Capacity Assessment
Remediation Measures Plan

Sanitary Sewer Evaluation Survey and Wastewater Master Plan

City of Shreveport, Louisiana

(RFS No. 10-704)

Prepared for

City of Shreveport, Louisiana

Prepared by

BURK-KLEINPETER, INC.

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Building a world of difference.

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SUBMITTAL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Autumn Permenter, P.E.
Assistant City Engineer

7/8/2016
Date

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1. Consent Decree Sections F.45, 46, and 47

1.0 Introduction

The City of Shreveport, Louisiana (City) entered into a Consent Decree with the United States Environmental Protection Agency (USEPA) to develop remedial actions needed to address capacity limitations and sanitary sewer overflows (SSOs) in the City's wastewater collection system and process and hydraulic limitations at the two wastewater treatment plants. To comply with the Consent Decree requirements, the City has invested in a Sanitary Sewer Evaluation and Wastewater Master Plan (Project). The capacity needs in the collection system and wastewater treatment plants were identified and presented in the *Capacity Assessment Report* dated March 9, 2016. This report summarizes the findings of the Project as required by Subsection F.45, 46, and 47 of the Consent Decree.

2.0 Wastewater Collection System

As part of the Project, a calibrated hydraulic model was used to perform capacity assessments and identify the capacity improvements needed to convey peak wet weather flows and eliminate Sanitary Sewer Overflows (SSO) for a 20-year planning horizon. Two comprehensive flow and rainfall monitoring programs were conducted in the spring of 2011 and 2012 to collect sufficient data to characterize the flows throughout the City's wastewater collection system. Detailed flow monitoring data, activities, and descriptions of the work performed are available in the two-volume *Flow and Rainfall Monitoring Report* (CES Flow Report) provided to the City in June 2012.

2.1 COLLECTION SYSTEM DESCRIPTION

The City's wastewater collection system is composed of two major sewer basins that drain to the North Regional and Lucas Wastewater Treatment Plants (WWTPs) and is further divided into 26 sewersheds. The City's wastewater collection system consists of about 983 miles of sanitary sewer gravity pipe, 90 miles of sanitary sewer force main, and 129 wastewater lift stations.

2.2 HYDRAULIC MODEL OVERVIEW

The hydraulic model was constructed using Innovyze's InfoWorks Collection System software. The hydraulic model includes all major gravity sewer lines (pipe diameters twelve inches and larger) as well as twenty percent of the smaller diameter piping as necessary to provide connectivity between selected lift stations and to accurately represent flows in each sewershed. In addition, the hydraulic model includes a total of 53 lift stations and force mains including all major lift stations and force mains as well as minor lift stations and force mains needed to connect the critical gravity system. Data was developed for the modeled system from multiple sources including the City's sewer geodatabase, record drawings, field surveys, previous model data, LIDAR, lift station records, and previous study documents.

The existing modeled collection system was evaluated for both dry weather and wet weather flow conditions. These results were used to identify existing capacity restrictions and determine appropriate basin-specific Rainfall Derived Infiltration and Inflow (RDII) reduction goals for the City. The model was used to evaluate the collection system under dry weather and wet weather projected flows for year 2035. The year 2015 wet weather flows include the basin-specific reduced

RDII rates to reflect the peak flows that would be expected after rehabilitation efforts are complete. The model-projected future peak flows with RDII reduction were used to identify future capacity restrictions. An in depth discussion on the model is included in the *Hydraulic Model Report* dated March 30, 2015.

2.3 CAPACITY ASSESSMENT RESULTS

The model results indicate that the collection system is adequate for dry weather conditions through the 20-year planning period, however it does not have sufficient capacity to convey peak wet weather flows primarily due to excessive RDII. Basin-specific RDII reduction goals were developed in coordination with the City and were incorporated into future model scenarios. Achieving and maintaining RDII reduction goals through the City's ongoing maintenance activities will be necessary to ensure adequate collection system capacity. While the RDII reduction is projected to provide a significant reduction of peak flow, over one third of the modeled gravity system is predicted to have capacity limitations under the year 2035 peak flow conditions under the 2-year design storm. This model indicates that approximately 333,140 linear feet of gravity sewer and approximately 198,067 linear feet of force main may need to be replaced with larger diameter pipe because of capacity restrictions. A breakdown of information on size, linear feet, and number of gravity sewer lines is included in Tables 2-1 and 2-2.

Table 2-1: Breakdown of Required Gravity Sewer Line Diameter Increases (Linear Feet)

		Existing Diameter (Inches)														Totals
		6	8	10	12	15	16	18	21	24	27	30	36	42	48	
Needed Diameter (Inches)	8	2,773														2,773
	10	326	28,219													28,545
	12		10,055	21,220												31,275
	15	371	6,871	15,089	49,520											71,851
	18	320	3,058	2,921	23,946	16,940	1,672									48,857
	21		57	1,066	19,439	19,173	1,083	3,566								44,384
	24			395	7,819	12,281		3,545	1,924							25,964
	30				1,423	4,065		6,524	11,674	6,596	6,997					37,279
	36								578	6,596		10,941				18,115
	42											4,167	7,976			12,143
	48												859			859
	54									2,159			647	3,780	4,509	11,095
Totals		3,790	48,260	40,691	102,147	52,459	2,755	13,635	14,176	15,351	6,997	15,108	9,482	3,780	4,509	333,140

Table 2-2: Breakdown of Required Force Main Diameter Increases (Linear Feet)

		Existing Diameter (Inches)																Total
		4	6	8	10	12	14	16	18	20	24	30	36	42	48	54	60	
Needed Diameter (Inches)	6	8,524																8,524
	8	1,025	5,724															6,749
	10		2,574	9,809														12,383
	12			1,229	4,570													5,799
	16				1,567	2,450	8,434											12,450
	20					43	10,532	145										10,720
	24							4,755	6,582									11,337
	30								4,969		11,887							16,856
	36									7,669		39						7,708
	48											5,698						5,698
	54									1,850	500		8,8435		53			90,838
	60														7,825			7,825
	72															102		102
	84													145			847	992
	96														85			85
Total		9,549	8,298	11,038	6,137	2,493	18,966	4,900	11,551	9,519	12,387	5,737	88,435	145	7,963	102	847	198,067

2.4 REMEDIATION MEASURES PLAN

2.4.1 Project Description

The capacity improvements to lift stations and conveyance pipelines identified in the *Capacity Assessment Report* are described in this section. The descriptions below provide general information about the type of work within the geographical basin areas and phases. The geographical area and phases correspond to the Consent Decree identified Sanitary Sewer Assessment (SSA) phases. The project details may change with further site investigations, flow monitoring, and/or design optimization. As additional data becomes available, the pump capacity, pipe size, and lengths indicated in the project descriptions may change.

Phase 1 - Cedar Grove Basin

In the Phase 1 basin areas, which coincides with the SSA Phase I geographical basin, capacity upgrades are anticipated at one lift station and approximately 28,280 linear feet (LF) of force main. These pojectss are generally discussed below.

- **Cedar Grove Force Mains:**
  - FM-CEDAR_GROVE SEG 1: This project will include installation of approximately 9,425 LF of force main to carry up to 63 million gallons per day (mgd) of wastewater from Cedar Grove Lift Station. This work is estimated to cost $8,316,000.
  - FM-CEDAR_GROVE SEG 2: This project will include installation of approximately 18,855 LF force main to carry up to 63 mgd of wastewater to Lucas WWTP. This work is estimated to cost $16,634,000.
- **Cedar Grove Lift Station:**
  - CEDAR GROVE LS: This project will increase the capacity of existing Cedar Grove lift station to approximately 63 mgd, which is the hydraulic model anticipated peak flow. The lift station is located at 505 West 80th Street in City Quarter Section FF-52, approximately ¾ miles north of the Linwood Avenue and LA 3132 (Inner Loop Expressway) interchange. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $16,680,000.

Note that all gravity main capacity improvements within Cedar Grove basin are identified in *Remediation Measures Plan (RMP) – Phase I Report*, September 2015.

Phase 2 – Southside, Queensboro, North Highlands, Westside, and Choctaw Bayou Basin

In the Phase 2 basin areas, which coincides with the SSA Phase 2 geographical area, capacity upgrades are anticipated at six lift stations, approximately 18,664 LF of force mains, and approximately 37,259 LF of gravity mains. These projects are generally discussed below by basin.

- **Queensboro Basin Gravity Mains:**
  - GR-QUEENSBORO-01: This project will include installation of approximately 450 LF of 12-inch diameter pipe. This work is estimated to cost $110,000.
  - GR-QUEENSBORO-02: This project will include installation of approximately 353 LF of 24-inch diameter pipe. This work is estimated to cost $157,000.
  - GR-QUEENSBORO-03: This project will include installation of approximately 880 LF of 8-inch diameter pipe. This work is estimated to cost $200,000.
  - GR-QUEENSBORO-05: This project will include installation of approximately 145 LF of 18 to 24-inch diameter pipe. This work is estimated to cost $68,000.
  - GR-QUEENSBORO-06: This project will include installation of approximately 4,927 LF of 8 to 15-inch diameter pipe. This work is estimated to cost $1,170,000.
  - GR-QUEENSBORO-07: This project will include installation of approximately 2,001LF of 18-inch diameter pipe. This work is estimated to cost $650,000.
  - GR-QUEENSBORO-08: This project will include installation of approximately 1,924 LF of 24-inch diameter pipe. This work is estimated to cost $1,011,000.
  - GR-QUEENSBORO-09: This project will include installation of approximately 1,398 LF of 12-inch diameter pipe. This work is estimated to cost $341,000.
- **Queensboro Basin Force Mains:**
  - FM-DARIEN: This project will include installation of approximately 4,726 LF of force main to carry up to 13 mgd of wastewater. This work is estimated to cost $3,135,000.
  - FM-HARDY: This project will include installation of approximately 4,755 LF of force main to carry up to 11.45 mgd of wastewater. This work is estimated to cost $1,684,000.
- **Queensboro Basin Lift Stations:**
  - ALABAMA LS: This project will increase the capacity of existing Alabama lift station to approximately 0.60 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $35,000.
  - DARIEN LS: This project will increase the capacity of existing Darien lift station to approximately 12.80 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $1,750,000.
  - HARDY LS: This project will increase the capacity of existing Hardy lift station to approximately 11.45 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures

if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $1,674,000.

- **Southside Basin Gravity Mains:**
  - GR-SOUTHSIDE-01: This project will include installation of approximately 1,053 LF of 18-inch diameter pipe. This work is estimated to cost $288,000.
  - GR-SOUTHSIDE-02: This project will include installation of approximately 863 LF of 18-inch diameter pipe. This work is estimated to cost $228,000.
  - GR-SOUTHSIDE-03: This project will include installation of approximately 838 LF of 12-inch diameter pipe. This work is estimated to cost $205,000.
  - GR-SOUTHSIDE-04: This project will include installation of approximately 782 LF of 12-inch diameter pipe. This work is estimated to cost $191,000.
  - GR-SOUTHSIDE-05: This project will include installation of approximately 168 LF of 30-inch diameter pipe. This work is estimated to cost $96,000.
  - GR-SOUTHSIDE-06: This project will include installation of approximately 1,382 LF of 12-inch diameter pipe. This work is estimated to cost $363,000.
  - GR-SOUTHSIDE-07: This project will include installation of approximately 1,322 LF of 10-inch diameter pipe. This work is estimated to cost $297,000.
  - GR-SOUTHSIDE-08: This project will include installation of approximately 533 LF of 12-inch diameter pipe. This work is estimated to cost $130,000.
  - GR-SOUTHSIDE-09: This project will include installation of approximately 1,674 LF of 30-inch diameter pipe. This work is estimated to cost $1,086,000.
  - GR-SOUTHSIDE-10: This project will include installation of approximately 2,828 LF of 15-inch diameter pipe. This work is estimated to cost $965,000.
  - GR-SOUTHSIDE-11: This project will include installation of approximately 2,585 LF of 15-inch diameter pipe. This work is estimated to cost $847,000.
  - GR-SOUTHSIDE-12: This project will include installation of approximately 2,062 LF of 12-inch diameter pipe. This work is estimated to cost $1,087,000.
  - GR-SOUTHSIDE-13: This project will include installation of approximately 2,109 LF of 10-inch diameter pipe. This work is estimated to cost $946,000.
  - GR-SOUTHSIDE-14: This project will include installation of approximately 1,038 LF of 10-inch diameter pipe. This work is estimated to cost $255,000.
- **Southside Basin Force mains:**
  - FM-SOUTH_HIGHLAND: This project will include installation of approximately 4,969 LF of force main to carry up to 14.70 mgd of wastewater. This work is estimated to cost $2,997,000.

- **Southside Basin Lift Stations:**
  - SOUTH HIGHLAND LS: This project will increase the capacity of existing South Highland lift station to approximately 14.70 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $4,525,000.
  - QUERBES LS: This project will increase the capacity of existing Querbes lift station to approximately 22.80 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $1,796,000.
- **Westside Basin Gravity Mains**
  - GR-WESTSIDE-01: This project will include installation of approximately 1,498 LF of 12-inch diameter pipe. This work is estimated to cost $446,000.
  - GR-WESTSIDE-02: This project will include installation of approximately 4,716 LF of 15 to 18-inch diameter pipe. This work is estimated to cost $1,555,000.
- **North Highlands Basin Force Main**
  - FM-PINEHILL_RD: This project will include installation of approximately 4,123 LF of force main to carry up to 0.30 mgd of wastewater. This work is estimated to cost $1,815,000.
- **North Highlands Basin Lift Station**
  - PINEHILL ROAD LS: This project will address conditions with the pumps to meet the capacity of existing Pinehill Road lift station of 0.29 mgd, which is also the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump rehabilitation to meet the increased head demands, and electrical panel upgrades. The work included is estimated to cost $131,000.

Phase 3 – Wallace, Cooper Road, and Broadmoor Basin

In the Phase 3 basin areas, which coincides with the Phase 3 geographical area, capacity upgrades are anticipated at five lift stations, approximately 24,335 LF of force mains, and approximately 90,833 LF of gravity mains. These projects are generally discussed below by basin.

- **Wallace Basin Gravity Mains:**
  - GR-WALLACE-01: This project will include installation of approximately 5,774 LF of 42-inch diameter pipe. This work is estimated to cost $9,702,000.
  - GR-WALLACE-02: This project will include installation of approximately 9,726 LF of 21 to 30-inch diameter pipe. This work is estimated to cost $7,696,000.

- GR-WALLACE-03: This project will include installation of approximately 4,337 LF of 15 to 18-inch diameter pipe. This work is estimated to cost $1,135,000.
- GR-WALLACE-04: This project will include installation of approximately 2,280 LF of 15-inch diameter pipe. This work is estimated to cost $590,000.
- GR-WALLACE-05: This project will include installation of approximately 7,360 LF of 36 to 42-inch diameter pipe. This work is estimated to cost $10,778,000.
- GR-WALLACE-06: This project will include installation of approximately 3,708 LF of 21-inch diameter pipe. This work is estimated to cost $1,672,000.
- GR-WALLACE-07: This project will include installation of approximately 6,941 LF of 24 to 30-inch diameter pipe. This work is estimated to cost $4,289,000.
- GR-WALLACE-08: This project will include installation of approximately 5,999 LF of 15 to 21-inch diameter pipe. This work is estimated to cost $1,895,000.
- GR-WALLACE-09: This project will include installation of approximately 1,301 LF of 12-inch diameter pipe. This work is estimated to cost $353,000.
- GR-WALLACE-10: This project will include installation of approximately 11,274 LF of 15 to 21-inch diameter pipe. This work is estimated to cost $3,787,000.
- GR-WALLACE-11: This project will include installation of approximately 3,168 LF of 15 to 18-inch diameter pipe. This work is estimated to cost $964,000.

Cooper Road Basin Gravity Mains:

- GR-COOPER_RD-01: This project will include installation of approximately 793 LF of 30-inch diameter pipe. This work is estimated to cost $451,000.
- GR-COOPER_RD-02: This project will include installation of approximately 1,260 LF of 15-inch diameter pipe. This work is estimated to cost $454,000.
- GR-COOPER_RD-03: This project will include installation of approximately 1,543 LF of 15-inch diameter pipe. This work is estimated to cost $546,000.

Cooper Road Basin Force Main

- FM-HAVANNA: This project will include installation of approximately 1,229 LF of force main to carry up to 0.53 million gallons per day mgd of wastewater. This work is estimated to cost $482,000.
- FM-LEGARDY: This project will include installation of approximately 1,856 LF of force main to carry up to 7.35mgd of wastewater. This work is estimated to cost $619,000.

Cooper Road Basin Lift Station

- LEGARDY LS: This project will increase the capacity of existing Legardy lift station to approximately 7.35 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures

if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $2,392,000.

- NORTH CADDO LS: This project will increase the capacity of existing North Caddo lift station to approximately 0.53 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $57,000.

Broadmoor Basin Gravity Mains:

- GR-BROADMOOR-01: This project will include installation of approximately 4,664 LF of 30 to 36-inch diameter pipe. This work is estimated to cost $4,345,000.
- GR-BROADMOOR-02: This project will include installation of approximately 2,031 LF of 21 to 24-inch diameter pipe. This work is estimated to cost $653,000.
- GR-BROADMOOR-03: This project will include installation of approximately 1,322 LF of 10-inch diameter pipe. This work is estimated to cost $349,000.
- GR-BROADMOOR-04: This project will include installation of approximately 633 LF of 15-inch diameter pipe. This work is estimated to cost $153,000.
- GR-BROADMOOR-05: This project will include installation of approximately 717 LF of 12-inch diameter pipe. This work is estimated to cost $222,000.
- GR-BROADMOOR-06: This project will include installation of approximately 6,053 LF of 21 to 30-inch diameter pipe. This work is estimated to cost $3,833,000.
- GR-BROADMOOR-07: This project will include installation of approximately 946 LF of 18-inch diameter pipe. This work is estimated to cost $273,000.
- GR-BROADMOOR-08: This project will include installation of approximately 1,843 LF of 12-inch diameter pipe. This work is estimated to cost $449,000.
- GR-BROADMOOR-09: This project will include installation of approximately 3,128 LF of 15-inch diameter pipe. This work is estimated to cost $756,000.
- GR-BROADMOOR-10: This project will include installation of approximately 1,687 LF of 15-inch diameter pipe. This work is estimated to cost $408,000.
- GR-BROADMOOR-11: This project will include installation of approximately 1,935 LF of 10-inch diameter pipe. This work is estimated to cost $435,000.
- GR-BROADMOOR-12: This project will include installation of approximately 411 LF of 10-inch diameter pipe. This work is estimated to cost $93,000.

Broadmoor Basin Force Main

- FM-CHAMPION LAKE: This project will include installation of approximately 63 LF of force main to carry up to 3.50 mgd of wastewater. This work is estimated to cost $16,000.

- FM-DIXIE_GARDEN: This project will include installation of approximately 4,570 LF of force main to carry up to 2.64 mgd of wastewater. This work is estimated to cost $1,151,000.
- FM-KNIGHT_ST: This project will include installation of approximately 2,080 LF of force main to carry up to 1.30 mgd of wastewater. This work is estimated to cost $377,000.
- FM-QUERBES_BROADMOOR: This project will include installation of approximately 13,406 LF of force main to carry up to 42.64 mgd of wastewater. This work is estimated to cost $8,576,000.
- FM-SHREVE_ISLAND: This project will include installation of approximately 1,130 LF of force main to carry up to 1.45 mgd of wastewater. This work is estimated to cost $221,000.

Broadmoor Basin Lift Station

- BROADMOOR LS: This project will increase the capacity of existing Broadmoor lift station to approximately 20.85 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $4,715,000.
- DIXIE_GARDEN LS: This project will increase the capacity of existing Dixie Garden lift station to approximately 2.64 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $566,000.
- SHREVE_ISLAND LS: This project will increase the capacity of existing Shreve Island lift station to approximately 1.45 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $375,000.

Phase 4 – Stoner, North Pierre bayou, Bickham Bayou, Country Club, and LSU Basin

In the Phase 4 basin areas, which coincides with SSA Phase 4 geographical area, capacity upgrades are anticipated at six lift stations, approximately 23,341 LF of force mains, and approximately 42,994 LF of gravity mains. These projects are generally discussed below by basin.

Stoner Basin Gravity Mains:

- GR-STONER-01: This project will include installation of approximately 6,103 LF of 36-inch diameter pipe. This work is estimated to cost $7,508,000.
- GR-STONER-02: This project will include installation of approximately 1,521 LF of 10-inch diameter pipe. This work is estimated to cost $404,000.
- GR-STONER-03: This project will include installation of approximately 3,876 LF of 18 to 21-inch diameter pipe. This work is estimated to cost $1,192,000.

- GR-STONER-04: This project will include installation of approximately 1,728 LF of 10-inch diameter pipe. This work is estimated to cost $402,000.
- GR-STONER-05: This project will include installation of approximately 760 LF of 12-inch diameter pipe. This work is estimated to cost $277,000.

Stoner Basin Lift Station

- STONER LS: This project will increase the capacity of existing Stoner lift station to approximately 27 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $7,278,000.

North Pierre Bayou Basin Lift Station

- LONG_LAKE LS: This project will increase the capacity of existing Long Lake lift station to approximately 1.23 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $361,000.
- NORRIS_FERRY_ROAD LS: This project will increase the capacity of existing Norris Ferry Road lift station to approximately 1.53 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $373,000.

Bickham Bayou Basin Gravity Mains:

- GR-BICKHAM-01: This project will include installation of approximately 1,533 LF of 10-inch diameter pipe. This work is estimated to cost $346,000.
- GR-BICKHAM-02: This project will include installation of approximately 1,443 LF of 10-inch diameter pipe. This work is estimated to cost $325,000.

Bickham Bayou Basin Force Main

- FM-BICKHAM: This project will include installation of approximately 11,887 LF of force main to carry up to 15.80 mgd of wastewater. This work is estimated to cost $4,999,000.
- FM-PUBLIC_LANDING: This project will include installation of approximately 1,260 LF of force main to carry up to 4.62 mgd of wastewater. This work is estimated to cost $310,000.

Country Club Basin Gravity Mains:

- GR-COUNTRY_CLUB-01: This project will include installation of approximately 2,304 LF of 15-inch diameter pipe. This work is estimated to cost $630,000.
- GR-COUNTRY_CLUB-02: This project will include installation of approximately 1,317 LF of 10-inch diameter pipe. This work is estimated to cost $296,000.

- GR-COUNTRY_CLUB-03: This project will include installation of approximately 2,386 LF of 10-inch diameter pipe. This work is estimated to cost $607,000.

Country Club Basin Force Main

- FM-COUNTRY_CLUB: This project will include installation of approximately 1,190 LF of force main to carry up to 3.40 mgd of wastewater. This work is estimated to cost $293,000.

Country Club Basin Lift Station

- COUNTRY_CLUB LS: This project will increase the capacity of existing Country Club lift station to approximately 3.40 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $285,000.

LSU Basin Gravity Mains:

- GR-LSU-01: This project will include installation of approximately 9,885 LF of 18 to 30-inch diameter pipe. This work is estimated to cost $6,634,000.
- GR-LSU-02: This project will include installation of approximately 1,438 LF of 18-inch diameter pipe. This work is estimated to cost $551,000.
- GR-LSU-03: This project will include installation of approximately 4,509 LF of 54-inch diameter pipe. This work is estimated to cost $5,497,000.
- GR-LSU-04: This project will include installation of approximately 290 LF of 21-inch diameter pipe. This work is estimated to cost $89,000.
- GR-LSU-05: This project will include installation of approximately 1,697 LF of 18-inch diameter pipe. This work is estimated to cost $447,000.
- GR-LSU-06: This project will include installation of approximately 2,204 LF of 15-inch diameter pipe. This work is estimated to cost $533,000.

LSU Basin Force Main

- FM-LUCAS_OUTFALL: This project will include installation of approximately 7,927 LF of force main to carry up to 62 mgd of wastewater. This work is estimated to cost $6,748,000.
- FM-LUCAS_WWTP: This project will include installation of approximately 1,077 LF of force main to carry up to 62 mgd of wastewater. This work is estimated to cost $1,378,000.

LSU Basin Lift Station

- LUCAS_OUTFALL LS: This project will increase the capacity of existing Lucas Outfall lift station to approximately 62 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $9,809,000.

- STRATMORE LS: This project will increase the capacity of existing Stratmore lift station to approximately 1.07 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $219,000.

Phase 5 – Princess Park, Texas Pierre, Boggy Bayou, Agurs, Highland, Springfield, Gilmer Bayou, Shorewood, Flournoy Bayou, Page Bayou, Cross Bayou, Lower Cross Lake, and Lakeview Basin

In the Phase 5 basin areas, which coincides with the SSA Phase 5 geographical area, capacity upgrades are anticipated at ten lift stations, and approximately 40,890 LF of force mains and 47,304 LF of gravity mains. These projects are generally discussed below by basin.

- **Princess Park Basin Gravity Mains:**
  - GR-PRINCESS-01: This project will include installation of approximately 5,148 LF of 18-inch diameter pipe. This work is estimated to cost $2,213,000.
  - GR-PRINCESS-02: This project will include installation of approximately 3,722 LF of 15-inch diameter pipe. This work is estimated to cost $1,635,000.
  - GR-PRINCESS-03: This project will include installation of approximately 1,444 LF of 10 to 12-inch diameter pipe. This work is estimated to cost $349,000.
- **Princess Park Basin Force Main**
  - FM-FANNIN: This project will include installation of approximately 43 LF of force main to carry up to 6.46 mgd of wastewater. This work is estimated to cost $17,000.
- **Princess Park Basin Lift Station**
  - FANNIN LS: This project will increase the capacity of existing Fannin lift station to approximately 6.46 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $1,781,000.
- **Texas Pierre Basin Gravity Mains:**
  - GR-TEXAS-01: This project will include installation of approximately 5,645 LF of 15 to 18-inch diameter pipe. This work is estimated to cost $3,146,000.
  - GR-TEXAS-02: This project will include installation of approximately 10,037 LF of 18 to 24-inch diameter pipe. This work is estimated to cost $5,542,000.
- **Texas Pierre Basin Force Main**
  - FM-PATZMAN_PARK: This project will include installation of approximately 5,724 LF of force main to carry up to 0.81 mgd of wastewater. This work is estimated to cost $1,440,000.

- **Texas Pierre Basin Lift Station**
  - PATZMAN_PARK LS: This project will increase the capacity of existing Patzman lift station to approximately 0.81 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $105,000.
- **Boggy Bayou Basin Gravity Mains:**
  - GR-BOGGY-01: This project will include installation of approximately 2,542 LF of 15-inch diameter pipe. This work is estimated to cost $652,000.
  - GR-BOGGY-02: This project will include installation of approximately 1,336 LF of 10-inch diameter pipe. This work is estimated to cost $351,000.
- **Agurs Basin Force Main**
  - FM-AGURS: This project will include installation of approximately 10,677 LF of force main to carry up to 5.80 mgd of wastewater. This work is estimated to cost $4,160,000.
  - FM-CHEROKEE: This project will include installation of approximately 1,504 LF of force main to carry up to 4 mgd of wastewater. This work is estimated to cost $625,000.
  - FM-WEST_ALGONQUIN: This project will include installation of approximately 1,329 LF of force main to carry up to 0.38 mgd of wastewater. This work is estimated to cost $241,000.
- **Agurs Basin Lift Station**
  - AGURS LS: This project will increase the capacity of existing Agurs lift station to approximately 5.80 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $473,000.
  - NORTH_HEARNE LS: This project will increase the capacity of existing North Hearne lift station to approximately 0.38 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $170,000.
  - WEST_ALGONQUIN LS: This project will increase the capacity of existing West Algonquin lift station to approximately 0.80 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $40,000.
- **Highland Basin Gravity Mains:**
  - GR-HIGHLAND-01: This project will include installation of approximately 1,335 LF of 12-inch diameter pipe. This work is estimated to cost $657,000.

- GR-HIGHLAND-02: This project will include installation of approximately 660 LF of 8-inch diameter pipe. This work is estimated to cost $137,000.

- **Springfield Basin Gravity Mains:**
  - GR-SPRINGFIELD-01: This project will include installation of approximately 2,580 LF of 15 to 18-inch diameter pipe. This work is estimated to cost $1,120,000.
- **Springfield Basin Force Main**
  - FM-ST_CHARLES: This project will include installation of approximately 9,459 LF of force main to carry up to 0.50 mgd of wastewater. This work is estimated to cost $2,261,000.
- **Sprinfield Basin Lift Station**
  - SAINT CHARLES LS: This project will increase the capacity of existing Saint Charles lift station to approximately 0.50 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $163,000.
- **Gilmer Bayou Basin Gravity Mains:**
  - GR-GILMER-01: This project will include installation of approximately 2,278 LF of 12-inch diameter pipe. This work is estimated to cost $768, 000.
- **Shorewood Basin Gravity Mains:**
  - GR-SHOREWOOD-01: This project will include installation of approximately 2,059 LF of 12-inch diameter pipe. This work is estimated to cost $659,000.
- **Shorewood Basin Force Main**
  - FM-PINECREST: This project will include installation of approximately 9,809 LF of force main to carry up to 1.75 mgd of wastewater. This work is estimated to cost $3,214,000.
  - FM-SHOREWOOD: This project will include installation of approximately 902 LF of force main to carry up to 0.45 mgd of wastewater. This work is estimated to cost $459,000.
- **Shorewood Basin Lift Station**
  - LONG_TIMBER LS: This project will increase the capacity of existing Long Timber lift station to approximately 0.72 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $152,000.
  - PINECREST LS: This project will increase the capacity of existing Pinecrest lift station to approximately 1.74 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $507,000.

- SHOREWOOD LS: This project will increase the capacity of existing Shorewood lift station to approximately 0.43 mgd, which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $129,000.

- **Page Bayou Basin Gravity Mains:**
  - GR-PAGE-01: This project will include installation of approximately 3,363 LF of 18-inch diameter pipe. This work is estimated to cost $1,425, 000.
- **Cross Bayou Basin Gravity Mains:**
  - GR-CROSS-01: This project will include installation of approximately 4,436 LF of 10 to 15-inch diameter pipe. This work is estimated to cost $1,104, 000.
- **Cross Bayou Basin Force Main**
  - FM-CADILLAC: This project will include installation of approximately 1,443 LF of force main to carry up to 1.81 mgd of wastewater. This work is estimated to cost $539,000.
- **Cross Bayou Basin Lift Station**
  - CADILLAC LS: This project will increase the capacity of existing Cadillac lift station to approximately 1.81 mgd which is the hydraulic model anticipated peak flow. The project recommends safety and security upgrades, protection of lift station equipment and structures if within the 100-year flood plain, evaluation and rehabilitation of wet wells, pump replacement, and electrical panel upgrades. This work is estimated to cost $589,000.
- **Lower Cross Lake Basin Gravity Mains:**
  - GR-LOWER_CROSS-01: This project will include installation of approximately 809 LF of 18-inch diameter pipe. This work is estimated to cost $359,000.

A total of 134 projects were identified for capacity improvements. Figure 2-1 below shows the location of the projects within the basin.

North Highlands
Choctaw Bayou
Cooper Road
Lakeview
Agurs
Lower Cross Lake
Cross Bayou
Cross Lake
Westside
Princess Park
Highland
Queensboro
Texas Pierre
Stoner
Shorewood
Bickham Bayou
Country Club
Southside
Page Bayou
Cedar Grove
Broadmoor
Gilmer Bayou
Lsu
Flournoy Bayou
Boggy Bayou
Terry Bradshaw Passway W
LA 3132 W
North Pierre Bayou
Wallace
Springfield

Pinehill Road LS
0.29 MGD
North Caddo LS
0.53 MGD
Legardy LS
7.34 MGD
North Regional LS
52.02 MGD
North Regional
WWTP
W. Algonquin LS
0.38 MGD
North Hearne LS
0.38 MGD
Agurs LS
5.80 MGD
Cadillac LS
1.81 MGD
Patzman Park LS
0.81 MGD
Fannin LS
6.46 MGD
Alabama LS
0.58 MGD
Stoner LS
27.12 MGD
Shorewood LS
0.43 MGD
Long Timber LS
0.72 MGD
Pinecrest LS
1.74 MGD
Country Club LS
3.39 MGD
Darien LS
12.79 MGD
Hardy LS
11.45 MGD
South Highland LS
14.66 MGD
Shreve Island LS
1.45 MGD
Querbes LS
21.79 MGD
Dixie Garden LS
2.64 MGD
Broadmoor LS
20.85 MGD
Cedar Grove LS
62.54 MGD
Lucas Outfall LS
61.40 MGD
Stratmore LS
1.07 MGD
Lucas
WWTP
Norris Ferry LS
1.53 MGD
Long Lake LS
1.23 MGD
St. Charles LS
0.50 MGD

220
I-20
49

N
W
E
S
0 0.25 0.5 0.75 1 Miles

City of Shreveport, LA Wastewater Master Plan CIP

Figure 2-1: Capacity Improvements Project Locations

CIP Projects
- Force Main
- Gravity Main
- Lift Station Improvements

Phase
1
2
3
4
5

major_Basin
- Lucas
- North Regional
- Sanitary Sewer
- Force Main
- Wastewater Treatment Plant

LS Name
Recomended Capacity

BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

BLACK & VEATCH
Building a world of difference.

dgarcia May 14, 2016

2.4.2 Work Packages and Cost Summary

The projects described above were grouped into work packages based on geographic location of basins within phases, size and type (gravity main, force main and lift stations). The minimum construction costs of each package were set to approximately $4 million. A summary of the work packages with estimated construction costs are provided in Tables 2-3 through 2-7.

Capital Costs

Planning level costs were developed for the identified capacity improvements projects. Standard procedures were used to estimate cost per unit basis. Construction costs were developed for gravity main and force main based on a unit price per linear foot of pipe for various pipe diameters. Polyvinyl Chloride (PVC) pipe material was considered for pipe diameters 8 to 42 inches and Fiberglass Reinforced Plastic (FRP) pipe material for diameters above 42 inches. Construction costs were developed for pump station based on a unit price basis for pump stations with various capacities. Previous project experience and SSA Phase 1 construction bid tabs were utilized in obtaining and verifying costs included in the estimates.

Operation and Maintenance Costs

Operations and Maintenance (O&M) costs for the capacity improvements projects were estimated based on number of factors including pumping, cleaning and inspection, emergency repairs, root control, other routine activities by Field Operations Department. The costs are considered for the portion of the overall system improved with the capacity work. For example, if a pump station increased from 5 mgd to 15 mgd, the O&M costs prepared are for the 10 mgd increase.

The City has spent approximately $10,000,000 in previous years on emergency repairs performed by an outside contractor. O&M cost savings are expected after implementation of the Capacity Improvements Remediation Measures Plan. Coupled with the work associated with the repairs and replacement work associated with the condition assessments, it is assumed that ten percent of the current emergency repair amount will be budgeted. This $1,000,000 will be distributed based on percentage of the system impacted by the capacity upgrades.

The City has an ongoing root control program with an annual budget of $4,000,000. The need for the root control program is expected to remain unaffected by the work to be performed under the Capacity Assessment Remediation Measures Plan. O&M costs for this report are based on the percentage of the system impacted by capacity upgrades.

The cost of routine activities of the Field Operations department for cleaning and CCTV operation for the entire City is estimated to be completed by 20 employees with raw salaries estimated at $40,000 a year. The annual cost for these employees and the equipment used for these measures is estimated at 3 times the annual salary or $120,000 total for the employee and equipment. The total field operating budgeted cost is estimated to be $2,400,000. O&M costs for this report are based on the system impacted by the capacity upgrades.

The O&M cost for lift station is estimated based on $1.50/1,000,000 gallons of wastewater pumped to the treatment plant. Costs area based on the difference in pump station capacity impacted by the capacity upgrades.

A summary of O&M costs by phase are shown in Table 2-9 and Table 2-10 presents O&M costs through 2026.

Table 2-3: Summary of Phase 1 Capacity Improvements

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
1	Cedar Grove	FM-CEDAR_GROVE SEG 1	Force Main	9,500 ft.	$ 8,381,000	2,017	$ 8,633,000
2	Cedar Grove	FM-CEDAR_GROVE SEG 2	Force Main	18,779 ft.	$ 16,566,000	2,018	$ 17,575,000
Total Force Main Replacements				**28,279 ft.**	**$ 24,947,000**		**$ 26,208,000**
3	Cedar Grove	CEDAR GROVE LS	Lift Station	63 mgd	$ 16,674,000	2,018	$ 17,690,000
Total Lift Station Improvements				**63 mgd**	**$ 16,674,000**		**$ 17,690,000**
TOTAL PHASE 1 COST					**$ 41,621,000**		**$ 43,898,000**

Table 2-4: Summary of Phase 2 Capacity Improvements

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
1	Queensboro	GR-QUEENSBORO-01	Gravity	450 ft.	$ 110,000	2018	$ 117,000
	Queensboro	GR-QUEENSBORO-02	Gravity	353 ft.	$ 157,000		$ 167,000
	Queensboro	GR-QUEENSBORO-03	Gravity	880 ft.	$ 200,000		$ 213,000
	Queensboro	GR-QUEENSBORO-05	Gravity	145 ft.	$ 68,000		$ 73,000
	Queensboro	GR-QUEENSBORO-06	Gravity	4,927 ft.	$ 1,170,000		$ 1,242,000
	Queensboro	GR-QUEENSBORO-07	Gravity	2,001 ft.	$ 650,000		$ 690,000
	Queensboro	GR-QUEENSBORO-08	Gravity	1,924 ft.	$ 1,012,000		$ 1,074,000
	Queensboro	GR-QUEENSBORO-09	Gravity	1,398 ft.	$ 341,000		$ 362,000
	Southside	GR-SOUTHSIDE-01	Gravity	1,053 ft.	$ 288,000		$ 306,000
	Southside	GR-SOUTHSIDE-02	Gravity	863 ft.	$ 228,000		$ 242,000
	Southside	GR-SOUTHSIDE-03	Gravity	838 ft.	$ 205,000		$ 218,000
	Southside	GR-SOUTHSIDE-04	Gravity	782 ft.	$ 191,000		$ 203,000
	Southside	GR-SOUTHSIDE-05	Gravity	168 ft.	$ 96,000		$ 102,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Southside	GR-SOUTHSIDE-06	Gravity	1,382 ft.	$ 363,000		$ 386,000
	Southside	GR-SOUTHSIDE-07	Gravity	1,322 ft.	$ 297,000		$ 316,000
	Southside	GR-SOUTHSIDE-08	Gravity	533 ft.	$ 130,000		$ 138,000
			Sub-Total	**19,019 ft.**	**$ 5,506,000**		**$ 5,849,000**
2	Southside	GR-SOUTHSIDE-09	Gravity	1,674 ft.	$ 1,087,000	2018	$ 1,154,000
	Southside	GR-SOUTHSIDE-10	Gravity	2,828 ft.	$ 965,000		$ 1,024,000
	Southside	GR-SOUTHSIDE-11	Gravity	2,585 ft.	$ 847,000		$ 899,000
	Southside	GR-SOUTHSIDE-12	Gravity	2,062 ft.	$ 1,087,000		$ 1,154,000
	Southside	GR-SOUTHSIDE-13	Gravity	2,109 ft.	$ 946,000		$ 1,004,000
	Southside	GR-SOUTHSIDE-14	Gravity	1,038 ft.	$ 256,000		$ 272,000
	Westside	GR-WESTSIDE-01	Gravity	1,498 ft.	$ 447,000		$ 475,000
	Westside	GR-WESTSIDE-02	Gravity	4,716 ft.	$ 1,555,000		$ 1,650,000
			Sub-Total	**18,510 ft.**	**$ 7,190,000**		**$ 7,632,000**
			Total Gravity Main Replacements	**37,529 ft.**	**$ 12,696,000**		**$ 13,481,000**
3	North Highlands	FM-PINEHILL_RD	Force Main	4,213 ft.	$ 1,815,000	2019	$ 1,984,000
	Southside	FM-SOUTH_HIGHLAND	Force Main	4,970 ft.	$ 2,997,000		$ 3,275,000
			Sub-Total	**9,183 ft.**	**$ 4,812,000**		**$ 5,259,000**
4	Queensboro	FM-DARIEN	Force Main	4,726 ft.	$ 3,135,000	2019	$ 3,426,000
	Queensboro	FM-HARDY	Force Main	4,755 ft.	$ 1,684,000		$ 1,841,000
			Sub-Total	**9,481 ft.**	**$ 4,819,000**		**$ 5,267,000**
			Total Force Main Replacements	**18,664 ft.**	**$ 9,631,000**		**$ 10,526,000**
5	Southside	SOUTH HIGHLANDS LS	Lift Station	15 mgd	$ 4,525,000	2019	$ 4,945,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Southside	QUERBES LS	Lift Station	22 mgd	$ 1,796,000		$ 1,963,000
			Sub-Total	**36 mgd**	**$ 6,321,000**		**$ 6,908,000**
6	Queensboro	DARIEN LS	Lift Station	13 mgd	$ 1,750,000	2019	$ 1,913,000
	Queensboro/North Highlands	HARDY LS, ALABAMA LS, PINEHILL ROAD LS	Lift Station	12 mgd	$ 1,839,000		$ 2,010,000
			Sub-Total	**25 mgd**	**$ 3,589,000**		**$ 3,923,000**
			Total Lift Station Improvements	**62 mgd**	**$ 9,910,000**		**$ 10,831,000**
				TOTAL PHASE 2 COST	**$ 32,237,000**		**$ 34,838,000**

Table 2-5: Summary of Phase 3 Capacity Improvements

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
1	Wallace	GR-WALLACE-01	Gravity	5,774 ft.	$ 9,702,000	2019	$ 10,602,000
			Sub-Total	**5,774 ft.**	**$ 9,702,000**		**$ 10,602,000**
2	Wallace	GR-WALLACE-02	Gravity	9,726 ft.	$ 7,696,000	2019	$ 8,410,000
	Wallace	GR-WALLACE-03	Gravity	4,337 ft.	$ 1,135,000		$ 1,241,000
	Wallace	GR-WALLACE-04	Gravity	2,280 ft.	$ 590,000		$ 645,000
			Sub-Total	**16,343 ft.**	**$ 9,421,000**		**$ 10,296,000**
3	Wallace	GR-WALLACE-05	Gravity	7,360 ft.	$ 10,778,000	2019	$ 11,778,000
			Sub-Total	**7,360 ft.**	**$ 10,778,000**		**$ 11,778,000**
4	Wallace	GR-WALLACE-06	Gravity	3,708 ft.	$ 1,672,000	2019	$ 1,828,000
	Wallace	GR-WALLACE-07	Gravity	6,941 ft.	$ 4,289,000		$ 4,687,000
			Sub-Total	**10,649 ft.**	**$ 5,961,000**		**$ 6,515,000**

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
5	Wallace	GR-WALLACE-08	Gravity	5,999 ft.	$ 1,895,000	2019	$ 2,071,000
	Wallace	GR-WALLACE-09	Gravity	1,301 ft.	$ 353,000		$ 386,000
	Wallace	GR-WALLACE-10	Gravity	11,274 ft.	$ 3,787,000		$ 4,139,000
	Wallace	GR-WALLACE-11	Gravity	3,168 ft.	$ 964,000		$ 1,054,000
			Sub-Total	**21,742 ft.**	**$ 6,999,000**		**$ 7,650,000**
6	Broadmoor	GR-BROADMOOR-01	Gravity	4,664 ft.	$ 4,344,000	2019	$ 4,747,000
	Broadmoor	GR-BROADMOOR-02	Gravity	2,031 ft.	$ 653,000		$ 714,000
	Broadmoor	GR-BROADMOOR-03	Gravity	1,322 ft.	$ 349,000		$ 382,000
	Broadmoor	GR-BROADMOOR-04	Gravity	633 ft.	$ 153,000		$ 168,000
			Sub-Total	**8,650 ft.**	**$ 5,499,000**		**$ 6,011,000**
7	Broadmoor	GR-BROADMOOR-05	Gravity	717 ft.	$ 222,000	2019	$ 243,000
	Broadmoor	GR-BROADMOOR-06	Gravity	6,053 ft.	$ 3,833,000		$ 4,189,000
	Broadmoor	GR-BROADMOOR-07	Gravity	946 ft.	$ 273,000		$ 299,000
	Broadmoor	GR-BROADMOOR-08	Gravity	1,843 ft.	$ 450,000		$ 492,000
			Sub-Total	**9,559 ft.**	**$ 4,778,000**		**$ 5,223,000**
8	Broadmoor	GR-BROADMOOR-09	Gravity	3,128 ft.	$ 756,000	2019	$ 827,000
	Broadmoor	GR-BROADMOOR-10	Gravity	1,687 ft.	$ 408,000		$ 446,000
	Broadmoor	GR-BROADMOOR-11	Gravity	1,935 ft.	$ 435,000		$ 476,000
	Broadmoor	GR-BROADMOOR-12	Gravity	411 ft.	$ 93,000		$ 102,000
	Cooper Road	GR-COOPER_RD-01	Gravity	793 ft.	$ 451,000		$ 493,000
	Cooper Road	GR-COOPER_RD-02	Gravity	1,260 ft.	$ 454,000		$ 497,000
	Cooper Road	GR-COOPER_RD-03	Gravity	1,543 ft.	$ 546,000		$ 597,000
			Sub-Total	**10,757 ft.**	**$ 3,143,000**		**$ 3,438,000**
			Total Gravity Main Replacements	**90,833 ft.**	**$ 56,281,000**		**$ 61,513,000**
				SUB-TOTAL PHASE 3 COST	**$ 56,281,000**		**$ 61,513,000**
9	Broadmoor	FM-CHAMPION_LAKE	Force Main	63 ft.	$ 16,000	2020	$ 19,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Broadmoor	FM-KNIGHT_ST	Force Main	2,080 ft.	$ 377,000		$ 425,000
	Broadmoor	FM-SHREVE_ISLAND	Force Main	1,130 ft.	$ 221,000		$ 249,000
	Broadmoor	FM-DIXIE_GARDEN	Force Main	4,570 ft.	$ 1,151,000		$ 1,296,000
	Cooper Road	FM-HAVANNA	Force Main	1,229 ft.	$ 482,000		$ 543,000
	Cooper Road	FM-LEGARDY	Force Main	1,856 ft.	$ 619,000		$ 697,000
			Sub-Total	**10,928 ft.**	**$ 2,866,000**		**$ 3,229,000**
10	Broadmoor	FM-QUERBES_BROADMOOR	Force Main	13,406 ft.	$ 8,576,000	2020	$ 9,653,000
			TOTAL Force Main Replacements	**24,334 ft.**	**$ 11,442,000**		**$ 12,882,000**
11	Broadmoor	BROADMOOR LS	Lift Station	21 mgd	$ 4,715,000	2020	$ 5,307,000
		DIXIE GARDEN LS	Lift Station	3 mgd	$ 566,000		$ 638,000
		SHREVE ISLAND LS	Lift Station	1 mgd	$ 375,000		$ 423,000
			Sub-Total	**25 mgd**	**$ 5,656,000**		**$ 6,368,000**
12	Cooper Road	LEGARDY LS	Lift Station	7 mgd	$ 2,392,000	2020	$ 2,693,000
		NORTH CADDO LS	Lift Station	1 mgd	$ 57,000		$ 65,000
			Sub-Total	**8 mgd**	**$ 2,449,000**		**$ 2,758,000**
			Total Lift Station Improvements		**$ 8,105,000**		**$ 9,126,000**
			TOTAL PHASE 3 COST		**$ 75,828,000**		**$ 83,521,000**

Table 2-6: Summary of Phase 4 Capacity Improvements

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
1	Stoner	GR-STONER-01	Gravity	6,103 ft.	$ 7,508,000	2020	$ 8,451,000
			Sub-Total	**6,103 ft.**	**$ 7,508,000**		**$ 8,451,000**
2	Stoner	GR-STONER-02	Gravity	1,521 ft.	$ 404,000	2020	$ 455,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Stoner	GR-STONER-03	Gravity	3,876 ft.	$ 1,192,000		$ 1,342,000
	Stoner	GR-STONER-04	Gravity	1,728 ft.	$ 402,000		$ 453,000
	Stoner	GR-STONER-05	Gravity	760 ft.	$ 277,000		$ 312,000
	Bickham Bayou	GR-BICKHAM-01	Gravity	1,533 ft.	$ 346,000		$ 390,000
	Bickham Bayou	GR-BICKHAM-02	Gravity	1,443 ft.	$ 325,000		$ 366,000
	Country Club	GR-COUNTRY_CLUB-01	Gravity	2,304 ft.	$ 630,000		$ 710,000
	Country Club	GR-COUNTRY_CLUB-02	Gravity	1,317 ft.	$ 296,000		$ 334,000
	Country Club	GR-COUNTRY_CLUB-03	Gravity	2,386 ft.	$ 607,000		$ 684,000
			Sub-Total	**16,868 ft.**	**$ 4,479,000**		**$ 5,046,000**
3	LSU Basin	GR-LSU-01	Gravity	9,885 ft.	$ 6,634,000	2020	$ 7,467,000
			Sub-Total	**9,885 ft.**	**$ 6,634,000**		**$ 7,467,000**
4	LSU Basin	GR-LSU-02	Gravity	1,438 ft.	$ 551,000	2020	$ 621,000
	LSU Basin	GR-LSU-03	Gravity	4,509 ft.	$ 5,497,000		$ 6,187,000
	LSU Basin	GR-LSU-04	Gravity	290 ft.	$ 89,000		$ 101,000
	LSU Basin	GR-LSU-05	Gravity	1,697 ft.	$ 447,000		$ 504,000
	LSU Basin	GR-LSU-06	Gravity	2,204 ft.	$ 533,000		$ 600,000
			Sub-Total	**10,138 ft.**	**$ 7,117,000**		**$ 8,013,000**
			Total Gravity Main Replacement	**42,994 ft.**	**$ 25,738,000**		**$ 28,977,000**
5	Bickham Bayou	FM-PUBLIC_LANDING	Force Main	1,260 ft.	$ 310,000	2024	$ 393,000
	Bickham Bayou	FM-BICKHAM	Force Main	11,887 ft.	$ 4,999,000		$ 6,333,000
	Country Club	FM-COUNTRY_CLUB	Force Main	1,190 ft.	$ 293,000		$ 372,000
			Sub-Total	**14,336 ft.**	**$ 5,602,000**		**$ 7,098,000**
6	LSU Basin	FM-LUCAS_OUTFALL	Force Main	7,927 ft.	$ 6,748,000	2024	$ 8,549,000
	LSU Basin	FM-LUCAS_WWTP	Force Main	1,077 ft.	$ 1,378,000		$ 1,746,000
			Sub-Total	**9,004 ft.**	**$ 8,126,000**		**$ 10,295,000**
			Total Force Main Replacement	**23,341 ft.**	**$ 13,728,000**		**$ 17,393,000**

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
7	Country Club	COUNTRY CLUB LS	Lift Station	3 mgd	$ 285,000	2024	$ 362,000
	North Pierre Bayou	LONG LAKE LS	Lift Station	1 mgd	$ 361,000		$ 458,000
	North Pierre Bayou	NORRIS FERRY ROAD LS	Lift Station	2 mgd	$ 373,000		$ 473,000
	Stoner	STONER LS	Lift Station	27 mgd	$ 7,278,000		$ 9,220,000
			Sub-Total	**33 mgd**	**$ 8,297,000**		**$ 10,513,000**
8	LSU Basin	LUCAS OUTFALL LS	Lift Station	61 mgd	$ 9,809,000	2024	$ 12,426,000
	LSU Basin	STRATMORE LS	Lift Station	1 mgd	$ 219,000		$ 278,000
			Sub-Total	**62 mgd**	**$ 10,028,000**		**$ 12,704,000**
			Total Lift Station	**96 mgd**	**$ 18,325,000**		**$ 23,217,000**
				TOTAL PHASE 4 COST	**$ 57,791,000**		**$ 69,587,000**

Table 2-7: Summary of Phase 5 Capacity Improvements

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
1	Boggy Bayou	GR-BOGGY-01	Gravity	2,452 ft.	$ 652,000	2021	$ 1,039,000
	Boggy Bayou	GR-BOGGY-02	Gravity	1,336 ft.	$ 351,000		$ 560,000
	Gilmer Bayou	GR-GILMER-01	Gravity	2,278 ft.	$ 768,000		$ 1,224,000
	Page Bayou	GR-PAGE-01	Gravity	3,363 ft.	$ 1,425,000		$ 2,270,000
	Shorewood	GR-SHOREWOOD-01	Gravity	2,059 ft.	$ 659,000		$ 1,050,000
	Springfield	GR-SPRINGFIELD-01	Gravity	2,580 ft.	$ 1,120,000		$ 1,784,000
			Sub-Total	**14,068 ft.**	**$ 4,975,000**		**$ 7,927,000**
2	Lower Cross Lake	GR-LOWER_CROSS-01	Gravity	809 ft.	$ 359,000	2021	$ 572,000
	Cross Bayou	GR-CROSS-01	Gravity	4,436 ft.	$ 1,104,000		$ 1,759,000
	Princess Park	GR-PRINCESS-01	Gravity	5,148 ft.	$ 2,213,000		$ 3,525,000
	Princess Park	GR-PRINCESS-02	Gravity	3,722 ft.	$ 1,635,000		$ 2,605,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Princess Park	GR-PRINCESS-03	Gravity	1,444 ft.	$ 349,000		$ 556,000
	Highland	GR-HIGHLAND-01	Gravity	1,335 ft.	$ 657,000		$ 1,047,000
	Highland	GR-HIGHLAND-02	Gravity	660 ft.	$ 137,000		$ 219,000
			Sub-Total	**17,554 ft.**	**$ 6,454,000**		**$ 10,283,000**
3	Texas Pierre	GR-TEXAS-01	Gravity	5,645 ft.	$ 3,146,000	2021	$ 5,011,000
	Texas Pierre	GR-TEXAS-02	Gravity	10,037 ft.	$ 5,542,000		$ 8,827,000
			Sub-Total	**15,682 ft.**	**$ 8,688,000**		**$ 13,838,000**
			Total Gravity Main Replacements	**47,304 ft.**	**$ 20,117,000**		**$ 32,048,000**
4	Agurs	FM-AGURS	Force Main	10,677 ft.	$ 4,160,000	2025	$ 5,428,000
	Agurs	FM-CHEROKEE	Force Main	1,504 ft.	$ 625,000		$ 816,000
	Agurs	FM-WEST_ALGONQUIN	Force Main	1,329 ft.	$ 241,000		$ 315,000
	Cross Bayou	FM-CADILLAC	Force Main	1,443 ft.	$ 539,000		$ 704,000
	Princess Park	FM-FANNIN	Force Main	43 ft.	$ 17,000		$ 23,000
	Texas Pierre	FM-PATZMAN_PARK	Force Main	5,724 ft.	$ 1,440,000		$ 1,879,000
			Sub-Total	**20,720 ft.**	**$ 7,022,000**		**$ 9,165,000**
5	Springfield	FM-ST_CHARLES	Force Main	9,459 ft.	$ 2,261,000	2025	$ 2,951,000
	Shorewood	FM-PINECREST	Force Main	9,809 ft.	$ 3,214,000		$ 4,194,000
	Shorewood	FM-SHOREWOOD	Force Main	902 ft.	$ 459,000		$ 599,000
			Sub-Total	**20,170 ft.**	**$ 5,934,000**		**$ 7,744,000**
			Total Force Main Replacements	**40,890 ft.**	**$ 12,956,000**		**$ 16,909,000**
6	Agurs	AGURS LS	Lift Station	6 mgd	$ 473,000	2025	$ 618,000
	Agurs	NORTH HEARNE LS	Lift Station	0.4 mgd	$ 170,000		$ 222,000
	Agurs	WEST ALGONQUIN LS	Lift Station	0.4 mgd	$ 40,000		$ 53,000
	Texas Pierre	PATZMAN PARK LS	Lift Station	0.8 mgd	$ 105,000		$ 138,000
	Cross Bayou	CADILLAC LS	Lift Station	2 mgd	$ 589,000		$ 769,000
	Shorewood	LONG TIMBER LS	Lift Station	0.7 mgd	$ 152,000		$ 199,000

Work Package	Basin	Project	Type	Description	2016 Capital Cost	Bid Year	Bid Year Capital Cost
	Shorewood	PINECREST LS	Lift Station	2 mgd	$ 507,000		$ 662,000
	Shorewood	SHOREWOOD LS	Lift Station	0.4 mgd	$ 129,000		$ 169,000
	Springfield	SAINT CHARLES PLACE LS	Lift Station	0.5 mgd	$ 163,000		$ 213,000
	Princess Park	FANNIN LS	Lift Station	6 mgd	$ 1,781,000		$ 2,324,000
Total Lift Station Improvements				**19 mgd**	**$ 4,109,000**		**$ 5,367,000**
TOTAL PHASE 5 COST					**$ 37,182,000**		**$ 54,324,000**

Table 2-8: Summary of Annual O&M Costs

Phase	Emergency Repair	Root Control	CCTV	Lift Station	Total
1	$ 26,000	$ 26,000	$ 61,000	$ 21,000	$ 134,000
2	$ 10,000	$ 10,000	$ 24,000	$ 12,000	$ 56,000
3	$ 21,000	$ 21,000	$ 49,000	$ 10,000	$ 101,000
4	$ 12,000	$ 12,000	$ 29,000	$ 22,000	$ 75,000
5	$ 16,000	$ 16,000	$ 38,000	$ 5,000	$ 75,000

Table 2-9: Factored 10-Year Operation and Maintenance Costs

	NPW	Year										
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Phase 1	$ 1,206,000	$ -	$ -	$ 143,000	$ 147,000	$ 151,000	$ 156,000	$ 161,000	$ 165,000	$ 170,000	$ 175,000	$ 181,000
Phase 2	$ 448,000	$ -	$ -	$ -	$ 62,000	$ 64,000	$ 65,000	$ 67,000	$ 69,000	$ 71,000	$ 74,000	$ 76,000
Phase 3	$ 707,000	$ -	$ -	$ -	$ -	$ 114,000	$ 118,000	$ 121,000	$ 125,000	$ 128,000	$ 132,000	$ 136,000
Phase 4	$ 225,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 96,000	$ 98,000	$ 101,000
Phase 5	$ 150,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 98,000	$ 101,000
Total	$ 2,736,000	$ -	$ -	$ 143,000	$ 209,000	$ 329,000	$ 339,000	$ 349,000	$ 359,000	$ 465,000	$ 577,000	$ 595,000

2.4.3 Implementation Schedule

The implementation schedule includes major tasks required for project execution. The schedule is setup into four major components: engineer procurement, preliminary and final design, bid and award, and construction. The times allotted for each task are based on general industry standards, construction cost, and B&V's experience on similar projects. The schedule assumes three months for engineer procurement, ten to twelve months for preliminary and final design, four months for bid and award, and nine to eighteen months for construction activities. It is assumed most of the permitting, ROW acquisition, and pipeline servitudes activities follow concurrently during preliminary and final design phase. The schedule assumes a traditional design-bid-build delivery method. The construction projects are phased and bidding task is staggered to allow the City to manage the projects. Figure 2-2 below shows the projects proposed schedule. Details for project start dates, interim milestones (preliminary design, final design, permitting, and bid & award) and end dates are presented in Table 2-10.

The measures specified within the capacity assessment remediation measures plan shall be completed no later than 12 years from the Effective Date of the Consent Decree. The City has elected to evaluate the results of the sewer system remediation measures plan to determine how the actual reduction in infiltration and inflow affect some elements of the capacity assessment remedial measures plan. Capacity projects have been identified and sized based on the best information available at this time and predictive hydraulic modeling of the collection system. Reductions to infiltration and inflow quantities may vary from those predicted. The City may elect to flow monitor after the completion of sewer system projects to determine actual rather than predicted flow volumes. The implementation of some elements have been scheduled in the later part of the Consent Decree implementation schedule to accommodate any changes to planned facilities based on new information. These measures will allow the City to avoid overbuilding of elements of the capacity projects.

WORK PACKAGE	DESCRIPTION	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2024 Q1	2024 Q2	2024 Q3	2024 Q4	2025 Q1	2025 Q2	2025 Q3	2025 Q4	2026 Q1	2026 Q2	2026 Q3	2026 Q4
	PHASE 1	53 months																																										
1	FM-CEDAR GROVE SEG 1	3 MO.	10 MO.		4 MO.	15 MO.																																						
2	FM-CEDAR GROVE SEG 2					3 MO.	10 MO.		4 MO.	18 MO.																																			
3	CEDAR GROVE LS									3 MO.	10 MO.		4 MO.	18 MO.																															
	PHASE 2													52 months																														
1	GR-QUEENSBORO SEG 1-9 & GR-SOUTHSIDE SEG 1-8													3 MO.	10 MO.		4 MO.	12 MO.																										
2	GR-SOUTHSIDE SEG 9-14 & GR-WESTSIDE SEG 1, 2																	3 MO.	10 MO.		4 MO.	12 MO.																							
3	FM-PINEHILL_RD, FM-SOUTH_HIGHLAND																					3 MO.	10 MO.		4 MO.	12 MO.																		
4	FM-DARIEN, FM-HARDY																									3 MO.	10 MO.		4 MO.	12 MO.														
5	SOUTH HIGHLANDS LS, QUERBES LS																													3 MO.	10 MO.		4 MO.	12 MO.									
6	DARIEN LS, HARDY LS, ALABAMA LS, PINEHILL ROAD LS																																	3 MO.	10 MO.		4 MO.	10 MO.					
	PHASE 3																																										
1	GR-WALLACE SEG 1																																										
2	GR-WALLACE SEG 2, 3, and 4																																										
3	GR-WALLACE SEG 5																																										
4	GR-WALLACE SEG 6, and 7																																										
5	GR-WALLACE SEG 8, 9, 10, and 11																																										
6	GR-BROADMOOR 1, 2, 3, and 4																																										
7	GR-BROADMOOR 5, 6, 7, and 8																																										
8	GR-BROADMOOR 9, 10, 11, 12 andGR-COOPER_RD 1, 2, and 3																																										
9	FM-QUERBES_BROADMOOR																																										
10	FM-CHAMPION_LAKE, KNIGHT_ST, SHREVE_ISLAND, DIXIE_GARDEN, HAVANNA, LEGARDY																																										
11	BROADMOOR LS, DIXIE GARDEN LS, SHREVE ISLAND LS																																										
12	LEGARDY LS, NORTH CADDO LS																																										
	PHASE 4																																										
1	GR-STONER-01																																										
2	GR-STONER SEG 2, 3, 4, and 5GR-BICKHAM SEG 1, and 2 GR-COUNTRY_CLUB SEG 1, 2, and 3																																										
3	GR-LSU SEG 1																																										
4	GR-LSU SEG 2, 3, 4, 5, and 6																																										
5	FM-PUBLIC_LANDING, BICKHAM, COUNTRY_CLUB																																										
6	FM-LUCAS_OUTFALL, LUCAS_WWTP																																										
7	COUNTRY CLUB, LONG LAKE, NORRIS FERRY ROAD, STONER LS																																										
8	LUCAS OUTFALL, STRATMORE LS																																										
	PHASE 5																																										
1	GR-BOGGY SEG 1, 2 GR-GILMER SEG 1, GR-PAGE 1, GR-SHOREWOOD SEG 1, GR-SPRINGFIELD SEG 1																																										
2	GR-LOWER_CROSS SEG 1, GR-CROSS SEG 1, GR-PRINCESS SEG 1, 2, and 3, GR-HIGHLAND SEG 1, and 2																																										
3	GR-TEXAS SEG 1, and 2																																										
4	FM-AGURS, CHEROKEE, WEST_ALGONQUIN, CADILLAC, FANNIN, PATZMAN_PARK																																										
5	FM-ST_CHARLES, PINECREST, SHOREWOOD																																										
6	AGURS, NORTH HEARNE, WEST ALGONQUIN, PATZMAN PARK, CADILLAC, LONG TIMBER, PINECREST, SHOREWOOD, SAINT CHARLES PLACE, FANNIN LS																																										

TODAY

ENGINEER PROCUREMENT

DESIGN PHASE

BID & AWARD

CONSTRUCTION PHASE

CAPACITY ASSESSMENT REMEDIATION MEASURES PLAN COMPLETION DATE 5/12/2026

CONSTRUCTION PHASE

PHASE 1 $8.5M

PHASE 1 $33.3M

PHASE 4 $25.8M

PHASE 4 $32.1M

PHASE 2 $12.7M

PHASE 2 $19.6M

PHASE 5 $20.2M

PHASE 5 $17.1M

PHASE 3 $75.9M

Figure 2-2: Work Package Implementation Schedule

Table 2-10: Summary of Capacity Improvements Work Packages

WORK PACKAGE	DESCRIPTION	START DATE	INITIAL DESIGN	DESIGN COMPLETION	PERMIT	BID & AWARD	CONSTRUCTION COMMENCEMENT	CONSTRUCTION COMPLETION
	PHASE 1							
1	FM-CEDAR GROVE SEG 1	3/1/2016	4/15/2016	1/2/2017	1/2/2017	5/2/2017	5/3/2017	8/3/2018
2	FM-CEDAR GROVE SEG 2	9/1/2017	10/16/2017	7/2/2018	7/2/2018	11/2/2018	11/5/2018	5/5/2020
3	CEDAR GROVE LS	10/2/2017	11/17/2017	8/2/2018	8/2/2018	12/3/2018	12/4/2018	6/4/2020
	PHASE 2							
1	GR-QUEENSBORO SEG 1 to 9 & GR-SOUTHSIDE SEG 1 to 8	1/2/2017	2/17/2017	11/2/2017	11/2/2017	3/2/2018	3/5/2018	3/5/2019
2	GR-SOUTHSIDE SEG 9 to 14 & GR-WESTSIDE SEG 1, 2	2/2/2017	3/17/2017	12/1/2017	12/1/2017	4/2/2018	4/5/2018	4/5/2019
3	FM-PINEHILL_RD, FM-SOUTH_HIGHLAND	10/1/2018	11/16/2018	8/1/2019	8/1/2019	12/1/2019	12/2/2019	12/2/2020
4	FM-DARIEN, FM-HARDY	11/1/2018	12/17/2018	9/2/2019	9/2/2019	1/2/2020	1/3/2020	1/4/2021
5	SOUTH HIGHLANDS LS, QUERBES LS	11/30/2018	1/14/2019	9/30/2019	9/30/2019	1/31/2020	2/3/2020	2/3/2021
6	DARIEN LS, HARDY LS, ALABAMA LS, PINEHILL ROAD LS	12/31/2018	2/15/2019	10/31/2019	10/31/2019	3/2/2020	3/3/2020	1/4/2021
	PHASE 3							
1	GR-WALLACE SEG 1	1/2/2018	2/19/2018	1/2/2019	1/2/2019	5/2/2019	5/3/2019	8/3/2020
2	GR-WALLACE SEG 2, 3, and 4	2/2/2018	3/19/2018	2/4/2019	2/4/2019	6/4/2019	6/5/2019	9/7/2020
3	GR-WALLACE SEG 5	3/2/2018	4/17/2018	1/4/2019	1/4/2019	5/6/2019	5/7/2019	8/7/2020
4	GR-WALLACE SEG 6, and 7	6/4/2018	7/19/2018	4/4/2019	4/4/2019	8/5/2019	8/6/2019	8/6/2020
5	GR-WALLACE SEG 8, 9, 10, and 11	5/4/2018	6/19/2018	5/6/2019	5/6/2019	9/6/2019	9/9/2019	9/9/2020
6	GR-BROADMOOR 1, 2, 3, and 4	7/4/2018	8/20/2018	5/6/2019	5/6/2019	9/6/2019	9/9/2019	9/9/2020
7	GR-BROADMOOR 5, 6, 7, and 8	8/3/2018	9/18/2018	6/3/2019	6/3/2019	10/3/2019	10/4/2019	10/5/2020
8	GR-BROADMOOR 9, 10, 11, 12 and GR-COOPER_RD 1, 2, and 3	9/3/2018	10/18/2018	7/3/2019	7/3/2019	11/4/2019	11/5/2019	9/4/2020
9	FM-QUERBES_BROADMOOR	10/3/2018	11/19/2018	10/3/2019	10/3/2019	2/3/2020	2/6/2020	5/6/2021
10	FM-CHAMPION_LAKE, KNIGHT_ST, SHREVE_ISLAND, DIXIE_GARDEN, HAVANNA, LEGARDY	1/3/2019	2/18/2019	11/4/2019	11/4/2019	3/5/2020	3/6/2020	12/7/2020
11	BROADMOOR LS, DIXIE GARDEN LS, SHREVE ISLAND LS	2/4/2019	3/19/2019	12/4/2019	12/4/2019	4/6/2020	4/7/2020	4/7/2021
12	LEGARDY LS, NORTH CADDO LS	3/4/2019	4/19/2019	1/6/2020	1/6/2020	5/6/2020	5/7/2020	2/8/2021
	PHASE 4							
1	GR-STONER-01	7/1/2019	8/16/2019	7/1/2020	7/1/2020	11/3/2020	11/4/2020	2/4/2022
2	GR-STONER SEG 2, 3, 4, and 5 GR-BICKHAM SEG 1, and 2 GR-COUNTRY_CLUB SEG 1, 2, and 3	9/30/2019	11/14/2019	7/30/2020	7/30/2020	11/30/2020	12/1/2020	12/1/2021
3	GR-LSU SEG 1	10/30/2019	12/16/2019	8/31/2020	8/31/2020	12/31/2020	1/1/2021	1/3/2022
4	GR-LSU SEG 2, 3, 4, 5, and 6	12/2/2019	1/17/2020	10/2/2020	10/2/2020	2/2/2021	2/3/2021	2/3/2022
5	FM-PUBLIC_LANDING, BICKHAM, COUNTRY_CLUB	6/2/2023	7/17/2023	4/2/2024	4/2/2024	8/2/2024	8/5/2024	8/5/2025
6	FM-LUCAS_OUTFALL, LUCAS_WWTP	3/2/2023	4/17/2023	3/1/2024	3/1/2024	7/1/2024	7/4/2024	10/6/2025
7	COUNTRY CLUB, LONG LAKE, NORRIS FERRY ROAD, STONER LS	1/2/2023	2/17/2023	1/4/2024	1/4/2024	5/6/2024	5/7/2024	8/7/2025
8	LUCAS OUTFALL, STRATMORE LS	2/3/2023	3/20/2023	2/5/2024	2/5/2024	6/5/2024	6/6/2024	10/6/2025

WORK PACKAGE	DESCRIPTION	START DATE	INITIAL DESIGN	DESIGN COMPLETION	PERMIT	BID & AWARD	CONSTRUCTION COMMENCEMENT	CONSTRUCTION COMPLETION
	PHASE 5							
1	GR-BOGGY SEG 1, 2 GR-GILMER SEG 1, GR-PAGE 1, GR-SHOREWOOD SEG 1, GR-SPRINGFIELD SEG 1	11/2/2020	12/17/2020	9/3/2021	9/3/2021	1/3/2022	1/4/2022	1/4/2023
2	GR-LOWER_CROSS SEG 1, GR-CROSS SEG 1, GR-PRINCESS SEG 1, 2, and 3, GR-HIGHLAND SEG 1, and 2	12/3/2020	1/18/2021	10/4/2021	10/4/2021	2/7/2022	2/8/2022	2/8/2023
3	GR-TEXAS SEG 1, and 2	11/3/2020	12/18/2020	11/3/2021	11/3/2021	3/4/2022	3/4/2022	6/5/2023
4	FM-AGURS, CHEROKEE, WEST_ALGONQUIN, CADILLAC, FANNIN, PATZMAN_PARK	1/2/2024	2/19/2024	11/4/2024	11/4/2024	3/6/2025	3/7/2025	3/9/2026
5	FM-ST_CHARLES, PINECREST, SHOREWOOD	2/2/2024	3/18/2024	12/2/2024	12/2/2024	4/2/2025	4/3/2025	4/3/2026
6	AGURS, NORTH HEARNE, WEST ALGONQUIN, PATZMAN PARK, CADILLAC, LONG TIMBER, PINECREST, SHOREWOOD, SAINT CHARLES PLACE, FANNIN LS	3/4/2024	4/19/2024	1/6/2025	1/6/2025	5/6/2025	5/7/2025	3/6/2026

3.0 Wastewater Treatment Plants

The City operates two wastewater treatment plants. The discharge parameters for Louisiana Pollution Discharge Elimination System (LPDES) permit for each plant are shown in Table 3-1. As part of the Project, the process and hydraulic capacities for both treatment plants was reviewed.

Table 3-1: Lucas and North Region WWRP Permit

Effluent Characteristic	Monthly Average	Weekly Average
Biochemical Oxygen Demand (BOD_5)	30 mg/L (1,751 lb/day)	45 mg/L
Total Suspended Solids (TSS)	30 mg/L (1,751 lb/day)	45 mg/L
Fecal Coliform colonies/100mL	200	400

3.1 WWTP DESCRIPTIONS

The Lucas WWTP is a 30 mgd activated sludge plant designed for BOD and TSS reduction. Major process treatment components include screening and grit removal, conventional biological treatment, final clarification, and UV disinfection.

The North Regional WWTP is a 7 mgd activated sludge plant designed also for BOD and TSS removal. Raw wastewater is conveyed to the site and then distributed to the plant for treatment. Major process treatment components include influent pumping, screening and grit removal, conventional biological treatment, final clarification, UV disinfection, and effluent pumping.

Figures 3-1 and 3-2 provide a schematic of the overall process flow for the Lucas and North Regional WWTPs.

3.2 PROCESS MODEL OVERVIEW

A review of plant operating data and process loadings was reviewed for each treatment plant. The loadings were projected for the 20-year planning horizon and then used on the BioWin process model to confirm the ability of the existing facilities to meet permit limits. If the permit limits were to remain unchanged and flows to the plant were in line with the projections during the planning horizon, the treatment plants would have the process capacity to continue to meet the permit limits identified in Table 3-1.

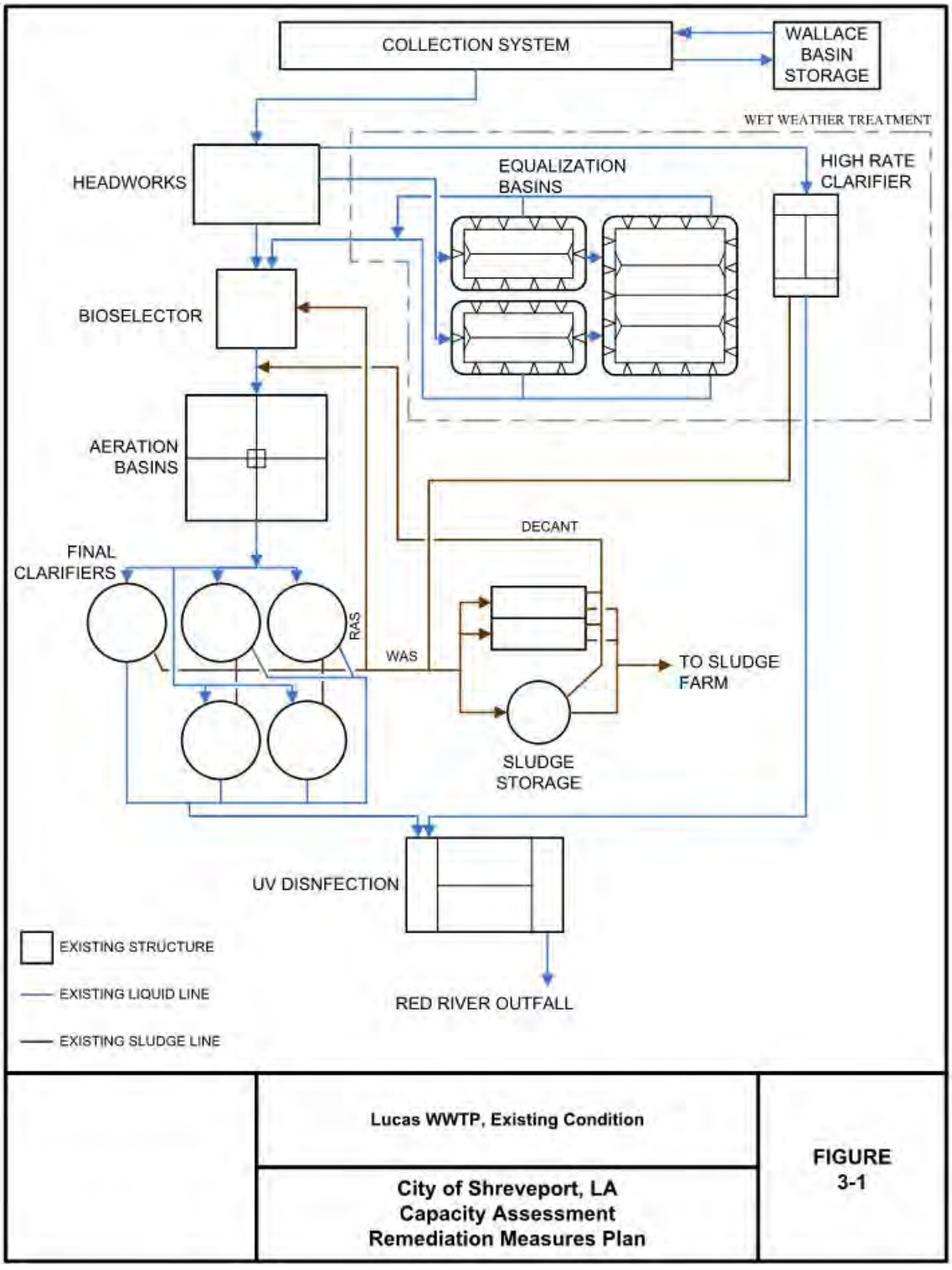


Figure 3-1: Lucas WWTP Existing Conditions

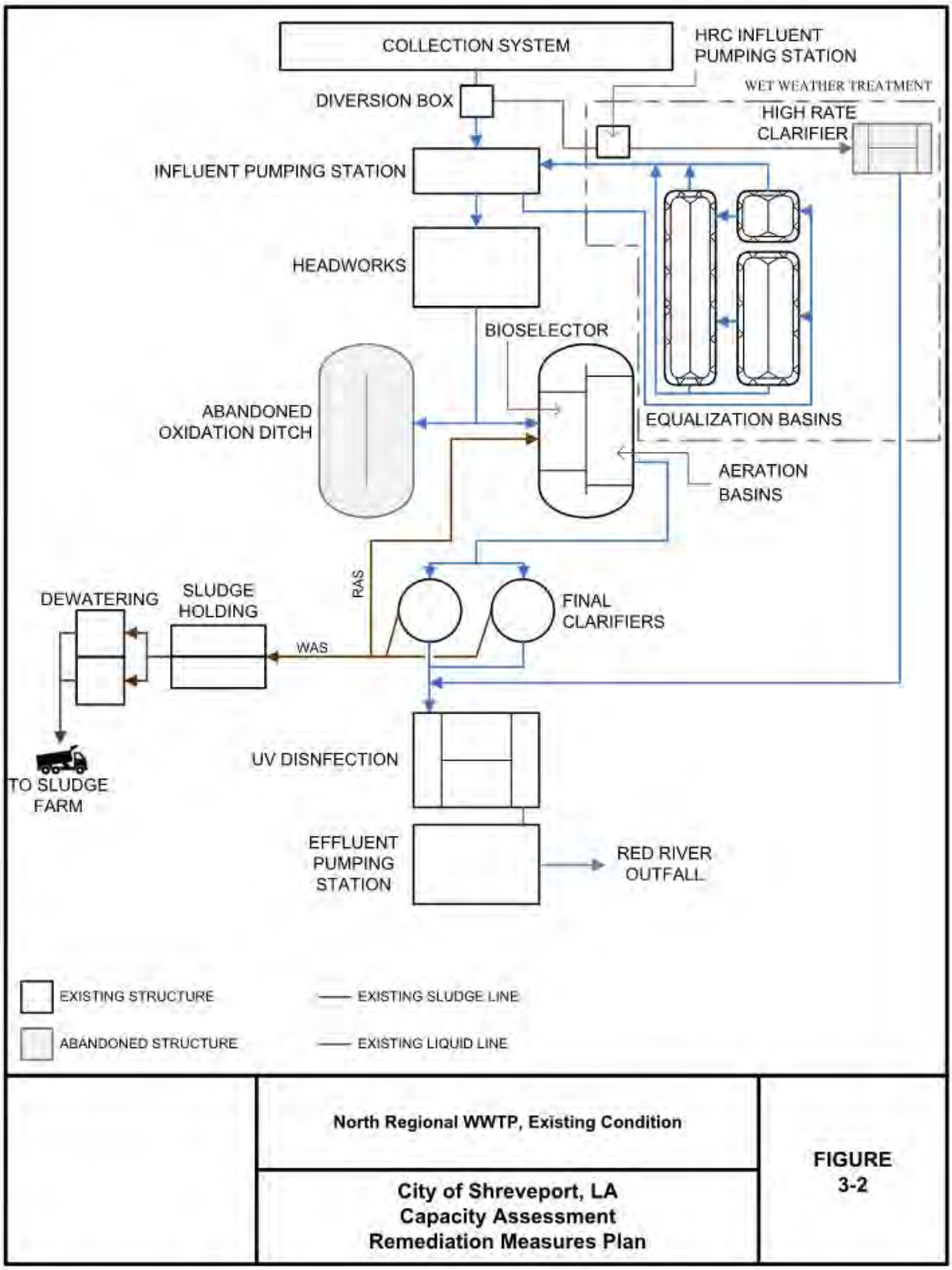


Figure 3-2: North Regional WWTP Existing Conditions

3.3 HYDRAULIC MODEL OVERVIEW

The Electronic Operations and Maintenance Manuals prepared by CDM Smith were reviewed to identify peak flow capacities through each treatment plant. The peak flow noted for Lucas WWTP is 80 mgd and 16 mgd for North Regional WWTP. A hydraulic model was developed for each plant to confirm the peak flows could pass through the existing facilities and identify any constraints.

For the Lucas WWTP, the peak hydraulic review noted that strict compliance with the Recommended Standards for Wastewater Facilities would not be met for freeboard at the aeration basins and for the screening channels. Additionally, the clarifier surface overflow rates and weir loading rates were exceeded. During peak flow events, higher rates can result in solids carry-over and short-circuiting of the clarifiers resulting in higher solids in the effluent.

For the North Regional WWTP, the peak hydraulic review noted that strict compliance with the Recommended Standards for Wastewater Facilities would not be met for freeboard at the aeration basins and for the screening channels.

All existing facilities at the Lucas and North Regional WWTPs were designed and constructed prior to the Recommended Standards for Wastewater Facilities being utilized by the Department of Health and Hospitals as the design standards for wastewater treatment plants. As appropriate, future work at the plants will incorporate provisions of the Recommended Standards.

3.4 WET WEATHER FLOW

Both treatment plants currently have equalization (EQ) basins and high rate clarifiers (HRC) onsite to handle peak flows. The Lucas WWTP has 20.3 million gallons (mg) onsite storage and 30 mgd HRC capacity. The largest equalization basin is currently unavailable, which reduces the storage capacity to 10 mg. There is additional storage available in the collection system in the Wallace Basin at the Huntington and West Shreveport oxidation lagoons. The City is currently upgrading the facilities that divert flow to the existing lagoons. The diversion facilities will be sized to divert approximately 20 mgd to the lagoons, which will remove enough flow from the system so that capacity upgrades to the downstream facilities are not required. This will to eliminate any capacity upgrades to the Wallace lift station and Wallace force main based on the modeled 2035 2-year storm.

The North Regional WWTP has 11.9 mg onsite storage and 30 mgd HRC capacity. The largest equalization basin is currently unavailable, which reduces the storage capacity to 6.9 mg. There is additional storage available using the abandoned oxidation ditch, which can be used to provide 3.0 mg of storage.

Based on the modeled 2-year storm event for the Year 2035 (refer to the *Collection System Capacity Analysis* Technical Memorandum for further information), the influent peak-hourly flow is approximately 220 mgd with I/I reduction at the Lucas WWTP or respective in-system storage basins. This equates to 40 mg of storage volume required to be handled with treatment, equalization basins, and in-system storage basin resulting from the excess capacity over the available 80 mgd treatment capacity for the Lucas WWTP. The peak hourly flow is approximately

52 mgd with I/I reduction at the North Regional WWTP. With the North Regional WWTP peak hourly incoming flow, the plant will need approximately 11.4 mg of storage volume over the available 16 mgd treatment capacity. Since adequate volume is currently unavailable for storage in the equalization basins, the remediation plan will address steps to allow the peak flow events to be managed.

3.5 REMEDIATION MEASURES PLAN

The remediation plan for the work at the treatment plants includes project descriptions, an implementation schedule, and costs associated with each project. This information is summarized in the following sections.

3.5.1 Project Descriptions

The following descriptions summarize the recommended projects required to address capacity deficiencies noted at the WWTPs.

Lucas WWTP

Figure 3-3 presents a schematic of the Lucas WWTP that includes the capacity projects discussed below.

Headworks

The new Headworks will have a capacity of 100 mgd and will function in parallel with the existing Headworks. Similar to the existing Headworks, the new facility will consist of 2 channels, and each channel will consist of a bar screen and grit removal. A diversion point will be provided to allow peak flows to be diverted to the equalization basins.

Ahead of the new Headworks station will be a new junction box which will demanifold the existing influent force mains from the Stoner, the Cedar Grove, the Bayou Pierre, the Lucas, and the Wallace Lift Stations. Any plant return lines will also be routed to this junction box. Two effluent lines will distribute flow to each Headworks facility.

Flow Equalization

The three existing flow equalization basins will be rehabilitated and new aeration and mixing equipment provided. The EQ basins will receive all plant flow above the plants 80 mgd capacity. Flow in excess of what the plant and EQ basins can handle will be stored in the collection system or be handled by the wet weather treatment. The existing Huntington and West Shreveport lagoons will continue to be used to divert flow from the Wallace basin.

The existing EQ basin pumping station will be rehabilitated. The pumps and valves will all be replaced.

Prior to detailed design, a detailed investigation of the existing basins should be completed to identify the failure mechanism. The basin design should account for the findings of the investigation.

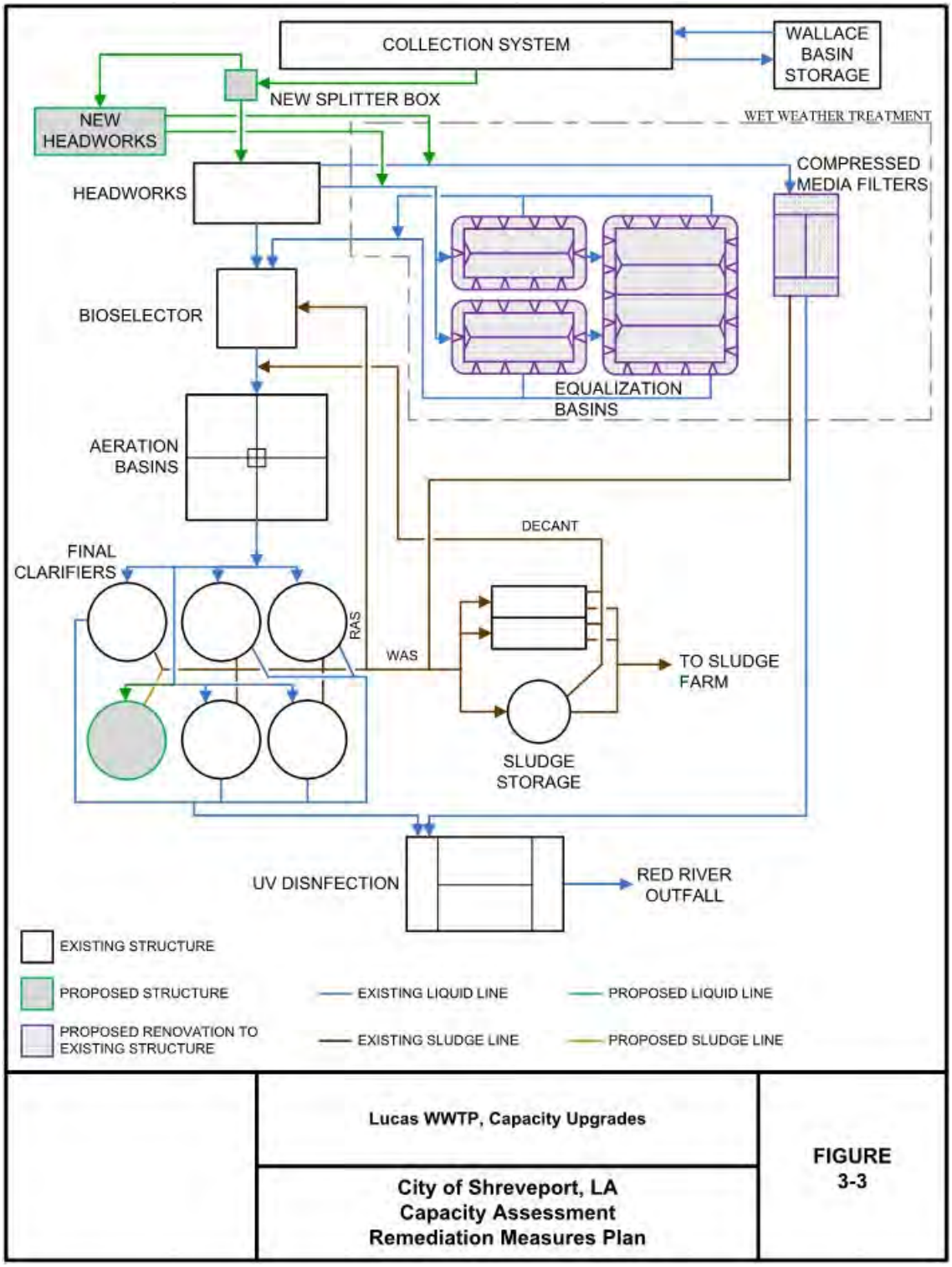


Figure 3-3: Lucas WWTP with Capacity Upgrades

New Final Clarifier

A sixth final clarifier is required immediately for plant operation. Clarifier No. 6 will be similar to Clarifier No. 5 in its capacity. Additionally, modifications at the splitter box will be required to split flow between clarifiers 1-4 and clarifiers 5-6. A new splitting structure may be considered to address the current issues pertaining to washout, which is a frequent occurrence in Clarifier No. 5.

A new return activated sludge (RAS) and waste activated sludge (WAS) pump dedicated to the new clarifier will be required.

Wet Weather Treatment

The high rate clarifier will be renovated to contain compressed media filters. The filter will accommodate flows up to 40 mgd using the existing facility footprint. During peak flow conditions, flow can be diverted to the compressed media filter facility for treatment. Treated effluent would be sent to the UV facility for disinfection prior to discharge.

North Regional WWTP

Figure 3-4 presents a schematic of the North Regional WWTP that includes the capacity projects discussed below.

Influent Pumping

The existing influent pump station has a firm capacity of approximately 33 mgd. The existing HRC pumping station will be modified to provide an approximate firm capacity of 19 mgd so that the modeled peak 2-hour flow of 52 mgd can be accommodated. Piping modifications will be required to allow the pumps to discharge directly to the EQ basin influent line.

Flow Equalization

The three existing flow equalization basins will be rehabilitated and new aeration and mixing equipment provided. The EQ basins will receive all excess plant flow over 16 mgd.

Prior to detailed design, a detailed investigation of the existing basins should be completed to identify the failure mechanism. The basin design should account for the findings of the investigation.

3.5.2 Implementation Schedule

The implementation schedule is presented in Figure 3-5. This figure shows the start of the more critical items needed to address peak and wet weather capacity at the Lucas WWTP. Final Clarifier No. 6 will provide relief to the surface overflow rate and solids loading rate and bring performance during peak flow more in line with design standards. The work on rehabilitation of all equalization basins will address failures in the basin concrete, replacement of all mixing and aeration equipment, and replacement of the return pumps. The design phase is extended to allow time for a detailed geotechnical review of the existing basins and soils. The extended construction time will allow phased construction of the basins to allow facilities to be taken out of service while maintaining services to other basins. The EQ basins at both WWTPs will be updated at the same time.

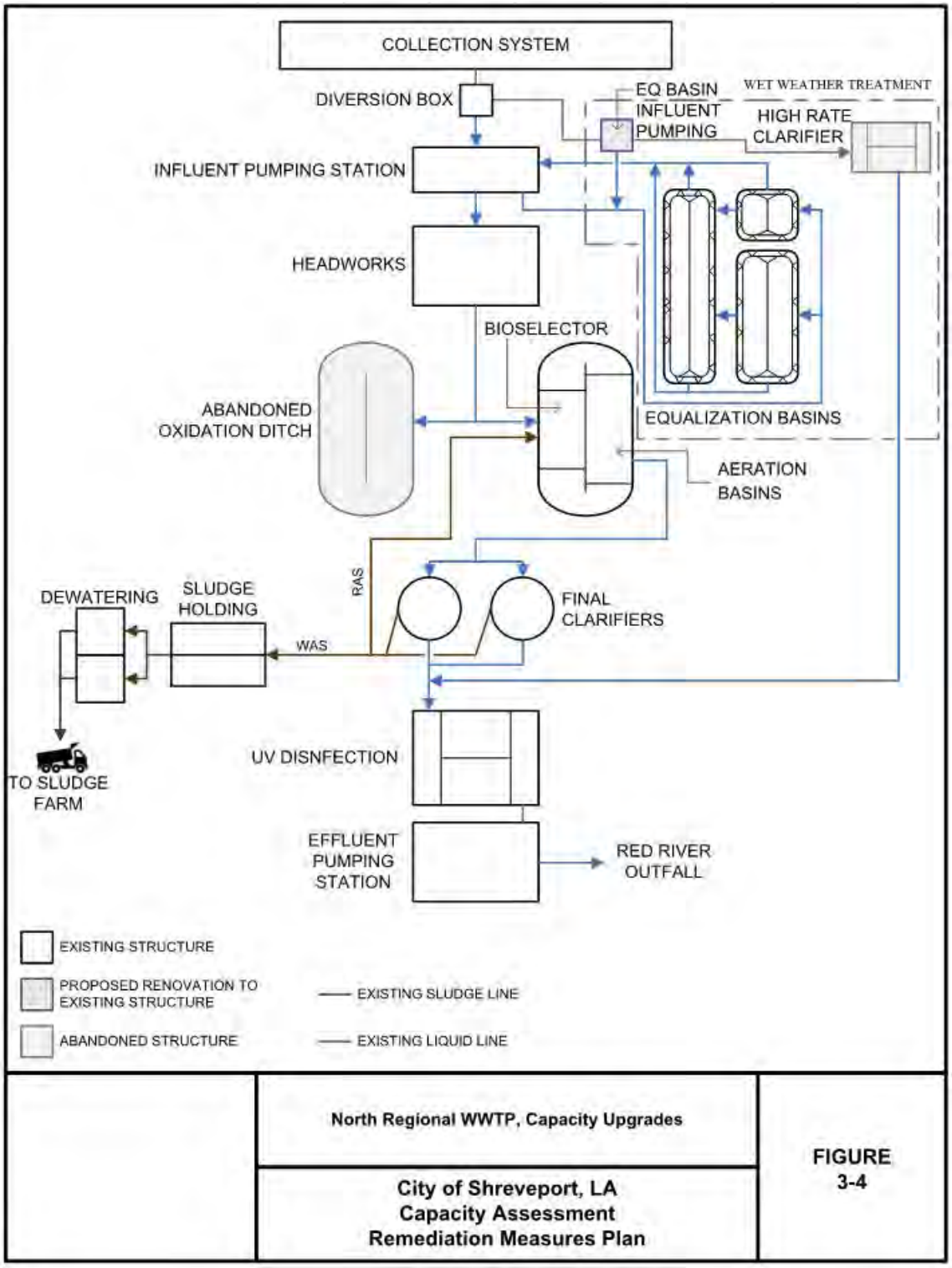


Figure 3-4: North Regional WWTP with Capacity Upgrades

The Headworks expansion will be scheduled to be online at the end of the phasing of the collection system improvements. As the collection system is improved, the flow will be monitored. If the monitoring indicates that flow to the plant is increasing to the capacity of the existing Headworks facility, the timing of the expansion can be moved forward to an earlier date.

Conversion of the exiting HRC to compressed media filtration will occur at the end of the consent decree schedule. The schedule will allow the City time to monitor system flows and to address permitting of the facility. An extended time during the design phase is provided to allow for an extended permit coordination and approval.

3.5.3 Cost Summary

Table 3-2 presents probable construction costs, overall project costs, and O&M costs associated with each project. Costs are assigned to the year when the project is anticipated to be implemented. Costs are shown for a 10 year period through the year 2026. Assumptions for the cost development are summarized below.

- Interest Rate – 3%
- Contractor Mobilization and Bond – 15%
- General Sitework – 10%
- Instrumentation & Control – 5%
- Electrical – 10%
- Contractor Overhead and Profit – 10%
- Contingency – 35%
- Engineering, Legal, Administration – 15%
- Operation and Maintenance Salary - $17/hour
- Electricity - $0.08/KWHr

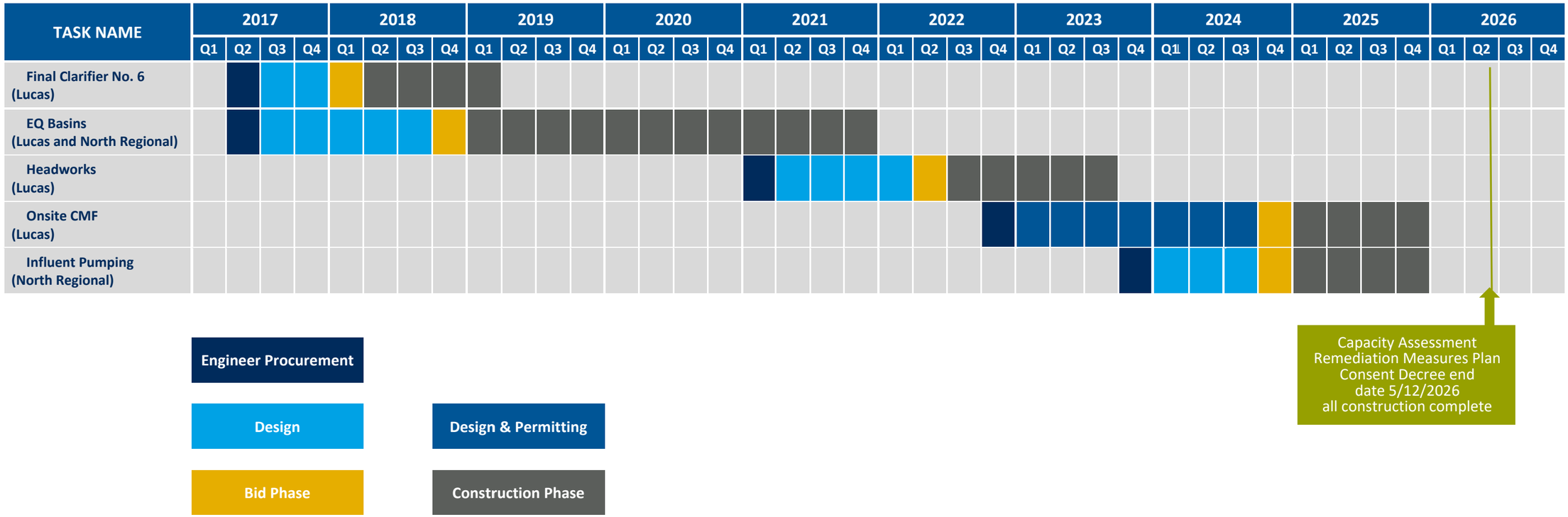


Figure 3-5: Wastewater Treatment Plant Remediation Measure Plan Schedule

Table 3-2: Summary of Probable Project and Operation and Maintenance Costs

Item	NPW	Year										
Lucas WWTP		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
CAPITAL COSTS		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EQ Basin Rehabilitation	$ 6,534,000	$ -	$ -	$ -	$ 4,760,000	$ 2,452,000	$ -	$ -	$ -	$ -	$ -	$ -
Headworks Expansion	$ 4,288,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,048,000	$ 3,165,000	$ -	$ -	$ -
Final Clarifier No. 6	$ 2,736,000	$ -	$ -	$ 2,177,000	$ 748,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
HRC Conversion to CMF	$ 4,797,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,259,000	$ -
Contractor Mobilization and Bond	$ 2,755,000	$ -	$ -	$ 327,000	$ 827,000	$ 369,000	$ -	$ 309,000	$ 475,000	$ -	$ 940,000	$ -
General Sitework	$ 1,838,000	$ -	$ -	$ 219,000	$ 551,000	$ 246,000	$ -	$ 206,000	$ 318,000	$ -	$ 627,000	$ -
Instrumentation & Control	$ 919,000	$ -	$ -	$ 110,000	$ 276,000	$ 123,000	$ -	$ 103,000	$ 159,000	$ -	$ 314,000	$ -
Electrical	$ 1,838,000	$ -	$ -	$ 219,000	$ 551,000	$ 246,000	$ -	$ 206,000	$ 318,000	$ -	$ 627,000	$ -
Contactor Overhead and Profit	$ 2,573,000	$ -	$ -	$ 306,000	$ 772,000	$ 344,000	$ -	$ 288,000	$ 444,000	$ -	$ 877,000	$ -
Contingency	$ 9,000,000	$ -	$ -	$ 1,069,000	$ 2,700,000	$ 1,203,000	$ -	$ 1,006,000	$ 1,553,000	$ -	$ 3,068,000	$ -
Engineering, Legal, Administrative	$ 5,594,000	$ -	$ -	$ 665,000	$ 1,678,000	$ 748,000	$ -	$ 625,000	$ 966,000	$ -	$ 1,907,000	$ -
CAPITAL COSTS TOTAL:	$ 42,872,000	$ -	$ -	$ 5,092,000	$ 12,863,000	$ 5,731,000	$ -	$ 4,791,000	$ 7,398,000	$ -	$ 14,619,000	$ -
O & M COSTS												
Operations	$ 107,000	$ -	$ -	$ 4,000	$ 8,000	$ 8,000	$ 8,000	$ 19,000	$ 19,000	$ 20,000	$ 25,000	$ 25,000
Equipment Maintenance	$ 107,000	$ -	$ -	$ 4,000	$ 8,000	$ 8,000	$ 8,000	$ 19,000	$ 19,000	$ 20,000	$ 25,000	$ 25,000
Electricity costs	$ 829,000	$ -	$ -	$ 32,000	$ 91,000	$ 94,000	$ 97,000	$ 114,000	$ 117,000	$ 121,000	$ 173,000	$ 178,000
O&M COSTS TOTAL :	$ 1,043,000	$ -	$ -	$ 40,000	$ 107,000	$ 110,000	$ 113,000	$ 152,000	$ 155,000	$ 161,000	$ 223,000	$ 228,000
North Regional WWTP												
CAPITAL COSTS												
EQ Basin Rehab	$ 4,878,000	$ -	$ -	$ -	$ -	$ 1,831,000	$ 3,770,000	$ -	$ -	$ -	$ -	$ -
Influent Pumping	$ 805,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,051,000	$ -
Contractor Mobilization and Bond	$ 853,000	$ -	$ -	$ -	$ -	$ 275,000	$ 566,000	$ -	$ -	$ -	$ 158,000	$ -
General Sitework	$ 570,000	$ -	$ -	$ -	$ -	$ 184,000	$ 378,000	$ -	$ -	$ -	$ 106,000	$ -
Instrumentation & Control	$ 286,000	$ -	$ -	$ -	$ -	$ 93,000	$ 189,000	$ -	$ -	$ -	$ 54,000	$ -
Electrical	$ 570,000	$ -	$ -	$ -	$ -	$ 184,000	$ 378,000	$ -	$ -	$ -	$ 106,000	$ -
Contractor Overhead and Profit	$ 797,000	$ -	$ -	$ -	$ -	$ 257,000	$ 529,000	$ -	$ -	$ -	$ 148,000	$ -
Contingency	$ 2,789,000	$ -	$ -	$ -	$ -	$ 899,000	$ 1,850,000	$ -	$ -	$ -	$ 517,000	$ -
Engineering, Legal, Administrative	$ 1,733,000	$ -	$ -	$ -	$ -	$ 559,000	$ 1,149,000	$ -	$ -	$ -	$ 321,000	$ -
CAPITAL COSTS TOTAL:	$ 13,281,000	$ -	$ -	$ -	$ -	$ 4,282,000	$ 8,809,000	$ -	$ -	$ -	$ 2,461,000	$ -
O & M COSTS												
Operations	$ 24,000	$ -	$ -	$ -	$ -	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 6,000	$ 6,000
Equipment Maintenance	$ 24,000	$ -	$ -	$ -	$ -	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 4,000	$ 6,000	$ 6,000
Electricity costs	$ 142,000	$ -	$ -	$ -	$ -	$ 21,000	$ 22,000	$ 22,000	$ 23,000	$ 24,000	$ 33,000	$ 34,000
O&M COSTS TOTAL :	$ 190,000	$ -	$ -	$ -	$ -	$ 29,000	$ 30,000	$ 30,000	$ 31,000	$ 32,000	$ 45,000	$ 46,000

ATTACHMENT 1

CONSENT DECREE
SECTIONS F.45, 46, AND 47

(j). identify any insufficient capacity in the WWTP, assuming insufficient capacity is the inability to provide full treatment to all flow reaching the plant and discharge those flows in full compliance with the LPDES Permits.

44. Upon review, EPA shall notify the City of any deficiencies in the capacity assessment report and require correction of these deficiencies within the time period specified in Section V ((Review, Approval, and Implementation of Deliverables), ¶ 16.

F. CAPACITY ASSESSMENT REMEDIATION MEASURES PLAN

45. The City shall submit to EPA for review and approval a capacity assessment remediation measures plan within twenty-six (26) months from the Effective Date of this Consent Decree. This plan shall include measures and schedules which, when implemented, will result in Adequate Capacity in the WCTS and/or the WWTP, such that SSOs and overloading at the WWTP and WWTP LPDES Permit noncompliance will be eliminated under current and anticipated future increased capacity conditions. The capacity assessment remediation measures plan shall be submitted pursuant to Section V (Review, Approval, and Implementation of Deliverables), ¶¶ 12 -15.

46. The City shall, in keeping with the requirements of Section V., ¶ 18, audit its capacity assessment remediation measures plan and certify, that the plan provides measures which will result in Adequate Capacity in the WCTS and/or its WWTP, such that SSOs and overloading at the WWTP, and WWTP LPDES Permit noncompliance will be eliminated under current and anticipated future increased capacity conditions. The City shall submit for review and comment the certification in conjunction with submission of the capacity assessment remediation measures plan in searchable electronic form.

47. The capacity assessment remediation measures plan shall:

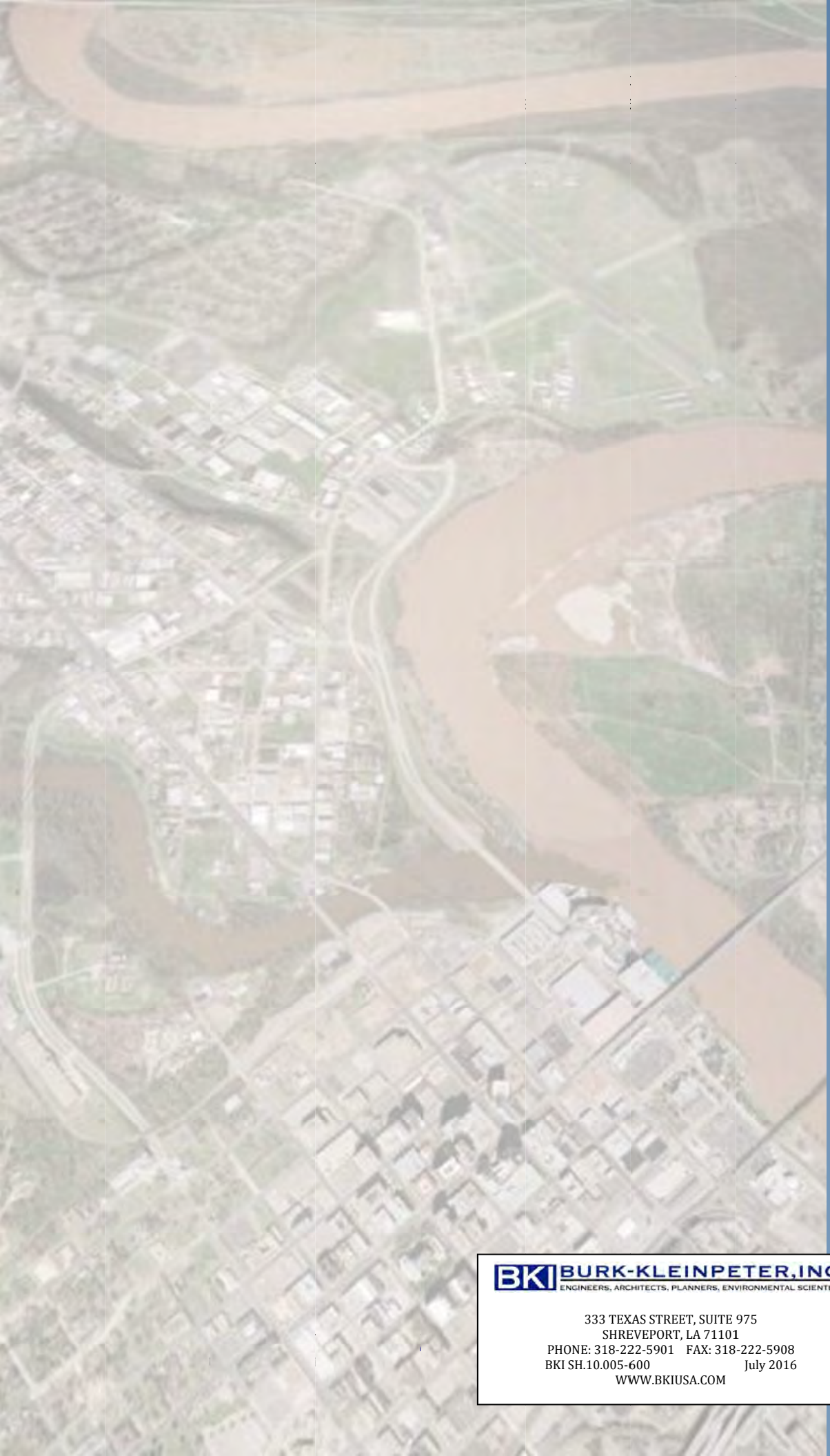
(a). identify all measures necessary to achieve Adequate Capacity, and if insufficient capacity to accommodate projected peak wet weather flows existing in any portion of the WCTS or WWTP(s), and propose measures to provide Adequate Capacity to eliminate SSOs and/or overloading at the WCTS and WWTP(s). Specific remedial measures to address capacity limitations may include increases in Pumping Station and sewer capacity in the WCTS, construction of storage or equalization basin facilities, and increases in wastewater treatment capacity;

(b). identify upgrades and repair measures to achieve WWTP compliance with all LPDES Permit requirements;

(c). provide estimated capital, operation and maintenance, and present value costs for each identified remedial measure in year-specific dollars; and

(d). provide a fixed end-date schedule to design, construct, and implement all proposed measures as expeditiously as possible, including interim dates for initial design, design completion, completed permitting, contract award, construction commencement, and completed construction for each proposed measure. The schedule shall provide that all tasks shall be completed as expeditiously as possible but in no event later than the deadline set forth in ¶ 50.

48. Should the capacity assessment remediation measures plan require revision of the sewer system remediation measures plan(s) developed according to Section VI. C., the City shall identify all measures requiring revisions within the capacity assessment remediation measures plan, and upon approval of these revisions by EPA, amend the sewer system remediation measures plan(s) to include the approved revisions.



BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

333 TEXAS STREET, SUITE 975
SHREVEPORT, LA 71101
PHONE: 318-222-5901 FAX: 318-222-5908
BKI SH.10.005-600 July 2016
WWW.BKIUSA.COM