

3/5/2020

To: Mayor and City Council members  
Preview for our second major early work package award on our large and important investment in water infrastructure (Surface Water Plant) plus follow up on the previous early award package and cost savings achieved through the CMAR bidding process. Trent



# Memo

To: Clay Pearson, City Manager

From: Skipper Jones, Assistant Director Capital Projects

CC: Trent Epperson, Assistant City Manager  
Robert D. Upton, P.E., Director Engineering and Capital Projects  
Clarence Wittwer, Director Public Works  
David Van Riper, Assistant Director Public Works

Date: March 5, 2020

Re: Surface Water Treatment Plant – Early Work Package 2

## Purpose

The memo provides information about progress on the Surface Water Treatment Plant project since the January 27 memo for the Early Works Package-1 and provides information on the final status of subcontractor selection for the sub-contracts. Additionally, this memo presents information pertaining to the planned release of an Early Work Package-2 (EWP2) to the PLW Waterworks the Construction-Manager-at-Risk (CMAR). The proposed award is the second of three progressive Guaranteed Maximum Prices (GMP's) anticipated for the construction of the project and is scheduled for the March 23, 2020 Agenda.

## Background and Progress

Final Design of the project began March 2019 with the awards of engineering contracts to CDM-Smith for (Package 2) and in August, to Freese & Nichols (for Package 1) and Stantec Consulting Services (Package 3). A CMAR contract was awarded to PLW Waterworks in April 2019. CDM-Smith submitted 60% plans in October 2019. Staff reviewed those and returned comments in November and CDM has incorporated those and is now well into 90% plan development at this time. Freese & Nichols and Stantec submitted 60% plans in early February. Staff conducted a two-day plan review February 10<sup>th</sup> and 11<sup>th</sup> and returned comments that same week. A progress meeting was held February 13 to review progress and clarify Staff comments with all three design firms.

Current plan submittal schedule calls for: CDM Smith will submit 90% plans in end-March; Freese & Nichols to submit 90% plans in mid-April and Stantec to submit their 90% plans in mid-April. All three design teams are progressing on schedule and coordinating with the CMAR as well as with Owner directed comments. This schedule supports the objective of securing a final Guaranteed Maximum Price (GMP) with the 90% plans from the CMAR in the August time frame as discussed in previous updates. While the GMP is being developed (through procurement and bidding of trades) and submitted for award, the project plans will be submitted to Texas Commission of Environmental Quality (TCEQ), Texas Water Development Board (TWDB) and the City Building Permits. 100% plans are expected for each of the Packages in October/November after any comments from TCEQ/TWDB and City permits are incorporated. The final plans do not affect the GMP that will be provided and only provide the approvals from the needed agencies.

## Early Works Package 1

Council approved the Early Works Package-1 (EWP1) at the February 10<sup>th</sup> meeting. That package contained a GMP of \$7,497,256 and consisted of \$2,985,160 for General Conditions, \$3,985,000 for Sitework and \$509,096 in Bonds and Insurance and CMAR pre-negotiated fees. The schedule of this package is important so that the site dirt work contained in it can get started and the construction laydown yard and site can be established.

Staff has reviewed the bid results from the CMAR's pre-qualified sub-contractor bid process. Full bid packages were assembled by the CMAR, including plans and specifications and any other relevant information. The review tabulated all bids received from each bidder and noted any irregularities or qualifications that the sub-contractor attached to his pricing and was used to make final selections for award of sub-contracts. Staff has reviewed each bid package, discussed the results with the CMAR and the Owner's Representative and has approved the CMAR to award the following sub-contracts:

Surface Water Plant Early Work Package 1 Bid Summary					
Work Package Description	EWP1 GMP Budget	EWP1 Sub-Contractor Bids	S's Returned to Project Contingency	Work to be Performed by	DBE
<b>Section 01 - General EWP1</b>	<b>\$2,985,160</b>	<b>\$ 2,912,610</b>	<b>\$ 72,550.00</b>		
General Conditions - Personnel Cost	\$ 1,607,600	\$ 1,607,600.00	\$ -	PLW	
General Conditions - Site Logistics	\$ 1,027,560	\$ 1,027,560.00	\$ -	PLW	
Pkg 01.01 - Temporary Electrical	\$ 200,000	\$ 159,600.00	\$ 40,400.00	Boyer Electric	
Pkg 01.02 - Temporary Water Wells	\$ 120,000	\$ 117,850.00	\$ 2,150.00	O'Day Drilling Co. Inc.	
Pkg 02.02 - Fire Stand Pipe	\$ 30,000	w/ Major Earthwork	\$ 30,000.00	Trinity Excavators	
<b>Section 02 - Sitework EWP1</b>	<b>\$3,985,000</b>	<b>\$ 2,750,919.58</b>	<b>\$ 1,234,080.42</b>		
Pkg 02.01 - Install SWPPP	\$ 37,500	\$ 31,255.00	\$ 6,245.00	Environmental Allies	
Pkg 02.02 - Major Earthworks	\$ 3,557,500	\$ 2,684,334.64	\$ 873,165.36	Trinity Excavators	
Pkg 02.03 - Building Demolition	\$ 50,000	\$ 35,329.94	\$ 14,670.06	J. Simmons Group	Certified MBE
Pkg 02.02 - Concrete Demolition	\$ 35,000	w/ Major Earthwork	\$ 35,000.00	Trinity Excavators	
Pkg 02.02 - Septic Demolition	\$ 15,000	w/ Major Earthwork	\$ 15,000.00	Trinity Excavators	
Pkg 02.02 - Storm Outfalls	\$ 140,000	w/ Major Earthwork	\$ 140,000.00	Trinity Excavators	
Pkg 02.02 - Curb Cut	\$ 150,000	w/ Major Earthwork	\$ 150,000.00	Trinity Excavators	
CMAR Bonds, Insurance and Fees	\$509,096				
	<b>\$7,479,256</b>	<b>\$ 5,663,529.58</b>	<b>\$ 1,306,630.42</b>		

In awarding the above contracts, the ACTUAL total costs of \$5,668,529.58 plus the CMAR's Bonds, Insurance and Fees will result in a return to the Project Budget of approximately \$1,306,630 from the GMP approved by Council February 10<sup>th</sup>.

## Early Works Package 2

Staff has moved forward with the generation of an Early Works Package 2 (EWP2) consisting of early procurement of the Membrane Filter System package, the Ground Storage Tank (GST), Piping and Valve material procurement and deep structure foundation construction. As with EWP1, EWP2 is an opportunity to take advantage of the time until 90% plans are available, the site preparation work that will be performed in EWP1 and the absence of other improvements on the property to move directly into construction of some of the plant facilities and to place orders for materials that traditionally will

have a long lead time for delivery. Advantages secured by moving forward with EWP2 at this time include:

1. Securing pricing for material and equipment to avoid the impact of inflation of prices in a hyper-volatile market.
2. Securing delivery schedules for long lead time equipment allows adjacent work to proceed with known dates for installation coordination
3. The early accomplishment of deep foundation work allows for benching these excavations and eliminates the requirement for shoring without reducing safe working areas. This reduces the time required to construct these structures and significantly reduces the sunk costs involved in engineered shoring.

The work packages included in EWP2 are briefly described below. Each item has a cost associated with that description and the cost is identified as either a “budget” or an actual “bid” based price resulting from the CMAR’s bid process. The “budget” costs form the basis of the EWP2 GMP and the “bid” costs show the actual costs of the work as determined by the hard bid.

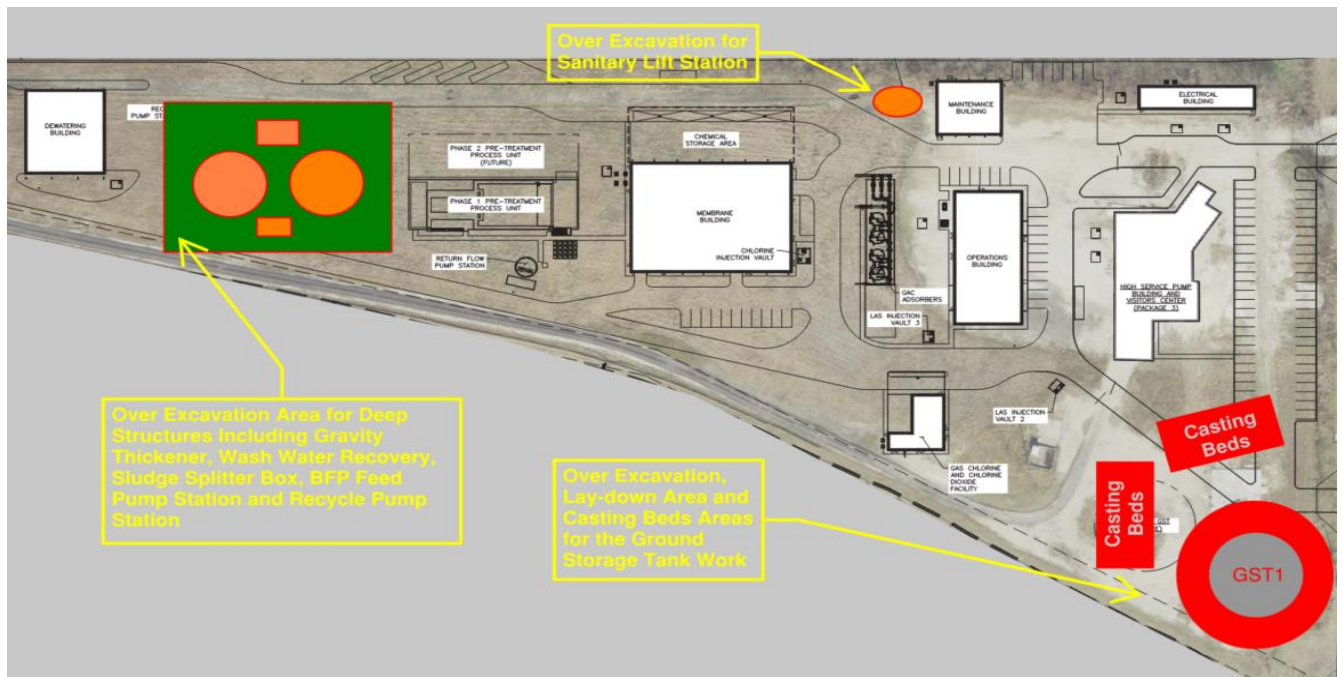
**Ground Storage Tank (GST): Division 13, BID, \$2,088,300**

Space requirements for construction of the 2.0Million Gallon GST make it preferable to begin this work early. The GST requires peripheral space to cast tank wall panels as well as space for the crane and the wire winding process once the wall panels and roof are in place. The foundation for the tank also requires over excavation of existing native soils and a replacement of that volume with compacted select fill. This work will require access for trucking as well as digging and compacting equipment. The CMAR was able to bid this work out with plans and specifications from Package 3 and obtained bids from both national firms that specialize in construction of pre-cast concrete tanks using the CMAR’s standard bidding process. **Staff have reviewed the results of that bid and agree that DN Tanks is both low bidder and an acceptable choice for the work.** DN Tanks has built the 3.0MG 521 water plant tank and is under construction for the 1.0MG Southeast tank.

**Deep Foundations/ Structural Concrete: Division 03, BUDGET, \$3,818,163**

Deep foundation excavation is required for the Gravity Thickener/ Washwater Recovery, Sludge Splitter Box, Belt Press Feed / Recycle Pump and the Sanitary Lift Station. Each of these work packages consist of Excavation and Backfill, Dewatering, Under Slab Process Piping and Structural Concrete. These can be constructed now by benching the excavations rather than constructing shoring which will add time and considerable costs. The below site layout identifies the locations of the deep foundation items. Performing this work now will move the project forward faster and reduce associated costs while maintaining a safe working environment.

## Site Layout with locations of Over-Excavation & Deep Foundation work



### Membrane Filter System: Division 11, BID, \$3,043,691

The Package 2 preliminary engineering phase included pilot testing of three membrane filtration systems: Pall Water, H2O Innovations (Toray) and DuPont (Evoqua Water Technologies). The pilot testing was conducted over a nine-month period to ensure the membranes were exposed to the full range of raw water quality conditions and to provide performance and operational data under real world conditions. While operational parameters varied among the three manufacturers all three produced the required water quality and all three were solicited to propose on the project. The request for proposals was issued through the CMAR's bid process because the CMAR will provide this equipment once the Owner has made its selection. On Tuesday, January 14<sup>th</sup> the project team held a pre-proposal meeting to discuss full details of the evaluation and procurement process. Proposals were received by the CMAR on January 30<sup>th</sup>. CDM Smith, Package 2 designer, began the technical evaluation of the responses immediately. On February 19<sup>th</sup>, Staff and the Owner's Representative met with CDM to review the submittals and initial findings from the technical review. Evaluation Criteria included: quality and detail of proposal, ability to meet delivery schedule, previous project experience, operating costs, integration of systems into existing plant design, no exceptions to warranty requirements, experience and location of support staff and capital cost. After completing the scoring and then ranking the suppliers the H2O's membrane filtration system was ranked highest and received an overall score of 4.06 out of 5.0. See Bid Results table below. **The total proposed cost includes Proposal Item A - \$2,981,713 for the membrane system and Proposal Item F-Alternate 1 - \$61,978 for the additional membranes to fill out all the membrane slots in each unit.** Each system is designed with additional spare slots that can be filled to provide some added capacity and redundancy. The City has selected to have those slots filled with the membranes at today's pricing. Proposal Items B through E are used to evaluate the system performance and life cycle costs and were used to assist in scoring each of the membrane units. The remaining Alternate item was to provide an additional membrane unit if the city



desired to have the needed number of units (3 units) with a redundant spare. This is known as N+1, N being the number of service units. With the selection of the additional membranes to fill out the spare slots, it has been determined that at this time a full spare unit is not required.

### Bid Tabulation of Membrane Filter System Equipment

Proposal Item		Dupont (with Memcor Membrane)	H2O Innovations (with Toray Membrane)	Pall Water
A	Membrane System Goods and Services (Capital Cost)	\$ 2,859,000	\$ 2,981,713	\$ 4,725,810
B	Present Worth of Membrane Replacement	\$ 361,643.52	\$ 293,731	\$ 351,540
C	Present Worth of Energy Consumption	\$ 483,276.70	\$ 178,313	\$ 495,506.31
D	Present Worth of Chemical Costs	\$ 100,802.40	\$ 59,836	\$ 209,310.85
E	Total Present Worth Cost of Membrane System (A+B+C+D)	\$ 3,804,594.69	\$ 3,513,594	\$ 5,782,167.85
F	Alt. 1 – Provide 10% Additional Membrane Modules	\$ 75,000	\$ 61,978	\$ 65,797.39
G	Alt. 2 – Provide Additional Membrane Rack	\$ 325,000	\$ 434,645	\$ 552,992.57

Although the DuPont product capital cost was \$109,000 lower, the Operating Costs, consisting of cleaning chemicals and energy costs for one year were nearly \$350,000 higher than those of the H2O/Toray membranes. Other areas where the H2O membranes scored well included, negligible costs to meet the current plant design and a positive work history with the CMAR's terms and conditions. Refer to Attachment 1 for full scoring of each membrane supplier, Engineer's Evaluation and Recommendation for award.

### Yard Pipe and Valves Material: Division 15, Budget, \$3,358,000

This item covers the procurement of piping, valves and appurtenances for plant piping. This is a simple direct purchase of materials that will be governed by conformance to the product specification, availability of the material and the price submitted by the responding bidding supplier.

**Project Budget:** See table below for status of the project budget and the impact of EWP2 Bid and Budget items.

Early Works Package 2 Partial Bid Updated						
60% Budget Distribution						
Description	Baseline Budget	EWP1 Actual	EWP2 GMP	Actual Bid Price	Balance of Plant	Projected GMP
<b>Specifications Sections</b>						
01 - General	\$ 10,927,000	\$ 2,912,610			\$ 8,014,390	\$ 10,927,000
02 - Sitework	\$ 16,078,726	\$ 2,750,920			\$ 12,952,442	\$ 15,703,362
03 - Concrete	\$ 12,866,709		\$ 3,818,163		\$ 9,048,546	\$ 12,866,709
04 - Masonry	\$ 183,351				\$ 183,351	\$ 183,351
05 - Metals	\$ 3,997,041				\$ 3,997,041	\$ 3,997,041
06 - Wood and Plastics	\$ 77,593				\$ 77,593	\$ 77,593
07 - Thermal and Moisture	\$ 1,833,321				\$ 1,833,321	\$ 1,833,321
08 - Openings	\$ 1,433,558				\$ 1,433,558	\$ 1,433,558
09 - Finishes	\$ 2,153,278				\$ 2,153,278	\$ 2,153,278
10 - Specialties	\$ 123,105				\$ 123,105	\$ 123,105
11 - Equipment	\$ 11,114,000		\$ 3,255,000	\$ 3,043,691	\$ 7,859,000	\$ 11,114,000
12 - Furnishings	\$ 400,766				\$ 400,766	\$ 400,766
13 - Special Construction	\$ 2,059,975		\$ 2,435,339	\$ 2,088,300	\$ -	\$ 2,435,339
14 - Conveyance	\$ 103,360				\$ 103,360	\$ 103,360
15 - Mechanical	\$ 28,804,349		\$ 3,358,000		\$ 25,446,349	\$ 28,804,349
16 - Electrical	\$ 22,588,000				\$ 22,588,000	\$ 22,588,000
<b>COST OF WORK</b>	<b>\$ 114,744,000</b>	<b>\$ 5,663,530</b>	<b>\$12,866,502</b>	<b>\$ 5,131,991</b>	<b>\$ 96,214,100</b>	<b>\$ 114,744,132</b>
CMAR Fee - 4.85%	\$ 5,817,000	\$ 338,052	\$ 466,000	\$ 101,000	\$ 5,012,948	\$ 5,817,000
CMAR FEE on OPE - 2.75%	\$ 82,500		\$ 90,000	\$ 84,000	\$ -	\$ 90,000
Project Contingency	\$ 5,191,000				\$ 5,183,501	\$ 5,183,501
Bonds and Insurance	\$ 2,999,000	\$ 171,044	\$ 336,000	\$ 133,000	\$ 2,491,956	\$ 2,999,000
Construction Planning Serv	\$ 1,092,320				\$ -	\$ 1,092,320
<b>TOTAL</b>	<b>\$ 129,925,820</b>	<b>\$ 6,172,626</b>	<b>\$13,758,502</b>		<b>\$ 108,902,505</b>	<b>\$ 129,925,953</b>

**Note: The costs shown in the Actual Bid Price column for the CMAR Fees reflect the mark-ups associated with BID items ONLY. This figure will be updated once bid data is available.**

### Current Status

As noted above, the CMAR has completed the bid process for the EWP1 and provided those results in a clear and concise format allowing for a full and complete review by Staff and the Owner's Representative. Staff has reviewed those bid results and has agreed with the CMAR on the pending award of a contract for that work. The entire package has been forwarded to TWDB for review and approval. Based on approval of the process following a pre-bid coordination meeting with TWDB in January, Staff anticipate a full approval from TWDB of the bid results and proposed award of sub-contracts. **Given that the EWP1 does not contain any work that is directly related to the finished water or the processes that produce it, TWDB's review process is expected to take about two weeks. This timetable would allow for a notice to proceed to be issued for mid-to late March.** During that time the EWP2 will complete bidding and go through the review and assessment process.

## **Guaranteed Maximum Price for EWP2**

The total cost proposal for EWP2 is \$13,758,502 and is based on PLW's current Scope of Work and on the level of detail included in the 60% (or better) design documents for all three design packages or that can reasonably be anticipated at this point in the design process. Portions of this work have been bid (Division 11 - Membranes and Division 13 - GST) and those prices indicate a downward trend between BUDGET figures and BID pricing. This trend shows a \$600,000 cost savings in the EWP2 package. Staff will continue to monitor and interact with the CMAR as the balance of this work package is finalized using the CMAR's processes and recommendations and make final decisions on selected contractors and prices. The ultimate cost of EWP2 will be based on those bid results and any savings will be returned to the project. EWP2 includes portions of Divisions 3, 11, 13 and 15. This proposal is based on a GMP for these services and is an advanced component of the final GMP that will be provided at 90% design and will be rolled into the final GMP.

### **Next Steps:**

Upon TWDB approval of the bids and recommendations for award of sub-contracts Staff will issue a Notice to Proceed with the work of EWP1. With Council's approval of EWP2 the work contained in this advanced package will begin as soon as the necessary components have received TWDB approval and site conditions and preparation allow. The Bidding process will continue during this time to finalize the packages within EWP2.

90% Plans for all three design packages are scheduled for late March and April. At that point the CMAR will begin finalizing his final GMP for all remaining work. Those plans will also go the City permits department, TWDB and TCEQ for review, comment and ultimately approval upon achieving 100% sealed and signed plans. The CMAR is expected to have final GMP prior to that final approval from Austin.

### **Recommendation**

On March 23, 2020 Staff plans to submit Amendment #2 (EWP2) to the Construction Manager at Risk contract with PLW Waterworks LLC for Council approval and authorization and will recommend Council approval of this next step towards a final GMP to implement initial work on site.

**Budget Info:**

<b>Funding Sources</b>	<b>Series</b>	<b>To Date</b>	<b>Future</b>	<b>Total Budget</b>
W/S Revenue Bonds	2017B	6,012,500		6,012,500
Impact Fee - Debt	2017B	6,012,500		6,012,500
W/S Revenue Bonds	2018A	4,325,000		4,325,000
Impact Fee - Debt	2018A	4,325,000		4,325,000
W/S Revenue Bonds	2019A	10,500,000		10,500,000
Impact Fee - Debt	2019A	10,500,000		10,500,000
W/S Revenue Bonds	Future		68,362,500	68,362,500
Impact Fee - Debt	Future		68,362,500	68,362,500
Cash				-
Other Funding Sources				-
<b>Total Funding Sources</b>		<b>41,675,000</b>	<b>136,725,000</b>	<b>178,400,000</b>

<b>Expenditures</b>	<b>To Date</b>	<b>Future</b>	<b>Total</b>
PER	9,376,810		9,376,810
Land		1,900,000	1,900,000
Design	12,368,006		12,368,006
Construction (Pre-Construction)	1,093,320		1,093,320
Construction (Early Work Package 1)	7,479,256		7,479,256
Construction (Early Work Package 2)		13,758,502	13,758,502
Construction		114,750,000	114,750,000
Construction Management/Inspection		2,000,000	2,000,000
Construction Materials Testing		350,000	350,000
FF&E		1,000,000	1,000,000
<b>Total Expenditures</b>	<b>30,317,392</b>	<b>133,758,502</b>	<b>164,075,894</b>

<b>Project Balance/Contingency</b>	<b>14,324,106</b>
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**Schedule:**

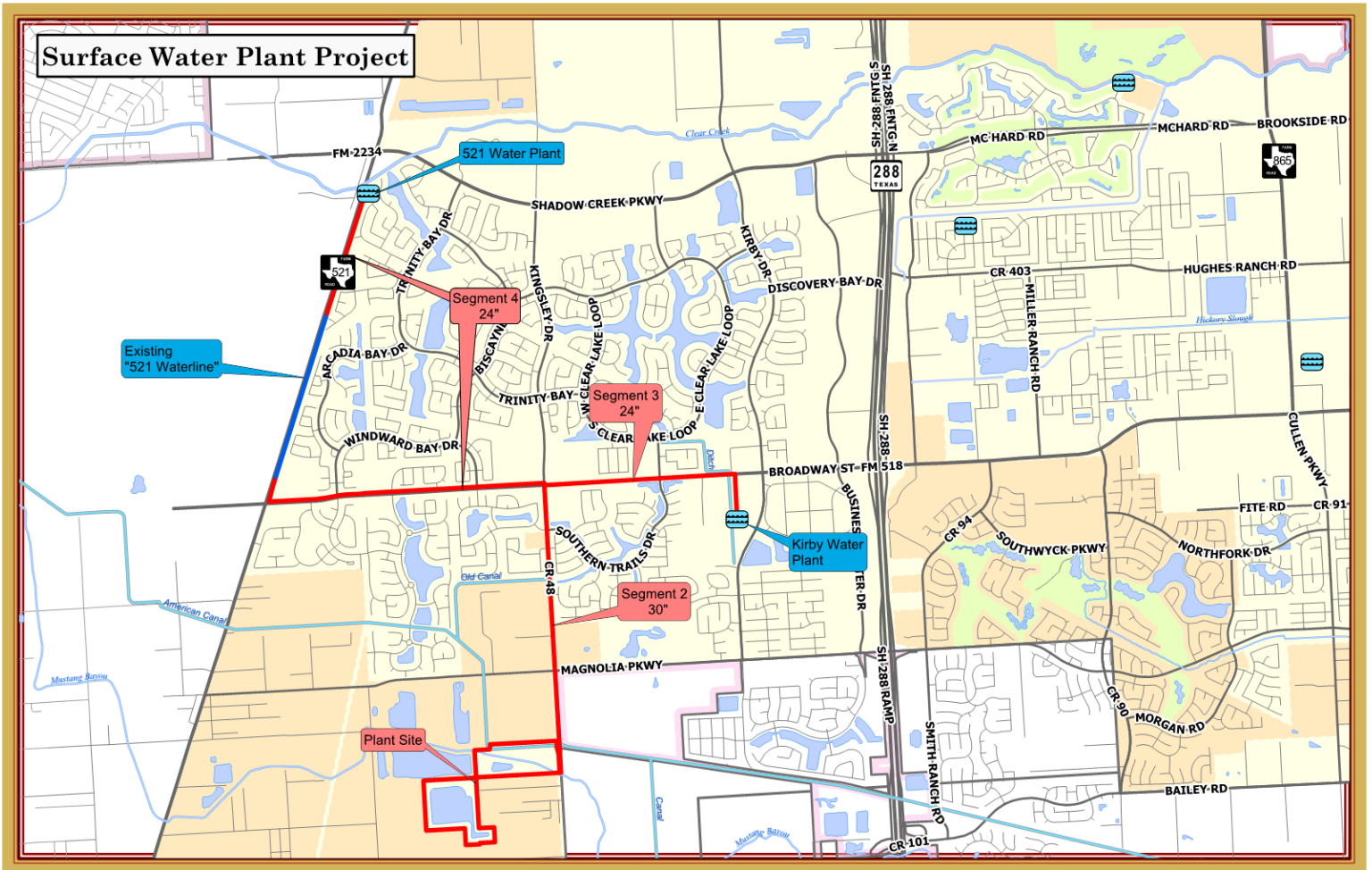
	<b>Base Line</b>	<b>Current</b>
<b>Design Start - Package 1</b>	August-19	September-19
<b>Design Start - Package 2</b>	February-19	March-19
<b>Design Start - Package 3</b>	August-19	September-19
<b>Bid Start</b>	March-20	January-19
<b>Construction Start</b>	May-20	October-20
<b>Proposed Construction Completion</b>	December-22	

**Rain Days: N/A**

\*This project was procured through the Construction Manager at Risk (CMAR) process. The original / base line schedule was projected using the design-bid-build process. In January 2019 the City advertised for a CMAR contractor.



# Project Location Map



Conceptual of completed plant site



# Attachment 1 – Engineers Evaluation and Recommendation

## Pearland Surface Water Plant Membrane Filtration System Procurement Proposal Evaluation

Evaluation Category	Definition	Weighting	Rating Determination (1-5)	Pall Rating	Pall Score	H2O Inov Rating	H2O Inov Score	Dupont Rating	Dupont Score
Capital Cost	Cost of equipment and services specified to be provided by the Membrane System Supplier	30%	Lowest Base Bid = 5 >5% - <10% above the Lowest Base Bid = 4 >10% - <15% above the Lowest Base Bid = 3 >15% - <20% above the Lowest Base Bid = 2 >20% above the Lowest Base Bid = 1	1	0.30	4	1.20	5	1.50
Operating Cost	Present Worth of the annual costs for operating the membrane system, including power, chemicals, and membrane replacement.	25%	Lowest PW Cost = 5 >5% - <10% above the Lowest PW Cost = 4 >10% - <15% above the Lowest PW Cost = 3 >15% - <20% above the Lowest PW Cost = 2 >20% above the Lowest PW Cost = 1	1	0.25	5	1.25	1	0.25
Quality and Details of Proposal	Quality and completeness of the Proposal based on the information requested in the Instructions to Bidders	5%	Rating (1 to 5) based on overall review of the proposal, including the completeness of the drawings, equipment specifications, calculations, and functional description of the system.	5	0.25	3	0.15	4	0.20
Delivering to Schedule	Ability to meet the specified delivery schedule.	5%	Can beat schedule by 10% = 5 Can beat schedule by 5% = 4 Can meet schedule = 3 Misses schedule by <5% = 2 Misses schedule by <10% = 1	3	0.15	3	0.15	3	0.15
Past Experience of Equipment on Similar Waters	Number of surface water plants treating water of similar nature	5%	>50 plants = 5 <50 - >25 plants = 4 <25 - >10 plants = 3 <10 - >5 plants = 2 <5 plants = 1	5	0.25	3	0.15	3	0.15
Integration into Plant Design	Ability of membrane system facilities to work within the design, minimizing changes to facilities.	10%	Baseline System = 5 Some impacts to plant (minor change with insignificant costs) compared to Baseline = 4 Moderate impacts to plant (minor changes with <5% of membrane costs impact) compared to Baseline = 3 Significant impacts to plant (changes with >5% <10% of membrane costs impact) compared to Baseline = 2 Major impacts to plant (change with >10% of membrane costs impact) compared to Baseline = 1	5	0.50	4	0.40	3	0.30
Qualifications as Defined in Bidders Qualification Statement	Membrane supplier qualifications related to staff, subcontractors; location of staff to cover O&M Issues;	4%	Rating (1 to 5) based on overall review of support staff location, quality of personnel resumes, and subcontractors to be used.	5	0.20	3	0.12	3	0.12
Acceptance of Terms & Conditions	Quantity and acceptability of exceptions taken to Contract Terms	8%	No exceptions = 5 Minor exceptions (1-2) = 4 Moderate exceptions (2-3) = 3 Several exceptions (4-5) = 2 Excessive exceptions (>5) = 1	4	0.32	5	0.40	3	0.24
Compliance with Equipment Specifications	Quantity and acceptability of exceptions taken to Technical Specs	6%	Exceeds specs = 5 Meets all specs = 4 Substantially meets specs = 3 Significant deviations to specs = 2 Major deviations from specs = 1	4	0.24	3	0.18	4	0.24
Acceptance of Membrane Module Warranty Conditions	Quantity and acceptability of exceptions taken to Warranty Conditions	2%	Provisions for extended years warranty (3 years or greater) = 5 Provisions for extended years warranty (1-2 years) = 4 No exceptions to warranty provisions = 3 Minor exceptions to warranty provisions = 2 Excessive exceptions to warranty provisions = 1	3	0.06	3	0.06	3	0.06
<b>Total</b>		<b>100%</b>			<b>2.52</b>		<b>4.06</b>		<b>3.21</b>