



WATER AND SEWER
Engineering Design

DATE:
July 13, 2026

TO:
Plan Holders
Contractors

FROM:
Jenna Richardson
918-596-9637
jennarichardson@cityoftulsa.org

EMAIL TRANSMITTAL

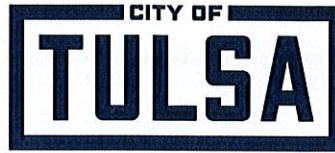
ADDENDUM NO. 2

**PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS
FAP 25-005-L | FAP 24-0002-L | FAP 24-0016L**

Number of pages: **231**

All addenda to the contract documents should be denoted on the
last page of the Proposal in the space provided.

Thank you,
Contract Administration



WATER AND SEWER
Engineering Design

DATE:
July 13, 2026

**ADDENDUM NO. 2
TO
PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS
FAP 25-005-L | FAP 24-0002-L | FAP 24-0016L**

This Addendum No. 2 consisting of (107) One Hundred Seven items, submitted by Jacobs Engineering Group Inc, is hereby made a part of the Contract Documents to the same extent as though it were originally included therein and shall supersede anything contained in the Plans and Specifications with which it might conflict. **All addenda to the contract documents should be denoted on the last page of the Proposal in the space provided.**

This Addendum No. 2 consists of the following:

1. The attached documents list the detailed items that have been modified in Addendum No. 2. These documents shall be inclusive and apply to this project.
2. Delete the existing bid proposal form in its entirety and replace with the revised Bid Proposal located at: <https://www.cityoftulsa.org/government/departments/public-works/engineering-services/construction-bids/>. It is the Bidder's responsibility to download the revised Bid Proposal.

All other provisions of the Plans and Specifications shall remain in full force and effect.

CITY OF TULSA

Eric Lee
Director

a2R HAS AL
For TGP/HAS/AL/JR/ma

ELECTRONIC BID PROPOSAL INSTRUCTIONS - EXCEL SPREADSHEET

RUMA PROJECT NO. ES 2020-11

HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS, FY26

Please read the following instructions carefully.

1. After opening this file re-save it as your company's name.
2. Open the BID FORM Sheet from the tabs below.
3. Input the unit price of the appropriate pay item in the cells highlighted in blue.
4. Review all data input and check calculations to ensure accuracy of Bid.
5. Print 1hardcopy of the "PROPOSAL" tab, BID FORM and the "SIGNATURE PAGE" tab.
6. Complete and sign the "Signature Page" document.
6. Submit hardcopy and electronic disk with Contract Documents and Specifications for Bid opening date.

LEGEND

- \$ 1.00 Cells Requiring Data Input.
- \$ 1.00 Internal Data Transfer.
- \$ 2.00 Calculated Results.

AGREEMENT FOR USING ELECTRONIC BID PROPOSAL

By and Between: Jacobs Solutions Inc., (ENGINEER) and RECIPIENT. The enclosed electronic media is provided pursuant to your request and is for your limited use in connection with your submittal of Bid Proposal for TMUA Project No. ES 2020-11. In no event shall the information be used for any other purpose or be released to third parties without the written consent of the ENGINEER. In the event of a discrepancy between the hard copy and this electronic media at delivery or in the future, the hard copy shall govern. ENGINEER hereby disclaims any and all liability for the consequences from use of the electronic media and makes no warranty or guarantee of accuracy. RECIPIENT shall assume full responsibility for the uses and consequences of the electronic media. It is agreed that ENGINEER has and retains ownership of the electronic media. ENGINEER does not warrant or guarantee that the electronic data is compatible with RECIPIENT'S computer hardware or software, and ENGINEER'S responsibility for the electronic media is limited to replacement of defective media for a period of thirty (30) days after delivery to RECIPIENT. !!! By opening and using this FILE, You AGREE to these TERMS AND CONDITIONS!!!

**PROPOSAL FOR
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS, FY26
RMUA PROJECT NO. ES 2020-11**

TO: TULSA METROPOLITAN UTILITY AUTHORITY
CITY OF TULSA, OKLAHOMA

THE UNDERSIGNED BIDDER, having carefully examined the drawings, specifications, and other Contract Documents of the above project presently on file in the City Clerk, City of Tulsa Oklahoma:

CERTIFIES THAT he has inspected the site of the proposed work and has full knowledge of the extent and character of the work involved, construction difficulties that may be encountered, and materials necessary for construction, class and type of excavation, and all other factors affecting or which may be affected by the specified work; and

CERTIFIES THAT he has not entered into collusion with any other bidder or prospective bidder relative to the project and/or bid: and

HEREBY PROPOSES: to enter into a contract to provide all necessary labor, materials, equipment and tools to completely construct and finish all the work required by the Contract Documents hereto attached and other documents referred to therein: to complete said work within **730** calendar days after the work order is issued; and to accept in full payment therefore the amount set forth below for all work actually performed as computed by the Engineer as set forth in the Contract.

Basis of Award

IT SHOULD BE NOTED THAT THE LOWEST RESPONSIVE BID SHALL BE DETERMINED BY THE TOTAL BASE BID PLUS ADDITIVE ALTERNATES NOS. 1, 2, 3, & 4. THE ITEMS IN ADDITIVE ALTERNATES NOS. 1, 2, 3, & 4 MAY OR MAY NOT BE INCLUDED IN THE CONTRACT AWARD AT THE SOLE DISCRETION OF THE CITY OF TULSA. ANY PROPOSAL SUBMITTED WITH THE ADDITIVE ALTERNATE NOS. 1, 2, 3, & 4 INCOMPLETE SHALL BE CONSIDERED NON-RESPONSIVE

Note: - Item numbers omitted are not a part of the Contract.

PROPOSAL FOR
HAKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS, FY26
RMUA PROJECT NO. ES 2020-11

BASE BID						
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	TOTAL EACH ITEM
1	01 50 00	MOBILIZATION	EA	1		\$ -
2	70-THK1-X-XXXX DRAWINGS	(EXISTING) GRAVITY THICKENER, COMPLETE	EA	1		\$ -
3	40-WAS1-X-XXXX DRAWINGS	(EXISTING) RAS WAS FACILITY, COMPLETE	EA	1		\$ -
4	70-RDT1-X-XXXX DRAWINGS	(EXISTING) ROTARY DRUM THICKENER, COMPLETE	EA	1		\$ -
5	90-D2BL-X-XXXX DRAWINGS	SLUDGE MIXING BUILDING, COMPLETE (EXCLUDING BLOWERS, PUMP AND MIXING ASSEMBLY)	EA	1		\$ -
6	44 42 19 04	SLUDGE MIXING BUILDING, BLOWERS	EA	3		\$ -
7	44 42 56 01	SLUDGE MIXING BUILDING, HORIZONTAL PUMP AND MIXING ASSEMBLY	EA	2		\$ -
8	90-D1CT-X-XXXX DRAWINGS	SLUDGE TANK SEDIMENT REMOVAL	CY	400		\$ -
9	90-D1CT-X-XXXX DRAWINGS	SLUDGE TANKS, COMPLETE	EA	1		\$ -
10	90-D1BL-X-XXXX DRAWINGS	DEWATERING CENTRIFUGE BUILDING, COMPLETE (EXCLUDING CENTRIFUGES AND SLUDGE CONVEYOR SYSTEM)	EA	1		\$ -
11	43 22 23	DEWATERING CENTRIFUGE BUILDING, CENTRIFUGES NO. 1 AND NO. 2	EA	2		\$ -
12	44 46 13 01	DEWATERING CENTRIFUGE BUILDING, SLUDGE CONVEYOR SYSTEM	EA	1		\$ -
13	90-D3BL-X-XXXX DRAWINGS	(EXISTING) SLUDGE MIXING ELECTRICAL ROOM, COMPLETE	EA	1		\$ -
14	95-C2BL-X-XXXX DRAWINGS	COMPOSTING BUILDING, COMPLETE	EA	1		\$ -
15	95-C2BF-X-XXXX DRAWINGS	BIOFILTER NO. 1, COMPLETE	EA	1		\$ -
16	95-C3CS-X-XXXX DRAWINGS	FINISHED COMPOSTING STORAGE BUILDING BASE BID, COMPLETE	EA	1		\$ -
17	95-C1BL-X-XXXX DRAWINGS	COMPOSTING OPERATIONS BUILDING, COMPLETE	EA	1		\$ -
18	33 32 13	PACKAGED SANITARY LIFT STATION	EA	1		\$ -
19	23 13 00	PACKAGED FUEL STATION	EA	1		\$ -
20	11 82 30	TROMMEL SCREEN UNIT	EA	1		\$ -
21	01 29 00	HYDROJETTER	EA	1		\$ -
22	02 41 00	DEMOLITION AND SITE CLEARING	EA	1		\$ -
23	01 57 13	EROSION CONTROL	EA	1		\$ -
24	Division 31	SITE GRADING (CUT/FILL/IMPORT/EXPORT)	EA	1		\$ -
25	31 32 13 16	GEOTEXTILE	SF	21,875		\$ -
26	32 11 23	ROADWAY BASECOURSE	SF	21,875		\$ -
27	32 12 16	SURFACING COURSE	SF	21,875		\$ -
28	32 12 18	ASPHALT PAVEMENT	SF	21,875		\$ -
29	32 16 00	CONCRETE VALLEY GUTTER	LF	1,108		\$ -
30	32 17 23	STRIPING	EA	1		\$ -
31	32 16 00	WHEEL STOPS	EA	24		\$ -
32	10 14 00	SIGNAGE	EA	1		\$ -
33	32 12 18	ASPHALT PAVEMENT PATCHES	SF	10,805		\$ -
34	32 13 13	CONCRETE PAVEMENT	SF	100,909.0		\$ -
35	32 16 00	SIDEWALKS	SF	4,474		\$ -
36	32 16 00	CURB	LF	288.0		\$ -
37	03 30 00	SITE EQUIPMENT PADS	SF	100		\$ -
38	32 31 13	FENCING AND GATES (SEE NOTE 11)	LF	1,428		\$ -
39	01 29 00, 09 90 00	REMOVE EXISTING PAINT AND RECOAT BOLLARDS SAFETY YELLOW	EA	2.0		\$ -
40	01 29 00	SITE GUARD POSTS	EA	52		\$ -
41	01 57 13	SEEDING	SF	83,791		\$ -
42	33 05 01.10, 40 27 00.14	6-INCH HDPE CENTRATE, BURIED WITH FITTINGS	LF	732		\$ -
43	33 05 01.09, 40 27 00.10	2-INCH PVC W1/W2, BURIED WITH FITTINGS	LF	855		\$ -
44	33 05 01.09, 40 27 00.10	2-1/2INCH PVC W1, BURIED WITH FITTINGS	LF	101.0		\$ -
45	33 05 01.09, 40 27 00.10	4-INCH PVC W1/W2, BURIED WITH FITTINGS	LF	475		\$ -
46	33 05 01.09, 40 27 00.10	8-INCH PVC W1, BURIED WITH FITTINGS	LF	620		\$ -
47	33 05 01.09, 40 27 00.10	10-INCH PVC W1, BURIED WITH FITTINGS	LF	368		\$ -
48	33 05 01.10, 40 27 00.14	6-INCH HDPE TWAS, BURIED WITH FITTINGS	LF	50		\$ -
49	33 05 01.10, 40 27 00.14	8-INCH HDPE TWAS, BURIED WITH FITTINGS	LF	619		\$ -
50	33 05 01.10, 40 27 00.14	4-INCH HDPE SSC, BURIED WITH FITTINGS	LF	569		\$ -
51	33 05 01.10, 40 27 00.14	6-INCH HDPE WAS, BURIED WITH FITTINGS	LF	608		\$ -
52	33 05 01.09, 40 27 00.10	12-INCH PVC PD, BURIED WITH FITTINGS	LF	230		\$ -
53	33 05 01.09, 40 27 00.10	8-INCH PVC PD, BURIED WITH FITTINGS	LF	365.0		\$ -
54	33 05 01.09, 40 27 00.10	4-INCH PVC PD, BURIED WITH FITTINGS	LF	1,148		\$ -
55	33 05 01.09, 40 27 00.10	3-INCH PVC SPD, BURIED WITH FITTINGS	LF	631		\$ -
56	40 05 15	10-INCH ALP, BURIED WITH FITTINGS	LF	33		\$ -
57	02 41 00	DEMOLISH 6-INCH TO 10-INCH DUCTILE IRON SLUDGE/RAIN	LF	4,000		\$ -
58	02 41 00	ABANDON 6-INCH PVC SLUDGE	LF	583		\$ -
59	02 41 00	ABANDON 36-INCH DUCTILE IRON INFLUENT	LF	407		\$ -
60	02 41 00	ABANDON 48-INCH DUCTILE IRON INFLUENT	LF	419		\$ -
61	02 41 00	ABANDON 12-INCH DUCTILE IRON FILTRATE	LF	564		\$ -
62	02 41 00	ABANDON 24-INCH DUCTILE IRON OVERFLOW	LF	350		\$ -
63	02 41 00	ABANDON 24-INCH DUCTILE IRON MIX LIQUOR	LF	172		\$ -
64	02 41 00	ABANDON 24-INCH DUCTILE IRON OVERFLOW	LF	54		\$ -
65	02 41 00	ABANDON 24-INCH DUCTILE IRON OVERFLOW	LF	284		\$ -
66	02 41 00	ABANDON 4-INCH DUCTILE IRON SCUM	LF	140		\$ -
67	33 44 13 13	CATCH BASINS	EA	6		\$ -
68	33 05 13	SANITARY SEWER MANHOLE	EA	4		\$ -
69	40 27 02	4" Backflow Preventer	EA	1		\$ -
70	40 27 02	10" METER, PSV AND VAULT	EA	1		\$ -
71	40 27 02	4" GATE VALVES	EA	6		\$ -
72	33 05 16 13	PRECAST VAULT (11' x 5')	EA	1		\$ -
73	26 05 02	ELECTRICAL DUCTBANK 1	LF	390		\$ -
74	26 05 02	ELECTRICAL DUCTBANK 2	LF	70		\$ -
75	26 05 02	ELECTRICAL DUCTBANK 3	LF	10		\$ -
76	26 05 02	ELECTRICAL DUCTBANK 4	LF	20		\$ -
77	26 05 02	ELECTRICAL DUCTBANK 5	LF	18		\$ -
78	26 05 02	ELECTRICAL DUCTBANK 6	LF	150		\$ -
79	26 05 02	ELECTRICAL DUCTBANK 7	LF	90		\$ -
80	26 05 02	ELECTRICAL DUCTBANK 8	LF	100		\$ -
81	26 05 02	ELECTRICAL DUCTBANK 9	LF	445		\$ -
82	26 05 02	ELECTRICAL DUCTBANK 10	LF	135		\$ -
83	26 05 02	ELECTRICAL DUCTBANK 11A	LF	475.0		\$ -
84	26 05 02	ELECTRICAL DUCTBANK 11B	LF	475		\$ -
85	26 05 02	ELECTRICAL DUCTBANK 12	LF	95.0		\$ -
86	26 05 02	ELECTRICAL DUCTBANK 13	LF	40		\$ -
87	26 05 02	ELECTRICAL DUCTBANK 14	LF	315		\$ -
88	26 05 02	ELECTRICAL DUCTBANK 15	LF	30.0		\$ -
89	26 05 02	ELECTRICAL DUCTBANK 16	LF	225		\$ -
90	26 05 02	ELECTRICAL DUCTBANK 17	LF	530		\$ -
91	26 05 02	ELECTRICAL DUCTBANK 18	LF	105		\$ -
92	26 05 02	ELECTRICAL DUCTBANK 19	LF	165		\$ -
93	26 05 02	ELECTRICAL DUCTBANK 20	LF	70		\$ -
94	26 05 02	ELECTRICAL MANHOLE	EA	7.0		\$ -
95	26 05 02	ELECTRICAL HANDHOLE	EA	7		\$ -
96	26 05 02	FIBER OPTIC DUCTBANK (2'-2" CONDUIT)	EA	600		\$ -

BASE BID							
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	UNIT	TOTAL EACH ITEM
97	26 08 00	PAD MOUNTED SWITCH	EA	1			\$ -
98	26 08 00	PAD MOUNTED TRANSFORMER	EA	1			\$ -
99	26 50 00	LUMINAIRE AND POLE	EA	14			\$ -
100	01 29 00	OWNER'S ALLOWANCE	ALLOW	1,000,000	\$100		\$ 1,000,000.00
101	01 29 00	AS-BUILT DRAWINGS	EA	1			\$ -
BASE BID TOTAL							\$1,000,000.00
ADDITIVE ALTERNATE NO. 1							
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	UNIT	TOTAL EACH ITEM
104	43 22 23	CENTRIFUGE NO. 3	EA	1			\$ -
ADDITIVE ALTERNATE NO. 1 TOTAL							\$ -
ADDITIVE ALTERNATE NO. 2							
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	UNIT	TOTAL EACH ITEM
105	41 51 29	FRONT-END LOADERS	EA	2			\$ -
ADDITIVE ALTERNATE NO. 2 TOTAL							\$ -
ADDITIVE ALTERNATE NO. 3							
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	UNIT	TOTAL EACH ITEM
106	50-FCL1-S-XXXX DRAWINGS	SCUM COLLECTION SYSTEM	EA	1			\$ -
ADDITIVE ALTERNATE NO. 3 TOTAL							\$ -
ADDITIVE ALTERNATE NO. 4							
BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	DATA INPUT UNIT PRICE	UNIT	TOTAL EACH ITEM
107	95-C3CS-X-XXXX DRAWINGS	FINISHED COMPOSTING STORAGE BUILDING	EA	1			\$ -
ADDITIVE ALTERNATE NO. 4 TOTAL							\$ -
BASE BID + ADDITIVE ALTERNATE NOS. 1, 2, 3, & 4 TOTAL							\$ 1,000,000.00

BASE BID (ITEMS 1-103)	<u>\$1,000,000.00</u>
ADDITIVE ALTERNATE NO. 1 (ITEM 104)	<u>\$0.00</u>
ADDITIVE ALTERNATE NO. 2 (ITEM 105)	<u>\$0.00</u>
ADDITIVE ALTERNATE NO. 3 (ITEM 106)	<u>\$0.00</u>
ADDITIVE ALTERNATE NO. 4 (ITEM 107)	<u>\$0.00</u>
BASE BID PLUS ADDITIVE ALTERNATES	<u>\$1,000,000.00</u>

Enclosed is a () Bidder's Surety Bond, () Certified Check, () Cashier's Check for

_____ %

which the City of Tulsa may retain or recover as liquidated damages in the event that the undersigned fails to enter into contract for the work covered by this proposal., provided the Contract is awarded to the undersigned within thirty (30) days, or within ninety (90) days if Federal funds are utilized, from the date fixed for opening of bids and the undersigned fails to execute said Contract and furnish the required bonds and other requirements as called for in these Contract Documents within thirty (30) days after award of Contract.

Dated at Tulsa, Oklahoma, this _____ day of _____, 20__.

Respectfully submitted,

(Complete legal name of company)

(State of Organization)

By:

Title: _____

Printed Name: _____

ATTEST:

Title: Corporate Secretary

Printed Name: _____

(SEAL)

Address: _____

Telephone Number: _____

Fax Number: _____

By signing above the bidder acknowledges receipt of the following Addenda (give number and date of each):

July 10, 2026

ADDENDUM NO. 2

**PROJECT NO. RMUA PROJECT NO. ES 2020-11, BAMA PROJECT NO.
HC21020 HAIKEY CREEK BIOSOLIDS IMPROVEMENTS**

This Addendum No. 2 consisting of 107 Items is hereby made a part of the Contract Documents to the same extent as though it were originally included therein and shall supersede anything contained in the Plans and Specifications with which it might conflict. **This addendum shall be attached to the Index Sheet of the Contract Documents and submitted with the bid. Failure to do so shall result in the bid being deemed non-responsive.**

This Addendum No. 2 consists of the following:

CLARIFICATION

- 1) QUESTION: Is there a geotechnical report available?

ANSWER: The geotechnical report will not be provided during the bidding phase.

- 2) QUESTION: How many hours per year will each centrifuge be operated?

ANSWER: For the first 20 years of operation, the centrifuges will run five days per week for a total of 10 hours per day, either using two units for 5 hours each or one unit for 10 hours.

- 3) QUESTION: Detail 4027-187 for process line clean-outs calls for installing flanged piping below grade. Can the Contractor install mechanical joint piping in lieu of flange piping below grade?

ANSWER: At the contractor's discretion, Mechanical Joint fittings may be used in place of Ductile Iron connections for flanged piping located below grade.

- 4) QUESTION: On sheet 07-Y-2002 (68), please confirm that the 4" W1 piping will be C900 PVC and then will transition to Sch 80 PVC after the backflow preventor assembly per the pipe schedule.

ANSWER: Sch 80 PVC shall be used for 3" and smaller W2. Pipe 4" and larger that is buried W2 shall be C900.

- 5) QUESTION: What is the finish of the block walls at the Composting Operations Building?

ANSWER: The finished Concrete Masonry Units for block walls at the Composting Operating Building is 16" x 8" x 8" (L x H x W). The color and surface texture of the units as indicated on plan sheet 95-C1BL-A-6001.

- 6) QUESTION: Does bid item #50 for the 4" SSC line need to be part of Alternate #3 as this line requires the scum collection system to be installed?

ANSWER: Bid item #50 is part of Bid Alternate #3 and will not be installed if Bid Alternate #3 is not awarded.

- 7) QUESTION: When the new FEB electrical building was installed in 2017, the electrical contractor installed the conduit from the MV ATS to the XFMR while PSO installed the MV cable. Since the existing MV cables from the MV ATS to the pad mount XFMR are owned by PSO, will they allow the electrical contractor to splice into the cables to get them to the new switch?

ANSWER: The Contractor will need to coordinate with the Owner and PSO on splicing MV cable.

- 8) QUESTION: Per plan sheet 08-E-2002, is the electrical contractor to splice the existing cables from the ATS to the XFMR in MH 95-MH-1H and install new MV cable from 95-MH-1H to the new switch? Alternatively, will the MV cable be removed and re-pulled from the switch to both the ATS and transformer?

ANSWER: No conductors shall be spliced in 95-MH-1H.

- 9) QUESTION: What size cable is the existing MV line?

ANSWER: Per available As-built drawings, 9 x 500kcmil conductors are installed. However, the Contractor will need to field verify conductor size.

10) QUESTION: Detail 4027-187 is called out for use on the 4" SSC line. The 4" SSC line is Sch 80 PVC or HDPE per the piping schedule. Does the piping need to transition to DIP for the clean-outs?

ANSWER: Do not transition material at cleanouts, match cleanout material to pipeline.

11) QUESTION: Can the bid form be modified to have a maximum of 10-15 bid items?

ANSWER: The scope and range of the bid items will not be reduced.

12) QUESTION: Please clarify if Aerzen is to supply MCP in addition to their standard Local Control Panels and integrated blower VFDs.

ANSWER: Packaged blowers are controlled at the plant SCADA level and will not use MCP.

13) QUESTION: Per Specification 44 42 19.04: 2.04, are Aerzen manufactured local control panels acceptable? Specification 40 99 90 states control panels must be manufactured by Hoffman or H.F. Cox. Is this in relation to the MCP?

ANSWER: The blower manufacturer should provide local panels that meet the requirements of specification 44 42 19.04 and the components in specification 40 99 00. Hoffman or H.F. Cox supply enclosures and accessories, not final assembled control panels.

14) QUESTION: Per Specification 44 42 19.04: 3.0, are anchor bolts to be supplied by the installing contractor? Or will they be supplied by the blower manufacturer?

ANSWER: The blower manufacturer is required to provide anchor bolts per specification 44 42 19.04: 3.01. It is acceptable for the installing contractor to coordinate with manufacturer to supply anchor bolts if preferred.

15) QUESTION: Are BFV01-02-03 to be supplied by the blower manufacturer or others?

ANSWER: Per Specification 44 42 19.04, Butterfly valves are not included in the list of accessory items the blower manufacturer is responsible for providing.

16) QUESTION: Can you confirm the full scope of sludge/sediment removal required under this contract? Specifically, which structures require removal and the quantity for each? Per sheet 90-D1CT-D-1000, 400 CY of sediment are estimated for the sludge holding tanks. Sheet 90-D1BL-D-2100 requires sediment removal from the existing wet well without giving an estimated quantity.

ANSWER: The two existing sludge holding tanks and the existing dewatering wet well are the three main areas for sediment removal. The dewatering wet well has an estimated 10 CY of sediment for removal; however, the volume shall be measured and verified by the contractor prior to removal.

17) QUESTION: According to the piping schedule, exposed centrate piping is to be Epoxy Lined DIP. The centrate lines coming off the centrifuges appear to be PVC per the details on sheet 162. Please confirm piping material.

ANSWER: The centrate line within the dewatering building, extending from the centrate chute to the floor drain hub, shall be PVC piping and shall terminate with an air-gap connection. Refer to Sheet 01-G-0070, Remarks column, for additional requirements related to the centrate line.

18) QUESTION: Do all abandoned pipes need to be 100% filled with cellular concrete or flowable fill?

ANSWER: Abandoned pipes should be 100% filled with CLSM (flowable fill) or cellular concrete.

19) QUESTION: Are the BMP quantities shown on the erosion and sediment control plan sheets are the bid basis? Or is the Contractor to design BMPs to the 25-yr / 24-hr storm and provide quantities? Confirm Contractor responsibility for the NPDES OKR10 General Permit and SWP3.

ANSWER: The erosion control measures shown on Sheet 05-C-0120 represent the minimum requirements for the project. The Contractor shall be responsible for obtaining all required erosion and sediment control permits and for complying with all applicable permit conditions and regulatory requirements.

20) QUESTION: What are the requirements for the contractor to provide temporary security at all times? Is this regarding temporary security fence or a security guard and shack?

ANSWER: Contractor is responsible for providing required temporary fencing to maintain site security. It is not anticipated at this time that a security guard and guard shack will be needed.

21) QUESTION: Plan sheet 05-C-1002 keynote 3 calls out a CIP trench at the Biofilter, while plan sheet 95-C2BF-S-2000 calls out a precast trench. Which is correct?

ANSWER: The trench shall be constructed as a precast structure in accordance with Structural Plan Sheet 95-C2BF-S-2000.

22) QUESTION: Please identify which existing equipment is OWNER-SALVAGE (to be removed, stored, and turned over to the Owner) versus Contractor demolition/disposal.

ANSWER: Items assigned for removal as shown on plan drawings are designated for contractor demolition/disposal. No equipment or material is intended for salvage by Owner.

23) QUESTION: Can the CAD files for the site be made available?

ANSWER: CAD files will be provided once the contract has been awarded.

24) QUESTION: Will the owner remove the existing compost material before demolition of the compost facility?

ANSWER: Existing compost material will be removed prior to construction.

25) QUESTION: Can the Contractor store spoils onsite or does all left over material need to be hauled offsite? If storing onsite is acceptable, can you provide a location?

ANSWER: Temporary onsite spoil storage is allowed during construction but must be in a location that is in keeping with the stormwater permit restrictions and does not impede any operations. Permanent storage is not allowed.

26) QUESTION: Is Data Logging required for HDPE Pipe?

ANSWER: Data logging for each HDPE fusion weld shall be required for all joints as per specification 33 05 01.10.

27) QUESTION: If provided by the Contractor, can Procore be utilized for project documentation?

ANSWER: The Contractor may propose the use of a project management information system for the Owner's review and approval. Acceptable platforms include Submittal Exchange and Procore. Any proposed alternative shall be provided to the Owner at no additional cost. If implemented, the Owner shall be granted full administrative access to all project data, documentation, and records within the system for the duration of the project.

Additionally, as a condition of project closeout, all project files, including but not limited to submittals, RFIs, correspondence, reports, and associated documentation, shall be transferred to the Owner in a complete and accessible format.

28) QUESTION: Does the existing dewatering building need to be kept in service in any way? If so, what are the available shutdown windows and temporary provisions necessary to allow demolition of belt filter presses, lime system, blowers, polymer equipment, and appurtenances and installation of new centrifuges if the dewatering building is to remain in service.

ANSWER: The existing dewatering building is not currently in use and is available to contractor throughout construction.

29) QUESTION: Structural Notes indicate PEMB foundations are designed for preliminary column reactions and column piers shall not be cast until actual reactions are verified by the Engineer. What is the expected PEMB reaction review turnaround and can foundations proceed on preliminary reactions?

ANSWER: Reactions cannot be confirmed and verified until PEMB manufacturer and anchorage design submittals are reviewed and approved. Foundations are designed on presumed frame sizes and weights and are not expected to be significantly different, but they still must be verified to confirm local anchor reinforcing and pier sizes for bearing of actual selected frame columns.

30) QUESTION: Structural Notes indicate composite beams are designed unshored and will deflect under wet concrete, with the Contractor to shore (if needed) at no additional cost to achieve finished top of concrete. Which elevated slabs require shoring to maintain finished floor elevation?

ANSWER: This is a general construction note. No composite slabs are included in the work.

31) QUESTION: Which structures and mix designs require the corrosion-inhibiting admixture (ASTM C1582) and the shrinkage-reducing admixture referenced in Spec 03 30 00, versus standard mixes?

ANSWER: Admixtures are only required as necessary to meet the performance criteria of the concrete. There is a specified maximum linear drying shrinkage limit for the structural concrete and this limit may be met by adding shrinkage reducing admixture or through other means as guided by the concrete mix designer and confirmed through specified testing.

32) QUESTION: Will Mass Concrete be utilized on this project?

ANSWER: Mass concrete is defined in Specification 03 30 00 based on placement dimensions; however, final determination may be influenced by the proposed pour sequence, placement plan, and use of accelerating admixtures.

33) QUESTION: Plan sheet 90-D1BL-D3004 note 5 states the contractor to procure a 10 ton crane. Can a specification for it be provided? What is to be done with the existing 2 ton crane? Is a new runway beam required?

ANSWER: No. A new runway beam is not required. Contractor is responsible for installing entire packaged centrifuge with their own rigging system. Existing bridge crane may utilized by the contractor for components that are within the safety rigging weight limits. Contractor shall work with the owner to recertify the crane at the end of the project following their usage. Contractor shall cover the costs of inspection and certification. Delete last sentence of Note 5 on 90-D1BL-D3004, "CONTRACTOR TO PROCURE 10-TON CRANE FOR INITIAL CENTRIFUGE INSTALLATION."

34) QUESTION: Is encasement required for all under-slab piping, including the piping at the Compost Building shown on Plan Sheet 95-C2BL-D-2000?

ANSWER: Concrete encasement is only required for piping underneath walls and foundations. At the Compost Building, only a portion of the compost/curing fan section piping passes beneath a concrete foundation and, therefore, requires concrete encasement.

35) QUESTION: Is the MCP H090-DEW3-MCP01 within the blower manufacturer's scope of supply? If so, please provide specifications and operational requirements for the MCP.

ANSWER: No. The MCP (H090-DEW3-MCP01) is the Contractor's scope and programming will be completed by the Engineer.

36) QUESTION: In reference to epoxy lining of Ductile Iron Pipe: Cerampure PL 90 is listed for NSF 61 applications, can it also be utilized for sewer service?

ANSWER: Cerampure PL 90 may be utilized for sewer service.

37) QUESTION: Spec 01 45 33 states seismic-, wind-, and component special inspection is 'None required' (SDC B), yet Specification 01 88 15 requires Contractor-designed seismic AND wind anchorage/bracing for nonstructural components. What is the full extent of engineered seismic/wind anchorage & bracing required? Does component importance factor $I_p=1.5$ applies given Risk Category III?

38) ANSWER: Special inspection of components does not apply because there are no components that require seismic certification. Specification 01 88 15 details the anchorage and bracing requirements for components to ensure the components are properly anchored to the structure and defines the loads that must be considered for the design of that anchorage (wind, seismic, operational, etc.).

39) QUESTION: Specification 01 50 00 requires a 'Construction Manager's and Engineer's field office' (225 SF, furnished, JACOBS door sign). Is one combined CM/Engineer field office required or are two separate offices required?

ANSWER: The intent of the specification is to provide a single field office for use by both the Owner's Construction Manager and the Engineer.

40) QUESTION: Can you provide the complete Statement of Special Inspections tables with the distinction between Owner-provided special inspection and testing services and Contractor-performed CQC and mix design verification testing shown?

ANSWER: Special Inspection Tables are included on Drawings 01-G-0022 through 01-G-0024. The responsibilities for both the Owner-provided and Contractor-provided testing are listed under the Inspection and Testing section of Plan Sheet 01-G-0020.

41) QUESTION: Specification 01 91 14 requires unit-process startup of 5 continuous days without significant interruption, with the Owner operating units. Please confirm Owner operations support availability and whether test water/chemicals for performance testing are Owner- or Contractor-furnished.

ANSWER: Operations support availability shall be coordinated with Owner during pre-work discussions. The Contractor shall provide all test water and chemicals required for performance testing.

42) QUESTION: Is all underslab encasement reinforced?

ANSWER: Underslab encasement is reinforced per standard details 0330-016 and 0330-017.

43) QUESTION: Specification 23 13 00 Above Ground Storage Tank does not list any manufacturers – is there a specific fuel storage tank manufacturer that is preferred for this project?

ANSWER: There is no preference regarding manufacturer as long as Contractor meets specification requirements.

44) QUESTION: For the centrate line routed to the headworks, are belt filter press submittals available for review?

ANSWER: No existing submittals are available. However, record drawings for the original belt filter press facility will be provided for the Contractor's reference. The most relevant record drawings will be provided for contractors reference.

45) QUESTION: 95-C2BL-S-2000. Please confirm the wall sections have armor plating, with the exceptions of columns and corners.

ANSWER: Armor plating shown in sheets 95-C2BL-S-2001 and 95-C2BL-S-2003 are the wall locations to have armor plating with the exceptions of columns and corners. The most relevant record drawings will be provided for contractors reference.

46) QUESTION: Can the record drawings of the 2 sludge tanks be provided?

ANSWER: These tanks have undergone multiple process revisions and have modifications made throughout multiple projects. The most relevant record drawings will be provided for contractors reference.

47) QUESTION: Can digital vector copies of plans and specifications be provided?

ANSWER: Digital Vector copies may be provided after the contract is awarded.

48) QUESTION: For the 400 CY of sludge tank sediment, what classification of biosolids is the sediment considered?

ANSWER: Sludge tank sediment is classified as unclassified biosolids.

49) QUESTION: Will the Existing Lime Silo be full of Lime? If so, is it the contractor's responsibility to remove it all?

ANSWER: The Lime Silo will not be full of lime, but there will be lime residuals left on the walls.

50) QUESTION: The concrete specifications reference galvanized rebar. Is galvanized reinforcing bar only required at joint locations as shown on standard details 0315-182 and 0315-201?

ANSWER: Galvanized reinforcing bar is required only where shown in the Contract Documents.

51) QUESTION: The composting building drawings show control joints in the slab at roughly 40LF spacing. Are any additional sawed and sealed contraction joints going to be required? Or should the project be bid only with jointing as drawn? If more joints are required, what are the type and spacing?

ANSWER: No additional sawn joints are required.

52) QUESTION: What is the maximum spacing of vertical construction joints for the concrete walls?

ANSWER: There is no maximum spacing as required for the design.

53) QUESTION: What specific locations require vertical control joints as shown on standard detail 0315-201? A vertical control joint is specifically identified at the Finished Compost Building on Plan Sheet 95-C3CS-S-2000; however, no additional vertical control joints are shown for that structure or for the walls within the Compost Building. Are slab control joint locations to be carried up through walls?

ANSWER: Control joints are only required where shown or indicated on the drawings. Slab control joints should not be continued into adjacent walls unless specifically shown.

54) QUESTION: For the Compost Building, what sections of wall are to receive armor plating per detail 6 on plan sheet 95-C2BL-S-5001?

ANSWER: The wall armoring detail applies to the interior walls of the sludge storage area and to the west face of the wall along Grid 4 within the composting area, immediately below the conveyor discharge.

55) QUESTION: For the Compost Building, are all concrete columns to receive full height armor plating per detail 5 on Plan Sheet 95-C2BL-S-5001.

ANSWER: Armoring applies at all interior circular columns.

56) QUESTION: Finished Composting Storage Building – Please confirm that there is no concrete armor plating required at this structure on any corners, walls, columns, etc.

ANSWER: There is no concrete armor plating required at this structure.

57) QUESTION: Plan Sheet 90-D1BL-S-1100 states to demolish concrete fill within curb extents and to repair slab surface. Can a detail or information regarding the slab repair after the demolition of concrete fill be provided?

ANSWER: Refer to Standard Detail 0330-143. Concrete surface defects that are exposed or as a result of demolition work are to be repaired in accordance with the Horizontal Concrete Surface Repair Specification.

58) QUESTION: A demolition scope for Sludge Holding Tank #2 is shown on the 90-D1CT Plan Sheets but there does not appear to be any new work inside this tank. What is to be done with this tank after completing demolition?

ANSWER: Refer to sheet 07-Y-2001, Note 4 for the drain line to be installed.

59) QUESTION: Can drawings be provided for the demolition work of the Containment area shown on Plan Sheet 90-D1BL-D-1100?

ANSWER: Facility staff will remove loose or non-permanent materials and equipment currently on site. Removal of all remaining permanent equipment shall be the responsibility of the Contractor.

60) QUESTION: There are several floor cleanouts throughout the compost building floor slab, each drawn with a 2'x2' box around the cleanout. Are these boxes recesses in the slab to slightly lower the drains? Are they stand-alone 2'x2' slabs for each cleanout?

ANSWER: The 2-foot by 2-foot box shown in the structural model is intended only to denote the location of an appurtenance.

61) QUESTION: The compost fans at the compost building are drawn on type J equipment pads. If this is correct, can a Type J pads detail be provided?

ANSWER: Compost and curing fan equipment pad is Type A. See detail 0330-056A.

62) QUESTION: Per Plan Sheet 90-D1CT-D-1000, the drawing notes state to demolish the air piping, pipe supports, and diffusers inside Sludge Holding Tank #2 and exposed piping outside the tank. General note 5 states to abandon the pipes in place. Which is the correct demolition scope for the tank?

ANSWER: General note 5 is in reference to the current sludge hauling operations location on the east side of Sludge Holding Tank #2 and will be required to stay in service during construction. At the completion of construction, those components can be abandoned in place. The process mechanical systems, air piping, diffusers, blowers, and the old tank process pipe connections are under the scope to be demolished.

63) QUESTION: Per Plan Sheet 90-D1CT-D-1000, do the hash marks on the sludge lines South of Sludge Holding Tank #2 indicate sludge lines to be demolished?

ANSWER: The Yard Piping drawing 07-Y-1000 provides the extents of demolition, while Plan Sheet 90-D1CT-D-1000 gives clarity on which lines are being demolished.

64) QUESTION: Plan sheet 90-D1BL-D-1100 shows the demolition of the existing conveyor. Is infill of the existing CMU wall required at locations where the conveyor passes through the existing building?

ANSWER: The existing CMU is to be infilled. Refer to Plan Sheet 90-D1BL-A-2100 for requirements.

65) QUESTION: Will any drawings be provided for the existing Centrate Wet Well that requires work per note 8 on Plan Sheet 90-D1BL-D-1000?

ANSWER: Record drawings for the existing dewatering building will be provided to the contractor for reference.

66) QUESTION: For the grinder control panel enclosure, should pricing be based on an FRP enclosure as specified in the grinder specification (Specification 26 24 25), or a Type 316SS enclosure as specified in Specification 40 90 00?

ANSWER: In-Line Sludge Grinder specification 46 24 25 references Package Control Systems Specification 40 99 00. This Specification 40 99 00 states that NEMA 4X 316 SS is used unless otherwise specified, thus it is acceptable for the contractor to use the NEMA 4X FRP enclosure for the grinder per the 46 24 25 Specification.

67) QUESTION: Spec Section 46 24 25 (2.07 Controls B) mentions NEMA 4X FRP enclosure. Spec Section 40 90 00 (D.1.b – Other Panels) specifies NEMA 4X 316 Stainless Steel enclosure. Confirm enclosure material to be considered for this project.

ANSWER: In-Line Sludge Grinder specification 46 24 25 references Package Control Systems specification 40 99 00. 40 99 00 states that NEMA 4X 316 SS is used unless otherwise specified, thus it is acceptable for the contractor to use the NEMA 4X FRP enclosure for the grinder per the 46 24 25 specification.

68) QUESTION: Spec Section 40 90 00 (1.05.B.1.a) requires Allen-Bradley ControlLogix PLC based on L7XT or L8XT processors with conformal coating. Reference is also made to Section 40 91 00 (S. Y50 – PLC System) processors are mandatory, or if standard is acceptable. Which is required between conformal coating or standard?

ANSWER: Conformal coating is required.

69) QUESTION: Plan sheet 05-C-1003 keynotes 10 & 12 indicate concrete and asphalt roadway - which is the correct roadway material?

ANSWER: Keynote 12 is correct. Road should be concrete. Note 10 will be updated and labeled as "not used".

70) QUESTION: Is exposed air piping required to be insulated for Sludge Holding Tank #1?

ANSWER: Only insulate ALP while indoors and exposed. See Specification 40 42 13 Supplement 1 for insulation conditions.

71) QUESTION: What detail is the contractor to use to install the Pressure Indicators and Switches on the Blower Discharge Piping on Plan Sheet 90-D2BL-D-2000?

ANSWER: Detail 4091-304B is to be used to install the Pressure Indicators and Switches on the Blower Discharge Piping.

72) QUESTION: Biofilter #1, Plan Sheet 95-C2BF-S-3001/Detail C – There is a 6” fill slab shown under the 1’ thick slab with the note, “min 6”x5’xcont unreinforced fill slab at 10’-0””, which makes it appear as though this fill slab is installed in 5’ wide x 125’ long strips spaced at 10’OC rather than the full 125’x80’ area. Is this the intent for the fill slab detail?

ANSWER: Intent of 'fill' slab is to support and anchor the pipes during placement of the 1'-0" main slab. Minimum width and spacing of these 'strips' is indicated on the drawings.

73) QUESTION: Bid item 26 quantifies 21,975 SF of aggregate base course for roadways. This square footage matches the asphalt paving bid item 28. There are additional paving bid items for 10,805 SF of asphalt patching and 100,909 SF of concrete paving (Bid items 33 and 34). Is the aggregate base for bid items 33 and 34 to be included with bid items 33 and 34? Or should the square footage of bid item 26 be increased to include all paving base rock?

ANSWER: Aggregate base for bid items 33 and 34 should be included in the price for bid items 33 and 34.

74) QUESTION: Plan Sheet 05-C-1002 includes keynote 1 for an asphalt to asphalt connection at the new plant entrance. Based on keynote 17 for the concrete to asphalt transition line, this new plant entrance is concrete. Which locations should reflect the concrete to asphalt transitions?

ANSWER: This keynote number will be updated to reference the concrete to asphalt transition detail. Asphalt and concrete paving locations and transitions on all sheets 05-C-1001 through 05-C-1006 have been confirmed and are noted correctly unless noted in Plan Sheet revisions on this addendum.

75) QUESTION: Is bypassing required to complete the work at the scum collection structure? If so, what is the bypass flow in MGD, and where does the bypass need to route? Can a detailed sequence be provided for this area?

ANSWER: Bypass is not anticipated to be required at the scum collection structure. Bypass is acceptable if it aids in constructability. Scum volume varies based on clarifier mechanism speed. It is estimated that 1-15 gpm of flow is created from the scum system, but this would not include any leakage flow volume.

76) QUESTION: Is the contractor supposed to include taxes on the Loaders and Trommel screen bid items? If not, will the owner be doing direct pay for these purchases?

ANSWER: Direct purchases are not planned by the Owner. Contractor to read through General Conditions of the Contract regarding Taxes. City will extend their sales tax exemption to the general contractor and their vendors.

77) QUESTION: Plan sheet 07-Y-2006 shows replacement of Gate Valves and cleanouts for each clarifier in the Keynotes. What size are these existing lines and are these items getting paid under the Alternate Scum Collection System bid item?

ANSWER: Existing lines are 6". All work associated with the Scum Collection system will be under Add Alternate #3, if awarded, per Spec 01 29 00.

78) QUESTION: How long can the Clarifiers be shutdown for to perform the Scum Collection work and Valve Replacements?

ANSWER: Secondary clarifiers should not be shutdown for scum collection work. Contractor shall coordinate with Owner and Plant staff if temporary scum collection isolation or bypass is required. The scum wet well is a self-contained (flanged bottom) unit. The intent is for the contractor to be able to drop-in the new wet well and use couplings to quickly connect to the scum piping. Temporary isolation with Owners approval may be utilized through the cut-in gate valves provided on the yard piping plans.

79) QUESTION: What is required for Polymer Piping? The details call out for Clear PVC Containment Piping. What all is to be double contained? Is the Manhole Boot Need to be double contained as well?

ANSWER: Polymer piping should be double contained rigid pipe. There is a section where polymer piping must pass through an existing pipe chase from the main dewatering floor to the basement. Through this section, flexible tubing may be used for ease of installation. The flexible tubing (only in the pipe chase) does not need to be double contained, but the entrance of the pipe chase at the main floor must use a manhole boot or other acceptable means to seal the floor penetration in the event of a slip that does not flood down into the basement. Manhole boot is a seal and not a form of double containment. Detail 4027-966 shall be installed on the three polymer feed piping lines located in the basement.

80) QUESTION: If Add Alt #3 is not taken, how does this affect the tie in of the 6" Sludge line, 4" & 6" SSC lines, and Valve Vault?

ANSWER: If ALT 3 is not selected, no equipment or process piping modification will be installed for this entire facility. This includes the yard piping from the proposed scum wet well pump station to the new sludge holding and all the scum piping abandonment.

81) QUESTION: Can pay notes or a summary of pay items be included to clarify inclusions of each item?

ANSWER: Breakdown list of inclusion items is not intended to be provided. Contractor to read through Specification Section 01 29 00, Payment Procedures.

82) QUESTION: Can the deadline for questions be pushed back to 7/8/2026?

ANSWER: Deadline for bid opening has been pushed to July 24th, however, the original question deadline still holds.

83) QUESTION: What electrical and programming modifications are required if Add Alt 3 is not selected?

ANSWER: If ALT 3 is not selected, no equipment or grounding shown on Plan Sheets 50-FCL1-E-2000 or 50-FCL1-E-4000 shall be installed. Duct bank "1" shown on the electrical site plan and the duct bank schedule shall not be installed, in addition to the 30A breaker feeding the scum pump in MCC-P2; refer to Plan Sheet 40-WAS1-E-6001. Programming is to be done by the Engineer.

84) QUESTION: Notes state to coordinate with owner and plant staff for tie-in duration requirements. What is the allowed duration for tie in of the RDT?

ANSWER: The RDT operates 6-8 hours per day during weekdays. The duration for tie-in requires the Contractor to coordinate with plant staff.

85) QUESTION: Is there an approved manufacturer or specification for the trommel screen unit?

ANSWER: See Specification 11 82 30 Part 2.01 Manufacturers for approved equipment and equipment service conditions for "or equal" equipment suppliers.

86) QUESTION: Does a premium polymer blending system meet or exceed the project specification?

ANSWER: Product and equipment pre-approvals are not being considered at this stage of the project. Requests for consideration of products believed to be equivalent to those specified will be reviewed as part of the Contractor's submittal package following contract award. It is the Prime Contractor's responsibility to determine that any proposed product meets all applicable specification requirements and contract requirements before including that product in their bid pricing.

87) QUESTION: We want to be sure we can bid the Universal Blower PAC system with the Gardner Denver model number as specified to meet your spec. This is a

typical arrangement as GD historically did not make sound attenuating and control system packages. UBP is essentially a sister company that makes the “system” utilizing the GD blower.

ANSWER: Product and equipment pre-approvals are not being considered at this stage of the project. Requests for consideration of products believed to be equivalent to those specified will be reviewed as part of the Contractor's submittal package following contract award. It is the Prime Contractor's responsibility to determine that any proposed product meets all applicable specification requirements and contract requirements before including that product in their bid pricing.

88) QUESTION: Would the Netzsch flanged inline grinder system be an acceptable substitution for the JWC?

ANSWER: Product and equipment pre-approvals are not being considered at this stage of the project. Requests for consideration of products believed to be equivalent to those specified will be reviewed as part of the Contractor's submittal package following contract award. It is the Prime Contractor's responsibility to determine that any proposed product meets all applicable specification requirements and contract requirements before including that product in their bid pricing.

89) QUESTION: Would the Hayward Gordon nozzle mixing system with chopper pumps be an acceptable substitution for the Vaughan system?

ANSWER: Product and equipment pre-approvals are not being considered at this stage of the project. Requests for consideration of products believed to be equivalent to those specified will be reviewed as part of the Contractor's submittal package following contract award. It is the Prime Contractor's responsibility to determine that any proposed product meets all applicable specification requirements and contract requirements before including that product in their bid pricing.

90) QUESTION: Would either a single or dual (per plans) Serpentix conveyor system with covers be an acceptable conveyor manufacturer for this application?

ANSWER: The Serpentix conveyor is not suitable for compost mix material conveyance. A trough belt conveyor is required and is outlined in Section 44 46 13.05. Revisions to this section will happen since the Mixer manufacturer can no longer provide the conveyor system.

91) QUESTION: Is a substitution of the Compost Building metal roofing with a Tite Loc Plus/ Flush Panel from Petersen Alum. Corp. allowed per Specification 07 42 13?

ANSWER: Proposed substitutions (Tite Loc Plus / Flush Panel) are acceptable for the Composting Operations Building (95-C1BL) provided that the roof assembly complies with the performance requirements specified in Specification 07 41 13-1.02 B.

92) QUESTION: Can JDV/Trillium be added via addendum as an acceptable manufacturer for the mixing nozzles/assembly to meet Specification 44 42 56.05? The JDV/Trillium design is comparable to the Rotamix Vaughan design. The primary difference between the two systems is the nozzle construction: JDV's standard design uses fabricated stainless steel nozzles with a rubber lining, while Vaughan's design uses cast nozzles with a glass lining.

ANSWER: JDV/ Trillium will be an acceptable alternate for the sludge tank mixing system. The process requirements along with calculations must be met and provided in the submittal. The thickened sludge nozzles require a 3-inch diameter opening instead of the standard 2-inch opening. This requirement must also be met.

93) QUESTION: For the packaged list station listed in Specification 33 32 13, would Old Castle Onelift be considered as an approved alternate?

ANSWER: Onelift system may be an accepted alternative, but will require submittal review to evaluate sizing requirements.

94) QUESTION: Kuhn no longer makes the RC 260 stationary mixer. It has been replaced by a newer model. Can the newer model be utilized to meet Specification 44 46 13.05?

ANSWER: The newer model will be accepted provided the larger HP motor is selected to handle the sludge mixed material. It is, for all intents and purposes, the same unit with a new model number.

95) QUESTION: Specification 44 46 13.05. According to Kuhn, they never manufactured their own conveyors, but instead rebranded units produced by another manufacturer. Since that manufacturer is no longer in business, Kuhn no longer offers conveyors for sale. Can the specification be allowed to utilize others for conveyors and control panels?

ANSWER: Yes.

96) QUESTION: The bid form calls out 7 each of bid item #67 Catch Basins. In the yard piping sheets I am only seeing 6 each (PD CB-1, 2; CB-1, 2, 3, 4). Can you confirm the number of catch basins on the project?

ANSWER: There are 6 catch basins total on Civil and YP sheets, bid form will be updated.

97) QUESTION: Plan sheet 05-C-1002 sheet keynote 23 calls out a monolithic containment curb - I cannot locate this note on this plan sheet. Please provide a location regarding this note.

ANSWER: Keynote 3 pointing to the curb at the truck wash station should be keynote 23. The number will be updated.

98) QUESTION: Plan sheet 05-C-1003 sheet keynotes 13 and 23 are not located on this sheet - can you provide a location for these notes.

ANSWER: Keynote 13 applies to the connection point between the asphalt main road and the new concrete driveway entrance. Keynote 23 is missing and will be added to the set and will point to the entrance sign.

99) QUESTION: Is profile G on Plan Sheet 07-Y-3005 for WAS or TWAS piping?

The piping connection inside the RDT facility on Plan Sheet 70-RDT1-D-2000, Section A calls the new and existing piping out as TWAS lines. As the TWAS lines call for Glass Lined Ductile and WAS lines are HDPE, there is a significant price difference between the two.

ANSWER: Plan Sheet 007-Y-3005 shows profiles for two (2) WAS lines to be installed using HDPE per Specification 33 05 01.10 shown on the piping schedule 01-G-0070.

100) QUESTION: Is the quantity for bid item 56 (buried 10" piping) correct?

ANSWER: Pay Item 56, ALP 10" piping, quantity shall change to 33'.

101) QUESTION: Is a construction sequencing schedule provided?

ANSWER: See below Example Construction Sequencing tables:

Example Construction Sequencing			
No.	Activity	Drawing References	Specification References
1	Mobilize and Install Temporary Facilities and Controls	01-G Series	Div 01
2	Coordinate with Owner for Staging and Laydown Locations	05-C-0110	01 50 00, 01 57 13
3	Survey, Clear, and Grub for proposed roadways, yard piping, and structures	05-C-0130	
4	Coordinate Solids Handling Operations and Maintain Continuous Plant Operations During Construction with temporary piping where required	01-G General Sheets, Process Flow Diagram 01-G-0060, Biosolids Process Flow Diagram 01-G-0061	01 11 00, 01 31 13, 01 31 19, 01 50 00
5	Begin Installation of Yard Piping Systems; Begin with Headworks, WAS, TWAS, and Scum Handling	07-Y Series	Div 33, 40

ADDENDUM NO. 2
PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

Example Construction Sequencing (Continued)			
No.	Activity	Drawing References	Specification References
6	Demolish West Sludge Tank Facilities. East Sludge Tank must stay online until new West Tank is complete.	90-D1CT Series	02 41 00
7	Complete West Sludge Tank and associated Mixer and Blower Facility (West Tank System). Once the West Tank comes online, then the East tank can go offline along with its mixing/aeration.	90-D1CT Series	43 40 01, 44 45 16.01
8	Complete Yard Piping Systems; Site Civil Improvements; Site Electrical Infrastructure; Plumbing Systems; HVAC Systems; Building Electrical Systems; Process Piping Systems; and Instrumentation and Controls Infrastructure as required for continuous plant and construction operations.	07-Y Series 05-C Series 08-E Series P-Series H-Series E-Series Process Sheets Throughout 09-N Series	Div 33, 40 Div 31, 32 Div 26 Div 22 Div 23 Div 26 40 05 15, 40 05 33, 40 27 00, 40 27 02 40 90 00, 40 91 00, 40 95 80, 40 96 00, 40 99 90
9	Demolish/Abandon Yard Piping taken out of service with WAS/TWAS/Scum Handling tie in	07-Y Series	Div 33, 40
10	Demolish Dewatering Facilities	90-D1BLB-X Series	02 41 00
11	Demolish Thickener Facilities (Rotary Drum Thickener Building and Gravity Thickener Building)	70-RDT1-D Series	02 41 00
12	Demolish WAS Facilities. Secondary Clarifiers must stay in service.	120-WAS1-D-1000	02 41 00
13	Demolish Scum Handling Facilities and manage scum flow. Secondary Clarifiers must stay in service.	09-N-0002 Scum Wet Well, 09-N-0006 Centrifuge No. 1, associated dewatering demo sheets	02 41 00
14	Tie in Yard Piping for WAS, TWAS, and Scum Handling, Continue with remaining Yard Piping	07-Y Series	Div 33, 40

ADDENDUM NO. 2
PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

Example Construction Sequencing (Continued)			
No.	Activity	Drawing References	Specification References
15	Complete WAS Facilities	120-WAS1 Series	03 30 00, 40 27 00, 40 27 02, 40 90 00, Div 23, Div 26
16	Complete Thickener Facilities	50-FCL1, 79-RDT1 Series	Div 44, Div 40
17	Complete Sludge Mixing Building	90-D2BLB Series	44 42 56.05, 44 42 19.04
18	Complete Scum Handling Facilities. Temporary discharge can be managed at the East Sludge Holding Tank as needed.	09-N-0002 Scum Wet Well, 09-N-0006 Centrifuge No. 1, associated process sheets	43 22 23, 44 42 56 Series, 40 27 00
19	Complete Dewatering Facilities	90-D1BLB Series	43 22 23, 44 42 56.09, 44 42 56.13, 44 44 63.01, 44 46 13.01, 46 24 25
20	Complete East Sludge Tanks Facilities and complete Existing Sludge Mixing Building Electrical Room Demolition	90-D1CT Series, 90-D2BLB Demo Sheets	02 41 00, 43 40 01, 44 45 16.01
21	Complete Lift Station	09-N-0015	33 32 13
22	Complete Odor Control Systems	Composting/Odor Control Sheets	23 31 13.05, 23 34 05
23	Complete Compost Operations Building	95-C1BL Series	Div 03, 04, 13, 22, 23, 26
24	Complete Testing and Commissioning of Composting Facilities	09-N-0011 through 09-N-0014	44 46 13.05, 44 42 19.04
25	Complete Testing and Commissioning of any Remaining Facilities	All Facilities	01 91 14, 23 05 93, 26 08 00, 40 80 01
26	Schedule Pre-final Walkthrough	All Facilities	Div 01
27	Address Punch List Items	All Facilities	Div 01
28	Complete Site Restoration and Landscaping	05-C Series	32 91 13, 32 92 00
29	Submit Record Drawings and O&M Manuals	Project Wide	
30	Complete Training and Closeout	All Facilities	01 43 33, 01 77 00, 01 78 23
31	Demobilize	Project Wide	Div 01

SPECIFICATIONS

- 102) Remove and Replace the following Specifications:
- a. 33 32 13 Packed Lift Station
 - b. 40 27 00.14 High Density Polyethylene Data Sheet
 - c. 40 91 00 Instrumentation and Control Components
 - d. 40 91 00 Supplement 01
 - e. 40 91 00 Supplement 02
 - f. 40 96 00 Applications Software
 - g. 44 42 33.19 Compost Biofilter Odor Control System
 - h. 44 42 56.05 Horizontal Chopper Pump and Mixing Assemblies

DRAWINGS

- 103) **01-G-0070, CHANGE**, CENTRATE nominal pipe size shall be > 4";
CHANGE, PROCESS DRAIN 4" – 8" specification section 33 05 01.12.03 shall
be 33 41 01.03; CHANGE, SANITARY DRAIN shall be RCP[KW1.1]; ADD,
Add BUR to ALP installation.; CHANGE, ALP Nominal size ≥ 8 " material
change to SST, SCH 10S from SST, SCH 5S.; CHANGE, SS BUR specification
change to 33 41 01.03 from 33 05 01. 12.03.; CHANGE, remove SUB from PVC
installation for SSC.
- 104) **08-E-2001, CHANGE**, Detail 2656-216 shall be 2650-220
- 105) **90-D1BL-D-2000, CHANGE**, PGV-38 shall be PGV-23
- 106) **REMOVE AND REPLACE** the following Plan Sheets:
- a. 01-G-0004
 - b. 01-G-0090
 - c. 05-C-1002
 - d. 05-C-1003
 - e. 07-Y-1000
 - f. 07-Y-2000
 - g. 07-Y-2001
 - h. 07-Y-2002
 - i. 07-Y-2004
 - j. 07-Y-3001
 - k. 07-Y-3010
 - l. 08-E-6004

ADDENDUM NO. 2
PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

m. 08-E-6101
n. 08-E-6113
o. 09-N-0001
p. 09-N-0002
q. 09-N-0004
r. 09-N-0005
s. 09-N-0007
t. 09-N-0008
u. 09-N-0009
v. 09-N-0010
w. 09-N-0011
x. 09-N-0012
y. 09-N-0014
z. 40-WAS1-R-0001
aa. 40-WAS1-D-2000
bb. 40-WAS1-E-2000
cc. 50-FCL1-D-1000
dd. 50-FCL1-D-2000
ee. 50-FCL1-D-3001
ff. 50-FCL1-E-2000
gg. 50-FCL1-E-4000
hh. 90-D1BL-A-2100
ii. 90-D1BL-D-2100
jj. 90-D1BL-E-2100
kk. 90-D1BL-E-2101
ll. 90-D1BL-E-4001
mm. 90-D1BL-E-6001
nn. 90-D1BL-E-6004
oo. 90-D2BL-A-2000
pp. 90-D2BL-A-3001
qq. 90-D2BL-D-2000
rr. 90-D2BL-D-2001
ss. 90-D2BL-D-3001
tt. 90-D2BL-D-9001
uu. 90-D2BL-E-2000
vv. 90-D1CT-E-2000
ww. 90-D3BL-E-2000
xx. 95-C2BL-S-2001
yy. 95-C2BL-S-2003

ADDENDUM NO. 2
PROJECT NO. RMUA ES 2020-11 & BAMA HC21020
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

zz. 95-C2BL-S-2004
aaa. 95-C2BL-D-4002
bbb. 95-C2BL-D-4003
ccc. 95-C2BL-D-4004
ddd. 95-C3CS-S-2000
eee. 95-C3CS-S-2010
fff. 95-C3CS-A-2000
ggg. 95-C3CS-E-2010

STANDARD DETAILS

107) **ADD** the following Standard Details:

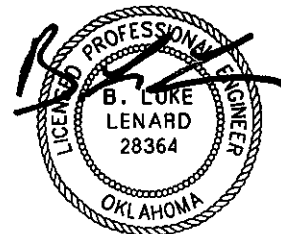
- a. 4091-050 – ORP Probe
- b. 3360-120 – RPZ Backflow Preventer Above Ground Installation
- c. 3360-121 – Tank Drain Connection

All other provisions of the Plans and Specifications shall remain in full force and effect.

Jacobs Engineering Group Inc.



Luke Lenard, PE
Engineer of Record



July 10, 2026

END OF ADDENDUM

HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

SECTION 40 91 00 INSTRUMENTATION AND CONTROL COMPONENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This section gives general requirements for instrumentation and control components.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.

PART 2 PRODUCTS

2.01 GENERAL

- A. Article Mechanical Systems Components covers requirements of mechanical PIC components that are not specifically referenced by Section 40 90 00, Instrumentation and Control for Process Systems, Instrument Lists or Data Sheets.
- B. Article Electrical Components covers requirements for electrical PIC components that are not specifically referenced by Section 40 90 00, Instrumentation and Control for Process Systems, Instrument Lists or Data Sheets.
- C. All other Part 2 articles cover components that are referenced by Instrument Lists or Data Sheets in Section 40 90 00, Instrumentation and Control for Process Systems, or by specific component numbers in other PIC subsections.
- D. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the

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maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 MECHANICAL SYSTEMS COMPONENTS

A. Flow Element, Rotameter, Purge:

1. For air or water service, unless otherwise noted.
2. Materials: Glass tube, fiberglass body, stainless steel float, nylon ball check valve.
3. Direct-Reading Scale Length: 2-1/2 inches, minimum.
4. Scale Ranges: 0 scfh to 2.5 scfh for air service or 0 gph to 10 gph for water service.
5. Integral inlet needle valves.
6. Integral differential pressure regulators:
 - a. For water service.
 - b. For air service for level ranges greater than 10 feet of water.
7. Rotameters for water service.
8. Manufacturers and Products:
 - a. Fischer & Porter; Series 10A3130.
 - b. Brooks; Series DS-1350.

B. Manifold, Three-Valve Equalizing:

1. Type: For isolation and equalization of differential pressure transducers.
2. Materials: Stainless steel.
3. Manufacturers and Product:
 - a. Anderson, Greenwood and Co.; Type M1.
 - b. Evans.

C. Pressure Gauge: For other than process variable measurement.

1. Dial Size: Nominal 2-inch dial size.
2. Accuracy: 2 percent of span.
3. Scale Range: Such that normal operating pressure lies between 50 percent and 80 percent of scale range.
4. Connection: 1/4-inch NPT through bottom, unless otherwise noted.
5. Manufacturers and Products:
 - a. Ashcroft Utility; Gauge Series 1000.
 - b. Marsh; Standard Gauge Series.
 - c. Ametek U.S.; Gauge Series P500.
 - d. Acculite; Series 2000.

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D. Valve, Needle:

1. Materials: Brass, stainless steel, PVC, or CPCV, as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
2. Size: 0.020-inch orifice.
3. Manufacturers and Products:
 - a. Whitey; Model 21RF2.
 - b. Hoke; 3700 Series.

E. ON/OFF Valves:

1. Type: Ball valve.
2. Materials: Brass, stainless steel, PVC, or CPCV, as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
3. Manufacturers and Products:
 - a. Whitey; Series 41 through Series 43.
 - b. Hoke; Flomite 7100 Series.

F. Regulating Valves:

1. Type: Needle valves, with regulating stems and screwed bonnets.
2. Materials: Brass, stainless steel, PVC, or CPCV, as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
3. Manufacturers and Products:
 - a. Whitey; Catalog No. RF or No. RS.
 - b. Hoke; 3100 through 3300 Series.

G. Valve, Three-Way:

1. Type: Ball valve.
2. Materials: Brass or stainless steel with nylon handle as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
3. Manufacturers and Products:
 - a. Whitey; Series 41 through Series 43.
 - b. Hoke; Selecto-Mite Series.

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H. Valve, Four-Way:

1. Type: Four-way, two-position ball valve.
2. Materials:
 - a. Body and Stem: Type 316 stainless steel.
 - b. Handle: Black nylon.
 - c. Packing Gland: Teflon.
3. Ball and stem bed, one-piece assembly.
4. Machined handle stops and directional nameplates.
5. Manufacturers and Products:
 - a. Whitey; Series 457.
 - b. Hoke; Multi-Mite Series.

I. Spool Valve:

1. Type: Five-port arrangement as shown, two-position, push-to-operate knob attached to the spool stem, and spring return.
2. Materials: Aluminum construction with Teflon impregnated aluminum spool, stainless steel spring, and Buna-N O-rings.
3. Port Connection: 1/4-inch outside diameter tube fittings.
4. Manufacturer and Product: Norgren; T71DAOO-TSO-TKO.

J. Solenoid Valve, Two-Way:

1. Type: Globe valve directly actuated by solenoid and not requiring minimum pressure differential for operation.
2. Materials:
 - a. Body: Brass or stainless steel globe valves as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
 - b. Valve Seat: Buna-N.
3. Size: Normally closed or opened, as noted.
4. Coil: 115V ac, unless noted otherwise.
5. Solenoid Enclosure: NEMA 4.
6. Manufacturer and Product: ASCO; Red Hat Series 8260.

K. Pressure Regulator, Air:

1. Provide air at reduced pressures, as shown, constant to within plus or minus 10 percent for flows from 0 scfh to 300 scfh with 100 psi supply pressure.
2. Setscrew for outlet pressure adjustment.
3. Integral filter and relief valve.

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4. Manufacturers and Products:
 - a. Masoneilan; Series 77-4.
 - b. Fisher; Series 67FR.

L. Pressure Regulator, Water:

1. Materials:
 - a. Body: Bronze.
 - b. Spring Case: Cast iron.
 - c. Seat Rings: Brass.
 - d. Valve Disk and Holder: Buna-N and bronze.
 - e. Diaphragm: Buna-N diaphragm.
2. Sizing: For maximum of 7 psi offset pressure.
3. Manufacturers and Products:
 - a. Fisher; Controls Type 95H or 95L.
 - b. Masoneilan; Series 17.

M. Test Tap:

1. Manufacturers and Products:
 - a. Imperial-Eastman; quick-disconnect couplings No. 292-P and caps No. 259-P.
 - b. Crawford Fitting Co.; Swagelok quick-connects Series QC4 and caps QC4-DC.
 - c. Parker; CPI Series precision quick couplings.

N. Copper Tubing and Fittings:

1. Type K hard copper, ASTM B88, with commercially pure wrought copper solder joint fittings. Make joints with 95-5 wire solder, ASTM B32, Grade 95 TA. Do not use cored solder.
2. Alternatively, Type K, soft temper copper tubing, ASTM B88, with brass compression type fittings may be used where shown on the Drawings.
3. Provide corrosion protection for all exposed copper.
4. Manufacturers:
 - a. Parker-Hannifin.
 - b. Swagelok tube fittings.

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O. Plastic Tubing and Fittings:

1. Tubing:
 - a. Polyethylene capable of withstanding 190 psig at 175 degrees F.
 - b. Manufacturers and Products:
 - 1) Dekoron; Type P.
 - 2) Imperial Eastman; Poly-Flo black instrument tubing.
2. Fittings:
 - a. Type: Brass compression.
 - b. Manufacturers and Products:
 - 1) Imperial Eastman; Poly-Flo tube fittings.
 - 2) Dekoron; E-Z fittings.

P. Stainless Steel Tubing: ASTM A312/A312M, Type 316, 0.065-inch wall, seamless, soft annealed, as shown on the Drawings.

Q. Stainless Steel Fittings:

1. Compression Type:
 - a. Materials: Type 316 stainless steel, ASTM A182/A182M forged bodies or ASTM A276 barstock bodies, flareless.
 - b. Manufacturers and Products:
 - 1) Parker Flodar; BA Series.
 - 2) Swagelok tube fittings.
 - 3) Parker CPI tube fittings; Parker A-LOK dual ferrule tube fittings.
2. Socket Weld Type:
 - a. Materials: Type 316 stainless steel, ASTM A182/A182M forged bodies or ASTM A276 barstock bodies, 3,000 psi maximum working pressure, safety factor 4:1.
 - b. Manufacturers:
 - 1) Cajon.
 - 2) Swagelok.
 - 3) Parker WELDLOK.

R. Air Set: Consists of a shutoff valve, pressure regulator, discharge pressure gauge, and interconnecting tubing.

S. Purge Set:

1. Parts: Purge rotameter flow element, pressure regulator, pressure gauge, test tap, shutoff valve, spool valve, and interconnecting tubing as shown on the Drawings and as required in this section.
2. Pressure Gauge Scale Range: 150 percent of the process variable.
3. Mounting: Within consoles, panels, or a separate enclosure as shown.

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T. Tubing Raceways:

1. Cable tray systems complete with tees, elbows, reducers, and covers.
2. Size in accordance with manufacturer's recommendations for intended service.
3. Materials: Galvanized steel or aluminum brass as recommended by manufacturer for designated service, unless otherwise shown on the Drawings.
4. Manufacturers:
 - a. Globetray.
 - b. Cope.

U. Air Supply Sets:

1. Parts:
 - a. Integrally Mounted:
 - 1) Pressure Controls: Automatic START/STOP, factory set at 30 psig to 50 psig.
 - 2) Valves: Manual drain, manual shutoff, pressure relief, and check valve.
 - 3) Pressure gauge.
 - 4) Inlet filter muffler.
 - 5) Power: 120V ac.
 - 6) Compressor: Oilless, single cylinder, rated for at least 1 scfm at 50 psig.
 - 7) Manufacturers and Products:
 - a) ITT Pneumotive; GH Series.
 - b) Gast.
2. Simplex Air Supply Sets:
 - a. Air Receiver: 2 gallons.
 - b. Compressors: One.
3. Duplex Air Supply Sets:
 - a. Air Receiver: 20 gallons.
 - b. Compressors: Two.
 - c. Automatic Failover Control: Factory set at 20 psig.

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2.03 ELECTRICAL COMPONENTS

A. Terminal Blocks for Enclosures:

1. General:
 - a. Connection Type: Screw compression clamp.
 - b. Compression Clamp:
 - 1) Complies with DIN-VDE 0611.
 - 2) Hardened steel clamp with transversal grooves that penetrate wire strands providing a vibration-proof connection.
 - 3) Guides strands of wire into terminal.
 - c. Screws: Hardened steel, captive, and self-locking.
 - d. Current Bar: Copper or treated brass. Provide corrosion protection for all exposed copper.
 - e. Insulation:
 - 1) Thermoplastic rated for minus 131 degrees F to plus 230 degrees F.
 - 2) Two funneled shaped inputs to facilitate wire entry.
 - f. Mounting:
 - 1) Standard DIN rail.
 - 2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
 - 3) End Stops: Minimum of one at each end of rail.
 - g. Wire Preparation: Stripping only permitted.
 - h. Jumpers: Allow jumper installation without loss of space on terminal or rail.
 - i. Marking System:
 - 1) Terminal number shown on both sides of terminal block.
 - 2) Allow use of preprinted and field marked tags.
 - 3) Terminal strip numbers shown on end stops.
 - 4) Mark terminal block and terminal strip numbers as shown on panel control diagrams and loop diagrams.
 - 5) Fuse Marking for Fused Terminal Blocks: Fuse voltage and amperage rating shown on top of terminal block.
 - j. Test Plugs: Soldered connections for 18 AWG wire.
 - 1) Pin Diameter: 0.079 inch.
 - 2) Quantity: 20, (need two plugs per test meter).
 - 3) Manufacturer and Product: Entrelec; Type FC2.
2. Terminal Block, General Purpose:
 - a. Rated Voltage: 600V ac.
 - b. Rated Current: 30 amp.
 - c. Wire Size: 24 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.

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- e. Color: Gray body.
- f. Spacing: 0.25 inch, maximum.
- g. Test Sockets: One screw test socket 0.079-inch diameter.
- h. Manufacturer and Product: Entrelec; Type M4/6.T.
- 3. Terminal Block, Ground:
 - a. Wire Size: 24 AWG to 10 AWG.
 - b. Rated Wire Size: 10 AWG.
 - c. Color: Green and yellow body.
 - d. Spacing: 0.25 inch, maximum.
 - e. Grounding: Electrically grounded to mounting rail.
 - f. Manufacturer and Product: Entrelec; Type M4/6.P.
- 4. Terminal Block, Blade Disconnect Switch:
 - a. Rated Voltage: 600V ac.
 - b. Rated Current: 10 amp.
 - c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Gray body, orange switch.
 - f. Spacing: 0.25 inch, maximum.
 - g. Manufacturer and Product: Entrelec; Type M4/6.SNT.
- 5. Terminal Block Diode:
 - a. Rated Voltage: 24V dc.
 - b. Rated Current: 30 mA.
 - c. Wire Size: 16 AWG.
 - d. Manufacturer and Product: Phoenix Contact ST-IN.
- 6. Terminal Block, Fused, 24V dc:
 - a. Rated Voltage: 600V dc.
 - b. Rated Current: 25 amp.
 - c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Gray body.
 - f. Fuse: 0.25 inch by 1.25 inches.
 - g. Indication: LED diode 24V dc.
 - h. Spacing: 0.512 inch, maximum.
 - i. Manufacturer and Product: Entrelec; Type ML10/13.SFD.
- 7. Terminal Block, Fused, 120V ac:
 - a. Rated Voltage: 600V ac.
 - b. Rated Current: 25 amp.
 - c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Gray body.
 - f. Fuse: 0.25 inch by 1.25 inches.
 - g. Indication: Neon lamp, 110V ac.
 - h. Leakage Current: 1.8 mA, maximum.

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- i. Spacing: 0.512 inch, maximum.
- j. Manufacturer and Product: Entrelec; Type ML10/13.SFL.
- 8. Terminal Block, Fused, 120V ac, High Current:
 - a. Rated Voltage: 600V ac.
 - b. Rated Current: 35 amps.
 - c. Wire Size: 18 AWG to 8 AWG.
 - d. Rated Wire Size: 8 AWG.
 - e. Color: Gray.
 - f. Fuse: 13/32 inch by 1.5 inches.
 - g. Spacing: 0.95 inch, maximum.
- 9. Manufacturer and Product: Entrelec; Type MB10/24.SF.

B. Relays:

- 1. General:
 - a. Relay Mounting: Plug-in type socket.
 - b. Relay Enclosure: Furnish dust cover.
 - c. Socket Type: Screw terminal interface with wiring.
 - d. Socket Mounting: Rail.
 - e. Provide holddown clips.
- 2. PLC Interface Relay:
 - a. Type: Narrow design for high density and direct connection of field wiring to relay terminals.
 - b. Function: Covert PLC input to dry contact for isolated discrete signal interface.
 - c. Relay Mounting: Plug into terminal block style socket.
 - d. Socket Mounting: DIN rail.
 - e. Socket Width: 0.25 inch nominal.
 - f. Coil Voltage: 120V ac or 24V dc to suit application.
 - g. Coil Power: 0.5 VA.
 - h. Expected Mechanical Life: 10,000,000 operations.
 - i. Operating Indicator: LED lights when coil is energized.
 - j. Contact Arrangement: One Form C, SPDT contact.
 - k. Contact Rating: 5A, at 24V dc and 250V ac.
 - l. Connection Type: Screw compression clamp.
 - m. Terminal Marking: Numbered with preprinted or field-marked tags.
 - n. Manufacturers and Products:
 - 1) Phoenix Contact; PLC-RSC Series.
 - 2) Allen-Bradley; Bulletin 700-HL Terminal Block Relays.
 - 3) Idec; RV8H Series.
- 3. Signal Switching Relay:
 - a. Type: Dry circuit.
 - b. Contact Arrangement: 2 Form C contacts.

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- c. Contact Rating: 5 amps at 28V dc or 120V ac.
 - d. Contact Material: Gold or silver.
 - e. Coil Voltage: As noted or shown.
 - f. Coil Power: 0.9 watt (dc), 1.2VA (ac).
 - g. Expected Mechanical Life: 10,000,000 operations.
 - h. Expected Electrical Life at Rated Load: 100,000 operations.
 - i. Indication Type: Neon or LED indicator lamp.
 - j. Seal Type: Hermetically sealed case.
 - k. Manufacturer and Product: Potter and Brumfield; Series KH/KHA.
4. Control Circuit Switching Relay, Nonlatching:
- a. Type: Compact general purpose plug-in.
 - b. Contact Arrangement: 3 Form C contacts.
 - c. Contact Rating: 10A at 28V dc or 120V ac, and 6.6A at 240V ac.
 - d. Contact Material: Silver cadmium oxide alloy.
 - e. Coil Voltage: As noted or shown.
 - f. Coil Power: 1.8 watts (dc), 2.7VA (ac).
 - g. Expected Mechanical Life: 10,000,000 operations.
 - h. Expected Electrical Life at Rated Load: 100,000 operations.
 - i. Indication Type: Neon or LED indicator lamp.
 - j. Push-to-test button.
 - k. Manufacturer and Product: Potter and Brumfield; Series KUP.
5. Control Circuit Switching Relay, Latching:
- a. Type: Dual coil mechanical latching relay.
 - b. Contact Arrangement: 2 Form C contacts.
 - c. Contact Rating: 10A at 28V dc or 120V ac.
 - d. Contact Material: Silver cadmium oxide alloy.
 - e. Coil Voltage: As noted or shown.
 - f. Coil Power: 2.7 watts (dc), 5.3VA (ac).
 - g. Expected Mechanical Life: 500,000 operations.
 - h. Expected Electrical Life at Rated Load: 50,000 operations.
 - i. Manufacturer and Product: Potter and Brumfield; Series KB/KBP.
6. Control Circuit Switching Relay, Time Delay:
- a. Type: Adjustable time delay relay.
 - b. Contact Arrangement: 2 Form C contacts.
 - c. Contact Rating: 10A at 30V dc or 277V ac.
 - d. Contact Material: Silver cadmium oxide alloy.
 - e. Coil Voltage: As noted or shown.
 - f. Operating Temperature: Minus 50 degrees F to 131 degrees F.
 - g. Repeatability: Plus or minus 2 percent.
 - h. Delay Time Range: Select range such that time delay setpoint fall between 20 percent to 80 percent of range.
 - i. Time Delay Setpoint: As noted or shown.
 - j. Mode of Operation: As noted or shown.

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- k. Adjustment Type: Integral potentiometer with knob external to dust cover.
- l. Manufacturer and Products: Potter and Brumfield; Series CB for 0.1-second to 100-minute delay time ranges, Series CK for 0.1-second to 120-second delay time ranges.

C. Surge Suppressors:

- 1. General:
 - a. Construction: First-stage, high-energy metal oxide varistor and second-stage, bipolar silicon avalanche device separated by series impedance; includes grounding wire, stud, or terminal.
 - b. Response: 5 nanoseconds maximum.
 - c. Recovery: Automatic.
 - d. Temperature Range: Minus 68 degrees F to plus 185 degrees F.
 - e. Enclosure Mounted: Encapsulated inflame retardant epoxy.
- 2. Suppressors on 120V ac Power Supply Connections:
 - a. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE C62.41 Category B test waveform.
 - b. First-Stage Clamping Voltage: 350 volts or less.
 - c. Second-Stage Clamping Voltage: 210 volts or less.
 - d. Power Supplies for Continuous Operation:
 - 1) Four-Wire Transmitter or Receiver: Minimum 5 amps at 130V ac.
 - 2) All Other Applications: Minimum 30 amps at 130V ac.
- 3. Suppressors on Analog Signal Lines:
 - a. Test Waveform: Linear 8-microsecond rise in current from 0 amps to a peak current value followed by an exponential decay of current reaching one-half the peak value in 20 microseconds.
 - b. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
 - 1) dc Clamping Voltage: 20 percent to 40 percent above operating voltage for circuit.
 - 2) dc Clamping Voltage Tolerance: Plus or minus 10 percent.
 - 3) Maximum Loop Resistance: 18 ohms per conductor.
- 4. Manufacturers and Products:
 - a. Analog Signals Lines: Emerson Edco PC-642 or SRA-64 series.
 - b. 120V ac Lines: Emerson Edco HSP-121.
 - c. Field Mounted at Two-Wire Instruments (Type 3):
 - 1) Encapsulated in stainless steel pipe nipples.
 - 2) Emerson Edco; SS64 series.

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- d. Field Mounted at Four-Wire Instruments (Type 4): With 120V ac outlet, ac circuit breaker, and 10-ohm resistors on signal lines, all in enclosure.
 - 1) Enclosure:
 - a) NEMA 4X fiberglass with door.
 - b) Maximum Size: 12 inches by 12 inches by 8 inches deep.
 - 2) Emerson Edco; SLAC series.

D. Power Supplies:

- 1. Furnish as required to power instruments requiring external dc power, including two-wire transmitters and dc relays. Provide dual power supplies with diode auctioneered outputs.
- 2. Convert 120V ac, 60-Hz power to dc power of appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that instruments being supplied can operate within their required tolerances.
- 3. Provide output over voltage and over current protective devices to:
 - a. Protect instruments from damage due to power supply failure.
 - b. Protect power supply from damage due to external failure.
- 4. Enclosures: NEMA 1.
- 5. Mount such that dissipated heat does not adversely affect other components.
- 6. Fuses: For each dc supply line to each individual two-wire transmitter.
 - a. Type: Indicating.
 - b. Mount so fuses can be easily seen and replaced.

E. Intrinsic Safety Barriers:

- 1. Intrinsically Safe Relays: Monitor discrete signals that originate in hazardous area and are used in a safe area.
 - a. Manufacturer and Product: MTL, Inc.; Series MTL 5000.
- 2. Intrinsically Safe Barriers: Interface analog signals as they pass from hazardous area to safe area.
 - a. Manufacturer and Product: MTL, Inc.; Series MTL 5000.

2.04 I&C COMPONENTS

A. A5 ORP Element and Transmitter:

1. General:

- a. Function: Measure, indicate, and transmit ORP of process fluid.
- b. Parts: Element, analyzer/transmitter, interconnecting cable, and noted ancillaries.

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2. Performance:
 - a. Element:
 - b. Process Range: If and as noted.
 - c. Range: Minus 1500 to plus 1500 mV.
 - d. Operating Temperature: 32 degrees F to 185 degrees F.
 - e. Operating Pressure: 100 psig maximum at 149 degrees F.
3. Analyzer/Transmitter:
 - a. Range: Minus 1400 mV to plus 1400 mV.
 - b. Accuracy: Plus or minus 1 mV.
 - c. Repeatability: Plus or minus 1 mV.
 - d. Stability: Plus or minus 1 mV per month, noncumulative.
 - e. Operating Temperature: 23 degrees F to plus 158 degrees F.
 - f. Operating Humidity: 95 percent maximum; relative humidity, noncondensing.
4. Element:
 - a. Process Connection: 1-inch MNPT.
 - b. Body Style: Convertible with 1-inch NPT on both ends.
 - c. Process Fluid: As noted.
 - d. Wetted Materials: Compatible with process fluid.
 - e. No field-replaceable parts, unless otherwise noted.
 - f. Electrode Type: Flat glass or general purpose, unless otherwise noted.
 - g. Integral Preamplifier: Required, unless otherwise noted.
 - h. Mounting/Process Connections: As shown on Drawings or as noted from among the following:
 - 1) Submersion:
 - a) Sensor handrail assembly.
 - b) Handrail mounting kit.
 - 2) Flow-through:
 - a) 3/4-inch NPT PVC tee.
 - b) 1-inch NPT PVC tee.
 - c) 1-1/2-inch NPT PVC tee.
 - 3) Insertion.
 - 4) Hot-Tap Retractable:
 - a) Suitable for 64-psig line pressure, unless otherwise noted.
 - b) 1-1/4-inch ball valve kit, unless otherwise noted.
 - c) Titanium Tube: 21 inches (12-inch insertion), unless otherwise noted.
 - i. Suitable for installation in Class I Div 2 hazardous locations: If noted or shown.
 - 1) Install in accordance with manufacturer's instructions and applicable codes.

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5. Analyzer/Transmitter:
 - a. Display: Graphic LCD, with backlighting.
 - b. Signal Interface:
 - 1) Analog Outputs: Two isolated 4 mA to 20 mA dc outputs (ORP and temperature).
 - 2) Discrete Outputs:
 - a) Process Alarms: Two SPSTs minimum, normally open.
 - b) Sensor/Analyzer and Process Fault Alarm: SPDT.
 - c) Contact Rating: 120 volts, 5 amps, resistive.
 - c. Enclosure.
 - 1) Type: NEMA 4X.
 - 2) Suitable for panel, 2-inch pipe, or wall mounting.
 - a) Wall and 2-inch mounting kit, unless otherwise noted.
 - b) Power: 115V ac, 50/60-Hz, unless otherwise noted.
 - c) Interconnecting Cable: Length as required.
 - d) Suitable for installation in Class I Div 2 hazardous locations: If noted or shown.
6. Expendables (for each unit provided):
 - a. Chemicals:
 - 1) ORP reference solution.
 - 2) 32 ounces, minimum.
7. Accessories:
 - a. Junction Box: If noted.
 - 1) NEMA 4X box for cable extension.
8. Manufacturers and Products:
 - a. Hach; Digital Differential ORP sensor and SC200 controller.
 - ~~a.~~b. Rosemount; Model 396P (wastewater) sensor and Model 56 ORP Analyzer.
 - c. Foxboro; 871A series ORP sensor and Model 875PH Intelligence Analyzer.^[ADD. 2]

B. D07 Suspended Solids Element and Transmitter, Microwave:

1. General:
 - a. Function: Measure, indicate, and transmit the percent total solids density of a process liquid in a full pipe.
 - b. Type: Microwave.
 - c. Parts: Density element, transmitter, interconnecting cables, and mounting hardware.
2. Service:
 - a. Stream Fluid: Thickened sludge from water treatment.

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3. Performance:
 - a. Measuring Range: 0 percent to 16 percent total solids.
 - b. Output Range: As noted.
 - c. Repeatability: Plus or minus 0.02 percent.
 - d. Temperature, Ambient: Minus 20 degrees C to 50 degrees C.
 - e. Temperature, Process: 0 degree C to 100 degrees C.
 - f. Damping: 1 second to 99 seconds.
4. Element:
 - a. Type: Flanged spool, ANSI 150.
 - b. Pipe Size: As noted.
 - c. Body: Type 316 stainless steel.
 - d. Enclosure: NEMA 4X.
 - e. Pressure Rating: 200 psig, minimum.
 - f. Wetted Materials: Type 316 stainless steel, ceramic, and EPDM.
5. Transmitter:
 - a. Mounting: Remote wall mounted, unless otherwise noted. Furnish with all manufacturer's appurtenances for wall-mounting.
 - b. Display: Digital LCD display, indicating percent solids.
 - c. Parameter Adjustments: By keypad or nonintrusive means.
 - d. Enclosure: NEMA 4, minimum.
 - e. Signal Outputs:
 - 1) Total Solids Signal Output: Isolated 4 mA to 20 mA dc for load impedance from 0 ohm to at least 500 ohms minimum for 24V dc supply. Supports superimposed digital HART protocol.
 - 2) Secondary Output: If noted, configured for temperature or conductivity.
 - 3) Communication: If and as noted.
 - f. Power: 120V ac.
6. Accessories:
 - a. Interconnecting Cable: For connecting element to transmitter, 25-feet, minimum or longer to suit mounting locations.
7. Manufacturers and Products:
 - a. Valmet; TS.
 - b. Toshiba; LQ500.
 - c. "Or-equal."

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C. F4 Flow Element and Transmitter, Electromagnetic:

1. General:
 - a. Function: Measure, indicate, and transmit the flow of a conductive process liquid in a full pipe.
 - b. Type:
 - 1) Electromagnetic flowmeter, with operation based on Faraday's Law, utilizing the pulsed dc type coil excitation principle with high impedance electrodes.
 - 2) Full bore meter with magnetic field traversing entire flow-tube cross-section.
 - 3) Unacceptable are insert magmeters or multiple single point probes inserted into a spool piece.
 - c. Parts: Flow element, transmitter, interconnecting cables, and mounting hardware. Other parts as noted.
2. Service:
 - a. Stream Fluid:
 - 1) As noted.
 - 2) Suitable for liquids with a minimum conductivity of 5 microS/cm and for demineralized water with a minimum conductivity of 20 microS/cm.
 - b. Flow Stream Descriptions: If and as described below.
3. Operating Temperature:
 - a. Element:
 - 1) Ambient: Minus 5 degrees F to 140 degrees F, typical, unless otherwise noted.
 - 2) Process: Minus 5 degrees F to 140 degrees F, typical, unless otherwise noted.
 - b. Transmitter:
 - 1) Ambient: Minus 5 degrees F to 140 degrees F, typical, unless otherwise noted.
 - 2) Storage: 15 degrees F to 120 degrees F, typical, unless otherwise noted.
4. Performance:
 - a. Flow Range: As noted.
 - b. Accuracy: Plus or minus 0.5 percent of rate for all flows resulting from pipe velocities of 2 feet to 30 feet per second.
 - c. Turndown Ratio: Minimum of 10 to 1 when flow velocity at minimum flow is at least 1 foot per second.

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5. Features:
 - a. Zero stability feature to eliminate the need to stop flow to check zero alignment.
 - b. No obstructions to flow.
 - c. Very low pressure loss.
 - d. Measures bi-directional flow.
6. Process Connection:
 - a. Meter Size (diameter inches): As noted.
 - b. Connection Type: 150-pound ANSI raised-face flanges; AWWA C207, Table 2 Class D; or wafer style depending on meter size, unless otherwise noted.
 - c. Flange Material: Carbon steel, unless otherwise noted.
7. Power (Transmitter): 120V ac, 60-Hz, unless otherwise noted.
8. Element:
 - a. Meter Tube Material: Type 304 or Type 316 stainless steel, unless otherwise noted.
 - b. Liner Material:
 - 1) For polymer, PTFE.
 - 2) For all else, Hard rubber or elastomer, unless otherwise noted.
 - c. Liner Protectors: Covers (or grounding rings) on each end to protect liner during shipment.
 - d. Electrode Type: Flush or bullet nose as recommended by the manufacturer for the noted stream fluid.
 - e. Electrode Material:
 - 1) For polymer, Alloy C22.
 - 2) For all else, Type 316L, unless otherwise noted.
 - f. Grounding Ring:
 - 1) Required, unless otherwise noted.
 - 2) Quantity: Two, unless otherwise noted.
 - 3) Material: Type 316 stainless steel, unless otherwise noted.
 - g. Enclosure: NEMA 4X, minimum, unless otherwise noted.
 - h. Submergence:
 - 1) Continuous (up to 10 feet depth), NEMA 6P/IP68.
 - i. Direct Buried (3 feet to 10 feet): If noted.
9. Transmitter:
 - a. Mounting: Remote wall mounted, unless otherwise noted. Furnish with all manufacturer's appurtenances for wall mounting.
 - b. Display: Required, unless otherwise noted.
 - 1) Digital LCD display, indicating flow rate and total.
 - 2) Bi-directional Flow Display: Required, unless otherwise noted.
 - a) Forward and reverse flow rate.
 - b) Forward, reverse, and net totalization.

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- c. Parameter Adjustments: By keypad or nonintrusive means.
 - d. Enclosure: NEMA 4X, minimum, unless otherwise noted.
 - e. Empty Pipe Detection:
 - 1) If noted.
 - 2) Drives display and outputs to zero when empty pipe detected.
10. Signal Interface (at Transmitter):
- a. Analog Output:
 - 1) Isolated 4 mA dc to 20 mA dc for load impedance from 0 ohm to at least 500 ohms minimum for 24V dc supply.
 - 2) Supports Superimposed Digital HART Protocol: If noted.
11. Cables:
- a. Types: As recommended by manufacturer.
 - b. Lengths: As required to accommodate device locations plus 50 feet.
12. Built-in Diagnostic System:
- a. Features:
 - 1) Field programmable electronics.
 - 2) Self-diagnostics with troubleshooting codes.
 - 3) Ability to program electronics with full scale flow, engineering units, meter size, zero flow cutoff, desired signal damping, totalizer unit digit value, etc.
 - 4) Initial flow tube calibration and subsequent calibration checks.
13. Factory Calibration:
- a. Calibrated in an ISO 9001 and NIST certified factory.
 - b. Factory flow calibration system must be certified by volume or weight certified calibration devices.
 - c. Factory flow calibration system shall be able to maintain calibration flow rate for at least 5 minutes for repeatability point checks.
14. Factory Ready for Future In situ Verifications: Original meter parameter values available from vendor by request.
15. Accessories:
- a. In situ Verification System:
 - 1) Verifies quantitatively that the meter and signal converter's present condition is the same as originally manufactured.
 - 2) Physical access to the flow-tube not required.
 - 3) Meet standards established by the National Testing Laboratory.
 - 4) Tests and stores over 50-meter parameters related to primary coils, electrodes, interconnecting cable and signal converter.

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- 5) Verification standard shall be plus or minus 1 percent of wet calibration for meters produced using the calibration verification service, or plus or minus 2 percent for standard meters.
- 6) Windows-based software.
- b. Primary Simulation System:
 - 1) Quantity: Two complete systems provided for the Project.
 - 2) Verifies proper operation of the signal converter by simulating the flow meter's output signal.
 - a) Generates pulsed dc excitation signal with a reference voltage of 70 mV.
 - b) Generated signal ranges from 0 percent to 99 percent (0 feet to 32.8 feet per second) with a resolution of 0.1 percent.
 - c) Switch selectable for forward, reverse and zero flow rate.
 - 3) Verifies various input and output signals.
16. Warranty: Provide 1 year full factory warranty for each meter and all accessories provide under this specification.
17. Manufacturers:
 - a. Endress + Hauser, Inc. Flow Measuring System with Promag 400 Flow Indicating Transmitter:
 - 1) Promag W10 (Size: 1 inch to 78 inches).
 - b. Siemens:
 - 1) Mag 1100 (Size: 1/2 inch to 1.5 inch).
 - 2) Mag 3100 Flow with Verificator accessory (Size: 1/2 inch to 78 inches).
 - Mag 5100W (Size: 1/2 inch to 48 inches).
 - 3) Transmitter: Mag 6000.

D. F51 Flow Element and Transmitter, Thermal Mass Flow:

1. General:
 - a. Function: Directly measure, indicate, and transmit mass flow of gas in pipe.
 - b. Type: Insertion type, thermal dispersion detection probe using platinum resistance temperature detectors (RTD).
 - c. Parts: Elements, transmitter, and interconnecting cable.
2. Performance:
 - a. Process Gas: As noted or shown.
 - b. Range for Air at 70 Degrees F and 14.7 psia:
 - 1) As noted, within the following:
 - a) 0.25 to 1,600 standard fps.
 - b) 0.25 to 200 actual fps.

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- c. Calibrated Span: As noted.
 - d. Accuracy:
 - 1) Flow: Plus or minus 1 percent of reading plus 0.5 percent full scale.
 - 2) Temperature: Plus or minus 2 degrees F.
 - e. Repeatability:
 - 1) Flow: Plus or minus 0.5 percent of reading.
 - 2) Temperature: Plus or minus 1 degree F.
 - f. Temperature, Operating:
 - 1) Flow Element: Minus 50 degrees F to plus 350 degrees F, unless otherwise noted.
 - 2) Transmitter Housing: 0 degree F to plus 150 degrees F.
 - g. Pressure, Operating, Flow Element: Up to 50 psig, unless otherwise noted.
3. Flow Element:
- a. Features:
 - 1) Insertion Length: As noted or manufacturer's recommendation.
 - 2) Wetted Surfaces Materials: Type 316 stainless steel with nickel braze, unless otherwise noted.
 - b. Process Connection:
 - 1) Line Size: As noted or shown.
 - 2) Connection Type: Retractable sensor with graphite-packed gland with 1-1/4-inch MNPT, unless otherwise noted.
 - 3) Connection Material: Type 316 stainless steel, unless otherwise noted.
 - c. Sensor Enclosure:
 - 1) Type: Aluminum, NEMA 4X, rated for Classes 1 and 2, Divisions 1 and 2, Groups B, C, D, E, F, G, and Eexd IIC; unless otherwise noted.
4. Transmitter:
- a. Features: 4-line by 20-character LCD, keypad programmable.
 - b. Nonvolatile memory.
 - c. Signal Interface:
 - 1) Outputs:
 - a) Analog: Two isolated 4 mA to 20 mA dc for maximum 600 ohm load, unless otherwise noted.
 - b) Discrete:
 - (1) Two independently adjustable 10 amps at 115V ac or 24V dc.
 - (2) Configurable as high or low flow or process temperature.
 - 2) Digital Communication: Modbus RTU/RS-485.

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- d. Power:
 - 1) Selectable: 115V ac, 230V ac, 24V dc.
 - e. Electrical Connection: 1-inch FNPT.
 - f. Transmitter Enclosure:
 - 1) Type: Fiberglass NEMA 4X, unless otherwise noted.
 - 2) Mounting: Remote from sensor.
 - g. Single factory calibration, unless otherwise noted.
 - 5. Cables:
 - a. Length: As required.
 - b. Cable Jacket: PVC rated for 220 degrees F, unless otherwise noted.
 - 6. Manufacturer and Product: Fluid Components International; Model ST50.
- E. L7 Level Element and Transmitter, Radar – Non-Contact, Type S:
- 1. General:
 - a. Function: Continuous level measurement.
 - b. Type: Radar; Non-contacting.
 - c. Loop-powered.
 - d. Parts: Element/integral transmitter and accessories as noted.
 - 2. Service:
 - a. Application: If and as noted.
 - b. Operating Temperature Range:
 - 1) Outside Ambient: Minus 40 degrees F to 176 degrees F.
 - 2) Transducer (inside vessel): Minus 40 degrees F to 212 degrees F.
 - 3. Performance:
 - a. Process Range: As noted.
 - b. Zero Reference: As noted.
 - c. Frequency: 80 GHz FMCW (frequency modulating, continuous wave).
 - d. Accuracy: The greater of 25 mm (1 inch) or 0.25 percent of range from minimum detectable distance to full range.
 - e. Medium Suitability: Non-contacting element for medium with dielectric constant greater than 1.6.
 - f. Blanking Distance: 15.75 inches.
 - 4. Element/Integral Transmitter:
 - a. Enclosure Rating:
 - 1) NEMA 4X/IP67 watertight.
 - 2) NEMA 6/IP68.
 - b. Enclosure Material: Aluminum, polyester powder-coated, C5 corrosion equivalent

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- c. Lens Antenna:
 - 1) Lens Antenna Material: PP, FKM, or EPDM.
 - 2) Include flange adapters.
 - 3) Process Connection:
 - a) 6-inch ASME 150-pound, flat faced flange, unless otherwise noted.
 - (1) Material: Type 316L stainless steel.
 - b) Cantilever Arm, unless otherwise noted.
 - 4) Process Seal/Gasket: As required.
 - 5) Pressure Rating of 14.31 psig Maximum: If noted.
- d. Beam Angle: 3 degrees.
- e. Approvals:
 - 1) FM, Classes I, II, III, Division 1, Groups A, B, C, D, E, F, G, and T6.
 - 2) FM, Class I, Division 2, Groups A, B, C, D, and T6.
- f. Element Beam Angle: 3 degrees inclusive.
- g. Display: Local LCD with bar graph (local display interface).
- 5. Transmitter Mounting: Remote wall mounted, unless otherwise noted. Furnish with all manufacturer's appurtenances for wall mounting.
- 6. Signal Interface:
 - a. Analog: 4 mA dc to 20 mA dc (HART) with maximum impedance of 550 ohms and nominal 24V dc power supply.
 - b. Digital, HART.
- 7. Conduit Entry: 1/2-inch NPT.
- 8. Accessories:
 - a. Handheld Programmer:
 - 1) One Per Lot of Level Units Provided: Required.
 - 2) Intrinsically safe version, unless otherwise noted.
 - b. Integral sunshield.
 - c. Stainless steel tag.
 - d. Wall mount bracket.
 - e. Others: As noted.
- 9. Manufacturer and Product:
 - a. Siemens; SITRANS LR 550.
 - b. No substitution allowed.

F. L08 Level Switch, Capacitance:

- 1. General: Capacitance type level switches shall be made up of a control relay, mechanically rigid and rugged non-metallic probe and probe housing.

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2. Switch:
 - a. For capacitance level switches in chemical tanks, instrument shall be chemically compatible with the application.
 - 1) Use Type 316 Stainless steel for instrument probe.
 - b. Provide a rigid, non-metallic element.
 - c. The control relay senses the liquid level by capacitance measurement between the electrode probe, the process liquid, and the equipment ground:
 - 1) Power Supply:
 - a) 120V ac.
 - b) Power consumption: 10 VA maximum.
 - 2) Outputs:
 - a) Relay Outputs:
 - (1) One Form C contact.
 - (2) Rated at 6 amperes at 120V ac.
 - (3) Programmable.
 - d. Electrical connection: One 1/2-inch NPT conduit entry.
 - e. Enclosure: NEMA Type 4X.
3. Manufacturers and Products:
 - a. Siemens; Pointek CLS200.
 - b. E+H; Liquicap M FTI51/FTI52.
 - c. "Or-equal."

G. L18 Level Switch, Nonmercury:

1. General:
 - a. Function: Actuate contact at preset liquid level.
 - b. Type:
 - 1) Direct-acting, stainless steel float with enclosed, encapsulated switch and integral cable.
 - 2) Mercury free.
2. Service (Liquid): Sludge, unless otherwise noted.
3. Performance:
 - a. Setpoint: As noted.
 - b. Differential: 8 inches maximum.
 - c. Temperature: 32 degrees F (nonfreezing) to 160 degrees F.
4. Features:
 - a. Entire Assembly: Watertight and impact-resistant.
 - b. Float:
 - 1) Material and Size: 5.5-inch diameter polymer-coated, Type 316 stainless steel float.
 - 2) Buoyancy: 2 pounds.

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- c. Cable:
 - 1) Length as noted or as necessary per mounting requirements.
 - 2) Plastic-jacketed cable, oil-resistant, and suitable for continuous service.
- d. Mounting: Pipe, unless otherwise noted.
 - 1) Pipe Mounting:
 - a) Cable clamp, suitable for connection to 1-inch pipe.
 - b) Pipe-to-wall bracket, suitable for connection to 1-inch pipe.
 - 2) Anchor Mounting Kit: If noted.
 - a) 15-pound vinyl-coated cast-iron anchor.
 - b) 1/8-inch, Type 316 stainless steel wire rope.
 - c) Stainless steel cable clips.
- 5. Signal Interface:
 - a. Switch Type: Magnetic reed.
 - b. Switch Contacts:
 - 1) Isolated, rated at least 0.8 amp continuous at 120V ac.
 - 2) Contact Type: Either NO or NC, as required by application or as noted; or SPDT (NO and NC).
- 6. Accessories: As noted.
- 7. Manufacturers and Products:
 - a. App4Water; Model 9G-EF Direct Acting Float Switch (B100).
 - b. Contegra; Model FS90.
 - c. No substitution allowed.

H. L42 Level Element/Transmitter, Submersible, Wastewater:

- 1. General:
 - a. Function: Measure and transmit signal proportional to level.
 - b. Type:
 - 1) Totally submersible pressure sensor (loop powered).
 - 2) Suitable for wastewater.
 - c. Parts: Sensor, interconnecting cable, other parts as noted.
- 2. Service:
 - a. Fluid: Wastewater, unless otherwise noted.
- 3. Performance:
 - a. Process Range:
 - 1) As noted.
 - 2) Provide fixed factory range such that noted process range is between 40 percent and 80 percent of fixed factory range.
 - b. Accuracy: 0.25 percent of full scale.
 - c. Temperature, Operating: Negative 4 degrees F to plus 140 degrees F.

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- d. Overpressure:
 - 1) Proof: At least 1.5 times full scale.
 - 2) Burst: At least 2.0 times full scale.
- 4. Features:
 - a. Sensor:
 - 1) Silicon pressure-sensing element.
 - 2) External Diaphragm: Flush type, coated with fluoro-polymer.
 - 3) Titanium or Type 316 stainless steel pressure module assembly, unless otherwise noted.
 - a) Special Warranty: 5-year corrosion warranty, replace sensor if it fails due to corrosion.
 - 4) NEMA 6/IP 68 rating (submersible).
 - 5) Temperature compensation.
 - 6) Dimensions, Nominal:
 - a) Diameter: 1.2 inches.
 - b) Length: 5 inches.
 - 7) Loop powered, 9V dc to 30V dc.
 - b. Interconnecting Cable:
 - 1) Length: As required.
 - 2) Polyurethane sheathed, unless otherwise noted.
 - 3) Kevlar strain relief cord.
 - 4) Integral vent tube.
 - c. Sensor Termination Enclosure: Required, unless otherwise noted.
 - 1) Enclosure: NEMA 4X.
 - 2) Terminations: Terminal blocks for termination of cable wiring.
 - 3) Houses moisture control elements.
 - 4) Mounting: 2-Inch Pipe Mounting.
 - d. Accessories:
 - 1) Moisture Control:
 - a) Terminate the integral vent tube with one of the following:
 - (1) Moisture filter cap.
 - (2) Aneroid bellows.
 - (3) Desiccant Module.
 - 2) Spare Desiccant Modules: One per element when desiccant modules are provided.
 - 3) Cable Hanger, Kellems Type Grip: Required, unless otherwise noted.

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- 4) Lightning Protection:
 - a) Internal (protects against water lightning strike): If noted.
 - b) External (protects 4 mA dc to 20 mA dc output): Required, unless otherwise noted.
- 5) Anchor Assembly: If noted or shown.
 - a) Marine anchor, clamps, Type 316 stainless steel cable or chain, length as required, nominally 3 feet longer than interconnecting cable.
 - b) Level Indicator: If noted or shown.
5. Signal Interface: 4 mA dc to 20 mA dc output, for load impedance of 0 ohm to 750 ohms, minimum for 24V dc supply without load adjustment.
6. Certification(s): Class I, Division 1, Groups A, B, C, and D.
7. Manufacturers and Products:
 - a. Endress + Hauser; Waterpilot FMX21.
 - b. Blue Ribbon Corp.; Model BC001, Birdcage Series.

I. M30 Horn, Indoor/Outdoor:

1. General:
 - a. Function: Audible alarm. Produces sound by electro-mechanical vibration of a diaphragm.
2. Performance:
 - a. Temperature, Operating: Minus 65 degrees F to 150 degrees F.
 - b. Sound Output Level: 100 dB nominal at 10 feet (110 dB at 1 meter).
3. Features:
 - a. Dimensions: 4-3/8 inches in height and width, and 2.5 inches in depth, for horn and enclosure.
 - b. Body: Die-cast zinc.
 - c. Diaphragm: Stainless steel.
 - d. Projector: None, unless otherwise noted.
 - e. Listings: UL, cUL listed, FM, CSA approved.
4. Enclosure:
 - a. Type: Cast aluminum with neoprene-gasketed NEMA 4X housing.
 - b. Mounting: Surface mount.
5. Power: 120V ac, 50/60-Hz, unless otherwise noted.
6. Manufacturer: Federal Signal Corp.; Model 350WB.

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J. M31 Warning Light, Indoor/Outdoor:

1. General:
 - a. Function: Visual alarm.
 - b. Type: Rotating reflector or flashing bulb.
 - c. Parts: Light and spare bulbs.
2. Performance:
 - a. Temperature, Operating: Minus 35 degrees F to 190 degrees F.
 - b. Flash Rate: Nominally 90 per minute.
3. Features:
 - a. Dome: Polycarbonate.
 - b. Dome Color: Amber, unless otherwise noted.
 - c. Lamp Life: 200 hours.
 - d. Lamp: Incandescent/25 watts.
4. Enclosure:
 - a. Type: IP65 (NEMA 4X).
 - b. Mounting: 1/2-inch pipe, unless otherwise noted.
 - c. Listing: UL listed, CSA certified.
5. Power: 120V ac, 50/60-Hz.
6. Spare Bulbs: Provide two for each light.
7. Manufacturer and Product: Federal Signal; Model 225.

K. M43 Intrusion Switch:

1. General:
 - a. Function: Monitor intrusion of entry points such as doors, overhead doors, and chain link gates.
 - b. Type:
 - 1) Magnetic.
 - 2) Large.
 - c. Parts: Magnet, switch, and cabling.
2. Features:
 - a. Type: Large magnet, surface-mount suitable for door, unless otherwise noted.
 - b. Cable: Armored, 36 inches long.
 - c. Mounting Kits:
 - 1) For Overhead Doors: If noted.
 - 2) Angle bracket for door mounting.
 - d. Magnet Length: 2.5 inches, nominal.
 - e. Magnet and Switch Dimensions: Each, 2.6 long by 0.875 wide by 0.600 thick, nominal inches.
 - f. Housing: Weather-resistant aluminum.
 - g. Two holes on switch and magnet for fasteners.

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- h. Current Sensor Assembly: If noted.
 - 1) Suited for use in 24V ac/dc circuits to protect the 10 watt rated standard switch.
 - 2) Includes shunt-to-ground circuit that shunts voltage above 60V ac/dc to ground.
 - 3) Quick blow fuse blows at 0.5 amp.
 - i. Additional Features: If and as noted.
 - 3. Signal Interface:
 - a. Switch: DPDT.
 - b. Contact Rating: 5 watts dc, unless otherwise noted.
 - c. Maximum Voltage: 175V dc.
 - d. Maximum Switching Current: 0.25 amp dc.
 - 4. Manufacturer and Product:
 - a. George Risk Industries; intrusion switch, Model 4405-A.
 - b. No substitution allowed.
- L. P02 Pressure Differential Switch:
- 1. General:
 - a. Function: Monitor differential pressure.
 - b. Type: Diaphragm actuated switch.
 - 2. Performance:
 - a. Setpoint:
 - 1) As noted.
 - 2) Repeatability: Plus or minus 1 percent.
 - b. Range: Noted setpoint shall fall between 20 percent and 90 percent of range.
 - c. Static Pressure:
 - 1) Operating Static Pressure: As noted.
 - 2) Operating static pressure must be less than switch's rated maximum static pressure.
 - d. Overpressure Proof Pressure: At least 400 percent of rated maximum static pressure.
 - e. Operating Temperature Range:
 - 1) Dependent on actuator seal materials.
 - 2) Buna-N Seal: 0 to 150 degrees F.
 - 3. Features:
 - a. Actuator Seal: Buna-N, unless otherwise noted.
 - b. Fixed differential, unless otherwise noted.
 - c. Mounting: Surface, unless otherwise noted.
 - 4. Process Connection:
 - a. 1/4-inch NPT female connections, unless otherwise noted.
 - b. Materials: Nickel-plated brass, unless otherwise noted.
 - 5. Enclosure: NEMA 4X.

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6. Signal Interface:
 - a. Contact Type:
 - 1) SPDT, unless otherwise noted.
 - 2) Rated for 10 amps minimum at 120V ac.
 - b. Hermetically Sealed Switch: If noted.
7. Manufacturers and Products:
 - a. Ashcroft; Type 400, D Series.
 - b. United Electric; 400 Series.

M. P4 Pressure Gauge:

1. General:
 - a. Function: Local pressure indication.
 - b. Type: Bourdon tube element.
2. Performance:
 - a. Scale Range: As noted.
 - b. Accuracy: Plus or minus 0.50 percent of full scale.
3. Features:
 - a. Dial: 4-1/2-inch diameter.
 - b. Pointer Vibration Reduction:
 - 1) Required, unless otherwise noted. Use the following method:
 - a) Liquid filled gauge front, unless otherwise noted.
 - (1) Glycerine fill, unless otherwise noted.
 - c. Case Material: Black thermoplastic, unless otherwise noted.
 - d. Materials of Wetted Parts (including element, socket/process connection, throttling device (if specified) and secondary components): Stainless steel, unless otherwise noted.
 - e. Pointer: Adjustable by removing ring and window.
 - f. Window: Glass or acrylic, unless otherwise noted.
 - g. Threaded reinforced polypropylene front ring.
 - h. Case Type: Solid front with blow-out back.
4. Process Connection:
 - a. Mounting: Lower stem, unless otherwise noted.
 - b. Size: 1/2-inch MNPT, unless otherwise noted.
5. Accessories:
 - a. Throttling Device: Required, unless otherwise noted.
 - 1) Type suitable for the intended service.
 - 2) Install in gauge socket bore.
6. Manufacturers and Products:
 - a. Ashcroft; Duragauge Model 1259, Model 1279.
 - b. Ametek U.S. Gauge; Solfrunt Model 19XX/1981 Advantage.
 - c. WIKA, Type 2XX.34.
 - d. No substitution allowed.

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N. P6 Pressure Seal, Diaphragm:

1. General:
 - a. Function: Isolate sensing element from process fluid.
 - b. Type:
 - 1) Diaphragm.
 - 2) Fluid filled between diaphragm and sensing element.
2. Service:
 - a. Pressure: Same as associated sensor.
 - b. Temperature Range: If noted.
3. Performance:
 - a. Pressure:
 - 1) For threaded process connections, at least 2,500 psig at 100 degrees F.
 - 2) Glycerin Fill: Suitable only for pressure (not vacuum applications).
 - b. Temperature:
 - 1) Dependent upon fill fluid.
 - a) Glycerin (food grade): Zero to 400 degrees F.
 - b) Silicone: Minus 40 degrees F to plus 600 degrees F.
 - c) Silicone (food grade): Zero to 375 degrees F.
 - d) Halocarbon: Minus 70 degrees F to 300 degrees F.
4. Features:
 - a. Materials:
 - 1) Lower Housing: Type 316 stainless steel, unless otherwise noted.
 - 2) Diaphragm Material: Type 316 stainless steel, unless otherwise noted.
 - 3) Top Housing: Steel, unless otherwise noted.
 - b. Diaphragm: Welded to upper housing, unless otherwise noted.
 - c. Filling screw in upper housing.
 - d. Fill Fluid:
 - 1) As noted.
 - 2) "Or-equal."
 - 3) Factory assembled and filled.
 - e. Flushing Connection: 1/4-inch NPT in lower housing.
 - f. Diaphragm Seal Displacement: 0.1 cubic inch, nominal.
5. Connections:
 - a. Instrument: 1/2-inch female NPT, unless otherwise noted or shown.
 - b. Process: 1/2-inch female NPT, unless otherwise noted or shown.

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6. Manufacturers:
 - a. Ashcroft; Type 201.
 - b. Ametek; Mansfield and Green Division; Type SG.
 - c. WIKA; Type L990.10.

O. P8 Pressure Switch, Fixed Deadband:

1. General:
 - a. Function: Monitor pressure.
 - b. Type: Diaphragm actuated switch.
2. Performance:
 - a. Setpoint:
 - 1) As noted.
 - 2) Repeatability: Plus or minus 1 percent.
 - b. Range: Noted setpoint shall fall between 20 percent and 80 percent of range.
 - c. Overpressure Proof Pressure: At least 400 percent of rated maximum static pressure.
 - d. Operating Temperature Range:
 - 1) Dependent on actuator seal materials.
 - 2) For Buna-N seal, 0 degree F to 150 degrees F.
3. Features:
 - a. Actuator Seal: Buna-N, unless otherwise noted.
 - b. Differential (deadband): Fixed.
 - c. Reset: Automatic, unless otherwise noted.
 - d. Mounting: Surface, unless otherwise noted.
4. Process Connection:
 - a. 1/4-inch NPT female connections, unless otherwise noted.
 - b. Materials: Nickel-plated brass, unless otherwise noted.
5. Enclosure: NEMA 4X.
6. Signal Interface:
 - a. Contact Type:
 - 1) SPDT, unless otherwise noted.
 - 2) Rated for 10 amps minimum at 120V ac.
 - b. Hermetically Sealed Switch: If noted.
7. Manufacturers and Products:
 - a. Ashcroft; Type 400, B Series.
 - b. United Electric; 400 Series.

P. P9 Pressure Transmitter:

1. General:
 - a. Function: Measure pressure and transmit signal proportional to pressure.

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- b. Type:
 - 1) Electronic variable capacitance or silicon strain gauge.
 - 2) Two-wire transmitter; "smart electronics."
- c. Parts: Transmitter and accessories.
- 2. Performance:
 - a. Range: As noted.
 - 1) Select transmitter's factory upper range limit (URL) such that upper boundary of noted range is as close as possible to 80 percent of factory URL, but does not exceed it.
 - b. Accuracy: Plus or minus 0.075 percent of span, unless otherwise noted.
 - c. Ambient Operating Temperature: Minus 40 degrees F to plus 175 degrees F, with integral meter.
 - d. Process Operating Temperature: Minus 40 degrees F to plus 250 degrees F.
 - e. Humidity: 0 percent to 100 percent relative humidity.
 - f. Hazardous Location Certifications: If and as noted.
- 3. Features:
 - a. Type: Gauge pressure, unless otherwise noted.
 - b. Adjustable damping.
 - c. LCD Indicator: Display in either percent or engineering units, field configurable.
 - d. Wetted Metallic Parts: Type 316 stainless steel, unless otherwise noted.
 - 1) Includes drain/vent valves; process flanges and adapters, and process isolating diaphragm.
 - e. Wetted O-Rings: Glass filled TFE, graphite filled PTFE, or Viton, unless otherwise noted.
 - f. Bolts and Nuts (if required): Type 316 stainless steel, unless otherwise noted.
 - g. Fill Fluid: Silicone, unless otherwise noted.
- 4. Process Connections:
 - a. Line Size: 1/2 inch.
 - b. Connection Type: FNPT.
 - c. Direct/remote Diaphragm Seal: If and as noted.
- 5. Signal Interface:
 - a. 4 mA dc to 20 mA dc output with digital signal based on HART protocol.
 - b. Nominal Maximum Loop Resistance with External 24V dc Power Supply: 550 ohms.
- 6. Enclosure:
 - a. Type: NEMA 4X, minimum, unless otherwise noted.
 - b. Materials: Coated aluminum, unless otherwise noted.

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- c. Mounting bracket, unless otherwise noted.
 - 1) Bracket and Accessories: Stainless steel; suitable for mounting transmitter to panel or 2-inch pipe.
 - 7. Accessories:
 - a. Two-valve (Isolate and Vent) Stainless Steel Manifold: If noted.
 - 8. Manufacturers and Products:
 - a. Endress + Hauser; PMC71B.
 - b. Rosemount; Model 3051 TG.
 - c. Siemens; SITRANS P310 Series.
- Q. P15 Pressure Seal, Annular:
- 1. General:
 - a. Function:
 - 1) Sense pressure in a process line and transfer to pressure monitoring device.
 - 2) Protect attached pressure monitoring device from sludge or slurry.
 - b. Type: Annular fluid-filled device that senses pressure through flexible sleeve around full pipe circumference.
 - 2. Performance:
 - a. Operating Conditions: Suitable for line pressures up to pipe flange rating.
 - 3. Features:
 - a. Construction:
 - 1) In-line, 8 Inches and Smaller: Full-faced thru-bolted with outside diameter same as mating flanges, unless otherwise noted.
 - 2) In-line, 10 Inches and Larger: Wafer style.
 - 3) Offline: Threaded, unless otherwise noted.
 - b. Materials:
 - 1) Body: Carbon steel, unless otherwise noted.
 - 2) Flanges (where applicable): Carbon steel, unless otherwise noted.
 - 3) Flexible Sleeve: Buna-N, unless otherwise noted.
 - 4) Fill Fluid: Ethylene glycol/water or propylene glycol, unless otherwise noted.
 - c. Factory Filled System:
 - 1) Filled and assembled with pressure monitoring device(s).
 - 2) Coordinate attached pressure monitoring device(s) with system integrator. Seal vendor's standard pressure monitoring device(s) only acceptable if it meets specification of the related pressure monitoring device.

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4. Process Connections:
 - a. Mounting: In-line or offline, as noted or shown.
 - b. Pipe Size:
 - 1) In-line: As noted or shown.
 - 2) Offline: 2 inches, unless otherwise noted.
 - c. Connections:
 - 1) In-Line, Full-Faced Through-Bolted: ASME B16.5, 150-pound flanges.
 - 2) In-Line, Wafer Style: Compatible with Classes 150/300 flange drilling.
 - 3) Offline: Female NPT Threaded, unless otherwise noted.
5. Manufacturers and Products:
 - a. Red Valve Company; Series 40, Series 48.
 - b. Dover/OPW Engineered Systems; Iso-Ring.
 - c. No substitution allowed.

R. T4 Temperature Element and Transmitter, Thermocouple:

1. General:
 - a. Function: Measure temperature of process fluid and transmit analog signal proportional to temperature.
 - b. Type: Thermocouple.
 - c. Parts: Element, thermowell, and transmitter.
2. Service:
 - a. Process Fluid: As noted.
 - b. Process Temperature Range: As noted.
3. Element:
 - a. Type:
 - 1) Single-element, unless otherwise noted.
 - 2) Iron-constantan, Type J, ungrounded, unless otherwise noted.
 - b. Performance:
 - 1) Accuracy: Plus or minus 4 degrees F or plus or minus 0.75 percent of reading, whichever is greater.
 - c. Features:
 - 1) Dimensions (Bare Element): 1/4-inch diameter.
 - 2) Length to accommodate thermowell insertion and extension length.
 - 3) Spring-loaded element when well is used.
 - 4) Sheath:
 - a) Type 316 stainless steel, unless otherwise noted.
 - b) Process Operating Temperature:
 - (1) Range: Minus 320 degrees F to 1600 degrees F, unless otherwise noted.

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- 5) Terminal Connection Head:
 - a) General purpose, NEMA 4 weatherproof, unless otherwise noted.
 - b) Maximum Temperature: 220 degrees F, unless otherwise noted.
 - 6) Thermowell Connection: Union coupler, stainless steel, unless otherwise noted.
 - 7) Sensitive Length: 1.6-inch minimum, measured from closed end.
4. Thermowell:
- a. Features:
 - 1) Inside Diameter: Sized to match thermocouple.
 - 2) Material: Type 316 stainless steel, unless otherwise noted.
 - 3) Insertion Length: As noted.
 - 4) Extension Length: 3 inches, unless otherwise noted.
 - b. Process Connection: 1-inch NPT connection, unless otherwise noted.
 - c. Well Type: Threaded straight, unless otherwise noted.
5. Transmitter:
- a. Ambient Operation Conditions:
 - 1) Temperature: Minus 20 degrees F to 158 degrees F, with display.
 - 2) Relative Humidity: 0 percent to 100 percent, noncondensing.
 - b. Type: Two-wire, powered by a remote power supply.
 - c. Performance:
 - 1) Digital Accuracy: Greater of plus or minus 0.07 degree F or plus or minus 0.01 percent of span.
 - 2) Response Time: 1.2 second 90 percent response time for 80 percent input step, with minimum damping.
 - d. Electrical Safety: Standard unless otherwise noted.
 - e. Features:
 - 1) Indicator: Three line LCD, unless otherwise noted.
 - 2) Automatic reference junction compensation.
 - 3) Failsafe Mode:
 - a) User configurable ON, unless otherwise noted.
 - b) Downscale, unless otherwise noted.
 - 4) Electric Damping: 1.2 seconds.
 - f. Signal Interface: 4 mA to 20 mA dc.
 - g. Power: 24V dc external power supply.
 - h. Digital Communication: HART.
 - 1) One HART communicator to be supplied for all HART capable transmitters, if not already supplied under another specification section.

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- i. Enclosure:
 - 1) Materials: Epoxy-coated, low-copper aluminum, unless otherwise noted.
 - 2) Type: NEMA 4X.
 - 3) Mounting: Wall, pipe stand, or integral to thermowell, as noted.
 - a) For pipe stand, provide stainless steel mounting set, unless otherwise noted.
 - b) For integral thermowell mount, provide explosion-proof connection.
- 6. Manufacturers and Products:
 - a. Invensys/Foxboro; RTT20 Series Transmitter with MINOX MT Series Thermocouple and Thermowell.
 - b. Rosemount; 78 Series Platinum RTD with Thermowell and Model 3144P Transmitter.
- S. Y40 Uninterruptible Power Supply System:
 - 1. General:
 - a. Function: Provides isolated, regulated uninterrupted ac output power during a complete or partial interruption of incoming line power.
 - b. Major Parts: Inverter, battery charger, sealed battery.
 - 2. Performance:
 - a. Capacity: Sized for connected load plus 50 percent spare capacity.
 - b. Input Power:
 - 1) 120V ac single phase, 60-Hz, unless otherwise noted.
 - 2) Connections: Manufacturer's standard, unless otherwise noted.
 - c. Output Power:
 - 1) 120V ac single phase, 60-Hz, unless otherwise noted.
 - 2) Connections: Manufacturer's standard, unless otherwise noted.
 - d. On-line Efficiency: 85 percent minimum, unless otherwise noted.
 - e. Backup Runtime:
 - 1) Full Load: 9 minutes minimum, unless otherwise noted.
 - 2) Half Load: 20 minutes minimum, unless otherwise noted.
 - f. Continuous no-break power with no measurable transfer time.
 - g. Sine-Wave Output Voltage Total Harmonic Distortion (THD): Plus or minus 6 percent or less.
 - h. Input Voltage Range: Plus 15 percent, minus 20 percent.
 - i. Output Voltage Regulation: Plus or minus 3 percent nominal.
 - j. Operating Temperature: 32 degrees F to 104 degrees F.

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- k. Operating Relative Humidity: 5 percent to 95 percent without condensation.
 - l. Lightning and Surge Protection:
 - 1) Pass lightning standard IEEE C62.41 Categories A and B tests.
 - 2) 2000 to 1 attenuation of input spike.
 - 3. Features:
 - a. Bypass Switch.
 - b. Monitoring Relay: Module for remote monitoring of UPS status. Minimum of two relay contacts configured for:
 - 1) Battery LOW.
 - 2) UPS Fault.
 - 3) Power Fail.
 - 4. Enclosure:
 - a. Tower, unless otherwise noted.
 - b. If rack-mount noted, unit to be suitable for mounting in a 19-inch rack.
 - 5. Manufacturer and Product: Eaton; 9130T.
 - 6. Manufacturers and Products:
 - a. UPS: Tripp-Lite; SU-RTXL series with relay I/O card.
 - b. External Battery Pack: Tripp-Lite; BP series external battery pack.
 - c. Automatic Bypass Switch: Geist Power; ATR100-103R20TL5.
 - d. Manual Bypass Switch: Liebert; MicroPOD MP2-130P maintenance bypass.
 - e. No substitution allowed.
- T. Y50 Programmable Logic Controller System:
- 1. In order to maximize the Owner's investment in terms of inventory and training, it is essential that PLC units where called for in specification shall strictly conform to the following. No substitution allowed:
 - a. Make: Allen Bradley.
 - b. Series: Control Logix.
 - c. Firmware: Version 24 or latest meeting City of Tulsa standards.
 - d. Module Types:
 - 1) CPU: 1756-L82XT; with conformal coating.
 - 2) Ethernet Module: 1756-EN2TR.
 - 3) DI: 1756-IA16.
 - 4) DO: 1756-OW16I wired to PLC Interface Relays.
 - 5) AI: 1756-IF16IH.
 - 6) AO: 1756-OF8.
 - 7) PS: 1756-PA75.
 - 8) Chassis: 1756-A17.
 - e. Quantity: Minimum quantity as required per IO list.

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U. Y99 Industrial Ethernet Switch:

1. Function: Connect industrial control devices for Ethernet communication.
2. Performance:
 - a. Operating Temperature: Minus 10 degrees C to 60 degrees C.
 - b. Operating Humidity: 10 percent to 95 percent non-condensing.
 - c. Operation: Plug and play.
 - d. Auto Sensing: Duplex, Speed, and Cable Type.
3. Approvals:
 - a. FCC Part 15 Class A.
 - b. UL Listed.
 - c. Noise: EN 61000-6-2 and EN 61000-6-4.
 - d. RoHS Compliant.
4. Features:
 - a. Ports: Eight RJ-45 Ethernet 10/100BaseTX ports, minimum.
 - b. Mounting: DIN-Rail.
 - c. Indicators:
 - 1) Per Switch: Power.
 - 2) Per Port: Link and Activity.
5. Power Input: 10V dc to 30V dc.
6. Manufacturers and Products:
 - a. Cisco; IE 3300 Series.
 - b. Transceivers:
 - 1) Multi-Mode: GLC-SX-MM-RGD=.
 - 2) Single-Mode: GLC-ZX-SM-RGD=, or as required to match offsite networking interface.

V. Y100 Local SCS Operator Interface Computer:

1. Features:
 - a. Aluminum Front Bezel suitable for mounting on Panel door.
 - b. Fan-less operation.
2. Processor: Windows-based PC with Intel Core i7 Processor, Dual Core 1.7 GHz minimum.
3. Display:
 - a. Size: 17-inch diagonal, Active Matrix TFT LCD.
 - b. Resolution: 1280 x 1024 XGA.
 - c. Backlight: LED.
 - d. Touchscreen: Single Touch Analog Resistive Touch Technology.
 - e. Graphics: Intel HD graphics.
 - f. Expansion Slot: PCIe.

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4. Mass Storage: 180 GB minimum Dual RAID 1, Solid-State Hard Disk Drive with onboard RAID controller.
5. System Memory: 8 GB DDR3L 1600 SDRAM.
6. Power Supply: 24V dc.
7. Ports:
 - a. Serial Ports: 1 x RS232/422/485 and 1 x RS232.
 - b. USB Ports: 4 x USB 3.0.
 - c. Ethernet Ports: 2 x RJ45, 10/100/1000 Mbps.
 - d. Graphics Ports: 1 X VGA and 1 x HDMI.
 - e. Audio: 1 x Line-In and 1 x Line-Out.
8. Environmental:
 - a. Degree of Protection: NEMA 4, IP66 front.
 - b. Ambient Temperature: 32 degrees F to 122 degrees F.
 - c. Relative Humidity: (Non-condensing) 30 percent to 95 percent RH at 104 degrees F.
9. Cables: As required.
10. Software: Wonderware InTouch version compatible with current plant standards and supplied with new InTouch Runtime License 64K I/O, supported by the City of Tulsa's existing support Contract No. 21090 with Standard Automation of Houston, TX. Integrate all Operator Control Interface functions into the plant wide Wonderware InTouch system and configure to automatically download the plant wide InTouch application into the touch screens.
11. Manufacturer and Product: American Industrial Systems; Model HMI-TPND0U-17SR-X00H.

2.05 SCADA SERVERS

- A. Provide two DELL PowerEdge R660 Servers. Each server shall be complete with the following:

Description	SKU
Trusted Platform Module 2.0 V6	461-AAIG
2.5" Chassis with up to 10 Hard Drives (SAS/SATA), PERC11, 1CPU	321-BKFF
Intel Xeon Gold 6526Y 2.8G, 16C/32T, 20GT/s, 37.5M Cache, Turbo, HT (195W) DDR5-5200	338-CPBV
No Additional Processor	374-BBBX
No HBM	379-BFFD

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Description	SKU
Performance Heatsink for 1 CPU Configuration (CPU less than 250W)	412-ABEH
Performance Optimized	370-AAIP
5600MT/s RDIMMs	370-BBRX
Unconfigured RAID	780-BCDS
PERC H755 SAS Front	405-AAZB
Front PERC Mechanical Parts, rear load	750-ADRI
Performance BIOS Settings	384-BBBL
UEFI BIOS Boot Mode with GPT Partition	800-BBDM
No Energy Star	387-BBEY
4 Very High Performance Fans	384-BCUJ
Dual, Hot Plug, Power Supply, Redundant (1+1) 1400W (100-240Vac)	450-AKWT
Riser Config 4, Low Profile, 2x8 LP Slots (Gen5) + 1x16 LP Slot (Gen4), 1CPU	330-BBZB
Broadcom 5720 Quad Port 1GbE BASE-T Adapter, OCP NIC 3.0	540-BCOB
Broadcom 5720 Dual Port 1GbE LOM	540-BDKD
No Cables Required	470-AEYU
PowerEdge 1U LCD Bezel	325-BEUG
Dell Luggage Tag	350-BCKC
BOSS-N1 controller card + with 2 M.2 480GB (RAID 1)	403-BCRU
BOSS Cables and Bracket for R660	470-AFMG
No Quick Sync	350-BBXM
iDRAC, Legacy Password	379-BCSG
iDRAC Group Manager, Disabled	379-BCQY
Windows Server 2025 Standard, 16CORE, FI, No Med, No CAL, Multi Language	634-CVGB
Dell Connectivity Client - Disabled	379-BFXT

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Description	SKU
Dell Connectivity Module	634-CYDF
iDRAC9, Enterprise 16G	528-CTIC
Secured Component Verification	528-COYT
Dell Secure Onboarding Client Disabled	634-CZRQ
Cable Management Arm	770-BDMT
ReadyRails Sliding Rails (A15)	770-BECD
No Systems Documentation, No OpenManage DVD Kit	631-AACK
R660 Dell label (BIS) for 2.5" Chassis	343-BBTS
PowerEdge R660 No CCC, No CE Marking	343-BBTU
ProSupport 7x24 Technical Support and Assistance 5 Years	887-1064
ProSupport Next Business Day On-Site Service After Problem Diagnosis 5 Years	887-1073
Dell Hardware Limited Warranty Plus On-Site Service - 2 -	887-1076
Two each - 16GB RDIMM, 5600MT/s, Single Rank	370-BBRQ
1.92TB SSD SAS, Read Intensive, up to 24Gbps 512e 2.5in Hot-Plug, AG Drive	345-BELF
Power Cord - C13, 3M, 125V, 15A (North America)	450-AALV
C13 to C14, PDU Style, 12 AMP, 6.5 Feet (2m) Power Cord, North America	492-BBDI
Windows Server 2025 Standard, 16CORE, Media Kit, MultiLang,	634-CVGJ
Windows Server 2025 Standard, 16CORE, DF Recovery Image, Multi Lang (Downgrade not included)	528-DHTW

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2.06 WORKSTATION

A. General:

1. Tower chassis workstation configured to run software shown on the Drawings and in Specifications.
2. Workstation shall be installed with HMI client node, intended for the Pre-Dewatering and Thickening area process operations.

B. One Intel Quad-Core processor, 3.0 GHz or greater, minimum of 10 MB L3 cache on chip die, 2133 MHz front side bus minimum.

C. 16 GB of RAM, 2133 MHz speed minimum, 2 DIMMS maximum.

D. Expansion Slots:

1. Two Full Height PCI slots.
2. One Full Height PCI Express slot.

E. Internal Disk: 2 TB of usable storage minimum, SATA, hard drives configured in a RAID 1 array.

F. Video graphics capable of 1920 by 1200 pixels, 70 Hz refresh rate and 32-bit true color minimum. VGA, DVI, and HDMI or Display Port outputs. 512 MB of dedicated video RAM minimum. Card must be dual monitor capable.

G. I/O Ports and Devices: Minimum of four USB 2.0 ports.

H. USB Port Blockers:

1. Unused USB ports shall have port blockers installed.
2. Port Blocker: LINDY USB Port Blockers White (Part No. 40464).

I. Interface Devices:

1. Generic USB 104 key (Windows) keyboard, no hot keys onboard.
2. Two button USB optical mouse with scroll wheel.

J. Monitor:

1. LCD 27-inch nominal size minimum.
2. Native Resolution: 1920 by 1080 resolution at 70 Hz minimum.
3. 16 ms response time maximum.
4. 250 nits (cd/m²) brightness minimum.
5. 400 to 1 contrast ratio minimum.
6. Vertical viewing angle of 85 degrees minimum.

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7. Horizontal viewing angle of 85 degrees minimum.
8. Analog GRB, Digital DVI-D, and HDMI or Display Port video input connector types.
9. Adjustable height stand.
10. Soundbar.

K. Networking:

1. Two network cards in addition to any onboard network interface.
2. All network interfaces shall have the following features:
 - a. Support for latest Microsoft operating system.
 - b. Gigabit Ethernet port, copper connection accepting standard CAT6 cables for Ethernet communications.
 - c. IEEE 802.3ab support for gigabit networking standard.
 - d. IEEE 802.Q VLAN support.
 - e. Auto sensing 10/100/1000 Mbps.
 - f. SNMP manageable.

L. Power supplies shall operate at 120V ac.

M. Operating System:

1. Latest release of 64-bit Windows 11 Professional Operating System shall be compatible with facility's existing Wonderware HMI.
2. The system shall auto boot directly to the HMI application with secure login credentials. There shall be no Windows desktop access.

N. Other Software:

1. MS Excel.
2. MS Word.

2.07 LAPTOP

- A. Provide two programming Laptops. Laptop shall be fully rugged that meets or exceeds MIL-STD-810G, while offering protection in harsh environments.
- B. Each Laptop shall be set up to run Allen-Bradley Studio 5000 PLC Programming development software in addition to the other software required herein. Software shall be licensed to the Owner.
- C. One Intel Snapdragon® X Plus X1P-64-100 or greater.
- D. 8 GB of RAM, 1333 MHz speed minimum.

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- E. Storage Drives: 512 GB, M.2 2230, TLC PCIe Gen4 NVMe, SSD.
- F. Integrated Qualcomm® Adreno™ GPU®, Snapdragon® X Elite X1E-80-100, 12 cores, 16GB LPDDR5x Memory.
- G. I/O Ports & Devices: Minimum of four USB 2.0 ports.
- H. Interface Devices:
 - 1. Compatible Docking Station.
 - 2. Generic USB 104 key (Windows) keyboard, no hot keys onboard.
 - 3. Two button USB optical mouse with scroll wheel.
- I. Monitor:
 - 1. LCD 20-inch nominal size minimum.
 - 2. Native Resolution: 1920 by 1080 resolution at 70 Hz minimum.
 - 3. 16 ms response time maximum.
 - 4. 250 nits (cd/m²) brightness minimum.
 - 5. 400 to 1 contrast ratio minimum.
 - 6. Vertical viewing angle of 85 degrees minimum.
 - 7. Horizontal viewing angle of 85 degrees minimum.
 - 8. Analog GRB, Digital DVI-D, and HDMI or Display Port video input connector types.
 - 9. Adjustable height stand.
- J. Primary Battery: 3 Cell, 54 Wh, ExpressCharge™, ExpressCharge™ Boost Capable.
- K. Power: 65W AC adapter, USB Type-C, EcoDesign.
- L. Operating System:
 - 1. Windows 11 Pro, Copilot+ PC.
 - 2. System shall be compatible with the supplied PLC platform and facility's existing Wonderware HMI.
- M. Other Software: Microsoft Office Latest version.
- N. Acceptable Manufacturers:
 - 1. Dell Latitude 7455.
 - 2. "Or-equal."

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2.08 ACCESS SERVICE SWITCH

- A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:
 - 1. CISCO Catalyst IE3300.
 - 2. No "or-equal."
- B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.
- C. Power Module Requirement:
 - 1. AC input Voltage: 100V ac to 240V ac auto ranging.
 - 2. AC frequency: 50 Hz to 60 Hz.
 - 3. AC input current: 1.25 A.
 - 4. Power Output: 24V dc/2.1A.
 - 5. Power consumption: 50W.
- D. Environmental:
 - 1. Operating Temperature: Minus 40 degrees C to plus 60 degrees C.
 - 2. Storage Temperature: Minus 40 degrees C to plus 85 degrees C.
 - 3. Operating Humidity: 5 percent to 95 percent non-condensing.
 - 4. Storage Humidity: 5 percent to 95 percent non-condensing.
 - 5. Maximum Operating Altitude: 15,000 feet.
- E. Physical:
 - 1. 256 MB DRAM.
 - 2. Microprocessor based managed type.
 - 3. IEEE 1588v2 FPGA.
 - 4. 19 in. DIN Rail mount kit.
 - 5. Mini-USB connector.
- F. Functional Performance:
 - 1. Per Port status LED indication.
 - 2. Six, ten, or 16 10/100Base-T Ethernet ports, fixed configurations with a compact form factor.
 - 3. One gigabit SFP (100 Mbps and 1 Gbps) or RJ45 uplink DRAM.
 - 4. Console Ports: 1x RJ45, 1x Mini USB type B and 1 x Aux. Port-RJ45.

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5. Supports: EtherNet/IP (CIP), and allow integration with existing management platforms from Rockwell, static IPv4 routing and static IPv6 routing protocols.
6. Meets AS/NZS 3548, BSMI CNS 13438, CAN/CSA-E60065-00, CISPR 22 Class A.

G. Options and Accessories Required:

1. Provide minimum 2-year warranty, and 5 years limited warranty.
2. The additional modules shall be included:
 - a. IP base IOS license and Security license.
 - b. All the required licenses to make the switch functional as per the Plant Standard.
 - c. 10/100 Port, Ethernet Switch Interface Card to support port requirement as specified in contract document.

2.09 DISTRIBUTION SERVICE SWITCH

- A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:
 1. CISCO IE 5000.
 2. No "or-equal."
- B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.
- C. Power Module Requirement:
 1. AC Input Voltage: 100V ac to 240V ac auto ranging.
 2. AC Frequency: 50 Hz to 60 Hz.
 3. AC Input Current: 2 A (110 V).
 4. Power Consumption: 90W maximum.
- D. Environmental:
 1. Operating Temperature: Minus 40 degrees C to plus 60 degrees C
 2. Operating Humidity: 5 percent to 95 percent non-condensing.
 3. Storage Temperature: Minus 40 degrees C to plus 85 degrees C.
 4. Maximum Operating Altitude: 13,800 feet.

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E. Physical:

1. 1 GB DRAM.
2. Microprocessor based managed type.
3. Mini-USB and traditional RJ-45 console connector.
4. 19-inches rack mount kit.

F. Functional Performance:

1. Per Port status LED indication.
2. Four gigabit SFP (100 Mbps and 1 Gbps) or RJ45 uplink DRAM.
3. 24 RJ45, or 12 RJ45 and 12 SFP Fiber ports 10/100/1000Base-T Ethernet ports, fixed configurations with a compact form factor.
4. Console Ports: 1x RJ45, 1x Mini USB type B and 1x Aux. Port-RJ45.
5. Supports: EtherNet/IP (CIP), and allow integration with existing management platforms from Rockwell, static IPv4 routing and static IPv6 routing protocols.
6. Meets AS/NZS CISPR 24, UL/CSA 60950-1, EN 60068-2-60, CISPR 22 Class A.

G. Options and Accessories Required:

1. Provide minimum 2-year full warranty, and 5 years limited warranty.
2. Two separate Switch will be provided at each location as redundant pair.
3. The additional modules shall be included:
 - a. 10/100/1000 Port, Ethernet Switch Interface Card to support port requirement as specified in contract document.
 - b. All the required licenses to make the switch functional as per the Plant Standard.

2.10 CORE SERVICE SWITCH

A. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable:

1. CISCO Catalyst 9300 Series.
2. No "or-equal."

B. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.

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C. Power Module Requirement:

1. AC Input Voltage: 100V ac to 240V ac auto ranging.
2. AC Frequency: 50 Hz to 60 Hz.
3. AC Input Current: 5 A to 10 A.
4. Power Consumption: 715 W maximum.

D. Environmental:

1. Normal Operating Temperature and Altitudes: Minus 5 degrees C to plus 45 degrees C, up to 5,000 feet.
2. Short-Term* Exceptional Conditions: Minus 5 degrees C to plus 50 degrees C, up to 5,000 feet (1,500m).
3. Storage Temperature: Minus 40 degrees F to 158 degrees F (Minus 40 degrees C to 70 degrees C).
4. Operating Humidity: 5 percent to 90 percent non-condensing.
5. Maximum Operating Altitude: 15,000 feet.

E. Physical:

1. 8 GB DRAM.
2. Microprocessor based managed type.
3. 19 inches rack mount kit.

F. Functional Performance:

1. Per Port status LED indication.
2. Four gigabit SFP (100 Mbps and 1 Gbps).
3. SFP Fiber ports 10/100/1000Base-T Ethernet ports, fixed configurations with a compact form factor.
4. Console Ports: 1x RJ45, 1x Mini USB type B and 1 x Aux. Port-RJ45
5. Supports: EtherNet/IP and allows integration with existing management platforms from Rockwell, static IPv4 routing and static IPv6 routing protocols.
6. Meets AS/NZS 3548 Class A, UL 60950-1, EN 55032 Class A, CISPR 32 Class A, and IEEE 802.3.

G. Options and Accessories Required:

1. Provide minimum 2-year full warranty, and 5 years limited warranty.
2. Fiber to copper converter shall be provided as needed for communications with other devices not equipped with Fiber ports.

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3. The additional modules shall be included:
 - a. 10/100/1000 Port, Ethernet Switch Interface Card to support port requirement as specified in contract document.
 - b. All the required licenses to make the switch functional as per the Plant Standard.

PART 3 EXECUTION

3.01 GENERAL

- A. Drawings for PICS Mechanical Systems are diagrammatic and not intended to specifically define element locations or piping and tubing run lengths. Base materials and installations on field measurements.

3.02 INSTALLATION

- A. Mechanical Systems:
 1. Copper and Stainless Steel Tubing Support: Continuously supported by aluminum tubing raceway system.
 2. Plastic Tubing Support: Except as shown on the Drawings, provide continuous support in conduit or by aluminum tubing raceway system.
 3. Install conduit for plastic tubing and tubing raceways parallel with, or at right angles to, structural members of buildings. Make vertical runs straight and plumb.
 4. Tubing and Conduit Bends:
 - a. Tool-formed without flattening, and all of same radius.
 - b. Bend Radius: Equal to or larger than conduit and tubing manufacturer's recommended minimum bend radius.
 - c. Slope instrument connection tubing in accordance with installation details.
 - d. Do not run liquid filled instrument tubing immediately over or within a 900 mm plan view clearance of electrical panels, motor starters, or mechanical mounting panel without additional protection. Where tubing must be located in these zones, shield electrical device to prevent water access to electrical equipment.
 - e. Straighten all coiled tubing by unrolling on flat surface. Do not pull to straighten.
 - f. Cut tubing square with sharp tubing cutter. Deburr cuts and remove chips. Do not gouge or scratch surface of tubing.
 - g. Blow debris from inside of tubing.

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- h. Make up and install fittings in accordance with manufacturer's recommendations. Verify makeup of tube fittings with manufacturer's inspection gauge.
 - i. Use lubricating compound or TFE tape on stainless steel threads to prevent seizing or galling.
 - j. Run tubing to allow but not limited to, clear access to doors, controls and control panels; and to allow for easy removal of equipment.
 - k. Provide separate support for components in tubing runs.
 - l. Supply expansion loops and use adapters at pipe, valve, or component connections for proper orientation of fitting.
 - m. Keep tubing and conduit runs at least 300 mm from hot pipes.
 - n. Locate and install tubing raceways in accordance with manufacturer's recommendations. Locate tubing to prevent spillage, overflow, or dirt from above.
 - o. Securely attach tubing raceways to building structural members.
 - 5. Enclosure Lifting Rings: Remove rings following installation and plug holes.
- B. Wiring: Refer to Section 40 90 00, Instrumentation and Control for Process Systems, and Division 26, Electrical.
- C. Electromagnetic Flowmeters:
- 1. Connect grounding straps to flowmeter flanges and adjoining pipe flanges or grounding rings. Connect grounding straps to a grounded metal potable water supply pipe at building entrance.
 - 2. Install grounding rings where adjoining piping is non-metallic or lined with a non-metallic material such as mortar.
- D. Ultrasonic Level Transducers:
- 1. Mount transducers to avoid interference of ultrasonic beam with walls, pipes, conduits, ladders, floats, cables and objects other than liquid surface to be measured.
 - 2. Mount transducers face a minimum of 12 inches above the highest liquid level to be measured.
 - 3. Provide aluminum support arms and stiffeners for non-flange mounted transducers and non-pendant mounted transducers.

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- E. Lighting Arresters: Connect lightning arrester ground terminal to main ground lug at MCC other locations prescribed by manufacturer's instructions via low resistance wiring.
- F. Stilling Wells:
 - 1. Provide all brackets, hooks, and fasteners be stainless steel or hot dipped galvanized welded pieces.
 - 2. Provide stilling wells where indicated. Stilling wells to be Schedule 80, 12 inch diameter PVC pipe.
 - 3. Cut bottom of stilling well on 45-degree angle.
 - 4. Bottom of stilling well to be located at or below inlet invert to pumps. Top of stilling well to be located no less than (a) 12 inches above nearest overflow, if overflow is via a weir plate, or (b) above 24 inches above nearest overflow, if overflow is directly into an overflow pipe without a weir plate.
 - 5. Provide a pair of hooks for storing excess cable.
- G. Intrinsic Safety System Installation:
 - 1. Comply with NEC Article 504, Intrinsically Safe Systems.
 - 2. Install intrinsically safe circuits in a separate wire way that:
 - a. Is separated from nonintrinsically safe circuits as specified by NEC.
 - b. Is colored light blue and has message "Intrinsically Safe Circuits Only" on raceway cover every 6 inches.

3.03 FIELD QUALITY CONTROL

- A. In accordance with Section 40 90 00, Instrumentation and Control for Process Systems.

3.04 MANUFACTURER'S SERVICES

- A. Specialty Equipment:
 - 1. For following equipment provide services of a qualified manufacturer's representative during installation, startup, demonstration testing, and Owner training. Provide original equipment manufacturer's services for:
 - a. Ultrasonic Flow Measurement Instrument.

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3.05 TRAINING

- A. Refer to Section 40 90 00, Instrumentation and Control for Process Systems.
- B. Operations Training: For Owner's operations personnel on operation of instruments and panel components.
 - 1. Trainer: PICs supplier.
 - 2. Training Session Duration: 2 instructor days.
 - 3. Number of Training Sessions: Three.
 - 4. Location: Project Site.
 - 5. Content: Conduct training on loop-by-loop basis.
 - a. Loop Functions: Understanding of loop functions, including interlocks for each loop.
 - b. Loop Operation: For example, adjusting process variable set points, equipment troubleshooting, AUTO and MANUAL control, and alarm resetting.
 - c. Interfaces with PICS Subsystems.
- C. Maintenance Training:
 - 1. Trainer: PICs supplier.
 - 2. Training Session Duration: 2 instructor days.
 - 3. Number of Training Sessions: Three.
 - 4. Location: Project Site.
 - 5. Content: Provide training for each type of component and function provided.
 - a. Loop Functions: Understanding details of each component and how they function.
 - b. Component calibration.
 - c. Adjustments: For example, controller configuration, current switch trip points, and similar items.
 - d. Troubleshooting and diagnosis for and components.
 - e. Replacing lamps, chart paper, fuses.
 - f. Instrumentation components removal and replacement.
 - g. Periodic maintenance.

3.06 CLEANING

- A. Prior to closing system using tubing, clear all tubing of interior moisture and debris.
- B. Clean all interior and exterior surfaces of control panels and field enclosures.
- C. Clean all exterior surfaces and terminal compartment of instruments.

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3.07 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are a part of this specification:

1. Instrument Index.
2. PLC I/O List.
3. Control Panel Schedule.
4. Surge Suppressor Products Table.

END OF SECTION

INSTRUMENT INDEX

TAG NO	ACCESSORY TAG	DESCRIPTION	CODE	TYPE	COMPONENT OPTIONS	SURGE SUPPRESSION DETAIL	DESIGN DETAIL	P&ID	NOTES
H040-WAS1-FMT01	FE11	WAS PUMPS INTAKE FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Remote. Process Fluid: Waste Activated Sludge. Range: 100 - 1200 gpm Installation: In-line Liner: Hard Rubber Electrode: 316L Pipe Size: 8"	4091-420US	4091-222M	09-N-0001	TRANSMITTER: RACK MOUNTED, INDOOR
PI12	PE12	WAS PUMP NO. 1 DISCHARGE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
PI14	PE14	WAS PUMP NO. 3 DISCHARGE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
PI16	PE16	WAS PUMP NO. 2 DISCHARGE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
PI11	PE11	WAS PUMP NO. 1 INTAKE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
PI13	PE13	WAS PUMP NO. 2 INTAKE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
PI15	PE15	WAS PUMP NO. 3 INTAKE PRESSURE GAUGE/INDICATOR	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0001	
H040-WAS1-PRS02	PE12	WAS PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 11 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H040-WAS1-PRS04	PE14	WAS PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 11 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H040-WAS1-PRS06	PE16	WAS PUMP NO. 3 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 11 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H040-WAS1-PRS01	PE11	WAS PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 2 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H040-WAS1-PRS03	PE13	WAS PUMP NO. 2 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 2 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H040-WAS1-PRS05	PE15	WAS PUMP NO. 3 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 2 psig Body Material: 316L	N/A	4091-304	09-N-0001	
H050-FCL1-LIT01		SCUM TANK RADAR LEVEL INDICATOR	L07	RADAR LEVEL INDICATING TRANSMITTER	Transmitter: Integral. Power: 24VDC (loop powered). Beam Angle: 4 degrees. Instrument Range: 131 feet. Instrument Span: 0 to 16 feet. Blanking Distance: 15 inch. Mount: Cantilever Arm. Accessories: Sunshield. Stainless Steel Tank Setpoint: 598.50 feet. Seal Material: PTFE	N/A	4091-251	09-N-0002	
LSH21		SCUM TANK HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 598.50 feet.	N/A	4091-249	09-N-0002	
LSH21		SCUM TANK HIGH HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 596.75 feet.	N/A	4091-249	09-N-0002	
LSL21		SCUM TANK LOW LOW FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 593.50 feet.	N/A	4091-249	09-N-0002	
H050-FCL1-PTM01	PE21	SECONDARY SCUM PUMP NO. 1 PRESSURE INDICATING TRANSMITTER	P09, P15	PRESSURE INDICATING TRANSMITTER, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0002	
H050-FCL1-PTM02	PE22	SECONDARY SCUM PUMP NO. 2 PRESSURE INDICATING TRANSMITTER	P09, P15	PRESSURE INDICATING TRANSMITTER, ANNULAR SEAL	Range: 0-20 psig	N/A	4091-304	09-N-0002	
H050-FCL1-PRS01	PE21	SECONDARY SCUM PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 16 psig Body Material: 316L	N/A	4091-304	09-N-0002	
H050-FCL1-PRS02	PE22	SECONDARY SCUM PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 16 psig Body Material: 316L	N/A	4091-304	09-N-0002	
H070-BDT1-FMT01		BDT BYPASS CONTROL VALVE BOX FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Integral. Process Fluid: Sludge. Range: 0 - 1200 gpm Installation: In-line Liner: Hard Rubber Electrode: 316L Pipe Size: 4"	4091-420US	4091-222M	09-N-0004	Located in vault subject to flooding.
H090-DEW1-LIT01		SLUDGE HOLDING TANK NO. 1 RADAR LEVEL INDICATOR	L07	RADAR LEVEL INDICATING TRANSMITTER	Transmitter: Integral. Power: 24VDC (loop powered). Beam Angle: 4 degrees. Instrument Range: 131 feet. Instrument Span: 0 to 20 feet. Blanking Distance: 15.75 inch Mount: Cantilever Arm. Accessories: Sunshield. Stainless Steel Tank Range: 0-20 psig Seal Material: PTFE	4091-420US	4091-251	09-N-0004	
PE31	PE31	BLOWER NO. 1 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE	Range: 0-20 psig	N/A	4091-304B	09-N-0004	
PE32	PE32	BLOWER NO. 2 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE	Range: 0-20 psig	N/A	4091-304B	09-N-0004	
PE33	PE33	BLOWER NO. 3 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE	Range: 0-20 psig	N/A	4091-304B	09-N-0004	
H090-DEW2-PRS01	PE31	BLOWER NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P08	PRESSURE SWITCH	Seal Material: PTFE High Setpoint: 13.5 psig Body Material: 316L	N/A	4091-304B	09-N-0004	
H090-DEW2-PRS02	PE32	BLOWER NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P08	PRESSURE SWITCH	Seal Material: PTFE High Setpoint: 13.5 psig Body Material: 316L	N/A	4091-304B	09-N-0004	
H090-DEW2-PRS03	PE33	BLOWER NO. 3 HIGH DISCHARGE PRESSURE SWITCH	P08	PRESSURE SWITCH	Seal Material: PTFE High Setpoint: 13.5 psig Body Material: 316L	N/A	4091-304B	09-N-0004	
H090-DEW2-MTRO1	AE31	SLUDGE HOLDING TANK ORP PROBE	A5	ORP PROBE	Transmitter: Remote. Process Fluid: Thickened Activated Sludge. Range: -500 - 500 mV (to be confirmed) Process Fluid: Sludge. Range: 0 - 25 psi. Size: 2 inch	4091-415AG	4091-050	09-N-0004	[ADD.2]
H090-DEW2-PTM03	PE35	RECIRCULATION PUMP NO. 1 DISCHARGE PRESSURE INDICATING TRANSMITTER	P09, P15	PRESSURE INDICATING TRANSMITTER, ANNULAR SEAL	Process Fluid: Sludge. Range: -15 - 25 psi. Size: 2 inch.	4091-415AG	4091-304	09-N-0004	
H090-DEW2-PTM04	PE36	RECIRCULATION PUMP NO. 2 INTAKE PRESSURE INDICATING TRANSMITTER	P09, P15	PRESSURE INDICATING TRANSMITTER, ANNULAR SEAL	Process Fluid: Sludge. Range: 0 - 25 psi. Size: 2 inch.	4091-415AG	4091-302	09-N-0004	
H090-DEW2-PTM05	PE37	RECIRCULATION PUMP NO. 2 DISCHARGE PRESSURE INDICATING TRANSMITTER	P09, P15	PRESSURE INDICATING TRANSMITTER, ANNULAR SEAL	Process Fluid: Sludge. Range: 0 - 25 psi. Size: 2 inch.	4091-415AG	4091-302	09-N-0004	
H090-DEW2-PTM01		SLUDGE HOLDING TANK NO. 1 PRESSURE INDICATING TRANSMITTER	P8, P09	PRESSURE INDICATING TRANSMITTER	Process Fluid: Air. Range: 0 - 13.5 psig Size: 1/2"	4091-415AG	4091-302	09-N-0004	
H090-DEW2-PTM02	PE34	RECIRCULATION PUMP NO. 1 INTAKE PRESSURE INDICATING TRANSMITTER	P8, P09	PRESSURE INDICATING TRANSMITTER	Process Fluid: Sludge. Range: -15 - 25 psi. Size: 2 inch.	4091-415AG	4091-304	09-N-0004	
H090-DEW2-PRS05	PE35	RECIRCULATION PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 23 psi Body Material: 316L	N/A	4091-304	09-N-0004	
H090-DEW2-PRS07	PE37	RECIRCULATION PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 23 psi Body Material: 316L	N/A	4091-304	09-N-0004	
H090-DEW2-PRS04	PE34	RECIRCULATION PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: -5 psi Body Material: 316L	N/A	4091-304	09-N-0004	
H090-DEW2-PRS06	PE36	RECIRCULATION PUMP NO. 2 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: -5 psi Body Material: 316L	N/A	4091-304	09-N-0004	
H090-DEW1-MTRO1	AA41	SLUDGE FEED PUMP GRINDER NO. 1 SUSPENDED SOLIDS ANALYZER	D07	ANALYZING INDICATING TRANSMITTER	Enclosure: NEMA 4X Dual Digital Channel Analytical Indicating Transmitter Digital Communications: Modbus RTU / RS-485. Contacts: 4 SPDT. Process Fluid: Sludge Range: Turbidity - 0 to 20,000 NTU. Installation: Interconnection cable: 25 feet or longer	4091-420US	4091-400	09-N-0005	Analytical Indicating Transmitter mounted on equipment rack on Clarifier No. 4 walkway, mounted in 316 Stainless Steel, NEMA 4X enclosure (powder coated white) mounted under a 316 stainless steel sun shield (powder coated white) with glare shield and type "SS-4" surge suppression. 4-20 mA dc/Digital HART® Protocol.
H090-DEW1-FMT01	FE41	SUPPLEMENTAL SLUDGE/POLYMER MIXER NO. 1 FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Remote. Process Fluid: Sludge. (2.5-5% TS) Range: 0-300 gpm Installation: In-line Liner: Hard Rubber Electrode: 316L Pipe Size: 4"	4091-420US	4091-222M	09-N-0005	TRANSMITTER: RACK MOUNTED, INDOOR

INSTRUMENT INDEX

TAG NO	ACCESSORY TAG	DESCRIPTION	CODE	TYPE	COMPONENT OPTIONS	SURGE SUPPRESSION DETAIL	DESIGN DETAIL	P&ID	NOTES
H090-DEW1-FMT02	FE42	SUPPLEMENTAL SLUDGE/POLYMER MIXER NO. 2 FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Remote Process Fluid: Sludge (2.5-5% TS) Range: 0-300 gpm Installation: Inline Liner: Hard Rubber Electrode: 316L Pipe Size: 4"	4091-420US	4091-222M	09-N-0005	TRANSMITTER RACK MOUNTED, INDOOR
H090-DEW1-FMT03	FE43	SUPPLEMENTAL SLUDGE/POLYMER MIXER NO. 3 FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Remote Process Fluid: Sludge (2.5-5% TS) Range: 0-300 gpm Installation: Inline Liner: Hard Rubber Electrode: 316L Pipe Size: 4"	4091-420US	4091-222M	09-N-0005	TRANSMITTER RACK MOUNTED, INDOOR
LSH41		DEWATERING BUILDING BASEMENT SUMP FLOODING LEVEL SWITCH	L08	LEVEL SWITCH, CAPACITANCE TYPE	Setpoint: 2 inch. Range: 0-100 psig N/A	N/A	4091-027	09-N-0005	
PM2	PE42	SLUDGE FEED PUMP NO. 1 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
PM4	PE44	SLUDGE FEED PUMP NO. 2 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
PM6	PE46	SLUDGE FEED PUMP NO. 3 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
PM1	PE41	SLUDGE FEED PUMP NO. 1 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
PM3	PE43	SLUDGE FEED PUMP NO. 2 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
PM5	PE45	SLUDGE FEED PUMP NO. 3 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, ANNULAR SEAL	Range: 0-100 psig N/A	N/A	4091-304	09-N-0005	
H090-DEW1-PRS02	PE42	SLUDGE FEED PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE High Setpoint: 95 psi Body Material: 316L Seal Material: PTFE	N/A	4091-304	09-N-0005	
H090-DEW1-PRS04	PE44	SLUDGE FEED PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	High Setpoint: 95 psi Body Material: 316L Seal Material: PTFE	N/A	4091-304	09-N-0005	
H090-DEW1-PRS06	PE46	SLUDGE FEED PUMP NO. 3 HIGH DISCHARGE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	High Setpoint: 95 psi Body Material: 316L Seal Material: PTFE	N/A	4091-304	09-N-0005	
H090-DEW1-PRS01	PE41	SLUDGE FEED PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 5 psig Body Material: 316L	N/A	4091-304	09-N-0005	
H090-DEW1-PRS03	PE43	SLUDGE FEED PUMP NO. 2 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 5 psig Body Material: 316L	N/A	4091-304	09-N-0005	
H090-DEW1-PRS05	PE45	SLUDGE FEED PUMP NO. 3 LOW INTAKE PRESSURE SWITCH	P8, P15	PRESSURE SWITCH, ANNULAR SEAL	Seal Material: PTFE Low Setpoint: 5 psig Body Material: 316L	N/A	4091-304	09-N-0005	
H090-DEW1-PRS21		ODOROUS AIR FAN NO. 1 PRESSURE DIFFERENTIAL SWITCH	P02	PRESSURE AND PRESSURE DIFFERENTIAL SWITCH	Process Fluid: Air Range: 0 - 10" W.C. Transmitter: Integral	N/A	4091-300	09-N-0006	
H090-DEW1-FMT04		CENTRIFUGE NO. 1 FLOW INDICATOR FROM POLYMER BLENDING UNITS	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Integral Process Fluid: Polymer. Range: 0-100 gpm Installation: Inline Liner: PTFE Electrode: 316L Pipe Size: 2 1/2"	4091-420US	4091-222M	09-N-0008	
H090-DEW1-FMT05		CENTRIFUGE NO. 2 FLOW INDICATOR FROM POLYMER BLENDING UNITS	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Integral Process Fluid: Polymer. Range: 0-100 gpm Installation: Inline Liner: PTFE Electrode: 316L Pipe Size: 2 1/2"	4091-420US	4091-222M	09-N-0008	
H090-DEW1-FMT06		CENTRIFUGE NO. 3 FLOW INDICATOR FROM POLYMER BLENDING UNITS	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Transmitter: Integral Process Fluid: Polymer. Range: 0-100 gpm Installation: Inline Liner: PTFE Electrode: 316L Pipe Size: 2 1/2"	4091-420US	4091-222M	09-N-0008	
H090-DEW1-LIT02	LE62	POLYMER BULK STORAGE TANK RADAR LEVEL INDICATOR	L07	RADAR LEVEL INDICATING TRANSMITTER	Transmitter: Integral. Power: 24VDC (loop powered). Beam Angle: 4 degrees. Instrument Range: 131 feet. Instrument Span: 0 to 12.25 feet. Blanking Distance: 15 inch Mount: 6 inch, 316 Stainless Steel Range. Accessories: Sunshield. Stainless Steel Tag.	4091-415AG	4091-257	09-N-0008	
LSH61		POLYMER CONTAINMENT AREA FLOOD LEVEL SWITCH	L08	LEVEL SWITCH, CAPACITANCE TYPE	Setpoint: 2 inch. Range: 0-20 psig N/A	N/A	4091-027	09-N-0008	
PM68	PE68	POLYMER RECIRCULATION PUMP NO. 1 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-20 psig N/A	N/A	4091-302	09-N-0008	
PM67	PE67	POLYMER RECIRCULATION PUMP NO. 1 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-20 psig N/A	N/A	4091-302	09-N-0008	
H090-DEW1-PRS08	PE68	POLYMER RECIRCULATION PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Process Fluid: Polymer. High Setpoint: 15 psi Transmitter: Integral	N/A	4091-302	09-N-0008	
H090-DEW1-PRS07	PE67	POLYMER RECIRCULATION PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Process Fluid: Polymer. Low Setpoint: 0 psi Transmitter: Remote	N/A	4091-302	09-N-0008	
H090-DEW1-FMT07	FE57	CENTRATE WET WELL DISCHARGE FLOW INDICATOR	F04	ELECTROMAGNETIC FLOW INDICATING TRANSMITTER	Process Fluid: Centrate. Range: 0-750 gpm Installation: Inline Liner: Hard Rubber Electrode: 316L Pipe Size: 6"	4091-420US	4091-222M	09-N-0009	RACK MOUNTED, INDOOR
LSH55		DEWATERING FACILITY BASEMENT FLOOD LEVEL SWITCH	L08	LEVEL SWITCH, CAPACITANCE TYPE	Setpoint: 2 inch. Range: 0-100 psig N/A	N/A	4091-027	09-N-0009	
LSH56		CENTRATE WET WELL HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 599.35 feet. N/A	N/A	4091-249	09-N-0009	
LSRH54		CENTRATE WET WELL HIGH HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 600.75 feet. N/A	N/A	4091-249	09-N-0009	
LSL54		CENTRATE WET WELL LOW FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 594.9 feet. N/A	N/A	4091-249	09-N-0009	
LSLL54		CENTRATE WET WELL LOW LOW FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 593.5 feet. N/A	N/A	4091-249	09-N-0009	
H090-DEW1-LIT03		CENTRATE WET WELL SUBMERSIBLE LEVEL INDICATOR	L42	LEVEL ELEMENT, SUBMERSIBLE	Transmitter: Integral. Power: 24VDC (loop powered). Instrument Span: 0 to 10 feet. Mount: 6 inch, 316 Stainless Steel Range. Cable, approximately 30.5 feet. Accessories: Stainless Steel Tag. Indicator: Local	N/A	4091-266AG 4091-267AG	09-N-0009	
PM56	PE56	CENTRATE PUMP NO. 1 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
PM58	PE58	CENTRATE PUMP NO. 2 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
PM50	PE50	CENTRATE PUMP NO. 3 DISCHARGE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
PM55	PE55	CENTRATE PUMP NO. 1 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
PM57	PE57	CENTRATE PUMP NO. 2 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
PM59	PE59	CENTRATE PUMP NO. 3 INTAKE PRESSURE GAUGE	P04	PRESSURE GAUGE, DIAPHRAGM SEAL	Range: 0-50 psig N/A	N/A	4091-302	09-N-0009	
H090-DEW1-PRS16	PE56	CENTRATE PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Seal Material: PTFE High Setpoint: 21 psig Body Material: 316L	N/A	4091-302	09-N-0009	
H090-DEW1-PRS18	PE58	CENTRATE PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Seal Material: PTFE High Setpoint: 21 psig Body Material: 316L	N/A	4091-302	09-N-0009	
H090-DEW1-PRS20	PE50	CENTRATE PUMP NO. 3 HIGH DISCHARGE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	High Setpoint: 21 psig Body Material: 316L Seal Material: PTFE	N/A	4091-302	09-N-0009	
H090-DEW1-PRS15	PE55	CENTRATE PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Low Setpoint: 0 psig Body Material: 316L Seal Material: PTFE	N/A	4091-302	09-N-0009	
H090-DEW1-PRS17	PE57	CENTRATE PUMP NO. 2 LOW INTAKE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Low Setpoint: 0 psig Body Material: 316L Seal Material: PTFE	N/A	4091-302	09-N-0009	
H090-DEW1-PRS19	PE59	CENTRATE PUMP NO. 3 LOW INTAKE PRESSURE SWITCH	P08, P06	PRESSURE SWITCH, DIAPHRAGM SEAL	Seal Material: PTFE Low Setpoint: 0 psig Body Material: 316L	N/A	4091-302	09-N-0009	
H095-COM2-FMT01		BIOPILTER FAN NO. 1 DISCHARGE FLOW INDICATOR	F51	FLOW ELEMENT AND TRANSMITTER, THERMAL MASS FLOW	Transmitter: Remote Process Fluid: Foul Air Range: 0 - 25,000 scfm Installation: Probe Pipe Size: 30"	4091-420US	4091-217 4091-380	09-N-0013	

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TAG NO	ACCESSORY TAG	DESCRIPTION	CODE	TYPE	COMPONENT OPTIONS	SURGE SUPPRESSION DETAIL	DESIGN DETAIL	PMID	NOTES
H095-COM2-FMT02		BIOFILTER FAN NO. 2 DISCHARGE FLOW INDICATOR	FS1	FLOW ELEMENT AND TRANSMITTER, THERMAL MASS FLOW	Transmitter: Remote Process Fluid: Foul Air Range: 0 - 25,000 scfm Installation: Probe Pkg Size: 10"	4091-420US	4091-217 4091-380	09-N-0013	
H095-COM2-PTM01		BIOFILTER FAN NO. 1 DISCHARGE PRESSURE INDICATING TRANSMITTER	PO9, PO5	PRESSURE INDICATING TRANSMITTER, DIAPHRAGM SEAL	Process Fluid: Foul Air Range: 0 - 11" w.C.	4091-415AG	4091-302	09-N-0013	
H095-COM2-PTM02		BIOFILTER FAN NO. 2 DISCHARGE PRESSURE INDICATING TRANSMITTER	PO9, PO6	PRESSURE INDICATING TRANSMITTER, DIAPHRAGM SEAL	Process Fluid: Foul Air Range: 0 - 11" w.C.	4091-415AG	4091-302	09-N-0013	
H095-COM2-TTA031		BIOFILTER FAN NO. 1 DISCHARGE TEMPERATURE INDICATOR	T4	TEMPERATURE INDICATING TRANSMITTER	Process Fluid: Foul Air Range: 0 - 140 degrees F	4091-420US	4091-068	09-N-0013	
H095-COM2-TTA032		BIOFILTER FAN NO. 2 DISCHARGE TEMPERATURE INDICATOR	T4	TEMPERATURE INDICATING TRANSMITTER	Process Fluid: Foul Air Range: 0 - 140 degrees F	4091-420US	4091-068	09-N-0013	
LSH01		SANITARY LIFT STATION HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 581.5 feet.	N/A	4091-249	09-N-0015	
LSH051		SANITARY LIFT STATION HIGH HIGH FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 583.75 feet.	N/A	4091-249	09-N-0015	
LSL01		SANITARY LIFT STATION LOW FLOAT LEVEL SWITCH	L18	FLOAT LEVEL SWITCH	Setpoint: 580 feet.	N/A	4091-249	09-N-0015	

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AI	H040-WAS1	FMT01-FI	WAS FLOW METER	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AI	H040-WAS1	WSP01-SI	WAS PUMP NO. 1 SPEED FEEDBACK	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AI	H040-WAS1	WSP02-SI	WAS PUMP NO. 2 SPEED FEEDBACK	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AI	H040-WAS1	WSP03-SI	WAS PUMP NO. 3 SPEED FEEDBACK	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AO	H040-WAS1	WSP01-SC	WAS PUMP NO. 1 SPEED COMMAND	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AO	H040-WAS1	WSP02-SC	WAS PUMP NO. 2 SPEED COMMAND	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	AO	H040-WAS1	WSP03-SC	WAS PUMP NO. 3 SPEED COMMAND	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS01-PL	WAS PUMP NO. 1 UPSTREAM LOW SUCTION PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS02-PH	WAS PUMP NO. 1 DOWNSTREAM HIGH DISCHARGE PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS03-PL	WAS PUMP NO. 3 UPSTREAM LOW SUCTION PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS04-PH	WAS PUMP NO. 3 DOWNSTREAM HIGH DISCHARGE PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS05-PL	WAS PUMP NO. 2 UPSTREAM LOW SUCTION PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	PRS06-PH	WAS PUMP NO. 2 DOWNSTREAM HIGH DISCHARGE PRESSURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP01-IR	WAS PUMP NO. 1 "IN REMOTE" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP01-MN	WAS PUMP NO. 1 "RUNNING" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP01-TH	WAS PUMP NO. 1 HIGH MOTOR TEMPERATURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP01-XF	WAS PUMP NO. 1 "FAULT" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP02-IR	WAS PUMP NO. 2 "IN REMOTE" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP02-MN	WAS PUMP NO. 2 "RUNNING" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP02-TH	WAS PUMP NO. 2 HIGH MOTOR TEMPERATURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP02-XF	WAS PUMP NO. 2 "FAULT" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP03-IR	WAS PUMP NO. 3 "IN REMOTE" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP03-MN	WAS PUMP NO. 3 "RUNNING" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP03-TH	WAS PUMP NO. 3 HIGH MOTOR TEMPERATURE	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI	H040-WAS1	WSP03-XF	WAS PUMP NO. 3 "FAULT" STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSC14-ZL	PGV04 POSITION SWITCH CLOSE STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSC15-ZL	PGV05 POSITION SWITCH CLOSE STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSC16-ZL	PGV06 POSITION SWITCH CLOSE STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSC17-ZL	PGV07 POSITION SWITCH CLOSE STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSC18-ZL	PGV08 POSITION SWITCH CLOSE STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSO14-ZH	PGV04 POSITION SWITCH OPEN STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSO15-ZH	PGV05 POSITION SWITCH OPEN STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSO16-ZH	PGV06 POSITION SWITCH OPEN STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSO17-ZH	PGV07 POSITION SWITCH OPEN STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		ZSO18-ZH	PGV08 POSITION SWITCH OPEN STATUS	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DO	H040-WAS1	WSP01-MD	WAS PUMP NO. 1 START/STOP	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DO	H040-WAS1	WSP02-MD	WAS PUMP NO. 2 START/STOP	09-N-0001
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DO	H040-WAS1	WSP03-MD	WAS PUMP NO. 3 START/STOP	09-N-0001
WAS FEED PUMPS HVAC	H040-WAS1-ACP01	H040-WAS1-PLC01	DI		ACU01-XA1	ACU01 GENERAL ALARM	09-N-0020
WAS FEED PUMPS HVAC	H040-WAS1-ACP01	H040-WAS1-PLC01	DI		ACU01-XA2	ACU01 FAIL	09-N-0020
WAS FEED PUMPS HVAC		H040-WAS1-PLC01	DI		SD01-XA1	SMOKE DETECTOR EXHAUST AIR ALARM	09-N-0020
WAS FEED PUMPS HVAC		H040-WAS1-PLC01	DI		SD01-XA2	SMOKE DETECTOR SUPPLY AIR ALARM	09-N-0020
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		UPS01-JA1	UPS POWER FAIL	09-N-0020
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		UPS01-OB	UPS01 BATTERY LOW	09-N-0020
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		UPS01-JA2	UPS01 FAIL	09-N-0020
WAS FEED PUMPS	H040-WAS1-CPL01	H040-WAS1-PLC01	DI		XS11-XA	PANEL INTRUSION ALARM	09-N-0020
TOTAL ETH:	0						
TOTAL AI:	4						
TOTAL AO:	3						
TOTAL DI:	36						
TOTAL DO:	3						

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	AI	H050-FCL1	LIT01-LI	SCUM TANK LEVEL	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	AI	H050-FCL1	PTM01-PI	SECONDARY SCUM PUMP NO. 1 PRESSURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	AI	H050-FCL1	PTM02-PI	SECONDARY SCUM PUMP NO. 2 PRESSURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP01-XA	SECONDARY SCUM PUMP NO. 1 MOISTURE ALARM	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP02-XA	SECONDARY SCUM PUMP NO. 2 MOISTURE ALARM	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP01-TH	SECONDARY SCUM PUMP NO. 1 HIGH MOTOR TEMPERATURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP02-TH	SECONDARY SCUM PUMP NO. 2 HIGH MOTOR TEMPERATURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP01-IR	SECONDARY SCUM PUMP NO. 1 "IN REMOTE" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP02-IR	SECONDARY SCUM PUMP NO. 2 "IN REMOTE" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP01-MN	SECONDARY SCUM PUMP NO. 1 "RUNNING" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP02-MN	SECONDARY SCUM PUMP NO. 2 "RUNNING" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP01-XF	SECONDARY SCUM PUMP NO. 1 "FAULT" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	SCP02-XF	SECONDARY SCUM PUMP NO. 2 "FAULT" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV02-IR	PGV02 VALVE VAULT "IN REMOTE" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV04-IR	PGV04 VALVE VAULT "IN REMOTE" STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV02-ZH	PGV02 VALVE VAULT FULLY OPEN STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV04-ZH	PGV04 VALVE VAULT FULLY OPEN STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV02-ZL	PGV02 VALVE VAULT FULLY CLOSE STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PGV04-ZL	PGV04 VALVE VAULT FULLY CLOSE STATUS	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PRS01-PH	SECONDARY SCUM PUMP NO. 1 HIGH PRESSURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	PRS02-PH	SECONDARY SCUM PUMP NO. 2 HIGH PRESSURE	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	LIT01-LH	SCUM TANK HIGH HIGH LEVEL ALARM	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	LIT01-LL	SCUM TANK LOW LOW LEVEL ALARM	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DI	H050-FCL1	LIT01-LH	SCUM TANK HIGH LEVEL ALARM	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	SCP01-MD	SECONDARY SCUM PUMP NO. 1 START/STOP	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	SCP02-MD	SECONDARY SCUM PUMP NO. 2 START/STOP	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	PGV02-ZD	PGV02 VALVE VAULT OPEN COMMAND	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	PGV04-ZD	PGV04 VALVE VAULT OPEN COMMAND	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	PGV02-ZB	PGV02 VALVE VAULT CLOSE COMMAND	09-N-0002
SCUM WET WELL	H050-FCL1-CPL01	H050-FCL1-PLC01	DO	H050-FCL1	PGV04-ZB	PGV04 VALVE VAULT CLOSE COMMAND	09-N-0002
TOTAL ETH:	0						
TOTAL AI:	3						
TOTAL AO:	0						
TOTAL DI:	21						
TOTAL DO:	6						

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT01-FI	CENTRIFUGE SLUDGE FEED NO. 1 FLOW	09-N-0005
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT02-FI	CENTRIFUGE SLUDGE FEED NO. 2 FLOW	09-N-0005
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT03-FI	CENTRIFUGE SLUDGE FEED NO. 3 FLOW	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	GRD01-TI	GRINDER 1 HIGH MOTOR TEMPERATURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	MTR01-AI	CENTRIFUGE SLUDGE FEED PUMPS SUSPENDED SOLIDS ANALYZER	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	SFP01-SI	CENTRIFUGE SLUDGE FEED PUMP NO. 1 SPEED FEEDBACK	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	SFP02-SI	CENTRIFUGE SLUDGE FEED PUMP NO. 2 SPEED FEEDBACK	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	SFP03-SI	CENTRIFUGE SLUDGE FEED PUMP NO. 3 SPEED FEEDBACK	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	SFP01-SC	CENTRIFUGE SLUDGE FEED PUMP NO. 1 SPEED COMMAND	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	SFP02-SC	CENTRIFUGE SLUDGE FEED PUMP NO. 2 SPEED COMMAND	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	SFP03-SC	CENTRIFUGE SLUDGE FEED PUMP NO. 3 SPEED COMMAND	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	GRD01-IR	GRINDER 1 "IN REMOTE" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	GRD01-MN	GRINDER 1 "RUNNING" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	GRD01-XF	GRINDER 1 "FAULT" STATUS	09-N-0005
DEWATERING BUILDING	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSH41-LH	DEWATERING BUILDING BASEMENT FLOOD LEVEL SWITCH	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-IR	CENTRIFUGE SLUDGE FEED PUMP NO. 1 "IN REMOTE" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-MN	CENTRIFUGE SLUDGE FEED PUMP NO. 1 "RUNNING" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-PH	CENTRIFUGE SLUDGE FEED PUMP NO. 1 HIGH DISCHARGE PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-PL	CENTRIFUGE SLUDGE FEED PUMP NO. 1 LOW SUCTION PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-TH	CENTRIFUGE SLUDGE FEED PUMP NO. 1 HIGH MOTOR TEMPERATURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP01-XF	CENTRIFUGE SLUDGE FEED PUMP NO. 1 "VFD FAULT" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-IR	CENTRIFUGE SLUDGE FEED PUMP NO. 2 "IN REMOTE" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-MN	CENTRIFUGE SLUDGE FEED PUMP NO. 2 "RUNNING" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-PH	CENTRIFUGE SLUDGE FEED PUMP NO. 2 HIGH DISCHARGE PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-PL	CENTRIFUGE SLUDGE FEED PUMP NO. 2 LOW SUCTION PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-TH	CENTRIFUGE SLUDGE FEED PUMP NO. 2 HIGH MOTOR TEMPERATURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP02-XF	CENTRIFUGE SLUDGE FEED PUMP NO. 2 "VFD FAULT" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-IR	CENTRIFUGE SLUDGE FEED PUMP NO. 3 "IN REMOTE" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-MN	CENTRIFUGE SLUDGE FEED PUMP NO. 3 "RUNNING" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-PH	CENTRIFUGE SLUDGE FEED PUMP NO. 3 HIGH DISCHARGE PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-PL	CENTRIFUGE SLUDGE FEED PUMP NO. 3 LOW SUCTION PRESSURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-TH	CENTRIFUGE SLUDGE FEED PUMP NO. 3 HIGH MOTOR TEMPERATURE	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	SFP03-XF	CENTRIFUGE SLUDGE FEED PUMP NO. 3 "VFD FAULT" STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC40-ZL	CENTRIFUGE SLUDGE FEED PUMP PGV10 VALVE CLOSE STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC41-ZL	CENTRIFUGE SLUDGE FEED PUMP PGV11 VALVE CLOSE STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC45-ZL	CENTRIFUGE SLUDGE FEED PUMP PGV05 VALVE CLOSE STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC47-ZL	CENTRIFUGE SLUDGE FEED PUMP PGV07 VALVE CLOSE STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC49-ZL	CENTRIFUGE SLUDGE FEED PUMP PGV09 VALVE CLOSE STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO40-ZH	CENTRIFUGE SLUDGE FEED PUMP PGV10 VALVE OPEN STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO41-ZH	CENTRIFUGE SLUDGE FEED PUMP PGV11 VALVE OPEN STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO45-ZH	CENTRIFUGE SLUDGE FEED PUMP PGV05 VALVE OPEN STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO47-ZH	CENTRIFUGE SLUDGE FEED PUMP PGV07 VALVE OPEN STATUS	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO49-ZH	CENTRIFUGE SLUDGE FEED PUMP PGV09 VALVE OPEN STATUS	09-N-0005

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	GRD01-MD	GRINDER 1 START/STOP	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	SFP01-MD	CENTRIFUGE SLUDGE FEED PUMP NO. 1 START/STOP	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	SFP02-MD	CENTRIFUGE SLUDGE FEED PUMP NO. 2 START/STOP	09-N-0005
SLUDGE FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	SFP03-MD	CENTRIFUGE SLUDGE FEED PUMP NO. 3 START/STOP	09-N-0005
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	OCF01-SI	ODOR CONTROL FAN NO. 1 SPEED FEEDBACK	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	OCF01-SC	ODOR CONTROL FAN NO. 1 SPEED COMMAND	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	OCF01-IR	ODOR CONTROL FAN NO. 1 "IN REMOTE" STATUS	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	OCF01-MN	ODOR CONTROL FAN NO. 1 "RUNNING" STATUS	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	OCF01-XF	ODOR CONTROL FAN NO. 1 "FAULT" STATUS	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS21-PL	ODOR CONTROL FAN NO. 1 LOW DIFFERENTIAL PRESSURE	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	OCF01-TH	ODOROUS FAN NO. 1 HIGH MOTOR TEMPERATURE	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZS053-ZH	CENTRIFUGE NO. 1 PGV13 VALVE OPEN STATUS	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC53-ZL	CENTRIFUGE NO. 1 PGV13 VALVE CLOSED STATUS	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	OCF01-MD	ODOR CONTROL FAN NO. 1 START/STOP	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	ETH	H090-DEW1	CEN01-ETH	CENTRIFUGE NO. 1	09-N-0006
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZS054-ZH	CENTRIFUGE NO. 2 CENTRIFUGE PGV14 VALVE OPEN STATUS	09-N-0007
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZS055-ZH	CENTRIFUGE NO. 3 CENTRIFUGE PGV15 VALVE OPEN STATUS	09-N-0007
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC54-ZL	CENTRIFUGE NO. 2 CENTRIFUGE PGV14 VALVE CLOSED STATUS	09-N-0007
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC55-ZL	CENTRIFUGE NO. 3 CENTRIFUGE PGB15 VALVE CLOSED STATUS	09-N-0007
CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	ETH	H090-DEW1	CEN02-ETH	CENTRIFUGE NO. 2	09-N-0007
ALT03: CENTRIFUGES	H090-DEW1-MCP01	H090-DEW1-PLC01	ETH	H090-DEW1	CEN03-ETH	CENTRIFUGE NO. 3	09-N-0007
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT04-FI	POLYMER METERING PUMP NO. 1 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT05-FI	POLYMER METERING PUMP NO. 2 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT06-FI	POLYMER METERING PUMP NO. 3 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-PNL01	H090-DEW1-PLC01	AI	H090-DEW1	LIT02-LI	POLYMER BULK STORAGE TANK LEVEL	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-PNL01	H090-DEW1-PLC01	AO		LI02-LI	POLYMER FILL PANEL TANK LEVEL	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PFP01-FI	POLYMER METERING PUMP NO. 1 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PFP02-FI	POLYMER METERING PUMP NO. 2 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PFP03-FI	POLYMER METERING PUMP NO. 3 PROCESS FLOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSH61-LH	POLYMER METERING PUMPS CONTAINMENT AREA LEVEL HIGH ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP01-IR	POLYMER METERING PUMP NO. 1 "IN REMOTE" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP01-MN	POLYMER METERING PUMP NO. 1 "RUNNING" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP01-XA	POLYMER METERING PUMP NO. 1 COMMON ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP02-IR	POLYMER METERING PUMP NO. 2 "IN REMOTE" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP02-MN	POLYMER METERING PUMP NO. 2 "RUNNING" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP02-XA	POLYMER METERING PUMP NO. 2 COMMON ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP03-IR	POLYMER METERING PUMP NO. 3 "IN REMOTE" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP03-MN	POLYMER METERING PUMP NO. 3 "RUNNING" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PFP03-XA	POLYMER METERING PUMP NO. 3 COMMON ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS07-PL	POLYMER RECIRCULATION PUMP NO. 1 LOW PRESSURE ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS08-PH	POLYMER RECIRCULATION PUMP NO. 1 HIGH HIGH PRESSURE ALARM	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS09-PL	POLYMER METERING MIXER NO. 1 DIFFERENTIAL PRESSURE LOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS11-PL	POLYMER METERING MIXER NO. 2 DIFFERENTIAL PRESSURE LOW	09-N-0008

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS13-PL	POLYMER METERING MIXER NO. 3 DIFFERENTIAL PRESSURE LOW	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	RCP01-IR	POLYMER RECIRCULATION PUMP NO. 1 "IN REMOTE" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-PNL01	H090-DEW1-PLC01	DI	H090-DEW1	RCP01-MN	POLYMER RECIRCULATION PUMP NO. 1 "RUNNING" STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-PNL01	H090-DEW1-PLC01	DI	H090-DEW1	RCP01-XF	POLYMER RECIRCULATION PUMP NO. 1 FAIL	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC60-ZL	POLYMER METERING PUMP BLV50 VALVE CLOSE STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC66-ZL	POLYMER METERING PUMP BLV46 VALVE CLOSE STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC67-ZL	POLYMER METERING PUMP BLV47 VALVE CLOSE STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC68-ZL	POLYMER METERING PUMP BLV48 VALVE CLOSE STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSC69-ZL	POLYMER METERING PUMP BLV49 VALVE CLOSE STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO60-ZH	POLYMER METERING PUMP BLV50 VALVE OPEN STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO66-ZH	POLYMER METERING PUMP BLV46 VALVE OPEN STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO67-ZH	POLYMER METERING PUMP BLV47 VALVE OPEN STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO68-ZH	POLYMER METERING PUMP BLV48 VALVE OPEN STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		ZSO69-ZH	POLYMER METERING PUMP BLV49 VALVE OPEN STATUS	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP01-MD	POLYMER METERING PUMP NO. 1 START/STOP	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP01-ZD	POLYMER METERING PUMP NO. 1 OPEN COMMAND	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP02-MD	POLYMER METERING PUMP NO. 2 START/STOP	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP02-ZD	POLYMER METERING PUMP NO. 2 OPEN COMMAND	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP03-MD	POLYMER METERING PUMP NO. 3 START/STOP	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PFP03-ZD	POLYMER METERING PUMP NO. 3 OPEN COMMAND	09-N-0008
POLYMER FEED PUMPS	H090-DEW1-PNL01	H090-DEW1-PLC01	DO	H090-DEW1	RCP01-MD	POLYMER RECIRCULATION PUMP NO. 1 START/STOP	09-N-0008
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	FMT07-FI	CENTRATE PUMP FLOW	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	LIT03-LI	DEWATERING CENTRATE WET WELL LEVEL	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	PMP01-SI	CENTRATE PUMP NO. 1 SPEED FEEDBACK	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	PMP02-SI	CENTRATE PUMP NO. 2 SPEED FEEDBACK	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	PMP03-SI	CENTRATE PUMP NO. 2 SPEED FEEDBACK	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PMP01-SC	CENTRATE PUMP NO. 1 SPEED COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PMP02-SC	CENTRATE PUMP NO. 2 SPEED COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	AO	H090-DEW1	PMP03-SC	CENTRATE PUMP NO. 2 SPEED COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSH54-LH	CENTRATE WET WELL LEVEL HIGH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSH55-LH	DEWATERING FACILITY BASEMENT LEVEL HIGH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSHH54-LS	CENTRATE WET WELL LEVEL HIGH HIGH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSL54-LS	CENTRATE WET WELL LEVEL LOW	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		LSLL54-LS	CENTRATE WET WELL LEVEL LOW LOW	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP01-IR	CENTRATE PUMP NO. 1 "IN REMOTE" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP01-MN	CENTRATE PUMP NO. 1 "RUNNING" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP02-IR	CENTRATE PUMP NO. 2 "IN REMOTE" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP02-MN	CENTRATE PUMP NO. 2 "RUNNING" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP03-IR	CENTRATE PUMP NO. 3 "IN REMOTE" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PMP03-MN	CENTRATE PUMP NO. 3 "RUNNING" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS15-PL	CENTRATE PUMP NO. 1 LOW INLET PRESSURE SWITCH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS16-PH	CENTRATE PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS17-PL	CENTRATE PUMP NO. 2 LOW INLET PRESSURE SWITCH	09-N-0009

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS18-PH	CENTRATE PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS19-PL	CENTRATE PUMP NO. 3 LOW INLET PRESSURE SWITCH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	PRS20-PH	CENTRATE PUMP NO. 3 HIGH DISCHARGE PRESSURE SWITCH	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP01-MD	CENTRATE PUMP NO. 1 RUN COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP01-XF	CENTRATE PUMP NO. 1 "VFD FAULT" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP02-MD	CENTRATE PUMP NO. 2 RUN COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP02-XF	CENTRATE PUMP NO. 2 "VFD FAULT" STATUS	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP03-MD	CENTRATE PUMP NO. 3 RUN COMMAND	09-N-0009
CENTRATE DRAIN PUMP STATION	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	PMP03-XF	CENTRATE PUMP NO. 3 "VFD FAULT" STATUS	09-N-0009
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	AI	H090-DEW1	CNV01-ET	SLUDGE CONVEYORE-ELAPSED TIME	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	CNV01-ES	SLUDGE CONVEYOR E-STOP FAULT STATUS	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	CNV01-IR	SLUDGE CONVEYOR "IN REMOTE" STATUS	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	CNV01-MN	SLUDGE CONVEYOR RUNNING STATUS	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	CNV01-XS	SLUDGE CONVEYOR ZERO SPEED FAULT STATUS	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H090-DEW1	CNV01-YA	SLUDGE CONVEYOR OVERLOAD FAULT	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		HS74-HS	SLUDGE CONVEYOR EMERGENCY STOP	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		HS75-HS	SLUDGE CONVEYOR EMERGENCY STOP	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	CNV01-MA	SLUDGE CONVEYOR FAULT RESET	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DO	H090-DEW1	CNV01-MD	SLUDGE CONVEYOR RUN COMMAND	09-N-0010
COMPOST STORAGE	H090-DEW1-MCP01	H090-DEW1-PLC01	DO		SNV71-ZC	SOLENOID VALVE OPEN/CLOSE COMMAND	09-N-0010
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF01-MN	EXHAUST FAN NO. 1 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF01-XF	EXHAUST FAN NO. 1 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF02-MN	EXHAUST FAN NO. 2 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF02-XF	EXHAUST FAN NO. 2 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF03-MN	EXHAUST FAN NO. 3 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF03-XF	EXHAUST FAN NO. 3 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF04-MN	EXHAUST FAN NO. 4 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF04-XF	EXHAUST FAN NO. 4 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF05-MN	EXHAUST FAN NO. 5 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF05-XF	EXHAUST FAN NO. 5 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF06-MN	EXHAUST FAN NO. 6 "RUNNING" STATUS	09-N-0011

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF06-XF	EXHAUST FAN NO. 6 FAIL	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF07-MN	EXHAUST FAN NO. 7 "RUNNING" STATUS	09-N-0011
COMPOST MIXER AND CONVEYOR SYSTEM	H090-DEW1-MCP01	H090-DEW1-PLC01	DI	H095-COM1	EHF07-XF	EXHAUST FAN NO. 7 FAIL	09-N-0011
DEWATERING BUILDING HVAC	H090-DEW1-ACP01	H090-DEW1-PLC01	AI		TT01-TI	ROOM TEMPERATURE	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW1-ACP01	H090-DEW1-PLC01	DI		ACU01-XA1	ACU01 GENERAL ALARM	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW1-ACP01	H090-DEW1-PLC01	DI		ACU01-XA2	ACU01 FAIL	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW1-ACP01	H090-DEW1-PLC01	DI		SD01-XA01	SMOKE DETECTOR EXHAUST AIR ALARM	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW1-ACP01	H090-DEW1-PLC01	DI		SD02-XA01	SMOKE DETECTOR SUPPLY AIR ALARM	09-N-0020
DEWATERING BUILDING	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		UPS01-XA01	UPS01 POWER FAIL	09-N-0020
DEWATERING BUILDING	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		UPS01-XA02	UPS01 BATTERY LOW	09-N-0020
DEWATERING BUILDING	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		UPS01-XA03	UPS01 FAIL	09-N-0020
SLUDGE HOLDING TANKS	RI001	H090-DEW1-PLC01	DI		UPS02-XA01	UPS02 POWER FAIL	09-N-0020
SLUDGE HOLDING TANKS	RI001	H090-DEW1-PLC01	DI		UPS02-XA02	UPS02 BATTERY LOW	09-N-0020
SLUDGE HOLDING TANKS	RI001	H090-DEW1-PLC01	DI		UPS02-XA03	UPS02 FAIL	09-N-0020
DEWATERING BUILDING	H090-DEW1-MCP01	H090-DEW1-PLC01	DI		XS41-XA	PANEL INTRUSION ALARM	09-N-0020
TOTAL ETH:	3						
TOTAL AI:	20						
TOTAL AO:	11						
TOTAL DI:	120						
TOTAL DO:	21						

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
DEWATERING BUILDING HVAC	H090-DEW2-ACP01	H090-DEW2-PLC01	DI		ACU01-XA1	ACU01 GENERAL ALARM	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW2-ACP01	H090-DEW2-PLC01	DI		ACU01-XA2	ACU01 FAIL	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		SD01-XA1	SMOKE DETECTOR EXHAUST AIR ALARM	09-N-0020
DEWATERING BUILDING HVAC	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		SD01-XA2	SMOKE DETECTOR SUPPLY AIR ALARM	09-N-0020
DEWATERING BUILDING	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		UPS01-JA1	UPS POWER FAIL	09-N-0020
DEWATERING BUILDING	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		UPS01-JA2	UPS01 FAIL	09-N-0020
DEWATERING BUILDING	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		UPS01-OB	UPS01 BATTERY LOW	09-N-0020
DEWATERING BUILDING	H090-DEW2-MCP01	H090-DEW2-PLC01	DI		XS51-XA	PANEL INTRUSION ALARM	09-N-0020
TOTAL AI:	0						
TOTAL AO:	0						
TOTAL DI:	8						
TOTAL DO:	0						
TOTAL ETH:	0						

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
[ADD. 2] SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	MTR01-ORP	SLUDGE HOLDING TANKS ORP	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	BLO01-SI	SLUDGE HOLDING TANK BLOWER NO. 1 SPEED FEEDBACK	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	BLO02-SI	SLUDGE HOLDING TANK BLOWER NO. 2 SPEED FEEDBACK	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	BLO03-SI	SLUDGE HOLDING TANK BLOWER NO. 3 SPEED FEEDBACK	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H070-RDT1	FMT01-FI	RDT BYPASS VALVE BOX FLOW	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW1	LIT01-LI	SLUDGE HOLDING TANK NO. 1 LEVEL	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	PTM01-PI	SLUDGE HOLDING TANK NO. 1 INLET PRESSURE	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	PTM02-PI	RECIRCULATION PUMP NO. 1 INLET PRESSURE	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	PTM03-PI	RECIRCULATION PUMP NO. 2 INLET PRESSURE	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	PTM04-PI	RECIRCULATION PUMP NO. 1 OUTLET PRESSURE	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	PTM05-PI	RECIRCULATION PUMP NO. 2 OUTLET PRESSURE	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	RCP01-SI	RECIRCULATION PUMP NO. 1 SPEED FEEDBACK	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AI	H090-DEW2	RCP02-SI	RECIRCULATION PUMP NO. 2 SPEED FEEDBACK	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AO	H090-DEW2	BLO01-SC	SLUDGE HOLDING TANK BLOWER NO. 1 SPEED COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AO	H090-DEW2	BLO02-SC	SLUDGE HOLDING TANK BLOWER NO. 2 SPEED COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	AO	H090-DEW2	BLO03-SC	SLUDGE HOLDING TANK BLOWER NO. 3 SPEED COMMAND	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AO	H090-DEW2	RCP01-SC	RECIRCULATION PUMP NO. 1 SPEED COMMAND	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	AO	H090-DEW2	RCP02-SC	RECIRCULATION PUMP NO. 2 SPEED COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO01-IR	SLUDGE HOLDING TANK BLOWER NO. 1 "IN REMOTE" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO01-MN	SLUDGE HOLDING TANK BLOWER NO. 1 "RUNNING" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO01-XF	SLUDGE HOLDING TANK BLOWER NO. 1 "VFD FAULT" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO02-IR	SLUDGE HOLDING TANK BLOWER NO. 2 "IN REMOTE" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO02-MN	SLUDGE HOLDING TANK BLOWER NO. 2 "RUNNING" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO02-XF	SLUDGE HOLDING TANK BLOWER NO. 2 "VFD FAULT" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO03-IR	SLUDGE HOLDING TANK BLOWER NO. 3 "IN REMOTE" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO03-MN	SLUDGE HOLDING TANK BLOWER NO. 3 "RUNNING" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	BLO03-XF	SLUDGE HOLDING TANK BLOWER NO. 3 "VFD FAULT" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	PRS04-PL	RECIRCULATION PUMP NO. 1 INLET "PRESSURE LOW" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	PRS05-PL	RECIRCULATION PUMP NO. 2 INLET "PRESSURE LOW" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	PRS06-PH	RECIRCULATION PUMP NO. 1 DISCHARGE "PRESSURE HIGH" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	PRS08-PH	RECIRCULATION PUMP NO. 2 DISCHARGE "PRESSURE HIGH" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP01-IR	RECIRCULATION PUMP NO. 1 "IN REMOTE" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP01-MN	RECIRCULATION PUMP NO. 1 "RUNNING" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP01-XF	RECIRCULATION PUMP NO. 1 "VFD FAULT" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP02-IR	RECIRCULATION PUMP NO. 2 "IN REMOTE" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP02-MN	RECIRCULATION PUMP NO. 2 "RUNNING" STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI	H090-DEW2	RCP02-XF	RECIRCULATION PUMP NO. 2 "VFD FAULT" STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSC31-ZL	RDT BYPASS PGV01 VALVE BOX POSITION SWITCH CLOSE STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSC32-ZL	RDT BYPASS PGV02 VALVE BOX POSITION SWITCH CLOSE STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSC33-ZL	RDT BYPASS PGV03 VALVE BOX POSITION SWITCH CLOSE STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSC34-ZL	RDT BYPASS PGV04 VALVE BOX POSITION SWITCH CLOSE STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSO31-ZH	RDT BYPASS PGV01 VALVE BOX POSITION SWITCH OPEN STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSO32-ZH	RDT BYPASS PGV02 VALVE BOX POSITION SWITCH OPEN STATUS	09-N-0004

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSO33-ZH	RDT BYPASS PGV03 VALVE BOX POSITION SWITCH OPEN STATUS	09-N-0004
ROTARY DRUM THICKENERS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		ZSO34-ZH	RDT BYPASS PGV04 VALVE BOX POSITION SWITCH OPEN STATUS	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DO	H090-DEW2	BLO01-MD	SLUDGE HOLDING TANK BLOWER NO. 1 START/STOP COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DO	H090-DEW2	BLO02-MD	SLUDGE HOLDING TANK BLOWER NO. 2 START/STOP COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DO	H090-DEW2	BLO03-MD	SLUDGE HOLDING TANK BLOWER NO. 3 START/STOP COMMAND	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	DO	H090-DEW2	RCP01-MD	RECIRCULATION PUMP NO. 1 START/STOP COMMAND	09-N-0004
SLUDGE MIXING	H090-DEW3-MCP01	H090-DEW3-PLC01	DO	H090-DEW2	RCP02-MD	RECIRCULATION PUMP NO. 2 START/STOP COMMAND	09-N-0004
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		UPS02-XA01	UPS02 POWER FAIL	09-N-0020
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		UPS02-XA02	UPS02 BATTERY LOW	09-N-0020
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		UPS02-XA03	UPS02 FAIL	09-N-0020
SLUDGE HOLDING TANKS	H090-DEW3-MCP01	H090-DEW3-PLC01	DI		XS31-XA	PANEL INTRUSION ALARM	09-N-0020
TOTAL ETH:	0						
TOTAL AI:	13						
TOTAL AO:	5						
TOTAL DI:	31						
TOTAL DO:	5						

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	MXR01-WI	COMPOST MIXER NO. 1 WEIGHT	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	MXR02-WI	COMPOST MIXER NO. 2 WEIGHT	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV01-IR	COMPOST CONVEYOR NO. 1 "IN REMOTE" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV01-MN	COMPOST CONVEYOR NO. 1 "RUNNING" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS79-ES	COMPOST CONVEYOR NO. 1 EMERGENCY STOP	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV01-XF	COMPOST CONVEYOR NO. 1 FAIL	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV02-IR	COMPOST CONVEYOR NO. 2 "IN REMOTE" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV02-MN	COMPOST CONVEYOR NO. 2 "RUNNING" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS80-ES	COMPOST CONVEYOR NO. 2 EMERGENCY STOP	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	CNV02-XF	COMPOST CONVEYOR NO. 2 FAIL	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR01-IR	COMPOST MIXER NO. 1 "IN REMOTE" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR01-MN	COMPOST MIXER NO. 1 "RUNNING" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS77-ES	COMPOST MIXER NO. 1 EMERGENCY STOP	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR01-XF	COMPOST MIXER NO. 1 FAIL	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR02-IR	COMPOST MIXER NO. 2 "IN REMOTE" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR02-MN	COMPOST MIXER NO. 2 "RUNNING" STATUS	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS78-ES	COMPOST MIXER NO. 2 EMERGENCY STOP	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	MXR02-XF	COMPOST MIXER NO. 2 FAIL	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	CNV01-MD	COMPOST CONVEYOR NO. 1 RUN COMMAND	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	CNV02-MD	COMPOST CONVEYOR NO. 2 RUN COMMAND	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	MXR01-MD	COMPOST MIXER NO. 1 RUN COMMAND	09-N-0011

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	MXR02-MD	COMPOST MIXER NO. 2 RUN COMMAND	09-N-0011
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN01-SI	COMPOST FAN NO. 1 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN10-SI	COMPOST FAN NO. 10 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN02-SI	COMPOST FAN NO. 2 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN03-SI	COMPOST FAN NO. 3 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN04-SI	COMPOST FAN NO. 4 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN05-SI	COMPOST FAN NO. 5 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN06-SI	COMPOST FAN NO. 6 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN07-SI	COMPOST FAN NO. 7 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN08-SI	COMPOST FAN NO. 8 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM1	FAN09-SI	COMPOST FAN NO. 9 SPEED FEEDBACK	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN01-SI	COMPOST FAN NO. 1 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN10-SI	COMPOST FAN NO. 10 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN02-SI	COMPOST FAN NO. 2 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN03-SI	COMPOST FAN NO. 3 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN04-SI	COMPOST FAN NO. 4 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN05-SI	COMPOST FAN NO. 5 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN06-SI	COMPOST FAN NO. 6 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN07-SI	COMPOST FAN NO. 7 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN08-SI	COMPOST FAN NO. 8 SPEED COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM1	FAN09-SI	COMPOST FAN NO. 9 SPEED COMMAND	09-N-0012

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN01-IR	COMPOST FAN NO. 1 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN01-MN	COMPOST FAN NO. 1 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN01-XF	COMPOST FAN NO. 1 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN10-IR	COMPOST FAN NO. 10 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN10-MN	COMPOST FAN NO. 10 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN10-XF	COMPOST FAN NO. 10 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN02-IR	COMPOST FAN NO. 2 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN02-MN	COMPOST FAN NO. 2 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN02-XF	COMPOST FAN NO. 2 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN03-IR	COMPOST FAN NO. 3 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN03-MN	COMPOST FAN NO. 3 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN03-XF	COMPOST FAN NO. 3 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN04-IR	COMPOST FAN NO. 4 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN04-MN	COMPOST FAN NO. 4 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN04-XF	COMPOST FAN NO. 4 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN05-IR	COMPOST FAN NO. 5 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN05-MN	COMPOST FAN NO. 5 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN05-XF	COMPOST FAN NO. 5 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN06-IR	COMPOST FAN NO. 6 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN06-MN	COMPOST FAN NO. 6 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN06-XF	COMPOST FAN NO. 6 FAIL	09-N-0012

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN07-IR	COMPOST FAN NO. 7 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN07-MN	COMPOST FAN NO. 7 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN07-XF	COMPOST FAN NO. 7 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN08-IR	COMPOST FAN NO. 8 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN08-MN	COMPOST FAN NO. 8 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN08-XF	COMPOST FAN NO. 8 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN09-IR	COMPOST FAN NO. 9 "IN REMOTE" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN09-MN	COMPOST FAN NO. 9 "RUNNING" STATUS	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN09-XF	COMPOST FAN NO. 9 FAIL	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN01-TH	COMPOST FAN NO. 1 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN02-TH	COMPOST FAN NO. 2 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN03-TH	COMPOST FAN NO. 3 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN04-TH	COMPOST FAN NO. 4 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN05-TH	COMPOST FAN NO. 5 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN06-TH	COMPOST FAN NO. 6 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN07-TH	COMPOST FAN NO. 7 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN08-TH	COMPOST FAN NO. 8 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN09-TH	COMPOST FAN NO. 9 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM1	FAN10-TH	COMPOST FAN NO. 10 HIGH MOTOR TEMPERATURE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN01-MD	COMPOST FAN NO. 1 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN10-MD	COMPOST FAN NO. 10 RUN COMMAND	09-N-0012

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN02-MD	COMPOST FAN NO. 2 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN03-MD	COMPOST FAN NO. 3 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN04-MD	COMPOST FAN NO. 4 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN05-MD	COMPOST FAN NO. 5 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN06-MD	COMPOST FAN NO. 6 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN07-MD	COMPOST FAN NO. 7 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN08-MD	COMPOST FAN NO. 8 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM1	FAN09-MD	COMPOST FAN NO. 9 RUN COMMAND	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM01-TI	COMPOST BAY NO. 1 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM02-TI	COMPOST BAY NO. 1 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM03-TI	COMPOST BAY NO. 1 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM28-TI	COMPOST BAY NO. 10 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM29-TI	COMPOST BAY NO. 10 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM30-TI	COMPOST BAY NO. 10 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM04-TI	COMPOST BAY NO. 2 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM05-TI	COMPOST BAY NO. 2 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM06-TI	COMPOST BAY NO. 2 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM07-TI	COMPOST BAY NO. 3 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM08-TI	COMPOST BAY NO. 3 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM09-TI	COMPOST BAY NO. 3 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM10-TI	COMPOST BAY NO. 4 TEMPERATURE PROBE	09-N-0012

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM11-TI	COMPOST BAY NO. 4 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM12-TI	COMPOST BAY NO. 4 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM13-TI	COMPOST BAY NO. 5 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM14-TI	COMPOST BAY NO. 5 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM15-TI	COMPOST BAY NO. 5 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM16-TI	COMPOST BAY NO. 6 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM17-TI	COMPOST BAY NO. 6 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM18-TI	COMPOST BAY NO. 6 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM19-TI	COMPOST BAY NO. 7 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM20-TI	COMPOST BAY NO. 7 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM21-TI	COMPOST BAY NO. 7 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM22-TI	COMPOST BAY NO. 8 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM23-TI	COMPOST BAY NO. 8 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM24-TI	COMPOST BAY NO. 8 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM25-TI	COMPOST BAY NO. 9 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM26-TI	COMPOST BAY NO. 9 TEMPERATURE PROBE	09-N-0012
ACTIVE COMPOSTING BLOWER SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM1	TTM27-TI	COMPOST BAY NO. 9 TEMPERATURE PROBE	09-N-0012
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	DMP01-ZI	AIR INTAKE VALVE POSITION FEEDBACK	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	DMP02-ZI	AIR INTAKE VALVE POSITION FEEDBACK	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	FAN11-SI	BIOFILTER FAN NO. 1 SPEED FEEDBACK	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	FAN12-SI	BIOFILTER FAN NO. 2 SPEED FEEDBACK	09-N-0013

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	FMT01-FI	BIOFILTER FAN NO.1 FLOW	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	PTM01-PI	BIOFILTER FAN NO.1 PRESSURE	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	TTM01-TI	BIOFILTER FAN NO.1 TEMPERATURE	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	FMT02-FI	BIOFILTER FAN NO.2 FLOW	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	PTM02-PI	BIOFILTER FAN NO.2 PRESSURE	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AI	H095-COM1	TTM02-TI	BIOFILTER FAN NO.2 TEMPERATURE	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AO	H095-COM1	DMP01-ZC	AIR INTAKE VALVE POSITION COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AO	H095-COM1	DMP02-ZC	AIR INTAKE VALVE POSITION COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AO	H095-COM1	FAN11-SC	BIOFILTER FAN NO. 1 SPEED COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	AO	H095-COM1	FAN12-SC	BIOFILTER FAN NO. 2 SPEED COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS82-IR	AIR INTAKE VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI		HS83-IR	AIR INTAKE VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN11-XF	BIOFILTER FAN NO. 1 "FAULT" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN11-IR	BIOFILTER FAN NO. 1 "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN11-MN	BIOFILTER FAN NO. 1 "RUNNING" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP04-IR	BIOFILTER FAN NO. 1 DOWNSTREAM VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP04-ZL	BIOFILTER FAN NO. 1 DOWNSTREAM VALVE CLOSE STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP04-ZH	BIOFILTER FAN NO. 1 DOWNSTREAM VALVE OPEN STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP03-IR	BIOFILTER FAN NO. 1 UPSTREAM VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP03-ZL	BIOFILTER FAN NO. 1 UPSTREAM VALVE CLOSE STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP03-ZH	BIOFILTER FAN NO. 1 UPSTREAM VALVE OPEN STATUS	09-N-0013

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN12-XF	BIOFILTER FAN NO. 2 "FAULT" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN12-IR	BIOFILTER FAN NO. 2 "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN12-MN	BIOFILTER FAN NO. 2 "RUNNING" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP06-IR	BIOFILTER FAN NO. 2 DOWNSTREAM VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP06-ZH	BIOFILTER FAN NO. 2 DOWNSTREAM VALVE OPEN STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP06-ZL	BIOFILTER FAN NO. 2 DOWNSTREAM VALVECLOSE STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP05-IR	BIOFILTER FAN NO. 2 UPSTREAM VALVE "IN REMOTE" STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP05-ZL	BIOFILTER FAN NO. 2 UPSTREAM VALVE CLOSE STATUS	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	DMP05-ZH	BIOFILTER FAN NO. 2 UPSTREAM VALVE OPEN STATUS	09-N-0013
BIOFILTER	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN11-TH	BIOFILTER FAN NO. 1 HIGH MOTOR TEMPERATURE	09-N-0013
BIOFILTER	H095-COM1-MCP01	H095-COM1-PLC01	DI	H095-COM1	FAN12-TH	BIOFILTER FAN NO. 2 HIGH MOTOR TEMPERATURE	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP04-ZB	BIOFILTER FAN NO. 1 DOWNSTREAM VALVE CLOSE COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP04-ZD	BIOFILTER FAN NO. 1 DOWNSTREAM VALVE OPEN COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	FAN11-MD	BIOFILTER FAN NO. 1 START/STOP	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP03-ZB	BIOFILTER FAN NO. 1 UPSTREAM VALVE CLOSE COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP03-ZD	BIOFILTER FAN NO. 1 UPSTREAM VALVE OPEN COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP06-ZB	BIOFILTER FAN NO. 2 DOWNSTREAM VALVE CLOSE COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP06-ZD	BIOFILTER FAN NO. 2 DOWNSTREAM VALVE OPEN COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	FAN12-MD	BIOFILTER FAN NO. 2 START/STOP	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP05-ZB	BIOFILTER FAN NO. 2 UPSTREAM VALVE CLOSE COMMAND	09-N-0013
COMPOSTING BIOFILTER SYSTEM	H095-COM1-MCP01	H095-COM1-PLC01	DO	H095-COM1	DMP05-ZD	BIOFILTER FAN NO. 2 UPSTREAM VALVE OPEN COMMAND	09-N-0013
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM3	FAN01-SI	CURING FAN NO. 1 SPEED FEEDBACK	09-N-0014

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM3	FAN02-SI	CURING FAN NO. 1 SPEED FEEDBACK	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM3	FAN03-SI	CURING FAN NO. 1 SPEED FEEDBACK	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AI	H095-COM3	FAN04-SI	CURING FAN NO. 1 SPEED FEEDBACK	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM3	FAN01-SC	CURING FAN NO. 1 SPEED COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM3	FAN02-SC	CURING FAN NO. 1 SPEED COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM3	FAN03-SC	CURING FAN NO. 1 SPEED COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	AO	H095-COM3	FAN04-SC	CURING FAN NO. 1 SPEED COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN01-IR	CURING FAN NO. 1 "IN REMOTE" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN01-MN	CURING FAN NO. 1 "RUNNING" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN01-XF	CURING FAN NO. 1 FAIL	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN02-IR	CURING FAN NO. 2 "IN REMOTE" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN02-MN	CURING FAN NO. 2 "RUNNING" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN02-XF	CURING FAN NO. 2 FAIL	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN03-IR	CURING FAN NO. 3 "IN REMOTE" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN03-MN	CURING FAN NO. 3 "RUNNING" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN03-XF	CURING FAN NO. 3 FAIL	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN04-IR	CURING FAN NO. 4 "IN REMOTE" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN04-MN	CURING FAN NO. 4 "RUNNING" STATUS	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN04-XF	CURING FAN NO. 4 FAIL	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN01-TH	CURING FAN NO. 1 HIGH MOTOR TEMPERATURE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN02-TH	CURING FAN NO. 2 HIGH MOTOR TEMPERATURE	09-N-0014

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN03-TH	CURING FAN NO. 3 HIGH MOTOR TEMPERATURE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DI	H095-COM3	FAN04-TH	CURING FAN NO. 4 HIGH MOTOR TEMPERATURE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM3	FAN01-MD	CURING FAN NO. 1 RUN COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM3	FAN02-MD	CURING FAN NO. 2 RUN COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM3	FAN03-MD	CURING FAN NO. 3 RUN COMMAND	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	DO	H095-COM3	FAN04-MD	CURING FAN NO. 4 RUN COMMAND	09-N-0014
ALT03: STORAGE BAYS	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM12-TI	ALTERNATE STORAGE BAY NO. 4 TEMPERATURE PROBE	09-N-0014
ALT03: STORAGE BAYS	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM13-TI	ALTERNATE STORAGE BAY NO. 5 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM01-TI	CURING BAY NO. 1 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM02-TI	CURING BAY NO. 1 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM03-TI	CURING BAY NO. 2 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM04-TI	CURING BAY NO. 2 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM05-TI	CURING BAY NO. 3 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM06-TI	CURING BAY NO. 3 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM07-TI	CURING BAY NO. 4 TEMPERATURE PROBE	09-N-0014
SCREENING AND CURING SYSTEM	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM08-TI	CURING BAY NO. 4 TEMPERATURE PROBE	09-N-0014
STORAGE BAYS	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM09-TI	STORAGE BAY NO. 1 TEMPERATURE PROBE	09-N-0014
STORAGE BAYS	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM10-TI	STORAGE BAY NO. 2 TEMPERATURE PROBE	09-N-0014
STORAGE BAYS	H095-COM1-CPL01	H095-COM1-PLC01	ETH	H095-COM3	TTM11-TI	STORAGE BAY NO. 3 TEMPERATURE PROBE	09-N-0014
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI		LSHH91-LH	SANITARY LIFT STATION HIGH HIGH LEVEL ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI		LSH91-LH	SANITARY LIFT STATION HIGH LEVEL ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI		LSL91-LL	SANITARY LIFT STATION LOW LEVEL ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP01-XF	SANITARY PUMP NO. 1 "FAULT" STATUS	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP01-XA	SANITARY PUMP NO. 1 HIGH MOISTURE ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP01-TH	SANITARY PUMP NO. 1 HIGH MOTOR TEMPERATURE ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP02-XF	SANITARY PUMP NO. 2 "FAULT" STATUS	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP02-XA	SANITARY PUMP NO. 2 HIGH MOISTURE ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DI	H110-LFT1	PMP02-TH	SANITARY PUMP NO. 2 HIGH MOTOR TEMPERATURE ALARM	09-N-0015
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DO	H110-LFT1	PMP01-MN	SANITARY PUMP NO. 1 "RUNNING" STATUS	09-N-0015

AREA	PANEL NO	PLC NO	TYPE	IO TAG PRE-FIX	IO TAG	SERVICE	P&ID NO.
SANITARY LIFT STATION	H095-COM1-MCP01	H095-COM1-PLC01	DO	H110-LFT1	PMP02-MN	SANITARY PUMP NO. 2 "RUNNING" STATUS	09-N-0015
COMPOSTING AREA		H095-COM1-PLC01	AI		TT01-TI	ROOM TEMPERATURE	09-N-0020
COMPOSTING AREA		H095-COM1-PLC01	AI		TT02-TI	ROOM TEMPERATURE	09-N-0020
COMPOSTING AREA	H095-COM1-ACP01	H095-COM1-PLC01	DI		ACU01-XA1	ACU01 GENERAL ALARM	09-N-0020
COMPOSTING AREA	H095-COM1-ACP01	H095-COM1-PLC01	DI		ACU01-XA2	ACU01 FAIL	09-N-0020
COMPOSTING AREA		H095-COM1-PLC01	DI		SD01-XA01	SMOKE DETECTOR EXHAUST AIR ALARM	09-N-0020
COMPOSTING AREA		H095-COM1-PLC01	DI		SD01-XA02	SMOKE DETECTOR SUPPLY AIR ALARM	09-N-0020
COMPOSTING AREA	H095-COM1-MCP01	H095-COM1-PLC01	DI		UPS01-JA1	UPS01 POWER FAIL	09-N-0020
COMPOSTING AREA	H095-COM1-MCP01	H095-COM1-PLC01	DI		UPS01-OB	UPS01 BATTERY LOW	09-N-0020
COMPOSTING AREA	H095-COM1-MCP01	H095-COM1-PLC01	DI		UPS01-JA2	UPS01 FAIL	09-N-0020
COMPOSTING AREA	H095-COM1-MCP01	H095-COM1-PLC01	DI		XS71-XA	PANEL INTRUSION ALARM	09-N-0020
TOTAL ETH: 43							
TOTAL AI: 28							
TOTAL AO: 18							
TOTAL DI: 111							
TOTAL DO: 30							

SECTION 40 96 00
APPLICATIONS SOFTWARE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. General: Work includes design, furnishing, testing, documenting, training, and starting up the Process Instrumentation and Control (PIC) Applications software, complete.
- B. Major applications software work items include:
 - 1. Work sequence and schedule.
 - 2. Applications software workshops.
 - 3. Applications software submittals.
 - 4. Applications software development, including:
 - a. Allen-Bradley PLC programming for new ~~H0X0-XXX1-PLC01~~ H040-WAS1-PLC01, H050-FCL1-PLC01, H090-DEW1-PLC01, and H090-DEW3-PLC01. ^[ADD. 2]
 - b. PLC and SCADA interface with new PLC's provided under this Contract.
 - c. Wonderware Intouch SCADA system upgrades and modifications, including new tags, new displays, I/O driver configuration, and updates to alarms and historian.
 - d. Integration of new Operator Interface Terminal (OIT) at main PLC panel.
 - 5. Software testing.
 - 6. Software installation.
 - 7. Software documentation.
 - 8. O&M development.
 - 9. Owner training.
 - 10. Startup.

1.02 DIVISION OF WORK

- A. Software Supplier: Employ a Software Supplier as part of the PIC scope indicated in Section 40 90 00, Instrumentation and Control for Process Systems, to implement the applications software specified herein.
- B. Contractor: The Contractor shall have overall system responsibility and shall provide all additional materials and work necessary to supplement the work provided by the Software Supplier and thereby satisfy all requirements of this section.

HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

1.03 OWNER ICS STANDARDS AND SITE ACCESS

- A. Site Access: Access to site and to existing SCADA system hardware and networks is restricted to qualified companies and individuals as specified in Section 40 90 00, Instrumentation and Control for Process Systems. Obtain specified certifications and approvals for work on site.
- B. Perform all work in accordance with Owner standards specified in Section 40 90 00, Instrumentation and Control for Process Systems.

1.04 DEFINITIONS

- A. Abbreviations:
 - 1. HMI: Human Machine Interface.
 - 2. I&C: Instrumentation and Control.
 - 3. I/O: Inputs and Outputs.
 - 4. O&M: Operation and Maintenance.
 - 5. ORT: Operational Readiness Test.
 - 6. P&ID: Process and Instrument Diagram.
 - 7. PC: Personal Computer.
 - 8. PIC: Process Instrumentation and Control.
 - 9. PLC: Programmable Logic Controller.
 - 10. PAT: Performance Acceptance Test.
 - 11. SCADA: Supervisory Control and Data Acquisition System (i.e., Wonderware InTouch).
 - 12. SDT: Software Demonstration Test.
 - 13. SLC: Single Loop Controller.
- B. Instructor Day: 8 hours of actual instruction time.
- C. Loop Specifications: Lists and descriptions in Article Supplements, giving additional requirements for individual control loops.
- D. Software:
 - 1. Programming of digital devices using all types of programming language.
 - 2. Configuring of digital devices using all types of configuring process.
 - 3. Programs or configuration data stored in read only memory, programmable read only memory, read/write memory, disk, tape, or other storage device.

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E. Types of Software:

1. Standard Software: Software packages that are independent of project on which they are used. Standard software includes system software and SCADA development and view software.
 - a. System Software: Application independent software developed by Microsoft. Includes, but is not limited to, Microsoft's NT operating system; file management utilities; text editors; debugging aids; and diagnostics.
 - b. SCADA Development and View Software: Software packages independent of specific process control project on which they are used. Includes, but is not limited to, providing capability for, data acquisition, monitoring, alarming, man-machine interface, data collection, data retrieval, trending, report generation, control, and diagnostics.
2. Application Software:
 - a. Software to provide functions unique to this Project and that are not provided by standard software alone.
 - b. Developing SCADA HMI graphic display screens, active screen objects, and screen navigation. Configuring alarm and historical tags, alarm notification, historical logging and trending.
 - c. Configuring databases, tables, displays, reports, parameter lists, programming ladder logic and control strategies required to implement functions unique to this Project.

1.05 WORK SEQUENCE AND SCHEDULE

- A. General: All work provided under this section shall be in accordance with a Milestone Breakdown and System Delivery Plan.
- B. Milestone Breakdown (MB): Summarize the major milestones for work provided along with the major milestones.
- C. System Delivery Plan (SDP):
 1. The intent of the SDP is to:
 - a. Coordinate and communicate applications software design and testing activities.
 - b. Coordinate interactions with the Owner regarding workshops, submittal reviews, work progress, test witnessing, training, etc.
 - c. Communicate and clarify required work sequences and major milestones.
 2. Minimum Content:
 - a. Work sequence and schedule.
 - b. Applications software workshops.

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- c. Applications software submittals.
- d. Applications software development.
- e. Software testing.
- f. Software installation.
- g. O&M development.
- h. Owner training.
- i. Startup.

1.06 SOFTWARE DESIGN WORKSHOPS

- A. Location: Owner's facility during the course of the Project.
- B. Kick off Meeting Objective: To enable the Owner communicate with the Integrator/Programmer (Software Supplier) about the expectations as well to share the existing software details including System Graphics to provide direction for Program development to ensure compatibility with existing System.
- C. Subsequent meetings to oversee the progress of applications software development.
- D. Documentation: Software Supplier summarize resolutions reached in each workshop and distribute copies to Owner and Engineer.
- E. Order and minimum topics to be covered in each Software Design Workshop as follows. Some workshops may be combined with Owner approval.
 - 1. Applications Software Design Workshop (kick off) that establishes project processes, including:
 - a. Software Supplier and Contractor organization and reporting procedures.
 - b. Workshop objectives.
 - c. Submittal process.
 - d. Review work sequence and schedule.
 - e. Share details of existing systems.
 - f. Review Owner's Standards.
 - 2. Software Standards Workshop:
 - a. Objective: To review and develop PLC and SCADA standards in a participative workshop with Owner.
 - b. Design products and topics to be finalized:
 - 1) Existing SCADA system integration.
 - 2) Tag Naming Conventions: Provide initial list of PLC and HMI tags for Owner to review. Final tag assignments will be made by Owner.
 - 3) Process graphic standards object symbols, colors, fonts, etc.
 - 4) Display paging and navigation methods.
 - 5) Equipment control through popup windows.

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- 6) Display philosophy, organization, and operation.
 - 7) General data entry through the HMI.
 - 8) Security.
 - 9) Alarm Management: Operation of the alarms, alarm areas, alarm filtering.
 - 10) Trending.
 - 11) Historical data storage and retrieval. Define which tags will be assigned to historical tagging.
 - 12) File naming convention.
 - 13) Network IP addressing.
3. Control Narrative, P&ID Review Workshop: Software Supplier uses P&IDs and Control Narrative to present how the proposed control system design and Applications Software will meet the functional requirements specified.
 4. Software Pre-Development Workshops:
 - a. Objectives: To present to Engineer and Owner how Applications Software Supplier will implement functional requirements of this section.
 - b. Present information on:
 - 1) Program Flow Diagram(s) showing all software sections, subsections, function blocks, subprograms, and their interrelationships.
 - 2) SCADA/PLC I/O Database listing.
 - 3) SCADA Screen sketches that illustrate dynamic objects, how control functions are controlled and monitored, how equipment is controlled and SCADA screen navigation.

1.07 SUBMITTALS

A. Action Submittals:

1. Software Standards Submittals: Developed in a Software Workshop, Documented and Submitted as software standards.
2. Control Narrative Submittal:
 - a. Timing: Following Control Narrative and P&ID Review Workshop.
 - b. Content: Updated version of control narratives.
3. Software Pre-Development Submittal:
 - a. Application Software Functional Documentation: Functional diagram following ISO 31320-1 IDEF0.
 - b. Submit sample Graphics for review. These shall be prepared based on information received in the Kick off Coordination meeting.
 - c. A list of planned tags with clear descriptions. The Owner will assign final tags based on the submitted list.

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4. Software Design Submittal: Detailed description of SCADA Configuration and PLC program on a Unit Operation Basis. Submit this during program development stage.
 - a. An updated version of all information presented in Software Pre-Development Submittal.
 - b. Documented PLC Program.
 - c. Print out of SCADA screens.

B. Informational Submittals:

1. Applications Software Schedule of Values and Progress Schedule:
 - a. Submit within 30 days after first Preconstruction Conference.
 - b. Upon acceptance by Engineer, shall form basis and schedule of Submittal reviews and test witnessing.
 - c. Prior to this acceptance, Engineer will not review Submittals or witness tests.
2. Owner Training Plan: In accordance with Section 01 43 33, Manufacturers' Field Services.
3. Testing Related Submittals:
 - a. Test Forms:
 - 1) Proposed test procedures, forms, and check lists:
 - a) Software Demonstration Tests (SDT).
 - b) Operational Readiness Test (ORT).
 - c) Performance Acceptance Test (PAT).
 - b. Test Procedures: Conduct tests using Engineer accepted test procedures, forms, and checklists.
 - c. Test Documentation: Copy of signed of test procedures when tests are completed.
4. Operations and Maintenance Manuals:
 - a. In accordance with Section 01 78 23, Operation and Maintenance Data, unless otherwise specified in this section.
 - 1) User's manuals for Standard Software packages.
 - 2) Licensed copies of Standard Software packages.
 - 3) Updated versions of material provided under Shop Drawing Submittals for Applications Software Design and Development.
 - 4) Applications software source files in native electronic format.

PART 2 PRODUCTS

2.01 PLC APPLICATION SOFTWARE DESIGN CRITERIA

- A. All PLC code shall be developed in LADDER logic except where infeasible to do so (no function block, structured text, etc., allowed). Use Rockwell Studio 5000 software for programming.

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B. PLC Program Design:

1. The programmable logic controller system (PLC) shall be used to provide facility automatic control, alarm functions, and continuous loop control. Specific PLC functional requirements are described in the Control Narrative attached as Supplement to this specification.
2. No control routines, control algorithms, or control logic shall be implemented in SCADA.
3. Break PLC applications software into:
 - a. Sections:
 - 1) Contains all logic for a specific unit operation.
 - 2) Each section consists of a general logic subsections and, followed by unit operation subsections.
 - b. Subsections: Contains logic for specific equipment such as a pump, valve, or loop.
4. Standard Functions:
 - a. Program all standard functions in the same manner, using the same logic, program order, and documentation nomenclature.
 - b. Standard functions are specified in Supplement PCN, Process Control Narratives.
5. Program Documentation:
 - a. Note and describe start of a new program section.
 - b. Briefly describe control objectives.
 - c. Identify subsections.
 - d. Subsection documentation includes brief description of control objective followed by a description and tag of the equipment being controlled.

C. PLC Program Documentation:

1. Ladder Diagram Description:
 - a. Written overview description of each ladder logic program.
 - b. Lead user through sections, subsections, and functions of programs.
 - c. Generally describe functions being implemented including software used to implement functional requirements of this specification.
2. Ladder Diagram Logic Listings:
 - a. Include a description for each element (input, output, or special function).
 - b. Comments that describes function of ladder rungs. Average of one 60-character comment line per ladder rung.
 - c. Complete ladder diagram logic listings.

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2.02 SCADA APPLICATION SOFTWARE DESIGN REQUIREMENTS

A. General:

1. The Applications Software Supplier shall develop SCADA design to convey accurate information to the plant operations staff so they can make informed process control decisions and provide the platform to execute the control decisions.
2. SCADA system is existing Wonderware InTouch. Integrate the work associated with this project to match appearance, color and style, navigation, and graphical symbols.
3. The following outlines key objectives in designing SCADA graphics displays:
 - a. Familiar format, look and feel for plant operation staff.
 - b. Easily navigated menus.
 - c. Provide no more than three mouse actions to navigate to any control display.
 - d. Maintain consistency in graphic display and controls design.
 - e. Maintain consistent and predictable window operations.
 - f. Accurate representation of the plant and its operations.
 - g. Represent control options in an easily understood fashion.
 - h. Develop help screens to provide additional information to help the operations staff understand the control options where complex operations are required.
 - i. Where possible, design overview displays similar to the physical layout of the facility. The perspective to the physical layout should be from the local main control room.
 - j. Provide operator access to process and alarm setpoints, including the following:
 - 1) Process alarms (HIGH-HIGH, HIGH, LOW, and LOW-LOW).
 - 2) Pump and equipment control setpoints.
 - 3) Process timer setpoints.
 - 4) Sequence setpoints.

2.03 SCADA/PLC I/O DATABASE

A. SCADA/PLC I/O Database:

1. The Software Supplier shall update the Owner's existing Database with all existing attributes and the following features:
 - a. Coordinate, manage and document all SCADA database points including those communicated between the PLCs and SCADA.

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- b. The database shall contain all the fields necessary to configure the various points including:
 - 1) Tag Name.
 - 2) PLC Address and Node.
 - 3) Data Format: Real (floating point), Integer, Discrete (Boolean).
 - 4) Access Type: Read/Write or Read Only.
 - 5) Scale Range for analog values.
 - 6) Zero and One State for discrete values, e.g., ON/OFF, or OPEN/CLOSE.
 - 7) Point Description.
 - 8) Engineering Units.

2.04 PLC AND SCADA FUNCTIONS

- A. Refer to Supplement PCN, Process Control Narratives.

PART 3 EXECUTION

3.01 TESTING

- A. General:

- 1. Test software to demonstrate that the applications software satisfies requirements outlined in the Control Narratives, and described in submittals, and workshops.
- 2. Test Format:
 - a. Cause and Effect:
 - 1) Person conducting test initiates input (cause).
 - 2) Specific test requirement is satisfied if correct result (effect), occurs.
- 3. Procedures, Forms, and Checklists:
 - a. Perform testing on a unit operation and loop basis that is coordinated with the PIC testing and startup.
 - b. The Software Supplier shall generate testing forms, and checklists from the SCADA/PLC database and Control Narratives.
 - c. Have space after each test item description for sign off by appropriate party after satisfactory completion.

- B. Software Demonstration Tests (SDT):

- 1. Scope: Test new PLC and SCADA equipment and functions to demonstrate that it is operational. The SDT shall be successfully completed to the satisfaction of the Engineer before the software is loaded on to the Plant SCADA and PLC.
- 2. Location: Software Suppliers facility.

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3. SCADA Display Tests: The Object of the test is to verify all SCADA database points and points communicated between SCADA and PLC. Test and verify each SCADA display and dynamic object on that display and control. Provide a test form for each display that lists all of dynamic objects, controls, pop-up windows and their associated database tags and corresponding PLC address. The test form shall provide a place for a sign off for the Software Supplier and Engineer.
 4. SCADA Display Navigation Test: The Objective of the test is to verify all the display navigation controls.
 5. Loop-Specific Functions: Demonstrate functions shown on P&IDs, specified in the Control Narratives, described in submittals, and workshops. This test shall not be started until the Display and Display navigation tests have been successfully completed. This test shall verify all SCADA and PLC functions through indications on SCADA and the PLC programming software. The Applications Software Supplier shall develop a test form for each unit or loop. The form shall list all controlled equipment, control routines, alarm points, status points, setpoints, controllers, and sequences. The test shall demonstrate all manual and automatic functions are operating as specified and verify that the outputs and inputs are configured to the correct PLC I/O point.
 6. Make following documentation available to Owner at Test Site both before and during SDT:
 - a. Control Narratives.
 - b. Software Pre-Development submittal.
 - c. Software design submittal.
 - d. O&M material.
 - e. Master copy of SDT sign off sheets.
 - f. Applications software documentation.
 - g. IDEF0 Diagrams
- C. Phase 1 Operational Readiness Test Provided by the Contractor: Prior to Phase 2 ORT, startup test period and PAT, inspect, test, and document that entire PIC is ready for operation. Performed by PIC Contractor to test and document PIC, excluding Software Supplier provided PLC and SCADA applications software.
- D. Phase 2 Operational Readiness:
1. Phase 2 ORT: Combined effort between Contractor and Software Supplier to confirm that PIC, including applications software, is ready for operation.
 - a. Prerequisite: Completion of Phase 1 ORT.
 - b. Joint test with Software Supplier. Repeat of Software Supplier's SDT, except using real field sensors and equipment. Plant interlocking and communications with PLCs and SCADA shall be tested on loop-by-loop basis.
 - c. Test procedures provided by Software Supplier based on Loop Specifications.

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- E. Performance Acceptance Tests (PAT): These are the activities that Section 01 91 14, Equipment Testing and Facility Startup, refers to as performance testing.
1. Once ORT Phase 1 and Phase 2 has been completed and facility has been started up, perform a witnessed PAT on complete PIC and software to demonstrate that it is operating as required by the Contract Documents and control narratives. Demonstrate each required function on a paragraph-by-paragraph, loop-by-loop basis.
 2. Loop-specific and non-loop-specific tests same as required for SDT except that entire installed PIC tested using actual process variables and all functions demonstrated.
 3. Perform local and manual tests for each loop before proceeding to remote and automatic modes.
 4. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Unless otherwise directed, exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall system functionality. Test verification by means of disconnecting wires or measuring signal levels is acceptable only where direct operation of plant equipment is not possible.
 5. Make updated versions of documentation required for PAT available to Owner at Site, both before and during tests.
 6. Make one copy of all software O&M manuals available to the Owner at the Site both before and during testing.

3.02 OWNER TRAINING

A. General:

1. Provide an integrated training program for Owner's personnel.
2. Perform training to meet specific needs of Owner's personnel.
3. Include training sessions, classroom and field, for managers, engineers, operators, and maintenance personnel.
4. Provide instruction on all working shift(s) as needed to accommodate the Owner's personnel schedule.
5. Owner reserves the right to make and reuse videotapes of all training sessions.

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B. Operations:

1. Provide a minimum of 2 days of training at the Site indicated by the Owner for Owner's personnel in the operation of the new SCADA upgrades and new PLC. Training shall include:
 - a. Standard operational features of PLC equipment provided.
 - b. Specific features provided for this project including:
 - 1) General Loop functions.
 - 2) Operation of Each Loop: For example, AUTO/MANUAL control, control setpoint settings, control mode selection, alarm acknowledgment.
 - 3) Operation of each new and revised SCADA HMI screen display, dynamic objects, and controls associated with each display.
2. Alarm Summary:
 - a. Describe each SCADA alarm, including SCADA tag name, detailed description of the alarm, probable cause, suggested operator action(s).
 - b. The Alarm summary shall be configured in Microsoft Excel.

C. Software Maintenance:

1. Provide a minimum of 5 days of training at the Site indicated by the Owners for personnel in the maintenance of the PLC and SCADA software.
2. Software functions review.
3. HMI Screens.
4. Documented ladder diagrams.
5. SCADA/PLC I/O Database.

3.03 O&M MANUALS

A. General:

1. Provide the following:
 - a. Suggested startup procedures.
 - b. Training material.
 - c. Alarm summaries.

B. Software:

1. Provide the following:
 - a. Finalized Loop Specifications.
 - b. Program flow diagrams.
 - c. Documented ladder programs.
 - d. PLC/SCADA I/O database, forms, queries, and reports.

END OF SECTION

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SECTION 44 42 33.19 COMPOST BIOFILTER ODOR CONTROL SYSTEM

PART 1 GENERAL

1.01 WORK OF THIS SECTION

- A. This section covers the Work necessary to provide compost biofilter media, biofilter slab and air distribution piping, irrigation system and control valves, drain system, instrumentation, startup, testing, and all necessary appurtenances for a complete and properly functioning biofilter odor control system. Odor control fans are specified in Section 23 34 05, Odor Control Fans.
- B. The scope of supply associated with the Work, in addition to equipment and material supply, shall include the following services: Laboratory analysis of air samples and functional testing of the completed installation.

1.02 RELATED SECTIONS

- A. Related sections include the following:
 - 1. Section 23 31 13.05, Metallic Process Ductwork.
 - 2. Section 23 34 05, Odor Control Fans.
 - 3. Section 40 27 00, Process Piping—General.
 - 4. Section 40 91 00, Instrumentation and Control Components.

1.03 GENERAL

- A. Like items of equipment specified hereunder shall be the end product of one Supplier in order to achieve standardization for operation, maintenance, spare parts, and Supplier's services.

1.04 SERVICE CONDITIONS

- A. The biofilter odor control system shall be installed as generally shown on the Drawings. This arrangement is intended to represent the minimum standard of quality and treatment capacity.
- B. The biofilter odor control system shall incorporate components and provisions to meet the following service conditions:
 - 1. Environment: Moderate humidity with rapid shifts in weather including hot summers and cold winters.
 - 2. Ambient Temperature Range: In accordance with Section 01 67 00, Product Requirements.

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3. Precipitation: Approximately 40 inches per year.
 4. Altitude: Approximately 600 feet above mean sea level (msl).
 5. Temperature of Influent Odorous Air to the Biofilter: 35 degrees F to 105 degrees F.
 6. Seismic, Wind, and Snow Loads: As described on General Structural Note Sheets on the Drawings.
- C. The biofilter system shall treat 25,000 cfm of continuously exhausted odorous air from the composting treatment operations. This system is designed to eliminate odorous compounds from the airstream typical of a municipal wastewater biosolids composting treatment application. These compounds shall include, but not be limited to, hydrogen sulfide, mercaptans, reduced sulfur compounds, ammonia, and volatile organic compounds typical of this type of application.
- D. The biofilter system shall use ground woodchip type media.
- E. Specific Design Criteria:
1. Number of Cells: One.
 2. Nominal Total Area: 10,000 square feet.
 3. Media Depth, After Placement and Initial Irrigation: 7 feet.
 4. Empty Bed Residence Time: Minimum of 60 seconds.
 5. Maximum Pressure Drop through Biofilter System: 10 inch WC.
- F. All electrical and control components located within 3 feet of odorous air leakage sources shall be UL listed for use in Class 1, Division 2, Group D hazardous area and shall be installed in compliance with NEC 500, NEC 501.
1. See Area Classification as shown on the Drawings.
- G. All mechanical components shall be designed and constructed in accordance with the latest edition and revision of all applicable codes and regulations, including the following:
1. NIST.
 2. ASTM.
 3. ANSI.
 4. ASME.

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H. Equipment Materials:

1. All components of the biofilter system shall be compatible with the conditions and chemicals to which they will be subjected to during normal operation.
2. Compounds with which the materials of construction must be compatible include, but are not limited to:
 - a. Hydrogen sulfide (H₂S).
 - b. Sulfuric acid caused by the presence of H₂S.

I. PERFORMANCE CRITERIA

1. Target Removal Efficiency:
2. All components of the biofilter shall be compatible with the conditions and chemicals to which they will be subjected during normal operation. Compounds the materials must be compatible include, but are not limited to:
 - a. Hydrogen Sulfide.
 - b. Sulfuric Acid.
 - c. Other Reduced-Sulfur Compounds.
 - d. Ammonia.
3. Biofiltration Odor Control System shall meet the following criteria:

Specification	Typical Range of Values
Type of Biofilter Media	Woodchips
Empty-Bed Residence Time	60 seconds
Media Temperature	40°F - 105°F
Media pH	5.5 – 8.5
Active Media Depth	72 inches
Media Moisture Content	> 50%
Initial Pressure Drop Thru Fresh Media	< 0.25 inches w.c./ft of media depth
Max Pressure Drop Thru Aged Media	< 1.0 inches w.c./ft of media depth
Dry Media Bulk Density	< 600 lb/CY
Notes: Woodchips shall be hardwood with minimal green waste from leaves.	

4. A performance demonstration test as described herein shall be means for demonstrating actual biofilter performance.

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J. REFERENCES

1. The following is a list of standards referenced in this section:
 - a. American National Standards Institute (ANSI).
 - b. American Society of Mechanical Engineers (ASME).
 - c. National Electrical Manufacturers Association (NEMA): 250-2014, Enclosures for Electrical Equipment (1,000 volts, maximum).
 - d. National Fire Protection Association (NFPA):
 - 1) 70, National Electrical Code (NEC).
 - 2) 820, Fire Protection in Wastewater Treatment and Collection Systems.
 - e. National Institute of Standards and Technology (NIST).
 - f. Occupational Safety and Health Act (OSHA).
 - g. UL: 508a, Industrial Control Panels.

K. DEFINITIONS

1. The following is a list of abbreviations which may be used in this section:
 - a. BOD: Biological Oxygen Demand.
 - b. COD: Chemical Oxygen Demand.
 - c. DCS: Distributed Control System.
 - d. D/T: Dilutions to Threshold.
 - e. FRP: Fiberglass Reinforced Plastic.
 - f. H₂S: Hydrogen Sulfide.
 - g. hp: Horsepower.
 - h. OSHA: Occupational Safety and Health Administration.
 - i. ppbv: Parts Per Billion, by volume.
 - j. ppmv: Parts Per Million, by volume.
 - k. TSS: Total Suspended Solids.
 - l. Negative Aeration: Foul air collected from individual compost bays through a suction process where the foul air is conveyed to a biofilter for odor treatment.
 - m. Biofilter Media: Woodchips free of ground green waste (leaves and grass clippings).

1.05 SUBMITTALS

- A. Submittals shall be made as required in Section 01 33 23, Submittal Procedures.

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B. Action Submittal:

1. Shop Drawings:
 - a. Product literature provides a complete description of the equipment and system components specified in this section.
 - b. Drawings, catalog information and cut sheets, and performance data for system components specified in this section.
 - c. Process and instrumentation drawing, general arrangement and Assembly Drawings for biofilter odor control system including all system components.
 - d. Media supplier's description of biofilter operation, including verification of control narrative described in Section 40 90 00, Instrumentation and Control for Process Systems, Supplement Loop Specifications.
 - e. Irrigation spray nozzle irrigation piping layout drawing.
 - f. Pressure loss to airflow curves for biofilter media and engineered media support flooring system.
 - g. Approximate shipping weight of the equipment and, if shipped unassembled, the number of components and approximate weight of each.
 - h. Slab construction methods including joint placement and layout.

C. Informational Submittals:

1. Supplier's Certificate of Compliance, in accordance with Section 01 67 00, Product Requirements.
2. Statement of Qualifications.
3. Supplier's Certificate of Proper Installation, in accordance with Section 01 79 00, Demonstration and Training.
4. Shipping, storage and protection, and handling instructions.
5. Manufacturer's written/printed installation instructions.

D. Functional Testing Submittals:

1. Submit a detailed Functional Testing Plan for approval prior to conducting testing which includes:
 - a. Test equipment and apparatus.
 - b. The specific testing methodology to be used.
 - c. The sampling and analysis procedures.
 - d. Submit a final report that provides a narrative of the testing activities, photographs showing the activities, tabular summary of all data collected, and conclusions of these results.

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E. Performance Demonstration Submittals:

1. Submit a detailed Performance Demonstration Test Plan for approval prior to conducting demonstration which includes:
 - a. Test equipment and apparatus.
 - b. The specific testing methodology to be used.
 - c. The sampling and analysis procedures.
2. Submit a final report that provides a narrative of the testing activities, photographs showing the activities, tabular summary of all data collected, and conclusions of these results.

F. Operation and Maintenance Data:

1. Operations and Maintenance (O&M) Manuals: Content format, and schedule for providing as specified in Section 01 78 23, Operation and Maintenance Data.
2. Data Sheet Forms: As specified in Section 01 78 23, Operation and Maintenance Data.

1.06 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following spare parts and special tools: One irrigation spray nozzle, of each type provided.
- B. Tools and Accessories: Provide manufacturer's recommended special tools and accessories required to assemble and disassemble the equipment furnished under this section.
- C. Delivery: In accordance with Section 01 67 00, Product Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 67 00, Product Requirements, and:
 1. Responsibility for Shipping Damage: Be responsible for the condition of biofilter components delivered to the Job Site. Any damage suffered during transportation or unloading shall be repaired or replaced at no cost to Contracting Officer.
 2. Crate materials whenever practical prior to shipment.

1.08 SAFETY REQUIREMENTS

- A. All equipment furnished shall be designed and manufactured with due regard to safety of operation, accessibility, and durability of parts, and shall comply with all applicable Occupational Health and Safety Act, federal, state, and local safety regulations.

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1.09 QUALITY ASSURANCE

- A. Perform smoke tests on the installed biofilter system to ensure uniform air distribution as specified in Article Field Quality Control. All tests shall be conducted in the presence of Contracting Officer's representative and shall commence only after the air flow testing and balancing has been completed. Sufficient notice shall be provided to Contracting Officer prior to testing. Biofilter media shall be removed, topped-off, or replaced as required by Contracting Officer to achieve proper airflow distribution. Following any system improvements resulting from smoke test findings, smoke testing shall be repeated until results are considered acceptable to Contracting Officer.
- B. Performance testing of the biofilter as specified in Article Field Quality Control. Testing shall commence only after the air flow testing and balancing has been completed, odor sources from process areas being treated are in operation and the biofilter media has been fully acclimated.

PART 2 PRODUCTS

2.01 BIOFILTER MEDIA

- A. Biofilter Media: The biofilter media shall be supplied by the owner. Media is expected to be the same as composting bulk agent, which is ground woodchips.
 - 1. Ensure woodchips used for the biofilter media are free of leaves and grass clippings.
- B. Design Intent: Each of the biofilter systems shall treat 25,000 scfm of odorous exhaust air using biofilter media in the area shown on the Drawings.

2.02 IRRIGATION SYSTEM

- A. The biofilter system shall include an irrigation system for secondary moisture control of the biofilter media using plant water (W2). Each irrigation system shall include sprinklers or soaker hose, piping, and automatic control valve. All irrigation control valves, accessories, and isolation valves shall be installed within the water panel as shown on the Drawings.
- B. The general layout of the irrigation system, using sprinkler nozzles, is shown on the Drawings. Provide submittal data to verify the type and layout for irrigation sprinkler nozzles meets biofilter media supplier requirements. The irrigation system shall incorporate provisions for cold weather operation as outlined in Article Service Conditions. All irrigation piping shall be sloped back to a system drain valve, as shown on the Drawings. Any vendor

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modifications to the sprinkler layout shall have no additional costs to the Owner.

- C. Sprinkler Heads: Adjustable arc, popup rotor style sprinkler heads. All sprinklers to have purple “Nonpotable Water” markings.
 - 1. Placement: As shown on the Drawings and as required by biofilter media supplier. Where spray nozzles are used, select nozzles to minimize overspray outside of the biofilter structure.
 - 2. Nozzle Trajectory: Standard 25-degree angle with a minimum 25 percent adjustment.
 - 3. Arc: Adjustable from 50 degrees to 360 degrees.
 - 4. Nozzle Size: As required to achieve precipitation rate indicated herein and radius as shown on the Drawings.
 - 5. Precipitation Rate: 0.4 inch to 0.75 inch per hour.
 - 6. Supply Water Pressure: Minimum 40 pounds per square inch gauge (regulated).
 - 7. Manufacturers and Products:
 - a. Hunter; I 25.
 - b. Rainbird Falcon Series 6504.
 - c. Proport Model 14053, Nozzle No 15.
 - d. “Or-equal.”
- D. Portable Sprinklers: Provide stand, flexible hose, and adjustable sprinkler head as shown on the Drawings.
- E. Pipe: PVC pipe conforming to Section 40 27 00, Process Piping—General.
- F. Winterization Provisions: Provide 1-inch isolation valve with Air King, or equal compressed air fitting downstream of last isolation valve for each biofilter cell.
- G. Signage: Provide signage conforming to Section 10 14 00, Signage, to indicate “DANGER Nonpotable Water Not for Drinking” at locations near the water panel, humidifier, and along each wall of the biofilter where irrigation spray piping is located.

2.03 INSTRUMENTATION AND CONTROL

- A. General:
 - 1. Control of the Biofilter Odor Control System shall be provided by the plant control system, provided by others.
 - 2. The minimum functional requirements of the control system are specified herein. Provide additional instrumentation as required to provide a safe and operable system.

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3. Control narratives for biofilter odor control system provided in Section 40 90 00, Instrumentation and Control for Process Systems, Supplement Loop Specifications. As part of submittal requirements, verify the narrative meets media supplier's requirements for proper operation and performance.
- B. Instrument Components as shown on the Drawings: As described in Section 40 91 00, Instrumentation and Control Components.
 1. Field Instrumentation: Pressure transmitters upstream and downstream of the fans.

PART 3 EXECUTION

3.01 EXCAVATION AND SUBGRADE PREPARATION

- A. Excavate to lines, grades, and dimensions as specified in Section 31 23 16, Excavation.
- B. Prepare subgrade as specified in Section 31 23 13, Subgrade Preparation.

3.02 BIOFILTER CONCRETE STRUCTURE

- A. Install concrete structure as shown on the Drawings. Slope floor and trench as indicated for drainage.
- B. Provide block outs for the aeration pipe laterals for the push wall concrete forms. Seal pipe penetrations with modular seals as shown on the Drawings.

3.03 BIOFILTER SLAB AND AIR DISTRIBUTION PIPING

- A. Install HDPE aeration lateral pipes as shown on the Drawings. Provide means to secure pipes from movement or flotation during the concrete pouring and curing phase.
- B. Install concrete slab as shown on the Drawings. See Drawing details for height tolerances.
- C. After concrete slab is fully cured, chalk line the top center of each lateral pipe and mark out the drilled penetration schedule as shown on the Drawings. Drill each penetration centered and provide means to minimize any pipe shavings or cores from falling to aeration laterals.

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3.04 BIOFILTER MEDIA INSTALLATION

A. Delivery:

1. Coordinate with Owner and facility operators for procurement of woodchip material. Delivery, placement, and installation of biofilter material shall not interrupt any current facility operations. Owner shall provide woodchip media.
2. Contractor shall furnish all equipment and accessories necessary to place and install biofilter media.

B. Installation:

1. Placement of biofilter media shall happen after biofilter facility is fully constructed and passes all performance and equipment testing requirements.
2. Media Installation Sequence: Media installation shall not begin until after installation of connecting ductwork and initial smoke test is complete (See FIELD ACCEPTANCE TESTING).
3. Moisture Control: Moisture addition is provided through a sprinkler irrigation system. The irrigation system must be operational before media is placed.

3.05 IRRIGATION SYSTEM INSTALLATION

- A. All valves, fittings, and hoses shall be installed as shown and all connections made to permit the irrigation and humidifier system to function properly.
- B. All materials and equipment shall be installed in strict accordance with the manufacturer's written instructions and recommendations.
- C. Irrigation system sprinklers shall be adjusted to achieve maximum coverage while also confining the irrigation spray coverage to within the perimeter walls of the biofilter cell.
- D. Irrigation system shall be flow tested to verify that each zone performs at specified application rates at specified pressures. Duration of test shall not be less than 1 hour.
- E. Drains:
 1. Install drains on low points of pipelines.
 2. Drains at low points in piping required for completed system may or may not be shown on the Drawings.

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3.06 FIELD QUALITY CONTROL

A. Field Acceptance Testing:

1. Preliminary tests, field tests, start-up and initial operation shall be performed in accordance with the Contract Documents.
 - a. Provide all test apparatus required.
 - b. Perform functional test on associated odor control exhaust fans. See Section 23 34 05, Odor Control Fans.
 - c. Air Balancing: See Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.
2. All testing shall be done in the presence of the Engineer or Owner approval representative. Notify Contracting Officer in writing at least 14 days prior to scheduled date of functional testing.
3. Final acceptance of the biofilter media and biofilter facility shall be made after the equipment has been demonstrated in the field to meet the performance requirements stated in this specification under all normal operating conditions and verification that the motors are not overloaded in normal operating conditions.
4. Adjustment, modification, or replacement of any biofilter media which fail to meet specified requirements shall be included in the Contractor acceptance testing. Owner and Engineer shall review and approve of any modifications proposed by Contractor necessary to correct any issues prior to work commencing.
5. Acceptance Test: Perform two smoke tests on each biofilter system at the design airflow rate of 25,000 scfm. Each smoke test shall be video recorded for owner/engineer review. The Contractor shall provide enough smoke candles to run the tests for a 10-minute duration at the design air flow rate. The Engineer shall be on-site to observe both smoke tests. The smoke tests shall consist of placing a smoke candle at the inlet of the blower that shall, in turn, force air and smoke through the piping distribution system.
 - a. The Contractor shall perform the first smoke test to verify joint integrity and to prove proper air distribution throughout the header and distribution lateral pipes. The smoke test shall be conducted after placement of the distribution lateral pipes. Prior to first smoke test, the biofilter laterals shall be flushed clean by flushing with potable water to the drain of each lateral and all the laterals shall be inspected to ensure clear openings. The absence of smoke over any section of laterals will indicate lack of air distribution in that area and shall result in failure of the smoke test. The Contractor shall replace broken, damaged, or leaking pipe and fittings in areas that are damaged.

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- b. The second smoke test performed by the Contractor shall be performed after placement of the media. The absence of smoke over any section of the pipe will indicate lack of air distribution in that area and shall result in failure of the smoke test. If uneven air distribution through the media is observed, the City shall re-distribute the media material and re-test the system until satisfactory test results are obtained. The Contractor shall repair pipe and fittings as necessary to correct air distribution problems. Any excessive air leakage around the edges of the filter shall be corrected by the City, including placement of additional media. The Contractor shall re-run the smoke test, if necessary, to demonstrate uniform air distribution throughout the aeration plenum.

END OF SECTION

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SECTION 44 42 56.05 HORIZONTAL CHOPPER PUMP AND MIXING ASSEMBLIES

EQUIPMENT AND COMPONENT NUMBER(S)

H090-DEW2-RCP01: Recirculation Pump No. 1.
H090-DEW2-RCP02: Recirculation Pump No. 2.

PART 1 GENERAL

1.01 WORK OF THIS SECTION

- A. The Work of this section includes providing pump mixing systems as defined herein and all appurtenant Work.
- B. Unit Responsibility: The Work requires that the Sludge Holding Tank No. 1 mixing, complete with all accessories and appurtenances (including, but not necessarily limited to, electric motors, safety guards, and spare parts) be supplied by one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment. The supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions indicated without altering or modifying the Contractor's responsibility under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.
- C. General Requirements: See Division 01, General Requirements, which contains information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Make, model, weight, and horsepower of each equipment assembly.

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- b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over the entire operating range of the pump, from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the guarantee point.
 - d. Detailed structural, mechanical, and electrical drawings showing the equipment dimensions, size, and locations of connections and weights of associated mixing system and recirculation equipment.
 - e. Motor information as specified in Section 26 20 00, Low-Voltage AC Induction Motors.
 - f. Factory finish system data sheets.
2. Computational Fluid Dynamics (CFD) analysis that models the flows within each Sludge Holding Tank verifying that nozzle location and orientation provides adequate mixing of the tank contents, under service conditions specified herein. Adequate mixing shall be provided to obtain suspended solids concentrations within 10 percent of the average value regardless of location inside the tank. Model must contain all structural and mechanical elements.

B. Informational Submittals:

1. Factory Functional and Performance Test Reports and Log from actual mixing pumps that will be used in the mixed systems for this Project.
2. Manufacturer's Certification of Compliance that the factory finish system is identical to the requirements specified herein.
3. Special shipping, storage and protection, and handling instructions.
4. Manufacturer's printed installation instructions.
5. Manufacturer's Certificate of Proper Installation.
6. Suggested spare parts list to maintain the equipment in service for a period of 1 year. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
8. Operation and Maintenance Manual.
9. If anchorage and support details, locations, sizes and materials are not identified by the manufacturer, the Contractor shall provide support and anchorage calculations stamped by an engineer registered in the state of the Project. Anchorage and support design criteria shall meet manufacturer's requirements, design loads provided in the General Structural Notes on the Drawings, and all applicable codes and standards. Provide ICC-ES report and special inspection requirements

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for any post installed anchors in concrete and masonry. Anchor calculations shall account for edge distance, concrete thickness and other existing conditions which shall be field verified by the Contractor and identified in the calculations and any related Drawings.

1.04 EXTRA MATERIALS

- A. Furnish complete mechanical seal, impeller, and cutter bar.

PART 2 PRODUCTS

2.01 GENERAL

- A. Coordinate pump requirements with drive manufacturer and be responsible for pump and drive requirements.
- B. Pumped Mixing System Manufacturer:
 - 1. Rotamix® as manufactured by Vaughan Co., Inc.
 - 2. Or approved equal.
- C. Mixing and Recirculation Pump Manufacturer:
 - 1. Vaughan Co., Inc.
 - 2. Trillium Flow Technologies.
 - 3. Or approved equal.

2.02 MIXING SYSTEM DESCRIPTION

- A. The Contractor shall furnish one complete mixing system, for Sludge Holding Tank No. 1, consisting of two floor-mounted mixing nozzle assemblies in the tank, and two associated chopper pumps. The dimensions of tank shall be as shown on the Drawings. The nozzles shall be designed to produce a rotational mixing pattern within the tank. The manufacturer shall be responsible for determining mixing assembly quantity, location, appropriate nozzle angles, and hydraulic performance of the pumps and system as a whole. Mixing system shall be designed to adequately mix the tank as specified under Article Field Quality Control, Paragraph Performance Test, with inner structural and mechanical elements including but not limiting to concrete fillets and weirs, as shown on the Drawings.
- B. Service Conditions:
 - 1. Design Percentage Total Solids (TS) of Feed Sludge: 3.5 percent maximum. Range 1 percent to 6 percent.

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2. Design Temperature of Sludge: 50 degrees F to 90 degrees F.
 3. Recirculation Sludge Flows:
 - a. Low Water Level: 300 gpm minimum.^[ADD. 2]
 - b. High Water Level: 1,000 gpm minimum.^[ADD. 2]
 4. Target Tank Turnovers ~~a~~/ Day:^[ADD. 2]
 - a. Low Water Level: 6 minimum.^[ADD. 2]
 - b. High Water Level: 10 minimum.^[ADD. 2]
 5. The sludge pH is anticipated to be normally 6-8.
- C. The Contractor shall submit manufacturer's standard warranties for equipment to be furnished in accordance with this section. The pump warranty shall be manufacturer's standard for 1 year. The nozzle warranty shall be a 10-year nonprorated warranty, commencing on the initial startup date.
- D. A performance affidavit shall be supplied certifying that the system as provided will meet or exceed the performance requirements for the specific application if proposed system has less than a minimum of 10 years of proven successful installations of the current design.
- E. Nozzle Construction:
1. Nozzles: Shall be glass-lined cast ductile iron, with 1-inch nominal wall thickness to protect against abrasive conditions, and a long straight taper length of at least 10 inches.
 2. Assembly Fittings: Shall be glass-lined cast ductile iron, with 150-pound flanged piping connection.
 3. Base: Shall be fabricated carbon steel, with 3/4-inch mounting holes for 5/8-inch anchor bolts.
 4. Anchor Bolts: Shall be 5/8-inch diameter minimum and sized by the equipment supplier, and of sufficient length to support thrust loads from nozzles. Construction shall be Type 316 stainless steel.
 5. Nozzle Geometry: Low-profile design such that submergence is near low water surface level.^[ADD. 2]
 - ~~4.6.~~ Performance: Provide larger diameter nozzle orifice as needed to maintain full hydraulic mixing efficiency and jet velocity without increasing system head loss.^[ADD. 2]

2.03 CHOPPER PUMPS

- A. Recirculation Pump No. 1, and No. 2 (H090-DEW2-RCP01 and H090-DEW2-RCP02):
1. Capacity: Determined by mixing system manufacturer. One duty and one standby pump.

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2. Head: Determined by mixing system manufacturer for the piping system as shown on the Drawings.
3. rpm: 1,170.
4. Pump shall be direct driven. Pump and motor orientation shall not compromise clearance shown on mechanical drawings for equipment access.

B. Pump Construction:

1. Pumps shall be horizontal chopper type pumps with all appurtenances as specified. The pumps shall be specifically designed to pump waste solids at heavy consistencies. Materials shall be macerated and conditioned by the pump as an integral part of the pumping action. The pump must have demonstrated the ability to chop through and pump high concentrations of solids such as plastics, heavy rags, grease and hair balls, wood, paper products and stringy materials without plugging, both in tests and field applications.
2. Casing: The pump casing shall be semi-concentric back pullout design, with the first half of the circumference being cylindrical beginning after the pump outlet, and the remaining circumference spiraling outward to the 150-pound flanged centerline discharge.
3. ASTM A536 ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. A 1/4-inch NPT pressure tap shall be included in the discharge flange.
4. Impeller: Shall be semi-open type with pump out vanes to reduce seal area pressure. Chopping/maceration of materials shall be accomplished by the action of the cupped and sharpened leading edges of the impeller blades moving across the cutter bar at the intake openings, with a maximum set clearance between the impeller and cutter bar of 0.010-inch to 0.030-inch cold. Impeller shall be cast from ASTM A148 alloy steel, case hardened to minimum Rockwell C 60 and dynamically balanced. The impeller shall have no axial adjustments and no setscrews.
5. Cutter Bar: Shall be recessed into the pump bowl, with a funnel shaped inlet opening, and shall extend diametrically across entire pump suction opening. Cutter bar shall be cast from ASTM A536 ductile iron, or T1 alloy steel, hardened to minimum Rockwell C 50. Replaceable shear bars shall be AISI 8620 or ASTM A148 cast alloy steel, case hardened to minimum Rockwell C 60.
6. Pump Shafting: The pump shaft and impeller shall be supported by AFBMA ball bearings. All shafting shall be AISI 4140 heat treated.
7. Bearings: Shaft thrust in both directions shall be taken up by two back-to-back mounted single-row angular contact ball bearings. Two back-to-

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- back mounted single-row radial bearings shall also be provided. B-10 bearing life shall be minimum 100,000 hours.
8. Bearing Housing: Shall be ASTM A536 ductile cast iron, and machined with piloted bearing fits for concentricity of all components. Bearing housing shall be oil bath lubricated with ISO Grade 46 turbine oil and a side-mounted sight glass to provide a permanently lubricated assembly. Viton® double lip seals riding on stainless steel shaft sleeves are to provide sealing at each end of the bearing housing.
 9. Seal: Flushless mechanical seal system specifically designed to require no seal flush through the elimination of the stuffing box: The seal shall be made of AISI Type 316 stainless steel and shall be cartridge-type with Viton O-rings and tungsten carbide faces. The cartridge seal shall be preassembled and pretested so that no seal settings or adjustments are required. Any springs used to push the seal faces together must be shielded from the fluid to be pumped. The cartridge shall also include a 17-4PH, heat-treated seal sleeve and an ASTM A536 ductile iron seal gland. The mechanical seal faces shall be lubricated and cooled by a separate oil chamber. The oil chamber shall include a 10 psi pressure relief valve. The area between the seal oil chamber and bearing oil chamber shall be vented and drained to prevent contamination of the bearings.
 10. Inlet Manifold: The pump assembly shall be mounted horizontally with 150-pound standard inlet flange, cleanout, 1/4-inch NPT suction pressure tap, drain connection, and mounting feet.
 11. Shaft Coupling:
 - a. Bearing housing and motor stool design is to provide accurate, self-aligning mounting for a C-flanged electric motor. Pump and motor coupling shall be as manufactured by:
 - 1) T.B. Woods; Sureflex elastomeric type.
 - 2) Falk.
 - 3) "Or-equal."
 12. The pump manufacturer shall provide a common pump and motor base constructed of a minimum 3/8-inch thick fabricated steel, suitably reinforced to support the full weight of the pump and motor.
- C. Motors: Drive motors shall be inverter duty, horizontal, TEFC, 20 hp minimum, 1.15 service factor, 460 volts, three-phase, 60 Hz. Motor nameplate horsepower shall not be exceeded at any head capacity point on the pump curve. See Section 26 20 00, Low-Voltage AC Induction Motors.

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2.04 ACCESSORIES

- A. Equipment Identification Plate: 16-gauge stainless steel with 3/8-inch high engraved block type equipment tag number securely mounted in a readily visible location.
- B. Lifting Lugs: Equipment weighing over 100 pounds.
- C. Anchor Bolts: Sized by equipment manufacturer, 1/2-inch minimum diameter, and as specified in Section 05 50 00, Metal Fabrications.

2.05 FACTORY FINISHING

- A. Manufacturer's premium epoxy and polyurethane coating system "or-equal."

2.06 SOURCE QUALITY CONTROL

- A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
- B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
- C. Factory Test Report: Include test data sheets, curve test results, performance test logs, certified correct by a registered professional engineer.
- D. Functional Test:
 - 1. Perform manufacturer's standard motor test on equipment. Include vibration test, as follows:
 - a. Dynamically balance rotating parts of each pump and its driving unit before final assembly.
 - b. Limits:
 - 1) Driving Unit Alone: Less than 80 percent of NEMA MG 1 limits.
 - 2) Complete Rotating Assembly, Including Coupling and Motor: Less than 90 percent of limits established in the Hydraulic Institute Standards.
- E. Performance Test:
 - 1. Conduct on each pump.
 - 2. Perform under simulated operating conditions.
 - 3. Test for a continuous 3-hour period without malfunction.
 - 4. Test Log:

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- a. Record the following:
 - 1) Total head.
 - 2) Capacity.
 - 3) Horsepower requirements.
 - 4) Flow measured by factory instrumentation and storage volumes.
 - 5) Average distance from suction well water surface to pump discharge centerline for duration of test.
 - 6) Pump inlet and outlet pressure converted to feet of liquid pumped and corrected to pump discharge centerline.
 - 7) Driving motor voltage and amperage measured for each phase.
 5. Adjust, realign, or modify units and retest in accordance with Hydraulic Institute Standards if necessary.
- F. Motor Test: See Section 26 20 00, Low-Voltage AC Induction Motors.
- G. Hydrostatic Tests: Pump casing(s) tested at 150 percent of shutoff head. Test pressure maintained for not less than 5 minutes.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Level base by means of steel wedges (steel plates and steel shims). Wedge taper not greater than 1/4 inch per foot. Use double wedges to provide a level bearing surface for the pump and driver base. Accomplish wedging so that there is no change of level or springing of the baseplate when the anchor bolts are tightened.
- C. Adjust pump assemblies such that the driving units are properly aligned, plumb, and level with the driven units and all interconnecting shafts and couplings. Do not compensate for misalignment by use of flexible couplings.
- D. After the pump and driver have been set in position, aligned, and shimmed to the proper elevation, grout the space between the bottom of the baseplate and the concrete foundation with a poured, nonshrinking grout of the proper category, as specified in Section 03 62 00, Grouting. Remove wedges after grout is set and pack void with grout.
- E. Connect suction and discharge piping without imposing strain to pump flanges.

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- F. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05 50 00, Metal Fabrications. Type 316 stainless steel, sized by equipment manufacturer in accordance with Section 01 88 15, Anchorage and Bracing.

3.02 FIELD FINISHING

- A. Nozzle assemblies manufacturers finish shall be suitable UV exposure. If factory finishes do not meet UV resistant then, field finish nozzle assemblies as specified in Section 09 90 00, Painting and Coating, System No. 2.

3.03 FIELD QUALITY CONTROL

- A. Functional Tests: Conduct on each pump, system, and subsystem as specified in Section 01 91 14, Equipment Testing and Facility Startup.
 - 1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
 - 2. Vibration Test:
 - a. Test with units installed and in normal operation, and discharging to the connected piping systems at rates and with the actual building structures and foundations provided shall not develop at any frequency or in any plane, peak-to-peak vibration amplitudes in excess of 3 mils.
 - b. If units exhibit vibration in excess of the limits specified, adjust or modify as necessary. Units which cannot be adjusted or modified to conform as specified shall be replaced.
 - 3. Flow Output: Measured by plant instrumentation and storage volumes.
- B. Operating Temperatures: Monitor bearing areas on pump and motor for abnormally high temperatures.
- C. Performance Test:
 - 1. In accordance with Hydraulic Institute Standard 1.6, Centrifugal Pump Test.
 - 2. After startup of the sludge holding process, perform a mixing test at each mixing system using each pump to demonstrate adequate mixing.
 - a. Perform at conditions stated in Article Mixing System Description.
 - b. Select three vertical lines and two depths in each tank.
 - c. Take three Samples at each of two depths along each vertical line using Van Doren sampler.
 - d. Independent testing laboratory approved by Engineer will perform residue test on each Sample. Mean value of total residue for three

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Samples at each depth will be used to determine if suspended solids concentrations of all samples are within 10 percent of the average value regardless of location inside the tank.

- e. All testing and sampling shall conform to procedures established in latest edition of Standard Methods for Examination of Water and Wastewater.

3.04 MANUFACTURER'S SERVICES

A. Manufacturer's Representative:

- 1. Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
 - a. 1 person-day for installation assistance and inspection.
 - b. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
 - c. 1 person-day for post-startup training of Owner's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Owner.

- B. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Equipment Testing and Facility Startup.

END OF SECTION

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SECTION 33 32 13 PACKAGED LIFT STATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Bearing Manufacturers Association (ABMA):
 - a. 9, Load Ratings and Fatigue Life for Ball Bearings.
 - b. 11, Load Rating and Fatigue Life for Roller Bearings.
2. American Concrete Institute (ACI):
 - a. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - b. 211.2, Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
 - c. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - d. 305R, Hot Weather Concreting.
 - e. 306R, Cold Weather Concreting.
 - f. 309R, Co of Concrete.
 - g. 318, Building Code Requirements for Structural Concrete.
 - h. 350, Code Requirements for Environmental Engineering Concrete Structures and Commentary.
 - i. 517.2R, Accelerated Curing of Concrete at Atmospheric Pressure.
3. American Society of Mechanical Engineers (ASME): B16.1, Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 150.
4. ASTM International (ASTM):
 - a. A48, Standard Specification for Gray Iron Castings.
 - b. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
 - c. A36, Specification for Carbon Structural Steel.
 - d. A82, Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - e. A615, Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - f. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - g. C33, Specification for Concrete Aggregates.
 - h. C39, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - i. C40, Test Method for Organic Impurities in Fine Aggregates for Concrete.

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- j. C70, Standard Test Method for Surface Moisture in Fine Aggregate.
- k. C117, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
- l. C123, Standard Test Method for Lightweight Particles in Aggregate.
- m. C136, Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- n. C138, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
- o. C150, Specifications for Portland Cement.
- p. C172, Standard Practice for Sampling Freshly Mixed Concrete.
- q. C192, Practice for Making and Curing Concrete Test Specimens in the Laboratory.
- r. C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- s. C260, Specification for Air-Entraining Admixtures for Concrete.
- t. C494, Standard Specification for Chemical Admixtures for Concrete.
- u. C566, Test Method for Total Evaporable Moisture content of Aggregate by Drying.
- v. C595, Specification for Blended Hydraulic Cements.
- w. C617, Standard Practice for Capping Cylindrical Concrete Specimens.
- x. C618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- y. C805, Test Method for Rebound Number of Hardened Concrete.
- z. C857, Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
- aa. C858, Specification for Underground Precast Concrete Utility Structures.
- bb. C890, Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
- cc. C891, Practice for Installation of Underground Precast Concrete Utility Structures.
- dd. C913, Specification for Precast Concrete Water and Wastewater Structures.
- ee. C920, Specification for Elastomeric Joint Sealants.
- ff. C990, Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
- gg. C1037, Practice for Inspection of Underground Precast Concrete Utility Structures.
- hh. C1064, Standard Test Method for Temperature of Freshly Mixed Concrete.

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- ii. C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
- jj. C1231, Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders.
- kk. C1240, Standard Specification for Use of Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout.
- ll. C1260, Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).
- mm. C1293, Standard Test Method for Determination of Length Change of Concrete due to Alkali-Silica Reaction.
- nn. C1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- oo. C1611, Standard Test Method for Slump Flow of Self-Consolidating Concrete.
- 5. Concrete Reinforcing Steel Institute (CRSI):
 - a. Manual of Standard Practice.
 - b. Placing Reinforcing Bars.
- 6. Hydraulic Institute Standards (HIS):
 - a. 11.6, Submersible Pump Test.
 - b. 14.6, Rotodynamic Pumps for Hydraulic Performance Acceptance Tests.
- 7. National Electrical Manufacturers Association (NEMA).
- 8. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code.
 - b. 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.
- 9. National Precast Concrete Association (NPCA): NPCA QC Manual.
- 10. UL.

1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to ratings and nomenclature of Hydraulic Institute Standards.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Make, model, weight, and horsepower of each pump equipment assembly.
 - 2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction, including cable seal details.

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3. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over entire operating range of pump, from shutoff to maximum capacity. Indicate separately head, capacity, horsepower demand, overall efficiency, and minimum submergence required at guarantee point.
4. Power and control wiring diagrams, including terminals and numbers.
5. Motor data, in accordance with the requirements of Section 26 20 00, Low-Voltage AC Induction Motors.
6. Adjustable frequency drive data, in accordance with the requirements of Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.
7. Factory-finish system.
8. L-10 bearing life calculations per ABMA.
9. If required, wiring for motor protection module.
10. Prepackaged, subassembled Lift Station complete with submersible pumps, precast concrete pump chamber with separate valve vault structure, slide rail pump removal system, discharge piping with required supports and fittings, discharge check and plug valves, access hatches, valve vault access ladder, liquid level controls, duplex pump control panel, internal wiring and other required associate options and appurtenances.
11. Drawings indicating dimensions, mechanical and electrical components, complete bill of materials, structural layout and reinforcing per calculations and structural weights.

B. Informational Submittals:

1. Factory and Field Performance Test Reports and Log.
2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, that factory finish system meets requirements specified herein.
3. Suggested spare parts list to maintain equipment in service for period of 1 year and 5 years. Include list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
4. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
5. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.
6. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
7. Installation and construction information.

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1.04 QUALITY ASSURANCE

- A. Pumps and controls from a single manufacturer; coordinated operating system where adjustable speed drives are required.
- B. Precast package lift station manufacturer shall have minimum 10 years' experience producing factory-built packaged Lift Stations and a permanent audited QC program.
- C. All electrical materials, devices, and equipment UL listed where applicable; installations per NEC.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Precast concrete units shall be handled and transported in a manner to minimize damage. Lifting devices or holes shall be consistent with industry standards. Lifting shall be accomplished with methods or devices intended for this purpose as indicated on the Shop Drawings. Upon request, the precast concrete producer shall provide documentation on acceptable handling methods for the product.
- B. Precast concrete units shall be stored in a manner that will minimize potential damage.
- C. Precast concrete units shall be delivered to the Site in accordance with the delivery schedule. Upon delivery to the Job Site, all precast concrete units shall be inspected by the customer's agent for quality and final acceptance.

1.06 WARRANTY

- A. Manufacturer's standard equipment warranty applies.
- B. Packaged Station Warranty: 1 year from installation from ~~factory completion, whichever occurs first~~ project acceptance^[ADD. 2]; single-source responsibility by package manufacturer.

1.07 EXTRA MATERIALS

- A. Furnish for this set of pumps:
 - 1. One set mechanical seals.
 - 2. One complete set of special tools required to dismantle pump.

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B. Concrete Additives and Treatments:

1. Waterproofing.
2. Antimicrobial additives.
3. Damp-proofing.

C. Joint and Penetration Seal Materials:

1. Sealant.
2. Manhole boots.
3. Water stop couplings.

D. Ladder extensions.

E. Extra materials and special tools for corrosive or abrasive service consider spare impeller and wear rings for each pump.

PART 2 PRODUCTS

2.01 GENERAL

A. The packaged submersible lift station and all system components are furnished by a single supplier. The pumps, valves, and accessories must be standard catalog design, totally warranted by the manufacturer.

B. Submersible Pump:

1. Submersible, vertical shaft, centrifugal nonclog type, for pumping wastewater.
2. Designed for continuous operation under submerged or partially submerged conditions, and intermittent operation when totally dry without damage to pump or motor.
3. Pump and Electrical Driver: Meet requirements for class, group, and division location in accordance with NFPA 70.
4. Where adjustable speed drives are required, furnish a coordinated operating system complete with pump, drive, and speed controller.
5. Pumps furnished under this section to be provided by a single manufacturer.

2.02 WET WELL AND VALVE VAULT

A. See Section 33 05 13, Manholes, for wet well manhole materials of construction.

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- B. Precast structures wall thickness shall be sized by the supplier and appropriate for the installation.
 - 1. Footing and wet well floor shall be designed to account for buoyancy forces.
 - 2. Roof slab shall be able to handle HS-20 traffic rated.
 - 3. Design for wet well manhole shall be sealed by a professional engineer in Oklahoma.
 - 4. The Horizontal joints between precast sections shall be sealed with a vulcanized butyl rubber joint material conforming to AASHTO M-198.
- C. Monolithically precast structures. Wet well alternates shall be approved by the Engineer prior to bid opening.
- D. Lift Station Wet Well Dimensions:
 - 1. Shape: Circular.
 - 2. Diameter: 6-foot minimum.
 - 3. Depth: 25 feet maximum. Reference supplements following end of section.
 - 4. Basin Floor: 1H:1V sloped.
- E. Valve Vault Dimensions: Size recommended by Manufacturer.
 - 1. Shape: Rectangular.
 - 2. Length: 6 feet, minimum.
 - 3. Width: 6-feet, minimum.
 - 4. Height: As required to maintain burial depth (36 inches of cover).

2.03 SUBMERSIBLE PUMPS

- A. See Section 44 42 56.04, Submersible Pumps, for product requirements.
- B. Pumps shall be submersible, vertical shaft, centrifugal nonclog type, for wastewater pumping.
- C. Designed for continuous operation under submerged or partially submerged conditions, and intermittent operation when totally dry without damage to pump or motor.
- D. Pump and Electrical Driver: Meet requirements for class, group, and division location in accordance with NFPA 70.
- E. Where adjustable speed drives are required, furnish a coordinated operating system complete with pump, drive, and speed controller.

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- F. Pumps furnished under this section to be provided by a single manufacturer.

2.04 SUPPLEMENTS

- A. Specific requirements are attached to this section as supplements.

2.05 COMPONENTS

- A. Equipment consists of pump complete with motor, control system, guide rail, anchoring brackets, base elbow, power cable, and pump lifting cable and control panel and level switches.
- B. Lifting Arrangement:
 - 1. Stainless steel chain, 5 feet minimum, and one "grip-eye."
 - 2. Attach chain permanently to pump and access platform with stainless steel wire rope.
 - 3. "Grip-eye" capable of being threaded over and engaging links of stainless-steel chain so pump and motor may be lifted with "grip-eye" and independent hoist.
- C. Sliding Guide Bracket:
 - 1. Integral part of pump unit.
 - 2. Pump unit to be guided by no less than two Type 316 stainless steel guide bars, or equivalent cable system, and pressed tightly against discharge connection elbow with metal-to-metal contact or through use of profile-type gasket, provided gasket is attached to pump's flange and can be easily accessed for inspection when pump is lifted out of wet well.
 - 3. Pump metal parts that come into contact with guide rail or cable system shall be made of non-sparking materials.
- D. Lift Station Access Frame and Cover:
 - 1. Furnish and install aluminum pump access hatch flush with precast cover, H20-ASTM C1802-14- Load Level 4 for accidental traffic load rating with Type 316 stainless steel hardware.
 - 2. Hold open arm to lock cover in 90-degree position, heavy duty stainless hinges.
 - 3. Access frame to be angle style with continuous 1-inch anchor flange and full slab-height skirt to show no exposed concrete when hatch is open Valve Vault Aluminum Access Frame and Cover.
 - 4. Pump access hatch to be supplied with integral safety grating system able to withstand H20-ASTM C1802-14- Load Level 4 for accidental traffic load rating, stainless steel gas shock for ease of operation when

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opening, and coated with 2 mils to 4 mils thick OSHA type safety orange color.

- E. Valve Vault Aluminum Access Frame and Cover: H20 Traffic Rated.
 - 1. Valve vault access hatch to be similar for pump access hatch above.
- F. Vault Ladder:
 - 1. The valve vault shall be supplied with an aluminum (6061-T6) wall-mount access ladder. The ladder shall be fastened to the concrete with Type 316 stainless expansion bolts and shall meet OSHA Standard 1910.27 requirements.
 - 2. The ladder rails and supports shall be all welded aluminum construction. Rails and wall supports shall be solid 3/8-inch by 2-1/2-inch flat stock, and rungs shall be 15/16-inch square with serrated top surface extruded into the rung for slip resistance. The minimum design live load shall be a single concentrated load of 200 pounds.
 - 3. Rung spacing shall be uniform and not exceed 12 inches, the minimum clear length of rungs shall be 18 inches, and the distance from the center line of the rung to the nearest permanent object shall not be less than 7 inches.
- G. Motor nameplate horsepower not to be exceeded at head-capacity point on pump curve.
- H. Pump motor and sensor cables shall be suitable for submersible pump applications and cable sizing shall conform to NFPA 70 specifications for pump motors. Cables shall be of sufficient length to reach junction boxes without strain or splicing.
- I. Motor Protection Module: If required, provide pump with a motor protection module for remote mounting. The Drawings are based on first named submersible pump manufacturer and motor protection module. If pump and motor protection module other than first named manufacturer is provided, provide revised wiring for the motor protection module.
- J. Polyvinyl Chloride (PVC) Piping and Fittings:
 - 1. 3-inch PVC piping will be used inside the lift station and valve vault.
 - 2. All PVC pressure piping and fittings for water and wastewater treatment are to be Schedule 80. Corrosion resistant pressure pipe, IPS sizes, for use at temperatures up to and including 140 degrees F. Pressure rating (120 psi to 1,230 psi) varies with schedule, pipe size, and temperature.
 - 3. The material used in the manufacture of the pipe and fittings shall be domestically produced rigid polyvinyl chloride (PVC) compound, Type 1 Grade 1, with a Cell Classification of 12454 as defined in

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ASTM D1784, trade name designation H707 PVC. This compound shall be gray in color and shall be approved by NSF International for use with potable and non-potable water (NSF 61). All sizes of PVC Schedule 80 pipe and fittings shall be manufactured in strict accordance with the requirements of ASTM D1785 for physical dimensions and tolerances, and all performance test requirements of ASTM D1785.

K. Pipe Supports:

1. Piping shall be supported in the valve vault using adjustable stainless steel floor supports, which cradles the pipe/valve flanges.
2. Piping shall be supported in the Lift Station by means of a common Type 304 stainless fabricated angle brace spanning the width of the station and mounted with wall brackets and Type 316 stainless hardware. Both vertical discharge pipes shall be supported from the brace by means of individual Type 316 stainless U-bolts and bolting hardware.
 - a. Common pipe support assembly at mid length shall be required when the vertical discharge pipe lengths exceed 10 feet 0 inch.
 - b. Common pipe support assemblies at equal spacing shall be required when the vertical discharge pipe lengths exceed 14 feet 0 inch.

L. Wall Penetrations:

1. Mechanical piping shall utilize cast or cored openings with flexible manhole boots. Flexible rubber boots shall consist of EPDM polymer compounds meeting ASTM C923 material performance requirements. Expansion banding and strap shall be Type 304 stainless material and the connection between boot and structure shall utilize an expansion wedge system with Type 304 stainless wedge and hardware components.
2. Electrical conduit penetrations will utilize aluminum electrical couplings assemblies with 2-inch wide minimum water stop, secured to the structure with watertight seal, or cored openings with mechanical rubber seals to fill the annular spacing between electrical conduit and precast wall structure. Mechanical seals shall utilize stainless steel assembly hardware and may be need to be employed when an exterior junction box option is factory mounted to the station.

M. HDPE Piping and Fittings:

1. All HDPE piping and fitting utilized in the Lift Station and/or valve vault shall be DR11, 200 psi, meeting ASTM D3350 cell classification and ASTM F412 thermoplastic piping material designation code. All

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pipe/fitting joining shall be fusion welded in a clean and climate-controlled environment, with product approved fusion welding equipment. The fusion weld shall be equally as strong as the adjacent joining materials.

2. HDPE flange back-up ring, shall be ductile iron, with epoxy top coat. Backup ring with HDPE flange will meet class 150-flange requirements. Backup ring to meet ASME/ANSI B16.5 standards for 3-inch to 24-inch HDP size range.
3. Where HDPE pipe assembly shall engage with flange coupling adapters; stainless pipe stiffeners shall be used on the plain end to provide internal circumferential support. Stiffeners shall be Type 304 stainless steel and be supplied with reinforced wedge to provide full ID support.

N. Flange Type Couplings:

1. Flange couplings shall be mounted on each pump base elbows to ensure proper pressure seal while providing a minimum of assembly flexibility. The flange couplings shall be fusion bond epoxy coated and supplied with Type 304 stainless assembly and mounting hardware for harsh and wet environments. The pipe gasket and O-ring seal shall be EPDM.
2. To ensure correct fitting of pipe and couplings, all flange couplings shall be furnished by the pipe supplier and shall be of the pressure rating of at least that of the pipeline in which they are to be installed.

O. Plug Valves:

1. Plug valves shall be of the non-lubricated, quarter-turn, eccentric type with flanged ends and lever operated (up to 4-inch valves) in full conformance with the latest revision of the AWWA C517 Standard.
2. Valves sizes 3 inches shall have a minimum 175 psi pressure rating. Plug Valves shall be round ported for reduced pumping costs and improved flow characteristics. The valves shall have the following minimum full open flow coefficients (Cv): 3 inches = 569.
3. Flange diameter, thickness, and drilling shall conform to ANSI B16.1, Class 125.
4. Valve shaft seals shall be of the self-adjusting U-cup design for reduced maintenance and replaceable without removing the cover from the valve.
5. Valves shall have bodies and covers of ductile iron per ASTM A536 for superior strength. Valve sizes 3 inches shall have body seats of 95 percent welded nickel applied directly to the body and machined to a smooth finish. Sprayed, plated or removable seats are not acceptable. Valves shall have plugs made from ductile iron per ASTM A536 with a vulcanized synthetic rubber seat facing tested per ASTM D429 for all sizes.

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6. Valves shall be provided with stainless steel thrust bearings on the upper and lower plug shaft to eliminate plug-to-body contact and ensure long lasting plug-to-seat alignment. Grit seals shall be provided on the upper and lower bearing journals to minimize the entrance of grit into the shaft seal and bearing areas.
 7. Valves shall be coated internally and externally with 6 mils to 8 mils NSF approved two-part epoxy paint for corrosion protection.
- P. Check Valve: A flanged model ball check valve rated for 150 psi at 73 degrees F.
- Q. Gasket, Bolts, Nuts:
1. For flange joints, gaskets shall be a minimum of 1/8-inch thick full faced gaskets. Gaskets shall be of composition suitable for exposure to fluids within the pipe. Gaskets shall meet AWWA C110, AWWA C111, and AWWA C115 performance standards.
 2. Flange joints shall be bolt assembled utilizing the full faced gasket. Bolting hardware, number, and size, shall conform to the same ANSI standards as the flange. Bolts and nuts shall be Type 304 stainless steel, heavy hex Grade B conforming to ASTM A493/494.
- R. Lift Station Vent: A passive station vent shall be supplied using 4-inch Schedule 80 PVC piping and fittings, and a stainless insect screen. The vent will be factory assembled and mounted to the exterior of the station, where the venting will rise above the station, and turn downward (gooseneck), and end with insect screen minimum 3 feet above finish grade.

2.06 CONTROL PANEL

- A. NEMA 4X enclosure, for outdoor duty.
- B. Refer to Section 40 99 90, Package Control Systems, for additional panel requirements. Manufacturer's standard panel.
- C. Free standing, post mounted.
- D. Features:
1. Main circuit breaker disconnect interlocked with panel door.
 2. Combination circuit breaker type, NEMA rated motor starters.
 3. Fused control power transformer, 120V ac.
 4. Alternator and pump lead-lag controls.
 5. ON/OFF/AUTO switches.
 6. Running lights.
 7. High level indication.

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8. Normally closed, dry, 5 amps at 120V ac contacts for remote indication of:
 - a. High level alarm.
 - b. Pump failure (temperature or moisture alarm).
 9. Terminal strip for interfacing with external wiring.
 10. High temperature indication.
 11. Moisture alarm indication.
 12. Alarm (high temperature, moisture, or high level) beacon located on top of panel.
 13. Lightning protection.
 14. Intrinsically safe relays as required for UL validation.
 15. Alarm silence button.
 16. Document pocket located inside panel with pump and panel operation and maintenance manual, and separate laminated pump curve.
 17. 110-volt, duplex GFI outlet, weather-protected, and accessible from outside of panel.
 18. Run hour meter.
 19. 100 watts minimum, condensation heater with thermostat.
 20. UL listing mark.
- E. Prewired and factory tested.
- F. Mount control switches, indicating lights, and switches on hinged front panel.
- G. Single Feed: 480 volts, three-phase.
- H. Interior Junction Boxes for Pumps and Level Control Devices:
1. Pump and level control SJO jacketed cables shall be properly supported within the pump station via stainless strain reliefs and hung from stainless equipment hooks positioned in the pump access hatchway. Cable weight will not be transferred to cable entre conduits or wall couplings.
 2. The pump station shall be supplied with interior junction boxes for pump power/control and float conductor connections. The pump power/control junction boxes shall be rated NEMA 7 explosion-proof, and shall require one junction box for each pump. The float junction box shall be rated NEMA 4X and constructed of non-metallic durable polypropylene for intrinsically safe float operation, where barrier relays are supplied in the pump control panel. The interior junction boxes shall be positioned together and accessible from the hatchway at grade. Interior conduits and fittings shall be utilized for passage of pump power/control and level control conductors to the junction boxes.

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3. Interior conduits and fittings between the wall-attached electrical couplings and the interior junction boxes will be RGS construction and will be factory mounted. Interior conduit support assembly shall be a fabricated Type 304 stainless steel Unistrut frame with all Type 316 stainless steel fasteners. All final conductor connection in the junction boxes and final float positioning shall be completed onsite by the site electrician.
4. Conduit seal fittings shall be supplied outside of the pump station and prior to the control panel on site by site electrician.

I. Exterior Termination Cabinet:

1. A NEMA 4X, stainless steel, weather-tight pump station exterior termination cabinet shall be factory furnished and mounted to the exterior of the pump station with a minimum of 2-foot clearance between the bottom of the cabinet and the top surface of the pump station. The cabinet will house divided areas for both power/control and low voltage level control. The termination cabinet shall be Type 304 stainless steel with back plate, interior area dividers, power/control/low voltage terminals, continuous door hinge, quarter-turn latch hardware and pad locking hardware. The cabinet size will be 16 inches high by 16 inches wide by 6 inches deep, minimum.
2. The pump power, pump control and float switch conductors shall be connected to suitable power and terminal blocks inside the cabinet. Pump and level control SJO jacketed cables shall be properly supported within the pump station via stainless strain reliefs or other methods, so that cable weight is not transferred to the terminal strips.
3. The exterior termination cabinet shall be mounted to the pump station with a fabricated Type 304 stainless steel Unistrut frame with all Type 316 stainless steel fasteners.
4. Conduits, fittings and seal between the termination cabinet and pump station will be RGS construction and will be factory mounted. Conduits, fittings and seals between the termination cabinet and pump control panel shall be supplied and installed by the site electrician. All final conductor termination and filling of seal fittings, shall be completed onsite by the site electrician.
5. The complete factory mounted termination cabinet will be removed from the station (via station mounting bolts) and shipped separately to the Job Site due to shipping height restrictions, for field reattachment by site electrician.
6. Provide stainless steel local disconnects allowing for lock out tag out requirements.^[ADD. 2]

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2.07 ACCESSORIES

A. Level Switches:

1. In accordance with Section 40 99 90, Package Control Systems, component L8 and for:
 - a. Low Level: Pump off.
 - b. High Level: Pump on.
 - c. High High Level: Alarm.

B. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in readily visible location.

C. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, and as specified in Section 05 50 00, Metal Fabrications. Coat in accordance with Section 09 90 00, Painting and Coating.

D. Sidewalk Door:

1. Size as shown on the Drawings or if not shown, sized by equipment manufacturer. As specified in Section 05 50 00, Metal Fabrications, with the following additional requirements:
 - a. Gasketed and odor tight.
 - b. Channel drain is not required.

2.08 FACTORY FINISHING

A. Prepare, and prime, and finish coat in accordance with Section 09 90 00, Painting and Coating.

B. Manufacturer's standard epoxy system for continuous submergence in corrosive water.

2.09 SOURCE QUALITY CONTROL

A. Control Panel:

1. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.
2. Factory Tests and Adjustments: Test control panels identical to that furnished.

B. Pump:

1. Factory Performance Test:
 - a. In accordance with HIS 11.6, Level B for submersible pump tests.
 - b. Include test data sheets curve test results performance test logs.

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2. Conduct on each pump.
 3. Perform under actual or approved simulated operating conditions.
 - a. Throttle discharge valve to obtain pump data points on curve at 2/3, 1/3, and shutoff conditions.
- C. Submersible Motor Functional Test: In accordance with HIS 11.6.

PART 3 EXECUTION

3.01 PLANNING

- A. All utilities and owners of surface and subsurface facilities and structures in the area shall be given advance notification of proposed excavation. Every effort shall be made to avoid damage to the facilities of others. If any damage occurs, the owner of the damaged facility shall be notified immediately.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Mount the discharge elbow to the floor of the wet well floor with stainless steel bolts.
- C. Connect piping without imposing strain to flanges.
- D. No portion of pump shall bear directly on floor of sump.
- E. Precast concrete units shall be installed: to the lines and grades shown on the contract documents or otherwise specified; be lifted by suitable lifting devices at points provided by the precast concrete producer; in accordance with applicable industry standards. Upon request, the precast concrete producer shall provide installation instructions and oversight.
- F. Where leak resistance is a necessary performance characteristic of the precast concrete unit's end use, joint sealant, pipe-entry connectors, and other penetrations shall be sealed according to manufacturer's requirements to ensure the integrity of the system. Structural leak testing at the joints can only be completed with an exfiltration test after complete backfilling.

3.03 FIELD FINISHING

- A. Equipment as specified in Section 09 90 00, Painting and Coating.

3.04 FIELD QUALITY CONTROL

- A. Inspection: Final field elevations and compaction properties shall be verified and documented.

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B. Functional Test: Conduct on each pump.

1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
2. Flow Output: Measured by plant instrumentation and storage volumes.
3. Operating Temperatures: Monitor bearing areas on pump and motor for abnormally high temperatures.
4. Test for continuous 3-hour period.
5. Test Report Requirements: In accordance with Hydraulic Institute Standards for submersible pump tests HIS 14.6 and HIS 11.66.

C. Pump Test:

1. General:
 - a. Conduct on each pump provided.
 - b. Conduct in accordance with HIS 11.6.
2. Routine Production Tests:
 - a. Check impeller, motor rating, and electrical connections for compliance to specification.
 - b. Test motor and cable insulation for moisture content and insulation defects.
 - c. Prior to submergence, run pump dry to establish correct rotation and mechanical integrity.
 - d. Conduct abbreviated three-point operational performance test.
 - e. After operational performance test, perform insulation test again.
3. Hydrostatic test.

D. Leakage Test:

1. Structure shall be backfilled as stated above to testing level, unless specifically authorized by Oldcastle's design engineers.
2. Watertightness Test: The structure shall be tested for water tightness to a minimum of the high-water alarm elevation. Fill tank to the desired level and let stand for 24 hours for absorption, top off liquid to required level and let stand for a 24-hour period. Watertightness shall be defined as loss of liquid level less than 0.05 percent in 24 hours.

3.05 MANUFACTURER'S SERVICES

- A. See Section 01 43 33, Manufacturers' Field Services, and Section 01 91 14, Equipment Testing and Facility Startup.

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3.06 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are a part of this specification:

1. Duplex, Submersible Pump.
2. Sanitary Pump No. 1 and Sanitary Pump No. 2 Data Sheet.

END OF SECTION

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Duplex, Submersible Pump								
Submersible Pump Design Criteria:								
Tag Number	Flow Rate (gpm)	Pressure (feet head)	Motor (hp)	Motor Speed (rpm)	Power (volts/phase)	Manufacturer, Model No.		
H110-LFT-PMP01 & H110-LFT-PMP02	80	13.5	2.2	1,735	460V/3ph	FLYGT, NP 3085 SH 3~ Adaptive 456		
Wet Well Design Criteria:								
Tag Number	Config (sq/rd)	Wet Well Size (LxW/dia)	(T/RIM) Finished Grade ¹ (feet)	Inlet Pipe (feet)	(LSHH) Water Alarm (feet)	(LSH) Pump On (feet)	(LSL) Pump Off (feet)	Bottom of Sump (feet)
H110-LFT-PMP01 & H110-LFT-PMP02	Round	6'	605.75 +/-	587.60	588.00	587.50	583.50	582.50
Note: Finished grade around lift station may vary slightly. Top of Rim elevation shall match yard piping profiles (07-Y-3004).								

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SANITARY PUMP NO. 1 AND SANITARY PUMP NO. 2 DATA SHEET

Tag Numbers: H110-LFT-PMP01 and H110-LFT-PMP02

Pump Name: Sanitary Pump No. 1 and Sanitary Pump No. 2

Manufacturer and Model Number: (1) Flygt NP 3085 SH 3~ Adaptive 456

(2) Or approved equal

SERVICE CONDITIONS

Liquid Pumped (Material and Percent Solids): Sanitary sewer and composting condensate. > 1% TS.

Pumping Temperature (Fahrenheit): Normal: 70 Max 100 Min 40

Specific Gravity at 60 Degrees F: 1 Viscosity Range: 1 – 1.57

Vapor Pressure at 60 Degrees F: 0.12 pH: 4.5 – 8

Abrasive (Y/N) Y Possible Scale Buildup (Y/N): N

Total suspended solids (mg/L) estimated 0 mg/L to 500 mg/L

Minimum diameter solid pump can pass (inches) 4

Min. NPSH Available (Ft. Absolute): 33.68

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Rated: 80 Secondary: 80

Total Dynamic Head (Ft): 13.5 Secondary: 16

Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%):

Max. Pump Speed at Rated Capacity (rpm): 1,735 Constant (Y/N): Y

Adjustable (Y/N): N

DESIGN AND MATERIALS

Pump Type: Heavy-Duty Nonclog (Y/N) Y Other:

Volute Material: Cast Iron ASTM A48

Pump Casing Material: Cast Iron ASTM A48

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Motor Housing Material: Cast Iron ASTM A48

Wear Rings Case (Y/N): N Material: _____

Wear Ring Impeller (Y/N): N Material: _____

Elastomers: Nitrile Rubber

Fasteners: Stainless Steel

Impeller: Type: Double-Shrouded Non-Clog (Y/N): N Other: _____
Material: Cast Iron ASTM A48

Shaft Material: Carbon Steel, ASTM A576 with stainless steel sleeve or all stainless steel.

Base Elbow: Cast Iron ASTM A48

Double Mechanical Seal (Y/N): Y Bearing Life (Hrs): _____

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors.)

Horsepower: 2.2 Voltage: 460 Phase: 3 Synchronous Speed (rpm): 1,735

Enclosure: EXP

Other Features: _____

Moisture Detection Switches (Y/N): Y

Thermal Protection Embedded in Windings (Y/N): Y

REMARKS: Submersible pump may exhibit woodchip debris from the composting process
and shall be able to pass solids up to 4 inches.

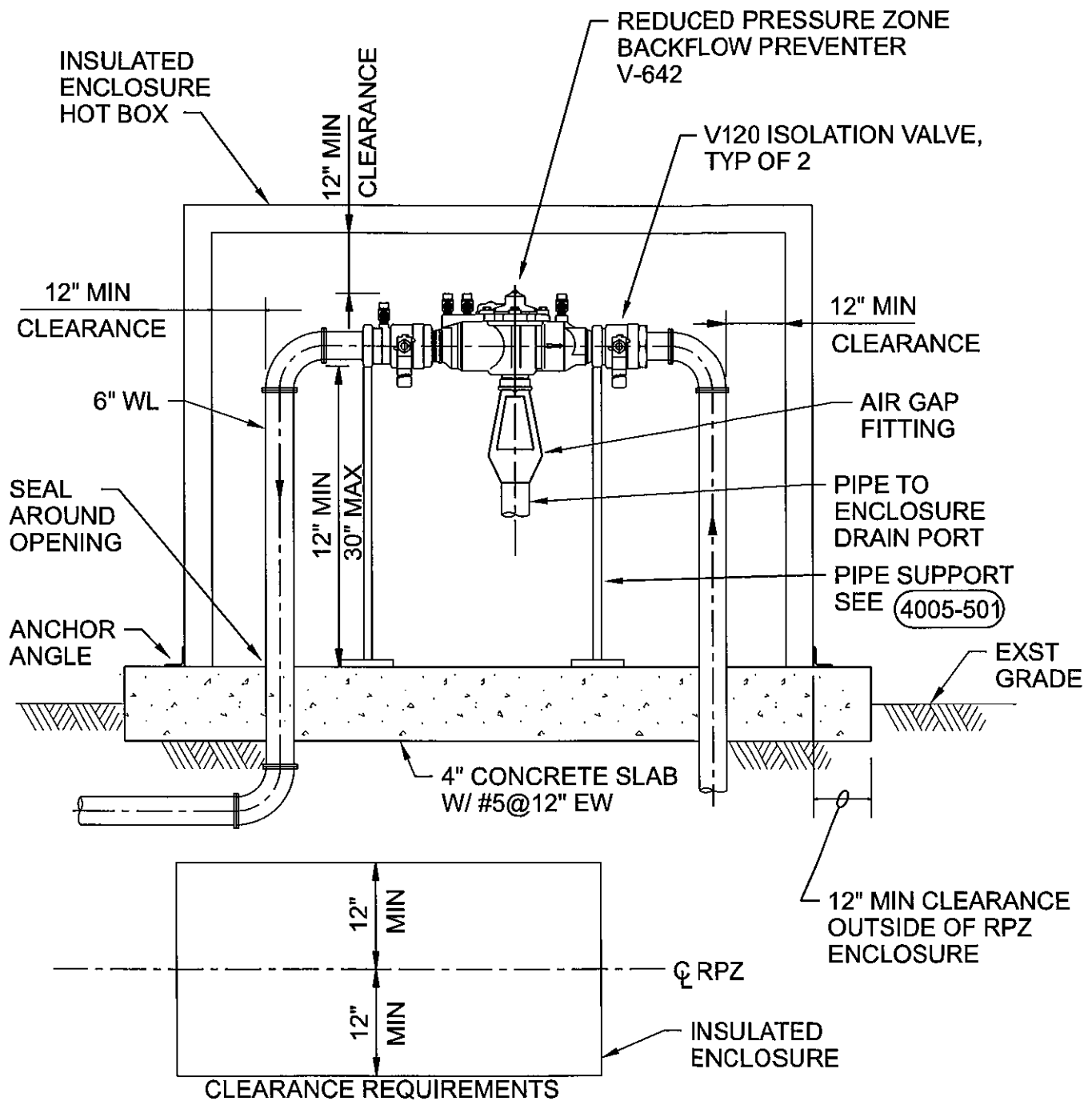
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

SECTION 40 27 00.14 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS		
Item	Size	Description
General	All	Pipe lengths, fittings, and flanged connections to be joined by thermal butt-fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier
Pipe		Schedule 80 PVC: Type I, Grade I or Class 12454 conforming to ASTM D1784 and ASTM D1785. Pipe shall be manufactured with titanium dioxide for ultraviolet protection. Threaded Nipples: Schedule 80 PVC. <u>ASTM D3350, high density polyethylene, maximum allowable hoop stress 800 psi at 73.4 degrees F.</u> <u>Polyethylene resins shall conform to Type PE 3408 or better.</u> <u>Protection shall be provided against ultraviolet light degradation using carbon black, not less than 2 percent well dispersed in the resin.</u> <u>Pipe wall thickness shall reflect the required SDR* and diameter, as shown in Table 8, ASTM F714. SDR 17 shall be used in this Project.</u> <u>Design Stress Rating: ASTM F714, 800 psi hydrostatic.</u> <u>* SDR: standard dimension ratio = OD/thickness [ADD. 2]</u>
Fittings	6" & Smaller	Molded fittings, butt fusion joined, conforming to ASTM D3261.
	8" & larger	Same as pipe butt fusion joined, conforming to ASTM D3350. All fittings shall have same pressure rating as pipe, unless otherwise noted.

HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

SECTION 40 27 00.14 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS		
Item	Size	Description
Flanges	All	Van Stone type, cast ASTM A536 (65/45/12), ductile iron backing ring, IPP Deltaflex convoluted design or equal for bolting to ANSI B16.5, Class 150; and AWWA C207, Class E. Pressure performance of the backing ring equal to SDR rating of pipe with safety factor of two. Stub ends same grade HDPE and pressure rating as pipe.
Bolting		Stainless Steel, ASTM A193/A193M Grade B8M studs and ASTM A194/A194M Grade 8M hex head nuts Washer shall be same material as bolts.
Gaskets		Flat ring, 1/8-inch ethylene propylene rubber (EPR).

END OF SECTION



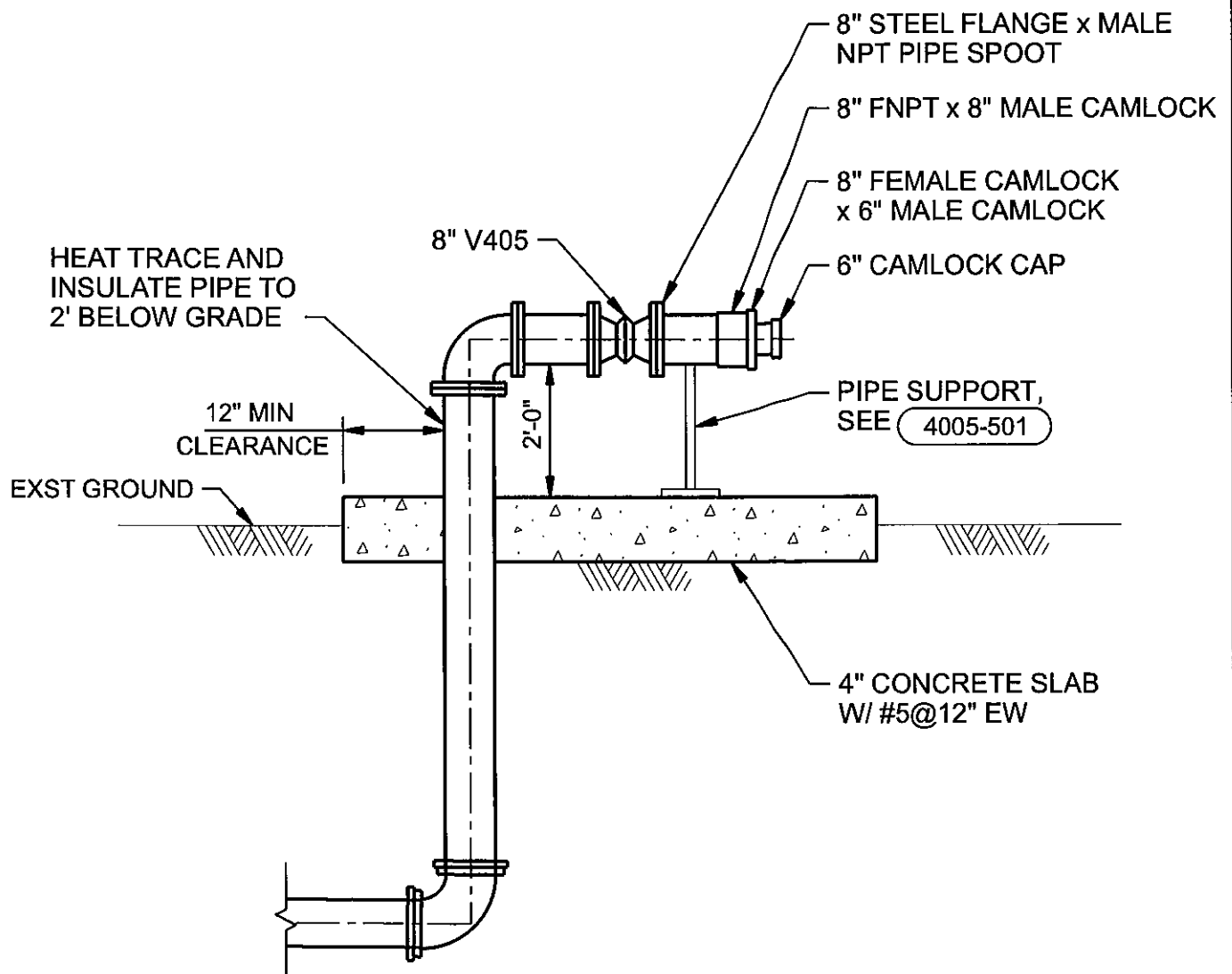
RPZ BACKFLOW PREVENTER ABOVE GROUND INSTALLATION

NTS

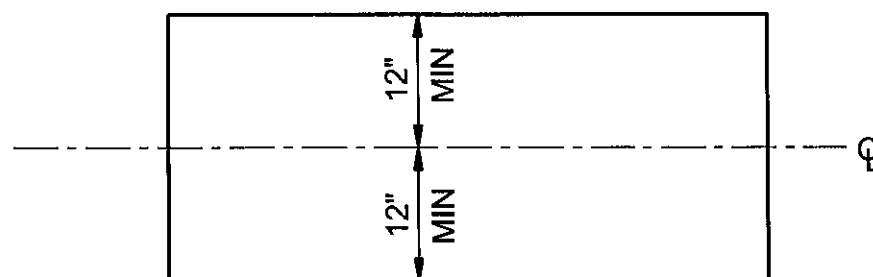
HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENT
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

3360-120

Jacobs



SECTION



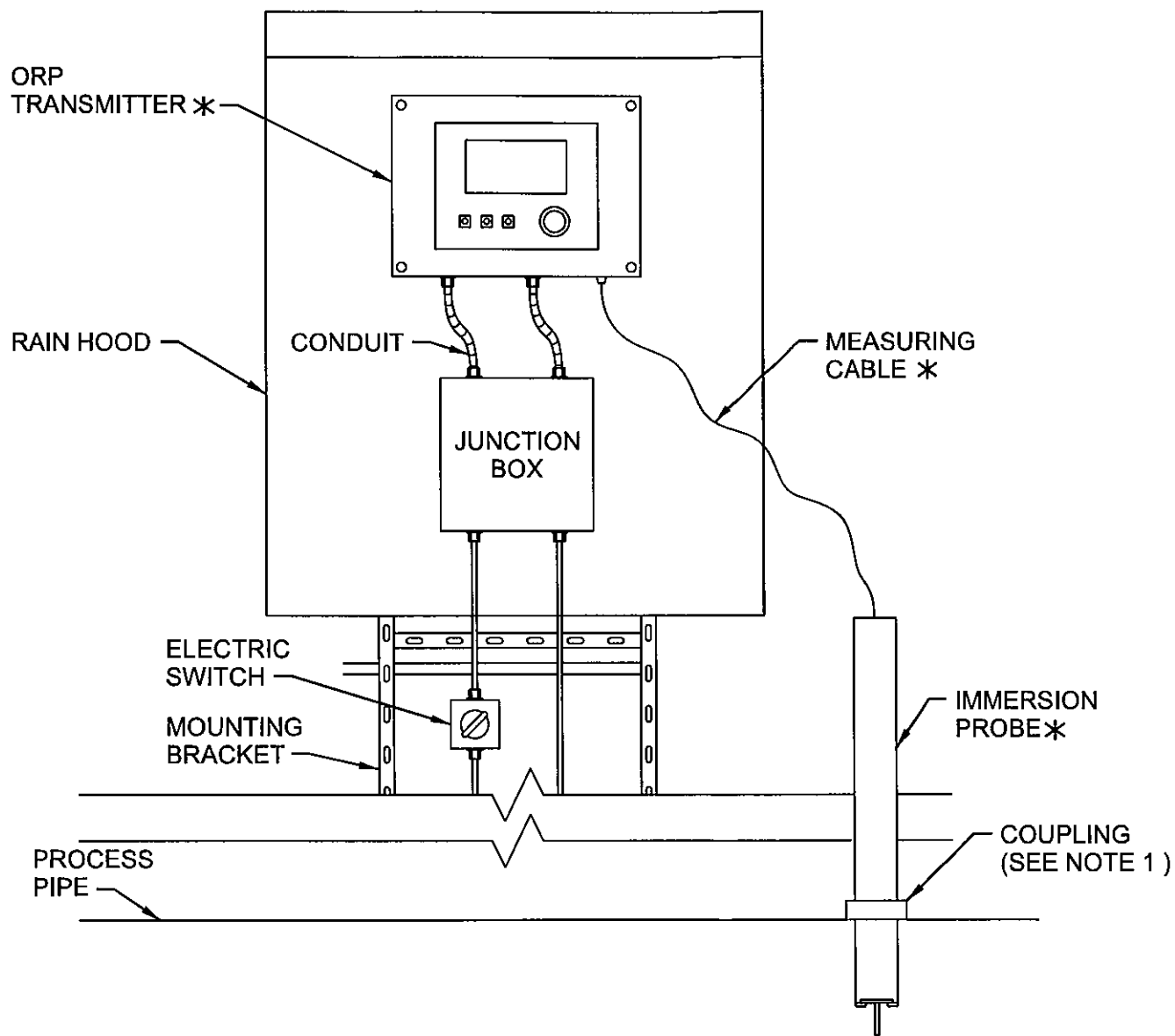
PLAN

TANK DRAIN CONNECTION

NTS

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENT
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

3360-121

**NOTES:**

1. COORDINATE WITH MECHANICAL CONTRACTOR FOR COUPLING.
2. MOUNT RAIN HOOD BETWEEN TRANSMITTER AND MOUNTING BRACKETS.
3. COMPONENTS DESIGNATED BY * SUPPLIED BY INSTRUMENT MANUFACTURER.

ORP PROBE

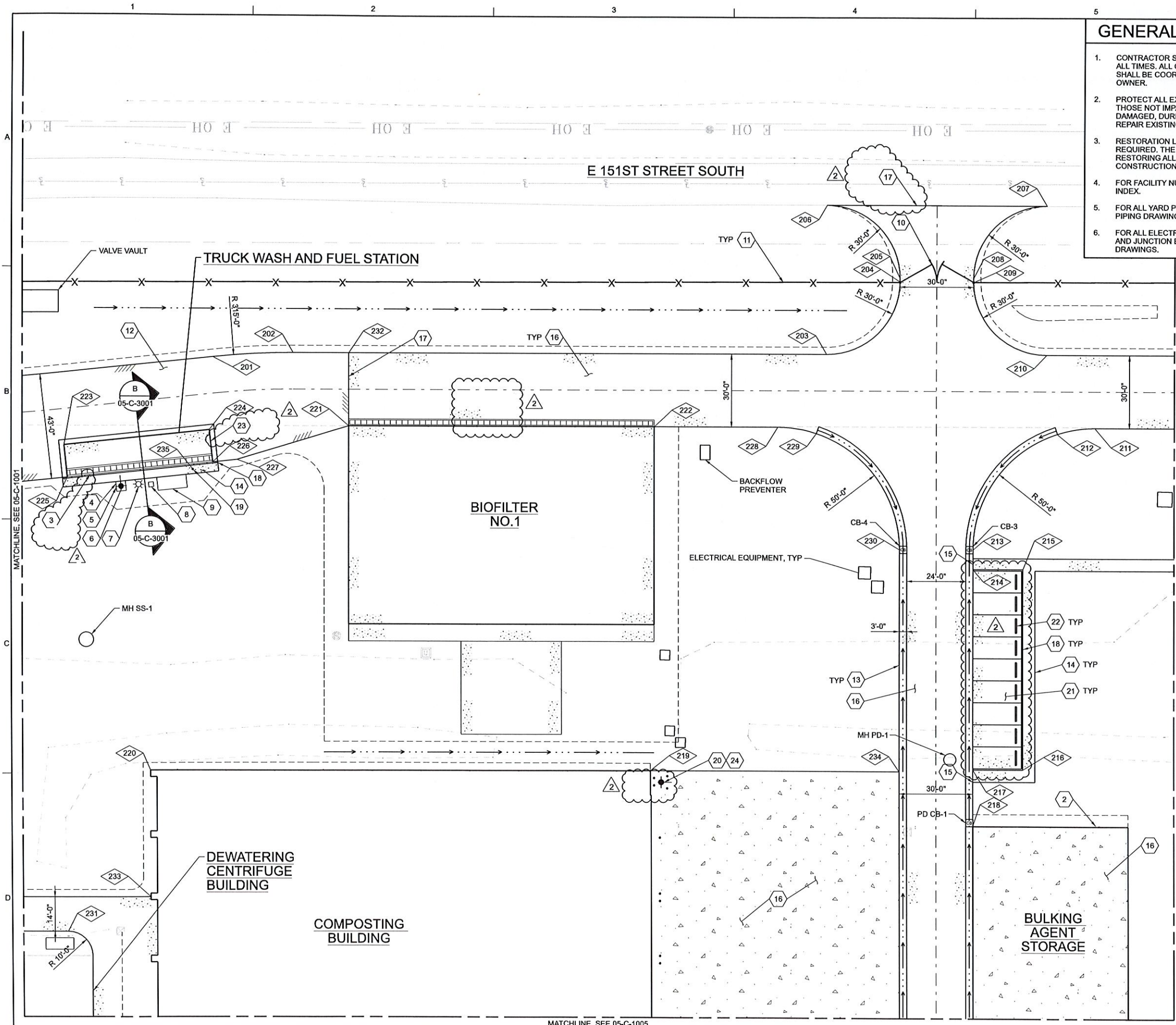
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HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENT
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

4091-050

LUCITY EQUIPMENT TABLE PART 1						
LOCATION	DEMOLISH EQUIPMENT DESCRIPTION	STATUS	EQUIPMENT ID	CORRECTED ID	DRAWING NO.	SPEC NO.
SQUM COLLECTION	EXHAUST FAN	DEMOLISH			50-FCL1-D-1000	02 41 00
SQUM COLLECTION	ELECTRICAL PANEL	DEMOLISH			50-FCL1-D-1000	02 41 00
SQUM COLLECTION	AIR PISTON VALVE	DEMOLISH			50-FCL1-D-1000	02 41 00
SQUM COLLECTION	SQUM PUMP	DEMOLISH			50-FCL1-D-1000	02 41 00
GRAVITY THICKENER	WATER HEATER	DEMOLISH			70-THK1-D-1000	02 41 00
GRAVITY THICKENER	POLYMER BLENDING UNIT	DEMOLISH			70-THK1-D-1000	02 41 00
GRAVITY THICKENER	POLYMER FEED PUMP	DEMOLISH			70-THK1-D-1000	02 41 00
GRAVITY THICKENER	POLYMER SYSTEM CONTROL PANEL	DEMOLISH			70-THK1-D-1000	02 41 00
GRAVITY THICKENER	POLYMER STOCK PUMP	DEMOLISH			70-THK1-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	SLUDGE FEED PUMP #1	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	SLUDGE FEED PUMP #2	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	SLUDGE FEED PUMP #3	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	DEWATERING SLUDGE FILTRATE PUMP #1	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	DEWATERING SLUDGE FILTRATE PUMP #2	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	DEWATERING SLUDGE FILTRATE PUMP #3	DEMOLISH			90-D1BL-D-1000	02 41 00
DEWATERING CENTRIFUGE BUILDING	BELT FILTER PRESS #1	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	BELT FILTER PRESS #2	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	POLYMER EQUIPMENT AND SYSTEM	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	LIME SCREW CONVEYOR	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	LIME MIXER	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	LIME MOTOR	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	LIME SLO	DEMOLISH			90-D1BL-D-1001	02 41 00
DEWATERING CENTRIFUGE BUILDING	EXHAUST FAN	DEMOLISH			90-D1BL-D-1100	02 41 00
DEWATERING CENTRIFUGE BUILDING	HVACH HEATER	DEMOLISH			90-D1BL-D-1100	02 41 00
DEWATERING CENTRIFUGE BUILDING	VENTILLATION EQUIPMENT	DEMOLISH			90-D1BL-D-1100	02 41 00
DEWATERING CENTRIFUGE BUILDING	WATER HEATER	DEMOLISH			90-D1BL-P-1100	02 41 00
SLUDGE TANKS	SLUDGE HOLDING TANK #1	DEMOLISH			90-D1CT-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	PISTON PUMP	DEMOLISH			90-D3BL-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	SLUDGE FEED PUMP #1	DEMOLISH			90-D3BL-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	SLUDGE FEED PUMP #2	DEMOLISH			90-D3BL-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	SLUDGE FEED PUMP #3	DEMOLISH			90-D3BL-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	ROTARY LOBE BLOWER #1	DEMOLISH			90-D3BL-D-1000	02 41 00
SLUDGE MANAGEMENT BUILDING	ROTARY LOBE BLOWER #2	DEMOLISH			90-D3BL-D-1000	02 41 00
WAS PUMPS	LOUVER	DEMOLISH			40-WAS1-D-1001	02 41 00
LOCATION	NEW EQUIPMENT DESCRIPTION	STATUS	EQUIPMENT ID	CORRECTED ID	DRAWING NO.	SPEC NO.
WAS FEED PUMPS	AIR RELIEF VALVE FOR WAS PUMP NO. 1	NEW	H040-WAS1-ARV01		09-N-0001	40 27 02
WAS FEED PUMPS	AIR RELIEF VALVE FOR WAS PUMP NO. 3	NEW	H040-WAS1-ARV02		09-N-0001	40 27 02
WAS FEED PUMPS	AIR RELIEF VALVE FOR WAS PUMP NO. 2	NEW	H040-WAS1-ARV03		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 1	NEW	H040-WAS1-BLV01		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 2	NEW	H040-WAS1-BLV02		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 3	NEW	H040-WAS1-BLV03		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 4	NEW	H040-WAS1-BLV04		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 5	NEW	H040-WAS1-BLV05		09-N-0001	40 27 02
WAS FEED PUMPS	DRAIN BALL VALVE NO. 6	NEW	H040-WAS1-BLV06		09-N-0001	40 27 02
WAS FEED PUMPS	CHECK VALVE FOR WAS PUMP NO. 1	NEW	H040-WAS1-CKV01		09-N-0001	40 27 02
WAS FEED PUMPS	CHECK VALVE FOR WAS PUMP NO. 3	NEW	H040-WAS1-CKV02		09-N-0001	40 27 02
WAS FEED PUMPS	CHECK VALVE FOR WAS PUMP NO. 2	NEW	H040-WAS1-CKV03		09-N-0001	40 27 02
WAS FEED PUMPS	WAS PUMPS INTAKE FLOW INDICATOR	NEW	H040-WAS1-FMT01		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 1	NEW	H040-WAS1-PGV01		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 2	NEW	H040-WAS1-PGV02		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 3	NEW	H040-WAS1-PGV03		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 4 WITH POSITION FEEDBACK	NEW	H040-WAS1-PGV04		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 5 WITH POSITION FEEDBACK	NEW	H040-WAS1-PGV05		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 6 WITH POSITION FEEDBACK	NEW	H040-WAS1-PGV06		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 7 WITH POSITION FEEDBACK	NEW	H040-WAS1-PGV07		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 8 WITH POSITION FEEDBACK	NEW	H040-WAS1-PGV08		09-N-0001	40 27 02
WAS FEED PUMPS	PLUG VALVE NO. 9	NEW	H040-WAS1-PGV09		09-N-0001	40 27 02
WAS FEED PUMPS	WAS PUMP NO. 1 LOW SUCTION PRESSURE SWITCH	NEW	H040-WAS1-PRS01		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	NEW	H040-WAS1-PRS02		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 2 LOW SUCTION PRESSURE SWITCH	NEW	H040-WAS1-PRS03		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	NEW	H040-WAS1-PRS04		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 3 LOW SUCTION PRESSURE SWITCH	NEW	H040-WAS1-PRS05		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 3 HIGH DISCHARGE PRESSURE SWITCH	NEW	H040-WAS1-PRS06		09-N-0001	
WAS FEED PUMPS	WAS PUMP NO. 1	NEW	H040-WAS1-WSP01		09-N-0001	44 42 56.01
WAS FEED PUMPS	WAS PUMP NO. 2	NEW	H040-WAS1-WSP02		09-N-0001	44 42 56.01
WAS FEED PUMPS	WAS PUMP NO. 3	NEW	H040-WAS1-WSP03		09-N-0001	44 42 56.01
SQUM WET WELL	AIR RELIEF VALVE FOR SQUM PUMP NO. 1	NEW	H050-FCL1-ARV01		09-N-0002	40 27 02
SQUM WET WELL	AIR RELIEF VALVE FOR SQUM PUMP NO. 2	NEW	H050-FCL1-ARV02		09-N-0002	40 27 02
SQUM WET WELL	BACKFLOW PREVENTOR FOR WASHDOWN SPRAY BAR	NEW	H050-FCL1-BFL01		09-N-0002	40 27 02
SQUM WET WELL	BALL VALVE NO. 1	NEW	H050-FCL1-BLV01		09-N-0002	40 27 02
SQUM WET WELL	BALL VALVE NO. 2	NEW	H050-FCL1-BLV02		09-N-0002	40 27 02
SQUM WET WELL	BALL VALVE NO. 3	NEW	H050-FCL1-BLV03		09-N-0002	40 27 02
SQUM WET WELL	BALL VALVE NO. 4	NEW	H050-FCL1-BLV04		09-N-0002	40 27 02
SQUM WET WELL	BALL VALVE NO. 5	NEW	H050-FCL1-BLV05		09-N-0002	40 27 02
SQUM WET WELL	CHECK VALVE FOR SQUM PUMP NO. 1	NEW	H050-FCL1-CKV01		09-N-0002	40 27 02
SQUM WET WELL	CHECK VALVE FOR SQUM PUMP NO. 2	NEW	H050-FCL1-CKV02		09-N-0002	40 27 02
SQUM WET WELL	DUCKBILL VALVE FOR DRAIN	NEW	H050-FCL1-DBV01		09-N-0002	40 27 02
SQUM WET WELL	GATE VALVE FROM INFLUENT CHAMBER	NEW	H050-FCL1-GTV01		09-N-0002	40 27 02
SQUM WET WELL	GATE VALVE FROM SECONDARY CLARIFIER NO. 1	NEW	H050-FCL1-GTV02		09-N-0002	40 27 02
SQUM WET WELL	GATE VALVE FROM SECONDARY CLARIFIER NO. 2	NEW	H050-FCL1-GTV03		09-N-0002	40 27 02
SQUM WET WELL	GATE VALVE FROM SECONDARY CLARIFIER NO. 3	NEW	H050-FCL1-GTV04		09-N-0002	40 27 02
SQUM WET WELL	GATE VALVE FROM SECONDARY CLARIFIER NO. 4	NEW	H050-FCL1-GTV05		09-N-0002	40 27 02
SQUM WET WELL	SQUM TANK RADAR LEVEL INDICATOR	NEW	H050-FCL1-LIT01		09-N-0002	
SQUM WET WELL	PLUG VALVE NO. 1	NEW	H050-FCL1-PGV01		09-N-0002	40 27 02
SQUM WET WELL	MOTORIZED PLUG VALVE NO. 2	NEW	H050-FCL1-PGV02		09-N-0002	40 27 02
SQUM WET WELL	PLUG VALVE NO. 3	NEW	H050-FCL1-PGV03		09-N-0002	40 27 02

LUCITY EQUIPMENT TABLE PART 2						
LOCATION	NEW EQUIPMENT DESCRIPTION	STATUS	EQUIPMENT ID	CORRECTED ID	DRAWING NO.	SPEC NO.
SQUM WET WELL	MOTORIZED PLUG VALVE NO. 4	NEW	H050-FCL1-PGV04		09-N-0002	40 27 02
SQUM WET WELL	SECONDARY SQUM PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	NEW	H050-FCL1-PRS01		09-N-0002	
SQUM WET WELL	SECONDARY SQUM PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	NEW	H050-FCL1-PRS02		09-N-0002	
SQUM WET WELL	SECONDARY SQUM PUMP NO. 1 PRESSURE TRANSMITTER	NEW	H050-FCL1-PTM01		09-N-0002	
SQUM WET WELL	SECONDARY SQUM PUMP NO. 2 PRESSURE TRANSMITTER	NEW	H050-FCL1-PTM02		09-N-0002	
SQUM WET WELL	SECONDARY SQUM PUMP NO.1	NEW	H050-FCL1-SCP01		09-N-0002	44 42 56.04
SQUM WET WELL	SECONDARY SQUM PUMP NO.2	NEW	H050-FCL1-SCP02		09-N-0002	44 42 56.04
SLUDGE HOLDING TANKS	RDT BYPASS CONTROL VALVE BOX FLOW INDICATOR	NEW	H070-RDT1-FMT01		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 1 WITH POSITION FEEDBACK	NEW	H070-RDT1-PGV01		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 2 WITH POSITION FEEDBACK	NEW	H070-RDT1-PGV02		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 3 WITH POSITION FEEDBACK	NEW	H070-RDT1-PGV03		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 4 WITH POSITION FEEDBACK	NEW	H070-RDT1-PGV04		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	SLUDGE HOLDING TANK NO. 1 RADAR LEVEL INDICATOR	NEW	H090-DEW1-LIT01		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMPS ORP PROBE	NEW	H090-DEW2-MTR01		09-N-0004	
SLUDGE HOLDING TANKS	AIR RELIEF VALVE FOR REGIOULATION PUMP NO. 1	NEW	H090-DEW2-ARV02		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	AIR RELIEF VALVE FOR REGIOULATION PUMP NO. 2	NEW	H090-DEW2-ARV03		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	BUTTERFLY VALVE FOR BLOWER NO. 1	NEW	H090-DEW2-BFV01		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	BUTTERFLY VALVE FOR BLOWER NO. 2	NEW	H090-DEW2-BFV02		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	BUTTERFLY VALVE FOR BLOWER NO. 3	NEW	H090-DEW2-BFV03		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	SLUDGE HOLDING TANK BLOWER NO. 1	NEW	H090-DEW2-BLOW01		09-N-0004	44 42 19.04
SLUDGE HOLDING TANKS	SLUDGE HOLDING TANK BLOWER NO. 2	NEW	H090-DEW2-BLOW02		09-N-0004	44 42 19.04
SLUDGE HOLDING TANKS	SLUDGE HOLDING TANK BLOWER NO. 3	NEW	H090-DEW2-BLOW03		09-N-0004	44 42 19.04
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 1	NEW	H090-DEW2-BLV01		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 2	NEW	H090-DEW2-BLV02		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 3	NEW	H090-DEW2-BLV03		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 4	NEW	H090-DEW2-BLV04		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 5	NEW	H090-DEW2-BLV05		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 6	NEW	H090-DEW2-BLV06		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 7	NEW	H090-DEW2-BLV07		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	DRAIN BALL VALVE NO. 8	NEW	H090-DEW2-BLV08		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 1	NEW	H090-DEW2-PGV01		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 2	NEW	H090-DEW2-PGV02		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 3	NEW	H090-DEW2-PGV03		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 4	NEW	H090-DEW2-PGV04		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 5	NEW	H090-DEW2-PGV05		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 6	NEW	H090-DEW2-PGV06		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 7	NEW	H090-DEW2-PGV07		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 8	NEW	H090-DEW2-PGV08		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 9	NEW	H090-DEW2-PGV09		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	PLUG VALVE NO. 10	NEW	H090-DEW2-PGV10		09-N-0004	40 27 02
SLUDGE HOLDING TANKS	BLOWER NO. 1 HIGH DISCHARGE PRESSURE SWITCH	NEW	H090-DEW2-PRS01		09-N-0004	
SLUDGE HOLDING TANKS	BLOWER NO. 2 HIGH DISCHARGE PRESSURE SWITCH	NEW	H090-DEW2-PRS02		09-N-0004	
SLUDGE HOLDING TANKS	BLOWER NO. 3 HIGH DISCHARGE PRESSURE SWITCH	NEW	H090-DEW2-PRS03		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 1 LOW INTAKE PRESSURE SWITCH	NEW	H090-DEW2-PRS04		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 1 HIGH DISCHARGE PRESSURE SWITCH	NEW	H090-DEW2-PRS05		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 2 LOW INTAKE PRESSURE SWITCH	NEW	H090-DEW2-PRS06		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 2 HIGH DISCHARGE PRESSURE SWITCH	NEW	H090-DEW2-PRS07		09-N-0004	
SLUDGE HOLDING TANKS	SLUDGE HOLDING TANK NO. 1 INTAKE PRESSURE INDICATOR	NEW	H090-DEW2-PTM01		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 1 INTAKE PRESSURE INDICATOR	NEW	H090-DEW2-PTM02		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 1 DISCHARGE PRESSURE INDICATOR	NEW	H090-DEW2-PTM03		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 2 INTAKE PRESSURE INDICATOR	NEW	H090-DEW2-PTM04		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 2 DISCHARGE PRESSURE INDICATOR	NEW	H090-DEW2-PTM05		09-N-0004	
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 1	NEW	H090-DEW2-RCP01		09-N-0004	44 42 56.05
SLUDGE HOLDING TANKS	REGIOULATION PUMP NO. 2	NEW	H090-DEW2-RCP02		09-N-0004	44 42 56.05
SLUDGE FEED PUMPS	DRAIN BALL VALVE NO. 1	NEW	H090-DEW1-BLV01		09-N-0005	40 27 02
SLUDGE FEED PUMPS	DRAIN BALL VALVE NO. 3	NEW	H090-DEW1-BLV03		09-N-0005	40 27 02
SLUDGE FEED PUMPS	POLYMER INJECTION BALL VALVE NO. 4	NEW	H090-DEW1-BLV04		09-N-0005	40 27 02
SLUDGE FEED PUMPS	DRAIN BALL VALVE NO. 6	NEW	H090-DEW1-BLV06		09-N-0005	40 27 02
SLUDGE FEED PUMPS	POLYMER INJECTION VALVE NO. 7	NEW	H090-DEW1-BLV07		09-N-0005	40 27 02
SLUDGE FEED PUMPS	DRAIN BALL VALVE NO. 9	NEW	H090-DEW1-BLV09		09-N-0005	40 27 02
SLUDGE FEED PUMPS	POLYMER INJECTION BALL VALVE NO. 10	NEW	H090-DEW1-BLV10		09-N-0005	40 27 02
SLUDGE FEED PUMPS	POTABLE WATER BALL VALVE NO. 11	NEW	H090-DEW1-BLV11		09-N-0005	40 27 02
SLUDGE FEED PUMPS	CHECK VALVE FOR SLUDGE FEED PUMP NO. 1	NEW	H090-DEW1-CKV01		09-N-0005	40 27 02
SLUDGE FEED PUMPS	CHECK VALVE FOR SLUDGE FEED PUMP NO. 2	NEW	H090-DEW1-CKV02		09-N-0005	40 27 02
SLUDGE FEED PUMPS	CHECK VALVE FOR SLUDGE FEED PUMP NO. 3	NEW	H090-DEW1-CKV03		09-N-0005	40 27 02
SLUDGE FEED PUMPS	SUPPLEMENTAL SLUDGE/ POLYMER MIXER NO. 1 FLOW INDICATOR	NEW	H090-DEW1-FMT01		09-N-0005	
SLUDGE FEED PUMPS	SUPPLEMENTAL SLUDGE/ POLYMER MIXER NO. 2 FLOW INDICATOR	NEW	H090-DEW1-FMT02		09-N-0005	
SLUDGE FEED PUMPS	SUPPLEMENTAL SLUDGE/ POLYMER MIXER NO. 3 FLOW INDICATOR	NEW	H090-DEW1-FMT03		09-N-0005	
SLUDGE FEED PUMPS	GRINDER NO. 1	NEW	H090-DEW1-GRD01		09-N-0005	46 24 25
SLUDGE FEED PUMPS	SUPPLEMENTAL SLUDGE/ POLYMER MIXER NO. 1	NEW	H090-DEW1-MXR01		09-N-0005	44 44 63.01

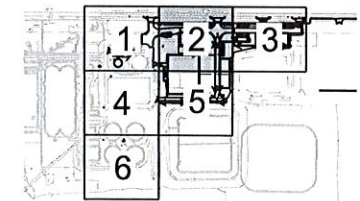
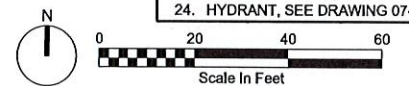


GENERAL SHEET NOTES

1. CONTRACTOR SHALL MAINTAIN ACCESS TO PLANT AT ALL TIMES. ALL OBSTRUCTIONS TO PLANT ACCESS SHALL BE COORDINATED WITH AND APPROVED BY OWNER.
2. PROTECT ALL EXISTING STRUCTURES OUTSIDE THOSE NOT IMPACTED BY PROPOSED WORK. IF DAMAGED, DURING CONSTRUCTION, RESTORE AND REPAIR EXISTING STRUCTURES IN KIND.
3. RESTORATION LIMITS SHOWN ARE MINIMUM REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL SURFACES DISTURBED DURING CONSTRUCTION.
4. FOR FACILITY NUMBER DESIGNATIONS, SEE DRAWING INDEX.
5. FOR ALL YARD PIPING RESTORATION, SEE YARD PIPING DRAWINGS AND PROFILES.
6. FOR ALL ELECTRICAL EQUIPMENT, CONCRETE PADS, AND JUNCTION BOXES, SEE ELECTRICAL SITE DRAWINGS.

SHEET KEYNOTES

1. MATCH NEW ASPHALT TO EXISTING ASPHALT, SEE DETAIL 3212-215
2. PROTECT AND REUSE EXISTING RETAINING WALL
3. CAST-IN-PLACE TRENCH DRAIN, SEE DETAIL 3344-791
4. POST MOUNTED HOSE RACK, SEE DETAIL 2210-720
5. 4'x4' EQUIPMENT PAD, TYPE H, SEE DETAIL 0330-056
6. RELOCATED POST HYDRANT
7. RELOCATED LUMINAIRE, SEE ELECTRICAL PLANS
8. RELOCATED ELECTRICAL EQUIPMENT, SEE ELECTRICAL PLANS
9. RELOCATED FUEL TANK AND HOSE AND 12'-0"x5'-4" EQUIPMENT PAD, TYPE H, SEE DETAIL 0330-056
10. 30' WIDE DOUBLE SWING GATE, SEE DETAIL 3231-415
11. 6' CHAINLINK FENCE, SEE DETAIL 3231-410
12. ASPHALT CONCRETE PAVEMENT, SEE DETAIL 3213-210
13. CONCRETE VALLEY GUTTER, SEE DETAIL 3216-330
14. TYPICAL CONCRETE SIDEWALK, SEE DETAIL 3213-220
15. SIDEWALK ACCESS RAMP, TYPE 4, SIM, SEE DETAIL 3213-226
16. CONCRETE PAVEMENT, SEE DETAIL 3213-240
17. CONCRETE TO ASPHALT TRANSITION, SEE DETAIL 3213-250
18. CONCRETE CURB, SEE DETAIL 3216-315
19. PERMANENT GUARD POST LOCATED 5 FT FROM FUEL TANK AND CENTERED IN SIDEWALK, SEE DETAIL 3305-954. MOUNT TYPE 1 FIRE EXTINGUISHER TO BOLLARD, SEE SPECIFICATION SECTION 10 44 00. CONTRACTOR TO SUBMIT PROPOSED BOLLARD AND MOUNTING DETAIL.
20. REMOVABLE GUARD POST, SEE DETAIL 3471-811 AND DETAIL 1 ON DRAWING 05-C-5001
21. EMPLOYEE PARKING SPACE, 9' X 20' WITH 4" WIDE WHITE TRAFFIC PAINT AS SPECIFIED IN SECTION 32 17 23
22. PRECAST CONCRETE WHEELSTOP, SEE DETAIL 3217-350
23. 2' WIDE CONCRETE CONTAINMENT CURB. CONSTRUCT MONOLITHICALLY WITH CONCRETE PAD AND WITH A HEIGHT OF 3"
24. HYDRANT, SEE DRAWING 07-Y-2002



KEY PLAN



SITE CIVIL
SITE PLAN
AREA 2

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
Jacobs

REVISION
ADDENDUM NO.2

BY
VP

DATE
7/2026

PLAN SCALE:
NOTE ON
DWG.

DRAWN
DESIGNED

BG
SC

PROFILE:

HORIZONTAL:

VERTICAL:

FILE:

DRAWING:

05-C-1002

ATLAS PAGE NO.: 3328

PLOT DATE: 7-JUL-2026

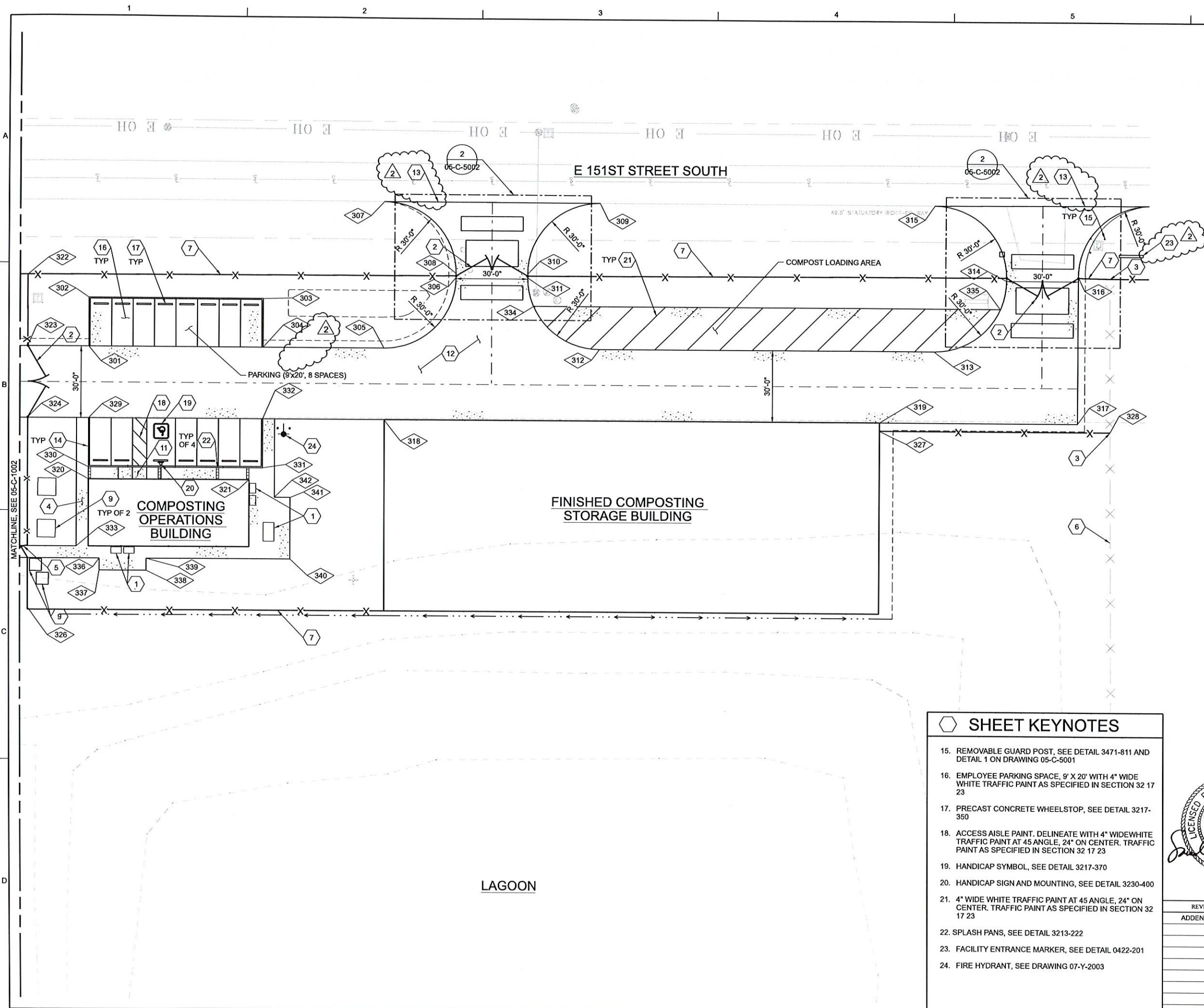
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APPROVED:

DESIGN MANAGER

DATE: MAY 2026

SHEET 48 OF 300 SHEETS

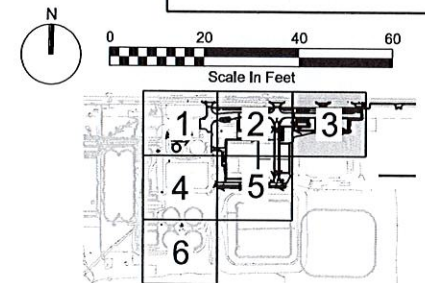


GENERAL SHEET NOTES

1. CONTRACTOR SHALL MAINTAIN ACCESS TO PLANT AT ALL TIMES. ALL OBSTRUCTIONS TO PLANT ACCESS SHALL BE COORDINATED WITH AND APPROVED BY OWNER.
2. PROTECT ALL EXISTING STRUCTURES OUTSIDE THOSE NOT IMPACTED BY PROPOSED WORK. IF DAMAGED, DURING CONSTRUCTION, RESTORE AND REPAIR EXISTING STRUCTURES IN KIND.
3. RESTORATION LIMITS SHOWN ARE MINIMUM REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL SURFACES DISTURBED DURING CONSTRUCTION.
4. FOR FACILITY NUMBER DESIGNATIONS, SEE DRAWING INDEX.
5. FOR ALL YARD PIPING RESTORATION, SEE YARD PIPING DRAWINGS AND PROFILES.
6. FOR ALL ELECTRICAL EQUIPMENT, CONCRETE PADS, AND JUNCTION BOXES, SEE ELECTRICAL SITE DRAWINGS.

SHEET KEYNOTES

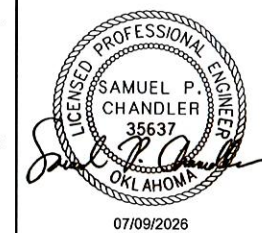
1. HVAC EQUIPMENT AND CONCRETE PAD, SEE SHEET 95-C1BL-H-2000
2. 30' DOUBLE-LEAF SWING GATE, SEE DETAIL 3231-415
3. CONNECT NEW FENCE TO EXISTING FENCE AND POST.
4. TYPICAL CONCRETE SIDEWALK, SEE DETAIL 3213-220
5. 5' SINGLE PEDESTRIAN GATE, SEE DETAIL 3231-420
6. CONTRACTOR SHALL PROTECT EXISTING FENCE TO REMAIN DURING CONSTRUCTION
7. 6' CHAIN LINK FENCE, SEE DETAIL 3231-410
8. PAVEMENT CONNECTION, SEE DETAIL 3212-215
9. ELECTRICAL EQUIPMENT AND CONCRETE PADS, SEE DRAWING 095-C1BL-E-2000
10. NOT USED
11. SIDEWALK ACCESS RAMP, TYPE 4, SEE DETAIL 3213-226
12. CONCRETE PAVEMENT, SEE DETAIL 3213-240
13. CONCRETE TO ASPHALT TRANSITION, SEE DETAIL 3213-250
14. CONCRETE CURB, SEE DETAIL 3216-315



KEY PLAN

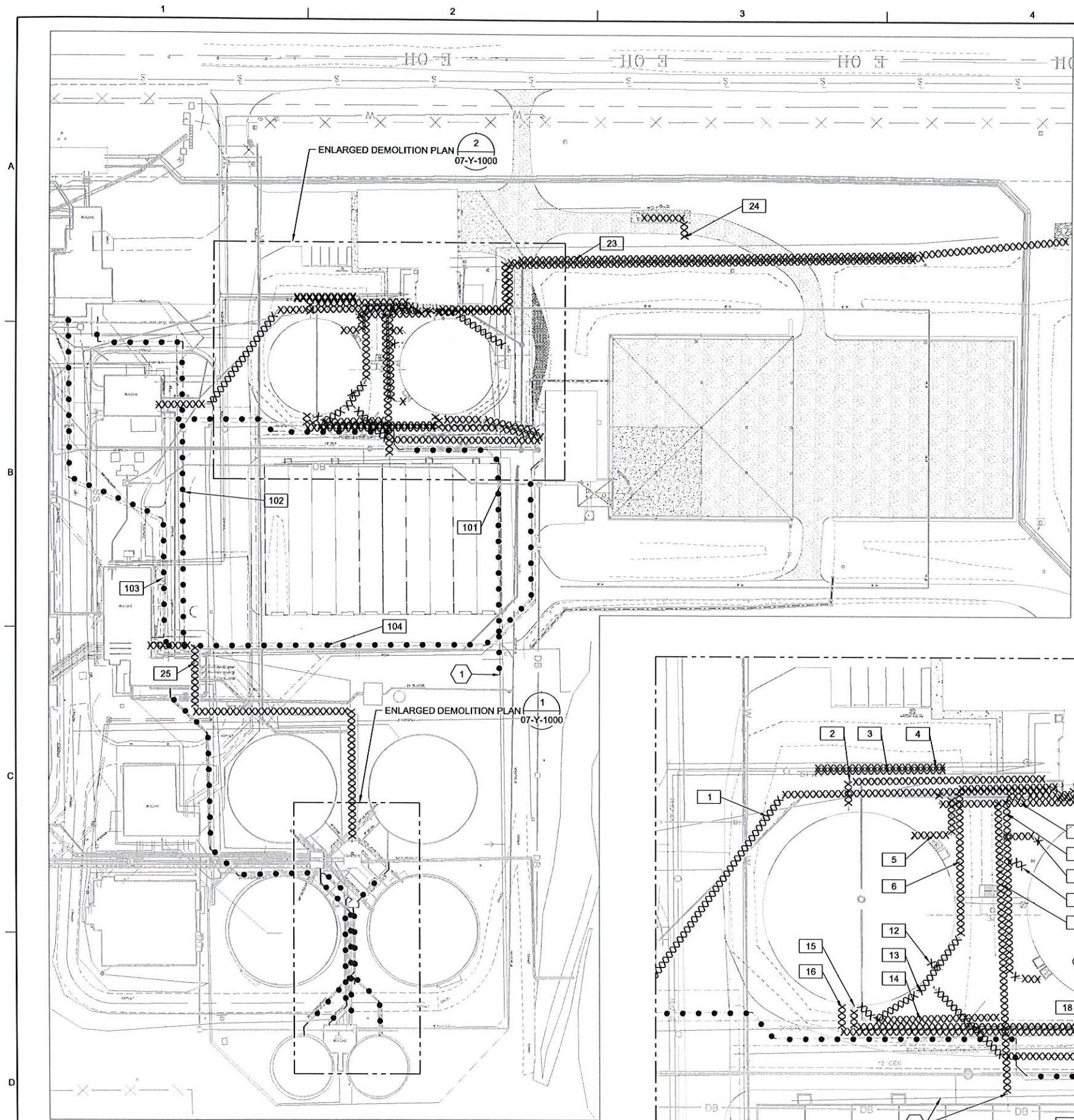
SHEET KEYNOTES

15. REMOVABLE GUARD POST, SEE DETAIL 3471-811 AND DETAIL 1 ON DRAWING 05-C-5001
16. EMPLOYEE PARKING SPACE, 9' X 20' WITH 4" WIDE WHITE TRAFFIC PAINT AS SPECIFIED IN SECTION 32 17 23
17. PRECAST CONCRETE WHEELSTOP, SEE DETAIL 3217-350
18. ACCESS AISLE PAINT, DELINEATE WITH 4" WIDE WHITE TRAFFIC PAINT AT 45 ANGLE, 24" ON CENTER. TRAFFIC PAINT AS SPECIFIED IN SECTION 32 17 23
19. HANDICAP SYMBOL, SEE DETAIL 3217-370
20. HANDICAP SIGN AND MOUNTING, SEE DETAIL 3230-400
21. 4" WIDE WHITE TRAFFIC PAINT AT 45 ANGLE, 24" ON CENTER. TRAFFIC PAINT AS SPECIFIED IN SECTION 32 17 23
22. SPLASH PANS, SEE DETAIL 3213-222
23. FACILITY ENTRANCE MARKER, SEE DETAIL 0422-201
24. FIRE HYDRANT, SEE DRAWING 07-Y-2003



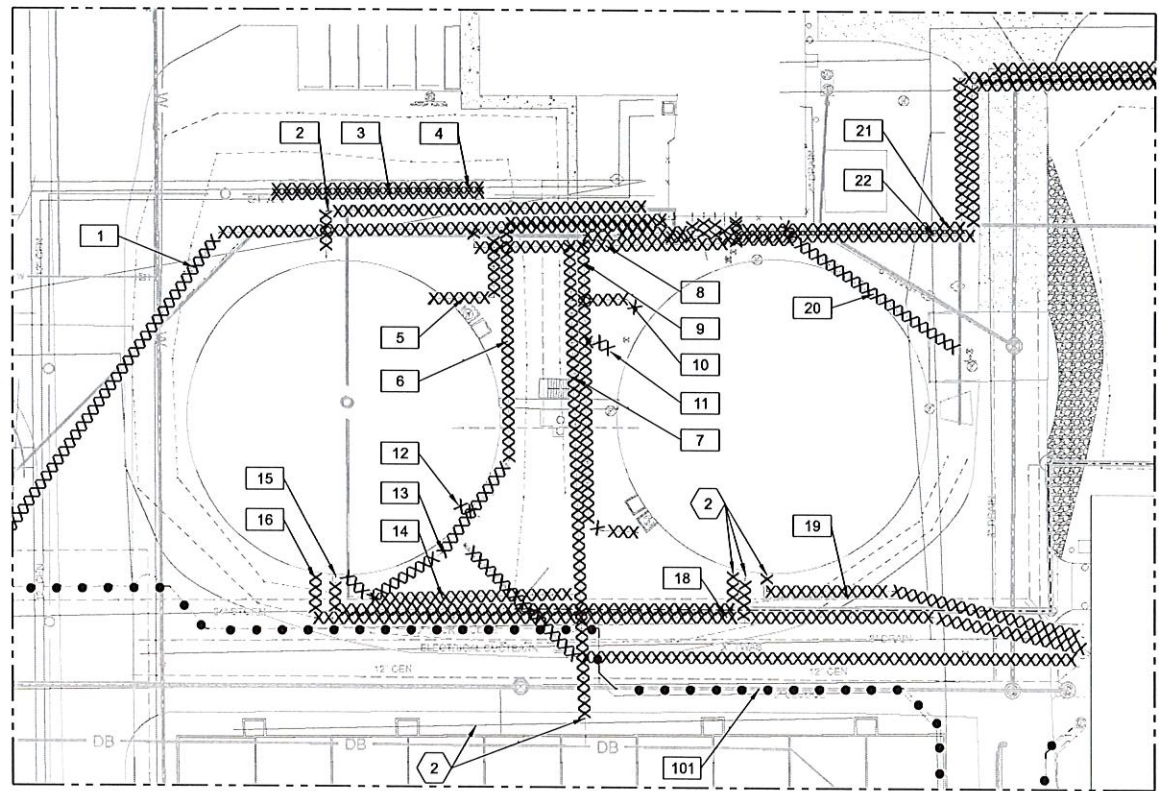
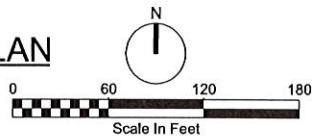
07/09/2026

REVISION		BY	DATE	PLAN SCALE:			DRAWN	BG	APPROVED: 
ADDENDUM NO.2		VP	7/2026	NOTE ON DWG.			DESIGNED	SC	
				PROFILE:			SURVEY		
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				FILE:			DRAWING: 05-C-1003		
				ATLAS PAGE NO:			3328		
DESIGN MANAGER									
DATE: MAY 2026									
SHEET 47 OF 300 SHEETS									



OVERALL DEMOLITION PLAN

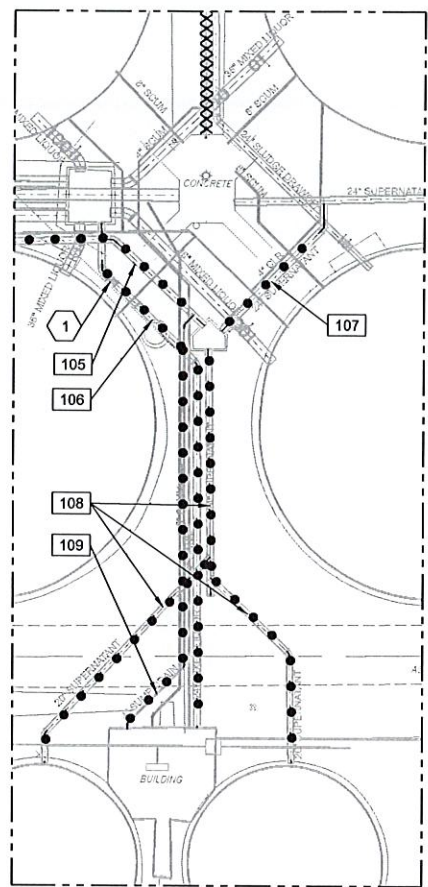
1"=60'



ENLARGED DEMOLITION PLAN

1"=30'-0"

07-Y-1000



ENLARGED DEMOLITION PLAN

1"=30'-0"

07-Y-1000

GENERAL SHEET NOTES

- SEE CIVIL FOR DEMOLITION OF STRUCTURES.
- ALL ABANDONED PIPELINES SHALL BE FILLED WITH CLSM.

SHEET KEYNOTES

- CLOSE VALVE AND CAP UPSTREAM PIPE. CONSTRUCT THRUST BLOCK PER 3311-765.
- CAP PIPE 1' OUTSIDE FACILITY OR TEE AS SHOWN.
- DEMO PIPING BETWEEN SPLITTER BOXES IF DRYING BED LOCATION IS DEMOLISHED AND USED FOR CONTRACTOR STAGING AREA.

DEMO PIPELINE

LINE NO.	SIZE	SERVICE	TYPE	DESCRIPTION
1	6"	THICKENED SLUDGE	PVC	FROM SLUDGE THICKENER BUILDING TO SLUDGE MANAGEMENT CENTER (THIS LINE IS TO REMAIN IN SERVICE UNTIL THE COMPLETION OF THE NEW SLUDGE HOLDING TANK)
2	10"	AIR	DIP	FROM SLUDGE HOLDING TANK TO SLUDGE MANAGEMENT CENTER
3	2"	CITY WATER	CU	DEMO TO EXTENTS SHOWN
4	3/4"	HP AIR	CU	DEMO TO EXTENTS SHOWN
5	8"	SLUDGE RECIRC	PVC	FROM SLUDGE HOLDING TANK 1 TO SLUDGE MANAGEMENT CENTER
6	6"	SLUDGE RECIRC	PVC	FROM SLUDGE HOLDING TANK 1 TO SLUDGE MANAGEMENT CENTER
7	8"	SLUDGE TRANSFER	PVC	FROM DRYING BEDS TO SLUDGE MANAGEMENT CENTER
8	6"	THICKENED SLUDGE	PVC	FROM TEE TO SLUDGE MANAGEMENT CENTER
9	6"	SLUDGE RECIRC	PVC	FROM SLUDGE HOLDING TANK 2 TO SLUDGE MANAGEMENT CENTER
10	8"	OVERFLOW	DIP	FROM SLUDGE HOLDING TANK 2 TO TEE
11	8"	SLUDGE RECIRC	PVC	FROM SLUDGE HOLDING TANK 2 TO TEE
12	8"	SLUDGE RECIRC	PVC	FROM SLUDGE HOLDING TANK 1 TO TEE
13	8"	OVERFLOW	DIP	FROM SLUDGE HOLDING TANK 1 TO TEE
14	8"	SLUDGE TRANSFER	PVC	FROM SLUDGE HOLDING TANK 1 TO TEE
15	6"	SLUDGE	PVC	FROM SLUDGE HOLDING TANK 1 TO TANK 2
16	10"	THICKENED SLUDGE	PVC	FROM SLUDGE HOLDING TANK 1 TO SLUDGE DEWATERING BUILDING
18	6"	SLUDGE	PVC	FROM SLUDGE HOLDING TANK 2 TO TEE
19	10"	THICKENED SLUDGE	PVC	FROM SLUDGE HOLDING TANK 2 TO SLUDGE DEWATERING BUILDING
20	6"	SLUDGE LOADING	PVC	FROM SLUDGE MANAGEMENT CENTER TO LOADING STAND
21	6"	SLUDGE	PVC	FROM SLUDGE MANAGEMENT CENTER TO SLUDGE STORAGE AREA
22	8"	SLUDGE	PVC	FROM SLUDGE MANAGEMENT CENTER TO SLUDGE STORAGE AREA
23	8"	DRAIN	PVC	FROM MANHOLE TO POND DRAIN INLET
24	8"	DRAIN	PVC	FROM TRUCK WASH TO MANHOLE
25	6"	SCUM	DIP	FROM EXISTING SCUM EJECTOR PIT TO WAS
26	6"	SCUM	DIP	FROM CLARIFIER 4 TO SCUM EJECTOR PIT

ABANDON PIPE

LINE NO.	SIZE	SERVICE	TYPE	DESCRIPTION
101	6"	SLUDGE	PVC	FROM VALVE TO RDT FACILITY
102	48"	INFLUENT	RCP	FROM OPERATION BUILDING TO HEADWORKS (REPURPOSE ABANDONED PIPE AS CONDUIT FOR NEW TWS LINES AS SHOWN IN YARD PIPING PROFILES)
103	36"	INFLUENT	DIP	FROM OPERATION BUILDING TO HEADWORKS
104	12"	FILTRATE	DIP	FROM OPERATION BUILDING TO DEWATERING BUILDING
105	24"	OVERFLOW	DIP	FROM CONTROL CHAMBER NO. 2 TO RAS
106	24"	ML	DIP	FROM GRAVITY THICKENER CONTROL BUILDING TO ML JUNCTION
107	24"	OVERFLOW	DIP	FROM CONTROL CHAMBER NO. 2 TO DISINFECTION
108	24"	OVERFLOW	DIP	FROM CLARIFIERS TO CONTROL CHAMBER NO. 2
109	4"	SCUM SUCTION	DIP	FROM GRAVITY THICKENER CONTROL BUILDING TO ML JUNCTION



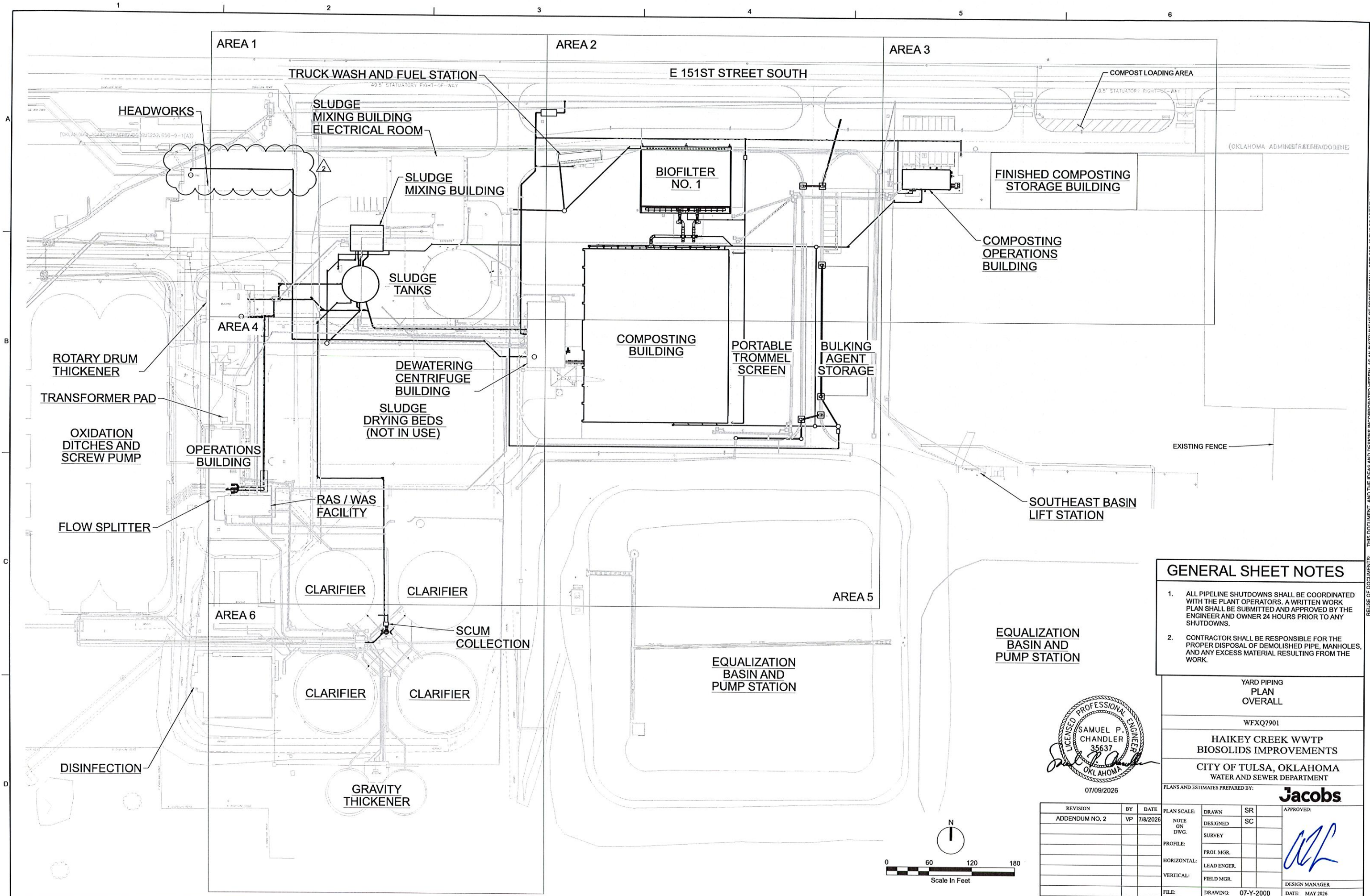
07/09/2026

REVISION	BY	DATE	PLAN SCALE:	DRAWN	SR	APPROVED:
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			ATLAS PAGE NO:	3328		SHEET 65 OF 300 SHEETS

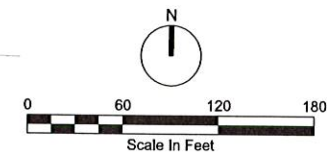
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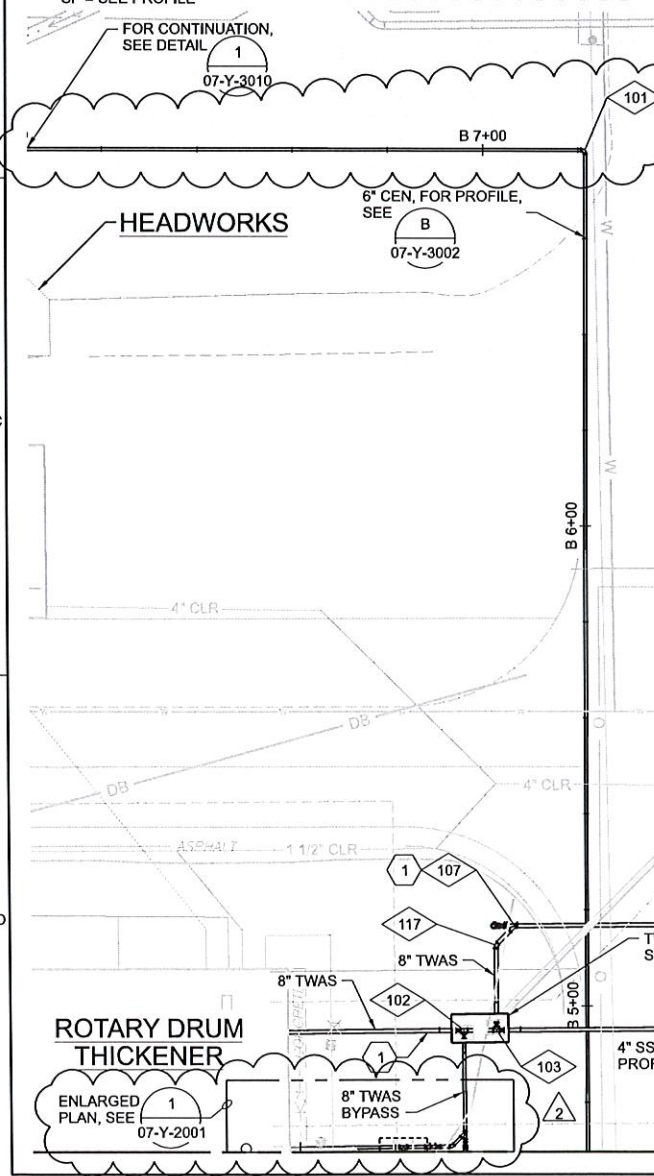


- GENERAL SHEET NOTES**
1. ALL PIPELINE SHUTDOWNS SHALL BE COORDINATED WITH THE PLANT OPERATORS. A WRITTEN WORK PLAN SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER AND OWNER 24 HOURS PRIOR TO ANY SHUTDOWNS.
 2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER DISPOSAL OF DEMOLISHED PIPE, MANHOLES, AND ANY EXCESS MATERIAL RESULTING FROM THE WORK.



REVISION			BY	DATE	PLAN SCALE:	DRAWN	SR	APPROVED:
ADDENDUM NO. 2			VP	7/8/2026				
					NOTE ON DWG.	DESIGNED	SC	
					SURVEY			
					PROFILE:	PROJ. MGR.		
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					ATLAS PAGE NO. 3328	SHEET 66 OF 300 SHEETS		

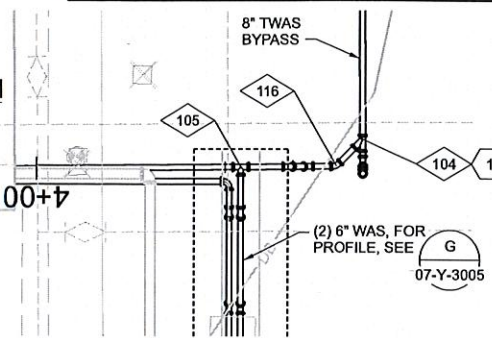
PIPING COORDINATE TABLE				
POINT NO.	DESCRIPTION	CL ELEV	NORTHING	EASTING
101	6" CEN, 90° BEND	SP	350837.54	2605570.42
102	8" TWAS, TEE	597.28	350653.57	2605546.94
103	8" TWAS, TEE	597.28	350653.72	2605553.81
104	6" TWAS, LATERAL TO CLEANOUT	597.98	350632.30	2605547.35
105	8" TWAS, TEE	SP	350629.22	2605534.45
106	4" PD, LATERAL TO CLEANOUT	596.97	350694.15	2605620.92
107	8" TWAS, LATERAL TO CLEANOUT	597.33	350675.48	2605557.43
108	8" TWAS, LATERAL TO CLEANOUT	597.28	350654.77	2605601.57
109	8" TWAS, LATERAL TO CLEANOUT	593.53	350639.68	2605617.33
110	8" TWAS, 30° BEND	592.41	350641.01	2605677.78
111	8" TWAS, LATERAL	592.41	350639.74	2605680.09
112	8" PD, 45° BEND	592.40	350639.24	2605667.39
113	8" PD, 45° VERT BEND	592.40	350646.32	2605660.69
114	4" SSC, 90° BEND UP	SP	350650.85	2605655.14
115	4" SSC, 45° BEND	SP	350650.42	2605635.27
116	6" TWAS, 45° BEND	597.00	350629.44	2605644.62
117	8" TWAS, 45° BEND	597.28	350671.39	2605553.52
118	8" TWAS, 22.5° BEND	597.00	350714.93	2605663.87
119	8" TWAS, 22.5° BEND	597.88	350712.23	2605664.59
120	2" W1, 45° BEND	598.03	350726.63	2605757.69
121	10" W1, 45° BEND	SP	350823.75	2605890.74
122	10" W1, 45° BEND	SP	350843.77	2605910.21
123	10"x4" W1, TEE	SP	350849.94	2605910.13
124	10"x8" W1, TEE	SP	350890.19	2605909.57
125	10" W1, 90° BEND	598.18	350925.87	2605909.07
126	2" W1, 45° BEND	598.03	350736.31	2605767.10
127	10"x2" W1, TAPPING SADDLE	598.37	350738.05	2605891.94
128	10" ALP, 45° BEND	597.00	350717.15	2605677.64
129	10" ALP, 45° BEND	597.88	350710.23	2605670.97
130	4" PD, 45° BEND	599.48	350713.63	2605660.48
131	4" PD, LATERAL TO CLEANOUT	599.40	350711.69	2605658.60
132	4" PD, 45° BEND	598.78	350711.40	2605637.70
133	8" PD, 45° VERT BEND	601.49	350650.38	2605663.64
134	8" PD, 90° BEND UP	592.37	350637.48	2605665.09



SHEET KEYNOTES

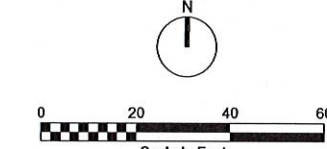
1. PROVIDE 45° WYE FOR PRESSURIZED EXTERIOR CLEANOUT 4027-187.
2. CORE DRILL INTO EXISTING MANHOLE PER 3305-730.
3. CROSSING SANITARY SEWER PIPE AND POTABLE WATER LINE SHALL NOT HAVE PIPE JOINTS WITHIN 10' OF CROSSING.
4. CORE DRILL EXISTING TANK 6" ABOVE EXISTING GRADE PER 3305-730
5. INSTALL 10" METER WITH PRESSURE SUSTAINING VALVE ASSEMBLY AND VAULT PER CITY OF TULSA STD. 534
6. INSTALL GATE VALVE V136 SAME SIZE AS PIPE 6" FROM SIDE OF TANK.
7. INSTALL NON-FREEZE POST HYDRANT PER 4027-154.
8. PROVIDE 45° WYE FOR EXTERIOR CLEANOUT PER 3305-740.
9. INSTALL TANK DRAIN CONNECTION PER 3360-121.

ROTARY DRUM THICKENER



1 ENLARGED PLAN

07-Y-2001
1"=10'-0"



KEY PLAN



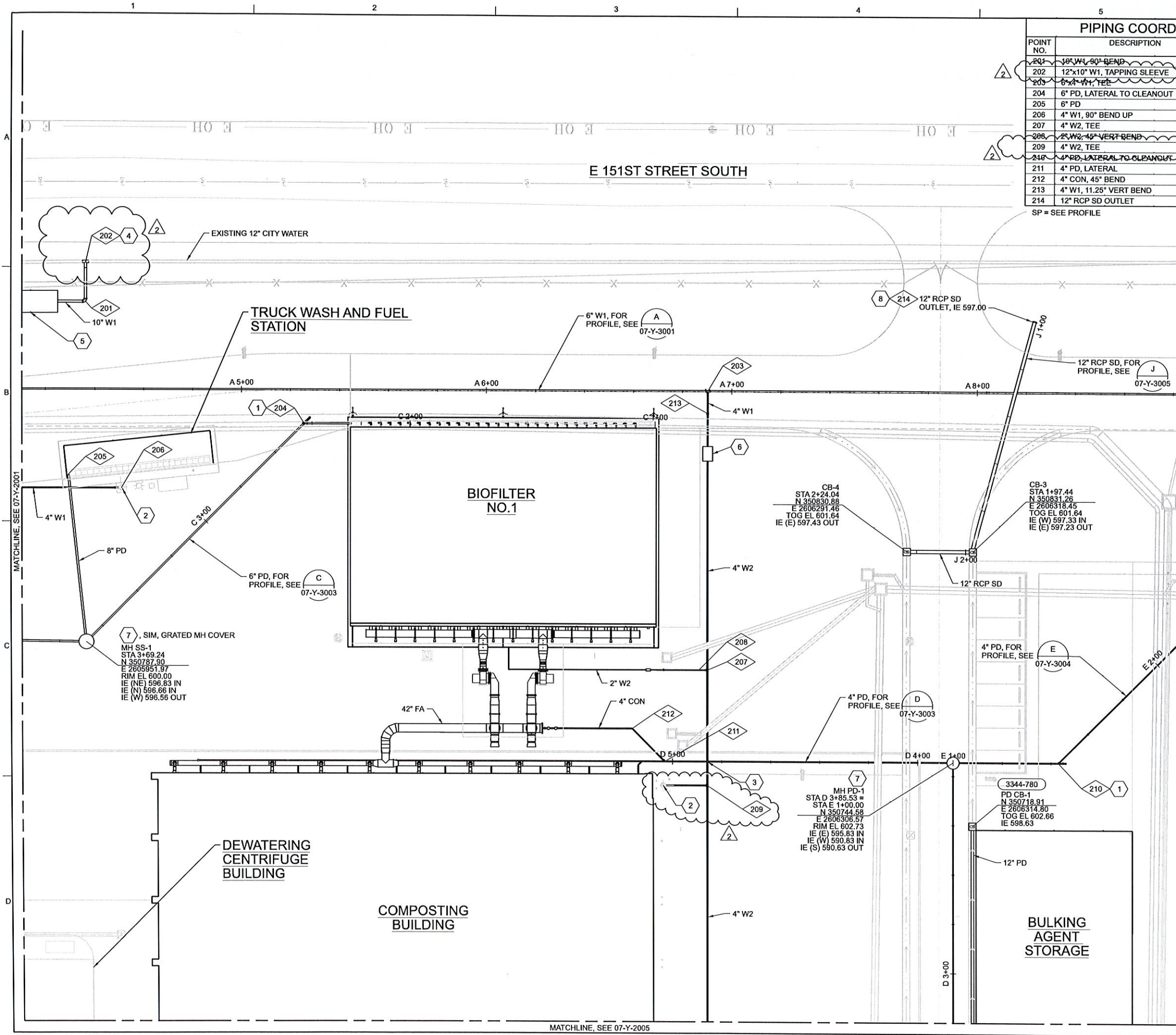
07/09/2026

YARD PIPING YARD PIPING PLAN AREA 1			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	VP	7/8/2026	
PLAN SCALE:	DRAWN	SR	
NOTE ON DWG.	DESIGNED	SC	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		
FILE:	FIELD MGR.		
DRAWING:	07-Y-2001	DATE:	MAY 2026
ATLAS PAGE NO:	3328	SHEET	67 OF 300 SHEETS

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PLOT DATE: 07/08/2026

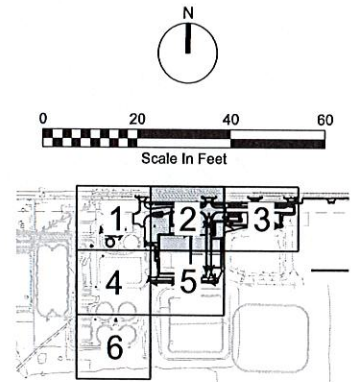
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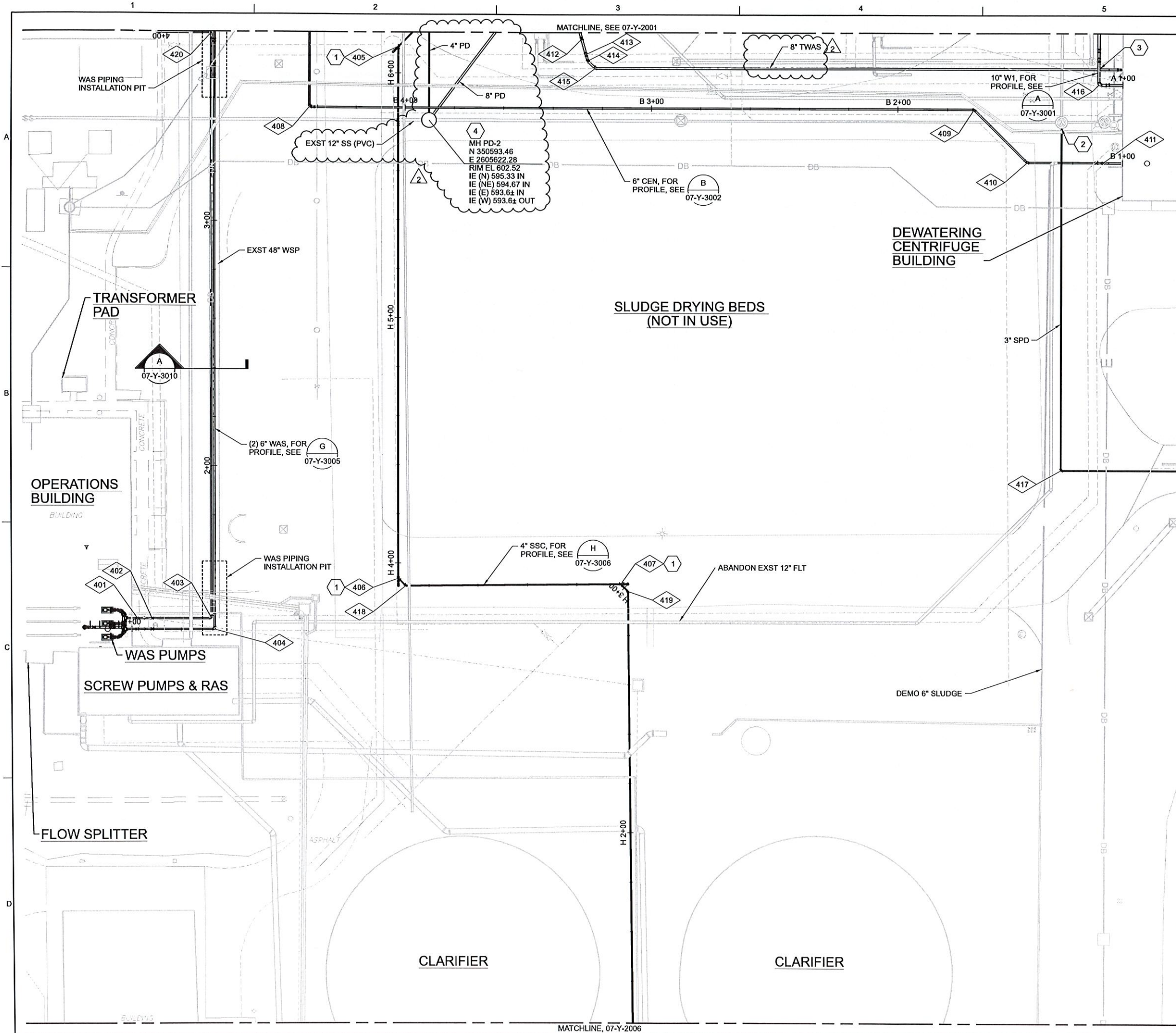
PIPING COORDINATE TABLE				
POINT NO.	DESCRIPTION	CL ELEV	NORTHING	EASTING
201	10" W1, 90° BEND	598.18	350926.43	2605949.66
202	12"x10" W1, TAPPING SLEEVE	598.18	350942.66	2605949.42
203	6"x4" W1, TEE	599.33	350894.30	2606204.18
204	6" PD, LATERAL TO CLEANOUT	SP	350878.23	2606039.81
205	6" PD	595.84	350855.58	2605943.87
206	4" W1, 90° BEND UP	598.22	350850.71	2605965.39
207	4" W2, TEE	597.48	350780.38	2606205.77
208	4" W2, 45° VERT BEND	597.48	350780.38	2606205.77
209	4" W2, TEE	599.33	350733.45	2606206.43
210	4" PD, LATERAL TO CLEANOUT	SP	350745.18	2606349.80
211	4" PD, LATERAL	591.28	350742.94	2606188.94
212	4" CON, 45° BEND	593.76	350756.07	2606175.44
213	4" W1, 11.25° VERT BEND	597.48	350885.01	2606204.31
214	12" RCP SD OUTLET	597.50	350925.01	2606336.82

SP = SEE PROFILE

- ### SHEET KEYNOTES
1. PROVIDE 45° WYE FOR EXTERIOR CLEANOUT 3305-740.
 2. INSTALL NON-FREEZE POST HYDRANT PER 4027-154.
 3. CROSSING SANITARY SEWER PIPE AND POTABLE WATER LINE SHALL NOT HAVE PIPE JOINTS WITHIN 10' OF CROSSING.
 4. FIELD VERIFY AND CONNECT TO EXISTING 12" WATER LINE HOT TAP USING TAPPING SLEEVE AND VALVE PER CITY OF BROKEN ARROW SPEC REFERENCE 624.02.B.
 5. INSTALL 10" METER WITH PRESSURE SUSTAINING VALVE ASSEMBLY AND VAULT PER CITY OF TULSA STANDARD DETAIL 534.
 6. INSTALL BACKFLOW PREVENTER ASSEMBLY, SEE DETAIL 3360-120.
 7. INSTALL 48" DIAMETER MANHOLE PER SPECIFICATION SECTION 33 05 13B AND CITY OF BROKEN ARROW STANDARD DETAIL STD SS-08.
 8. INSTALL PREFABRICATED CULVERT END SECTION PER ODOT STANDARD DETAIL R-30. COORDINATE PIPE OUTLET WITH CIVIL GRADING AND DRAINAGE.



YARD PIPING YARD PIPING PLAN AREA 2	
WFXQ7901	
HAIKEY CREEK WWT BIOSOLIDS IMPROVEMENTS	
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY: Jacobs	
REVISION	BY DATE
ADDENDUM NO. 2	VP 7/8/2026
PLAN SCALE:	DRAWN: DESIGNED: SR: SC:
NOTE ON DWG.	SURVEY
PROFILE:	PROJ. MGR.
HORIZONTAL:	LEAD ENGR.
VERTICAL:	FIELD MGR.
FILE:	DRAWING: 07-Y-2002
ATLAS PAGE NO: 3328	DATE: MAY 2026
SHEET 68 OF 300 SHEETS	

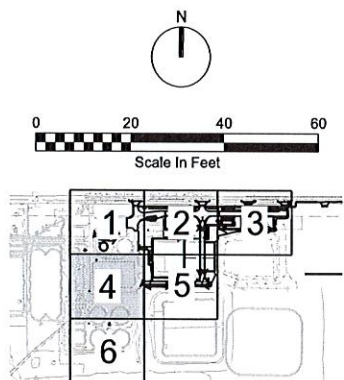


- ### SHEET KEYNOTES
1. PROVIDE 45° WYE FOR PRESSURIZED EXTERIOR CLEANOUT 4027-187.
 2. CORE DRILL INTO EXISTING MANHOLE PER 3305-730.
 3. CROSSING SANITARY SEWER PIPE AND POTABLE WATER LINE SHALL NOT HAVE PIPE JOINTS WITHIN 10' OF CROSSING. CONCRETE ENCASE PIPELINE JOINTS WITHIN 10' OF SANITARY SEWER.
 4. INSTALL 48" DIAMETER MANHOLE PER SPECIFICATION SECTION 33 05 13B AND CITY OF BROKEN ARROW STANDARD DETAILS.

PIPING COORDINATE TABLE

POINT NO.	DESCRIPTION	CL. ELEV	NORTHING	EASTING
401	6" WAS, 45° VERT BEND	600.99	350388.61	2605506.28
402	6" WAS, 45° VERT BEND	594.97	350388.69	2605512.25
403	6" WAS, 90° BEND	594.38	350389.05	2605536.56
404	6" WAS, 90° BEND	SP	350384.63	2605537.87
405	4" SSC, LATERAL TO CLEANOUT	SP	350623.27	2605609.28
406	4" SSC, LATERAL TO CLEANOUT	SP	350406.29	2605612.33
407	4" SSC, LATERAL TO CLEANOUT	SP	350405.27	2605702.71
408	6" CEN, 90° BEND	SP	350597.93	2605573.62
409	6" CEN, 45° BEND	SP	350601.34	2605843.29
410	6" CEN, 45° BEND	SP	350579.99	2605865.22
411	6" CEN, 45° VERT BEND	SP	350580.39	2605896.03
412	8" TWAS, 45° VERT BEND	592.41	350627.71	2605683.60
413	8" TWAS, 45° VERT BEND	599.01	350621.36	2605685.45
414	8" TWAS, 30° BEND	599.01	350618.66	2605686.24
415	8" TWAS, 45° BEND	599.01	350615.73	2605689.30
416	10" W1, 90° BEND	SP	350612.24	2605893.71
417	3" SPD, 90° BEND	598.39	350454.41	2605880.92
418	4" SCC, 45° BEND	SP	350403.35	2605615.40
419	4" SCC, 45° BEND	SP	350402.34	2605705.78
420	6" TWAS, 90° BEND	600.00	350627.68	2605533.23

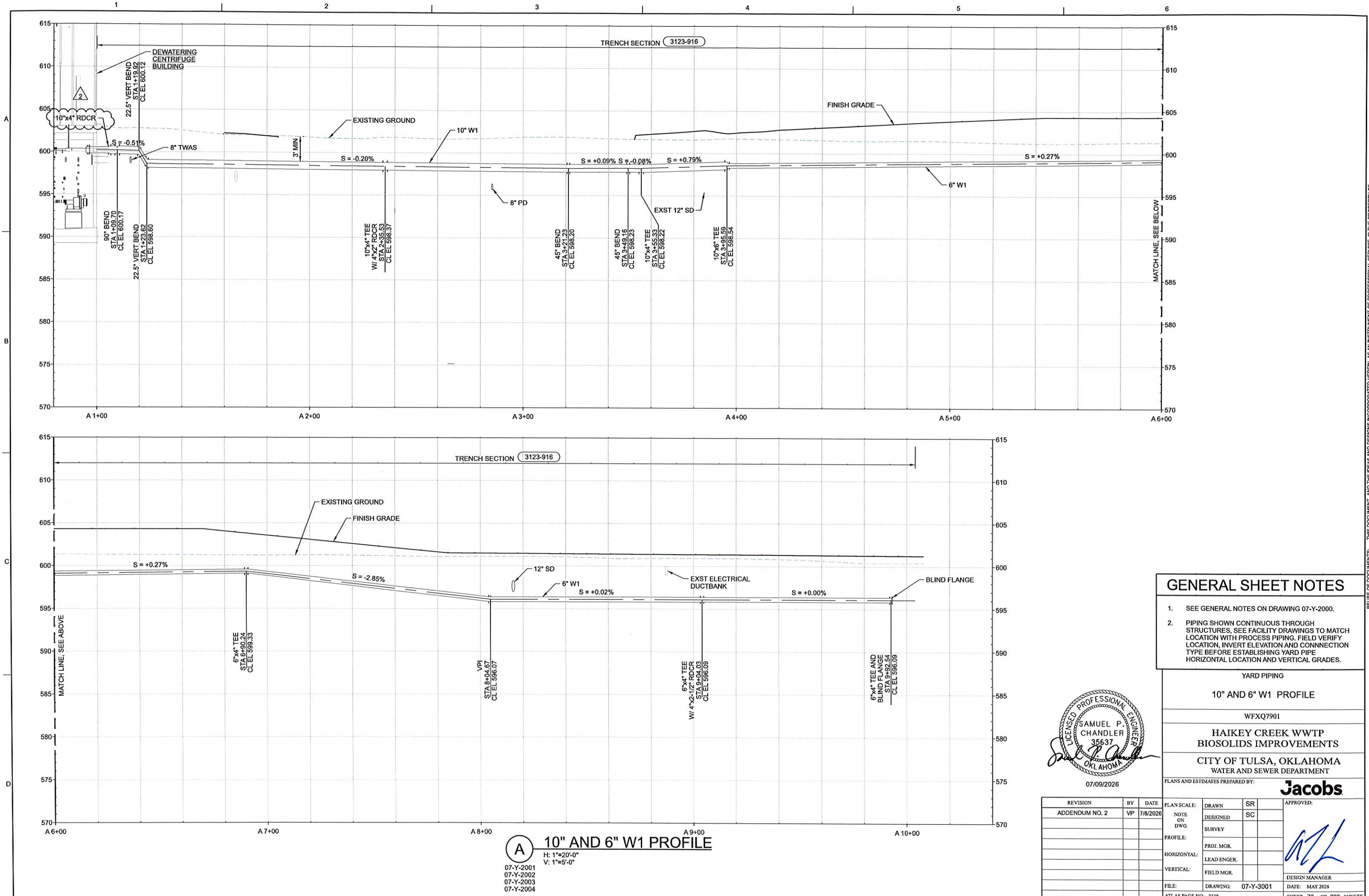
SP = SEE PROFILE



KEY PLAN



YARD PIPING YARD PIPING PLAN AREA 4						
WFXQ7901						
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS						
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT						
PLANS AND ESTIMATES PREPARED BY: Jacobs						
REVISION	BY	DATE	PLAN SCALE:	DRAWN	SR	APPROVED:
ADDENDUM NO. 2	VP	7/8/2026	NOTE ON DWG.	DESIGNED	SC	
			PROJ. MGR.			
			LEAD ENGR.			
			FIELD MGR.			
			FILE:	DRAWING:	DATE: MAY 2026	
			ATLAS PAGE NO: 3328	SHEET 70 OF 300 SHEETS		

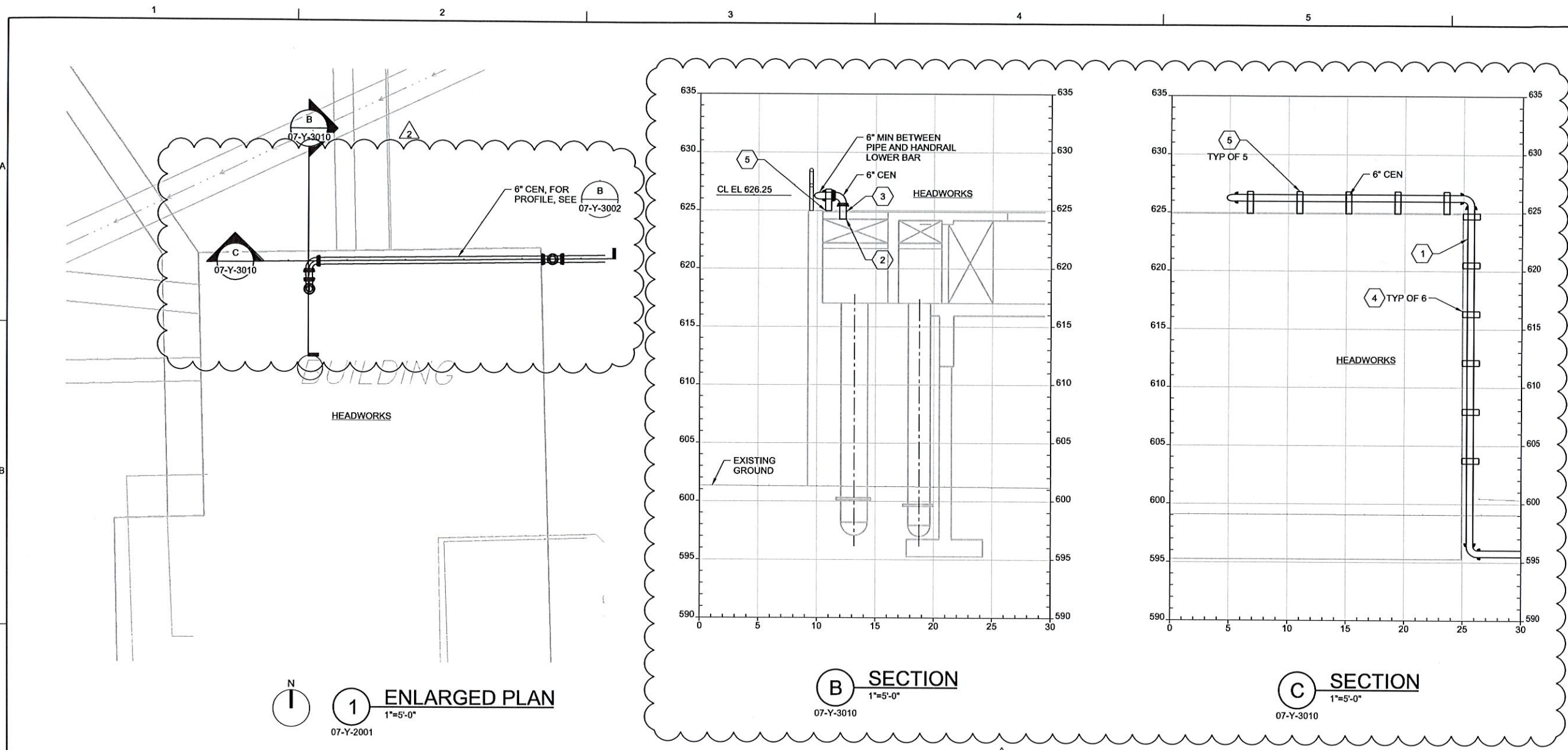


- GENERAL SHEET NOTES**
- SEE GENERAL NOTES ON DRAWING 07-Y-2000.
 - PIPING SHOWN CONTINUOUS THROUGH STRUCTURES. SEE FACILITY DRAWINGS TO MATCH LOCATION WITH PROCESS PIPING. FIELD VERIFY LOCATION, INVERT ELEVATION AND CONNECTION TYPE BEFORE ESTABLISHING YARD PIPE HORIZONTAL LOCATION AND VERTICAL GRADES.

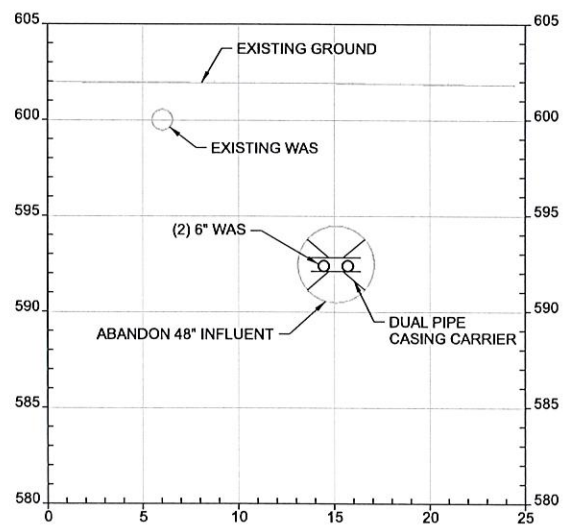
YARD PIPING
10" AND 6" W1 PROFILE
WFXQ7901
HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT
PLANS AND ESTIMATES PREPARED BY: **Jacobs**



REVISION	BY	DATE	PLAN SCALE:	DRAWN	SR	APPROVED:
ADDENDUM NO. 2	VP	7/8/2026	NOTE ON DWG.	DESIGNED	SC	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
				FIELD MGR.		
			FILE:	DRAWING: 07-Y-3001	DATE: MAY 2026	
			ATLAS PAGE NO: 3328		SHEET 73 OF 300 SHEETS	



- ### SHEET KEYNOTES
- PIPE HEAT TRACE AND INSULATION TO BE PROVIDED FOR CENTRATE RETURN PIPING. SEE SECTION 40 05 33.
 - PROVIDE DUCKBILL FITTING AT THE END OF CENTRATE RETURN PIPING.
 - DEMOLISH MINIMAL PORTION OF GRATING ABOVE THE ENTRY TO THE SCREEN CHANNEL TO PROVIDE PIPE PENETRATION FOR CENTRATE RETURN PIPING.
 - PIPE SUPPORT EVERY 4 FEET ON FACE OF WALL, SEE DETAIL 4005-505.
 - PIPE SUPPORT ON FLOOR TO ANCHOR HORIZONTAL STRETCH OF CENTRATE PIPING TO CONCRETE, DETAIL 4005-505.



YARD PIPING						
ENLARGED PLAN AND SECTION						
WFXQ7901						
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS						
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT						
PLANS AND ESTIMATES PREPARED BY: Jacobs						
REVISION	BY	DATE	PLAN SCALE:	DRAWN	SR	APPROVED:
ADDENDUM NO. 2	VP	7/8/2026	NOTE ON DWG.	DESIGNED	SC	
			SURVEY			
			PROF. MGR.			
			LEAD ENGR.			
			FIELD MGR.			
			FILE:	DRAWING:	07-Y-3010	DATE: MAY 2026
			ATLAS PAGE NO:	3328		SHEET 79 OF 300 SHEETS

1			2				
DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
1	H001-0P52-MCC02	H050-FCL1-CPL02	1	1"	480V	POWER	
	PANEL A	H050-FCL1-CPL01	1	1"	120	POWER	
	OPERATION'S SERVER ROOM	H050-FCL1-CPL01	1	2"	FMM	CONTROL	
	HH-1	HH-3	2	2"	EMPTY	POWER	
	HH-1	HH-3	2	2"	EMPTY	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
2	H02-MNT1-MCC01	H090-DEW2-BLO01	1	3"	480V	POWER	
	H02-MNT1-MCC01	H090-DEW2-BLO02	1	3"	480V	POWER	
	H02-MNT1-MCC01	H090-DEW2-BLO03	1	3"	480V	POWER	
	H090-DEW3-VFD04	H090-DEW2-RCP01	1	2"	480V	POWER	
	H090-DEW3-VFD05	H090-DEW2-RCP02	1	2"	480V	POWER	
	H02-MNT1-MCC01	H090-DEW2-ACU01	1	2"	480V	POWER	
	H02-MNT1-MCC01	H090-DEW2-EHF01	1	1"	480V	POWER	
	H090-DEW3-LVP01	H090-DEW2-BLT01	1	2"	120V	POWER	
	H090-DEW3-LVP01	H090-DEW2-RECEPTACLE	2	2"	120V	POWER	
	H090-DEW3-MCP01	H090-DEW2-LCP01			DISCRETE	CONTROL	
	H090-DEW3-MCP01	SD-1			DISCRETE	CONTROL	
	H090-DEW3-MCP01	SD-2	1	1"	DISCRETE	CONTROL	
	H090-DEW3-MCP01	DPS-1			DISCRETE	CONTROL	
	H090-DEW3-MCP01	DPS-2			DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW1-PTM01			ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW1-LT01	1	2"	ANALOG	CONTROL	
	H090-DEW3-LVP01				120V	POWER	
	H090-DEW3-MCP01	H090-DEW2-BLO01			ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-BLO02	1	2"	ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-BLO03			ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-BLO01			DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-BLO02	1	2"	DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-BLO03			DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS01	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS02	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS03	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS04	1	2"	DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS05	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS06	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PRS07	1		DISCRETE	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PTM02	1	2"	ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PTM03	1		ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PTM04	1		ANALOG	CONTROL	
	H090-DEW3-MCP01	H090-DEW2-PTM05	1		ANALOG	CONTROL	
	H090-DEW3-MCP01	ZSO31			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO32			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO33			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO34	1	2"	DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC31			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC32			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC33			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC34			DISCRETE	CONTROL	
	H090-DEW3-MCP01	H070-RTD1-FMT01	1	1"	ANALOG	CONTROL	
	H090-DEW3-LVP01				120V	POWER	
	H02-MNT1-MCC01	H090-HH-1P	3	4"	EMPTY	POWER	
H02-MNT1-LVP01	H090-HH-1P	8	2"	EMPTY	POWER		
H090-DEW3-CLP02	H090-HH-1P	2	1"	EMPTY	CONTROL		

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
3	EXISTING SWT01	H095-COM1-SWT01	1	4"	13.2 kV	POWER	
	EXISTING SWT01	H095-COM1-SWT01	1	4"	EMPTY	POWER	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
4	H095-COM1-SWT01	H095-COM1-TRN01	1	4"	13.2 kV	POWER	
	H095-COM1-SWT01	H095-COM1-TRN01	1	4"	EMPTY	POWER	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
5	H095-COM1-TRN01	H095-COM1-MCC01	2	4"	480V	POWER	
	H095-COM1-TRN01	H095-COM1-MCC02	1	4"	EMPTY	POWER	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
7	H095-COM1-VFD11	H095-COM1-FAN11	1	3"	480V	POWER	
	H095-COM1-VFD12	H095-COM1-FAN12	1	3"	480V	POWER	
	H095-COM1-LVP01	BIOFILTER RECP TAC	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-FMT01	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-FMT02	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP11	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP12	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP13	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP14	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP15	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP16	1	1"	120V	POWER	
	H095-COM1-MCP01	H095-COM2-FMT01			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-FMT02			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP11			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP12	1	2"	ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP13			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP14			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP15			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-DMP16			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-PTM01			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-PTM02			ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-TTM31	1	1"	ANALOG	CONTROL	
	H095-COM1-MCP01	H095-COM2-TTM32			ANALOG	CONTROL	
	H095-COM1-MCP01	HS83			DISCRETE	CONTROL	
	H095-COM1-MCP01	HS84			DISCRETE	CONTROL	
	H095-COM1-VFD11	TSH93	1	1"	DISCRETE	CONTROL	
	H095-COM1-VFD12	TSH94	1	1"	DISCRETE	CONTROL	
95-MH-2P	95-HH-1	2	3"	EMPTY	POWER		

3							
DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
6	H095-COM1-VFD11	H095-COM1-FAN11	1	3"	480V	POWER	
	H095-COM1-VFD12	H095-COM1-FAN12	1	3"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN01	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN02	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN03	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN04	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN01	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN02	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN03	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN04	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN05	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN06	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN07	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN08	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN09	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM2-FAN10	1	2"	480V	POWER	
	H095-COM1-LVP01	BIOFILTER RECPTACLE	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-FMT01	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-FMT02	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP11	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP12	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP13	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP14	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP15	1	1"	120V	POWER	
	H095-COM1-LVP01	H095-COM2-DMP16	1	1"	120V	POWER	
	H095-COM1-MCP01	H095-COM2-FMT01				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-FMT02				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP11				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP12	1	2"		ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP13				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP14				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP15				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-DMP16				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-PTM01				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-PTM02				ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-TTM31	1	1"		ANALOG	CONTROL
	H095-COM1-MCP01	H095-COM2-TTM32				ANALOG	CONTROL
	H095-COM1-MCP01	HS83				DISCRETE	CONTROL
	H095-COM1-MCP01	HS84				DISCRETE	CONTROL
	H095-COM1-VFD11	TSH93	1	1"		DISCRETE	CONTROL
	H095-COM1-VFD12	TSH94	1	1"		DISCRETE	CONTROL
	H095-COM1-MCP01	H095-COM2-CPL01	1	1"		DISCRETE	CONTROL
	H095-COM1-MCC01	TSH81				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH82				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH83				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH84				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH85	1	2"		DISCRETE	CONTROL
	H095-COM1-MCC01	TSH86				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH87				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH88				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH89				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH80				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH95				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH96	1	1"		DISCRETE	CONTROL
	H095-COM1-MCC01	TSH97				DISCRETE	CONTROL
	H095-COM1-MCC01	TSH98				DISCRETE	CONTROL
H095-COM1-MCC01	95-MH-1P	2	3"		EMPTY	POWER	
H095-COM1-LVP01	95-MH-1P	4	2"		EMPTY	POWER	
H095-COM1-MCP01	95-MH-1C	4	1"		EMPTY	CONTROL	
H095-COM1-MCC01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	480	POWER		
H095-COM1-LVP01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	120	POWER		
H095-COM1-NPL01	WOODCHIP DELIVERY ENTRANCE GATE	1	2"	FMM	CONTROL		
H095-COM1-MCC01	COMPOST PICK-UP ENTRANCE GATE	1	1"	480	POWER		
H095-COM1-LVP01	COMPOST PICK-UP ENTRANCE GATE	1	1"	120	POWER		
H095-COM1-NPL01	COMPOST PICK-UP ENTRANCE GATE	1	2"	FMM	CONTROL		
H095-COM1-MCC01	COMPOST PICK-UP EXIT GATE	1	1"	480	POWER		
H095-COM2-LVP01	COMPOST PICK-UP EXIT GATE	1	1"	120	POWER		
H095-COM1-NPL01	COMPOST PICK-UP EXIT GATE	1	2"	FMM	CONTROL		
H095-COM1-NPL01	H090-DEW1-MCP01	1	2"	FMM	CONTROL		
H095-COM1-NPL01	EMH-3	1	2"	FMM	CONTROL	BETWEEN FOPP IN SERVER ROOM AND H095-COM1-NPL01	

4					5				
DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES		
			SETS	SIZE					
8	H095-COM1-MCC01	H095-COM2-FAN01	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN02	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN03	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN04	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN05	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN06	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN07	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN08	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN09	1	2"	480V	POWER			
	H095-COM1-MCC01	H095-COM2-FAN10	1	2"	480V	POWER			
	H095-COM2-MCC01	TS181	1	2"	DISCRETE	CONTROL			
	H095-COM2-MCC01	TS182			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS183			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS184			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS185			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS186			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS187			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS188			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS189			DISCRETE	CONTROL			
	H095-COM2-MCC01	TS180			DISCRETE	CONTROL			
95-MH-2P	95-HH-2P	2	2"	EMPTY	POWER				
95-MH-2P	95-HH-2C	2	1"	EMPTY	CONTO				

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
9	H095-COM1-MCC01	H095-COM3-FAN01	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN02	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN03	1	2"	480V	POWER	
	H095-COM1-MCC01	H095-COM3-FAN04	1	2"	480V	POWER	
	H095-COM1-MCP01	H095-COM2-CPL01	1	1"	DISCRETE	CONTROL	
	H095-COM2-MCC01	TS195	1	1"	DISCRETE	CONTROL	
	H095-COM2-MCC01	TS196			DISCRETE	CONTROL	
	H095-COM2-MCC01	TS197			DISCRETE	CONTROL	
	H095-COM2-MCC01	TS198			DISCRETE	CONTROL	
	95-MH-2P	95-MH-3P	2	2"	EMPTY	POWER	
95-MH-2C	95-MH-3C	2	1"	EMPTY	CONTO		

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTES
			SETS	SIZE			
10	H090-DEW3-MCP01	H070-RTD1-FMT01	1	1"	120V	POWER	
	H090-DEW3-LVP01				ANALOG	CONTROL	
	H090-DEW3-MCP01	ZSO31	1	2"	DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO32			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO33			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSO34			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC31			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC32			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC33			DISCRETE	CONTROL	
	H090-DEW3-MCP01	ZSC34			DISCRETE	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
11A	MS-1A	H090-DEW1-MCC01	1	4"	480V	POWER	REUSE EXISTING CONDUIT
	MS-1A	H090-DEW1-MCC01	1	4"	480V	POWER	REUSE EXISTING CONDUIT
	MS-1A	H090-DEW1-MCC01	1	4"	480V	POWER	REUSE EXISTING CONDUIT
	MS-1A	H090-DEW1-MCC01	1	4"	480V	POWER	REUSE EXISTING CONDUIT
	MS-1A	SPARE	1	4"	EMPTY	POWER	
	MS-1A	IMS1	1	4"	480V	POWER	
	MS-1A	SPARE	1	3"	EMPTY	POWER/CONTROL	
	MS-1A	SPARE	1	3"	EMPTY	POWER/CONTROL	
	MS-1A	SPARE	1	3"	EMPTY	POWER/CONTROL	
	MS-1A	FO	1	3"	FMM	CONTROL	
11B	MS-1A	SPARE	1	3"	EMPTY	POWER/CONTROL	
	MS-1A	SPARE	1	3"	EMPTY	POWER/CONTROL	
	MS-1A	H090-DEW1-MCC02	1	4"	480V	POWER	
	MS-1A	H090-DEW1-MCC02	1	4"	480V	POWER	
	MS-1A	H090-DEW1-MCC02	1	4"	480V	POWER	
	MS-1A	H090-DEW1-MCC02	1	4"	480V	POWER	
	MS-1A	SPARE	1	4"	EMPTY	POWER	
	EMH-1B	EMH-3	1	2"	EMPTY	POWER	BETWEEN FOPP IN SERVER ROOM AND H095-COM1-NP101

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
12	H095-COM1-MCC01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	480	POWER	
	H095-COM1-LVP01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	120	POWER	
	H095-COM1-NPL01	WOODCHIP DELIVERY ENTRANCE GATE	1	2"	FMM	CONTROL	
	H095-COM1-MCC01	COMPOST PICK-UP ENTRANCE GATE	1	1"	480	POWER	
	H095-COM1-LVP01	COMPOST PICK-UP ENTRANCE GATE	1	1"	120	POWER	
	H095-COM1-NPL01	COMPOST PICK-UP ENTRANCE GATE	1	2"	FMM	CONTROL	
	H095-COM1-MCC01	COMPOST PICK-UP EXIT GATE	1	1"	480	POWER	
	H095-COM1-LVP01	COMPOST PICK-UP EXIT GATE	1	1"	120	POWER	
	H095-COM1-NPL01	COMPOST PICK-UP EXIT GATE	1	2"	FMM	CONTROL	
	H095-COM1-NPL01	H090-DEW1-MCP01	1	2"	FMM	CONTROL	
	H095-COM1-NPL01	EMH-3	1	2"	FMM	CONTROL	

6							
DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
13	H095-COM1-MCC01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	480	POWER	
	H095-COM1-LVP01	WOODCHIP DELIVERY ENTRANCE GATE	1	1"	120	POWER	
	H095-COM1-NPL01	WOODCHIP DELIVERY ENTRANCE GATE	1	2"	FMM	CONTROL	
DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
14	H095-COM1-MCC01	COMPOST PICK-UP ENTRANCE GATE	1	1"	480	POWER	
	H095-COM2-LVP01	COMPOST PICK-UP ENTRANCE GATE	1	1"	120	POWER	
	H095-COM1-NPL01	COMPOST PICK-UP ENTRANCE GATE	1	2"	FMM	CONTROL	
	H095-COM1-MCC01	COMPOST PICK-UP EXIT GATE	1	1"	480	POWER	
	H095-COM1-LVP01	COMPOST PICK-UP EXIT GATE	1	1"	120	POWER	
	H095-COM1-NPL01	COMPOST PICK-UP EXIT GATE	1	2"	FMM	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
15	H095-COM1-MCC01	COMPOST PICK-UP EXIT GATE	1	1"	480	POWER	
		COMPOST PICK-UP EXIT GATE	1	1"	120	POWER	
	H095-COM1-LVP01	COMPOST PICK-UP EXIT GATE	1	2"	FMM	CONTROL	
		H095-COM1-NPL01	COMPOST PICK-UP EXIT GATE	1	2"	FMM	CONTROL

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
16	HO95-COM1-MCC01	COMPOST PICK-UP ENTRANCE GATE	1	1"	480	POWER	
	HO95-COM1-LVP01	COMPOST PICK-UP ENTRANCE GATE	1	1"	120	POWER	
	HO95-COM1-NPL01	COMPOST PICK-UP ENTRANCE GATE	1	2"	FMM	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
17	H095-COM1-NPL01	H090-DEW1-MCP01	1	2"	FMM	CONTROL	BETWEEN FOPP IN SERVER ROOM AND H095-COM1-NPL01
	H095-COM1-NPL01	EMH-3	1	2"	FMM	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
18	H090-DEW1-MCP01	H090-DEW3-MCP01	1	2"	FMM	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
19	H095-COM1-NP101	H090-DEW1-MCP01	1	2"	FMM	CONTROL	BETWEEN FOPP IN SERVER ROOM AND H095-COM1-NP101
	H095-COM1-NP101	EMH-3	1	2"	FMM	CONTROL	
	H090-DEW1-MCP01	H090-DEW3-MCP01	1	2"	FMM	CONTROL	

DUCT BANK	FROM	TO	CONDUIT		TYPE		NOTE
			SETS	SIZE			
20	OPERATION'S SERVER ROOM	EMH-18	1	2"	FMM	CONTROL	BETWEEN FOPP IN SERVER ROOM AND H095-COM1-INP01

SITE ELECTRICAL
ELECTRICAL

	DUCT BANK SCHEDULE
	WFXQ7901
	HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS
	CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT
	07/09/2026

REVISION		BY	DATE	PLAN SCALE:	DRAWN	AP	 APPROVED:
ADDENDUM NO. 2		VP	7/7/2026	NOTE ON DWG.	DESIGNED	BB	
				PROFILE:	SURVEY		
				HORIZONTAL:	PROJ. MGR.		
				VERTICAL:	LEAD ENGINEER		
					FIELD MGR.		
				FILE:	DRAWING:	08-E-6004	
				ATLAS PAGE NO:	3328		
							DESIGN MANAGER
							DATE: MAY 2026
							SHEET 91 OF 300 S

1

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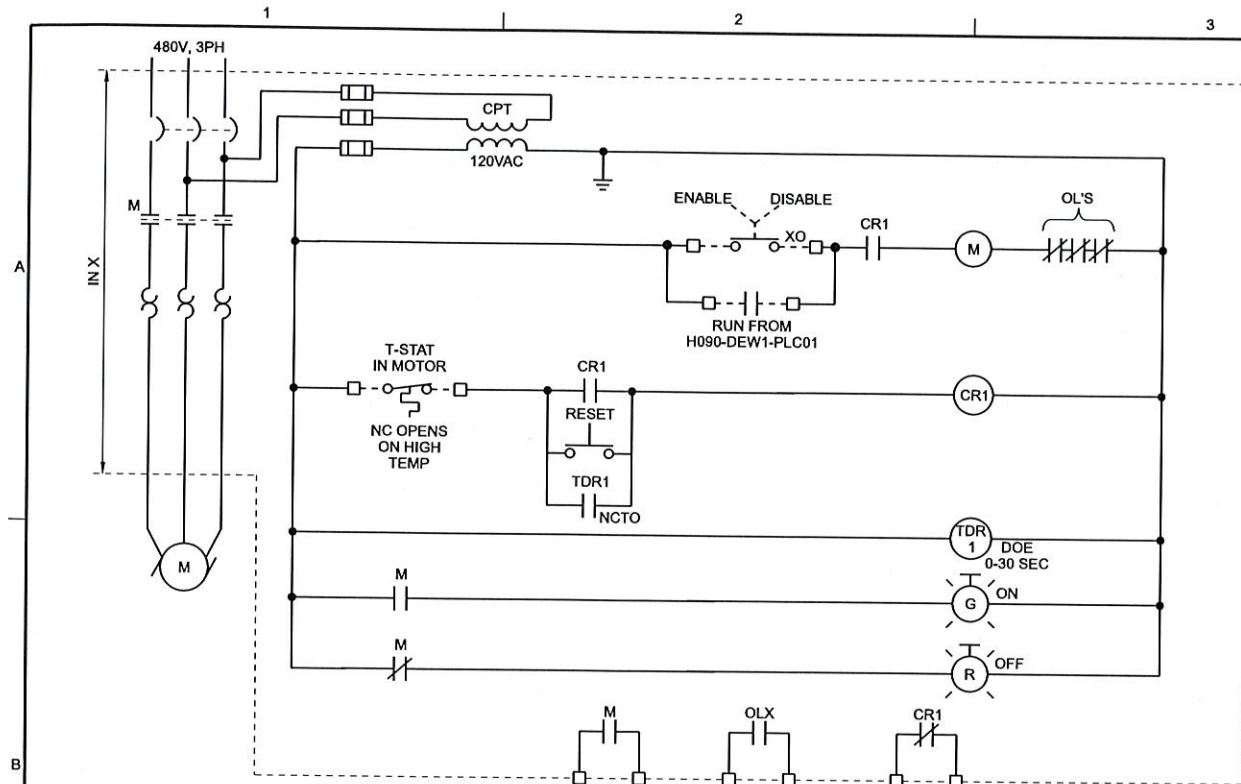
1. VERIFY THE MOTOR NAMEPLATE RATING FOR OVERHEAD DOOR AND BRIDGE CRANE PRIOR TO PURCHASING CIRCUIT BREAKER.
2. VERIFY THE AVAILABLE CIRCUIT IN THE PANEL PRIOR TO PURCHASING CIRCUIT BREAKER.



PLANS AND ESTIMATES PREPARED BY

APPROVED

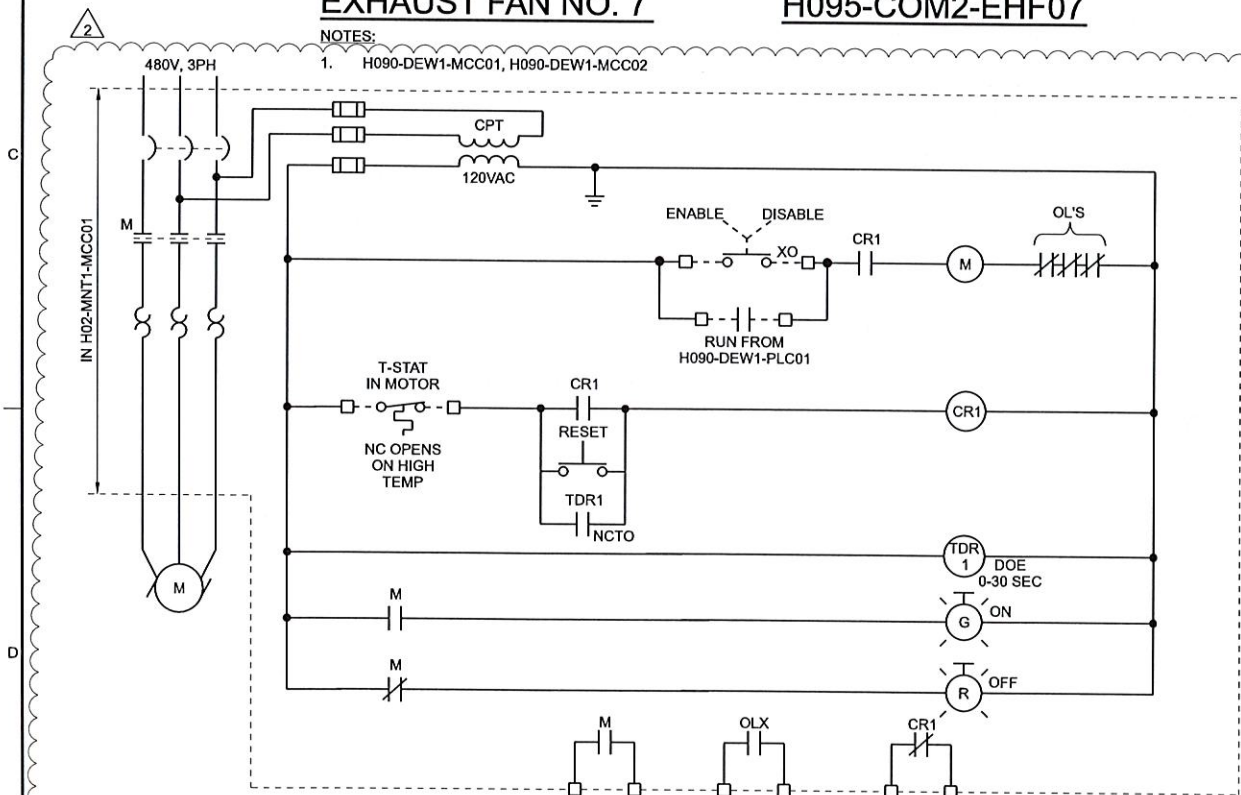
12



EXHAUST FAN NO. 1
EXHAUST FAN NO. 2
EXHAUST FAN NO. 3
EXHAUST FAN NO. 4
EXHAUST FAN NO. 5
EXHAUST FAN NO. 6
EXHAUST FAN NO. 7

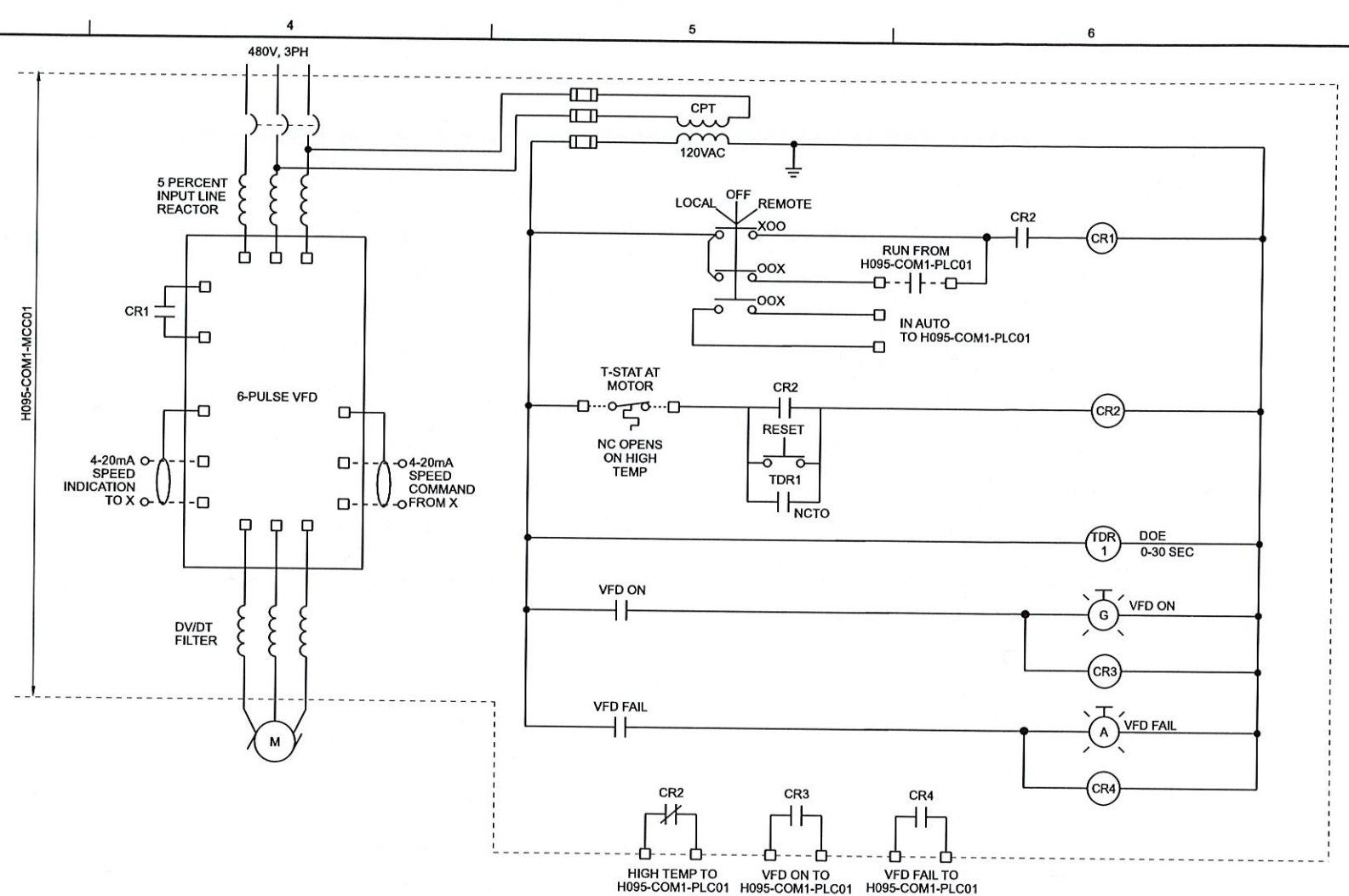
H095-COM2-EHF01
H095-COM2-EHF02
H095-COM2-EHF03
H095-COM2-EHF04
H095-COM2-EHF05
H095-COM2-EHF06
H095-COM2-EHF07

NOTES:
1. H090-DEW1-MCC01, H090-DEW1-MCC02



SLUDGE MIXING BUILDING EXHAUST FAN NO. 1

H090-COM2-EHF01

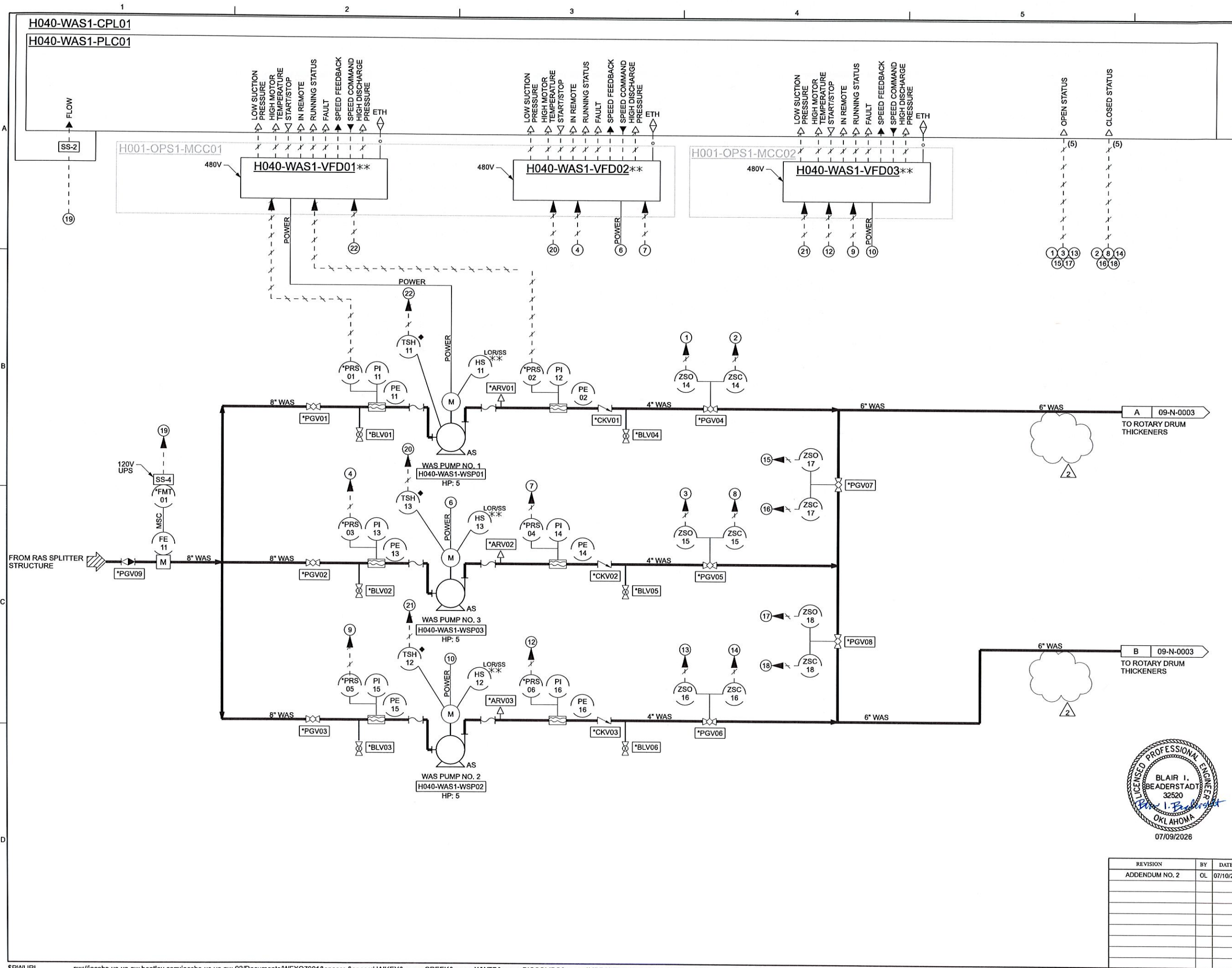


COMPOST FAN NO. 1
COMPOST FAN NO. 2
COMPOST FAN NO. 3
COMPOST FAN NO. 4
COMPOST FAN NO. 5
COMPOST FAN NO. 6
COMPOST FAN NO. 7
COMPOST FAN NO. 8
COMPOST FAN NO. 9
COMPOST FAN NO. 10

H095-COM2-FAN01
H095-COM2-FAN02
H095-COM2-FAN03
H095-COM2-FAN04
H095-COM2-FAN05
H095-COM2-FAN06
H095-COM2-FAN07
H095-COM2-FAN08
H095-COM2-FAN09
H095-COM2-FAN10



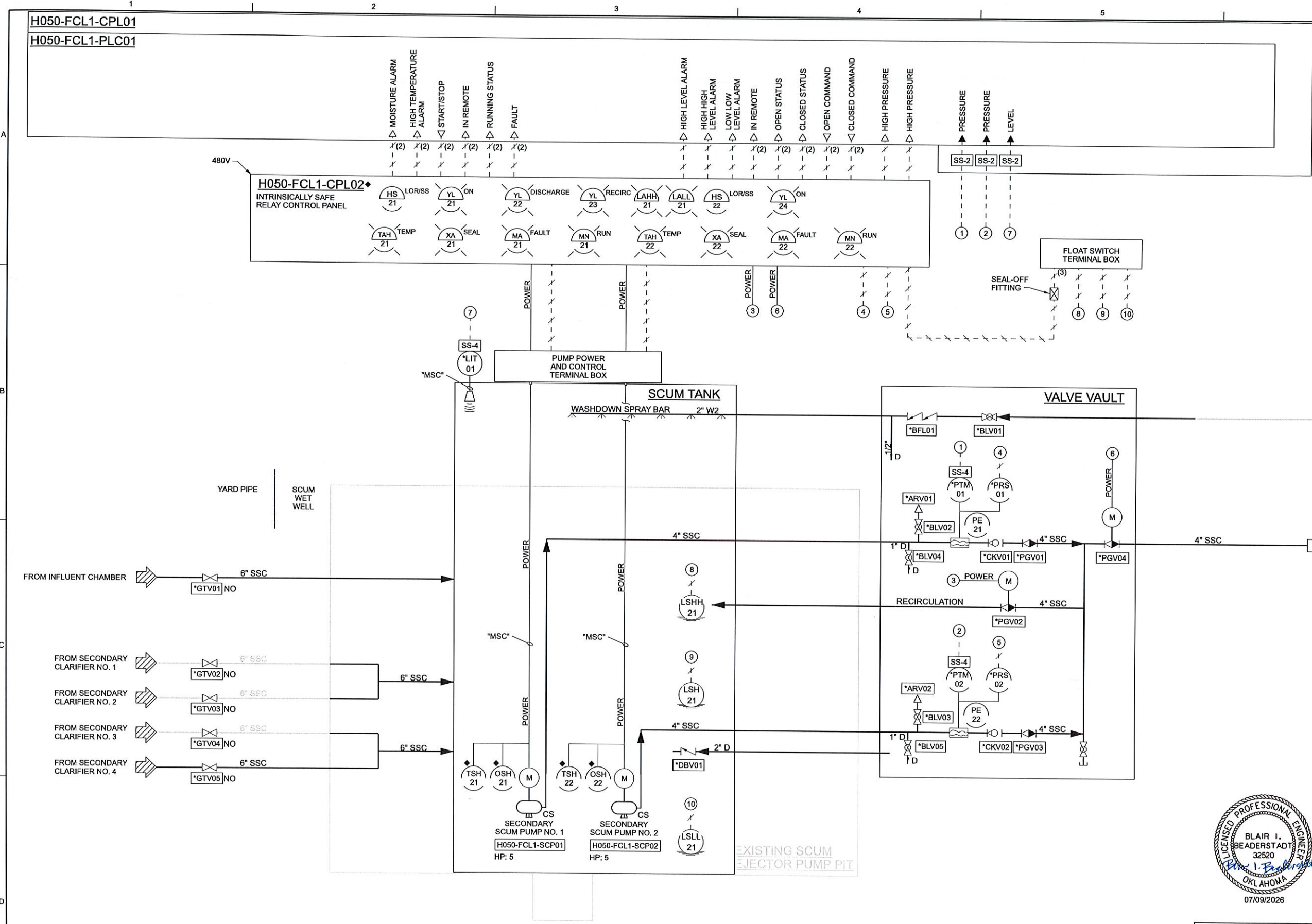
SITE ELECTRICAL			
MOTOR CONTROL DIAGRAMS			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED
ADDENDUM NO. 2	VP	7/7/2026	
NOTE ON DWG.			
PROFILE:			
HORIZONTAL:			
VERTICAL:			
FILE:			
ATLAS PAGE NO:			
DRAWN: BB			
DESIGNED: BB			
PROJ. MGR.			
LEAD ENGR.			
FIELD MGR.			
DATE: MAY 2026			
SHEET 96 OF 300 SHEETS			



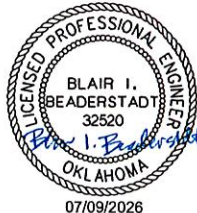
- GENERAL SHEET NOTES**
1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H040-WAS1". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAMEPLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
 2. SEE INSTRUMENTATION AND CONTROLS LEGEND FOR SURGE SUPPRESSOR (SS) TABLE.



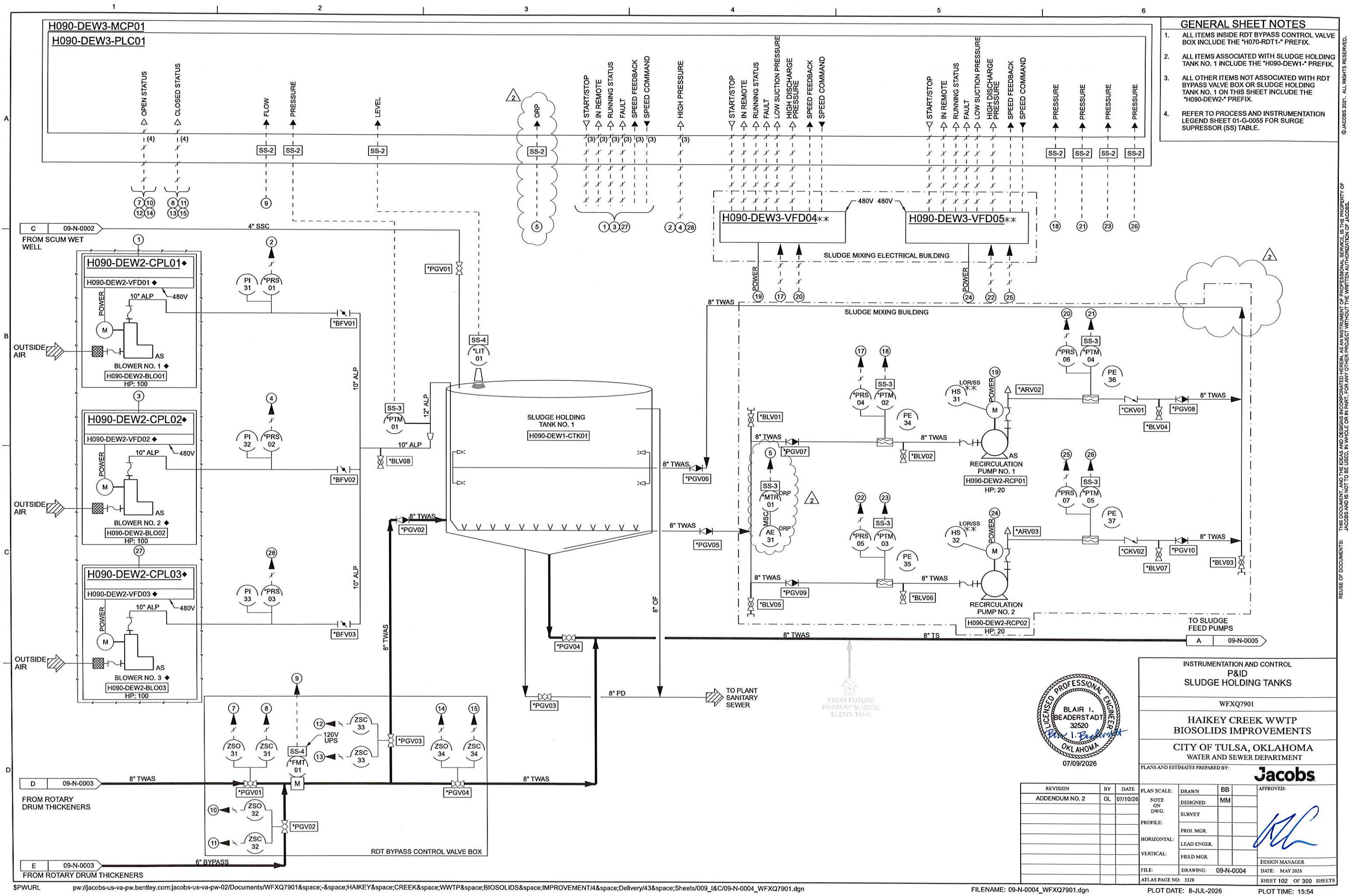
INSTRUMENTATION AND CONTROL P&ID WAS FEED PUMPS			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION		BY	DATE
ADDENDUM NO. 2		OL	07/10/26
PLAN SCALE:	DRAWN	BB	APPROVED:
NOTE ON DWG.	DESIGNED	MM	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		
FILE:	DRAWING:	09-N-0001	DATE: MAY 2026
ATLAS PAGE NO: 3328			SHEET 99 OF 300 SHEETS



- GENERAL SHEET NOTES**
1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H050-FCL1". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAMEPLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
 2. ENTIRE DRAWING IS CONSIDERED THE SCUM COLLECTION SYSTEM: ALT 03, SEE 01-G-0004 PAY QUANTITIES AND NOTES.



INSTRUMENTATION AND CONTROL	
P&ID	
SCUM WET WELL	
WFXQ7901	
HAIKEY CREEK WWTP	
BIOSOLIDS IMPROVEMENTS	
CITY OF TULSA, OKLAHOMA	
WATER AND SEWER DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY:	
Jacobs	
REVISION	BY DATE
ADDENDUM NO. 2	OL 07/10/26
PLAN SCALE:	DRAWN BB
NOTE ON DWG.	DESIGNED MM
PROFILE:	SURVEY
HORIZONTAL:	PROJ. MGR.
VERTICAL:	LEAD ENGR.
FILE:	FIELD MGR.
DRAWING: 09-N-0002	DATE: MAY 2026
ATLAS PAGE NO: 3328	SHEET 100 OF 300 SHEETS



- GENERAL SHEET NOTES**
1. ALL ITEMS INSIDE RDT BYPASS CONTROL VALVE BOX INCLUDE THE "H070-RDT1-" PREFIX.
 2. ALL ITEMS ASSOCIATED WITH SLUDGE HOLDING TANK NO. 1 INCLUDE THE "H090-DEW1-" PREFIX.
 3. ALL OTHER ITEMS NOT ASSOCIATED WITH RDT BYPASS VALVE BOX OR SLUDGE HOLDING TANK NO. 1 ON THIS SHEET INCLUDE THE "H090-DEW2-" PREFIX.
 4. REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055 FOR SURGE SUPPRESSOR (SS) TABLE.



INSTRUMENTATION AND CONTROL
P&ID
SLUDGE HOLDING TANKS

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: **Jacobs**

REVISION	BY	DATE
ADDENDUM NO. 2	OL	07/10/26

PLAN SCALE: NOTE ON DWG.

PROFILE: DESIGNED, SURVEY, PROJ. MGR., LEAD ENGR., FIELD MGR.

HORIZONTAL: PROJ. MGR., LEAD ENGR., FIELD MGR.

VERTICAL: PROJ. MGR., LEAD ENGR., FIELD MGR.

FILE: DRAWING: 09-N-0004

ATLAS PAGE NO: 3328

DATE: MAY 2026

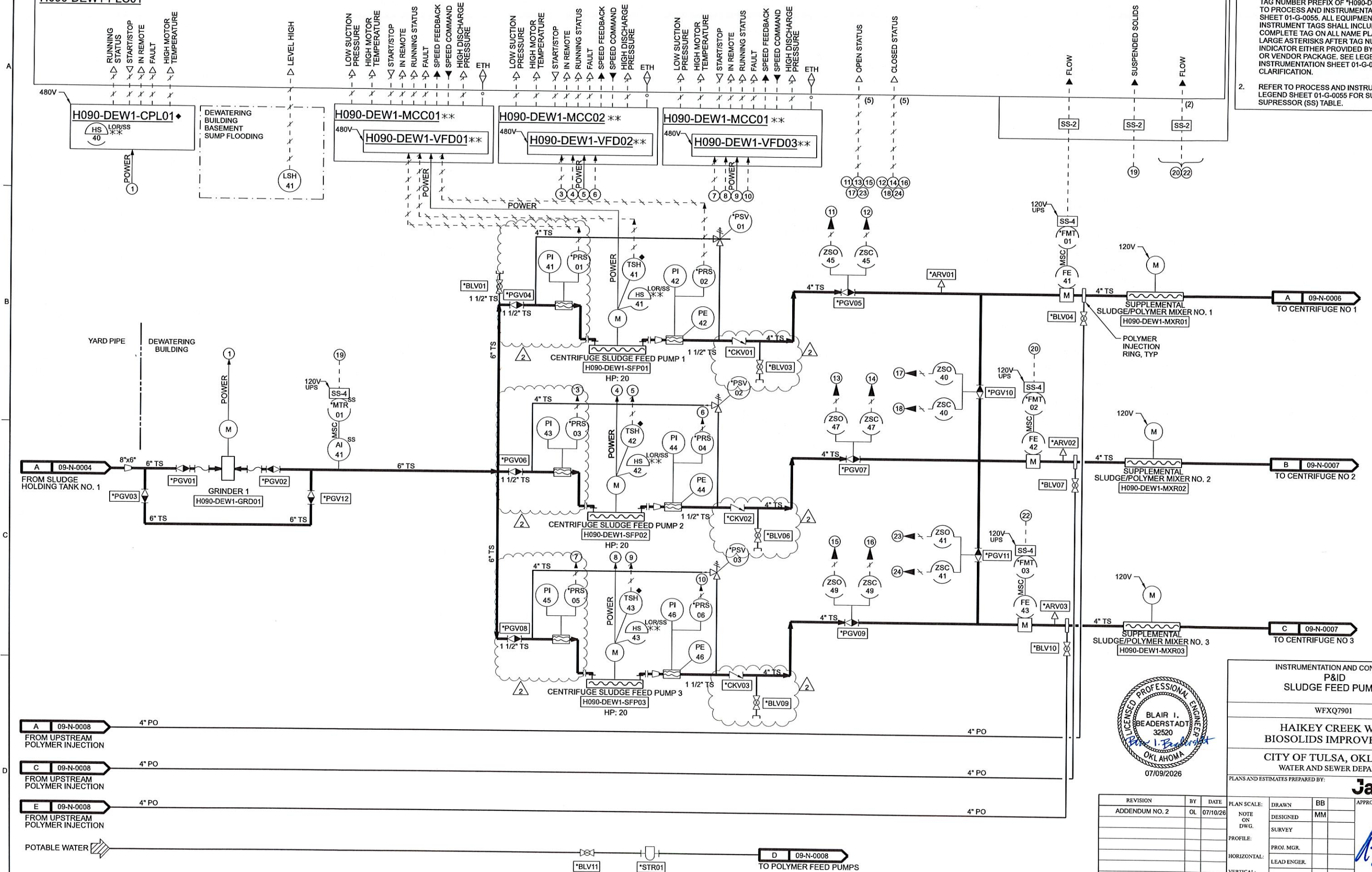
SHEET 102 OF 300 SHEETS

H090-DEW1-MCP01

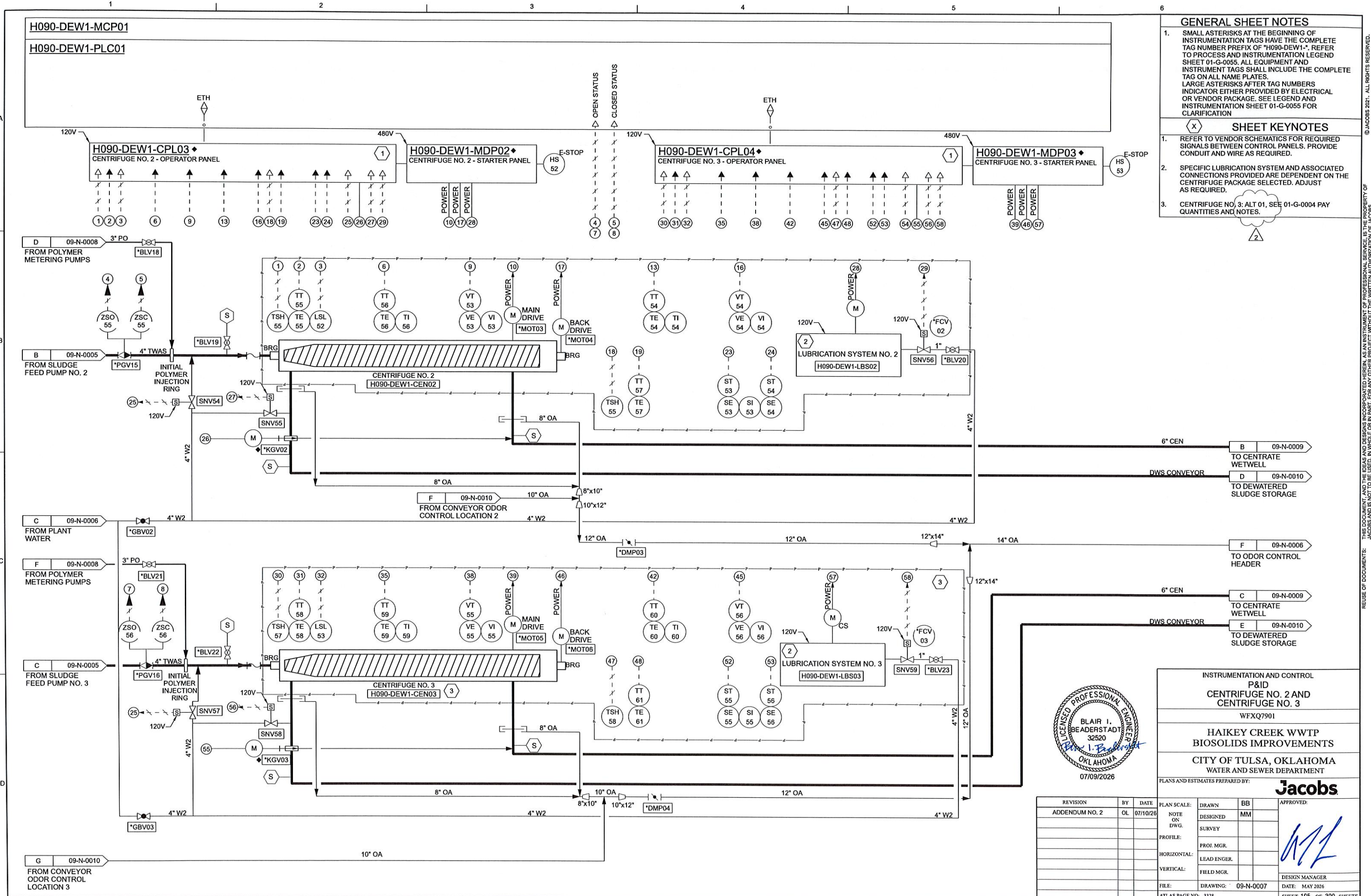
H090-DEW1-PLC01

GENERAL SHEET NOTES

1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H090-DEW1-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
2. REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055 FOR SURGE SUPPRESSOR (SS) TABLE.



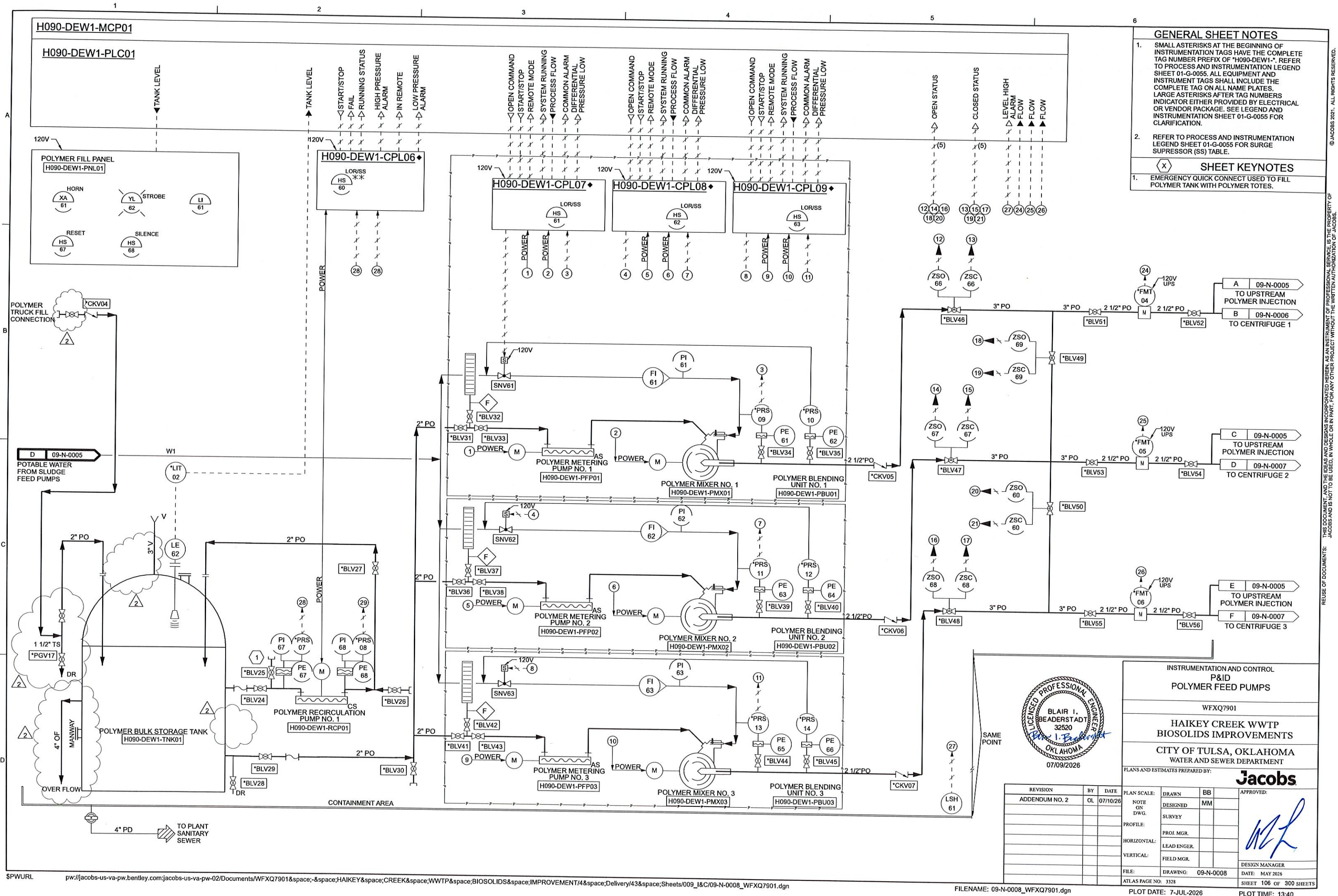
INSTRUMENTATION AND CONTROL	
P&ID	
SLUDGE FEED PUMPS	
WFXQ7901	
HAIKEY CREEK WWTP	
BIOSOLIDS IMPROVEMENTS	
CITY OF TULSA, OKLAHOMA	
WATER AND SEWER DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY:	
Jacobs	
APPROVED:	
DESIGN MANAGER	
DATE: MAY 2026	
SHEET 103 OF 300 SHEETS	



- GENERAL SHEET NOTES**
 - SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H090-DEW1-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES.
LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION
 - REFER TO VENDOR SCHEMATICS FOR REQUIRED SIGNALS BETWEEN CONTROL PANELS. PROVIDE CONDUIT AND WIRE AS REQUIRED.
 - SPECIFIC LUBRICATION SYSTEM AND ASSOCIATED CONNECTIONS PROVIDED ARE DEPENDENT ON THE CENTRIFUGE PACKAGE SELECTED. ADJUST AS REQUIRED.
 - CENTRIFUGE NO. 3: ALT 01, SEE 01-G-0004 PAY QUANTITIES AND NOTES.
- SHEET KEYNOTES**
 - REFER TO VENDOR SCHEMATICS FOR REQUIRED SIGNALS BETWEEN CONTROL PANELS. PROVIDE CONDUIT AND WIRE AS REQUIRED.
 - SPECIFIC LUBRICATION SYSTEM AND ASSOCIATED CONNECTIONS PROVIDED ARE DEPENDENT ON THE CENTRIFUGE PACKAGE SELECTED. ADJUST AS REQUIRED.
 - CENTRIFUGE NO. 3: ALT 01, SEE 01-G-0004 PAY QUANTITIES AND NOTES.



INSTRUMENTATION AND CONTROL P&ID CENTRIFUGE NO. 2 AND CENTRIFUGE NO. 3 WFXQ7901	
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT	
PLANS AND ESTIMATES PREPARED BY: Jacobs	
REVISION	BY DATE
ADDENDUM NO. 2	OL 07/10/26
PLAN SCALE:	NOTE ON DWG.
PROFILE:	SURVEY
HORIZONTAL:	PROJ. MGR.
VERTICAL:	LEAD ENGR.
FILE:	FIELD MGR.
ATLAS PAGE NO: 3328	DRAWING: 09-N-0007
DATE: MAY 2026	
SHEET 105 OF 300 SHEETS	

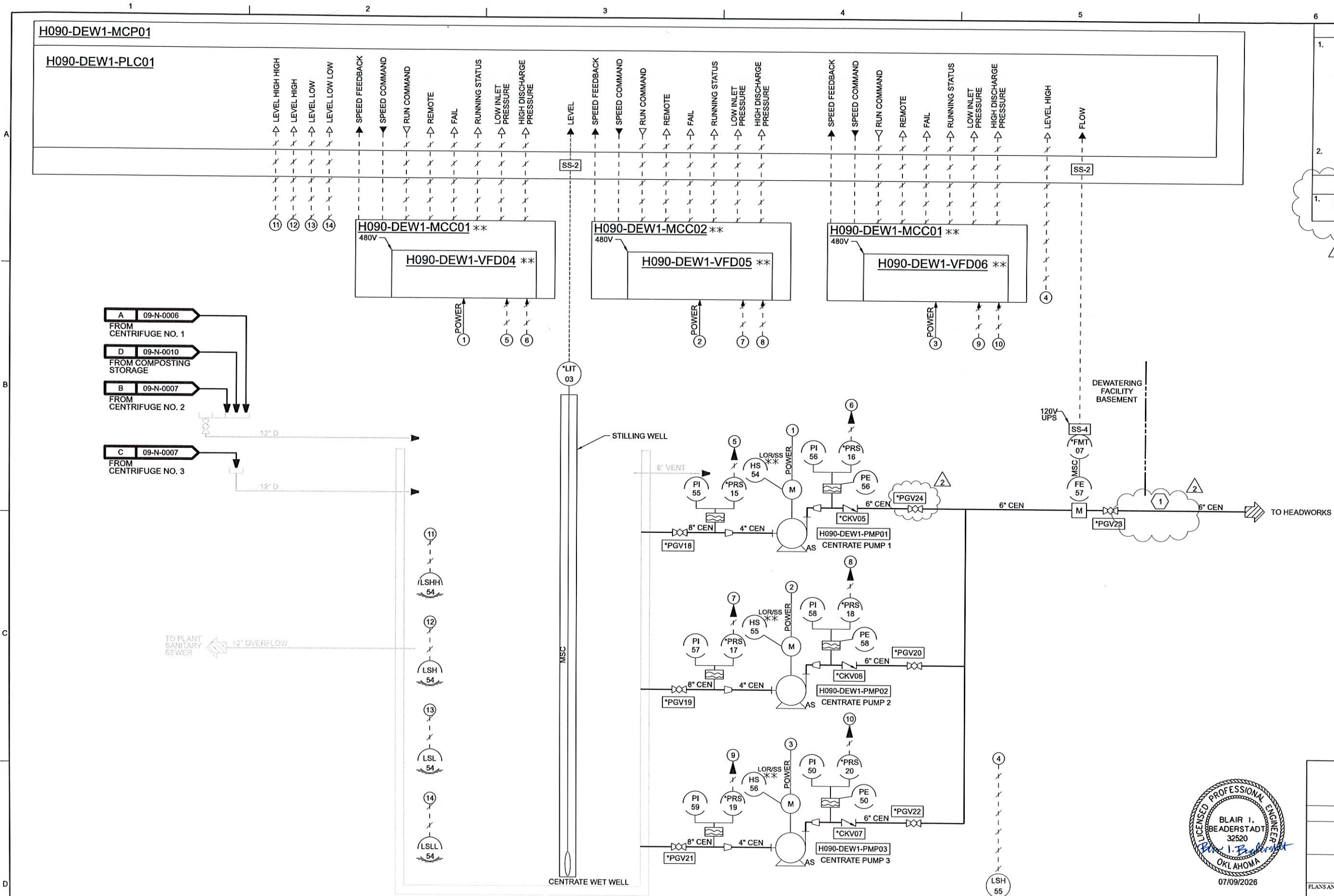


GENERAL SHEET NOTES

- SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H090-DEW1-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATE EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
- REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055 FOR SURGE SUPPRESSOR (SS) TABLE.

SHEET KEYNOTES

- EMERGENCY QUICK CONNECT USED TO FILL POLYMER TANK WITH POLYMER TOTES.



GENERAL SHEET NOTES

1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H090-DEW1-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
2. REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055 FOR SURGE SUPPRESSOR (SS) TABLE.

SHEET KEYNOTES

1. REFER TO PROCESS MECHANICAL SHEET 09-D1BL-D3006 FOR WALL PENETRATION DETAIL.

INSTRUMENTATION AND CONTROL
P&ID
CENTRATE DRAIN PUMP STATION

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs



REVISION	BY	DATE	PLAN SCALE:	DRAWN	BB	APPROVED:
ADDENDUM NO. 2	OL	07/10/26	NOTE ON DWG.	DESIGNED	MM	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
				FIELD MGR.		
			FILE:	DRAWING:	09-N-0009	DESIGN MANAGER
			ATLAS PAGE NO:	3328		DATE: MAY 2026
						SHEET 107 OF 300 SHEETS

H090-DEW1-MCP01

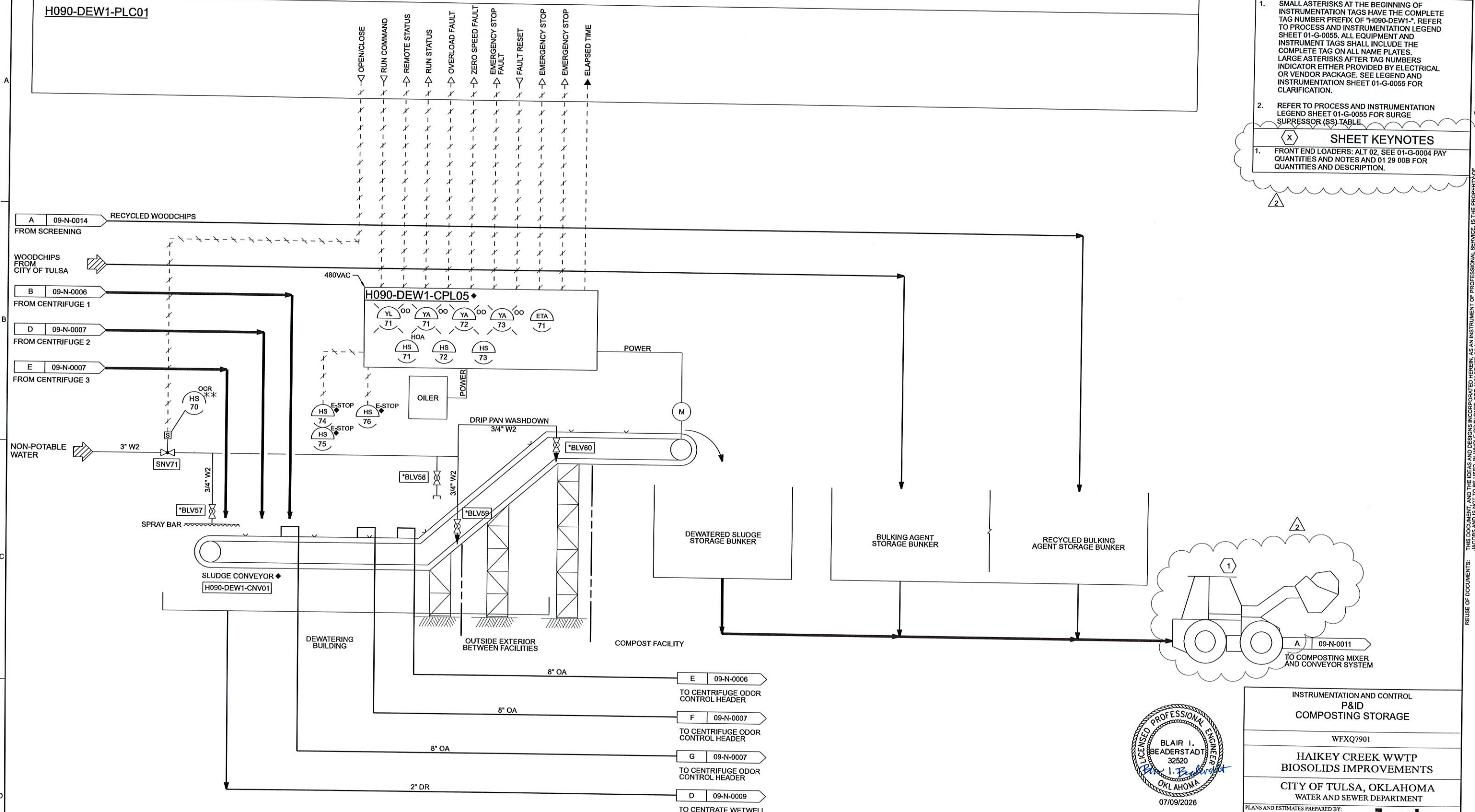
H090-DEW1-PLC01

GENERAL SHEET NOTES

1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H090-DEW1-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
2. REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055 FOR SURGE SUPPRESSOR (SS) TABLE.

SHEET KEYNOTES

1. FRONT END LOADERS: ALT 02, SEE 01-G-0004 PAY QUANTITIES AND NOTES AND 01 29 00B FOR QUANTITIES AND DESCRIPTION.



INSTRUMENTATION AND CONTROL
P&ID
COMPOSTING STORAGE

WFXQ7901

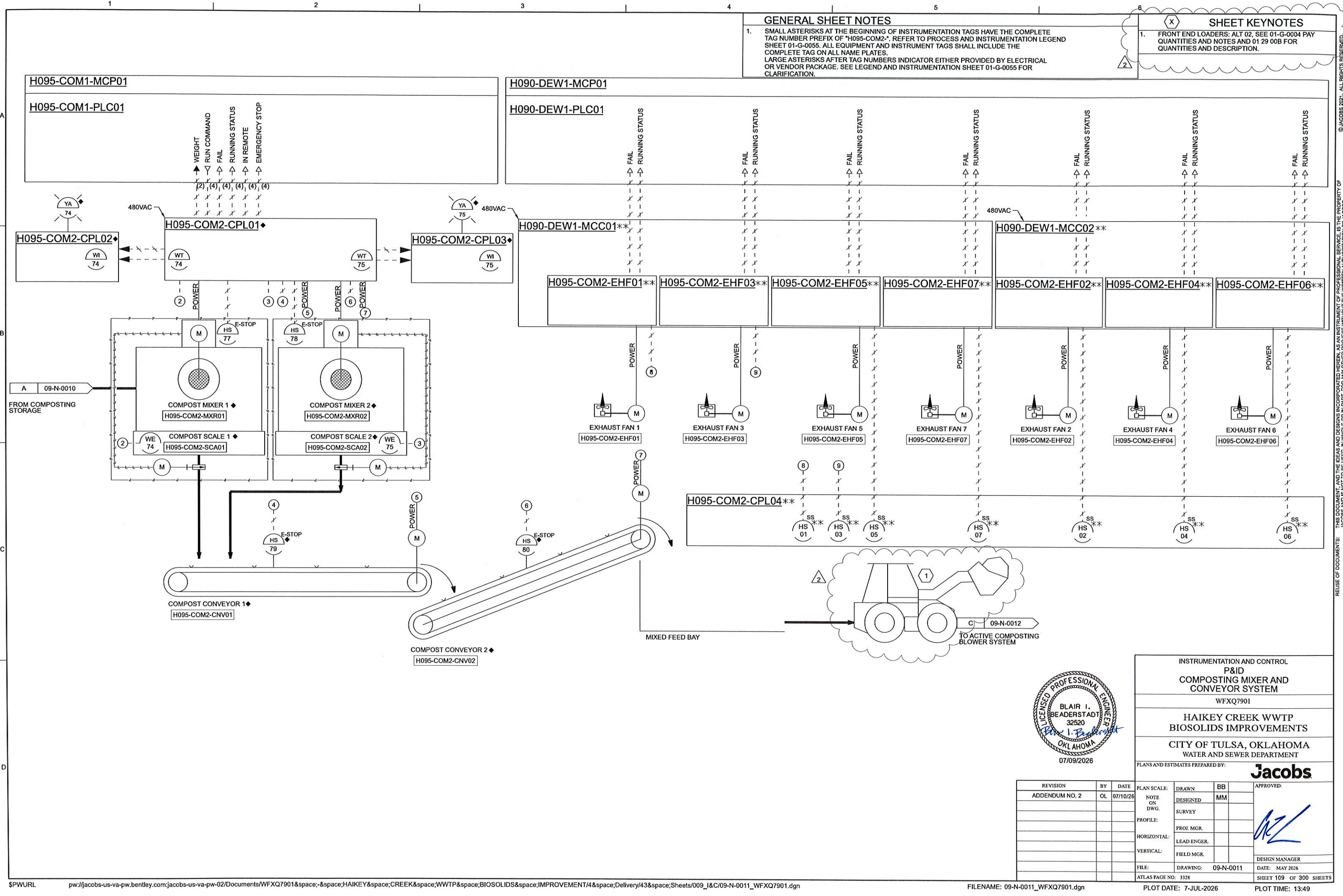
HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs

REVISION	BY	DATE	PLAN SCALE:	DRAWN	BB	APPROVED:
ADDENDUM NO. 2	OL	07/10/26	NOTE ON DWG.	DESIGNED	MM	
			SURVEY			
			PROFILE:	PROJ. MGR.		
			HORIZONTAL:	LEAD ENGR.		
			VERTICAL:	FIELD MGR.		
			FILE:	DRAWING:	09-N-0010	DESIGN MANAGER
			ATLAS PAGE NO:	3328		DATE: MAY 2026
						SHEET 108 OF 300 SHEETS



GENERAL SHEET NOTES

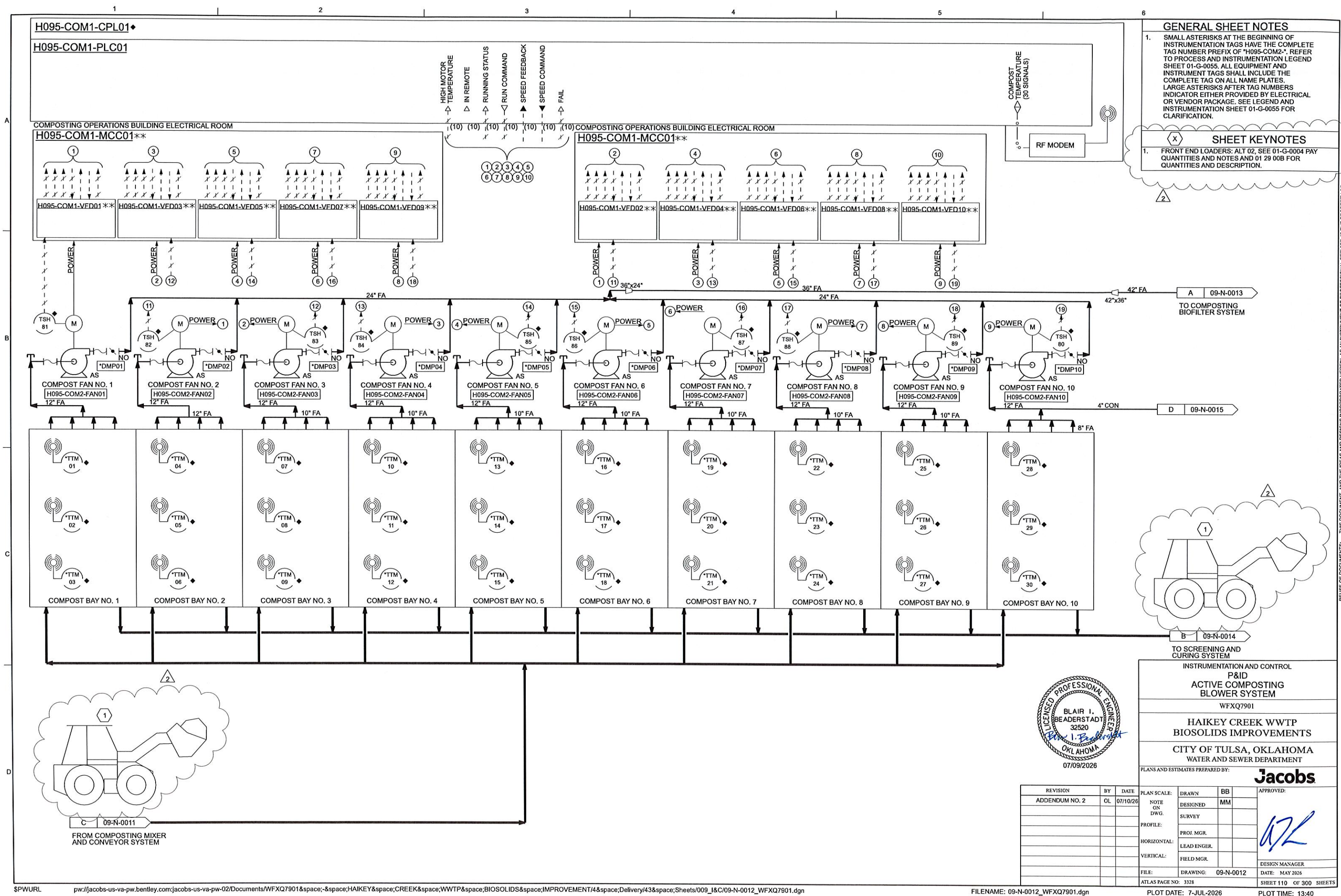
1. SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H095-COM2-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES.
LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.

SHEET KEYNOTES

1. FRONT END LOADERS: ALT 02, SEE 01-G-0004 PAY QUANTITIES AND NOTES AND 01 29 00B FOR QUANTITIES AND DESCRIPTION.



INSTRUMENTATION AND CONTROL P&ID COMPOSTING MIXER AND CONVEYOR SYSTEM WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	OL	07/10/26	
PLAN SCALE:	DRAWN	BB	
NOTE ON DWG.	DESIGNED	MM	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		
	FIELD MGR.		
FILE:	DRAWING:	09-N-0011	DATE: MAY 2026
ATLAS PAGE NO: 3328			SHEET 109 OF 300 SHEETS

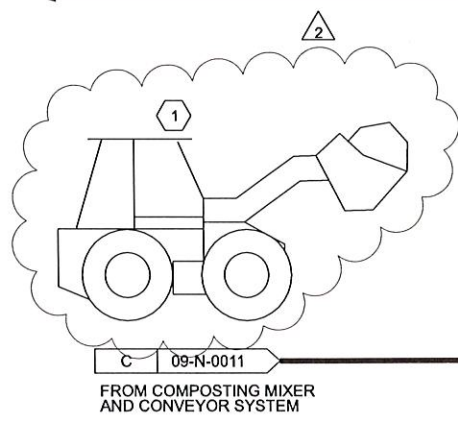
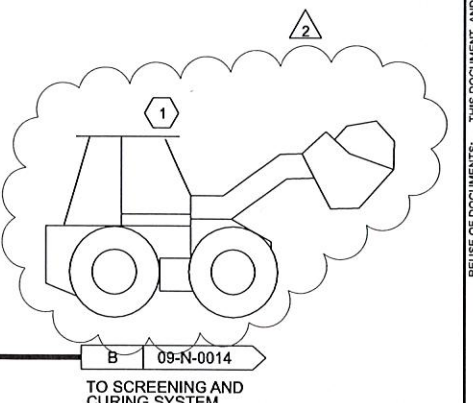


GENERAL SHEET NOTES

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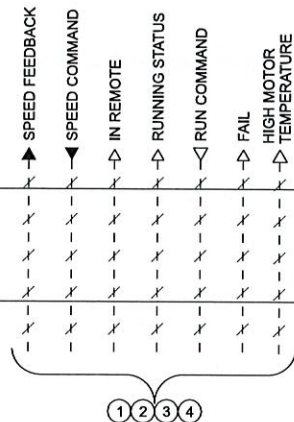
SHEET KEYNOTES

1. FRONT END LOADERS: ALT 02, SEE 01-G-0004 PAY QUANTITIES AND NOTES AND 01 29 00B FOR QUANTITIES AND DESCRIPTION.



H095-COM1-CPL01♦

H095-COM1-PLC01



COMPOST
TEMPERATURE
(11 SIGNALS)
(2 ALTERNATE
SIGNALS)

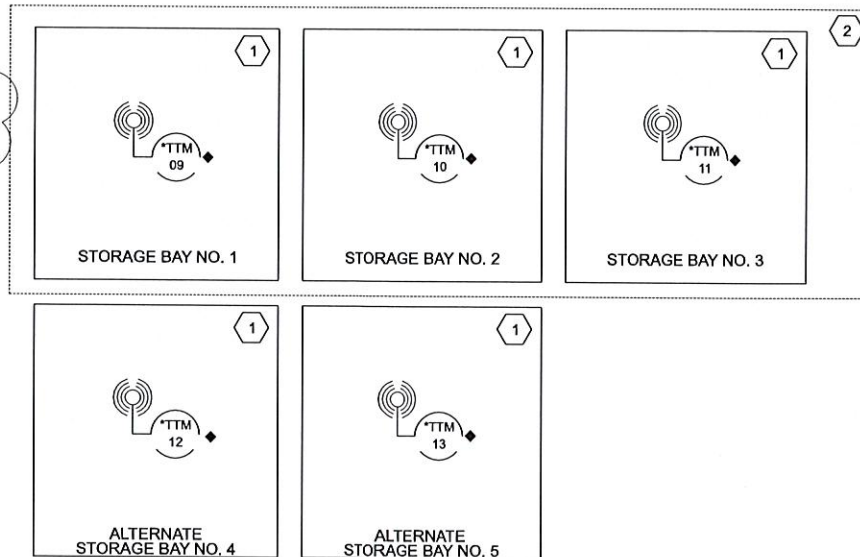
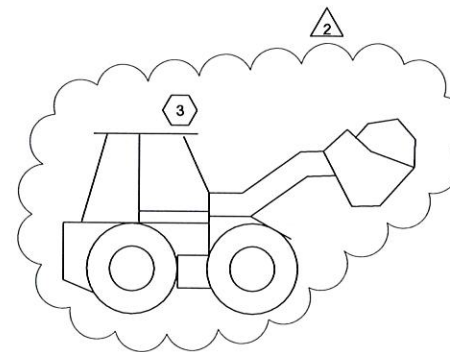
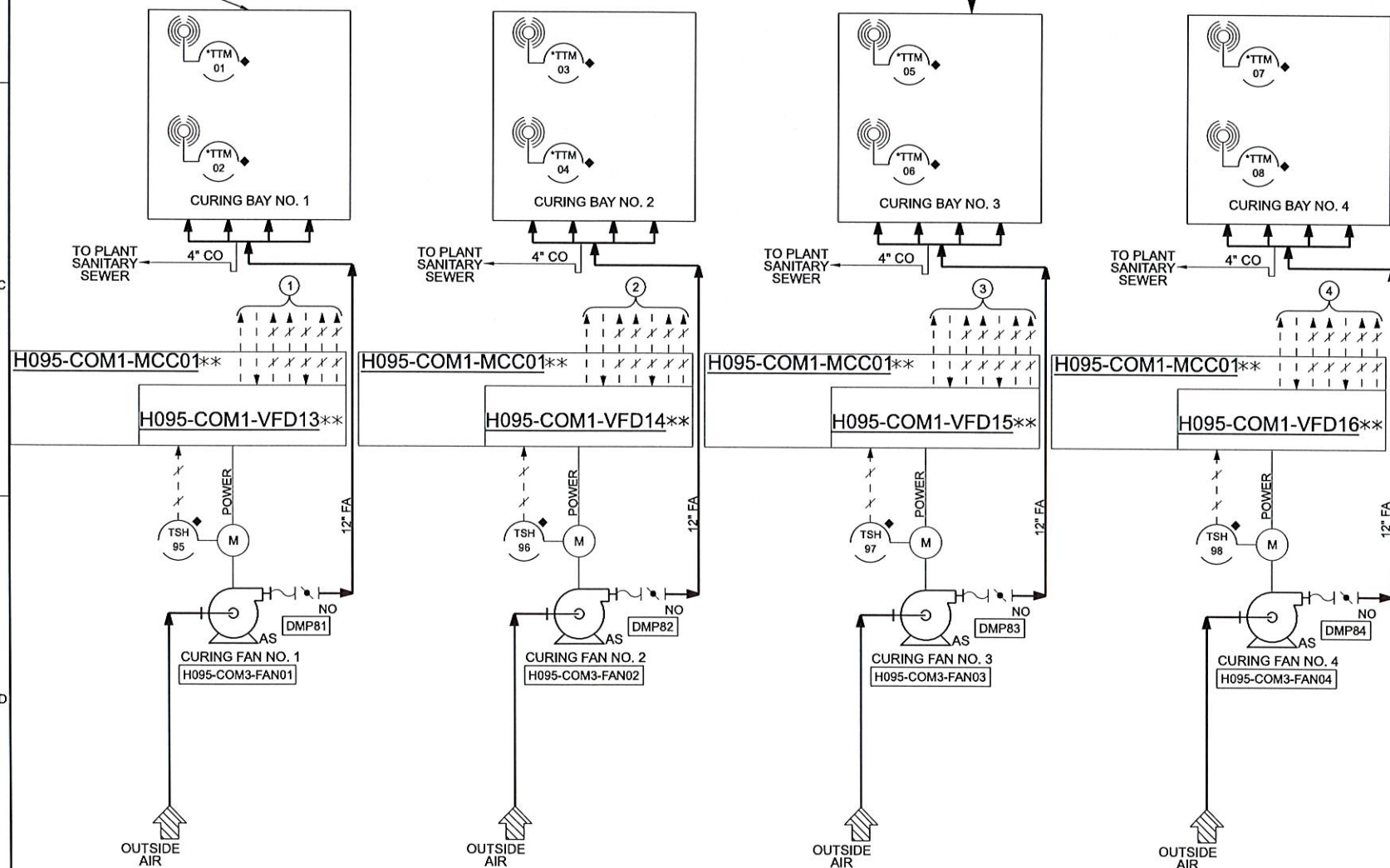
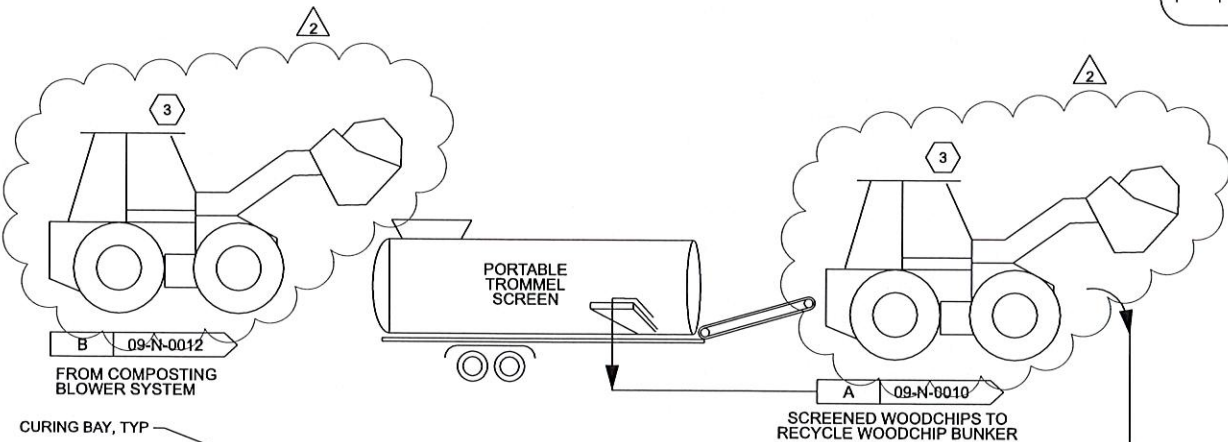
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GENERAL SHEET NOTES

- SMALL ASTERISKS AT THE BEGINNING OF INSTRUMENTATION TAGS HAVE THE COMPLETE TAG NUMBER PREFIX OF "H095-COM3-". REFER TO PROCESS AND INSTRUMENTATION LEGEND SHEET 01-G-0055. ALL EQUIPMENT AND INSTRUMENT TAGS SHALL INCLUDE THE COMPLETE TAG ON ALL NAME PLATES. LARGE ASTERISKS AFTER TAG NUMBERS INDICATOR EITHER PROVIDED BY ELECTRICAL OR VENDOR PACKAGE. SEE LEGEND AND INSTRUMENTATION SHEET 01-G-0055 FOR CLARIFICATION.
- CONTRACTOR TO PROVIDE FIVE OF THE STORAGE BAY TEMPERATURE PROBES. TWO WILL BE FOR FUTURE USE.
- FINISHED COMPOST STORAGE BAYS BETWEEN GRIDS A AND D: BASE BID BAYS BETWEEN GRIDS D AND F: ALT 04 SEE 01-G-0004 PAY QUANTITIES AND NOTES.
- FRONT END LOADERS: ALT 02, SEE 01-G-0004 PAY QUANTITIES AND NOTES AND 01 29 00B FOR QUANTITIES AND DESCRIPTION.

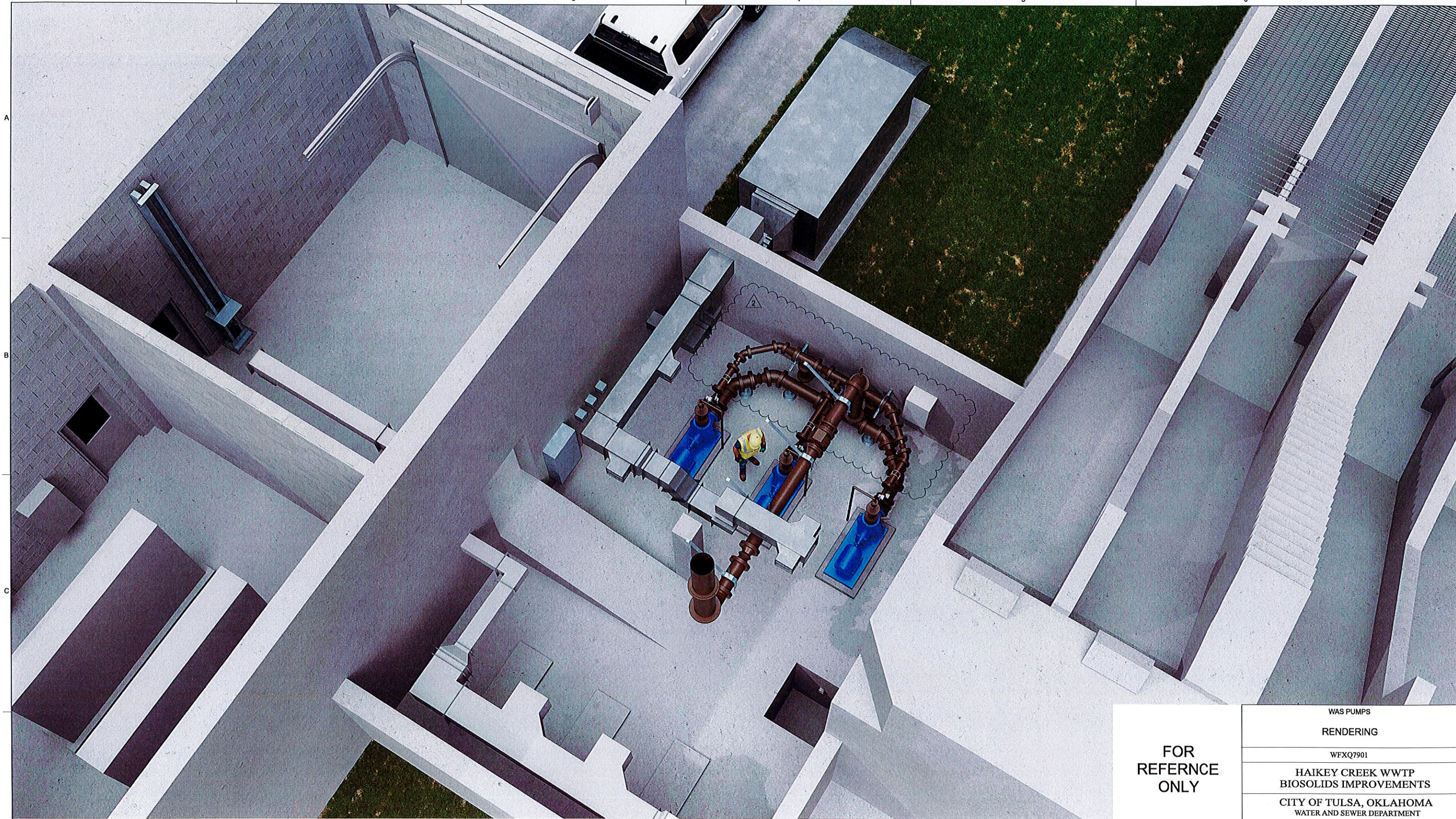
SHEET KEYNOTES

- CONTRACTOR TO PROVIDE FIVE OF THE STORAGE BAY TEMPERATURE PROBES. TWO WILL BE FOR FUTURE USE.
- FINISHED COMPOST STORAGE BAYS BETWEEN GRIDS A AND D: BASE BID BAYS BETWEEN GRIDS D AND F: ALT 04 SEE 01-G-0004 PAY QUANTITIES AND NOTES.
- FRONT END LOADERS: ALT 02, SEE 01-G-0004 PAY QUANTITIES AND NOTES AND 01 29 00B FOR QUANTITIES AND DESCRIPTION.



INSTRUMENTATION AND CONTROL
P&ID
SCREENING, CURING, AND
STORAGE SYSTEM
WFXQ7901
HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT
PLANS AND ESTIMATES PREPARED BY:
Jacobs

REVISION	BY	DATE	PLAN SCALE:	DRAWN	BB	APPROVED:
ADDENDUM NO. 2	OL	07/10/26	NOTE ON DWG.	DESIGNED	MM	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
			FILE:	FIELD MGR.		
			ATLAS PAGE NO:	DRAWING:	09-N-0014	



FOR
REFERENCE
ONLY

WAS PUMPS
RENDERING

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

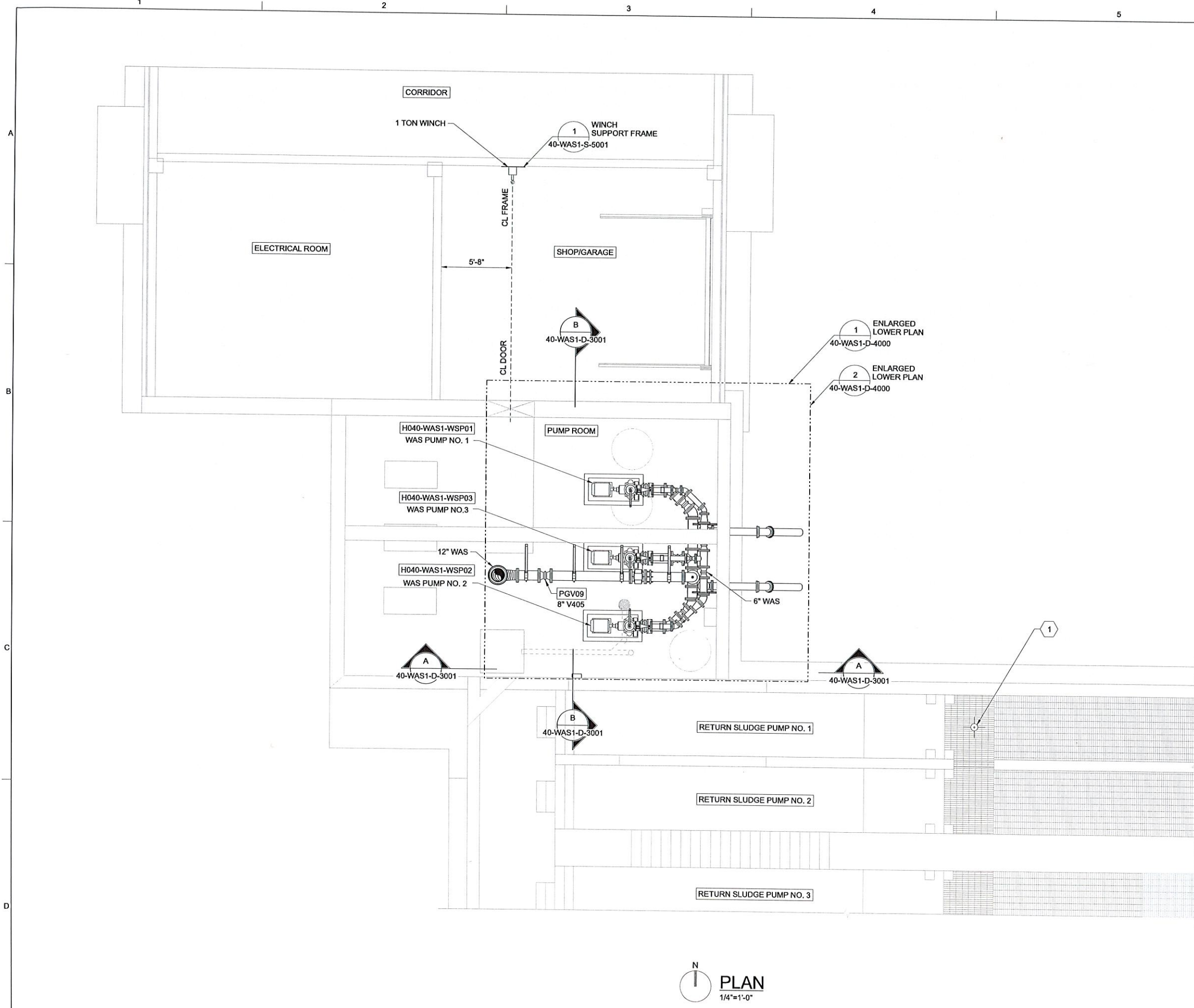
PLANS AND ESTIMATES PREPARED BY:

Jacobs

REVISION	BY	DATE	PLAN SCALE:	DRAWN	SG	APPROVED:
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			VERTICAL:	FIELD MGR.		
			FILE:	DRAWING: 40-WAS1-R-0001		DESIGN MANAGER
			ATLAS PAGE NO: 3328			DATE: MAY 2026
						SHEET 120 OF 300 SHEETS



RENDERING
NTS



GENERAL NOTES

1. FIELD VERIFY WINCH LOCATION IS CENTERED FOR EQUIPMENT REMOVAL IN PUMP ROOM BASEMENT.
2. COORDINATE WITH ENGINEER ANY CONFLICTS WITH PERSONNEL ACCESS.
3. VERIFY CABLE LENGTH REACHES PAST THE BOTTOM OF THE PUMP ROOM RAMP PRIOR TO INSTALLATION.

SHEET KEYNOTES

1. APPROXIMATE LOCATION OF EXISTING 6" WAS SUCTION FEED TO EXISTING BASEMENT WAS PUMP HEADER. CONTRACTOR TO SUBMIT TEMPORARY ISOLATION PLAN FOR DEMOLITION ACTIVITIES. OPTIONAL SOLUTION: INSTALL TEMPORARY INFLATABLE PLUG ATTACHED VIA POLE.

WINCH PERFORMANCE DATA

MOTOR HORSE POWER (HP)	1.5
MOTOR VOLTAGE	115V
CABLE DIAMETER (IN)	3/8
MINIMUM PULL LENGTH (FT)	100
THERN MODEL 3WG4-B/M4000-9S6 OR EQUAL	

2

WAS PUMPS PROCESS PLAN

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JP	APPROVED:
ADDENDUM NO. 2	TP	6/2026	NOTE ON DWG.	DESIGNED	TP	
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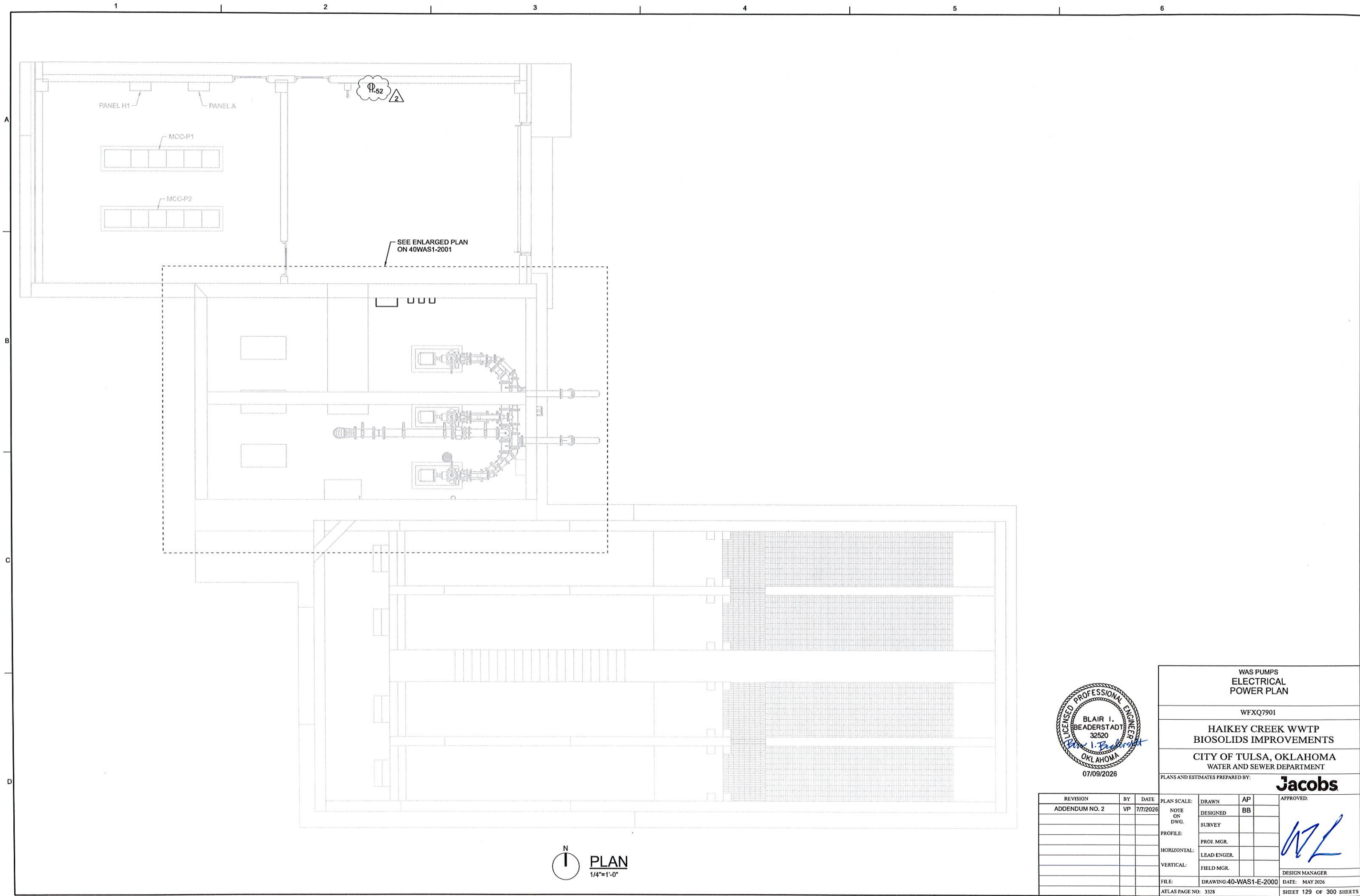
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WAS PUMPS
ELECTRICAL
POWER PLAN

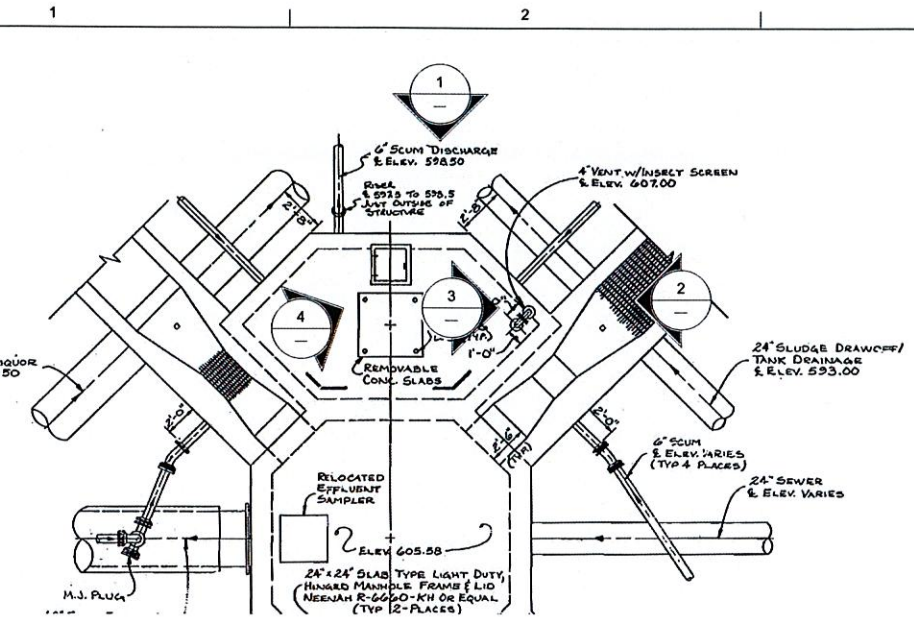
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

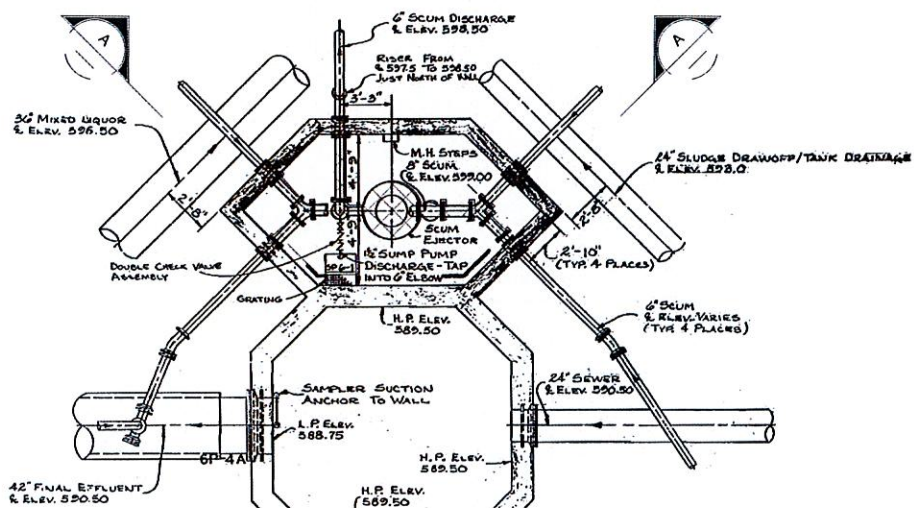
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
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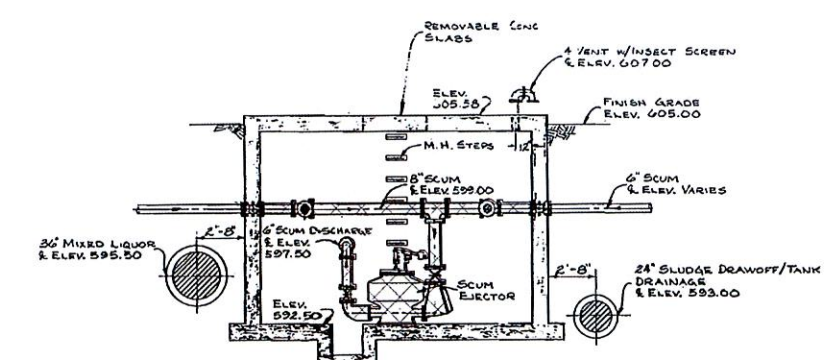
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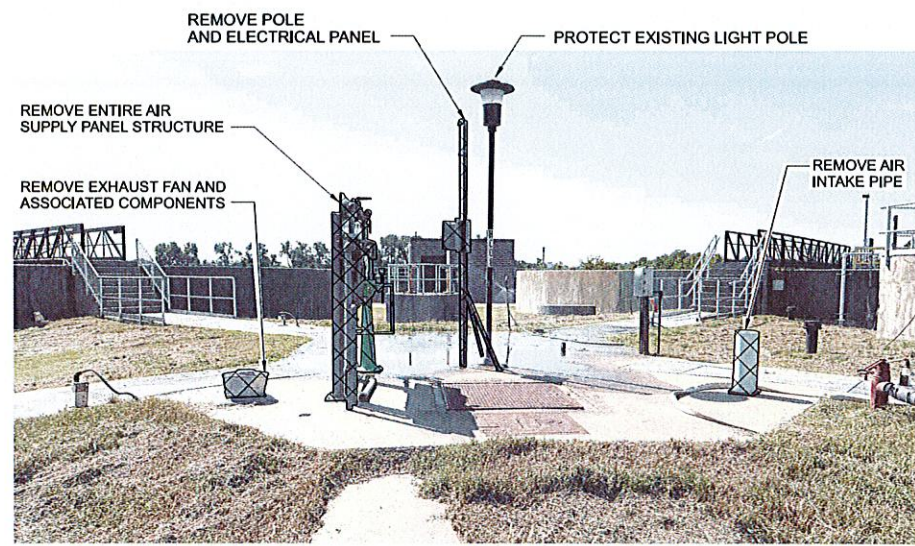
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NTS
SCUM EJECTOR EXTERIOR (AERIAL VIEW)



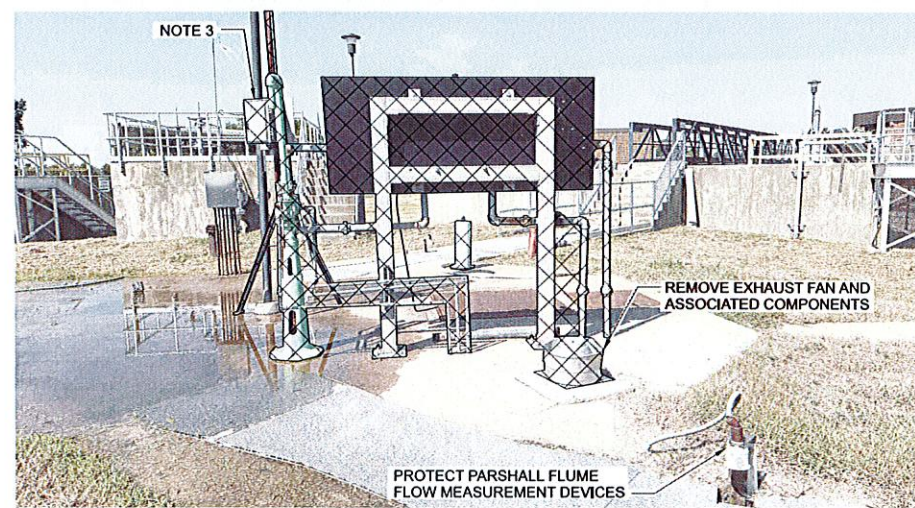
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NTS
SCUM EJECTOR INTERIOR (AERIAL VIEW)



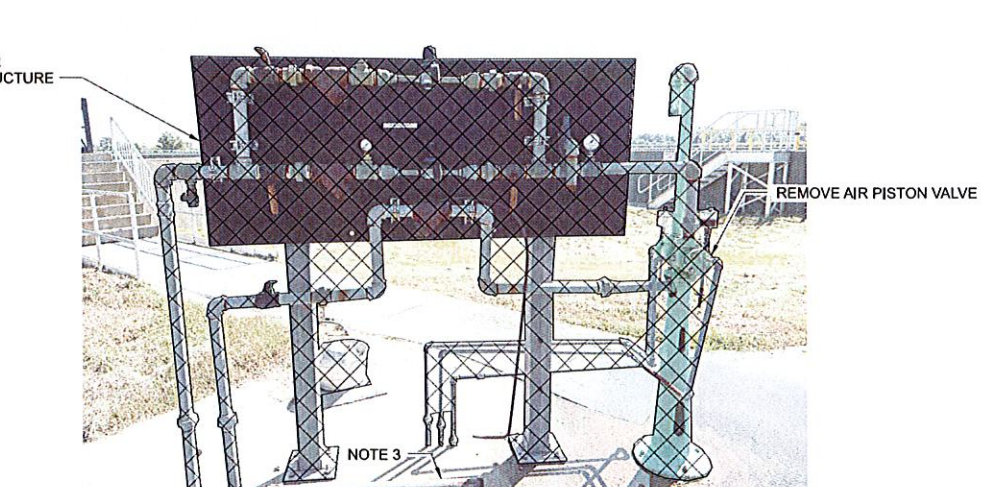
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SECTION



1
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SCUM EJECTOR EXTERIOR



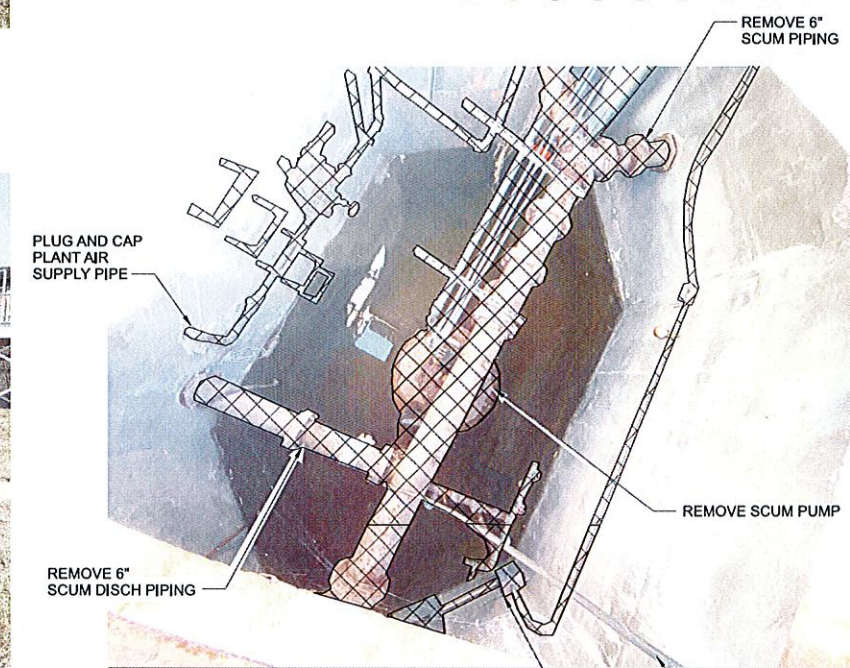
2
NTS
SCUM EJECTOR AIR SUPPLY PIPING (BACK VIEW)



3
NTS
SCUM EJECTOR AIR SUPPLY PIPING (FRONT VIEW)

GENERAL SHEET NOTES

- OWNER SHALL REMOVE MISCELLANEOUS ITEMS SUCH AS CORDS, HOSES, PIPES, TUBES, SACKS, BUCKETS, ROPES, BOTTLES, AND SPRAY BOTTLES AROUND DEMOLITION AREA BEFORE REMOVAL CAN BEGIN.
- CONTRACTORS SHALL CLEAN SCUM EJECTOR PIT EXTERIOR AND INTERIOR FROM DEBRIS AFTER COMPLETION.
- ELECTRICAL COMPONENTS ON SCUM WELL SITE SHALL BE INSPECTED TO ENSURE POWER IS DISCONNECTED BEFORE REMOVAL OF SCUM COMPONENTS.
- REFER TO GRAVITY THICKENER PROCESS FLOW DIAGRAM, SHEET 01-G-0062, FOR DEMOLITION AND ABANDONMENT STEPS.
- REFER TO YARD PIPING DRAWING 07-Y-1000 FOR BURIED PIPE ABANDONMENT.
- REFER TO STRUCTURAL SHEET DRAWING 50-FCL1-S-1000 FOR SCUM PIT CONCRETE DEMOLITION.
- SCUM COLLECTION SYSTEM: ALT03. SEE DRAWING 01-G-0004 PAY QUANTITIES AND NOTES.



4
NTS
SCUM EJECTOR INTERIOR (DOWN VIEW)

SCUM COLLECTION PROCESS DEMOLITION PLANS, SECTION AND PHOTOS

WFXQ7901

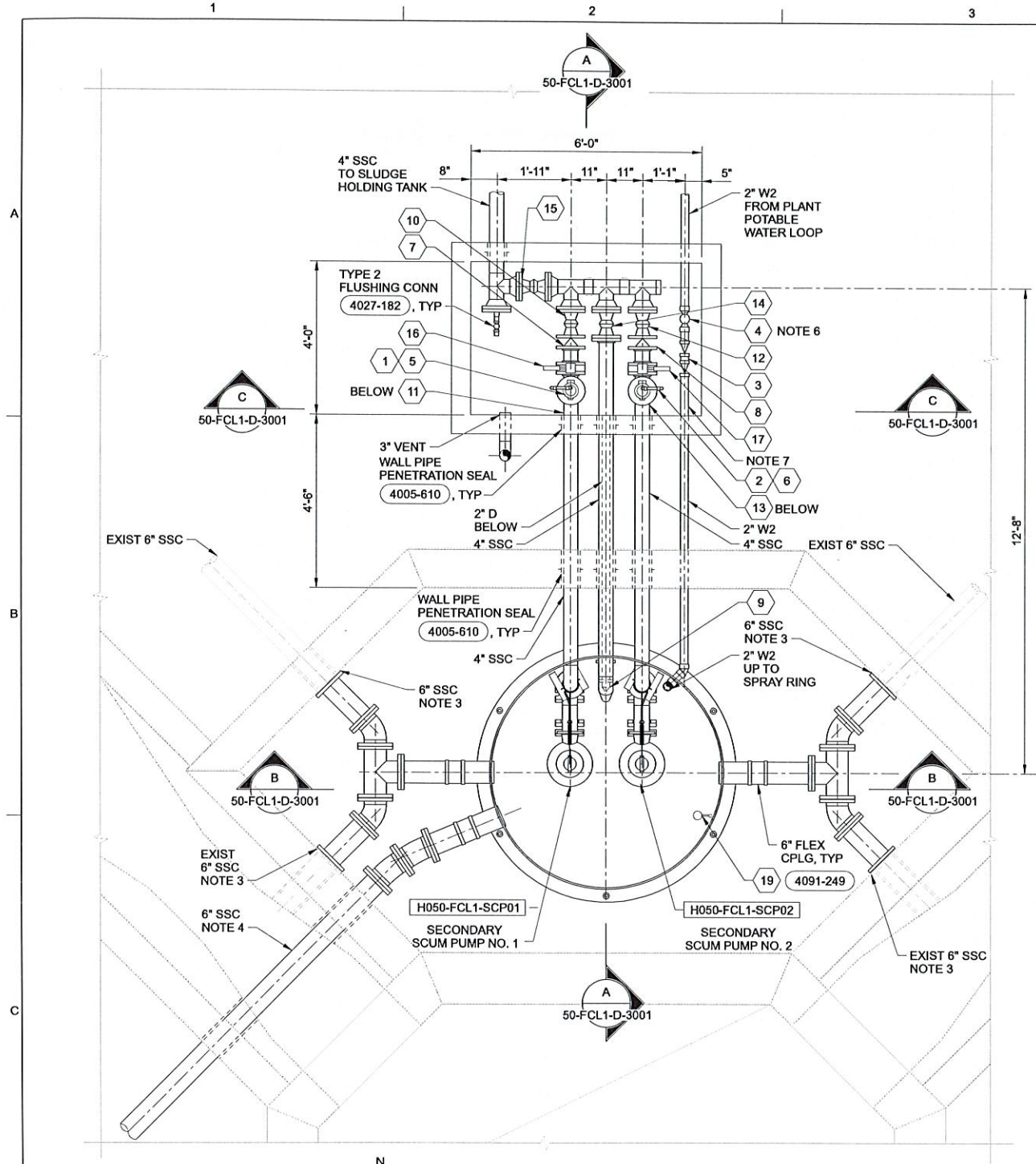
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT

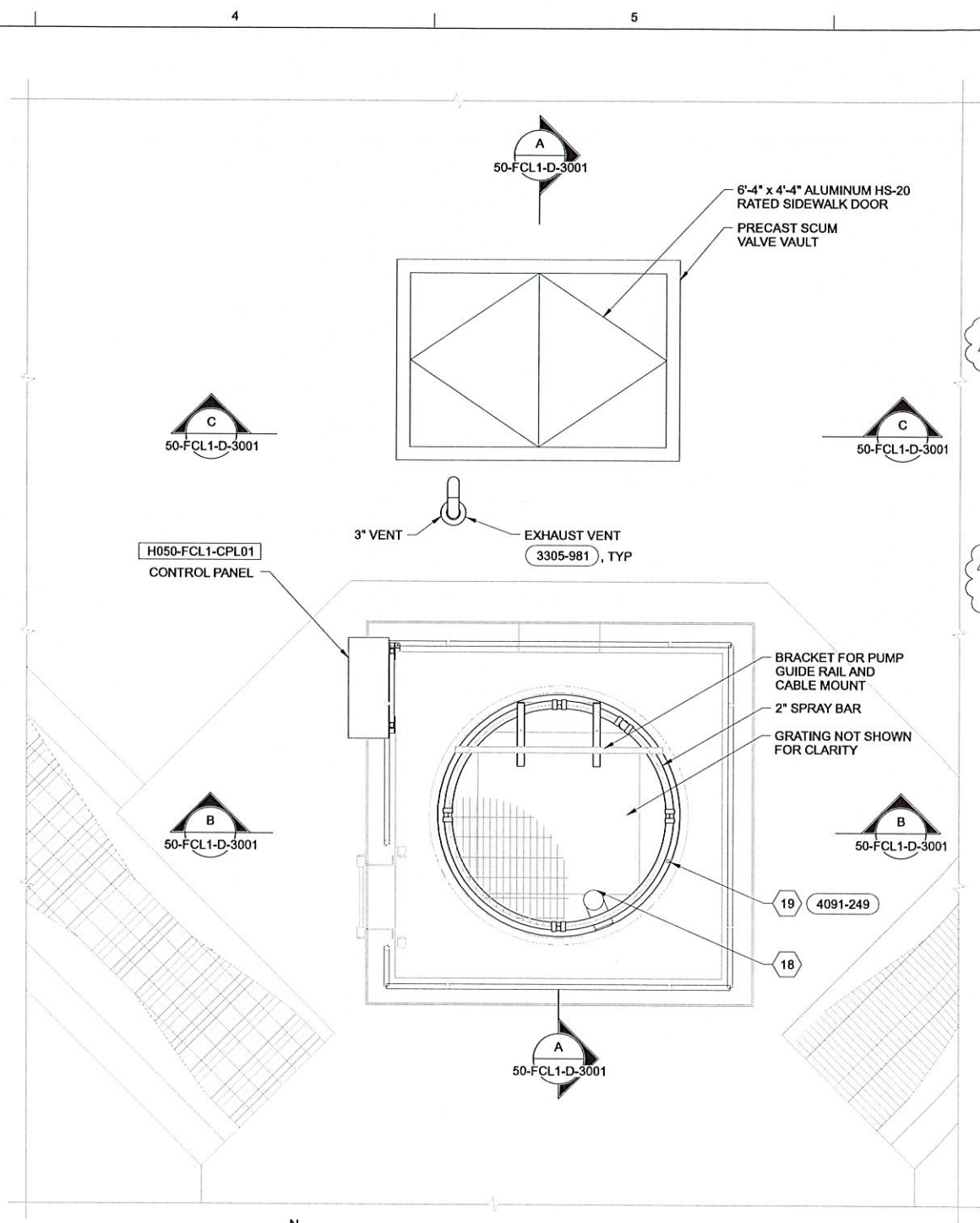
PLANS AND ESTIMATES PREPARED BY: **Jacobs**



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JP	APPROVED:
ADDENDUM NO. 2	TP	6/2026	NOTE ON DWG.	DESIGNED	TP	
			PROFILE:	SURVEY		
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				FIELD MGR.		
			FILE:	DRAWING: 50-FCL1-D-1000		DATE: MAY 2026
			ATLAS PAGE NO: 3328			SHEET 134 OF 300 SHEETS



LOWER LEVEL PLAN
1/2"=1'-0"



UPPER LEVEL PLAN
1/2"=1'-0"

GENERAL SHEET NOTES

- COMPLETE TAG NUMBERS INCLUDE THE "H050-FCL1" PREFIX.
- NEW FRP MANHOLE SHALL BE INSTALLED WITH A CLOSED BOTTOM AND OPEN TOP.
- FIELD CONFIRM EXISTING PIPE TIE-IN ELEVATIONS AND COORDINATE WITH MANUFACTURER FOR FINAL FRP MANHOLE PIPE TIE-IN ELEVATIONS.
- DESIGN SHORING AND SUPPORT AS REQUIRED TO PROTECT EXISTING STRUCTURE DURING PIPE INSTALLATION UNDERNEATH FLUME. BACKFILL WITH CLSM TO BOTTOM OF STRUCTURAL SLAB. ANY DAMAGE TO PARSHALL FLUME DURING CONSTRUCTION ACTIVITIES SHALL BE FIXED AT THE CONTRACTORS EXPENSE.
- SCUM COLLECTION SYSTEM: ALT03. SEE DRAWING 01-G-0004 PAY QUANTITIES AND NOTES.
- PROVIDE OPERATOR EXTENSION SUCH THAT ISOLATION VALVE CAN BE OPERATED FROM THE SURFACE.
- INSTALL 1/2" MNPT IRRIGATION AUTOMATIC DRAIN VALVE.
- SCUM WET WELL AND VALVE VAULT ARE DESIGNED TO BE INDIVIDUALLY INSTALLED AND ASSEMBLED. A PACKAGED FRP LIFT STATION WITH A PRECAST CONCRETE VAULT MAY BE SUBMITTED FOR ENGINEER'S REVIEW AND APPROVAL AS WELL.
- PROCESS PIPING IS DRAWN AS WELDED JOINTS BUT SHALL FOLLOW PIPE SCHEDULE SELECTION FOR DUCTILE IRON PIPE WITH FLANGED JOINTS OR RIGID GROOVED JOINTS.

SHEET KEYNOTES

- | | | | | |
|------------|------------------|------------|--------|--------|
| 1. ARV01 | 1" V742 | 19. LSL 21 | LSH 21 | LSH 21 |
| 2. ARV02 | 1" V742 | | | |
| 3. BFL01 | 2" V640, 2" V642 | | | |
| 4. BLV01 | 2" V330 | | | |
| 5. BLV02 | 1" V330 | | | |
| 6. BLV03 | 1" V330 | | | |
| 7. CKV03 | 4" V632 | | | |
| 8. CKV04 | 4" V632 | | | |
| 9. DBV01 | 2" V634 | | | |
| 10. PGV01 | 4" V405 | | | |
| 11. PGV02 | 1" V405 | | | |
| 12. PGV03 | 4" V405 | | | |
| 13. PGV04 | 1" V405 | | | |
| 14. PGV05 | 4" V405 | | | |
| 15. PGV06 | 4" V405 | | | |
| 16. PE 21 | PTM 01 | PRS 01 | | |
| 17. PE 22 | PTM 02 | PRS 02 | | |
| 18. LIT 01 | | | | |

SCUM COLLECTION
PROCESS
LOWER AND UPPER LEVEL PLANS

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

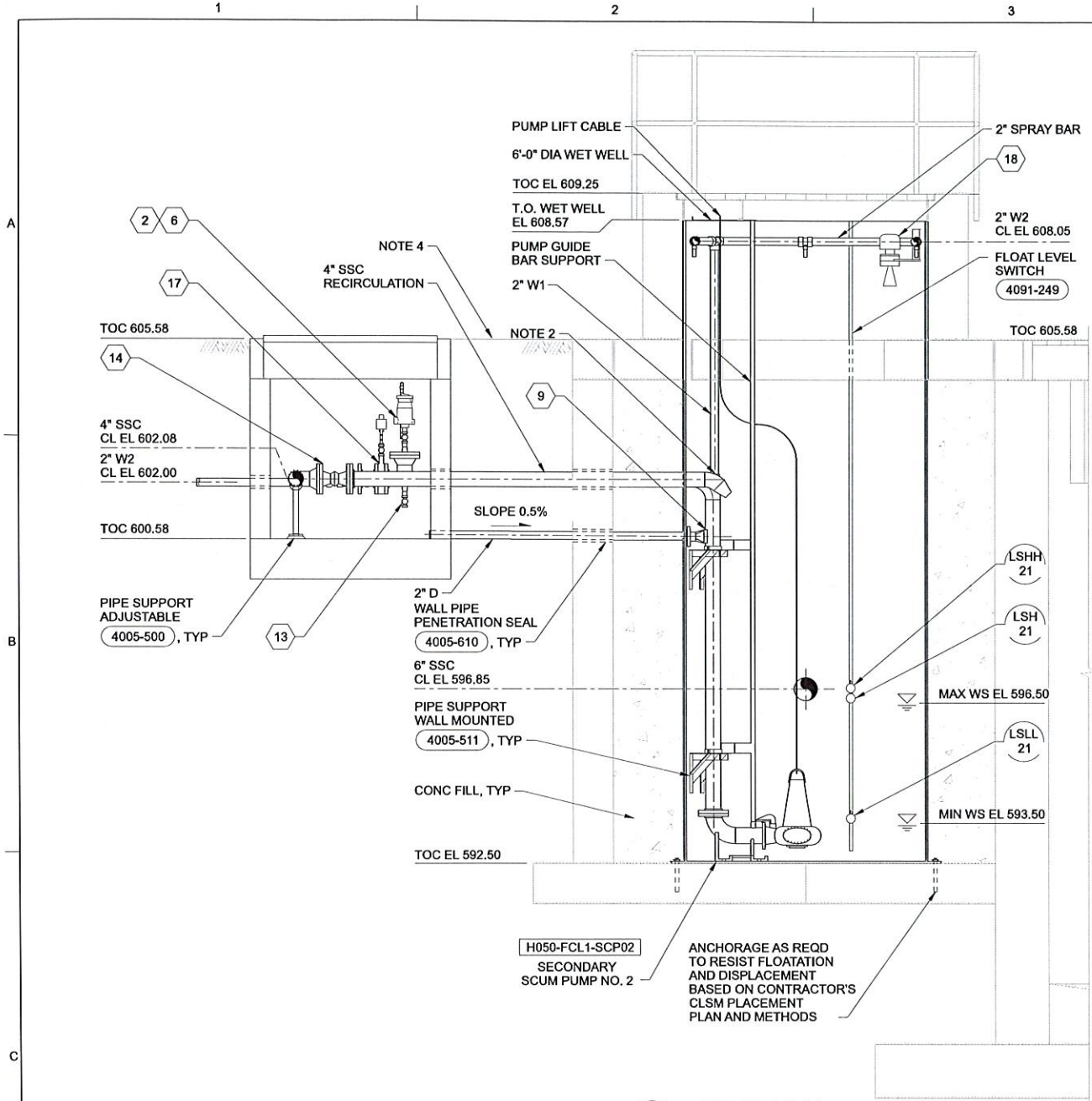
Jacobs



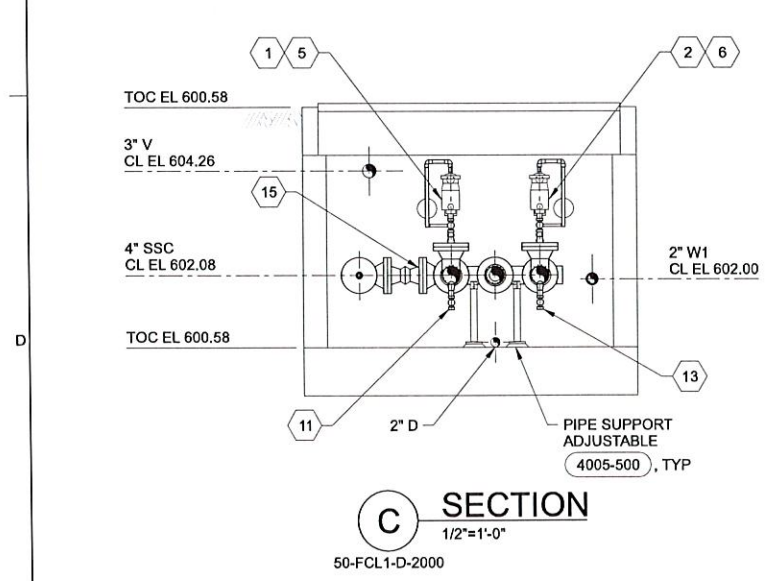
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REVISION	BY	DATE
ADDENDUM NO. 2	TP	8/2026

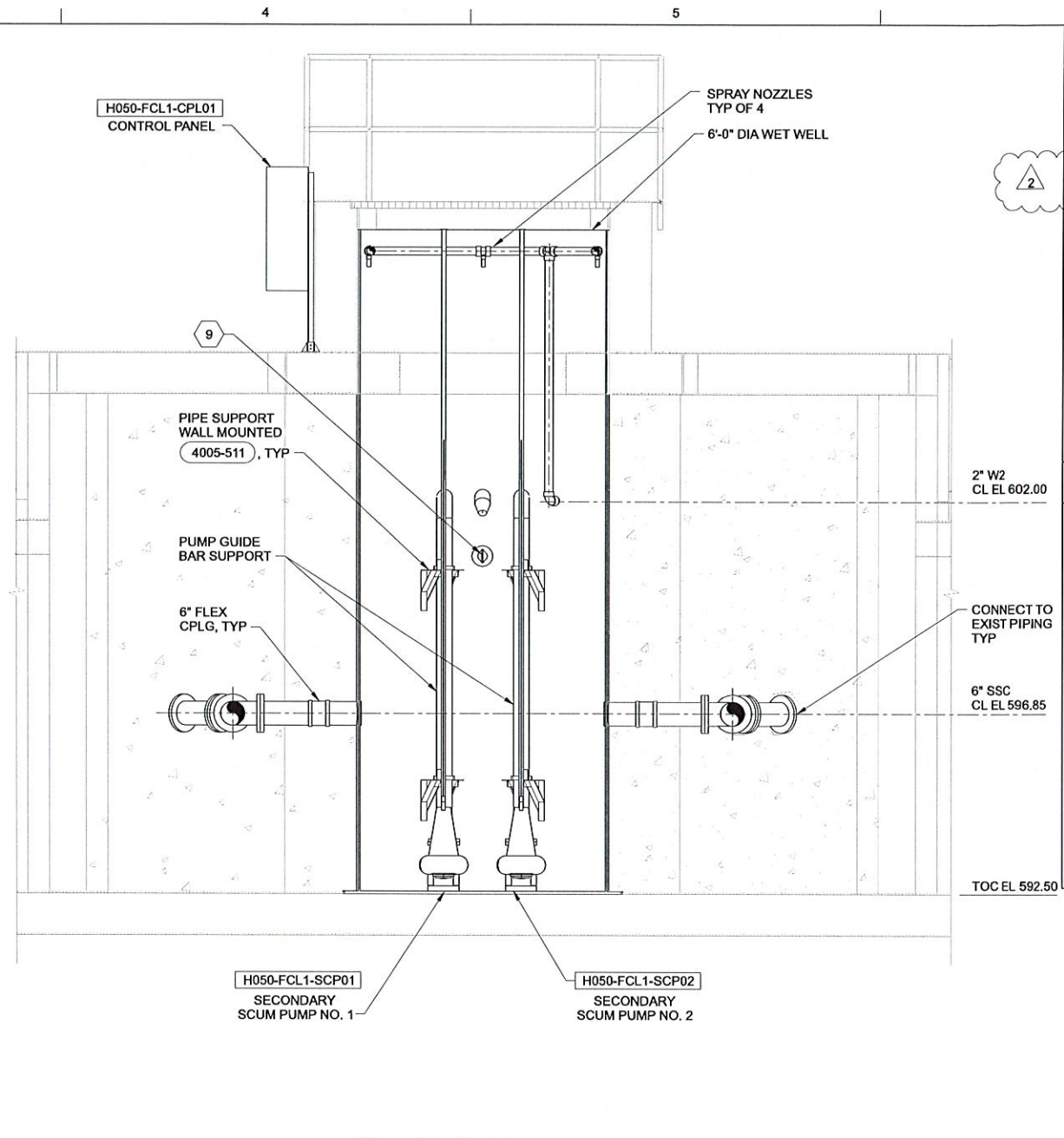
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VERTICAL:	LEAD ENGR.		
	FIELD MGR.		
FILE:	DRAWING: 50-FCL1-D-2000		DESIGN MANAGER
ATLAS PAGE NO: 3328			DATE: MAY 2026
			SHEET 135 OF 300 SHEETS



A SECTION
1/2"=1'-0"
50-FCL1-D-2000



C SECTION
1/2"=1'-0"
50-FCL1-D-2000



B SECTION
1/2"=1'-0"
50-FCL1-D-2000

GENERAL SHEET NOTES

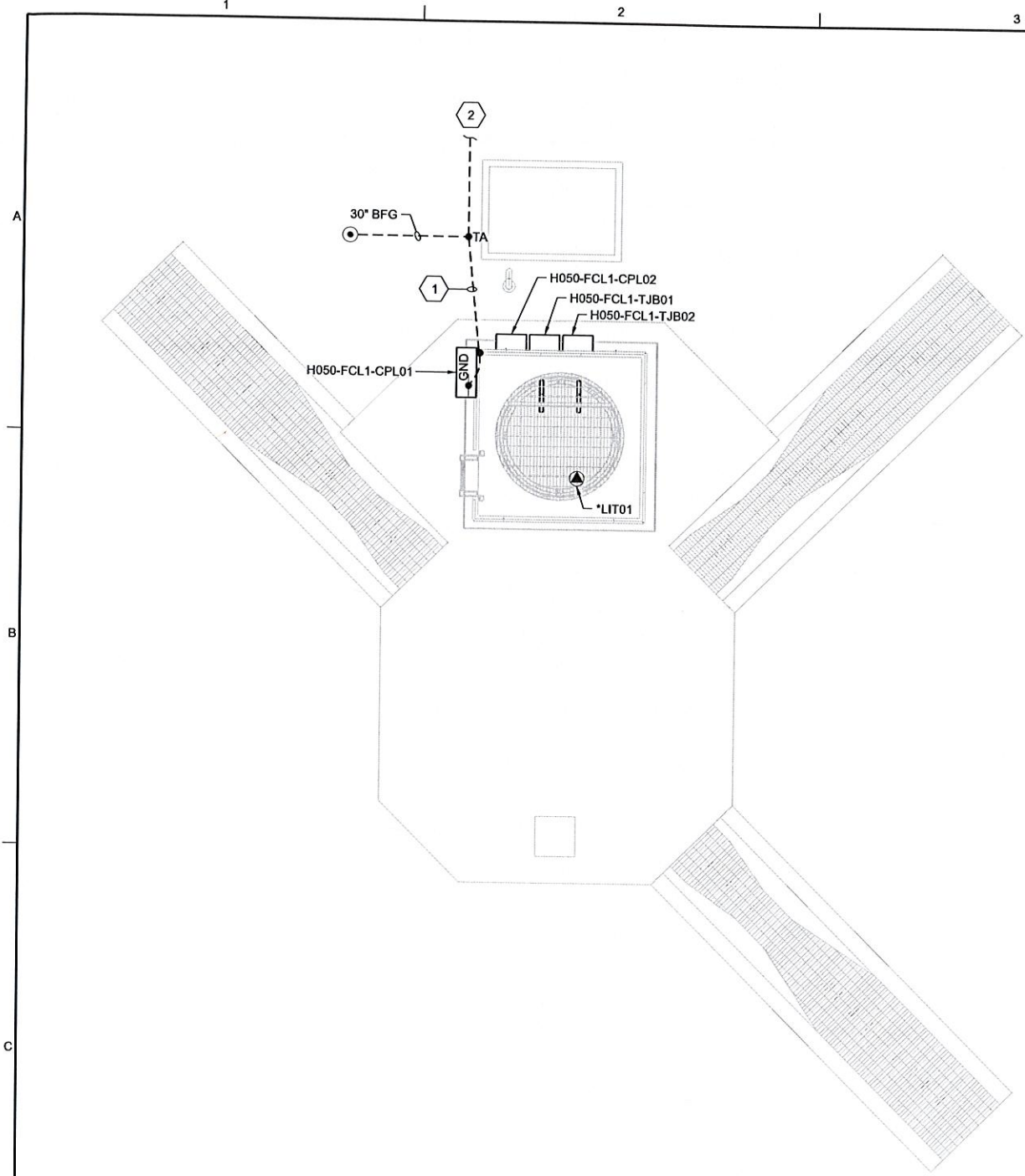
- COMPLETE TAG NUMBERS INCLUDE THE "H050-FCL1" PREFIX.
- 4" SSC RECIRCULATION NOZZLE FABRICATED WITH 45" ELL AND 4" x 2" REDUCER.
- SCUM COLLECTION SYSTEM: ALT03. SEE DRAWING 01-G-0004 FOR QUANTITIES AND NOTES.
- PROVIDE EARTH FILL BETWEEN WET WELL AND VALVE VAULT. FINISHED SOD SHALL BE APPROXIMATELY 1" BELOW FINISHED CONCRETE SURFACE.
- FRP WET WELL WITH BASE FLANGE. JOINT OR RISER SECTIONS WILL NOT BE ACCEPTED.
- ENSURE RADAR LEVEL ELEMENT IS MOUNTED FREE OF OBSTRUCTIONS AND STILL PROVIDES SPACE FOR REMOVAL.
- INSTALL TEE WITH BRANCH OUTLET VERTICAL WHICH WILL ALSO PROVIDE AS A CLEANOUT ACCESS. AIR VALVE INSTALLATION CAN USE A COMPANION FLANGE OR TAPPED WITH FOR THREADED NIPPLE.

SHEET KEYNOTES

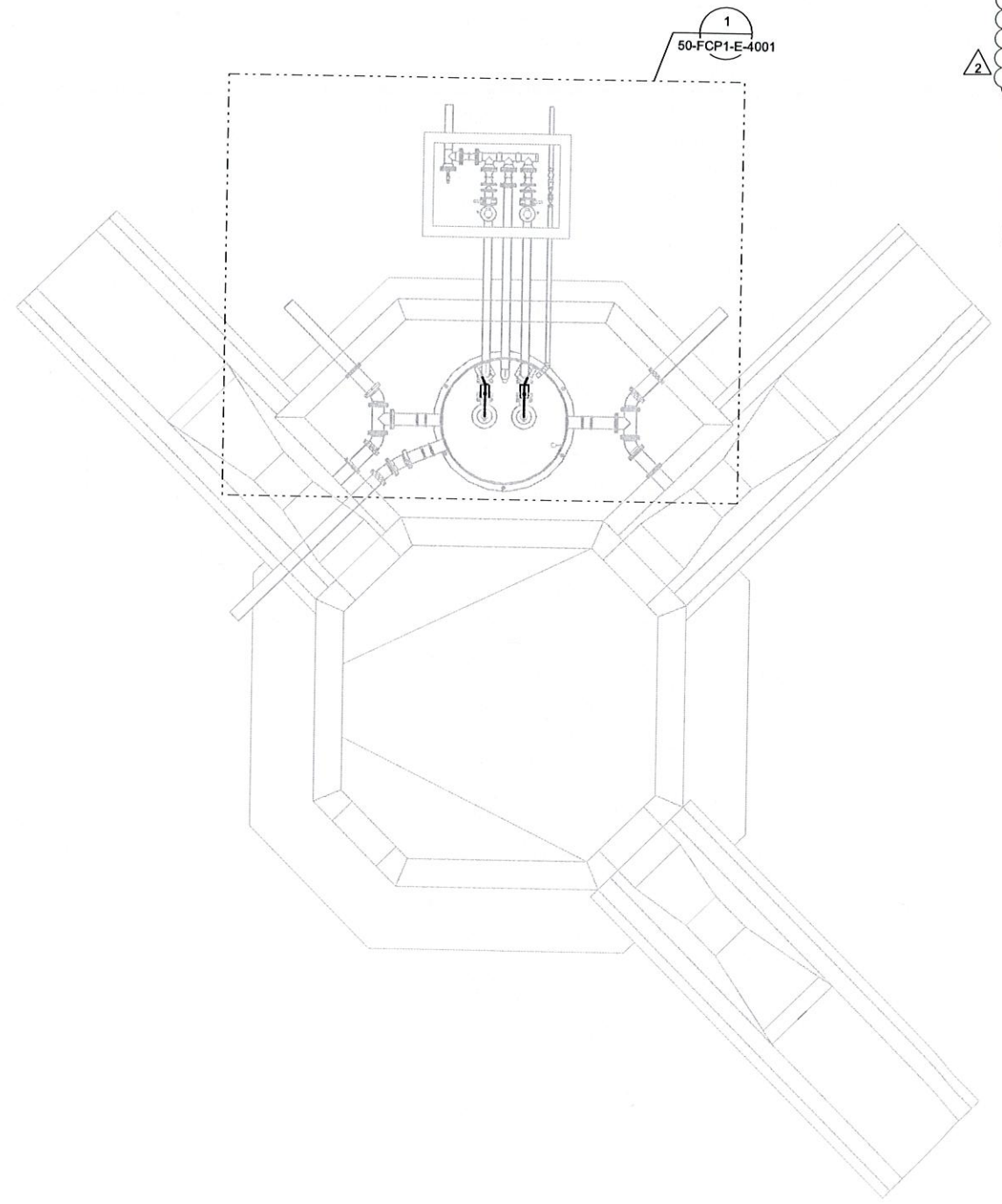
- ARV01 1" V752 4027-207
- ARV02 1" V752 4027-207
- BLV02 1" V330
- BLV03 1" V330
- DBV01 2" V634
- PGV02 1" V405
- PGV04 1" V405
- PGV05 4" V405
- PGV06 4" V405
- PE 22
- PTM 02
- PRS 02
- LIT 01 4027-257



SCUM COLLECTION PROCESS SECTIONS			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	TP	6/2026	
PLAN SCALE:	DRAWN	JP	
NOTE ON DWG.	DESIGNED	TP	
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ATLAS PAGE NO: 3328	DRAWING: 50-FCL1-D-3001	DATE: MAY 2026	DESIGN MANAGER
		SHEET 136 OF 300 SHEETS	



UPPER POWER PLAN
1/4"=1'-0"



LOWER POWER PLAN
1/4"=1'-0"

- GENERAL SHEET NOTES**
 - SCUM COLLECTION SYSTEM: ALT03. SEE 01-G-0004 PAY QUANTITIES AND NOTES.
- SHEET KEYNOTES**
 - #4/0 AWG STRANDED BELOW GRADE, BARE, TIN PLATED COPPER.
 - CONTRACTOR SHALL ENSURE CONTINUITY WITH UFER GROUNDING SYSTEM LOCATED IN THE DUCT BANK.



SCUM COLLECTION
ELECTRICAL
UPPER AND LOWER POWER PLAN

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
Jacobs

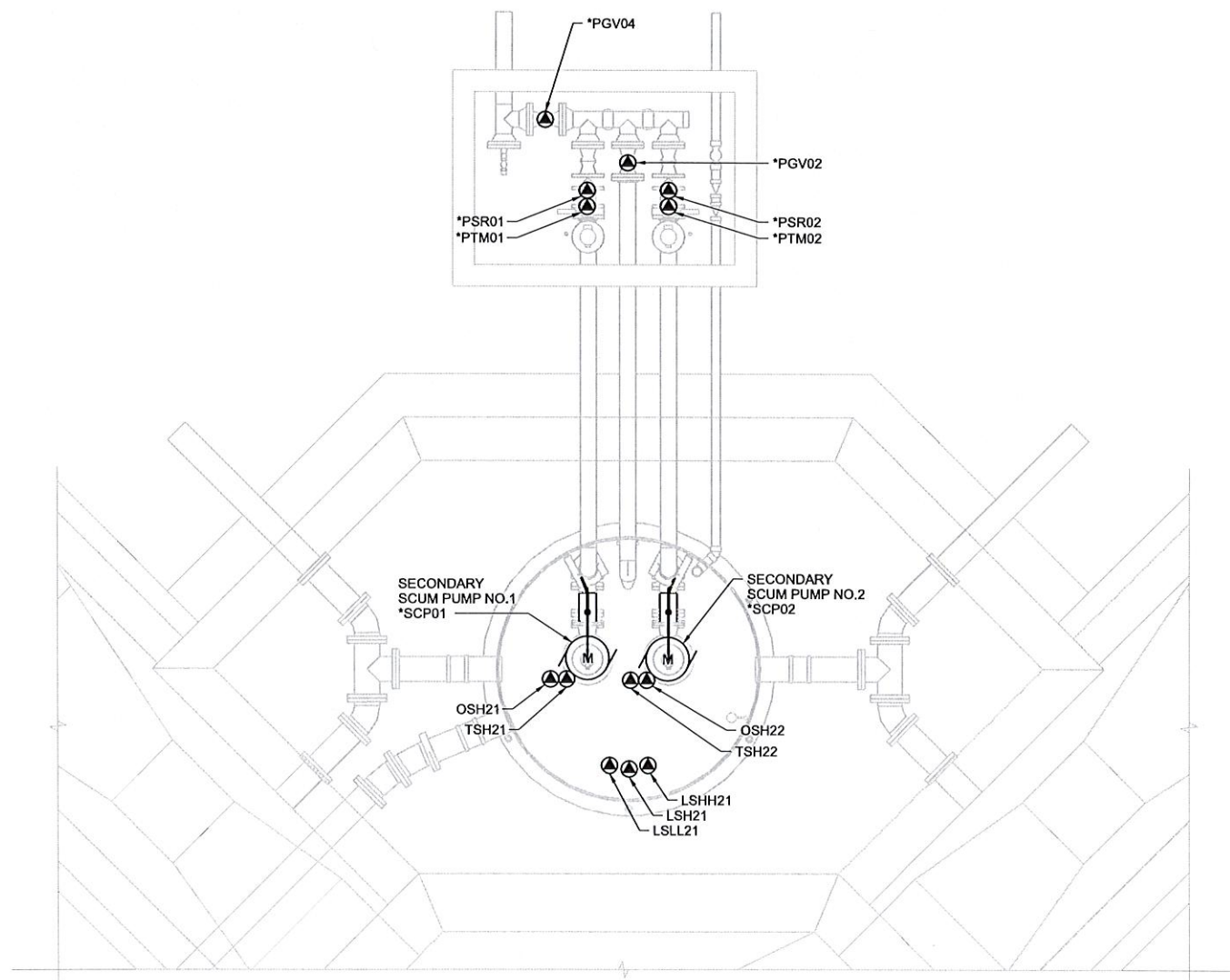
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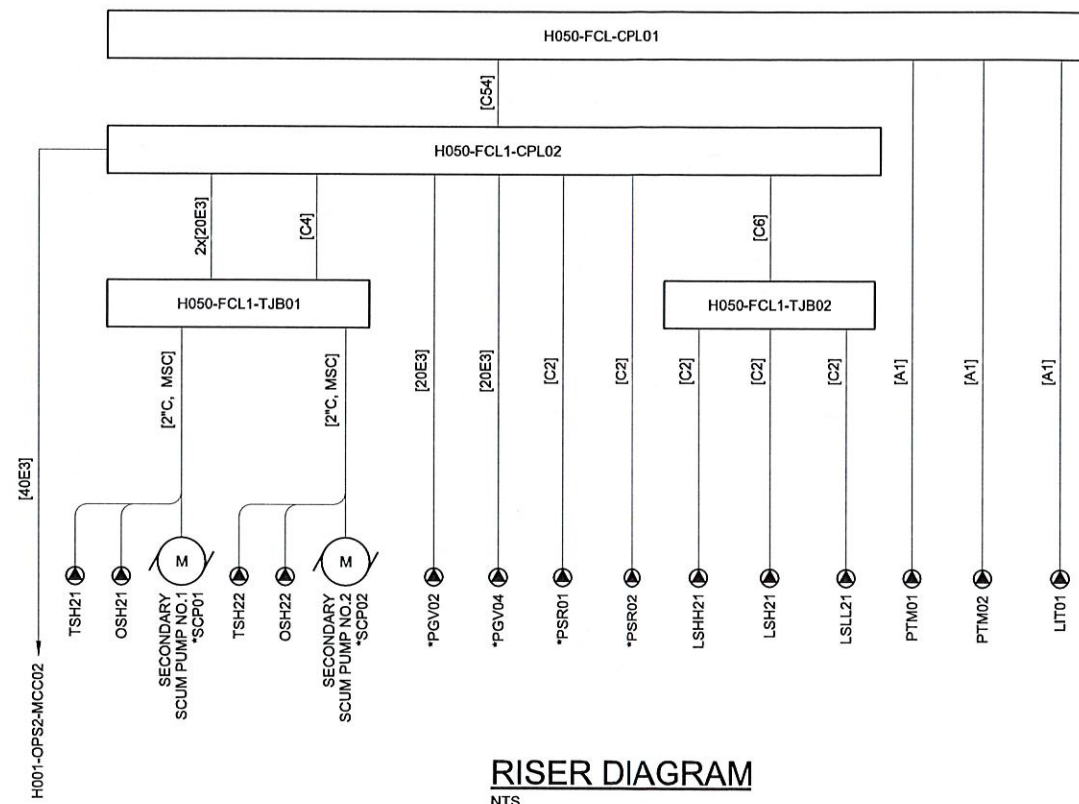
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GENERAL SHEET NOTES

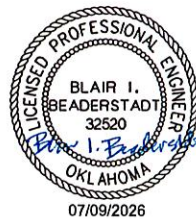
- SCUM COLLECTION SYSTEM: ALT03. SEE 01-G-0004 PAY QUANTITIES AND NOTES.
- COMPLETE TAG NUMBER INCLUDES THE H050-FCL1-* PREFIX.
- REFER TO 08-E-6003 FOR OVERALL NETWORK RISER DIAGRAM.
- REFER TO 50-FCL1-E-2000 FOR CONTROL PANEL AND TJB LOCATION.



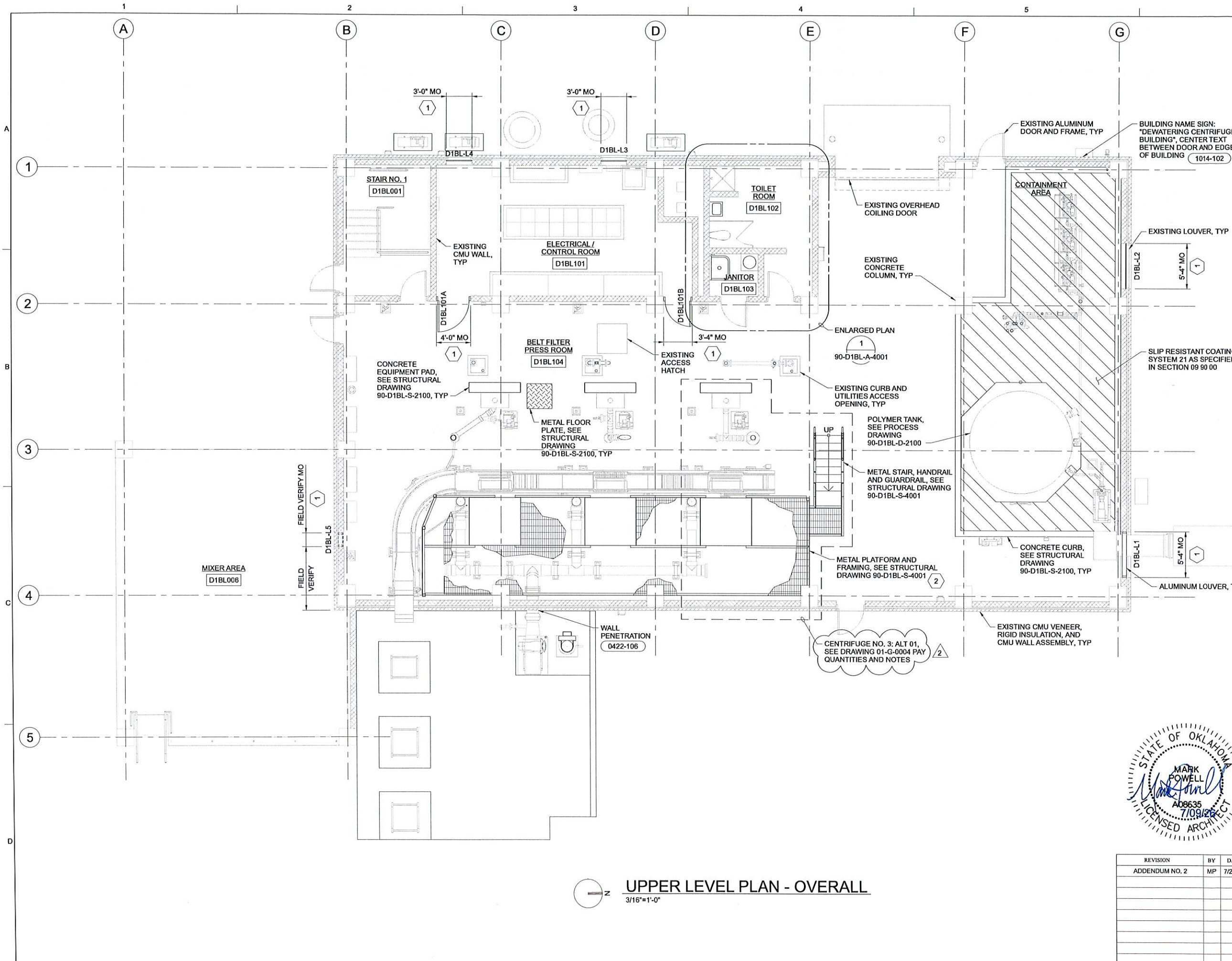
LOWER POWER POWER PLAN
1/2"=1'-0"
50-FCL1-E-2000



RISER DIAGRAM
NTS



SCUM COLLECTION ELECTRICAL ENLARGED POWER PLAN						
WFXQ7901						
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS						
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT						
PLANS AND ESTIMATES PREPARED BY: Jacobs						
REVISION	BY	DATE	PLAN SCALE:	DRAWN	AP	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.	DESIGNED	BB	
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			ATLAS PAGE NO: 3328			SHEET 138 OF 300 SHEETS



GENERAL SHEET NOTES

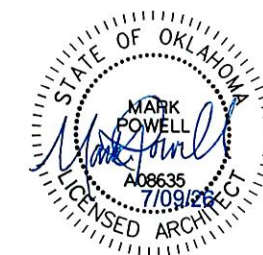
- FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND, WALL TYPES, SEE DRAWING 01-G-0012.
- FOR BUILDING CODE DATA TABLE, SEE DRAWINGS 01-G-0013.

SHEET KEYNOTES

- EXISTING STRUCTURE DIMENSIONS ARE FOR REFERENCE ONLY. FIELD VERIFY DIMENSIONS THAT RELATE TO NEW WORK, PRIOR TO BEGINNING NEW WORK AND FABRICATION.
- PLATFORM AND STAIR ARE ASSOCIATED WITH PROCESS EQUIPMENT AND ARE CONSIDERED AN EQUIPMENT PLATFORM AND NOT SUBJECT TO MEANS OF EGRESS REQUIREMENTS.



UPPER LEVEL PLAN - OVERALL
3/16"=1'-0"



DEWATERING CENTRIFUGE BUILDING
ARCHITECTURAL
UPPER LEVEL PLAN - OVERALL

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

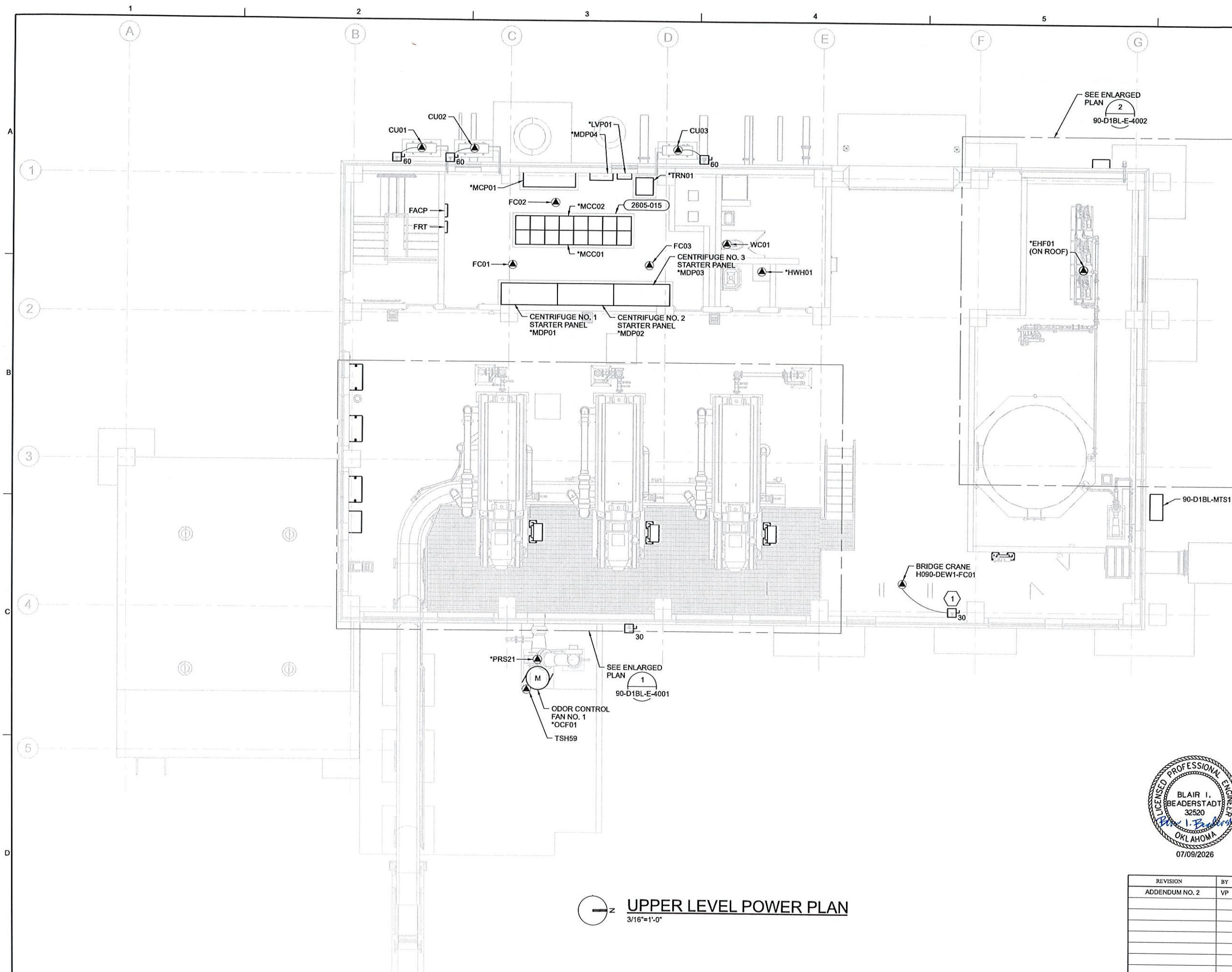
PLANS AND ESTIMATES PREPARED BY:

Jacobs

REVISION	BY	DATE
ADDENDUM NO. 2	MP	7/2026

PLAN SCALE:	DRAWN	JH	APPROVED:
NOTE ON DWG.	DESIGNED	MP	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
	LEAD ENGR.		
VERTICAL:	FIELD MGR.		
FILE:	DRAWING: 90-D1BL-A-2100	DATE: MAY 2026	
ATLAS PAGE NO. 3328			

DESIGN MANAGER
DATE: MAY 2026
SHEET 151 OF 300 SHEETS



- GENERAL SHEET NOTES
1.

CENTRIFUGE NO. 3 STARTER PANEL, ALT01. SEE 01-G-0004 FOR QUANTITIES AND NOTES.
2.

THE COMPLETE TAG NUMBER INCLUDES THE "H090-DEW1-" PREFIX.
- SHEET KEYNOTES
1.

VERIFY THE MOTOR NAMEPLATE RATING FOR OVERHEAD DOOR AND BRIDGE CRANE PRIOR TO PURCHASING DISCONNECT.

UPPER LEVEL POWER PLAN
3/16"=1'-0"



DEWATERING CENTRIFUGE BUILDING
ELECTRICAL
UPPER LEVEL
POWER PLAN

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

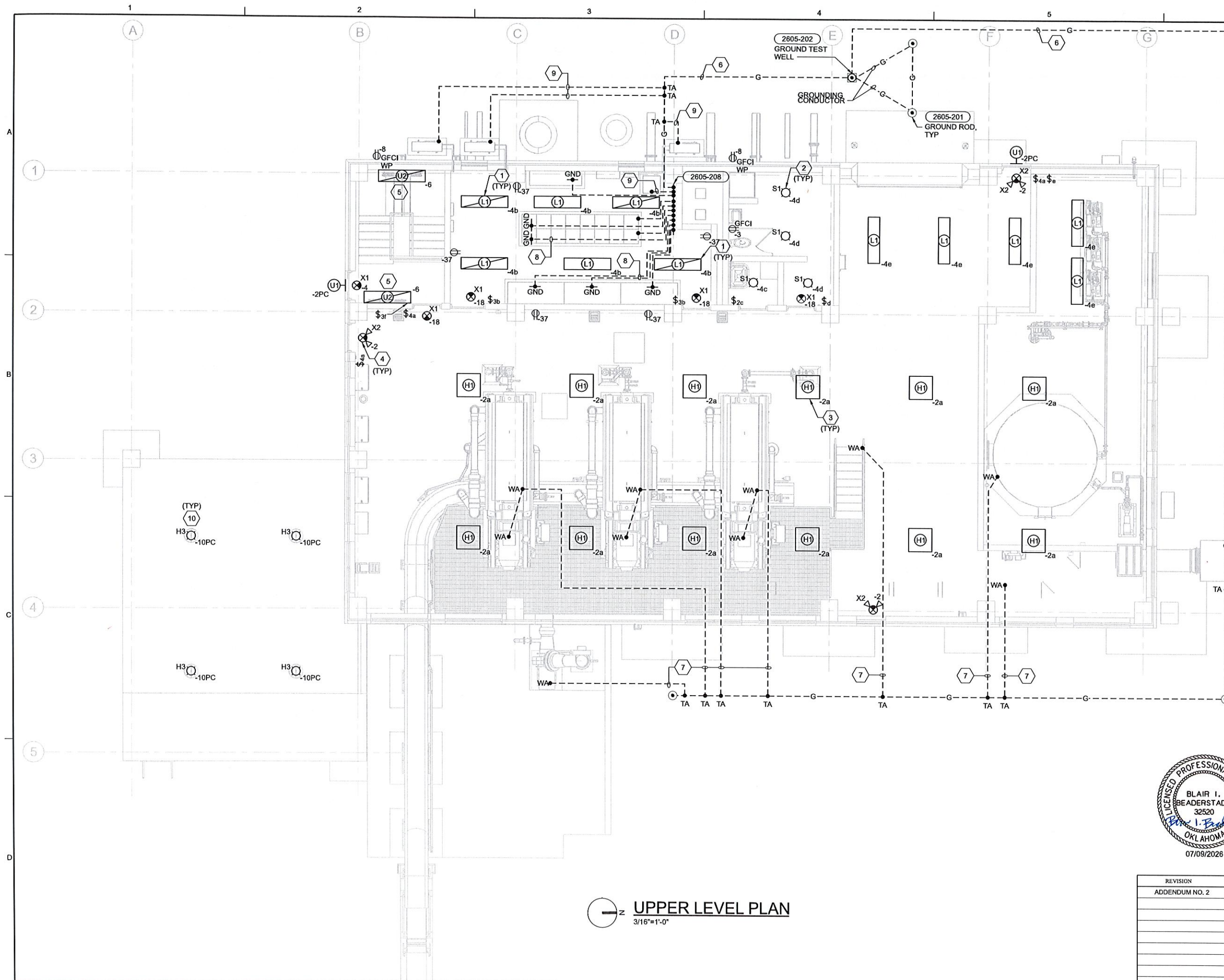
PLANS AND ESTIMATES PREPARED BY: **Jacobs**

REVISION	BY	DATE
ADDENDUM NO. 2	VP	7/7/2026

PLAN SCALE:	DRAWN	AP	APPROVED:
NOTE ON DWG.	DESIGNED	BB	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		

FILE:	DRAWING:	DATE:
ATLAS PAGE NO: 3328	90-D1BL-E-2100	MAY 2026

SHEET 183 OF 300 SHEETS



GENERAL SHEET NOTES

1. CENTRIFUGE NO. 3; ALT01. SEE 01-G-0004 PAY QUANTITIES AND NOTES.

 SHEET KEYNOTES

1. INSTALL LIGHT FIXTURE TYPE L1 SUCH THAT THE FIXTURE IS CEILING MOUNTED.
2. INSTALL LIGHT FIXTURE TYPE S1 SUCH THAT THE FIXTURE IS RECESSED IN DROP CEILING.
3. INSTALL LIGHT FIXTURE TYPE H1 SUCH THAT TOP OF THE FIXTURE IS 22'-0" FROM FINISHED FLOOR. CONTRACTOR SHALL ENSURE THE LUMINAIRE DO NOT IMPEDE THE EXISTING CRANE.
4. INSTALL EXIT SIGN ABOVE DOOR OR DOOR TRANSOM.
5. INSTALL LIGHT FIXTURE TYPE U2 SUCH THAT TOP OF FIXTURE IS 7'-0" ABOVE FINISHED FLOOR.
6. #4/0 AWG STRANDED, BARE, TIN-PLATED COPPER.
7. #2/0 AWG STRANDED, XHHW-2 INSULATED, 600VAC.
8. #1/0 AWG STRANDED, XHHW-2 INSULATED, 600VAC.
9. #2 AWG STRANDED, XHHW-2 INSULATED, 600VAC.
10. INSTALL LIGHT FIXTURE TYPE H3 SUCH THAT THE TOP OF THE FIXTURE IS 12'-6" FROM FINISHED FLOOR.

REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF

 **UPPER LEVEL PLAN**
3/16"=1'-0"



DEWATERING CENTRIFUGE BUILDING
ELECTRICAL
UPPER LEVEL
FACILITY PLAN

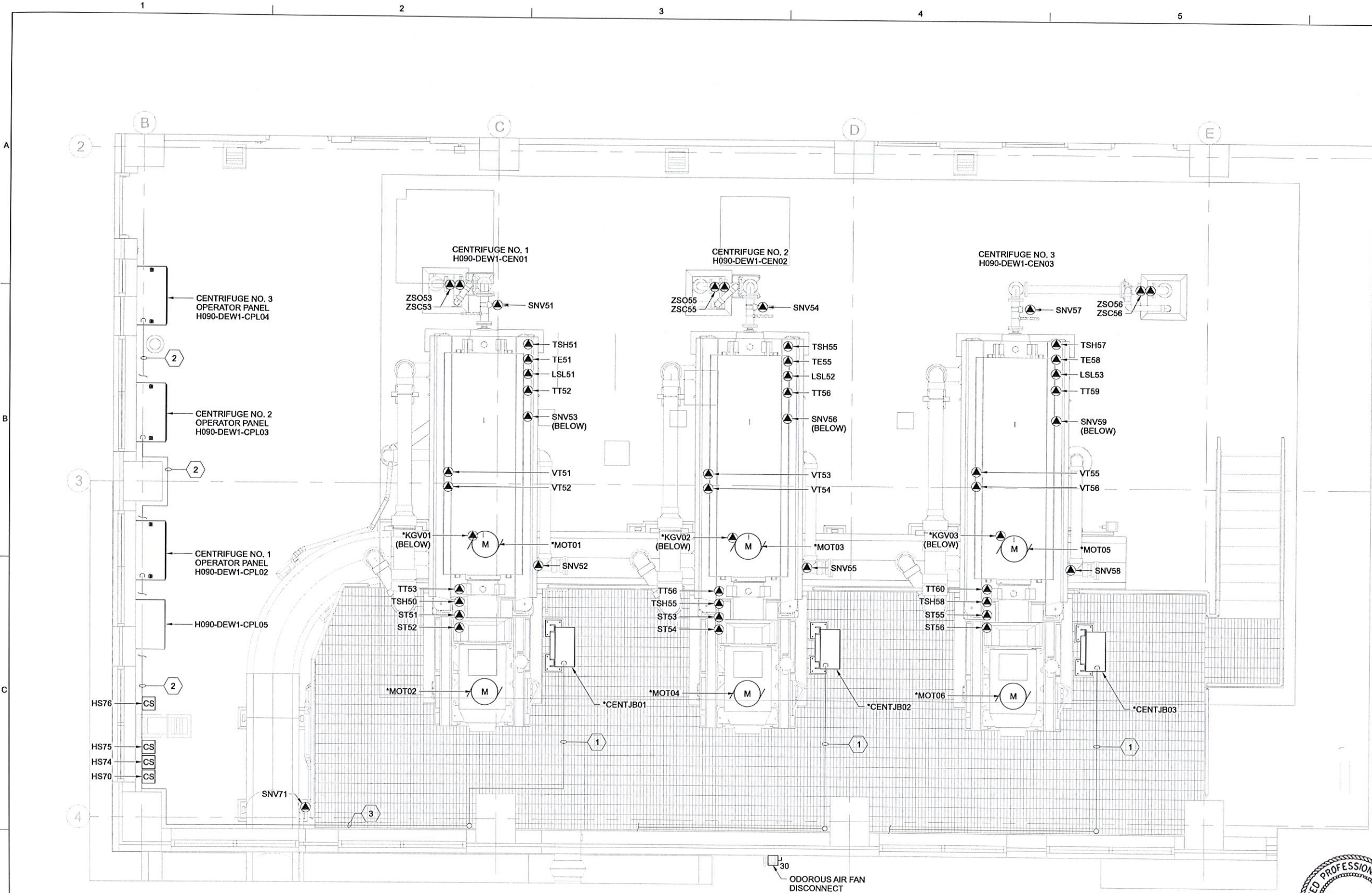
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTSCITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs

REVISION	BY	DATE	PLAN SCALE:	DRAWN	AP	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.	DESIGNED	BB	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
				FIELD MGR.		DESIGN MANAGER
			FILE:	DRAWING: 90-D1BLE-2101		DATE: MAY 2026
			ATLAS PAGE NO: 3328			SHEET 185 OF 300 SHEETS



- GENERAL SHEET NOTES**
1.

CENTRIFUGE NO. 3; ALT01. SEE 01-G-0004 PAY QUANTITIES AND NOTES.
2.

THE COMPLETE TAG NUMBER INCLUDES THE "H090-DEW1-" PREFIX.
3.

REFER TO PROCESS MECHANICAL DRAWINGS AND VENDOR SHEETS FOR FINAL LOCATION OF INSTRUMENTATION AND EQUIPMENT.
- SHEET KEYNOTES**

1.

CONTRACTOR SHALL ROUTE CONDUITS UNDER PLATFORM TO CENTRIFUGE TJB.

2.

CONTRACTOR SHALL ROUTE CONDUIT OVERHEAD ALONG WALL TO CONTROL PANELS.

3.

CONTRACTOR TO ROUTE CONDUITS ALONG EXISTING CONDUIT PATHS.

1

ENLARGED POWER PLAN

3/8"=1'-0"

90-D1BL-E-2100



DEWATERING CENTRIFUGE BUILDING
ELECTRICAL
ENLARGED UPPER LEVEL
POWER PLAN
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
Jacobs

REVISION

BY

DATE

ADDENDUM NO. 2

VP

7/7/2026

PLAN SCALE:

NOTE ON DWG.

PROFILE:

HORIZONTAL:

VERTICAL:

FILE:

ATLAS PAGE NO:

3328

DRAWN

DESIGNED

SURVEY

PROJ. MGR.

LEAD ENGR.

FIELD MGR.

DRAWING: 90-D1BL-E-4001

AP

BB

APPROVED:

DESIGN MANAGER

DATE: MAY 2026

SHEET 186 OF 300 SHEETS

H090-DEW1-MCC01 CONNECTED LOAD	
DESCRIPTION	AMP
H090-DEW1-MDP01	245.35
H090-DEW1-MDP03	245.35
CENTRATE PUMP 1	21
CENTRATE PUMP 3	21
SLUDGE FEED PUMP 1	27
SLUDGE FEED PUMP 3	27
DEWATERING EXHAUST FAN	11
GRINDER 1	4.8
BUILDING VENTILATION FAN1	4.8
BUILDING VENTILATION FAN3	4.8
BUILDING VENTILATION FAN5	4.8
BUILDING VENTILATION FAN7	4.8
SLUDGE CONVEYOR	7.6
ODOR CONTROL FAN NO. 1	7.6
H090-DEW1-MDP04	90
DEWATERING HOT WATER HEATER	10
TOTAL	736.9
TOTAL PLUS 25% LARGEST MOTOR	798.2375

* DESIGN LOAD = CONNECTED LOAD PLUS 25% OF LARGEST MOTOR

H090-DEW1-MCC02 CONNECTED LOAD	
DESCRIPTION	AMP
H095-COM2-CPL01	276
H090-DEW1-MDP02	245.35
H095-COM1-ACU01	182
CENTRATE PUMP 2	21
SLUDGE FEED PUMP 2	27
BUILDING VENTILATION FAN2	7.6
BUILDING VENTILATION FAN4	7.6
BUILDING VENTILATION FAN6	7.6
TOTAL	774.15
TOTAL PLUS 25% LARGEST MOTOR	843.15

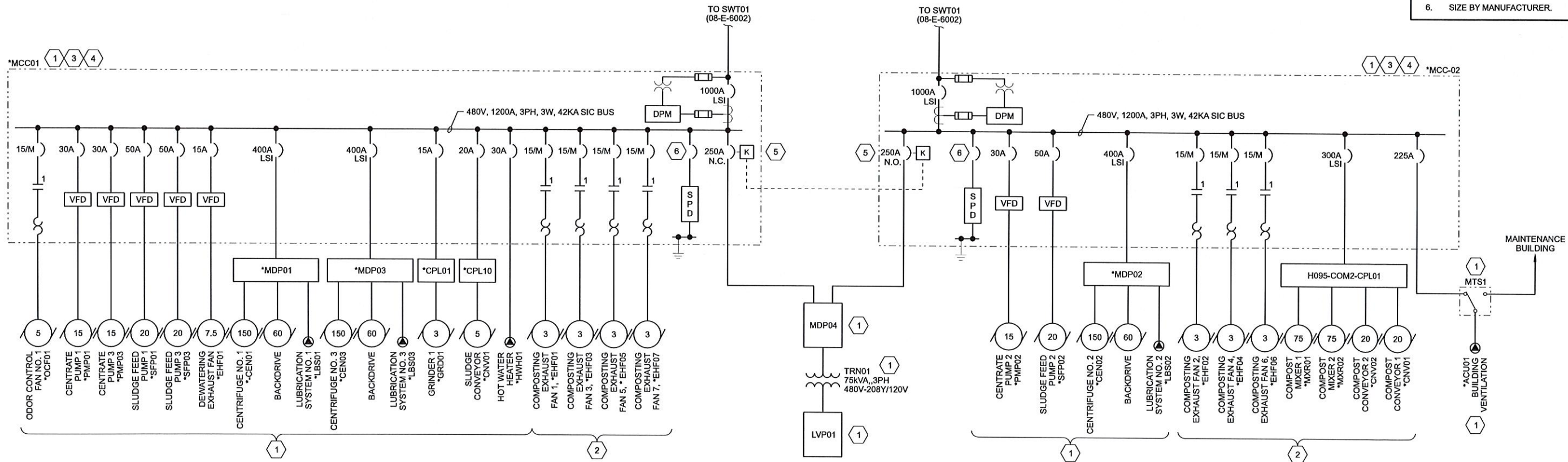
* DESIGN LOAD = CONNECTED LOAD PLUS 25% OF LARGEST MOTOR

GENERAL SHEET NOTES

- CENTRIFUGE NO. 3 AND STARTER PANEL, ALT01, SEE 01-G-0004 FOR QUANTITIES AND NOTES.
- REFER TO 08-E-6003 FOR THE OVERALL POWER RISER DIAGRAM, OVERALL NETWORK RISER DIAGRAM AND INDIVIDUAL FACILITY RISER DIAGRAMS FOR CONDUIT AND WIRE CALLOUTS.
- CIRCUIT BREAKERS AND STARTERS TO HAVE PADLOCKABLE OPERATING HANDLE WHEN DE-ENERGIZED.

SHEET KEYNOTES

- COMPLETE TAG NUMBER INCLUDES 'H090-DEW1-' PREFIX.
- COMPLETE TAG NUMBER INCLUDES 'H095-COM2-' PREFIX.
- REFER TO FRONT ELEVATION ON DWG 90-D1BL-E-6002 FOR SPARE CIRCUIT BREAKER AND COMBINATION STARTER QUANTITY AND SIZE.
- PRELIMINARY CALCULATED AVAILABLE FAULT = 26,297.99 AMPS. FINAL AVAILABLE FAULT CURRENT SHALL BE PROVIDED BY THE SHORT CIRCUIT STUDY SPECIFIED IN SECTION 26 05 70, ELECTRICAL SYSTEM ANALYSIS.
- PROVIDE MECHANICAL KEY INTERLOCK PROCEDURAL SIGNS WITH LOCATIONS OF ALL KEYS.
- SIZE BY MANUFACTURER.



DEWATERING CENTRIFUGE BUILDING
ELECTRICAL
H090-DEW1-MCC01 AND H090-DEW1-MCC02
ONE-LINE DIAGRAM

WFXQ7901
HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS
CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

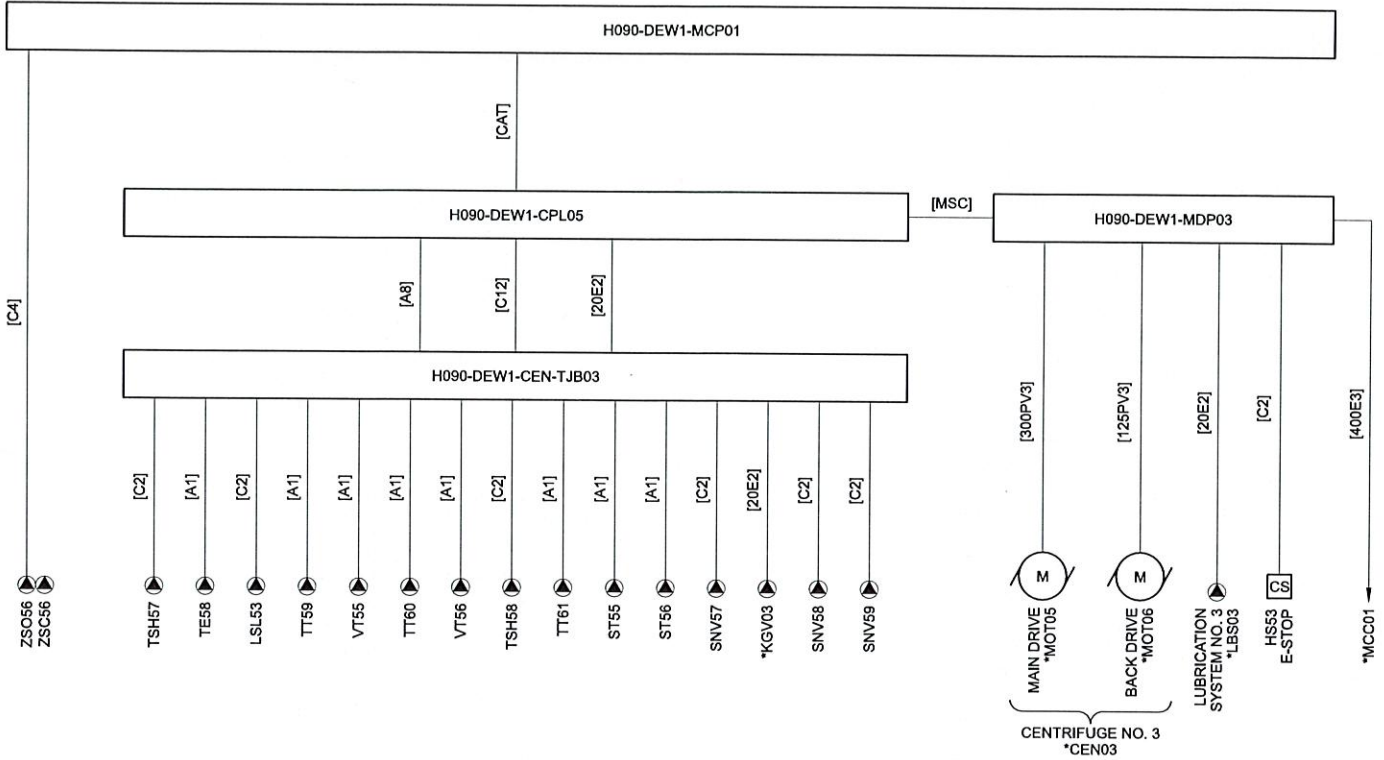
PLANS AND ESTIMATES PREPARED BY: **Jacobs**

REVISION	BY	DATE	PLAN SCALE:	DRAWN	AP	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.	DESIGNED	BB	
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			PROFILE:	PROJ. MGR.		
			HORIZONTAL:	LEAD ENGR.		
			VERTICAL:	FIELD MGR.		
			FILE:	DRAWING: 90-D1BL-E-6001	DATE: MAY 2026	
			ATLAS PAGE NO: 3328		SHEET 188 OF 300 SHEETS	

PLOT DATE: 8-JUL-2026 PLOT TIME: 11:29

GENERAL SHEET NOTES

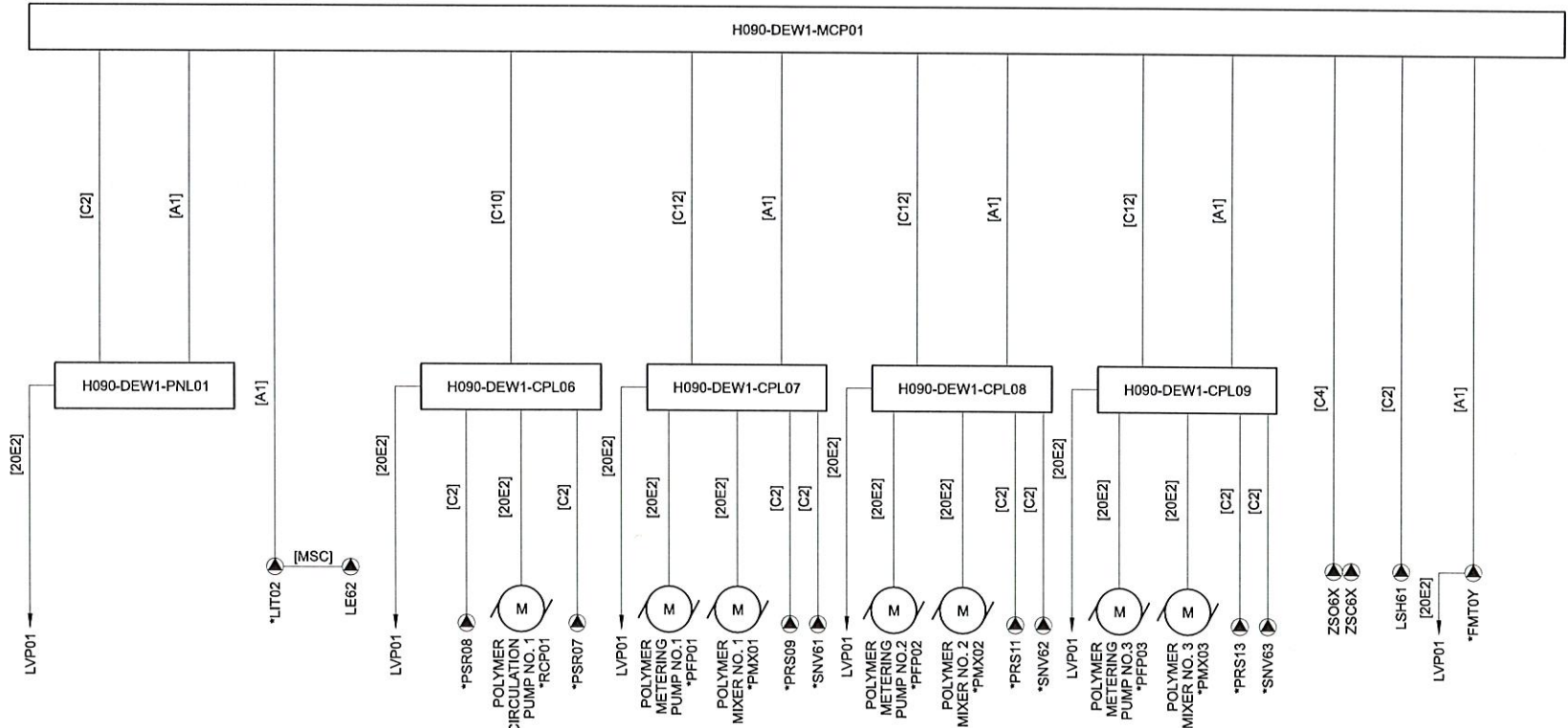
1. CENTRIFUGE NO. 3 (ALT01, SEE 01-G-0004 PAY QUANTITIES AND NOTES.)



NOTE:
THE COMPLETE TAG NUMBER INCLUDES THE "H090-DEW1-" PREFIX.

CENTRIFUGE NO. 3 - RISER DIAGRAM

NTS



NOTE:
THE COMPLETE TAG NUMBER INCLUDES THE "H090-DEW1-" PREFIX.

POLYMER FEED PUMPS - RISER DIAGRAM

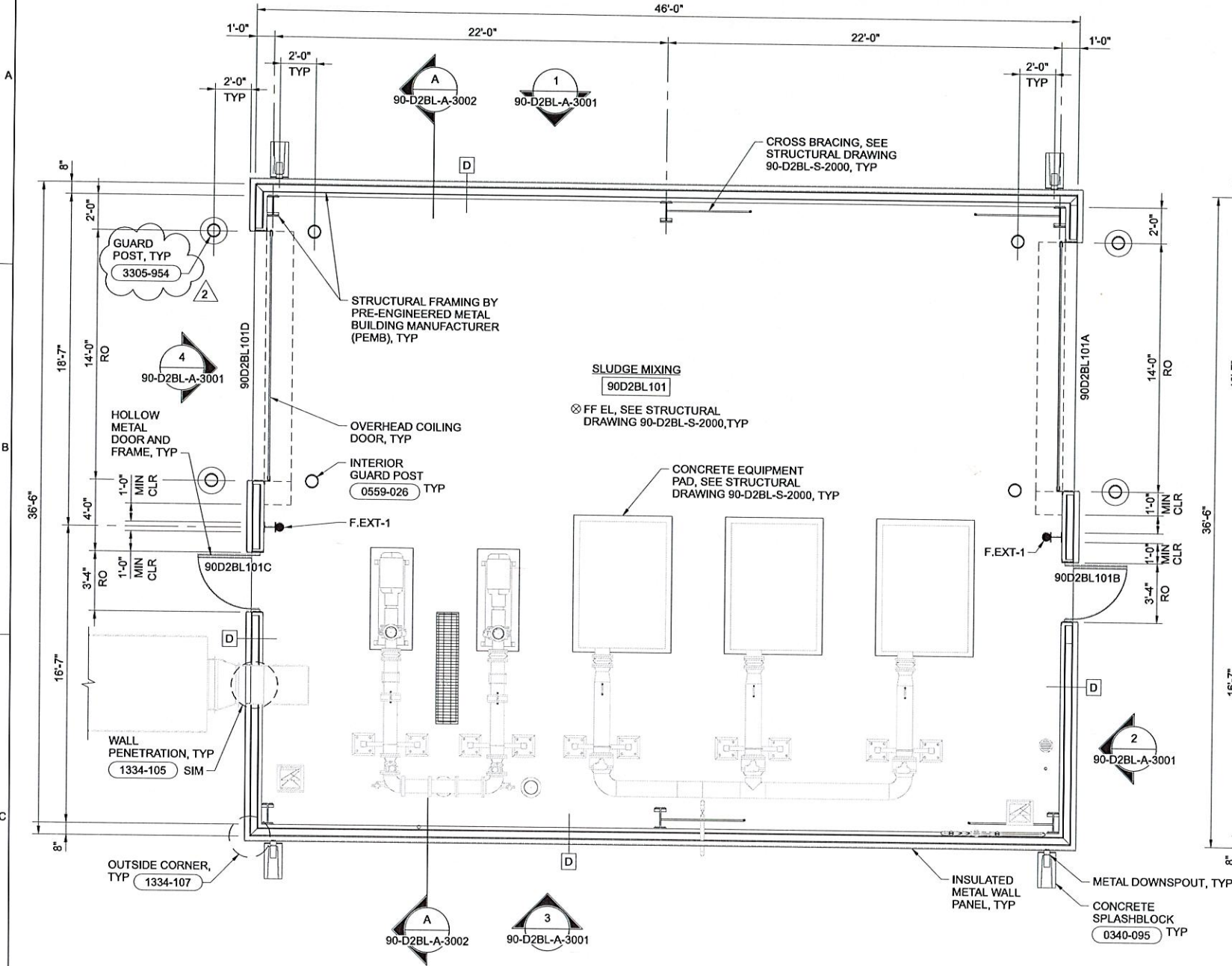
(X = 0, 6, 7, 8, 9) (Y = 4, 5, 6)



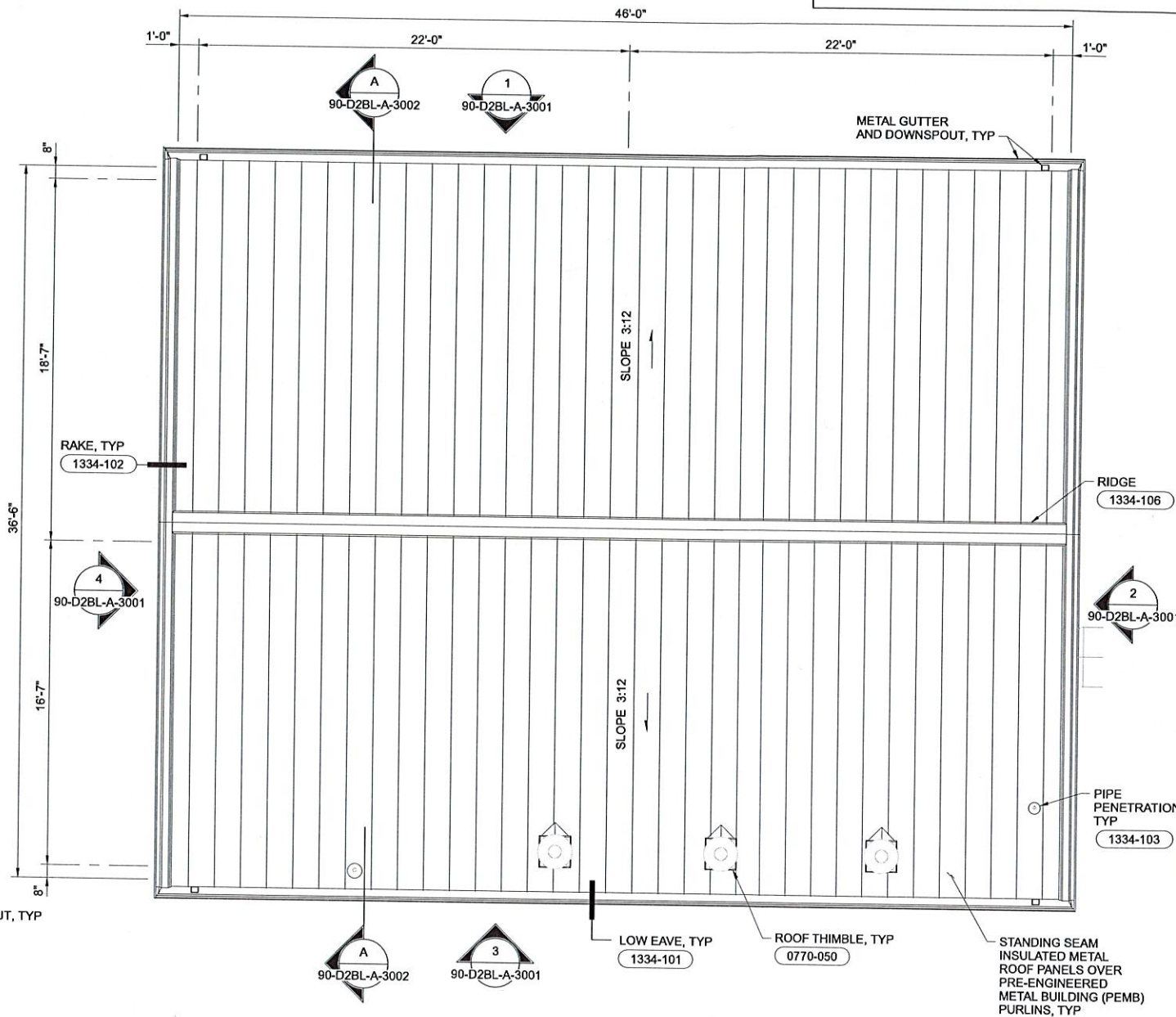
DEWATERING CENTRIFUGE BUILDING ELECTRICAL RISER DIAGRAMS			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	PLAN SCALE:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.
			SURVEY
			PROFILE:
			HORIZONTAL:
			VERTICAL:
			FILE:
			ATLAS PAGE NO: 3328
			DRAWING: 90-D1BL-E-6004
			DATE: MAY 2026
			SHEET 191 OF 300 SHEETS
			APPROVED:
			DESIGN MANAGER
			PLOT DATE: 8-JUL-2026
			PLOT TIME: 11:30

GENERAL SHEET NOTES

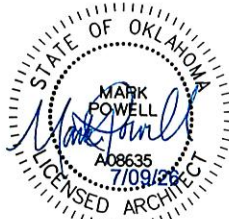
1. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND AND WALL TYPES, SEE DRAWING 01-G-0012.
2. FOR BUILDING CODE DATA TABLE AND LIFE SAFETY PLAN, SEE DRAWING 01-G-0013.



FLOOR PLAN
1/4"=1'-0"



ROOF PLAN
1/4"=1'-0"



SLUDGE MIXING BUILDING
ARCHITECTURAL
FLOOR PLAN AND ROOF PLAN

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs

REVISION	BY	DATE	PLAN SCALE:	DRAWN	JH	APPROVED:
ADDENDUM NO. 2	MP	7/2026	NOTE ON DWG.	DESIGNED	MP	
			SURVEY			
			PROFILE:	PROJ. MGR.		
			HORIZONTAL:	LEAD ENGR.		
			VERTICAL:	FIELD MGR.		
			FILE:	DRAWING: 90-D2BL-A-2000		
			ATLAS PAGE NO: 3328			

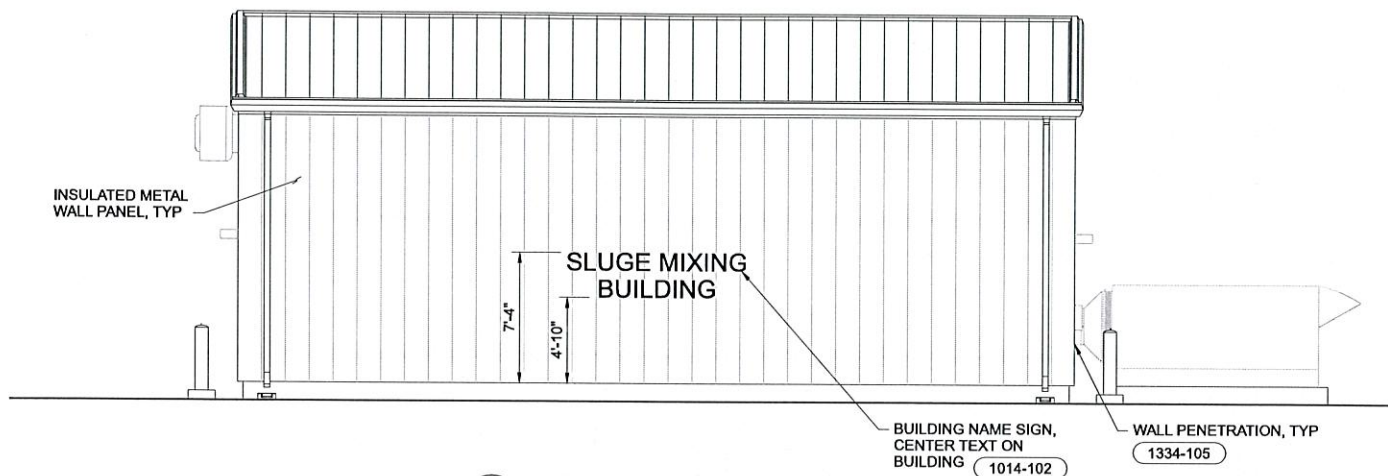
DATE: MAY 2026

SHEET 196 OF 300 SHEETS

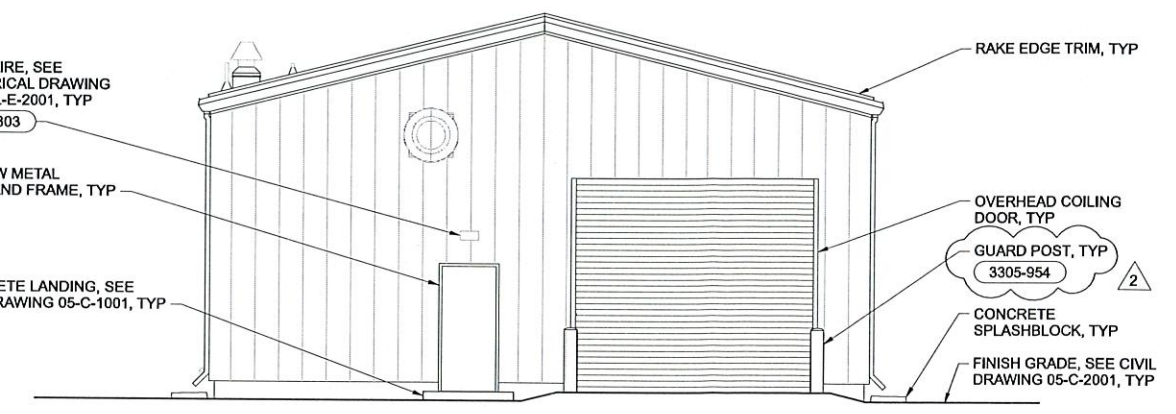
FILENAME: 90-D2BL-A-2000_WFXQ7901.dgn

PLOT DATE: 07/09/2026

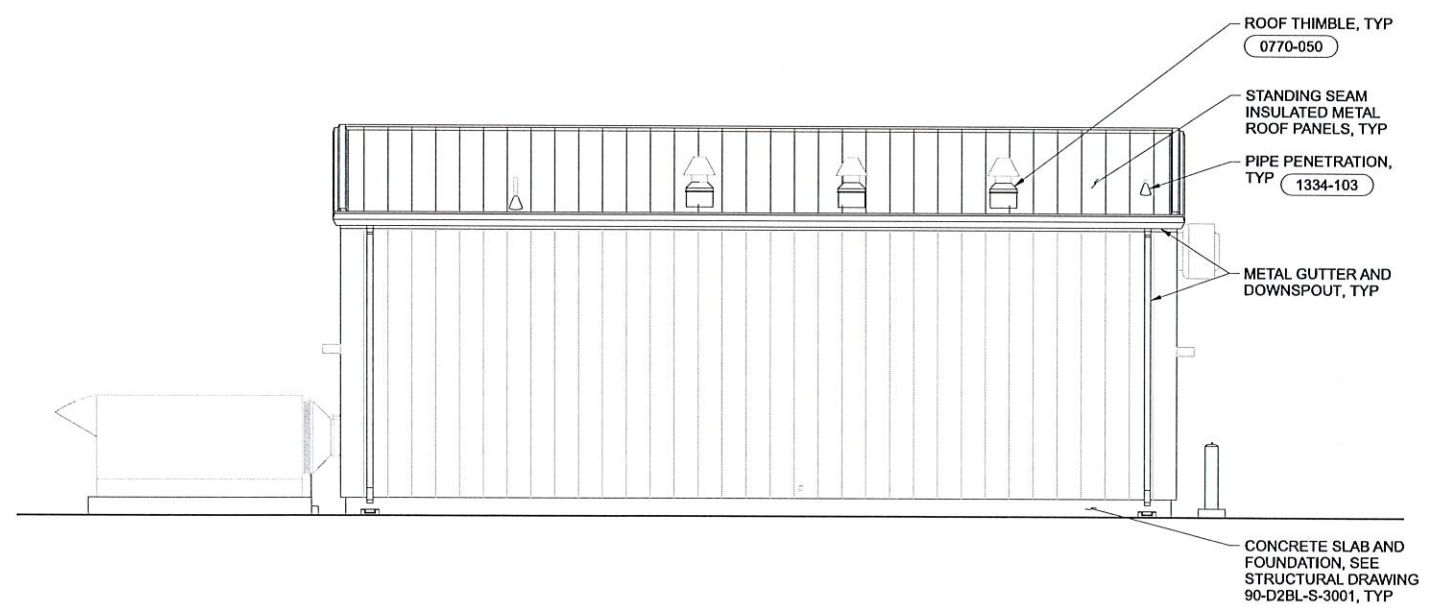
PLOT TIME: 8:48:31 AM



1 NORTH ELEVATION
3/16"=1'-0"
90-D2BL-A-2000



2 EAST ELEVATION
3/16"=1'-0"
90-D2BL-A-2000



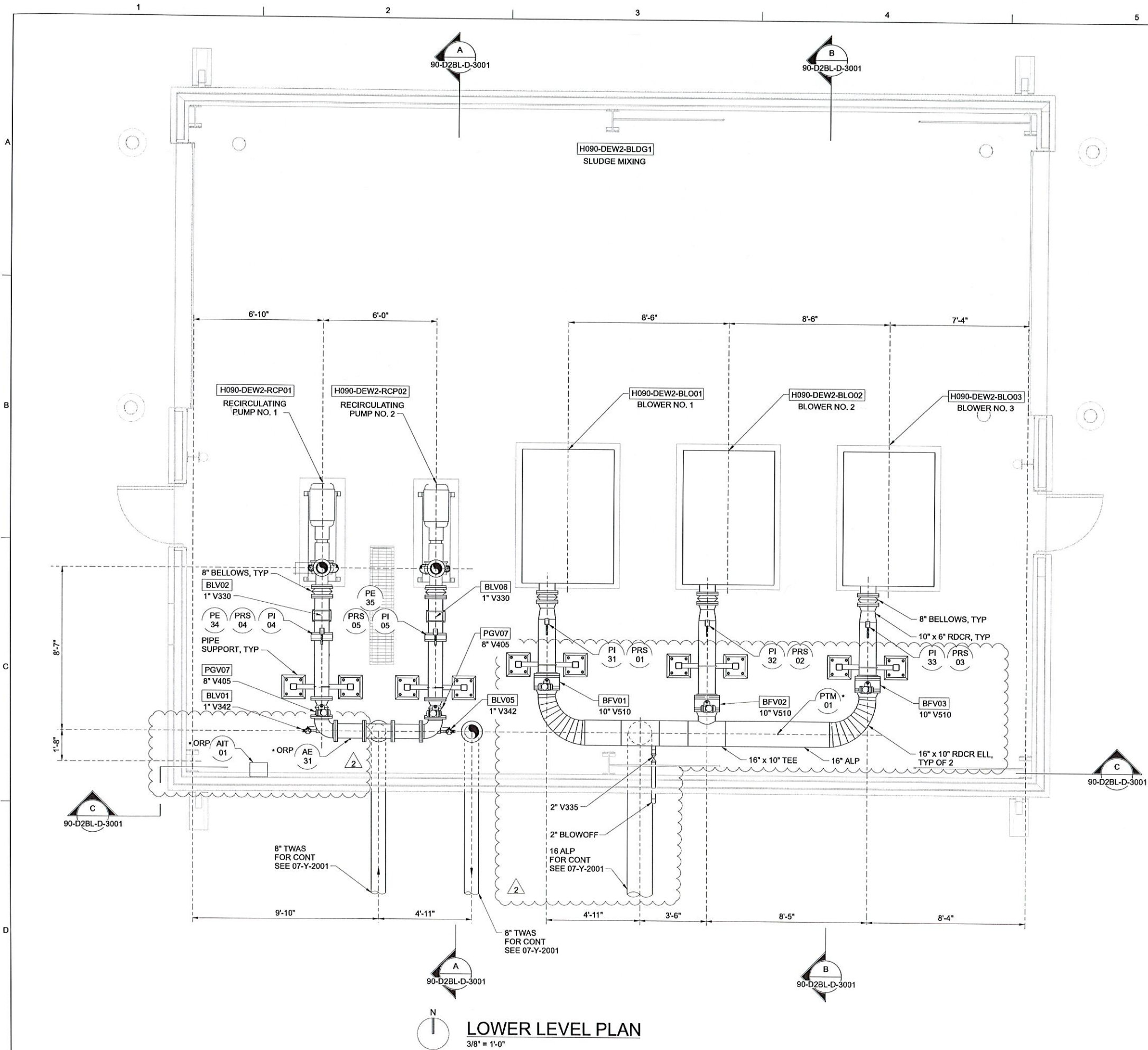
3 SOUTH ELEVATION
3/16"=1'-0"
90-D2BL-A-2000



4 WEST ELEVATION
3/16"=1'-0"
90-D2BL-A-2000



SLUDGE MIXING BUILDING ARCHITECTURAL ELEVATIONS			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	PLAN SCALE:
ADDENDUM NO. 2	MP	7/2026	DESIGNED
			SURVEY
			PROFILE:
			HORIZONTAL:
			VERTICAL:
			FILE:
			ATLAS PAGE NO. 3328
			DRAWN
			JH
			MP
			PROJ. MGR.
			LEAD ENGR.
			FIELD MGR.
			DRAWING: 90-D2BL-A-3001
			DATE: MAY 2026
			SHEET 197 OF 300 SHEETS
			DESIGN MANAGER
			APPROVED:
			<i>caZ</i>



GENERAL SHEET NOTES

- EQUIPMENT SIZES ARE APPROXIMATE. FINAL SIZES TO BE DETERMINED BY VENDOR.
- ROTARY BLOWER DISCHARGE CONNECTION IS SHOWN AS FLANGED WITH FLEXIBLE BELLOWS. A SLEEVE-TYPE CONNECTION WITH FLEXIBLE COUPLING IS ACCEPTABLE.
- FOR ALP INSULATION REQUIREMENTS SEE SECTION 40 42 13.
- VENDOR BLOWER EQUIPMENT SELECTION MUST ALLOW FOR MAINTENANCE FORKLIFT EQUIPMENT REMOVAL FROM THE NORTH.
- FLOOD RECIRCULATION PUMP SUCTION PIPING WITH THE FLUSH CONNECTIONS DURING STARTUP ACTIVITIES.

SLUDGE MIXING BUILDING
PROCESS
LOWER FLOOR PLAN

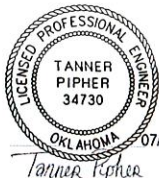
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs



REVISION	BY	DATE	PLAN SCALE:	DRAWN	JP	APPROVED:
ADDENDUM NO. 2	TP	6/2026	NOTE ON DWG.	DESIGNED	TP	
			PROFILE:	PROJ. MGR.		
			HORIZONTAL:	LEAD ENGR.		
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			FILE:	DRAWING: 90-D2BL-D-2000		DESIGN MANAGER
			ATLAS PAGE NO: 3328	DATE: MAY 2026		

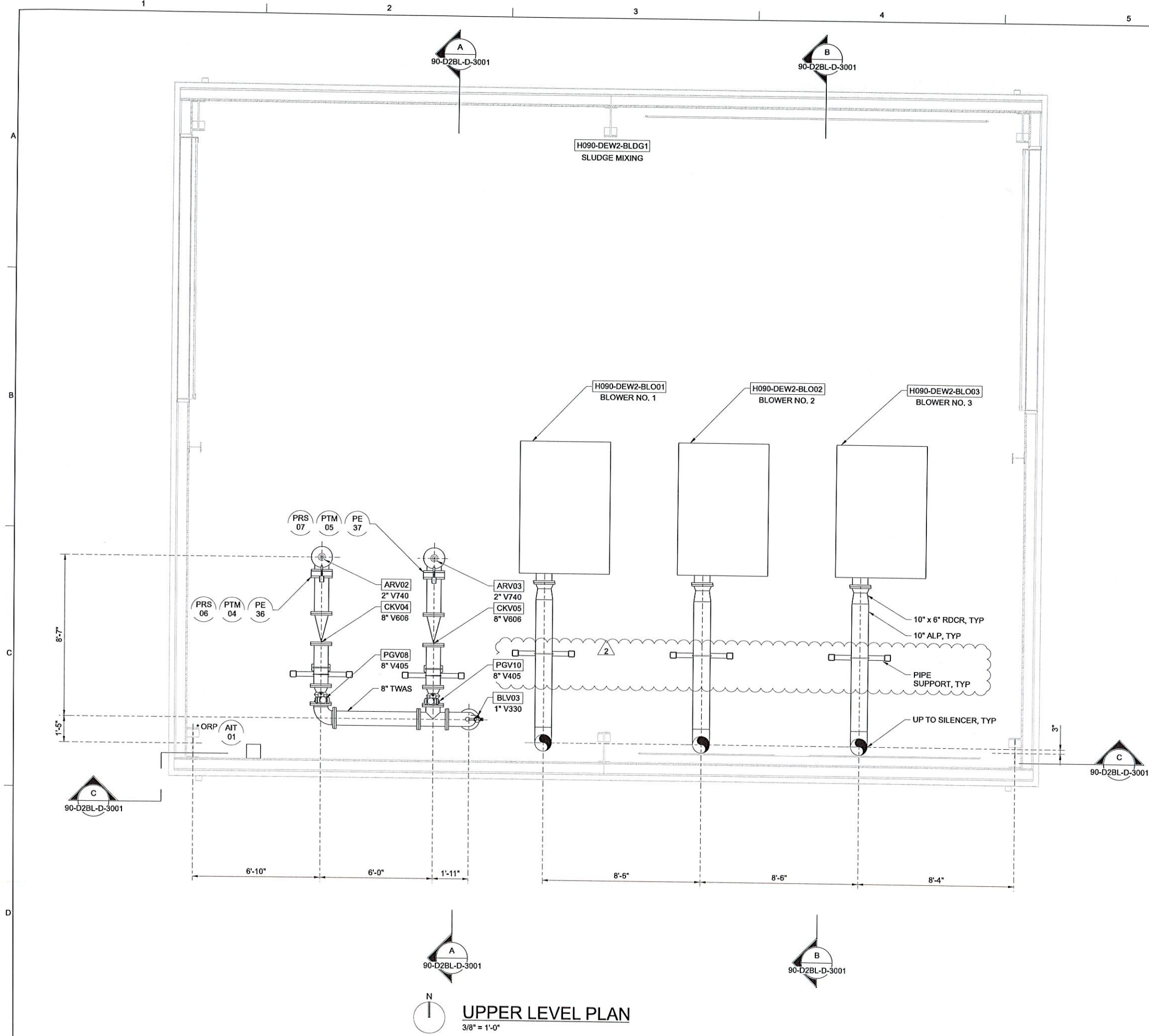
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PLOT DATE: 07/09/2026

PLOT TIME: 12:29:10 PM

GENERAL SHEET NOTES

- EQUIPMENT SIZES ARE APPROXIMATE. FINAL SIZES TO BE DETERMINED BY VENDOR.



UPPER LEVEL PLAN
3/8" = 1'-0"



SLUDGE MIXING BUILDING PROCESS UPPER LEVEL PLAN			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	TP	6/2026	
NOTE ON DWG.			
SURVEY			
PROFILE:			
HORIZONTAL:			
VERTICAL:			DESIGN MANAGER
FILE:	DRAWING: 90-D2BL-D-2001	DATE: MAY 2026	
ATLAS PAGE NO: 3328			SHEET 200 OF 300 SHEETS

- 

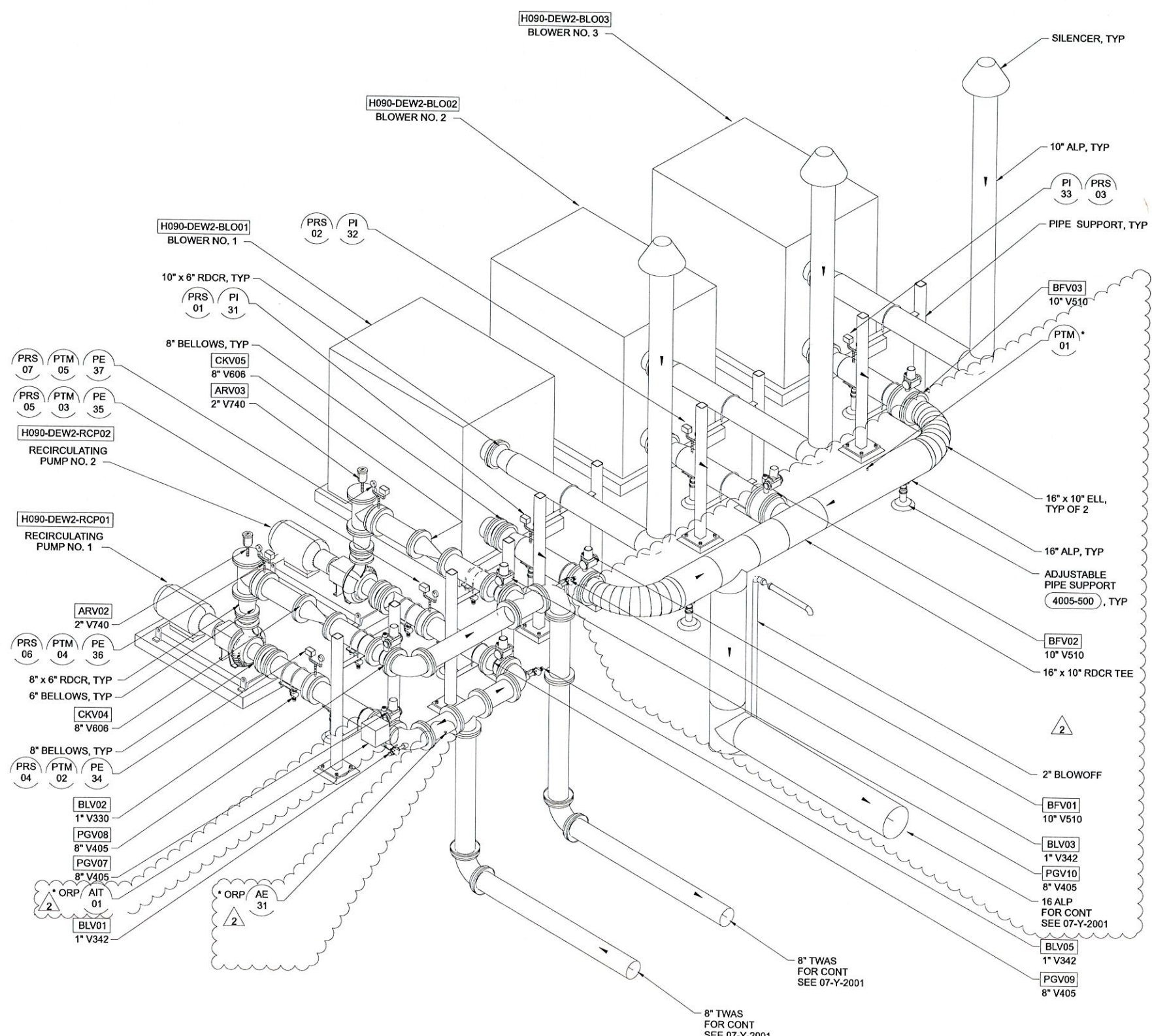


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PLOT DATE: 07/09/2026

PLOT TIME: 1:31:02 PM

A
B
C
D



ISOMETRIC VIEW
NTS



SLUDGE MIXING BUILDING
PROCESS
ISOMETRIC

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:
Jacobs

APPROVED:

DESIGN MANAGER

DATE: MAY 2026

SHEET 207 OF 300 SHEETS

REVISION	BY	DATE
ADDENDUM NO. 2	TP	6/2026

PLAN SCALE:	DRAWN	JP
NOTE ON DWG:	DESIGNED	TP
PROFILE:	SURVEY	
HORIZONTAL:	PROJ. MGR.	
VERTICAL:	LEAD ENGR.	
	FIELD MGR.	

FILE:	DRAWING: 90-D2BL-D-9001
ATLAS PAGE NO: 3328	

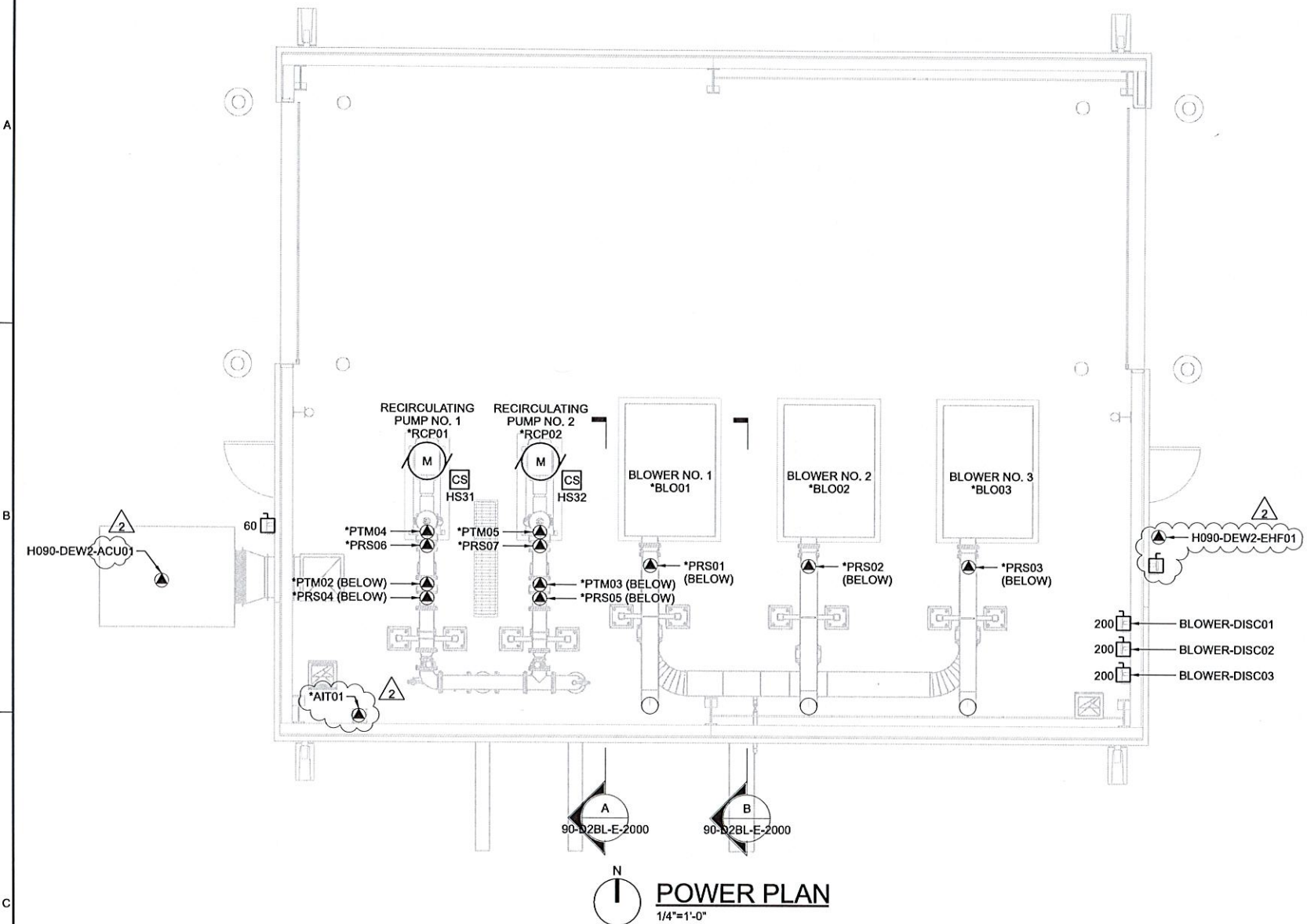
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GENERAL SHEET NOTES

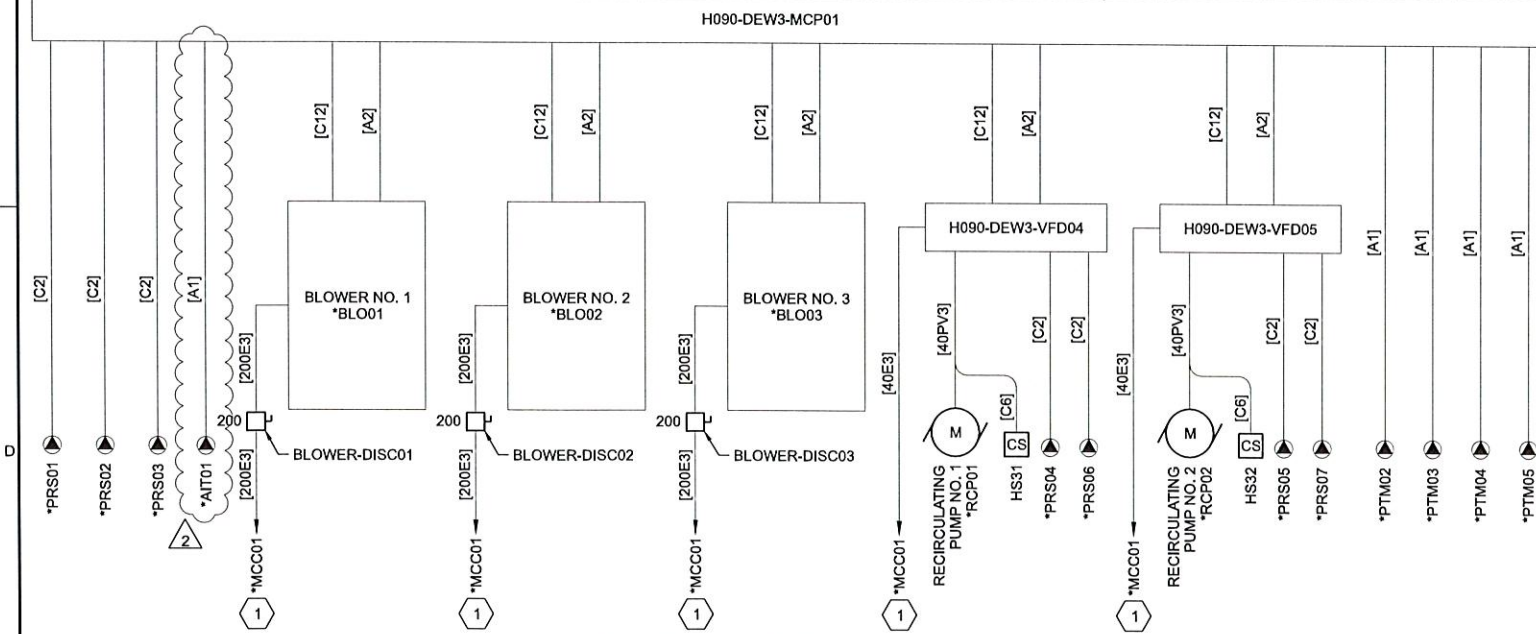
1. COMPLETE TAG NUMBER INCLUDES THE "H090-DEW2-" PREFIX.

SHEET KEYNOTES

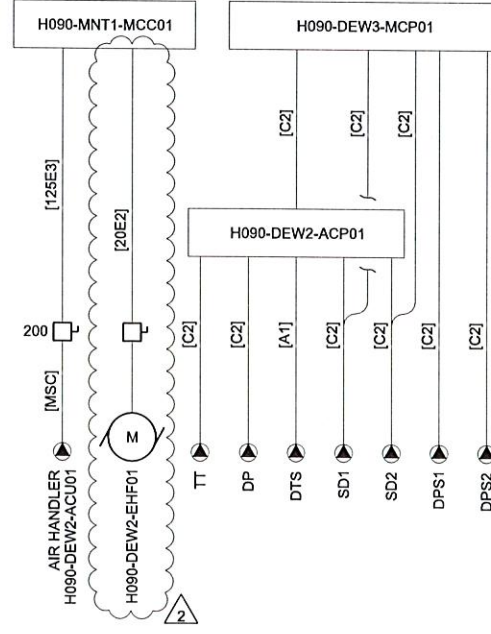
1. COMPLETE TAG NUMBER INCLUDES THE "H02-MNT1-" PREFIX.



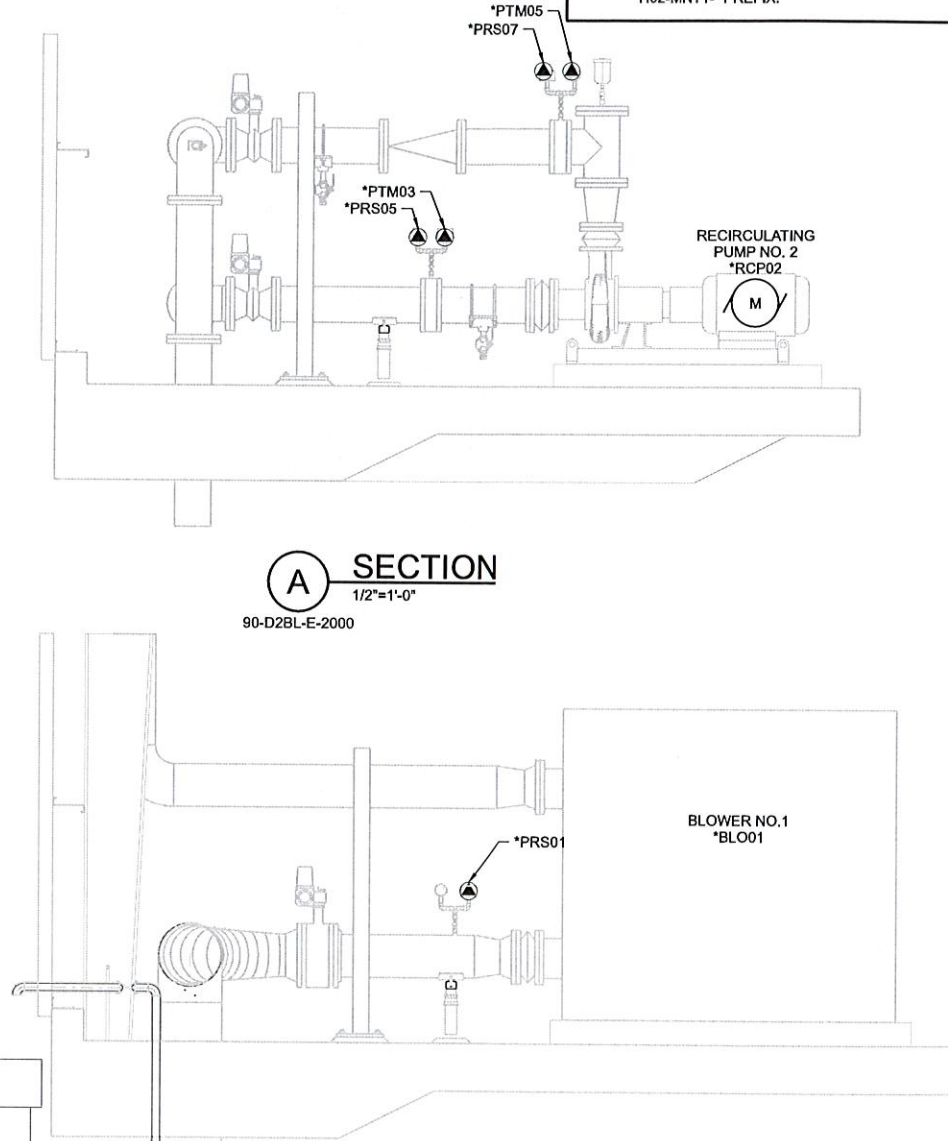
POWER PLAN
1/4"=1'-0"



RISER DIAGRAM
NTS



HVAC RISER DIAGRAM
NTS

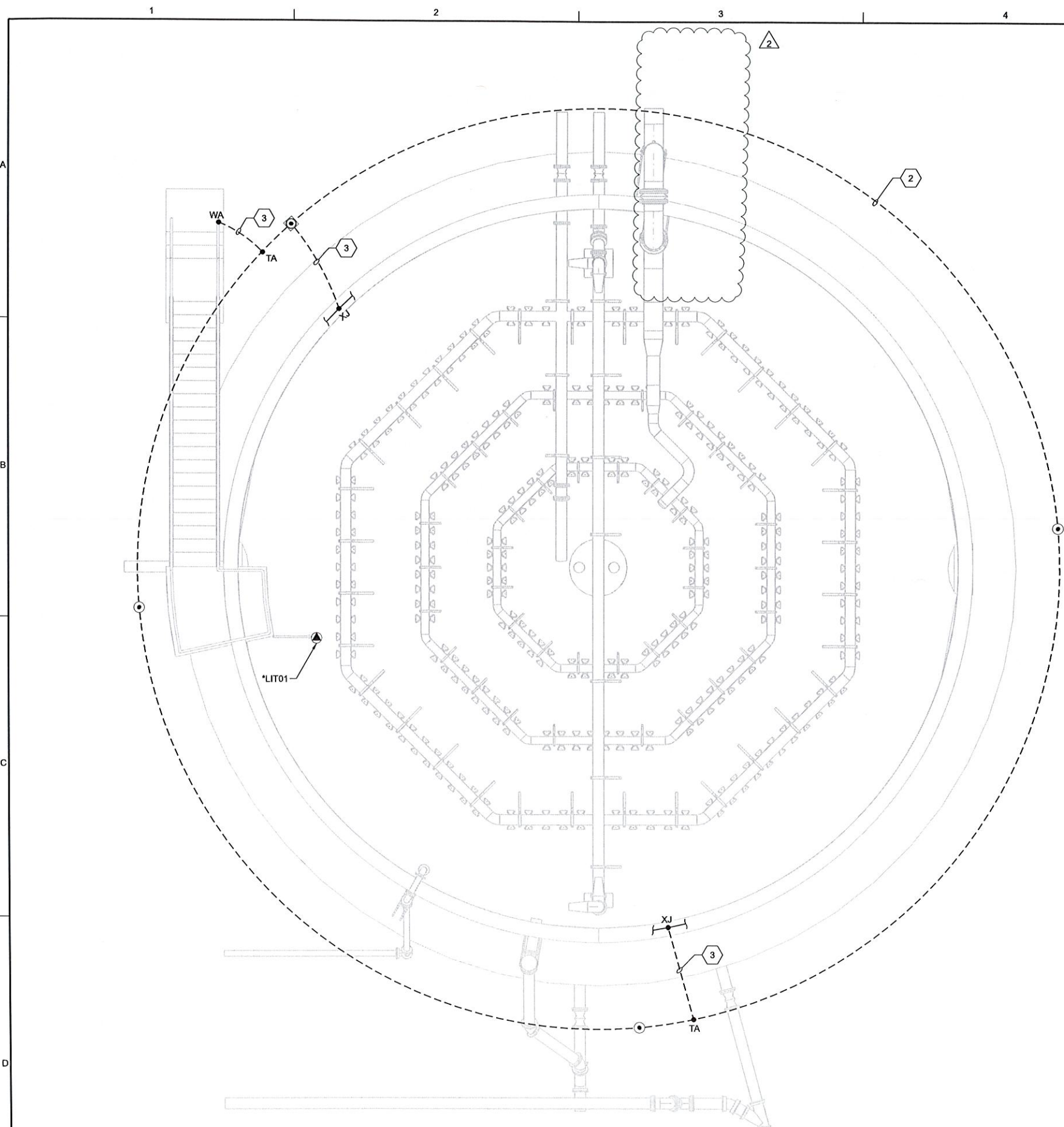


SECTION A
1/2"=1'-0"

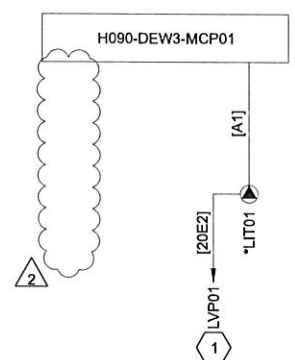
SECTION B
1/2"=1'-0"



SLUDGE MIXING BUILDING ELECTRICAL POWER PLAN			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	PLAN SCALE:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.
			SURVEY
			HORIZONTAL:
			FIELD MGR.
			FILE:
			DRAWING: 90-D2BL-E-2000
			ATLAS PAGE NO: 3328
			DATE: MAY 2026
			SHEET 208 OF 300 SHEETS



SLUDGE HOLDING TANK NO. 1 POWER PLAN
1/4"=1'-0"



RISER DIAGRAM
NTS

GENERAL SHEET NOTES

1. COMPLETE TAG NUMBER INCLUDES THE 'H090-DEW1-' PREFIX.
- SHEET KEYNOTES**
1. COMPLETE TAG NUMBER INCLUDES THE 'H090-DEW3-' PREFIX.
 2. #4/0 AWG STRANDED, BARE, TIN-PLATED COPPER.
 3. #2/0 AWG STRANDED, XHHW-2 INSULATED, 600VAC.

SLUDGE TANK 1
ELECTRICAL
POWER PLAN

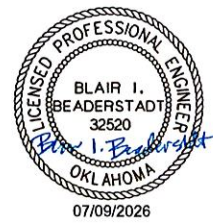
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY:

Jacobs

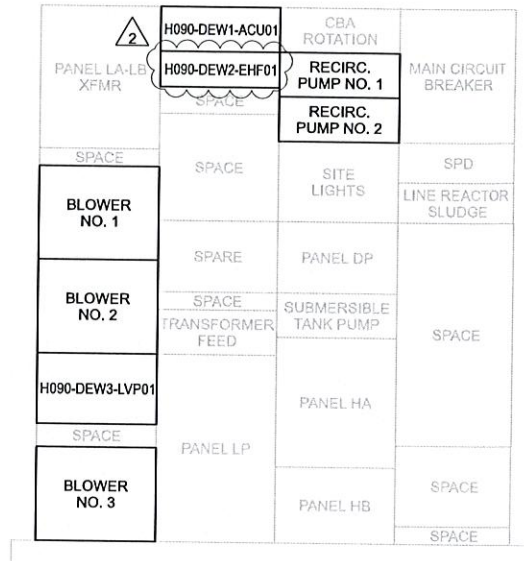
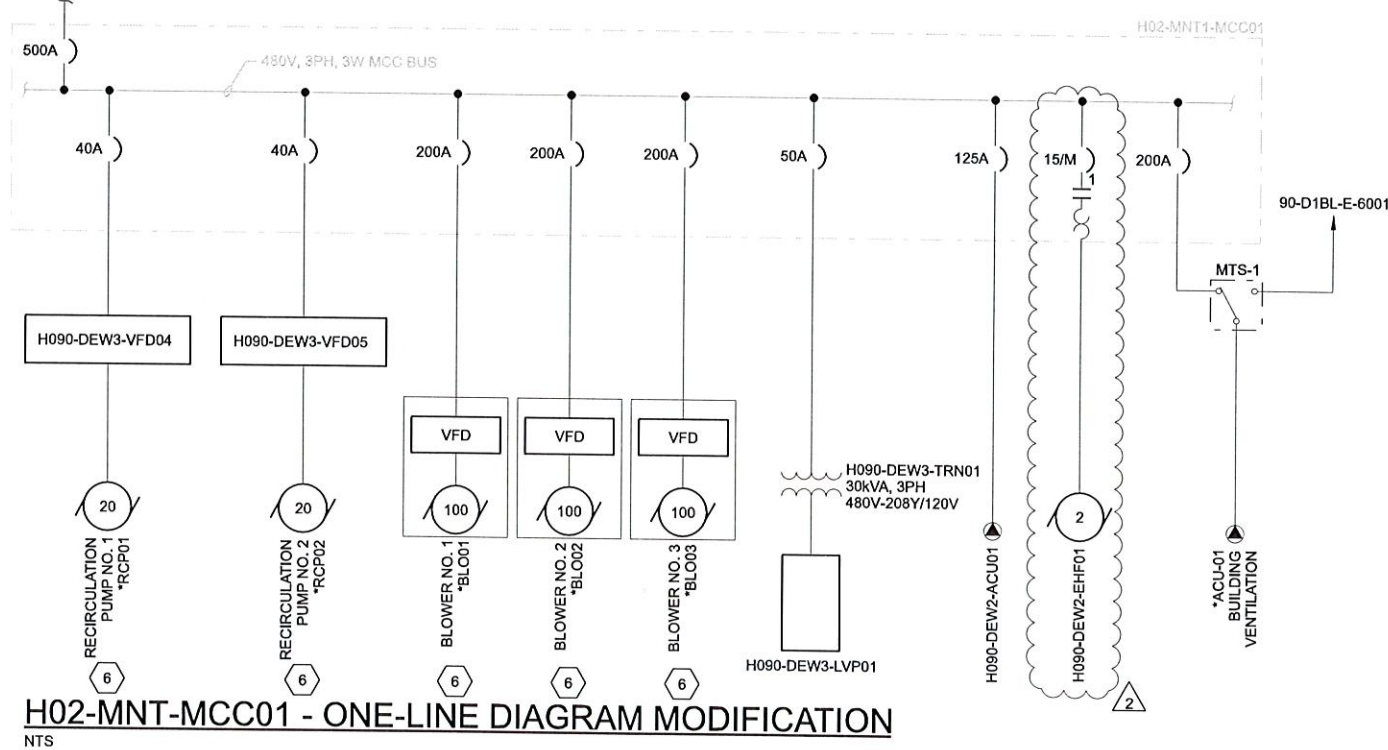
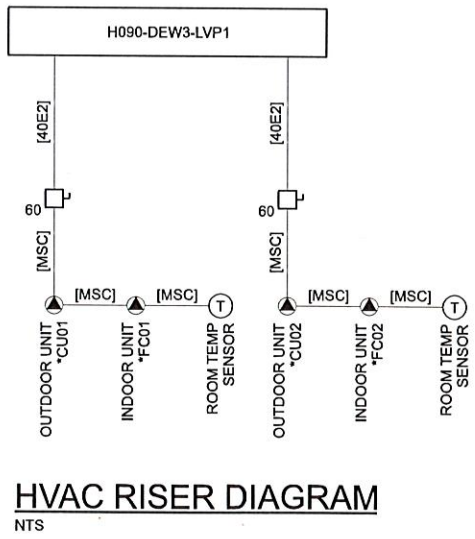
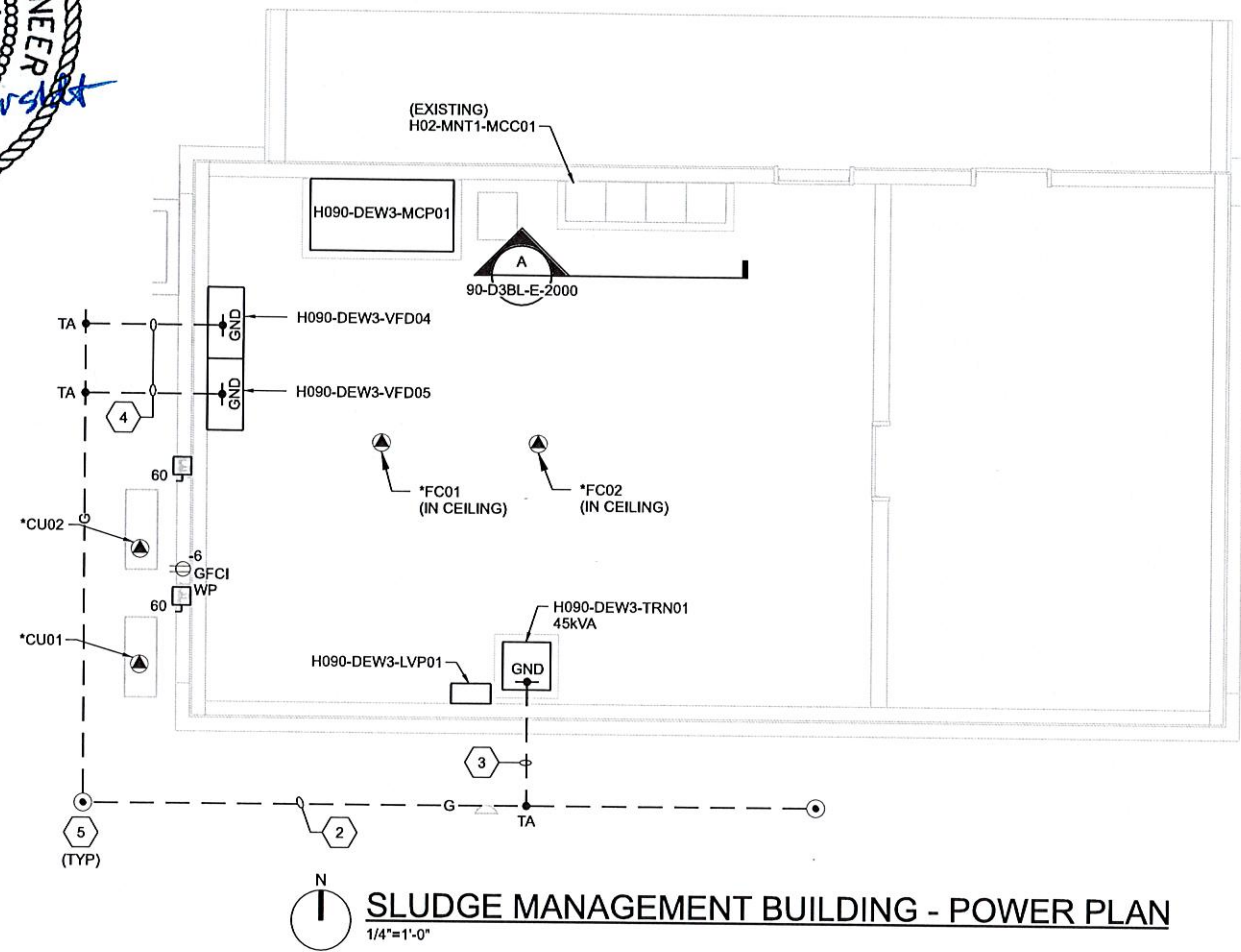


07/09/2026

REVISION	BY	DATE	PLAN SCALE:	DRAWN	AP	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	NOTE ON DWG.	DESIGNED	BB	
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			HORIZONTAL:	LEAD ENGR.		
			VERTICAL:	FIELD MGR.		
			FILE:	DRAWING: 90-D1CT-E-2000		DATE: MAY 2026
			ATLAS PAGE NO: 3328			SHEET 217 OF 300 SHEETS

PLOT DATE: 9-JUL-2026

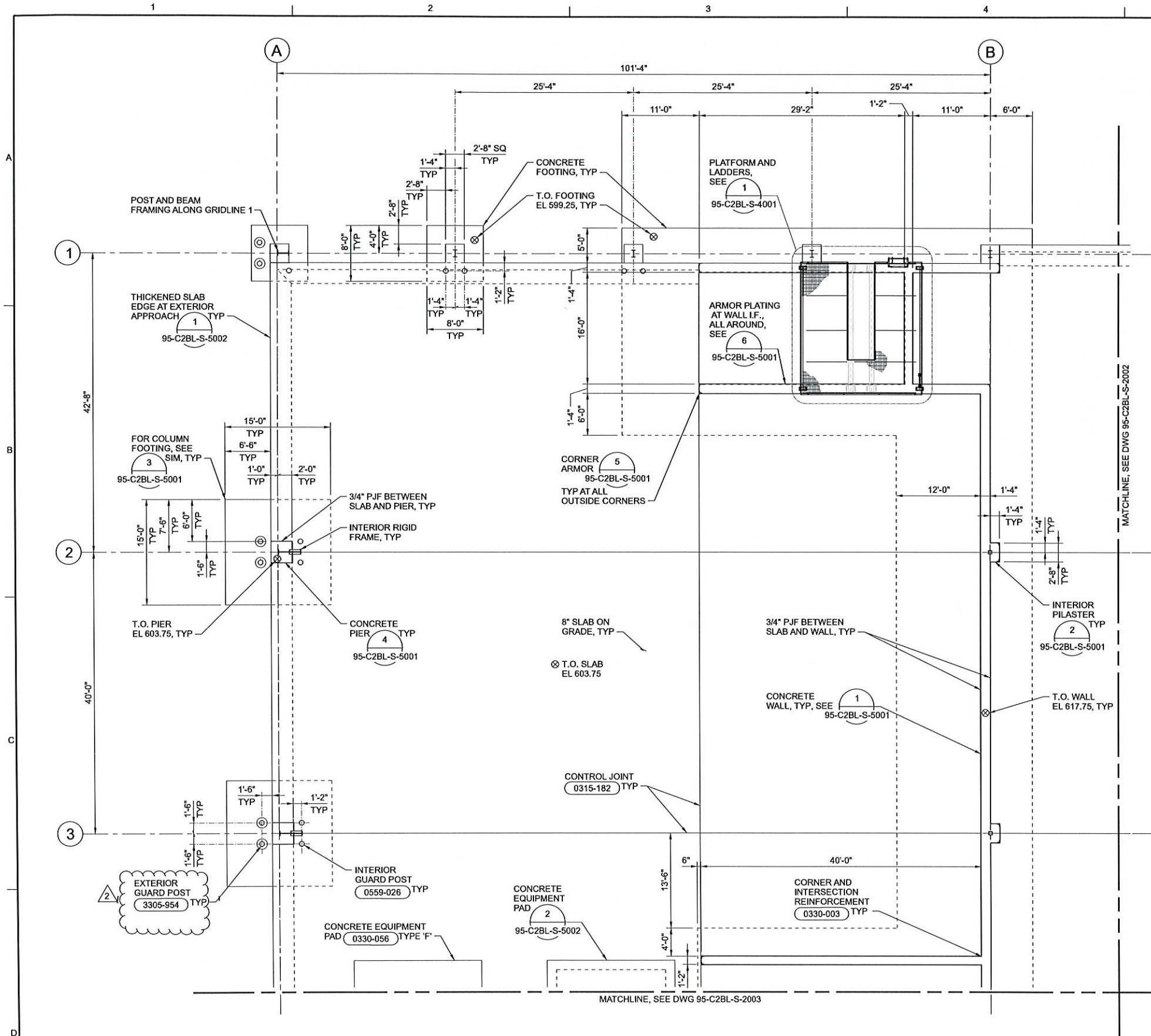
PLOT TIME: 13:20



- ### GENERAL SHEET NOTES
1. COMPLETE TAG NUMBER INCLUDES THE "H090-DEW3-" PREFIX.
- ### SHEET KEYNOTES
1. THE #4/0 TIN-PLATED BARE COPPER GROUND ENCASED IN THE DUCTBANK SHALL EXIT THE DUCTBANK AND CONNECT TO THE GROUND RING.
 2. #4/0 AWG STRANDED, BARE, TIN-PLATED COPPER.
 3. #2 AWG STRANDED, BARE, XHHW-2 INSULATED, 600VAC.
 4. #1/0 AWG STRANDED, XHHW-2 INSULATED, 600VAC.
 5. INSTALL NEW GROUND ROD AND CONNECT TO EXISTING GROUND SYSTEM.
 6. COMPLETE TAG NUMBER INCLUDES THE "H090-DEW2-" PREFIX.

EXISTING SLUDGE MIXING ELECTRICAL BUILDING ELECTRICAL POWER PLAN			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	PLAN SCALE:
ADDENDUM NO. 2			NOTE ON DWG.
			SURVEY
			PROFILE:
			HORIZONTAL:
			VERTICAL:
			FILE:
			ATLAS PAGE NO: 3328
			DATE: MAY 2026
			SHEET 221 OF 300 SHEETS

DRAWN	AP	APPROVED:
DESIGNED	BB	
PROJ. MGR.		
LEAD ENGR.		
FIELD MGR.		
DESIGN MANAGER		
PLOT DATE: 8-JUL-2026		PLOT TIME: 13:34



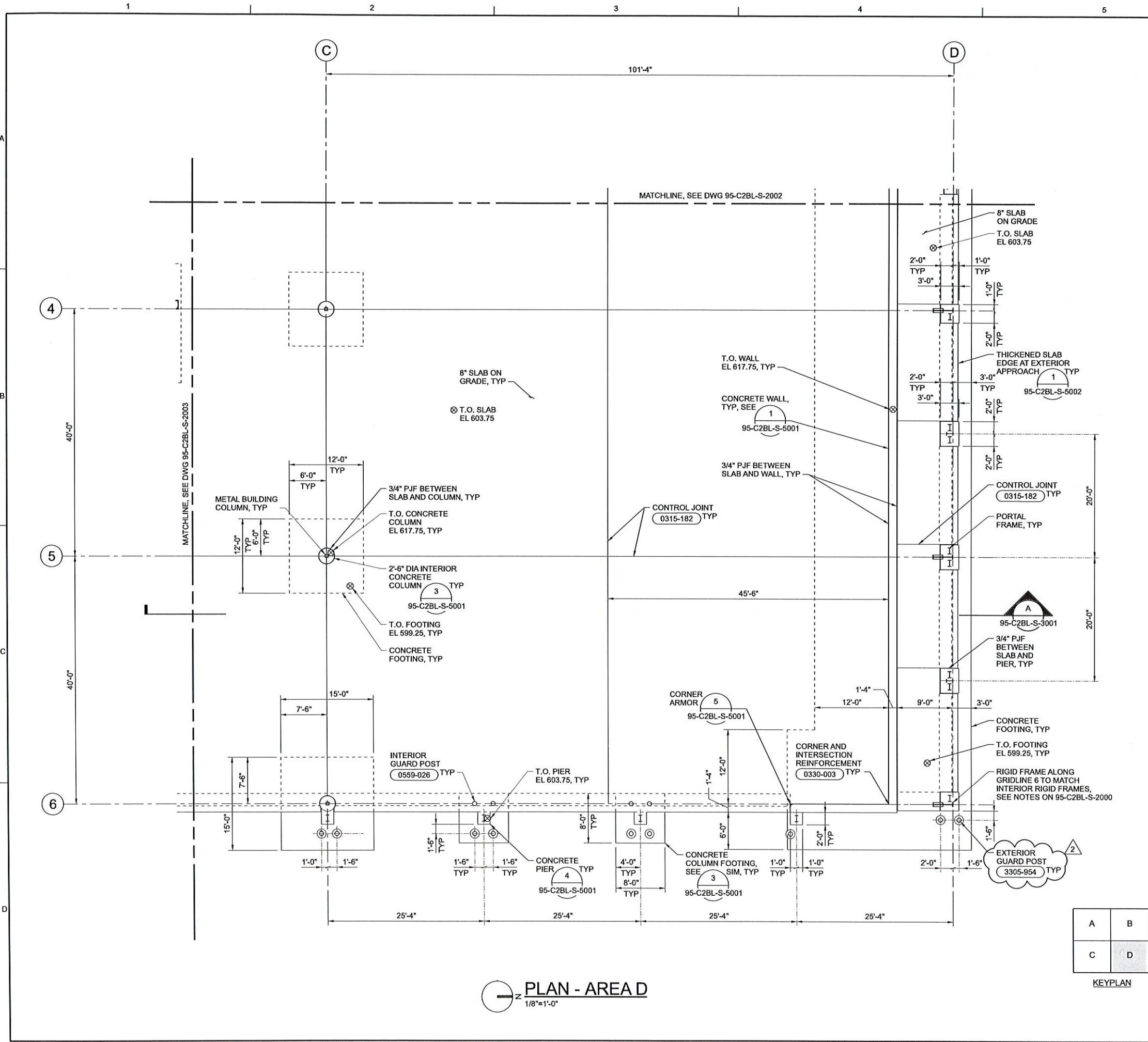
PLAN - AREA A
1/8"=1'-0"

A	B
C	D

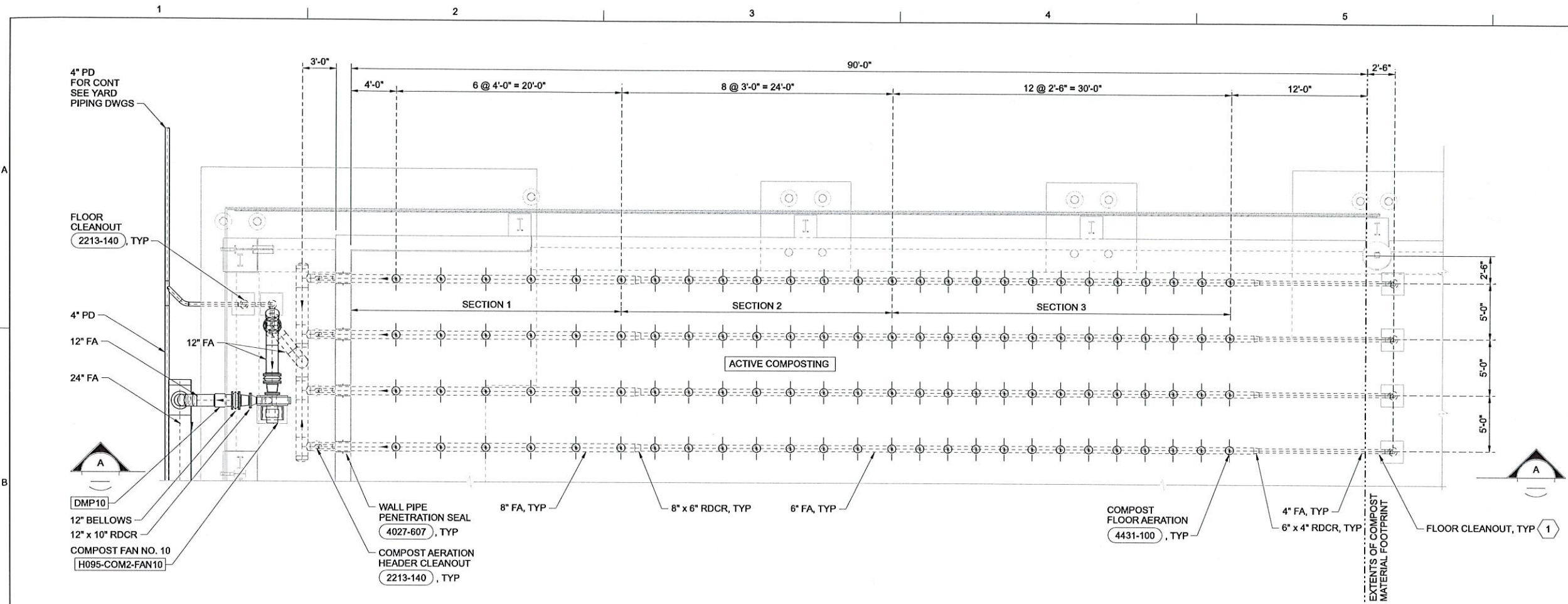
KEYPLAN



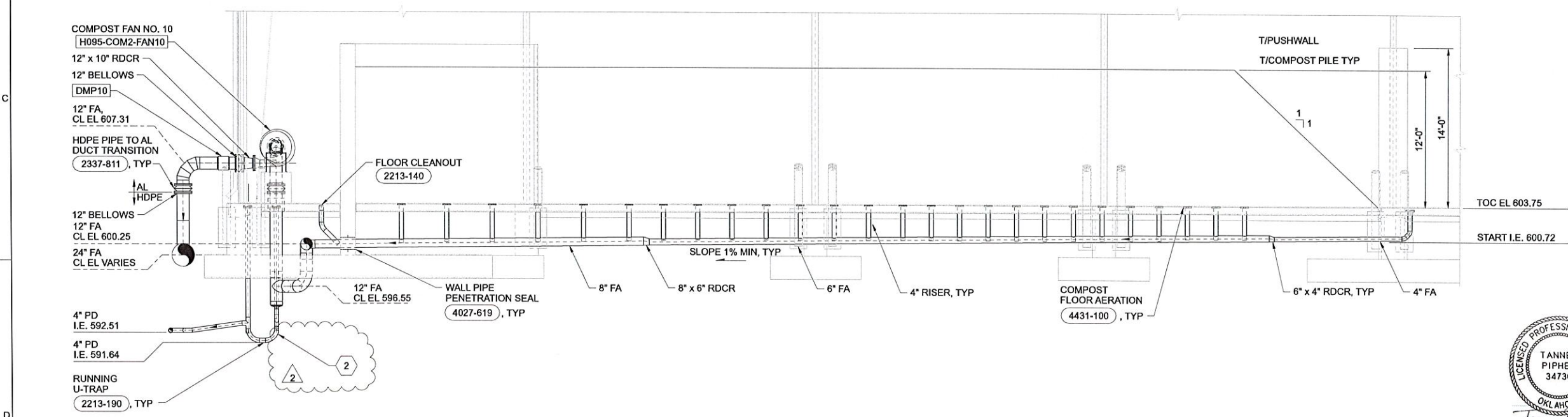
COMPOSTING BUILDING STRUCTURAL FOUNDATION PLAN AREA A			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	
NOTE ON DWG.			
PROFILE:			
HORIZONTAL:			
VERTICAL:			
FILE:	DRAWING: 95-C2BL-S-2001		DATE: MAY 2026
ATLAS PAGE NO. 3328	SHEET 238 OF 300 SHEETS		



COMPOSTING BUILDING STRUCTURAL FOUNDATION PLAN AREA D			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION		BY	DATE
ADDENDUM NO. 2		VP	7/7/2026
PLAN SCALE:	NOTE ON DWG.	DRAWN	HJ
		DESIGNED	LS
PROFILE:		SURVEY	
HORIZONTAL:		PROJ. MGR.	
VERTICAL:		LEAD ENGR.	
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FILE:	DRAWING: 95-C2BL-S-2004		DATE: MAY 2026
ATLAS PAGE NO: 3328			SHEET 249 OF 300 SHEETS



2 ACTIVE COMPOSTING ENLARGED PLAN
3/16"=1'-0"
95-C2BL-D-2000



A SECTION
3/16"=1'-0"

GENERAL SHEET NOTES

1. MAINTAIN A MINIMUM 1% SLOPE ON CONDENSATE PIPES.
2. CURING FANS ARE POSITIVE AERATION.
3. DIMENSIONS ARE MEASURED FROM FACE OF CONCRETE WALLS.

SHEET KEYNOTES

1. INSTALL FLOOR CLEANOUT FLUSH TO 1/8" RECESSED WITHIN FINISHED FLOOR SUCH THAT LOADER BUCKET BLADES DO NOT SNAG. CLEANOUT ACCESS CAP SHALL BE ALL STAINLESS STEEL AND SECURED WITH SCREWS. ZURN ELKAY MODEL LC-CS06SS 6" SQUARE FLOOR DRAIN ACCESS OR EQUAL.
2. PROCESS PIPING IN THIS SECTION IS UNDERNEATH THE FOUNDATION AND REQUIRES CONCRETE ENCASEMENT. SEE 95-C2BL-S-2000 GENERAL FACILITY NOTES FOR CONCRETE ENCASEMENT REQUIREMENTS.



COMPOSTING BUILDING
PROCESS
ENLARGED PLAN & SECTION
ACTIVE COMPOSTING

WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

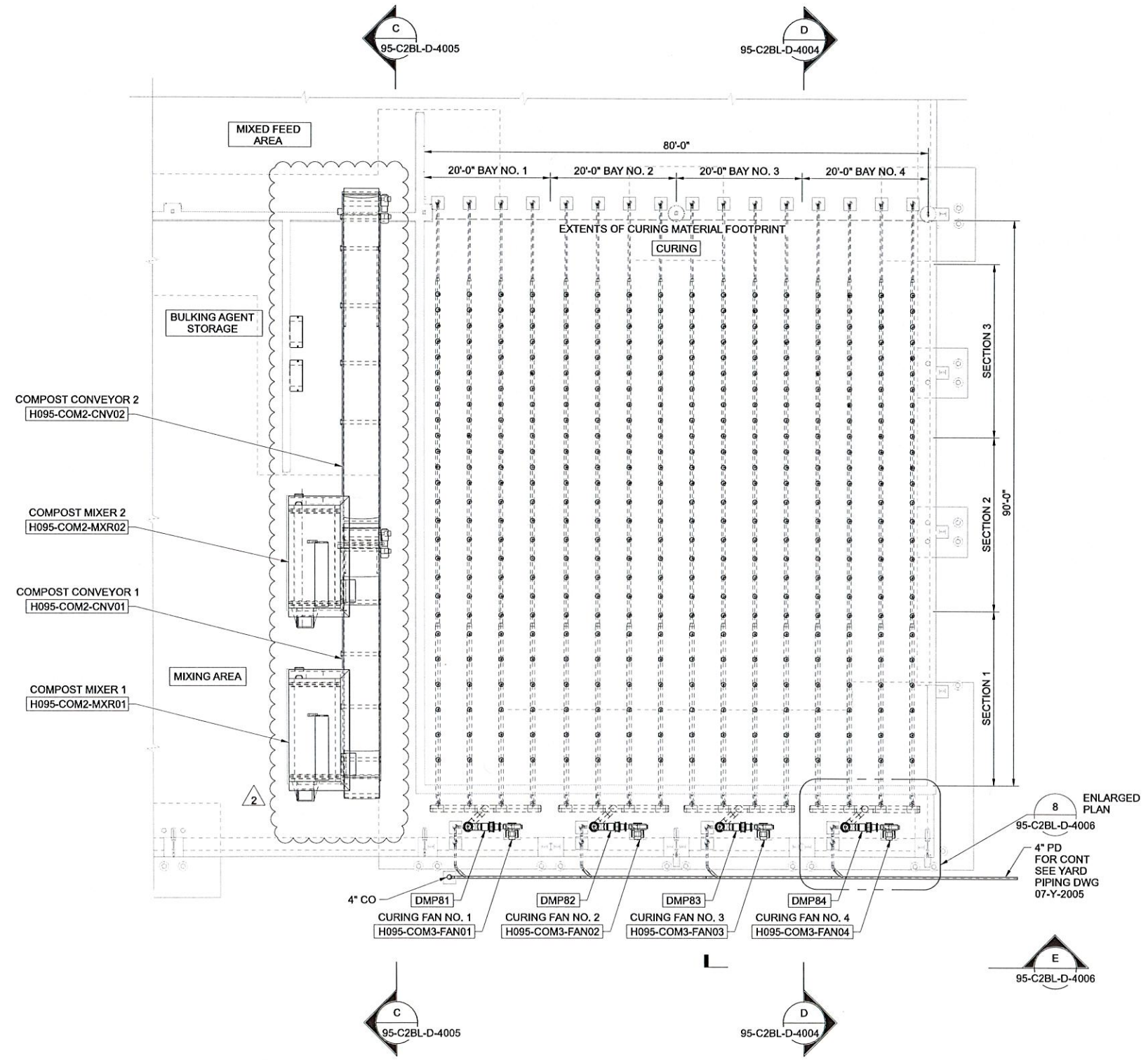
PLANS AND ESTIMATES PREPARED BY: **Jacobs**

REVISION	BY	DATE	PLAN SCALE:	DRAWN	JW	APPROVED:
ADDENDUM NO. 2	TP	6/2026	NOTE ON DWG.	DESIGNED	TP	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
				FIELD MGR.		
			FILE:	DRAWING: 95-C2BL-D-4002		DESIGN MANAGER
			ATLAS PAGE NO: 3328			DATE: MAY 2026
						SHEET 261 OF 300 SHEETS

GENERAL SHEET NOTES

1. MAINTAIN A MINIMUM 1% SLOPE ON CONDENSATE PIPES.
2. SEE ENLARGED PLAN 95-C2BL-D-4006 FOR MORE DETAILS AROUND FAN AND AERATION HEADER INSTALLATION.
3. CURING FANS ARE POSITIVE AERATION.
4. SEE SECTION 44 46 13.05 FOR CONVEYOR SYSTEM SETUP AND MODIFICATIONS. CONTRACTOR TO COORDINATE FINAL CONVEYOR ELEVATIONS, MIXER EQUIPMENT FINISHED CONCRETE PAD ELEVATION, AND FINAL PLACEMENT OF COMPONENTS. PROVIDE SUBMITTAL OF CONVEYOR LAYOUT AND NOTATE MIXER EQUIPMENT DISCHARGE ELEVATIONS FOR ENGINEERS APPROVAL.

2



3 CURING ENLARGED PLAN
3/32"=1'-0"
95-C2BL-D-2000



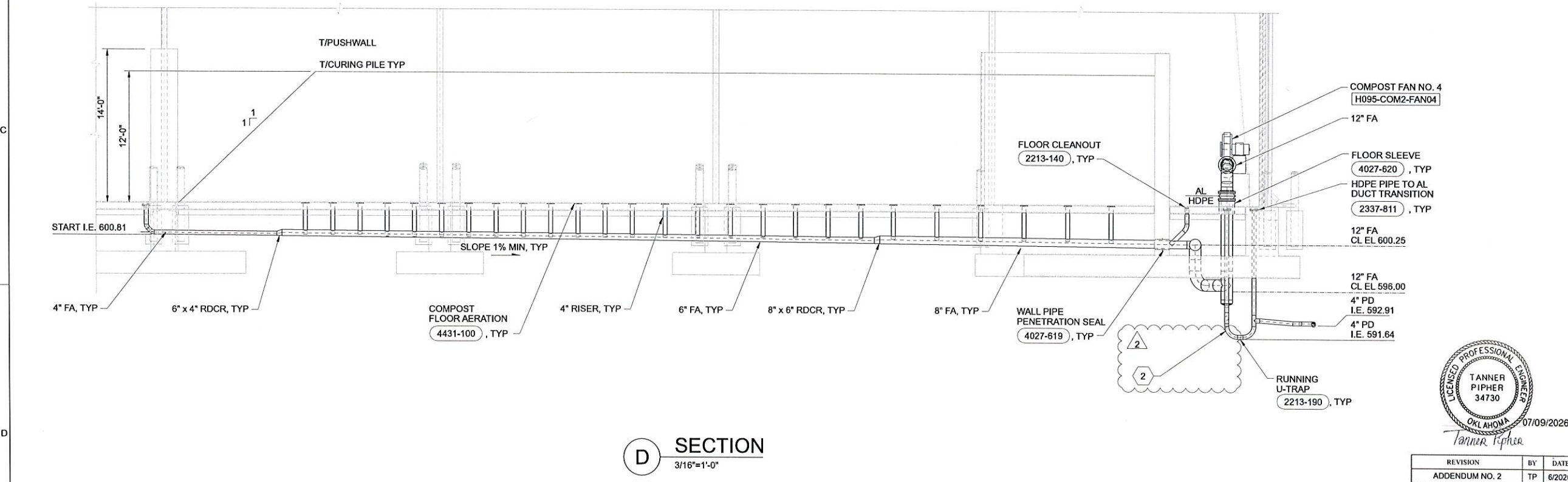
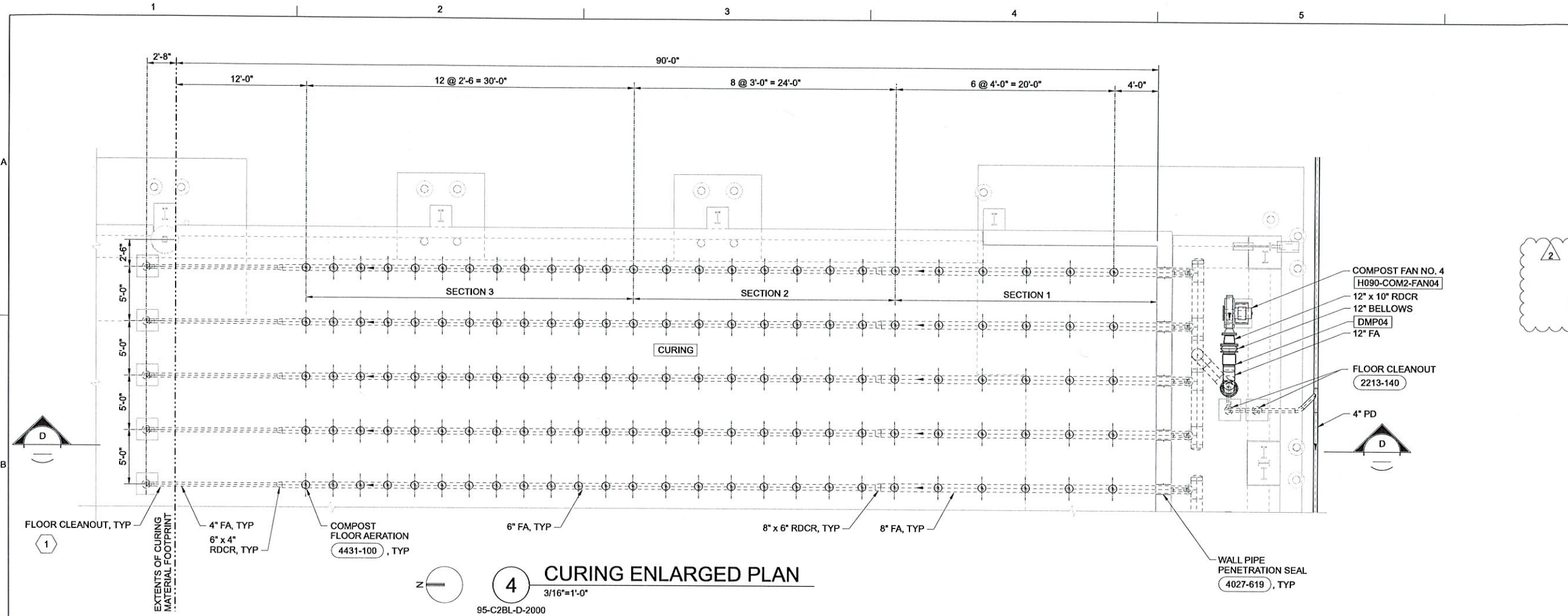
COMPOSTING BUILDING
PROCESS
ENLARGED PLAN
COMPOST CURING
WFXQ7901

HAIKEY CREEK WWTP
BIOSOLIDS IMPROVEMENTS

CITY OF TULSA, OKLAHOMA
WATER AND SEWER DEPARTMENT

PLANS AND ESTIMATES PREPARED BY: **Jacobs**

REVISION	BY	DATE	PLAN SCALE:	DRAWN	JW	APPROVED:
ADDENDUM NO. 2	TP	6/2026	NOTE ON DWG.	DESIGNED	TP	
			PROFILE:	SURVEY		
			HORIZONTAL:	PROJ. MGR.		
			VERTICAL:	LEAD ENGR.		
				FIELD MGR.		DESIGN MANAGER
			FILE:	DRAWING: 95-C2BL-D-4003		DATE: MAY 2026
			ATLAS PAGE NO:	3328		SHEET 262 OF 300 SHEETS



GENERAL NOTES

1. MAINTAIN A MIN 1% SLOPE ON CONDENSATE PIPES.
2. DIMENSIONS ARE MEASURED FROM FACE OF CONCRETE WALLS.

SHEET KEYNOTES

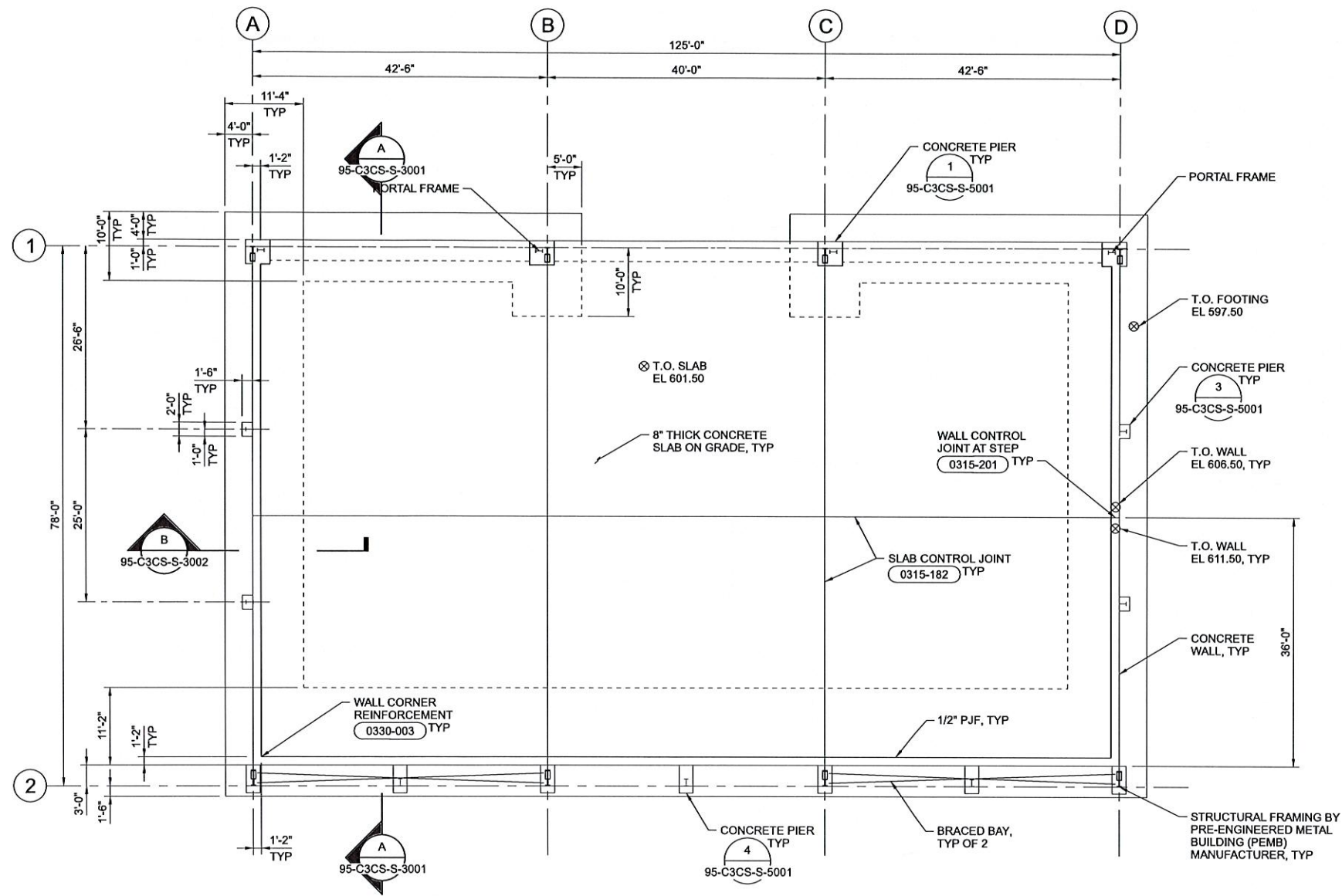
1. INSTALL FLOOR CLEANOUT FLUSH TO 1/8" RECESSED WITHIN FINISHED FLOOR SUCH THAT LOADER BUCKET BLADES DO NOT SNAG. CLEANOUT ACCESS CAP SHALL BE ALL STAINLESS STEEL AND SECURED WITH SCREWS. ZURN ELKAY MODEL LC-CS06SS 6" SQUARE FLOOR DRAIN ACCESS OR EQUAL.
2. PROCESS PIPING IN THIS SECTION IS UNDERNEATH THE FOUNDATION AND REQUIRES CONCRETE ENCASEMENT. SEE 95-C2BL-S-2000 GENERAL FACILITY NOTES FOR CONCRETE ENCASEMENT REQUIREMENTS.

COMPOSTING BUILDING PROCESS ENLARGED PLAN & SECTION COMPOST CURING			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION		BY	DATE
ADDENDUM NO. 2		TP	8/2026
PLAN SCALE:	NOTE ON DWG.	DRAWN	JW
PROFILE:	SURVEY	DESIGNED	TP
HORIZONTAL:	PROJ. MGR.	LEAD ENGR.	
VERTICAL:	FIELD MGR.		
FILE:	DRAWING: 95-C2BL-D-4004	DATE:	MAY 2026
ATLAS PAGE NO:	3328	SHEET	263 OF 300 SHEETS



GENERAL FACILITY NOTES

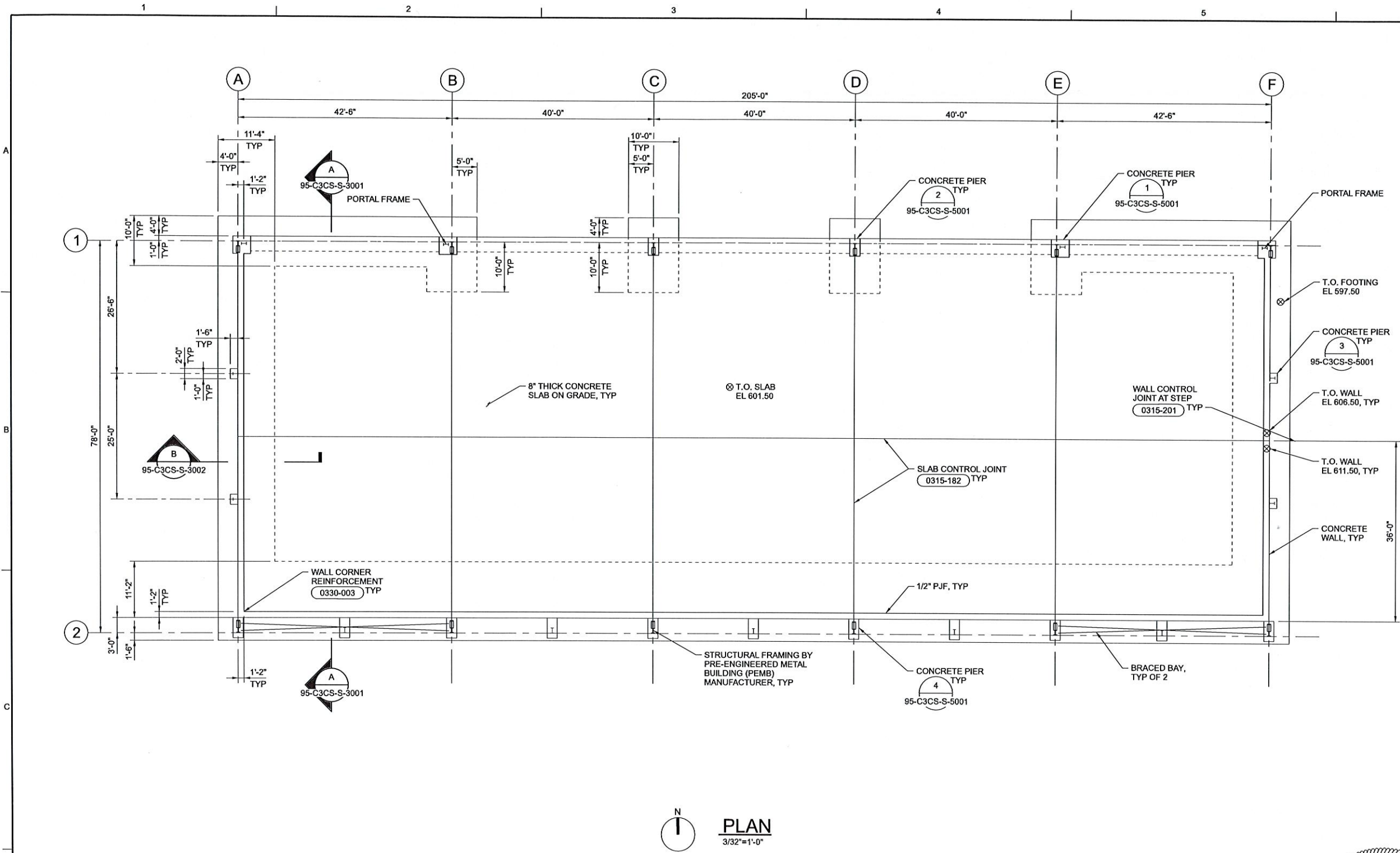
1. FINISHED COMPOST STORAGE (ALT 04) SEE 01-G-0004 FOR QUANTITIES AND NOTES.
2. FOR GENERAL STRUCTURAL NOTES, SEE DRAWINGS 01-G-0020 AND 01-G-0021.
3. FOR STRUCTURAL STATEMENT OF SPECIAL INSPECTIONS, SEE DRAWINGS 01-G-022 THROUGH 01-G-0024.



N
PLAN
3/32"=1'-0"



FINISHED COMPOSTING STORAGE BUILDING STRUCTURAL FOUNDATION PLAN - BASE BID			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	
PLAN SCALE:	DRAWN	HJ	APPROVED:
NOTE ON DWG.	DESIGNED	LS	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		
	FIELD MGR.		
FILE:	DRAWING: 95-C3CS-S-2000		DESIGN MANAGER
ATLAS PAGE NO: 3328	DATE: MAY 2026		
	SHEET 279 OF 300 SHEETS		



GENERAL FACILITY NOTES

1. FINISHED COMPOST STORAGE (ALT 04) SEE 01-G-0004 FOR QUANTITIES AND NOTES.
2. FOR GENERAL STRUCTURAL NOTES, SEE DRAWINGS 01-G-0020 AND 01-G-0021.
3. FOR STRUCTURAL STATEMENT OF SPECIAL INSPECTIONS, SEE DRAWINGS 01-G-022 THROUGH 01-G-024.

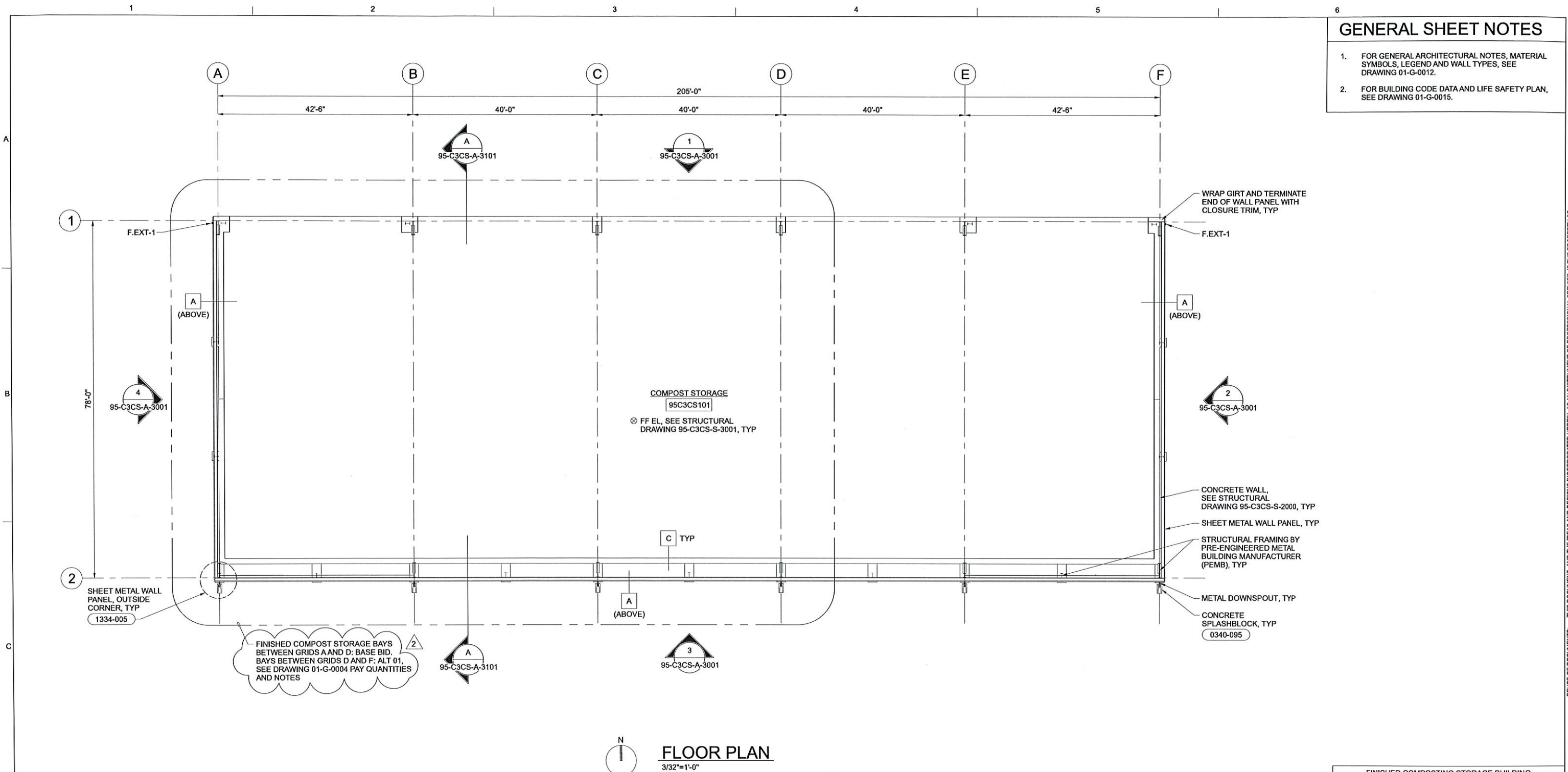
PLAN
3/32"=1'-0"



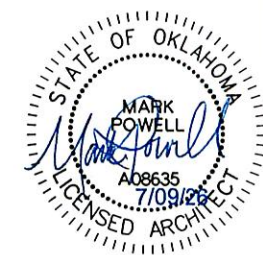
FINISHED COMPOSTING STORAGE BUILDING STRUCTURAL FOUNDATION PLAN - ALTERNATE BID			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	
			DESIGN MANAGER
			DATE: MAY 2026
			SHEET 290 OF 300 SHEETS

GENERAL SHEET NOTES

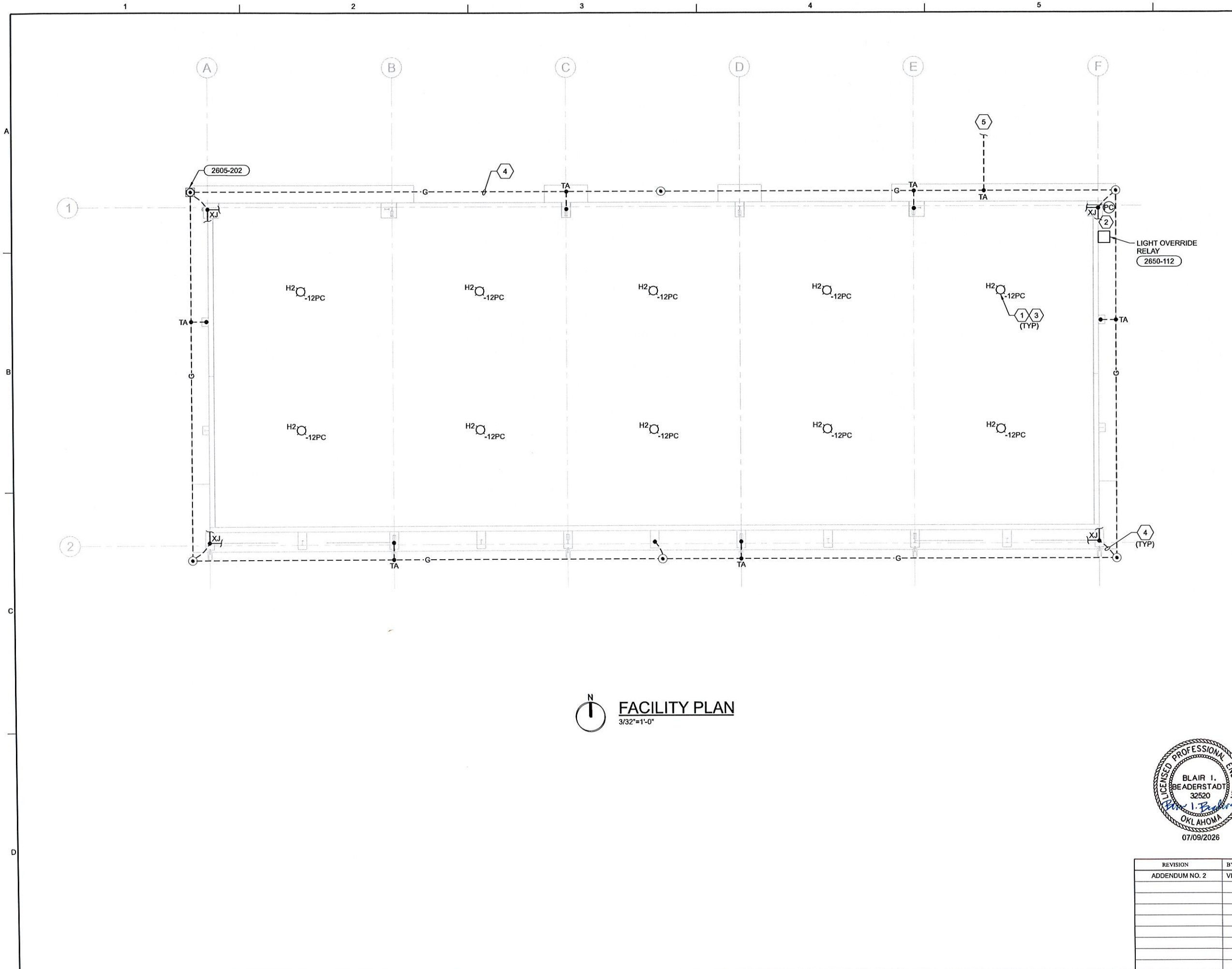
- FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND AND WALL TYPES, SEE DRAWING 01-G-0012.
- FOR BUILDING CODE DATA AND LIFE SAFETY PLAN, SEE DRAWING 01-G-0015.



FLOOR PLAN
3/32"=1'-0"



FINISHED COMPOSTING STORAGE BUILDING ARCHITECTURAL FLOOR PLAN			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	MP	7/2026	
NOTE ON DWG.			
PROFILE:			
HORIZONTAL:			
VERTICAL:			
FILE:	DRAWING: 95-C3CS-A-2000		DESIGN MANAGER
ATLAS PAGE NO: 3328			DATE: MAY 2026
			SHEET 294 OF 300 SHEETS



GENERAL SHEET NOTES

1. FINISHED COMPOST STORAGE: ALT04, SEE 01-G-004 PAY QUANTITIES AND NOTES.
2. GROUND RING CONDUCTOR BURIED MINIMUM 30" BELOW FINISHED GRADE.
3. LIGHTING SHOULD BE ENERGIZED BY H090-DEW1-LVP01 LOCATED IN THE DEWATERING BUILDING.

SHEET KEYNOTES

1. INSTALL LIGHT FIXTURE TYPE H2 SUCH THAT THE TOP OF THE FIXTURE IS 14'-6" FROM FINISHED FLOOR. LIGHTS INSTALLATION METHOD SHALL BE SUCH TO ELIMINATE ANY MOVEMENT FROM INCLEMENT WEATHER.
2. PHOTOCELL PC TO BE MOUNTED FACING NORTH.
3. LUMINAIRES TO BE CONTROLLED VIA PHOTOCELL WITH MANUAL OVERRIDE.
4. #4/0 AWG STRANDED, BARE, TIN-PLATED COPPER.
5. BOND TO DEWATERING GROUNDING SYSTEM.

FACILITY PLAN
3/32"=1'-0"



FINISHED COMPOST STORAGE ELECTRICAL FACILITY PLAN ALTERNATE BID			
WFXQ7901			
HAIKEY CREEK WWTP BIOSOLIDS IMPROVEMENTS			
CITY OF TULSA, OKLAHOMA WATER AND SEWER DEPARTMENT			
PLANS AND ESTIMATES PREPARED BY: Jacobs			
REVISION	BY	DATE	APPROVED:
ADDENDUM NO. 2	VP	7/7/2026	
NOTE ON DWG.	DESIGNED	BB	
PROFILE:	SURVEY		
HORIZONTAL:	PROJ. MGR.		
VERTICAL:	LEAD ENGR.		
FILE:	DRAWING: 95-C3CS-E-2010	DATE: MAY 2026	DESIGN MANAGER
ATLAS PAGE NO: 3328			SHEET 300 OF 300 SHEETS