



BAYTOWN AREA WATER AUTHORITY

NOTICE OF MEETING

BAYTOWN AREA WATER AUTHORITY REGULAR MEETING

WEDNESDAY, JULY 20, 2022

4:30 P.M.

COUNCIL CHAMBER, CITY HALL

2401 MARKET STREET, BAYTOWN, TEXAS 77520

AGENDA

CALL TO ORDER AND ANNOUNCEMENT OF QUORUM

1. MINUTES

- a.** Consider approving the minutes of the Baytown Area Water Authority Regular Meeting held on June 15, 2022.

2. BAWA FISCA YEAR 2022-23 PROPOSED BUDGET

- a.** Conduct a public hearing concerning the Baytown Area Water Authority Fiscal Year 2022-23 Proposed Budget.
- b.** Consider a resolution adopting the Baytown Area Water Authority's Fiscal Year 2022-23 Proposed Budget.

3. PROPOSED RESOLUTIONS

- a.** Consider a resolution awarding an Annual Mechanical Services contract to IPS Pump Services, Inc., for maintenance and repairs at water treatment facilities.
- b.** Consider a resolution authorizing Change Order No.2 with LEM Construction Company, Inc., for the Baytown Area Water Authority's Fritz Lanham Water Treatment Plant Filter Air Scour Improvements Project.

4. REPORTS

- a.** Receive an update regarding the Baytown Area Water Authority Filter Scour Improvements Project.

5. **MANAGER'S REPORT**

- a. The next Baytown Area Water Authority meeting is scheduled for Wednesday, August 17, 2022, at 4:30 p.m., in the Council Chamber located at City Hall, 2401 Market Street, Baytown, Texas 77520.

6. **ADJOURN**

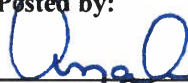
PUBLIC NOTICE IS GIVEN THAT IN ADDITION TO ANY EXECUTIVE SESSION LISTED ABOVE, THE AUTHORITY RESERVES THE RIGHT TO ADJOURN INTO EXECUTIVE SESSION AT ANY TIME AS AUTHORIZED BY THE TEXAS GOVERNMENT CODE SECTIONS 551.071 - 551.090 TO DISCUSS ANY OF THE MATTERS LISTED ABOVE.

THE AUTHORITY IS COMMITTED TO COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT. REASONABLE ACCOMMODATIONS AND EQUAL ACCESS TO COMMUNICATIONS WILL BE PROVIDED UPON REQUEST. FOR ASSISTANCE PLEASE CALL 281-420-6522, FAX 281-420-6586, OR CONTACT 281-420-6522 VIA RELAY TEXAS AT 711 OR 1-800-735-2988 FOR TTY SERVICES. FOR MORE INFORMATION CONCERNING RELAY TEXAS, PLEASE VISIT: [HTTP://RELAYTEXAS.COM](http://RELAYTEXAS.COM).

Approved for posting:


Rick Davis, General Manager

Posted by:


Angela Jackson, Assistant Secretary
(SEAL)



Posted this 15th day of July 2022, at 5:00 P.M.



**BAYTOWN AREA WATER AUTHORITY
MEETING**

1. a.

Meeting Date: 07/20/2022

Subject: June 15, 2022, BAWA Meeting Minutes

Prepared For: Angela Jackson, City Clerk's Office

Prepared By: Alisha Segovia, City Clerk's Office

Information

ITEM

Consider approving the minutes of the Baytown Area Water Authority Regular Meeting held on June 15, 2022.

PREFACE

This item allows for the Board to review and approve the meeting minutes of the Baytown Area Water Authority Regular Meeting held on June 15, 2022.

RECOMMENDATION

Fiscal Impact

Attachments

June 15, 2022, BAWA Draft Minutes

DRAFT
MINUTES OF THE REGULAR MEETING OF THE BOARD OF DIRECTORS
OF THE BAYTOWN AREA WATER AUTHORITY

June 15, 2022

The Board of Directors of the Baytown Area Water Authority (BAWA) met in a Regular Meeting on Wednesday, June 15, 2022, at 4:32 P.M., in the Council Chamber of the Baytown City Hall, 2401 Market Street, Baytown, Texas with the following in attendance:

Brenda Bradley Smith	President
Mike Wilson	Vice President
Jimmy Smith	Director
Brandon Benoit	Director
Rick Davis	General Manager
Trevor Fanning	General Counsel
Raquel Martinez	Deputy Assistant Secretary

President Brenda Bradley Smith convened the June 15, 2022, BAWA Board Regular Meeting with a quorum present at 4:32 P.M., all members were present with the exception of Secretary Frank McKay III, who was absent.

1. MINUTES

a. Consider approving the minutes of the Baytown Area Water Authority Regular Meeting held on April 20, 2022.

A motion was made by Vice President Mike Wilson, and seconded by Director Brandon Benoit to approve the minutes of the BAWA Regular Meeting held on April 20, 2022, as submitted. The vote was as follows:

Ayes: Vice President Mike Wilson, Director Jimmy Smith, Director Brandon Benoit

Nays: None

Other: President Brenda Bradley Smith (Abstain), Secretary Frank McKay III (Absent)

Approved

2. BAYTOWN AREA WATER AUTHORITY FY 2022-23 PROPOSED BUDGET

a. Receive and discuss the Baytown Area Water Authority's Fiscal Year 2022-23 Proposed Budget.

Finance Director Victor Brownlees presented the draft of the Baytown Area Water Authority's Fiscal Year 2022-23 Proposed Budget and thanked staff for their work on this item. He reminded the Directors of flux and transition over the last year due to the COVID Pandemic in terms of water consumption, and the new plant that came into operation. As such assumptions were made last year to the best of staff's ability, due to the degree of uncertainty, and numbers presented today are a better reflection of the reality of the current positions of the revenues and expenditures. Mr. Brownlees further provided the following overview of the proposed budget and offered any questions from the Board:

Revenues:

Revenues are due to go up a little over \$15 million, which is largely due to a 6% increase in rates that are going into effect in the next fiscal year, which these numbers are included in the budget as presented.

Expenditures:

Expenditures are seeing an upward turn, which is due to increased inflation rate pressures. Also, some of those cost increases include, Raw Water Supply Costs from the City of Houston, and Debt Services for a program of investment that is in place for Capital Projects. He noted that equates to a little under \$1 million in cash going into the Capital Improvement Project Fund ("CIPF") for next year to increase the debt payments to a little under a million to pay for bonds, which will be issued for the Raw Water Rehabilitation and East Surface Water Plant Phase 2 Expansion Projects.

Working Capital:

The budget, as presented, will result in Working Capital of all other things being equal of up to 51 days of operating expenditures at year end, and as a conservator, it is a little low, but reasonable as we are in the business of providing services and not to hoard money. However, Mr. Brownlees noted he would not like it to go below the current amount, and as such staff will be watching for any need to increase water rates for the following fiscal year of 2023-24.

Vice President Mike Wilson questioned the differences in the numbers for the budget presented in their packet, compared to the attachment that was before the Board at the dais and Mr. Brownlees responded that the budget had been amended since the posting.

President Brenda Bradley Smith noted the City of Houston untreated water rates for the last entry on the table is for April 2021, and asked if they had increased for April 2022. Mr. Brownlees noted on page 4 of the Expenditures under Raw Water Supply Cost, it was highlighted that the cost went up from \$0.7573 to \$0.90 on April 1st, 2022. Further President Bradley Smith questioned the proposed expansion of the BAWA East Surface Water Plant Phase 2 Expansion and the relatively low amount of \$5.4 million to design and construct such a project. Assistant Director of Utilities Sterling Beaver answered that this was misstated in the description of the budget and clarified that this item is not for the construction, but only for the Engineering of the project.

Furthermore, General Manager Rick Davis clarified that it is expected that an expansion for BAWA East might cost similar to the new construction, and that Carollo Engineers, Inc., is currently conducting an analysis on this project to determine potential use of technologies that could be included in the expansion project, and that this information is needed in order to move

further with financial figures. Mr. Brownlees further stated that once this assessment is complete, staff would bring that information before the Board with how to fund the final expense, as this amount is just to get them started.

Director Brandon Benoit questioned the transfer of \$1 million from the Working Capital to the Capital Improvement Project Fund ("CIPF"), which is down from previous years, and asked for clarification for the reason for this transfer. Mr. Brownlees responded that on page 5 of the proposed budget it outlines the Capital Programs that will be funded, which are the Backwash and Decant Pump Replacement Project, as well as the Administration Building Project, and that his earlier statement for Working Capital was to watch it and ensure that it does not get lower. General Manager Rick Davis further clarified that it was not a what-if number, but what they will actually do.

b. Consider a resolution calling for a public hearing regarding the Baytown Area Water Authority Fiscal Year 2022-23 Proposed Budget.

A motion was made by Director Jimmy Smith, and seconded by Vice President Mike Wilson to approve Resolution No. 2022 -08, related to Item 2.b. The vote was as follows:

Ayes: President Brenda Bradley Smith, Vice President Mike Wilson, Director Jimmy Smith, Director Brandon Benoit

Nays: None

Other: Secretary Frank McKay III (Absent)

Approved

RESOLUTION NO. 2022-08

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY ESTABLISHING THE DATE, TIME AND PLACE FOR A PUBLIC HEARING ON THE FISCAL YEAR 2022-2023 PROPOSED BUDGET; AND PROVIDING FOR THE EFFECTIVE DATE THEREOF.

3. REPORTS

a. Receive the Baytown Area Water Authority Quarterly Financial and Investment Reports for the Quarter Ending March 31, 2022.

Finance Director Victor Brownlees presented the Baytown Area Water Authority Quarterly Financial and Investment Reports for the Quarter Ending March 31, 2022, and stated that they are slightly behind on Revenues for the half way point, as reflected earlier. Expenditures match dollar for dollar, and slightly behind on personnel and supplies. However, overall tracking was within expected areas. On the Capital Improvement side, the spending is being invested in infrastructure

and the slightly lower Revenue figures are reflected in the estimates that were just presented, along with next year's budget as well.

4. MANAGER'S REPORT

a. The next Baytown Area Water Authority meeting is scheduled for Wednesday, July 20, 2022, at 4:30 p.m., in the Council Chamber located at City Hall, 2401 Market Street, Baytown, Texas 77520.

General Manager Rick Davis stated that this year, they entering into a different environment and that things will get tighter with inflation; labor markets with pools of fewer qualified applicants; and pressing needs to further the City's infrastructure. As such, there will be weighted decisions that the Board and staff will have to make in the future. Likely, to consider an expansion to the BAWA East Treatment Plant. Also, another headwind will possibly be for rate increases, as the City of Houston had a rate increase of 14%, and the demand for water for a continually growing community expands. Furthermore, Mr. Davis stated that he was optimistic as the Revenues have not come in yet for the next fiscal year, therefore, a lot was left to be seen. Lastly, Mr. David announced the next meeting was scheduled for July 20th, and thanked the Board for their service.

5. ADJOURN

With there being no further business to discuss, President Brenda Bradley Smith adjourned the June 15, 2022, BAWA Board Regular Meeting at 4:51 P.M.

Angela Jackson, Assistant Secretary
City of Baytown



**BAYTOWN AREA WATER AUTHORITY
MEETING**

2. a.

Meeting Date: 07/20/2022

Subject: Conduct a Public Hearing Adopting Baytown Area Water Authority FY 2022-23 Proposed Budget.

Prepared For: Victor Brownlees, Finance

Prepared By: Monica Fabela, Finance

Information

ITEM

Conduct a public hearing concerning the Baytown Area Water Authority Fiscal Year 2022-23 Proposed Budget.

PREFACE

This item allows the Baytown Area Water Authority to conduct a public hearing regarding the Baytown Area Water Authority Fiscal Year 2022-23 Proposed Budget. Notice of this public hearing was posted on the City's notice boards and website on July 6, 2022, and published in *The Baytown Sun* on July 7, 2022. The notice of this public hearing and the proposed budget are attached to this item for your review.

RECOMMENDATION

Fiscal Impact

Fiscal Year:

Acct Code:

Source of Funds (Operating/Capital/Bonds):

Funds Budgeted Y/N:

Amount Needed:

Fiscal Impact (Additional Information):

There is no fiscal impact with this item.

Attachments

FY23 BAWA Proposed Budget

BAWA Budget Hearing Notice

BAYTOWN AREA WATER AUTHORITY (BAWA)

ANNUAL PROGRAM OF SERVICES
2022-23

PROPOSED BUDGET



BAYTOWN AREA WATER AUTHORITY BOARD OF DIRECTORS

BRENDA BRADLEY SMITH, President

MIKE WILSON, Vice President

FRANK McKAY III, Secretary

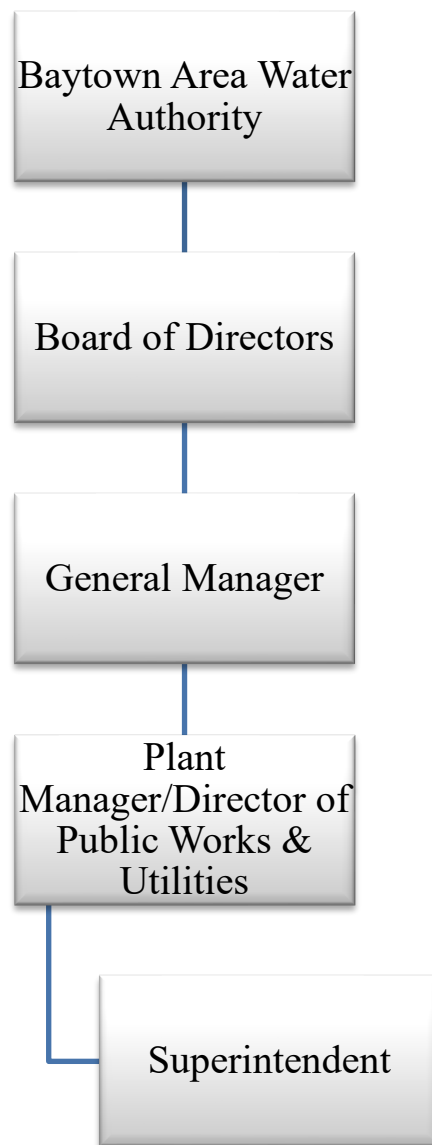
CITY CLERK, Assistant Secretary

BRANDON BENOIT, Director

JIMMY SMITH, Director

BAYTOWN AREA WATER AUTHORITY (BAWA)

ORGANIZATION CHART



BAYTOWN AREA WATER AUTHORITY
MAJOR BUDGET ISSUES
FISCAL YEAR 2022-23

This fund accounts for the operations of the Baytown Area Water Authority (BAWA). BAWA is a water authority created by the Texas Legislature to supply water for the City of Baytown (City) and surrounding communities. BAWA services a total of eight customers with the City as the largest customer, generating approximately 88% of BAWA's annual sales. BAWA is a separate legal entity; however, it is considered a component unit of the City. Since it began operating, BAWA has not experienced shortages of its raw water supply to the plant or interruptions of service to its customers.

REVENUES

The 2022-23 proposed budget estimates sales of \$15,220,828 for an average of 13.5 million gallons per day (MGD). Fluctuations in rainfall amounts can significantly impact actual sales. The existing rate structure for BAWA is \$3.08 per 1,000 gallons for the City of Baytown and \$3.12 per 1,000 gallons for customers outside the city. The rates will consist of a 6% bump to \$3.26 per 1,000 gallons for the City of Baytown and \$3.46 per 1,000 gallons for customers outside the city for the 2022-23 budget.

EXPENDITURES

Total operating expenditures for the proposed 2022-23 budget are \$10,332,898 which is an increase of \$634,597 from the 2021-22 budget. An increase of \$273,314 over current year estimate in the untreated water supplies is included in the budget due to the City of Houston's raw water supply contract. This budget includes a transfer of \$350,000 to the General Fund for an indirect cost allocation to reimburse the City for administrative services such as Human Resources, Fiscal Operations, Legal and Information Technology Services. Highlights of major operating changes are as follows:

• Increase in personnel services	\$ 62,321
• Increase in supplies	186,615
• Increase in maintenance	63,200
• Increase in services	322,462
• Increase in capital outlay	47,806
• Increase to transfers out-debt service	71,589

Raw Water Supply Cost – BAWA purchases raw water from the City of Houston. The raw water supply contract with the City of Houston is in effect through the year 2040, and sets the maximum amount of raw water to be delivered to the BAWA plant at 20 MGD without penalties. The surcharge for water purchased over the 20 MGD is nominal at this time. BAWA received a rate increase from \$0.7573 to \$0.90 on April 1, 2022. The annual rate adjustment is based on inflation.

Debt Service – The transfer to cover the debt service requirement for the proposed 2022-23 budget is \$4,483,294. The Authority awarded a construction contract to build the BAWA East Water Treatment Plant and due to the length of time for construction, 27-36 months, the Authority chose to issue bonds in two parts. The combination of bonds and operating funds totaling \$28 million was issued for the first year. The second issue, \$18 million in bonds, was issued in the fiscal year 2018-19.

BAYTOWN AREA WATER AUTHORITY
MAJOR BUDGET ISSUES
FISCAL YEAR 2022-23

CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program for BAWA is funded through the issuance of revenue bonds, grants, and revenue from operations.

BAWA Backwash and Decant Pump Replacement \$500,000

This project would replace the existing (7.5HP) decant and backwash pumps and motors to increase reliability and control of surface water sludge processes.

BAWA Administration Building \$550,000

This project would perform a minor remodel of office space updating the finishes, and replace the HVAC system, replace the roof, plumbing upgrades, and electrical upgrades.

BAWA Raw Water Rehabilitation \$13,500,000

This project, funded from debt, would replace the existing BAWA Forebay liner, raw water pumps and motors with variable frequency drive (VFD) pumps/motors at the Fritz Lanham Surface Water Plant. Project will be split into two phases to smooth funding requirements. Phase I: Canal Pumps with Decant PS. Phase II: Forebay pumps and liner.

BAWA East Surface Water Plant Phase 2 Expansion \$5,420,000

This project, funded by debt, covers the engineering services of the expansion and the existing surface water treatment plant south of Interstate Highway (IH) 10 and west of SH 99 along the Coastal Water Authority (CWA) Barbers Hill Canal. The design will provide for the ability to expand the plant based on future water demands and allow the plant to convert to salt water treatment (desalinization) ensuring long term viability.

WORKING CAPITAL

In order to maintain fiscal stability, governmental entities maintain a working capital balance to meet daily liquidity needs. Appropriate levels of working capital vary from entity to entity based on the relative impact of particular circumstances or financial conditions. Working capital is defined as current assets (e.g., cash, investments and accounts receivable) less current liabilities (e.g., accounts payable).

In the 2022-23 proposed budget, BAWA's working capital level at year end is projected to represent 51 days of operating expenditures plus we are able to transfer out \$1,000,000 to BAWA's Capital Improvement Project Fund (CIPF) which will be available for funding future capital projects.

3070 BAYTOWN AREA WATER AUTHORITY – PROGRAM SUMMARY

Program Description

BAWA operates and maintains a 31.898 Million Gallon per Day (MGD) surface water treatment facilities. BAWA currently serves 8 surrounding area customers, including the City of Baytown, which uses 88% of BAWA's production. Operations personnel ensure the facility's compliance with the Texas Commission on Environmental Quality's (TCEQ) Rules and Regulations for Public Water Supplies. BAWA provides its customers with high quality, safe drinking water and consistent water pressure for fire protection.

Major Goals

- Maintain water quality to be classified as "Meeting Optimum Corrosion Control" by TCEQ.
- Maintain "Superior Public Water System" status.
- Maintain standards for the Texas Optimization Program - a voluntary program through TCEQ that promotes the optimization of surface water treatment plants, by identifying and addressing the various factors that limit performance in order to lower the risk of waterborne disease.
- Develop and maintain a staff of highly trained water professionals through continuing education classes and hands on training.

Major Objectives

- Produce 13.5 MGD of finished water.
- Maintain finished water turbidity (haze measurement) consistently < 0.1 NTU.
- Maintain compliance with all TCEQ and EPA regulations.

BAYTOWN AREA WATER AUTHORITY FUND 510
BUDGET SUMMARY BY FUND

	Actual 2020-21	Budget 2021-22	Estimated 2021-22	Proposed 2022-23
Revenues				
Sale of Water - Baytown	\$ 12,472,111	\$ 13,814,730	\$ 12,727,954	\$ 13,491,632
Sale of Water - Other	1,394,136	1,527,968	1,631,318	1,729,197
Interest Revenue	3,002	10,000	1,012	1,073
Miscellaneous	-	-	-	-
Transfers In From WWIS Fund	117,227	123,258	123,258	123,258
Total Revenues	<u>13,986,477</u>	<u>15,475,955</u>	<u>14,483,542</u>	<u>15,345,160</u>
Expenditures				
Personnel Services	1,603,279	1,985,739	1,661,869	2,048,060
Supplies	5,568,156	6,159,857	5,927,918	6,346,472
Maintenance	357,033	313,650	452,968	376,850
Services	894,296	1,239,055	783,391	1,561,517
Total Operating	<u>8,422,764</u>	<u>9,698,301</u>	<u>8,826,147</u>	<u>10,332,898</u>
Capital Outlay	27,125	25,194	37,292	73,000
Transfers Out - Debt Service	3,515,370	4,411,705	3,511,705	4,483,294
Transfers Out - Capital Improvement	2,258,192	3,000,000	3,000,000	1,000,000
Transfers Out - General Fund	350,000	350,000	350,000	350,000
Contingency	-	250,000	-	250,000
Total Expenditures	<u>14,573,451</u>	<u>17,735,200</u>	<u>15,725,144</u>	<u>16,489,192</u>
Excess (Deficit) Revenues				
Over Expenditures	(586,974)	(2,259,245)	(1,241,602)	(1,144,033)
GAAP to budget basis adjustment	(239,007)	-	-	-
Working Capital - Beginning	<u>4,666,850</u>	<u>3,840,869</u>	<u>3,840,869</u>	<u>2,599,267</u>
Working Capital - Ending	<u>\$ 3,840,869</u>	<u>\$ 1,581,623</u>	<u>\$ 2,599,267</u>	<u>\$ 1,455,234</u>
Days of Operating Expenditures	166	60	107	51

3070 BAYTOWN AREA WATER AUTHORITY- SERVICE LEVEL BUDGET

		Actual 2020-21	Budget 2021-22	Estimated 2021-22	Proposed 2022-23
7100	Personnel Services				
71031	Contract Personnel BAWA	\$ 1,603,279	\$ 1,985,739	\$ 1,661,869	\$ 2,048,060
	Total Personnel Services	1,603,279	1,985,739	1,661,869	2,048,060
7200	Supplies				
72001	Office Supplies	7,364	6,500	6,142	6,500
72002	Postage Supplies	342	400	395	400
72007	Wearing Apparel	13,282	10,000	8,922	10,000
72016	Motor Vehicle Supplies	13,454	10,000	19,885	15,000
72021	Minor Tools	4,411	4,000	4,587	5,000
72022	Fuel For Generators	36,019	10,000	15,574	13,000
72026	Cleaning & Janitorial Sup	4,700	4,620	3,820	4,620
72031	Chemical Supplies	1,098,954	1,410,508	1,235,464	1,410,508
72032	Medical Supplies	2,197	1,760	3,413	2,500
72041	Educational Supplies	748	2,000	2,237	2,000
72051	Untreated Water Supplies	4,340,923	4,656,069	4,555,230	4,828,544
72055	Laboratory Supplies	45,762	44,000	72,250	48,400
	Total Supplies	5,568,156	6,159,857	5,927,918	6,346,472
7300	Maintenance				
73011	Buildings Maintenance	12,264	17,500	10,420	10,500
73027	Heat & Cool Sys Maint	10,258	13,000	58,519	20,000
73028	Electrical Maintenance	88,585	65,200	35,881	85,200
73041	Furniture/Fixtures Maint	1,667	2,750	322	2,750
73042	Machinery & Equip Maint	231,369	205,200	332,636	246,400
73043	Motor Vehicles Maint	12,889	10,000	15,190	12,000
	Total Maintenance	357,033	313,650	452,968	376,850
7400	Services				
74001	Communication	-	-	-	-
74002	Electric Service	520,574	833,000	486,276	840,000
74011	Equipment Rental	20,736	20,000	-	20,000
74021	Special Services	332,405	344,971	241,277	656,971
74022	Audits	-	16,352	26,394	17,596
74026	Janitorial Services	6,000	8,280	6,675	9,100
74036	Advertising	2,053	2,052	648	1,200
74042	Education & Training	12,528	14,200	21,871	16,000
74071	Association Dues	-	-	50	450
74280	Bonds	-	200	200	200
	Total Services	894,296	1,239,055	783,391	1,561,517
	Total Operating	8,422,764	9,698,301	8,826,147	10,332,898
8000	Capital Outlay				
80001	Furniture & Equip <\$10000	27,125	-	-	-
83023	Water Distribution System	-	-	-	-
84042	Machinery & Equipment	-	25,194	37,292	73,000
84043	Motor Vehicles	-	-	-	-
	Total Capital Outlay	27,125	25,194	37,292	73,000
9000	Other Financing Uses				
91511	To BAWA Debt Service	3,515,370	4,411,705	3,511,705	4,483,294
91512	To BAWA Capital Project	-	-	-	-
91518	To BAWA CIPF Fund	2,258,192	3,000,000	3,000,000	1,000,000
92101	Expense - General Fund	350,000	350,000	350,000	350,000
	Total Other Financing Uses	6,123,562	7,761,705	6,861,705	5,833,294
9900	Contingencies				
99001	Contingencies	-	250,000	-	250,000
	Total Contingencies	-	250,000	-	250,000
	TOTAL DEPARTMENT	\$ 14,573,451	\$ 17,735,200	\$ 15,725,144	\$ 16,489,192

BAWA - CAPITAL IMPROVEMENT PROGRAM FUND 518
BUDGET SUMMARY BY FUND

	Actual 2020-21	Total Allocation 2021-22	Estimated 2021-22	Total Allocation 2022-23
Revenues				
Transfer In from Operating Fund	\$ 2,258,192	\$ 3,000,000	\$ 3,000,000	\$ 1,000,000
Interest Revenue	2,737	5,000	3,000	5,000
Total Revenues	2,260,929	3,005,000	3,003,000	1,005,000
Expenditures				
BAWA East Plant Engineering	6,865	143,135	-	-
East Plant - 2017	1,389,268	3,134,965	345,680	2,984,285
Filter Scour	23,023	107,529	764,032	2,078,497
BAWA East Plant Sanitary Sewer	-	160,000	-	205,000
BAWA Raw Water Rehabilitation	1,270	198,730	57,074	205,110
Thermal Blankets	-	-	47,849	-
Backwash and Decant Pump	-	-	-	500,000
BAWA Administration Building	-	-	6,519	543,481
BAWA CIPF	461,944	-	5,171	-
New Capital Project Initiatives	-	3,883,199	-	420,924
Total Expenditures	3,388,875	7,627,557.46	1,226,325	6,937,296.48
Excess (Deficit) Revenues				
Over Expenditures	(1,127,946)	(4,622,557)	1,776,675	(5,932,296)
Working Capital - Beginning	5,283,568	4,155,622	4,155,622	5,932,297
Working Capital - Ending	\$ 4,155,622	\$ (466,936)	\$ 5,932,297	\$ -

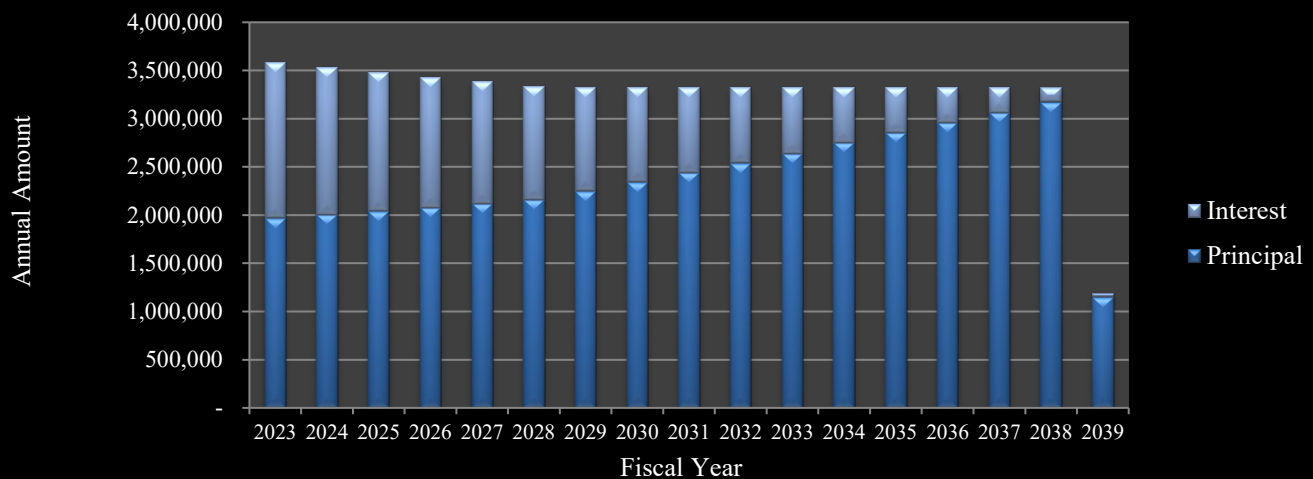
**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
LONG TERM DEBT AMORTIZATION SCHEDULES**

Revenue Bonds	Amount of Issue	Principal Outstanding Oct. 1, 2022	Principal & Interest Requirements for 2022-23			Principal Outstanding Sept. 30, 2023
			Principal	Interest	Total	
Series 2012	8,315,000	3,440,000	300,000	108,394	408,394	3,140,000
Series 2018	22,040,000	21,700,000	1,000,000	989,650	1,989,650	20,700,000
Series 2019	17,315,000	15,410,000	670,000	515,250	1,185,250	14,740,000
		\$ 40,550,000	\$ 1,970,000	\$ 1,613,294	\$ 3,583,294	\$ 38,580,000

**Combined BAWA Debt, All Series
Debt Requirements to Maturity**

Fiscal Year	Principal 5/01	Total Interest	Total Requirement
2023	1,970,000	1,613,294	3,583,294
2024	2,005,000	1,528,994	3,533,994
2025	2,040,000	1,442,668	3,482,668
2026	2,080,000	1,354,218	3,434,218
2027	2,120,000	1,264,268	3,384,268
2028	2,160,000	1,172,400	3,332,400
2029	2,250,000	1,078,588	3,328,588
2030	2,345,000	980,888	3,325,888
2031	2,440,000	887,250	3,327,250
2032	2,540,000	789,226	3,329,226
2033	2,640,000	686,850	3,326,850
2034	2,755,000	574,150	3,329,150
2035	2,855,000	473,900	3,328,900
2036	2,960,000	369,950	3,329,950
2037	3,065,000	262,100	3,327,100
2038	3,175,000	150,350	3,325,350
2039	1,150,000	34,500	1,184,500
Total	\$ 40,550,000	\$ 14,663,594	\$ 55,213,594

Combined BAWA Debt, All Series Debt Requirements to Maturity



**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
DETAIL DEBT AMORTIZATION SCHEDULES**

Revenue Bonds		Funding: BAWA					\$ 8,315,000
Series 2012		Issue Date - March 29, 2012					Term - 20 Years
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding
2013	2.00%	\$ 485,000	\$ 123,050	\$ 103,500	\$ 226,550	\$ 711,550	\$ 7,830,000
2014	2.00%	510,000	98,650	98,650	197,300	707,300	7,320,000
2015	2.00%	520,000	93,550	93,550	187,100	707,100	6,800,000
2016	2.00%	535,000	88,350	88,350	176,700	711,700	6,265,000
2017	2.00%	540,000	83,000	83,000	166,000	706,000	5,725,000
2018	2.00%	550,000	77,600	77,600	155,200	705,200	5,175,000
2019	2.00%	570,000	72,100	72,100	144,200	714,200	4,605,000
2020	2.00%	580,000	66,400	66,400	132,800	712,800	4,025,000
2021	2.00%	290,000	60,600	60,600	121,200	411,200	3,735,000
2022	2.38%	295,000	57,700	57,700	115,400	410,400	3,440,000
2023	2.50%	300,000	54,197	54,197	108,394	408,394	3,140,000
2024	2.75%	310,000	50,447	50,447	100,894	410,894	2,830,000
2025	3.00%	315,000	46,184	46,184	92,368	407,368	2,515,000
2026	3.00%	325,000	41,459	41,459	82,918	407,918	2,190,000
2027	3.13%	335,000	36,584	36,584	73,168	408,168	1,855,000
2028	3.25%	345,000	31,350	31,350	62,700	407,700	1,510,000
2029	3.25%	360,000	25,744	25,744	51,488	411,488	1,150,000
2030	3.38%	370,000	19,894	19,894	39,788	409,788	780,000
2031	3.50%	385,000	13,650	13,650	27,300	412,300	395,000
2032	3.50%	395,000	6,913	6,913	13,826	408,826	-
		\$ 8,315,000	\$ 1,147,422	\$ 1,127,872	\$ 2,275,294	\$ 10,590,294	

Call Option: Bonds maturing on 05/01/2023 to 05/01/2032 callable in whole or in part on any date beginning 05/01/2022 @ par.

**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
DETAIL DEBT AMORTIZATION SCHEDULES**

Revenue Bonds		Funding: BAWA					\$	22,040,000
Series 2018		Issue Date - June 21, 2018					Term-20 Yrs	
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding	
2019		\$ -	\$ 426,771	\$ 512,125	\$ 938,896	\$ 938,896	\$ 22,040,000	
2020	0.00%	-	503,325	503,325	1,006,650	1,006,650	22,040,000	
2021	5.00%	135,000	503,325	503,325	1,006,650	1,141,650	21,905,000	
2022	5.00%	205,000	499,950	499,950	999,900	1,204,900	21,700,000	
2023	5.00%	1,000,000	494,825	494,825	989,650	1,989,650	20,700,000	
2024	5.00%	1,000,000	469,825	469,825	939,650	1,939,650	19,700,000	
2025	5.00%	1,000,000	444,825	444,825	889,650	1,889,650	18,700,000	
2026	5.00%	1,000,000	419,825	419,825	839,650	1,839,650	17,700,000	
2027	5.00%	1,000,000	394,825	394,825	789,650	1,789,650	16,700,000	
2028	5.00%	1,000,000	369,825	369,825	739,650	1,739,650	15,700,000	
2029	5.00%	1,040,000	344,825	344,825	689,650	1,729,650	14,660,000	
2030	5.00%	1,095,000	318,825	318,825	637,650	1,732,650	13,565,000	
2031	5.00%	1,145,000	291,450	291,450	582,900	1,727,900	12,420,000	
2032	5.00%	1,210,000	262,825	262,825	525,650	1,735,650	11,210,000	
2033	5.00%	1,675,000	232,575	232,575	465,150	2,140,150	9,535,000	
2034	4.00%	1,760,000	190,700	190,700	381,400	2,141,400	7,775,000	
2035	4.00%	1,830,000	155,500	155,500	311,000	2,141,000	5,945,000	
2036	4.00%	1,905,000	118,900	118,900	237,800	2,142,800	4,040,000	
2037	4.00%	1,980,000	80,800	80,800	161,600	2,141,600	2,060,000	
2038	4.00%	2,060,000	41,200	41,200	82,400	2,142,400	-	
		\$ 22,040,000	\$ 6,564,921	\$ 6,650,275	\$ 13,215,196	\$ 35,255,196		

Call Option: Bonds maturing on 05/01/2029 to 05/01/2038 callable in whole or in part on any date beginning 05/01/2029 @ par.

Revenue Bonds		Funding: BAWA					\$	17,315,000
Series 2019		Issue Date - May 30, 2019					Term-20 Yrs	
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding	
2020	4.00%	\$ 640,000	\$ 248,080	\$ 295,725	\$ 543,805	\$ 1,183,805	\$ 16,675,000	
2021	4.00%	620,000	282,925	282,925	565,850	1,185,850	16,055,000	
2022	4.00%	645,000	270,525	270,525	541,050	1,186,050	15,410,000	
2023	4.00%	670,000	257,625	257,625	515,250	1,185,250	14,740,000	
2024	4.00%	695,000	244,225	244,225	488,450	1,183,450	14,045,000	
2025	4.00%	725,000	230,325	230,325	460,650	1,185,650	13,320,000	
2026	4.00%	755,000	215,825	215,825	431,650	1,186,650	12,565,000	
2027	4.00%	785,000	200,725	200,725	401,450	1,186,450	11,780,000	
2028	4.00%	815,000	185,025	185,025	370,050	1,185,050	10,965,000	
2029	4.00%	850,000	168,725	168,725	337,450	1,187,450	10,115,000	
2030	3.00%	880,000	151,725	151,725	303,450	1,183,450	9,235,000	
2031	3.00%	910,000	138,525	138,525	277,050	1,187,050	8,325,000	
2032	3.00%	935,000	124,875	124,875	249,750	1,184,750	7,390,000	
2033	3.00%	965,000	110,850	110,850	221,700	1,186,700	6,425,000	
2034	3.00%	995,000	96,375	96,375	192,750	1,187,750	5,430,000	
2035	3.00%	1,025,000	81,450	81,450	162,900	1,187,900	4,405,000	
2036	3.00%	1,055,000	66,075	66,075	132,150	1,187,150	3,350,000	
2037	3.00%	1,085,000	50,250	50,250	100,500	1,185,500	2,265,000	
2038	3.00%	1,115,000	33,975	33,975	67,950	1,182,950	1,150,000	
2039	3.00%	1,150,000	17,250	17,250	34,500	1,184,500	-	
		\$ 17,315,000	\$ 3,175,355	\$ 3,223,000	\$ 6,398,355	\$ 23,713,355		

Call Option: Bonds maturing on 05/01/2029 to 05/01/2033 callable in whole or in part on any date beginning 05/01/2028 @ par.

**CITY OF HOUSTON
UNTREATED WATER RATES**

Effective Month/Year	Rate
04/81	.22142
02/83	.24157
10/86	.25123
10/87	.28022
01/88	.26591 FIRST 150 MGD/PER 1,000, .26113 NEXT 150 MGD
08/88	.28426 FIRST 300 MGD/PER 1,000, .27915 NEXT 300 MGD
07/89	.29344 FIRST 300 MGD/PER 1,000, .28817 NEXT 300 MGD
08/90	.31178 FIRST 300 MGD/PER 1,000, .30618 NEXT 300 MGD
02/92	.31820 FIRST 300 MGD/PER 1,000, .31249 NEXT 300 MGD
10/93	.32907 FIRST 300 MGD/PER 1,000, .32316 NEXT 300 MGD
10/94	.37192 UP TO 13.1 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 11.9
06/04	.385 UP TO 13.1 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 11.9
04/05	.398 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/06	.4123 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/07	.4238 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/08	.4314 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/09	.4533 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/10	.4546 UP TO 20.00 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
06/10	.5647 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/11	.5754 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/12	.59439 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/13	.61580 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/14	.6232 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/15	.6506 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/16	.6597 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/17	.6821 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/18	.7012 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/19	.7208 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/20	.7460 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/21	.7573 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MAXIMUM.

TREATED WATER RATES

Year	City Rate/1,000 gallons	Other Rate/1,000 Gallons	Increase- City	Increase- Other	Comments
1981	\$0.97	\$0.97			
1985 - 1987	\$0.97	\$1.00	\$0.00	\$0.03	
1988 - 1992	\$1.07	\$1.10	\$0.10	\$0.10	Result of rising operating cost. (Raw water rates up 25%)
1993 - 1998	\$1.18	\$1.21	\$0.11	\$0.11	Result of increase in raw water rates.
1999 - 2006	\$1.26	\$1.29	\$0.08	\$0.08	Funding for plant expansion debt
2006-2007	\$1.39	\$1.42	\$0.13	\$0.13	Funding for new water line debt and City of Houston rate increase.
2007-2008	\$1.46	\$1.49	\$0.07	\$0.07	Funding for new water line debt and City of Houston rate increase.
2008-2009	\$1.55	\$1.58	\$0.09	\$0.09	Funding for new water line debt, other operating increases and City of Houston rate increase.
2009-2010	\$1.71	\$1.74	\$0.16	\$0.16	Funding for new water line debt, other operating increases and City of Houston rate increase.
2010-2011	\$1.96	\$1.99	\$0.25	\$0.25	Funding for new water line debt, other operating increases and City of Houston rate increase.
2011-2012	\$2.15	\$2.18	\$0.19	\$0.19	Funding for new water line debt, other operating increases and City of Houston rate increase.
2012-2013	\$2.35	\$2.39	\$0.20	\$0.21	Funding for new water line debt, other operating increases and City of Houston rate increase.
2013-2014	\$2.53	\$2.57	\$0.18	\$0.18	Funding for new water line debt, other operating increases and City of Houston rate increase.
2014-2015	\$2.61	\$2.65	\$0.08	\$0.08	Funding for new water line debt, other operating increases and City of Houston rate increase.
2015-2016	\$2.74	\$2.78	\$0.13	\$0.13	Funding for new water line debt, other operating increases and City of Houston rate increase.
2016-2017	\$2.74	\$2.78	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2017-2018	\$2.74	\$2.78	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2018-2019	\$2.82	\$2.86	\$0.08	\$0.08	Funding for the BAWA East Treatment Plant, other operating increases and City of Houston rate increase.
2019-2020	\$2.82	\$2.86	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2020-2021	\$2.90	\$2.95	\$0.08	\$0.09	Funding for City of Houston rate increase.
2021-2022	\$3.08	\$3.12	\$0.18	\$0.17	Per the 2020 BAWA rate study.
2022-2023	\$3.26	\$3.46	\$0.18	\$0.34	Per the 2020 BAWA rate study.



CITY OF BAYTOWN

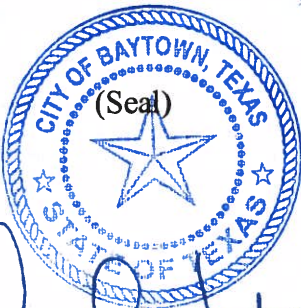
NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING REGARDING THE BAYTOWN AREA WATER AUTHORITY FY 2022-23 PROPOSED BUDGET

NOTICE is hereby given that the Baytown Area Water Authority (the “Authority”) will hold a public hearing giving all interested parties the right to appear and be heard regarding the Baytown Area Water Authority Fiscal Year 2022-23 proposed budget. The hearing will be held in the **Council Chamber of the Baytown City Hall, 2401 Market Street, Baytown, Texas**, during the meeting which commences at **4:30 P.M., on Wednesday, July 20, 2022.**

The agenda packet is accessible to the public in both HTML and PDF formats at the following link: <https://www.baytown.org/183/Public-Meetings-Agenda-Packets>. After the meeting, a video recording of this meeting will be made available to the public at <https://www.baytown.org/183/Public-Meetings-Agenda-Packets>. For more information or questions concerning the teleconference, please contact the Office of the City Clerk at 281-420-6504.

THE DISTRICT IS COMMITTED TO COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT. REASONABLE ACCOMMODATIONS AND EQUAL ACCESS TO COMMUNICATIONS WILL BE PROVIDED UPON REQUEST. FOR ASSISTANCE PLEASE CALL 281-420-6522, FAX 281-420-6586, OR CONTACT 281-420-6522 VIA RELAY TEXAS AT 711 OR 1-800-735-2989 FOR TYY SERVICES. FOR MORE INFORMATION CONCERNING RELAY TEXAS, PLEASE VISIT: [HTTP://RELAYTEXAS.COM](http://RELAYTEXAS.COM).



Angela Jackson, BAWA Assistant Secretary

Posted Date: Wednesday, July 6, 2022

Posted Time: 5:00 P.M.



**BAYTOWN AREA WATER AUTHORITY
MEETING**

2. b.

Meeting Date: 07/20/2022

Subject: Approval of the BAWA FY 2022-23 Budget.

Prepared For: Victor Brownlees, Finance

Prepared By: Monica Fabela, Finance

Information

ITEM

Consider a resolution adopting the Baytown Area Water Authority's Fiscal Year 2022-23 Proposed Budget.

PREFACE

This proposed resolution adopts the Baytown Area Water Authority ("BAWA") Fiscal Year 2022-23 Proposed Budget. The budget is attached for your review and consideration.

RECOMMENDATION

Staff recommends approval.

Fiscal Impact

Attachments

Resolution - Adopting BAWA FY2022-23 Proposed Budget

Exhibit A - Proposed 2022-23 Budget - BAWA

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY ADOPTING A BUDGET FOR THE ENSUING FISCAL YEAR, BEGINNING OCTOBER 1, 2022, AND ENDING SEPTEMBER 30, 2023; MAKING OTHER PROVISIONS RELATED THERETO; AND PROVIDING FOR THE EFFECTIVE DATE THEREOF.

WHEREAS, the General Manager of the Baytown Area Water Authority ("BAWA") has submitted to BAWA's Board of Directors a budget estimate of the revenues of BAWA and the expense of conducting the affairs thereof for the ensuing fiscal year, beginning October 1, 2022, and ending September 30, 2023; and

WHEREAS, the Board of Directors of BAWA (the "Board") received the General Manager's estimate and held a public hearing thereon; and

WHEREAS, after full and final consideration of the information contained in the proposed budget and the input received at the public hearing, it is the opinion of the Board that the budget attached hereto should be approved and adopted; NOW THEREFORE,

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY:

Section 1: That the Board of Directors of the Baytown Area Water Authority hereby adopts the budget, which is attached hereto as Exhibit "A" and incorporated herein for all intents and purposes for BAWA's 2022-2023 fiscal year.

Section 2: This resolution shall take effect immediately from and after its passage by the Board of Directors of the Baytown Area Water Authority.

INTRODUCED, READ and PASSED by the affirmative vote of the Board of Directors of the Baytown Area Water Authority this the 20th day of July, 2022.

BRENDA BRADLEY SMITH, President

ATTEST:

ANGELA JACKSON, Assistant Secretary

APPROVED AS TO FORM:

SCOTT LEMOND, General Counsel

BAYTOWN AREA WATER AUTHORITY (BAWA)

ANNUAL PROGRAM OF SERVICES
2022-23

PROPOSED BUDGET



BAYTOWN AREA WATER AUTHORITY BOARD OF DIRECTORS

BRENDA BRADLEY SMITH, President

MIKE WILSON, Vice President

FRANK McKAY III, Secretary

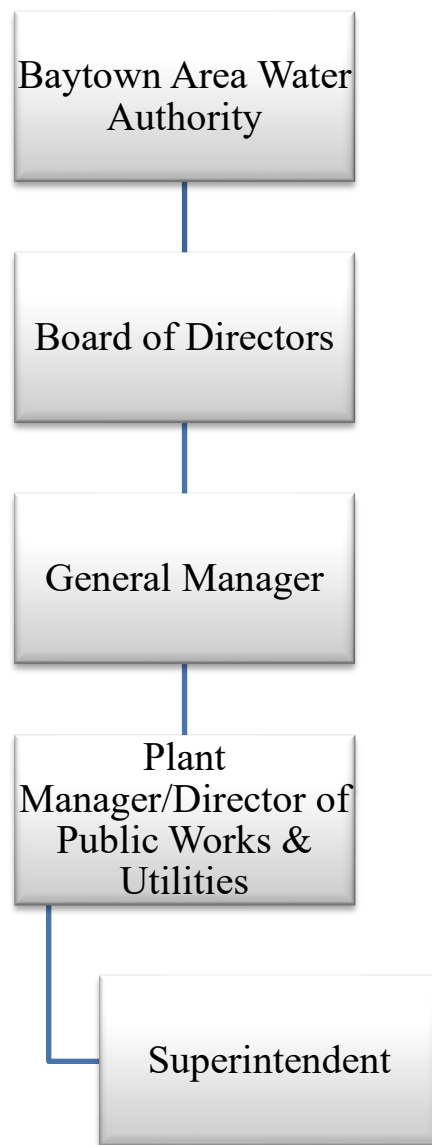
CITY CLERK, Assistant Secretary

BRANDON BENOIT, Director

JIMMY SMITH, Director

BAYTOWN AREA WATER AUTHORITY (BAWA)

ORGANIZATION CHART



BAYTOWN AREA WATER AUTHORITY
MAJOR BUDGET ISSUES
FISCAL YEAR 2022-23

This fund accounts for the operations of the Baytown Area Water Authority (BAWA). BAWA is a water authority created by the Texas Legislature to supply water for the City of Baytown (City) and surrounding communities. BAWA services a total of eight customers with the City as the largest customer, generating approximately 88% of BAWA's annual sales. BAWA is a separate legal entity; however, it is considered a component unit of the City. Since it began operating, BAWA has not experienced shortages of its raw water supply to the plant or interruptions of service to its customers.

REVENUES

The 2022-23 proposed budget estimates sales of \$15,220,828 for an average of 13.5 million gallons per day (MGD). Fluctuations in rainfall amounts can significantly impact actual sales. The existing rate structure for BAWA is \$3.08 per 1,000 gallons for the City of Baytown and \$3.12 per 1,000 gallons for customers outside the city. The rates will consist of a 6% bump to \$3.26 per 1,000 gallons for the City of Baytown and \$3.46 per 1,000 gallons for customers outside the city for the 2022-23 budget.

EXPENDITURES

Total operating expenditures for the proposed 2022-23 budget are \$10,332,898 which is an increase of \$634,597 from the 2021-22 budget. An increase of \$273,314 over current year estimate in the untreated water supplies is included in the budget due to the City of Houston's raw water supply contract. This budget includes a transfer of \$350,000 to the General Fund for an indirect cost allocation to reimburse the City for administrative services such as Human Resources, Fiscal Operations, Legal and Information Technology Services. Highlights of major operating changes are as follows:

• Increase in personnel services	\$ 62,321
• Increase in supplies	186,615
• Increase in maintenance	63,200
• Increase in services	322,462
• Increase in capital outlay	47,806
• Increase to transfers out-debt service	71,589

Raw Water Supply Cost – BAWA purchases raw water from the City of Houston. The raw water supply contract with the City of Houston is in effect through the year 2040, and sets the maximum amount of raw water to be delivered to the BAWA plant at 20 MGD without penalties. The surcharge for water purchased over the 20 MGD is nominal at this time. BAWA received a rate increase from \$0.7573 to \$0.90 on April 1, 2022. The annual rate adjustment is based on inflation.

Debt Service – The transfer to cover the debt service requirement for the proposed 2022-23 budget is \$4,483,294. The Authority awarded a construction contract to build the BAWA East Water Treatment Plant and due to the length of time for construction, 27-36 months, the Authority chose to issue bonds in two parts. The combination of bonds and operating funds totaling \$28 million was issued for the first year. The second issue, \$18 million in bonds, was issued in the fiscal year 2018-19.

BAYTOWN AREA WATER AUTHORITY
MAJOR BUDGET ISSUES
FISCAL YEAR 2022-23

CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program for BAWA is funded through the issuance of revenue bonds, grants, and revenue from operations.

BAWA Backwash and Decant Pump Replacement \$500,000

This project would replace the existing (7.5HP) decant and backwash pumps and motors to increase reliability and control of surface water sludge processes.

BAWA Administration Building \$550,000

This project would perform a minor remodel of office space updating the finishes, and replace the HVAC system, replace the roof, plumbing upgrades, and electrical upgrades.

BAWA Raw Water Rehabilitation \$13,500,000

This project, funded from debt, would replace the existing BAWA Forebay liner, raw water pumps and motors with variable frequency drive (VFD) pumps/motors at the Fritz Lanham Surface Water Plant. Project will be split into two phases to smooth funding requirements. Phase I: Canal Pumps with Decant PS. Phase II: Forebay pumps and liner.

BAWA East Surface Water Plant Phase 2 Expansion \$5,420,000

This project, funded by debt, covers the engineering services of the expansion and the existing surface water treatment plant south of Interstate Highway (IH) 10 and west of SH 99 along the Coastal Water Authority (CWA) Barbers Hill Canal. The design will provide for the ability to expand the plant based on future water demands and allow the plant to convert to salt water treatment (desalinization) ensuring long term viability.

WORKING CAPITAL

In order to maintain fiscal stability, governmental entities maintain a working capital balance to meet daily liquidity needs. Appropriate levels of working capital vary from entity to entity based on the relative impact of particular circumstances or financial conditions. Working capital is defined as current assets (e.g., cash, investments and accounts receivable) less current liabilities (e.g., accounts payable).

In the 2022-23 proposed budget, BAWA's working capital level at year end is projected to represent 51 days of operating expenditures plus we are able to transfer out \$1,000,000 to BAWA's Capital Improvement Project Fund (CIPF) which will be available for funding future capital projects.

3070 BAYTOWN AREA WATER AUTHORITY – PROGRAM SUMMARY

Program Description

BAWA operates and maintains a 31.898 Million Gallon per Day (MGD) surface water treatment facilities. BAWA currently serves 8 surrounding area customers, including the City of Baytown, which uses 88% of BAWA's production. Operations personnel ensure the facility's compliance with the Texas Commission on Environmental Quality's (TCEQ) Rules and Regulations for Public Water Supplies. BAWA provides its customers with high quality, safe drinking water and consistent water pressure for fire protection.

Major Goals

- Maintain water quality to be classified as "Meeting Optimum Corrosion Control" by TCEQ.
- Maintain "Superior Public Water System" status.
- Maintain standards for the Texas Optimization Program - a voluntary program through TCEQ that promotes the optimization of surface water treatment plants, by identifying and addressing the various factors that limit performance in order to lower the risk of waterborne disease.
- Develop and maintain a staff of highly trained water professionals through continuing education classes and hands on training.

Major Objectives

- Produce 13.5 MGD of finished water.
- Maintain finished water turbidity (haze measurement) consistently < 0.1 NTU.
- Maintain compliance with all TCEQ and EPA regulations.

BAYTOWN AREA WATER AUTHORITY FUND 510
BUDGET SUMMARY BY FUND

	Actual 2020-21	Budget 2021-22	Estimated 2021-22	Proposed 2022-23
Revenues				
Sale of Water - Baytown	\$ 12,472,111	\$ 13,814,730	\$ 12,727,954	\$ 13,491,632
Sale of Water - Other	1,394,136	1,527,968	1,631,318	1,729,197
Interest Revenue	3,002	10,000	1,012	1,073
Miscellaneous	-	-	-	-
Transfers In From WWIS Fund	117,227	123,258	123,258	123,258
Total Revenues	<u>13,986,477</u>	<u>15,475,955</u>	<u>14,483,542</u>	<u>15,345,160</u>
Expenditures				
Personnel Services	1,603,279	1,985,739	1,661,869	2,048,060
Supplies	5,568,156	6,159,857	5,927,918	6,346,472
Maintenance	357,033	313,650	452,968	376,850
Services	894,296	1,239,055	783,391	1,561,517
Total Operating	<u>8,422,764</u>	<u>9,698,301</u>	<u>8,826,147</u>	<u>10,332,898</u>
Capital Outlay	27,125	25,194	37,292	73,000
Transfers Out - Debt Service	3,515,370	4,411,705	3,511,705	4,483,294
Transfers Out - Capital Improvement	2,258,192	3,000,000	3,000,000	1,000,000
Transfers Out - General Fund	350,000	350,000	350,000	350,000
Contingency	-	250,000	-	250,000
Total Expenditures	<u>14,573,451</u>	<u>17,735,200</u>	<u>15,725,144</u>	<u>16,489,192</u>
Excess (Deficit) Revenues				
Over Expenditures	(586,974)	(2,259,245)	(1,241,602)	(1,144,033)
GAAP to budget basis adjustment	(239,007)	-	-	-
Working Capital - Beginning	<u>4,666,850</u>	<u>3,840,869</u>	<u>3,840,869</u>	<u>2,599,267</u>
Working Capital - Ending	<u>\$ 3,840,869</u>	<u>\$ 1,581,623</u>	<u>\$ 2,599,267</u>	<u>\$ 1,455,234</u>
Days of Operating Expenditures	166	60	107	51

3070 BAYTOWN AREA WATER AUTHORITY- SERVICE LEVEL BUDGET

		Actual 2020-21	Budget 2021-22	Estimated 2021-22	Proposed 2022-23
7100	Personnel Services				
71031	Contract Personnel BAWA	\$ 1,603,279	\$ 1,985,739	\$ 1,661,869	\$ 2,048,060
	Total Personnel Services	1,603,279	1,985,739	1,661,869	2,048,060
7200	Supplies				
72001	Office Supplies	7,364	6,500	6,142	6,500
72002	Postage Supplies	342	400	395	400
72007	Wearing Apparel	13,282	10,000	8,922	10,000
72016	Motor Vehicle Supplies	13,454	10,000	19,885	15,000
72021	Minor Tools	4,411	4,000	4,587	5,000
72022	Fuel For Generators	36,019	10,000	15,574	13,000
72026	Cleaning & Janitorial Sup	4,700	4,620	3,820	4,620
72031	Chemical Supplies	1,098,954	1,410,508	1,235,464	1,410,508
72032	Medical Supplies	2,197	1,760	3,413	2,500
72041	Educational Supplies	748	2,000	2,237	2,000
72051	Untreated Water Supplies	4,340,923	4,656,069	4,555,230	4,828,544
72055	Laboratory Supplies	45,762	44,000	72,250	48,400
	Total Supplies	5,568,156	6,159,857	5,927,918	6,346,472
7300	Maintenance				
73011	Buildings Maintenance	12,264	17,500	10,420	10,500
73027	Heat & Cool Sys Maint	10,258	13,000	58,519	20,000
73028	Electrical Maintenance	88,585	65,200	35,881	85,200
73041	Furniture/Fixtures Maint	1,667	2,750	322	2,750
73042	Machinery & Equip Maint	231,369	205,200	332,636	246,400
73043	Motor Vehicles Maint	12,889	10,000	15,190	12,000
	Total Maintenance	357,033	313,650	452,968	376,850
7400	Services				
74001	Communication	-	-	-	-
74002	Electric Service	520,574	833,000	486,276	840,000
74011	Equipment Rental	20,736	20,000	-	20,000
74021	Special Services	332,405	344,971	241,277	656,971
74022	Audits	-	16,352	26,394	17,596
74026	Janitorial Services	6,000	8,280	6,675	9,100
74036	Advertising	2,053	2,052	648	1,200
74042	Education & Training	12,528	14,200	21,871	16,000
74071	Association Dues	-	-	50	450
74280	Bonds	-	200	200	200
	Total Services	894,296	1,239,055	783,391	1,561,517
	Total Operating	8,422,764	9,698,301	8,826,147	10,332,898
8000	Capital Outlay				
80001	Furniture & Equip <\$10000	27,125	-	-	-
83023	Water Distribution System	-	-	-	-
84042	Machinery & Equipment	-	25,194	37,292	73,000
84043	Motor Vehicles	-	-	-	-
	Total Capital Outlay	27,125	25,194	37,292	73,000
9000	Other Financing Uses				
91511	To BAWA Debt Service	3,515,370	4,411,705	3,511,705	4,483,294
91512	To BAWA Capital Project	-	-	-	-
91518	To BAWA CIPF Fund	2,258,192	3,000,000	3,000,000	1,000,000
92101	Expense - General Fund	350,000	350,000	350,000	350,000
	Total Other Financing Uses	6,123,562	7,761,705	6,861,705	5,833,294
9900	Contingencies				
99001	Contingencies	-	250,000	-	250,000
	Total Contingencies	-	250,000	-	250,000
	TOTAL DEPARTMENT	\$ 14,573,451	\$ 17,735,200	\$ 15,725,144	\$ 16,489,192

BAWA - CAPITAL IMPROVEMENT PROGRAM FUND 518
BUDGET SUMMARY BY FUND

	Actual 2020-21	Total Allocation 2021-22	Estimated 2021-22	Total Allocation 2022-23
Revenues				
Transfer In from Operating Fund	\$ 2,258,192	\$ 3,000,000	\$ 3,000,000	\$ 1,000,000
Interest Revenue	2,737	5,000	3,000	5,000
Total Revenues	2,260,929	3,005,000	3,003,000	1,005,000
Expenditures				
BAWA East Plant Engineering	6,865	143,135	-	-
East Plant - 2017	1,389,268	3,134,965	345,680	2,984,285
Filter Scour	23,023	107,529	764,032	2,078,497
BAWA East Plant Sanitary Sewer	-	160,000	-	205,000
BAWA Raw Water Rehabilitation	1,270	198,730	57,074	205,110
Thermal Blankets	-	-	47,849	-
Backwash and Decant Pump	-	-	-	500,000
BAWA Administration Building	-	-	6,519	543,481
BAWA CIPF	461,944	-	5,171	-
New Capital Project Initiatives	-	3,883,199	-	420,924
Total Expenditures	3,388,875	7,627,557.46	1,226,325	6,937,296.48
Excess (Deficit) Revenues				
Over Expenditures	(1,127,946)	(4,622,557)	1,776,675	(5,932,296)
Working Capital - Beginning	5,283,568	4,155,622	4,155,622	5,932,297
Working Capital - Ending	\$ 4,155,622	\$ (466,936)	\$ 5,932,297	\$ -

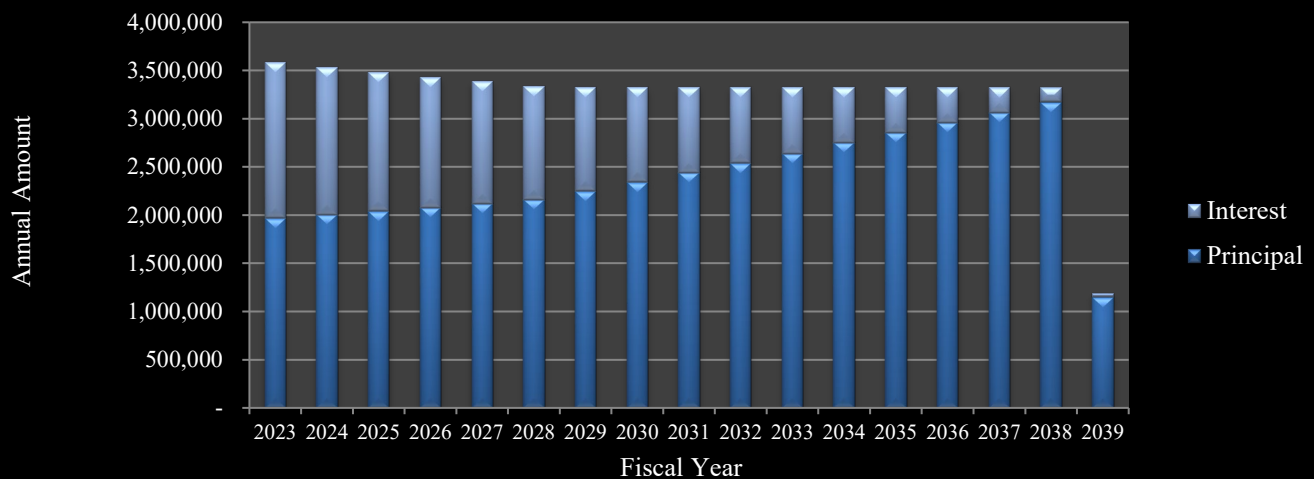
**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
LONG TERM DEBT AMORTIZATION SCHEDULES**

Revenue Bonds	Amount of Issue	Principal Outstanding Oct. 1, 2022	Principal & Interest Requirements for 2022-23			Principal Outstanding Sept. 30, 2023
			Principal	Interest	Total	
Series 2012	8,315,000	3,440,000	300,000	108,394	408,394	3,140,000
Series 2018	22,040,000	21,700,000	1,000,000	989,650	1,989,650	20,700,000
Series 2019	17,315,000	15,410,000	670,000	515,250	1,185,250	14,740,000
		\$ 40,550,000	\$ 1,970,000	\$ 1,613,294	\$ 3,583,294	\$ 38,580,000

**Combined BAWA Debt, All Series
Debt Requirements to Maturity**

Fiscal Year	Principal 5/01	Total Interest	Total Requirement
2023	1,970,000	1,613,294	3,583,294
2024	2,005,000	1,528,994	3,533,994
2025	2,040,000	1,442,668	3,482,668
2026	2,080,000	1,354,218	3,434,218
2027	2,120,000	1,264,268	3,384,268
2028	2,160,000	1,172,400	3,332,400
2029	2,250,000	1,078,588	3,328,588
2030	2,345,000	980,888	3,325,888
2031	2,440,000	887,250	3,327,250
2032	2,540,000	789,226	3,329,226
2033	2,640,000	686,850	3,326,850
2034	2,755,000	574,150	3,329,150
2035	2,855,000	473,900	3,328,900
2036	2,960,000	369,950	3,329,950
2037	3,065,000	262,100	3,327,100
2038	3,175,000	150,350	3,325,350
2039	1,150,000	34,500	1,184,500
Total	\$ 40,550,000	\$ 14,663,594	\$ 55,213,594

Combined BAWA Debt, All Series Debt Requirements to Maturity



**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
DETAIL DEBT AMORTIZATION SCHEDULES**

Revenue Bonds		Funding: BAWA					\$ 8,315,000
Series 2012		Issue Date - March 29, 2012					Term - 20 Years
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding
2013	2.00%	\$ 485,000	\$ 123,050	\$ 103,500	\$ 226,550	\$ 711,550	\$ 7,830,000
2014	2.00%	510,000	98,650	98,650	197,300	707,300	7,320,000
2015	2.00%	520,000	93,550	93,550	187,100	707,100	6,800,000
2016	2.00%	535,000	88,350	88,350	176,700	711,700	6,265,000
2017	2.00%	540,000	83,000	83,000	166,000	706,000	5,725,000
2018	2.00%	550,000	77,600	77,600	155,200	705,200	5,175,000
2019	2.00%	570,000	72,100	72,100	144,200	714,200	4,605,000
2020	2.00%	580,000	66,400	66,400	132,800	712,800	4,025,000
2021	2.00%	290,000	60,600	60,600	121,200	411,200	3,735,000
2022	2.38%	295,000	57,700	57,700	115,400	410,400	3,440,000
2023	2.50%	300,000	54,197	54,197	108,394	408,394	3,140,000
2024	2.75%	310,000	50,447	50,447	100,894	410,894	2,830,000
2025	3.00%	315,000	46,184	46,184	92,368	407,368	2,515,000
2026	3.00%	325,000	41,459	41,459	82,918	407,918	2,190,000
2027	3.13%	335,000	36,584	36,584	73,168	408,168	1,855,000
2028	3.25%	345,000	31,350	31,350	62,700	407,700	1,510,000
2029	3.25%	360,000	25,744	25,744	51,488	411,488	1,150,000
2030	3.38%	370,000	19,894	19,894	39,788	409,788	780,000
2031	3.50%	385,000	13,650	13,650	27,300	412,300	395,000
2032	3.50%	395,000	6,913	6,913	13,826	408,826	-
		\$ 8,315,000	\$ 1,147,422	\$ 1,127,872	\$ 2,275,294	\$ 10,590,294	

Call Option: Bonds maturing on 05/01/2023 to 05/01/2032 callable in whole or in part on any date beginning 05/01/2022 @ par.

**BAYTOWN AREA WATER AUTHORITY REVENUE BONDS
DETAIL DEBT AMORTIZATION SCHEDULES**

Revenue Bonds		Funding: BAWA					\$	22,040,000
Series 2018		Issue Date - June 21, 2018					Term-20 Yrs	
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding	
2019		\$ -	\$ 426,771	\$ 512,125	\$ 938,896	\$ 938,896	\$ 22,040,000	
2020	0.00%	-	503,325	503,325	1,006,650	1,006,650	22,040,000	
2021	5.00%	135,000	503,325	503,325	1,006,650	1,141,650	21,905,000	
2022	5.00%	205,000	499,950	499,950	999,900	1,204,900	21,700,000	
2023	5.00%	1,000,000	494,825	494,825	989,650	1,989,650	20,700,000	
2024	5.00%	1,000,000	469,825	469,825	939,650	1,939,650	19,700,000	
2025	5.00%	1,000,000	444,825	444,825	889,650	1,889,650	18,700,000	
2026	5.00%	1,000,000	419,825	419,825	839,650	1,839,650	17,700,000	
2027	5.00%	1,000,000	394,825	394,825	789,650	1,789,650	16,700,000	
2028	5.00%	1,000,000	369,825	369,825	739,650	1,739,650	15,700,000	
2029	5.00%	1,040,000	344,825	344,825	689,650	1,729,650	14,660,000	
2030	5.00%	1,095,000	318,825	318,825	637,650	1,732,650	13,565,000	
2031	5.00%	1,145,000	291,450	291,450	582,900	1,727,900	12,420,000	
2032	5.00%	1,210,000	262,825	262,825	525,650	1,735,650	11,210,000	
2033	5.00%	1,675,000	232,575	232,575	465,150	2,140,150	9,535,000	
2034	4.00%	1,760,000	190,700	190,700	381,400	2,141,400	7,775,000	
2035	4.00%	1,830,000	155,500	155,500	311,000	2,141,000	5,945,000	
2036	4.00%	1,905,000	118,900	118,900	237,800	2,142,800	4,040,000	
2037	4.00%	1,980,000	80,800	80,800	161,600	2,141,600	2,060,000	
2038	4.00%	2,060,000	41,200	41,200	82,400	2,142,400	-	
		\$ 22,040,000	\$ 6,564,921	\$ 6,650,275	\$ 13,215,196	\$ 35,255,196		

Call Option: Bonds maturing on 05/01/2029 to 05/01/2038 callable in whole or in part on any date beginning 05/01/2029 @ par.

Revenue Bonds		Funding: BAWA					\$	17,315,000
Series 2019		Issue Date - May 30, 2019					Term-20 Yrs	
Fiscal Year	Interest Rate	Principal Due 5/01	Interest Due 11/01	Interest Due 5/01	Total Interest	Annual Requirement	Principal Outstanding	
2020	4.00%	\$ 640,000	\$ 248,080	\$ 295,725	\$ 543,805	\$ 1,183,805	\$ 16,675,000	
2021	4.00%	620,000	282,925	282,925	565,850	1,185,850	16,055,000	
2022	4.00%	645,000	270,525	270,525	541,050	1,186,050	15,410,000	
2023	4.00%	670,000	257,625	257,625	515,250	1,185,250	14,740,000	
2024	4.00%	695,000	244,225	244,225	488,450	1,183,450	14,045,000	
2025	4.00%	725,000	230,325	230,325	460,650	1,185,650	13,320,000	
2026	4.00%	755,000	215,825	215,825	431,650	1,186,650	12,565,000	
2027	4.00%	785,000	200,725	200,725	401,450	1,186,450	11,780,000	
2028	4.00%	815,000	185,025	185,025	370,050	1,185,050	10,965,000	
2029	4.00%	850,000	168,725	168,725	337,450	1,187,450	10,115,000	
2030	3.00%	880,000	151,725	151,725	303,450	1,183,450	9,235,000	
2031	3.00%	910,000	138,525	138,525	277,050	1,187,050	8,325,000	
2032	3.00%	935,000	124,875	124,875	249,750	1,184,750	7,390,000	
2033	3.00%	965,000	110,850	110,850	221,700	1,186,700	6,425,000	
2034	3.00%	995,000	96,375	96,375	192,750	1,187,750	5,430,000	
2035	3.00%	1,025,000	81,450	81,450	162,900	1,187,900	4,405,000	
2036	3.00%	1,055,000	66,075	66,075	132,150	1,187,150	3,350,000	
2037	3.00%	1,085,000	50,250	50,250	100,500	1,185,500	2,265,000	
2038	3.00%	1,115,000	33,975	33,975	67,950	1,182,950	1,150,000	
2039	3.00%	1,150,000	17,250	17,250	34,500	1,184,500	-	
		\$ 17,315,000	\$ 3,175,355	\$ 3,223,000	\$ 6,398,355	\$ 23,713,355		

Call Option: Bonds maturing on 05/01/2029 to 05/01/2033 callable in whole or in part on any date beginning 05/01/2028 @ par.

**CITY OF HOUSTON
UNTREATED WATER RATES**

Effective Month/Year	Rate
04/81	.22142
02/83	.24157
10/86	.25123
10/87	.28022
01/88	.26591 FIRST 150 MGD/PER 1,000, .26113 NEXT 150 MGD
08/88	.28426 FIRST 300 MGD/PER 1,000, .27915 NEXT 300 MGD
07/89	.29344 FIRST 300 MGD/PER 1,000, .28817 NEXT 300 MGD
08/90	.31178 FIRST 300 MGD/PER 1,000, .30618 NEXT 300 MGD
02/92	.31820 FIRST 300 MGD/PER 1,000, .31249 NEXT 300 MGD
10/93	.32907 FIRST 300 MGD/PER 1,000, .32316 NEXT 300 MGD
10/94	.37192 UP TO 13.1 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 11.9
06/04	.385 UP TO 13.1 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 11.9
04/05	.398 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/06	.4123 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/07	.4238 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/08	.4314 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/09	.4533 UP TO 17.38 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER 15.8
04/10	.4546 UP TO 20.00 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
06/10	.5647 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/11	.5754 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/12	.59439 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/13	.61580 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/14	.6232 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/15	.6506 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/16	.6597 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/17	.6821 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
04/18	.7012 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/19	.7208 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/20	.7460 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MINIMUM.
4/21	.7573 UP TO 20.0 MGD. IF WE GO OVER, THEN 5% ADDED TO ANYTHING OVER. BAWA EAST (2nd TAKE POINT) 6 MGD MAXIMUM.

TREATED WATER RATES

Year	City Rate/1,000 gallons	Other Rate/1,000 Gallons	Increase- City	Increase- Other	Comments
1981	\$0.97	\$0.97			
1985 - 1987	\$0.97	\$1.00	\$0.00	\$0.03	
1988 - 1992	\$1.07	\$1.10	\$0.10	\$0.10	Result of rising operating cost. (Raw water rates up 25%)
1993 - 1998	\$1.18	\$1.21	\$0.11	\$0.11	Result of increase in raw water rates.
1999 - 2006	\$1.26	\$1.29	\$0.08	\$0.08	Funding for plant expansion debt
2006-2007	\$1.39	\$1.42	\$0.13	\$0.13	Funding for new water line debt and City of Houston rate increase.
2007-2008	\$1.46	\$1.49	\$0.07	\$0.07	Funding for new water line debt and City of Houston rate increase.
2008-2009	\$1.55	\$1.58	\$0.09	\$0.09	Funding for new water line debt, other operating increases and City of Houston rate increase.
2009-2010	\$1.71	\$1.74	\$0.16	\$0.16	Funding for new water line debt, other operating increases and City of Houston rate increase.
2010-2011	\$1.96	\$1.99	\$0.25	\$0.25	Funding for new water line debt, other operating increases and City of Houston rate increase.
2011-2012	\$2.15	\$2.18	\$0.19	\$0.19	Funding for new water line debt, other operating increases and City of Houston rate increase.
2012-2013	\$2.35	\$2.39	\$0.20	\$0.21	Funding for new water line debt, other operating increases and City of Houston rate increase.
2013-2014	\$2.53	\$2.57	\$0.18	\$0.18	Funding for new water line debt, other operating increases and City of Houston rate increase.
2014-2015	\$2.61	\$2.65	\$0.08	\$0.08	Funding for new water line debt, other operating increases and City of Houston rate increase.
2015-2016	\$2.74	\$2.78	\$0.13	\$0.13	Funding for new water line debt, other operating increases and City of Houston rate increase.
2016-2017	\$2.74	\$2.78	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2017-2018	\$2.74	\$2.78	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2018-2019	\$2.82	\$2.86	\$0.08	\$0.08	Funding for the BAWA East Treatment Plant, other operating increases and City of Houston rate increase.
2019-2020	\$2.82	\$2.86	\$0.00	\$0.00	Excess revenues are sufficient to cover incremental operating cost.
2020-2021	\$2.90	\$2.95	\$0.08	\$0.09	Funding for City of Houston rate increase.
2021-2022	\$3.08	\$3.12	\$0.18	\$0.17	Per the 2020 BAWA rate study.
2022-2023	\$3.26	\$3.46	\$0.18	\$0.34	Per the 2020 BAWA rate study.



**BAYTOWN AREA WATER AUTHORITY
MEETING**

3. a.

Meeting Date: 07/20/2022

Subject: Consider a resolution awarding an Annual Mechanical Services contract to IPS Pump Services, Inc.

Prepared For: Frank Simoneaux, Public Works/Engineering/BAWA

Prepared By: Sterling Beaver, Public Works/Engineering/BAWA

Information

ITEM

Consider a resolution awarding an Annual Mechanical Services contract to IPS Pump Services, Inc., for maintenance and repairs at water treatment facilities.

PREFACE

This proposed resolution awards the Annual Mechanical Services contract for maintenance and repairs at water treatment plants in the amount not to exceed of \$300,000.00.

The scope of this contract consists of repair/replacement of pumps, motors, and other associated mechanical equipment required in the operation of both BAWA water treatment facilities. BAWA utilizes this contract to repair water infrastructure, where the age, material, functionality, and/or repair history warrants repair/replacement. This contract work is completed via work order authorization for work activities, and also includes the requisite of on call response repair work items to address emergency work when needed.

Advertising for the project commenced on June 14, 2022. Three (3) bids were received and publicly opened on June 29, 2022, at 10:30 A.M., with IPS Pump Services, Inc., submitting the lowest responsible bid. Staff recommends the award of the contract to IPS Pump Services, Inc., based on staff's evaluation of all bids which were scored on the following criteria: pricing, material/parts mark up, and licensure/references.

The one (1) year annual term contract includes an option for two (2) additional renewals through mutual agreement for a total of up to three (3) terms.

RECOMMENDATION

Staff recommends approval.

Fiscal Impact

Fiscal Year: FY22 & FY23

Acct Code: 30710-74021

Source of Funds (Operating/Capital/Bonds): Operating

Funds Budgeted Y/N:

Y

Amount Needed:

\$300,000.00

Fiscal Impact (Additional Information):

Attachments

Resolution - Accepts Bid of Annual Mechanical Svcs. Contract with IPS

Bid Tab

Proposers Certification

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY ACCEPTING THE BID OF IPS PUMP SERVICES, INC., FOR THE ANNUAL MECHANICAL SERVICES CONTRACT FOR MAINTENANCE AND REPAIRS AT WATER TREATMENT PLANTS AND AUTHORIZING PAYMENT BY THE BAYTOWN AREA WATER AUTHORITY, IN THE AMOUNT OF THREE HUNDRED THOUSAND AND NO/100 DOLLARS (\$300,000.00); MAKING OTHER PROVISIONS RELATED THERETO; AND PROVIDING FOR THE EFFECTIVE DATE THEREOF.

WHEREAS, the Board of Directors of the Baytown Area Water Authority advertised for bids for the Annual Mechanical Services Contract for maintenance and repairs at water treatment plants to be received on June 29, 2022; and

WHEREAS, notice to bidders as to the time and place, when and where the contract would be let was published in accordance with law; and

WHEREAS, all bids were opened and publicly read at the City of Baytown City Hall at 10:30 a.m., on Wednesday, June 29, 2022, as per published notice to bidders; NOW THEREFORE,

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY:

Section 1: That, subject to the approval of the City Council of the City of Baytown, Texas, the Board of Directors of the Baytown Area Water Authority hereby accepts the bid of IPS Pump Services, Inc., for the Annual Mechanical Services Contract for maintenance and repairs at water treatment plants for the sum of THREE HUNDRED THOUSAND AND NO/100 DOLLARS (\$300,000.00).

Section 2: That, subject to the approval of the City Council of the City of Baytown, Texas, the General Manager is hereby granted general authority to approve any change order involving a decrease or an increase in costs of FIFTY THOUSAND AND NO/100 DOLLARS (\$50,000.00) or less, provided that the original contract price may not be increased by more than twenty-five percent (25%) or decreased by more than twenty-five percent (25%) without the consent of the contractor to such decrease.

Section 3: This resolution shall take effect immediately from and after its passage by the Board of Directors of the Baytown Area Water Authority.

INTRODUCED, READ and PASSED by the affirmative vote of the Board of Directors of the Baytown Area Water Authority this the 20th day of July, 2022.

BRENDA BRADLEY SMITH, President

ATTEST:

ANGELA JACKSON, Assistant Secretary

APPROVED AS TO FORM:

SCOTT LEMON, General Counsel

BAWA Mechanical Services for Maintenance and Repair of Pumps at Water Plants (#8232109)

Owner: Baytown TX, City of

Solicitor: Baytown TX, City of

06/29/2022 10:30 AM CDT

				IPS Pump Services		Coastal Pump Services, Inc.		Premium Pumps & Controls	
Section	Tit	Line Item	Item Description	UofM	Quantity	Unit Price	Extension	Unit Price	Extension
Regular Hours-only a quantity of 1 is asked for to establish cost per hour							\$255.00		\$280.00
		1	Journeyman-per hour	Hour	1	\$95.00	\$95.00	\$110.00	\$110.00
		2	Apprentice-per hour	Hour	1	\$85.00	\$85.00	\$85.00	\$85.00
		3	Laborer-per hour	Hour	1	\$75.00	\$75.00	\$85.00	\$85.00
Overtime and/or after hours-only a quantity of one is asked for to establish cost per hour							\$382.50		\$420.00
		4	Journeyman, overtime and/or after hours-per hour	Hour	1	\$142.50	\$142.50	\$165.00	\$165.00
		5	Apprentice, overtime and/or after hours-per hour	Hour	1	\$127.50	\$127.50	\$127.50	\$127.50
		6	Laborer, overtime and/or after hours-per hour	Hour	1	\$112.50	\$112.50	\$127.50	\$127.50
Holiday rate-only a quantity of one is asked for to establish cost per hour							\$510.00		\$560.00
		7	Journeyman, holiday-per hour	Hour	1	\$190.00	\$190.00	\$220.00	\$220.00
		8	Apprentice, holiday-per hour	Hour	1	\$170.00	\$170.00	\$170.00	\$170.00
		9	Laborer, holiday-per hour	Hour	1	\$150.00	\$150.00	\$170.00	\$170.00
Base Bid Total:							\$1,147.50		\$1,260.00

PROPOSER'S CERTIFICATION

Section 2252.002 of the Texas Government Code provides as follows:

A governmental entity may not award a governmental contract to a nonresident proposer unless the nonresident underbids the lowest proposal submitted by a responsible resident proposer by an amount that is not less than the amount by which a resident proposer would be required to underbid the nonresident proposer to obtain a comparable contract in the state in which the nonresident's principal place of business is located.

In providing the certification below, please make note of the following definitions:

"Governmental contract" means a contract awarded by a governmental entity for general construction, an improvement, a service, or a public works project or for a purchase of supplies, materials, or equipment.

"Nonresident proposer" refers to a person who is not a resident.

"Resident proposer" refers to a person whose principal place of business is in this state, including a proposer whose ultimate parent company or majority owner has its principal place of business in this state.

I certify that _____ is a resident proposer as defined hereinabove. (Company Name)

Signature:

Print Name:

I certify that _____ is a nonresident proposer as defined hereinabove and our principal place of business is _____ (Company Name)

Signature:

Print Name:



BAYTOWN AREA WATER AUTHORITY MEETING

3. b.

Meeting Date: 07/20/2022

Subject: Consider a resolution authorizing Change Order No.2 with LEM Construction Company, Inc., for the Baytown Area Water Authority's Fritz Lanham Water Treatment Plant Filter Air Scour Improvements Project.

Prepared For: Andrea Brinkley, Public Works/Engineering/BAWA

Prepared By: Enrique Villa, Public Works/Engineering/BAWA

Information

ITEM

Consider a resolution authorizing Change Order No.2 with LEM Construction Company, Inc., for the Baytown Area Water Authority's Fritz Lanham Water Treatment Plant Filter Air Scour Improvements Project.

PREFACE

The Baytown Area Water Authority ("BAWA") and the City of Baytown (the "City") approved the construction contract with LEM Construction Company, Inc., for the Baytown Area Water Authority's Fritz Lanham Water Treatment Plant Filter Air Scour Improvements Project (the "Project") in December 2021. The project construction is underway and is on schedule.

Staff has been working to evaluate certain areas of the Fritz Lanham Water Treatment Plant that were affected by Winter Storms Viola and Uri in February 2021. In April 2022, the Board approved the purchase of four (4) 30-inch Pratt butterfly valves from the Scruggs Company. Replacement of the valves will ensure the proper function of the existing ground storage tanks. Design of the valve replacement is complete.

This project has one previous change order that was approved administratively, which included changing manufacturer of valves to the filter basins, and a change from double-wall piping to single-wall piping for the air header above the water line. This was a nominal change to the project and no costs were increased.

The items that are a part of Change Order No. 2, are for the amount of \$559,281.58. The work is described below:

- Replacement four (4) 30 inch butterfly valves on Tank A and Tank B at the BAWA Fritz Lanham Plant, three of which were damaged during the February 2021 freeze events.

This change order includes the work to isolate each tank, replacing the valves and returning the tanks to full service. The duration of the work is 90 calendar days, which will be added to the total contract duration.

This change order is subject to the approval of the City Council, which is scheduled to consider this matter at its upcoming meeting to be held on July 28, 2022.

RECOMMENDATION

Staff recommends approval.

Fiscal Impact

Fiscal Year: 2021
Acct Code: 51804-85001-BAWA1901-85001
Source of Funds (Operating/Capital/Bonds): CIP
Funds Budgeted Y/N: Y
Amount Needed: \$559,281.58
Fiscal Impact (Additional Information):

Attachments

Resolution - Change Order No. 2
Exhibit A - Change Order No. 2

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY AUTHORIZING CHANGE ORDER NO. 2 WITH LEM CONSTRUCTION COMPANY, INC., FOR THE BAWA FRITZ LANHAM WATER TREATMENT PLANT FILTER AIR SCOUR IMPROVEMENTS PROJECT IN THE AMOUNT OF FIVE HUNDRED FIFTY-NINE THOUSAND TWO HUNDRED EIGHTY-ONE AND 58/100 DOLLARS (\$559,281.58); AND PROVIDING FOR THE EFFECTIVE DATE THEREOF.

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY:

Section 1: That, subject to the approval of the City Council of the City of Baytown, Texas, the Board of Directors of the Baytown Area Water Authority does hereby authorize Change Order No. 2 with LEM Construction Company, Inc., for the BAWA Fritz Lanham Water Treatment Plant Filter Air Scour Improvements Project. A copy of said change order is attached hereto, marked Exhibit "A" and made a part hereof for all intents and purposes.

Section 2: That, subject to the approval of the City Council of the City of Baytown, Texas, the Board of Directors of the Baytown Area Water Authority hereby authorizes the payment of an amount not to exceed FIVE HUNDRED FIFTY-NINE THOUSAND TWO HUNDRED EIGHTY-ONE AND 58/100 DOLLARS (\$559,281.58) to LEM Construction Company, Inc., consistent with the change order authorized in Section 1.

Section 3: This resolution shall take effect immediately from and after its passage by the Board of Directors of the Baytown Area Water Authority.

INTRODUCED, READ and PASSED by the affirmative vote of the Board of Directors of the Baytown Area Water Authority this the 20th day of July, 2022.

BRENDA BRADLEY SMITH, President

ATTEST:

ANGELA JACKSON, Assistant Secretary

APPROVED AS TO FORM:

SCOTT LEMON, General Counsel

EXHIBIT "A"



BAYTOWN AREA WATER AUTHORITY

Change Order No. 2 Filter Scour Improvements



PO:
Date:

2203123
28-Jul-22

Brief Description of Changes:

CO 2.1 The following change order is for the replacement of four (4) 30 inch Pratt butterfly valves on Tank A (T-801) and Tank B (T-802) at the BAWA Fritz Lanham Plant location. During the February 2021 Freeze events (Storm Viola and Uri) three valves were damaged. This replacement will allow the Ground Storage Tanks to be operated as required. This change order involves the sequenced work to isolate each tank, replace the valves and return the tank to full service. The duration of the work is 90 calendar days which will be added to the total contract duration. The replacement 30 inch Pratt butterfly valves approved and purchased by staff under PO 2205186 and BAWA Board Resolution No. 2022-07.

Add or Delete Items:

<u>Item</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total</u>
CO 2.1	All work to replace four (4) 30 inch Butterfly Valve Replacement (CPR #2)	1	LS	\$ 870,500.00	\$ 870,500.00
	Allowance for dewatering for line stops	1	LS	\$ 60,000.00	\$ 60,000.00
Total					\$ 930,500.00

Contract Summary:

				<u>Original</u>	<u>Revised</u>
1	Original Contract Price			\$ 4,903,000.00	
2	Owner Contingency (within contract)				\$ 371,218.42
	Previous Change Orders			\$ -	
	This Change Order				\$ 559,281.58
3	Change Orders				
	Previous Change Orders			\$ -	
	This change order			\$ -	\$ 559,281.58
4	Revised Contract Price			\$ 4,903,000.00	\$ 5,462,281.58

Original Contract Duration	425
Previous Extensions	0
This Change Order	90
Revised Duration - Calendar Days	515

Attached back-up documentation: LEM Proposal dated 7-11-22, Technical Drawings, Emergency PO No. 2205186, Resolution No. 2022-07, Specifications

7-13-2022

07/13/2022

Contractor: LEM Construction Co., Inc. Date
Micah Allison. Project Manager

Director of Public Works & Engineering Date
Frank O. Simoneaux, Jr. P.E.

7-13-2022

Consultant: Ardurra Group Date
Yue Sun, P.E.

City Manager Date
Rick Davis, ICMA-CM

*Contractor agrees to perform change(s) included in this Change Order for the price and time indicated. The prices for changes included all costs associated with this Change Order.

No payment to the Contractor (or Consultant) shall be made for work included in the change order until the Contractor's pay estimate is updated.

Revised project plans and specifications as referenced and insofar as the original project drawings and specifications are inconsistent, this Change Order governs. Upon execution by all parties, the changes identified in this change order are considered final for the items listed, for the contract value and/or contract time shown, and are made a part of the contract.



July 11th, 2022

Mr. Enrique Villa
City of Baytown
2401 Market Street
Baytown, Texas 77520
281-422-8281
enrique.villa@baytown.org

Subject: BAWA Water Treatment Plant Filter Air Scour Imp.
Proposal to Install 30" BFV's

Dear Mr. Villa,

Attached, please find our proposal to replace four existing 30" butterfly valves. It is our understanding that the butterfly valves have already purchased and are stored at the BAWA Main Campus. LEM will transport the valves from the stored location to the project site. The line stops will be installed by our subcontractor, Rangeline. Installation of the valves and related piping work will be performed by LEM.

As detailed in the attached proposal, this work will be completed for the lump sum price of \$870,500. We are also requesting a schedule extension of 90 calendar days.

There is a contingency line item within the Schedule of Values totaling \$371,218.42. We have been instructed to utilize this amount to assist in offsetting some cost to BAWA.

30" Valve Replacement	\$870,500.00
Ground Water Allowance	\$60,000.00
Contingency	<u>(\$371,218.42)</u>
 Total Change Order	 \$559,281.58

Included in this proposal is an allowance for potential groundwater control. The above \$60,000.00 to be used as directed by BAWA in the case of the presence of excessive groundwater

Please call me with any questions.

Sincerely,

Micah Allison
Vice President-LEM Construction Co., Inc

BID/PROPOSAL FORM

TABLE 00300-1 PROPOSAL FORM

		Quantity	Unit	Description	Spec Reference ¹	Unit Price	Total Amount
Base Bid							
1	Base Bid	1	Lump Sum	Mobilization and Preparatory Work (This item shall not exceed more than three (3) percent of the Total Bid amount)	01505	<u>\$25,000</u>	<u>\$25,000</u>
2	Base Bid	1	Lump Sum	Texas Pollutant Discharge Elimination System (TPDES)/Stormwater Pollution Prevention Plan (SWPPP)	01565	<u>\$7,500</u>	<u>\$7,500</u>
3	Base Bid	1	Lump Sum	Trench and Excavation Safety	01570	<u>\$5,000</u>	<u>\$5,000</u>
4	Base Bid	1	Lump Sum	NOT USED	---	---	---
5	Base Bid	4	Each	Install owner-provided 30" Butterfly Valves	15110 15112	<u>\$1,500</u>	<u>\$6,000</u>
6	Base Bid	1	Lump Sum	48" Linestop "LS-C" with Bypass Outlet	02551	<u>\$217,000</u>	<u>\$217,000</u>
7	Base Bid	1	Lump Sum	30" Linestop "LS-D" with 24" Valved Bypass Outlet	02551	<u>\$205,000</u>	<u>\$205,000</u>
8	Base Bid	1	Lump Sum	Temporary 30" (or larger) Bypass Piping	02553	<u>\$120,000</u>	<u>\$120,000</u>
9	Base Bid	1	Lump Sum	48" Linestop "LS-E"	02551	<u>\$210,000</u>	<u>\$210,000</u>

		Quantity	Unit	Description	Spec Reference ¹	Unit Price	Total Amount
10	Base Bid	4	Each	30" Tank Piping Removal and Reinstallation	01757 15052 15121 15249	<u>\$15,000</u>	<u>\$60,000</u>
11	Base Bid	1	Lump Sum	Protective Coatings	09960	<u>\$15,000</u>	<u>\$15,000</u>
						TOTAL BASE BID (Items 1-11):	<u>\$870,500</u>
4A	Contingency Item	1	Lump Sum	Ground Water Allowance and Surface Water Control (The Work associated with this bid item may or may not be authorized and paid by the Owner)	01564	<u>\$60,000</u>	<u>\$60,000</u>
12	Additive Item	1	Lump Sum	48" Linestop if Valve F does not function	02551	<u>\$210,000</u>	<u>\$210,000</u>
13	Additive Item	1	Lump Sum	30" Linestop if Valve A does not function	02551	<u>\$205,000</u>	<u>\$205,000</u>

Notes:

1. The Specification section referenced address a portion of the Work but not necessarily all of the Work. Additional requirements may be specified throughout the Contract Documents.
2. Bidder acknowledges that: (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

END OF SECTION

**Valve Replacement Project
Fritz Lanham Surface Water Treatment Plant**

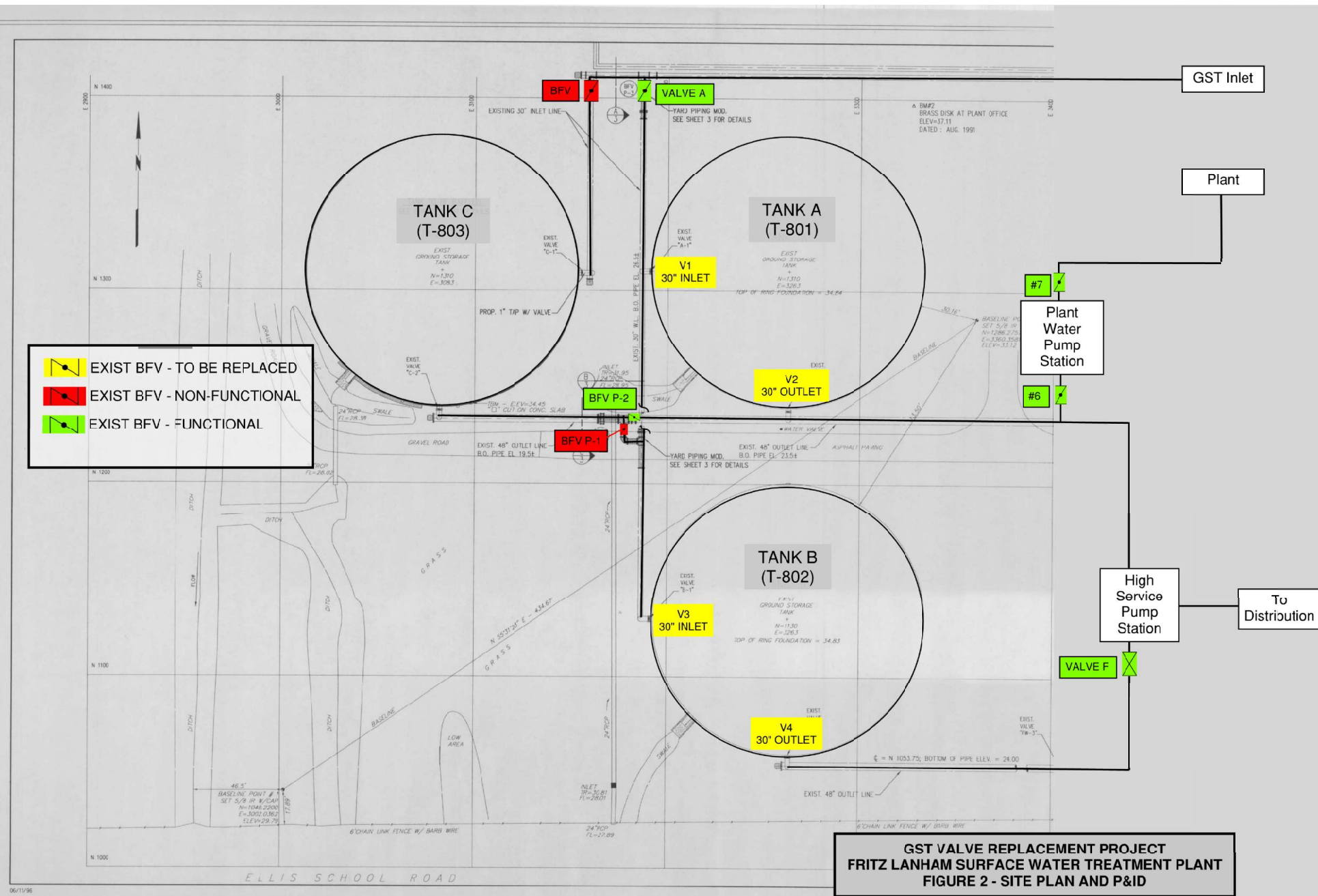
Appendix 1

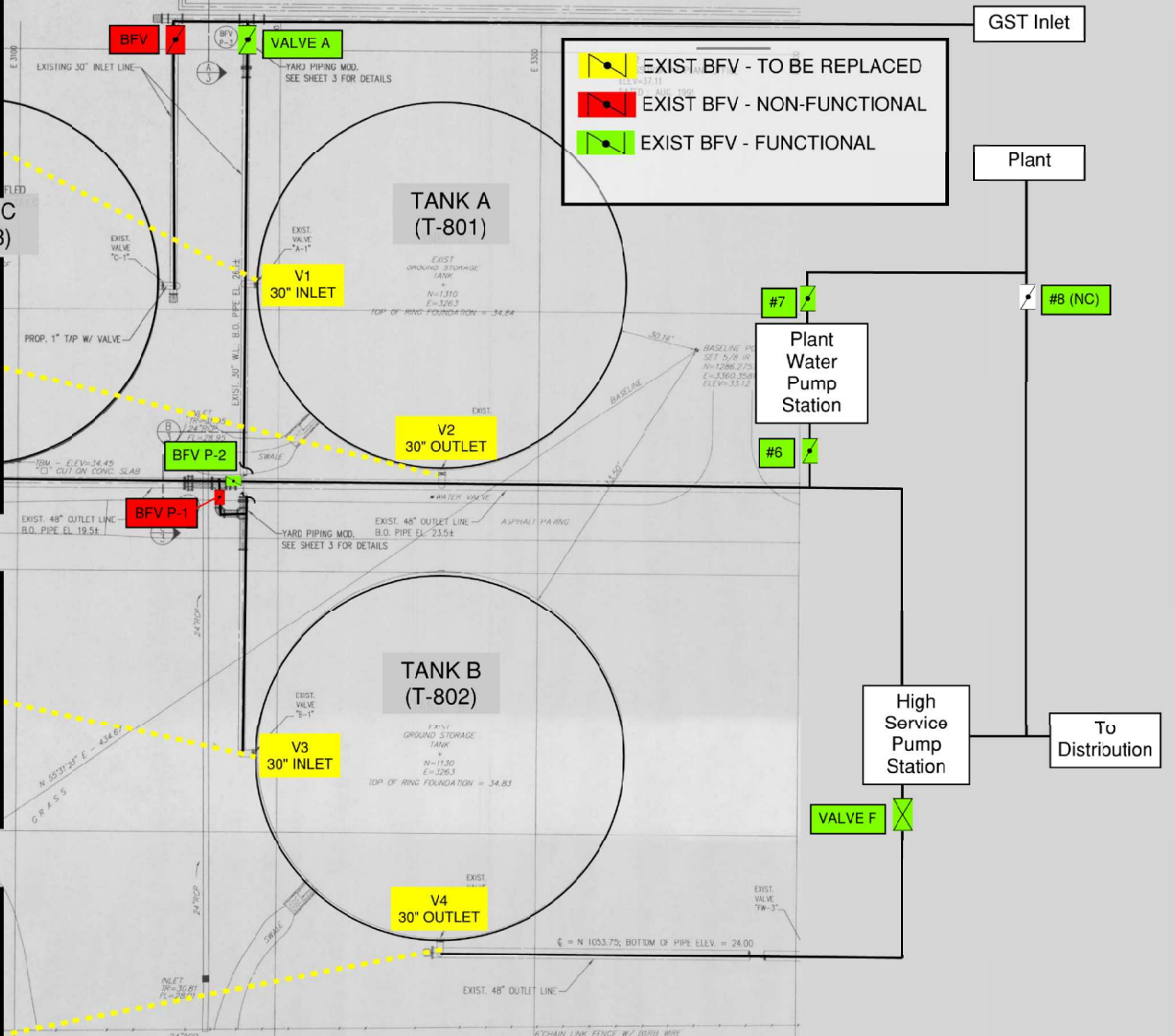
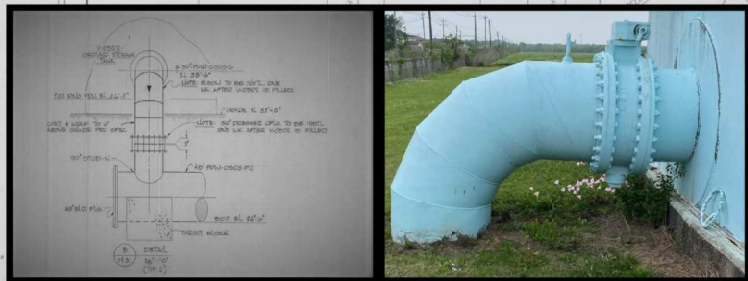
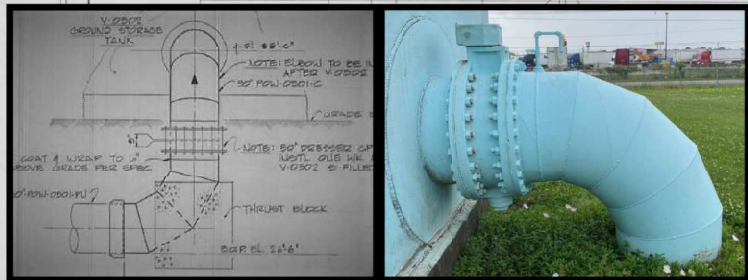
Figures 1 - 6



**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT
FIGURE 1 - OVERALL SITE PLAN**

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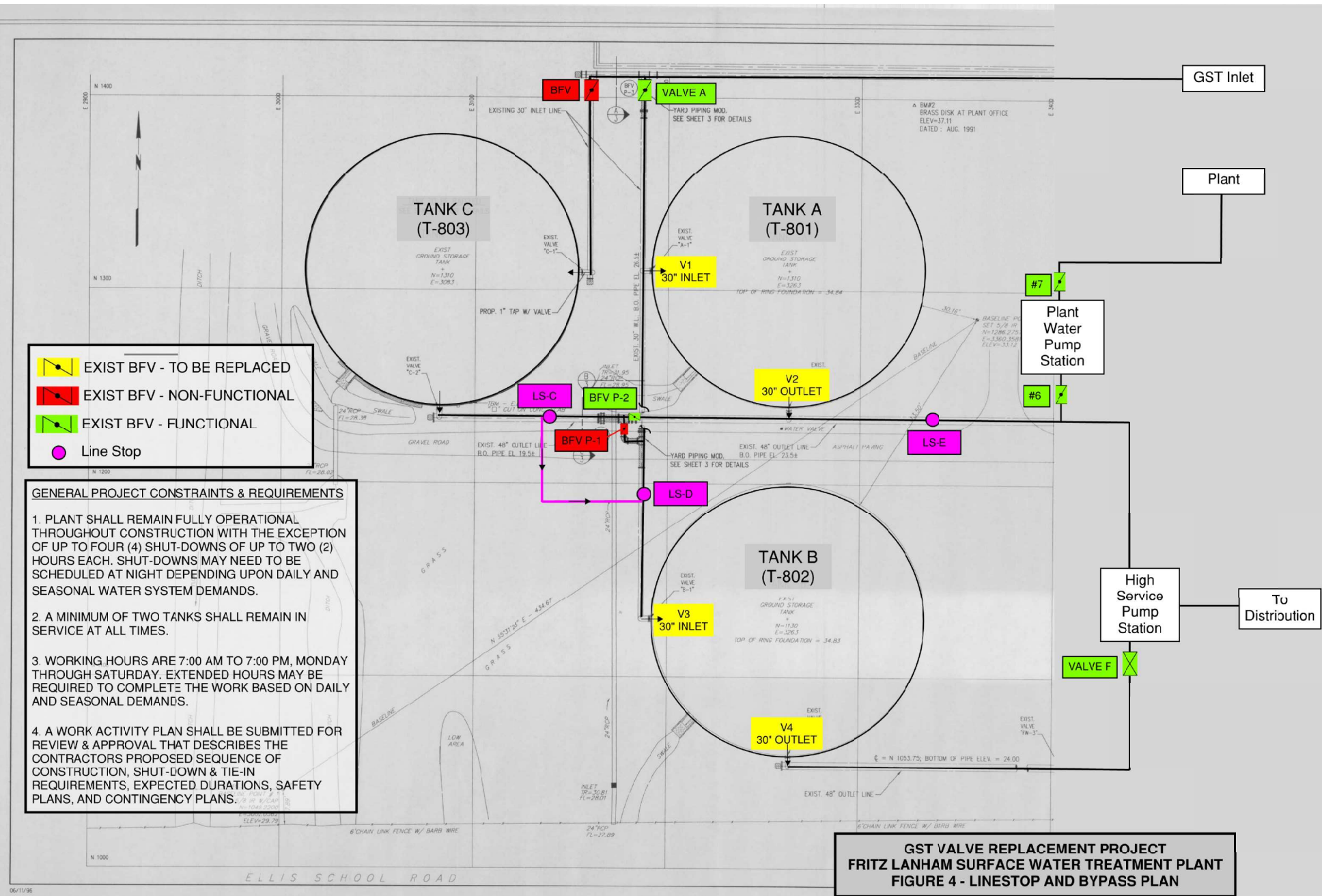


**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT
FIGURE 3 - PIPING DETAILS**

-  EXIST BFV - TO BE REPLACED
-  EXIST BFV - NON-FUNCTIONAL
-  EXIST BFV - FUNCTIONAL
-  Line Stop

GENERAL PROJECT CONSTRAINTS & REQUIREMENTS

1. PLANT SHALL REMAIN FULLY OPERATIONAL THROUGHOUT CONSTRUCTION WITH THE EXCEPTION OF UP TO FOUR (4) SHUT-DOWNS OF UP TO TWO (2) HOURS EACH. SHUT-DOWNS MAY NEED TO BE SCHEDULED AT NIGHT DEPENDING UPON DAILY AND SEASONAL WATER SYSTEM DEMANDS.
2. A MINIMUM OF TWO TANKS SHALL REMAIN IN SERVICE AT ALL TIMES.
3. WORKING HOURS ARE 7:00 AM TO 7:00 PM, MONDAY THROUGH SATURDAY. EXTENDED HOURS MAY BE REQUIRED TO COMPLETE THE WORK BASED ON DAILY AND SEASONAL DEMANDS.
4. A WORK ACTIVITY PLAN SHALL BE SUBMITTED FOR REVIEW & APPROVAL THAT DESCRIBES THE CONTRACTORS PROPOSED SEQUENCE OF CONSTRUCTION, SHUT-DOWN & TIE-IN REQUIREMENTS, EXPECTED DURATIONS, SAFETY PLANS, AND CONTINGENCY PLANS.



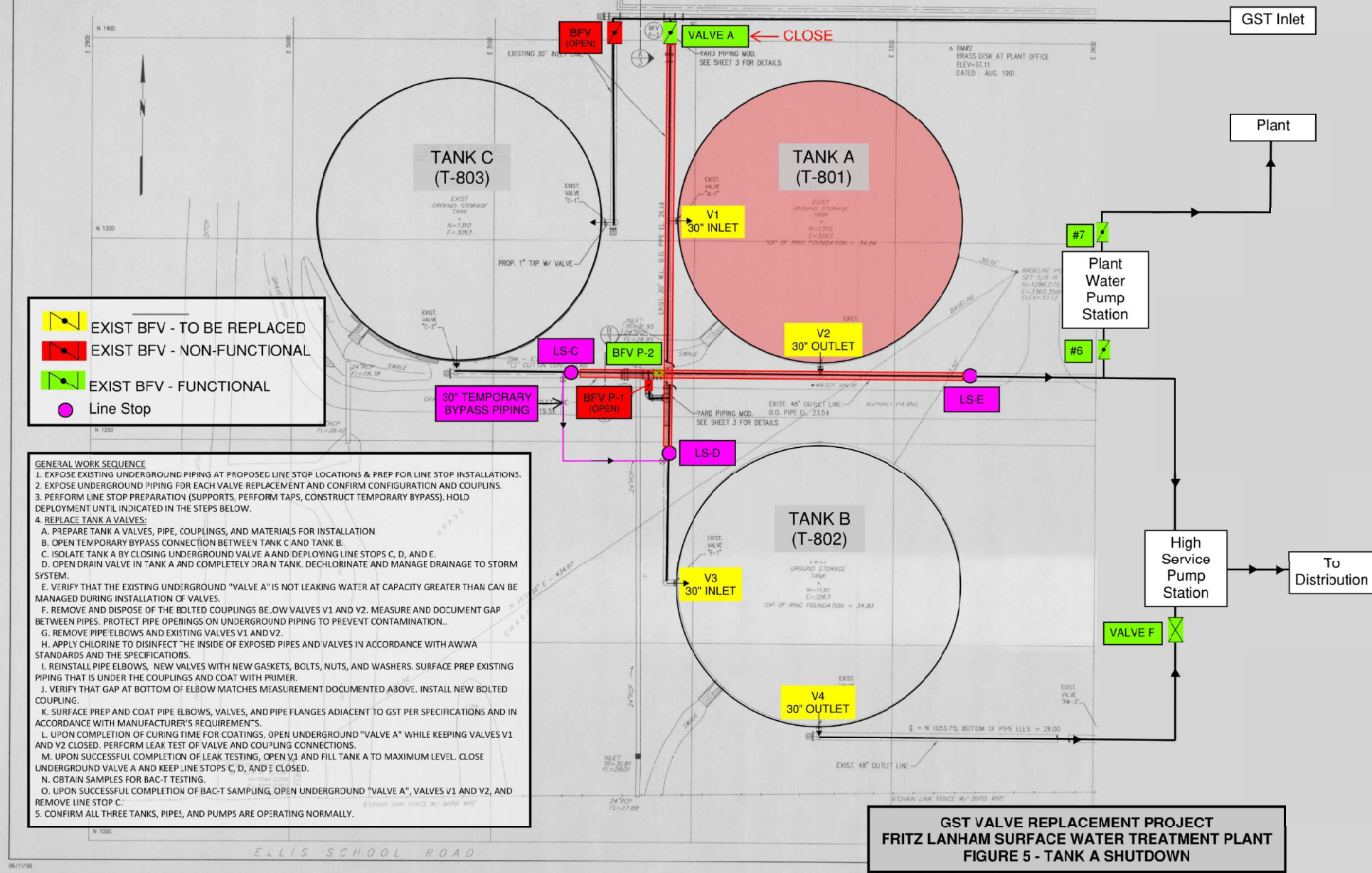
**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT
FIGURE 4 - LINESTOP AND BYPASS PLAN**



- GENERAL WORK SEQUENCE**
1. EXPOSE EXISTING UNDERGROUND PIPING AT PROPOSED LINE STOP LOCATIONS & PREP FOR LINE STOP INSTALLATIONS.
 2. EXPOSE UNDERGROUND PIPING FOR EACH VALVE REPLACEMENT AND CONFIRM CONFIGURATION AND COUPLINS.
 3. PERFORM LINE STOP PREPARATION (SUPPORTS, PERFORM TAPS, CONSTRUCT TEMPORARY BYPASS). HOLD DEPLOYMENT UNTIL INDICATED IN THE STEPS BELOW.
 4. REPLACE TANK A VALVES:
 - A. PREPARE TANK A VALVES, PIPE, COUPLINGS, AND MATERIALS FOR INSTALLATION
 - B. OPEN TEMPORARY BYPASS CONNECTION BETWEEN TANK C AND TANK B.
 - C. ISOLATE TANK A BY CLOSING UNDERGROUND VALVE A AND DEPLOYING LINE STOPS C, D, AND E.
 - D. OPEN DRAIN VALVE IN TANK A AND COMPLETELY DRAIN TANK. DECHLORINATE AND MANAGE DRAINAGE TO STORM SYSTEM.
 - E. VERIFY THAT THE EXISTING UNDERGROUND "VALVE A" IS NOT LEAKING WATER AT CAPACITY GREATER THAN CAN BE MANAGED DURING INSTALLATION OF VALVES.
 - F. REMOVE AND DISPOSE OF THE BOLTED COUPLINGS BETWEEN VALVES V1 AND V2. MEASURE AND DOCUMENT GAP BETWEEN PIPES. PROTECT PIPE OPENINGS ON UNDERGROUND PIPING TO PREVENT CONTAMINATION..
 - G. REMOVE PIPE ELBOWS AND EXISTING VALVES V1 AND V2.
 - H. APPLY CHLORINE TO DISINFECT THE INSIDE OF EXPOSED PIPES AND VALVES IN ACCORDANCE WITH AWWA STANDARDS AND THE SPECIFICATIONS.
 - I. REINSTALL PIPE ELBOWS, NEW VALVES WITH NEW GASKETS, BOLTS, NUTS, AND WASHERS. SURFACE PREP EXISTING PIPING THAT IS UNDER THE COUPLINGS AND COAT WITH PRIMER.
 - J. VERIFY THAT GAP AT BOTTOM OF ELBOW MATCHES MEASUREMENT DOCUMENTED ABOVE. INSTALL NEW BOLTED COUPLING.
 - K. SURFACE PREP AND COAT PIPE ELBOWS, VALVES, AND PIPE FLANGES ADJACENT TO GST PER SPECIFICATIONS AND IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
 - L. UPON COMPLETION OF CURING TIME FOR COATINGS, OPEN UNDERGROUND "VALVE A" WHILE KEEPING VALVES V1 AND V2 CLOSED. PERFORM LEAK TEST OF VALVE AND COUPLING CONNECTIONS.
 - M. UPON SUCCESSFUL COMPLETION OF LEAK TESTING, OPEN V1 AND FILL TANK A TO MAXIMUM LEVEL. CLOSE UNDERGROUND VALVE A AND KEEP LINE STOPS C, D, AND E CLOSED.
 - N. OBTAIN SAMPLES FOR BAC-T TESTING.
 - O. UPON SUCCESSFUL COMPLETION OF BAC-T SAMPLING, OPEN UNDERGROUND "VALVE A", VALVES V1 AND V2, AND REMOVE LINE STOP C.
 5. CONFIRM ALL THREE TANKS, PIPES, AND PUMPS ARE OPERATING NORMALLY.

ELLIS SCHOOL ROAD

**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT
FIGURE 5 - TANK A SHUTDOWN**

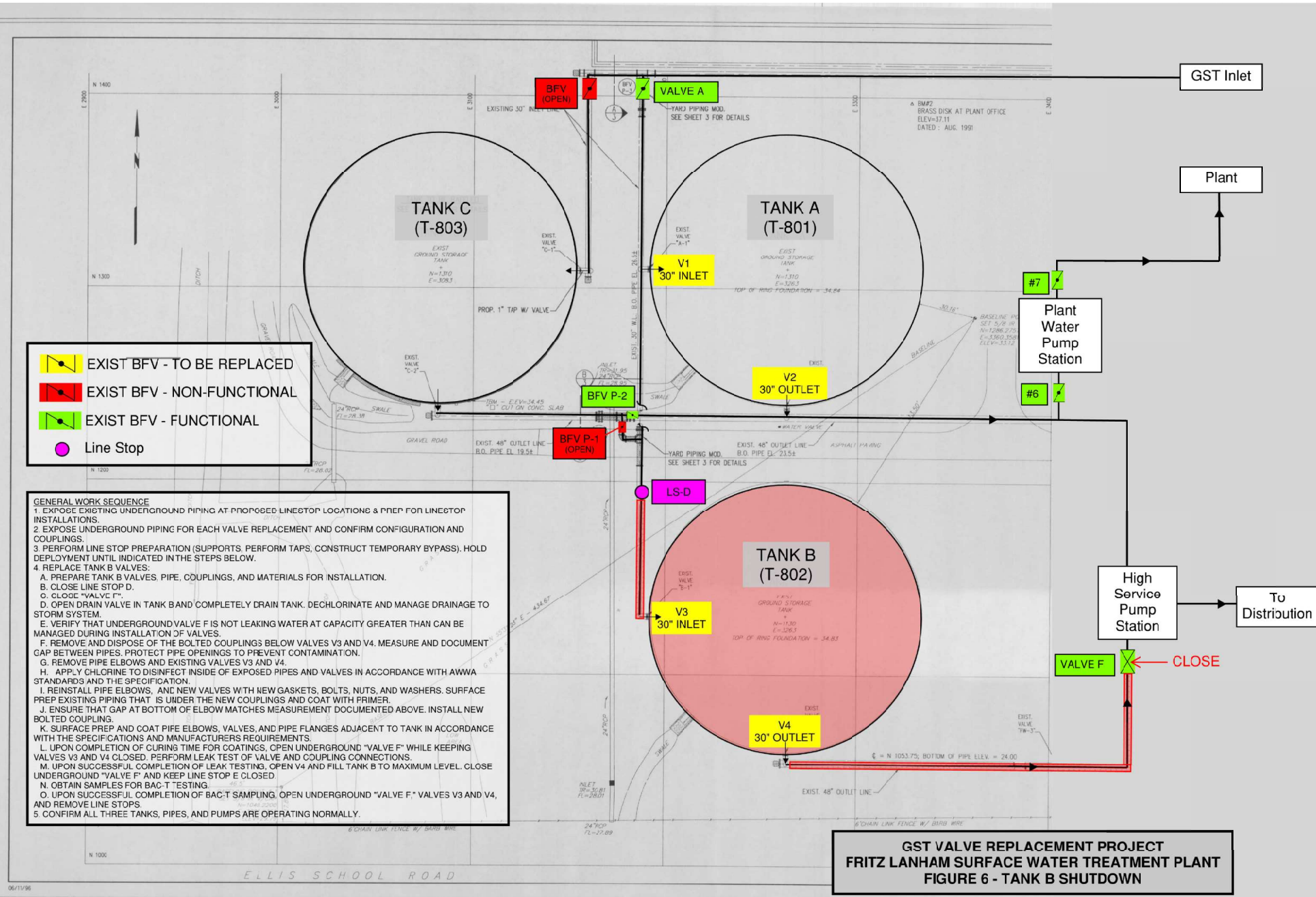


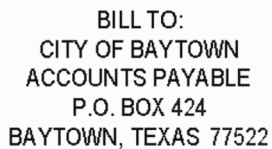


- GENERAL WORK SEQUENCE**
1. EXPOSE EXISTING UNDERGROUND PIPING AT PROPOSED LINESTOP LOCATIONS & PREP FOR LINESTOP INSTALLATIONS.
 2. EXPOSE UNDERGROUND PIPING FOR EACH VALVE REPLACEMENT AND CONFIRM CONFIGURATION AND COUPLINGS.
 3. PERFORM LINE STOP PREPARATION (SUPPORTS, PERFORM TAPS, CONSTRUCT TEMPORARY BYPASS). HOLD DEPLOYMENT UNTIL INDICATED IN THE STEPS BELOW.
 4. REPLACE TANK B VALVES:
 - A. PREPARE TANK B VALVES, PIPE, COUPLINGS, AND MATERIALS FOR INSTALLATION.
 - B. CLOSE LINE STOP D.
 - C. CLOSE "VALVE F".
 - D. OPEN DRAIN VALVE IN TANK BAND COMPLETELY DRAIN TANK. DECHLORINATE AND MANAGE DRAINAGE TO STORM SYSTEM.
 - E. VERIFY THAT UNDERGROUND VALVE F IS NOT LEAKING WATER AT CAPACITY GREATER THAN CAN BE MANAGED DURING INSTALLATION OF VALVES.
 - F. REMOVE AND DISPOSE OF THE BOLTED COUPLINGS BELOW VALVES V3 AND V4. MEASURE AND DOCUMENT GAP BETWEEN PIPES. PROTECT PIPE OPENINGS TO PREVENT CONTAMINATION.
 - G. REMOVE PIPE ELBOWS AND EXISTING VALVES V3 AND V4.
 - H. APPLY CHLORINE TO DISINFECT INSIDE OF EXPOSED PIPES AND VALVES IN ACCORDANCE WITH AWWA STANDARDS AND THE SPECIFICATION.
 - I. REINSTALL PIPE ELBOWS, AND NEW VALVES WITH NEW GASKETS, BOLTS, NUTS, AND WASHERS. SURFACE PREP EXISTING PIPING THAT IS UNDER THE NEW COUPLINGS AND COAT WITH PRIMER.
 - J. ENSURE THAT GAP AT BOTTOM OF ELBOW MATCHES MEASUREMENT DOCUMENTED ABOVE. INSTALL NEW BOLTED COUPLING.
 - K. SURFACE PREP AND COAT PIPE ELBOWS, VALVES, AND PIPE FLANGES ADJACENT TO TANK IN ACCORDANCE WITH THE SPECIFICATIONS AND MANUFACTURERS REQUIREMENTS.
 - L. UPON COMPLETION OF CURING TIME FOR COATINGS, OPEN UNDERGROUND "VALVE F" WHILE KEEPING VALVES V3 AND V4 CLOSED. PERFORM LEAK TEST OF VALVE AND COUPLING CONNECTIONS.
 - M. UPON SUCCESSFUL COMPLETION OF LEAK TESTING, OPEN V4 AND FILL TANK B TO MAXIMUM LEVEL. CLOSE UNDERGROUND "VALVE F" AND KEEP LINE STOP E CLOSED.
 - N. OBTAIN SAMPLES FOR BAC-T TESTING.
 - O. UPON SUCCESSFUL COMPLETION OF BAC-T SAMPLING, OPEN UNDERGROUND "VALVE F" VALVES V3 AND V4, AND REMOVE LINE STOPS.
 5. CONFIRM ALL THREE TANKS, PIPES, AND PUMPS ARE OPERATING NORMALLY.

ELLIS SCHOOL ROAD

**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT
FIGURE 6 - TANK B SHUTDOWN**





PAGE NO. 1

SHIP BAYTOWN AREA WATER AUTHORITY
7425 THOMPSON ROAD
BAYTOWN, TEXAS 77521

TO ATTN: MICHAEL GAY

APPROVED BY

DIRECTOR OF PURCHASING/AGENT

TERMS AND CONDITIONS

1. Seller To Package Goods. Seller will package goods in accordance with good commercial practice. Goods shall be clearly marked to provide: Seller's name, consignee's name and address, the purchase order number, and indicate the box containing the packaging slip. Seller shall bear cost of packaging.
2. All quotations are F.O.B. destination, unless specified otherwise in the body of the purchase order.
3. Title and Risk of Loss. The title and risk of loss of goods shall not pass to Buyer until Buyer actually receives and takes possession of the goods at the point of delivery.
4. Place of Delivery. The place of delivery shall be that set forth in the block of the purchase order. Delivery shall be made during normal work hours only, 8 a.m. to 3 p.m., unless prior approval for late deliveries has been obtained.
5. Delivery Time. Seller is required to place material in receiving agency's designated location in the number of days indicated on the purchase order. Absence of delivery time obligates the Seller to complete delivery in 14 calendar days. Consistent failure to meet delivery promises without valid reasons may be cause for removal from bid list.
6. Invoices and Payment.
 - a. Seller shall submit separate invoices, in duplicate, on each purchase order.
 - b. Invoices shall indicate the purchase order number on them. Invoices shall be itemized.
 - c. Mail invoices to: City of Baytown, Accounts Payable Division, P.O. Box 424, Baytown, Texas 77522.
 - d. Payment shall not be due until thirty days after receipt of invoice or goods or service whichever is later. Suppliers shall keep the Accounts Payable Division advised of any changes in your remittance address.
 - e. Do not include Federal Excise, State and City Sales Tax. City shall furnish a tax exemption certificate upon request.
7. Warranty-Product. Seller shall not limit or exclude any implied warranties and any attempt to do so shall render this contract voidable at the option of the Buyer. Seller warrants that the goods furnished will conform to specifications and descriptions listed. Contractor agrees to protect the City from claims involving infringement of patents and copyrights.
8. Right of Inspection. All deliveries shall be accepted subject to inspection, count and/or testing. A waiver on one occasion does not constitute a waiver on future occasions.
9. Cancellation. Buyer shall have the right to cancel for default all or any part of the undelivered portion of this order if Seller breaches any of the terms hereof including warranties of Seller or if the Seller becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which Buyer may have in law.
10. Force Majeure. If by reason of Force Majeure, either party hereto shall be rendered unable wholly or in part to carry out its obligations under this Agreement then such party shall give notice and full particulars of such Force Majeure in writing to the other party within a reasonable time after occurrence of the event or cause relied upon, and the obligation of the party giving such notice so far as it is affected by such Force Majeure, shall be suspended during the continuance of the inability then claimed, except as hereinafter provided, but no longer period, and such party shall endeavor to remove or overcome such inability with all reasonable dispatch. The term Force Majeure as employed herein, shall mean acts of God, strikes, lockouts, act of public enemy, orders of any kind of government of the United States or the State of Texas or any civil or military authority, riots, landslides, lightning, earthquakes, fires, hurricanes, floods, restraint of government and people, civil disturbances, and explosions. If vendor is faced with a Force Majeure, Buyer requires written notice within ten (10) days of the conditions involved. The City reserves the right to cancel this contract if the Force Majeure delays delivery of the required goods for more than 30 calendar days.
11. Assignment-Delegation. No right or interest in this contract shall be assigned or delegation of any obligation made by Seller without the written permission of the Buyer. Any attempted assignment or delegation by Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.
12. Modifications. This contract can be modified or rescinded only by writing signed by both of the parties.
13. Applicable Law. This agreement shall be governed by the Uniform Commercial Code as adopted in the State of Texas as effective and in force at the time of this agreement.
14. Right to Assurances. Whenever one party to this contract in good faith has reason to question the other party's intent to perform he may demand that the other party give written assurance of this intent to perform in the event that a demand is made and no assurance is given within ten (10) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.
15. All items bid shall be new, in first class condition and manufacturers latest model and design including containers suitable for shipment and storage, unless otherwise indicated in bid invitation. Verbal agreements to the contrary are void.
16. NO substitutions or cancellation permitted without written approval of the City of Baytown.

RESOLUTION NO. 2022-07

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY DECLARING AN EMERGENCY; AUTHORIZING PAYMENT BY THE BAYTOWN AREA WATER AUTHORITY IN THE AMOUNT OF SEVENTY THOUSAND EIGHT HUNDRED EIGHTY-FOUR AND NO/100 DOLLARS (\$70,884.00) TO THE SCRUGGS COMPANY FOR THE PURCHASE OF FOUR (4) 30-INCH BUTTERFLY VALVES ASSOCIATED WITH TWO (2) BAWA GROUND STORAGE TANKS; MAKING OTHER PROVISIONS RELATED THERETO; AND PROVIDING FOR THE EFFECTIVE DATE THEREOF.

WHEREAS, Baytown Area Water Authority ("BAWA") staff has determined that four (4) valves associated with two (2) BAWA ground storage tanks are non-operational and in need of replacement; and

WHEREAS, due to long lead times and availability issues, BAWA is electing to purchase the valves and subsequently hire a contractor for installation; and

WHEREAS, the risks associated with the non-operational valves makes the purchase of the replacement valves critical and necessary to preserve or protect the public health or safety of the citizens; and

WHEREAS, to preserve the health, safety and well-being of BAWA's customers, immediate purchase of replacement valves is necessary; NOW THEREFORE,

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE BAYTOWN AREA WATER AUTHORITY:

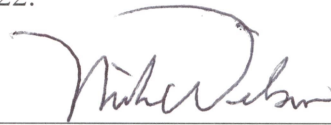
Section 1: That the Board of Directors of the Baytown Area Water Authority hereby finds that the recitals contained hereinabove are true and correct and are the findings of the Board of Directors of the Baytown Area Water Authority. As such, the Board of Directors of the Baytown Area Water Authority hereby declares an emergency exists because of an imminent threat to public health and safety.

Section 2: That subject to the approval of the City Council of the City of Baytown, Texas, of the authorization referenced in Section 1 hereof, the Board of Directors of the Baytown Area Water Authority hereby authorizes payment in the amount of SEVENTY THOUSAND EIGHT HUNDRED EIGHTY-FOUR AND NO/100 DOLLARS (\$70,884.00) to The Scruggs Company for the purchase of four (4) 30-inch butterfly valves associated with two (2) BAWA ground storage tanks.

Section 3: That the General Manager is hereby granted general authority to approve any change order involving a decrease or an increase in costs of FIFTY THOUSAND AND NO/100 DOLLARS (\$50,000.00) or less, subject to the provision that the original contract price may not be increased by more than twenty-five percent (25%) or decreased by more than twenty-five percent (25%) without the consent of the contractor to such decrease.

Section 4: This resolution shall take effect immediately from and after its passage by the Board of Directors of the Baytown Area Water Authority.

INTRODUCED, READ and PASSED by the affirmative vote of the Board of Directors of the Baytown Area Water Authority this the 20th day of April, 2022.



MIKE WILSON, Vice President

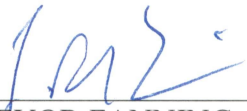
ATTEST:



~~ANGELA JACKSON, Assistant Secretary~~

Raquel Martinez, Deputy Assistant Secretary

APPROVED AS TO FORM:



TREVOR FANNING, Interim General Counsel



**CITY OF BAYTOWN
BAYTOWN, TEXAS**

**GST VALVE REPLACEMENT PROJECT
FRITZ LANHAM SURFACE WATER TREATMENT PLANT**

CLIENT PROJECT NO. BAWA2104

TECHNICAL SPECIFICATIONS

VOLUME 1 OF 1

JULY 2022

Digitally signed by Neil R. Barnsdale
Contact Info: Carollo Engineers, Inc.
Date: 2022.07.13 10:02:28 -05'00'



		Quantity	Unit	Description	Spec Reference ¹	Unit Price	Total Amount
Base Bid							
1	Base Bid	1	Lump Sum	Mobilization and Preparatory Work (This item shall not exceed more than three (3) percent of the Total Bid amount)	01505		
2	Base Bid	1	Lump Sum	Texas Pollutant Discharge Elimination System (TPDES)/Stormwater Pollution Prevention Plan (SWPPP)	01565		
3	Base Bid	1	Lump Sum	Trench and Excavation Safety	01570		
4	Base Bid	1	Lump Sum	NOT USED	---	---	---
5	Base Bid	4	Each	Install owner-provided 30" Butterfly Valves	15110 15112		
6	Base Bid	1	Lump Sum	48" Linestop "LS-C" with Bypass Outlet	02551		
7	Base Bid	1	Lump Sum	30" Linestop "LS-D" with 24" Valved Bypass Outlet	02551		
8	Base Bid	1	Lump Sum	Temporary 30" (or larger) Bypass Piping	02553		
9	Base Bid	1	Lump Sum	48" Linestop "LS-E"	02551		
10	Base Bid	4	Each	30" Tank Piping Removal and Reinstallation	01757 15052 15121 15249		

		Quantity	Unit	Description	Spec Reference ¹	Unit Price	Total Amount
11	Base Bid	1	Lump Sum	Protective Coatings	09960		
						TOTAL BASE BID (Items 1-11):	
4A	Contingency Item	1	Lump Sum	Ground Water Allowance and Surface Water Control (The Work associated with this bid item may or may not be authorized and paid by the Owner)	01564		
12	Additive Item	1	Lump Sum	48" Linestop if Valve F does not function	02551		
13	Additive Item	1	Lump Sum	30" Linestop if Valve A does not function	02551		

Notes:

1. The Specification section referenced address a portion of the Work but not necessarily all of the Work. Additional requirements may be specified throughout the Contract Documents.
2. Bidder acknowledges that: (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

END OF SECTION

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: General summary of the Work.

1.02 THE WORK

- A. The Work described herein applies to a specific Change Order to replace four butterfly valves, only. All existing Contract Documents are still in effect and the requirements described herein are intended to supplement the existing contract documents. Contractor shall immediately notify the Engineer if a conflict exists.
- B. The Work consists of construction of the replacement of four existing above-ground 30" butterfly valves with new Owner-supplied valves, and appurtenance work, including, installation and deployment of linestops to isolate the work area, temporary bypass piping, disinfection, removal and repairs to existing piping and couplings, and coatings.

1.03 LOCATION OF PROJECT

- A. The Work is located at the Fritz Lanham Water Treatment Plant, 7425 Thompson Road, Baytown, Texas 77521.

1.04 OWNER FURNISHED EQUIPMENT

- A. Owner will furnish:
1. Four (4) 30" butterfly valves, as specified in Section 15112 – Butterfly Valves.
- B. Owner will:
1. Arrange for and deliver necessary shop drawings and product data to Contractor.
 2. Deliver supplier's bill of materials to Contractor.
 3. Inspect deliveries jointly with Contractor.
 4. Submit claims for transportation damage.
 5. Arrange for replacement of damaged, defective, or missing items.
 6. Arrange for manufacturer's warranties, bonds, service, and inspections.
- C. Contractor's responsibility for Owner-furnished products:
1. Pick up valves at the BAWA storage location and deliver valves to the project site.
 2. Reviewing shop drawings and product data.
 3. Submitting notification of discrepancies or anticipated problems.
 4. Receiving and unloading products at site.

5. Promptly inspecting products jointly with Owner and recording shortages, and damaged or defective items.
 6. Handling products at site, including uncrating and storage.
 7. Protecting products from damage.
 8. Installing, including assembly, connections, adjustments, and commissioning in accordance with Contract Documents.
 9. Obtaining a Certificate of Proper Installation from the manufacturer for all four valves.
 10. Providing operating oils, lubricants, and incidental materials required for complete installation.
 11. Repairing or replacing items damaged after receipt until date of Substantial Completion of the Work by Owner.
- D. When Owner fails to deliver products in accordance with accepted Construction Schedule, adjustments will be made to Contract Times as stipulated in General Conditions.

1.05 ACTIVITIES BY OTHERS

- A. Activities by others which may affect performance of work include:
1. The Work will take place at a functioning water treatment plant. The Owner's employees and plant operators will be performing their typical daily activities within the Work vicinity.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for scheduling the Work affected by existing site and facility, work restrictions, and coordination between construction operations and plant operations.

1.02 GENERAL CONSTRAINTS ON WORK AND SCHEDULING OF WORK

- A. Plant access for Contractor will be provided at the main entrance gate to the Fritz Lanham Water Treatment Plant, 7425 Thompson Road, Baytown, Texas, 77521.
- B. Water projects:
 - 1. The Fritz Lanham Water Treatment Plant is the Owner's primary source of drinking water.
 - 2. Conduct Work such that the Owner's ability to meet its customer's demands for treated drinking water shall not be impaired or reduced in terms of the required quantity or quality of treated water. Do not impair the operational capabilities of essential elements of the treatment process or reduce treatment capacity below levels sufficient to meet demands for water throughout the contract time. The quantities of and quality of treated water required are described in this Section.
 - 3. Conduct commissioning activities as specified, in a manner that will not impair capabilities of essential elements of the treatment process or reduce treatment capacity below levels sufficient to meet demands for water throughout the contract time. The quantities of and quality of treated water required are described in this Section.
 - 4. The status of the treatment plant shall be defined as "operational" when the plant is capable of meeting the Owner's customer's demands for treated drinking water in terms of the required quantity or quality of treated water as defined in this Section.

1.03 SHUTDOWN AND CONSTRUCTION CONSTRAINTS

- A. General shutdown constraints:
 - 1. Execute the Work while the existing facility is in operation.
 - 2. The majority of activities shall be accomplished without a shutdown through the use of temporary isolation plugs and temporary bypass piping.
 - 3. Apply to activities of construction regardless of process or work area.
 - 4. Activities that disrupt plant or utilities operations must comply with these shutdown constraints.
 - 5. Organize work to be completed in a minimum number of shutdowns.
 - 6. Provide thorough advanced planning, including having required equipment, materials, and labor on hand at time of shutdown.

7. Where required to minimize treatment process interruptions while complying with specified constraints, provide temporary piping, power, lighting, and safety devices.
 8. Final determination of the permitting of shutdowns will be the sole judgment of the Owner.
 9. Owner maintains the ability to abort on the day of the scheduled shutdown.
- B. General maximum plant flow work limitations:
1. Activities that disrupt plant operations are prohibited during the following flow conditions, unless otherwise approved in writing by the Owner and Engineer.
 - a. Flow condition: greater than 18 mgd (12,500 gpm).
 2. At a minimum, the following facilities must be in service in order to proceed with a scheduled shutdown.
 - a. At least two of the three tanks shall remain in operation throughout construction, except during scheduled shutdowns.
 - b. A temporary bypass shall be constructed as shown on the Drawings.
- C. Shutdown activities:
1. Scheduling:
 - a. Perform between the hours of 7 p.m. and 7 a.m. or as approved by Owner.
 - b. Up to four (4) shutdowns for a duration of no greater than two (2) hours each will be allowed. Shutdowns shall be requested in writing at least 48 hours in advance. If approved, Contractor will be notified in writing at least 24 hours in advance.
 - c. Unplanned shutdowns due to emergencies are not defined in this Section.

1.04 COMPLIANCE WITH DRINKING WATER PERMIT

- A. The existing facility is operating under the terms of a Drinking Water permit issued by the Texas Commission on Environmental Quality. This permit specifies the water quality limits that the plant must meet prior to discharge of finished water. A copy of the existing permit is on file for review at the office of the Owner.
- B. Perform work in a manner that will not prevent the existing facility from achieving the finished water quality requirements established by regulations.
- C. Bear the cost of penalties imposed on the Owner for water quality violations caused by actions of the Contractor.
- D. Bear the costs for exceeding the drinking water standards of \$10,000 per day for each day of the occurrence and each subsequent day of a boil water notice.

1.05 OPERATIONS AND MAINTENANCE ACCESS

- A. Provide safe, continuous access to process control equipment for plant operations personnel.

1.06 UTILITIES

- A. Provide advance notice to and utilize services of Texas811 for location and marking of underground utilities operated by utility agencies other than the Owner.
- B. For location and marking of utilities owned by the City of Baytown, call the City Utilities Department at 281-420-5300.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01220

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Procedures for measurement and payment of Work under this Contract for lump sum items and unit prices.

1.02 REFERENCES

- A. Occupational Safety and Health Administration (OSHA).

1.03 DESCRIPTION OF BID ITEMS

- A. Item 1: Mobilization and Preparatory Work:
 - 1. Description: The price bid for this item shall not exceed 3-percent of the total of Base Bid. The lump sum bid price shall include, but not be limited to, the cost of movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of temporary facilities and services at the project site; for the securing of permits required for the work and occupancy rights to lands incidental to the work; for payment of premiums for bonds and insurance for the project; for any necessary costs of acquisition of equipment; and for any other work and operations which must be performed or costs that must be incurred incident to the initiation of work at the site, all in accordance with the contract documents.
 - 2. Bid Units: Lump Sum.
 - 3. Measurement and Payment: Progress payments for mobilization and preparatory work will be made as specified in Section 01505.
 - 4. When other contract items are adjusted, mobilization and preparatory work costs will be included in the item being adjusted and this bid item will therefore remain unchanged.
- B. Item 2: Texas Pollutant Discharge Elimination System (TPDES)/Stormwater Pollution Prevention Plan (SWPPP):
 - 1. Description: The contract price bid shall cover all work related to the required documentation to be prepared, signed, and submitted by the Contractor before conducting construction operations, in accordance with the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) General Permit, as specified in Section 01565.
 - 2. Bid Units: Lump Sum.
 - 3. Measurement and Payment: Payment for this item will be based on the percentage of total Work completed, which generally consists of the replacement of valves, couplings, coatings, and disinfection, complete in place, all in conformance with the Contract Documents.

- C. Item 3: Trench and Excavation Safety:
1. Description: The contract price bid shall cover all work related to excavation trench and excavation safety systems, including but not limited to worker protection from the hazard of caving ground, application of protective procedures, measures and materials required for the safe and effective execution of the Work.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the completed percentage of linestops, complete in place, deployed, removed, and excavations backfilled.
- D. Item 4A: CONTINGENCY ITEM – Geotechnical Boring and Ground Water and Surface Water Control:
1. Description: The Work associated with this bid item may or may not be authorized and paid. The extent of groundwater dewatering required will be determined during construction. The contract price bid shall cover all Work related to dewatering excavations and maintaining excavations in dry and stable conditions, protecting the Work against surface runoff, draining the tanks, dechlorinating and disposing of removed water, and managing up to 5 gpm coming from each open pipe in the event that Valve A and/or Valve F do not provide drip-tight shutoff.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the completed percentage of the Work.
- E. Item 5: Installation of 30-inch Butterfly Valves:
1. Description: The contract price bid shall cover all work related to installation of Owner provided 30-inch butterfly valves, including but not limited to assignment of the purchase order to the Contractor, installation in accordance with manufacturer's published recommendations and certification by the manufacture that the valves are properly installed.
 2. Bid Units: Each.
 3. Measurement and Payment: Payment for this item will be based on the quantity of valves installed and certified by the manufacturer, complete in place, all in accordance with the Contract Documents.
- F. Item 6: 48-inch Linestop "LS-C" with 30-inch Outlet for Bypass:
1. Description: The contract price bid shall cover all work related to installation and successful performance of the linestop, installation of the 30-inch outlet for the bypass piping, restoration of the pipeline, backfilling and compaction of the excavation and restoration of the site.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- G. Item 7: 30-inch Linestop "LS-D" with 24-inch Valved Outlet for Bypass:
1. Description: The contract price bid shall cover all work related to installation and successful performance of the linestop, removal and restoration of the pipeline, backfilling and compaction of the excavation and restoration of the site.

2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- H. Item 8: Temporary 30-inch Bypass Piping:
1. Description: The contract price bid shall cover all Work related to installation and successful performance of the 30" or larger bypass piping, including but not limited to piping, valves, fittings, couplings supports and restraints.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- I. Item 9: 48-inch Linestop "LS-E":
1. Description: The contract price bid shall cover all work related to installation and successful performance of the linestop, restoration of the pipeline, backfilling and compaction of the excavation, and restoration of the site.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- J. Item 10: 30-inch Tank Piping Removal and Reinstallation:
1. Description: The contract price bid shall cover all Work related to the removal and reinstallation of the 30-inch 90-degree elbow, including but not limited to removal and replacement of the bolted coupling, removal and replacement of the 2-inch gate valve and PVC piping, and rigorous sanitary procedures to prevent contamination within tank and open piping.
 2. Bid Units: Each.
 3. Measurement and Payment: Payment for this item will be based on quantity of 90-degree elbows removed and reinstalled, complete in place, all in accordance with the Contract Documents.
- K. Item 11: Protective Coatings
1. Description: The contract price bid shall cover all Work related to the application of protective coatings to 30-inch butterfly valves, 30-inch 90 degree elbows, including but not limited to surface preparation, prime, intermediate and top coat, pre-installation conference, training, and protection of adjacent surfaces.
 2. Bid Units: Lump Sum.
 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- L. Item 12: ADDITIVE ITEM – 48-inch Linestop if "Valve F" does not function:
1. Description: This item may or may not be included in the Work. If "Valve F" does not provide adequate shutoff, then the Engineer may direct Contractor to proceed with this additional work. The contract price bid shall cover all work related to installation and successful performance of the linestop, removal and

- restoration of the pipeline, backfilling and compaction of the excavation and restoration of the site.
 - 2. Bid Units: Lump Sum.
 - 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.
- M. Item 13: ADDITIVE ITEM – 30-inch Linestop if “Valve A” does not function:
- 1. Description: This item may or may not be included in the Work. If “Valve A” does not provide adequate shutoff, then the Engineer may direct Contractor to proceed with this additional work. The contract price bid shall cover all work related to installation and successful performance of the linestop, removal and restoration of the pipeline, backfilling and compaction of the excavation and restoration of the site.
 - 2. Bid Units: Lump Sum.
 - 3. Measurement and Payment: Payment for this item will be based on the percent of Work complete, as estimated by the Engineer, all in accordance with the Contract Documents.

1.04 UNIT PRICE ITEMS

- A. Measurement of quantities:
- 1. Work paid at a unit price times number of units measured will be measured by Engineer in accordance with United States Standard Measures:
 - a. 1 ton shall consist of 2,000 pounds avoirdupois.
 - 2. Provide and pay for accurate scales:
 - a. Use platform scales of sufficient size and capacity to permit the entire vehicle or combination of vehicles to rest on the scale platform while being weighed.
 - b. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed.
 - c. Have scales inspected and certified as often as necessary to ascertain accuracy.
 - d. Furnish weigh slips and daily summary weigh sheets to Engineer.
 - e. When material is shipped by rail, certified car weights will be acceptable, provided that not more than the actual weight of material will be paid, without consideration of minimum car weight used for assessing freight tariff.
 - f. Car weight will not be acceptable for materials passing through mixing plants.
 - g. Daily, or at shorter intervals when necessary to ensure accuracy, weigh empty trucks used to haul material paid by weight.
 - h. Provide such trucks with plain, unique, permanent, legible identification marks.
 - 3. Reinforcing steel, steel shapes, castings, and similar items paid by weight will be measured by handbook weights for the type and quantity indicated for the Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, temporary controls, sheds, and removal after construction.

1.02 REFERENCE

- A. American National Standards Institute (ANSI).
- B. Occupational Safety and Health Administration (OSHA).

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.

1.04 TEMPORARY UTILITIES

- A. Temporary electrical power:
 - 1. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
 - 2. Provide, maintain, and pay for electric power for performance of the Work.
- B. Temporary electrical lighting:
 - 1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
- C. Temporary heating, cooling, and ventilating:
 - 1. Heat and ventilate work areas to protect the Work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
 - 2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.
- D. Temporary water:
 - 1. Pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction.
 - 2. Remove temporary piping and connections and restore affected portions of the facility to original condition before final acceptance.
 - 3. Pay for water used for construction prior to final acceptance.

- E. Temporary sanitary facilities:
 - 1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
 - 2. Existing facility use is not allowed.
 - 3. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.
- F. Temporary fire protection:
 - 1. Provide fire protection required to protect the Work and ancillary facilities.
- G. First aid: Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.
- H. Utilities in existing facilities: As specified in Section 01140 - Work Restrictions.

1.05 CONSTRUCTION AIDS

- A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.
- B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.
- C. Design temporary supports with adequate safety factor to ensure adequate load bearing capability:
 - 1. When requested, submit design calculations by professional registered engineer prior to application of loads.
 - 2. Submitted design calculations are for information and record purposes only.
- D. Accident prevention:
 - 1. Exercise precautions throughout construction for protection of persons and property.
 - 2. Observe safety provisions of applicable Laws and Regulations.
 - 3. Guard machinery and equipment and eliminate other hazards.
 - 4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
 - 5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.
- E. Barricades:
 - 1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
 - 2. Provide barriers with flashing lights after dark.
 - 3. Keep barriers in place until excavations are entirely backfilled and compacted.
 - 4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.

- F. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:
 - 1. Provide devices in accordance with minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.
- G. Hazards in protected areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.
- H. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage, or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.

1.06 TEMPORARY CONTROLS

- A. Dust control:
 - 1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
 - 2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.
- B. Noise control:
 - 1. Comply with noise and work hours regulations by local jurisdiction.
 - 2. In or near inhabited areas, particularly residential, perform operations in manner to minimize noise.
 - 3. In residential areas, take special measures to suppress noise during night hours.
- C. Mud control:
 - 1. Prevent mud nuisance caused by construction operations, unpaved roads, excavation, backfilling, demolition, or other activities.

1.07 REMOVAL

- A. Remove temporary facilities and controls before inspection for final Completion or when directed.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Remove underground installations to minimum depth of 24 inches and grade to match surrounding conditions.
- D. Restore existing facilities used during construction to specified or original condition.

1.08 TEMPORARY PROCESS PIPING SYSTEMS

- A. Provide piping, appurtenances, and other materials as required to provide temporary piping systems as specified in this Section, as indicated on the Drawings, and as needed to perform the Work.

- B. Provide field route piping as needed and as field conditions dictate, unless otherwise indicated on the Drawings, and determine appropriate lengths of piping and quantity/type of pipe fittings needed to construct temporary piping system.
- C. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - 1. When piping is buried, use concrete thrust block or mechanical restraints.
 - 2. When piping is exposed or under water, use mechanical or structural restraints.
 - 3. Determine thrust forces by multiplying the nominal cross sectional area of the piping by the operating pressure of the piping.
- D. Install temporary piping systems in a manner that will not damage existing or new facilities.
- E. Piping material, including gaskets: Suitable for the process fluid requiring temporary piping, unless indicated otherwise.
- F. Temporary piping includes, but is not limited to, the following piping services:
 - 1. From Linestop C to Linestop D, 30-inch with approximate alignment indicated on the Drawings.
- G. After temporary piping system is no longer required:
 - 1. Remove temporary piping system.
 - 2. Clean and repair damage caused by installation or use of temporary piping system.
 - 3. Restore existing facilities to original condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

Section 01564

CONTROL OF GROUND WATER AND SURFACE WATER

1.0 GENERAL

1.01 SECTION INCLUDES

- A Dewatering, depressurizing, draining, and maintaining trench and structure excavations and foundation beds in dry and stable condition.
- B Protecting work against surface runoff and rising floodwaters.
- C Disposing of removed water.
- D References to Technical Specifications:
 - 1. Section 01220 – Measurement & Payment Procedures
 - 2. Section 01300 – Submittals
 - 3. Section 01570 – Trench Safety Systems
 - 4. Section 01565 – TPDES Requirements
 - 5. Section 01566 – Source Controls for Erosion & Sedimentation
- E Referenced Standards:
 - 1. Occupational Safety and Health Administration (OSHA)
 - 2. Texas Commission on Environmental Quality (TCEQ)
 - 3. Code of Ordinances, City of Baytown, Texas
 - 4. Water Well Drillers and Pump Installers Advisory Council (WWD/PI)
- F Definitions:
 - 1. Ground Water Control Systems - installations external to the excavation such as well points, eductors, or deep wells. Ground water control includes dewatering and depressurization.
 - a. Dewatering - lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations and disposing of removed water. The intent of dewatering is to increase stability of excavated slopes; prevent dislocation of material from slopes or bottoms of excavations; reduce lateral loads on sheeting and bracing; improve excavating and hauling characteristics of excavated material; prevent failure or heaving of the bottom of excavations; and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.
 - b. Depressurization - reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottom.

2. Surface Water Control - diversion and drainage of surface water runoff and rain water away from the excavation.
3. Excavation Drainage - keeping excavations free of surface and seepage water.

1.02 MEASUREMENT AND PAYMENT

- A Measurement for and control of ground water for open cut pipe excavations shall be on a linear foot basis and shall not exceed the length of open cut pipe installation in the area requiring ground water control.
- B Unless indicated as a Bid Item, no separate payment will be made for control of ground water for any condition(s) other than those described in this Section, 1.02A. No separate payment will be made for control of surface water. Include the cost to control non-pipe excavation ground water and surface water in price for Work requiring such controls.
- C Refer to Section 01220 – Measurement & Payment Procedures.

1.03 SUBMITTALS

- A Make Submittals required by this Section under the provisions of Section 01300 – Submittals.
- B Submit a Ground Water and Surface Water Control Plan for review by the Engineer prior to start of any field work. The plan shall be signed by a Professional Engineer registered in the State of Texas. The plan shall include the following:
 1. Results of subsurface investigation and description of the extent and characteristics of water bearing layers subject to ground water control.
 2. Names of equipment suppliers and installation subcontractors.
 3. A description of proposed ground water control systems indicating arrangement, location, depth and capacities of system components, installation details and criteria, and operation and maintenance procedures.
 4. A description of proposed monitoring and control system indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics.
 5. A description of proposed filters including types, sizes, capacities and manufacturer's application recommendations.
 6. Design calculations demonstrating adequacy of proposed systems for intended applications. Define potential area of influence of ground water control operation near contaminated areas.

7. Operating requirements, including piezometric control elevations for dewatering and depressurization.
 8. Excavation drainage methods including typical drainage layers, sump pump application and other necessary means.
 9. Surface water control and drainage installations.
 10. Proposed methods and locations for disposing of removed water.
- C Submit the following records upon completed initial installation:
1. Installation and development reports for well points, eductors, and deep wells.
 2. Installation reports and baseline readings for piezometers and monitoring wells.
 3. Baseline analytical test data of water from monitoring wells.
 4. Initial flow rates.
- D Submit the following records on a weekly basis during operations:
1. Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization. Refer to this Section, 3.02 "Requirements for Eductor, Well Points, or Deep Wells".
 2. Maintenance records for ground water control installations, piezometers, and monitoring wells.
- E Submit the following records at end of the Work. Decommissioning (abandonment) reports for monitoring wells and piezometers installed by other during the design phase and left for Contractor's monitoring and use.

1.04 PERFORMANCE REQUIREMENTS

- A Conduct subsurface investigations to identify groundwater conditions and to provide parameters for design, installation, and operation of groundwater controlsystems.
- B Design a ground water control system, compatible with the requirements of OSHA Standards - 29 CFR, Part 1926, and Section 01570 - Trench Safety Systems of these Technical Specifications, to produce the following results:
1. Effectively reduce the hydrostatic pressure affecting excavations.
 2. Develop a substantially dry and stable subgrade for subsequent construction operations.
 3. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities, and other work.
 4. Prevent the loss of fines, seepage, boils, quick condition, or softening of the foundation strata.
 5. Maintain stability of sides and bottom of excavations.

- C Ground water control systems may include single-stage or multiple-stage well point systems, eductor and ejector-type systems, deep wells, or combinations of these equipment types.
- D Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials, such as crushed stone and filter fabric, together with sump pumping.
- E Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.
- F Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.
- G Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the ground water control operations. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells, or affect potentially contaminated areas. Repair damage caused by ground water control systems or resulting from failure of the system to protect property as required.
- H Provide an adequate number of piezometers installed at the proper locations and depths as required providing meaningful observations of the conditions affecting the excavation, adjacent structures, and water wells.
- I Provide environmental monitoring wells installed at the proper locations and depths as required to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into the work area or into the ground water control system.
- J Decommission piezometers and monitoring wells installed during design phase studies and left for Contractors monitoring and use.

1.05 ENVIRONMENTAL REQUIREMENTS

- A Comply with requirements of agencies having jurisdiction.
- B Comply with TCEQ regulations and WWD/PI Advisory Council for development, drilling, and abandonment of wells used in dewatering system.
- C Obtain permit from TCEQ under the Texas Pollutant Discharge Elimination System (TPDES), for storm water discharge from construction sites. Refer to Section 01565– TPDES Requirements, 3.02 “Certification Requirements”.

- D Obtain all necessary permits from agencies with control over the use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, take early action to pursue and submit for the required approvals.
- E Monitor ground water discharge for contamination while performing pumping in the vicinity of potentially contaminated sites.
- F Implement control of ground and surface water under the provisions of Section 01566
 - Source Controls for Erosion & Sedimentation.

2.0 PRODUCTS

2.01 EQUIPMENT AND MATERIALS

- A Equipment and materials are at the option of Contractor as necessary to achieve desired results for dewatering. Selected equipment and materials are subject to review of the Engineer through Submittals required in Section 01330 – Submittals, 1.06 “Operations and Maintenance Data”.
- B Eductors, well points, or deep wells, where used, must be furnished, installed and operated by an experienced contractor regularly engaged in ground water control system design, installation, and operation.
- C Equipment and instrumentation for monitoring and control of the ground water control system includes piezometers and monitoring wells, and devices, such as flow meters, for observing and recording flow rates.
- D All equipment must be in good repair and operating order.
- E Sufficient standby equipment and materials shall be kept available to ensure continuous operation, where required.

3.0 EXECUTION

3.01 GROUND WATER CONTROL

- A Perform a subsurface investigation by borings as necessary to identify water bearing layers, piezometric pressures, and soil parameters for design and installation of ground water control systems. Perform pump tests, if necessary to determine the drawdown characteristics of the water-bearing layers. The results shall be presented in the Ground Water and Surface Water Control Plan. Refer to this Section, 1.03B.

- B Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in a manner compatible with construction methods and site conditions. Monitor effectiveness of the installed system and its effect on adjacent property.
- C Install, operate, and maintain ground water control systems in accordance with the Plan. Notify Engineer in writing of any changes made to accommodate field conditions and changes to the Work. Provide revised drawings and calculations with such notification.
- D Provide for continuous system operation, including nights, weekends, and holidays. Arrange for appropriate backup if electrical power is primary energy source for dewatering system.
- E Monitor operations to verify that the system lowers ground water piezometric levels at a rate required to maintain a dry excavation resulting in a stable subgrade for prosecution of subsequent operations.
- F Where hydrostatic pressures in confined water bearing layers exist below excavation, depressurize those zones to eliminate risk of uplift or other instability of excavation or installed works. Allowable piezometric elevations shall be defined in the Plan.
- G Maintain water level below subgrade elevation. Do not allow levels to rise until foundation concrete has achieved design strength.
- H During backfilling, dewatering may be reduced to maintain water level a minimum of 5 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place. Do not allow water levels to rise into cement stabilized sand until at least 48 hour after placement.
- I Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove pipe drain when it has served its purpose. If removal of pipe is impractical, provide grout connections at 50-foot intervals and fill pipe with cement-bentonite grout or cement-sand grout when pipe is removed from service.
- J Extent of construction ground water control for structures with a permanent perforated underground drainage system may be reduced, such as for units designed to withstand hydrostatic uplift pressure. Provide a means of draining the affected portion of underground system, including standby equipment. Maintain drainage system during operations and remove it when no longer required.

- K Remove system upon completion of construction or when dewatering and control of surface or ground water is no longer required.
- L Compact backfill as required by the Contract Documents.

3.02 REQUIREMENTS FOR EDUCTOR, WELL POINTS, OR DEEP WELLS

- A For aboveground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between every eductor well or well point and discharge header so that discharge from each installation can be visually monitored.
- B Install sufficient piezometers or monitoring wells to show that all trench or shaft excavations in water bearing materials are predrained prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install piezometers and monitoring wells for tunneling as appropriate for Contractor's selected method of work.
- C Install piezometers or monitoring wells not less than one week in advance of beginning the associated excavation.
- D Dewatering may be omitted for portions of underdrains or other excavations, but only where auger borings and piezometers or monitoring wells show that soil is predrained by an existing system such that the criteria of the Ground Water and Surface Water Control Plan are satisfied.
- E Replace installations that produce noticeable amounts of sediments after development.
- F Provide additional ground water control installations or change the methods in the event that the installations according to the Ground Water and Surface Water Control Plan do not provide satisfactory results based on the performance criteria defined by the Plan and by this Section. Submit a revised Plan according to this Section, 1.03A.
- G Mechanical dewatering equipment shall comply with Chapter 19 NOISE, Code of Ordinances, City of Baytown, Texas.

3.03 EXCAVATION DRAINAGE

- A Contractor may use excavation drainage methods if necessary to achieve well drained, stable trench conditions. The excavation drainage may consist of the following methods or combination of methods:
 - 1. Sump pumping in combination with:
 - a. Layer of crushed stone and filter fabric.
 - b. Sand and gravel drains.

2. Wells for ground water control.

- B Use sump pumping and a drainage layer, as defined in ASTM D 2321, placed on the foundation beneath pipe bedding or thickened bedding layer of Class I material.

3.04 MAINTENANCE AND OBSERVATION

- A Conduct daily maintenance and observation of piezometers or monitoring wells while the ground water control installations or excavation drainage are operating in an area. Keep system in good operating condition.
- B Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedule.
- C Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make observations, as specified.
- D Remove and grout piezometers inside or outside the excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by the Engineer.

3.05 MONITORING AND RECORDING

- A Once groundwater dewatering operations are initiated, for the duration of the project, prepare a daily dewatering report to document all groundwater and dewatering operations and conditions. As a minimum, the daily dewatering report shall include:
1. Hours of pumping operation. Identify down time, even if for a short duration.
 2. Tank levels.
 3. Engine speed.
 4. Fuel level.
 5. System pressure(s).
 6. Discharge flow, measured in gpm.
 7. Daily sand and sediment discharged, measured in cubic feet.
 8. Groundwater level.
 9. Water conditions (quantity, level, saturation, dryness) within the excavation(s).
- B Monitor and record average flow rate of operation for each deep well, or for each wellpoint or eductor header used in dewatering system. Also monitor and record water level and ground water recovery. These records shall be obtained daily until the dewatering system is permanently removed from service.

- C Observe and record elevation of water level daily as long as ground water control system is in operation, and weekly thereafter until the Work is completed or piezometers or wells are removed, except when Engineer determines that more frequent monitoring and recording are required. Comply with Engineer's direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended purpose.

3.06 SURFACE WATER CONTROL

- A Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. The requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by such agencies.
- C Provide additional surface water control measures or change the methods in the event that the measures according to the Ground Water and Surface Water Control Plan do not provide satisfactory results based on the performance criteria defined by the Plan and by this Section. Submit a revised Plan according to this Section, 1.03B.

END OF SECTION

Section 01566

SOURCE CONTROLS FOR EROSION AND SEDIMENTATION

1.0 GENERAL

1.01 SECTION INCLUDES

- A Descriptions of measures and practices, in response to TPDES General Permit TXR 150000, which shall be used on the Work to eliminate or significantly minimize pollutants in discharges into Surface Water in the State by controlling erosion and sediments at their source.
- B References to Technical Specifications:
 - 1. Section 01564 – Waste Material Disposal
 - 2. Section 01564 – Control of Ground Water and Surface Water
 - 3. Section 01565 – TPDES Requirements
 - 4. Section 01573 – Erosion and Sediment Control
- C Definitions:
 - 1. Potential Water Pollutant - any substance that could potentially alter the physical, thermal, chemical, or biological quality of the Surface Water in the State, rendering the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to public health, safety or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.

1.02 MEASUREMENT AND PAYMENT

- A Unless indicated as a Bid Item, no separate payment will be made for Work performed under this Section. Include cost in Bid Items for which this Work is a component.

2.0 PRODUCTS - Not Used

3.0 EXECUTION

3.01 PREPARATION AND INSTALLATION

- A Contractor shall conduct all construction operations under this Contract in conformance with the erosion control practices described in the Drawings and this Technical Specification.
- B Erosion and sediment control measures shall be in place prior to the start of any Work that exposes the soil, other than as specifically directed by the Engineer to allow soil testing and surveying.

- C The Contractor shall install, maintain, and inspect erosion and sediment control measures and practices that operate effectively and as specified in the Drawings and in this or other Technical Specifications.
- D Equipment and vehicles shall be prohibited by the Contractor from maneuvering on areas outside of the limits of construction or dedicated rights-of-way and easements. Damage caused by construction traffic to erosion and sediment control systems shall be repaired immediately by the Contractor.
- E The Contractor shall be responsible for collecting, storing, hauling, and disposing of spoil, silt, waste materials, and contaminated material resulting from erosion and sediment control measures as specified in this or other Technical Specifications and in compliance with applicable federal, state, and local rules and regulations.

3.02 EXPOSED SOIL

- A When soil is exposed as a result of clearing, grading, excavating, stockpiling, or other soil disturbing activities, the Contractor shall implement measures to effectively control erosion and prevent the escape of sediments from the Project Site.
- B Control measures may include the following practices:
 - 1. Preserve existing vegetation to the extent possible.
 - 2. Construct drainage swales, berms, or sediment basins.
 - 3. Maintain grades to minimize the velocity of sheet flow over disturbed areas and promote evaporation and infiltration of storm water directly into the ground.
 - 4. Install filter fabric fences or barriers, sediment traps, seepage basins, gabions, or storm drain inlet protection devices.
 - 5. Utilize vegetative buffer strips, mulching, or riprap
- C When the placement of topsoil, bank sand, or other soil material is specified, after an area has been brought to grade and immediately prior to placement, loosen the subgrade discing or by scarifying to a depth of at least 2 inches to permit bonding to the subsoil.
- D When all soil disturbing activities have been completed, establish a perennial vegetative cover on all areas that are not paved, covered by permanent structures, or otherwise permanently stabilized.

3.03 DUST CONTROL

- A Implement control measures to minimize dust creation and movement on construction sites and roads and to prevent airborne sediment from reaching receiving streams or storm water conveyance systems, to reduce on-site and off-site damage, to prevent health hazards, and to improve traffic safety.
- B Control blowing dust by using one or more of the following measures:
 - 1. Mulches bound with chemical binders.
 - 2. Temporary vegetative cover.
 - 3. Tillage to roughen surface and bring clods to the surface.
 - 4. Irrigation by water sprinkling.
 - 5. Barriers using solid board fences, burlap fences, crate walls, bales of hay, or similar materials.
- C Implement dust control measures immediately whenever dust can be observed blowing on the Project Site.

3.04 DEMOLITION AREAS

- A Demolition activities which create large amounts of dust with significant concentrations of heavy metals or other potential water pollutants shall use methods described in this Section, 3.03 “Dust Control”, to limit transport of airborne pollutants. However, water or slurry used to control dust contaminated with heavy metals or potential water pollutants shall be retained on the Project Site and shall not be allowed to run directly into watercourses or storm water conveyance systems by the appropriate use of control measures described in this Section. Methods of ultimate disposal of these materials shall be carried out in accordance with applicable local, state, and federal health and safety regulations.

3.05 SEDIMENT TRACKING

- A Minimize off-site tracking of sediments and the generation of dust by construction vehicles, keeping the streets clean of construction debris and mud, by implementing one or more of the following control measures:
 - 1. Restrict all ingress and egress to stabilized construction exits.
 - 2. Stabilize areas used for staging, parking, storage or disposal.
 - 3. Stabilize on-site vehicle transportation routes.
 - 4. Remove mud and other debris, washing if necessary, from vehicles prior to entrance onto public roadways from the Project Site.
 - 5. Maintain grade to minimize the occurrence of mud on the Project Site.
- B Construct stabilized construction areas under the provisions of Section 01550 – Stabilized Construction Exists.

- C In addition to Stabilized Construction Exits shovel or sweep the pavement to the extent necessary to keep the street clean. Water-hosing or sweeping of debris and mud off of the street into adjacent areas is not allowed.

3.06 EQUIPMENT MAINTENANCE AND REPAIR

- A Control equipment maintenance and repair so that oils, gasoline, grease, solvents, and other potential water pollutants cannot be washed directly into receiving streams or storm water conveyance systems.
- B Control measures may include the following practices:
 - 1. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose.
 - 2. Provide these areas with adequate waste disposal receptacles for liquids as well as solid waste.
 - 3. Clean and inspect maintenance and repair areas daily.
 - 4. Stabilize the area with coarse aggregate.
 - 5. Maintain grade to prevent surface water from flowing over the area.
 - 6. Place plastic matting, packed clay, tar paper, or other impervious material to prevent contamination of soil in the area.
 - 7. Isolate areas of contaminated soil or other materials to facilitate proper removal and disposal.
- C Where effective control measures are not feasible, equipment shall be taken off-site for maintenance and repair.

3.07 WASTE COLLECTION AND DISPOSAL

- A Conduct operations in conformance with the plan provided in Section 01562 – Waste Material Disposal and utilize such control measures, described in this Section, as may be necessary to eliminate or significantly reduce the discharge of possible water pollutants from the Project Site as a result of waste collection and disposal.
- B Keep receptacles and waste collection areas neat and orderly to the extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they will least likely be affected by concentrated storm water runoff.

3.08 WASHING AREAS

- A Vehicles such as concrete delivery trucks or dump trucks and other construction equipment shall not be washed at locations where the runoff will flow directly into a watercourse or storm water conveyance system. Preventative measures may include the following practices:
 - 1. Designate special areas for washing vehicles.
 - 2. Locate these areas where the wash water will spread out and evaporate or infiltrate directly into the ground, or where the runoff can be collected in a temporary holding or seepage basin.
 - 3. Beneath wash areas construct a gravel or rock base to minimize mud production.
- B Construct washing areas under the provisions of Section 01573 – Erosion and Sediment Control.

3.09 STORAGE AND USAGE OF POTENTIAL WATER POLLUTANTS

- A Store and use potential water pollutants such as pesticides, fertilizers, distillate fuels, lubricants, solvents, cements, paints, acids, caustics, and other toxic substances in accordance with manufacturers' guidelines, Material Safety Data Sheets, and with local, state, and federal regulations.
- B Isolate these substances in areas where they are to be stored, opened or used such that they will not cause pollution of runoff from the Project Site. Preventative measures may include the following practices:
 - 1. Stabilize the area with coarse aggregate.
 - 2. Store containers on raised platforms.
 - 3. Place plastic matting, packed clay, tar paper, or other impervious material to prevent contamination of soil in the area.
 - 4. Provide protective cover or weather proof enclosure.
 - 5. Minimize accidental spillage.
 - 6. Keep containers tightly closed.
 - 7. Periodically inspect containers for leakage.
 - 8. Maintain grade to prevent surface water from flowing over the area.
 - 9. Provide berms, filter fabric fences or barriers, or sediment basins.
 - 10. Designate washing areas for containers and other items that have come in contact with potential water pollutants.
- C Avoid overuse of substances such as pesticides and fertilizers which could produce contaminated runoff.

3.10 SANITARY FACILITIES

- A Provide the Project Site with adequate portable toilets for workers in accordance with Section 01500 – Temporary Facilities and Controls, and applicable health regulations.

- B Control areas where sanitary facilities are located so that sewage or chemicals will not be washed directly into receiving streams or storm water conveyance systems by using one or more of the following measures.
 - 1. Inspect the facilities daily.
 - 2. Service the facilities as often as necessary to maintain cleanliness and prevent overflows.
 - 3. Stabilize the area with coarse aggregate
 - 4. Maintain grade to prevent surface water from flowing over the area

END OF SECTION

Section 01570

TRENCH SAFETY SYSTEM

1.0 GENERAL

1.01 SECTION INCLUDES

- A. Trench safety system for the construction of trench excavations.
- B. Trench safety system for excavation of utilities, excavation of structures, and embankment which fall under provisions of federal, state, or local excavation safety laws.
- C. References to Technical Specifications:
 - 1. Section 01220 – Measurement & Payment Procedures
 - 2. Section 01300 – Submittals
- D. Referenced Standards:
 - 1. Occupational Safety and Health Administration (OSHA)
- E. Definitions:
 - 1. Trench: A narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet.
 - 2. Trench safety system requirements apply to larger open excavations if the erection of structures or other installations limits the space between the excavation slope and the installation to dimensions equivalent to a trench as defined.
 - 3. Trench safety systems include both Protective Systems and Shoring Systems but are not limited to sloping, sheeting, trench boxes or trench shields, slide rail systems, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.
 - a. Protective System: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of an adjacent structure.

- b. Shoring System: A structure, which supports the sides of an excavation, to prevent cave-ins, maintain stable soil conditions, or to prevent movements of the ground affecting adjacent installations or improvements.
 - c. Special Shoring: A shoring system meeting Special Shoring Requirements for locations identified on the Plans.
4. Competent Person- one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement for trench safety systems used on utility excavations is on a lump sum basis and is included in the various bid items for the Work.
- B. Unless indicated in as a Bid Item, no separate payment will be made for shoring systems under this Section. Include cost in Bid Items for trench safety systems.
- C. If shown on the Plans and included in Section 00300 – Bid Proposal as a separate Bid Item, Measurement and Payment for Special Shoring system installation for trench excavation is on a square foot basis, measured and completed in place.
- D. Unless indicated as a Bid Item, no separate payment will be made for trench safety systems used on structural excavations under this Section. Include cost for trench safety system used on structural excavations in applicable structure installation.
- E. Unless indicated as a Bid Item, no separate payment will be made for trench safety systems used on roadway excavation or embankment under this Section. Include cost in applicable Sections.
- F. Refer to Section 01220 – Measurement & Payment Procedures.

1.03 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01330 – Submittals.
- B. Submit a safety plan specifically for the construction of trench excavation, excavation of utilities, excavation of structures, and embankment which fall under provisions of federal, state, or local excavation safety laws. Design the

Trench Safety Plan to be in accordance with OSHA Standards - 29CFR governing the presence and activities of individuals working in and around trench excavations, and in accordance with any Special Shoring requirements at locations shown on the Plans. Include in the plan, submittal of the contact information for the Competent Person.

- C. Have Shop Drawings for trench safety systems sealed, as required by OSHA, by a Professional Engineer, licensed by the State of Texas, retained and paid by the Contractor.

1.04 REGULATORY REQUIREMENTS

- A. Install and maintain trench safety systems in accordance with the provision of Excavations, Trenching, and Shoring, OSHA Standards–29 CFR, Part 1926, Subpart P, as amended, including Final Rule, published in the Federal Register Vol. 54, No. 209 on Tuesday, October 31, 1989. The sections that are incorporated into these Technical Specifications, by reference, include Standard 1926.650 – 652.
- B. A reproduction of the OSHA Standards – 29 CFR included in Subpart P – “Excavations” from the Federal Register Vol. 54, No. 209 is available upon request to Contractors bidding on the Work. The Owner assumes no responsibility for the accuracy of the reproduction. The Contractor is responsible for obtaining a copy of this section of the Federal Register.
- C. Include in the Trench Safety Program measures that establish compliance with the standard interpretation of the General Duty Clause, Section 5.(a)(1), of the Occupational Safety and Health Act of 1970 – 20 USC 654 which states, “Employers must shore or otherwise protect employees who walk/work at the base of an embankment from possible collapse.”
- D. Legislation that has been enacted by the State of Texas with regard to Trench Safety Systems is hereby incorporated, by reference, into these specifications. Under Texas Statutes, refer to Chapter 756 of the Health and Safety Code, SUBCHAPTER C. TRENCH SAFETY.
- E. Reference materials, if developed for this Work, will be issued by the Engineer along with the Bid Documents, including the following:
 - 1. Geotechnical information obtained for use in design of the trench safety system.
 - 2. Special Shoring Requirements.

1.05 INDEMNIFICATION

- A. Contractor shall indemnify and hold harmless the Owner, its employees, and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgments or claims by anyone for injury or death of persons resulting from the collapse or failure of trenches constructed under this Contract.
- B. Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner in case the Owner is negligent either by act or omission in providing for trench safety, including, but not limited to safety program and design reviews, inspections, failures to issue stop work orders, and the hiring of the Contractor.
- C. Review of the safety program by the Engineer will only be in regard to compliance with the Contract Documents and will not constitute approval by the Engineer nor relieve Contractor of obligations under state and federal trench safety laws.

2.0 PRODUCTS - Not Used

3.0 EXECUTION

3.01 INSTALLATION

- A. Install and maintain trench safety systems in accordance with provisions of OSHA Standards – 29 CFR.
- B. Specially designed trench safety systems shall be installed in accordance with the Contractor's trench excavation safety program for the locations and conditions identified in the program.
- C. Install Special Shoring at the locations shown on the Plans.
- D. Obtain verification from a Competent Person, defined in this Section and as identified in the Contractor's Trench Safety Program, that trench boxes and other pre-manufactured systems are certified for the actual installation conditions.

3.02 INSPECTION

- A. Conduct daily inspections by Contractor or Contractor's independently retained consultant, of the trench safety systems to ensure that the installed systems and operations meet OSHA Standards – 29 CFR and other personnel protection regulations requirements.

- B. If evidence of possible cave-ins or slides is apparent, immediately stop work in the trench and move personnel to safe locations until necessary precautions have been taken to safeguard personnel.
- C. Maintain a permanent record of daily inspections.

3.03 FIELD QUALITY CONTROL

- A. Verify specific applicability of the selected or specially designed trench safety systems to each field condition encountered on the Work.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for tangible materials, raw or manufactured, that become part of the project.

1.02 REFERENCES

- A. NSF International (NSF):
 - 1. 60 - Technical Requirements.
 - 2. 61 - Drinking Water System Components - Health Effects.

1.03 DEFINITIONS

- A. Certificates: Documents that the work is in accordance with the Contract Documents.
- B. Extra stock materials: Extra stock materials provided for the Owner's use in facility operation and maintenance.
- C. Manufacturer's instructions:
 - 1. Stipulations, directions, and/or recommendations issued form by the manufacturer of the product addressing handling, installation, erection, and/or application of the product.
- D. Products:
 - 1. Raw materials, finished goods, equipment, systems, and shop fabrications.
- E. Product data:
 - 1. Public information about the product which is found in the manufacturer's catalogs or on their web site including catalog pages, data sheets, bulletins, layout drawings, exploded views, and brochures.
- F. Samples:
 - 1. As defined in the General Conditions and Supplementary Conditions.
 - 2. Full-size actual products or pieces of products intended to illustrate the products to be incorporated into the project. Sample submittals are often necessary for such characteristics as colors, textures, and other appearance issues.
- G. Schedules:
 - 1. Product parts and materials lists.

- H. Shop drawings:
 - 1. As defined in the General Conditions and Supplementary Conditions.
 - 2. Shop drawings are prepared specifically for the project to illustrate details, dimensions, and other data necessary for satisfactory fabrication or construction that are not shown in the contract documents.
- I. Submittals:
 - 1. As defined in the General Conditions and Supplementary Conditions.
 - 2. Samples, product data, shop drawings, and others that demonstrate how Contractor intends to conform to the Contract Documents.

1.04 SUBMITTALS

- A. Products in contact with drinking water:
 - 1. Provide certification for by an independent ANSI accredited third party.
 - a. In accordance with NSF 61.
 - b. Weighted average lead content of less than 0.25 percent in accordance with NSF 372.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide products by same manufacturer when products are of similar nature, unless otherwise specified.
- B. Provide like parts of duplicate units that are interchangeable.
- C. Provide equipment or product that has not been in service prior to delivery, except as required by tests.
- D. Provide products produced by manufacturers regularly engaged in the production of these products.
- E. Provide products that bear approvals and labels as specified.

2.02 MATERIAL

- A. Dissimilar metals:
 - 1. Separate contacting surfaces with dielectric material.
 - 2. Neoprene, bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other materials as specified.
- B. Products in contact with drinking water or water in the process of becoming drinking water in accordance with NSF 60 or NSF 61 by an independent ANSI accredited third party.

- C. Edge grinding:
 - 1. Sharp projections of cut or sheared edges of ferrous metals which are not to be welded shall be ground to a radius required to ensure satisfactory paint adherence.
- D. Use anti-galling compound on threads of stainless steel fasteners during factory assembly.
- E. Provide anti-galling compound with stainless steel fasteners shipped for field assembly.

2.03 PRODUCT SELECTION

- A. Provide products with Engineer approved submittals.
- B. When products are specified by standard or specification designations of technical societies, organizations, or associations only, provide products that meet or exceed reference standard and Specifications.
- C. When products are specified with names of manufacturers but no model numbers or catalog designations, provide Products by one of named manufacturers that meet or exceed Specifications.
- D. When products are specified with names of manufacturers and model numbers or catalog designations, provide Products with model numbers or catalog designations by one of named manufacturers.
- E. When products are specified with names of manufacturers, but with brand or trade names, model numbers, or catalog designations by one manufacturer only, provide:
 - 1. Products specified by brand or trade name, model number, or catalog designation.
 - 2. Products by one of named manufacturers proven, in accordance with requirements for an "or equal", including Engineer's approval, to meet or exceed quality, appearance and performance of specified brand or trade name, model number, or catalog designation.
- F. When Products are specified with only one manufacturer followed by "or Equal," provide:
 - 1. Products meeting or exceeding Specifications by specified manufacturer.
 - 2. Engineer deemed "or equal" evidenced by an approved shop drawing or other written communication.
- G. When Products are specified by naming 2 or more manufacturers with 1 manufacturer as a "Basis of Design":
 - 1. Any of the named manufacturers can be submitted.
 - 2. If the product submitted requires a change in the scope (dimensions, configuration, physical properties, etc.), schedule (longer lead time), or budget, the Contractor must submit a substitution request.

2.04 SHIPMENT

- A. Requirements prior to shipment of equipment:
 - 1. Engineer approved shop drawings.
 - 2. Engineer approved Manufacturer's Certificate of Source Testing as specified in the Technical Sections .
 - 3. Draft operations and maintenance manuals, as specified in Section 01782 - Operation and Maintenance Manuals, when required by specifications.
- B. Prepare products for shipment by:
 - 1. Tagging or marking to agree with delivery schedule or shop drawings.
 - 2. Including complete packing lists and bills of material with each shipment.
 - 3. Packaging products to facilitate handling and protection against damage during transit, handling, and storage.
 - 4. Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.
- C. Transport products by methods that avoid product damage.
- D. Deliver products in undamaged condition in manufacturer's unopened containers or packaging.

PART 3 EXECUTION

3.01 DELIVERY AND HANDLING

- A. Handle equipment in accordance with manufacturer's instructions.
- B. Provide construction equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Upon delivery, promptly inspect shipments:
 - 1. Verify compliance with Contract Documents, correct quantities, and undamaged condition of products.
 - 2. Acceptance of shipment does not constitute final acceptance of equipment.
- D. Spare parts, maintenance products, special tools.
 - 1. Immediately store in accordance with the manufacturer's instructions.
 - 2. Store spare parts, maintenance products, and special tools in enclosed, weather-proof, and lighted facility during the construction period.
 - a. Protect parts subject to deterioration, such as ferrous metal items and electrical components with appropriate lubricants, desiccants, or hermetic sealing.
 - 3. With Owner's written request for advanced delivery of spare parts, maintenance products, and special tools.
 - a. Deliver requested items and deduct them from the inventory list.
 - b. Provide transmittal documentation.
 - 4. Store large items individually:
 - a. Weight: Greater than 50 pounds.
 - b. Size: Greater than 24 inches wide by 18 inches high by 36 inches long.

- c. Clearly labeled:
 - 1) Equipment tag number.
 - 2) Equipment manufacturer.
 - 3) Subassembly component, if appropriate.
 - 4) Store smaller items in spare parts box:
- d. Weight: Less than 50 pounds.
- e. Size: Less than 24 inches wide by 18 inches high by 36 inches long.
- f. Clearly labeled:
 - 1) Equipment tag number.
 - 2) Equipment manufacturer.
 - 3) Subassembly component, if appropriate.
 - 4) Spare parts and special tools box:
- g. Box material: Waterproof, corrosion resistant.
- h. Hinged cover:
 - 1) Locking hasp.
- i. Spare parts inventory list taped to underside of cover.
- j. Clearly labeled:
 - 1) The words "Spare Parts and/or Special Tools".
 - 2) Equipment tag number.
 - 3) Equipment manufacturer.
 - 4) Subassembly component, if appropriate.

3.02 STORAGE AND PROTECTION

- A. Immediately store and protect products until installed in Work.
- B. Furnish covered, weather-protected storage structures providing a clean, dry, noncorrosive environment for mechanical equipment, valves, architectural items, electrical and instrumentation equipment and special equipment to be incorporated into this project.
 - 1. Storage of equipment shall be in strict accordance with the "instructions for storage" provided by the manufacturer.
 - a. Including connection of heaters, lubrication, rotating shafts, etc.
 - 2. The Contractor shall furnish a copy of the manufacturer's instructions for storage to the Engineer prior to storage of equipment and materials.
- C. Store products with seals and legible labels intact.
- D. Protect painted or coated surfaces against impact, abrasion, discoloration, and damage.
 - 1. Repaint or recoat damaged painted or coated surfaces.
- E. Exterior storage of fabricated products:
 - 1. Place on aboveground supports that allow for drainage.
 - 2. Cover products subject to deterioration with impervious sheet covering.
 - 3. Provide ventilation to prevent condensation under covering.
- F. Store moisture sensitive products in watertight enclosures.

- G. Store loose granular materials on solid surfaces in well-drained area.
 - 1. Prevent materials mixing with foreign matter.
 - 2. Provide access for inspection.
- H. When needed and approved by the Engineer, offsite storage location shall be within 20 miles of the project site.
 - 1. Provide proof of insurance coverage for products stored offsite.
- I. Payment will not be made for equipment and materials improperly stored or stored without providing Engineer with the manufacturer's instructions for storage.
- J. Provide an equipment log and stored products log with monthly pay applications.
 - 1. Data includes as a minimum: The storage location, equipment or product identification, date stored, date of inspection/maintenance, date removed from storage, copy of manufacturer's recommended storage guidelines, description of inspection/maintenance activities performed, and signature of party performing inspection/maintenance.

3.03 INSTALLATION

- A. Inspect hardware or fittings prior to product installation.
- B. Use anti-galling compound on stainless steel threads used for field assembly.

3.04 PROTECTION AFTER INSTALLATION

- A. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.
 - 1. Remove covering when no longer needed.
 - 2. Replace corroded, damaged, or deteriorated equipment, product, or parts before acceptance of the project.
- B. Update equipment log with monthly pay applications.
 - 1. Data includes as a minimum: Description of maintenance activities performed in accordance with the manufacturer's recommendation and industry standards and signature of party performing maintenance.

END OF SECTION

SECTION 01757

DISINFECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Cleaning and disinfection requirements for new and existing facilities affected by the Work.

1.02 REFERENCES

- A. American Water Works Association (AWWA):
 - 1. C651 - Disinfecting Water Mains.
 - 2. C652 - Disinfection of Water Storage Facilities.
 - 3. C653 - Disinfection of Water Treatment Plants.
- B. U.S. Environmental Protection Agency (EPA):
 - 1. Method 524.2 Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry.
 - 2. Safe Drinking Water Act (SDWA).

1.03 SUBMITTALS

- A. Submit disinfection test plan which details procedure to be utilized to disinfect the facilities including:
 - 1. Method and locations of disinfectant application.
 - 2. Locations of sampling points.
 - 3. Method of flushing and location of flushing ports (as appropriate for method of chlorination).
 - 4. Method of dechlorination (as appropriate for method of chlorination).
 - 5. Disposal location for chlorinated water (as appropriate for method of chlorination).
- B. Submit disinfection reports and include the following:
 - 1. Date issued.
 - 2. Project name and location.
 - 3. Treatment subcontractor's name, address, and phone number.
 - 4. Type and form of disinfectant used.
 - 5. Time and date of disinfectant injection start.
 - 6. Time and date of disinfectant injection completion.
 - 7. Test locations.
 - 8. Initial and 24-hour disinfectant residuals in milligrams per liter for each outlet tested.
 - 9. Time and date of flushing start.
 - 10. Time and date of flushing completion.
 - 11. Disinfectant residual after flushing in milligrams per liter for each outlet tested.

- C. Submit bacteriological reports and include the following:
 - 1. Date issued.
 - 2. Project name and location.
 - 3. Laboratory's name, certification number, address, and phone number.
 - 4. Time and date of water sample collection.
 - 5. Name of person collecting samples.
 - 6. Test locations.
 - 7. Time and date of laboratory test start.
 - 8. Coliform bacteria test results for each outlet tested.
 - 9. Certification that water conforms or fails to conform to bacterial standards of SDWA.
 - 10. Bacteriologist's signature and bacteriological laboratory's evidence of certification.
- D. Submit required permits, including but not limited to permit clearance.
 - 1. Coordinate with Owner and Engineer to obtain any necessary signatures.

1.04 QUALITY ASSURANCE

- A. Bacteriological and physical chemistry laboratory: Certified by state in which Project is located.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect chlorine and bacteriological samples against damage and contamination.
- B. Maintain caution labels on hazardous materials.
- C. Maintain storage room dry and with temperatures as uniform as possible between 60 degrees Fahrenheit and 80 degrees Fahrenheit.

1.06 PROTECTION

- A. Provide necessary signs, barricades, and notices to prevent persons from accidentally consuming water or disturbing system being treated.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Disinfectant: Free chlorine in liquid, powder, tablet, or gas form in accordance with AWWA C653.
- B. Dechlorination agent: Sulfur dioxide, sodium bisulfate, sodium sulfite, or sodium thiosulfate in accordance with AWWA C653.

PART 3 EXECUTION

3.01 PRELIMINARY CLEANING

- A. Rigorous sanitary procedures shall be followed to prevent contamination within the tank, including but not limited to the following:
 - 1. Whenever existing piping is opened to the atmosphere, all openings shall be immediately covered with polyethylene and sealed with tape.
 - 2. Once a tank is drained, exercise extreme caution to prevent debris or contaminants from entering the tank.
 - 3. Follow the preventative contamination measures described in AWWA C651 Section 4.3 Preventative and Corrective Measures During Construction.
 - 4. Upon reassembly of piping, and before closures, disinfect the interior of all pipe and fittings, (particularly valves, couplings and sleeves) used on make the repairs by swabbing or spraying with a 1% hypochlorite solution before they are installed, all in accordance with AWWA C651.
 - 5. Fill tank to the level equal with the top of inlet piping.
 - 6. Sample and Test the contents of the tank in accordance with AWWA C652, Section 5: Verification.
 - 7. Once test results confirm that the water quality is appropriate for distribution, promptly return the tank to service.
- B. Clean newly constructed and/or modified facilities, including conveyance facilities, such as pipes and channels at the plant, in accordance with AWWA C653 and the following:
 - 1. Remove water, paint flakes, sediment, dirt, and foreign material accumulated during cleaning.
 - 2. Remove by flushing or other means, soil and debris from water pipes and channels in accordance with AWWA C651.
 - 3. Protect surfaces from adverse environmental exposure between the preliminary cleaning and the disinfection stages.
- C. Prior to chlorination, clean newly constructed and/or modified facilities to be disinfected in accordance with AWWA C651, C652, or C653, as applicable.
- D. Contractor shall provide necessary blind flanges, hoses, sample taps, or any other appurtenances that may be required to clean and disinfect the piping and wetted surfaces.

3.02 SURFACES TO BE DISINFECTED

- A. Disinfect wetted surfaces associated with pipes, fittings, valves, and couplings.
- B. Piping systems that are used to convey water, solutions, or chemicals to potable water facilities.

3.03 DISINFECTION OF WATER LINES

- A. Cleaning:
 - 1. Remove soil and debris in accordance with AWWA C652 prior to chlorination.
- B. Inspection:
 - 1. Verify that water system is completed and cleaned of soil and debris prior to chlorination.
 - 2. Start disinfection when conditions are satisfactory.
- C. System treatment:
 - 1. Perform disinfection of water lines and structures in accordance with AWWA C651, C652, and C653, and as specified in this Section.

3.04 REPAIRS OR CONNECTIONS TO EXISTING LINES

- A. Clean and sterilize the interior surfaces of new piping, fittings, equipment, and appurtenances to be installed in an existing potable water system or connected to an existing system.
- B. Clean and sterilize the existing pipe or facilities for a minimum distance of 3 pipe diameters back from the ends of the pipe. Plug the ends of the line when work is not being performed on the pipe.
- C. Perform sterilization by swabbing each item with a concentrated chlorine solution.
 - 1. Each piece is to be disinfected prior to being assembled for installation in the existing pipe.
 - 2. Disinfect each piece just prior to assembly to help prevent recontamination.
 - 3. Plug the ends of the assembly until a new item is to be added to the assembly.
 - 4. Store disinfected materials on blocks to prevent contact with the ground.

3.05 DISPOSAL OF CHLORINATED WATER

- A. Dispose of chlorinated water in accordance with the submitted disinfection test plan and applicable requirements of federal, state, county, and city having jurisdiction over disposal of hazardous wastes in location of the Project and disposal site.
- B. Chlorinated water may only be disposed of in a sanitary sewer system with the written permission of the Owner. If allowed, discharge the chlorinated water at a low rate so it does not surcharge the sewer line.

3.06 BACTERIOLOGICAL TEST

- A. Instruct bacteriological laboratory to collect water samples no sooner than 24 hours after start of disinfection of each facility.
- B. A minimum of 24 hours after flushing system and within 24 hours before the water main is placed in service, collect bacteriological quality samples at each of following locations and other locations in accordance with the submitted disinfection test plan and Standard Methods for the Examination of Water and Wastewater:
 - 1. Where water enters system.

2. Inlet piping.
 3. Ends of piping runs.
 4. Drain lines.
 5. Remote outlets.
 6. Tanks.
- C. Analyze water samples in accordance with Standard Methods for Examination of Water and Wastewater.
- D. When bacteriological test proves water quality to be unacceptable, repeat disinfection treatment process until water meets quality standards for disinfection.

END OF SECTION

SECTION 02551

TEMPORARY ISOLATION PLUG

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
- B. Section includes: Tapping, sleeves and installation for mechanical plug (also referred to as “linestop”) deployment in pipelines with diameters equal to or greater than 30 inches.
- C. The Work under this section consists of providing labor, materials, tools, equipment, and services required to install and test tapping sleeves, tapping valves and plug existing pipeline as indicated on the Contract Drawings and as specified within this Section to allow temporary plugging of pipeline.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME).
- B. American Water Works Association (AWWA):
 - 1. C213 - Fusion-Bonded Epoxy Coating and Linings for the Interior and Exterior of for Steel Water Pipelines and Fittings.
 - 2. Manual M11 for Steel Water Pipe: - A Guide for Design and Installation.
- C. ASTM International (ASTM):
 - 1. A36 – Standard Specification for Carbon Structural Steel.
 - 2. A285 - Standard Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength.
 - 3. D2000 - Standard Classification System for Rubber Products in Automotive Applications.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.
- B. Experience summary and references for specialty contractor to perform work.
- C. Submit qualifications and certificate from equipment manufacturer certifying operators are qualified to operate manufacturer’s hot tap and plugging equipment.
- D. Product data: Description of tapping valves/plugging procedure and equipment to be used. Identify any special procedures required during and or after tapping procedure for the specified pipe material being tapped.

- E. Shop drawings for tapping saddle, completion plug, tapping valves, blind flange, and associated appurtenances.
- F. Execution plan:
 - 1. Identify excavation size and clearances required.
 - 2. Schematic of deployed equipment and plan for securing the excavation while plug is installed.
 - 3. Tapping procedure to retain coupon.
 - 4. Information, including any required calculations showing how components will be supported without bearing on existing pipes.
- G. Monitoring and emergency removal plan including removal time and number of personnel required.
 - 1. Contact information for staff who will operate linestop and be available 24 hours per day, 7 days a week, in the event that the linestop needs to be opened prior to disassembly.

1.04 QUALITY ASSURANCE

- A. Contractor's qualifications:
 - 1. Tapping and plug deployment work shall be performed by a specialty contractor that has successfully performed 48-inch diameter and larger hot taps and plugs on past projects.
 - 2. On-site field technician shall have a minimum 5 years of experience with performing hot tap/plug deployment.
 - 3. Submit list of at least 3 separate, qualifying projects completed within the last 10 years that include the satisfactory set-up, operation, and maintenance of a plugging system.

PART 2 PRODUCTS

2.01 TAPPING SLEEVE

- A. Manufacturers: One of the following or equal:
 - 1. JCM Industries, Model 442.
 - 2. Romac Model 420.
- B. Sleeve shall consist of segments that bolt together on the pipe, 1 segment incorporates a sealing gasket around the nozzle opening to seal against the pipeline.
 - 1. Segments of the sleeve shall be fabricated to accurately conform to the outside diameter of the host pipe and to provide reinforcement.
 - 2. The sleeve shall be in accordance with AWWA Manual M11 for Steel Water Pipe - A Guide for Design and Installation.
- C. Body: Minimum 1/2-inch thick ASTM A285 Grade C or ASTM A36 Carbon Steel.
- D. Nozzle:
 - 1. Diameter: 30 inches.

- 2. Flange: ASME 150 pounds drilling, carbon steel.
- 3. Testport: 3/4-inch NPT.
- E. Hardware: Type 304 (18-8) stainless steel.
- F. Finish: Fusion-bonded epoxy coating in accordance to AWWA C213.
- G. Gasket:
 - 1. EPDM. Molded rubber with a pressure activated hydro mechanical design.
 - 2. Gasket is bonded into a cavity for internal and external retention.
- H. Temporary isolation valve: in accordance with plug manufacturer requirements.
- I. Bleed tap: 12-inch tap with AWWA gate valve and plug on side of fitting to confirm isolation, to bleed air from system and to equalize pressure.

2.02 DESIGN AND PERFORMANCE REQUIREMENTS – PLUGGING SYSTEM

- A. The plugging system shall have the capability to plug the pipeline and be left in place without requiring continuous monitoring. The plug must be capable of removal and reinsertion as needed.
- B. Tapping sleeve, valve and plugging system shall be designed at 150 percent of the operating pressure of the pipeline.
- C. The means and methods of accomplishing and maintaining the plugging system and associated facilities is the sole responsibility of the Contractor.
- D. Plugging equipment may not bear upon the existing pipe or joints.
 - 1. Support plan must be provided to transfer loads if necessary.
- E. Contractor shall be liable for cleanup, damages, and resultant fines in the event of spills, leaks or backups associated with the plugging system, which includes commissioning, operation, and decommissioning of the plugging system.
- F. Contractor will need to field verify pipe diameter or provide plan for tapping and plugging pipe without detailed dimension.
- G. Plug must be capable of removal within 1-hours of notice to remove in the case of bypass failure. Equipment and staff must be available to meet this removal requirement 24-hours a day/ 7-days a week during plug deployment.
- H. Contractor shall coordinate the temporary line plug with the bypass pumping plan as specified in Section 02552 - Temporary Bypass Piping.
- I. Existing pipe information:
 - 1. Pipe: 30-inch and 48-inch steel.
 - 2. Pipe material: CML&C (to be verified by Contractor).
 - 3. Nominal Inner diameter approximate: 30 and 48-inches.
 - 4. Outer diameter, approximate: 34 and 52- inches.
 - 5. Maximum operating pressure: 100 pounds per square inch.

6. Maximum velocity at time of plugging: 6 foot per second.
7. Contents: Chloraminated potable water.

2.03 PLUGGING MACHINERY

- A. Furnish folding-head plug capable of pressure tight seal against inside diameter of existing pipe designed at 150 percent the operating pressure of the pipeline.
- B. Plugging mechanism is advanced and retracted from the pipeline by means of hydraulic or mechanical actuator.
- C. When retracted the plug head is housed in pressure-tight chamber between the actuator and tapping valve.
- D. Plug shall be capable of displacing accumulated grit deposits in interior of the pipe while advancing to its final position and have molded rubber or polyurethane sealing element around its perimeter and supply workable seal with interior diameter when fully advanced.
- E. The tapping procedure to retain the coupon shall be presented at time of submittal.
- F. The equipment shall be folding-type assembly to allow for a reduced entry hole instead of a full size cut to retain the pipe stability.
- G. Installer shall provide means to address sealing issues caused by out-of-round and pipe imperfections.

PART 3 EXECUTION

3.01 GENERAL

- A. Upon providing the required advance notice to the Owner and receiving authorization,
- B. Contractor shall excavate the existing pipe at the proposed tap locations prior to ordering the tapping sleeve or saddle.
- C. Contractor shall fully expose the pipe within the limits of the proposed tapping sleeve or saddle and shall verify the type of existing pipe, the outside diameter, roundness, joint length and condition of the pipe on which the tapping sleeve/saddle is to be installed.
- D. If any existing joint, fitting, tap, or other obstruction is located at the proposed tap location, the Contractor shall coordinate with the Engineer to determine the appropriate adjustment to the proposed tap location.

- E. All equipment and materials that may come into contact with the pipeline contents, shall first be disinfected in accordance with AWWA standards and as specified in the Contract Documents.
- F. Temporary bypass piping shall be installed, as schematically indicated on the Drawings. Piping and valves shall be 30" diameter. Adequately restrain all piping to prevent movement.

3.02 INSTALLATION

- A. Operating conditions (e.g. flow rates, operating pressure, etc.) shall be confirmed with the Owner or Engineer prior to ordering materials. Equipment and methods used to perform the tap shall be appropriate for the operating conditions.
- B. Install the sleeve and valve in strict accordance with the manufacturers' instructions and requirements of the Contract Documents.
 - 1. Tapping sleeve/saddle outlets shall be installed vertical.

3.03 FIELD QUALITY CONTROL

- A. Perform a hydrostatic test of the tapping sleeve and valve assembly after installation of the tapping sleeve and valve, but prior to making the tap.
 - 1. Test to a pressure equal to 1.5 times the maximum operating pressure.
 - 2. Test duration: 2 hours.
- B. Bolts and nuts shall be kept clean and shall be handled carefully.
 - 1. Bolts and nuts shall be kept free of nicks and shall not be tossed or thrown. Bolts/nuts shall not be over-torqued.
 - 2. Stainless steel bolts and nuts shall be assembled with an anti-seize coating to prevent galling.

END OF SECTION

SECTION 02553

TEMPORARY BYPASS PIPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for temporary bypass piping for potable water, as needed to complete the Work.

1.02 GENERAL REQUIREMENTS

- A. Provide all necessary labor, tools, materials, and supervision to provide temporary bypass piping and valves in accordance with the requirements of this Section.
- B. Operate and maintain bypass piping facilities including, but not limited to, piping, valves, and monitoring until the involved portion(s) of the Work have been completed to the satisfaction of the Engineer.
- C. Bypassing potable water in a way that ensures that no water is allowed to leak outside of the bypass system.
- D. Coordinate the placement of the bypass piping and pumping equipment with the Owner.
- E. The means and methods of accomplishing and maintaining the temporary bypass pumping and associated facilities shall be the sole responsibility of the Contractor.
- F. Except as otherwise specified or authorized in writing, no interruption of water flow shall be permitted throughout the duration of the project.
- G. Take precautions to prevent any potential spillage of chloraminated water from entering the stormwater system. All discharges must be dechlorinated prior to entering the stormwater system.
- H. Temporary bypass pumping operation:
 - 1. Limited to the days and times indicated, unless approved in writing by the Engineer.
 - 2. Continuous operation for 24 hours per day and 7 days per week is anticipated during the period of Work.
- I. Monitor temporary bypass piping.
- J. Upon completion of bypass operation, remove all temporary components and restore area to pre-Work conditions.

1.03 SUBMITTALS

- A. Prepare and submit a project-specific bypass piping plan with completed potable water bypass piping checklist.
 - 1. Be advised that the bypass plan must provide accessibility for plant operators and vehicular traffic in accordance with Owner requirements.
- B. Potable water bypass piping plan: Include the following at a minimum:
 - 1. Alignment and points of connection
 - 2. Pipe, fittings, and valves materials, joints, details
 - 3. Disinfection plan
 - 4. Pipe thrust and restraint types, sizes, and locations.
 - 5. Temporary pipe supports and anchoring required.
 - 6. Schedule that shows duration of temporary bypass including milestones for installation, maintenance, and removal of equipment and accessories.
 - 7. Means and methods of installing, operating, monitoring, and maintaining the temporary bypass.
 - 8. Address access for plant operators and vehicular traffic.
 - 9. Mechanical plan showing equipment, valves, pipe sizes and locations, pipe materials, dimensions, vehicle access (where applicable), plant operator access (where applicable).
 - 10. Proposed type and location of linestops.
 - 11. Catalog cutsheets for, pipe and fittings, valves, other equipment.
 - 12. Emergency response plan.
 - 13. Monitoring plan.

1.04 QUALITY ASSURANCE

- A. Contractor's qualifications:
 - 1. Minimum 5 years of experience in performing substantially similar temporary bypass operations.
 - 2. Submit evidence of satisfactory operation of temporary bypass facilities similar to those specified in at least 5 separate projects in accordance with the specifications, including references.
- B. Fulfillment of the specified experience requirements shall be a condition of acceptance.

PART 2 PRODUCTS

2.01 CAPACITY

- A. Pumps, piping and accessories: Of adequate capacity and size to handle the range of wastewater flows from minimum flow to peak flow.
- B. Piping, fittings, and all accessories shall withstand 100 psi.

- C. Maintain sufficient on site equipment and materials to ensure continuous and successful operation of the bypass system.
 - 1. Maintain on site a sufficient number of valves, tees, elbows, connections, tools, pipe plugs, piping, and other parts or system hardware to ensure immediate repair or modification of any part of the bypass system as necessary.

2.02 BYPASS PIPING

- A. Use HDPE, ductile iron, or steel piping for the temporary bypass system.
- B. Piping integrity: 0 leakage:

PART 3 EXECUTION

3.01 GENERAL

- A. Notify the Owner and Engineer a minimum of 14 days prior to the Work and notify the Engineer at least 24 hours prior to bypassing or diverting flow
- B. Before taking pipeline out of service, verify that bypass system is fully operational and acceptable to Engineer.

3.02 PROTECTION

- A. Be responsible for all bypass flows:
 - 1. Inspect the entire bypass pumping and piping system for leaks or spills at a frequency of not less than 2 times per day, including weekends and holidays.
 - 2. Do not shutdown the temporary bypass system between shifts, on holidays or weekends, or during work stoppages without written permission from the Engineer.
- B. Provide trained and qualified attendants to monitor the bypass until it is no longer required. The attendants shall:
 - 1. Be capable of performing piping maintenance required.
 - 2. Have cellular phones for communication with the Contractor and the Owner in the event of emergencies.
- C. Implement measures to prevent interference between plant staff and the bypass system.
- D. Take precautions to protect all bypass lines from damage.
 - 1. Clearly identify above ground portions of the bypass lines by flashers, fencing, or other means to warn of their presence.
- E. Protect existing pipes, including coatings. Repair any damage to existing pipes to pre-Work conditions.

3.03 FIELD QUALITY CONTROL

- A. Hydrostatic pressure test:
 - 1. Prior to operation, test each section of discharge piping with maximum pressure equal to 1.5 times the maximum operating pressure.
 - 2. Conduct test for a duration of 2 hours.
 - 3. Test using chloraminated potable water.
 - 4. Disinfect and perform bacteria test per Section 01757 – Disinfection.
 - 5. Place the line in service after test if the pressure has been maintained and there are no observable leaks, and negative bacteria tests have been received.
 - 6. Notify Engineer at least 24 hours prior to testing.
- B. Inspection:
 - 1. Inspect temporary bypass piping system at a minimum of every 12 hours.
 - 2. Inspection log: Update after each inspection and provide to Engineer upon request.

3.04 CLEAN-UP

- A. Disturbed areas: Upon completion of bypass operation, clean disturbed areas, restoring to original condition, including turf restoration, at least equal to that which existed prior to start of Work.

3.05 SYSTEM CONDITIONS

- A. Maximum operating pressure = 100 psi.
- B. Minimum diameter = 30 inches.

END OF SECTION

SECTION 09960

HIGH-PERFORMANCE COATINGS

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ATTACHMENT A - SCHEDULE OF SURFACES TO BE COATED

ATTACHMENT B - COATING DETAIL SHEETS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Coatings, including coating systems, surface preparation, application requirements, and quality control requirements.

1.02 REFERENCES

- A. ASTM International (ASTM):
1. D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 2. D2200 – Standard Practice for Use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces.
 3. D3359 - Standard Test Methods for Rating Adhesion by Tape Test.
 4. D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 5. D4262 - Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
 6. D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 7. D4285 - Standard Test Method for Indicating Oil or Water in Compressed Air.
 8. D4414 - Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
 9. D4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast-Cleaned Steel.
 10. D4541 - Standard Test Methods for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 11. D4787 - Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates.
 12. D5162 - Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates.
 13. D7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
 14. E337 - Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures).
 15. F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 16. F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes.
- B. International Concrete Repair Institute (ICRI):
1. 310.2 - Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.
- C. NACE International (NACE):
1. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
 2. SP0188 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.

- D. National Association of Pipe Fabricators (NAPF):
 - 1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings.
- E. NSF International (NSF):
 - 1. 61 - Drinking Water System Components - Health Effects.
- F. Occupational Safety and Health Administration (OSHA).
- G. Society of Protective Coatings (SSPC):
 - 1. Glossary - SSPC Protective Coatings Glossary.
 - 2. Guide 6 - Guide for Containing Surface Preparation Debris Generated during Paint Removal Operations.
 - 3. Guide 15 - Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates.
 - 4. PA 1 - Shop, Field, and Maintenance Painting of Steel.
 - 5. PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements.
 - 6. PA 9 - Measurement of Dry Coating Thickness Using Ultrasonic Gages.
 - 7. QP 1 - Standard Procedure for Evaluating the Qualifications of Industrial/Marine Painting Contractors.
 - 8. SP 1 - Solvent Cleaning.
 - 9. SP 3 - Power Tool Cleaning.
 - 10. SP 5 - White Metal Blast Cleaning.
 - 11. SP 10 - Near-White Metal Blast Cleaning.
 - 12. SP 11 - Power Tools Cleaning to Bare Metal.
 - 13. SP 13 - Surface Preparation of Concrete.
 - 14. SP 16 - Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals.
 - 15. SP COM - Surface Preparation Commentary.
 - 16. SP VIS 1 - Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning.
 - 17. SP WJ-1 - Waterjet Cleaning of Metals -- Clean to Bare Substrate.
 - 18. SP WJ-2 - Waterjet Cleaning of Metals -- Very Thorough Cleaning.
 - 19. SP WJ-3 - Waterjet Cleaning of Metals -- Thorough Cleaning.
 - 20. SP WJ-4 - Waterjet Cleaning of Metals -- Light Cleaning.

1.03 DEFINITIONS

- A. Definitions used in this Section are in accordance with definitions referenced in ASTM D16, ASTM D3960, and SSPC Glossary of Definitions.
- B. Specific definitions:
 - 1. Abrasive: Material used for blast cleaning, such as sand, grit, or shot.
 - 2. Abrasive Blast Cleaning: Cleaning/surface preparation by abrasive propelled at high speed.
 - 3. Anchor Pattern: Profile or texture of prepared surface(s).
 - 4. Biogenic Sulfide Corrosion: Corrosion caused by sulfuric acid formed when *Thiobacillus* bacteria metabolizes hydrogen sulfide.

5. Bug Holes: Small cavities resulting when air bubbles are entrapped in the surface of formed concrete during placement and consolidation.
6. System: Protective film with 1 or more coats applied in a predetermined order, including surface preparation and quality control requirements.
7. Coating/Paint/Lining Thickness: Total thickness of primer, intermediate, and/or finish coats after drying or curing.
8. Dew point: Temperature a given air/water vapor mixture starts to condense.
9. Drying Time: Time interval between application and material curing.
10. Dry to Recoat: Time interval between material application and its ability to receive the next coat.
11. Dry to Touch: Time interval between material application and its ability to tolerate a light ouch without coating damage.
12. Exposed Surface: Any indoor or outdoor surface not buried or encased.
13. Feather Edging: Reducing coating thickness at its edge to blend with existing surrounding coating.
14. Feathering: Tapering off a wet edge with a comparatively dry brush.
15. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.
16. Field Coat: Application of a surface coating system at the work site.
17. Finish Coat: Final coat in a paint system, including texture, color, smoothness of surface, and other properties affecting appearance.
18. Hold Point: A defined point, specified in this Section, at which work shall be halted for inspection.
19. Holiday: A discontinuity, skip, void, or pinhole in coating or coating system film that exposes the substrate.
20. Honeycomb: Segregated and porous surface of hardened concrete due to insufficient consolidation.
21. Hydroblast: High or ultra-high-pressure water jet surface preparation.
22. Incompatibility: One coating's inability to overlay another coating or surface as evidenced by bleeding, poor bonding, or lifting of old coating; inability of a coating to bond to a substrate.
23. Immersed/Immersion: A service condition in which substrate is submerged, is immediately above liquids, or is subject to frequent wetting, splashing, or washdown.
24. Laitance: A thin, weak, brittle layer of cement and aggregate fines on a concrete surface.
25. Mil: 0.001 inch.
26. Overspray: Dry spray, particularly paint bonded to an unintended surface.
27. Pinhole: A small diameter discontinuity in a coating or coating system film, created by offgassing from a void in a concrete or masonry substrate causing a void between coats or exposing the substrate. Usually caused by coating application while temperature is rising.
28. Pot Life: Time interval after components are mixed and coating can be satisfactorily applied.
29. Prime Coat: First full paint coat applied to a surface when using a multicoat system. Primers adhere to a new substrate, protect the substrate, and promote adhesion of subsequent coats of paint. The prime coat on metal surfaces is the first full coat and does not include solvent wash, grease emulsifiers, or other pretreatment applications.

30. Resurfacer/Resurfacing Material: A layer of cementitious and/or resin-based material used to fill or otherwise restore surface continuity to worn or damaged concrete surfaces.
31. Shelf Life: Maximum storage time a material may be stored without losing its usefulness.
32. Shop Coat: 1 or more coats applied in an off-site shop or plant before shipment to work site where field or finishing coat(s) are applied.
33. Spreading Rate: Area covered by a unit volume of paint at a specific thickness.
34. Stripe Coat: A separate brush coat of paint applied to all weld seams, pits, nuts/bolts/washers, and edges. This coat shall not be applied until previous coats have cured. Once applied, the coat shall be allowed to cure before subsequent coats are applied.
35. Tie Coat: An intermediate coat that bonds different types of paint material, improving succeeding coat adhesion.
36. Thick Film Coating System: A coating system applied with a minimum dry film thickness of 25 mils.
37. Touch-Up Painting: Application of paint on previously painted surfaces to repair marks, scratches, and deteriorated or damaged areas to restore the appearance and performance of the coating.
38. Water Blast: An alternative to air abrasive blast cleaning that can be used with or without abrasive injection. Water cleaning at pressures up to 5,000 pounds per square inch is called low-pressure water cleaning or power washing. High-pressure water cleaning uses water pressures between 5,000 and 10,000 pounds per square inch. Water jetting is water blasting with added abrasive at pressures between 10,000 and 25,000 pounds per square inch. Ultra-high-pressure water jetting is water blasting at pressures above 25,000 pounds per square inch.
39. Weld Splatter: Beads of non-structural weld metal that adhere to the surrounding surface, removed as part of surface preparation.

1.04 ABBREVIATIONS

- A. CSM - Coating System Manufacturer.
- B. CMU - Concrete Masonry Units.
- C. CSA - Coating System Applicator. Specialty subcontractor retained by the Contractor to install the coating systems specified in this Section.
- D. CTR - Coating System Manufacturer's Technical Representative.
- E. DFT - Dry-Film Thickness. Thickness of cured film, usually expressed in mils (0.001 inch).
- F. SSD - Surface Saturated Dry. Refers to concrete surface condition where the surface is saturated (damp) without the presence of standing water.
- G. TPC - Technical Practice Committee.

- H. VOC - Volatile Organic Compound. Portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing; expressed in grams per liter (g/l) or pounds per gallon (lb/gal). VOC is determined by EPA Method 24.
- I. WFT - Wet Film Thickness. Coating thickness as measured immediately after application. Usually expressed in mils (0.001 inch).

1.05 SUBMITTALS

- A. As specified in Section 01330 - Submittal Procedures, submit the following:
 - 1. Schedule of proposed coating materials.
 - 2. Schedule of surfaces to be coated with each coating material.
 - 3. Dehumidification and heating plan.
 - 4. Product data:
 - a. Physical properties of coatings, including the following:
 - 1) Solids content.
 - 2) Ingredient analysis.
 - 3) VOC content.
 - 4) Temperature resistance.
 - 5) Typical exposures and limitations.
 - 6) Manufacturer's standard color chips.
 - b. Compliance with regulatory requirements:
 - 1) VOC limitations.
 - 2) Lead compounds and polychlorinated biphenyls.
 - 3) Abrasives and abrasive blast cleaning techniques and disposal.
 - 4) Methods for tenting blasting areas and methods to protect existing equipment from dust and debris.
 - 5) NSF certification of coatings for potable water supply systems.
 - c. CSM's current printed recommendations and product data sheets for coating systems, including:
 - 1) Surface preparation recommendations.
 - 2) Primer type.
 - 3) Maximum dry and wet-mil thickness per coat and number of coats.
 - a) Coating Coverage Worksheets.
 - 4) Minimum and maximum curing time between coats, including atmospheric conditions for each.
 - 5) Curing time before submergence in liquid.
 - 6) Thinner to be used for each coating.
 - 7) Ventilation requirements.
 - 8) Minimum and maximum atmospheric conditions during which the paint shall be applied.
 - 9) Allowable application methods.
 - 10) Maximum allowable substrate moisture content.
 - 11) Maximum shelf life.
 - 12) Requirements for transportation and storage.
 - 13) Mixing instructions.
 - 14) Shelf life.
 - 15) Material Pot life.
 - 16) Precautions for applications free of defects.
 - 17) Method of application.

- 18) Drying time of each coat, including prime coat.
- 19) Compatible prime coats.
- 20) Limits of ambient conditions during and after application.
- 21) Required protection from sun, wind, and other conditions.
- 22) Touch-up requirements and limitations.
- 23) Minimum adhesion of each system submitted in accordance with ASTM D4541 and ASTM D7234.
- d. Samples: Include 8-inch square drawdowns or brushouts of topcoat finish when requested. Identify each sample as to finish, formula, color name and number, sheen name, and gloss units.
- e. Affidavits signed by an officer of the CSM's corporation attesting to full compliance of each coating system component with current federal, state, and local air pollution control regulations and requirements.
- f. List of cleaning and thinner solutions allowed by the CSMs.
- g. Storage requirements, including temperature, humidity, and ventilation for Coating System Materials as recommended by the CSMs.
- h. Thick film coating systems (greater than 25 mils):
 - 1) CSM's detailed written instructions for coating system treatment and graphic details for coating system terminations in coated structures, including pipe penetrations, metal embedments, gate frames, and other terminations encountered.
 - 2) Include detail treatment for coating system at concrete joints.
 - 3) Manufacturer's Representative's (CTR) Field Reports.
- 5. Quality assurance submittals:
 - a. Quality assurance plan.
 - b. Qualifications of CSA, including:
 - 1) List of Similar Projects.
 - a) Name and address of project.
 - b) Year of installation.
 - c) Year placed in operation.
 - d) Point of contact: Name and phone number.
 - 2) Provide a minimum of 5 project references, each including contact name, address, and telephone number where similar coating work has been performed by their company in the past 5 years.
 - c. CSA Reports:
 - 1) Written daily quality control inspection reports.
 - d. CTR Reports:
 - 1) Reports on visits to project site to view and approve surface preparation of structures to be coated.
 - 2) Reports on visits to project site to observe and approve coating application procedures.
 - 3) Reports on visits to coating plants to observe and approve surface preparation and coating application on shop-coated items.

1.06 QUALITY ASSURANCE

- A. CSA qualifications:
 - 1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work:
 - a. Provide qualifications of applicator and references listing 5 similar projects completed in the past 5 years.
 - 2. SSPC QP 1 certified.
 - 3. Manufacturer-approved applicator when manufacturer has approved applicator program or when required in these specifications.
- B. CTR qualifications:
 - 1. Certification, one of the following:
 - a. NACE Level 2 or 3 Certified Coating Inspector.
 - b. SSPC Level 3 Protective Coatings Inspector.
 - 2. Minimum of 5 years of experience evaluating application of manufacturer's coatings under conditions similar to those of the Work:
 - a. Provide CTR qualifications and references listing 5 similar projects completed in the past 5 years.
- C. Regulatory requirements: Comply with governing agencies' regulations by using coatings conforming to their VOC limits.
 - 1. Lead-based coatings are not permitted.
 - 2. Do not use coal-tar epoxy in contact with drinking water or exposed to ultraviolet radiation.
- D. Pre-installation conference: Conduct as specified in Section 01312 - Project Meetings.
 - 1. Coordinate Hold Point schedule
- E. Obtain approval before coating other surfaces. Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
- F. CSM services:
 - 1. CSA shall arrange for CTR to attend pre-installation conference.
 - 2. Visit the project site periodically to consult on and inspect specified surface preparation and application Hold Points.
 - 3. CTR shall provide written inspection reports.
- G. Quality control requirements:
 - 1. Contractor shall be responsible for the workmanship and quality of the coating system installation.
 - a. Inspections by Owner, Engineer, CSA, or CTR will not relieve or limit Contractor's responsibilities.
 - 2. Conform to this specification's requirements and the standards referenced in this Section. Changes in the coating system application requirements will be allowed only with the Engineer's written acceptance.

3. Specially trained crews with experience applying the specified coating system coating are required for:
 - a. Coating application using plural component spray equipment or other specialty equipment.
 - b. Coating with specialty linings for severe service conditions, including floor coatings, and with linings for corrosive headspaces or secondary containment areas.
4. CTR shall specially train personnel for coating systems as specified in Attachment B - Coating Detail Sheets.
 - a. CSM shall approve personnel in writing applying the coating system.
5. Do not use contaminated, outdated, diluted materials, and/or materials from previously opened containers.
6. Conduct and continually inspect work so the coating system is installed as specified. The CSM shall provide written directions to correct coating work not conforming to the specifications or is otherwise unacceptable.
7. Provide written daily reports summarizing test data, work progress, surfaces covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system application.
 - a. Determine relative humidity in accordance with ASTM E337. Confirm other conditions, such as proper protective measures for surfaces not to be coated and safety requirements for personnel.
 - 1) Measure daily at shift's beginning and end and at intervals not to exceed 4 hours during the shift.
 - 2) Determine the acceptability of weather and/or environmental conditions within the structure in accordance with the CSM's requirements.
 - b. Monitoring surface preparation: Spot check cleanliness, surface profile, and surface pH testing at least 3 times daily. Check each surface at least once. In accordance with:
 - 1) ASTM D4262.
 - 2) ASTM D4263.
 - 3) ASTM D4417.
 - 4) ICRI 310.2 requirements.
 - 5) SSPC Surface Preparation Standards.
 - c. Confirm that compressed air used for surface preparation or blow-down cleaning is free of oil and moisture.
 - d. Monitor surface preparation daily at shift's beginning and end and at intervals not to exceed 4 hours during the shift.
 - e. Do not apply coatings when environmental conditions are outside of the CSM's published limits.
 - f. Monitoring coatings application: Continuously inspect, measure, and record the wet film thickness and general film quality (visual inspection) for runs, sags, pinholes, holidays, etc. during coating.
 - 1) Perform WFT measurements in accordance with ASTM D4414.
 - g. Post cure evaluation: Measure and inspect the overall dry film thickness on all surfaces. Conduct a DFT survey and perform adhesion testing, holiday detection, or cure testing as required in this Section and/or the CSM's written instructions. Perform all applicable tests in accordance with ASTM D4541, ASTM D4787, ASTM D5162, ASTM D7234, SSPC-PA 1,

SSPC-PA 2, SSPC-PA 9, and other pertinent standards and recommended practices.

- H. Inspection at Hold Points:
 - 1. Conduct inspections at Hold Points during the coating system application and record the results.
 - 2. Coordinate Hold Points with the Engineer so the Engineer can observe Contractor's inspections on a scheduled basis.
 - 3. Provide the Engineer a minimum of 24 hours of notice before conducting Hold Point Inspections.
 - 4. Hold Points shall be as follows:
 - a. At the beginning of coating system application, measure, record, and confirm acceptability of surface and ambient air temperature and humidity. Inspect applicator's equipment for serviceability and suitability for coatings application. Observe conditions during the Pre-application Meeting.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as specified in Section 01600 - Product Requirements.
- B. Immediately remove unspecified and unapproved coatings from Project site.
- C. Deliver new labeled, unopened containers:
 - 1. Do not deliver materials after manufacturer's expiration date or over 12 months from manufacturing date, whichever is more stringent. Store materials in well-ventilated enclosed structures and protect from weather and excessive heat or cold in accordance with the CSM's recommendations.
 - a. Store flammable materials in accordance with federal, state, and local requirements.
 - b. Store rags and cleanup materials appropriately to prevent fire and spontaneous combustion.
 - 2. Store and dispose of hazardous waste in accordance with federal, state, and local requirements. This requirement specifically applies to waste solvents and coatings.
 - 3. Container labels shall show the following:
 - a. Brand name or product title.
 - b. CSM's batch number.
 - c. CSM's manufacture date.
 - d. CSM's name.
 - e. Generic material type.
 - f. Application and mixing instructions.
 - g. Hazardous material identification label.
 - h. Shelf life expiration date.
 - i. Color.
 - j. Mixing and reducing instructions.
 - 4. Clearly mark containers to indicate safety hazards associated with the use of or exposure to materials.

1.08 PROJECT CONDITIONS

- A. Apply coatings to dry surfaces.
 - 1. Surface moisture: Comply with manufacturer's requirements or as specified in this Section.
- B. Do not apply coatings when the following conditions exist. If such conditions exist, provide containment, covers, environmental controls, and other necessary measures.
 - 1. During rainy, misty, or damp weather, or to surfaces with frost or condensation.
 - 2. When the surface temperature is below 10 degrees Fahrenheit above the dew point.
 - 3. When ambient or surface temperature:
 - a. Is less than 55 degrees Fahrenheit unless manufacturer allows a lower temperature.
 - b. Is less than 65 degrees Fahrenheit for clear finishes, unless manufacturer allows a lower temperature.
 - c. Exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
 - d. Exceeds manufacturer's recommendation.
 - 4. When relative humidity is higher than 85 percent.
 - 5. Under dusty or adverse environmental conditions.
 - 6. When light on surfaces measures less than 15 foot-candles.
 - 7. When wind speed exceeds 15 miles per hour.
- C. Apply coating only under evaporation conditions rather than condensation.
 - 1. Use dehumidification equipment, fans, and/or heaters inside enclosed areas to maintain required atmospheric and surface temperature requirements for proper coating application and cure.
 - 2. Measure and record relative humidity and air and surface temperatures at the start and end of each shift to confirm proper humidity and temperature levels inside the work area.
 - a. Submit test results.
- D. Systems:
 - 1. Site electrical power availability as specified in Section 01500 - Temporary Facilities and Controls.
 - 2. Internal combustion engine generators may be used.
 - a. Obtain required permits and provide air pollution and noise control devices on equipment as required by permitting agencies require.
 - b. Comply with state, federal, and local fire and explosion protection measures when locating and operating generator.
 - c. Locate engine generator outside hazardous classified areas per NFPA 820.
 - d. Provide daily fuel service for generator for duration of use.
 - 3. Design and submittals:
 - a. Prepare and submit dehumidification and heating plan, including all equipment and operating procedures.
 - b. Suppliers of services and equipment shall have at least 3 years of experience in similar applications.

1.09 MAINTENANCE

- A. Provide table of products applied organized by surface type. List coating manufacturer, color, color formulation, distributor name, telephone number, and address.

1.10 CTR RESPONSIBILITIES

- A. General:
 - 1. Attend pre-installation conference.
 - 2. Perform onsite application training.
 - 3. Periodically inspect coating system application.
- B. Coating system installation training:
 - 1. Provide a minimum of 1 hour of on-site training for application personnel and supervisory personnel in one of the following ways:
 - a. Train a minimum of 1 supervisory personnel and 1 application personnel.
 - b. Submit a letter from the CSM stating that CSM approves the supervisory and application personnel, listed by name and responsibility, and no additional training is required.
 - 2. Minimum training requirements:
 - a. Explain in detail the mixing, application, curing, and termination requirements.
 - b. Provide hands-on demonstration of coating system mixing.
 - c. Explain in detail the ambient condition requirements for temperature and humidity.
 - d. Explain in detail the surface preparation requirements.
 - e. Explain in detail the re-coat times, cure times, and related ambient condition requirements.
 - f. Write a letter stating that training was satisfactorily completed by the personnel, listed by name and responsibility.
 - 3. Provide special training as specified in the Coating Detail Sheets.
- C. Coating system inspection:
 - 1. CTR inspection is in addition to the CSA's inspection as specified in this Section.
 - 2. Be on-site to oversee:
 - a. Coating application at least once a week.
 - b. End of surface preparation.
 - c. During coating application.
 - d. Post-cure inspection.
 - 3. Routinely inspect and verify in writing that application personnel have successfully performed surface preparation, filler/surfacer application, coating system application, and Quality Control Inspection in accordance with this Section and to warrantable quality.
 - 4. Perform the following activities to confirm conformance with the specifications:
 - a. Inspect ambient conditions during coating system installation at Hold Points for conformance with the specified requirements.
 - b. Inspect each coated surface type and coating system applied to verify the following:
 - 1) Cleanliness.

- 2) Surface pH for concrete substrates.
 - 3) Confirm surface preparation of substrates where coating system will terminate or will be applied for conformance to the specified application criteria.
 - c. Verify surface profile of substrates by completing the following:
 - 1) Inspect preparation and application of coating detail treatment at terminations, transitions, metal embedments in concrete, and joints and cracks in substrates.
 - 2) Inspect application of filler/surfacer materials for concrete and masonry substrates.
 - 3) Verify proper mixing of coating materials.
 - 4) Inspect application of primers and finish coats, including wet and dry film thickness.
 - 5) Inspect coating systems for proper cure times and conditions.
 - d. Review adhesion testing of cured coating systems.
 - e. Review coating system continuity testing.
 - f. Inspect and record representative-localized repairs.
 - g. Conduct final review of completed coating system installation.
 - h. Prepare and submit site visit reports after each site visit to document that the coating work is in accordance with the CSM's Recommendations.
- D. Final report:
- 1. Prepare a final report, after coating work ends, summarizing each day's test data, observations, drawings, and photographs. Include substrate conditions, ambient conditions, and application procedures observed during the CTR's site visits. Include a statement that completed work was performed in accordance with the requirements of the CSM's recommendations.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Coating materials shall be formulated for environments encountered in water treatment processes.
- B. Coating materials that come in contact with water distributed as potable water shall be certified in accordance with NSF 61.

2.02 MATERIALS

- A. General:
 - 1. Product requirements as specified in Section 01600 - Product Requirements.

2.03 COATING SYSTEMS IDENTIFICATION

- A. Naming Conventions: Coating Systems Identifications contain the elements defined in Table 1.

Table 1 - Coating System Identification Elements						
First Element	-	Second Element	-	Third Element	-	Fourth Element (optional)
3 or 4 alpha characters		1-3 alpha characters		1 number		3 or 4 alpha characters
Coating Type		Substrate		System Number		Additional Substrate or Special Condition
Example: EPX	-	C	-	6	-	BSC

- 1) First element identifies the coating type using the following abbreviations:
 - a) ACR: acrylic.
 - b) CTE: coal tar epoxy.
 - c) ELA: elastomeric acrylic.
 - d) EPU: epoxy-polyurethane.
 - e) EPX: epoxy.
 - f) POL: polyurethane.
 - g) SIL: silicone.
 - h) SILX: siloxane or silane.
 - i) VE: vinyl ester.
- 2) Second element identifies the substrate using the following abbreviations:
 - a) C: concrete or masonry.
 - b) F: concrete flooring.
 - c) FRP: fiber-reinforced plastic.
 - d) GM: galvanized metal.
 - e) M: metal.
 - f) PVC: polyvinyl chloride, chlorinated polyvinyl chloride.
- 3) Third element identifies the sequential system number.
 - a) For example, EPX-C-2 is the second standard epoxy coating system for concrete substrates.
- 4) Fourth element is optional and identifies the additional substrate or special condition with the following abbreviations:
 - a) PWS: Potable water service applications (NSF-61 approved).
 - b) BG: Below grade or buried.

2.04 PRODUCTS FOR COATING SYSTEMS

- A. Products: As specified in Attachment B - Coating Detail Sheets.
- B. Cleaning solvents:
 1. Requirements for solvent wash, solvent wipe, or cleaner used, including, but not limited to, those used for surface preparation in accordance with SSPC-SP 1:
 - a. Emulsifying type.
 - b. Containing no phosphates.
 - c. Biodegradable.
 - d. Does not damage zinc.
 - e. Compatible with the specified primer.
 - f. Complying with applicable air-quality control board requirements.
 2. Use clean white cloths and clean fluids in solvent cleaning.

PART 3 EXECUTION

3.01 GENERAL PROTECTION REQUIREMENTS

- A. Protect adjacent coated surfaces from coatings and damage associated with coating work. Repair damage resulting from inadequate or unsuitable protection.
- B. Use drop cloths and other coverings to protect adjacent surfaces not to be coated against spatter and droppings.
- C. Mask off surfaces of items not to be coated or remove items from area.
- D. Furnish and deploy sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being coated and, in particular, surfaces within storage and preparation areas.
- E. Place coating waste, cloths, and material that may pose a fire hazard in closed metal containers and remove daily from site.
- F. Remove electrical plates, surface hardware, fittings, and fasteners before coating application. Carefully store, clean, and replace items after completing coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finishes.
- G. Erect and maintain protective enclosures in accordance with SSPC- Guide 6.
- H. Protect the following surfaces from abrasive blasting by masking or by other means:
 - 1. Threaded portions of valve and gate stems, grease fittings, and identification plates.
 - 2. Machined surfaces for sliding contact.
 - 3. Surfaces to be assembled against gaskets.
 - 4. Surfaces of shafting where sprockets will be fit.
 - 5. Surfaces of shafting where bearings will be fit.
 - 6. Machined bronze surfaces, including slide gates.
 - 7. Cadmium-plated items, except cadmium-plated, zinc-plated, or sherardized fasteners used to assemble equipment requiring abrasive blasting.
 - 8. Galvanized items, unless scheduled to be coated.
- I. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by spent abrasive blast media, dust, or dirt entering such equipment.
- J. Schedule cleaning and coating to keep dust and spray from the cleaning process from falling on wet, newly coated surfaces.
 - 1. Whenever possible, coordinate with other trades and complete surface preparation and coating work before installing hardware, hardware accessories, nameplates, data tags, electrical fixtures, and similar uncoated items that will be in contact with coated surfaces. Mask machined surfaces, sprinkler heads, and other small items that will not be coated.

2. After completing coating, reinstall removed items.
3. Disconnect and move equipment adjacent to walls to clean and coat equipment and walls. Replace and reconnect equipment after coating.

3.02 GENERAL SURFACE PREPARATION REQUIREMENTS

- A. Prepare surfaces in accordance with CSM's instructions unless more stringent requirements are specified in this Section.
- B. Coating detail sheets in Attachment B - Coating Detail Sheets include additional surface preparation requirements.
- C. Follow more stringent requirement if information conflicts.

3.03 MECHANICAL AND ELECTRICAL EQUIPMENT PREPARATION

- A. Prepare and finish coat equipment primed by the manufacturer using specified intermediate and top coats, as applicable, and color selected by the Owner.
- B. Prepare, prime, and coat both insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are covered with material not requiring coating, or with a prefinished coating.
- C. Replace identification markings on mechanical or electrical equipment when coated over or spattered.
- D. Prepare and coat interior surfaces of air ducts and convector and baseboard heating cabinets visible through grilles and louvers with 1 coat of flat black paint to limit of sight line.
- E. Prepare and coat exposed conduit and appurtenances occurring in finished areas with color and texture to match adjacent surfaces.

3.04 CLEANING OF NEW AND PREVIOUSLY COATED OR NEW SURFACES

- A. Utilize cleaning agent to remove soluble salts, such as chlorides, from concrete and metal surfaces:
 1. Cleaning agent: Biodegradable non-flammable and containing no VOC.
 2. Manufacturers: The following or equal:
 - a. CHLOR*RID International, Inc.
 - 1) Complete soluble salt removal with steam or warm water cleaning.
 3. Test cleaned surfaces to ensure removal of soluble salts. Carry out additional cleaning as needed.
 4. Complete final surface preparation before applying new coating system in strict accordance with CSM's printed instructions.

3.05 BLAST CLEANING

- A. Surface preparation requirements:
 1. Do not reuse spent blast abrasive.

2. Ensure that filter compressed air used for blast cleaning is free of condensed water and oil. Clean moisture traps at least once every 4 hours or more frequently, as required, to prevent moisture from entering the abrasive blasting equipment air supply. Check blast air for moisture and oil after each cleaning in accordance with ASTM D4285.
 3. Install oil separators just downstream of compressor discharge valves and at the discharge point of blast pot discharges. Check separators on the same frequency as the moisture traps.
 4. Keep regulators, gauges, filters, and separators on compressor air lines to blasting nozzles operational at all times.
 5. Install an air dryer or desiccant filter drying unit to dry the compressed air before blast pot connections. Use and maintain the dryer throughout surface preparation work.
 6. Use a venturi-type, or other high velocity-type, abrasive blast nozzles supplied with at least 100 pounds per square inch gauge air pressure at the nozzle and enough volume to obtain appropriate blast cleaning production rates and surface cleanliness.
 7. Provide airborne particulate evacuation and filtering that meets OSHA safety standards. Maintain optimal visibility both to clean and provide the specified surface profile and to allow inspection of the substrate during surface preparation work.
 8. If prepared and cleaned metallic substrates become contaminated between final surface preparation work and coating system application, or if the prepared substrate darkens or changes color, re-clean by water blasting, or abrasive blast cleaning as appropriate until the specified degree of cleanliness is restored.
- B. Water jetting or water blasting:
1. Use water jetting or water blasting for recoating or relining where an adequate surface profile exists.
 2. Perform water jetting or water blasting in accordance with SP 13 and SSPC-WJ-1, WJ-2, WJ-3, WJ-4.

3.06 GENERAL PREPARATION REQUIREMENTS FOR METALLIC SURFACES

- A. Remove rust, scale, and welding slag and spatter.
1. Remove and grind smooth all excessive weld material and weld spatter on metal surfaces before blast cleaning in accordance with NACE SP0178, Appendix C, Level C.
 2. Grind sharp edges on metal substrate to approximately 1/16-inch radius before abrasive blast cleaning.
- B. Prepare metallic surfaces in accordance with applicable portions of surface preparation specifications of the SSPC specified for each coating system.
1. Remove grease and oil in accordance with SSPC-SP 1.
 2. Use solvent as recommended by the CSM.
 3. Measure profile depth of the surface to be coated in accordance with Method C of ASTM D4417. Contractor shall select blast particle size and gradation to produce the specified surface profile.
 4. Constantly monitor and maintain ambient environmental conditions to ensure cleanliness and that no "rust back" occurs before coating material application.

- C. Prepare metallic surfaces by blast cleaning in accordance with SSPC-VIS 1 (ASTM D2200). Prepare abrasive blast representative areas for the Owner's representative to inspect on the first day of cleaning.
- D. Unless otherwise specified, the requirements for blast cleaning steel, ductile iron, and stainless steel substrates are as follows:
 - 1. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC-SP 10 unless blasting may damage adjacent surfaces, is prohibited, or is specified otherwise. Where abrasive blasting is not possible, clean surfaces to bare metal with power tools in accordance with SSPC-SP 11.
 - 2. Ferrous metal surfaces to be submerged: Abrasive blast in accordance with SSPC-SP 5, unless specified otherwise, to clean and provide roughened surface profile with a depth between 2 and 4 mils.
 - 3. Remove traces of grit, dust, dirt, rust scale, friable material, loose corrosion products, or embedded abrasive from substrate before coating application.
 - 4. When abrasive blasted surfaces rust or discolor before coating, abrasive blast clean surfaces again.
- E. Field preparation of shop-primed surfaces:
 - 1. Smooth welds and prominences with power tools before applying field-applied coatings.
 - 2. Clean and dry shop-primed ferrous metal surfaces and fabricated assemblies before applying field coats.
 - 3. Prepare shop epoxy primed surfaces with light abrasive blasting or abrading and then vacuum before applying finish coats.
 - a. Follow CSM instructions for surface preparation when the primer recoat limit has been exceeded.
 - 4. Non-immersion service: Clean in accordance with SSPC-SP 2 (Hand Tool Cleaning) or SSPC-SP 3 (Power Tool Cleaning) and uniformly roughen.
 - 5. Immersion, BSC, and SC service: Remove shop primer in accordance with SSPC-SP 5 (Near-White Blast Cleaning).
- F. Damaged shop primer or rust bleeding:
 - 1. Ferrous metals: Clean in accordance with SSPC-SP 1 (Solvent Cleaning) and spot blast in accordance with SSPC-SP 10 (Near-White Metal Blast Cleaning) to achieve a uniform surface profile between 2.0 and 2.5 mils before recoating.
 - 2. Reject galvanized steel with rust bleeding.
- G. Damaged coating: Repair by abrasive blast cleaning surfaces as specified for the coating system; feather to a smooth transition before touching up.

3.07 PREPARATION REQUIREMENTS BY SURFACE TYPE

- A. Galvanized steel and non-ferrous metal surfaces:
 - 1. Degrease or solvent clean (SSPC-SP 1) to remove oily residue.
 - 2. Abrasive blast clean in accordance with SSPC-SP 16.
 - a. If abrasive blast cannot be performed, abrade in accordance with SSPC-SP 3 (Power Tool Cleaning).

3. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded, such as bolts, nuts, or preformed channels.
4. Test surface for contaminants using copper sulfate solution.
- B. Stainless-steel surfaces:
 1. Abrasive blast clean in accordance with SSPC-SP 16 to leave a clean, uniform appearance with surface profile between 1.5 and 2.5 mils.
- C. Ductile iron pipe and fittings to be lined or coated: Abrasive blast clean in accordance with NAPF 500-03.
- D. Sherardized, aluminum, copper, and bronze surfaces:
 1. Abrasive blast clean in accordance with SSPC-SP 16.
 2. Prepare in accordance with CSM's instructions.

3.08 APPLICATION REQUIREMENTS

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Empty aboveground piping to be coated of contents when applying coatings.
- C. Mechanical equipment shop primed by the manufacturer.
 1. Pumps and valves: Shop coat with manufacturer's highest quality coating system meeting the project specifications.
 - a. Contractor shall provide CTR shop coating reports.
 2. Non-immersed equipment: Touch up shop primer, and coat in the field with specified coating system after installation.
 - a. If project requires equipment removal and reinstallation, complete touch-up coating after final installation.
- D. Verify surface preparation immediately before applying coating in accordance with SSPC SP COM and the SSPC visual standard for the specified surface preparation method.
- E. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- F. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
- G. Do not apply coatings to a surface until it has been prepared as specified.
- H. Use equipment designed to apply materials specified.
 1. Use compressors with moisture traps and filters that remove water and oils from the air.
 - a. Perform a paper blotter test at the Engineer's request to verify air is sufficiently free of oil and moisture. Do not allow the amount of oil and moisture to exceed CSM-recommended amount.
 2. Equip spray equipment with properly sized mechanical agitators, pressure gauges, pressure regulators, and spray nozzles.

- I. Where 2 or more coats are required, tint prime coat intermediate coats as necessary to distinguish each coating and to help indicate coverage.
 - 1. Do not use color additives with chromium, lead or lead compounds that hydrogen sulfide, other corrosive gases, might destroy or alter. Apply the specified number of coats.
- J. Apply coating by brush, roller, trowel, or spray unless a specific application method is required by coating manufacturer's instructions or these Specifications.
 - 1. Apply primer or first coat by brush to power tool cleaned ferrous surfaces.
 - 2. Brush or spray-apply coats for blast-cleaned ferrous surfaces and subsequent coats for non-blast cleaned ferrous surfaces.
 - 3. After prime coat dries, mark, repair, and retest pinholes and holidays before intermediate or top coats are applied.
- K. Spray application:
 - 1. With a brush, stripe coat edges, welds, corners, nuts, bolts, and difficult-to-reach areas, as necessary, before spray application to ensure specified coating thickness along edges.
 - 2. When using spray application, apply each coat to thickness no greater than recommended in coating manufacturer's instructions.
 - 3. Use airless spray method unless air spray method is required by CSM's instruction or these Specifications.
 - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.
- L. Lightly sand and thoroughly clean surfaces to receive high-gloss finishes unless CSM instructs otherwise.
- M. Remove all dust on coatings between coats.
- N. Shop and field coats:
 - 1. Prime coat: Shop-apply or field-apply prime coats as specified. Use shop-applied primer compatible with the specified field coating system and apply at the minimum dry film thickness recommended by the finish coat CSM.
 - a. Provide data sheets identifying the shop primer to on-site coating application personnel.
 - b. Perform adhesion tests on the shop primer.
 - c. Remove and recoat damaged, deteriorated, and poorly applied shop coatings.
 - d. If shop primer coat meets this Section's requirements, spot prime exposed metal of shop-primed surfaces before spray applying primer over the entire surface.
 - 2. Field coats: Apply field coats with 1 or more prime coats and finish coats to build up coating to dry film thickness specified for the coating system.
 - a. Do not apply finish coats until other work in the area is complete and previous coats are inspected.
 - 3. Adhesion confirmation: Perform adhesion tests after proper coating cure in accordance with ASTM D3359. Demonstrate that:
 - a. Prime coat adheres to the substrate.

- b. Coatings adhere to the prime and intermediate coats.
 - 1) Coating 5 mils or more DFT: Achieve adhesion test result of 5A on immersed surfaces and 4A or better on other surfaces.
 - 2) Coating less than 5 mils DFT: Achieve adhesion test results of 5B on immersed surfaces and 4B or better on other surfaces.
- O. Plural component coating application:
 - 1. Premix contents of component drums if required by the CSM each day.
 - 2. Before starting application:
 - a. Verify gauges are working properly.
 - b. Complete ratio checks.
 - c. Sample the mix on plastic sheeting to ensure set time is appropriate and complete.
 - d. Label and retain all spray samples. Submit to Engineer when requested.
- P. Drying and recoating:
 - 1. Provide fans, heating devices, or other means to prevent condensate or dew on substrate surface or between coats and during curing after applying the last coat.
 - 2. Allow each coat to cure or dry thoroughly, in accordance with if required in CSM's printed instructions, before recoating.
 - 3. Use CSM's printed instructions and the requirements specified in this Section to determine minimum required drying time.
 - a. Do not allow excessive drying time or exposure, which may impair bond between coats.
 - b. Recoat all coatings within time limits recommended by CSM.
 - c. If time limits are exceeded, abrasive blast clean and de-gloss clean before applying another coat.
 - 4. If limitations on time between abrasive blasting and coating are not met before attaching components to surfaces that cannot be abrasive blasted, coat components before attachment.
 - 5. Ensure primer and intermediate coats of coating are unscarred and completely integral when applying each succeeding coat.
 - 6. Touch up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
 - 7. Leave no holidays. Repair all holidays in accordance with the requirements on pertinent Coating Detail Sheets or as recommended by the CSM.
 - 8. Sand and feather in to a smooth transition and recoat scratched, contaminated, or otherwise damaged coating surfaces so repairs are invisible to the naked eye.
- Q. Workmanship:
 - 1. Ensure that coated surfaces are free from runs, drips, ridges, waves, laps, and brush marks. Coats shall be applied to produce a smooth, even film of uniform thickness completely coating corners and crevices.
 - 2. Coat surfaces without drops, overspray, dry spray, excessive runs, ridges, waves, holidays, laps, or brush marks.
 - 3. Remove splatter and droppings after coating work is completed.
 - 4. Evenly apply each coat of material and sharply cut to a line created with masking tape or other suitable materials.

5. Avoid over spraying or spattering paint on surfaces not to be coated. Protect glass, hardware, floors, roofs, vehicles, and other adjacent areas and installations by taping, drop cloths, or other suitable measures.
 6. When coating complex steel shapes, stripe coat welds, edges of structural steel shapes, metal cut-outs, pits in steel surfaces, or rough surfaces with the primer before overall coating system application.
 - a. Brush apply stripe coat to ensure proper coverage.
 - b. Do not stripe coat with spray or roller.
 7. Ensure that finish coat, including repairs, has a uniform color and gloss.
- R. Coating properties, mixing, and thinning:
1. Thin prime coat and apply as recommended by the CSM. Thinned coating must comply with prevailing air pollution control regulations.
 2. If maximum recoat time is exceeded, prepare surface with solvent washing, light abrasive blasting, or other procedures per CSM's instructions.
 3. Allow adequate drying time between coats as instructed by the CSM, adjusted as necessary for the site conditions.
 4. Ensure that coatings, when applied, provide a satisfactory film and a smooth even surface. Lightly sand glossy undercoats to provide a surface suitable for proper application and adhesion of subsequent coats. Thoroughly stir and strain coating materials during application and maintain uniform consistency.
 5. Mix coatings with 2 or more components in accordance with CSM's instructions.
 6. Where necessary to suit conditions of the surface, temperature, weather and method of application, thin the coating per CSM's recommendations.
 - a. Ensure that volatile organic content (VOC) of the thinned coating complies with prevailing air pollution control regulations.
 - b. Thin coatings to only what is necessary to obtain proper application characteristics.
 - c. Use a thinner recommended by the CSM.
- S. Film thickness and continuity:
1. Apply coating to the specified thicknesses.
 - a. Apply additional coats when necessary to achieve specified thicknesses, especially at edges and corners.
 2. Verify WFT of the coating system first coat and after applying each subsequent coat.
 3. Do not allow the minimum thickness at any point to deviate more than 25 percent from the required average.
 4. Do not allow the surface area covered per gallon of coating for various types of surfaces to exceed those recommended by the CSM.
 - a. Provide coating coverage worksheets listing the maximum and minimum coverage for each unit volume of coating for concrete surfaces.
 5. Apply additional coats to achieve the specified dry film thickness if brush or roller application methods cannot achieve the specified film thicknesses per coat.
- T. Protecting coated surfaces:
1. Do not handle, work on, or otherwise disturb coated items until the coating is completely dry and hard.

2. After installation, recoat shop-coated surfaces with specified coating system as necessary to match surrounding surfaces, and to coordinate with the specified color identification requirements.
- U. Special requirements:
1. Before erection, apply all but the final finish coat to interior surfaces of roof plates, roof rafters and supports, pipe hangers, piping in contact with hangers, and contact surfaces inaccessible after assembly. Apply final coat after erection.
 2. Coat structural slip-critical connections and high strength bolts and nuts after erection.
 3. Areas damaged during erection:
 - a. Prepare surface for spot repairs as specified for the coating system.
 - b. Recoat with prime coat before applying subsequent coats.
 - c. Touch up surfaces after installation.
 - d. Clean and dry surfaces to be coated at time of application.
 4. Coat underside of equipment bases and supports not galvanized with at least 2 coats of primer specified before setting the equipment in place.
 5. Coat aluminum in contact with concrete.

3.09 COATING SYSTEM SCHEDULE

- A. Attachment A - Schedule of Surfaces to be Field Coated specifies surfaces to be coated in the field with the coating systems required.

3.10 SURFACES NOT REQUIRING COATING

- A. Stainless steel piping, valves, pipe supports.
- B. Galvanized structural steel framing, galvanized roof decking, galvanized pipe supports.
- C. Copper and brass pipe, fittings, valves, etc.
- D. Bronze valves, bearings, bushings, and fasteners.
- E. Corrosion resistant special alloys: Inconel, Alloy 20, Hastelloy, etc.
- F. Buried Piping that is encased in concrete or cement mortar.

3.11 QUALITY CONTROL

- A. Owner-provided inspection or inspection by others does not limit the Contractor's or CSA's responsibilities for quality workmanship or quality control as specified or as required by the CSM's instructions. Owner inspection is in addition to any inspection required of the Contractor.
- B. Owner may perform, or contract with an inspection agency to perform, quality control inspection and testing of the coating work covered by this Section. These inspections may include the following:
1. Inspect materials upon receipt to ensure that the CSM supplied them.

2. Verify that specified storage conditions for the coating system materials, solvents, and abrasives are provided.
 3. Inspect and record findings for substrate cleanliness.
 4. Inspect and record pH of concrete and metal substrates.
 5. Inspect and record substrate profile (anchor pattern).
 6. Measure and record ambient air and substrate temperature.
 7. Measure and record relative humidity.
 8. Check for substrate moisture in concrete.
 9. Verify that mixing of coating system materials is in accordance with CSM's instructions.
 10. Inspect, confirm, and record that coating system materials' "pot life" is not exceeded during installation. Inspect to verify that recoat limitations for coating materials are not exceeded.
 11. Perform adhesion testing.
 12. Measure and record the coating system's thickness.
 13. Verify proper curing of the coating system in accordance with the CSM's instructions.
 14. Holiday or continuity testing in accordance with NACE SP0188 for coatings that will be immersed or exposed to aggressively corrosive conditions.
- C. Contractor shall perform holiday testing in accordance with NACE SP0188 to identify holidays or pinholes needing repair for coating over 100 percent of surfaces:
1. Coated steel that will be immersed or exposed to aggressively corrosive conditions.
 2. Coated concrete.
 3. Perform holiday tests after proper application and coating system cure.

3.12 CORRECTIVE MEASURES

- A. Repair pinholes or holidays identified by Holiday Testing as follows:
1. Remove the coating system with a grinder or other suitable power tool.
 2. Remove coating system at all pinholes and holidays at least 2 inches diameter around the defect back to expose substrate.
 3. Concrete voids: chip back to expose entire cavity in all directions.
 - a. Completely fill void with approved filler/surfacer material using a putty knife or other suitable tool and strike off. Cure per CSM's recommendations.
 4. Aggressively abrade or sand the intact coating system surface at least 3 inches beyond the removal area in all directions to produce a uniform 6- to 8-mil profile in the intact coating system.
 5. Vacuum the prepared area to remove all dust, dirt, etc., leaving clean, sound surfaces.
 6. Tape to mask the periphery of the prepared intact coating area to prevent coating repair application onto the prepared area.
 7. Apply the coating system with enough coats to achieve the specified finish coat thickness over the defect and coating removal area. Feather the coating onto the abraded coated surfaces around the removal area to avoid a lip and to achieve a neat repair outline.

8. Follow curing time between coats as specified by CSM for the site conditions. Solvent wash and abrasive blast per CSM's instructions, if the maximum recoat time is exceeded.
9. Apply coating at specified dry film thickness.

3.13 CLEANUP

- A. Remove surplus materials, protective coverings, and accumulated rubbish after completing coating. Thoroughly clean surfaces and repair overspray or other coating-related damage.

3.14 FINAL INSPECTION

- A. Conduct final inspection of coating system work to determine whether it meets specifications requirements.
- B. Conduct subsequent final inspection with Engineer to ensure work conforms to contract documents requirements.
- C. Mark any rework required.
 1. Re-clean and repair, as specified, at no additional cost to the Owner.

END OF SECTION

ATTACHMENT A - SCHEDULE OF SURFACES TO BE COATED

APPENDIX A
Schedule of Surfaces to be Coated

- A. The following schedule is incomplete. Coat unlisted surfaces with same coating system as similar listed surfaces. Contact Engineer for clarification.

EPU-M-1	Metals: exterior, above ground, non-immersed (PIPE AND VALVE EXTERIOR COATING).
Notes:	
1: Non-immersed ferrous metal surfaces include: a. Exterior of above ground pipe and valves. b. Exterior of tanks and other containment vessels. c. Other above ground miscellaneous metals, other than stainless steel or PVC piping.	
2: Immersed ferrous metal surfaces include: a. Exterior of buried pipe, valves, and couplings. b. Valve interior lining. c. Other buried miscellaneous metals, other than stainless steel or PVC piping.	

Appendix B			
Coating Detail Sheet			
Coating System	EPU-M-1 (above ground pipe and valve exterior coating)		
Coating Material	Two coats epoxy with polyurethane finish coat		
Substrate	Metal		
Products: One of the following or equal:	Primer	Intermediate Coat	Finish Coat
Carboline	Carbozinc 895	Carboguard 890	Carbothane 134 HG
International Paint	Devran 224V	Devran 224V	Devthane 379
PPG	Amercoat 385	Amercoat 385	Amercoat 450H
Sherwin-Williams	Macropoxy 646	Macropoxy 646	Hi Solids Polyurethane
Tnemec	Series 69	Series 69	Series 1095
Service Condition	Interior or Exterior, subject to direct sunlight. Non-immersion.		
Surface Preparation			
General	Prepare surfaces as specified in this Section and as follows.		
Ferrous Metal	Previously painted and primed surfaces: SSPC-SP6 Commercial Blast Cleaning. Bare surfaces: SSPC-SP10, Near-White Blast Cleaning. Damaged primer or rust: SSPC-SP10, Near White Blast Cleaning and spot prime.		
Nonferrous Metal	SSPC-SP16, Brush Blast Cleaning.		
Galvanized Metal	SSPC-SP16, Brush Blast Cleaning. Test for surface contaminants.		
Surface profile			
Ferrous Metal	2.5 to 3.0 mils		
Nonferrous Metal	1.5 to 2.0 mils		
Galvanized Metal	1.5 to 2.0 mils		
System Thickness (Dry Film)			
Total	10 to 13 mils		
Primer	4 to 5 mils		
Intermediate Coat	4 to 5 mils		
Finish Coat	2 to 3 mils		
Application			
Special CTR Training	Not required.		

SECTION 15052

COMMON WORK RESULTS FOR GENERAL PIPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Basic materials and methods for metallic and plastic piping systems.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through 24.
 - 2. B16.47 - Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard.
- B. American Water Work Association (AWWA):
 - 1. C11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe.
 - 2. C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - 3. C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 4. C151 - Ductile-Iron Pipe, Centrifugally Cast.
 - 5. C207 - Standard for Steel Pipe Flanges for Waterworks Services-Size 4 In. Through 144 In.
- C. ASTM International (ASTM):
 - 1. A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
 - 2. A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - 3. A194 - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 - 4. A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - 5. A320 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
 - 6. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 - 7. B88 - Standard Specification for Seamless Copper Water Tube.
 - 8. D2000 - Standard Classification System for Rubber Products in Automotive Applications.
 - 9. D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing and Fittings.
 - 10. F37 - Standard Test Methods for Sealability of Gasket Materials.
 - 11. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

- 12. F594 – Standard Specification for Stainless Steel Nuts.
- 13. F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements of Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- D. California Health and Safety Code.
- E. NSF International (NSF):
 - 1. 61 – Drinking Water System Components – Health. Effects.

1.03 DEFINITIONS

- A. Buried pipes: Pipes that are buried in the soil with or without a concrete pipe encasement.
- B. Exposed pipe: Pipes that are located above ground, or located inside a structure, supported by a structure, or cast into a concrete structure.
- C. Underground pipes: Buried pipes - see A. above.
- D. Underwater pipes: Pipes below the top of walls in basins or tanks containing water.
- E. Wet wall: A wall with water on at least 1 side.
- F. Pipes adjacent to a wet wall: Pipe centerline within 10 inches of the wet wall.

PART 2 PRODUCTS

2.01 GENERAL

- A. Materials as specified in Section 01600 - Product Requirements including special requirements for materials in contact with drinking water.

2.02 FLANGE BOLTS AND NUTS

- A. General:
 - 1. Washer:
 - a. Provide a washer for each nut.
 - b. Washer shall be of the same material as the nut.
 - 2. Nuts: Heavy hex-head.
 - 3. Cut and finish flange bolts to project:
 - a. Face of the bolt shall exceed face of nut by 1/8 inch minimum.
 - b. A maximum of 1/4 inch beyond outside face of nut after assembly.
 - 4. Tap holes for cap screws or stud bolts when used.
 - 5. Lubricant for stainless steel bolts and nuts:
 - a. Chloride-free.
 - b. Manufacturers: One of the following or equal:
 - 1) Huskey FG-1800 Anti-Seize.
 - 2) Weicon Anti-Seize High-Tech.

- B. Steel pipe:
 - 1. On exposed pipes:
 - a. For ASME B16.5 Class 150 flanges and AWWA C207 Class D flanges:
 - 1) Bolts: In accordance with ASTM A307, Grade B.
 - 2) Nuts: In accordance with ASTM A563, Grade A.
 - 3) Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
 - 2. On underwater pipes and pipes adjacent to wet walls:
 - a. Bolts: In accordance with ASTM A193, Grade B8M.
 - b. Nuts: In accordance with ASTM A194, Grade 8M.

2.03 MECHANICAL JOINTS BOLTS AND NUTS

- A. Bolts including T-Bolts:
 - 1. High strength low alloy steel in accordance with AWWA C111.
 - a. Fluoropolymer coated.
 - 2. Type 304 stainless steel in accordance with ASTM F593.
 - 3. Type 316 stainless steel in accordance with ASTM F593.
- B. Heavy Hex Nuts:
 - 1. High strength low alloy steel in accordance with AWWA C111.
 - a. Fluoropolymer coated.
 - 2. Type 304 stainless steel in accordance with ASTM F594.
 - 3. Type 316 stainless steel in accordance with ASTM F594.

2.04 GASKETS

- A. General.
 - 1. Gaskets shall be suitable for the specific fluids, pressure, and temperature conditions.
 - 2. Capable of being applied on surface of piping with cavities to provide for an improved seal with the internal piping pressure.
- B. Gaskets for flanged joints in ductile iron or steel drinking water piping meeting NSF 61 requirements:
 - 1. Suitable for hot or cold water, pressures equal to or less than 150 pounds per square inch gauge, and temperatures equal to or less than 160 degrees Fahrenheit.
 - 2. Material:
 - a. EPDM material with 80 Shore A durometer rating.
 - 3. Manufacturers: One of the following or equal:
 - a. Garlock, 98206.
 - b. John Crane, similar product.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:

1. Piping drawings:
 - a. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Drawings. Sizes and locations are indicated on the Drawings.
 - b. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.
 - 1) Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Times.
2. Piping alternatives:
 - a. Provide piping as specified in this Section, unless indicated on the Drawings or specified otherwise.
 - b. Alternative pipe ratings:
 - 1) Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price.
 - 2) Piping of different material may not be substituted in lieu of specified piping.
 - c. Valves in piping sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.
 - d. Grooved joints: Use couplings, flange adapters, and fittings of the same manufacturer.
 - 1) Manufacturer's factory trained representative:
 - a) Provide on-site training for Contractor's field personnel.
 - b) Periodically visit the jobsite to verify Contractor is following best recommended practices.
 - 2) Distributor's representative is not considered qualified to conduct the training or jobsite visits.
 - e. Flanged joints: where 1 of the joining flanges is raised face type, provide a matching raised face type flange for the other joining flange.
3. Unless otherwise indicated on the Drawings, piping at pipe joints, fittings, couplings, and equipment shall be installed without rotation, angular deflection, vertical offset, or horizontal offset.

B. Exposed piping:

1. Install exposed piping in straight runs parallel to the axes of structures, unless otherwise indicated on the Drawings:
 - a. Install piping runs plumb and level, unless otherwise indicated on the Drawings.
 - 1) Slope plumbing drain piping with a minimum of 1/4-inch per foot downward in the direction of flow.

2. Install exposed piping after installing equipment and after piping and fitting locations have been determined.
 - a. Do not transfer pipe loads and strain to equipment.
 3. In addition to the joints indicated on the Drawings, provide unions, flexible couplings, flanged joints, flanged coupling adapters, and other types of joints or means which are compatible with and suitable for the piping system, and necessary to allow ready assembly and disassembly of the piping.
 4. Assemble piping without distortion or stresses caused by misalignment:
 - a. Match and properly orient flanges, unions, flexible couplings, and other connections.
 - b. Do not subject piping to bending or other undue stresses when fitting piping.
 - c. Do not correct defective orientation or alignment by distorting flanged joints or subjecting flange bolts to bending or other undue stresses.
 - d. Flange bolts, union halves, flexible connectors, and other connection elements shall slip freely into place.
 - e. Alter piping assembly to fit when proper fit is not obtained.
 - f. Install eccentric reducers or increasers with the top horizontal for pump suction piping.
- C. Restraining buried piping:
1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - a. When piping is underground, use concrete thrust blocks, mechanical restraints, or push-on restraints.
 - b. Determine thrust forces by multiplying the nominal cross-sectional area of the piping by 150 psi.
 2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
 - a. During testing, provide suitable temporary restraints where piping does not require permanent restraints.
 3. Place concrete thrust blocks against undisturbed soil.
 4. Place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
 5. Provide underground mechanical restraints where specified in Attachment A - Piping Schedule.
- D. Restraining above ground piping:
1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - a. When piping is aboveground or underwater, use mechanical or structural restraints.
 - b. Determine thrust forces by multiplying the nominal cross-sectional area of the piping by 150 psi.
 2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
 - c. During testing, provide suitable temporary restraints where piping does not require permanent restraints.

- E. Connections to existing piping:
 - 1. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings:
 - a. Protect domestic water/potable water supplies from contamination:
 - 1) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
 - 2) Provide devices approved by Owner of domestic water supply system to prevent flow from other sources into the domestic supply system.
 - 2. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
 - 3. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.
 - 4. For flanged connections, provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.
- F. Connections between ferrous and nonferrous metals:
 - 1. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
 - 2. Nonferrous metals include aluminum, copper, and copper alloys.
- G. Flanged connections between dissimilar metals such as ductile iron pipe and steel pipe:
 - 1. Provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.

3.02 CLEANING

- A. Piping cleaning:
 - 1. Upon completion of installation, clean piping interior of foreign matter and debris.
 - 2. Perform special cleaning when required by the Contract Documents.

END OF SECTION

SECTION 15110

COMMON WORK RESULTS FOR VALVES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Basic requirements for valves.
- B. Four (4) 30" butterfly valves will be supplied by Owner. Contractor is responsible for installation and coatings per Sections 3.02 and 3.03 herein.

1.02 REFERENCES

- A. American Water Works Association (AWWA):
 - 1. C111/A21.11 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe Fittings.
- B. ASTM International (ASTM):
 - 1. A126 - Standard Specification for Gray Iron Casting for Valves, Flanges, and Pipe Fittings.
 - 2. A480 - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
 - 3. A536 - Standard Specification for Ductile Iron Castings.
- C. NSF International (NSF):
 - 1. 61 - Drinking Water System Components - Health Effects.
- D. Society for Protective Coatings (SSPC):
 - 1. SP7 - Brush-Off Blast Cleaning.
 - 2. SP10 - Near-White Blast Cleaning.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.
- B. Product data:
 - 1. Submit the following information for each valve:
 - a. Valve type, size, pressure rating, Cv factor.
 - b. Coatings.
 - c. Manual valve actuators:
 - 1) Information on valve actuator including size, manufacturer, model number.
 - d. Certified drawings with description of component parts, dimensions, weights, and materials of construction.
 - e. Certifications of reference standard compliance:
 - 1) Submit certification that the valves and coatings are suitable in potable water applications in accordance with NSF 61.

- f. Clearly mark submittal information to show specific items, materials, and accessories or options being furnished.
- C. Provide vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.
 - 1. Furnish bound sets of installation, operation, and maintenance instructions for each type of manual valve 4 inches in nominal size and larger, and all non-manual valves. Include information on valve operators.
- D. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
- E. Provide Manufacturer's Certificate of Installation and Functionality Compliance.

1.04 QUALITY ASSURANCE

- A. Manufacturer qualifications:
 - 1. Valves manufactured by manufacturers whose valves have had successful operational experience in comparable service.

1.05 DELIVERY STORAGE AND HANDLING

- A. Protect valves and protective coatings from damage during handling and installation; repair coating where damaged.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Pressure rating:
 - 1. Suitable for service under minimum working pressures of 150 pounds per square inch gauge.
- B. Valve to piping connections:
 - 1. Metallic valves:
 - a. Valves 3 inches nominal size and larger: Flanged ends.
 - b. Valves less than 3 inches nominal size: Screwed ends.

2.02 MATERIALS

- A. Stainless steel: In accordance with ASTM A480, Type 316, or Type 304, UNS Alloy S31600 or S30400.
- B. Valve and operator bolts and nuts (not including flange bolts and nuts, which are specified in Section 15052 - Common Work Results for General Piping):
 - 1. Fabricated of stainless steel for the following installation conditions:
 - 2. Where dissimilar metals are being bolted, use stainless steel bolts with isolation bushings and washers.
 - 3. Underground bolts: Low-alloy steel in accordance with AWWA C111/A21.11.

- C. Bronze and brass alloys: Use bronze and brass alloys with not more than 6 percent zinc and not more than 2 percent aluminum in the manufacture of valve parts; UNS Alloy C83600 or C92200 unless specified otherwise.
- D. Cast iron valve bodies: In accordance with ASTM A126, Class 30 minimum.
- E. Ductile iron valve bodies: In accordance with ASTM A536, Grade 65-45-12 minimum unless specified otherwise.

2.03 INTERIOR PROTECTIVE LINING

- A. When specified in the particular valve specification, provide valves with type of protective lining specified in the particular valve Specification.
- B. Apply protective lining to interior, non-working surfaces, except stainless steel surfaces.
- C. Lining types:
 - 1. Fusion bonded epoxy:
 - a. Manufacturers: The following or equal:
 - 1) 3-M Company, ScotchKote 134; certified to NSF 61 for drinking water use.
 - b. Clean surfaces in accordance with SSPC SP 7 or SP 10, as recommended by epoxy manufacturer.
 - c. Apply in accordance with manufacturer's published instructions.
 - d. Lining thickness: 0.010 to 0.012-inch, except that:
 - 1) Lining thickness in grooves for gaskets: 0.005-inch.
 - 2) Do not coat seat grooves in valves with bonded seat.
 - e. Quality control:
 - 1) Lining thickness: Measured with a non-destructive magnetic type thickness gauge.
 - 2) Verify lining integrity with a wet sponge-testing unit operating at approximately 60 volts, or as recommended by the lining manufacturer.
 - 3) Consider tests successful when lining thickness meets specified requirements and when no pinholes are found.
 - 4) Correct defective lining disclosed by unsuccessful tests, and repeat test.
 - 5) Repair pinholes with liquid epoxy recommended by manufacturer of the epoxy used for lining.
 - 2. High solids epoxy:
 - a. Product equivalent to high solids epoxy EPX-M-2-PWS as specified in Section 09960 - High-Performance Coatings.
 - 1) Certified in accordance with NSF 61 for drinking water use.
 - 2) Interior: Coat valve interior with manufacturer's equivalent high performance high solids epoxy coating system with a certifiable performance history for the service conditions and as approved by the Engineer. Manufacturer shall provide for approval, coating information sufficient to allow Engineer to assess equivalence to the specified high solids epoxy EPX-M-2-PWS as specified in Section 09960 - High-Performance Coatings.

- b. Clean surfaces to meet SP-7 or SP-10, or as recommended by coating manufacturer.
- c. Quality control: After coating is cured, check coated surface for porosity with a holiday detector set at 1,800 volts, or as recommended by coating manufacturer.
 - 1) Repair holidays and other irregularities and retest coating.
 - 2) Repeat procedure until holidays and other irregularities are corrected.

2.04 UNDERGROUND VALVES

- A. Valves in steam or steam condensate piping: Ductile iron body in accordance with ASTM A536, Grade 65-45-12 minimum or cast steel or forged steel.
- B. Provide cast-iron valve boxes at each buried valve to access valve and valve operators.
- C. Do not support boxes on valve, valve operator, or pipe.
- D. Boxes:
 - 1. 2-piece, fabricated of cast iron; provide cover, with asphalt varnish or enamel protective coating.
 - 2. Adjustable to grade, install centered around the upper portions of the valve and valve operator.
- E. Manufacturers: One of the following or equal:
 - 1. Tyler Pipe Industries, Inc.
 - 2. Neenah Foundry Co.

2.05 VALVE OPERATORS

- A. Valve operator "Open" direction: Open counterclockwise.
- B. Provide valves located below operating level or deck with extensions for key operation or floor stands and handwheels, as indicated on the Drawings.
- C. Provide manually operated valves located not more than 6 feet above the operating level with handwheels.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Preparation prior to installation:
 - 1. Install valves after the required submittal on installation has been accepted.
 - 2. Determine after flanged valves, the face-to-face dimensions of flanged valves.

3.02 INSTALLATION

- A. Provide incidental work and materials necessary for installation of valves including flange gaskets, flange bolts and nuts, valve boxes and covers, concrete bases, blocking, and protective coating.
- B. Valve and actuator orientation:
 - 1. Contractor shall coordinate with valve supplier final orientation of valve and actuator assembly based on Contractor's selection of equipment manufacturers and the valve and piping arrangement as indicated on the Drawings.
 - a. Contractor shall rotate valve and/or actuator mounting orientation as specified in this Section unless otherwise indicated on the Drawings.
 - 2. Install valves with their stems in vertical position above the pipe, except as follows:
 - a. Butterfly valves, and gate valves above ground may be installed with their stems in the horizontal position.
 - 3. Install valves so that handles clear obstructions when the valves are operated from fully open to fully closed.
- C. Valves with threaded connections:
 - 1. Install valves by applying wrench on end of valve nearest the joint to prevent distortion of the valve body.
 - 2. Apply pipe joint compound or Teflon™ tape on external (male) threads to prevent forcing compound into valve seat area.
- D. Valves with flanged connections:
 - 1. Align flanges and gasket carefully before tightening flange bolts.
 - 2. When flanges are aligned, install bolts and hand tighten.
 - 3. Tighten nuts opposite each other with equal tension before moving to next pair of nuts.

3.03 FIELD APPLIED COATING OF VALVE EXTERIOR

- A. Match color and be compatible with manufacturer's coating system and as specified in Section 09960 - High-Performance Coatings.
 - 1. When shop applied finish coating matches field applied coating on adjacent piping, touch up shop coating in damaged areas in accordance with instructions recommended by the paint manufacturer.
 - 2. When shop applied coating does not match field coating on adjacent piping, or when damage has occurred to the shop applied coating that requires more than touchup, blast clean valve surfaces or utilize other surface preparation recommended by the manufacturer of the coating material and apply the coating system used for coating adjacent piping.

3.04 COMMISSIONING

- A. Manufacturer services from each manufacturer for all valves supplied:
 - 1. Provide Manufacturer's Certificate of Source Testing.
 - 2. Provide Manufacturer's Certificate of Installation and Functionality Compliance.

- B. As specified elsewhere for specific valve types, sizes or actuators.
 - 1. Source testing.
 - 2. Manufacturers on site services for Owner Training, Installation Testing, Functional Testing, and during the Process Operational Period.

END OF SECTION

SECTION 15112

BUTTERFLY VALVES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Butterfly valves:
 - 1. As specified in Section 15110 - Common Work Results for Valves.
 - 2. Note: Four 30" butterfly valves have been pre-purchased by the Owner. Contractor is responsible for installation and commissioning in accordance with Sections 3.01 and 3.02 herein.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125 and 250.
 - 2. B16.5 - Pipe Flanges and Flanged Fittings, NPS 1/2 through NPS 24.
- B. American Water Works Association (AWWA):
 - 1. C110 - Standard for Ductile-Iron and Gray-Iron Fittings.
 - 2. C504 - Rubber-Seated Butterfly Valves.
 - 3. C540 - Standard for Power-Actuating Devices for Valves and Sluice Gates.
 - 4. C550 - Protective Interior Coatings for Valves & Hydrants.
 - 5. C606 - Standard for Grooved and Shouldered Joints.
- C. ASTM International (ASTM):
 - 1. A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for Higher-Temperature Service.
 - 3. A276 - Standard Specification for Stainless Steel Bars and Shapes.
 - 4. A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
 - 5. A395 - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
 - 6. A479 - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
 - 7. A515 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate - and Higher-Temperature Service.
 - 8. A516 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower-Temperature Service.
 - 9. A536 - Standard Specification for Ductile Iron Castings.
 - 10. A564 - Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.
 - 11. A582 - Standard Specification for Free-Machining Stainless Steel Bars.

12. A743 - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
 13. A890 - Standard Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion-Resistant, Duplex (Austenitic/Ferritic) for General Application.
 14. B462 - Standard Specification for Forged or Rolled UNS N06030, UNS N06022, UNS N06035, UNS N06200, UNS N06059, UNS N10362, UNS N06686, UNS N08020, UNS N08024, UNS N08026, UNS N08367, UNS N10276, UNS N10665, UNS N10675, UNS N10629, UNS N08031, UNS N06045, UNS N06025, UNS R20033 Alloy Pipe Flanges, Forged Fittings, and Valves and Parts for Corrosive High-Temperature Service.
 15. B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
 16. B691 - Standard Specification for Iron-Nickel-Chromium-Molybdenum Alloys (UNS N08366 and UNS N08367) Rod, Bar, and Wire.
 17. D429 - Standard Test Methods for Rubber Property-Adhesion to Rigid Substrate.
- D. Compressed Gas Association (CGA):
1. Standard G-4.1 - Cleaning Equipment for Oxygen Service.
- E. NSF International (NSF):
1. Standard 61 - Drinking Water System Components - Health Effects.
- F. United States Code of Federal Regulations (CFR):
1. 21 - Food and Drugs.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures
- B. Product data: 15110 - Common Work Results for Valves
1. For general purpose AWWA butterfly valves, include description of the method of attachment of the disc edge to the valve disc.
 2. Interior epoxy coatings: Affidavit of compliance attesting that epoxy coatings applied to interior surfaces of butterfly valves comply with all provisions in accordance with AWWA C550.
 3. Certification, for valves and coatings in contact with potable water, that the products used are suitable for contact with drinking water in accordance with NSF Standard 61.
- C. Commissioning submittals:
1. Provide Manufacturer's Certificate of Installation and Functionality Compliance.

1.04 WARRANTY

- A. Provide warranty as specified in Section 01740 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Design requirements:
 - 1. Valve pressure rating shall be greater than or equal to the piping system test pressure specified in the Piping Schedule at the maximum service temperature.
 - 2. General purpose AWWA butterfly valves:
 - a. Design standard: Provide valves designed and manufactured in accordance with AWWA C504.
 - b. Class:
 - 1) Provide butterfly valves in accordance with AWWA Class 150B, unless otherwise specified.
- B. Usage:
 - 1. Provide and install butterfly valve types as outlined in the Butterfly Valve Application Schedule at the end of this Section.
- C. Performance requirements:
 - 1. Tight shutoff at the pressure rating of the valve with pressure applied in either direction.
 - 2. Suitable for the following service conditions:
 - a. Throttling.
 - b. Frequent operation.
 - c. Operation after long periods of inactivity.
 - d. Installation in any position and flow in either direction.

2.02 GENERAL PURPOSE AWWA BUTTERFLY VALVES (BFV00)

- A. Manufacturers: One of the following or equal:
 - 1. DeZURIK/Sartell Model BAW.
 - 2. Mueller/Pratt Co.
- B. Valve body:
 - 1. Material: Cast iron, ASTM A126, Grade B, or ductile iron, ASTM A536, Grade 65-45-12.
 - 2. Body design:
 - a. Flanged body valves:
 - 1) Usage: Comply with limitations specified in the Butterfly Valve Application Schedule.
 - 2) Flanges: In accordance with ASME B16.1 Class 125 flanges for Class 150B valves.
- C. Disc:
 - 1. Material: Cast iron or ductile iron with Type 316 stainless steel edge that matches seat in valve body.
 - 2. Secure valve disc to shaft by means of smooth-sided, taper or dowel pins, Type 316 stainless steel, or Monel.
 - 3. Extend pins through shaft and mechanically secure in place.

- D. Shaft and bearings:
 - 1. Shaft design:
 - a. Valves greater than 20-inch size: 2-piece, stub shaft design.
 - 2. Shaft seal: Vee type, chevron design.
 - 3. Shaft material for Class 150B valves: Type 316 stainless steel, ASTM A276.
 - 4. Shaft bearings: Self-lubricating sleeve type:
 - a. Valves greater than 20-inch size: Teflon™ with stainless steel or fiberglass backing.
- E. Seats:
 - 1. Seat materials:
 - a. In low-pressure air applications: EPDM.
 - 2. For valves 24 inches in nominal size and larger, retain seats mechanically or by adhesive:
 - a. Mechanical retainage: Retain seat by a clamping ring with segmented clamping ring locks with adjusting locking screws.
 - 1) Clamping ring, ring locks, and adjusting locking screws: Type 316 stainless steel.
 - 2) Provide means to prevent ring locks and screws used to retain seats from loosening due to vibration or cavitation.
 - b. Adhesive retainage: Inset the seat within a groove in the valve body and retain in place with epoxy injected behind the seat so that the seat expands into the body.
 - c. Do not provide valves with seats retained by snap rings or spring-loaded retainer rings.
 - 3. Resilient seat: Withstand 75 pound per inch pull when tested in accordance with ASTM D429, Method B.
- F. Valve packing:
 - 1. Valves 4 inches to 48 inches nominal size: Self-adjusting V-type packing or chevron-type packing. EPDM to match seat material.

2.03 COATING REQUIREMENTS FOR METAL VALVES

- A. Shop coat interior and exterior metal surfaces of valves, except as follows:
 - 1. Interior machined surfaces.
 - 2. Surfaces of gaskets and elastomeric seats and stem seals.
 - 3. Bearing surfaces.
 - 4. Stainless steel surfaces and components.
- B. Coating material for components in contact with potable water applications:
 - 1. Formulate interior coating material from materials in accordance with CFR 21, AWWA C550, and NSF 61.
 - 2. Submit affidavit of compliance attesting that epoxy coatings applied to interior surfaces of butterfly valves in accordance with CFR 21, AWWA C550, and NSF 61.
- A. Interior surfaces:
 - 1. Interior surfaces: High solids epoxy as specified in Section 09960 - High-Performance Coatings, Attachment A – Coating Schedule.

- B. Exterior surfaces:
 - 1. Exterior surfaces of valves, actuators, and accessories coating as specified in Section 09960 - High-Performance Coatings, Attachment A – Coating Schedule for the following conditions:
 - a. High solids epoxy with polyurethane topcoat.
 - 2. Polished and machined surfaces: Apply rust-preventive compound,
 - a. Manufacturers: One of the following or equal:
 - 1) Houghton, Rust Veto 344.
 - 2) Rust-Oleum, R-9.
- C. Field applied coatings of valve exterior:
 - 1. Match color and be compatible with manufacturer's coating system and as specified in Section 09960 - High-Performance Coatings.
 - a. When shop applied finish coating matches field applied coating on adjacent piping, touch up shop coating in damaged areas in accordance with instructions recommended by the paint manufacturer.
 - b. When shop applied coating does not match field coating on adjacent piping, or when damage has occurred to the shop applied coating that requires more than touchup, blast clean valve surfaces or utilize other surface preparation recommended by the manufacturer of the coating material and apply the coating system used for coating adjacent piping.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install valves with valve shafts horizontal, unless a vertical shaft is required to suit a particular installation, and unless a vertical shaft is indicated on the Drawings.
- B. Install pipe spools or valve spacers in locations where butterfly valve disc travel may be impaired by adjacent pipe lining, pipe fittings, valves, or other equipment.
- C. Install in accordance with manufacturer's instructions.

3.02 COMMISSIONING

- A. Manufacturer services:
 - 1. Provide certificates:
 - a. Manufacturer's Certificate of Installation and Functionality Compliance.
- B. Functional testing:
 - 1. Valves:
 - a. Test witnessing: Witnessed.
 - b. Conduct pressure and leak test, as specified in Section 15110 - Common Work Results for Valves.

3.03 BUTTERFLY VALVE APPLICATION SCHEDULE

- A. Acceptable butterfly valve types and body styles are listed in the Butterfly Valve Application Schedule provided at the end of this Section. Furnish and install butterfly valves in accordance with this Schedule.

BUTTERFLY VALVE APPLICATION SCHEDULE	
Valve Type and Style	Acceptable Applications
General Purpose AWWA Butterfly Valves - Flanged Body Design.	Aboveground or submerged in the following service applications only: <ul style="list-style-type: none">- Acceptable in all service applications except oxygen and ozone service and high-pressure service.- May be used in buried applications when required by the specified piping system.

END OF SECTION

SECTION 15115

GATE VALVES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Gate valves.
- B. As specified in Section 15110 - Common Work Results for Valves.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 inch Standard.
- B. American Water Works Association (AWWA):
 - 1. C515 - Standard for Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Services.
- C. ASTM International (ASTM):
 - 1. B98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.
- B. Product data: As specified in Section 15110 - Common Work Results for Valves.

1.04 WARRANTY

- A. Provide warranty as specified in Section 01740 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GATE VALVES – GENERAL SERVICE (GV00)

- A. Gate valves aboveground:
 - 1. Valves less than 3 inches in size for clean water and air service:
 - a. Manufacturers: One of the following or equal:
 - 1) Crane, Figure 431.
 - 2) Jenkins, Figure 47.
 - 3) Lunkenheimer Co., Figure 2151.

- b. Design:
 - 1) Size and configuration: Existing.
 - 2) Manufacturer's standard bronze, solid wedge disc, rising stem, screwed end, Class 150 pounds.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Replace existing gates valves mounted on top of existing 30" inlet and outlet piping.

3.02 COMMISSIONING

- A. Functional testing:
 - 1. Valves:
 - a. Test witnessing: Witnessed.
 - b. Conduct pressure and leak test as specified in Section 15110 - Common Work Results for Valves.

END OF SECTION

SECTION 15121

PIPE COUPLINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Pipe couplings for carbon steel piping.

1.02 REFERENCES

- A. American National Standards Institute (ANSI).
- B. American Society of Mechanical Engineers (ASME):
 - 1. B31.1 - Power Piping.
 - 2. B31.9 - Building Services Piping.
- C. American Water Works Association (AWWA):
 - 1. C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 2. C207 - Standard for Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In.
 - 3. C213 - Standard for Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings.
 - 4. C606 - Standard for Grooved and Shouldered Joints.
- D. ASTM International (ASTM):
 - 1. A36 - Standard Specification for Carbon Structural Steel.
 - 2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. A193 - Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - 4. A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 5. A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
 - 6. A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/9 ksi Minimum Tensile Strength, General Use.
 - 7. A536 - Standard Specification for Ductile Iron Castings.
 - 8. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 - 9. A576 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
 - 10. C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.

11. C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
 12. C564 - Standard Specification for Rubber Gasket for Cast Iron Pipe and Fittings.
 13. C1173 - Standard Specification for Flexible Transition Couplings for Underground Piping Systems.
 14. D1869 - Standard Specification for Rubber Rings for Asbestos-Cement Pipe.
 15. D2000 - Standard Classification System for Rubber Products in Automotive Applications.
 16. D5926 - Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems.
 17. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 18. F594 - Standard Specification for Stainless Steel Nuts.
 19. F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength.
- E. NSF International (NSF):
1. 61 - Drinking Water System Components - Health Effects.
 2. 372 - Drinking Water System Components - Lead Content.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.
- B. Product data:
1. For each product in this Section as applicable:
 - a. Design features.
 - b. Load capacities.
 - c. Material designations by UNS alloy number or ASTM Specification and Grade.
 - d. Data needed to verify compliance with the Specifications.
 - e. Catalog data.
 - f. Clearly mark submittal information to show specific items, materials, and accessories or options being furnished.
- C. Calculations:
1. Provide calculations in accordance with NSF 372 for materials in contact with drinking water.

1.04 WARRANTY

- A. Provide warranty as specified in Section 01740 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GENERAL

- A. As specified in Section 01600 - Product Requirements:
 - 1. Materials in contact with drinking waters: In accordance with NSF 61 and NSF 372.
- B. Known acceptable manufacturers are listed by specific products.
- C. Provide references as specified in this Section by specific product.
- D. Manufacturer's representatives requirements.
- E. Gaskets for flexible couplings and flanged coupling adapters:
 - 1. Provide gasket materials for piping applications as follows:
 - a. EPDM.
- F. Exterior coatings for underground and submerged applications:
 - 1. Manufacturers: One of the following or equal:
 - a. Tapecoat Co., Inc., T.C. Mastic.
 - b. Kop-Coat Co., Inc., Bitumastic Number 50.
 - 2. Thickness: Minimum 0.040 inch.

2.02 PIPE COUPLINGS FOR CARBON STEEL PIPING

- A. Flexible couplings:
 - 1. Manufacturers: One of the following or equal:
 - a. Dresser, Inc., Style 38.
 - b. Smith-Blair, Inc., Series 411.
 - c. Romac Ind., Inc., Style 511 or Style 400.
 - 2. Materials:
 - a. Center sleeve and follower flanges: Ductile iron or low carbon steel having a minimum yield strength of 30,000 pounds per square inch.
 - b. Bolts and hex nuts:
 - 1) Aboveground: High strength, low alloy steel in accordance with AWWA C111.
 - 2) Buried and underwater: Type 316 stainless steel bolts in accordance with ASTM F593.
 - 3. Coating and lining: Manufacturer's standard fusion bonded epoxy, NSF 61 certified.
 - 4. Center sleeve dimensions: Provide center sleeves with lengths in accordance with following table:

Nominal Pipe Diameter	Sleeve Length
30"	10 7/8 inch

PART 3 EXECUTION

3.01 INSTALLATION

- A. In underground and underwater installations, coat the exterior of coupling with a protective coating in accordance with manufacturer's instructions.
- B. Joints and flexible connections shall be installed centered with no angular deflection unless otherwise indicated on the Drawings.
- C. Flexible couplings and flange coupling adapters: Install with gap between pipe ends in accordance with the following table unless a greater gap is indicated on the Drawings. Maximum gap tolerance shall be within 1/8 inch.
 - 1. Install flexible coupling with pipe gap located in middle of center sleeve.
 - 2. Install flanged coupling adapter with end of plain end pipe in middle of flanged coupling body.

Center Ring Length	Gap Dimension and Tolerance
10 inch and greater	7/8 inch

- D. Bolted, split-sleeve couplings:
 - 1. Inspect each coupling to insure that there are no damaged portions of the coupling.
 - a. Pay particular attention to the sealing pad/sealing plate area.
 - b. Before installation, thoroughly clean each coupling of any foreign substance which may have collected thereon and shall be kept clean at all time.
 - 2. Wrenches:
 - a. Conform to manufacturer instructions.
 - b. Bolts and studs shall be tightened so as to secure a uniform gasket compression between the coupling and the body of the pipe with all bolts or studs tightened approximately the same amount.
 - c. Final tightening shall be done by hand (no air impact wrenches) and is complete when the coupling is in uniform contact with the outside surface of the pipe all around the circumference of the pipe.
 - 3. No joint shall be misfit in any plane.
 - 4. On the fixed ends of bolted, split-sleeve couplings, the shoulders shall bear on the restraint rings all around with no visible gap.
 - 5. Ends of piping where coupler are installed shall be smooth and free of defects.
 - a. Remove weld splatter and grind smooth.
 - b. Grind pipe seam welds flush with pipe wall and smooth.

END OF SECTION

SECTION 15249

POLYVINYL CHLORIDE (PVC) PIPE: SCHEDULE TYPE

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Schedule type PVC pipe and fittings.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
 - 2. D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - 3. D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 4. D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - 5. D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
 - 6. D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
 - 7. F645 - Standard Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems.
- B. NSF International (NSF):
 - 1. 61 - Drinking Water System Components - Health Effects.

1.03 SUBMITTALS

- A. Submit as specified in Section 01300 - Submittal Procedures.
- B. Product data: As specified in Section 15052 - Common Work Results for General Piping.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect from sunlight, scoring, and distortion.
- B. Do not allow surface temperatures to exceed 120 degrees Fahrenheit.
- C. Store and handle as recommended by manufacturer in published instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Extruding and molding material: Virgin material containing no scrap, regrind, or rework material except where permitted in the referenced standards.
 - 1. Pipe: Designation PVC 1120 in accordance with ASTM D1785 and appendices:
 - a. Extruded from Type I, Grade 1, Class 12454 material in accordance with ASTM D1784.
 - b. Schedule 80 unless otherwise indicated on the Drawings.
 - 2. Fittings: In accordance with ASTM D2467.
 - a. Same material as the pipe and of equal or greater pressure rating.
 - b. Supplied by pipe manufacturer.
 - c. Unions 4 inches and smaller:
 - 1) Use socket end screwed unions.
 - 3. Solvent cement:
 - a. In accordance with ASTM D2564.
 - b. Manufacturers: The following or equal:
 - 1) IPS Corp.
 - a) Primer: Type P70
 - b) Cement: Type 724
 - c. Certified by the manufacturer for the service of the pipe.
 - d. In potable water applications: Provide solvent cement listed by NSF for potable water applications.

2.02 SOURCE QUALITY CONTROL

- A. Meets or exceeds all quality assurance test requirements stated in ASTM D1785.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install piping in accordance with ASTM F645, or manufacturer's published instructions for installation of piping, as applicable.
- B. Provide molded transition fittings for transitions from plastic to metal pipe.
 - 1. Do not thread pipe.
 - 2. Do not use flanged transition fittings unless specifically indicated on the Drawings.
- C. Locate unions where required for adequate access and assembly of the piping system.
- D. Provide serrated nipples for transition from pipe to rubber hose.
- E. Solvent weld joints in accordance with ASTM D2855.

3.02 FIELD QUALITY CONTROL

- A. Test pipe as specified in Section 15052 - Common Work Results for General Piping.

END OF SECTION



**BAYTOWN AREA WATER AUTHORITY
MEETING**

4. a.

Meeting Date: 07/20/2022

Subject: Receive a construction update on the Filter Scour Improvement Project at the Fritz Lanham Water Treatment Plant

Prepared For: Andrea Brinkley, Public Works/Engineering/BAWA

Prepared By: Enrique Villa, Public Works/Engineering/BAWA

Information

ITEM

Receive an update regarding the Baytown Area Water Authority Filter Scour Improvements Project.

PREFACE

This item allows the Baytown Area Water Authority members to receive an update regarding the Baytown Area Water Authority Filter Scour Improvements Project.

RECOMMENDATION

Fiscal Impact

Attachments

No file(s) attached.
