



# Memo

**To:** Trent Epperson, City Manager  
**From:** Lorenzo Wingate, P.E., C.F.M., Director of Engineering & Public Works  
**CC:** David Sohns, Director of Utilities  
Zach Lillie, Assistant Director of Utilities

**Date:** February 1, 2024

**Re:** Surface Water Treatment Plant Update

2/8/2024

To: Mayor & City Council  
Update on the Surface Water Plant progress. Basically status quo with water in the system estimated to be April.  
-Trent

## Executive Summary

This memo provides information about the progress on the Surface Water Plant project's current financial and schedule status. The memo details the current progress of the start-up and commissioning phase. The project remains in budget, but the schedule is now rigid, in that any length of delay pushes back the schedule exactly as long as the delay without any avenues of regaining lost time. **The projected completion date (Water into the System) is now estimated for April 2024, with completion of the final construction activities estimated for May 2024.**

## Background

The project entails the design and construction of the City's 10 million gallon per day (MGD) surface water treatment plant, intended to supplement the City's drinking water supply to meet current and future demands. The project includes the construction of approximately five miles (5 mi) of water transmission line to supply water to the Kirby Water Plant and the FM521 Water Plant on the west end of town, allowing the Alice Street system and ground water wells to manage the east end demands. The project also includes the extension of the City's fiber network to provide operational connectivity to these receiving plants and a redundant Data Center to be housed in the Surface Water Plant's Operations Building. The project is being delivered through the Construction Manager At Risk (CMAR) process with PLW Waterworks performing CMAR activities. The last Change Order (#8) to the CMAR's contract was approved by Council in March 2022 and consisted of Owner requested Work Change Directives (WCD's) 1, 2 and 3 increasing the total contract Guaranteed Maximum Price (GMP) to \$137,075,681. **There are no change orders impacting the GMP at this time.**

## Schedule Update

The schedule remains fluid, with new material and equipment startup delays identified almost weekly. This trend remains the primary concern for the project and one that occupies a great deal of time and effort from the project team to generate work-arounds.

The manufacturer of the membrane system and components, H2O Innovations, is also having supply chain issues that are impacting the ability to obtain remaining components needed for testing the membrane system and sub-systems. Additionally, this firm's start up teams are in high demand with other projects around the State, so when components are delayed, leaving the membrane system partially assembled, H2O's staff gets re-assigned to other projects until all components are available, installed, and the full assembly is ready for testing. This scenario is inserting additional delays into completing sub-system assembly and check-out and consequently delaying overall completion of pre-start-up activities.

The delivery of the final generator package was finally attained at the end of December 2023.

The project continues to struggle with the availability of American Iron and Steel (AIS) compliant pipe, valves and fittings. In locations where it was possible and with the engineers' agreement, some of this material has been replaced with HDPE. In other cases, a temporary non-AIS component has been used to complete a critical system likely requiring it to be replaced when the actual components become available. In one instance the City is relying on a di minimis exemption to allow minor components of a manufactured system to contain imported fittings. The City applied for and was granted two waivers, (in January 2023) for valves and check valves after the EPA confirmed domestic products meeting these specifications were not available in the current supply market. This issue also delayed the completion of construction of the transmission lines by about 6 months. Availability of American made valves and fitting delayed work at both receiving water plants right and increasing the cost of this work (increased costs will not impact the GMP).

**Due to these delays, the Water into the System schedule is now projected for April 2024 and Final Completion of Construction projected for May 2024.**

### **Construction Progress**

Operations Building construction is complete, minus a final punch list.

The Administration Building (Admin) is complete, minus a final punch list.

In the High Service Pump Room, the pumps and motors have been installed and all piping inside of the building is connected. This will leave flushing and chlorinating these lines to be done once the plant is making drinking water.

The transmission line from both receiving plants back to the Surface Water Plant is complete, except for the tie-in at 521 and 518, and the meter run at Shadow Creek Ranch. The sanitary force main at the plant is complete and in operation.

The Chlorine Building gas evacuation system has been installed and the building only lacks minor electrical systems for the chlorine alarms and the piping for the gas chlorinator system to be functionally acceptable for phased plant startup.

The GAC (Granulated Activated Carbon) vessels and piping have been installed and will be flushed once the system is making clean water. The GAC media will not be installed until the plant is running, to avoid accidental damage to this material. The delivery of material is tentatively scheduled for March of 2024.

Dummy modules and plugs for commissioning have been installed within the membrane racks. The majority of pipe painting is complete in the Membrane building. Airline routing and potable water supplies have been completed. The membrane manufacturer's technical representatives have completed system check outs to ensure proper installation. CMAR has completed the startup of individual equipment and certification of proper installation for items within its scope.

The plant ethernet fiber has been terminated at the various buildings to create the supervisory control and data acquisition (SCADA) system. SCADA engineers are checking equipment and instrumentation connections, programming programmable logic cards (PLCs) and continuing to write the operational logic for the plant. Recent completion of the plant's MDF/ Server Room and fiber connection to the City's network has allowed on-site work to begin. The Operations team is currently reviewing and submitting feedback to the SCADA engineers about concerns and ease of use issues found within the system.

In keeping with the City’s IT Department request, the CMAR and the SCADA programmers have completed the work revising the plant’s IP addressing scheme to make it a Level Three scheme. This affords the plant a higher level of data security and makes internal communications more efficient. City IT completed coordination with GCWA’s IT team to allow Raw Water intake meter data to flow directly to GCWA. Once installed the Filtrate (return flow) meter will also provide data on quantities of water returned to the canal from the process generating and accurate account of water used.

Site work is progressing well. The storm drainage outfall has been constructed tying the site drainage into Mustang Bayou. The paving contractor has completed all the roadway and most of the sidewalks throughout the plant. The plant’s north entrance has been upgraded with the completion of the left turn lane on County Road 48 (Kingsley).

Within the process units: Raw Water Lift Station, Pre-Treatment, and Solids Handling (wash water recovery, gravity thickener, belt presses) equipment has been started up and inspected by the manufacturer’s representatives to provide Certification of Proper Installation (COPI). The Membrane system, High Service Pump Station, and the Chlorine system are the remaining systems left for completion and training. The vendors, while onsite conducting COPI certifications, are also performing vendor-based training for the City’s plant operations and maintenance staff for these components. Operations equipment that was being exercised is now in use and no longer requires separate exercise schedules to meet manufacturer’s requirements.

Connections and metering stations into Shadow Creek Ranch are being prepped for material delivery and construction activities to commence. The Kirby Water Plant is tied into the transmission line from the SWTP. Current plans for work in these operating plants revolve around no impact to operations. However, it is possible, given unforeseen circumstances, that short duration shutdowns might be required. The Team is in constant contact with and coordinating efforts with Water Operations Staff.

**Budget Update**

There are no pending Change Orders or additional Owner Directed Changes with the CMAR at this time. As noted below in the Budget table, the Original Project budget was \$175,500,000. Current expenditures total \$169,320,054 and potential future expenditures of \$1,976,570 (for additional GST at Kirby receiving plant) totaling \$171,296,624, leaving a project contingency of \$ 4,203,376. As of the October 2023 Pay Estimate the project is 97% complete by pay with \$132,250,235 paid. Approximately 84% of the construction time has been expended (1556 days used out of 1854 days of contract time).Additional contract time (through May 2024) was provided, via a zero-dollar change order, to accommodate the remaining project scope.

See budget table below.

Funding Sources	Series	To Date	Future	Total Budget
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	2020A	53,800,000		53,800,000
Impact Fee - Debt	2020A	53,800,000		53,800,000
W/S Certificates of Obligation	2022C	10,490,000		10,490,000
Impact Fee - Debt	2022C	10,490,000		10,490,000
	TBS			
W/S Certificates of Obligation	2023		2,622,500	2,622,500
	TBS			
Impact Fee - Debt	2023		2,622,500	2,622,500
Cash				-
Other Funding Sources				-
<b>Total Funding Sources</b>		<b>170,255,000</b>	<b>5,245,000</b>	<b>175,500,000</b>

<b>Expenditures</b>	<b>To Date</b>	<b>Future</b>	<b>Total</b>
PER	8,773,058		8,773,058
Land	179,598		179,598
Design	16,377,732		16,377,732
Construction	142,546,976		142,546,976
Construction Management/Inspection	5,100,448		5,100,448
Construction Materials Testing	462,860		462,860
FF&E	1,315,620		1,315,620
<b>Total Expenditures</b>	<b>174,756,292</b>	<b>-</b>	<b>174,756,292</b>

<b>Project Contingency</b>	<b>0.4%</b>	<b>743,708</b>
<b>Project Balance</b>		<b>0</b>

### Start-Up Planning

The activities of **Loops 1 and 2** were completed using raw water from the canal and returning that water to the canal. This tested out the Raw Water Pumps, vertical screens, raw water piping and portions of the Pre-Treatment structure and chemical treatment equipment.

**Loop 4** introduced coagulant through the static mixers upstream of Pre-Treatment to produce settled water. The process produced sludge allowing the CMAR to test the solids handling and removal systems. The settled canal water was then cycled back to the GCWA canal. Once settled water reached less than 2 Nephelometric Turbidity Units (NTU) it was used to flush the necessary Loop 3 lines.



**Loop 3** used settled water generated in Loop 4 to flush the membrane supply piping and then to test membrane rack functions without the membranes installed. This testing exercised all the functions of the membrane racks and associated equipment without jeopardizing the membranes themselves, including all three versions of membrane cleaning and the cleaning chemical systems and tanks. Loop 3 testing recycled the water back through the process water handling system to test functionality.

**Loop 5** is now scheduled to be completed in February 2024, and the Finished Water storage/disposal loop. The membrane modules will be installed in late January/early February and will go through performance testing and cleaning checks in this Loop. The manufacture will begin proving the system meets chemical and energy performance requirements in compliance with the specifications. At this point the plant is making potable water. Once the water meets drinking water quality standards, it will be stored in the GST and used to flush the transmission lines. Once all three racks are in production, the plant will be making about 3 to 4 million gallons during an 8-to-10-hour operational day and water that cannot be stored or used in flushing will be released into Mustang Bayou.

The transmission line flushing process will require several flushes to clean the lines of construction debris and obtain clear biological tests. This water will be pushed from the Surface Water Plant to the receiving plants at Kirby and Shadow Creek (FM521). The flushing process will require dechlorination at the receiving plants and then spilling out to drainage systems prompting the need to notify the public that this is a purposeful activity and not a leak. The flushing process provides the opportunity to adjust plant processes to fine tune water quality while ensuring the transmission lines are free of debris, chlorinated and fully tested.

Once the plant water quality has been accepted by TCEQ as meeting drinking water quality standards the project will produce water for final introduction into the distribution system. This is scheduled for late March 2024.

This schedule represents the evolving start up process and is subject to delays as equipment operation is refined and fine-tuned and problems encountered are resolved. The Water into the System date presented above is a conservative estimate of receipt of TCEQ's final approval of the plant and the water quality.

#### **Staffing Update:**

Staffing for the plant is proceeding as planned with recruitment and hiring as of September 1<sup>st</sup>, as follows:

Surface Water Treatment Plant Manager – Hired

Process Control Supervisor – Hired

Operator II – Hired

Operator I – Hired

Operator I – Hired

Lab Tech – Hired

Maintenance Coordinator – Hired

Plant Mechanic – Hired

Plant Mechanic – Hired

Instrument Technician – Hired

Operator II – Taking applications

Lead Operator – Taking applications

Electrician – Vacant

**Schedule Info:**

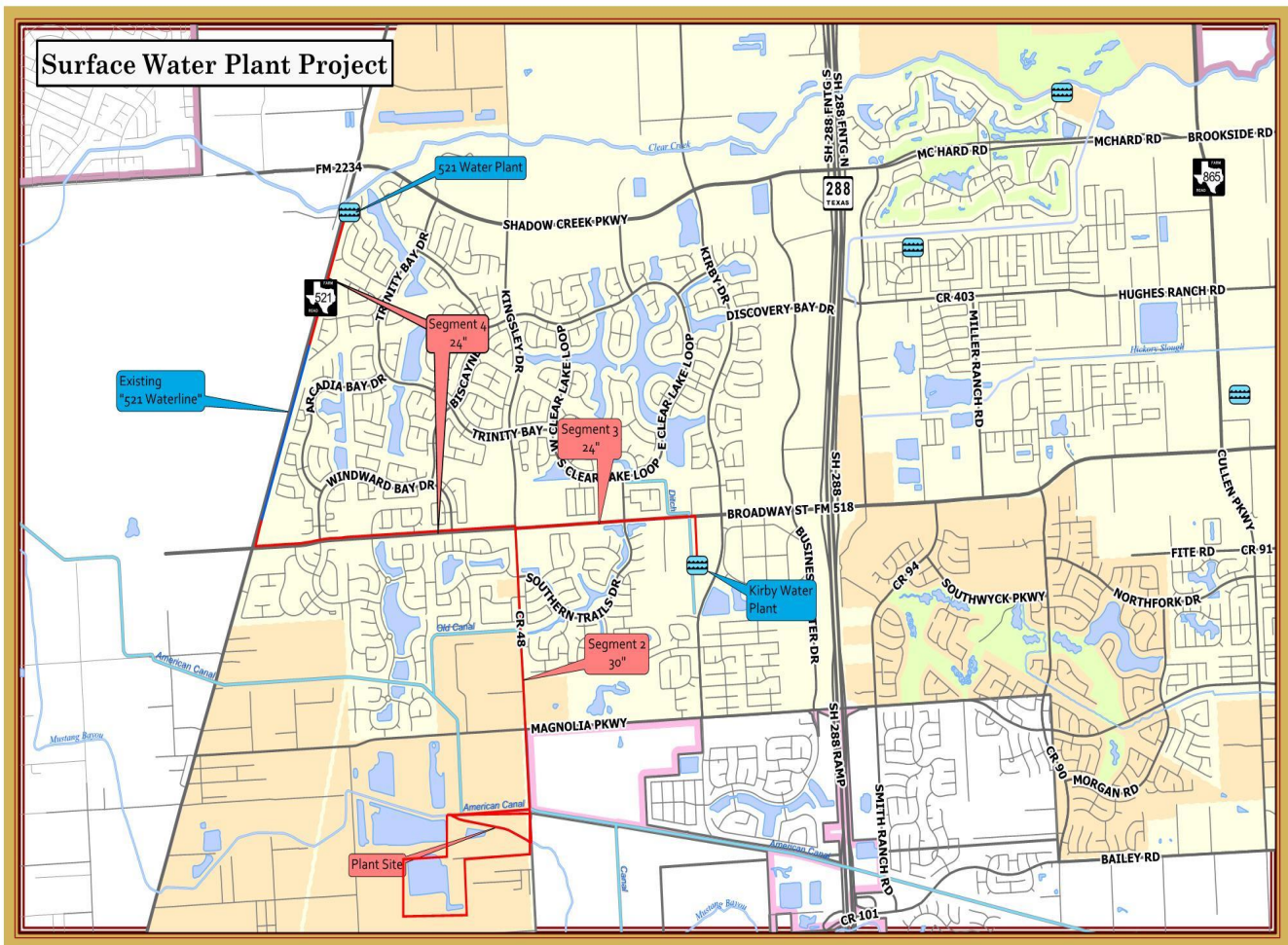
	<b>Base Line</b>	<b>Current</b>
<b>Design Start - Package 1</b>	August-19	September-19
<b>Design Start - Package 2</b>	February-19	March-19
<b>Design Start - Package 3</b>	August-19	September-19
<b>Bid Start</b>	March-20	January-19
<b>Construction Start</b>	May-20	June-20
<b>Construction Completion</b>	December-22	May-24

\*April-2024 is current schedule for water in the system with substantial completion in May-2024

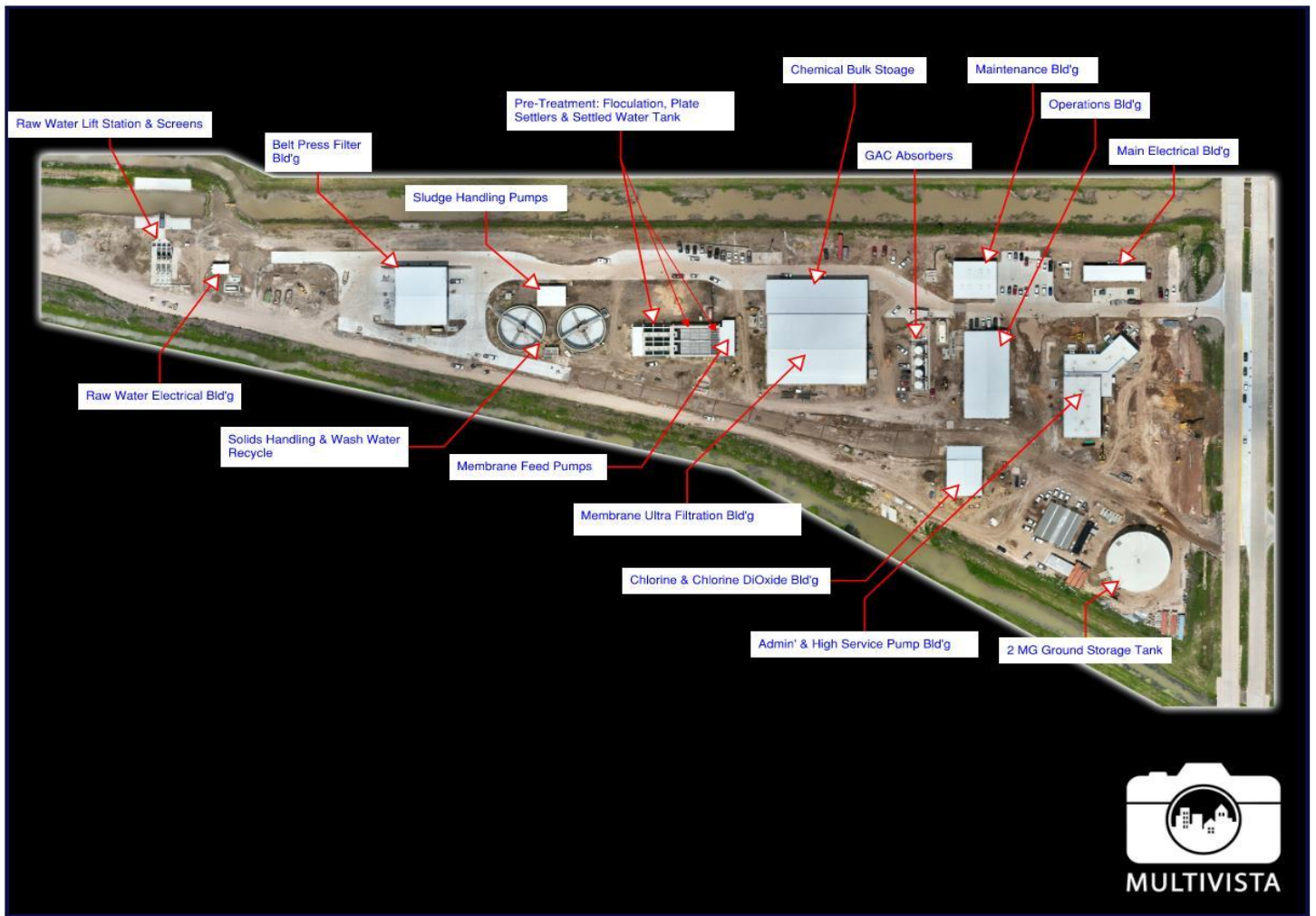
**Previous Memos:**

[6/16/16](#), [2/2/17](#), [3/9/17](#), [4/13/17](#), [3/29/18](#), [4/19/18](#), [1/10/19](#), [2/21/19](#), [3/28/19](#), [8/1/19](#), [8/8/19](#), [1/23/20](#), [3/5/20](#), [4/16/20](#), [9/17/20](#), [3/4/21](#), [6/9/21](#), [11/4/21](#), [3/10/22](#), [4/14/22](#), [5/12/22](#), [7/14/22](#), [9/15/22](#), [11/17/22](#), [2/23/23](#), [6/22/23](#), [9/14/23](#)

**Project Map:**



# Project Photos:



City of Pearland - Surface A Water Treatment Facility - Aerial Slideshows - April 11 2023 - Photo 28

## Site Facility Function Identification





Aerial from the East



Chlorine Gas and Chlorine Dioxide Generator Piping





Chemical offloading area with eyewash and hose reels



Dummy modules in membrane racks for system function testing



Temporary ACH tote chemical feed setup for making settled water