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Solicitation Addendum

Addendum No.:	5
Solicitation No.:	20-TA003171SAM
Project No.:	6083381 & 6091780
Solicitation Title:	SWWRF New Headworks & Chlorine Contact Chamber Rehabilitation and Recharge Well Pump Station
Addendum Date:	January 8, 2020
Procurement Contact:	Sherri Meier

IFBC No. 20-TA003171SAM is amended as set forth herein. Responses to questions posed by prospective bidders are provided below. This addendum is hereby incorporated in and made a part of IFBC 20-TA003171SAM.

Add:

ELECTRONIC BID PRICING FORM

An electronic copy of the Bid Pricing form is issued with this Addendum 5 and available for download as a separate attachment.

Add:

BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS COMBINED, SPECIFICATION 02640, SECTION 2.05

Add the following C.11 and D.12 to Specification 02640, Section 2.05:

C.11 Enclosed Motor and Operators/Controllers located in the hazardous areas shown on the Contract Drawings shall be rated for use within the identified hazardous area.

D.12 Enclosed Motor and Operators/Controllers located in hazardous areas shown on the Contract Drawings shall be rated for use within the identified hazardous area.

Addendum No. 5

IFBC No. 20-TA003171SAM

SWWRF New Headworks and Chlorine Contact Chamber Rehabilitation and Recharge Well Pump Station

Page 1 of 14

Replace:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 02640, SECTION 2.16 IN ITS ENTIRETY**

Replace Specification 02640, Section 2.16 with the following:

2.16 Knife Gates

- A. *The construction of knife gate valves shall be in accordance with AWWA C520.*
- B. *The valves should have ends adapted for connection to the piping having flanges per ANSI B 16.5 150# with raised face or DIN PN10 or as applicable.*
- C. *The valve body as well as bonnet should be of cast ductile iron construction. Valves up to 24" should have an integral bonnet.*
- D. *Valves up to 24" should be designed to withstand min 145 psi or 232 psi as applicable at the location of its installation.*
- E. *Valves should be full lug type construction up to 24" & full flanged construction for higher sizes. Valves of lug type construction should be full lugged so that these could be used in end of line application without the use of additional flange.*
- F. *Valves should have full bore opening which does not restrict the flow in pipe line.*
- G. *Valves should be designed for sealing in unidirectional flow application.*
- H. *The valve should be provided with gate made of 316 stainless steel and the gate should have beveled knife edge at the bottom to cut through and part the solids settled in the bottom to ensure positive shut-off / closure in sewage / slurry environment.*
- I. *The gate will be designed to withstand full differential pressure across the closed valve gate when against the seat without exceeding a stress level equivalent to lower of either 30% of the tensile strength or 70% of the yield strength of the material. Calculations justifying this design requirement to be provided.*
- J. *Valve should be provided with replaceable type resilient sealing arrangement to offer drop tight shut off. The seals should be made of EPDM rubber.*
- K. *The resilient seal should be placed in grooves within a separate seal retainer ring mechanically retained in place on valve body using screws from the top. Use of separate screwed on retainer ring allows for easy field replacement in the event the bore face of the valve wears out due to abrasion / erosion and also enables easy replacement of seal at site. Seal retained in place using a thin stainless steel band will not be acceptable as the SS band is not reusable and is not screwed in place making it difficult to replace at site.*

- L. *Valve housing should have integral cast tapered lugs for pushing the gate towards the flexible rubber seal only at the verge of closure with a view to avoid seal wear and achieve drop tight shut off. The surface of the gate coming in contact with the seal should be polished & buffed.*
- M. *Valves shall have glandless design to avoid repeated tightening / replacement of gland packing.*
- N. *The stem should be made of 316 SS material and shall have single / double start threading as required.*
- O. *The stem should be non-rising type for compact and safe operation.*
- P. *Valve will be provided with visual open / close indication arrangement.*
- Q. *Operation of the valves shall be motorized with non-modulating (open-close) actuators as specified herein (refer to Sec. 2.05).*
- R. *Valves shall have operating torque lesser than 22 ft-lbs. for ease in manual operation and to ensure that size of motorized / pneumatic operator is smaller and consumes less power / air.*
- S. *Materials of Construction:*
 - Body : Ductile Iron ASTM A 536 Grade 65-45-12 or Grade 400-15.
 - Seal Retainer Ring : Ductile Iron ASTM A 536 Grade 65-45-12 or Grade 400-15.
 - Inlet Seal / Rubber Seals : EPDM Rubber
 - Knife Gate : Stainless Steel ASTM A 240 type 316
 - Stem : Stainless Steel ASTM A 276 type 316
 - Assembly bolts, nuts and fasteners : Stainless Steel ASTM A 276 type 316
 - Stem Nut : Gunmetal / Phosphor Bronze / Brass
 - Bracket / Adapter plate : Carbon Steel epoxy painted
- T. *Surface preparation to be blast clean to near white metal finish followed by fusion bonded epoxy paint with min 250 micron DFT.*
- U. *Knife Gate Valves shall be Model ZFI MONO as manufactured by Rodney Hunt or approved equal.*

Replace:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11201 SIDE GATES**

Replace Specification 11201, Side Gates, with attached Specification 11201, Side Gates, revised per this Addendum 5.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 1.05A**

Change Specification 11320, Section 1.05.A to read as follows:

- A. The entire Grit Removal System shall be manufactured by Hydro International, Hillsboro, OR, 2925 NE Aloclek Drive, #140, Hillsboro, OR 97124, telephone 503-615-8130. Being named or bidding as an equal does not relieve the manufacture of meeting these specifications.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.01.D.1(c)**

Change Specification 11320, Section 2.01.D.1(c) to read as follows:

1. The Grit Concentrator shall be provided with the following accessories:
 - c) One (1) 1" 8-40 gpm acrylic flow meter with 316 SS float and guide rail.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.03.D.1(c & d) "NEMA 4X"**

Change Specification 11320, Sections 2.03.D.1(c & d) to read as follows:

1. The Grit Washing / Classification Unit shall be supplied with the following equipment to regulate and automate the system water supply:
 - c) One (1) 1.5" NEMA 7 brass solenoid valve to automate system water to the HV.

Addendum No. 5

IFBC No. 20-TA003171SAM

- d) One (1) 1.5" NEMA 7 brass solenoid valve to automate system backwash water.

Replace:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.04.D.2**

Replace Specification 11320, Section 2.04.D.2 in its entirety with the following:

- 2. The motor shall be 3 phase, 406, 60 Hz, NEMA Design B, TENV enclosure rated for use in a Class 1 Division 2 area.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.04.E.1(b)**

Change Specification 11320, Section 2.04.E.1(b) to read as follows:

- b) One (1) 1" NEMA 7 brass solenoid valve to automate the water to the rinse bar system.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.05.A.2(a) and (b)**

Change Specification 11320, Section 2.05.A.2(a) and (b) to read as follows:

- a) Enclosure Rating: NEMA 12
- b) Material: Carbon Steel painted ANSI 61 Gray

Add:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 11320, SECTION 2.05.A.7(f)**

Add the following Section 2.05.A(f) to Specification 11320:

- f) 120 VAC UPS Battery Backup

Replace:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 13232 IN ITS ENTIRETY**

Replace Bid Attachment 2, Contract Documents and Technical Specifications Combined, Specification 13232 with Revised Specification 13232 issued with this Addendum 5.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 13300, SECTION 2.03.G**

Change Specification 13300, Section 2.03.G to read as follows

- G. All discrete outputs from local control panels and Instrumentation and Control System PLCs, to field devices, starters, panels, etc., shall be 24 VDC, 10A dry contacts. Output contacts may be powered from the field equipment or powered from 120 VAC sourced from PLCs cabinet power system and interposing relays, as required to interface with field equipment. Outputs to solenoid valves, horns, and strobe lights shall be 24 DVC, powered from the PLC or control panel unless specified or shown otherwise.

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 13330**

Change the footer in Specification 13330, pages 1 thru 9, to read as follows:

13330- Instrumentation and Control, SCADA Hardware.docx

Change to:

**BID ATTACHMENT 2, CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
COMBINED, SPECIFICATION 13330, 2.09.4**

4. Discrete outputs (DO) shall be 16-point, 120 VAC / 28 VDC 5A relay contact modules, for the PLC. Output contact may be powered from the field equipment or powered from 24 VDC / 120 VAC sourced from PLC control panel's power system, as required to interface with field equipment. Outputs to solenoid valves shall be 24 VDC, powered from the PLC or control panel unless specified or shown otherwise. Provide interposing relays as specified in Section 17130 as required to meet dry contact rating. CompacLogix – 1769-OW16

Replace:

**BID ATTACHMENT 4, PLANS/DRAWING-SOUTHWEST WATER RECLAMATION FACILITY
NEW HEADWORKS, PLAN SHEETS S-06, S-07, S-08, AND S-10**

Replace Bid Attachment 4 Plans/Drawing-Southwest Water Reclamation Facility New Headworks S-06, S-07, S-08, and S-10 with Revised Plan Sheet Numbers S-06, S-07, S-08, and S-10 issued with this Addendum 5 and available for download as a separate attachment.

Delete:

**BID ATTACHMENT 4, PLANS/DRAWING-CONTRACT DOCUMENTS AND TECHNICAL
SPECIFICATIONS, SPECIFICATION SECTION 16110, 1.03.C**

Delete Bid Attachment 4, Plans/Drawing-Contract Documents and Technical Specifications, Specification Section 16110, 1.03C

~~1.03.C Rigid Aluminum conduits shall be used at all locations for shielded instrumentation/control and communication wiring, except where otherwise shown on the Contract Drawings.~~

QUESTIONS AND RESPONSES:

Q1. Please clarify which of the details between drawings E-15 and E-16 are accurate for the Headworks ductbanks.

E-15 Detail

- a. #4 rebar laterals
- b. #4 hoops
- c. 3000PSI Concrete

E-16 Detail

- a. #7 rebar laterals
- b. #5 hoops
- c. 4000PSI Concrete

R1. Detail given on Drawing E-15 shall be used for all low voltage concrete encased ductbanks. Disregard contradictory detail callouts given on Drawing E-16.

Q2. Please clarify the number of spare conduits for P003 and P004 as the E-04 medium voltage conduit schedule shows two (2) 4" spares for each while MV ductbank detail sections 1 and 3 only show one (1) 4" spare each.

Addendum No. 5

IFBC No. 20-TA003171SAM

R2. Conduit tags P003 and P004 shall have one (1) spare conduit each. Increase the width of MV Ductbank Section 1 to 2'-11" to accommodate a total of four (4) spare conduits from MV-SWGR to MV-HH-201.

Q3. Please clarify which of the details between CCC E-04 and E-15 is accurate for the Chlorine Contact Chamber ductbanks.

E-04 Detail

- a. #5 rebar laterals**
- b. 4000PSI red concrete**

E-15 Detail

- d. #4 rebar laterals**
- e. 3000PSI concrete**

R3. Drawing E-04 Detail shall be used for all medium voltage concrete encased ductbanks. E-15 Detail shall be used for all low voltage concrete encased ductbanks.

Q4. Specification # 16110-1.03C-F; Please clarify the locations rigid aluminum should be used for shielded instrumentation/control and communication wiring per C as it contradicts D, E, and F.

R4. Conduits for 24V instrumentation/control wiring shall have a minimum spacing of 3" from 120V control conduits and 12" from power conduits.

Q5. Specification Section 11320 and the drawings for the subject project; Please clarify the following:

1.05.A: Please correct Hydro's address 2925 NE Aloclek Drive #140, Hillsboro, OR 97124.

R5. Address has been corrected per this Addendum 5.

Q6. Specification Section 11320 and the drawings for the subject project; Please clarify the following:

2.01.D, 2.03.D & 2.04.E: These sections show a mix of NEMA 7/NEMA 4X/Brass/Bronze process valves. Previously process valves were to be stainless steel and NEMA 7 rated for C1D1 environments. The flow meter supplied for the HeadCells shall have an acrylic body with 316SS float and guide rod. The flow meter supplied for the SlurryCup unit shall have a flow range of 3.5-35 gpm.

R6. See referenced replacements noted above. No valuable difference in the specified flow range of 0 (no flow) - 35 gpm, and 3.5 - 35 gpm listed above.

Q7. Specification Section 11320 and the drawings for the subject project; Please clarify the following:

2.02.A: Manufacturer shall ensure that Washing/Classification Unit performance can be met within the design flow of 300–400 gpm/unit. Ensure that the required design flow to the Washing/Classification Unit can be met under gravity flow design as shown on the Drawings.

R7. The language in Specification 11320 Section 2.02.A. will remain unchanged to ensure a complete and operational grit removal system.

Q8. Specification Section 11320 and the drawings for the subject project; Please clarify the following:

2.04.A.7: The Grit snail motor shall be XPFC in a C1D1 environment.

R8. The grit snail motor is not located in a C1D1 Environment.

Q9. Specification Section 11320 and the drawings for the subject project; Please clarify the following:

2.05.A.2: Should the panel enclosure shall be NEMA 12, painted steel?

R9. See response to question 23.

Q10. Specification Section 11320 Drawings M-06

The sloped drop immediately upstream of the HeadCell inlet duct could be eliminated by increasing the elevation of the HeadCell inlet duct invert. Note we need to keep the required inlet duct angle constant, so increasing the inlet duct invert elevation will increase the distance from the HeadCell center axis to the mouth of the inlet duct.

R10. Acknowledged.

Q11. Please clarify the CCT Set of Plans for repair work.

- 1. Detail C&D/S-05 – What is the length to be repaired?**
- 2. Detail 3 & 4/S-05 – Are not shown.**

Addendum No. 5

IFBC No. 20-TA003171SAM

SWWRF New Headworks and Chlorine Contact Chamber Rehabilitation and Recharge Well Pump Station

Page 9 of 14

R11. 1. Please reference Drawing S-03 for overview plan of Anoxic Basin Cover modifications. For Detail C, the length is 252-ft (24 locations @ 10'-6" per location). For Detail D, the length is 42-ft (4 location @ 10'-6" per location).

2. Detail Nos. 3 & 4 are shown on Drawing S-04.

Q12. Please clarify: Dwg C-06 southwest of Final Clarifier 4. The drawings represent a 10" PVC line crossing the road past the fence. Please confirm if SDR35 PVC is to be used in this application.

R12. SDR35PVC is acceptable.

Q13. Please clarify: Dwg C-06 Inlet 4 thru Inlet 5 to Rip Rap. Please confirm if 18" RCP CLIII is the correct pipe at this location.

R13. 18" RCP CLIII is correct

Q14. The Pipe Schedule in 15051 calls for the Grit piping to be Glass Lined. Please confirm that all Glass Lined Ductile Iron Pipe is required to meet the current standard of ASTM B1000-15.

R14. Glass lining of the ductile iron pipe and fittings shall be in accordance with ASTM B1000-15.

Q15. Specification Section 02615 does not outline Mechanical Joint Buried Hardware. Please confirm that Cor-Blue Hardware is to be used for Mechanical Joint buried applications.

R15. Hardware for buried installations shall be high strength, low alloy steel conforming to the latest edition of AWWA C111/ANSI 21.11 or ASTM A242.

Q16. Specification Section 02615-2.01-E States:

"E. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be Ethylene Propylene Diene Monomer (EPDM) rubber for potable water, sanitary sewage, and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic

Addendum No. 5

IFBC No. 20-TA003171SAM

hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminants are found.

Please confirm the location of the specific areas of types of contaminated soil in order to select the correct gasket applications per this specification. If these areas cannot be clarified, it will be assumed there is no contaminated soil and EPDM gaskets shall be used.

R16. There are no known locations of contaminated soil within the project area that would require the use of NBR or FKM gaskets on the potable water mains.

Q17. Spec Section 02615-2.01-I does not outline protective coatings for restraints. Please confirm if “Star Bond” coatings are required for Star-Grip restraints.

R17. Restraint devices shall have the following factory applied high performance coatings:

Star Pipe Products: Starbond System

Sigma Corp. Products: CORRSAFE System

EBBA Iron Products: MEGA-BOND System

Q18. Spec Section 02615-2.01-B states: “Ductile iron pipe, 14 inches in diameter, shall not be used” The Flow Meter Station on Drawing C-10 calls out 14” Diameter piping to be used. Please advise as what diameter piping is required.

R18. Provide 14” diameter piping where specified on Drawing C-10.

Q19. The Headwork's part of the project is missing a profile of the 54" Effluent pipe, as it travels vertically into the Effluent Channel of the Headwork's Structure. On drawing M-06 the profile is a 48" Influent pipe. We need a profile for the 54" Effluent Pipe, to determine the rise from fitting at grade to Effluent Channel.

R19. Provide 54” PE x MJ Wall Sleeve in Effluent Channel. PE shall be flush with Effluent Channel floor at EL. 32.25’ and center of collar shall be at EL. 31.67’. Beneath, provide 54” 90-degree bend with bottom EL. 12.75’.

Also, provide 48” PE x MJ Wall Sleeve in Inlet Box. PE shall be at EL. 32.75’ as shown on Drawing S-10 and center of collar shall be EL. 31.67’.

Q20. Spec Section 16310- S&C Switches:

2.04.G.5.b.II: Fault interrupters shall be provided with 200-ampere bushing- well adapters. 101.A.2: The load-interrupter switch and fault-interrupter terminals shall be equipped with bushings rated 600 amperes continuous to provide for elbow connection.

Addendum No. 5

IFBC No. 20-TA003171SAM

Need confirmation if 200A bushing wells or 600A bushings is needed for Fault Interrupter ways.

R20. Fault interrupter terminal bushings shall be 600A continuous rated.

Q21. Spec Section 02064 3.03 Removal and Abandonment of Asbestos Cement Pipe and Appurtenances – is it confirmed there is asbestos with the cement lined pipe removal and if so, how many feet?

R21. There is no known removal of asbestos pipe.

Q22. Boesch Vertical Turbine Pumps would like to become an “approved equal” vertical turbine pump manufacturer for inclusion in the IFBC No. 20-TA003171SAM project.

R22. Boesch Vertical Turbine Pumps will not be listed as an approved equal.

Q23. Specification 11320-2.05.A.2 requires the Grit System control panels to be provided as NEMA 4X, 316SS. According to plan drawing E-04, the three Grit Control panels (LCP-20401, LCP-20402, LCP-20403) are installed indoors, in the South Electrical Building electrical room. Please confirm the Grit System control panels should be provided as NEMA 12, Painted Steel for the indoor installation.

R23. Specification 11320 requires the use of NEMA 4X, 316 Stainless Steel for the control panel. Revise 11320-2.05.A.2(a) and (b) to NEMA 12, Carbon Steel painted ANSI 61 Gray.

Q24. Specification 11320-2.05 does not require a UPS battery backup to be included in the Grit System control panels. Please advise if a UPS battery backup is required for each Grit System Control panel.

R24. Specification 11320 does not require the use of a UPS battery backup. For Section 11320-2.05.A.7, add Item (f) 120 VAC UPS battery backup.

Q25. Plan drawing, I-5 requires the Grit System control panels (LCP-20401, LCP-20402, LCP-20403) to include the embedded I/O type CompactLogix, which is specified as the 1769-L27ERM in specification 13330-2.08. The Grit System specification 11320-2.05.A.3 requires the CompactLogix L32ER PLC for each control panel. Please confirm the Grit System control panels should include the embedded I/O type CompactLogix 1769-L27ERM PLCs.

R25. Specification Section 11320-2.05-A-3, revise ‘Allen Bradley CompactLogix L33ER’ with ‘Allen Bradley CompactLogix 1769-L27ERM’

Addendum No. 5

IFBC No. 20-TA003171SAM

Q26. Section 13300-1.06.B outlines preliminary site testing meetings. Will the Grit System supplier be required to attend this meeting, or is this requirement for the CSI?

R26. All references in this section are in regards to the CSI.

Q27. Section 13300-3.05 outlines witnessed factory acceptance testing. Please advise if this witnessed testing will be required for the Grit System control panels outlined in section 11330.

R27. All references in this section are in regards to the CSI.

Q28. Are the circuit breakers shown in MCC-A1 and MCC-A2 required to be new breakers only, complete bucket replacements or new MCC sections? What model number are the existing Square D MCC's?

R28. MCC-A1 and MCC-A2 are Square D Model 6 Motor Control Centers that have existing sections with equipped space. (FO# 35359079-001) Contractor shall install six (6) new breakers in MCC-A1 and five (5) new breakers in MCC-A2, as shown in bold on sheet E-02. All new and modified MCC equipment shall conform to specification 16921.

Q29. Are circuit breakers shown in PP2 required to be replaced with new 225 amp CB's?

R29. Circuit breakers in PP2 do not require replacement.

Q30. What make and model are existing panels DP-A1 and LP-A1?

R30. Both panels were manufactured by Schneider Electric 4-5 years ago. DP-A1 is an Model NF and LP-A1 is Model NQ.

Q31. Are local control stations shown on E-13 vendor furnished with headwork control panels?

R31. No, the local controls station shown on Headworks Drawing E-13 shall be furnished per Specification 16144.

Q32. What make and model is existing MCC-1 shown on E-14?

R32. MCC-1 is a Square D Model 6 Motor Control Center (FO# 13492590-003).

Q33. Drawing S-06 shows varying elevation for the tops of the walls around the Headcell Vaults. This seems like it would be incorrect considering these walls are supporting covers that are usually flat. Please clarify if this is meant to be all at the same level.

Addendum No. 5

IFBC No. 20-TA003171SAM

R33. Per Note 5 Headworks Drawing S-06, the T.O.W. elevations shown are correct to provide drainage slope to the four (4) 4" drains at the screen channels.

Q34. Can the vendor dump raw sewage at the Headworks or septic receiving area for the abandoned pipes that need to be grouted?

R34. Contractor may dump raw sewage collected from the abandoned pipes into the SWWRF Plant Drain Lift Station located on-site upon advanced coordination with plant staff. Discharge rate shall be visually monitored as to not cause an overflow condition.

Q35. Is there a requirement for fencing around the pond? Don't see on Drawing C-06, but on Drawing C-14 indicates 6' high chain link fence. Please Clarify.

R35. Fencing is not required around the pond.

Q36. I would like to request that NEFCO be listed as an approved manufacturer for Section 06900 and 13233 of the technical specifications for the SWWRF project IFBC #20-TA003171SAM.

R36. NEFCO will not be added as an approved manufacturer for the FRP Covers. The wiers proposed upstream of the headworks effluent box shall remain 316 stainless steel as specified on the drawings.

NOTE: Items that are ~~struck through~~ are deleted. Items that are underlined have been added or changed. All other terms and conditions remain as stated in the IFBC.

End of Addendum

INSTRUCTIONS:

Receipt of this addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the response being deemed non-responsive.

AUTHORIZED FOR RELEASE

DIVISION 11 - EQUIPMENT

SECTION 11201 SLIDE GATES

PART 1 GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies slide gates of composite fiber or composite plastic reinforced material. The work covered by this section includes furnishing all labor, materials, and equipment required to install, test, and place into satisfactory operation slide gates complete with slide frames, as shown on the Drawings and/or specified herein. The gates will be provided for new construction as specified herein.

The manufacturer shall review the mechanical and structural layout drawings to familiarize themselves with the location and the set-up of the equipment specified and shall assure themselves that the equipment specified is appropriate for and coordinated with what is shown on the Contract Drawings.

B. TYPE:

Slide gate shall be manufactured of fiberglass reinforced polyester or composite plastic totally encapsulating an internal reinforcing structure. Slide gates shall be substantially watertight.

C. EQUIPMENT LIST

Item	Equipment No.
Screen Channel 1 - Upstream	SG 20111
Screen Channel 2 - Upstream	SG 20112
Screen Channel 3 - Upstream	SG 20113
Screen Channel 1 - Downstream	SG 20114
Screen Channel 2 - Downstream	SG 20115
Screen Channel 3 - Downstream	SG 20116
Grit Influent 1	SG 20211
Grit Influent 2	SG 20212
Grit Influent 3	SG 20213
Anoxic Basin 1A Influent	SG 20311
Anoxic Basin 1B Influent	SG 20312
Anoxic Basin 2A Influent	SG 20313
Anoxic Basin 2B Influent	SG 20314
Anoxic Basin 3A Influent	SG 20315
Anoxic Basin 3B Influent	SG 20316
Anoxic Basin 4A Influent	SG 20317
Anoxic Basin 4B Influent	SG 20318
CCC Basin No. 1 Influent	SG 20411
CCC Basin No. 2 Influent	SG 20412

Item	Equipment No.
CCC Basin No. 3 Influent	SG 20413

D. OPERATING REQUIREMENTS:

Equipment Number	Size WxH (inches) ^a	Design Head (feet)	
		Seating	Unseating
SG 20111	36 x 75	6	6
SG 20112	36 x 75	6	6
SG 20113	36 x 75	6	6
SG 20114	36 x 75	6	6
SG 20115	36 x 75	6	6
SG 20116	36 x 75	6	6
SG 20211	37 x 93	6	6
SG 20212	37 x 93	6	6
SG 20213	37 x 93	6	6
SG 20311	48 x 48	5.0	5.0
SG 20312	48 x 48	5.0	5.0
SG 20313	48 x 48	5.0	5.0
SG 20314	48 x 48	5.0	5.0
SG 20315	48 x 48	5.0	5.0
SG 20316	48 x 48	5.0	5.0
SG 20317	48 x 48	5.0	5.0
SG 20318	48 x 48	5.0	5.0
SG 20411	66 x 60	13.0	13.0
SG 20412	66 x 60	13.0	13.0
SG 20413	66 x 60	13.0	13.0

a. Width dimension refers to the channel width, and does not account for frame mounting requirements.

E. DESIGN REQUIREMENTS

Equipment Number	Open Direction ^a	Bottom Seating Sill ^b	Frame Type ^c	Operator Type ^d	Operator Mount ^e
SG 20111*	U	B	EF	EA	Y
SG 20112*	U	B	EF	EA	Y
SG 20113*	U	B	EF	EA	Y
SG 20114*	U	B	EF	EA	Y
SG 20115*	U	B	EF	EA	Y
SG 20116*	U	B	EF	EA	Y
SG 20211*	U	B	EF	EA	Y
SG 20212*	U	B	EF	EA	Y
SG 20213*	U	B	EF	EA	Y
SG 20311	U	B	WM	MH	Y
SG 20312	U	B	WM	MH	Y
SG 20313	U	B	WM	MH	Y
SG 20314	U	B	WM	MH	Y
SG 20315	U	B	WM	MH	Y
SG 20316	U	B	WM	MH	Y
SG 20317	U	B	WM	MH	Y

Equipment Number	Open Direction ^a	Bottom Seating Sill ^b	Frame Type ^c	Operator Type ^d	Operator Mount ^e
SG 20318	U	B	WM	MH	Y
SG 20411	U	B	WM	MH	Y
SG 20412	U	B	WM	MH	Y
SG 20413	U	B	WM	MH	Y

a. *U = upward opening; D = downward opening*

b. *B = flush bottom; S = standard*

c. *EF = embedded frame; WM = wall mounted; TH = thimble mounted; EF/WM = lower portion of frame embedded in drainage trench, the upper portion of the frame is wall mounted to the baffle wall.*

d. *MH = manual handwheel; MC = manual crank; EA = Electric Motor Actuator; RAHW = Right angle gear drive with manual handwheel*

e. *Y = Yoke mounted (self-contained); P = pedestal mounted*

** indicates slide gate shall be enclosed above the deck for odor control*

F. COMPONENT SIZING:

Operating forces used for determining the strength of gate components comprising of yokes, frames, discs, stems, disc nut pockets, and other load-bearing members shall be based on the sum of the guide friction force (computed using an opening breakaway friction factor of 0.70) and the weight of disc and stem.

When the gate is in motion, the operating forces shall be based on the sum of the frictional force (using a guide friction factor of 0.35) and the weight of disc and stem.

G. CORROSION RESISTANCE:

Each unit shall be designed for passively resisting corrosion from free and combined chlorine residuals, and chlorides within the CCC structure and hydrogen sulfides at the headworks facility. Dissimilar metals shall be isolated or carefully selected to prevent galvanic corrosion.

1.02 QUALITY ASSURANCE

A. REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of the Agreement. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM A193	Stainless Steel Anchor Bolts
ASTM A276	Stainless Steel Bars
ASTM D256	Izod Impact Strength
ASTM D570	Water Absorption Rate
ASTM D638	Tensile Strength
ASTM D695	Compressive Properties of Rigid Plastic
ASTM D696	Coefficient of Linear Expansion
ASTM D790	Flexural Properties
ASTM D792	Density and Specific Gravity at 23 ^o C
ASTM D1056	Polymer Grade
ASTM D2563	Visual Defects
ASTM D2583	Indentation Hardness
ASTM D2584	Resin, Glass & Filler Content
AWWA C-563	Fabricated Composite Slide Gates

B. UNIT RESPONSIBILITY:

The Contractor shall assign unit responsibility to the manufacturer for the Slide Gate specified in this Section. The Slide Gate manufacturer shall furnish and have overall system responsibility for coordination of all major components of the system. Overall system responsibility shall include start-up, training, calibration, coordination and overall successful operation of the equipment. Unit responsibility for related components in a mechanical equipment assembly does not require or obligate the unit responsibility manufacturer to warranty the workmanship or quality of component products not manufactured by them.

C. SHIPMENT, PROTECTION AND STORAGE:

Equipment shipment, protection and storage shall conform to the requirements of Section 01620.

All gates shall be fully assembled in their frames except for operators, guides, stem-extension, and stem covers or concrete-mounted pedestals. Where shipping constraints require it, frame may be partially assembled such that the top may be easily mounted to the bottom containing the disc.

1.03 ENVIRONMENTAL CONDITIONS

Equipment shall be installed outdoors at a wastewater treatment plant.

1.04 SUBMITTALS

A. The following information shall be provided:

1. Performance Affidavit
2. Plan, cross section, and details showing proposed mounting for each size and typical application of gate.
3. Fabrication drawings with full dimensions.

4. Complete engineering data including, but not limited to, design calculations, descriptive data, material specifications, as appropriate, to support the design of the equipment being provided.
5. Provide name and expected usage of all oil / grease / lubrication requirements for the first two years of operation. Assume the equipment is operated continuously under design conditions. This should include initial fill.
6. Complete description of the warranty to be provided.

1.05 PERFORMANCE REQUIREMENTS

Gates shall have a maximum leakage rate of 0.10 GPM per wetted foot of wetted linear seal under seating and unseating head pressures under full design head in accordance with the requirements of AWWA C-563. Design head shall be as specified in the gate schedule.

1.06 WARRANTY INFORMATION

- A. All equipment supplied under this Section shall be warranted in compliance with the GENERAL CONDITIONS by the CONTRATOR and each equipment manufacturer with exception of the more stringent warranty requirements specified below. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the OWNER.
- B. The Gate Manufacturer shall guarantee the slide gates, when installed and operated as recommended by the Gate Manufacturer, trouble-free operation for a period of at least ten (10) years. If the Owner is not completely satisfied with the performance of the product, the Manufacturer shall remedy the problem at no cost or refund the materials and installation cost upon the return of the equipment. The Gate Manufacturer shall guarantee the following:
 1. Leakage shall be no more than that allowed by the AWWA C-563 Standard during the guarantee period.
 2. Disc shall be free of sticking or binding as judged by the Owner (move freely via operator provided) with no exercising required.
 3. The seals of the slide gate shall be covered under this warranty as well as labor to change seals.
- C. Gate operators are to be warranted by the operator manufacturer for a period of at least three (3) years. During this period all warranty issues will be managed and coordinated through Gate Manufacturer.

1.07 OPERATION AND MAINTENANCE DATA

The Contractor shall provide operation and maintenance data in accordance with the requirements of Section 01730 of these specifications.

PART 2 PRODUCTS

2.01 ACCEPTABLE PRODUCTS

Manufacturer shall be experienced in the design and manufacture of composite slide gates for a minimum period of 20 years. Approved manufacturers include Ashbrook Simon-Hartley, Plasti-Fab, or engineer approved equal.

2.02 MATERIALS

The gate body shall be engineered composite fiberglass reinforced polyester or composite plastic totally encapsulating an internal reinforcing structure. It shall be molded to create a seamless corrosion barrier impervious to moisture.

Gate materials shall be as follows:

Component	Material
Frames, rails, and yokes	ASTM A276 or ASTM A240, Type 316L Stainless Steel
Slides	Reinforced fiberglass reinforced polyester or reinforced rigid composite plastic (KEVLAR family of fibers)
Fasteners and anchor bolts	ASTM A276, Type 316 Stainless Steel
Stems	ASTM A276, Stainless Steel, Type 316
Stem Guides	ASTM A276, Stainless Steel, or 316L
Lift Nuts and Thrust Nuts	ASTM B-584, Manganese bronze
Seals	UHMW polyolefin or EPDM

2.03 SLIDE GATES

A. GENERAL DESIGN

All slide gates shall be flat and level. Warpage throughout the entire gate shall not produce a crown of more than 1/16" in any direction. Each gate shall be manufactured individually to the exact dimensions required.

Guides shall be styled for mounting as shown on the contract drawings and/or gate schedule. Guides/frames shall be fabricated from 316L stainless steel and shall have a slot suitable for mating with the gate slide. Frame thickness shall be 5/16" thick minimum. Where self-contained guides are extended above the operating floor level to form the bench stand upon which the lift mechanism is fastened, they must be suitably strong and rigid without the use of additional stiffening members. The head rail shall be affixed so as to allow the gate to be removed from the guide without disassembly. The head rail shall have a maximum deflection of 1/4" when subjected to a horizontal force of four times the 40 lb. maximum hand wheel pull.

Where a wall mounted guide frame extends above a concrete wall the top anchor bolt shall be not more than 6" below the top of the wall.

Gate inverts shall be flush with the channel bottom unless specified otherwise in the gate schedule.

B. FRP CONSTRUCTION

Gate body surface shall be resin rich to a depth of .010 inches to .020 inches and reinforced with C-glass and/or polymeric fiber surfacing material. The surface shall be free of exposed reinforcing fibers. The composition of these layers shall be approximately 95% (by weight) resin. The remaining laminate shall be made up of copolymer composite and reinforcing fibers in a form, orientation and position to meet the mechanical requirements. Structural reinforcing shall be utilized to attain the necessary stiffness to meet deflection requirements using the following minimum properties and shall be designed to limit the deflection to a maximum of 1/1000 of the span under design head conditions based upon horizontal support members only. Manufacturer shall submit drawings and comprehensive design criteria to substantiate that the required deflection figure for each door has been achieved. The laminate shall be well encapsulated with a laminate not less than 1/4" thick on each side to ensure against any permeation by water to the core areas. Stem mounting bracket shall fasten to the gate as required for gate operation. Mounting through holes shall not pass through or be in contact with any internal mild steel reinforcing. Core material must be 100% resistant to decay and attack by fungus and bacteria and be resistant to hydrocarbons.

Composition of the slide gate laminate shall be in accordance with the recommendations shown in the Quality Assurance Report for Reinforced Thermostat Plastic (RTP) Corrosion Resistant Equipment prepared under the sponsorship the Society of the Plastics Industry, Inc. (SPI) and the Material Technology Institute of the Chemical Process Industries, Inc. (MTI) for "Hand Lay-up Laminates" and shall meet the specifications for Type 1, Grade 10 laminates shown in Appendix M-1.

Visual inspection for defects shall be made without the aid of magnification and defects shall be classified as to type and level as shown in Table 1 of ANSI/ASTM D2563. Allowable surface tolerances are as follows:

DEFECTS	ALLOWABLE TOLERANCE
Cracks Crazing Blisters Chips Pits Dry Spots Fish Eyes Burned Areas Entrapped Air	None
Wrinkles and solid blisters, not to exceed 1/8"	Maximum Deviation: 10% of thickness
Surface porosity (pinholes or	None

pores in the laminate surface)	
DEFECTS	ALLOWABLE TOLERANCE
Exposed Glass Exposure of cut edges	None
Scratches	None more than 0.002" deep (0.05mm)
Foreign Matter	None
Max Fiber Stress	Ultimate or yield, does not exceed 2.5 times the working stress.
Deflection	1/1000 of span
Head Pressure	Designed for max head pressure

The gate shall be equipped with elastomeric seals to reduce leakage. Elastomeric J-seals shall be made of molded or extruded EPDM having a hardness range of 55 to 65 shore A durometer and conforming to ASTM D2000 having a maximum compression set of 25%, and low temperature brittleness to meet suffix F-17. Seals, including bottom seals, shall be mounted on gate covers with type 316L stainless steel cap screws and FRP or T-316 SS clamping bars providing a means of repair, and replacement without dewatering the channel. Gates shall be designed and manufactured with the seals mounted to the gate body.

C. COMPOSITE PLASTIC CONSTRUCTION:

Slide shall be constructed from a reinforced rigid composite plastic material, having a minimum thickness of 1/8-inch. Slide shall have an internal matrix of carbon steel of suitable strength for the specified service. The slide outer surface skins shall be a homogeneous plastic material having extremely high tensile and impact strength, be nontoxic and shall be stabilized against ultraviolet light. The plastic material shall be an Aramid fiber from the KEVLAR family of fibers, and shall have the following minimum properties and shall be designed to limit the deflection to a maximum of 1/1000 of the span under design head conditions based upon horizontal support members only. Manufacturer shall submit drawings and comprehensive design criteria to substantiate that the required deflection figure for each door has been achieved. Comprehensive safety factor calculations shall include bending moments, buckling stress, and bonding stress with thermal expansion factors suitable for reference in NASA CR-1457, "Manual for Plates and Shells". et al. Safety factors shall be calculated for the disc under maximum head, and shear at the disc/seal interface. No substitute of fiber type will be acceptable.

PROPERTIES TABLE	
Tensile Strength	15,400
Young's Modulus	1,756,000 psi
Flexural Strength	28,000 psi
Flexural Modulus	1,497,000 psi
Compressive Strength	30,200 psi
Impact Strength	9.65 ft-lb/in

Water Absorption	0.09 %
Specific Gravity	1.72
Coefficient of Thermal Expansion	1.6 x 10 ⁻⁵ per C
Heat Distortion Point	80 degrees C ASTM D648
Low Temperature Impact Strength	93% @ -20 C
Notch Sensitivity	Not notch sensitive
Weathering Properties	Excellent
Fire Resistance	Class 1 Spread of Flame, Rating BS476: Part 1: 1953 self-extinguishing, ASTM D635 - 56R
Chemical Resistance	Organics, Alkaline, Ozone (2 to 3 ppm)

Rigid Polyurethane foam shall be used as filler between the steel grid reinforcing system and shall be a min. of 7 lb density/cu.ft.

The sealing arrangement for the reinforced plastic slide gates shall comprise of sealing faces and side guides constructed of ultra-high molecular weight polyolefin having an extremely low coefficient of friction and a backing constructed of highly resilient expanded neoprene. Guides and seating of the gate shall be easily adjustable (min. 5/8-inch). All moving contact surfaces shall be compatible to each other thereby minimizing sticking / jamming and making the operation easy.

2.04 OPERATORS

A. GENERAL

Manually operated lifting mechanisms shall be as indicated on the plan drawings or in the gate schedule. The crank operated type shall have either double or quadruple gear reduction, depending upon the lifting capacity required. Each type shall be furnished with a threaded bronze lift nut to engage the threaded portion of the stem. The lift nut shall be flanged and supported on non-metallic thrust washers, ball or roller bearings to take the thrust developed during opening and closing of the gate.

Gears shall be provided with machine cut teeth designed for smooth operation. The gearing and lift nut shall be mounted in a housing which in turn shall be mounted on the yoke of the gate, or separately supported on another structure or pedestal. Lubrication fittings shall be provided to permit lubrication of all gears and bearings.

Gates which have widths exceeding twice the slide height shall be furnished with tandem interconnected operators with a single input crank.

When indicated, all operators shall be furnished with either a graduated, clear plastic stem cover or a galvanized pipe stem cover with a counter type position indicator to show the position of the gate in tenths of an inch.

Provide electric actuator where shown on the drawings. Electrical actuator shall conform to paragraph 2.04C of this section.

B. STEMS AND GUIDES

The stem shall be of suitable length and ample strength for the intended service. The stem diameter shall be capable of withstanding twice the rated output of the operator at 40 pounds pull and shall be supported such that L/r ratio for the unsupported part of the stem shall not exceed 200. The entire stem, including extension stem, shall be Type 316 Stainless Steel solid bar. The sections of extension stems shall be joined together by solid couplings, threaded and keyed to the stems. All couplings of the same size shall be interchangeable.

C. ELECTRIC ACTUATOR

1. General

- a. Provide an electric actuator for operation of the valve/gate.
- b. Electric actuator shall be provided by valve/gate manufacturer.
- c. Electric actuator shall be selected by the valve/gate manufacturer and actuator supplier in coordination with other valve actuators provided for the project.
- d. Actuator shall conform to AWWA C504.

2. Motors

- a. Actuator motor shall be 480V, 3 phase, 60 Hz, TENV specifically designed for gate or valve actuator service.
- b. Motors shall be rated for 15-minute duty and shall be provided with NEMA Class F insulation. A thermistor for thermal protection shall be embedded in the motor windings.

3. Enclosure

- a. Motor and all electrical enclosures shall be rated NEMA 7.

4. Motor Starter

- a. Actuator shall be provided with a three phase, full voltage, reversing starter with overload elements in each of the three poles.

5. Disconnect Switch

- a. Actuator shall be provided with a heavy duty non-fused disconnect switch close coupled to the motor operator.

6. Gearing

- a. Gearing shall be double-reduction, with a helical gear and pinion forming the first reduction and a worm shall be fabricated from heat-treated alloy steel with hobbled and finished shaved teeth. The worm shall be fabricated from heat-treated alloy steel, ground, carburized and hardened. The worm gear shall be fabricated from high tensile strength bronze with hobbled teeth. The stem nut shall be fabricated

from high tensile strength bronze and shall be the two-piece type, when possible. It shall be possible to remove the stem nut from rising stem actuators from the top without removing the actuator from the valve, disconnecting any electrical wiring, or disassembling any of the gearing. All gearing shall be designed to withstand a 100 percent overload.

7. Torque Switch

- a. Electric actuators shall be provided with a double-torque switch set to disengage motor power at 75 percent of the shafts design torque. The torque switch shall operate in either the opening or closing direction and shall operate during the complete cycle without the use of auxiliary relays, linkages, latches, or other devices. Each side of the switch shall have a numbered dial for set point adjustment. A calibration tag shall be mounted near each switch for correlating the dial settings with output torque.

8. Manual Operator

- a. Electric actuators shall be provided with a handwheel for manual operation. The handwheel shall not rotate during motor operation nor shall a locked motor prevent manual operation. Motor or manual selection shall be accomplished by a positive de-clutching knob or lever, which will disengage the motor and motor gearing mechanically but not electrically. It shall not be possible for the unit to be in manual and motor operation simultaneously. Hand operation shall not require more than 100 pounds of rim effort at maximum torque.

9. Hammer Blow Device

- a. Electronic actuators shall be provided with a built-in lost-motion device that allows sufficient travel of the worm gear, prior to engaging the stem nut, for the motor to reach full speed. This action shall impart a "hammer blow" to start the valve/gate in motion in either direction. Two lugs cast integrally on the drive sleeve shall share the load equally.

10. Controller

- a. The controller shall be an unfused disconnect type combination starter in compliance with NEMA ICS.

11. Controls

- a. Control power shall be provided by an integral 24 VDC control transformer unless a separate power source is shown on the electrical Drawings.
- b. The transformer shall be sized to operate at not more than 80 percent of rating with the connected load shown. The transformer shall have protective secondary fusing.

- c. Unless otherwise specified, actuators shall be provided with an integral control station. The control station shall include a padlockable LOCAL/REMOTE switch, an OPEN pushbutton, a CLOSE pushbutton, and a STOP pushbutton. When the LOCAL/REMOTE switch is in the LOCAL position, momentary operation of the OPEN or CLOSE pushbutton shall cause the actuator to drive the valve to the appropriate limit. When the LOCAL/REMOTE switch is in the LOCAL position, momentary operation of the STOP pushbutton shall cause the actuator to stop. When the LOCAL/REMOTE switch is in the REMOTE position, the actuator shall move in response to remote OPEN, CLOSE, and STOP contacts, and the local pushbuttons shall have no effect.
- d. The LOCAL/REMOTE switch shall include a dry contact connection for remote monitoring of the switch position.
- e. The actuator shall provide a configurable general fault with dry contacts for remote monitoring.
- f. Controls shall be remotely mounted from actuator when shown on Drawings.

12. Position Switches

- a. Actuators shall be provided with a minimum of two rotor-type switch assemblies containing a minimum of 8 contacts. When shown on the electrical drawings, the actuator shall have 16 contacts, 4 on each of 4 rotors. Position switches shall be heavy-duty, open-contact type, with rotary wiping action. Contacts shall be rated at 3 amps at 120 VAC. Position switch gearing shall be of the intermittent type and shall allow switch set points to be set at any point of travel between fully open and fully closed. Switches shall not be subject to breakage or slippage due to over-travel. The position switch assembly shall be enclosed in its own housing.
- b. Dry contact indications for actuator OPEN and CLOSED position shall be provided for remote monitoring

2.05 FASTENERS

All fasteners and hardware shall be 316 stainless steel. All anchor bolts, assembly bolts, screws, nuts, etc. shall be of ample section to safely withstand the forces created by operation of the gate while subjected to the heads specified. Anchor bolts shall be designed and provided by the gate manufacturer.

2.06 COATINGS

Stainless steel components shall be provided with an ASTM A480, No. 1 finish. Ferrous or steel components shall be coated in accordance with Section 09900.

2.07 SPARE PARTS

Spare parts shall be tagged and stored. The following spare parts shall be provided.

- 1. 1 set - any special tools required to assemble, disassemble, or maintain the equipment

Spare parts, special tools, expendables, and maintenance materials shall comply with the following requirements:

1. Shall be furnished prior to (i) starting functional testing, (ii) operation of the equipment by the City, or (iii) 75 percent Project completion, whichever occurs first.
2. Shall be properly packaged to avoid damage, in original cartons insofar as possible. Damaged parts shall be replaced or otherwise inoperable.
3. On each package there shall be affixed a minimum 3-inch by 6-inch manila shipping tag with the following information printed clearly:
 4. Manufacturer's part description and number.
 5. Applicable equipment description.
 6. Quantity of parts in package.
 7. Equipment manufacturer.
 8. Applicable Specification section.
 9. Name of Design-Builder.
 10. Project name.
11. Materials shall be delivered to the site.

Manufacturer shall provide written certification that the spare parts provided are in accordance with the manufacturer's recommendations. Spare parts shall consist of the following:

1. All materials, including filters, seals, bearings, and other wearing parts that are recommended by the manufacturer to be changed during the first year of service or may reasonably be expected to need replacing during the first year of service.

Manufacturer shall provide initial lubricant recommended by manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by the City. Supply one year's supply of lubricant of the manufacturer's recommended type and grade for all process equipment. If shipping lubricant is different than operating lubricant, instructions for draining the shipping lubricant and filling with operating lubricant shall be provided. Supply complete lubricant specifications for each lubricant supplied.

2.08 PRODUCT DATA

The following product data shall be provided in accordance with Section 01340 and include the following:

1. Applicable O&M manual information as specified in Section 01730.
2. Installation details and instructions.
3. Factory Test report and video.
4. Installation Certification Form.
5. Training Certification Form.

PART 3 EXECUTION

3.01 INSTALLATION

Equipment manufacturer shall provide Contractor with detailed recommendations and instructions for installation of the equipment furnished under this Section. Equipment manufacturer shall provide assistance during equipment installation as required by the Contractor. The units shall be aligned, connected, and installed at the locations shown and in accordance with the manufacturer's recommendations. The unit's supplier shall provide Manufacturer's Certificate of Proper Installation.

3.02 START-UP AND TESTING

The equipment provided under this Section shall be started and tested only under the direction of personnel provided by the equipment manufacturer. All such activities shall be performed under the direction of these specialists.

After installation of equipment, and after completion of services of manufacturer's representative, operate each gate continuously without vibration, jamming, or overheating and perform specified function satisfactorily.

Correct all defects and defective equipment promptly to the satisfaction of the Engineer or replace at no additional cost to the Owner. Make final adjustments to place equipment in satisfactory working order, at time of above tests.

The supplier shall provide a Manufacturer's Certificate of Performance Test Acceptance. The following tasks must be completed and items supplied prior to final acceptance of the gates.

1. Verification of equipment alignment.
2. Preoperational lubrication.
3. Verification that all external system protective functions are functional and have been tested.
4. Verification that all internal protective functions are operational.
5. Review and verify that the specified control strategies are implemented to ensure proper protection and operation of all components, systems, interlocks, etc. Written acceptance of controls implementation by the manufacturer shall be submitted prior to startup.
6. The equipment shall be installed and tested under the direction of a factory employed service technician.
7. Manufacturer's recommendations for prestart preparation and preoperational checkout procedures.
8. A shop leakage test shall be performed in accordance with AWWA Specification C563. Leakage shall meet the performance requirements specified herein.

3.03 TRAINING

Equipment manufacturer shall provide training. Training shall include the following:

1. Operations Training: 2 sessions, 3 hours per session.
2. Maintenance Training: 2 sessions, 3 hours per session.

3. General operational information for the specific equipment provided under this Section.
4. Operation of the equipment in automatic and manual modes.
5. Troubleshooting.
6. Routine maintenance.

The supplier shall provide a completed Training Certification Form.

3.04 MAINTENANCE AGREEMENT

The manufacturer shall provide a maintenance agreement for the equipment provided under this Section.

END OF SECTION

**SECTION 13232
ALUMINUM FLAT COVERS**

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

1. CONTRACTOR shall furnish all labor, materials, and equipment to provide a complete, installed system of fixed and removable, custom fit, flat aluminum covers as shown on the drawings. The aluminum cover system includes cover panels, access hatch panels and hardware, structural support beams, edge angles, structural stiffenerfasteners at cover components and fasteners to the existing walls and beams. The aluminum cover system shall be fully engineered andsubstantially airtight

B. Related Sections:

1. Section 03300 - Cast-In-Place concrete
2. Section 05500 - Metal Fabrications

1.02 QUALITY ASSURANCE

- A. MANUFACTURER'S Qualifications: MANUFACTURER shall be a company specialized in providing engineered aluminum covers for wastewater treatment tanks/troughs for at least ten (10) years with a minimum of (5) successful and similar installations located in the State of Florida. These installations shall be similar in square footage and design to this project. When requested by the ENGINEER, submit written evidence to show experience qualifications and adequacy of plant capability and facilities for performance of contract requirements.
- B. Erector: Regularly engaged for at least ten (10) years in the erection of aluminum covers for wastewater treatment tanks.
- C. Welders: Qualified within the past two (2) years in accordance with AWS.

1.03 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. MANUFACTURER'S literature, illustrations, specifications, and engineering data.
2. Erection drawings clearly showing fixed and removable cover locations, structural beam and support member sizes and locations, structural beam and support member connections to existing walls and beam, access hatch panel sizes and locations, hatch panel hinges and lifting handles.
2. Drawings showing fabrication methods, assembly, accessories, installation details.

3. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
4. Deviations from Drawings and Specifications.
5. Proof of qualifications

B. Computations:

1. Complete structural calculations showing the governing stresses in all members and connections, and detailed shop drawings. Preliminary drawings shall be stamped by the cover MANUFACTURER'S PE. Final Drawings and calculations shall be signed and sealed by a Florida PE.
2. MANUFACTURER'S standard guarantee.
3. A letter of certification signed and sealed by a Florida registered Professional Engineer confirming that the aluminum cover is in full compliance with the plans and specifications including any testing provisions included therein.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Delivery of the components of the structure shall be made to a location nearest the site that is accessible to over the road trucks, unless otherwise specified.
- B. Storage: The CONTRACTOR shall be responsible for jobsite storage of the delivered components. The components shall be stored off the ground on level surface in such a manner as to prevent damage.
- C. Installation: The CONTRACTOR shall furnish such personnel, tools, equipment, and materials as required to install the cover using the MANUFACTURER'S recommended procedures.
- D. OEM Manual: The MANUFACTURER shall provide an OEM Manual that includes drawings, maintenance instructions, and removal and replacement instructions for the installed cover.

1.05 ENGINEER'S PRE-APPROVAL OF ALTERNATE COVERS

- A. Manufacturer of an alternate cover system shall submit a pre-approval submittal package to the engineer at least (14) days prior to the bid date. Only approved alternates listed by addendum will be acceptable. The following information and supporting documentation shall be provided to the engineer.
- B. Shop Drawings: Submit for approval the following:
 1. MANUFACTURER'S literature, illustrations, specifications, and engineering data.
 2. Complete detailed drawings showing the proposed cover system, fabrication methods, assembly, accessories and installation details.
 3. Setting drawings, templates, and directions for the installation of anchor bolts and other anchorages.
 4. Deviations from Drawings and Specifications.

5. Proof of qualifications.
- C. Computations:
1. Complete structural calculations showing the governing stresses in all members and connections, and detailed shop drawings. Preliminary drawings shall be Signed and sealed by a Florida Registered Professional Engineer.
 2. MANUFACTURER'S standard guarantee.
 3. A letter of certification signed and sealed by a Florida Registered Professional Engineer confirming that the aluminum cover is in full compliance with the plans and specifications including any testing provisions included therein.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

- A. Except as otherwise specified or shown, all design, materials, joints, connections, and workmanship shall conform to the Uniform Building Code (UBC), the Florida Building Code, and the Aluminum Association.
- B. Design flat covers to withstand the cover dead load plus equipment dead load plus the following live load conditions:
1. Structure is in a Hurricane Prone Region. Wind loading shall be in accordance with the applicable Florida Building Code.
 - a. Ultimate Wind Speed shall be 158 MPH.
 - b. Exposure Category C.
 - c. Risk Category IV
 2. Span: The clear span length of the cover shall be as noted in the scope of work.
 3. Width: The inside width of the cover shall be as noted in the scope of work.
 4. Distributed Design Live Load and Deflection: All structural components shall be designed to support the dead weight of the structure, plus a live load of 50 pounds per square foot of surface. The maximum deflection of any component under this load shall not exceed L/240 of the span of that component. In no event shall the dead load deflection exceed the rise of any component in order to avoid surface ponding.
 5. Concentrated Live Load: The structural components shall be designed to support a 400-pound load on a 6"x6" area located anywhere on the surface of the structure without permanently deforming the tested area. Deflections at the cover under concentrated load should be less than or equal to L/240.
 6. Design Stresses: All allowable design stresses in structural aluminum shall be in accordance with the "Specifications for Aluminum Structures" for building-type structures by the Aluminum Association.
 7. Skid Resistance: The cover shall possess an integral non-skid surface and no exposed area of cover system wider than one inch shall be without ribs/non-skid surface. The aluminum-decking surface of the structure shall be ribbed to provide an aggressively non-skid surface. The edges of

adjacent deck slats shall double interlock so that the slats shall act together. Interlocking cover panels may be supported by cross stiffening in lieu of double interlock. The cover system shall be manufactured from 6061-T6 alloy, 6063-T6 or 6005A-T61. The MANUFACTURER of the non-skid surface shall demonstrate in writing satisfactory performance for a minimum period of 10 years in the wastewater industry for the intended purpose. This surface shall not be achieved by the use of paint, adhesive tapes, sand blasting, or any other means other than an extruded process.

8. Chemical Resistance: Panels shall be fabricated entirely of 6061-T6, 6063-T6 or 6005A-T61 corrosion resistant aluminum extrusions. Every panel to beam connection shall be chemical resistant and will not weaken or corrode and will interlock. A mechanical and replaceable Santoprene or Neoprene seal shall isolate the cover perimeter from the concrete wall. No foam tape or caulk shall be allowed.
9. Configuration: The low-profile mount aluminum cover land on the surface of the structures as shown on the drawings. The cover shall be low profile as shown on the drawings to eliminate trip hazards. The cover shall be composed of panels and beams. Uplift of each panel will be resisted with the use of an integral latch system. The weight of an individual panel shall not exceed 150 pounds. Each removable panel shall be easy to remove without disruption of adjacent panels and the lifting force required shall not exceed the dead weight of the panel.

2.02 DETAILS OF CONSTRUCTION

- A. MANUFACTURER: Provide flat covers as designed and fabricated by one of the following:
 1. Hallsten
 2. CST
 3. Or pre-approved equal per section 1.5
- B. Flat Coved Dimensions: The flat covers shall conform to the dimensions shown on the Drawings.
- C. General:
 1. Each flat cover shall be a clear span structure, designed to be self-supporting from its periphery on concrete tank walls.
 2. The edges of each panel shall be interconnected as to prevent slippage or disengagement under design conditions.
 3. Provide gasket material such that all connections to the concrete structure are substantially airtight. Provide gasket material such that all connections between adjacent aluminum cover panels are substantially airtight. Gasket material shall be as specified below.
 4. Provide each flat cover with access hatches, as shown in the Drawings.
 5. Provide openings for odor control ductwork and air piping inlet for each tank cover, at the locations and in accordance with the details shown.
 6. No welding or thermal cutting of aluminum structural members, supports, or connections will be permitted in the field.
- D. Materials:

1. Aluminum: All aluminum used in the fabrication of the cover system shall be alloy 6061-T6, 6063-T6 or 6005A-T61. All plate shall be alloy 6061-T6. Material shall be new and of top quality.
2. Welding Electrodes: Welding shall be with electrodes of an alloy, which shall produce welds with strength and corrosion resistant characteristics compatible to the base metal.
3. Fasteners: All fasteners between aluminum components shall be stainless steel type 316. Aluminum shall be isolated from dissimilar materials by means of a stainless steel spacer or an elastomeric isolator. Beams and panels shall be fastened to concrete using stainless steel type 316 drill in place adhesive anchor bolts.
4. Steel Accessories: No carbon steel components shall be used.
5. Seals: A mechanical and replaceable Santoprene or Neoprene seal shall isolate the cover perimeter from dissimilar materials such as concrete and steel. No foam tape or caulk shall be allowed for isolation of cover system.
6. Access Hatch Panels: Access to any location under the cover shall be gained through hinged access hatches. The Access Hatch Panels shall have the identical properties as the rest of the aluminum cover including loads, deflection, and slip resistance specifications. The access-hinged panels shall be the full panel width. The length of the access panel shall be as indicated on drawings. Hinged panel components including hinges, decking, and lifting handles shall be extruded 6061-T6, 6063-T6 or 6005A-T61. While in the closed position the hatches will be completely flush therefore posing no tripping hazard. In the open position, the panel will not need a hold open device.
7. Handles: Handles shall be an integral flush mounted aluminum and incorporated into the non-skid deck slat.
8. Anchor Bolts: Furnish anchor bolts and nuts of Series 316 stainless steel, of ample size and strength for the purpose intended, sized by the equipment manufacturer.

E. FABRICATION AND WORKMANSHIP

1. Workmanship: The quality of workmanship shall be equal to the best general practice in modern structural fabrication shops. Workmanship, fabrication, and shop connections shall be in accordance with the latest edition of ANSI/AWS D1.2 "Structural Welding Code - Aluminum".
2. Experience: The MANUFACTURER must furnish adequate evidence of a minimum of ten (10) years of ongoing experience in the manufacture of similar structures.
3. Preparation for Welding: All components to be welded shall be free of dirt, grease, and other contaminants and shall fit up properly for sound welding. Surfaces to be welded may not be cut with oxygen. Sawing, shearing, or machining may be used.
4. Welding Procedures: All welding shall be with an inert gas shield arc process. Machine settings shall be developed with test welds of the same material, alloy, and geometry as the work pieces and samples will be tested destructively. 100% penetrant testing of structural welds is required to confirm weld quality.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Flat covers shall be erected in accordance with the MANUFACTURER'S instructions by the CONTRACTOR. The MANUFACTURER shall field verify all dimensions prior to fabrication of covers/components. These dimensions shall insure a substantially airtight installation of the cover to the structure
- B. Properly align covers, assuring that they are plumb and level. Field re-fabrication of structural components of panels is not allowed. Forcing of the structure to make it fit during construction is expressly forbidden and not acceptable.
- C. The cover CONTRACTOR shall install the aluminum covers.

3.02 TESTING

- A. Prequalified Shop Testing: MANUFACTURER shall perform a prequalified shop air tightness test and certification for the cover components proposed. This test shall be performed in accordance with the "Procedural Standards for Testing, Adjusting and Balancing of Environment System" as published by the National Environmental Balancing Bureau (NEBB) on cover components of not less than 80 square feet. Said test shall be conducted and witnessed by a NEBB certified technician. The method of testing, test apparatus and proposed contents of the test report shall be submitted to the ENGINEER for approval. Subsequent to the receipt of ENGINEER'S approval, the MANUFACTURER shall set up testing protocol and schedule the test. A report of the test shall be prepared by the certified technician and shall be sealed with the NEBB seal. The report shall include a description and illustration of the test components, a description and illustration of the test apparatus and a report of the results. The cover shall maintain an air intrusion leakage rate not to exceed 0.2 cfm per square foot at an applied negative pressure of 0.2 inches of water column for a 5-minute duration.

END OF SECTION