



January 21, 2020 (REVISED 1-28-2020)

Mr. Kevin Padgett  
Public Works Director  
City of Seabrook  
1100 Red Bluff Drive  
Seabrook, Texas 77586

Re: Proposal for Professional Engineering, Surveying and Geotechnical Services for the City of Seabrook – Wastewater System Infrastructure Retrofit, Phase 1  
CobbFendley Project No. 1912-031-01

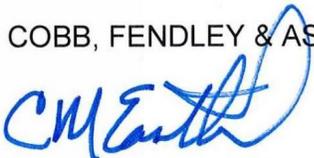
Dear Mr. Padgett:

Cobb, Fendley & Associates, Inc. (CobbFendley) is pleased to submit this proposal to provide Professional Engineering, Surveying and Geotechnical Services for the City of Seabrook Wastewater System Infrastructure Retrofit, Phase 1 in Seabrook, Texas. CobbFendley proposes to provide the Scope of Services and Compensation as outlined in the attached Exhibit A.

Thank you for the opportunity to submit this proposal. Please advise if you have any questions or require additional information.

Sincerely,

COBB, FENDLEY & ASSOCIATES, INC.

  
Charles M. Eastland, P.E.  
Vice President / Regional Manager

Attachments

This proposal accepted by:

CITY OF SEABROOK, TEXAS

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date of Authorization

**EXHIBIT A**  
**SCOPE OF SERVICES & COMPENSATION**

Cobb, Fendley & Associates, Inc.  
Proposal for Professional Engineering, Surveying and Geotechnical Services  
City of Seabrook – Wastewater System Infrastructure Retrofit, Phase 1

**General**

The City of Seabrook, and the surrounding areas which are served by the City's wastewater system, is composed of 16,000 people and approximately 3,490 acres. The residents of the City of Seabrook are served by a single wastewater treatment plant which collects sewage from 22 lift stations throughout the City and surrounding areas. The proposed project is a wastewater system retrofit including a new wastewater treatment plant and redirecting a total of approximately 21,500 feet of forcemain from four of the existing lift stations to the higher elevation facility location.

The proposed system retrofit will include a new wastewater facility close to Pine Gully on the north side of the City. This facility will be called Pine Gully Wastewater Treatment Plant (PGWWTP) and will be a 2 - 2.5 Million Gallon Per Day (MGD) facility, which is the flow treated at the existing Main Street Wastewater Treatment Plant (MSWWTP). The proposed plant location is a less hazardous location at a higher elevation, further inland. The PGWWTP will be located on property which was removed from the Special Flood Hazard Area by a Letter of Map Revision Based on Fill, just north of the current Seabrook Public Works Building.

Demolition of the MSWWTP is not included with this contract.

- See *Exhibit B* for the Pine Gully Wastewater Treatment Plant Layout
- See *Exhibit C* for the Proposed Force Main and Lift Station Construction
- See *Exhibit D* for Opinion of Probable Construction Cost

**Construction Estimate**

- A Preliminary Opinion of Probable Construction Cost for the City of Seabrook Wastewater Infrastructure Retrofit Phase 2 was prepared as part of the grant application submittal. (See *Exhibit D* for Opinion of Probable Construction Cost)

## **BASIC SERVICES**

Cobb, Fendley & Associates, Inc. (CobbFendley) will provide the following scope of services:

## **DESIGN**

### **A. PINE GULLY WASTEWATER TREATMENT PLANT**

#### **a. PRELIMINARY ENGINEERING**

- Determine hydraulic profile for the proposed plant.
- Meet with the City as may be necessary to review the design and provide any clarifications and/or changes that may be required.
- Perform calculations to determine adequate tank capacity and provide design recommendations for each
- Perform field reconnaissance and review design survey, provided under the Additional Services section of this proposal.
- Review Geotechnical Investigation report and recommendations.
- Develop overall conceptual Treatment Process (treatment process flow diagram) and preliminary site plan accommodating any future expansion.
- Prepare preliminary opinion of probable construction cost for the project.

#### **b. CIVIL/YARD PIPING**

- Determine piping plan for internal plant functions
- Route piping to avoid conflict during construction and with future expansions
- Site grading and drainage plan
- Site layout and dimension plan
- Paving layout and detailing
- Miscellaneous civil details
- Submittals at 30%, 60%, 90% and Final
- Technical Specifications

#### **c. MECHANICAL**

- Equipment detailing
- Basin equipment layout
- Building layout for required components
- Miscellaneous mechanical details
- Submittals at 60%, 90% and Final
- Technical Specifications

#### **d. STRUCTURAL**

- Onsite lift station structural design and rebar consideration
- Building foundation design
- Overhead structure design
- Basin design including foundation
- Miscellaneous structural detailing and notes
- Submittals at 30%, 60%, 90% and Final
- Technical Specifications

**e. ELECTRICAL**

- Electrical site plan
- Instrumentation and controls for all required components
- Electrical equipment elevation
- Conduit schedule and schematics
- Miscellaneous electrical details
- Submittals at 60%, 90% and Final
- Technical Specifications

CobbFendley will make the necessary changes to the final drawings and documents resulting from the interim and final reviews and prepare “bid ready” documents including obtaining and/or securing approvals required by governmental authorities with jurisdiction over the designated or the operation of the project.

**B. LIFT STATION(S) AND FORCE MAIN(S)**

**a. ENGINEERING DESIGN (Hydraulics, Route Planning, Site Civil, Mechanical, Structural)**

- Perform calculations of the sanitary sewer service areas to determine adequate pumping capacity and provide design for Lift Station design.
- Perform field reconnaissance and review design survey, provided under the Additional Services section of this proposal.
- Review Geotechnical Investigation report and recommendations.
- Prepare new lift station design(s) as necessary to convey flow from the MSWWTP to the PGWWTP. Lift Station to be designed per latest City of Seabrook standards. Drawings will include but not be limited to:
  - a. General Notes
  - b. Site Plan
  - c. Mechanical and Piping Details
  - d. Structural Details
    - Structural element details and pipe supports (as needed)
  - e. Electrical Plan
    - Power, Lighting and Grounding
  - f. Instrumentation and Control Panel Details
    - Flow measurement on flow from lift station
    - Telecommunication of most crucial operational parameters to a centralized location (anticipated at public works facility)
  - g. Force Main Plan and Profile (approx. 15,400 LF)
  - h. Stormwater Pollution Prevention Plan (SWPPP)
  - i. Demolition P/S (as needed)
  - j. Detail Sheets
  - k. Traffic Control Plan
- Investigate construction phasing and gather any additional information that may benefit the construction implementation of the PGWWTP.
- Submittals at 30%, 60%, 90% and Final
- Meet with the City as may be necessary to review the 30%, 60% & 90% submittals and provide any clarifications and/or changes that may be required.

- Prepare contract bidding documents consisting of technical specifications and contract documents outlining the construction contract requirements.
- Assist the City in obtaining and/or securing approvals required by governmental authorities with jurisdiction over the design and/or the operation of the project and all public and private utilities including pipeline transmission companies affected by this project.
- Make the necessary changes to the final drawings and documents resulting from the interim and final reviews and prepare “bid ready” documents.
- Provide Opinion of Probable Construction Cost at 30%, 60%, 90% and Final Submittals

**b. ELECTRICAL**

- Electrical site plan
- Instrumentation and controls for all required components
- Electrical equipment elevation
- Conduit schedule and schematics
- Miscellaneous electrical details
- Submittals at 60%, 90% and Final
- Technical Specifications

**C. FEMA Deliverables**

- a. Provide revised Scope of Work (SOW) and work schedule for Phase II Construction
- b. Revised Budget Estimate and Budget Narrative
- c. Assist Client in updating Benefit Cost Analysis .zip file
- d. Provide Completed set of signed and sealed construction plans (100%)

**ADDITIONAL SERVICES**

**A. Surveying**

- Establish horizontal and vertical project control throughout the site. Horizontal and vertical control will be tied to current TSARP datum.
- Provide updated topographic survey of the proposed WWTP location (approx. 8.5 acres) and entrance road. Topographic information will be obtained on a 50-foot grid within the proposed site area. 100-foot cross sections will be taken for the entrance road. Location of all features within the proposed WWTP and road area and offsite manholes and other utilities, with depths, as directed by the engineer. Surveyor will establish horizontal and vertical control throughout the project for construction.
- Provide topographic surveys of the proposed route (approx. 15,400 LF) with minimum of 100-foot cross sections, all features within the proposed corridor and offsite manholes and other utilities, with depths, as directed by the Engineer. Surveyor will establish horizontal and vertical control throughout the project for construction. Topographic surveys for existing lift station locations (as necessary) including adjacent proposed new facility areas. Location of all existing facilities, piping, wet wells etc. Depths of all wet utility structures.

- Surveyor shall provide the results of all surveys in electronic form (Autocad) along with hard copy strip maps and copies of established control.

#### **B. Geotechnical Investigation**

- Utilize a subcontract geotechnical firm to perform soil borings and provide a geotechnical investigation of the project area. This will include borings throughout the PGWWTP site and at locations where structures and utilities are being placed at depths agreeable by CobbFendley and the geotechnical engineer.
- Subconsultant will provide CobbFendley with an engineering report describing soil stratigraphy, groundwater conditions and bedding and backfill criteria.

#### **Exclusions from the Scope of Services:**

The services described above are the identified **BASIC AND ADDITIONAL SERVICES** for this assignment. Other items that may arise during the course of the project that the CITY may wish to add to the scope of services shall be deemed as SUPPLEMENTAL SERVICES. CobbFendley shall undertake such additional services as assigned by the CITY upon written direction from the CITY. Examples of such items are as follows:

1. Any other services not specifically included within the description of the Basic Services or Additional Services as described above.
2. Environmental Assessment and permitting
3. Principles Requirements and Guidelines Analysis
4. United States Army Corps of Engineers Permit
5. State Historic Preservation Office coordination
6. Grant Administration
7. TPDES Permitting

If supplemental services are requested by the City, CobbFendley will provide the City with a separate proposal for the supplemental work.

**BASIS OF COMPENSATION**

**BASIC SERVICES**

The Compensation to be paid to CobbFendley for providing the services described above rendered under this agreement shall be based on Lump Sum fees for overall phases of the work as shown below.

1.	Design .....	\$3,006,475
	a. Pine Gully Wastewater Treatment Plant	
	b. Lift Station(s) and Force Main(s)	
	<b>Subtotal .....</b>	<b>\$3,006,475</b>

**ADDITIONAL SERVICES**

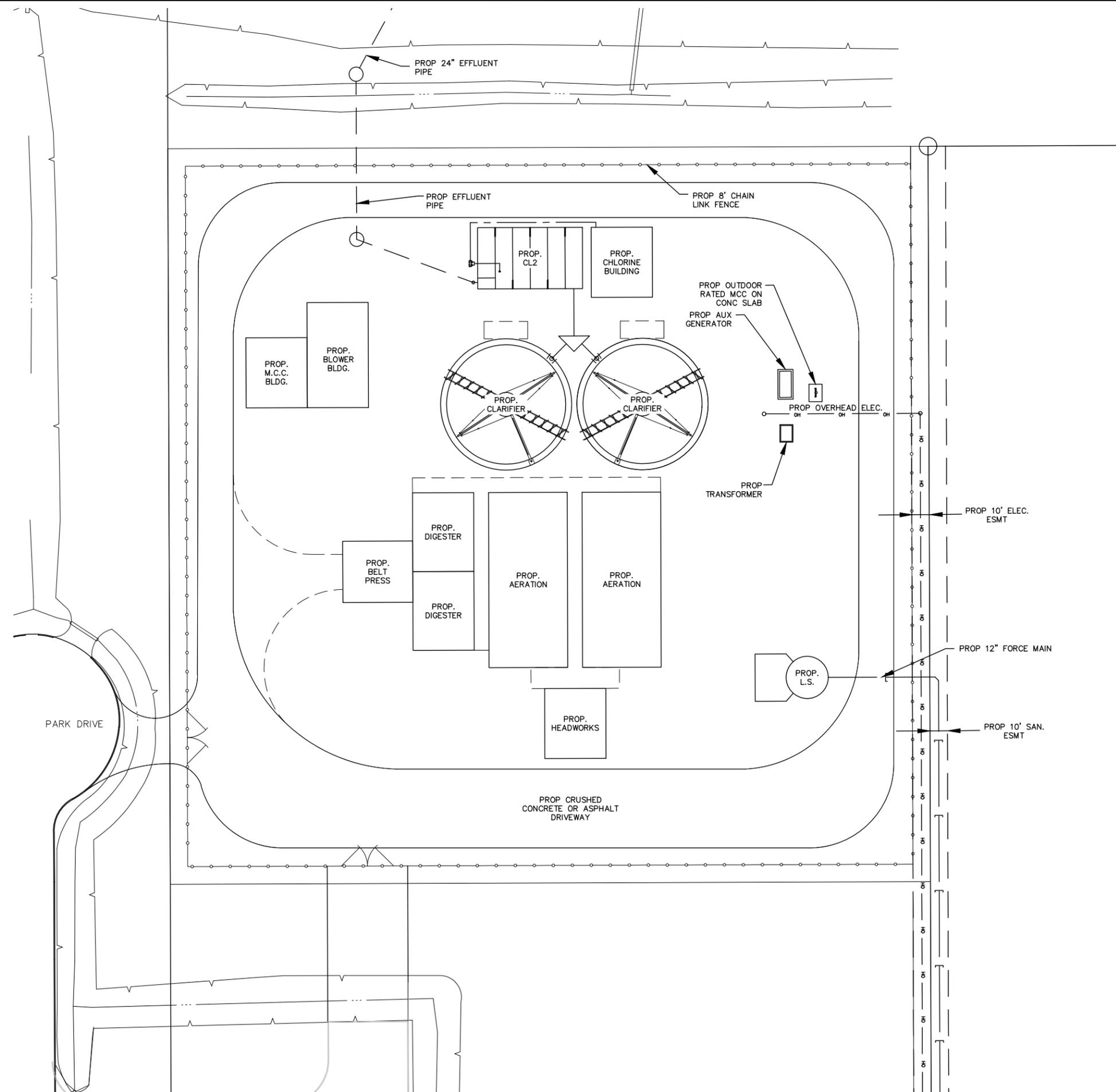
1.	Surveying .....	\$172,715
2.	Geotechnical Engineering .....	\$103,395
	<b>Subtotal, Additional Services .....</b>	<b>\$276,305</b>

**TOTAL, Basic & Additional Services, Including Reimbursables .....** **\$3,282,585**

The Basic and Additional Services listed above will be invoiced monthly and billed on a percent completed. The Compensation for any other Additional Services which the City desires to be added to the work scope of the project shall be negotiated.

- See Exhibit F for Level of Effort (LOE) Breakdown

DWG FILE: \\cobb-fendley.com\Public\Comm\2019\12001\City of Seabrook\CAD\WWT\2020\00 SITE PLAN.dwg  
 SAVE DATE: Dec 19, 2019 1:48 PM BY: KFlaminio  
 PLOT DATE: Dec 19, 2019 4:16 PM BY: Katrina Flaminio

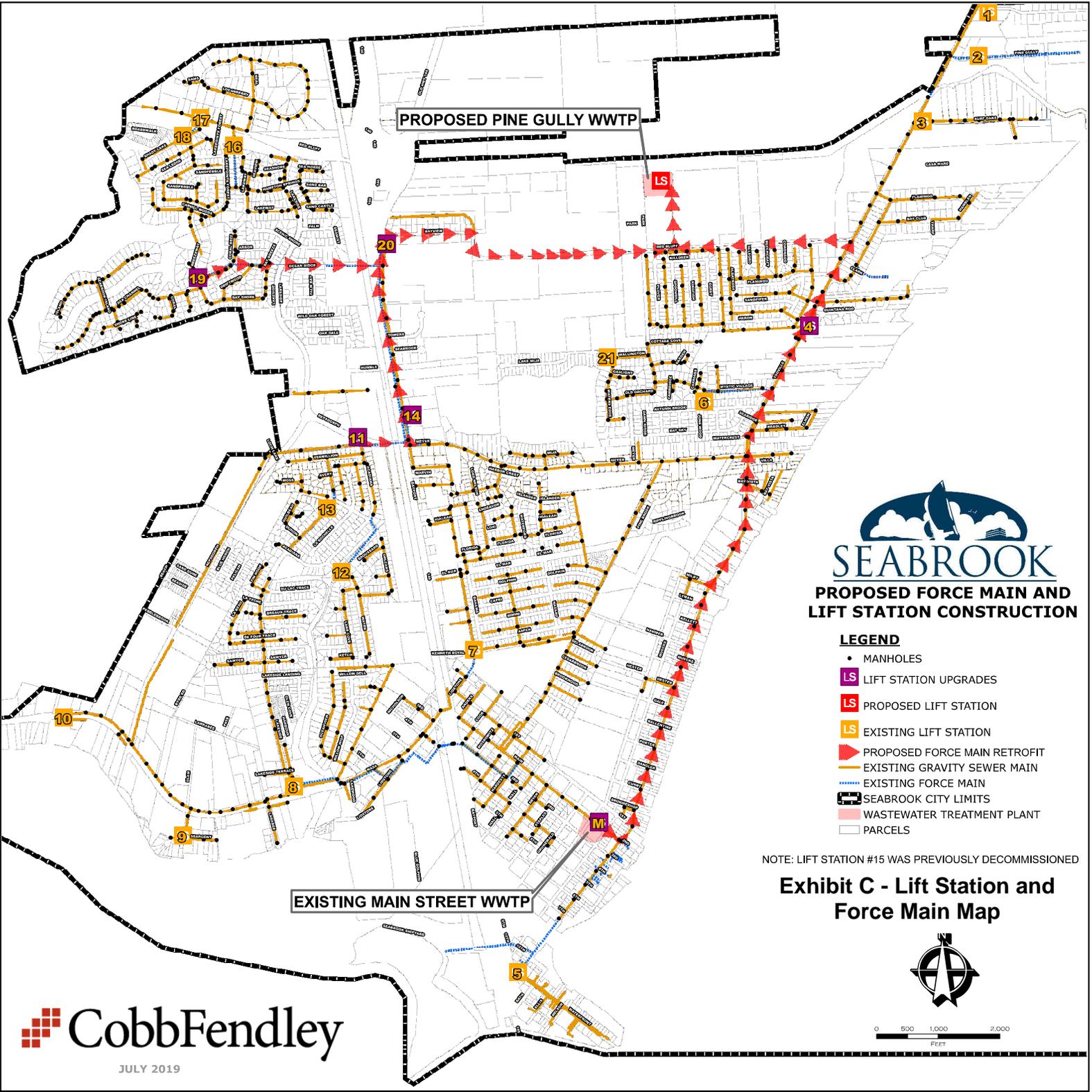


**WWT COMPONENTS**

- A.D.F. 2.5 MGD
- PEAK HOURLY FLOW 10.0 MGD
- AERATION BASINS (2) 100'x50'x12' (ea)
- CLARIFIERS (2) 75'x12' (EA)
- DIGESTERS (2) 45'x35'x15' (EA)
- CHLORINE CONTACT 60'x35'x12'
- BLOWERS (IN RAISED BUILDING) 3 @ 4,750 SCFM
- CHLORINE GAS (IN RAISED BUILDING)
- AUTOMATED AND MANUAL BAR SCREEN W/ 1" OPENINGS
- CONTROL PANELS
- ACCESS STAIRS AND WALKWAY
- EFFLUENT FLOW MEASURING DEVICE

No.	DATE	REVISION
<p><b>PRELIMINARY</b>            NOT FOR CONSTRUCTION,            BIDDING, OR PERMIT PURPOSES.            FOR REVIEW ONLY.</p> <p>RACHEL M. BROOM            131010            Date: 12/19/19            CobbFendley            Consulting Engineers            Firm Registration No. 274</p>		
<p><b>CITY OF SEABROOK, TEXAS</b></p>		
<p>TBPE Firm Registration No. 274            TBPLS Firm Registration No. 100467            1920 Country Place Parkway, Suite 310            Pearland, Texas 77584            281.993.4952   fax 281.993.8086            www.cobb-fendley.com</p>		
<p><b>PINE GULLY WASTEWATER TREATMENT PLANT PROJECT</b></p>		
SUBMITTED: SCALE: DATE: DECEMBER 2019 SURVEY BY: CFA F B NO:	DESIGNED BY: DRAWN BY: SHEET No.: OF XX DWG. NO:	

**Exhibit B - Pine Gully  
 Wastewater Treatment Plant  
 Layout**



PROPOSED PINE GULLY WWTP

EXISTING MAIN STREET WWTP



**SEABROOK**  
**PROPOSED FORCE MAIN AND LIFT STATION CONSTRUCTION**

**LEGEND**

- MANHOLES
- LS LIFT STATION UPGRADES
- LS PROPOSED LIFT STATION
- LS EXISTING LIFT STATION
- PROPOSED FORCE MAIN RETROFIT
- EXISTING GRAVITY SEWER MAIN
- EXISTING FORCE MAIN
- SEABROOK CITY LIMITS
- WASTEWATER TREATMENT PLANT
- PARCELS

NOTE: LIFT STATION #15 WAS PREVIOUSLY DECOMMISSIONED

**Exhibit C - Lift Station and Force Main Map**



0 500 1,000 2,000  
 FEET

## Exhibit D - Cost Estimate

Client: City of Seabrook

Project Name: Infrastructure Retrofit of the Wastewater System

### Opinion of Probable Construction Cost

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Price
<b>BASE BID</b>					
<b>SECTION 1 - 2.5 MGD CONCRETE PLANT</b>					
1	Wastewater Treatment Plant				
	Site Work	AC	4	\$ 1,125,000	\$ 4,500,000.00
	Treatment Units Including Equipment	EA	9	\$ 1,500,000	\$ 13,500,000.00
2	Chlorine Feed Equipment and Building	EA	1	\$ 315,000	\$ 315,000.00
3	Blowers	EA	5	\$ 125,000	\$ 625,000.00
4	Generator	EA	1	\$ 1,250,000	\$ 1,250,000.00
5	Electrical Including all Controls and Lighting (NEMA 4x)	EA	1	\$ 950,000	\$ 950,000.00
6	Plant Piping	EA	1	\$ 750,000	\$ 750,000.00
7	NPW Skid	EA	1	\$ 65,000	\$ 65,000.00
<b>SUBTOTAL SECTION 1</b>					<b>\$ 21,955,000.00</b>
<b>SECTION 2 - PGWWTP LIFT STATION</b>					
8	New Pine Gully LS	EA	1	\$ 1,450,000.00	\$ 1,450,000.00
<b>SUBTOTAL SECTION 2</b>					<b>\$ 1,450,000.00</b>
<b>SECTION 3 - LIFT STATION #20</b>					
9	FM from LS20 to Pine Gully LS	LF	6,330	\$ 105.00	\$ 664,650.00
10	Piping & Fittings	EA	1	\$ 30,000.00	\$ 30,000.00
11	Pump Upgrades	EA	3	\$ 90,000.00	\$ 270,000.00
12	Control Panel	EA	1	\$ 50,000.00	\$ 50,000.00
13	4 Ft MH with Combination Air Valves	EA	3	\$ 8,000.00	\$ 24,000.00
14	Flow Meter with Precast MH	EA	1	\$ 15,000.00	\$ 15,000.00
<b>SUBTOTAL SECTION 3</b>					<b>\$ 1,053,650.00</b>
<b>SECTION 4 - LIFT STATION #11</b>					
15	Pump Upgrades	EA	3	\$ 90,000.00	\$ 270,000.00
16	Piping & Fittings	EA	1	\$ 30,000.00	\$ 30,000.00
17	Control Panel	EA	1	\$ 50,000.00	\$ 50,000.00
18	FM from LS 11 to Existing FM on SH146	LF	200	\$ 105.00	\$ 21,000.00
<b>SUBTOTAL SECTION 4</b>					<b>\$ 371,000.00</b>
<b>SECTION 5 - LIFT STATION #4</b>					
19	New LS 4 Lift Station				
	LS Pumps	EA	3	\$ 90,000.00	\$ 270,000.00
	Piping & Fittings	EA	1	\$ 50,000.00	\$ 50,000.00
	Control Panel	EA	1	\$ 80,000.00	\$ 80,000.00
	Wetwell	EA	1	\$ 425,000.00	\$ 425,000.00
20	FM from LS4 to Pine Gully LS	LF	5,400	\$ 105.00	\$ 567,000.00
21	Boring/Casing	LF	60	\$ 400.00	\$ 24,000.00
22	Flow Meter with Precast MH	EA	1	\$ 15,000.00	\$ 15,000.00
<b>SUBTOTAL SECTION 5</b>					<b>\$ 1,431,000.00</b>
<b>SECTION 6 - LIFT STATION M @ MSWWTP</b>					
23	New Lift Station M				
	LS Pumps	EA	3	\$ 90,000.00	\$ 270,000.00
	Piping & Fittings	EA	1	\$ 50,000.00	\$ 50,000.00
	Control Panel	EA	1	\$ 80,000.00	\$ 80,000.00
	Wetwell	EA	1	\$ 425,000.00	\$ 425,000.00
24	FM from LS M to New PGWWTP	LF	9,600	\$ 105.00	\$ 1,008,000.00
25	Boring/Casing	LF	60	\$ 400.00	\$ 24,000.00
<b>SUBTOTAL SECTION 6</b>					<b>\$ 1,857,000.00</b>

<b>SECTION 7 - SWPPP</b>					
26	Erosion/Sediment Control in Accordance with TPDES Requirements, Including Notice of Intent (NOI) and Notice of Termination (NOT)	EA	1	\$ 2,175.00	\$ 2,175.00
27	SWPPP Inspection and Maintenance, and Reporting	Month	24	\$ 2,500.00	\$ 60,000.00
28	Furnish and Install Inlet Protection Barrier (Stage I)	EA	25	\$ 315.00	\$ 7,875.00
29	Hydromulch Seeding, Complete in Place	SY	2,000	\$ 4.25	\$ 8,500.00
<b>SUBTOTAL SECTION 7</b>					<b>\$ 78,550.00</b>
<b>SECTION 8 - TRAFFIC CONTROL AND REGULATION</b>					
30	Traffic Control and Regulation for LS work	Month	18	\$ 5,750.00	\$ 103,500.00
<b>SUBTOTAL SECTION 8</b>					<b>\$ 103,500.00</b>
<b>SECTION 9 - SUPPLEMENTAL ITEMS</b>					
31	Dewatering	LF	21,530	\$ 30.00	\$ 645,900.00
32	Wet Condition Bedding	LF	21,530	\$ 15.00	\$ 322,950.00
<b>SUBTOTAL SECTION 9</b>					<b>\$ 968,850.00</b>
<b>TOTAL COST</b>					<b>\$ 29,268,550.00</b>



### Exhibit F - LOE Breakdown

A. BASIC ENGINEERING SERVICES	PRINCIPAL (DEPT MNGR)	SR PROJECT MANAGER	PROJECT MANAGER	PROJECT ENGINEER	TECHNICIAN	ADMIN	TOTAL LABOR HRS. & COSTS	TOTAL COST PER TASK
<b>CONTRACT LABOR RATE PER HOUR</b>	\$290.00	\$235.00	\$195.00	\$150.00	\$125.00	\$105.00		
<b>ENGINEERING SERVICES</b>								
<b>I. Pine Gully WWTP Design</b>								
a. Preliminary Engineering Investigation	30	75	220	400	280	90	1095	\$173,675.00
b. 30% Design Submittal	50	120	360	680	460	150	1820	\$288,150.00
c. 60% Design Submittal	40	100	300	540	360	120	1460	\$232,200.00
d. 90% Design Submittal	50	125	360	670	460	140	1805	\$286,775.00
e. Final Plans Submittal	70	170	510	950	650	200	2550	\$404,450.00
f. Structural Design	70	170	530	950	650	200	2570	\$408,350.00
<b>II. Lift Station(s) and Force Main(s) Design</b>								
a. Preliminary Engineering Investigation	30	75	240	400	280	95	1120	\$178,100.00
b. 30% Design Submittal	50	120	360	670	460	150	1810	\$286,650.00
c. 60% Design Submittal	30	75	210	400	280	90	1085	\$171,725.00
d. 90% Design Submittal	50	120	360	670	460	150	1810	\$286,650.00
e. Final Plans Submittal	50	130	380	670	460	120	1810	\$289,750.00
<b>HOURS SUB-TOTALS</b>	520	1280	3830	7000	4800	1505	18935	
<b>TOTAL LABOR COSTS</b>	\$150,800.00	\$300,800.00	\$746,850.00	\$1,050,000.00	\$600,000.00	\$158,025.00	<b>\$3,006,475.00</b>	
<b>% DISTRIBUTION OF STAFFING</b>	5.0%	10.0%	24.8%	34.9%	20.0%	5.3%		
<b>TOTAL DESIGN COST</b>								<b>\$3,006,475.00</b>

### Exhibit F - LOE Breakdown

<b>B. SURVEY SERVICES</b>	PRINCIPAL (DEPT MNGR)	Registered Professional Surveyor	3 Person Crew	Senior Tech I	TECHNICIAN II	Clerical	TOTAL LABOR HRS. & COSTS	TOTAL COST PER TASK
<b>CONTRACT LABOR RATE PER HOUR</b>	\$290.00	\$170.00	\$170.00	\$125.00	\$80.00	\$65.00		
<b>SURVEY</b>								
<b>I. WWTP Design</b>								
a. Topographic Survey		15	190	8	60	12	285	\$41,430.00
b. One-Call and Utility Coordination		0	0	24	0	15	39	\$3,975.00
c. Prepare Survey Control & Topographic Drawings		2	0	12	120	4	138	\$11,700.00
<b>II. Lift Station(s) and Force Main(s) Design</b>								
a. Topographic Survey		24	320	36	103	12	495	\$72,000.00
b. One-Call and Utility Coordination		0	0	40	0	12	52	\$5,780.00
c. Lift Station Measurements		4	16	6	60	4	90	\$9,210.00
d. Prepare Survey Control & Topographic Drawings		4	0	24	175	4	207	\$17,940.00
e. Subsurface Utility Evaluation (SUE)		0	0	48	52	8	108	\$10,680.00
<b>HOURS SUB-TOTALS</b>	0	49	526	198	570	71	1414	
<b>TOTAL LABOR COSTS</b>	\$0.00	\$8,330.00	\$89,420.00	\$24,750.00	\$45,600.00	\$4,615.00	<b>\$172,715.00</b>	
<b>% DISTRIBUTION OF STAFFING</b>	0.0%	4.8%	51.8%	14.3%	26.4%	2.7%		
<b>TOTAL SURVEY COST</b>								<b>\$172,715.00</b>

**Exhibit F - LOE Breakdown**

**COST BREAKDOWN - WWTP**

	<u>QUANTITY</u>	<u>UNIT RATE</u>	<u>COST</u>
<b>Field Investigation</b>			
Mob. & Demob., Truck Mounted Drilling Rig, Water Truck, Crew	1 LS	\$700.00	\$700.00
Drilling and Continuous Sampling from 0 to 20 ft	160 ft.	\$25.00	\$4,000.00
Drilling and Intermittent Sampling, from 20 to 50 ft	180 ft.	\$23.00	\$4,140.00
Drilling and Intermittent Sampling, from 50 to 60 ft	20 ft.	\$24.00	\$480.00
Field Coordination and Utility Clearance for Boring Locations	16 hr.	\$65.00	\$1,040.00
Piezometer Installation	80 ft.	\$24.00	\$1,920.00
Piezometer Abandonment	80 ft.	\$20.00	\$1,600.00
Water Level Readings in Piezometers (24-hr and 30-Day)	8 hr.	\$65.00	\$520.00
Vehicle charge	24 hr.	\$12.00	\$288.00
Grouting of Boreholes - Cement-Bentonite Grout	280 ft.	\$12.00	<u>\$3,360.00</u>
		Subtotal:	<b>\$18,048.00</b>
<b>Laboratory Tests</b>			
Liquid and Plastic Limits	36 ea.	\$60.00	\$2,160.00
Percent passing the #200 sieve	36 ea.	\$46.00	\$1,656.00
Sieve analysis through No. 200 Sieve	18 ea.	\$55.00	\$990.00
Moisture Content	84 ea.	\$9.00	\$756.00
Unconsolidated-Undrained triaxial compression	36 ea.	\$61.00	\$2,196.00
Aggressivity Tests (pH, resistivity, chloride and sulfate)	4 ea.	\$150.00	<u>\$600.00</u>
		Subtotal:	<b>\$8,358.00</b>
<b>Engineering Services</b>			
Sr. Project Manager	4.0 hrs.	\$250.00	\$1,000.00
Sr. Engineer	8.0 hrs.	\$205.00	\$1,640.00
Project Engineer	16.0 hrs.	\$165.00	\$2,640.00
Graduate Engineer	40.0 hrs.	\$115.00	\$4,600.00
Support Personnel, Word Processing	8.0 hrs.	\$70.00	<u>\$560.00</u>
		Subtotal:	<b>\$10,440.00</b>
		<b>Total</b>	<b><u>\$36,846.00</u></b>

**Exhibit F - LOE Breakdown**

**COST BREAKDOWN - FORCEMAIN**

	<u>QUANTITY</u>	<u>UNIT RATE</u>	<u>COST</u>
<b>Field Investigation</b>			
Mob. & Demob., Truck Mounted Drilling Rig, Water Truck, Crew	1 LS	\$700.00	\$700.00
Drilling and Continuous Sampling from 0 to 20 ft	385 ft.	\$25.00	\$9,625.00
Drilling and Intermittent Sampling, from 20 to 50 ft	55 ft.	\$23.00	\$1,265.00
Drilling and Continuous Sampling, from 20 to 50 ft	40 ft.	\$30.00	\$1,200.00
Field Coordination and Utility Clearance for Boring Locations	28 hr.	\$65.00	\$1,820.00
Pavement Coring for Borings Access	19 ea.	\$150.00	\$2,850.00
Traffic Control Devices During Coring and Drilling	10 day	\$700.00	\$7,000.00
Piezometer Installation	145 ft.	\$24.00	\$3,480.00
Manhole Cover for Piezometer	6 ea.	\$100.00	\$600.00
Piezometer Abandonment	145 ft.	\$20.00	\$2,900.00
Water Level Readings in Piezometers (24-hr and 30-Day)	8 hr.	\$65.00	\$520.00
Vehicle charge	36 hr.	\$12.00	\$432.00
Grouting of Boreholes - Cement-Bentonite Grout	335 ft.	\$12.00	\$4,020.00
		Subtotal:	<b>\$36,412.00</b>
<b>Laboratory Tests</b>			
Liquid and Plastic Limits	39 ea.	\$60.00	\$2,340.00
Percent passing the #200 sieve	39 ea.	\$46.00	\$1,794.00
Sieve analysis through No. 200 Sieve	12 ea.	\$55.00	\$660.00
Moisture Content	185 ea.	\$9.00	\$1,665.00
Unconsolidated-Undrained triaxial compression	39 ea.	\$61.00	\$2,379.00
		Subtotal:	<b>\$8,838.00</b>
<b>Engineering Services</b>			
Sr. Project Manager	5.0 hrs.	\$250.00	\$1,250.00
Sr. Engineer	10.0 hrs.	\$205.00	\$2,050.00
Project Engineer	20.0 hrs.	\$165.00	\$3,300.00
Project Engineer	40.0 hrs.	\$115.00	\$4,600.00
Support Personnel, Word Processing	10.0 hrs.	\$70.00	\$700.00
		Subtotal:	<b>\$11,900.00</b>
		Total	<b>\$57,150.00</b>

Total Geotechnical Cost

WWTP - \$36,846.00

FORCEMAIN - \$57,150.00

ENGINEERING REVIEW AND OVERSITE = \$9,399.00

**TOTAL = \$103,395.00**