

October 9, 2018



Mr. Bill Pedersen
Director of Public Works
City of Deer Park
710 East San Augustine
Deer Park, Texas 77536

Subject: Proposal to Provide Professional Engineering Services
City of Deer Park Water Treatment Plant
Disinfection Alternative Evaluation

Dear Mr. Pedersen:

Engineering
& Disaster
Management

Ardurra Group, LLC (“Ardurra”) is pleased to submit this proposal to the City of Deer Park to perform an evaluation study of disinfection alternatives for City’s surface water treatment plant. The Deer Park surface water treatment plant currently uses gas chlorine and aqua ammonia to form chloramine as their disinfectant. The City has a concern with chemical safety and handling risks. Therefore, the City desires to evaluate alternative disinfection systems for the plant. In addition, the City also requested to look at the option of using liquid ammonium sulfate (LAS) to replace aqua ammonia that is currently being used at the plant.

The following presents our understanding of the proposed project, the required scope of work for engineering services, our proposed technical approach, anticipated schedule, and estimated fees.

1.0 Description and Scope

Ardurra will provide the following scope of services:

- Task 1 – Project Management and Coordination
- Task 2 – Data Collection and Basis of Design
- Task 3 – Alternative Evaluation
- Task 4 – Electrical Service Analysis
- Task 5 – Development of Evaluation Report

Task 1 – Project Management and Coordination

1.1 Engineer will perform project management and coordination duties throughout the project, including tracking budget, schedule, and progress of work. Engineer will provide a project status report to the City with the monthly invoices.

1.2 Engineer will provide quality control reviews and technical reviews of all evaluations and recommendations, and technical memorandum.

1.3 Engineer will coordinate with regulatory agencies for inputs and guidance.

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- 1.4 Upon submission of the evaluation report, Engineer will hold a review workshop with the City to discuss alternatives being evaluated, improvement recommendations, and path forward.

Task 2 – Data Collection and Basis of Design

- 2.1 Engineer will review the existing plant drawings, previous reports, and operations data necessary to understand current operating conditions and disinfection chemical storage and feed systems. The following data will be requested from the City, if available:
 - 5-year worth of chlorine and aqua ammonia chemical dosage from CWA in excel format.
 - 5-year worth of chlorine and aqua ammonia chemical dosage from the City in excel format.
 - Chemical MSDS sheets.
- 2.2 Engineer has obtained 5-year worth of plant raw water flow data and record drawings from recent Solids Handling Evaluation study and will use them as part of this project. The Engineer will process these data and develop a basis of design for the new chemical storage and feed system.
- 2.3 Engineer will conduct up to three (3) site visits with plant staff to gather operations data and field-verify conditions.

Task 3 –Alternative Evaluation

- 3.1 Disinfection Alternatives - Engineer will evaluate three (3) disinfection alternatives, including the following.
 - a. Gas chlorine disinfection with improvements to add ChlorTainer containment system and scrubber system.
 - b. Bulk-delivered sodium hypochlorite solution, typically 12.5%.
 - c. Low-strength on-site hypochlorite generation (OSHG), typically 0.8%. MicroClor system will be assumed for the purpose of this study.

The alternative analysis will include development of design criteria, process flow diagrams, preliminary equipment selection and sizing, and conceptual layouts depicting general footprint of new chemical storage and feed facilities.

- 3.2 Ammonia Storage and Feed System improvements – Engineer will perform preliminary equipment selection and sizing for replacing the existing aqua ammonia storage and feed system with LAS storage and feed system.



- 3.3 Cost Analysis - Engineer will coordinate with equipment vendors and manufacturers to obtain necessary engineering, operational, layout and budgetary cost information, and develop conceptual-level cost opinions (capital costs and operation and maintenance costs), to evaluate each alternative on a lifecycle basis.

Task 4 – Electrical Service Analysis

- 4.1 Perform an electrical service analysis to evaluate if the existing electrical power source is adequate to handle increased electrical loads from proposed improvements. The analysis will include determining new equipment loads from the plant Solids Handling Improvement project, Clearwell and Transfer Pump Station Improvement project, and Disinfection Improvement project, evaluation of existing electrical services, and review of power company operating bills.
- 4.2 Develop modifications for existing services, one-line diagram for service modifications, and preliminary site plan to route power to improvement area.
- 4.3 Develop preliminary cost opinion for proposed electrical improvements and upgrades and summarize the findings and recommendations from the analysis in the evaluation report.

Task 5 – Evaluation Report

- 5.1 Prepare and develop a draft evaluation report with associated graphs, tables, and figures. Engineer will provide plan views of alternative layouts in pdf format utilizing existing aerial images and existing site layout drawings. A draft table of content is provided below:
 - Section 1 – Introduction
 - Section 2 – Basis of Design
 - Section 3 – Alternative Evaluation
 - Section 4 – Electrical Service Analysis
 - Section 5 – Recommendations
- 5.2 Upon review of the City, Engineer will incorporate review comments and issue the final report.

2.0 Schedule

We anticipate being able to commence work immediately after receiving Notice to Proceed. A project schedule is provided on **Exhibit A**.

3.0 Fees, Terms and Conditions

Based on the scope of services outlined above, we have prepared a detailed level of effort estimate as shown on **Exhibit B**. Our fee estimate is based on the scope of work defined for the project and in part on an estimate of required services. We estimate a lump sum, not to exceed fee to complete the subject project.



This letter is to request authorization from the City to perform the above services in the amount of **\$74,862.00**.

We will not exceed our quoted budget unless the nature of the project changes. Your approval will be secured before any extra charges are incurred.

Services will be billed on a monthly basis in accordance with the scope of services for work incurred. Payment shall be due within 30 days after date of invoice. Interest at the rate of 1% per month (or the highest rate allowable by law) shall accrue on all amounts not paid within 30 days after date of invoice. All attorney fees and expenses associated with collection of past due invoices will be paid to client. Failure to timely pay any invoice shall constitute a waiver of any and all claims against Ardurra.

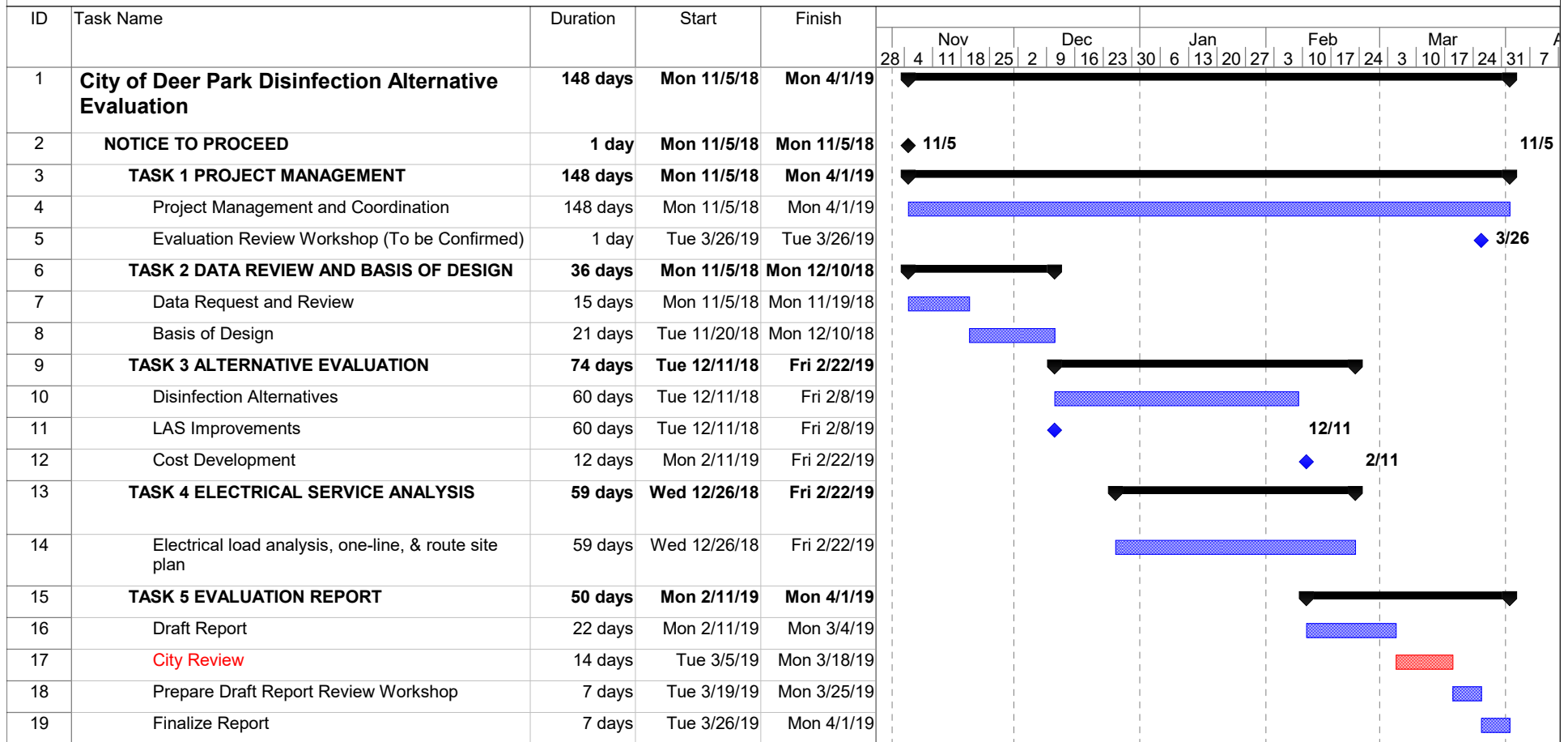
Please feel free to contact me at (713) 208-9463 or Jeff Peters at (713) 385-5601 to discuss any questions you may have. Thank you for the opportunity to propose these professional engineering services for the City of Deer Park.

Very truly yours,

Yue Sun, P.E., BCEE
Senior Project Manager/Water Treatment Practice Leader
TBPE Firm Registration No F-17004

cc: Jeff Peters, PE, BCEE, Client Account Manager, File

EXHIBIT A - City of Deer Park Disinfection Alternative Evaluation PROJECT SCHEDULE VERSION V1.0



Project: Deer Park Disinfection Study S
Date: Tue 10/9/18

Task		Inactive Milestone	
External Tasks		Inactive Summary	
Milestone		Manual Task	
Summary		Duration-only	
Inactive Task		Manual Summary Rollup	

Manual Summary	
Start-only	
Finish-only	
Progress	
Deadline	

Exhibit A-1 - Level of Efforts Fee Estimate
City of Deer Park
Surface Water Treatment Plant - Disinfection Alternative Evaluation



Task No.	Task Description	Principal / QA/QC \$275 hrs	Sr. Project Manager \$240 hrs	Sr. Project Engineer \$230 hrs	Engineer 5/6 \$180 hrs	Project Engineer \$160 hrs	Sr. CAD Designer \$150 hrs	Admin Support \$120 hrs	Accounting \$120 hrs	Ardurra Subtotal Cost \$	OP \$	ODC \$	Totals \$	Total hrs
1.0	Project Management and Coordination													
1.1	Plant Management, Coordination, invoicing and progress reports		6			4		4	4	\$3,040			\$3,040	18
1.2	QA/QC Review	4								\$1,100			\$1,100	4
1.3	Regulatory Coordination		2		6					\$1,560			\$1,560	8
1.4	Study Review Workshop	2	4			6				\$2,470			\$2,470	12
	Expense (5% of labor cost)											\$410	\$410	
	Task 1.0 - Sub Total	6	12	0	6	10	0	4	4	\$8,170	\$0	\$410	\$8,580	42
2.0	Data Collection and Basis of Design													
2.1	Plant Record Drawing and Data Research					8				\$1,280			\$1,280	8
2.2	Site Visit (up to 3)		6			6				\$2,400			\$2,400	12
2.3	Basis of Design Development		2			16				\$3,040			\$3,040	18
	Expense (5% of labor cost)											\$340	\$340	
	Task 2.0 - Sub Total	0	8	0	0	30	0	0	0	\$6,720	\$0	\$340	\$7,060	38
3.0	Alternative Evaluation													
3.1	Disinfection Alternatives													
a	Alternative 1 - Gas chlorine with Chlordane and Scrubber													
a.1	Design criteria, safety review, and constructability review			4	8					\$2,360			\$2,360	12
a.2	Development of preliminary layouts		2		8		10			\$3,420			\$3,420	20
a.3	Development of Planning-level POCC					16				\$2,560			\$2,560	16
b	Alternative 2 - Bulk-delivered sodium hypochlorite solution (10-12.5%)													
b.1	Design criteria, safety review, and constructability review			4	8					\$2,360			\$2,360	12
b.2	Development of preliminary layouts		2		8		10			\$3,420			\$3,420	20
b.3	Development of Planning-level OPCC					16				\$2,560			\$2,560	16
c	Alternative 3 - Low strength on-site hypochlorite generation													
c.1	Design criteria, safety review, and constructability review			4	8					\$2,360			\$2,360	12
c.2	Development of preliminary layouts		2		8		10			\$3,420			\$3,420	20
c.3	Development of Planning-level OPCC					16				\$2,560			\$2,560	16
3.2	Ammonia Storage and Feed System Improvements		2	4	8	16	12			\$7,200			\$7,200	42
3.3	Cost analysis (capital included above under individual OPCC development, O&M, and life cycle cost analysis)		3			24				\$4,560			\$4,560	27
	Expense (5% of labor cost)											\$1,840	\$1,840	
	Task 3.0 -Sub Total	0	11	16	56	88	42	0	0	\$36,780	\$0	\$1,840	\$38,620	213
4.0	Electrical Service Analysis													
4.1	Load analysis									\$0	\$3,213		\$3,213	0
4.2	One-line and preliminary power route site plan									\$0	\$4,851		\$4,851	0
4.3	Development of cost opinion									\$0	\$2,048		\$2,048	0
	Expense (5% of labor cost)											\$0	\$0	
	Task 4.0 -Sub Total	0	0	0	0	0	0	0	0	\$0	\$10,112	\$0	\$10,112	0
5.0	Evaluation Report													
5.1	Development of DRAFT Report		4		4	24		8		\$6,480			\$6,480	40
5.2	Incorporate City Comments and FINAL Report	2	4			8		6		\$3,510			\$3,510	20
	Expense (5% of labor cost)											\$500	\$500	
	Task 5.0 -Sub Total	2	8	0	4	32	0	14	0	\$9,990	\$0	\$500	\$10,490	60
	TOTAL	8	39	16	66	160	42	18	4	\$61,660	\$10,112	\$3,090	\$74,862	353