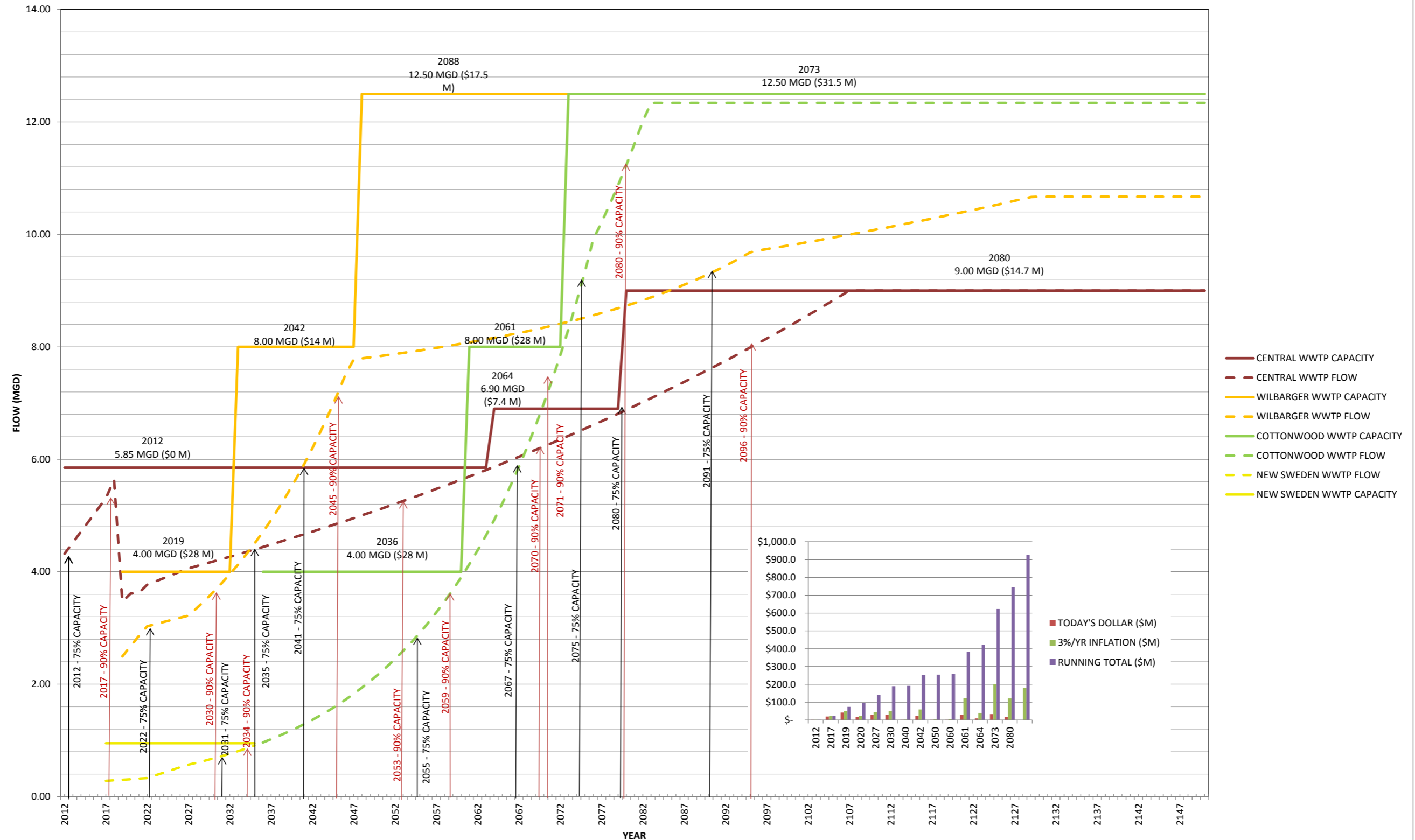


EXHIBIT A-13 ALTERNATIVE 5 (REVISED)

EXPAND CENTRAL WWTP, BUILD WILBARGER WWTP, BUILD COTTONWOOD REGIONAL WWTP



Cost Analysis

A net present worth evaluation was performed using high level costs for treatment plants and major interceptors, to determine which service area delineation plan (Existing or Revised) is most feasible for the City with respect to plant and interceptor timing and associated operating costs. The net present worth study also provided information on when and where treatment capacity should be added.

For the high level cost analysis wastewater treatment costs were assumed to be priced at \$7/gallon of treated wastewater. Interceptor costs were based on preliminary diameter estimations per linear feet and manhole cost was based on assuming manholes every 400 linear feet on the interceptor. Operational costs were assumed to be 5 percent of the treatment capacity.

Based on timing and year of construction for each alternative net present worth was compared for all the alternatives. Table A-4 shows the cost summary for all the Alternatives. Tables A-5 through A-14 show the detailed cost evaluations for each alternative.

Alternative Evaluation

From the results of the net present worth evaluation, the Revised Service Area alternatives were generally more cost effective with regard to plant timing and phasing. The best net present worth cost alternatives were Revised Service Area Alternative 2 and 4. Both of these alternatives show WWTP expansion at Central and one additional plant in either Cottonwood or Wilbarger Basins. Based on the results and the City's desire to operated only two plants in their wastewater service areas, Alternative 2 and 4 were selected as a basis of design for the Wastewater Mater Plan. Exhibit A-14 shows the final service area considered in the Master Plan for the regional treatment plant in either Wilbarger or Cottonwood Natural Drainage Basin

Table A-4 Population and Flow Projections Summary Sheet

ALT.	DESCRIPTION	EXISTING SERVICE AREAS				REVISED SERVICE AREAS			
		WWTP & INTERCEPTORS	TODAY'S DOLLAR (\$M)	3% INF. CUMMULATIVE	NPW	WWTP & INTERCEPTORS	TODAY'S DOLLAR (\$M)	3% INF. CUMMULATIVE	NPW
1	Expand Central and Delay Building Wilbarger (No Cottonwood)	Central: 5.85, 6.9 (2019) MGD Wilbarger: 5.5 (2023), 12.0, 18.0, 25.5 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	\$ 264.4	\$ 852.2	\$ 153.1	Central: 5.85, 6.9(2019), 9.0 (2022) MGD Wilbarger: 12.0 (2036), 18.0, 22.0, 25.0 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	\$ 275.6	\$ 860.5	\$ 158.1
2	Delay Central Expansion and Build Wilbarger	Central: 5.85, 6.9 MGD Wilbarger: 6.0 (2019), 12.0 (2040), 18.0, 24.0, 25.5 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	\$ 267.4	\$ 915.9	\$ 153.3	Central: 5.85, 6.9, 9.0 MGD Wilbarger: 6.0 (2019), 12.0 (2038), 18.0, 22.0, 25 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Cottonwood to Wilbarger	\$ 255.6	\$ 893.9	\$ 146.0
3	Build Wilbarger and Eliminate Central	Central: 5.85, 6.9, 0 MGD Wilbarger: 10.0, 20.0, 30.0, 32 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Central to Wilb. & Cottwd. to Wilb.	\$ 323.6	\$ 903.0	\$ 201.4	Central: 5.85, 6.9, 0.0 MGD Wilbarger: 20.0, 30.0, 32 MGD Cottonwood: 0.0 MGD Interceptors: Cross-Basin Central to Wilb. & Cottwd. to Wilb.	\$ 338.1	\$ 986.8	\$ 195.4
4	Expand Central and Delay Building Cottonwood	Central: 5.85, 6.9 (2019) MGD Wilbarger: 0 Cottonwood: 6 (2020) 12.0 (2036), 24.0, 25.5 MGD Interceptors: Cross-Basin Wilb. To Cottwd.	\$ 271.8	\$ 822.4	\$ 169.1	Central: 5.85, 6.9 (2019), 9.0 (2023) MGD Wilbarger: 0.0 MGD Cottonwood: 8.0 (2034), 12.0 (2045), 18.0, 25.0 MGD Interceptors: Cross-Basin Wilb. To Cottwd.	\$ 270.0	\$ 846.3	\$ 149.4
5	Delay Central Expansion, Build Wilbarger, Build Cottonwood	Central: 5.85, 6.9 MGD Wilbarger: 4.0 (2020), 8.0 (2029), 12.0, 14.0 MGD Cottonwood: 4.0 (2027), 8.0, 12.5 MGD Interceptors: No Cross-Basin	\$ 238.2	\$ 1,046.3	\$ 154.8	Central: 5.85, 6.9, 9.0 MGD Wilbarger: 4.0 (2019), 8.0 (2030), 12.5 MGD Cottonwood: 4.0 (2036), 8.0 (2061), 12.5 MGD Interceptors: No Cross-Basin	\$ 270.0	\$ 926.0	\$ 159.9

TABLE A-5 ALTERNATIVE 1 (EXIST): EXPAND CENTRAL WWTP AND DELAY BUILDING WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND WILBARGER)

DESCRIPTION: Expand Central WWTP from 5.85 to 6.9 to max. 6.90 MGD capacity to serve Gilleland & Wilbarger areas
 Once flow to Central WWTP is near 6.90 MGD capacity, build a 5.50 MGD Wilbarger Regional WWTP
 Reroute Wilbarger area flow to the new Wilbarger WWTP
 Build trunk sewers in Cottonwood area to flow to new Wilbarger WWTP
 Expand Wilbarger Regional WWTP from 5.5 to 12.0 to 18.0 to 24.0 MGD
 Central WWTP will serve Gilleland area, Wilbarger Regional WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	DOLLAR (\$M)	INFLATION (\$M)	WORTH (\$M)	TOTAL (\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	
2017	5.85	\$ 0.3						0.95	\$ 6.7							\$ 7.0	\$ 8.1	\$ 6.3	\$ 8.4	
2019	6.90	\$ 7.7	West SH 130 to Wilbarger	\$ 8.7				0.95	\$ 0.0							\$ 16.4	\$ 20.2	\$ 14.4	\$ 28.6	
2020	6.90	\$ 0.3	Highland Pk & Pfluger Ln	\$ 0.9				0.95	\$ 0.0							\$ 10.3	\$ 13.0	\$ 8.8	\$ 41.6	
2023	6.90	\$ 0.3			5.50	\$ 38.8	Sorento & NE Sorento	\$ 9.0	1.95	\$ 0.1						\$ 42.9	\$ 59.4	\$ 34.7	\$ 101.0	
2030	6.90	\$ 0.3			5.50	\$ 0.3	Wilbarger Interceptor	\$ 3.7								\$ 0.6	\$ 1.1	\$ 0.5	\$ 102.1	
2036	6.90	\$ 0.3			12.00	\$ 46.1								X-Basin (Cottw. To Wilb.)	\$ 22.0	\$ 68.4	\$ 139.1	\$ 43.1	\$ 241.2	
2040	6.90	\$ 0.3			12.00	\$ 0.6										\$ 0.9	\$ 2.2	\$ 0.6	\$ 243.4	
2050	6.90	\$ 0.3			12.00	\$ 0.6								Main Cottonwood	\$ 16.4	\$ 17.3	\$ 53.3	\$ 8.3	\$ 296.7	
2053	6.90	\$ 0.3			18.00	\$ 42.9										\$ 43.2	\$ 145.3	\$ 19.7	\$ 442.0	
2060	6.90	\$ 0.3			18.00	\$ 0.9										\$ 1.2	\$ 5.1	\$ 0.5	\$ 447.1	
2073	6.90	\$ 0.3			24.00	\$ 43.2										\$ 43.5	\$ 264.2	\$ 13.5	\$ 711.3	
2095	6.90	\$ 0.3			25.50	\$ 11.8										\$ 12.1	\$ 140.9	\$ 2.5	\$ 852.2	
TOTAL		\$ 11.7				\$ 185.1		\$ 12.7		\$ 6.9					\$ 38.4	\$ 264.4	\$ 852.2	\$ 153.1	\$ 852.2	

TABLE A-6 ALTERNATIVE 2 (EXIST): DELAY CENTRAL WWTP INITIAL EXPANSION AND BUILD WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND WILBARGER)

DESCRIPTION: Once flow is near Central WWTP 5.85 MGD, delay initial expansion of Central WWTP by building a 4.0 MGD Wilbarger Regional WWTP
 Reroute Wilbarger area flow to the new Wilbarger WWTP
 Build trunks sewers in Cottonwood area to flow to Wilbarger WWTP
 Wilbarger Regional WWTP will serve Wilbarger and Cottonwood area flows
 Expand Central WWTP from 5.58 to 6.9 MGD
 Expand Wilbarger Regional WWTP from 4.0 to 8.0 to 12.0 to 18.0 to 25.5 MGD
 Central will serve Gilleland area, Wilbarger Regional WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	TOTAL
	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	DOLLAR (\$M)	INFLATION (\$M)	WORTH (\$M)	TOTAL (\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	
2017	5.85	\$ 0.3	West SH 130 to Wilbarger	\$ 8.7												\$ 18.0	\$ 20.9	\$ 16.4	\$ 21.2	
2019	5.85	\$ 0.3			6.00	\$ 42.3	Sorento & NE Sorento	\$ 9.0								\$ 52.9	\$ 65.1	\$ 46.3	\$ 86.3	
2020	5.85	\$ 0.3	Highland Pk & Pfluger Ln	\$ 0.9	6.00	\$ 0.3	Wilbarger Interceptor	\$ 3.7	0.95	\$ 6.7						\$ 1.5	\$ 1.9	\$ 1.3	\$ 88.2	
2027	5.85	\$ 0.3			6.00	\$ 0.3										\$ 0.6	\$ 0.9	\$ 0.4	\$ 89.1	
2030	5.85	\$ 0.3			6.00	\$ 0.3								X-Basin (Cottw. To Wilb.)	\$ 22.0	\$ 22.6	\$ 38.5	\$ 16.0	\$ 127.6	
2040	5.85	\$ 0.3			12.00	\$ 42.6										\$ 42.9	\$ 98.1	\$ 25.0	\$ 225.7	
2042	5.85	\$ 0.3			12.00	\$ 0.6										\$ 0.9	\$ 2.2	\$ 0.5	\$ 227.9	
2050	5.85	\$ 0.3			12.00	\$ 0.6								Main Cottonwood	\$ 16.4	\$ 17.3	\$ 53.2	\$ 8.3	\$ 281.1	
2053	5.85	\$ 0.3			18.00	\$ 42.9										\$ 43.2	\$ 145.1	\$ 19.6	\$ 426.2	
2060	5.85	\$ 0.3			18.00	\$ 0.9										\$ 1.2	\$ 4.9	\$ 0.5	\$ 431.1	
2073	5.85	\$ 0.3			24.00	\$ 43.2										\$ 43.5	\$ 263.9	\$ 13.5	\$ 695.0	
2078	6.90	\$ 7.7			24.00	\$ 1.2										\$ 8.9	\$ 62.6	\$ 2.5	\$ 757.6	
2094	6.90	\$ 0.3			24.00	\$ 1.2										\$ 1.5	\$ 17.4	\$ 0.3	\$ 775.0	
2095	6.90	\$ 0.3			25.50	\$ 11.8										\$ 12.1	\$ 140.9	\$ 2.5	\$ 915.9	
TOTAL		\$ 11.9		\$ 9.6		\$ 188.2		\$ 12.7		\$ 6.7			\$ -		\$ 38.4	\$ 267.4	\$ 915.9	\$ 153.3	\$ 915.9	

TABLE A-7 ALTERNATIVE 3 (EXIST): BUILD WILBARGER REGIONAL WWTP AND ELIMINATE CENTRAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 1 (WILBARGER)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Expand Central WWTP from 5.58 to 6.9 MGD
 Once flow is near Central WWTP 6.9 MGD capacity, build a 10.0 MGD Wilbarger WWTP
 Build trunk sewer and route flow from Central WWTP to new Wilbarger WWTP
 Eliminate Central WWTP
 Build trunk sewer in Cottonwood area to flow to new Wilbarger WWTP
 Expand Wilbarger Regional WWTP from 10.0 to 20.0 to 30.0 to 32.0 MGD
 Wilbarger Regional WWTP will serve Gilleland, Wilbarger, and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	DOLLAR (\$M)	INFLATION (\$M)	WORTH (\$M)	TOTAL (\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	
2017	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.2	\$ 0.6	
2019	6.90	\$ 7.7	West SH 130 to Wilbarger	\$ 8.7				0.95	\$ 6.7							\$ 23.1	\$ 28.4	\$ 20.2	\$ 29.0	
2020	6.90	\$ 0.3	Highland Pk & Pfluger Ln	\$ 0.9			\$ 9.0	0.95	\$ 0.0							\$ 10.3	\$ 13.0	\$ 8.8	\$ 42.0	
2023	6.90	\$ 0.3	X- Basin Central to Wilb.	\$ 15.1	10.00	\$ 70.5	\$ 3.7									\$ 89.6	\$ 124.1	\$ 72.6	\$ 166.1	
2030	0.00	\$ -			10.00	\$ 0.5								X-Basin (Cottw. To Wilb.)	\$ 22.0	\$ 22.5	\$ 38.3	\$ 15.9	\$ 204.4	
2036	0.00	\$ -			20.00	\$ 71.0										\$ 71.0	\$ 144.3	\$ 44.7	\$ 348.7	
2040	0.00	\$ -			20.00	\$ 1.0										\$ 1.0	\$ 2.3	\$ 0.6	\$ 351.0	
2050	0.00	\$ -			20.00	\$ 1.0								Main Cottonwood	\$ 16.4	\$ 17.4	\$ 53.5	\$ 8.4	\$ 404.5	
2060	0.00	\$ -			20.00	\$ 1.0										\$ 1.0	\$ 4.1	\$ 0.4	\$ 408.6	
2065	0.00	\$ -			30.00	\$ 71.5										\$ 71.5	\$ 342.5	\$ 25.8	\$ 751.1	
2089	0.00	\$ -			32.00	\$ 15.6										\$ 15.6	\$ 151.9	\$ 3.5	\$ 903.0	
2095	0.00	\$ -														\$ -	\$ -	\$ -	\$ 903.0	
TOTAL		\$ 9.0		\$ 24.7		\$ 232.1	\$ 12.7		\$ 6.7				\$ -		\$ 38.4	\$ 323.6	\$ 903.0	\$ 201.4	\$ 903.0	

TABLE A-8 ALTERNATIVE 4 (EXIST): EXPAND CENTRAL WWTP, BUILD COTTONWOOD REGIONAL WWTP (NO WILBARGER WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND COTTONWOOD)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Expand Central WWTP from 5.58 to 6.9 MGD
 Once flow is near Central WWTP 6.9 MGD capacity, build a 6.0 MGD Cottonwood Regional WWTP
 Reroute Wilbarger area flow to the new Cottonwood WWTP
 Build trunks sewers in Cottonwood area to flow to new Cottonwood WWTP
 Expand Cottonwood WWTP from 12.0 to 18.0 to 24.00 25.5 MGD
 Central WWTP will serve Gilleland area, Cottonwood Regional WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	DOLLAR (\$M)	INFLATION (\$M)	WORTH (\$M)	TOTAL (\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	
2017	5.85	\$ 0.3	West SH 130 to Wilbarger	\$ 8.7			\$ 9.0									\$ 18.0	\$ 20.9	\$ 16.4	\$ 21.2	
2019	6.90	\$ 7.7	Highland Pk & Pfluger Ln	\$ 0.9				0.95	\$ 6.7							\$ 15.2	\$ 18.7	\$ 13.3	\$ 39.9	
2020	6.90	\$ 0.3										6.00	\$ 42.3	Main Cottonwood	\$ 16.4	\$ 59.0	\$ 74.8	\$ 50.6	\$ 114.7	
2030	6.90	\$ 0.3					\$ 21.5					6.00	\$ 0.3			\$ 22.1	\$ 37.7	\$ 15.7	\$ 152.4	
2036	6.90	\$ 0.3										12.00	\$ 42.6			\$ 42.9	\$ 87.3	\$ 27.1	\$ 239.7	
2040	6.90	\$ 0.3										12.00	\$ 0.6			\$ 0.9	\$ 2.2	\$ 0.6	\$ 241.9	
2050	6.90	\$ 0.3										12.00	\$ 0.6			\$ 0.9	\$ 2.9	\$ 0.5	\$ 244.8	
2053	6.90	\$ 0.3										24.00	\$ 85.2			\$ 85.5	\$ 287.4	\$ 38.9	\$ 532.2	
2060	6.90	\$ 0.3										24.00	\$ 1.2			\$ 1.5	\$ 6.4	\$ 0.6	\$ 538.6	
2073	6.90	\$ 0.3										24.00	\$ 1.2			\$ 1.5	\$ 9.4	\$ 0.5	\$ 548.0	
2095	6.90	\$ 0.3										25.50	\$ 23.3			\$ 23.6	\$ 274.4	\$ 4.8	\$ 822.4	
TOTAL		\$ 11.4		\$ 9.6		\$ -	\$ 30.5		\$ 6.7				\$ 197.3		\$ 16.4	\$ 271.8	\$ 822.4	\$ 169.1	\$ 822.4	

TABLE A-9 ALTERNATIVE 5 (EXIST): EXPAND CENTRAL WWTP, BUILD WILBARGER WWTP, BUILD COTTONWOOD REGIONAL WWTP
 TOTAL NO. OF WWTP'S: 3 (CENTRAL, WILBARGER, AND COTTONWOOD)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Once flow is near Central WWTP 5.85 capacity, build a 4.0 MGD Wilbarger WWTP
 Route flow generated from Wilbarger area to new Wilbarger WWTP
 Built a 4.0 MGD Cottonwood WWTP
 Build trunk sewers in Cottonwood area to flow to new Cottonwood WWTP
 Central WWTP will serve Gilleland area, Wilbarger WWTP will serve Wilbarger area, and Cottonwood will serve Cottonwood area

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	DOLLAR (\$M)	INFLATION	WORTH	TOTAL
	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)		(\$M)	(\$M)	(\$M)
2012	5.85	\$ 0.3															\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3
2017	5.85	\$ 0.3					Sorento & NE Sorento	\$ 9.0	0.95	\$ 6.7							\$ 15.9	\$ 18.5	\$ 14.5	\$ 18.8
2020	5.85	\$ 0.3	West SH 130 to Wilbarger	\$ 8.7	4.00	\$ 28.2	Wilbarger Interceptor	\$ 3.7							Main Cottonwood	\$ 16.4	\$ 57.3	\$ 72.6	\$ 49.1	\$ 91.4
2027	5.85	\$ 0.3			4.00	\$ 0.2							4.00	\$ 28.2			\$ 28.7	\$ 44.7	\$ 21.5	\$ 136.1
2029	5.85	\$ 0.3	Highland Pk & Pflugler Ln	\$ 0.9	8.00	\$ 28.4							4.00	\$ 0.2			\$ 29.8	\$ 49.2	\$ 21.5	\$ 185.3
2030	5.85	\$ 0.3			8.00	\$ 0.4							4.00	\$ 0.2			\$ 0.9	\$ 1.5	\$ 0.6	\$ 186.8
2040	5.85	\$ 0.3			8.00	\$ 0.4							4.00	\$ 0.2			\$ 0.9	\$ 2.0	\$ 0.5	\$ 188.8
2046	5.85	\$ 0.3			12.00	\$ 34.0							4.00	\$ 0.2			\$ 34.5	\$ 94.2	\$ 17.9	\$ 283.0
2050	5.85	\$ 0.3			12.00	\$ 0.6							4.00	\$ 0.2			\$ 1.1	\$ 3.4	\$ 0.5	\$ 286.4
2060	5.85	\$ 0.3			12.00	\$ 0.6							4.00	\$ 0.2			\$ 1.1	\$ 4.5	\$ 0.4	\$ 290.9
2061	5.85	\$ 0.3			12.00	\$ 0.6							8.00	\$ 28.4			\$ 29.3	\$ 124.7	\$ 11.4	\$ 415.6
2073	5.85	\$ 0.3			12.00	\$ 0.6							12.50	\$ 31.5			\$ 32.4	\$ 196.6	\$ 10.0	\$ 612.2
2078	6.90	\$ 7.7			12.00	\$ 0.6							12.50	\$ 0.6			\$ 8.9	\$ 62.8	\$ 2.5	\$ 675.0
2094	6.90	\$ 0.3			12.00	\$ 0.6							12.50	\$ 0.6			\$ 1.6	\$ 17.7	\$ 0.3	\$ 692.7
2106	6.90	\$ 0.3			14.00	\$ 21.0							12.50	\$ 0.6			\$ 22.0	\$ 353.6	\$ 3.6	\$ 1,046.3
TOTAL		\$ 11.9		\$ 9.6		\$ 116.2		\$ 12.7		\$ 6.7				\$ 91.2		\$ 16.4	\$ 264.6	\$ 1,046.3	\$ 154.8	\$ 1,046.3

TABLE A-10 ALTERNATIVE 1 (REVISED): EXPAND CENTRAL WWTP AND DELAY BUILDING WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND WILBARGER)

DESCRIPTION: Expand Central WWTP from 5.85 to 6.9 to max. 9.0 MGD capacity to serve Gilleland & Wilbarger areas
 Once flow to Central WWTP is near 9.0 MGD capacity, build a 12.0 MGD Wilbarger WWTP
 Reroute Wilbarger area flow to the new Wilbarger WWTP
 Build trunk sewers in Cottonwood area to flow to new Wilbarger WWTP
 Expand Wilbarger Regional WWTP from 12.0 to 18.0 to 22.0 to 25.0 MGD
 Central WWTP will serve Gilleland area, Wilbarger Regional WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	DOLLAR (\$M)	INFLATION	WORTH	TOTAL
(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)		(\$M)	(\$M)	(\$M)	(\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3
2017	5.85	\$ 0.3						0.95	\$ 6.7							\$ 7.0	\$ 8.1	\$ 6.3	\$ 8.4	\$ 8.4
2019	6.90	\$ 7.7						0.95	\$ 0.0							\$ 7.7	\$ 9.5	\$ 6.8	\$ 17.9	\$ 17.9
2020	6.90	\$ 0.3	West SH 130 to Central	\$ 5.2				0.95	\$ 0.0							\$ 5.6	\$ 7.1	\$ 4.8	\$ 25.0	\$ 25.0
2023	9.00	\$ 15.2					Carmel, Sorento, NE Sorento	\$ 12.2	0.95	\$ 0.0						\$ 27.4	\$ 37.9	\$ 22.2	\$ 62.9	\$ 62.9
2030	9.00	\$ 0.5	Highland Pk & Pfluger Ln	\$ 0.9			Wilbarger Interceptor	\$ 3.7	0.95	\$ 0.0				X-Basin (Cottw. To Wilb.)	\$ 22.0	\$ 27.1	\$ 46.1	\$ 19.2	\$ 109.0	\$ 109.0
2036	9.00	\$ 0.5			12.00	\$ 84.6								Main Cottonwood	\$ 16.4	\$ 101.5	\$ 206.2	\$ 63.9	\$ 315.2	\$ 315.2
2045	9.00	\$ 0.5			12.00	\$ 0.6										\$ 1.1	\$ 2.8	\$ 0.6	\$ 318.0	\$ 318.0
2050	9.00	\$ 0.5			12.00	\$ 0.6										\$ 1.1	\$ 3.2	\$ 0.5	\$ 321.2	\$ 321.2
2057	9.00	\$ 0.5			18.00	\$ 42.9										\$ 43.4	\$ 163.9	\$ 18.2	\$ 485.1	\$ 485.1
2060	9.00	\$ 0.5			18.00	\$ 0.9										\$ 1.4	\$ 5.6	\$ 0.5	\$ 490.7	\$ 490.7
2074	9.00	\$ 0.5			22.00	\$ 29.1										\$ 29.6	\$ 184.7	\$ 9.0	\$ 675.4	\$ 675.4
2083	9.00	\$ 0.5			25.00	\$ 22.3										\$ 22.7	\$ 185.1	\$ 5.8	\$ 860.5	\$ 860.5
TOTAL		\$ 27.4		\$ 6.1		\$ 181.0		\$ 15.9		\$ 6.9			\$ -		\$ 38.4	\$ 275.6	\$ 860.5	\$ 158.1	\$ 860.5	\$ 860.5

TABLE A-11 ALTERNATIVE 2 (REVISED): DELAY CENTRAL WWTP INITIAL EXPANSION AND BUILD WILBARGER REGIONAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND WILBARGER)

DESCRIPTION: Once flow is near Central WWTP 5.85 MGD, delay initial expansion of Central WWTP by building a 6.0 MGD Wilbarger Regional WWTP
 Reroute Wilbarger area flow to the new Wilbarger WWTP
 Build trunks sewers in Cottonwood area to flow to Wilbarger WWTP
 Wilbarger Regional WWTP will serve Wilbarger and Cottonwood area flows
 Expand Central WWTP from 5.58 to 6.9 to 12.0 MGD
 Expand Wilbarger Regional WWTP from 6.0 to 12.0 to 18.0 to 22.0 to 25.0 MGD
 Central will serve Gilleland area, Wilbarger Regional WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	DOLLAR (\$M)	INFLATION	WORTH	TOTAL
(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)		(\$M)	(\$M)	(\$M)	(\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3
2017	5.85	\$ 0.3	West SH 130 to Central	5.2			Carmel, Sorento, NE Sorento	\$ 12.2	0.95	\$ 6.7						\$ 24.3	\$ 28.2	\$ 22.1	\$ 28.5	\$ 28.5
2019	5.85	\$ 0.3	Highland Pk & Pfluger Ln	\$ 0.9	6.00	\$ 42.3	Wilbarger Interceptor	\$ 3.7								\$ 47.2	\$ 58.0	\$ 41.2	\$ 86.5	\$ 86.5
2020	5.85	\$ 0.3			6.00	\$ 0.3										\$ 0.6	\$ 0.8	\$ 0.5	\$ 87.3	\$ 87.3
2030	5.85	\$ 0.3			6.00	\$ 0.3								X-Basin (Cottw. To Wilb.)	\$ 22.0	\$ 22.6	\$ 38.5	\$ 16.0	\$ 125.8	\$ 125.8
2038	5.85	\$ 0.3			12.00	\$ 42.0										\$ 42.3	\$ 91.2	\$ 25.6	\$ 217.0	\$ 217.0
2040	5.85	\$ 0.3			12.00	\$ 0.6										\$ 0.9	\$ 2.0	\$ 0.5	\$ 219.0	\$ 219.0
2050	5.85	\$ 0.3			12.00	\$ 0.6										\$ 0.9	\$ 2.7	\$ 0.4	\$ 221.7	\$ 221.7
2057	5.85	\$ 0.3			18.00	\$ 24.0								Main Cottonwood	\$ 16.4	\$ 40.7	\$ 153.9	\$ 17.1	\$ 375.6	\$ 375.6
2060	5.85	\$ 0.3			18.00	\$ 0.9										\$ 1.2	\$ 4.9	\$ 0.5	\$ 380.5	\$ 380.5
2064	6.90	\$ 7.7			18.00	\$ 0.9										\$ 8.6	\$ 40.0	\$ 3.2	\$ 420.5	\$ 420.5
2074	6.90	\$ 0.3			22.00	\$ 28.0										\$ 28.3	\$ 177.2	\$ 8.6	\$ 597.7	\$ 597.7
2080	9.00	\$ 15.2			22.00	\$ 1.1										\$ 16.3	\$ 121.3	\$ 4.4	\$ 719.0	\$ 719.0
2083	9.00	\$ 0.5			25.00	\$ 21.0										\$ 21.5	\$ 174.9	\$ 5.5	\$ 893.9	\$ 893.9
TOTAL		\$ 26.6		\$ 6.1		\$ 162.0		\$ 15.9		\$ 6.7			\$ -		\$ 38.4	\$ 255.6	\$ 893.9	\$ 146.0	\$ 893.9	\$ 893.9

TABLE A-12 ALTERNATIVE 3 (REVISED): BUILD WILBARGER REGIONAL WWTP AND ELIMINATE CENTRAL WWTP (NO COTTONWOOD WWTP)
 TOTAL NO. OF WWTP'S: 1 (WILBARGER)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Expand Central WWTP from 5.58 to 6.9 to 12.0 MGD
 Once flow is near Central WWTP 12.0 MGD capacity, build a 20.0 MGD Wilbarger Regional WWTP
 Build trunk sewer and route flow from Central WWTP to new Wilbarger WWTP
 Eliminate Central WWTP
 Build trunk sewer in Cottonwood area to flow to new Wilbarger WWTP
 Expand Wilbarger Regional WWTP from 20.0 to 30.0 to 36.5 MGD
 Wilbarger Regional WWTP will serve Gilleland, Wilbarger, and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	DOLLAR (\$M)	INFLATION	WORTH	TOTAL
	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)		(\$M)	(\$M)	(\$M)
2012	5.85	\$ 0.3															\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3
2017	5.85	\$ 0.3							0.95	\$ 6.7							\$ 6.9	\$ 8.0	\$ 6.3	\$ 8.3
2019	6.90	\$ 7.7							0.95	\$ 0.0							\$ 7.7	\$ 9.5	\$ 6.8	\$ 17.8
2020	6.90	\$ 0.3	West SH 130 to Central	\$ 5.2					0.95	\$ 0.0							\$ 5.6	\$ 7.1	\$ 4.8	\$ 24.9
2023	9.00	\$ 15.2	Highland Pk & Pfluger Ln	\$ 0.9					0.95	\$ 0.0							\$ 16.1	\$ 22.3	\$ 13.0	\$ 47.2
2030	9.00	\$ 0.5					Carmel, Sorento, NE Sorento	\$ 12.2	0.95	\$ 0.0				X-Basin (Cottw. To Wilb.)	\$ 22.0		\$ 34.7	\$ 59.1	\$ 24.6	\$ 106.3
2036	9.00	\$ 0.5	X- Basin Central to Wilb.	\$ 15.1	20.00	\$ 141.0	Wilbarger Interceptor	\$ 3.7									\$ 160.3	\$ 325.8	\$ 101.0	\$ 432.1
2045	0.00	\$ -			20.00	\$ 1.0											\$ 1.0	\$ 2.7	\$ 0.5	\$ 434.8
2050	0.00	\$ -			20.00	\$ 1.0								Main Cottonwood	\$ 16.4		\$ 17.4	\$ 53.5	\$ 8.4	\$ 488.3
2060	0.00	\$ -			20.00	\$ 1.0											\$ 1.0	\$ 4.1	\$ 0.4	\$ 492.4
2065	0.00	\$ -			30.00	\$ 71.5											\$ 71.5	\$ 342.5	\$ 25.8	\$ 834.9
2089	0.00	\$ -			32.00	\$ 15.6											\$ 15.6	\$ 151.9	\$ 3.5	\$ 986.8
TOTAL		\$ 24.7		\$ 21.2		\$ 231.1		\$ 15.9		\$ 6.8			\$ -		\$ 38.4		\$ 338.1	\$ 986.8	\$ 195.4	\$ 986.8

TABLE A-13 ALTERNATIVE 4 (REVISED): EXPAND CENTRAL WWTP, BUILD COTTONWOOD REGIONAL WWTP (NO WILBARGER WWTP)
 TOTAL NO. OF WWTP'S: 2 (CENTRAL AND COTTONWOOD)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Expand Central WWTP from 5.58 to 6.9 to 12.0 MGD
 Build New Sweden WWTP for 0.95 MGD Capacity to serve Cottonwood
 Build 2.0 MGD Cottonwood WWTP when flow is 90% at New Sweden
 Expand Cottonwood when flow at Central is near capacity
 Reroute Wilbarger area flow to Cottonwood WWTP
 Build trunks sewers in Cottonwood area to flow to new Cottonwood WWTP
 Expand Cottonwood WWTP from 8.0 to 18.0 to 25.0 MGD
 Central WWTP will serve Gilleland area, Cottonwood WWTP will serve Wilbarger and Cottonwood areas

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	CAPACITY	COST	QUANTITY	COST	DOLLAR (\$M)	INFLATION	WORTH	TOTAL
	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)	(MGD)	(\$M)	DESCRIPTION	(\$M)		(\$M)	(\$M)	(\$M)
2012	5.85	\$ 0.3															\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3
2019	6.90	\$ 7.7															\$ 7.7	\$ 9.5	\$ 6.8	\$ 9.5
2020	6.90	\$ 0.3							0.95	\$ 6.7							\$ 7.0	\$ 8.9	\$ 6.0	\$ 18.4
2023	9.00	\$ 15.2	West SH 130 to Central	\$ 5.2			Carmel, Sorento, NE Sorento	\$ 12.2	0.95	\$ 0.0							\$ 32.6	\$ 45.1	\$ 26.4	\$ 63.5
2030	9.00	\$ 0.5	Highland Pk & Pfluger Ln	\$ 0.9			Wilbarger Interceptor	\$ 3.7	1.95	\$ 0.1							\$ 5.1	\$ 8.8	\$ 3.7	\$ 72.3
2034	9.00	\$ 0.5					X-Basin (Wilb. To Cottw.)	\$ 17.8					8.00	\$ 56.4			\$ 74.7	\$ 143.0	\$ 48.9	\$ 215.3
2040	9.00	\$ 0.5											8.00	\$ 0.4			\$ 0.9	\$ 1.9	\$ 0.5	\$ 217.2
2045	9.00	\$ 0.5											12.00	\$ 28.6			\$ 29.1	\$ 77.1	\$ 15.4	\$ 294.3
2050	9.00	\$ 0.5											12.00	\$ 0.6			\$ 1.1	\$ 3.2	\$ 0.5	\$ 297.5
2057	9.00	\$ 0.5											18.00	\$ 42.9	Main Cottonwood	\$ 16.4	\$ 59.8	\$ 226.0	\$ 25.2	\$ 523.5
2060	9.00	\$ 0.5											18.00	\$ 0.9			\$ 1.4	\$ 5.6	\$ 0.5	\$ 529.1
2074	9.00	\$ 0.5											25.00	\$ 50.3			\$ 50.7	\$ 316.9	\$ 15.4	\$ 846.0
TOTAL		\$ 27.1		\$ 6.1		\$ -		\$ 33.7		\$ 6.8			\$ 180.1		\$ 16.4		\$ 270.1	\$ 846.3	\$ 149.5	\$ 846.0

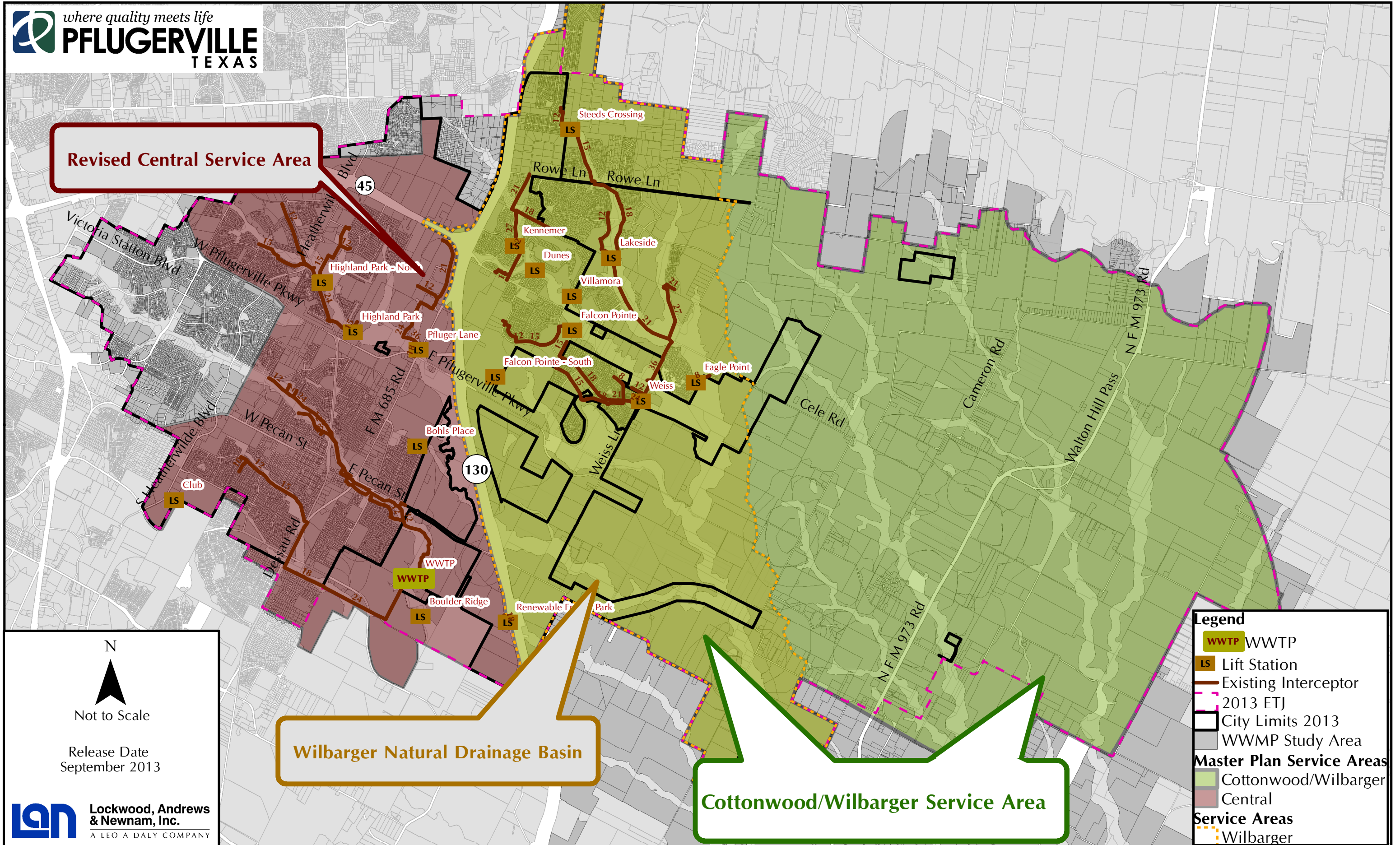
TABLE A-14 ALTERNATIVE 5 (REVISED): EXPAND CENTRAL WWTP, BUILD WILBARGER WWTP, BUILD COTTONWOOD REGIONAL WWTP
 TOTAL NO. OF WWTP'S: 3 (CENTRAL, WILBARGER, AND COTTONWOOD)

DESCRIPTION: Central WWTP serves Gilleland and Wilbarger areas
 Once flow is near Central WWTP 5.85 capacity, build a 4.0 MGD Wilbarger WWTP
 Route flow generated from Wilbarger area to new Wilbarger WWTP
 Build a 4.0 MGD Cottonwood WWTP
 Build trunk sewers in Cottonwood area to flow to new Cottonwood WWTP
 Central WWTP will serve Gilleland area, Wilbarger WWTP will serve Wilbarger area, and Cottonwood will serve Cottonwood area

Discount Rate: 5%

YEAR	GILLELAND				WILBARGER				NEW SWEDEN				COTTONWOOD				TOTAL COST			
	CENTRAL WWTP		GILLELAND TRUNK SEWERS		WILBARGER WWTP		WILBARGER TRUNK SEWERS		N SWED WWTP		N SWED TRUNK SEWERS		COTTONWD WWTP		COTTONWD TRUNK SEWERS		TODAY'S	3%/YR	NET PRESENT	RUNNING
	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	CAPACITY (MGD)	COST (\$M)	QUANTITY DESCRIPTION	COST (\$M)	DOLLAR (\$M)	INFLATION (\$M)	WORTH (\$M)	TOTAL (\$M)
2012	5.85	\$ 0.3														\$ 0.3	\$ 0.3	\$ 0.3	\$ 0.3	
2017	5.85	\$ 0.3					Carmel, Sorento, NE Sorento	\$ 12.2	0.95	\$ 6.7						\$ 19.2	\$ 22.2	\$ 17.4	\$ 22.5	
2019	5.85	\$ 0.3	West SH 130 to Central	\$ 5.2	4.00	\$ 32.1	Wilbarger Interceptor	\$ 3.7	0.95	\$ 0.0						\$ 41.3	\$ 50.8	\$ 36.1	\$ 73.3	
2020	5.85	\$ 0.3	Highland Pk & Pfluger Ln	\$ 0.9	4.00	\$ 0.2			0.95	\$ 0.0				Main Cottonwood	\$ 16.4	\$ 17.8	\$ 22.6	\$ 15.3	\$ 95.9	
2027	5.85	\$ 0.3			4.00	\$ 0.3						4.00	\$ 28.2			\$ 28.8	\$ 44.8	\$ 21.5	\$ 140.7	
2030	5.85	\$ 0.3			8.00	\$ 28.4						4.00	\$ 0.2			\$ 28.9	\$ 49.2	\$ 20.4	\$ 189.9	
2040	5.85	\$ 0.3			8.00	\$ 0.4						4.00	\$ 0.2			\$ 0.9	\$ 2.0	\$ 0.5	\$ 191.9	
2042	5.85	\$ 0.3			10.00	\$ 24.1						4.00	\$ 0.2			\$ 24.5	\$ 59.6	\$ 13.8	\$ 251.5	
2050	5.85	\$ 0.3			10.00	\$ 0.5						4.00	\$ 0.2			\$ 1.0	\$ 3.1	\$ 0.5	\$ 254.6	
2060	5.85	\$ 0.3			10.00	\$ 0.5						4.00	\$ 0.2			\$ 1.0	\$ 4.1	\$ 0.4	\$ 258.7	
2061	5.85	\$ 0.3			10.00	\$ 0.5						8.00	\$ 28.4			\$ 29.2	\$ 124.2	\$ 11.4	\$ 382.9	
2064	6.90	\$ 7.7			10.00	\$ 0.5						8.00	\$ 0.4			\$ 8.6	\$ 40.0	\$ 3.2	\$ 422.9	
2073	6.90	\$ 0.3			10.00	\$ 0.5						12.50	\$ 32.1			\$ 33.0	\$ 200.1	\$ 10.2	\$ 623.0	
2080	9.00	\$ 15.2			10.00	\$ 0.5						12.50	\$ 0.6			\$ 16.3	\$ 121.5	\$ 4.4	\$ 744.5	
2088	9.00	\$ 0.5			12.50	\$ 18.1						12.50	\$ 0.6			\$ 19.2	\$ 181.5	\$ 4.5	\$ 926.0	
TOTAL		\$ 26.9		\$ 6.1		\$ 106.6		\$ 15.9		\$ 6.8			\$ 91.4		\$ 16.4	\$ 270.0	\$ 926.0	\$ 159.9	\$ 926.0	

Exhibit A-14 - City of Pflugerville - Revised Ultimate Wastewater Service Areas



Revised Central Service Area

Wilbarger Natural Drainage Basin

Cottonwood/Wilbarger Service Area

- Legend**
- WWTP WWTP
 - LS Lift Station
 - Existing Interceptor
 - 2013 ETJ
 - City Limits 2013
 - WWMP Study Area
 - Master Plan Service Areas**
 - Cottonwood/Wilbarger
 - Central
 - Service Areas**
 - Wilbarger

N

 Not to Scale
 Release Date
 September 2013

Lockwood, Andrews & Newnam, Inc.
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Lockwood, Andrews & Newnam Inc. makes no representations or warranties regarding accuracy or completeness of the information depicted on this map or the data from which it was produced. This map is NOT suitable for survey purposes and does not purport to depict or establish boundaries between land owners or locations of utility infrastructure where survey data is available and field locations have been established.

Appendix B

Future Wastewater Treatment Plant Requirements

Future Wastewater Regulations and Permit Limits

The report is based on current discharge permit requirements for wastewater into Gilleland Creek. The State of Texas is implementing nutrient requirements. While future requirements are impossible to know with absolute certainty, there are trends and policies in place from which reasonable assumptions can be made.

Nutrient Removal

The current discharge permit for the Central Wastewater Treatment Plant (Upper Gilleland Creek WWTP) has limits on phosphorous and ammonia, but no total nitrogen limits. The conventional wisdom is that phosphorous limits will be the nutrient of concern in inland plants, and total nitrogen will be the nutrient of concern for wastewater plants along coastal areas.

The Central WWTP currently achieves its phosphorous removal goals by adding chemicals (alum). Chemical addition can be reduced, and perhaps eliminated, by plant modifications to add an anaerobic basin, which if properly managed would allow conditions for phosphorus accumulating organisms (PAOs) to compete in the activated sludge environment. Phosphorous removal by biological methods requires increased operational diligence, and sludge management is crucial as the phosphorous that is removed biologically is disposed of with the waste sludge. The current permit limit of 1.0 mg/L phosphorus will probably be decreased at some point in the future. Limits less than 0.5 mg/L are difficult to achieve reliably by biological means alone, and supplemental chemical addition is generally required.

While total nitrogen limits are not specifically required by the current permit, the plant's design (the Carrousel® Process) achieves some removal by the nature of its design. The conversion of ammonia to nitrates, and the subsequent biological conversion of nitrates to nitrogen gas is the process for nitrogen removal from the incoming wastewater. While nitrogen limits are generally not permitted for inland plants, the recovery of oxygen by the consumption of nitrates allows more energy efficient operation. Other denitrification processes exist which can accomplish the same goals and can be considered when evaluating future plant design options. Water quality modeling ultimately decides if nutrient limits will be required for individual plants, and there have been instances where nitrate is a constituent of concern even on inland plants.

The central plant currently has reporting requirements for total dissolved solids, chlorides, and sulfates. Monitoring requirements are generally placed on a plant as a form of notification that the constituents are of concern, and that limits may be placed on these constituents in the future. Treating the total wastewater stream for these particular constituents (total dissolved solids, chlorides, and sulfates) is generally not economically feasible. These constituents are best treated by examining the potable water sources, and looking for options for blending, or selective use of reverse osmosis treatment. It is generally more economical to pick a small source stream and treat it to very low level so that when combined into the total flow the desired concentration is achieved. It is important to understand why the permit writer has placed these reporting requirements on the permit, and to be aware of how changes in the potable water system may impact the wastewater quality.

Appendix C

CIP Project Cut Sheets



City of Pflugerville, Texas
Capital Improvements Program

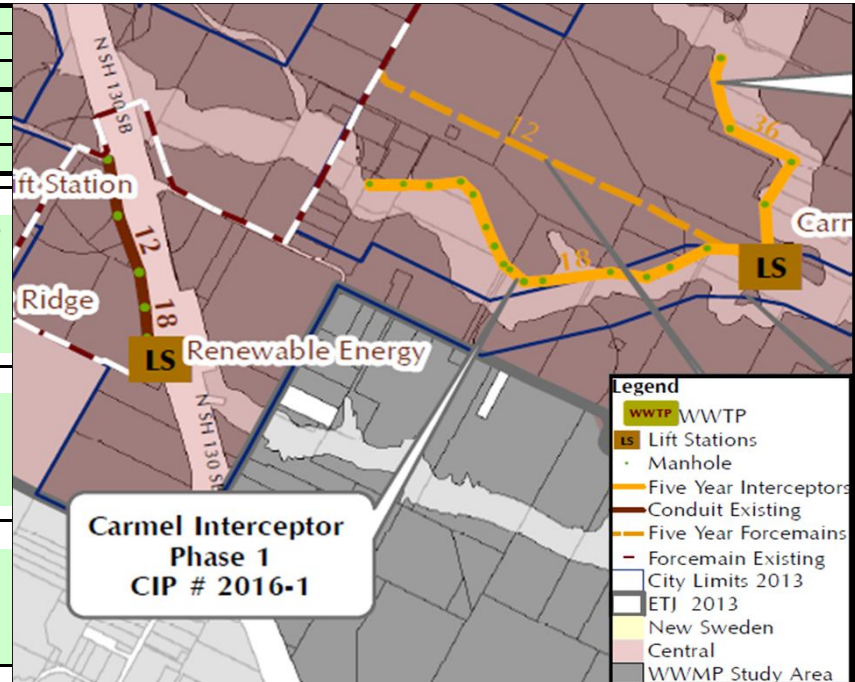
Carmel Interceptor Phase 1

Budget:	\$2,079,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	City Limits
Project Number:	2016-1

Description:
 8,660 LF of 18-inch gravity interceptor to convey wastewater from the Carmel subdivision to the Sorento/Carmel LS

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements			\$ 290,000								\$ 290,000
Design			\$ 199,000								\$ 199,000
Construction (+/-10%)				\$ 1,590,000							\$ 1,590,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ 489,000	\$ 1,590,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,079,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	(\$489,000)	(\$1,590,000)	\$0	\$0	\$0	\$0	\$0	\$0	(\$2,079,000)
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City of Pflugerville, Texas
Capital Improvements Program

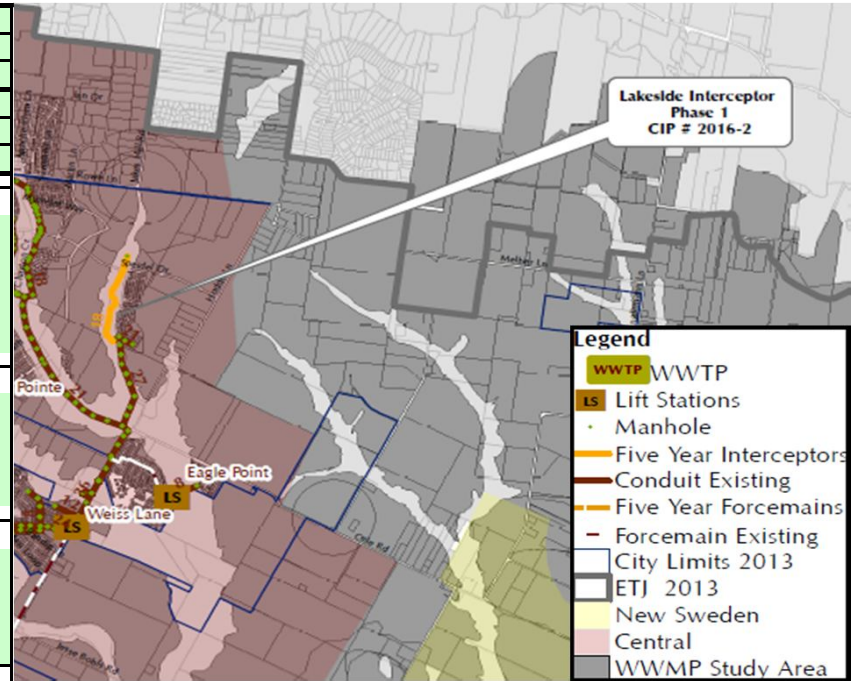
Lakeside Interceptor Phase 1

Budget:	\$995,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	ETJ
Project Number:	2016-2

Description:
 3,300 LF of 18-inch gravity interceptor to convey wastewater from the Lakeside WCID to the Weiss Lane LS

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements			\$ 111,000								\$ 111,000
Design			\$ 99,000								\$ 99,000
Construction (+/-10%)				\$ 785,000							\$ 785,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ 210,000	\$ 785,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 995,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	(\$210,000)	(\$785,000)	\$0	\$0	\$0	\$0	\$0	\$0	(\$995,000)
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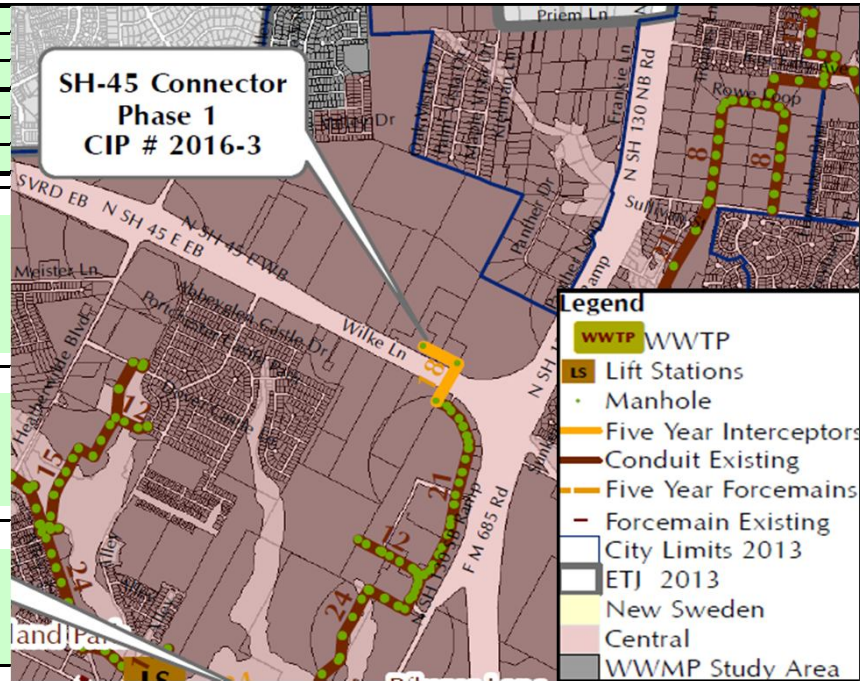
SH-45 Connector Interceptor Phase 1

Budget:	\$901,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	City Limits
Project Number:	2016-3

Description:
 1,540 LF of 18-inch gravity interceptor to convey wastewater from the parcels just North of SH-45 to the Pfluger Lane lift station

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements			\$ 51,000								\$ 51,000
Design			\$ 95,000								\$ 95,000
Construction (+/-10%)				\$ 755,000							\$ 755,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ 146,000	\$ 755,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 901,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	(\$146,000)	(\$755,000)	\$0	\$0	\$0	\$0	\$0	\$0	(\$901,000)
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City of Pflugerville, Texas
Capital Improvements Program

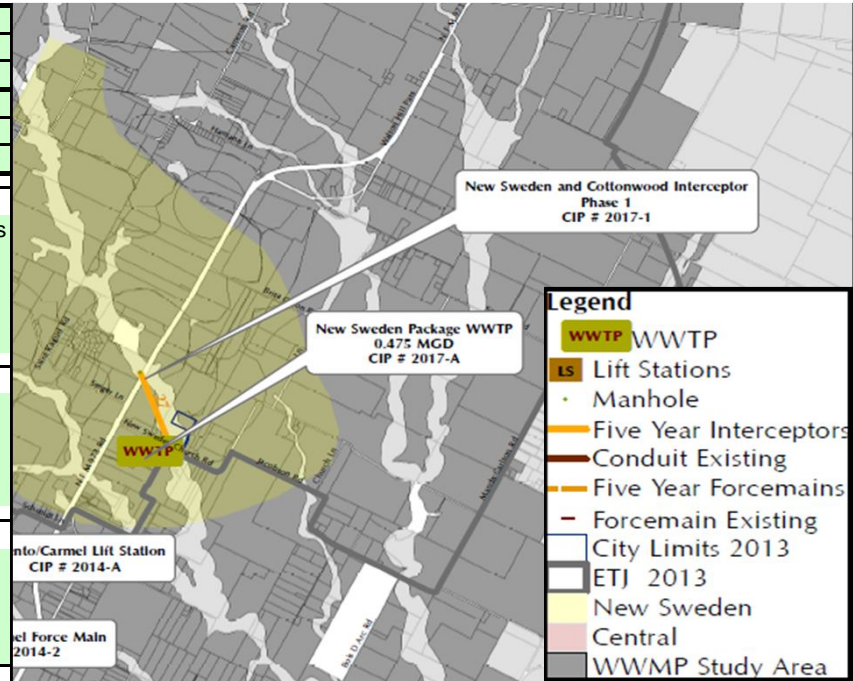
New Sweden/Cottonwood Interceptor Phase 1

Budget:	\$896,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	ETJ
Project Number:	2017-1

Description:
 2,740 LF of 27-inch gravity interceptor to convey wastewater from the New Sweden subdivisions to the New Sweden packaged plant

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements				\$ 104,000							\$ 104,000
Design				\$ 88,000							\$ 88,000
Construction (+/-10%)					\$ 704,000						\$ 704,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ 192,000	\$ 704,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 896,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	(\$192,000)	(\$704,000)	\$0	\$0	\$0	\$0	\$0	(\$896,000)
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City of Pflugerville, Texas
Capital Improvements Program

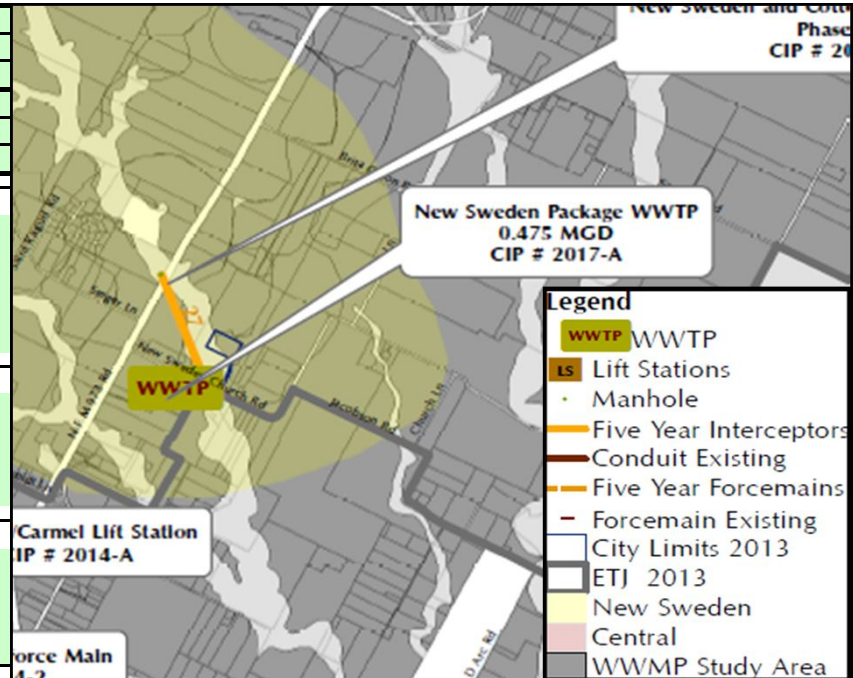
New Sweden Package WWTP 0.475 MGD

Budget:	\$3,680,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Capacity Expansion
Location:	ETJ
Project Number:	2017-A

Description:
 Construction complete of a 0.475 MGD packaged plant

Project Schedule:

Notes:



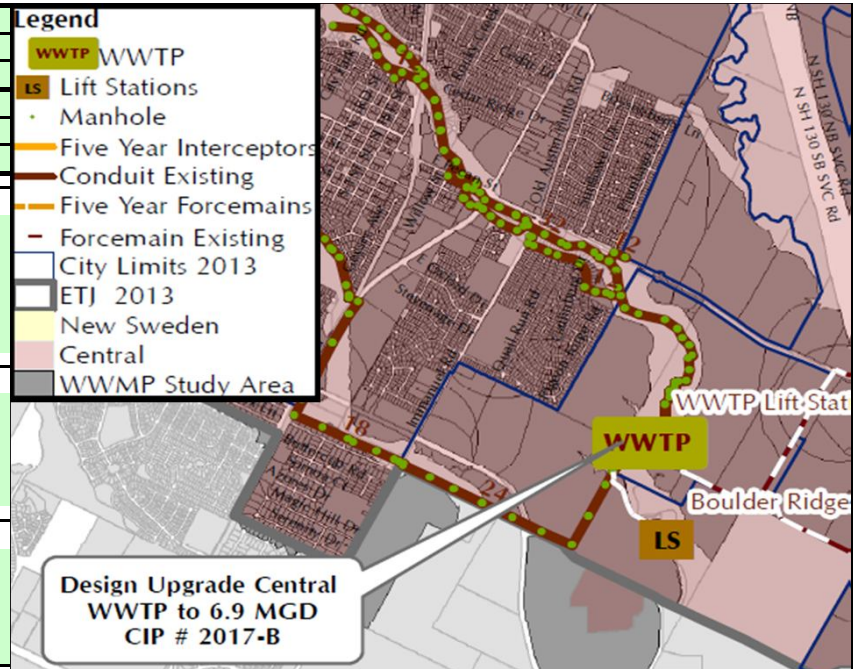
Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design				\$ 432,000							\$ 432,000
Construction (+/-10%)					\$ 3,248,000						\$ 3,248,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ 432,000	\$ 3,248,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,680,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	(\$432,000)	(\$3,248,000)	\$0	\$0	\$0	\$0	\$0	(\$3,680,000)
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Design of Central WWTP Capacity Upgrades 6.9 MGD

Budget:	\$3,122,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Capacity Expansion
Location:	City Limits
Project Number:	2017-B
Description:	
Design Construction plans and specifications for the 6.90 MGD expansion to the Central WWTP	
Project Schedule:	
Notes:	



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design				\$3,122,000							\$ 3,122,000
Construction (+/-10%)											\$ -
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ 3,122,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,122,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	(\$3,122,000)	\$0	\$0	\$0	\$0	\$0	\$0	(\$3,122,000)
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City of Pflugerville, Texas Capital Improvements Program

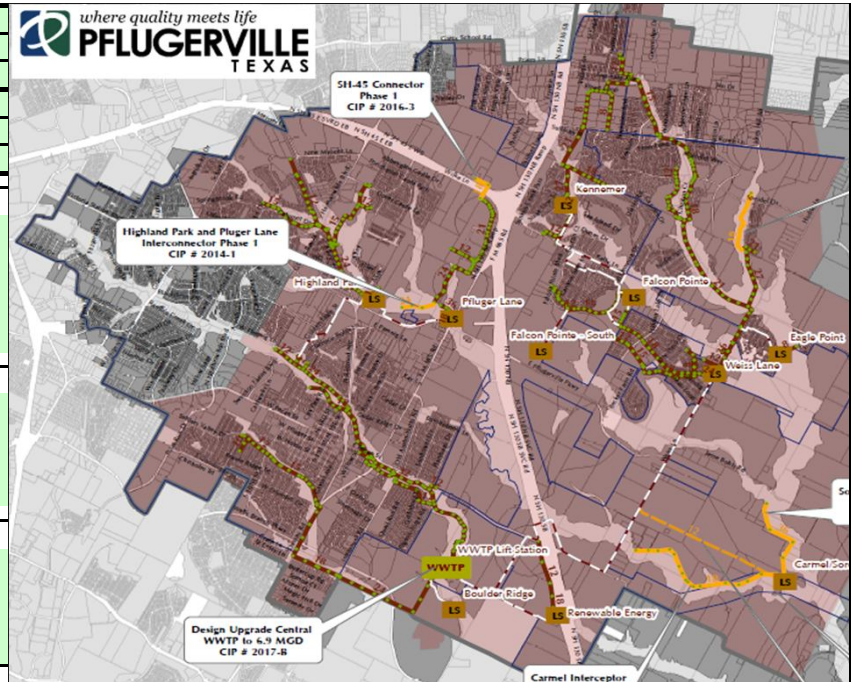
Update Master Plan and CIP

Budget:	\$374,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	
Project Number:	2017-C

Description:
Update the master plan based on the latest developments and growth patterns

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design					\$374,000						\$ 374,000
Construction (+/-10%)											\$ -
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ 374,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 374,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	(\$374,000)	\$0	\$0	\$0	\$0	\$0	(\$374,000)
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City of Pflugerville, Texas
 Capital Improvements Program

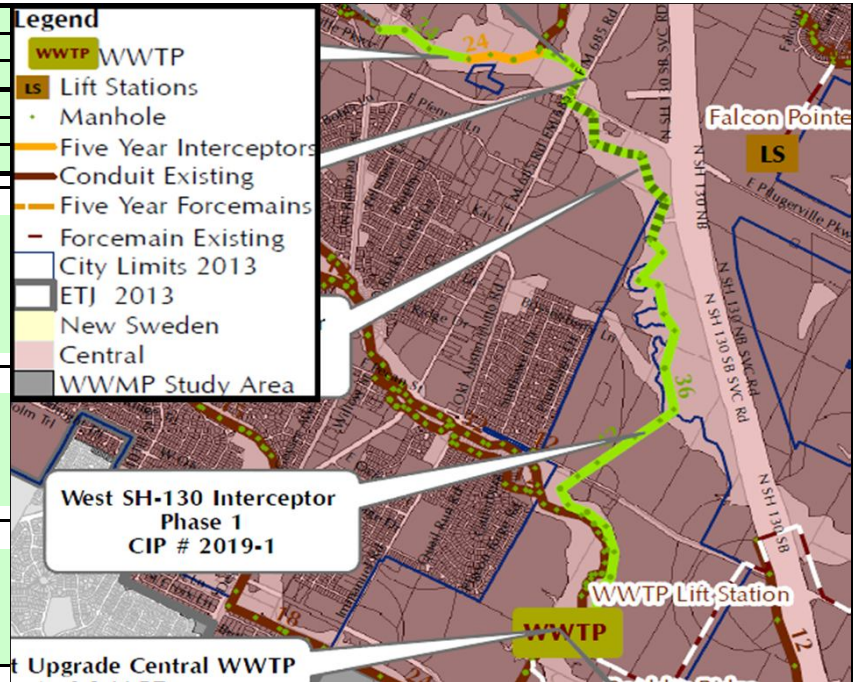
West SH-130 Interceptor Phase 1

Budget:	\$6,059,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2019-1

Description:
 12,440 LF of 36-42-inch gravity interceptor to convey wastewater from developments along SH-130 and will ultimately allow for decommissioning of Pfluger Lane and Highland Park lift station

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements						\$ 286,000	\$ 286,000				\$ 572,000
Design						\$ 610,000					\$ 610,000
Construction (+/-10%)							\$ 4,877,000				\$ 4,877,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 896,000	\$ 5,163,000	\$ -	\$ -	\$ -	\$ 6,059,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	(\$896,000)	(\$5,163,000)	\$0	\$0	\$0	(\$6,059,000)
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City of Pflugerville, Texas
 Capital Improvements Program

West SH-130 Interceptor Phase 2

Budget:	\$1,889,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2019-2

Description:
 5,220 LF of 36-inch gravity interceptor to convey wastewater from the Stone Hill and Highland Park areas. This interceptor will ultimately allow for decommissioning of Pfluger Lane and Highland Park lift station

Project Schedule:

Notes:

Legend

- WWTP WWTP
- LS Lift Stations
- Manhole
- Ten Year Phase 2
- Five Year Interceptors
- Ten Year Interceptors
- Conduit Existing
- Five Year Forcemains
- Forcemain Existing
- City Limits
- ETJ
- Service Area 5-10 Year
- New Sweden
- Central
- WWMP Study Area



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements						\$ 227,000					\$ 227,000
Design						\$ 185,000					\$ 185,000
Construction (+/-10%)							\$ 1,477,000				\$ 1,477,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 412,000	\$ 1,477,000	\$ -	\$ -	\$ -	\$ 1,889,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	(\$412,000)	(\$1,477,000)	\$0	\$0	\$0	(\$1,889,000)
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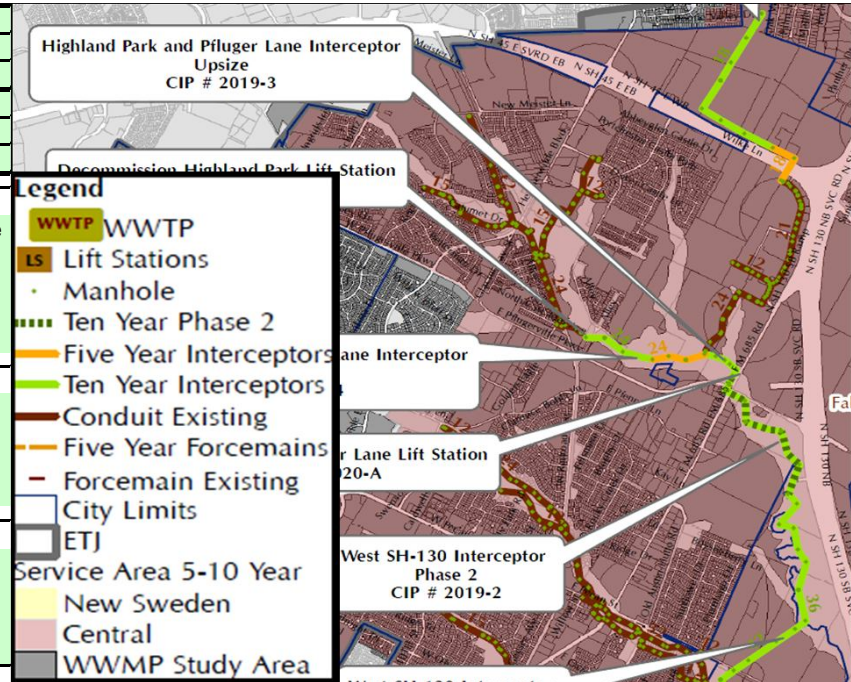
Highland Park and Pfluger Lane Interceptor Upsize

Budget:	\$422,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2019-3

Description:
 1,360 LF of 36-inch capacity increase to existing gravity interceptor to convey wastewater to the SH-130 interceptor. This interceptor will increase capacity of the existing interceptor and allow for the decommissioning of the Highland Park lift station

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements						\$ 58,000					\$ 58,000
Design						\$ 41,000					\$ 41,000
Construction (+/-10%)							\$ 323,000				\$ 323,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 99,000	\$ 323,000	\$ -	\$ -	\$ -	\$ 422,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	(\$99,000)	(\$323,000)	\$0	\$0	\$0	(\$422,000)
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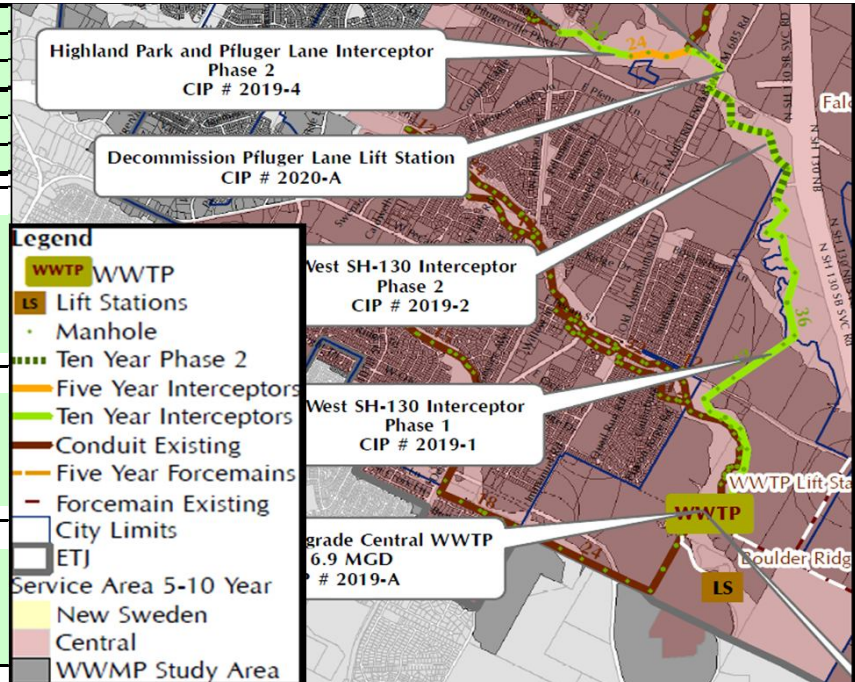
Highland Park and Pfluger Lane Interceptor Phase 2

Budget:	\$704,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2019-4

Description:
 2,180 LF of 24-inch gravity interceptor to convey wastewater from Highland Park lift station and lead toward the decommissioning of the Highland Park lift station

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements						\$ 84,000					\$ 84,000
Design						\$ 69,000					\$ 69,000
Construction (+/-10%)							\$ 551,000				\$ 551,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 153,000	\$ 551,000	\$ -	\$ -	\$ -	\$ 704,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

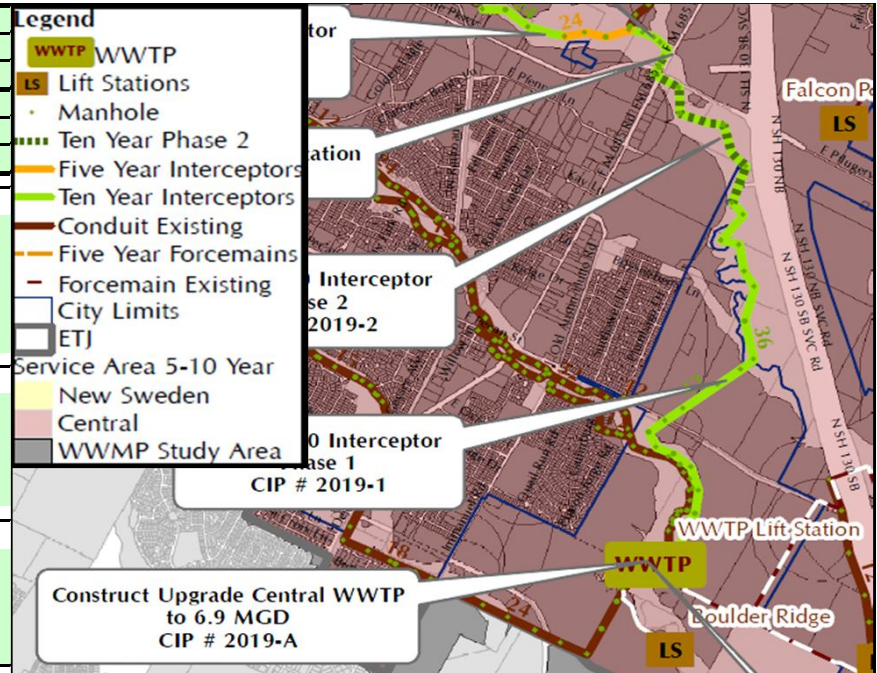
Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	(\$153,000)	(\$551,000)	\$0	\$0	\$0	(\$704,000)
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City of Pflugerville, Texas Capital Improvements Program

Construction of Central WWTP Capacity Upgrades 6.9 MGD

Budget:	\$21,516,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2019-A
Description:	
Increase capacity at Central WWTP to 6.9 MGD	
Project Schedule:	
Notes:	



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design											\$ -
Construction (+/-10%)							\$21,516,000				\$ 21,516,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$21,516,000	\$ -	\$ -	\$ -	\$ 21,516,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	#####	\$0	\$0	\$0	(\$21,516,000)
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City of Pflugerville, Texas
Capital Improvements Program

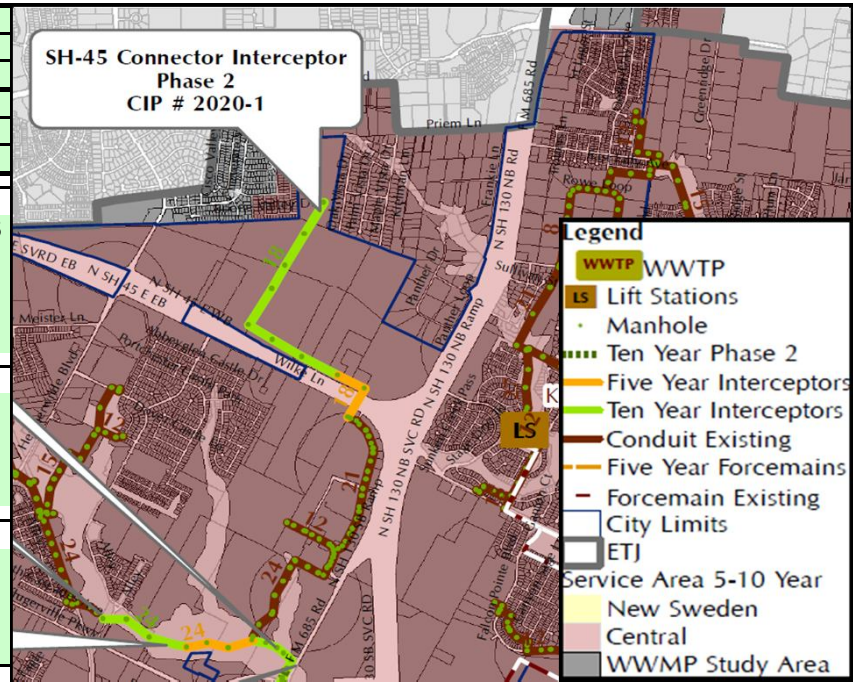
SH-45 Connector Interceptor Phase 2

Budget:	\$1,644,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	City Limits
Project Number:	2020-1

Description:
6,030 LF of 18-inch gravity interceptor to convey wastewater from developments north of SH-45

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements							\$ 224,000				\$ 224,000
Design							\$ 158,000				\$ 158,000
Construction (+/-10%)								\$ 1,262,000			\$ 1,262,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 382,000	\$ 1,262,000	\$ -	\$ -	\$ 1,644,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	(\$382,000)	(\$1,262,000)	\$0	\$0	(\$1,644,000)
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City of Pflugerville, Texas Capital Improvements Program

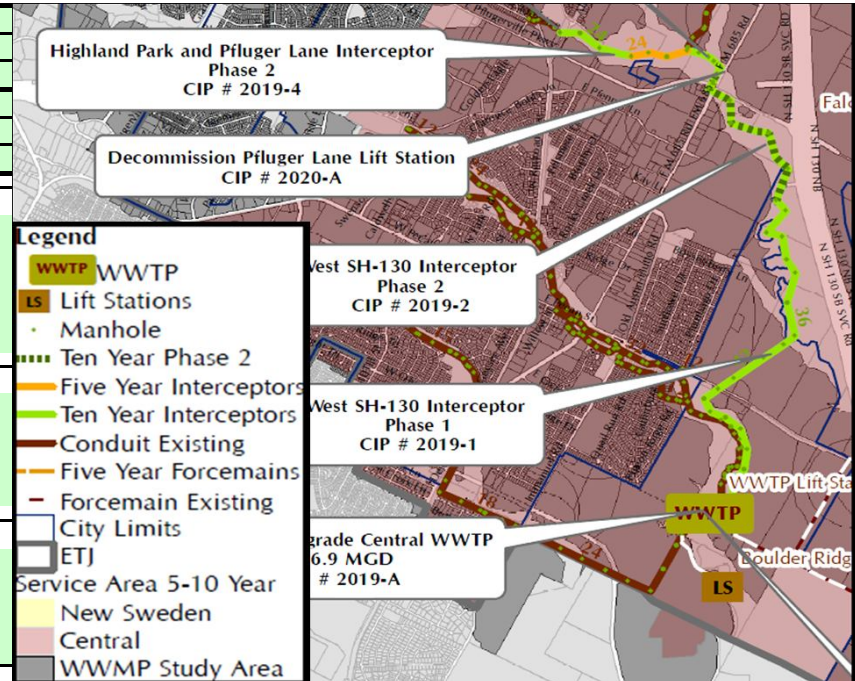
Decommission Pfluger Lane Lift Station

Budget:	\$180,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2020-A

Description:
Decommission the Pfluger Lane lift station after completion of the SH-130 interceptors

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design								\$ 19,000			\$ 19,000
Construction (+/-10%)								\$ 161,000			\$ 161,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 180,000	\$ -	\$ -	\$ 180,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$180,000)	\$0	\$0	(\$180,000)
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City of Pflugerville, Texas
 Capital Improvements Program

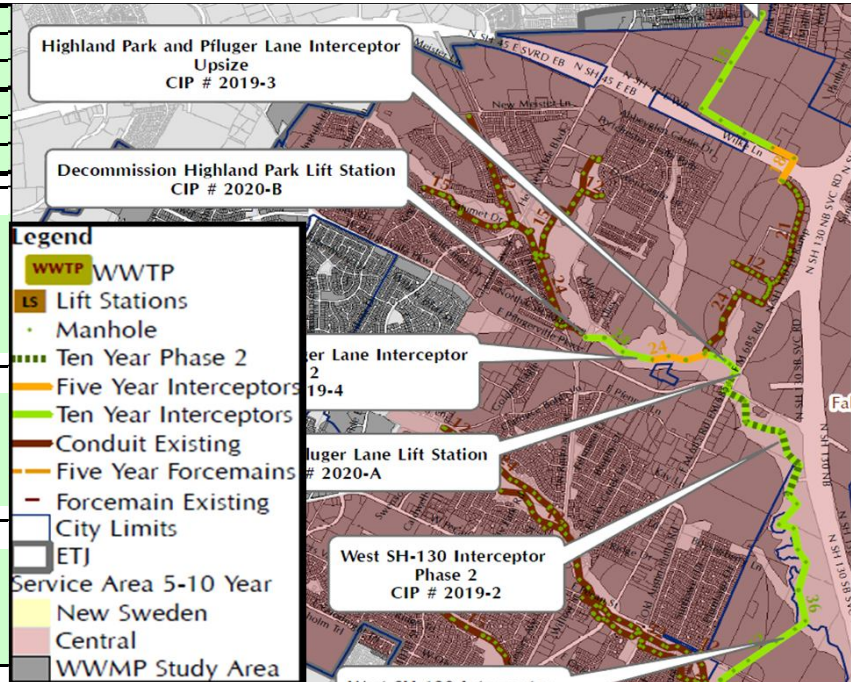
Decommission Highland Park Lift Station

Budget:	\$180,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Lift Station Removal
Location:	City Limits
Project Number:	2020-B

Description:
 Decommission the Highland Park lift station after completion of the SH-130 interceptor and the Highland Park interceptor

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design								\$ 19,000			\$ 19,000
Construction (+/-10%)								\$ 161,000			\$ 161,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 180,000	\$ -	\$ -	\$ 180,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$180,000)	\$0	\$0	(\$180,000)
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City of Pflugerville, Texas
 Capital Improvements Program

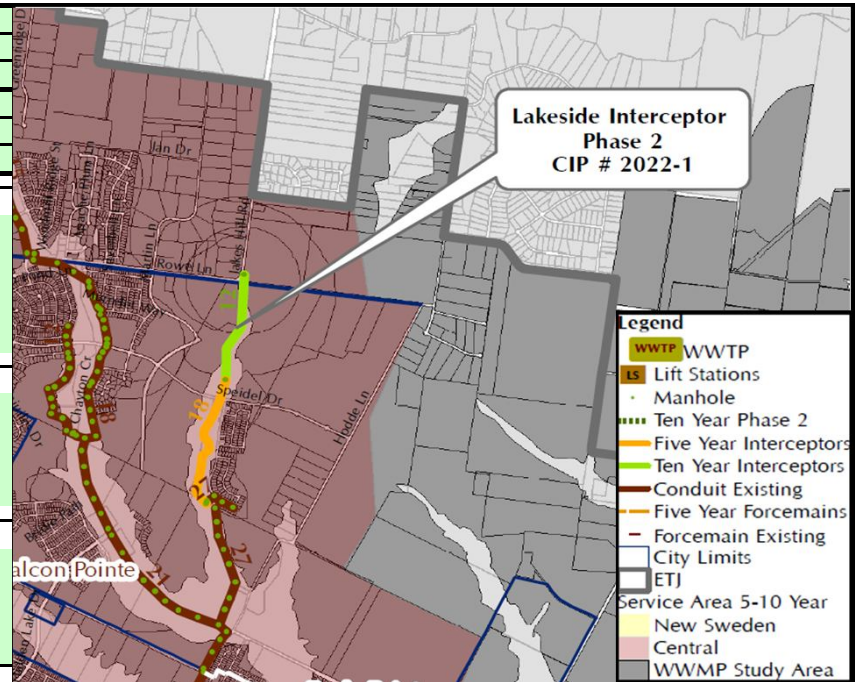
Lakeside Interceptor Phase 2

Budget:	\$599,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	City Limits
Project Number:	2022-1

Description:
 2,690 LF of 12-inch gravity interceptor to convey wastewater from the Lakeside WCID to the Weiss Lane lift station

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements									\$ 98,000		\$ 98,000
Design									\$ 56,000		\$ 56,000
Construction (+/-10%)										\$ 445,000	\$ 445,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 154,000	\$ 445,000	\$ 599,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$154,000)	(\$445,000)	(\$599,000)
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City of Pflugerville, Texas Capital Improvements Program

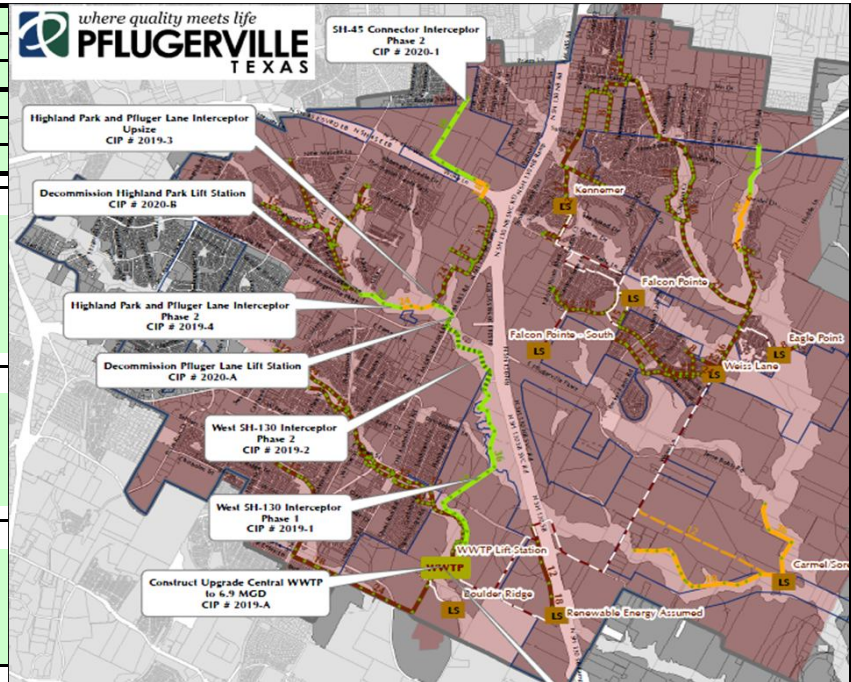
Update Master Plan and CIP

Budget:	\$423,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Development
Location:	
Project Number:	2022-A

Description:
Update the master plan based on the latest developments and growth patterns

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design										\$423,000	\$ 423,000
Construction (+/-10%)											\$ -
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 423,000	\$ 423,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$423,000)	(\$423,000)
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City of Pflugerville, Texas Capital Improvements Program

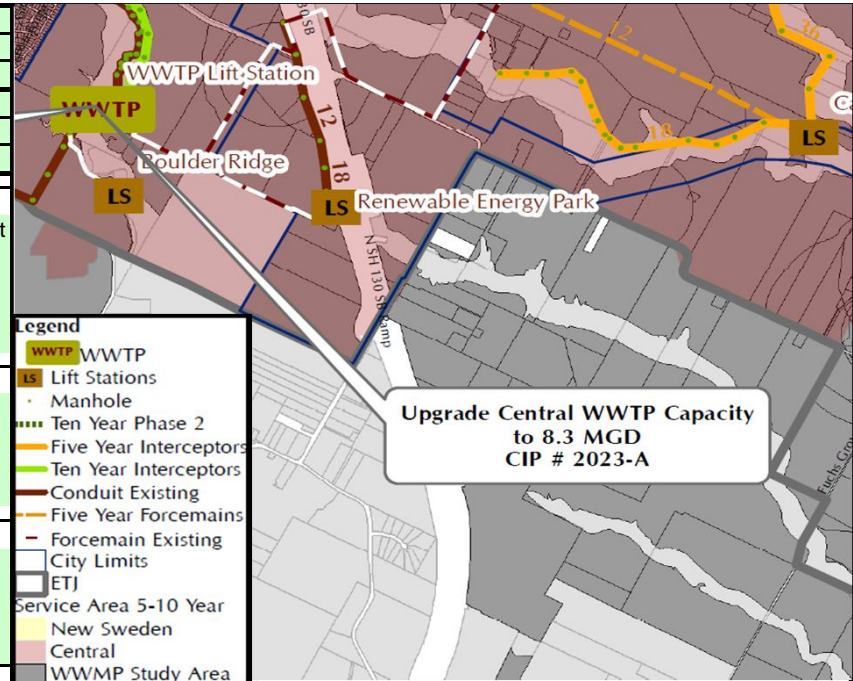
Central WWTP Capacity Upgrade 8.3 MGD

Budget:	\$3,654,000
Funding Source(s):	
Department:	Wastewater
Project Driver:	Capacity Expansion
Location:	City Limits
Project Number:	2023-A

Description:
Phase 1 of the expansion of the Central WWTP to 9.0 MG. Construction of new Carrousel® unit to 8.3 MGD

Project Schedule:

Notes:



Project Cost(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
ROW/Easements											\$ -
Design										\$ 369,000	\$ 369,000
Construction (+/-10%)										\$ 3,196,000	\$ 3,196,000
Other											\$ -
Total Project Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,565,000	\$ 3,565,000

Funding Source(s)	YR 13/14	YR 14/15	YR 15/16	YR 16/17	YR 17/18	YR 18/19	YR 19/20	YR 20/21	YR 21/22	YR 22/23	TOTAL
Impact Fees											\$ -
Revenue Bonds											\$ -
CO Bonds											\$ -
GO Bonds											\$ -
Fund Balance											\$ -
Interest											\$ -
Total Project Funding	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Surplus / (Deficit)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	(\$3,565,000)	(\$3,565,000)
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