

Forsyth County Procurement

Greg Bridges, Procurement Agent III

ADDENDUM #5

RFP Number: 23-016-3340	Title: Antioch Water Treatment Plant Phase 3A Expansion
	Date: June 8, 2023
Issuing Officer: Greg Bridges	Bid Initially Solicited: April 27, 2023
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This addendum supersedes and supplements all portions of the bidding documents and becomes part of the contract documents for the above-referenced project. Where any item called for in the specifications or indicated on the drawings is supplemented hereby, the original requirements shall remain in effect. Where any original item is amended, voided, or superseded hereby, the provision of such item not so specifically amended, voided, or superseded shall remain in effect.

#	Question	Referenced Bid Section	Answers
2.	From the site visit, there appears to be quite a bit of sediment accumulated in the bottom of the Filter Backwash EQ basin. Will the Owner remove the sediment when the tank is drained? Same question for the Membrane Backwash EQ Basin. Please confirm that erosion control and site work is not required for Quadrant 3. No drawings were provided.		The Owner will pump down the solids as much as possible, and the Contractor will be responsible for the full and final cleanout of each backwash basin, prior to placement of grout and equipment. The Contractor shall include all costs associated with removal, and disposal of 6 inches of residual sediment in on-site sludge lagoons. Confirmed.
3.	Is there a cast in place design option for the New Flow Control Vault? This is a very large vault for precasting.		Contractor is allowed to provide a cast-in-place design as a submittal, following the requirements of the Division 3 specifications and the reinforcement table in drawing S-90-502-3A.

#	Question	Referenced Bid Section	Answers
4.	Please provide the top of wall and bottom of slab elevations for the new Flow Control Vault no M-08-101-3A.	M-08-101-3A	Top of Wall EL 1229.50, and top of bottom slab EL 1219.50.
5.	We request the deadline for questions be extended one additional week. Please confirm this is acceptable.		The schedule will remain as detailed in the RFP.
6.	Can Danfoss be an approved VFD manufacturer?	26 19 24 Medium Voltage Adjustable Frequency Drives	No.
7.	Contract drawing C-05-105-3A and others call for "Pond Cleanout" with no define scope of work. Please clarify the expectation of this work or add as unit price work.	C-05-105-3A	Disregard note relative to "Pond Cleanout".
8.	Addendum 4 added the scope of the 3" HDPE force main from the grinder pump station. Please provide a profile of this work.		No profile is provided. The 3" HDPE is to be installed with 4-feet of cover. The route of the 3" HDPE will intersect with a 24" potable water line, a 48" raw water line, and several smaller lines. Forsyth County standard is to provide a minimum of 18" vertical separation between a sewer and a water line and reducing the 4-feet of cover restriction can be reviewed on a case-by-case basis.
9.	Please provide any borings or test dig information for the 3" HDPE force main routing added by Addendum 4.		No borings are available.
10.	Note 2 on drawing C-05-112-3A and several others indicate the contractor is to relocate existing utilities at their own expense. Are these utilities defined on the drawings? Please clarify.	C-05-112-3A	There are no significant utility relocations planned; however, utilities encountered by the Contractor that are disturbed in the execution of the work must reinstalled or relocated as necessary.
11.	Drawing C-05-112-3A shows the routing of the 3" HDPE force main passing through a electrical	C-05-112-3A	The attached drawing (A5 Q11) is the only drawing available that shows this transformer and ductbank.

#	Question	Referenced Bid Section	Answers
	transformer adjacent to the chain link fence at the SE corner of the plant. This transformer is not shown on the contract drawings. Please clarify the scope of work as it relates to the electrical transformer and as - builts of the electrical ductbanks in this area.		Contractor shall adjust the 3" HDPE route to avoid the transformer and ductbank as approved by the Engineer. Contractor to locate ductbank before starting pipeline work.
12.	Can the contractor use the existing monorails and hoists at the plant for installation of new pipe and equipment?		Yes. Contractor shall coordinate use with plant staff.
13.	Can the limits of disturbance for the 3" HDPE sewer line added by Addendum 4 be increased to at least 15 feet from 7 feet? The 7 foot width does not provide an adequate space to clear the trees and do the work.		This can be allowed in limited areas, but due to the disturbed area limitations of the project permit application, will need to be evaluated during construction.
14.	Detail "Sr" on plan sheet C-05-506-3A details the stream crossing pipe as "Minimum pipe diameters sized as specified in "pipe diameters for stream crossing"". Can you provide these pipe diameters? We cannot find them in the drawings or the specifications.	C-05-506-3A	Please refer to Table 6-33.1 "Corrugated Metal Pipe (CMP) Diameters for Temporary Stream Crossings" found in the Manual for Erosion and Sediment Control in Georgia, latest edition, for this information.
15.	Please refer to plan sheet C-05-110-3A, please provide a detail for plan note "CH2", shown at Sta +/- 12+25 of the 10" gravity sewer line.	C-05-110-3A	No detail is to be provided for Channel Stabilization (Ch2). Please refer to the Channel Stabilization section found on page 6-85 of the Manual for Erosion and Sediment Control in Georgia, latest edition, for this information.
16.	Please confirm the silt fence shown on drawing C-05-101-3A, but not on the Quadrant 4 drawings, is not part of the erosion control plans.	C-05-101-3A	Confirmed. For silt fence locations and extent, please see the quadrant Phase 1 and 2 drawings.

#	Question	Referenced Bid Section	Answers
17.	On dwg M-20-101-3A 8 Actuators are being replaced on the 1" AHP lines. What type of valve are they operating?	M-20-101-3A	They are air header isolation valves, and are resilient seated butterfly valves, similar to the FV-3473B-9/10/11 for the new membrane trains.
18.	Plan sheet C-05-116-3a calls out (far left side) "extend 48" line". What are we tying onto, a 48" fitting with an MJ plug?	C-05-116-3A	Record drawings indicate it to be a 48" fitting with an MJ plug and thrust restraints or megalugs. Contractor to assume that a concrete thrust block will have to be removed. Contractor to field verify before starting the work.
19.	Plan sheet M-08-301-3A calls out the new flow control vault to be precast, will cast-in-place be acceptable?	M-08-301-3A	See Question 3.
20.	Has Suez received an NTP? What are the expected delivery dates of shop drawings, equipment and membranes? Suez has a proposed total lead time of 80-84 weeks. Plan sheet S-10-101-3A calls out	S-10-101-3A	Yes. The Suez NTP date was January 24, 2023. The approved submittals from Suez are included as part of Specification Section 44 43 00. The NTP for manufacture of equipment was provided to Suez by April 1, 2023. As stated in the Suez proposal included as part of Specification Section 44 43 00, shipment of equipment is 30-60 weeks from the NTP for manufacturer. Membrane availability is 68 weeks from the PO date, however, they will not ship until immediately prior to installation and commissioning. Suez is currently on track to meet these delivery timelines. Review of record drawings indicate
21.	"waterstop w/ protection & mechanical connectors in wall and slab (typ., uno)". The details shown on plan sheet S-10-503-3A show an unreinforced cap over the water stop & couplers. Is the edge of the	2-10-101-3A	waterstops at the existing edge of slab and walls for the basin are protected by a stainless-steel plate.

#	Question	Referenced Bid Section	Answers
	existing concrete, both slabs and walls, the same as the requirement for the new concrete edge, both slab and walls? (is there an unreinforced cap on the existing concrete both slab and walls?)		
22.	The details of concrete joints on plan sheet S-10-503-3A appear to show a concrete working slab under the structural slab. Is a concrete working slab required? If so, how thick?	S-10-503-3A	Provide a 3" lean concrete mud slab below the structural slab.
23.	Sheet S-10-301-3A, S-10-503-3A: Confirm there is no stone base required under the structural or working slab.	S-10-301-3A, S- 10-503-3A	No crushed stone is anticipated beneath the lean concrete mud slab (see response to Question 22). However, over excavation and backfilling with crushed stone base may be required if debris-laden fill materials are observed at the foundation strata by the geotechnical engineer.
24.	Note 1 on Sheet G-01-003-03A states "All Improvements to Confirm with Forsyth County Construction Standards and Specifications, Latest Edition." If there are instances where the bid documents are less stringent than the latest Forsyth County standards, will the Contractor be reimbursed if required to go above and beyond the bid documents provided?	G-01-003-03A	No.
25.	31 23 11.1-3.01 and Figure 2 of 31 23 11: The Figure 2 form referenced indicates the Professional Engineer is to sign the form. Please clarify the Contractors responsibility relating to the Figure 2 Design Certificate.	31 23 11.1-3.01 and Figure 2 of 31 23 11	If a temporary earth retention system is used, the Contractor must have the design of the temporary earth retention performed by a professional engineer registered in Georgia.

#	Question	Referenced Bid Section	Answers
26.	Note 1, Sheet S-01-001-3A under "Delegated Design": Confirm the extents that the Contractor will need to provide the design and PE sealed submittals for "016800 – Equipment and Valve Identification". Specifically, will all identification signs need to be designed and sealed by a PE?	S-01-001-3A	Delegated design for Specification Section 01 68 00 can be disregarded.
27.	Note 1, Sheet S-01-001-3A under "Delegated Design": Confirm the extents that the Contractor will need to provide the design and PE sealed submittals for "058100 – Anchorage in Concrete and Masonry". Specifically, will every wedge or insert anchor installed for items such as conduit and small diameter process piping supports need to be designed and sealed by a PE?	S-01-001-3A	No – only for railings, ladders, equipment, and pre-engineered structures.
28.	Note 2, Sheet C-05-102-3A states all costs associated with utility relocation shall be the responsibility of the Contractor. If utilities are not shown on the drawings and need to be relocated when encountered, an unforeseen condition exists. Will the Contractor be reimbursed for unforeseen conditions such as this?	C-05-102-3A	See answer to question 10.
29.	Please confirm the new chain link fence height.		Per paragraph 2-1 of Specification Section 32 31 13, fabric height is to be 8-feet.
30.	Plan sheet M-10-102-3A (far left) calls out a 36" mj x flg dip 90 deg. Vert. bend. Please advise who makes a fitting like this?	M-10-102-3A	Vertical 90 deg bend shall be FLGxFLG as visually depicted.

#	Question	Referenced Bid Section	Answers
31.	Plan sheet M-10-102-3A appears to show concrete encasement of the 36" sed basin effluent piping. Please provide limits for concrete encasement.	M-10-102-3A	Concrete encasement shall extend 2 feet from pipe exterior, starting at grade and ending halfway of spool piece connecting the pipe to the main header.
32.	Plan sheet M-10-101-3A shows the drain pipe in two directions. The drain within the basin appears to run parallel to the wall 8 at a 45 deg angle to a line outside the basin wall. Please clarify.	M-10-101-3A	Both drain lines shall run from South to North (page right to page left). Drain line inside basin will service the proposed basin. Drain line outside of basin shall service a future basin. Ends of exterior drain line shall be capped (as shown on drawings) until construction of future basin occurs.
33.	Plan sheet M-10-103-3A show pipe supports for the 4" RSD line, should these supports be 316 s.s.?	M-10-103-3A	Pipe support and base plate shall be 304 SS. All bolts, nuts, washers, and fasteners shall be 316 SS.
34.	Plan sheet M-10-103-3A, sample line detail. This detail calls out sch 80 pvc typ., and also calls out 314 stainless steel pipe. Please clarify what type of pipe is required for the sample pipe.	M-10-103-3A	304 stainless steel pipe shall be used within the wall penetration up to the first isolation valve. At that point, pipe material shall transition to SCH 80 PVC.
35.	Will Jacobs have any involvement with this construction project?		No.
36.	Addendum #4 added the 3" low pressure force main to the scope. Can Contractors visit the site anytime to walk where this line is to be installed?		Yes - please contact Forsyth County Project Manager John Davis: <u>jadavis@forsythco.com</u> as instructed in Addendum 1.
37.	Can the question deadline be extended to give Contractors time to evaluate the added scope and also revisit the site?		The schedule will remain as detailed in the RFP.
38.	Mutliple subcontractors have asked for a 1 week extension on the RFI deadline. Please consider granting		See answer to question 37.

#	Question	Referenced Bid Section	Answers
	a 1 week extension to allow for maximum participation.		
39.	Reference drawing H-25-101-3A. What are the sizes of the control dampers?	H-25-101-3A	CD-25-1 is 4'-0" W x 3'-4" H, and CD- 25-2 is 24" W x 24" H.
40.	Reference drawing S10-503-3A details 1 and 2. Should the expansion joint included a slip or greased dowel detail?	DWG S10-503-3A	Expansion joint does not require a dowel.
41.	Are wall pipes with flanges and MJ bells flush with the face of concrete wall and tapped for studs acceptable in lieu of them extending 6" as noted in detail 9 on drawing M-33-301-3A?	M-33-301-3A	No.
42.	"Supplemental Conditions SC-14.02 deletes paragraph 14.02B and says the following: ""14.02.B. Contractor shall retain an independent testing laboratory or testing agency and shall be responsible for arranging and shall pay for specified tests, inspections, and approvals, including tests, inspections, and approvals to be paid for on a cash allowance basis, required for Owner's and Engineer's acceptance of the Work at the Site except: 14.02.B.1. costs incurred in	007300	Forsyth County will provide and pay for an independent material testing firm for this work. The Contractor will be required to coordinate with this firm and to schedule all testing to be performed.
	connection with tests or inspections pursuant to Paragraph 14.02.C shall be paid for as provided in said paragraph; and 14.02.B.2. as otherwise specifically provided in the Contract		
	Documents as being paid for by the Owner, such as special inspections, as identified in Specification		

#	Question	Referenced Bid Section	Answers
	Section 01 45 33, Special Inspections.""		
	This indicates that there is a cash allowance to pay for the construction materials testing. The bid form currently does not have a cash allowance for this. Please confirm if the contractor shall include construction materials testing in their base bid."		
43.	Spec 01 14 00 requires site security maintained by the contractor during all phases of the project. Should all costs for security including temporary fencing be paid by the cash allowance or should these costs be included in the base bid?	0114 00 Work Restrictions	As noted in Paragraph 1-5.B "Contractor shall install temporary security fencing around Work that occurs outside the normal facility fencing." While most of the project is inside the existing fencing, the Contractor is still responsible for their own site security, and any security efforts needed should be in their bid costs.
44.	Spec 01 14 00 requires site security maintained by the contractor during all phases of the project. Does the contractor need to supply a security guard? If so, for what hours?	0114 00 Work Restrictions	No.
45.	With the large number of preselected vendors, please consider adding a cash allowance to cover expired quotes and materials escalation.	Cash Allowances	A cash allowance will not be added for this item.
46.	Spec 03 08 13 references the water will be furnished as outlined in the temporary facilities section. This section requires the contractor to meter and pay for water. Please confirm the owner would like the contractor to purchase water for the leak testing of the tanks.	03 08 13 Tightness Testing of Structures	The Contractor will be responsible for purchasing water for the leak test. Please reference specification section 01 18 13 "Utility Service Connections".

#	Question	Referenced Bid Section	Answers
47.	Spec 03 08 13 references the water testing requirements. Please clarify if each of the 3 flocculation chambers, the effluent chamber, and the sedimentation chamber for Basin #3, need to be tested independently of each other.	03 08 13 Tightness Testing of Structures	Water tightness testing is not required for each chamber individually. Provide independent water tightness testing of the effluent chamber. Provide independent water tightness testing for the combination of the sedimentation chamber and flocculation chambers.
48.	Spec 03 08 13 references the water testing requirements. If each chamber of Basin #3 needs to be tested independently, does it then need to be filled and tested as one (1) whole structure after?	03 08 13 Tightness Testing of Structures	See response to question 47.
49.	The RFP states that the Owner has pre-purchased key plant equipment from Veolia/Suez, and that the provisions of the Veolia/Suez Purchase Order therefore cannot be negotiated by bidders. The Suez terms and conditions are very favorable to the vendor, and they appear to leave the Contractor with no rights or remedies against Suez for critical matters: for example, the P.O. says that the only delay damages payable by Suez are liquidated damages assessed by Owner – no delay damages are available to Contractor. Owner has also preselected equipment from several other vendors as stated in the RFP. These vendors have also included one-sided terms and conditions. Contractor cannot negotiate with these vendors as it would in a competitive situation. Will Owner consider adding a provision that Contractor's liability for these Scopes of Work will be co-extensive	RFP	No. Any additional costs related to terms and conditions should be included in the lump sum proposal.

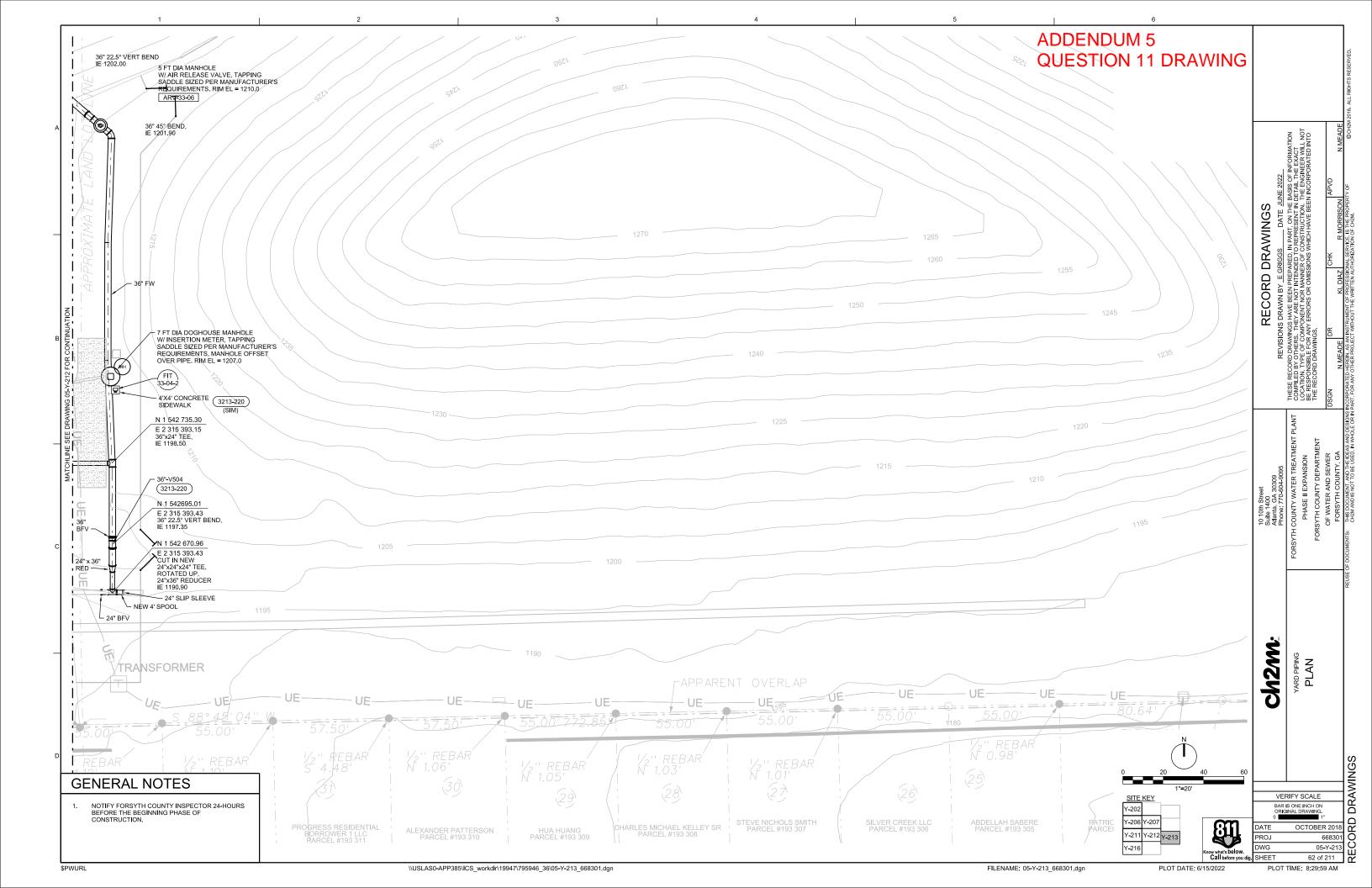
#	Question	Referenced Bid Section	Answers
	with that of the pre-selected vendors and be limited to the same amount as the vendors' liability?" Contractor would remain fully responsible for its own acts and omissions in connection with these Purchase Orders, such as delays or defects in installation.		
50.	Please confirm that all special inspections and construction material testing that falls outside of what is required by the building code will be provided by and paid for by the Owner.	01 45 33.4	See answer to question 42.
51.	Reference 00 11 19, Requests for Proposals, Tab 3 Business Plan / Approach. Paragraph 2 states in part, "Provide a list of proposed subcontractors, and the portion/trade of the work that would be assigned to them." Please confirm you are seeking a list of major subcontractors.	00 11 19	Confirmed.
52.	Drawing C-05-117-3A shows a jack and bore creek crossing. In lieu of jack and bore, does the contractor have the option to install the steel encasement pipe utilizing trenching and pump around method?	C-05-117-3A	The requirement is for pipe encasement under the creek, which can be installed by jack and bore or by trenching.
53.	Reference 00 73 00, Supplemental Conditions. SC 6.03.B.7 states the Contractor's General Liability coverage must eliminate the exclusion for property in the care, custody and control of the contractor. Please strike this requirement. This is an industry standard exclusion that insurers	00 73 00 Supplemental Conditions	The request to remove general liability as the care custody and control is acceptable as it will be part of the builder's risk policy.

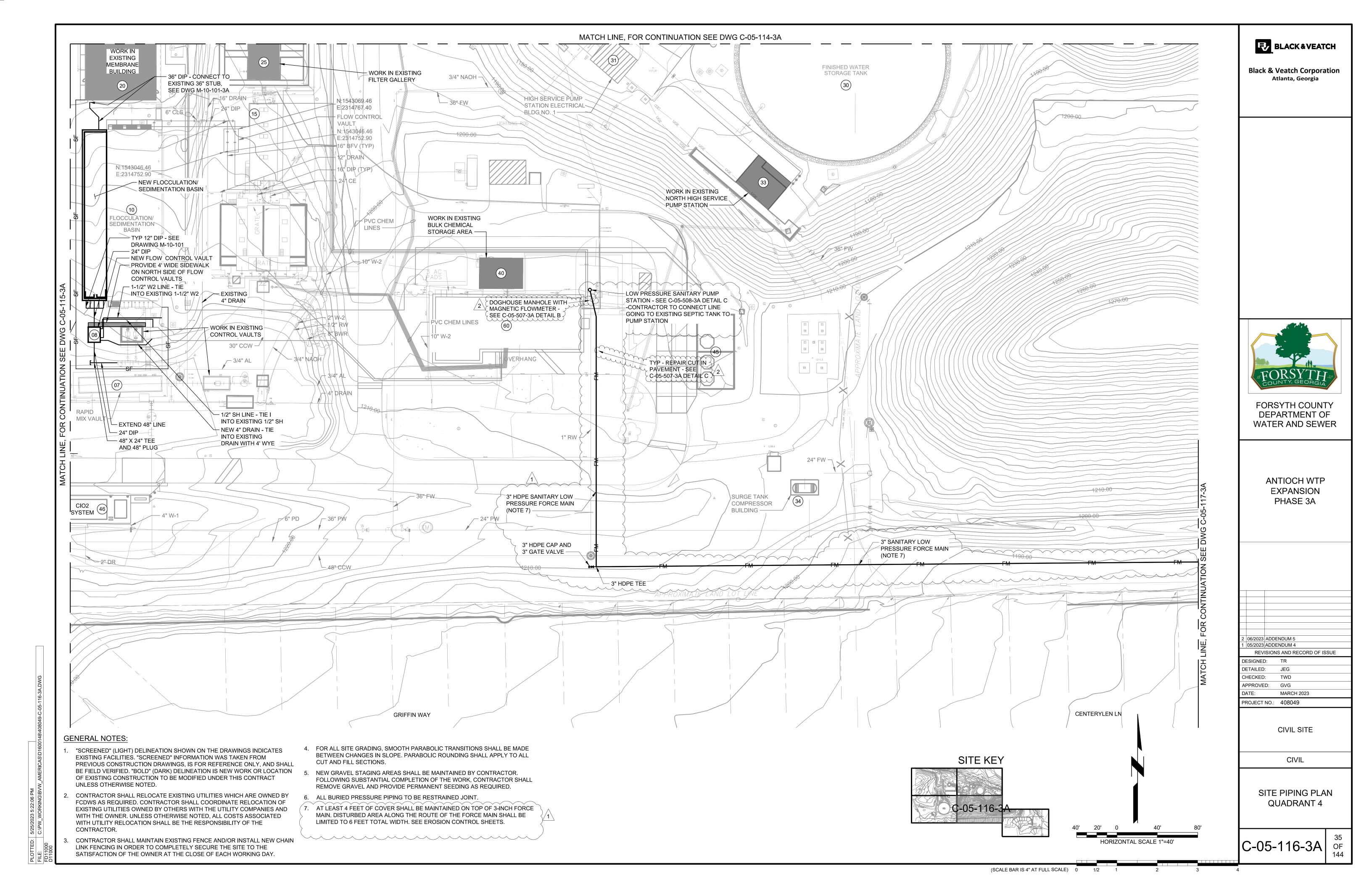
#	Question	Referenced Bid Section	Answers
	will not remove. Contractors can provide coverage for property in their care, custody and control through the builder's risk policy.		
54.	Drawing M-20-101-3A, General Note #1, states that "only larger items to be constructed "by others" are indicated on these plans for reference". Is the contractor to assume that the new membrane cassettes, new process pumps, and new blower assembly will be installed by others? Similarly, should the contractor assume that the new turbidimeter assembly shown on Drawing M-20-301-3A, and the new ejectors assembly shown on Drawing M-20-302-3A will be installed "by others"?	Drawing M-20- 101-3A	No – all of these items are to be installed by the Contractor.
55.	The scope of work shown at the North High Service Pump Station requires the contractor to install new 30" BFV and a restrained DMJ of the same diameter. Should the contractor assume that these new appurtenances will fit through the hatch installed at the top-slab, or that the scale of the hatches shown on Drawing M-33-101-3A are accurate, or will the Engineer provide as-built dimensions of these openings? Note that the covers are fixed in-place, which doesn't allow Contractors to verify at the site.	Drawing M-33- 101-3A	The Contractor will have access to the hatch above FWP No. 8 (approximate dimensions of 3'-0" by 6'-9") and the sidewalk door between FWPs No. 7 and 8 (approximate dimensions of 2'-6" by 3'-0"). Contractor to field verify dimensions.
56.	Please confirm that the Contractor can assume that the Owner's overhead bridge cranes can be utilized for installation of new equipment at the Membrane	Bridge Cranes	Contractor will be able to use the Owner's overhead cranes, with no additional testing or certifications. Contractor must coordinate this work with plant staff.

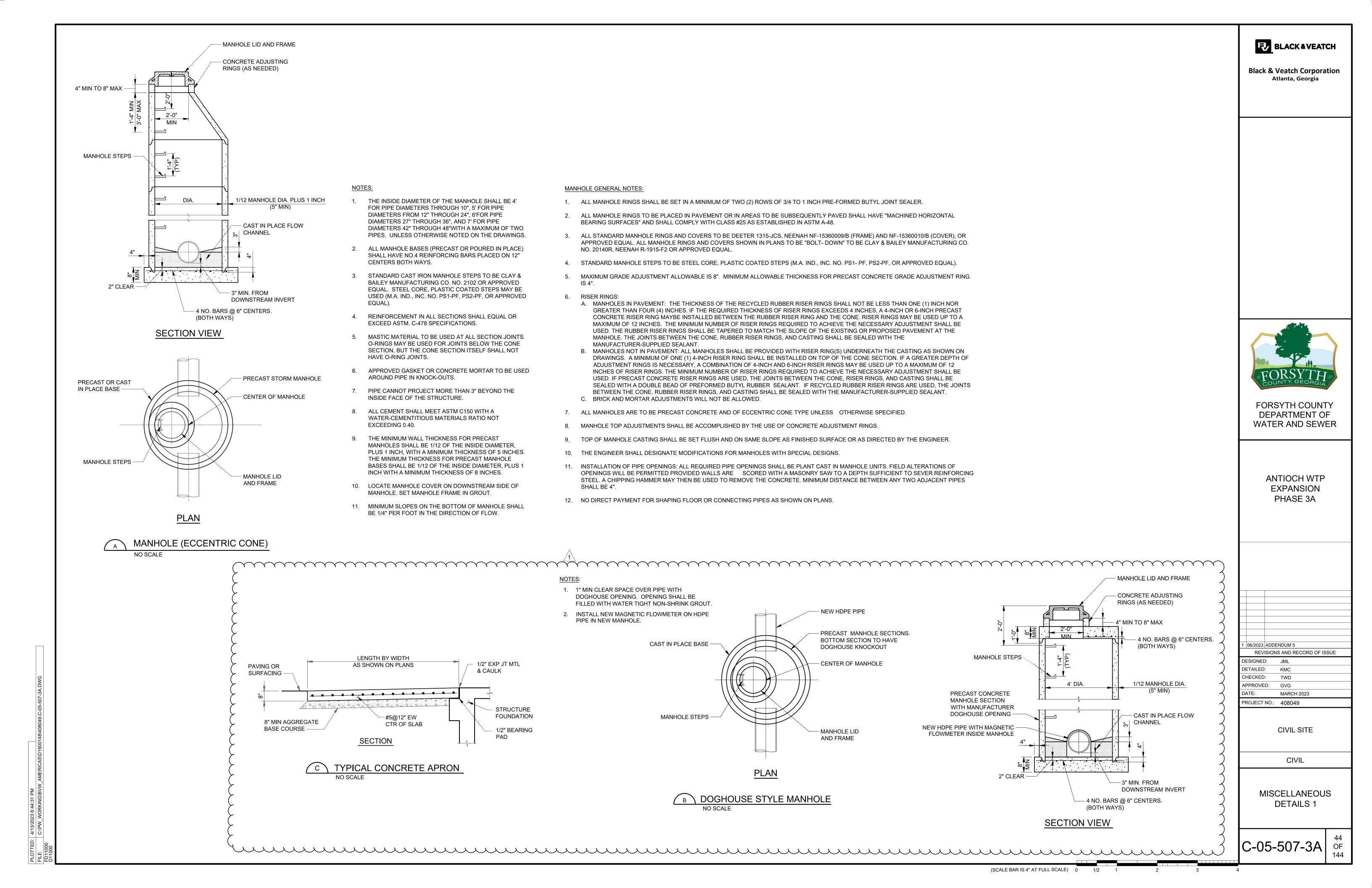
#	Question	Referenced Bid Section	Answers
	Building, as necessary. If so, please confirm if the contractor needs to carry any additional costs, such as load testing or recertifications, to be able to use the Owner's hoisting equipment.		
57.	The existing Membrane Building pump room has a high-build epoxy floor coating that will be compromised when the pump pads are demolished and replaced. Please confirm that the floor coatings listed in Specification 09 96 11 will be accepted on the new concrete in this area, and that the coatings will match reasonably with the existing floor coatings such that the contractor will not be required to re-coat more than the areas that are compromised during construction.	09 96 11	Confirmed. Note that per Paragraph 2-2.03, the epoxy for the concrete floors is to be nonskid.
58.	Please confirm that Doka, Efco, and Meva would also be acceptable formwork providers.	03 11 00	The listed providers are acceptable.
59.	General comment: The cover system will require structural support beams to clear span across the basin in the long (57' +/-) dimension of the basin. The service level point load imposed by the end of these structural supports is approx. 18kips. The concrete walls supporting the cover system by others must be structurally capable of supporting the dead, live and point load imposed by the installed cover.	13 22 50	Loads are noted; the drawings indicate a structural design spanning the short direction anchored to existing concrete walls adequate to support the load. Alternative configurations proposed by the Contractor will be considered. Any additional walls provided as part of the cover support system must be designed for the loads applied.
60.	General comment: Please consider removing the grated walkway at the	S-25-102-3A	The grated walkway can be removed if needed for installation of the cover

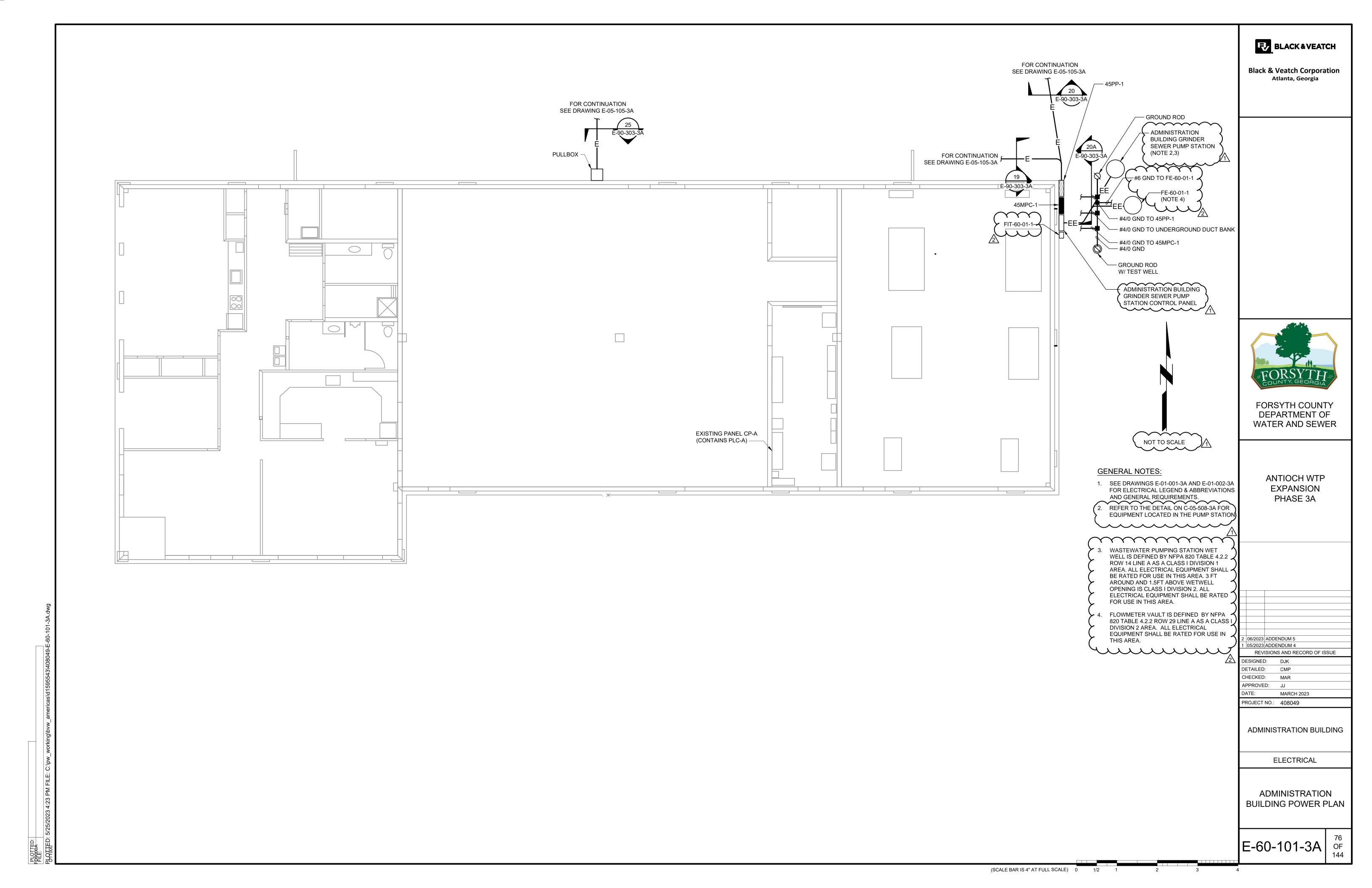
#	Question	Referenced Bid Section	Answers					
		Section						
	North end of the Filter Basin for		system but must be replaced with a					
	aluminum cover clearance.		walkway that can traverse the area.					
61.	Part 2.2 B. 1. The Specification lists a Uniform Roof live load of 100-psf and a Uniform Load Distributed over total panel surface area of 60-psf. Both requirements are higher than our standard aluminum cover product specification of 50-psf. Please consider reducing the live load requirement for the entire cover system as a whole to 50 pounds per square foot.	13 22 50	Load may be reduced to 50 pounds per square foot.					
62.	Part 2.2 B. 1. Please consider raising the concentrated load requirement listed from 30psf to 300psf.	13 22 50	Confirmed. Change the concentrated load applied simultaneously on 1 ft ² area at any point in the panel to 300 psf.					
63.	Part 2.4 A. Closure Panels Aluminum Sheet – Please revise this requirement to allow an extruded cover system. A sheet metal panel cover will pond water.	13 22 50	An extruded cover system can be allowed.					
64.	Part 2.4 A. Access Hatches. Please consider removing this requirement altogether or removing the requirement for raised curbs. No hatches are shown on the drawings.	13 22 50	See answer to question 69.					
65.	Part 2.4 C. Please consider removing "skylight curbs" from the specification. None are identified on the drawings.	13 22 50	Remove paragraph 2.4.C from the specification.					
66.	Part 2.4 C. Please consider removing "drainage gutters" from the specification. The installed cover will overlap the top wall of concrete by approx. 6-inches on all sides. Rain runoff will flow toward	13 22 50	Remove paragraph 2.4.C from the specification.					

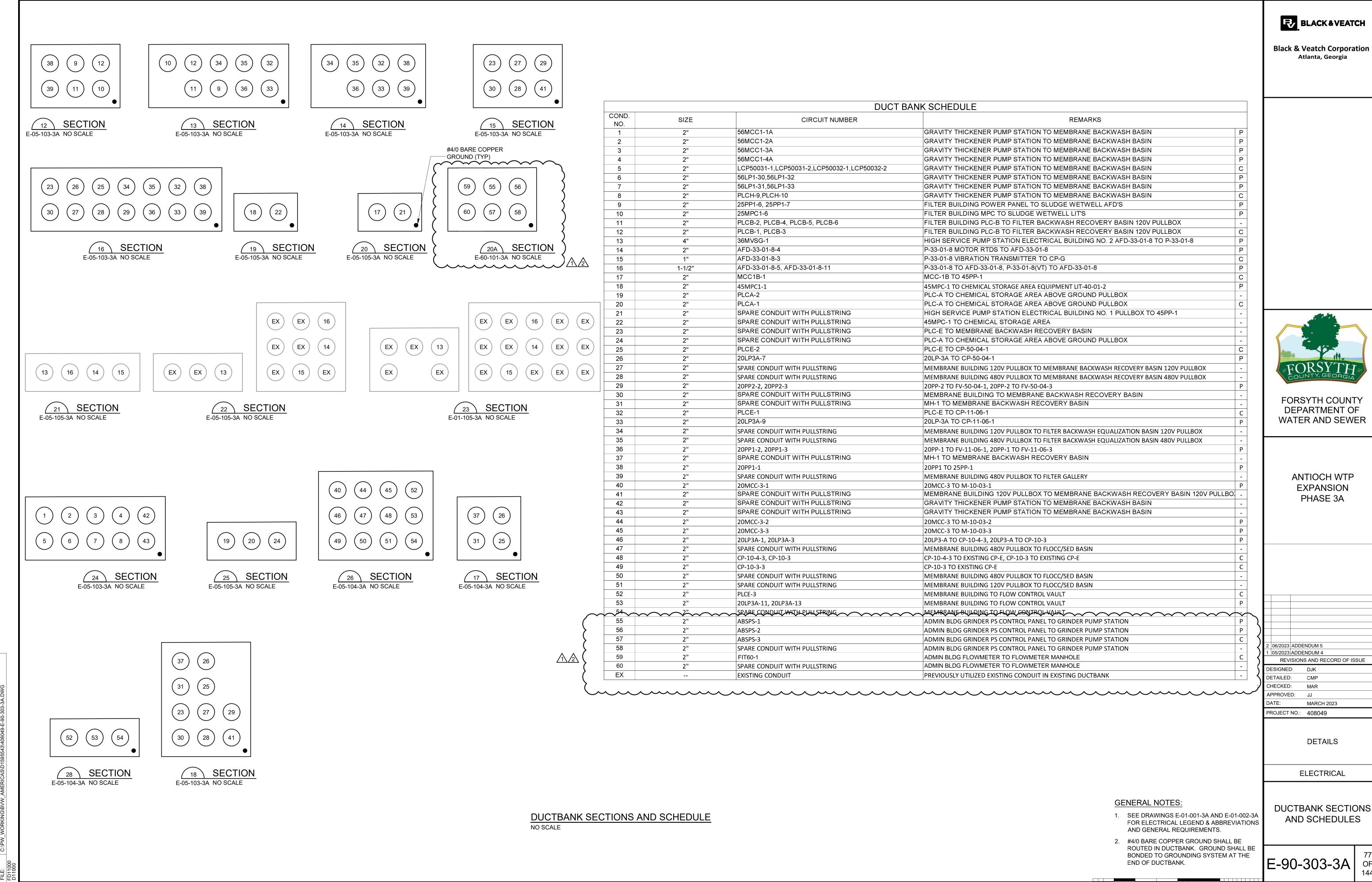
#	Question	Referenced Bid Section	Answers
	the perimeter off of the cover system.		
67.	Part 2.4 C. Please consider removing the anodizing requirement from the specification. The structural support beams of the cover cannot be anodized due to their size. The individual panels of the cover can be anodized, but the process will add cost and lead time to the covers.	13 22 50	Remove paragraph 2.4.C from the specification.
68.	Part 2.5 C. Drainage Gutters – Please consider removing this requirement. Rain gutters are not available with the aluminum cover design as the cover will overlap the top wall of the concrete.	13 22 50	Remove paragraph 2.5.C from the specification. No drainage gutters will be required.
69.	Part 2.5 D. Access Hatches. Please consider removing this requirement. No hatches are shown on the drawings.	13 22 50	Remove paragraph 2.5.D from the specification. No access hatches will be required.
70.	Will a flowmeter be needed for the low pressure sewer pump station?	40 61 11A 40 71 00 C-05-116-3A C-05-507-3A E-60-101-3A E-90-303-3A E-90-609-3A E-90-616-3A I-90-504-3A	Provide a 3-inch magnetic flowmeter on the 3-inch low pressure sewer line, downstream of the low-pressure sewer pump station, per the new and edited specifications and edited drawings. Flow measurements shall be capable to 25 gpm. Install the flowmeter at an elevation in an upwardly sloping pipe section to ensure full pipe flow conditions at the meter. Work includes the addition of a doghouse manhole with project drawings attached. Also, notes and a detail have been added for pavement replacement.



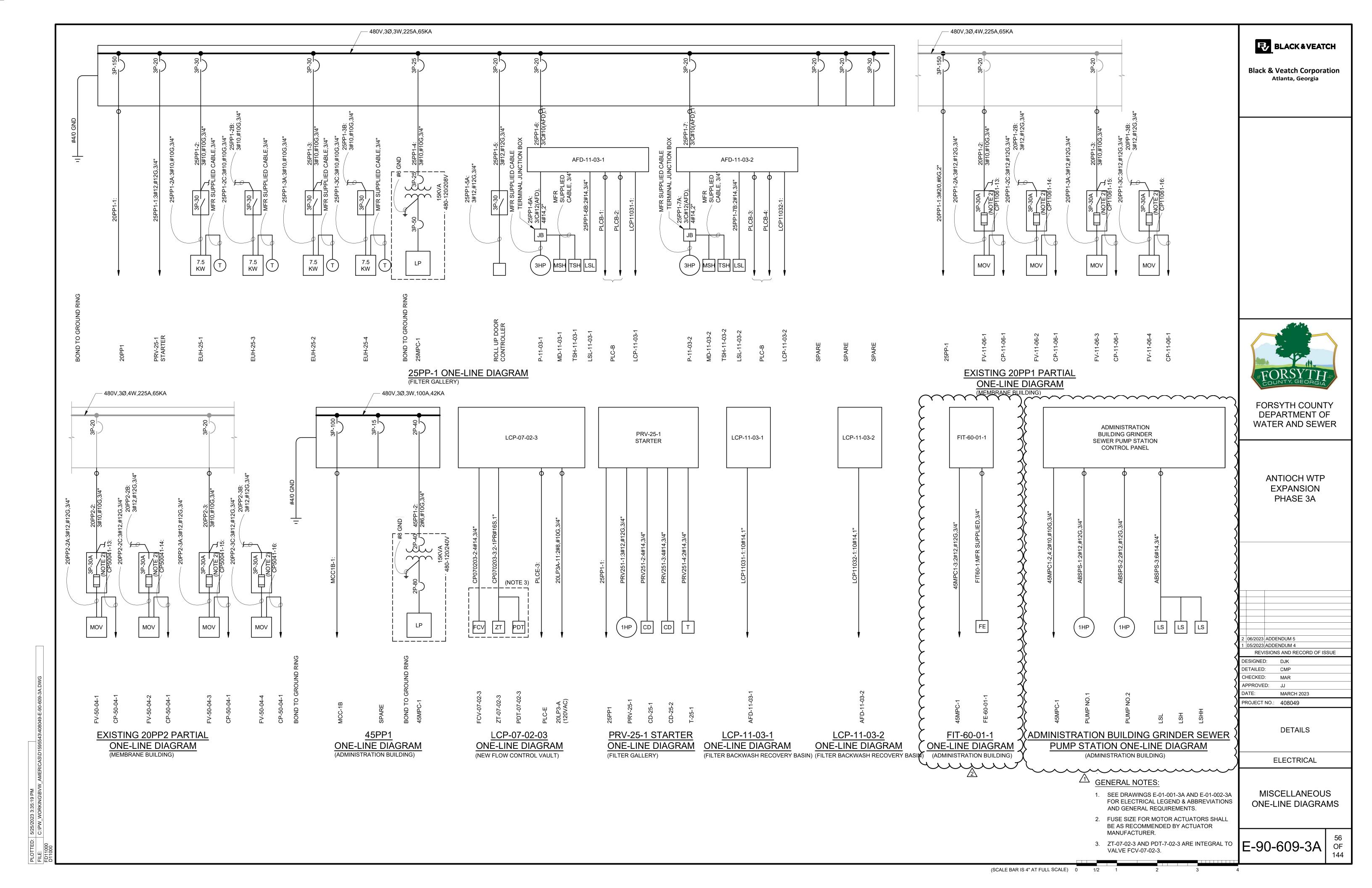


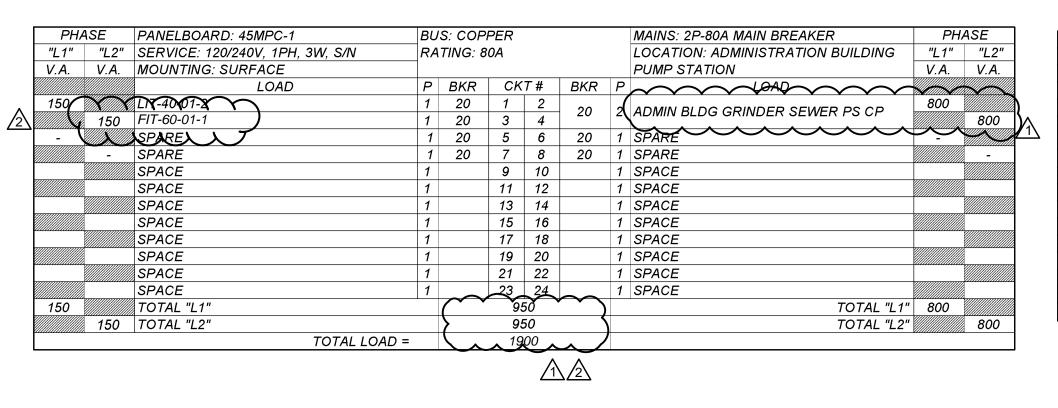






(SCALE BAR IS 4" AT FULL SCALE) 0





			PANELBOARD: 25MPC-1		BUS:	COP	PER		M	AINS: 3P-50A MAIN BREAKER			
	PHASE		SERVICE: 120/208V, 3PH, 4W, S/N		RATII	NG: 1	100A		LC	CATION: FILTER COMPLEX		PHASE	
"A"	"B"	"C"	MOUNTING: SURFACE								"A"	"B"	"C"
V.A.	V.A.	V.A.	LOAD	P	BKR	CK	T #	BKR	Р	LOAD	V.A.	V.A.	V.A.
200			LOWER LEVEL LIGHTS	1	20	1	2	20	1	LOWER LEVEL LIGHTS	250		
	125		WALKWAY LIGHTS	1	20	3	4	20	1	LOWER LEVEL RECEPTACLES		360	
		360	WALKWAY RECEPTACLES	1	20	5	6	20	1	LIT-11-03-1,LIT-11-03-2			300
500			DOOR CONTROLLER SCP-25-01	1	20	7	8	20	1	SPARE	_		
			SPACE	1		9	10		1	SPACE			
			SPACE	1		11	12		1	SPACE			
			SPACE	1		13	14		1	SPACE			
			SPACE	1		15	16		1	SPACE			
			SPACE	1		17	18		1	SPACE			
700			TOTAL "A"			95	50			TOTAL "A"	250		
	125		TOTAL "B"			48	35			TOTAL "B"		360	
		360	TOTAL "C"			66	<i>50</i>			TOTAL "C"			300
			TOTAL	=		2095							

25MPC-1 PANELBOARD SCHEDULE

NO SCALE

45MPC-1 PANELBOARD SCHEDULE

NO SCALE

			PANELBOARD: 56LP1		BUS:	COP	PER		MA	INS: 3P-100A MAIN BREAKER			
	PHASE		SERVICE: 120/208V, 3PH, 4W, S/	N	RATI	NG:	100/	4	LO	CATION: THICKENED SLUDGE	PHASE		
"A"	"B"	"C"	MOUNTING: SURFACE						PU	MP STATION ELECTRICAL ROOM	"A"	"B"	"C"
V.A.	V.A.	V.A.	LOAD	Р	BKR	CKT	Т #	BKR	Р	LOAD	V.A.	V.A.	V.A.
700			TSPS UPPER LEVEL LIGHTING	1	20	1	2	20	1	TSPS LOWER LEVEL LIGHTS	600		
	400		TSPS UPPER LEVEL RECEPTACLES	1	20	3	4	20	1	TSPS LOWER LEVEL RECEPTACLES		500	
		500	PLC CP-H	1	20	5	6	20	1	SUMP PUMP P-56-09			500
400			LIT-55-01-1	1	20	7	8	20	1	FIT-56-02	400		
	400		FE/FIT-55-03	1	20	9	10	20	2	56 - AHU - 2		300	
		300	56 - AHU - 1	2	20	11	12	-	-	-			300
300			-	-	-	13	14	35	2	56 - ACCU - 1	2500		
	2500		56 - ACCU - 2	2	35	15	16	-	-	-		2500	
		2500	-	-	-	17	18	20	1	GRAVITY THICKENER 1 LIGHTS			400
500			CP-54-01	1	20	19	20	20	1	GRAVITY THICKENER 1 RECEPT	200		
			FUTURE GRAVITY THICKENER LIGHT	1	20	21	22	20	1	55HT - 1		400	
			FUTURE GRAVITY THICKENER RECPT	1	20	23	24	20	1	55HT-2			400
400			55HT-4	1	20	25	26	20	1	55HT-3	400		
	400		TSPS EXTERIOR LIGHTS	1	20	27	28	20	1	TSPS EXTERIOR RECEPTACLES		400	
		500	SCP - 56	1	20	29	30	20	1	LCP-50-03-1			150
50			LIT-50-03-1	1	20	31	32	20	1	LCP-50-03-2	150		
	50		LIT-50-03-2	1	20	33	34	20	1	SPARE			
			SPARE	1	20	35	36	20	1	SPARE			
			SPARE	1	20	37	38	20	1	SPARE			
			SPARE	1	20	39	40	20	1	SPARE			
			SPARE	1	20	41	42	20	1	SPARE			
2350			TOTAL "A"			66	00		TOTAL "A"		4250		
	3750		TOTAL "B"			7850				TOTAL "B"		4100	
		3800	TOTAL "C"			55	50			TOTAL "C"			1750
			TOTAL	=		200	000						·

56LP1 PANELBOARD SCHEDULE

GENERAL NOTE:

1. SEE DRAWINGS E-01-001-3A AND E-01-002-3A FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.



Black & Veatch Corporation Atlanta, Georgia

FORSYTH COUNTY, GEORGIA	

FORSYTH COUNTY DEPARTMENT OF WATER AND SEWER

> ANTIOCH WTP **EXPANSION** PHASE 3A

2 06/2023 ADDENDUM 5 05/2023 ADDENDUM 4 REVISIONS AND RECORD OF ISSUE

DESIGNED: DJK DETAILED: CMP CHECKED: APPROVED:

MARCH 2023 PROJECT NO.: 408049

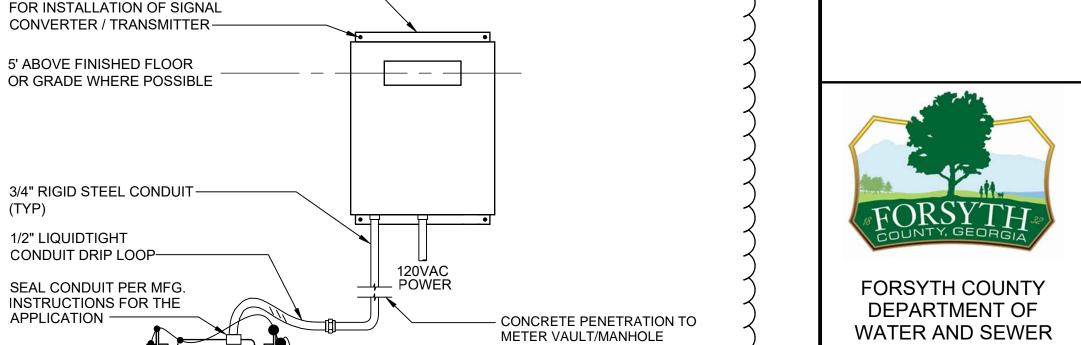
DETAILS

ELECTRICAL

PANELBOARD SCHEDULES

E-90-616-3A OF 144

Black & Veatch Corporation Atlanta, Georgia



EARTH GRD. SEE ELECTRICAL

DRAWINGS FOR CONNECTION

☐ MAGNETIC FLOW ELEMENT

2. LENGTH OF MFR CABLE SHALL BE OF SUFFICIENT LENGTH TO PROVIDE A

CONTINUOUS CONNECTION (NOT SPLICED) CONNECTION TO THE TRANSMITTER.

3. MAGNETIC FLOWMETER, CONDUIT, FITTINGS AND SEALS SHALL BE SUITABLE FOR

C MAGNETIC FLOWMETER

INSTALLATION IN CLASS 1, DIVISION 2 AREA.

1. PIPE TO BE SUPPORTED ON BOTH SIDES OF METER.

NO SCALE

SIGNAL CONVERTER / TRANSMITTER —

INSTRUMENT MOUNTING DETAIL

REFER TO OUTDOOR

(TYP)

1/2" LIQUIDTIGHT

APPLICATION -

GROUNDING -

RING (TYP)

ANTIOCH WTP **EXPANSION** PHASE 3A

WATER AND SEWER

06/2023 ADDENDUM 5

REVISIONS AND RECORD OF ISSUE DESIGNED: MR DETAILED: MR CHECKED: APPROVED:

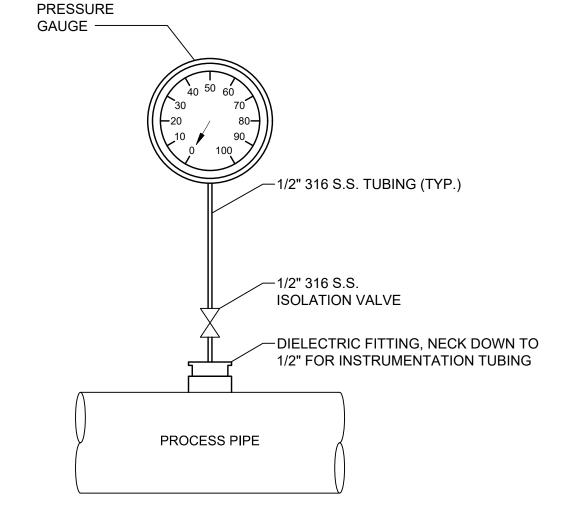
MARCH 2023 PROJECT NO.: 408049

INSTRUMENTATION

DETAILS

INSTALLATION DETAILS 2 OF 2

I-90-504-3A



A PRESSURE GAUGE NO SCALE

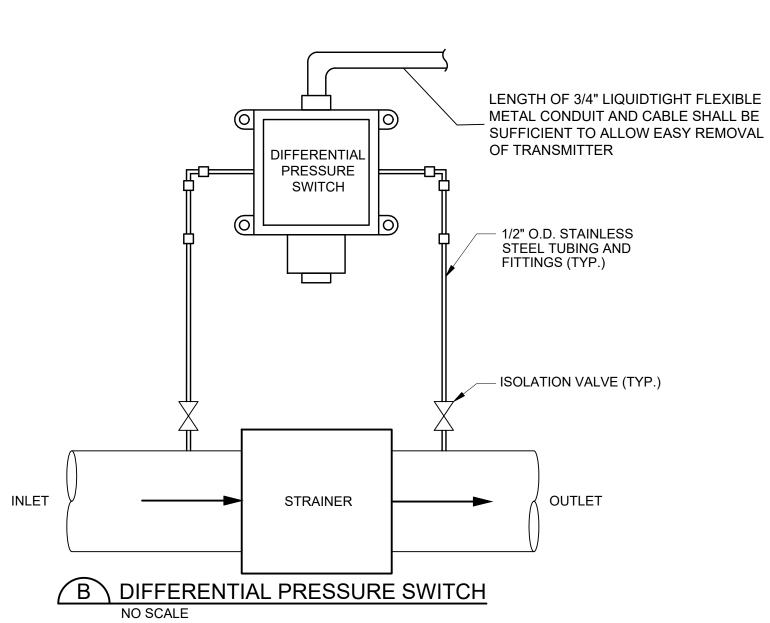
NOTES:
1. PROVIDE MFR BRACKETS, UNISTRUTS, OR OTHER SUPPORTS AS NECESSARY.

2. DETAIL SHOWS SCHEMATIC REPRESENTATION OF PRESSURE CONNECTIONS. 3. INSTRUMENTATION SHALL BE MOUNTED AS TO BE EASILY VISIBLE AND SERVICED.

NOTES:
1. PROVIDE MFR BRACKETS, UNISTRUTS, OR OTHER SUPPORTS AS NECESSARY.

2. DETAIL SHOWS SCHEMATIC REPRESENTATION OF PRESSURE CONNECTIONS.

3. INSTRUMENTATION SHALL BE MOUNTED AS TO BE EASILY VISIBLE AND SERVICED.



tem. This is an arbitrary sequential number which is for reference only.

Type. ISA (or similar) tag representing the function of the instrument.

Loop. This is the sequential number assigneed to the instrument as shown on the P&IDs.

Tag. This is the ISA (or similar) alpha tag representing the function of the instrument.

Service Description. This is the description of the instrument service.

Device Type. This is the linstrument device type and matches the description as listed in the specification.

Size. Element size for flow applications or size as required by specialized instruments. A size is given if applicable (e.g., flow meters)

Output Type. This generally will be '4-20 mA' or "Dry Contact". It could also be a serial output for smart devices (such as HART or FLD-BUS) but only if the serial output is the primary I/O interface.

Output Range. This is the calibrated range for analog devices or the trip point(s) for discrete devices.

Power Type. This will typically be '2-vier' for devices which are loop powered from the PLC enclosure, or '4-wire' for devices which are loop powered from the PLC enclosure, or '4-wire' for devices which are powered form external power supplies, unless noted otherwise.

Drawing. This is the drawing number of where the device is shown.

Specification. This column may include a cross reference to another specification section where applicable or to a note which provides additional information. Notes are appended to the end of the device schedule listings. Installation Detail. Reference to Drawing Number and index for specific installation detail.

Remarks. This column may include additional instrument information such as "shipped loose".

Notes:

1) Flow meter transmitter display shall show instantanous volumetric flow rate and totalized flow.
2) Located in classified area. Refer to referenced Specification and Electrical Drawings for specific area classification.

Item T	vpe Loop	Tag	Service Description	Device Type	Size	Output Type	Output Range	Power Type	Drawing	Specification	Installation Detail	Remarks
1 IF	11-03-1	LE-11-03-1	FILTER BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL ELEMENT	N/A	BY SENSOR MFR	BY SENSOR MFR	BY SENSOR MFR	I-11-601-3A	40 72 00	I-90-503-3A/D	
2 LI	Г 11-03-1	LIT-11-03-1	FILTER BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL TRANSMITTER	N/A	4 - 20 mADC	1185.6 FT EL - 1204.5 FT EL	4-WIRE	I-11-601-3A	40 72 00	I-90-503-3A/D	
3 LS	L 11-03-1	LSL-11-03-1	FILTER BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL LOW	WEIGHTED FLOAT TYPE LEVEL SWITCH	N/A	DRY CONTACT	1188.0 FT EL (CLOSES ON RISING LEVEL)	DRY CONTACT	I-11-601-3A	40 72 00	I-90-503-3A/C	COORDINATE ELEVATION WITH PUMP MFR
4 HS		HS-11-06-1	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-11-601-3A	46 43 12	N/A	
5 ZS	F 11-06-1	ZSF-11-06-1	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
6 7S		ZSR-11-06-1	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
7 LE	11-03-2	LE-11-03-2	FILTER BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL ELEMENT	N/A		BY SENSOR MFR	BY SENSOR MFR	I-11-601-3A	40 72 00	I-90-503-3A/D	
8 LI		LIT-11-03-2	FILTER BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL TRANSMITTER	N/A	4 - 20 mADC	1185.6 FT EL - 1204.5 FT EL	4-WIRF	I-11-601-3A	40 72 00	I-90-503-3A/D	
9 LS		LSL-11-03-2	FILTER BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL LOW	WEIGHTED FLOAT TYPE LEVEL SWITCH	N/A	DRY CONTACT	1188.0 FT EL (CLOSES ON RISING LEVEL)	DRY CONTACT	I-11-601-3A	40 72 00	I-90-503-3A/C	COORDINATE ELEVATION WITH PUMP MFR
10 HS		HS-11-06-2	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-11-601-3A	46 43 12	N/A	
11 ZS	F 11-06-2	ZSF-11-06-2	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
12 ZS		ZSR-11-06-2	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
13 PC		PDT-07-02-3	FLOCCULATION/SEDIMENTATION BASIN NO. 3 FLOW CONTROL VALVE DIFFERENTIAL PRESSURE	DIFFERENTIAL PRESSURE TRANSMITTER	N/A		0 - XX PSI (SEE REMARKS)	2-WIRE	I-08-601-3A	40 05 73.13	N/A	INTEGRAL TO VALVE FCV-07-02-3. RANGE BY SUPPLIER
14 7T	07-02-3	7T-07-02-3	FLOCCULATION/SEDIMENTATION BASIN NO. 3 FLOW CONTROL VALVE POSITION	POSITION TRANSMITTER	N/A	4 - 20 mADC	0 - 100% OPEN	2-WIRF	I-08-601-3A	40 05 73.13	N/A	INTEGRAL TO VALVE FCV-07-02-3
15 HS	0. 0-0	HS-10-04-3	SEDIMENTATION BASIN NO. 3 SLUDGE REMOVAL UNIT EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-10-602-3A	46 43 12	N/A	INTEGRAL TO VALVETEV 07 02 3
16 ZS		ZSF-10-04-3	SEDIMENTATION BASIN NO. 3 SLUDGE REMOVAL UNIT FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-10-602-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
17 75		ZSR-10-04-3	SEDIMENTATION BASIN NO. 3 SLUDGE REMOVAL UNIT REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-10-602-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
18 HS		HS-11-06-3	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLE
19 7S		7SF-11-06-3	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 FORWARD END OF TRAVEL	POSITION SENSOR	NI/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
20 ZS		ZSR-11-06-3	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
20 23 21 HS		HS-11-06-4	FILTER BACKWASH EQUALIZATION BASIN SLODGE REMOVAL UNIT NO. 4 FMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAE TO CABLE DRIVE ASSEMBLE
22 ZS		ZSF-11-06-4	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 4 FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-11-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
23 ZS		ZSR-11-06-4			N/A			DRY CONTACT				INTEGRAL TO CABLE DRIVE ASSEMBLY
23 ZS		HS-33-01-8	FILTER BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 4 REVERSE END OF TRAVEL HIGH SERVICE PUMP NO. 8 ENABLE-DISABLE	POSITION SENSOR SELECTOR SWITCH, 2-POSITION	N/A N/Δ	DRY CONTACT	BY SLUDGE REMOVAL MFR NORMALLY OPEN CONTACT (BOTH POSITIONS)	DRY CONTACT	I-11-601-3A I-33-601-3A	46 43 12 26 05 11	N/A N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
					,,,		, , ,	N/A				CALLOS CLALL DE LIQUID ELLES (MEATLESPERGE
25 PI	33-01-8	PI-33-01-8	HIGH SERVICE PUMP NO. 8 DISCHARGE PRESSURE	PRESSURE GAUGE	4-1/2"		0 - 200 PSI	,	I-33-601-3A	40 72 00	M-33-301-3A/3	GAUGE SHALL BE LIQUID FILLED/WEATHERPROOF
26 PS	H 33-01-8	PSH-33-01-8	HIGH SERVICE PUMP NO. 8 DISCHARGE PRESSURE HIGH	PRESSURE SWITCH	N/A		175 PSIG (OPENS ON RISING LEVEL)	DRY CONTACT	I-33-601-3A	40 72 00	M-33-301-3A/3	
27 VI	33-01-8A	VT-33-01-8A	HIGH SERVICE PUMP NO. 8 X-AXIS VIBRATION	AXIAL POSITION VIBRATION TRANSMITTER	N/A	4 - 20 mADC	0-0.5 IPS (TRIP AT @ 0.17 IPS)	2-WIRE	I-33-601-3A	43 23 31.17	N/A	
28 VT	33-01-8B	VT-33-01-8B	HIGH SERVICE PUMP NO. 8 Y-AXIS VIBRATION	AXIAL POSITION VIBRATION TRANSMITTER	N/A		0-0.5 IPS (TRIP AT @ 0.17 IPS)	2-IRE	I-33-601-3A	43 23 31.17	N/A	
29 LE	40-01-2	LE-40-01-2	SODIUM HYDROXIDE STORAGE TANK NO. 2 LEVEL	ULTRASONIC LEVEL ELEMENT	N/A	BY SENSOR MFR	BY SENSOR MFR	BY SENSOR MFR	I-40-601-3A	40 72 00	I-90-503-3A/A	
30 LG		LG-40-01-2	SODIUM HYDROXIDE STORAGE TANK NO. 2 SIGHT GAUGE	SIGHT GAUGE	N/A	N/A	0.5 - 17.5 FT (REFERENCED TO TANK)	N/A	I-40-601-3A	43 05 41	N/A	APPROXIMATE LEVEL RANGE OF GAUGE
31 LI		LIT-40-01-2	SODIUM HYDROXIDE STORAGE TANK NO. 2 LEVEL	ULTRASONIC LEVEL TRANSMITTER	N/A		0 - 17.5 FT (REFERENCED TO TANK)	4-WIRE	I-40-601-3A	40 72 00	I-90-503-3A/A	
32 LS	H 40-02-1	LSH-40-02-1	SODIUM HYDROXIDE STORAGE TANKS CONTAINMENT AREA LEAK DETECTED	FLOOD TYPE LEVEL SWITCH	N/A	DRY CONTACT	FIELD LOCATE (OPENS ON RISING LEVEL)	DRY CONTACT	I-40-601-3A	40 72 00	I-90-503-3A/B	LOCATE IN EXISTING CONTAINMENT SUMP
33 LE	50-03-1	LE-50-03-1	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL ELEMENT	N/A	BY SENSOR MFR	BY SENSOR MFR	BY SENSOR MFR	I-50-601-3A	40 72 00	I-90-503-3A/D	
34 LI		LIT-50-03-1	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL TRANSMITTER	N/A		1178.2 FT EL - 1198.0 FT EL	4-WIRE	I-50-601-3A	40 72 00	I-90-503-3A/D	
35 LS		LSL-50-03-1	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 1 SLUDGE WETWELL LEVEL LOW	WEIGHTED FLOAT TYPE LEVEL SWITCH	N/A	DITI CONTACT	1180.5 FT EL (CLOSES ON RISING LEVEL)	DRY CONTACT	I-50-601-3A	40 72 00	I-90-503-3A/C	
36 LE	50-03-2	LE-50-03-2	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL ELEMENT	N/A	BY SENSOR MFR	BY SENSOR MFR	BY SENSOR MFR	I-50-601-3A	40 72 00	I-90-503-3A/D	
37 LI		LIT-50-03-2	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL	ULTRASONIC LEVEL TRANSMITTER	N/A	4 - 20 mADC	1178.2 FT EL - 1198.0 FT EL	4-WIRE	I-50-601-3A	40 72 00	I-90-503-3A/D	
38 LS		LSL-50-03-2	MEMBRANE BACKWASH EQUALIZATION BASIN NO. 2 SLUDGE WETWELL LEVEL LOW	WEIGHTED FLOAT TYPE LEVEL SWITCH	N/A	DRY CONTACT	1180.5 FT EL (CLOSES ON RISING LEVEL)	DRY CONTACT	I-50-601-3A	40 72 00	I-90-503-3A/C	
39 HS		HS-50-04-1	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-50-601-3A	46 43 12	N/A	
40 ZS		ZSF-50-04-1	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 FORWARD END OF TRAVEL	POSITION SENSOR	N/A		BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
41 ZS		ZSR-50-04-1	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 1 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
42 HS		HS-50-04-2	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A		NORMALLY CLOSED CONTACT	DRY CONTACT	I-50-601-3A	46 43 12	N/A	
43 ZS		ZSF-50-04-2	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
44 ZS		ZSR-50-04-2	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 2 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
45 HS		HS-50-04-3	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A		NORMALLY CLOSED CONTACT	DRY CONTACT	I-50-601-3A	46 43 12	N/A	
46 ZS		ZSF-50-04-3	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 FORWARD END OF TRAVEL	POSITION SENSOR	N/A		BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
47 ZS		ZSR-50-04-3	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 3 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
48 HS		HS-50-04-4	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 4 EMERGENCY STOP	EMERGENCY STOP PUSHBUTTON	N/A	DRY CONTACT	NORMALLY CLOSED CONTACT	DRY CONTACT	I-50-601-3A	46 43 12	N/A	
49 ZS	F 50-04-4	ZSF-50-04-4	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 4 FORWARD END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
50 ZS		ZSR-50-04-4	MEMBRANE BACKWASH EQUALIZATION BASIN SLUDGE REMOVAL UNIT NO. 4 REVERSE END OF TRAVEL	POSITION SENSOR	N/A	DRY CONTACT	BY SLUDGE REMOVAL MFR	DRY CONTACT	I-50-601-3A	46 43 12	N/A	INTEGRAL TO CABLE DRIVE ASSEMBLY
51 PE		PDSH-7640C	SELF-CLEANING STRAINER 3 (STR-7600C) DIFFERENTIAL PRESSURE HIGH	PRESSURE SWITCH, DIFFERENTIAL	_	DRY CONTACT	4 PSI (OPENS ON RISING PRESSURE)	DRY CONTACT	I-20-601-3A	46 61 73	I-90-504-3A/B	
52 PI	7640C	PI-7640C	SELF-CLEANING STRAINER 3 (STR-7600C) OUTLET PRESSURE	PRESSURE GAUGE	4-1/2"		0 - 15 PSI	N/A	I-20-601-3A	46 61 73	I-90-504-3A/A	
53 PI	7641C	PI-7641C	SELF-CLEANING STRAINER 3 (STR-7600C) INLET PRESSURE	PRESSURE GAUGE	4-1/2"	N/A	0 - 15 PSI	N/A	I-20-601-3A	46 61 73	I-90-504-3A/A	
54 FE	60-01-1	FE-60-01-1	ADMINISTRATION BUILDING LOW PRESSURE SANITARY PUMP STATION DISCHARGE FLOW	MAGNETIC FLOWMETER	N/A	N/A	N/A	N/A	E-60-101-3A	40 71 00	I-90-504-3A/C	
55 FI	T 60-01-1	FIT-60-01-1	ADMINISTRATION BUILDING LOW PRESSURE SANITARY PUMP STATION DISCHARGE FLOW	MAGNETIC FLOWMETER TRANSMITTER	3"	4 - 20 mADC	0 - 25 GPM	4-WIRE	E-60-101-3A	40 71 00	I-90-504-3A/C	SEE NOTES 1,2

Section 40 71 00 FLOW INSTRUMENTS

PART 1 - GENERAL

1-1. <u>SCOPE</u>. The Flow Instrument Section covers the furnishing of flow instruments and accessories required for the Instrumentation and Control System as specified herein or as indicated on the Drawings.

Equipment and services provided under this section shall be subject to the Instrumentation and Control System section. This section shall be used and referenced only in conjunction with the Instrumentation and Control System section. Supplementing the Instrumentation and Control System section, instrument data, special requirements, and options are indicated on the Drawings or the Instrument Device Schedule.

When multiple instruments of a particular type are specified, and each requires different features, the required features are described on the Drawings or the Instrument Device Schedule.

1-2. <u>DESIGN CRITERIA</u>. Each device shall be a pre-assembled, packaged unit. Upon delivery to the work site, each device or system shall be ready for installation with only minor piping and electrical connections required by Contractor.

Primary elements shall derive any required power from the transmitter, unless otherwise indicated.

The instruments shall be installed to measure, monitor, or display the specified process at the ranges and service conditions indicated on the Drawings or as indicated in the Instrument Device Schedule. The instruments shall be installed at the locations indicated on the Drawings or in the Instrument Device Schedule.

Where possible, each instrument shall be factory wet flow calibrated to the full scale flow range of the sensors or calibration ranges indicated on the Drawings or in the Instrument Device Schedule. Transmitters or similar measurement instruments shall be calibrated using National Institute of Standards and Technology (NIST) approved bench calibration procedures, when such procedures exist for the instrument type. Calibration and configuration data shall be stored digitally in each device, including the instrument tag designation indicated on the Drawings or Instrument Device Schedule.

1-3. <u>SUBMITTALS</u>. Submittals shall be made as specified in the Instrumentation and Control System section.

1-4. <u>SHIPMENT, PROTECTION, AND STORAGE</u>. Equipment provided under this section shall be shipped, protected, and stored as specified in the Instrumentation and Control System section. Identification of packaging shall be as specified in the Instrumentation and Control System section.

PART 2 - PRODUCTS

- 2-1. <u>GENERAL</u>. The following paragraphs provide minimum device requirements. The Drawings or Instrument Device Schedule shall be used to determine any additional instrument options, requirements, or service conditions.
- 2-1.01. <u>Interconnecting Cable</u>. For instruments where the primary element and transmitter are physically separated, interconnecting cable from the element to the transmitter shall be provided. The cable shall be the type approved by the instrument manufacturer for the intended purpose of interfacing the element to the transmitter. Length of cable shall be a minimum of three meters or as indicated on the Drawings or in the Instrument Device Schedule. The interconnecting cable shall be provided in the length necessary for installation. Splices shall not be allowed in the installed cable.
- 2-1.02. <u>Programming Device</u>. For instruments that require a dedicated programming device for calibration, maintenance, or troubleshooting, one such programming device shall be provided for each Owner facility (quantity required shall be as indicated in the Instrumentation and Control System section). The programming device shall include appropriate operation manuals and shall be included in the training requirements. For systems that allow the programming device functions to be implemented in software, running on a laptop computer, the software shall be provided instead of the programming device.
- 2-1.03. Configuration Software/Serial Interface. Devices indicated as requiring a serial interface shall be provided with all accessories required to properly communicate over the serial link. As a minimum, an appropriate cable shall be provided to allow the transmitter serial interface to be connected to a personal computer. One licensed copy of the diagnostic/interface software shall be provided for each Owner facility (quantity required shall be as indicated in the Instrumentation and Control System section). Software shall be capable of running under the Windows 10 operating system. If the software furnished performs the same functions as the programming device, specified elsewhere, then the programming device shall not be furnished.

2-2. FLOW INSTRUMENTATION.

2-2.01. Magnetic Flowmeters, Signal Converters, and Accessories.

2-2.01.01. Magnetic Flowmeter. The magnetic flowmeter shall be a completely obstructionless, in-line flowmeter with no constrictions in the flow of fluid through the meter. The meter shall consist of a metallic tube with flanged ends and with grounding rings or grounding electrodes as required by the application. Flange diameter and bolt drilling pattern shall comply with ANSI/ASME B16.5 for line sizes from one-half inch to 24 inches or AWWA C207 for line sizes larger than 24 inches. Flange class ratings and meter maximum pressure ratings shall be compatible with the adjoining piping. Self-cleaning electrodes shall be provided for all meters used for sludge metering. Electrode and liner materials shall be fully compatible with the process fluid as approved by the Engineer and shall comply with the requirements specified in the instrument device schedules. Each meter shall be factory wet flow calibrated to the sensors full flow capacity, at a facility, which is traceable to NIST or other standard acceptable to Engineer, and a copy of the calibration, report shall be submitted as part of the operation and maintenance manual submittal

The meter shall be capable of standing empty for extended periods of time without damage to any components.

The meter housing shall be capable of withstanding submergence in up to 30 feet of water for 48 hours without damage.

The meter shall be suitable for use in a Class I, Division 2, hazardous area.

Meters shall be manufactured by ABB, Endress+Hauser, Foxboro, Krohne, Rosemount, or Siemens.

2-2.01.02. Magnetic Flowmeter Signal Converters. Separately mounted, microprocessor-based signal converters shall be provided for the magnetic flowmeters. The signal converters shall include output damping, self-testing, built-in calibration capability, and an "empty pipe zero" contact input. The overall accuracy of the magnetic flowmeter transmitter and signal converter shall be ±0.5 percent of actual flow rate for full-scale settings of 3 to 30 fps. The meter manufacturer shall furnish the signal cable between the converter and the magnetic flowmeter. Signal cable shall be continuous and not spliced between the meter and the signal converter. The signal converter shall be housed in a corrosion-resistant, weatherproof NEMA Type 4X housing and shall be suitable for operation over an ambient temperature range of -30 to +140°F and relative humidity of 10 to 100 percent. The converter shall have an analog output of 4-20 mA dc. The converter shall have a pulse output designed to operate a remote seven-digit totalizer and scaled so that the totalizer will operate for 60 days at 100 percent flow without repeating. Scaling factors shall be field adjustable and shall be selected to provide a totalizer multiplier of a power of 10. Transmitters shall be equipped with a local indicator with a minimum four digit LCD type display, scaled to read in engineering units of flow. Transmitters shall

also display totalized flow via the LCD type display. Totalized flow shall be represented by a minimum of six-digits and shall be manually resettable.

Magnetic flowmeter systems shall provide zero flow stability by means of automatic zero adjustment of a DC excited metering circuit. Converters shall be capable of bi-directional flow measurement. Signal converters shall be of the same brand as the magnetic flowmeters.

The signal converter shall be diagnosed and recalibrated with the use of a handheld communicator/calibrator device. One device shall be furnished for all converters provided by a single manufacturer.

PART 3 - EXECUTION

3-1. <u>FIELD SERVICES</u>. Manufacturer's field services shall be provided for installation, field calibration, startup, and training as specified in the Instrumentation and Control System section.

Instruments shall not be shipped to the Work Site until two weeks prior to the scheduled installation. The Contractor or Contractor's Instrumentation System Supplier shall be responsible for coordinating the installation schedule with the Installation Contractor. Each shipment shall contain a listing of protective measures required to maintain sensor operation, including a listing of any common construction or cleaning chemicals that may affect instrument operation.

End of Section