Jones & Henry
ENGINEERS, LTD.

City of Greenville, Ohio
WWTP Solids Handling Facility and Administration Building

ADDENDUM 2

12.23.2024

Planholders of the City of Greenville, WWTP Solids Handling Facility and Administration Building are hereby notified of the following amendments to the Contract Documents. This Addendum is hereby made a part of the Contract Documents.

GENERAL CLARIFICATIONS

A2-G1:
Question: How is the C900 PVC waterline getting restrained? We assume bell restraints utilizing the EBAA calculator. Please advise
Response: The C900 PVC waterline shall be restrained using bell restraints.

A2-G2:
Question: Greenville provided a copy of the Sales Tax Exemption Form to include as part of Contract Documents.
Response: A copy of the Sales Tax Exemption Form is included in Addendum 2.

A2-G3:
Question: Greenville requested to include a copy of below as part of Contract Documents:

- C451 Qualifications Statement
- City of Greenville Certification of Fiscal Officer
- City of Greenville Income Tax Questionnaire
- City of Greenville Notice of Commencement
- Non-Collusion Affidavit
- Statement of Bidder Delinquency
- Statement of Bidder No Delinquency

Response: Yes, these documents are included in Addendum 2.

A2-G4:
Question: Provide detail for buried sanitary cleanouts as shown on C-3.1 and 3.2
Response: Sanitary cleanout detail added to updated Sheet C-0.2 included in Addendum 2.

A2-G5:
Question: Sheet C-0.4 shows a 7' fence height. Item 4.01 in spec 02710 calls out a 6' fence height. Please clarify
Response: Refer to updated fencing detail in C-0.4 included in Addendum 2.

A2-G6:
Question: Pelton and our manufacturers continue to work through the Greenville specs. Currently section 11239 only has one vender listed, Aerzen. As you've stated the customer is very cost focused. We'd like Jones and Henry to consider listing Universal Blower PAC as a named supplier to ensure competitive pricing.
Response: Universal has been included in Base Bid Schedule for Blowers. Refer to Addendum 1.

A2-G7:
Question: Blower specification section 11239, 2.02.L – Calls for a positive pressure lubrication system. We do not recommend pressurized lubrication because it adds cost & complexity to the system. It's an additional failure point and that we don't feel is beneficial to the customer.
Response: Positive pressure lubrication system noted in specification is the Basis of Design spec standard.

A2-G8:
Question: Blower specification section 11239, 2.03.B **–** Calls for inlet filters on the blower. Drawings show remote filters. Please clarify.
Response: Refer to updated Specification 11239 included in Addendum 2.

A2-G9:
Question: Blower specification section 11239, 4.03.A.1.L – Calls for VFDs in an MCC
Response: Yes, this is accurate.

A2-G10:
Question: For Item 4.02 in spec 11600, a few of the items are not provided with a manufacturer or model number. Please clarify.
Response: Specification 11600 Section 4.02 has been updated with the manufacturer/model numbers. Refer to updated Specification 11600 included in Addendum 2.

A2-G11:
Question: Under 15160-Storm Drain Piping, cast iron piping is called for 5' beyond buildings. This seems to contradict 02550 which calls for PVC pipe. Please confirm PVC pipe is to be utilized for storm piping. Also, can PVC be used buried storm piping under the building?
Response: 15160 Storm Drainage Piping Specification has been removed from project.

A2-G12: Question: It appears that there is storm piping connecting all the downspouts on each building, however, no pipe sizes appear to be given. Also, CB ST-3 only shows two 12" pipes. C-3.1 shows three pipes. Please clarify.
Response: Refer to updated drawing C3.1 and C3.2

A2-G13:
Question: Please verify that no masonry cavity wall damp proofing is required.
Response: Where masonry cavity walls are provided above grade, an air barrier is required to be installed on the outside face of rigid insulation throughout, see issued specification section 072715 - NONBITUMINOUS SELF-ADHERING SHEET AIR BARRIERS.

A2-G14:
Question: Please provide a spec for the FRP door D-3-1. Also, should the frame for this door be hollow metal as shown on the door schedule or FRP?
Response: Specification SECTION 08220 FIBERGLASS REINFORCED POLYESTER (FRP) DOORS AND FRAMES has been added to the project manual, for any door specified to be FRP the frame should also be FRP.

A2-G15:
Question*:* The Velodyne model number in section 11233 - 2.01.A.1 calls for the XOD version. This is the model number that PW Tech uses and indicated no control panel and no VFD, just a junction box. The volute press panel controls the polymer system.
- Then section 2.05.D states control panel with VFD and HOA.
- The PID I-0.9 shows a junction box with all controls through the PW Tech unit, which aligns with the XOD model listed in the specs

Response: ***The Polymer system VFDs will be part of Dewatering Press Control Panel. Refer to updated specification section 11233 included in Addendum 2.***

A2-G16:
Question: We request adding Aquarius Technologies to the list of approved suppliers for the 24" wide-band stainless steel, coarse bubble diffusers specified for the Greenville project.
Response: Aquarius included in Base Bid Schedule for Diffusers. Refer to updated C410 Base Bid Manufacturers Schedule included in Addendum 2.

SPECIFICATIONS

Add the following specifications:

C-451 – Qualification Statement

City of Greenville – Certification of Fiscal Officer

City of Greenville – Income Tax Questionnaire

City of Greenville – Notice of Commencement

City of Greenville – Non-Collusion Affidavit

City of Greenville – Statement of Bidder Delinquency

City of Greenville – Statement of Bidder No Delinquency

072715 – Nonbituminous Self-Adhering Sheet Air Barriers

078413 – Penetration Firestopping

078443 – Joint Firestopping

08220 – Fiberglass Reinforced Polyester Doors Frames

Replace the following specifications with the attached:

C-410 – Base Bid Manufacturers Schedule

02710 – Fencing

11104 – Air Diffusion Equipment

11233 – Liquid Polymer Equipment

11239 – Rotary Lobe Blowers

11600 – Laboratory Furniture and Equipment

15150 – Sanitary Waste and Vent Piping

Remove the following specifications:

15160 – Storm Drainage Piping

DRAWINGS

Replace the following drawing with the attached:

C-0.2 page 19

C-0.4 page 21

C-3.1 page 29

C-3.2 page 30

S-2.8 page 78

A-5.1 page 48

S-5.8 page 92

M-0.8 page 129

E-2.1 page 153

E-2.2 page 154

E-2.4 page 156

E-3.2 page 160

E-5.2 page 164

E-5.3 page 165

E-5.4 page 166

E-5.6 page 168

I-0.9 page 179

I-0.10 page 180

I-0.12 page 182

RECEIPT OF THIS ADDENDUM MUST BE ACKNOWLEDGED ON PAGE C-410-1 OF THE BID.

QUALIFICATIONS STATEMENT
(Addendum 2, Issued December 23, 2024)

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm: _____

Address: _____

_____

_____

2. SUBMITTED TO: _____

3. SUBMITTED FOR: _____

Owner: _____

Project Name: _____

_____

_____

_____

TYPE OF WORK: _____

_____

_____

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person: _____

Title: _____

Phone: _____

Email: _____

5. AFFILIATED COMPANIES:

Name: _____

Address: _____

_____

_____

6. TYPE OF ORGANIZATION:

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

_____

_____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20__

_____

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES: _____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1. (if specifically requested)
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13. (if specifically requested)
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

NON-COLLUSION AFFIDAVIT
(Addendum 2, Issued December 23, 2024)

STATE OF _____)
) SS.
COUNTY OF _____)

_____, being first duly sworn, deposes and says that he is _____ (sole owner, partner, president, secretary, etc.) of _____, the party making the foregoing proposal or bid; that such bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly with any bidder or person, to put in a sham bid, or that such person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the City of Greenville, Ohio or any person or persons interested in the proposed contract; and that all statements contained in said proposal or bid are true; and further, that such bidder has not, directly or indirectly, submitted this bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

_____
Affiant

SWORN to and subscribed before me
this _____ day of _____
20_____.

_____
Notary Public in and for
_____County,_____
My Commission Expires_____

STATEMENT OF BIDDER

Concerning CAT Taxes/Corporate Tax
(No Delinquency)
(Addendum 2, Issued December 23, 2024)

STATE OF _____)
) SS.
COUNTY OF _____)

_____, being the _____
(Name of person making statement) (Title/Position)

of _____,being first
(Name of Bidder or Company)
duly cautioned and sworn according to law does hereby swear or affirm as follows:

1. That as of _____(date of bid), _____(name of bidder) was not charged with any delinquent Concerning CAT Taxes/Corporate Tax on the general tax list of personal property of Darke County, Ohio.

2. That I understand that a copy of this Statement shall be incorporated into the contract to be entered between _____ _____(name of bidder) and the City of Greenville, Ohio.

Further Affiant sayeth naught.

_____
(Signature of person making statement)

_____, being the _____
(Name of person making statement) (Title/Position)

of_____ appeared before me and
(Name of Bidder or Company)
did swear that the foregoing comments are true as he verily believes.

Sworn to and subscribed in my presence this _____ day of _____, 20_____,
at _____County,_____.

_____
Notary Public
My Commission Expires_____

STATEMENT OF BIDDER

Concerning CAT Taxes/Corporate Tax
(Delinquency)
(Addendum 2, Issued December 23, 2024)

STATE OF _____)
) SS.
COUNTY OF _____)

_____being the _____
(Name of person making statement) (Title/Position)

_____, being first duly cautioned and
(Name of bidder or company)
sworn according to law does hereby swear or affirm as follows:

AMOUNT OF UNPAID DELINQUENT TAX/PENALTY & INTEREST/TOTAL DUE

a. _____
b. _____
c. _____
d. _____

That I understand that a copy of this Statement shall be incorporated into the Contract to be entered between _____(Name of bidder) and the City of Greenville, Ohio.

Further Affiant sayeth naught.

_____
(Signature of person making statement)

_____, being the _____
(Name of person making statement) (Title/Position)
_____(company/bidder) appeared before me and did swear that the foregoing statements are true as he verily believes.

Sworn to and subscribed in my presence this _____ day of _____, 20_____, at _____ County, _____.

_____
Notary Public
My Commission Expires _____

CITY OF GREENVILLE, OHIO INCOME TAX DEPARTMENT

Municipal Building
100 Public Square
Greenville OH 45331-1499
PHONE: 937-548-5747; FAX 937-548-3035

BUSINESS QUESTIONNAIRE

This information may be shared with other departments within the City of Greenville

(Addendum 2, Issued December 23, 2024)

1. Name of Individual _____ or
   Owner(s) _____
2. Name of Corporation _____
   (a) Statutory Agent _____ SSN _____
   (b) Federal Identification Number _____
   (c) Telephone Number _____ Fax Number _____
3. Trade Name (If any) _____
4. Give home address of Owner(s) or all Partners if a Partnership & include social security number(s)

	NAME	ADDRESS	TELEPHONE	SSN
(a)	_____	_____	_____	_____
(b)	_____	_____	_____	_____
(c)	_____	_____	_____	

5. Business Address _____
6. Mailing Address (If different from above) _____
7. Date when business (or job) started or will start in Greenville _____
8. Address where work will be done in Greenville _____
9. Withholding remittance is required: Monthly ($200 or more) _____ Quarterly _____
10. Total number of employees withholding for _____
11. Type of Organization: Individual_____Partnership _____ Corporation _____
12. Accounting Period: Calendar Year _____ *Fiscal Year Ending (month) _____
13. Nature of Business _____
14. Do you have any Sub-Contractors on the Greenville job? Yes_____ No _____ If yes, please attach a list showing names, addresses and phone numbers or write **list of Sub-Contractors** on back of this sheet.
15. With reference to Real Estate Property and Personal Property within the City of Greenville:
    (a) Does the Business or Profession occupy, as Tenant, Real Property rented from others?

    Yes _____ No _____ If yes, to whom is rent paid _____

    _____
    NAME ADDRESS

For all Business / Contractor doing business inside Greenville City limits but are located outside Greenville

16. Non-Resident Business, estimated completion date of job: (Month & Year) _____
17. Non-Resident Business, how many Employees (**WORKING MORE THAN 20 DAYS**) will be working on the project? (Do not include yourself) _____
18. Non-Resident Business, are you a Small Business (total revenue of less than $500,000 during the preceding taxable year)? Yes_____ No _____ If yes please **send a copy** of your preceding tax year Federal return for verification.

Signature _____ Date _____

***** Withholding Forms may be found on our Website: cityofgreenville.org***

PLEASE RETURN THIS QUESTIONNAIRE WITHIN 20 DAYS TO THE CITY OF GREENVILLE.

CERTIFICATION OF FISCAL OFFICER
(Addendum 2, Issued December 23, 2024)

The undersigned, as City Auditor of the City of Greenville, Ohio hereby certifies that funds sufficient to meet the requirements of this Contract have been lawfully appropriated for such purpose and are in the treasury, or in the process of collection.

Project:

By_____
City Auditor

Date _____

CERTIFICATE OF OWNER'S ATTORNEY

The undersigned, as Law Director of the City of Greenville, Ohio, do hereby certify as follows:

I have examined the attached contract(s) and surety bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Project:

_____
Law Director

_____,20_____

NOTICE OF COMMENCEMENT
(Addendum 2, Issued December 23, 2024)

STATE OF OHIO :
COUNTY OF DARKE :

Ryan Delk says that he is the Safety/Service Director of the City of Greenville (the "Public Authority" hereinafter) and states as follows:

1. The Public Authority has contracted for the completion of the following public improvement: _____, and all other appurtenant work as indicated in the specifications. Said project is located in the public right-of-way of _____ in Greenville.

2. The Public Authority has identified the Project as the _____ **Project**;

3. The City of Greenville has executed Contract(s) for the Project with the following Principal Contractor(s), having the following address(es) and trade(s):

Name of Contractor	Address	Trade

4. The first of these Contracts, with _____, contractor, was executed on the ___ day of _____, 20___;

5. The name and address of all sureties guaranteeing payment of the obligation of each such principal contractor are as follows:

Name of Surety	Address of Surety	Name of Principal Contractor

6. Service of the Affidavit described in ORC 1311.26 may be made on the following representative of the Public Authority: Ryan Delk, Safety/Service Director, 100 Public Square, Greenville, Ohio 45331.

7. Ryan Delk, as Safety/Service Director of the City of Greenville, Ohio, having been duly sworn, states that the information contained herein is true and correct and that Affiant has the requisite authority to execute this instrument.

_____
Affiant

STATE OF OHIO :
COUNTY OF DARKE :

SWORN to before me and subscribed in my presence this _____ day of _____, 20

_____
Notary Public

This document was prepared by Katie Benge, Clerk, Board of Control, for the City of Greenville.

Ohio | Department of Taxation
tax.ohio.gov

Reset Form

STEC CC
Rev. 11/14

(Addendum 2, Issued December 23, 2024)

Sales and Use Tax
Construction Contract Exemption Certificate

Identification of Contract:

Contractee's (owner's) name _____

Exact location of job/project _____

Name of job/project as it appears on contract documentation _____

The undersigned hereby certifies that the tangible personal property purchased under this exemption certificate was purchased for incorporation into:

☐	A building used exclusively for charitable purposes by a nonprofit organization operated exclusively for charitable purposes as defined in Ohio Revised Code (R.C.) section 5739.02(B)(12);	☐	Real property that is owned, or will be accepted for ownership at the time of completion, by the United States government, its agencies, the state of Ohio or an Ohio political subdivision;
☐	Real property under a construction contract with the United States government, its agencies, the state of Ohio or an Ohio political subdivision;	☐	A computer data center entitled to exemption under R.C. 122.175;
☐	A horticulture structure or livestock structure for a person engaged in the business of horticulture or producing livestock;	☐	A building under a construction contract with an organization exempt from taxation under section 501(c)(3) of the Internal Revenue Code of 1986 when the building is to be used exclusively for the organization's exempt purposes;
☐	A house of public worship or religious education;		
☐	The original construction of a sports facility under R.C. section 307.696;	☐	A hospital facility entitled to exemption under R.C. section 140.08;
☐	Real property outside this state if such materials and services, when sold to a construction contractor in the state in which the real property is located for incorporation into real property in that state, would be exempt from a tax on sales levied by that state;	☐	Building and construction materials and services sold for incorporation into real property comprising a convention center that qualifies for property tax exemption under R.C. 5709.084 (until one calendar year after the construction is completed).

The original of this certificate must be signed by the owner/contractee and/or government official and must be retained by the prime contractor. Copies must be maintained by the owner/contractee and all subcontractors. When copies are issued to suppliers when purchasing materials, each copy must be signed by the contractor or subcontractor making the purchase.

Prime Contractor
Name _____
Signed by _____
Title _____
Street address _____
City, state, ZIP code _____
Date _____

Owner/Contractee
Name _____
Signed by _____
Title _____
Street address _____
City, state, ZIP code _____
Date _____

Subcontractor
Name _____
Signed by _____
Title _____
Street address _____
City, state, ZIP code _____
Date _____

Political Subdivision
Name _____
Signed by _____
Title _____
Street address _____
City, state, ZIP code _____
Date _____

SECTION 072715
NONBITUMINOUS SELF-ADHERING SHEET AIR BARRIERS
(Addendum 2, Issued December 23, 2024)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Self-adhering, vapor-permeable, nonbituminous sheet air barriers.

1.02 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.04 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of nonbituminous self-adhering sheet air barrier.

B. Product test reports.

1.05 QUALITY ASSURANCE

A. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly , 150 sq. ft. , incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.

b. Include junction with roofing membrane , building corner condition, and foundation wall intersection.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-

barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.02 NONBITUMINOUS SHEET AIR BARRIER

A. Vapor-Permeable Nonbituminous Sheet: Minimum 20-mil- thick, self-adhering sheet consisting of a breathable carrier film or fabric and an adhesive with release liner on adhesive side and formulated for application with primer that complies with VOC limits.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Carlisle Coatings & Waterproofing Inc; Fire Resist 705 VP or comparable product by one of the following:

   a. 3M Building and Construction.

   b. Henry Company; a Carlisle company.

   c. W. R. Meadows, Inc.

   d. Or equal

2. Physical and Performance Properties:

   a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.

   b. Puncture Resistance: Minimum 40 lbf ; ASTM E154/E154M.

   c. Vapor Permeance: Minimum 15 perms ; ASTM E96/E96M, Desiccant Method, Procedure A.

   d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested in accordance with ASTM D4541 as modified by ABAA.

   e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

   f. UV Resistance: Can be exposed to sunlight for 150 days in accordance with manufacturer's written instructions.

2.03 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate in accordance with manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

F. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement in accordance with manufacturer's written instructions and details.

3.02 INSTALLATION

A. Install materials in accordance with air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water.
2. Roll sheets firmly to enhance adhesion to substrate.

D. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.

E. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing

and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

G. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.

H. Do not cover air barrier until it has been tested and inspected by testing agency.

I. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: As determined by testing agency from among the following tests:

1. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate in accordance with ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.

C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, in accordance with manufacturer's written instructions, where inspection results indicate insufficient thickness.

2. Remove and replace deficient air-barrier components for retesting as specified above.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

E. Prepare test and inspection reports.

3.04 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.

PART 4 SPECIAL PROVISIONS

Not used.

END OF SECTION

SECTION 078413
PENTRATION FIRESTOPPING
(Addendum 2, Issued December 23, 2024)

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.

1.02 ACTION SUBMITTALS

A. Product Data.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly developed in accordance with current International Firestop Council (IFC) guidelines. Obtain approval of authorities having jurisdiction prior to submittal.

1.03 INFORMATIONAL SUBMITTALS

A. Listed system designs.

1.04 CLOSEOUT SUBMITTALS

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test in accordance with testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    a. Penetration firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.
        1) UL in its online directory "Product iQ."
        2) Intertek Group in its "Directory of Building Products."
        3) FM Approvals in its "Approval Guide."

2.02 PENETRATION FIRESTOPPING SYSTEM

A. Description: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems are to be compatible with one another, with the substrates forming openings, and with penetrating items if any.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
        a. 3M Building and Construction.
        b. Hilti, Inc.
        c. STC Sound Control.
        d. Tremco Incorporated.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined in accordance with ASTM E814 or UL 1479.
    1. F-Rating: Not less than the fire-resistance rating of the wall penetrated.
    2. Membrane Penetrations: Install recessed fixtures such that the required fire resistance will not be reduced.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined in accordance with ASTM E814 or UL 1479.
    1. Rating: At least one hour, but not less than the fire-resistance rating of the floor penetrated.
    2. T-Rating: At least one hour, but not less than the fire-resistance rating of the floor. The following floor penetrations do not require a T-rating:

a. Those within the cavity of a wall.

b. Floor, tub, or shower drains within a concealed space.

c. 4-inch or smaller metal conduit penetrating directly into metal-enclosed electrical switchgear.

3. W-Rating: Provide penetration firestopping systems with a Class 1 W-rating in accordance with UL 1479

D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, in accordance with ASTM E84.

1. Verify sealant has a VOC content of 250 g/L or less.

2. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

PART 3 EXECUTION

3.01 INSTALLATION OF PENETRATION FIRESTOPPING

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

D. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.02 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.03 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION

SECTION 078443
JOINT FIRESTOPPING
(Addendum 2, Issued December 23, 2024)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated construction.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly developed in accordance with current International Firestop Council (IFC) guidelines.

1.03 INFORMATIONAL SUBMITTALS

A. Listed System Designs: For each joint firestopping system, for tests performed by a qualified testing agency.

1.04 CLOSEOUT SUBMITTALS

1.05 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    a. Joint firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with Listed System Designs published by a qualified testing agency.
        1) UL in its online directory "Product iQ."
        2) Intertek Group in its "Directory of Building Products."

2.02 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems must accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
    1. Provide products that, upon curing, do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture.
    2. Provide firestop products that do not contain ethylene glycol.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
        a. 3M Building and Construction.
        b. ClarkDietrich.
        c. Hilti, Inc.
        d. Owens Corning.
        e. ROCKWOOL.
        f. Tremco Incorporated.
    2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
    1. Verify sealant has a VOC content of 250 g/L or less.

2. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.03 ACCESSORIES

A. Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

C. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

D. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.

2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.

3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.02 IDENTIFICATION

A. Wall Identification: Permanently label walls containing firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 ft. from end of wall and at intervals not exceeding 30 ft.

3.03 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections in accordance with ASTM E2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION

SECTION 08220
FIBERGLASS REINFORCED POLYESTER (FRP) DOORS AND FRAMES
(Addendum 2, December 23, 2024)

PART 1 GENERAL

1.01 SCOPE

A. This Section includes furnishing and installing FRP flush doors, stainless steel door frames, glass side lites, and architectural panels and other accessories as required for completion of the Work.

1.02 REFERENCES

A. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

B. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.

C. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.

D. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

F. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

G. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.

H. ASTM D 570 - Water Absorption of Plastics.

I. ASTM D 638 - Tensile Properties of Plastics.

J. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

K. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

L. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

M. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

N. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.

O. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

P. ASTM D 5420 - Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling Weight.

Q. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.

R. ASTM E 84 - Surface Burning Characteristics of Building Materials.

S. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

T. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

U. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

V. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

W. ASTM F 476 - Security of Swinging Door Assemblies.

X. ASTM F 1642-04 - Standard Test Method for Glazing Systems Subject to Air Blast Loading.

Y. NWWDA T.M. 7-90 - Cycle Slam Test Method.

Z. SFBC PA 201 - Impact Test Procedures.

AA. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

BB. SFBC 3603.2 (b)(5) - Forced Entry Resistance Test.

1.03 SUBMITTALS

A. Submittals Shall Include:

1. Shop Drawings for Review shall comply with Specification Section 01300, and include at a minimum:

a. Dimensional Drawing.

b. Manufacturer’s literature, including Manufacturer’s Qualifications.

c. Product Data, including description of materials, components, fabrication, finishes, and installation.

d. Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

e. Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

f. Samples:

1) Submit manufacturer’s sample of door showing face sheets, core, framing, and finish.

2) Submit manufacturer's samples of standard colors of doors and frames. Samples shall indicate color range and finish texture/ pattern for color selection by the Owner.

2. Information for the Record:

a. Operations and Maintenance Manual consisting minimally of manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

b. Warranty

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualification shall be submitted within any Shop Drawings for re-view. The manufacturer's qualifications shall include the following assurances:

1. The manufacturer shall have been continuously engaged in successful experience of manufacturing of doors of the type specified for a minimum of twenty-five years.

2. Door and frame components shall by the same manufacturer.

3. Evidence of a compliant documented quality management system.

1.05 WARRANTY

A. Warrant doors, frames, factory hardware, and all other accessories provided under this Specification against failure in material and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

B. The warranty period shall be for ten years starting on the date of substantial completion. In addition, a lifetime warranty shall be provided for failure of corner joinery, core deterioration, delamination, or bubbling of the door skin.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials utilized for fabrication of doors and frames shall be free from defects.

B. Reference the door schedule within the Contract Drawings for sizing, frame type, and other pertinent information regarding the doors to be supplied.

C. All components of the doors and frames shall be by the same manufacturer.

2.02 FRP FLUSH DOORS

A. Construction:

1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T5 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.

B. Face Sheet:

1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout.
2. Protective Coating: Abuse-resistant engineered surface. Provide FRP with SpecLite3 protective coating, or equal.
3. Texture: Pebble-like embossed finish.
4. Adhesion: The use of glue to bond face sheet to foam core shall not be acceptable.
5. Face sheet color shall be selected by the Owner from a standard color sample pro-vided by the Contractor.

C. Core:

1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 9.

D. Cutouts:

1. Manufacture doors with cutouts for required vision lites, louvers, and panels.

2. Factory install vision lites, louvers, and panels.

E. Hardware:

F. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule. Finish Hardware shall be installed as indicated in Section 08700.

1. All hardware shall be factory installed.

2. All fasteners shall be completely of 18-8 stainless steel construction.

G. Shall be constructed starting from the outside toward the inside of a 15 to 20 mil gel coat of the color specified followed by a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat. The stile and rail shall be molded in one continuous piece to a U-shaped configuration and to the exact dimensions of the door. In this manner, there will be no miter joints or disparate materials used to form the one-piece stile and rail. Pultrusions will not be acceptable for stiles and rails.

H. Door plates shall be molded in one continuous piece, starting with a 15 to 20 mil gel coat of the color specified, integrally molded with at least two layers of 1.5 ounce per square foot fiberglass mat and layer of 16 ounce per square yard unidirectional glass roving.

I. Adequate reinforcement and compression members shall be used to accommodate surface hinges, closers, locksets, kickplates, push or pull plates. When engineering considerations dictate, mild steel is buried in the fiberglass matrix to provide enhances screw holding power. In no case should screws be used into fiberglass matrix to provide holding for hinges, lockers, closers, or any other structured attachment.

J. All voids between the door plates shall be completely filled with the equivalent of 4 to 6 pounds expanded polyurethane foam, having a flame spread of 25 or less per ASTM E-84. A phenolic-coated kraft honeycomb may be substituted for urethane foam where engineering requirements dictate.

K. All reinforcing resins shall contain a halogenated additive or co-reactant plus Antimony Trioxide to achieve a flame spread of 25 or less per ASTM E-84 and shall be self-extinguishing per ASTM D-635.

L. The jamb shall be flat on the backside (against the opening) and uniform in thickness so as to provide a solid, uniform surface against the wall opening. No wood blocks or spacers are permitted.

M. Doors shall be Model SL-17 Pebblegrain FRP Flush Doors with SpecLite3 reinforced polyester (FRP) face sheets as manufactured by Special-Lite, Inc:

N. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com. E-Mail info@special-lite.com.

O. Performance Requirements:

1. Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
2. Air Infiltration: For a single door 3 feet by 0-inches by 7 feet by 0-inches, test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
3. Water Resistance: For a single door 3 feet by 0-inches by 7 feet by 0-inches, test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
4. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
5. Hurricane Test Standards, Single Door with Single-Point Latching:
6. Uniform Static Load, ASTM E 330: Plus or minus 75 pounds per square foot.
7. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
8. Cyclic Load Test, SFBC PA 203: Plus or minus 53 pounds per square foot.
9. Large Missile Impact Test, SFBC PA 201: Passed.
10. Blast Test, Doors and Frames, ASTM F 1642-04, 6 psi / 41 psi-msec: Minimal Hazard.
11. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
12. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
13. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
14. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
15. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
16. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.
17. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
    a. Flame Spread: Maximum of 200, Class C.
    b. Smoke Developed: Maximum of 450, Class C.
18. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
    a. Flame Spread: Maximum of 25.
    b. Smoke Developed: Maximum of 450.

19. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.
20. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
21. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
22. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 per-cent after 24 hours.
23. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
24. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.
25. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
26. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
27. Chemical Resistance, ASTM D 543. Excellent rating.
    a. Acetic acid, Concentrated.
    b. Ammonium Hydroxide, Concentrated.
    c. Citric Acid, 10%.
    d. Formaldehyde.
    e. Hydrochloric Acid, 10%
    f. Sodium hypochlorite, 4 to 6 percent solution.
28. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
29. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
30. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
31. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Per-cent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

2.03 FRAMES

A. Frames shall be Stainless Steel construction No. 316 alloy and materials.

B. Frames shall be a double rabbetted design in depth and profile with a 5/8-inch stop. Jambs and headers shall be fabricated of 16 gauge cold rolled steel. Frames shall be welded with ends of framing members forming square corners, providing square and

solid joints. Frames shall be provided with unitized rubber or vinyl weather-stripping. A thermal break design frame with a continuous vinyl weather-strip is also available.

C. Frames shall have a minimum 9 gauge steel hinge tap plate reinforcement projection welded with provisions for 4-1/2-inch by 4-1/2-inch full mortise template type hinges and minimum 14 gauge steel strike tap plate reinforcement, extruded, and formed to the equivalent of 10 gauge projection welded.

D. Frames shall be rigidly attached to masonry construction with a minimum of six masonry anchors.

2.04 VISION AND SIDE LITES

A. Factory Glazing shall consist of 1-inch glass insulating units.

B. Lites in exterior doors shall allow for thermal expansion.

C. Rectangular Lites:

1. Size of lites shall be as indicated on the Drawings.

2. Doors shall be factory glazed.

2.05 HARDWARE

A. All hardware where applicable (locksets, hinges, closers, etc.) shall be installed at the door manufacturing plant. The hardware manufacturer's warranty shall be included with the hardware installation.

B. Each door shall be furnished with the hardware as indicated by the hardware schedule in Section 08700 except hinges. Hinges shall be continuous and supplied by the door manufacturer.

C. All component parts of hardware shall be 316 stainless steel or FRP. All fasteners shall be 316 stainless steel.

PART 3 EXECUTION

3.01 DELIVERY, HANDLING, AND STORAGE

A. Door shall be individually packaged in corrugated carton completely covering entire door to prevent damage to door. Door shall be "floated" within carton. Doors shall be delivered to the site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Doors and frames shall be stored in an upright position in a manner that will prevent damage. They shall be stored in a clean, dry, indoor area in accordance with the manufacturer's instructions. No portion of the door or attached hardware shall be in contact with the outer corrugated shell.

C. During handling and installation, protect the door materials and finish from damage.

3.02 EXAMINATION

A. The Contractor shall verify that the opening sizes and tolerances are acceptable.

B. The Contractor shall examine the areas to receive doors. The Engineer shall immediately be notified of conditions that would adversely affect installation or subsequent use. The Engineer shall inform the Contractor when unsatisfactory conditions have been corrected, and the installation may proceed.

3.03 INSTALLATION OF DOORS AND FRAMES

A. The Contractor shall install the doors and frames in accordance with the manufacturer's written recommendations. Frames shall be anchored securely with 316 stainless steel anchors. Door shall be hung with all clearances accurately maintained. Doors shall be installed plumb, level, square, true to line, and without warp or rack.

B. Exterior doors shall be installed to be weathertight in the closed position.

C. Doors, hinges, and locksets shall be adjusted, when necessary, per the manufacturer's recommendations to operation smoothly, without binding.

3.04 CLEANING

A. Doors shall be cleaned promptly after installation in accordance with the manufacturer's instructions.

B. Manufacturer's cleaning recommendations shall be followed. No harsh cleaning materials or methods shall be utilized that would damage the doors, the finish, the frames, or the hardware.

PART 4 SPECIAL PROVISIONS

Not used.

END OF SECTION

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CITY OF GREENVILLE
BASE BID MANUFACTURER'S SCHEDULE

Contract Documents have been prepared using specific manufacturers for certain equipment and materials and the prices provided by bidder shall be based on the manufacturers specified and listed below as base bid manufacturers. For items that list only one manufacturer, that manufacturer's equipment or material shall be include in the base bid. For items that list more than one manufacturer, bidder shall indicate, by circling the manufacturer proposed to be furnished as part of the base bid. One and only one selection shall be entered for each base bid item with more than one listed manufacturer. If bidder circles more than one manufacturer or fails to circle one where required for a piece of equipment or material, the equipment or material provided under the contract shall be that as selected by Owner from the listed base bid manufacturers.

Base Bid List										
Specification Section	**Specification Name**	**Manufacturers** Select One by Circling								
11104	Air Diffusion Equipment	Sanitaire	EDI		SSI	Aquarius Technologies **(Addendum 2, Issued December 23, 2024)**				
11222	Biosolids Storage Day Tank	Poly Processing		Assman Tanks						
11233	Liquid Polymer Equipment	USGI Chemical Feed		VeloDyne USA						
11239	Rotary Lobe Blower	Aerzen	Kaeser	Atlas Copco	Universal					
11441	Sludge Macerator	JWC Environ.	Seepex	Moyno EZ Strip	Vogolsang					
11735 4.02 (Booster Pump Skid)	Pumping Equipment	Grundfos		Metropolitan Industries						
11735 4.03 (Digester Pumps)	Pumping Equipment	Flygt	Sulzer	KSB	Ebara-Hayward Gordon					
11735 4.04 (Pressate Pump)	Pumping Equipment	Flygt	Sulzer	KSB	Ebara-Hayward Gordon					
11735 4.05 (Volute Dewatering Press Pump)	Pumping Equipment	Moyno		Seepex						
11735 4.06 (Day tank Recirculation Pump)	Pumping Equipment	Vaughan		Ebara-Hayward Gordon						
11835	Volute Dewatering Press	Process Wastewater Technologies LLC (PW) Tech								
14551	Shaftless Screw Conveyors	Spirac	Keystone	JDV	JMS	KWS				

SECTION 02710
FENCING

PART 1 GENERAL

1.01 SCOPE

A. This Section includes the furnishing of all materials, equipment, labor, and supervision necessary for the installation of new fencing as shown on the Drawings and to replace fencing damaged during construction in accordance with the Contract Documents.

B. All Work performed under this Section shall comply and be in accordance with all approved trade practices and manufacturers' recommendations.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for review:

a. Manufacturer's product literature.

b. Materials of Construction.

1.03 PROJECT HANDLING

A. Materials, including but not limited to post, barb wire, and fence fabric, shall be handled and stored in accordance with the manufacturer's recommendations and in such a manner as to prevent any damage to the finish coating.

PART 2 PRODUCTS

2.01 FENCE FABRIC

A. Fence fabric shall be 2-inch mesh of carbon steel wire and ~~shall be galvanized after weaving in accordance with ASTM A392 Class II or~~ aluminum-clad in accordance with ASTM A491 Class II. ***(Addendum 2, Issued December 23, 2024)***

B. Wire shall be 6 gauge on 6-feet fabric and 9 gauge on 4-feet fabric.

C. PVC-coated fences shall be galvanized materials and chemically cleaned. A phosphate conversion treatment shall be applied to prepare the zinc coating to receive the polyvinyl chloride coating.

1. A minimum of 7 mils of green color compound shall be applied to the materials. Coating application shall be as recommended by the manufacturer.

D. Fence fabric shall be attached to all post rails and tension wires with 12-gauge tie wire at a maximum of 15-inch centers. Tie wire shall be aluminum or galvanized steel.

2.02 FENCE POST AND RAILS

A. Line posts shall be galvanized 2-3/8-inch OD Standard Schedule 40 Steel pipe.

B. Fencing 4 feet in height or less shall be provided with a top rail.

1. Top rails shall be galvanized 1-5/8-inch OD Standard Schedule 40 Steel pipe.

C. Fencing greater than 4 feet in height shall be provided with a tension wire, in lieu of the top rail, unless otherwise specified in Part 4.

1. Tension wire shall be 9-gauge braided wire rope stainless steel or galvanized. Tension wire shall support fence fabric taut to prevent fabric from sagging.

D. Tension wire shall be provided at the bottom of the fence fabric on all fence systems, unless bottom rail is provided.

1. Tension wire shall be 9-gauge braided wire rope stainless steel or galvanized.

2. Bottom rails shall be identical to the top rails.

E. Ends, corners, and pull posts shall be galvanized 2-7/8-inch OD Standard Schedule 40 Steel pipe.

F. Posts for swing gates shall be sized by fence gate manufacturer for the gate width specified.

G. All terminal, corner, and gate posts shall be braced to the next post using a brace rail and a galvanized 3/8-inch truss rod with tightener.

2.03 GATES

A. All gates shall be the same height as the adjacent fence. Barbed wire shall be included on all gates where the adjacent fence system has barbed wire installed.

B. Gates shall be constructed on 4.0-inch OD (larger if required for strength) tubular steel frame, adequately reinforced and braced to prevent sagging,

C. Gates shall be covered with fence fabric similar to that of the adjacent fence.

D. Gates shall include all hinges or rollers, hardware, catches and latching/locking mechanisms as specified herein or otherwise required for complete, functioning installation. All gate components shall be galvanized, aluminum-clad, or PVC-coated as specified in Part 4.

E. Gate shall be electrically operated with 120 volt Liftmaster CSL24UL commercial slide gate opener, or equal.

2.04 ACCESSORIES

A. Three rows of barbed wire shall be provided. Each barbed wire row shall consist of two strands of twisted 12-1/2-gauge wire with 14-gauge, 4 point barbs spaced on 5 inch centers.

1. Extension arms for supporting barbed wire shall be galvanized, inclined at 45 degrees, and shall be capable of supporting a weight of 250 pounds applied vertically at the tip.

2. Barbed wire shall be installed with barbed arms angled outward from facility.

B. Provide one padlock for each gate specified shown on the Drawings or as ordered.

1. Pad lock shall be keyed to the Owner's master key.

C. Provide four gate openers.

PART 3 EXECUTION

3.01 COORDINATION

A. Permanent fencing may be installed for convenience of the Contractor prior to completion of Work.

1. Contractor shall be responsible for maintenance and repairs to keep the fence system like new during construction. The fencing system is subject to the Owner and Engineers approval at project completion and the entire system or any part there off may be required to be replaced.

3.02 PREPARATION

A. Final grading shall be completed prior to the installation of the permanent fence system.

3.03 INSTALLATION

A. The Contractor shall erect the fence, gates, and fence posts level and plumb as required, in accordance with manufacturer's recommendations and as shown on the Drawings.

B. Line posts shall be spaced at intervals not exceeding 10-feet.

C. Fence fabric shall be stretched taut, securely fastened to the posts, tension wire and top rail as specified and shown on the Drawings.

1. Fence fabric shall be installed approximately 1 inch above the top rail.

2. Fence fabric shall be installed approximately 2 inches above finish grade. Fence fabric when lifted shall not allow an opening greater than 5 inches.

3. Fence fabric shall be stretched at a maximum of 30 feet and all terminal posts.

D. All changes in fence alignment of 30 degree or more and all abrupt changes in grade shall be made with corner posts.

E. Foundations for post shall be sized by fence manufacturer.

1. Foundations shall extend a minimum of 36 inches below finish grade.
2. Concrete foundation shall have a minimum outside diameter of 3 times the embedded post OD and not less than 9 inches.
3. Concrete foundation shall be crowned to shed water way from the embedded post.
4. Concrete foundation shall be belled at the bottom.

PART 4 SPECIAL PROVISIONS

4.01 FENCE SYSTEM

Location	Height	Fence Fabric	Gate Type	Gate Size	Accessories
See Drawings	6 ft	AL	Sliding	20 ft.	1, 3, 4, and 5

ABBREVIATIONS

Fence Fabric

PVC PVC Coated
Galv Galvanized
AL Aluminum Clad

Gate Type

Swing
Sliding

Accessories

1. Barb Wire
2. Top Rail
3. Top Tension Wire
4. Latch/Lock
5. Bottom Rail

4.02 PRIVACY FENCE

A. The privacy fence shall consist of 72-inch-high vinyl solid privacy panels.

B. Posts shall be 5 inch x 5 inch x 108 inch.

END OF SECTION

SECTION 11104
AIR DIFFUSION EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

A. This Section includes furnishing and installing air diffusion equipment in Aerobic Digester Tanks and the Pressate Holding Tank.

B. The Equipment Manufacturer shall furnish the items listed below:

1. Drop Pipes,
2. Manifolds,
3. Distribution Headers,
4. Coarse Bubble Diffusers (for Aerobic Digester and Pressate Holding Tank)
5. Floor Support Brackets,
6. Air Purge Diffuser Assemblies.

C. All Work performed under this Section shall be in accordance with all approved trade practices and manufacturers' recommendations.

D. Additional product requirements are specified in Section 01350.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:
   a. The Contractor shall indicate all variances from the requirements of the Contract Documents.
   b. Scaled dimensional drawings.
   c. Materials of construction.
   d. Manufacturer's catalog data.
2. Information for the Record:
   a. Test data showing compliance with the Specifications.
   b. Manufacturer's certification.
3. Operation and maintenance manual.

PART 2 PRODUCTS

2.01 GENERAL

A. The design and layout shown on the Drawings are based on the manufacturer shown in Section 2.02. If equipment other than that of the manufacturer shown is submitted to the

Engineer for consideration as an equal, it shall be the responsibility of the Bidder wishing to make the substitution to submit with the request a revised drawing of the mechanical equipment and tank layouts acceptable to the Engineer. This revised drawing shall show the proposed location of the substitute unit, and area required for withdrawal space of replacement or serviceable components. This drawing shall also show clearances of adjacent equipment and service area required by that equipment.

B. Fabricate all welded parts and assemblies from sheets and plates of 304L stainless steel with a 2D finish conforming to ASTM A240.

C. Fabricate non-welded parts and flanges from sheets, plates, or bars of 304 stainless steel conforming to ASTM A240 or ASTM A276.

D. Provide droplegs, manifolds, and headers of the diameter shown on the drawings with dimensional tolerances conforming to ASTM A554 and fabrication procedures in accordance to ASTM A774 & A778.

E. Furnish 304L stainless steel diffusers with a cast 304L Schedule 80 threaded inlet nozzle. Furnish diffuser connector from cast 316L Stainless Steel.

2.02 MANUFACTURERS

A. Aerobic Digester Tank Coarse Bubble Diffuser System shall be manufactured ~~Fixed Header with D-24 Wide Band Diffuser~~ by Sanitaire *Division of Xylem, Milwaukee, Wisconsin, EDI, SSI, Aquarius Technologies or equal**. (Addendum 2, Issued December 23, 2024)*** Basis of Design: Sanitaire D-24 Wide Band Diffuser. ***(Addendum 1, Issued December 16, 2024)***

B. Pressate Holding Tank Coarse Bubble Diffuser System shall be manufactured ~~Fixed Header with D-12 Wide Band Diffuser~~ by Sanitaire Division of Xylem, Milwaukee, Wisconsin, EDI, SSI, Aquarius Technologies or equal***. (Addendum 2, Issued December 23, 2024)*** Basis of Design: Sanitaire D-12 Wide Band Diffuser. ***(Addendum 1, Issued December 16, 2024)***

2.03 COARSE BUBBLE DIFFUSER SYSTEM AERATION EQUIPMENT (AEROBIC DIGESTER TANK)

A. Piping (Fixed Aeration Headers, Manifolds and Drop Legs):

1. For each digester tank, provide three valved droplegs from the main air header to the digester tank aeration system as shown on the drawings.

2. Provide a stainless steel Van Stone style flange design with an 150 pound drill pattern flange ring for the top connection.

3. Provide a stainless-steel band clamp coupling with gasket for the lower dropleg to header connection.

4. Drop Pipe: A4-inch SCH10, 304 L stainless steel drop pipe shall be provided for each aeration header. The drop pipe shall start at the top of the tank with a flanged connection as shown on the contract drawings. Upper drop pipe shall have a minimum wall thickness of .109 inch and shall conform to ASTM A554, ASTM A774, ASTM A778, ASTM A-312 & A-409.

5. Manifold: A 6-inch SCH 10, 304 L stainless steel manifold shall be provided perpendicular to the distribution headers and as shown on the contract drawings. Manifold shall have a minimum wall thickness of .109 inch and shall conform to to ASTM A554, ASTM A774, ASTM A778, ASTM A-312 & A-409.

6. Distribution Headers: A 4-inch SCH 10, 304 L stainless steel distribution header shall be provided for each drop pipe. The distribution header shall start at the manifold. Header pipe shall have a minimum wall thickness of .109 inch and shall conform to ASTM A-774 & A-778. Header piping shall be drilled and tapped with a 3/4-inch half coupling shall be welded to at the crown of the distribution headers for attachment of the diffusers.

B. Coarse Bubble Diffusers:

1. Design:

a. Air diffusers shall be furnished and installed as shown on the Drawings. The arrangement and spacing of the diffusers may differ slightly depending upon the diffuser performance characteristics.

b. Diffusers to meet the design requirements noted in Section 4.

c. The diffusers shall provide uniform wide band diffusion for a full 2-feet beyond each side of the fixed air header. Diffusers to provide full-wide band aeration with a minimum air release perimeter of 48 inches per diffuser.

d. The diffuser assemblies shall include an orifice designed to provide the proper headloss to assure uniform air distribution to each diffuser along the length of the fixed air header. Air shall be supplied to the diffusers through fittings factory welded along the bottom centerline of the fixed air header. The diffusers shall be connected to these fittings in a manner which allows for rotational adjustment of each diffuser. The system shall be designed so that upon supplying air to the header, water and solids will be blown out of the header through the diffusers.

e. The design and installation of the diffusion system shall be such that all diffusers can be leveled to within 3/8-inch of a common horizontal plane. The diffuser connectors shall be designed to withstand a moment of 500 inches per pounds without permanent deformation.

f. The diffusers shall be a non-clog design and contain no flexible or moving parts. The diffusers shall be constructed of 304 stainless steel.

g. Provide deflector below each diffuser for its full length and width.

h. Design deflector to direct the liquid being aerated along the diffuser reservoir walls so that the air exits through the ports and is sheared into small bubbles and distributed into the liquid.

C. Supports:

1. Manifold & Drop Pipe Supports:

a. Manifold and drop pipe supports to be fabricated from 304 stainless steel. All mounting hardware shall be 316 SS. Each support shall have a support cradle with a minimum 2-inch-wide bearing surface and shall be secured to the concrete bottom with two 304 stainless steel threaded rods with a minimum diameter of ½ inch. Maximum spacing between supports shall not exceed 17 feet-6 inches. Limit header or manifold cantilever to no more than 4 feet.

2. Distribution Header Supports:

a. Distribution header supports (flat bottom tank only) to be fabricated from 304 stainless steel. All mounting hardware shall be 316 SS. Each support shall have a support cradle with a minimum 2-inch-wide bearing surface and shall be attached to one 304 stainless steel threaded rod with a minimum diameter of 3/8 inch. Rod will be attached to the concrete floor with one stainless-steel drop-in wedge anchor. Maximum spacing between supports shall not exceed 17 feet-6 inches. Limit header or manifold cantilever to no more than 4 feet.

b. Provide header supports with a vertically adjustable header hold down locking mechanism mounted on a stainless-steel supporting structure.

c. Provide header supports with a vertically adjustable header hold down locking mechanism mounted on anchor bolts cast into 4,000 PSI reinforced concrete pedestals.

d. Design support hold down locking mechanisms using a "U" bolt smaller diameter and larger.

D. Design:

1. The system shall be designed for contraction/expansion over a temperature range of 125 degrees F without deforming any component. Fixed supports will anchor the header against movement and intermediate supports will allow for longitudinal movement. One fixed support shall be provided for each straight pipe run.

2. Fixed or expansion joints shall be provided as required.

3. Flanged joints shall Van Stone with through bolts. The flanged joints shall transmit the longitudinal forces caused by expansion and contraction of the air distribution header. All flanged joints shall have 45 to 55 durometer, Shore A, neoprene gaskets.

2.04 COARSE BUBBLE DIFFUSER SYSTEM AERATION EQUIPMENT (PRESSATE HOLDING TANK)

A. Piping (Fixed Aeration Headers, Manifolds and Drop Legs):

1. For pressate holding tank, provide one drop leg from the main air header to the tank manifold and headers as shown on the drawings.

2. Provide a stainless steel Van Stone style flange design with a 150-pound drill pattern flange ring for the top connection.

3. Provide a stainless-steel band clamp coupling with gasket for the lower dropleg to header connection.

4. Drop Pipe: A 4-inch SCH10, 304 L stainless steel drop pipe shall be provided for aeration header. The drop pipe shall start at the top of the basin with a flanged connection as shown on the contract drawings. Upper drop pipe shall have a minimum wall thickness of .109 inch and shall conform to ASTM A554, ASTM A774, ASTM A778, ASTM A-312 & A-409.

5. Manifold: A 4-inch SCH 10, 304 L stainless steel manifold shall be provided perpendicular to the distribution headers and as shown on the contract drawings. Manifold shall have a minimum wall thickness of .109 inch and shall conform to to ASTM A554, ASTM A774, ASTM A778, ASTM A-312 & A-409.

6. Distribution Headers: Two 4-inch SCH 10, 304 L stainless steel distribution header shall be provided. The distribution header shall start at the manifold. Header pipe shall have a minimum wall thickness of .109 inch and shall conform to ASTM A-774 & A-778. Header piping shall be drilled and tapped with a 3/4-inch half coupling shall be welded to at the crown of the distribution headers for attachment of the diffusers.

B. Coarse Bubble Diffusers:

1. Design:

a. Air diffusers shall be furnished and installed as shown on the Drawings. The arrangement and spacing of the diffusers may differ slightly depending upon the diffuser performance characteristics.

b. Diffusers to meet the design requirements noted in Section 4.

c. The diffusers shall provide uniform wide band diffusion for a full 2-feet beyond each side of the fixed air header. Diffusers to provide full-wide band aeration with a minimum air release perimeter of 48 inches per diffuser.

d. The diffuser assemblies shall include an orifice designed to provide the proper headloss to assure uniform air distribution to each diffuser along the length of the fixed air header. Air shall be supplied to the diffusers through fittings factory welded along the bottom centerline of the fixed air header. The diffusers shall be connected to these fittings in a manner which allows for rotational adjustment of each diffuser. The system shall be designed so that upon supplying air to the header, water and solids will be blown out of the header through the diffusers.

e. The design and installation of the diffusion system shall be such that all diffusers can be leveled to within 3/8-inch of a common horizontal plane. The diffuser connectors shall be designed to withstand a moment of 500 inches per pounds without permanent deformation.

f. The diffusers shall be a non-clog design and contain no flexible or moving parts. The diffusers shall be constructed of 304 stainless steel.

g. Provide deflector below each diffuser for its full length and width.

h. Design deflector to direct the liquid being aerated along the diffuser reservoir walls so that the air exits through the ports and is sheared into small bubbles and distributed into the liquid.

2. Corrosion Protection and Finishing

a. Clean all welded stainless steel surfaces and welds after fabrication by using the following procedure:

1) Pre-clean all outside weld areas to remove weld splatter with the use of stainless steel brushes and/or deburring and finish grinding wheels.

2) Finish clean all interior and exterior welds and piping by full immersion pickling and rinse with water to remove all carbon deposits, oxide film and contaminants to regenerate a uniform corrosion resistant chromium oxide film.

3) Completely immerse all stainless steel assemblies and components in an acid solution as described in Section 6.2.11 of ASTM A380-88. The acid shall be a nitric-hydrofluoric solution as defined in Table A.2.1 of Annex A2 of ASTM A380.

4) Provide a final thorough rinse using ordinary industrial or potable water and dry in conformance per Section 8.3 of ASTM A380.

b. Corrosion protection techniques not utilizing full immersion methods are unacceptable and will be cause for rejection of the equipment.

c. Engineer/Owner at their option may choose to observe the equipment cleaning procedure by notifying the manufacturer of their intent to visit thirty (30) days prior to the date. Cost of the travel and expenses are by the owner.

C. Supports:

1. Manifold & Drop Pipe Supports:

a. Manifold and drop pipe supports to be fabricated from 304 stainless steel. All mounting hardware shall be 316 SS. Each support shall have a support cradle with a minimum 2-inch-wide bearing surface and shall be secured to the concrete bottom with two 304 stainless steel threaded rods with a minimum diameter of 1/2 inch. Maximum spacing between supports shall not exceed 17 feet-6 inches. Limit header or manifold cantilever to no more than 4 feet.

2. Distribution Header Supports:

a. Distribution header supports (flat bottom tank only) to be fabricated from 304 stainless steel. All mounting hardware shall be 316 SS. Each support shall have a support cradle with a minimum 2-inch-wide bearing

surface and shall be attached to one 304 stainless steel threaded rod with a minimum diameter of 3/8 inch. Rod will be attached to the concrete floor with one stainless-steel drop-in wedge anchor. Maximum spacing between supports shall not exceed 17 feet-6 inches. Limit header or manifold cantilever to no more than 4 feet.

b. Provide header supports with a vertically adjustable header hold down locking mechanism mounted on a stainless-steel supporting structure.

c. Provide header supports with a vertically adjustable header hold down locking mechanism mounted on anchor bolts cast into 4,000 PSI reinforced concrete pedestals.

d. Design support hold down locking mechanisms using a "U" bolt smaller diameter and larger.

D. Design:

1. The system shall be designed for contraction/expansion over a temperature range of 125 degrees F without deforming any component. Fixed supports will anchor the header against movement and intermediate supports will allow for longitudinal movement. One fixed support shall be provided for each straight pipe run.

2. Fixed or expansion joints shall be provided as required.

3. Flanged joints shall Van Stone with through bolts. The flanged joints shall transmit the longitudinal forces caused by expansion and contraction of the air distribution header. All flanged joints shall have 45 to 55 durometer, Shore A, neoprene gaskets.

2.05 WELDING

A. All welding on this equipment shall be completed in the factory. Field welding shall not be permitted. All welding shall be by the shielded arc, inert gas, MIG, or TIG method. Filler wire shall be added to all welds to provide for a cross section of weld metal equal to or greater than the parent metal. Butt welds shall have full penetration to the interior and exterior of the joint.

B. Interior weld beads shall be smooth, evenly distributed with an interior projection not exceeding 1/16-inch.

C. The outside weld area shall be wire brushed. Brushes shall be of stainless steel and used only on stainless steel. All discoloration and deposits left by welding shall be removed by pickling.

D. After fabrication, all stainless-steel assemblies and parts shall be passivated by immersion in a pickling solution of 6% nitric acid and 3% hydrofluoric acid at 140 degrees F for a minimum of 15 minutes. Parts shall be free of iron particles or other foreign material. A complete neutralizing operation shall be required by immersion in a tri-sodium phosphate rinse.

E. Continuously weld both sides of face rings and flanges to eliminate potential for crevice corrosion.

PART 3 EXECUTION

3.01 INSTALLATION

A. Prior to connecting the diffuser to the headers, the Contractor shall carefully clean all piping, headers, and accessories through which air is delivered, so that all dust, dirt, oil, grease, or other foreign material will be effectively removed from contact with the air being blown through the diffusers. This cleaning shall be done with clean water at velocity of 2 to 3 feet per second. All diffusers shall be leveled to within 3/8 inch of a common horizontal plane.

3.02 FIELD TESTING

A. After the piping, headers, and diffusers for any tank have been installed, clear water shall be introduced into the tank until the diffusers have been covered about 2 inches. Compressed air shall then be released through the piping and any leaks through joints, piping, and the like shall be repaired. This test shall be repeated until the entire system is tight, to the satisfaction of the Engineer. Testing will be done by the Contractor.

B. By visual inspection, air release shall be shown to be uniform for each diffuser and header section.

C. The Contractor shall make all modifications and repairs until the system passes all tests at no cost to the Owner.

3.03 FIELD SERVICE

A. The manufacturer shall furnish the services of a competent representative experienced in the operation of the equipment to inspect the installation of his equipment and instruct the plant operating personnel in the proper operation and maintenance of the diffused air equipment. A total of one 8-hour day in one trip shall be provided. The Contractor to coordinate field service with equipment manufacturer and Engineer and shall provide at least two weeks' notice for scheduling purposes.

4.02 WARRANTY

A. Warrant all parts to be free from defects in materials and workmanship for a period of one year after installation or 18 months after delivery, whichever occurs first.

B. Furnish replacement parts to the Owner for any items found to be defective within the one year warranty period.

PART 4 SPECIAL PROVISIONS

4.01 AEROBIC DIGESTER TANK DIFFUSER SYSTEM

A. Aerobic Digester Tank Summary:

Aerobic Digester Tank Summary		
Description	**Units**	
No of Tanks:		3
Tank Size (Square)	Feet	50 Feet x 50 Feet

Tank Depth:	Feet	16
Storage Depth:	Feet	14
Design Oxygen Requirement/Tank:	SCFM	1,100
Standard Oxygen Transfer Rate:	lbs/day	2,698
Volumetric Rate:	SCFM	1,100
Operating Pressure at Top of Drop Leg:	PSI	5.85
Diffuser Submergence:	Feet	13
Diffuser Placement i.e., side roll, etc:		Midwidth

B. Aerobic Digester Tank Diffuser Summary:

Aerobic Digester Tank Diffuser Summary (Per Tank)		
Description	**Units**	**Operating Point**
No of Trains in Operation	Per Tank	3
No of Grids in Operation		3
No of Operating Diffusers /Grid		24
SOR	lbs/day	2,698
SOTE	%	9.8
Total Air Rate	scfm	1,100
Min/Max Diffuser Rate	scfm/diffuser	15.28
Diffuser Operating Range	scfm	8 to 40

4.02 PRESSATE HOLDING TANK DIFFUSER SYSTEM

A. Pressate Holding Tank Summary:

Pressate Digester Tank Summary		
Description	**Units**	
No of Tanks:		3
Tank Size (Square)	Feet	44.5 Feet x 20 Feet
Tank Depth:	Feet	7
Storage Depth:	Feet	6
Design Oxygen Requirement/Tank:	SCFM	200
Standard Oxygen Transfer Rate:	lbs/day	150
Volumetric Rate:	SCFM	200
Operating Pressure at Top of Drop Leg:	PSI	2.71
Diffuser Submergence:	Feet	5
Diffuser Placement i.e., side roll, etc:		Midwidth

B. Pressate Holding Tank Diffuser Summary:

Pressate Tank Diffuser Summary (Per Tank)		
Description	**Units**	**Operating Point**
No of Trains in Operation	Per Tank	1
No of Grids in Operation		2
No of Operating Diffusers /Grid		22
SOR	lbs/day	150.3

SOTE	%	3.0
Total Air Rate	scfm	200
Min/Max Diffuser Rate	scfm/diffuser	9.09
Diffuser Operating Range	scfm	4 to 20

END OF SECTION

SECTION 11233
LIQUID POLYMER EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

A. The Contractor shall furnish and install one liquid polymer blending unit. The equipment is to be supplied by a single, engineer-approved, equipment supplier for installation by the contractor in accordance with the Manufacturer's drawings and instructions.

B. Major components of the liquid polymer blending unit to be supplied under this section shall include, but not be limited to, the following:

1. Motor-driven mixing chamber,
2. Primary and post-dilution water controls,
3. Neat polymer pump,
4. System Controls,
5. Spare parts and accessories,
6. Start-up and training services.

C. Additional product requirements are specified in Section 01350.

D. ~~Note that the~~ The electrical components and requirements of the Liquid Polymer System may vary depending on the manufacturer selected. The electrical design of the Liquid Polymer System shall need to be confirmed and updated during the shop drawings phase of the project. ***(Addendum 2, Issued December 23, 2024)***

1.02 SUBMITTALS

A. Submittals shall be in accordance with Section 01300 and shall include the following information:

1. Shop Drawings for Review:
   a. Dimensional drawings as required for the installation.
   b. Electrical wiring diagrams as required for the installation.
   c. Sufficient information on each component to show that the equipment meets this specification.
2. Information for the Record:
   a. Operation and Maintenance information.
   b. Installation instructions.

1.03 QUALITY ASSURANCE

A. Components and installation shall comply with the Uniform, Standard and National Building and Fire Codes.

B. Pre-assemble and factory test system to ensure compliance with pressure and operational requirements.

C. The Contractor shall submit, upon request, a list of ten installations, each at least five years in operation, which quantify the proposed alternate's system ability to meet the above criteria.

D. The Contractor shall include in the bid, and shall be responsible for, the costs of any changes to accommodate other equipment, including but not limited to structural, mechanical and electrical work. The Contractor shall also pay additional costs necessary for revisions by the Engineer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Items to be shipped as complete assemblies except where partial disassembly is required by transportation regulations or for protection of components.

B. Spare parts belts to be shipped separately.

C. Spare Parts:

1. Pack in containers bearing labels clearly designating contents and pieces of equipment for which the part is intended. Each part shall be identified with a tag bearing its part number and a part description.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Provide a liquid polymer blending and feed system by below manufacturers:

1. UGSI Chemical Feed, Inc. (Model: Polyblend® Magnum Model MM1200-P5AA)

2. ~~(Model: Veloblend VM 5P 600 XOD~~) VeloDyne USA
(Addendum 2, Issued December 23, 2024)

3. or equal.

2.02 DESIGN CRITERIA

A. The liquid polymer dilution/blending system shall be capable of automatically metering, diluting, activating and feeding liquid polymer with water.

B. The polymer dilution/blending system unit shall be capable of producing polymer solution with polymer-to-water solution concentrations between 0.25 percent and 1.0 percent.

2.03 PERFORMANCE REQUIREMENTS

A. The liquid polymer blending unit shall automatically meter, mix and blend concentrated liquid polymers with dilution water.

B. The polymer input capacity of each unit shall be: 0.25 gph to 5.0 gph of neat polymer using a liquid concentrate pump.

C. Primary mixing dilution water range shall be: 60 to 600 gph.

D. Post dilution water range shall be: 60 to 600 gph.

2.04 SERVICE CONDITIONS

A. Dilution Water supply pressure shall be a minimum of 45 psi.

B. Control Panel supply voltage shall be: 120 VAC.

2.05 PREPARATION EQUIPMENT

A. Multi-Zone Mixing Chamber:

1. Polymer and water shall be mixed in a chamber designed to create sufficient mixing energy.

    a. High shear zone of the mixing chamber shall have a mechanical mixing impeller for successful initial activation and the low shear zone shall not have a mixing impeller to avoid damaging polymer molecules.

    b. Solution shall undergo a tapered mixing intensity slope as it exits the initial high sheer zone and passes through a second low shear zone, isolated by a baffle.

    c. The design shall have primary mixing and post-dilution to expedite the polymer activation process by maximizing the value of breaker surfactant present in emulsion polymer, as per the AWWA Standard for Polyacrylamide (ANSI/AWWA B453-06).

    d. Polymer activation efficiency shall be consistent over the dilution water range.

    e. The volume of the mixing chamber shall be a minimum of 1.0 gallon to provide sufficient residence time for activating and disentangling polymer molecules.

2. Mixing chamber shall be transparent with acrylic barrel to allow viewing of mixing intensity.

3. Impeller shall be driven by a 1/2 HP maximum washdown duty motor.

    a. Motor shall be TEFC.

    b. Impeller speed shall be 3450 rpm, minimum.

    c. Motor shall be direct-coupled to impeller shaft.

4. Mixing chamber shall include a stainless steel injection check valve.

5. Mixing impeller shall be cast brass construction with holes drilled on the backside of the impeller. The impeller, when rotating, shall pull fluid from

around the mechanical seal pocket to eliminate the need for a separate mechanical seal flushing system.

6. In order to quantify the mixing intensity in the mix chamber, the applied horsepower shall be defined by measuring the difference in torque when the mix chamber is empty versus being full of water. This value shall be the basis of determining the mixing intensity defined as "G" value.

7. The G-value in the high shear mixing zone shall exceed 14,000 sec^{-1} to effectively disperse polymer gels to prevent fisheye formation.

8. The G-value in the low shear mixing zone shall be lower than 3,500 sec^{-1} to avoid damaging polymer chains.

B. Dilution Water Control:

1. Dilution water shall be split into two streams.

   a. Primary water flow shall supply the mixing chamber.

   b. Secondary water flow shall be used to post dilute the activated polymer stream.

   c. These two streams shall be completely blended by a static mixer prior to exiting the unit.

2. Unit shall have an electric solenoid valve for on/off control of total dilution water flow. Valve shall have brass body with NBR seals and NEMA 4X rated coil enclosure.

3. Flow indicators and flow control valves shall be provided for each dilution water stream.

4. Dilution water and solution output connections shall include 304 stainless steel unions connected to the chassis.

C. Pump:

1. Unit shall have a neat polymer metering pump.

   a. Pump shall be positive displacement, progressing cavity type.

   b. Rotor shall be 316 stainless steel.

   c. Stator shall be Viton.

   d. Pump shall have mechanical seal.

   e. Rotor speed shall not exceed 500 rpm.

2. Pump shall be driven by a 1/2 HP, TEFC, AC motor.

   a. Variable speed shall be provided by a VFD controller.

   b. Motor shall be direct-coupled to a gear reducer.

   c. Pump shall be direct-coupled to gear reducer.

3. Pump shall include a pressure relief valve and pressure gauge located on the discharge side of the pump and piped to the pump suction. Pressure relief valve shall be PVC construction with Viton seals.

4. A suitably-sized calibration cylinder shall be mounted to the frame with PVC isolation ball valves. Cylinder shall be calibrated in ml, and be constructed of clear PVC with slip on cap and ½ inch NPT vent connection.

D. Controls:

1. System shall be supplied with waterproof control enclosure. Unit shall be powered through an on-off-auto circuit controlled by a three-position selector switch.

2. A VFD shall be supplied to vary pump speed. A keypad shall be mounted on the motor control enclosure for VFD control and display.

a. VFD shall accept single phase power and convert it to three phase output.

b. The VFD's must support Ethernet IP with the ability to natively be controlled over ethernet from an Allen-Bradley ControlLogix or CompactLogix PLC. Eaton or Allen Bradley VFD's are acceptable.

c. Full VFD drawings and parameter configuration details shall be provided.

d. Polymer system VFD's shall be provided as part of the Volute Dewatering Press Panel (11835 2.06)
(Addendum 2, Issued December 23, 2024)

3. The controller shall also have manual motor speed control via a potentiometer for touchpad for VFD.

E. Functional Specification:

1. The Control panel will undertake the following Auto-manual operations:

a. Polymer systems may be set to either remote/ on/off on the control panel via a three-position selector switch.

b. When set to ON, the polymer system starts. When set to remote, the system starts when the volute press polymer system start contacts close. The polymer pump motor speed can be controlled manually or remotely from the local VFD keypad panel via up/ down arrows in the VFD display.

c. When set to off, polymer system will not work when switched on from the control panel or anywhere else.

d. When set to Auto, polymer system shall accept a remote signal from BFP2/ PWT control panel. VFD shall accept 4-20 mA input signal to vary pump speed in automatic mode.

e. Unit shall detect loss of water flow, sensing that water flow has been interrupted for any reason, will place the polymer pump and mix chamber on standby and will restart it automatically when flow is restored.

f. An integral timer shall monitor loss of flow and energize contacts indicating alarm after 15 seconds of continuous loss.

2.06 MAINTENANCE

A. Unit shall be open frame design to allow easy access to all components.

B. Mixing chamber shall be easily disassembled and reassembled to allow access to all parts exposed to neat polymer.

C. Polymer check valve shall be readily accessible. Check valves installed inside mixing chamber shall not be acceptable.

2.07 MATERIAL SPECIFICATIONS

A. Connections - Plumbing:

1. Dilution water inlet, 1 inch FNPT CL150 flange.
2. Neat polymer inlet, 1/2 inch FNPT.
3. Solution discharge, 1-1/2 inch FNPT CL150 flange.

B. Connections - Electrical:

1. Standard, grounded male plug - 120/1/60, 20 amps max.
2. Terminal blocks for interconnecting all skid-mounted electrical devices.
3. Terminal blocks – 4-20 mA signal input,
4. Terminal blocks – dry contact input for remote start,
5. Terminal blocks – dry contact alarm output,
6. Terminal blocks – dry contact run output,

C. Dimensions:

1. Frame, 37 inches wide by 28 inches deep by 47 inches high.

D. Materials of Construction:

1. The system's frame shall be of rugged 304 stainless steel construction. No mild steel shall be used. The skid shall be constructed of 3/16-inch minimum 304 stainless steel. The frame shall be constructed of 3/16 inch angle or structural stainless steel tubing. The panel supporting the control panel shall be a minimum of 12 gauge. Vertical frame members shall be gusseted. All pipe supports shall be stainless steel. The skid shall be designed for fork-lifting and shall have holes for mounting to concrete pad. Pump suction shall not exceed 18 inches from the skid base.

2. Piping and valves shall be mounted with rigid pipe clamps. Fasteners required to mount components to system frame shall be minimum 1/4-20. Water plumbing shall be schedule 80 PVC. Hose shall be braided vinyl. Hose fittings shall be schedule 80 PVC. No nylon fittings shall be used.

3. Mixing Chamber – PVC, acrylic.

PART 3 EXECUTION

3.01 COORDINATION

A. Installation shall be complete and in accordance with the manufacturer's recommendations, Engineer's instructions, and Contract Documents.

3.02 INSTALLATION

A. The Contractor shall install the liquid polymer blending units in accordance with the manufacturer's requirements.

3.03 INSPECTION, STARTUP AND TRAINING

A. Minimum Service Requirements:

1. Certify proper installation.

2. One eight-hour day on site for start-up and testing.

3. One eight-hour day on site for operator training.

B. Initial start-up and instruction of the Owner's personnel in equipment operation shall be provided by the equipment manufacturer or manufacturer’s representative.

3.04 WARRANTY

A. The warranty period shall be twelve (12) months from the date of start-up by an authorized technician or eighteen (18) months from the date of shipment, whichever occurs first.

PART 4 SPECIAL PROVISIONS

4.01 FLEXIBLE HOSE

A. Tote Suction Hose: A tote suction hose with isolation ball valve, 2-inch quick disconnect adapter, and 2-inch clear, braided PVC hose shall be supplied to connect each tote to suction header piping. The suction hose to tote shall be 1-inch based on 5 gpm capacity. The flexible hose is 10 feet long.

B. Spare parts kit shall include mechanical seal, mixing chamber o-rings, injection check valve, and pump stator.

4.02 OTHER SERVICES

A. Manufacturer to work with PAC Engineering to provide all producer/ consumer tags sufficient to allow coordination or ownership of sludge, polymer, conveyor and other support systems between the two dewatering platforms.

END OF SECTION

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SECTION 11239
ROTARY LOBE BLOWERS

PART 1 GENERAL

1.01 SCOPE

A. This Section includes furnishing, installing, factory test, and placing in operation blowers and related accessories complete and in place ready for service, as shown in the Drawings and described herein.

B. The blowers shall include all drives, drive shafts, couplings, guards, common bases, anchor bolts, silencers, and other accessories specified or required for a complete installation.

C. Each blower package shall be furnished complete with positive displacement tri-lobe blower, electric motor, transmission belting and guards, expansion joints, inlet and discharge silencers, pressure relief valve, check valve, auto tensioner, gauges, soundproof enclosure, and all other accessories required for satisfactory operation.

D. All work performed under this Section shall be in accordance with approved trade practices and the manufacturer's recommendations.

E. Additional product requirements are specified in Section 01350.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

a. The Contractor shall indicate all variances from the requirements of the Contract Documents.

b. General Arrangement Drawings.

a. Scaled dimensional Drawings.

b. Sectional assembly Drawings.

c. Installation instructions and Drawings.

d. Wiring schematics with termination point identification.

e. Materials of construction.

f. Manufacturer's literature and catalog data.

g. Motor information per Section 11050.

h. Manufacturer's certificates and test curves.

i. Complete blower performance data including RPM, capacity, discharge pressure, dB(A) noise pressure level, maximum gear tip speed and rotor

tip speed (fpm), HP required at rated capacity and pressure, and rated maximum pressure rise of blowers

j. Test curves (computer model printouts are not acceptable).

k. Valves

l. Anchoring requirements and installation instructions.

m. Special maintenance tools.

2. Information for the Record:

a. The Contractor shall submit blower supplier's installation and operation certificate.

b. Results of factory tests.

3. Operation and maintenance manual.

1.03 WARRANTY

A. The blower(s) shall be covered by a warranty for 24 months from date of commissioning, or a maximum of 30 months from date of shipment.

PART 2 PRODUCTS

2.01 GENERAL

A. The blower performance shall be as indicated in Part 4 of this Section.

B. The blower shall be of rotary positive displacement design.

C. The blower manufacturer shall be Aerzen, or equal.

D. All equipment shall be designed and proportioned to have liberal strength, stability, and stiffness and shall be especially adapted for the intended service. Ample room and facilities shall be provided for inspection, repairs, and adjustments.

E. The blowers shall be designed to operate continuously without overheating or overloading the motor at any discharge pressure up to and including design pressure, as specified.

F. Blower bases shall be rigidly and accurately anchored into position. All necessary anchor bolts, nuts, and washers shall be furnished by the blower manufacturer and installed by the Contractor.

G. Blower base to have machined sole plate for placement of the blower and have jacking lugs on the blower flange.

H. Nameplates stating the manufacturer, serial number and design operating characteristics shall be rigidly attached to each item of equipment.

I. Each blower shall be given a factory mechanical and one point flow test to assure mechanical integrity and verify performance. If the tests indicate that adjustments are

necessary to meet the manufacturer's standard design capacities of these specifications, such adjustments shall be made prior to shipment.

J. The blower shall be shipped with openings sealed after injection of rust inhibiting powder or with desiccant bags.

K. The Contractor shall furnish and install all interconnecting piping and wiring, gaskets, bolts, nuts, washers, and anchor bolts for auxiliary equipment to complete the system as shown on the Drawings and specified herein.

2.02 BLOWERS

A. The air blower shall be of the rotary positive displacement type as described in Paragraph 2.01 and be constructed with suction and discharge connections oriented as shown on the Drawings.

B. The blower casing shall be of one-piece construction, with separate side plates that are bolted and pinned to the housing. Materials shall be close-grained cast iron ASTM A48.

C. Inlet and outlet shall be flanged connections.

D. The rotors shall be of the straight, three-lobe type and shall be one single piece.

E. Each rotor/shaft shall be supported by anti-friction bearings and fixed to control the axial location of the rotor/shaft in the unit.

F. Bearings shall be sized for a minimum expected life of 5 years between overhauls.

G. The rotors shall be timed by a pair of single helical AGMA 12 quality gears with hardened and ground teeth; minimum AGMA service factor of 1.70.

H. A double sealing arrangement shall be provided to prevent lubricant from contaminating the airstream. Four rotary piston ring shaft seals, an oil slinger and an O-ring seal shall be provided.

I. The timing gears and the bearings shall be splash lubricated.

J. A recessed oil sight glass must be provided on each oil sump.

K. Each bearing shall be provided with positive lip-type oil seal designed to prevent lubricant from entering the airstream, and a labyrinth seal on each shaft designed to reduce air leakage at the point where the shaft extends through the headplate of the blower casing. Further provisions shall be made to vent the area between the two sealing systems to atmosphere to relieve any excessive pressure on the seals.

L. The bearings and gears shall be lubricated by a positive pressure lubrication system completely mounted and piped on the blower unit. The lube system shall consist of an integral direct-driven oil pump, distribution piping, oil sump in the bottom of the gear housing, suction strainer, pressure relief valve, pressure gauge, temperature gauge, provision for Contractor supplied, low oil pressure and temperature transmitters for alarm and shutdown, and oil cooler.

2.03 BLOWER ACCESSORY EQUIPMENT

A. Each blower shall be provided with a suction silencer, suction and discharge expansion joints, discharge silencer, and other accessories as shown on the Drawings.

B. The inlet filter silencer shall be mounted ~~directly to the inlet flange of the blower.~~ to the common air inlet. ***(Addendum 2, Issued December 23, 2024)***

C. The silencer portion shall be located upstream of the inlet filter.

D. The base frame shall be constructed from welded carbon steel or cast iron.

E. Suction silencer shall be on the chamber-absorptive type with inlet and outlet connections as shown on the Drawings. The silencer shall be sized for 100% of the blower flow with a pressure drop not to exceed 5.5 inches of WC. The silencer shall be all-welded steel construction.

F. Discharge silencers shall be of the chamber-absorptive type with inlet and discharge connections and flange sizes as shown on the Drawings. The silencer shall be sized such that a pressure drop of 5.5 inches WC will not be exceeded at the specified blower operating conditions.

G. The silencer shall be subject to a pressure test for tightness and strength at a minimum of 1.65 times the maximum blower operating pressure.

H. The silencer shall be provided with supporting legs as shown on the Drawings, shall be all-welded steel construction.

I. Each package shall be connected to the plant piping via flexible connector(s) located downstream of the discharge silencer.

J. Flexible discharge connectors shall be Proco Style 240, Type EE, EPDM, with a standard ANSI flange discharge connection, rated for 300 degrees F at 20 psig.

K. The blower shall have temperature gauge and air pressure gauges located in the discharge piping and mechanical counter mounted on a lobe shaft extension.

2.04 ELECTRIC MOTOR

A. Each package shall be supplied with a WEG manufactured TEFC motor that shall operate on 460 Volts, 3 Phase, 60 Hertz current.

1. Torque NEMA B.
2. Temperature Rise Class B.
3. Dust tight enclosures (Severe Duty).
4. Class F inverter rated insulation with Class H applied varnish.
5. 3:1 Constant torque.
6. All cast iron construction, including frame, end bells, conduit box and fan cover.
7. NPT threaded and gasketed F3 top mounted conduit box.

8. Copper windings.

9. Regreasable bearings, positive pressure lubrication system with automatic drawn plugs – pressure compensated (Frame sizes 254T and larger).

B. All frame sizes shall be NEMA standard, suitable for overhung belt drive and with the conduit box location on top of the motor.

C. The motor shall be mounted on a pivoting base to provide automatic tensioning of the belts.

D. The motor nominal rating after any corrections for ambient conditions shall be 10% above the maximum operating bHp.

E. The motor shall have a 1.15 service factor.

F. Motor windings shall be supplied with a normally closed thermostat, one per phase, wired in series to form a fail-safe motor protection circuit for the external fault circuit of the motor controller.

G. Motors shall be equipped with an Aegis ring and insulated NDE bearing to mitigate the effects of stray motor currents.

H. The blower manufacturer shall be responsible for coordinating the starting torque requirement of the blower and the motor.

2.05 V BELT DRIVE

A. Each package shall be supplied with a V-belt drive that shall be of the high-capacity type, oil and heat resistant. The drive shall be designed for a minimum service factor of 1.4 times operating power (bHp), or 1.1 times the motor nameplate Hp, whichever is larger to allow a minimum of 1.4-service factor based on the maximum blower bHp.

B. Belt tensioning shall be automatic without the use of any devices or interaction on the part of the operator. Neither slide rails nor load-adjusting springs shall be used.

C. Sheaves shall be dynamically balanced regardless of the operating speed.

D. The belt drive shall be guarded in compliance with OSHA regulations.

E. Portions of the guard shall be easily removable allowing for belt inspection and replacement.

F. Guard material shall be perforated carbon steel.

2.06 VIBRATION ISOLATORS

A. Each package shall be supplied with vibration isolating feet with a minimum efficiency of 80%.

B. The blower manufacturer shall be responsible for attenuating noise and vibration in the blower package such that no special installation base shall be required, nor shall any additional measures be required to reduce vibrations from the blower package being transmitted to the base or the piping.

2.07 PRESSURE SAFETY VALVE

A. Each package shall be supplied with a single pressure safety valve on the discharge side of the blower mounted downstream of the discharge silencer and upstream of the check valve.

B. The safety valve shall be set to protect the blower from exceeding its maximum pressure rating and shall be sized to pass 100% of the design flow.

C. The safety valve shall be field adjustable, spring loaded, and have a certificate of conformity to PED.

D. If the blower package is supplied with a sound enclosure. The pressure relief valve shall be housed by the sound enclosure and shall relieve into a segmented section of the sound enclosure. Weighted relief valves inside the enclosure are not permitted.

E. The valve shall be manufactured by the blower manufacturer.

2.08 CHECK VALVE

A. Each package shall be supplied with one check valve that shall be installed on the discharge line.

B. The check valve shall be of the full-bore low pressure-drop, flapper type design with a steel body, and steel flap embedded in EPDM with full-contact seal.

C. The valve shall be removable without disturbing the piping. Pressure losses produced by the check valve shall be included in the blower performance calculation. Check valves requiring installation in the discharge piping shall not be considered unless installation cost of the external valve is included in supplier’s proposal.

D. The valve shall be manufactured by blower manufacturer.

2.09 INSTRUMENTATION

A. Each package shall be supplied with the following instrumentation:

1. Inlet Vacuum Gauge (4-Inch Gauges):
    a. Standard gauge with 4-inch dial and scale from 0 to –40 inches of water column.
    b. Gauge to function as a filter maintenance indicator.
2. Discharge Pressure Gauge (4-Inch Gauges):
    a. 4-Inch dial and scale from 0 to 20 psig.
    b. The pressure gauge shall have a stainless-steel case.
    c. Gauge shall be dry (no fill) with no pulsation snubber required.
3. Discharge Pressure Switch:
    a. Ashcroft Model B4-24-V-XRN-XJK-15 PSI.

b. Type 400 pressure Switch in NEMA 4X enclosure.

c. Single general purpose 15A, 110-480V switches (2) SPDT snap-acting, NOT independently adjustable.

d. Viton Actuator Seal.

e. Internal range scale and operating range of 0 to 15 PSIG.

4. Discharge Temperature Gauge / Switch (4-Inch Gauges):

a. Standard gauge with 4-inch dial and scale from 32 to 397-degree F.

b. NEMA 4 enclosure, 5A at 250 volt, SA 28 SPDT microswitch.

c. UL & CSA approved.

5. E-Stop Switch:

a. Siemens model 52PX2V2.

b. Mounted on the face of the blower enclosure.

c. NEMA 4X rating.

d. Two normally closed contacts.

6. Terminal Strip:

a. The switches and motor thermostat shall be prewired to a labeled terminal junction box inside the blower enclosure.

2.10 ACCOUSTICAL SOUND ENCLOSURE

A. Each package shall be supplied with a sound enclosure covering the entire blower package.

B. Each blower system shall be equipped with an acoustical enclosure. The acoustical enclosure shall need to meet below:

Sound Limit Req. @ 1 Meter In Free Field:	80 dB

C. The Enclosures shall be designed, assembled, and inspected at the manufacturing site with documentation provided to verify the noise reduction demanded in these documents. Noise attenuation shall be provided as necessary to reach the specified sound limit requirement at a distance of 1 meter from the operating equipment in a free field environment. All readings shall be taken by personnel experienced in the field of sound attenuation. The enclosure herein specified shall be designed and manufactured by the blower system manufacturer specifically for the equipment supplied.

D. The enclosure shall be designed so as to be able to install them side-by-side with all maintenance done from the front or back of the package.

E. Details shall be as follows:

1. Panels shall be made of galvanized steel sheet, powder coated in a light reflecting, blue color per RAL 5001. The skid shall be of the same color.

2. The enclosure and the blower package shall both be mounted on a skid / oil-drip pan designed for meeting environment protection standards and for easy transportation and installation.

3. A grounding strap shall be installed between the blower base and the package skid to bypass any vibration isolating mounts.

4. Quick release panels, each less than 50 lb (as mandated by OSHA) must provide easy and quick access for routine maintenance of the blower and the package components.

5. Enclosure Cooling Fan:

a. A high efficiency blower shaft driven ventilation fan shall provide ventilation and cooling integral to the sound enclosure.

b. Cooling fan shall be sized for sufficient heat removal from the sound enclosure, even when the blower is operated with a VFD.

F. Electrical components, instrumentation and instrument connections shall not be mounted or interface with moving panels of the sound enclosure.

G. Both blower oil sumps shall be piped to a common fill and drain, located at the front of the package for easy maintenance. An oil level indicator shall be mounted on the outside of the enclosure, which gives an accurate oil level indication while the blower is in operation. All oil lines to be hydraulic hose with fittings. No plastic tubing with compression fittings is allowed.

2.11 SHOP PAINTING

A. Shop painting shall be in accordance with Section 01350.

2.12 SPECIAL TOOLS AND SPARE PARTS

A. Any special tools required to perform routine maintenance functions, such as replacement of gears and bearings, shall be furnished with the blowers.

B. The following spare parts, as applicable, shall be furnished with each blower equipment:

1. One complete set of gaskets, seals, O-rings, and bearings for each blower.

2. One integral inlet silencer filter elements (Total 2).

3. Lubrication for first year of operation (Total 2).

4. One belt set (Total 2).

2.13 FACTORY TESTING

A. All critical dimensions of the blower components actually provided by the manufacturer shall be verified and documented prior to assembly.

B. The rotating parts of each blower actually provided by the manufacturer shall be statically and dynamically balanced before final assembly. The blower line shall operate without excessive vibration. Removal of material from the face of the rotors for balancing purposes is not allowed.

C. Each blower actually provided by the manufacturer shall be slip tested. The Slip RPM shall be documented. Each bare blower provided by the manufacturer shall be operated as its maximum rated speed and differential pressure for 30 minutes. A document certifying that the supplied blowers conform to the design specifications shall be provided.

D. On completion of final assembly of the packaged blower and prior to shipment, each packaged blower shall be mechanically run to a minimum of 15 minutes.

2.14 QUALITY ASSURANCE

A. The blowers and equipment covered by this specification are intended to be standard blower equipment, of proven ability, as manufactured by a reputable CE certified manufacturer having at least two years' experience in the production of such blowers. The blowers furnished shall be designed, constructed, and installed in accordance with the best practice and methods and shall operate satisfactorily when installed.

PART 3 EXECUTION

3.01 INSTALLATION

A. The blowers and accessories shall be installed in accordance with the approved Shop Drawings and the manufacturer's instructions.

B. All base pads and bearing pedestal shall be flat and parallel to the centerline of the existing drive within 0.001-inch. The new bearing and blower shall be installed in line with the centerline of the existing drive within 0.001-inch. A vibration test by an independent Contractor shall be provided. Corrections in alignment, fabrication, and installation shall be made as necessary to bring the installation within the requirements of the blower vendor. Vibration readings shall be equal to or less than one mil at each bearing location.

C. Installation shall include the furnishing and installation of all supports and bracing as required to support the blowers, silencers, and piping and to prevent any excessive vibration or movement which may be harmful to the equipment.

D. Precompression or extension of the expansion joints is not allowed.

E. Initial lubrication required for start-up and field test operation shall be furnished and applied in accordance with the manufacturer's recommendation.

F. After a satisfactory start-up and field test are completed, the initial gear oil will be replaced with clean oil meeting manufacturer's recommendation.

3.02 INSPECTION, STARTUP, AND TESTING

A. The Contractor shall furnish a qualified representative of the manufacturer to perform inspection, startup, and training services. The manufacturer's representative shall be experienced in the installation, start-up, and operation and maintenance of the equipment.

B. The representative shall check the installation and supervise final adjustments and initial startup of the equipment. He shall certify that the installation is correct, and that the equipment is operating satisfactorily.

C. The manufacturer's representative shall submit to the Engineer four copies of a written certification to verify that the installation, inspection, and startup is correct, and that the equipment is operating satisfactorily.

D. After the installation, inspection, and startup are satisfactorily complete, the manufacturer's representative shall train the Owner's personnel for a minimum of four hours in the proper operation and maintenance of the equipment.

PART 4 SPECIAL PROVISIONS

4.01 OSHA GUARDS

A. Provide OSHA Guards for all couplings, pillow blocks, and shafts.

4.02 BLOWER ROTATION

A. The Contractor shall verify existing driver engine rotation requirements and coordinate with the blower manufacturer.

B. Provide OSHA Guards for all couplings, pillow blocks, and shafts.

4.03 AEROBIC DIGESTER TANK BLOWERS

A. The Aerobic Digester Tank Blower shall be manufactured by Aerzen, Kaeser, Atlas Copco, Universal or Equal***. (Addendum 1, Issued December 16, 2024)***

B. Service:

1. The blowers will be used to supply atmospheric air to the aerobic digester tanks. The normal liquid level in the digester tank above the aeration diffuser will be 13 feet. The inlet temperature to the blower will be between 0 degrees F and 100 degrees F.

a.	Quantity:	4
b.	Basis of Design:	Aerzen Model GM 35 S DN 150
c.	Design Inlet Temperature:	100 Degree Fahrenheit
d.	Site Elevation:	1012 Feet above sea level

e. Design Inlet Pressure (abs): 14.17 psia

f. Design Humidity: 80%

g. Design Flow Inlet Volume: 1,100 SCFM per Blower

h. Design Discharge Pressure: 6.16 psi

i. Main Rotor Speed: 3,545 rpm

j. Brake Horsepower (Max): 59 BHP

k. Motor Size (Max): 75 HP

l. Power: 3 phase, 460 volts

1) Panel:75 HP VFD in MCC (see specification 16421 – Motor Control Center)

m. Free Field Noise Guarantee Sound pressure level without enclosure: 101 dB(A) at 3.3 feet (at design point)

n. Free Field Noise Guarantee Sound pressure level with enclosure: 77 dB(A) at 3.3 feet (at design point)

o. Package BHP to include pressure loss through a clean inlet filter/ silencer, pressure loss of the exhaust silencer and check valve.

p. Package Performance shall be guaranteed to ISO 1217 with a tolerance is +/- 5% on volume flow and +/- 5% on package horsepower. Manufacturer of blower must provide data for purchased machine.

q. Sound data shall be from an ISO 2151 method of measurement, in an ISO 3745 qualified test facility. Sound data shall be compliant with a Declaration of Conformity assessment standard.

4.04 PRESSATE TANK BLOWER

A. The Pressate Tank Blower shall be manufactured by Aerzen, Kaeser, Atlas Copco, Universal or Equal. **(*Addendum 1, Issued December 16, 2024)***

B. Service:

1. The blowers will be used to supply atmospheric air to the pressate tank. The normal liquid level in the pressate tank above the aeration diffuser will be 7 feet. The inlet temperature to the blower will be between 0 degrees F and 100 degrees F.

a. Quantity: 1

b. Basis of Design: Aerzen Model GM 7 L DN 80

c. Design Inlet Temperature: 100 Degree Fahrenheit

d. Site Elevation: 1012 Feet above sea level

e.	Design Inlet Pressure (abs):	14.17 psia
f.	Design Humidity:	80%
g.	Design Flow Inlet Volume:	200 SCFM
h.	Design Discharge Pressure (abs):	2.81 psia
i.	Main Rotor Speed:	3740 rpm
j.	Brake Horsepower (Max):	4.4 BHP
k.	Motor Size (Max):	5 HP
l.	Power:	3 phase, 460 volts
m.	Panel:	~~5 HP VFD NEMA 4X Package Mounted~~ No VFD

(Addendum 2, Issued December 23, 2024)

n. Free Field Noise Guarantee Sound pressure level without enclosure: 86 dB(A) at 3.3 feet (at design point)

o. Free Field Noise Guarantee Sound pressure level with enclosure: 70 dB(A) at 3.3 feet (at design point)

p. Package BHP to include pressure loss through a clean inlet filter/ silencer, pressure loss of the exhaust silencer and check valve.

q. Package Performance shall be guaranteed to ISO 1217 with a tolerance is +/- 5% on volume flow and +/- 5% on package horsepower. Manufacturer of blower must provide data for purchased machine.

r. Sound data shall be from an ISO 2151 method of measurement, in an ISO 3745 qualified test facility. Sound data shall be compliant with a Declaration of Conformity assessment standard.

END OF SECTION

SECTION 11600
LABORATORY FURNITURE AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

A. This Section includes the furnishing of all laboratory apparatus and the furnishing and installation of the laboratory furniture and equipment.

B. All Work performed under this Section shall comply and be in accordance with all approved trade practices and manufacturers' recommendations.

C. Additional product requirements are specified in Section 01350.

1.02 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Shop Drawings for Review:

a. The Contractor shall indicate all variances from the requirements of the Contract Documents.

b. Descriptive literature, bulletins, or other data describing the laboratory furniture and equipment.

c. Complete list of equipment and appurtenances included, complete with manufacturer's name and model number.

d. Detail plans and elevations.

e. Sectional assembly drawings.

f. Materials of construction.

g. Schematic wiring and piping diagrams.

2. Operation and maintenance manual.

1.03 QUALITY ASSURANCE

A. Casework, work surfaces, laboratory fume hoods, equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

B. Manufacturer's qualifications shall include modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:

1. Five years or more experience in manufacture of laboratory casework and equipment of type specified.
2. Ten installations of equal or larger size and requirements.

C. Installer's qualifications shall be factory trained and/or certified by the manufacturer.

D. Cabinets shall be identified on drawings by manufacturer's catalog numbers. Unless otherwise modified on drawings or in specifications, catalog description constitutes specific requirements for each type of cabinet.

PART 2 PRODUCTS

2.01 CASEWORK PERFORMANCE DESIGN REQUIREMENTS

A. Flush inset construction shall provide surfaces of doors, drawers and panel faces shall align with cabinet fronts without overlap of case ends, top or bottom rails. Horizontal and vertical case shell members (panels, tops rails and bottoms) shall meet in the same plane without overlap.

B. Interior of case units shall be easily cleanable, flush interior. Base cabinets, 30-inch and wider, with double swinging doors shall provide full access to complete interior without center vertical post.

C. Self-supporting units shall be completely welded shell assembly without applied panels at ends, backs or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.

D. Case openings shall be rabbeted-like joints all four sides of case opening for hinged doors and two sides for sliding doors in order to provide dust resistant case.

E. Drawers shall be sized on a modular basis for interchangeability to meet varying storage needs, and designed to be easily removable in the field without use of special tools.

F. Doors shall be solid or glazed, double wall telescoping box steel construction, interior sound deadening, removable hinges standard.

G. Casework components have been tested in conformance with SEFA 8 M-2007 Recommended Practice and shall withstand the following maximum static load capacity, without damage to the component or to the casework operation, when properly leveled, supported and the load evenly distributed:

1.	Steel base units:	500 pounds per lineal foot
2.	Suspended units:	300 pounds
3.	Drawers in a cabinet:	150 pounds per drawer
4.	Utility tables (4 legged):	300 pounds
5.	Hanging wall cases:	300 pounds
6.	Shelves (base, wall, tall units)	40 pounds/square foot, up to 200 pounds

H. Coatings on Casework components have been tested in conformance with the full requirements of SEFA 8 M-2010 Recommended Practice. See Section 2.07 for test procedures, acceptance levels and results for each criteria listed below from SEFA 8 M-2010 Section 8:

1. Chemical Spot Test - Section 8.1
2. Hot Water Test - Section 8.2
3. Finish Impact Test - Section 8.3
4. Paint Adhesion on Steel - Section 8.4
5. Paint Hardness on Steel - Section 8.5

2.02 WORK SURFACE PERFORMANCE REQUIREMENTS

A. Epoxy Work Surface Performance Requirements:

1. Test procedure shall apply five drops of each reagent to surface and cover with 25-millimeter watch glass, convex side down; test volatiles using one ounce bottle stuffed with saturated cotton. After one hour exposure flush surface, clean, rinse and wipe dry. Evaluate after 24 hours at 73 degrees F, and 50 degrees F at 5% relative humidity.
2. Change in surface finish and function shall be described by the following ratings:
   a. No Effect: No detectable change in surface material.
   b. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the Work surface material.
   c. Good: Clearly discernible change in color or gloss, but no significant impairment of Work surface function or life.
   d. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
   e. Failure: Pitting, cratering or erosion of Work surface material; obvious and significant deterioration.
3. Test Results - Epoxy Resin Work Surface:

Reagent	Rating	Reagent	Rating
Hydrochloric Acid, 37%	Excellent	Benzene	Excellent
Sulfuric Acid, 33%	No Effect	Xylene	No Effect
Sulfuric Acid, 77%	No Effect	Toluene	Excellent
Sulfuric Acid, 96%	Failure	Gasoline	No Effect
Formic Acid, 90%	Excellent	Dichlor Acetic Acid	Good
Nitric Acid, 20%	Excellent	Di Methyl Formamide	Excellent
Nitric Acid, 30%	Excellent	Ethyl Acetate	No Effect
Nitric Acid, 70%	Good	Amyl Acetate	Excellent

Reagent	Rating	Reagent	Rating
Hydrofluoric Acid, 48%	Fair	Acetone	Excellent
Phosphoric Acid, 85%	No Effect	Chloroform	Excellent
Chromic Acid, 60%	Failure	Carbon Tetrachloride	No Effect
Acetic Acid, 98%	Excellent	Phenol	Excellent
3 and 8 Equal Parts	Excellent	Cresol	Excellent
Ammonium Hydroxide, 28%	No Effect	Formaldehyde	No Effect
Sodium Hydroxide, 10%	No Effect	Trichlorethylene	Excellent
Sodium Hydroxide, 20%	No Effect	Ethyl Ether	Excellent
Sodium Hydroxide, 40%	No Effect	Furfural	Good
Sodium Hydroxide Flake	No Effect	Methylene Chloride	Excellent
Sodium Sulfide	Excellent	Mono Chlor Benzene	Good
Zinc Chloride	No Effect	Dioxane	Excellent
Tincture of Iodine	Excellent	Methyl Ethyl Ketone	Excellent
Silver Nitrate	No Effect	Acid Dichromate	Fair
Methyl Alcohol	No Effect	Hydrogen Peroxide	No Effect
Ethyl Alcohol	No Effect	Naphthalene	Excellent
Butyl Alcohol	No Effect		

2.03 MATERIALS

A. Casework shall be as manufactured and assembled by Jamestown Metal Products Division of Institutional Casework, Inc., 178 Blackstone Avenue, Jamestown, New York, 14701, Kewawnee Scientific Corporation or equal.

B. Sheet steel used in the construction of cases shall be:

1. Mild carbon, cold rolled and leveled unfinished steel, ASTM A1008.
2. Stainless steel, #4 finish one side, ASTM A666.
3. Mild carbon, cold rolled and hot dipped galvanized steel.

C. Unless otherwise noted, the typical gauge of steel used in the construction of cases and related products shall be 18 GA. Exceptions listed below:

1. 11 GA - table leg stretcher and leg rail support brackets.
2. 12 GA - bottom corner gussets.
3. 14 GA - hinge reinforcements, suspension channels.
4. 16 GA -table cross rails, apron rails and end rails.
5. 20 GA - inner door panels, filler stiles, fixed back panels, drawer bodies.
6. 22 GA - removable back panels.

D. Glass for glazed swinging, sliding and frameless doors as follows:

1. 1/4-inch Clear Float Glass - standard for swinging and sliding doors.
2. 1/4-inch Tempered Glass per ASTM C1048 - standard for frameless doors.

3. 1/4-inch Laminated Glass per ASTM C1172 -optional.

2.04 CASEWORK ASSEMBLY

A. Base and Tall Cabinets (standard 22-inch nominal depth):

1. Minimum height, including corner gussets, leveler fully retracted:

a. Base Standing 35.500-inch

b. Base Sitting 28.250-inch

c. Base ADA 31.853-inch

d. Tall 83.750-inch

2. One-piece formed end panels and back with internal reinforcing front posts.

3. Front post fully closed with full height reinforcing upright.

4. Shelf adjustment holes in front and rear posts shall be aligned for level setting, adjustable to 1/2-inch increments.

5. Base cabinet drawer units provided without backs or bottoms; cupboard units provided with removable backs for service access.

6. Tall cabinet units provided with full formed backs, recessed 1/8-inch for mounting purposes.

7. One-piece bottom with formed front edge spot welded to front rail. Rabbeted as required for swinging doors and drawers; flush for sliding doors.

8. Top rail interlocks with and welded to end panels, flush with front of unit; reinforced for suspended units.

9. Formed steel base provides minimum 3.750-inch high by 3.000-inch deep toe-kick space; reinforcing corner gussets accommodate standard 1/2-13 UNC by 2.500-inch zinc plated leveling bolt, accessible through bottom panel on Base and Tall Cabinets where applied.

B. Wall Cabinets (standard 12-inch and 16-inch depth):

1. Standard heights include 18-inch, 24.5-inch, 30-inch, 36-inch, 42-inch and 48-inch.

2. One piece formed end panels and back with internal reinforcing front posts.

3. Front post fully closed with full height reinforcing upright.

4. Shelf adjustment holes in front and rear posts shall be aligned for level setting, adjustable to 1/2-inch increments.

5. One-piece formed back, recessed 3/4-inch for mounting purposes.

6. One-piece top with front edge formed into front rail.

7. One-piece bottom with front edge formed into front rail.

8. Note: All exposed seams on joints will be welded, ground and polished to an equivalent mill finish.

C. Drawers:

1. Drawer fronts shall be 5/8-inch thick, double wall construction, assembled with sound deadened material, top front corners fitted smooth.

2. Provide 22 GA stainless steel self-closing drawers with zinc die cast metal hardware.

3. Drawers shall have affixed label holders.

4. No tools required for removal.

5. Drawer suspension:

6. Provide drawer with rubber bumpers. Friction centering devices are not acceptable.

D. Doors:

1. Solid panel doors shall be 5/8-inch thick, double wall, telescoping box steel construction with interior sound deadening, outer corners fitted smooth. Hinges with screws to internal 14-gauge reinforcement in case and door. Hinges shall be removable; welding of hinges not acceptable. Doors shall close against rubber bumpers.

2. Frame glazed doors shall be outer head to be one-piece construction with beaded edges. Inner head shall be one-piece construction also, telescoping, and secured with screws to outer head; removable for installation or replacement of glass. Provide vinyl glazing retainer to receive glass. In all other respects, framed glazed door construction and quality shall match solid panel doors.

3. Sliding doors - solid or framed glazed shall be designed for tilt-out removal. Doors shall ride on nylon tired sleeve bearing rollers in aluminum extended bottom hung track and shall close against rubber bumpers.

4. Unframed sliding glass doors shall be glass with edges ground set in extruded aluminum shoe with integral pull (top and bottom extruded aluminum track). Provide rubber bumpers at fully opened and closed door position.

5. Doors shall have affixed label holders.

E. Shelves:

1. Casework shelves shall be die formed steel, front and back edges formed down and back 1-inch; ends formed down 3/4-inch.

2. Reinforced shelves shall be over 36-inch long and 16-inch deep include hat channel reinforcement, full length of the shelf.

3. Pull out shelves shall be same suspension as specified for drawers.

F. Base molding shall be 4-inch high typical, to be furnished and installed by others.

G. Hardware:

1. Pulls shall be modern design, offering a comfortable hand grip, and be securely fastened to doors and drawers. Two pulls shall be required on all drawers 30-inch and longer.

2. Flush pulls):

a. Finger holes or slots machined into doors are not acceptable.

3. Hinges shall be brushed stainless steel type, 5-knuckle, frictionless, not less than 2-inch long with fast pin and rounded ends. Hinges are attached to both door and case with three (3) screws through each leaf. Doors over 36-inch in height shall be hung using 3 hinges.

4. Removable Core Locks:

a. Applied to doors and drawers where specifically requested in the specifications or on the equipment list, and shall be keyed and master-keyed as directed.

5. Door catches shall be adjustable nylon roller type, with strike.

6. Leveling devices shall be zinc plated 1/2-inch-13 UNC threaded bolt type.

7. Shelf clips shall be die formed steel, zinc plated, designed to provide shelf support and adjustment in 1/2-inch increments.

8. Label holders shall be applied (in the field) to doors and drawers where specifically requested in the specifications or on the equipment list, shall be self-adhesive type aluminum with satin finish and designed for 2-1/2-inch by 1-1/8-inch cards, unless otherwise specified.

9. Up-and-Down bolts shall be provided on hinged full height storage cases; they shall have a right-hand door provided with an active knob and up-and-down bolt assembly. Left hand door shall be provided with a dummy knob. Up-and-down bolts shall be concealed in the stiles of glazed doors and between pans of solid panel doors.

2.05 WORK SURFACES

A. Epoxy Resin shall be chemical and abrasion resistant, durable 1-inch-thick cast material of epoxy resins and inert products, cast flat, with a uniform low-sheen black surface. Backsplash curb shall be the same material as the top, but provided separate for field installation. Provide where indicated on drawings or as required where tops abut wall surfaces and at reagent ledges. Include end curb where top abuts end wall as specified. Reagent ledges shall be the same material as the top. Ledge face shall permit installation of service fixtures and top shall be removable for access to service utilities.

2.06 TABLE FRAMES

A. Table frames shall be 4-1/2-inch high “C” channel front and back aprons, end rails and cross rails.

B. Table drawers shall provide front and back rails; drawer unit, hardware and suspension same as specified for base unit drawers.

C. Legs shall be 2-inch by 2-inch steel tube legs with welded 11 GA leg bracket. Attach legs with two bolts to front and back aprons and weld to end rails. Each leg shall have a leveling screw.

D. Leg Shoes shall be provided on all table legs to conceal leveling device, unless otherwise specified. Shoes shall be pliable, black vinyl material.

2.07 SINKS

A. Stainless Steel Sinks shall be fabricated from Type 304 stainless steel per ASTM A666. All expose surfaces shall be finished in No. 4 finish. All sink surfaces (sides and bottoms) shall be full 16-gauge metal thickness unless heavier gauges are specified. Deep drawn sinks are not acceptable. All sink joints shall be continuously welded by heliarc welding process. Inside radii shall be 1-inch. Bottoms shall be pitched to the drain indent. Sink bowl shall be welded to the top as to form an integral part thereof where sinks are built into stainless steel tops or working surfaces. Top edges of free standing sinks shall be formed into a channel formation with all joints welded and ground smooth and polished. No soldering shall be permitted in connection with sink construction. Stainless steel sinks shall be furnished with crumb cup strainers unless otherwise specified.

B. Sink Supports shall be the hanger type, suspended from top front and top rear horizontal rails of sink cabinet by four (4) 1/4-inch diameter rods, threaded at bottom end and offset at top to hang from two full length reinforcements welded to the front and rear top rails. Two 3/4-inch by 1-1/2-inch gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks. When sink capacity exceeds 3,750 cubic inch, the sink supports shall be suspended from full length reinforcements welded to the two end rails. Two 1-inch by 2-inch by 10-gauge full length channels shall be hung from the four 1/4 -inch diameter rods to provide an alternate sink cradle.

2.08 SERVICE FITTINGS

A. Laboratory Service Fittings - Service fittings shall be laboratory grade; water faucets and valve bodies shall be cast bronze with a minimum copper content of 85%. Fittings shall be chromium plated unless otherwise specified.

B. Water Fittings - Water fittings shall be provided with a removable and replaceable unit containing all parts subject to wear. Seat washers shall be held in place with a Monel screw containing a locking device. Four arm handles shall be black, acid resisting, nonmetallic LEXAN, unless otherwise indicated or specified. Handles shall be furnished

with tamperproof and vandal resistant color coded service indexes. All water faucets shall be readily convertible from compression type to quick self-closing type, or to slow self-closing type, or vice versa, without disturbing body of faucet. All water faucets shall be supplied with vacuum breakers.

C. High Purity Water Fittings - All grades of purified laboratory water pipe valves and fittings shall be PVC. Valves shall be the self-closing type. Handles shall be furnished with tamperproof and vandal resistant service indexes.

D. Ground Key Hose Cocks - Ground key valve hose cocks for gas, air, and vacuum services shall have forged brass bodies and forged brass tapered plugs with broad flat handles having a minimum length of 2-inch beyond the index for convenience use. Valve bodies shall be individually lapped, ground, and sealed. The retaining spring shall be made of beryllium copper, and shall be the dirt resistant cup type. Worm type springs will not be acceptable. Handles shall be furnished with tamperproof and vandal resistant color coded service indexes.

E. Needle Valve Hose Cocks: Ball valve hose cock with chrome plated brass body and handle, serrated tip outlet and 3/8 inch NPT male inlet. Hose cock shall need to meet: ANSI Z21.15a / CSA 9.1a. and ADA ANSI/ICC A117.1 requirements.

F. Hose Connector Ends - Serrated hose connectors shall be provided on all service fittings, either removable or integral, unless otherwise specified.

G. Remote Control Valves - Valves for water shall be furnished with removable and replaceable units containing all parts subject to wear. Valves for gases shall be furnished with a floating steel cone and replaceable stainless steel seat. Valves shall be complete with hexagonal brass extension rods with black, acid resisting, nonmetallic LEXAN four arm handles and escutcheon plates. Handles shall be furnished with tamperproof and vandal resistant color coded service indexes.

H. Service Indexes - Fitting shall be identified with service indexes in the following color coding:

Hot Water	Red
Cold Water	Green
Gas	Blue
Air	Orange
Vacuum	Yellow
Distilled/Deionized Water	White
Raw Water	Grey

2.09 SPECIAL PURPOSE STORAGE CABINETS

A. Acid/Corrosive Storage Cabinets shall employ the same materials, hardware and construction methods as standard base and tall cabinets with the following exceptions:

1. Case:

a. Double-walled 18 GA steel (back and sides), provides internal backing surface for corrosion resistant inner liner.

b. Perforated at rear for use of venting apparatus; no penetration of liner at vent opening.

2. Liner shall be one-piece welded polypropylene, secured to case with nylon screws. Includes 1-inch lip along at door opening for spill containment.

3. Doors shall be polypropylene lined with louvers for ventilation; locks optional as defined by specifier.

4. Shelves shall be half-depth, 0.75-inch thick polypropylene with 1-inch high lip welded along front edge, adjustable (two levels).

5. Casters for mobile applications shall be swivel type; locking casters optional.

6. Labels “ACID” or “CORROSIVE” shall be silk-screened onto the door. “ACID” appears as red lettering on blue background; “CORROSIVE” as black lettering on white background.

B. Flammable Storage Cabinets shall follow requirements covering cabinets intended to be used to provide a storage area for limited quantities of flammable and combustible liquids stored in containers in compliance with ANSI/NFPA 30. Construction and performance requirements for these cabinets are primarily based on ANSI/NFPA 30.

In addition, all standard cabinets shall be constructed, tested and listed in accordance with UL 1275 “Standards for Flammable Liquid Storage Cabinets”. All UL 1275 approved cabinets will bear a label from the manufacturer stating such, including the company name, model number, and cabinet capacity.

Flammable Storage Cabinets shall employ the same materials, hardware and construction methods as standard base and tall cabinets with the following exceptions:

1. Case:

a. Double-walled 18 GA steel with 1-1/2-inch air space between panels on top, bottom, sides, back and door.

b. Air spaces shall be filled with a 1-inch thick blanket of High-Temp Fiberglass.

c. Perforated at rear for use of venting apparatus. Note: If cabinet is vented for whatever reason, it shall be vented outdoors in such a manner that will not compromise the specified performance of the cabinet, and be acceptable to the authority having jurisdiction over this matter. It the cabinet is not vented; the vent openings shall be sealed with plugs provided by the manufacturer.

d. Bottom Floor Pan shall provide a 2-inch deep liquid tight pan to contain liquid spills and prevent leaks.

e. Provisions for attaching grounding wire at the base of the cabinet on the outside, rear panel.

2. Doors:

a. Provided with a three-point locking mechanism (Up- and-Down bolt type).

b. Three-point slam latch optional.

c. Self-closing mechanism and fusible link shall also be incorporated (optional with slam latch version only).

d. Door synchronizer shall be incorporated on double door units (optional with slam latch version only).

e. Provided with full length stainless steel piano hinge.

3. Mobile with four casters (2-locking), swivel-type. Vent holes factory plugged. Cabinets shall be ADA compliant for height, width and load capacity.

4. Labels: "FLAMMABLE - KEEP FIRE AWAY" shall be silk-screened onto the door, appearing as red lettering on a bright yellow background.

C. Vacuum Pump Storage Cabinets: Shall employ the same materials, hardware and construction methods as standard base cabinets with the following exceptions:

1. Case:

a. Shall include acoustical insulation on the interior of the cabinet for noise absorption, rated for flammability to UL94 HF-1.

b. Bottomless, to facilitate movement of the mobile pump caddy in and out of the cabinet.

c. Removable back for access to services behind cabinet.

d. Perforated at rear for use of venting apparatus.

2. Doors:

a. Hinged doors with integral toe space.

b. Includes acoustical insulation affixed to door inner panel, rated for flammability to UL94 HF-1.

3. Mobile Pump Caddy:

a. 14 GA steel platform with four integral lips and welded in each corner to safely contain any accidental spills.

b. Includes casters, swivel type; locking casters optional.

c. Shall have a maximum load capacity of 300 pound.

4. Additional Features:

a. Shall incorporate an integral electrical switch (120V, 20 amp) with pilot light to indicate the operational mode of the vacuum pump unit.

b. Shall include an electrical duplex, located in the rear of the cabinet, for the vacuum pump plug end. Outlet is to be accessible from the inside of the cabinet and be hard wired to the electrical switch.

c. Optional exhaust fan can be employed for greater heat loads or as specified. The exhaust fan assembly will be attached to the exterior of the cabinet and incorporate a 4-foor diameter duct collar connection. Note: connection by others.

2.10 METAL FINISH (PAINTED SERIES)

A. Metal shall be treated with a heated alkaline based acid solution, rinsed with water, and a coat of epoxy-link applied; immediately dried in heated ovens, then gradually cool prior to application of finish.

B. Electrostatically apply epoxy powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thicknesses:

1. Exterior and interior surfaces exposed to view: 1.8 - 3 mils.

2. Backs of cabinets and other surfaces not exposed to view: 1.8 mils minimum.

C. Chemical Spot Test:

1. Test procedure shall place test panel on a flat surface, clean with soap and water and blot dry. Condition the test panel for 48 hours at 73 degrees F plus/minus 3 degrees F and 50% plus/minus 5% relative humidity. Panel will be subjected to chemical reagents according to SEFA 8 M-2010 Recommended Practice using one of the following two test methods:

a. Method A - Test volatile chemicals by placing a cotton ball saturated with reagent in the mouth of a 1-ounce bottle and inverting the bottle on the surface of the panel.

b. Method B - Test non-volatile chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24-millimeter watch glass, convex side down.

c. For both test methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naptha, and rinse with deionized water. Dry with a towel and evaluate after 24 hours at 73 degrees F plus/minus 3 degrees F and 50% plus/minus 5% relative humidity using the following rating system.

2. Evaluation ratings:

a. Level 0 - No detectable change.

b. Level 1 - Slight change in color or gloss.

c. Level 2 - Slight surface etching or severe staining.

d. Level 3 - Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

3. Acceptance level: No more than four (4) level 3 conditions

4. Test results: Two (2) level 3 conditions exist. See data below:

Reagent	Method	Rating	Reagent	Method	Rating
Acetate, Amyl	A	0	Iodine, Tincture of	B	2
Acetate, Ethyl	A	0	Methyl Ethyl Ketone	A	1
Acetic Acid, 98%	B	1	Methylene Chloride	A	1
Acetone	A	0	Mono Chlorobenzene	A	0
Acid Dichromate, 5%	B	0	Naphthalene	A	0
Alcohol, Butyl	A	0	Nitric Acid, 20%	B	1
Alcohol, Ethyl	A	0	Nitric Acid, 30%	B	1
Alcohol, Methyl	A	0	Nitric Acid, 70%	B	3
Ammonium Hydroxide, 28%	B	0	Phenol, 90%	A	0
Benzene	A	0	Phosphoric Acid, 85%	B	0
Carbon Tetrachloride	A	0	Silver Nitrate, Saturated	B	1
Chloroform	A	0	Sodium Hydroxide, 10%	B	0
Chromic Acid, 60%	B	2	Sodium Hydroxide, 20%	B	0
Cresol	A	1	Sodium Hydroxide, 40%	B	0
Dichlor Acetic Acid	A	2	Sodium Hydroxide, Flake	B	0
Dimethylformanide	A	1	Sodium Sulfide, Saturated	B	0
Dioxane	A	1	Sulfuric Acid, 25%	B	0
Ethyl Ether	A	0	Sulfuric Acid, 77%	B	0
Formaldehyde, 37%	A	0	Sulfuric Acid, 96%	B	0
Formic Acid, 90%	B	3	Sulfuric Acid (77%) and Nitric Acid (70%),(equal parts)	B	2
Furfural	A	2	Toluene	A	0
Gasoline	A	0	Trichloroethylene	A	0
Hydrochloric Acid, 37%	B	0	Xylene	A	0
Hydrofluoric Acid, 48%	B	1	Zinc Chloride, Saturated	B	0
Hydrogen Peroxide, 28%	B	0			

D. Hot Water Test

1. Hot water (100 degrees C plus/minus 3%) shall be allowed to trickle (with a steady stream and at a rate of not less than 6 ounces [177.44cc] per minute) on a finished surface, which shall be set at an angle of 45-degrees, for a period of five minutes.

2. After cooling and wiping dry, the finish shall show no visible effects from the hot water.

E. Finish Impact Test:

1. Position the 18 GA CRS test panel with nominal paint thickness of 3 mils on a smooth concrete floor. A one-pound ball (approximately 2-inch in diameter) shall be dropped from a distance of 12-inch onto a flat horizontal surface.
2. There shall be no visual evidence to the naked eye of cracks or checks in the finish due to impact.

F. Paint Adhesion on Steel:

1. This test is based on ASTM D3359-02 “Standard Test Methods for Measuring Adhesion by Tape Test 1 - Test Method B”. Two sets of six parallel lines 2 millimeter apart shall be cut with a razor blade to intersect at right angles thus forming a grid of 25 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. Brush the grid area lightly with a soft brush, and then place a piece of tape over the grid. Rub the tape firmly with the eraser of a pencil to ensure good contact. Remove the tape by rapidly pulling it back upon itself as close to an angle of 180 degrees as possible.
2. A 4B rating or better 95% or more of the grid area shall show finish intact.

G. Paint Hardness on Steel:

1. This test is based on ASTM D3363-01 “Standard Test Method for Film Hardness by Pencil Test”. Clip a corner of the sample at 45 degrees exposing a raw metal edge. Place the sample on a raw metal base plate so that the exposed metal edge of the sample makes contact with the turned up side of the base plate. Remove approximately 6 millimeters of wood from a 4H pencil, being careful to leave an undisturbed smooth cylinder of lead. Holding the pencil at an angle of 90 degrees to an abrasive paper, rub the lead against the paper maintaining an exact angle of 90 degrees section until a flat smooth and circular cross section is obtained. On the other end of the pencil remove approximately 13 millimeters of wood from on half of the pencil. Install the pencil into a Sheen model 720N Pencil Scratch Hardness Tester. Follow the manufacturer's instructions for conducting the test.
2. The paint finish shall withstand the abrasion of a 4H pencil without penetrating through to the substrate and completing a continuous circuit.

Note: manufacturer shall provide independent certified test report on chemical resistance of finish if requested.

PART 3 EXECUTION

3.01 INSTALLATION

A. Casework installation:

1. Set casework components plumb, square, and straight with no distortion and securely anchored to building structure. Shim as necessary using concealed shims.

2. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16-inch tolerance.

3. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.

4. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8-inch between top units.

5. Remove and discard shipping clip and associated screws from top of shelf, (thin galvanized angle) install 4 shelf clips into integral standard and set shelf. Check for level and adjust clips as required.

B. Work surface installation:

1. Where required due to field conditions, scribe to abutting surfaces.

2. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure joints in field, where practicable, in the same manner as in factory, with dowels, splines, adhesive or fasteners recommended by manufacturer.

3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

4. Sink installation: Sinks which were not factory installed shall be set in chemical resistant sealing compound and secured and supported per manufacturer's recommendations.

5. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations. Turn screws to seat flat; do not drive.

3.02 ADJUSTING

A. Repair or remove and replace defective work, as directed by Owner and Engineer upon completion of installation.

B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.03 CLEANING

A. Clean shop finished casework, touch up as required.

B. Clean counter tops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.

3.04 PROTECTION OF FINISHED WORK

A. Take protective measures to prevent exposure of casework and equipment from exposure to other construction activity.

B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by Work of other trades.

3.05 DELIVERY, STORAGE AND HANDLING

A. Schedule delivery of casework and equipment so that spaces are sufficiently complete that material can be installed when delivered.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

C. Protect all work surfaces throughout construction period label work surface with large lettering “NO STANDING”.

3.06 PROJECT CONDITIONS

A. Windows and doors shall be installed and the building is secure and weather tight prior to storage and installation of equipment.

PART 4 SPECIAL PROVISIONS

4.01 LABORATORY EQUIPMENT

A. Deionization Unit - Furnish and install a deionization unit in the Laboratory. The unit shall be Continental Water Systems Model 2911 Mixed Bed Deionizer rated at 3/4 gpm. The unit shall include a No. 2912 organic return filter, 10-inch filter housing, 10-inch C-5 prefilter cartridge, No. 2901 faucet, quality control light, No. 2200 inlet regulator, and all other accessories required for a complete installation.

B. Fume Hood - Conventional Type:

1. The fume hood shall be an auxiliary air, bench type fume hood assembly designed for use in an air-conditioned laboratory. The assembly shall consist of superstructure, an auxiliary air chamber, a metal understructure, service fittings, and electrical equipment.

2. The superstructure lining and baffle shall be 1/4-inch thick “Kemresin” and the work surface 1-1/4-inch thick “Kemresin” dished 3/8-inch to retain spillage. It shall contain a 3-inch by 6-inch Chemical Lead oval sink cup and drain.

3. The baffle shall have a fixed open center slot and adjustable upper and lower exhaust slots.

4. The front shall have two counterbalanced sashes of 1/4-inch thick combination safety sheet glass.

5. The hood superstructure exterior, auxiliary air chamber, and metal cabinet understructure shall be of cold rolled steel, phosphate coated had have a baked chemical resistant synthetic resin finish of the color selected by the Engineer.

6. Accessories shall include the following:

a. Eight remote controlled service fittings, two each for cold water, gas, vacuum, and air.

b. Four 115-VAC electric outlets.

c. Two 220-VAC electric outlets.

d. Fluorescent light fixtures (2 tubes) with wiring to switch.

e. Pushbutton controls for exhaust and auxiliary air fans with warning lights. Starters shall be provided under Division 16.

f. A cup sink.

7. Exhaust and Auxiliary Air Fans:

a. The exhaust fan for the fume hood shall have a capacity of 1,250 cfm at 1,247 rpm, 1-inch SP, 1/2 hp, Acme No. PV16G, or equal.

b. The auxiliary air fan shall have a capacity of 875 cfm at 1,523 rpm, 1/2-inch SP, Acme No. PXB12G, or equal.

c. The exhaust fans shall each be provided with a disconnect switch, prefab curb, base extension with m.o. damper.

d. The pushbutton controls. warning lights, and starter shall be provided under the Division 16.

C. Incubator - Furnish and install one air flow incubator with one piece, wrap around insulated steel cabinet with white porcelain interior. The cabinet shall have an external control unit with control-point dial, high-limit safety control, vapor tension dial thermometer, and pilot lights.

1. The temperature range from 10 degrees C to plus 50 degrees C, cabinet capacity of 17 cubic feet, five shelves with capacity of 300 ml BOD bottles, approximate overall size 74-inch by 31-inch by 30-inch, 120 VAC, 60 Hz, 8 amperes.

2. The cabinet shall be complete with interior light refrigeration system, safety thermostat, 3-wire chord and plug.

D. Refrigerators - Furnish and install one two-door frigid cabinet refrigerator-freezer with the following features:

Temperature Range:	
Main Storage Chamber:	+20 degrees F to +59 degrees F
Freezer Compartment:	-15 degrees F to +32 degrees F
Storage Capacity:	13 CF
Shelf Area:	19.6 sq ft
Overall Size:	32-inch x 30-inch x 65-inch
Baked white acrylic finish, hermetically sealed motor, compressor controls, and switches.	

E. Vacuum Pump - Furnish and install a vacuum pump and 30-gallon Rec. tank in the Storage Room.

1. The units shall be Quincy Model R-15, Sargent-Welch 1402M, GAST 4VSF-10-M402X, or equal.

2. The unit shall be furnished with a pressure switch to facilitate automatic start/stop of the pump, vacuum gauge, tank inlet valve, and drain cock. Operation shall be on 3 phase, 460-volt power.

F. Air Compressor:

1. The Contractor shall furnish and install an air compressor mounted on a 30-gallon Rec. tank located in the Storage Room.

2. The unit shall be Quincy Model HX8, Gardner-Denver Model ADA, or equal.

3. The unit shall be furnished with a pressure switch to facilitate automatic start/stop of the compressor, pressure gauge, tank inlet valve, and drain cock. The unit shall operate on a 3 phase, 460-volt power supply and produce a pressure of 100 psi and a displacement of 5.30 cubic feet.

4.02 LABORATORY EQUIPMENT LIST

A. Schedules - Are not guaranteed to be complete. All laboratory furniture and equipment shown on the Drawings or specified shall be furnished and installed by the Contractor whether or not listed in the furniture and equipment schedule.

Quantity	Item	Manufacturer	Model
1	Incubator	Shel Lab	SMI6
1	Microwave Muffle Furnace	CEM	Pheonix BLACK
1	Muffle Furnace	Thermo Scientific	FB1310M
1	Refrigerator (TSHP Series FMS High-Performance Lab Refrigerators)	Thermo Scientific	TSFMS2305A
1	Refrigerator-Under Counter (TSH Flammable Material Storage Refrigerator)	Thermo Scientific	TSH05RFSA
1	Sterilizing Oven	Thermo Scientific	PR305225G
1	Balance Table	Fisher Scientific	06-000-504
1	Desiccator Square	Thermo Scientific	5317-0180
1	DO meter for sour test	Hach	HQD HQ440D
1	DO meter optical sensor	Hach	LBOD101
1	Fume Hood	Cole-Parmer	EW-09102-74
1	Hot plate w stirrer	Bluebook	92169

Quantity	Item	Manufacturer	Model
1	Microscope	Bluebook	91669
1	Pipettes X3	Bluebook	400303
1	Portable meter	Bluebook	90628
1	Precision Coliform Bath, 19L	Bluebook	92069
1	Smart 6 Moisture/Solids Analyzer	CEM	Smart6
1	Vacuum pump	Bluebook	92114
1	Water bath		

(Addendum 2, Issued December 23, 2024)

4.03 LABORATORY FURNITURE LAYOUT AND SCHEDULE

A. The layout and model number of laboratory furniture is shown on the drawings. Contractor shall coordinate layout and selection.

END OF SECTION

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SECTION 15150
SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.01 SCOPE

A. Section Includes:

1. Sanitary drain, waste, and vent (DWV) piping buried within 5 feet of building.
2. Chemical resistant DWV piping.
3. Unions and flanges.
4. Valves.
5. Pipe hangers and supports.
6. Floor drains.
7. Trench Drains.
8. Cleanouts.
9. Universal p-traps.
10. Sleeves.
11. Sump pumps.
12. Backwater valves.
13. Bedding and cover materials.

B. This Section includes furnishing all materials, equipment, labor, and supervision related to air sanitary waste and vent piping necessary for the completion of the Work in accordance with the Contract Documents. Sleeves for penetrations for new Work shall be provided by this Section and installed by others.

C. This Section shall include but not limited to all appurtenances required for complete installation.

D. All Work performed under this Section shall comply and be in accordance with all approved trade practices and manufacturer's recommendations.

E. Additional equipment and installation requirements in Division 15 as included shall be provided by this Contract.

F. Additional product requirements are specified in Section 01350.

1.02 REFERENCES

A. American Standard of Mechanical Engineers:

1. ASME A112.14.1 – Backwater Valves.
2. ASME A112.14.3 – Grease Interceptors.
3. ASME A112.14.4 – Grease Removal Devices.
4. ASME A112.21.1 – Floor Drains.
5. ASME B16.1 – Cast Iron Pipe Flanges and Flanged Fittings.
6. ASME B16.3 – Malleable Iron Threaded Fittings.
7. ASME B16.4 – Gray Iron Threaded Fittings.
8. ASME B16.23 – Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
9. ASME B16.29 – Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV.
10. ASME B31.9 – Building Services Piping.

B. ASTM International:

1. ASTM A47/47M – Standard Specification for Ferritic Malleable Iron Castings.
2. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A74 – Standard Specification for Cast iron Soil Pipe and Fittings.
4. ASTM A234/A234M – Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
5. ASTM A395/A395M – Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
6. ASTM A536 – Standard Specification for Ductile Iron Castings.
7. ASTM B32 – Standard Specification for Solder Material.
8. ASTM B42 – Standard Specification for Seamless Copper Pipe, Standard Sizes.
9. ASTM B43 – Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
10. ASTM B75 – Standard Specification for Seamless Copper Tube.
11. ASTM B88 – Standard Specification for Seamless Copper Water Tube.
12. ASTM B251 – Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
13. ASTM B302 – Standard Specification for Threadless Copper Pipe, Standard Sizes.
14. ASTM B306 – Standard Specification for Copper Drainage Tube (DWV).

15. ASTM C14 – Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
16. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
17. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
18. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.
19. ASTM C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
20. ASTM C1053 – Standard Specification for Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications.
21. ASTM D1785 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80, and 120.
22. ASTM D2241 – Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
23. ASTM D2464 – Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
24. ASTM D2466 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
25. ASTM D2467 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
26. ASTM D2564 – Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
27. ASTM D2665 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
28. ASTM D2729 – Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
29. ASTM D2855 – Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
30. ASTM D 2996 – Standard Specification for Filament-Wound Fiberglass (Glass-Fiber-Reinforced Thermosetting Resign) Pipe.
31. ASTM D2997 – Standard Specification for Centrifugally Cast Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
32. ASTM D3034 – Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

33. ASTM D3262 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe.
34. ASTM D3517 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe.
35. ASTM D3574 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
36. ASTM D3840 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Fittings for Nonpressure Applications.
37. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
38. ASTM F708 – Standard Practice for Design and Installation of Rigid Pipe Hangers.
39. ASTM F891 – Standard Specification for Coextruded Poly (Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core.
40. ASTM F1476 – Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. Cast Iron Soil Pipe Institute:

1. CISPI 301 – Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waster, and Vent Piping Applications.
2. CISPI 310 – Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 – Pipe Hangers and Supports – Materials, Design and Manufacturer.
2. MSS SP 69 – Pipe Hangers and Supports – Selection and Application.
3. MSS SP 70 – Cast Iron Gate Valves, Flanged and Threaded Ends.
4. MSS SP 71 – Cast Iron Swing Check Valves, Flanged and Threaded Ends.
5. MSS SP 80 – Bronze Gate, Globe, Angle and Check Valves.
6. MSS SP 89 – Pipe Hangers and Supports – Fabrication and Installation Practices.
7. MSS SP 110 – Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. Plumbing and Drainage Institute:

1. PDI G101 – Standard – Testing and Rating Procedure for Grease Interceptors.

1.03 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes for sewage-ejectors, and manholes.

1. Product Data:

a. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.

b. Valves: Submit manufacturers catalog information with valve data and ratings for each service.

c. Hangers and Supports: Submit manufacturers catalog information including load capacity.

d. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

e. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

2. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.

3. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

C. Information for the Record:

1. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include spare parts list, exploded assembly views for pumps and equipment.

1.04 DRAWINGS

A. All Drawings are diagrammatic and are intended to show the approximate location of equipment and piping. Dimensions given on the Drawings shall take precedence over scaled dimensions and all dimensions whether in figures or scaled, shall be verified in the field.

1.05 PROTECTION FROM DAMAGE

A. Delivery, Handling, and Storage:

1. Material delivery, handling, and storage shall meet the requirements of Section 01350.
2. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.07 FIELD MEASUREMANTS

A. Verify field measurements prior to fabrication.

1.08 EXTRA MATERIALS

A. Furnish two sets of pumps seals for each pump.

PART 2 PRODUCTS

2.01 SANITARY DRAIN, WASTE, AND VENT (DWV) PIPING

A. Cast Iron Pipe: ASTM A74, service weight, bell and spigot ends.
   1. Fittings: Cast iron, ASTM A74.
   2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hub-less, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.

C. PVC Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2665, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

D. PVC Pipe: ASTM D1785 Schedule 40 or 80, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2466, Schedule 40, PVC, ASTM D2467, Schedule 80, PVC, ASTM D2464 PVC, threaded.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 Solvent cement.

2.02 CHEMICAL RESISTANT SEWER PIPING

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron, CISPI 301.

2. Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2729 or ASTM D2665, polyvinyl chloride (PVC) material.

1. Fittings: PVC, ASTM D2729 or ASTM D2665.

2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.03 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:

1. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2. PVC Piping: PVC.

B. Flanges for Pipe 2-1/2 inches and Larger:

1. PVC Piping: PVC flanges.

2. Gaskets: 1/16-inch-thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.04 BALL VALVES

A. Plastic Ball Valves for PVC Schedule 80 Pressure Pipe:

1. Manufacturers: Hayward TBH Series, Spears Manufacturing, or equal.

2. True Union Ball Valves: All thermoplastic ball valves shall be true union standard type, schedule 80 full-port design, manufactured to ASTM F1970 and constructed from PVC Type I, ASTM D1784 Cell Classification 12454 or CPVC Type IV, ASTM D1784 Cell Classification 23447. All O-rings shall be EPDM or FKM construction. All union nuts shall have Buttress threads. All EPDM valves shall be certified by NSF International for use with potable water.

2.05 CHECK VALVES

A. Plastic Check Valves for PVC Schedule 80 Pressure Pipe:

1. Manufacturers: Hayward TC Series, Spears Manufacturing, or equal.

2. True Union Ball Check Valves: All thermoplastic check valves shall be true union ball type suitable for horizontal or vertical installation, schedule 80 full-port design, manufactured to ASTM F1970 and constructed from PVC Type I, ASTM D1784 Cell Classification 12454 or CPVC Type IV, ASTM D1784 Cell Classification 23447. All O-rings shall be EPDM or FKM construction. Valve stem shall have an

O-ring stem seal. All handles shall be of polypropylene construction. All union nuts shall have Buttress threads. All EPDM valves shall be certified by NSF International for use with potable water.

2.06 UNIONS

A. Plastic Unions for PVC Schedule 80 Pressure Pipe:

1. Manufacturers: Hayward, Spears Manufacturing Union 2000, or equal.

2. Unions: All thermoplastic unions shall be schedule 80, manufactured to ASTM F1970 and constructed from PVC Type I, ASTM D1784 Cell Classification 12454 or CPVC Type IV, ASTM D1784 Cell Classification 23447. All O-rings shall be EPDM or FKM construction. All union nuts shall have Buttress threads. All EPDM valves shall be certified by NSF International for use with potable water.

2.07 PIPE HANGERS AND SUPPORTS

A. Drain, Waste, and Vent: Conform to ASME B31.9, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.

B. Hangers for Pipe Sizes ½ to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring.

C. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.

D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

E. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hooks.

F. Wall Support for Pipe Sizes 3 inches and Larger: Welded steel bracket and wrought steel clamp.

G. Vertical Support: Steel riser clamp.

H. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

I. Copper Pipe Support: Carbon-steel, copper-plated adjustable ring.

2.08 FLOOR DRAINS

A. Medium Duty:

1. Manufacturers: Zurn Industries, Inc., Model ZN550, J.R. Smith Mfg. Co., Model 2120-NB, Josam Manufacturing Co., or equal.

2. Construction: ASME A112.21.1; 9-inch diameter top drain, medium duty, latex coated, cast-iron two-piece body with double drainage flange and bottom outlet, seepage pan, weep holes, combination membrane flashing clamp and frame with integrated trap primer and plug, and round, adjustable slotted nickel-bronze medium-duty grate.

3. Deep Seal Trap with Floor Cleanout:

   a. Manufacturer: Zurn Industries, Inc., Model Z1012/ZN1406, J.R. Smith Mfg. Co., Josam Manufacturing Co., or equal.

   b. Construction: Deep seal trap, latex coated, cast-iron body for use with bottom outlet drain, with adjustable cast iron floor cleanout with spigot for caulking into Hub. Latex coated cast iron body with gas and watertight ABS plug and cast-iron housing with round, scoriated, secured cast iron heavy-duty cover adjustable to finished floor.

2.09 TRENCH DRAINS

A. Administration Area:

1. Manufacturers: Zurn Z886, or equal.

2. Construction: Channels made of High-Density Polyethylene (HDPE). Channels have a positive mechanical connection between channel sections that will not separate during installation and mechanically lock into the concrete surround a minimum of every 10”. Channels to be provided with ductile iron slotted grate with H-20 traffic rating.

B. Biosolids Storage Area:

1. Manufacturers: Aco Drain PowerDrain Type SK3-903D, or equal.

2. Construction: Trench system bodies made of polymer concrete. Channels to be provided with ductile iron slotted grate with load class F traffic rating.

2.10 BARRIER-TYPE TRAP SEAL

A. Manufacturers: Everflow Supplies Green Drain, Sure Seal, or equal.

B. Construction: ASSE 1072 tested and certified, inline floor drain, barrier type trap seal with UV ABS plastic frame, silicone rubber sealing flapper, and four flexible sealing ribs. Trap seal shall open to allow drainage and close when there is no flow. Trap seals shall be in compliance with the Ohio Plumbing Code.

2.11 CLEANOUTS

A. Interior Finished Floor Areas:

1. Manufacturers: Zurn Model ZN1400, J.R. Smith Mfg. Co., Josam, or equal.

2. Construction: Adjustable floor cleanout, latex coated cast iron body, anchor flange, threaded top assembly, and round scored polished nickel bronze cover with gasket in service areas and round depressed cover with gasket to accept floor finish in finished floor areas.

2.12 UNIVERSAL P-TRAPS

A. Manufacturers: United States Plastics Corporation/IPEX Industrial Systems, Item 33054 /Model No. 156511, or equal.

B. General: Dilution trap for installation at sink drain to provide immediate dilution.

C. Construction: Black polypropylene tops, translucent low density polyethylene jars, 1-1/2 inch tapered threaded outlet, with complete waste assembly for installation directly in a standard sink drain outlet.

D. Capacity: 1 gallon.

2.13 SLEEVES

A. Type B Sleeve:

1. Type B sleeves are for use in exterior walls.

2. Type B sleeves consist of casting in place a black wrought iron sleeve two sizes larger than the service pipe with couplings on both ends of the sleeve.

3. Service pipe shall be caulked in place with oakum. The oakum shall be covered with a minimum of 1-inch of lead wool on both ends.

B. Type C Sleeve:

1. Type C sleeves are used in exterior walls and other walls as designated on the Drawings.

2. Type C shall be a modular mechanical type seal of interlocking synthetic rubber links.

3. Unless otherwise indicated, the seal shall be suitable for corrosive service in a temperature range of 40-degree F to 250-degree F. The pressure plates shall be of Delrin plastic for good resistance to organic compounds. The bolts and nuts shall be of 18-8 stainless steel. The sealing elements shall be of EPDM rubber which has high resistance to most organic and inorganic materials.

C. Type D Floor Sleeve - Type D sleeves consist of casting in place a Schedule 40 steel sleeve with four anchors in the floor slab. The sleeve shall be one size larger than the service pipe or 1-inch larger than the flange on the service pipe. The sleeve shall extend 1-inch above the finish floor surface.

D. Type E Sleeve:

1. Type E wall sleeves shall be used where noted on the Drawings.

2. Type E sleeves consist of casting in place mechanical joint, cast iron wall sleeves meeting the requirements of AWWA C110 and C111.

3. Each Type E sleeve shall be sealed using plain rubber gaskets, follower glands, and mechanical joint studs meeting all requirements of AWWA C111 on both ends.

E. Type F Sleeve:

1. Type F sleeves shall be used for passing through masonry walls.

2. Type F sleeves shall be constructed as detailed on the Drawings using 15-pound felt paper and sealant.

2.14 SUBMERSIBLE SUMP PUMPS

A. Manufacturers: Zoeller Pump Company, ~~Model 137~~ Model X4163, or equal.

B. Type: Explosion proof, NEC Class I, Division I, Group D rated, Completely submersible, vertical, centrifugal.

C. Casing: Cast iron pump body with 100 percent baked-on powder coated epoxy finish for corrosion resistance and longer casting durability and oil filled motor chamber. All fasteners and external metal parts shall be of stainless steel.

D. Impeller: Cast iron; open non-clog vortex, corrosion resistant alloy steel shaft.

E. Pump Discharge: 1-1/2-inch NPT.

F. Bearings: Sleeve bearings.

G. Accessories: UL listed, oil resistant ~~10 foot~~ 25-foot cord and plug with three-prong connector for connection to electric wiring system.

H. Controls: Integral float operated mechanical switch type level controls.

I. Performance:

1. Flow: ~~30~~ 60 GPM, at 10 feet lift.

J. Electrical Characteristics and Components:

1. Power: 1/2 HP.

2. Electrical (V/PH/HZ): 120/1/60.

3. Motors: In accordance with Division 16*.*
(Addendum 2, Issued December 23, 2024)

2.15 SEWAGE EJECTOR SUMP BASIN

A. Manufacturers: Topp Industries, Jackel, or equal.

B. Provide fiberglass basin with bolted lid, 2 4” PVC pipe seals, 2 2” PVC pipe seals

C. Dimensions: 24” diameter, 42” height. ***(Addendum 2, Issued December 23, 2024)***

2.16 BACKWATER VALVES *(Addendum 2, Issued December 23, 2024)*

A. Manufacturers: Spears BWV-3-0410, or equal.

B. Description: Backwater valve for 6” diameter pipe with 20” Service Access extension kit.

C. Extension kit consists of:

1. Access plug.
2. Threaded adapter.
3. Riser pipe.
4. Riser coupling.
5. Threaded Tee Handle.
6. Lock Ring.
7. ¾" Threaded Coupling.
8. Internal Extension Pipe.

D. Riser pipe shall be 10” Class 125 PVC or 10” Sch 40 PVC .

2.17 BEDDING AND COVER MATERIALS *(Addendum 2, Issued December 23, 2024)*

A. Bedding, Cover, and Backfill: In accordance and as specified in Section 02200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Section 01300 - Administrative Requirements: Coordination and project conditions.

B. Verify excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.03 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:

1. Provide inserts for placement in concrete forms.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut flush with top of slab.

B. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9, ASTM F708, and MSS SP 89.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

7. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

8. Prime coat exposed steel hangers and supports. Refer to Section 09900. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

9. Install hangers adjacent to motor driven equipment with vibration isolation.

3.04 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, location, and invert are as indicated on Drawings.

B. Establish elevations of buried piping with not less than one ft of cover.

C. Establish minimum separation of from other services piping in accordance with applicable code.

D. Remove scale and dirt on inside of piping before assembly.

E. Excavate pipe trench in accordance with Section 02200.

F. Install pipe to elevation as indicated on Drawings.

G. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4 inches compacted depth; compact to 95 percent maximum density.

H. Install pipe on prepared bedding.

I. Route pipe in straight line.

1. Backfill trench in accordance with Section 02200.

2. Maintain optimum moisture content of fill material to attain required compaction density.

3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 6 inches compacted layers to 12 inches minimum cover over top of jacket. Compact to 95 percent maximum density.

4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.

5. Do not use wheeled or tracked vehicles for tamping.

J. Install Work in accordance with applicable standards.

3.05 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations and maintain gradients.

B. Slopes for Horizontal Drainage Pipe:

1. 2-1/2 Inches or Less: 1/4 inch per foot.

2. 3 to 6 Inches: 1/8 per foot.

3. 8 Inches or Larger: 1/16 inch per foot.

C. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.

D. Encase exterior cleanouts in concrete flush with grade.

E. Install floor cleanouts at elevation to accommodate finished floor.

F. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

G. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

H. Install piping to maintain headroom. Do not spread piping, conserve space.

I. Group piping whenever practical at common elevations.

J. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment

K. Provide clearance in hangers and from structure and other equipment for installation of insulation.

L. Provide access where valves and fittings are not accessible.

M. Install piping penetrating roofed areas to maintain integrity of roof assembly.

N. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

O. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09900.

P. Install bell and spigot pipe with bell end upstream.

Q. Sleeve pipes passing through partitions, walls, and floors.

R. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Follow Section 07270.

S. Support cast iron drainage piping at every joint.

T. Install Work in accordance with applicable standards.

3.06 INSTALLATION – SUMP PUMPS

A. Provide check valve, union, and ball valves on sump pump discharge piping.

B. Provide shaft length allowing ejector pumps to be located minimum 24 inches below lowest invert into sump pit and minimum 6 inches clearance from bottom of sump pit.

C. Check, align, and certify alignment of pumps prior to start-up.

D. Install Work in accordance with applicable standards.
(Addendum 2, Issued December 23, 2024)

3.07 INSTALLATION – SUMP BASIN

A. Install fiberglass basin with bolted lid in accordance with manufacturer recommendations.

B. Hermetically seal piping openings in lid.

C. Install work in accordance with applicable standards.
(Addendum 2, Issued December 23, 2024)

3.08 FIELD QUALITY CONTROL *(Addendum 2, Issued December 23, 2024)*

A. Test sanitary waste and vent piping system in accordance with applicable code or local authority having jurisdiction.

PART 4 SPECIAL PROVISIONS

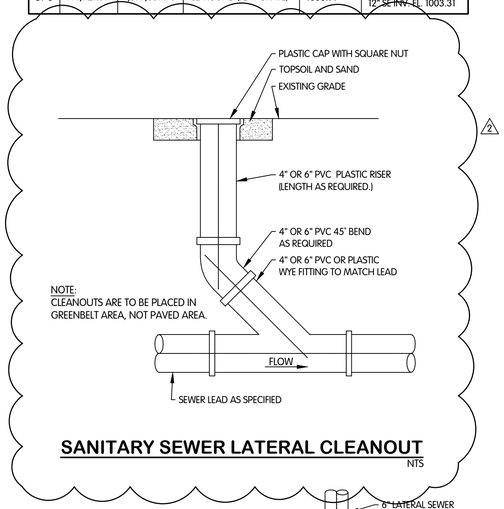
Not used.

END OF SECTION

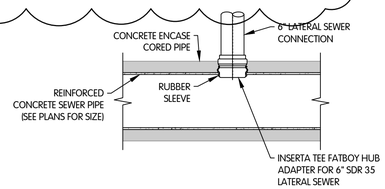
EXISTING STRUCTURE DATA		
NAME	TYPE	DATA
2141	CATCH BASIN	CASTING EL. 1003.60 6" NE INV. EL. 1000.08
2145	CATCH BASIN	CASTING EL. 1003.72 6" SW INV. EL. 999.93 6" E INV. EL. 999.93
2175	CATCH BASIN	CASTING EL. 1003.65 6" W INV. EL. 998.79 12" SE INV. EL. 998.79
2239	SANITARY MANHOLE	CASTING EL. 1008.90 24" W INV. EL. 1000.80 24" E INV. EL. 1000.80
2298	SANITARY MANHOLE	CASTING EL. 1010.32 24" W INV. EL. 1002.62 24" E INV. EL. 1002.62
2416	SANITARY MANHOLE	CASTING EL. 1008.52 12" N INV. EL. 1004.06 12" E INV. EL. 1004.06
2558	SANITARY MANHOLE	CASTING EL. 1008.09 12" W INV. EL. 996.61 12" N INV. EL. 1003.75 16" E INV. EL. 1002.59
2560	SANITARY MANHOLE	CASTING EL. 1005.48 24" NE INV. EL. 1000.39 24" W INV. EL. 1000.39 24" S INV. EL. 1000.29
2561	SANITARY MANHOLE	CASTING EL. 1009.31 24" E INV. EL. 1000.61 24" SW INV. EL. 1000.61
2561A	SANITARY MANHOLE	CASTING EL. 1005.55 24" N INV. EL. 1002.48 24" W INV. EL. 1002.48
2691	STORM MANHOLE	CASTING EL. 1004.05 12" E INV. EL. 999.32 12" S INV. EL. 999.56 12" W INV. EL. 999.32
2692	SANITARY MANHOLE	CASTING EL. 1004.65 20" E INV. EL. 995.85 20" S INV. EL. 995.85
2767	CATCH BASIN	CASTING EL. 1003.76 6" S INV. EL. 1000.24 6" SW INV. EL. 1000.24 12" N INV. EL. 999.73
2996	CATCH BASIN	CASTING EL. 1003.45 12" NW INV. EL. 998.64 12" E INV. EL. 998.84 15" S INV. EL. 998.64
7068	CATCH BASIN	CASTING EL. 1008.11 6" E INV. EL. 1005.65 6" S INV. EL. 999.32
7370	CATCH BASIN	CASTING EL. 1003.61 12" W INV. EL. 999.55
7454	CATCH BASIN	CASTING EL. 1009.01 6" SW INV. EL. 1005.50
7454A	CATCH BASIN	CASTING EL. 1009.56 6" NW INV. EL. 1006.04
7844	SANITARY MANHOLE	CASTING EL. 1007.62 20" E INV. EL. -1012.98 27" S INV. EL. -1012.98
8038	STORM MANHOLE	CASTING EL. 1009.11 6" N INV. EL. 997.76 6" SE INV. EL. 998.81 6" NE INV. EL. 1000.01 8" W INV. EL. 997.46
8153	STORM MANHOLE	CASTING EL. 1007.43 8" E INV. EL. 996.83 8" N INV. EL. 995.33
8262	SANITARY MANHOLE	CASTING EL. 1006.54 24" N INV. EL. 992.47 21" W INV. EL. 1000.46 24" E INV. EL. 992.47

MANHOLE SCHEDULE					
NO.	NORTHING	EASTING	TYPE	CASTING EL.	PIPE DATA
SA-1	772,087.54	1,377,101.94	TYPE IIIS 6' DIA. DOGHOUSE	1004.81	12" E INV. EL. 1000.39
SA-2	772,087.54	1,377,177.60	TYPE IS 4' DIA. BOLT DOWN CASTING	1005.71	12" E INV. EL. 1000.60 12" W INV. EL. 1000.60
SA-3	771,957.88	1,377,150.68	TYPE I 4' DIA. BOLT DOWN CASTING	1004.82	12" E INV. EL. 1000.54 12" W INV. EL. 1000.54
SA-4	771,968.04	1,377,177.60	TYPE IS 4' DIA. (FLAT GRATE) 3'-0" SUMP	1004.00	12" E INV. EL. 1000.68 12" W INV. EL. 1000.58 12" N INV. EL. 1000.58
SA-5	771,998.58	1,377,177.60	TYPE IS 4' DIA. (FLAT GRATE) 3'-0" SUMP	1004.00	12" S INV. EL. 1000.68 6" NE INV. EL. 1001.63 12" N INV. EL. 1000.68 12" E INV. EL. 1000.68
SA-6	772,061.43	1,377,177.60	TYPE IS 4' DIA.	1005.20	12" E INV. EL. 1001.80 12" S INV. EL. 1000.79
SA-7	772,025.49	1,377,201.89	CB SQUARE (FLAT GRATE)	1004.84	6" SW INV. EL. 1002.50 6" NE INV. EL. 1002.50

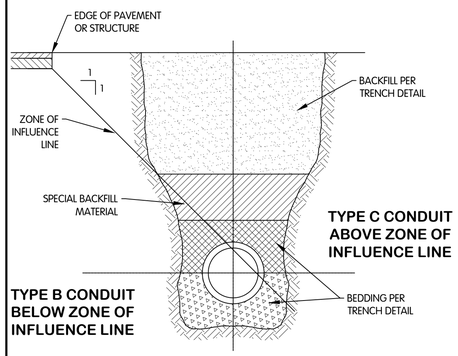
CATCH BASIN SCHEDULE					
NO.	NORTHING	EASTING	TYPE	CASTING EL.	INVERT EL.
ST-1	771,905.50	1,376,950.03	CB ROUND (FLAT GRATE)	1003.45	15" NW INV. EL. 999.66 18" S INV. EL. 999.56
ST-2	771,936.65	1,376,934.86	CB ROUND (FLAT GRATE)	1003.65	12" W INV. EL. 999.91 15" SE INV. EL. 999.81
ST-3	771,951.93	1,376,821.94	CB ROUND (CURB GRATE)	1003.72	12" SW INV. EL. 1000.51 12" E INV. EL. 1000.41
ST-4	771,943.47	1,376,809.14	CB ROUND (FLAT GRATE)	1003.60	12" NE INV. EL. 1000.58
ST-5	771,921.81	1,377,339.76	CB ROUND (FLAT GRATE)	1006.91	12" NW INV. EL. 1000.14 12" SE INV. EL. 1003.31



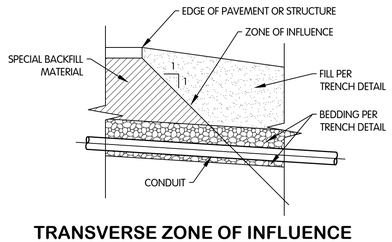
SANITARY SEWER LATERAL CLEANOUT
NTS



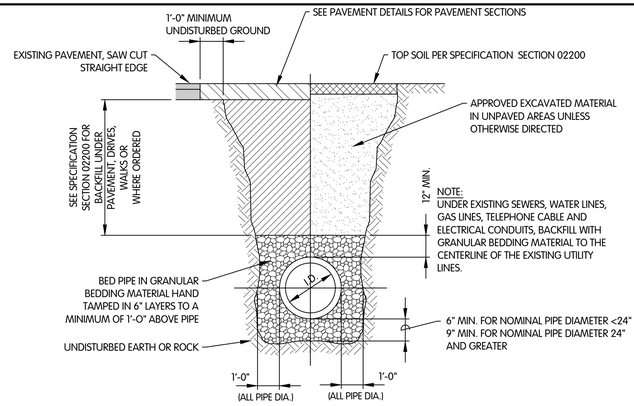
SANITARY LATERAL CONNECTIONS TO REINFORCED CONCRETE PIPE SEWERS
NTS



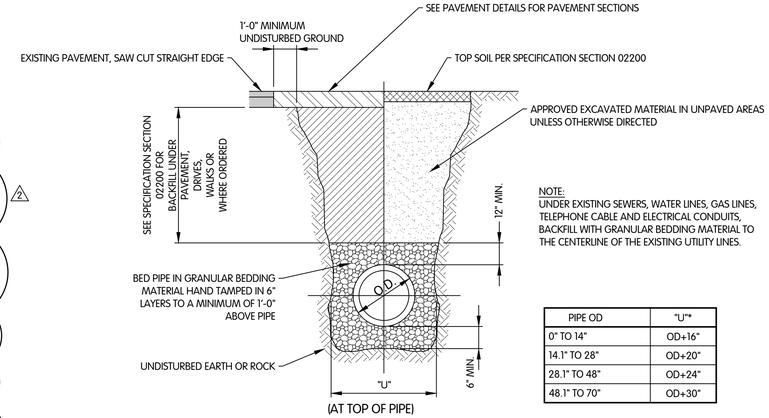
PARALLEL ZONE OF INFLUENCE DETAIL
NTS



TRANSVERSE ZONE OF INFLUENCE
NTS



TRENCH DETAIL FOR RIGID PIPE (DIP)
NTS

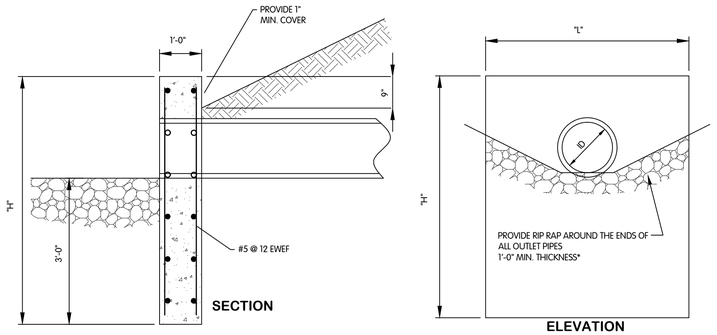


PIPE OD	"U"*
0" TO 14"	OD+16"
14.1" TO 28"	OD+20"
28.1" TO 48"	OD+24"
48.1" TO 70"	OD+30"

TRENCH SCHEDULE

* NOTE:
"U" IS THE MINIMUM WIDTH FOR FLEXIBLE PIPES IN ACCORDANCE WITH ASTM D-2321 AND D-2774.

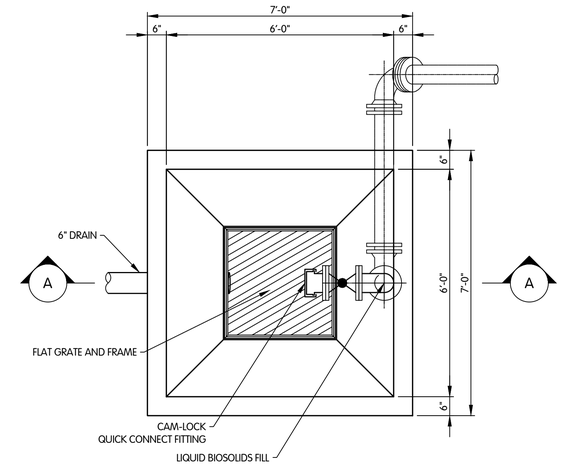
TRENCH DETAIL FOR FLEXIBLE PIPE
NTS



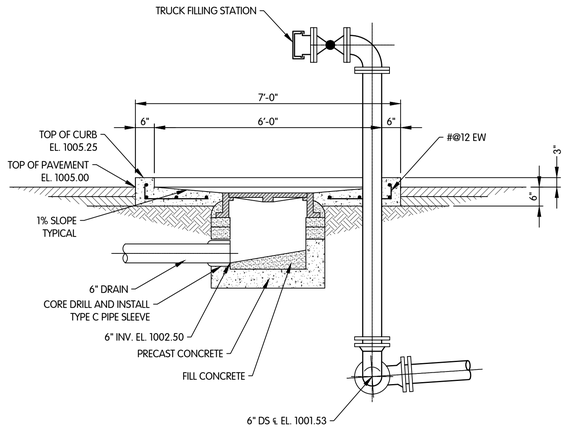
HEADWALL SCHEDULE			
ID	"H"	"L"	RIP RAP (L X W X T)
10"	5'-0"	3'-3"	3'-3" X 3'-3" X 1'
12" *	5'-6"	4'-0"	4'-0" X 4'-0" X 1'
(2)15"	6'-0"	8'-0"	8'-0" X 6'-8" X 1'
18"	6'-0"	5'-9"	5'-9" X 5'-9" X 1'

*NO RIP RAP REQUIRED FOR DRIVE CULVERTS. "L" DIMENSION FOR DRIVE CULVERTS SHALL BE 2'-0".

HEADWALL DETAIL
NTS

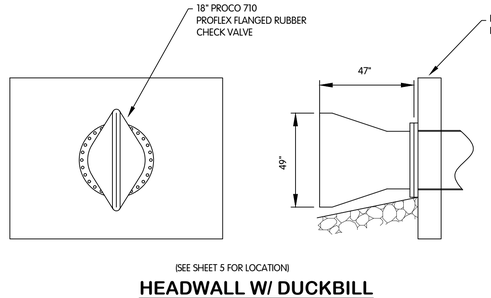


PLAN



SECTION

SLUDGE LOADING STATION
½"=1'-0"



(SEE SHEET 5 FOR LOCATION)

HEADWALL W/ DUCKBILL
NTS

STATE OF OHIO
DINESH KUMAR PALANISWAMY
E-72394
REGISTERED PROFESSIONAL ENGINEER
December 20, 2024

CIVIL DETAILS

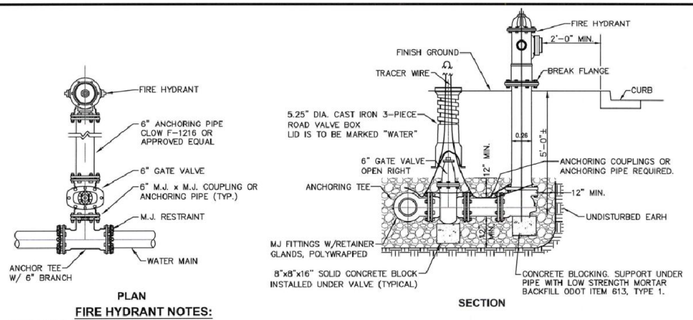
CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5			
4			
3			
2	12/20/24	SANITARY SEWER CLEANOUT	DPH
1			

Jones & Henry Engineers, Ltd.
Fluid thinking©.
www.JHeng.com

JOB NO. 039-8084.003
SCALE AS NOTED
THIS LINE SCALES 1" WHEN PLOTTED TO NOTED SCALE
DESIGNED DKP | DRAWN BDJ | CHECKED
STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO.
C-0.2
19 OF 182

T:\DL-8084\003\C0-0-2 DETAILS
12/20/2024 11:24 AM - LBROWN
12/20/2024 11:24 AM

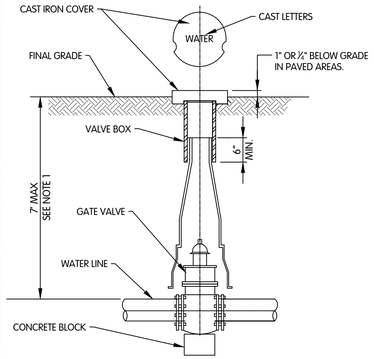


FIRE HYDRANT NOTES:

FIRE HYDRANT NOTES:

A. FIRE HYDRANTS SHALL BE AMERICAN DARLING B-84-B-5, 5' MINIMUM BURY DEPTH. ALL BOLTS SHALL BE STAINLESS STEEL.
B. HYDRANT BARRELS SHALL BE PAINTED SAFETY YELLOW AND HYDRANT TOPS SHALL BE PAINTED BLUE, CITY OF GREENVILLE SPECIFICATION.
C. HYDRANTS SHALL OPEN LEFT, BY TURNING IN A COUNTERCLOCKWISE DIRECTION.
D. 5" INTEGRAL STORZ CONNECTION SHALL FACE THE STREET. A THREADED ADAPTOR FOR THE STORZ CONNECTION WILL NOT BE PERMITTED.
E. HOSE NOZZLES: (2) 2.5" HOSE NOZZLES SHALL BE SUPPLIED, W/ NATIONAL STANDARD THREADS. NO CHAINS SHALL BE INCLUDED.
F. FIRE HYDRANT SHALL HAVE DRAIN PLUG INSTALLED AND WILL NOT BE SELF DRAINING.
G. FIRE HYDRANTS MUST BE INSTALLED AT THE PROPER GRADE. NO EXTENSIONS ARE PERMITTED TO OBTAIN PROPER GRADE. IF NEEDED FOR HEIGHT ADJUSTMENT, A GRADELOK ADAPTOR MAY BE INSTALLED AS THE LAST ITEM BEFORE THE HYDRANT RISER. THE ADAPTOR SHALL HAVE ANCHOR CONNECTIONS AT BOTH ENDS.
H. ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING THE BRANCH PIPE FROM THE MAIN TO THE FIRE HYDRANT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE FIRE HYDRANT. THE TEE AND VALVE FOR THE BRANCH LINE SHALL BE ITEMIZED AND BID AS SEPARATE ITEMS.
I. FIRE HYDRANT AND ACCESSORIES SHALL CONFORM TO LOCAL FIRE DEPARTMENT STANDARDS.
J. THE NEAREST JOINT IN THE WATER MAIN SHALL BE A MINIMUM OF 5' FROM THE HYDRANT TEE.
K. HYDRANT WATCH VALVE SHALL BE AMERICAN SERIES 2500 VALVE, OR APPROVED EQUAL, AND SHALL CONFORM TO AWWA C-509 OR C-515. ALL BOLTS AND NUTS SHALL BE 316 STAINLESS STEEL.

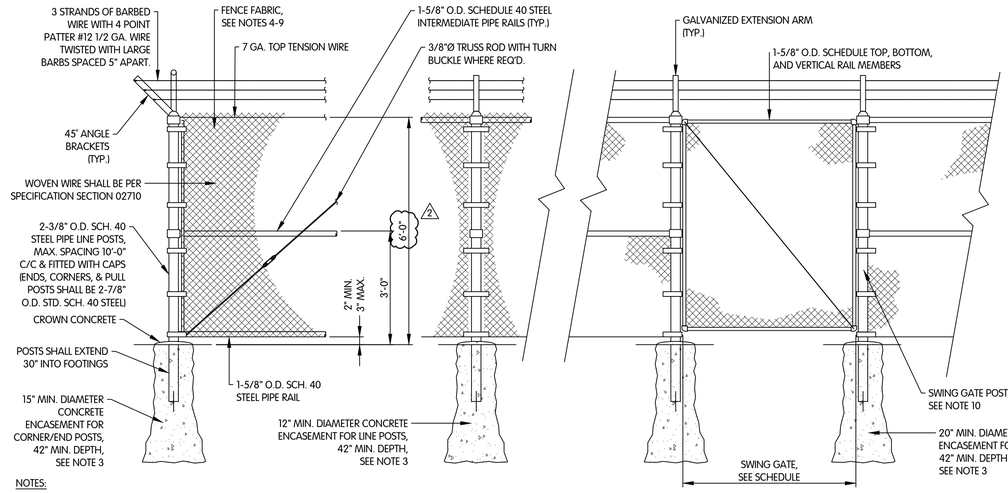
CITY OF GREENVILLE / ChoiceOne Engineering	FIRE HYDRANT DETAIL	REVISIONS:	DATE APPROVED: (MON.) 2025 PAGE No. 800-5



GATE VALVE DETAIL FOR 12" AND SMALLER WATER MAINS

NTS

NOTES:
1. VALVES WITH THE OPERATING NUT GREATER THAN 5-FEET BELOW GRADE SHALL BE PROVIDED WITH A VALVE EXTENSION.



NOTES:
1. ALL END & GATE POSTS BRACED HORIZONTAL WITH 1⅝" O.D. STEEL PIPE SECURELY TRUSSED.
2. PROVIDE MANUFACTURER'S STANDARD FOR VERTICAL & HORIZONTAL BRACING, AND LATCH & OR VISIONS FOR OWNERS LOCK.
3. CONCRETE FOUNDATIONS SHALL BE BELLED AS SHOWN. 42" MINIMUM FOR FENCE HEIGHT 7' OR LESS. OVER 7' SHALL BE DESIGNED.
4. FENCE FABRIC SHALL BE 2-INCH MESH OF CARBON STEEL WIRE AND SHALL BE GALVANIZED AFTER WEAVING IN ACCORDANCE WITH ASTM A392 CLASS II OR ALUMINUM-CLAD IN ACCORDANCE WITH ASTM A491 CLASS II.
5. WIRE SHALL BE 6 GAUGE ON 6-FEET FABRIC AND 9 GAUGE ON 4-FEET FABRIC. (2)
6. PVC-COATED FENCES SHALL BE GALVANIZED MATERIALS AND CHEMICALLY CLEANED. A PHOSPHATE CONVERSION TREATMENT SHALL BE APPLIED TO PREPARE THE ZINC COATING TO RECEIVE THE POLYVINYL CHLORIDE COATING.
   A. A MINIMUM OF 7 MILS OF CLACK COMPOUND SHALL BE APPLIED TO THE MATERIALS. COATING APPLICATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
   B. FENCE FABRIC SHALL BE ATTACHED TO ALL POST RAILS AND TENSION WIRES WITH 12 GAUGE TIE WIRE AT A MAXIMUM OF 15-INCH CENTERS. TIRE WIRE SHALL BE ALUMINUM OR GALVANIZED STEEL.
7. FENCE FABRIC SHALL BE STRETCHED TAUT, SECURELY FASTENED TO THE POSTS, TENSION WIRE, AND TOP RAIL. FENCE FABRIC SHALL BE INSTALLED APPROXIMATELY 1 INCH ABOVE THE TOP RAIL.
8. FENCE FABRIC SHALL BE INSTALLED APPROXIMATELY 2 INCHES ABOVE FINISHED GRADE. FENCE FABRIC WHEN LIFTED SHALL NOT ALLOW AN OPENING GREATER THAN 5 INCHES.
9. FENCE FABRIC SHALL BE STRETCHED AT A MAXIMUM OF 30 FEET AND ALL TERMINAL POSTS.
10. POSTS FOR SWING GATES TO BE SIZED BY FENCE MANUFACTURER.
11. ALL PADLOCKS TO BE KEYED TO OWNER'S REQUIREMENTS.
12. FENCE SHALL BE GROUNDED WHEN ENCLOSING ELECTRICAL EQUIPMENT.

FENCE SYSTEM					
DESIGNATION	HEIGHT	FENCE FABRIC	GATE TYPE	GATE SIZE	ACCESSORIES
GA-1	6'	GALV	SWING	4'	1, 2 AND 4

ABBREVIATIONS:

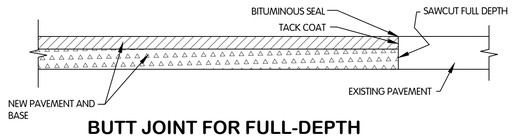
FENCE FABRIC
- PVC PVC COATED
- GALV GALVANIZED
- AL ALUMINUM CLAD

GATE TYPE
- SWING
- SLIDING

ACCESSORIES
1. BARB WIRE
2. TOP RAIL
3. TOP TENSION WIRE
4. LATCH/LOCK
5. BOTTOM RAIL

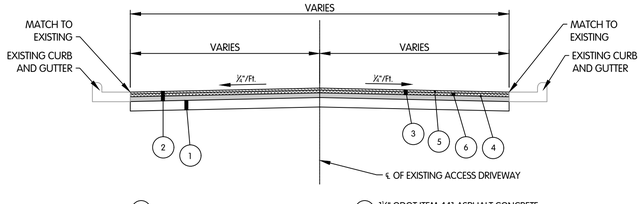
CHAIN LINK FENCE DETAIL

NTS



BUTT JOINT FOR FULL-DEPTH PAVEMENT REPLACEMENT

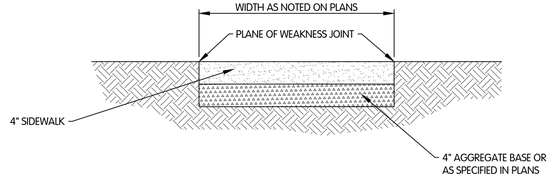
½"=1'-0"



1. EXISTING AGGREGATE BASE, VARIES
2. EXISTING ASPHALT CONCRETE PAVEMENT (6"-7")
3. ODOT ITEM 254 3" PAVEMENT PLANING, ASPHALT CONCRETE
4. TACK COAT ODOT ITEM 407 0.08 GAL/SQ.YD.
5. 1½" ODOT ITEM 441 ASPHALT CONCRETE SURFACE COURSE, TYPE I (448), PG-64-22
6. ODOT ITEM 441 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I, VARIABLE, PG-64-22
7. 3" ODOT ITEM 411 STABILIZED CRUSHED AGGREGATE

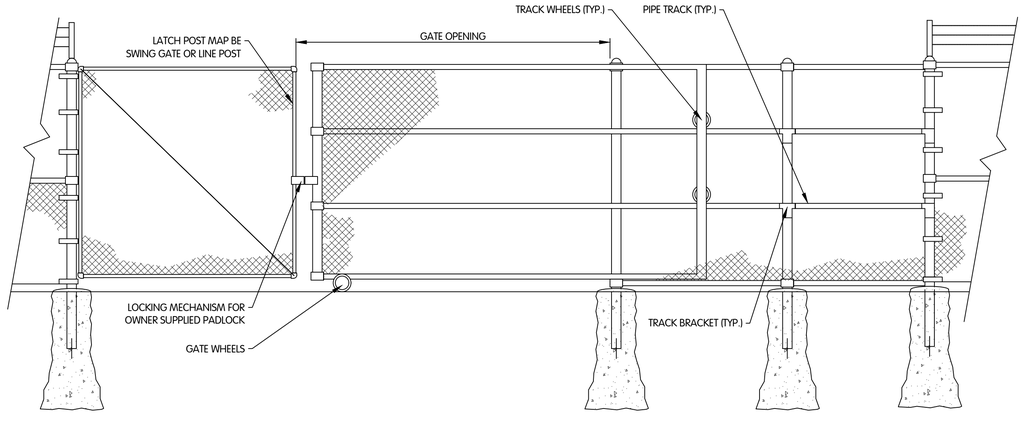
EXISTING ACCESS DRIVEWAY PAVEMENT SECTION

½"=1'-0"



4" CONCRETE SIDEWALK

NTS



ROLLING GATE DETAIL

NTS

DINESH KUMAR PALANISWAMY E-72394 PROFESSIONAL ENGINEER STATE OF OHIO
December 20, 2024

CIVIL DETAILS

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
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1			

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DATE: NOVEMBER 2024
SHEET NO. C-0.4
21 OF 182

TOL-8084\005\C0-C-0.4 DETAILS
12/20/2024 11:45 AM - LBROWN
12/20/2024 11:24 AM

EXISTING SHELTER HOUSE

CONNECTION SHALL BE MADE AT 2-O'CLOCK POSITION WITH INSERTA TEE.

1-1/2" NG

3" SANITARY

FIRE HYDRANT ASSEMBLY

1-1/2" NG

3" SANITARY

Soil Boring B-9
Ground Elevation
1003.86

6" WATER LINE

ADMINISTRATION BUILDING

6" DOWNSPOUT TRUNK LINE

2 1/2" WATER LINE

1-1/2" NG

2" NG

6" DOWNSPOUT TRUNK LINE

6" WATER LINE

Soil Boring B-8
Ground Elevation
1002.48

SEE STORM DRAIN PROFILE 2

ST-3

12" STORM

ST-4

12" STORM

26.93'

26.78'

GV6

GV6

6" WATER LINE

45.17'

2" NG

SEE WATER LINE PROFILE 2

N771,923.43
E1,376,826.90

VALVES TO BE INSTALLED BY GREENVILLE. WATER LINE FROM VALVES TO NEW ADMINISTRATION BUILDING AND SOLIDS HANDLING BUILDINGS TO BE INSTALLED BY CONTRACTOR

6" WATER LINE (BY OTHERS)

6" WATER LINE (BY OTHERS)

MATCH LINE SHEET C-3.2

Asphalt Pavement

Grass

Stone

Berm

Rock (typ.)

Conc.

KEY PLAN

1 2 3 4

STATE OF OHIO
DINESH KUMAR PALANISWAMY
E-72394
REGISTERED PROFESSIONAL ENGINEER

December 20, 2024

CIVIL NORTHWEST YARD PIPING PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5	12/19/24	UPDATED PIPING LABELS	RKP

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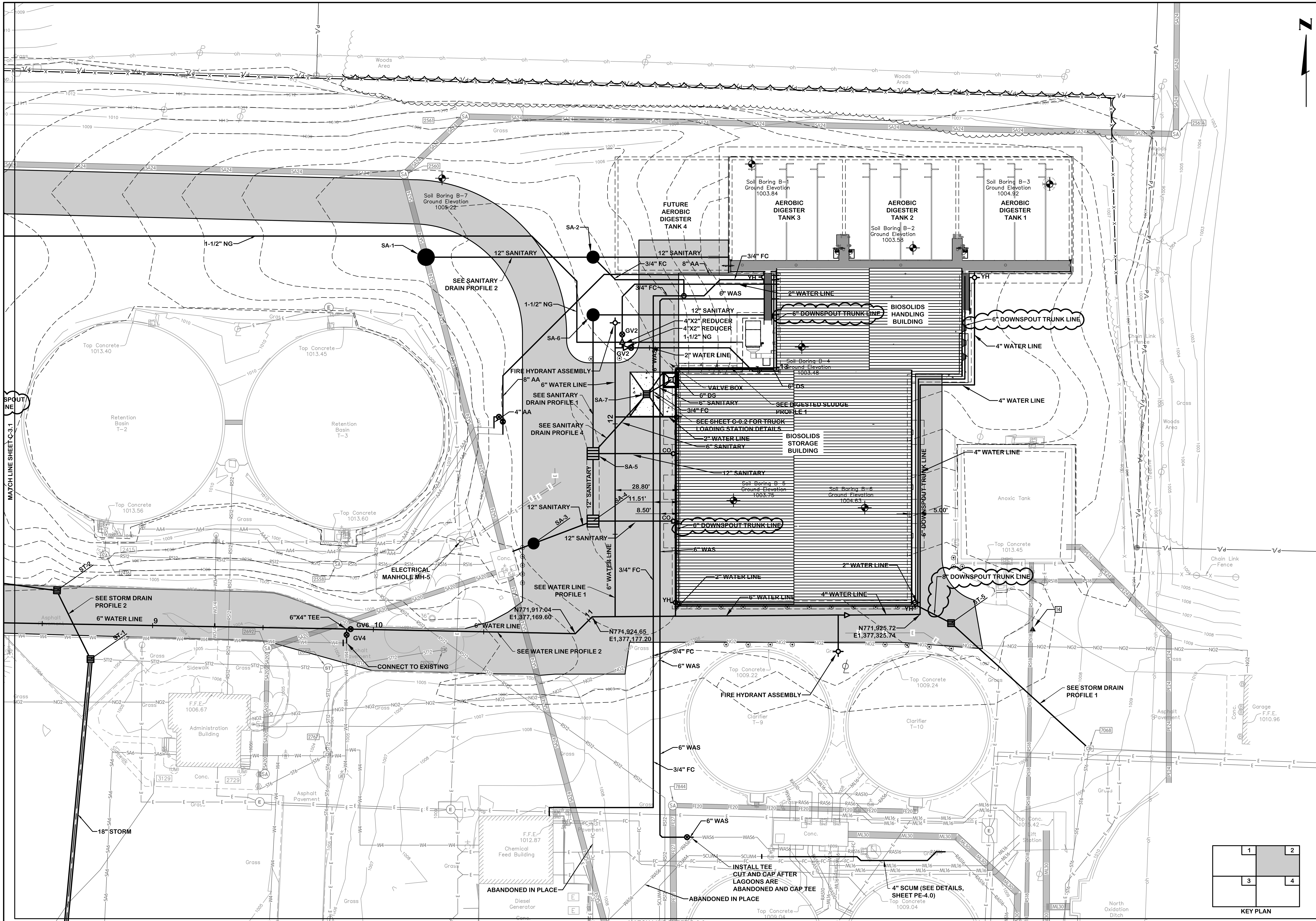
DKP	BJD	

STATUS: ISSUED FOR BID

DATE: NOVEMBER 2024

SHEET NO.
C-3.1
29 OF 182

T:\DL-8084\003\C-3.1 NORTHWEST YARD PIPING PLAN
12/20/2024 12:24 PM BROWN



TOL-8084003C3-C-3.2 NORTHEAST YARD PIPING PLAN
12/18/2024 9:17 AM - LBROWN
12/20/2024 12:23 PM

STATE OF OHIO
DINESH KUMAR PALANISWAMY
E-72394
REGISTERED PROFESSIONAL ENGINEER
December 20, 2024

CIVIL
NORTHEAST
YARD PIPING
PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
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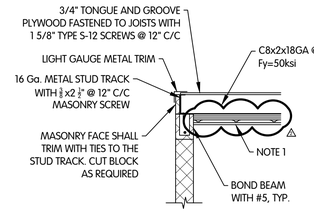
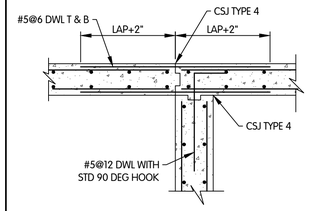
30 OF 182

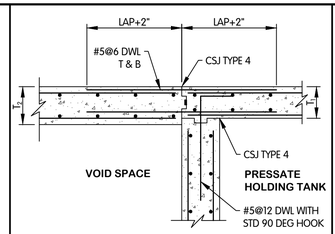


NOTE:
1. 2 HR FIRE RATED ASSEMBLY: BASE LAYER 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 1 1/8" TYPE S-12 SCREWS @12" C/C. SECOND LAYER 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 1 5/8" TYPE S-12 SCREWS @12" C/C, WITH JOINTS OFFSET BY 24" FROM BASE LAYER. THIRD LAYER, 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 2 3/8" TYPE S-12 SCREWS @12" C/C, WITH JOINTS OFFSET BY 12" FROM SECOND LAYER. FORTH LAYER, 5/8" TYPE X GYPSUM BOARD, FASTENED WITH 1 1/8" TYPE S-12 SCREWS AT 12" C/C TO 7/8" LIGHT GAUGE HAT CHANNELS AT 12" C/C LAID PERPENDICULAR TO FRAMING ON TOP OF THIRD LAYER. FASTENED HAT CHANNELS WITH 2 3/8" TYPE S-12 SCREWS TO EACH FRAMING MEMBER.
2. ADD ADDITIONAL 18 Ga. STUD BLOCKING AS REQUIRED TO SUPPORT THE MECHANICAL EQUIPMENT.

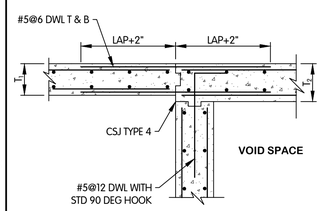
WBCS-2.01 ELECTRICAL ROOM CEILING DETAIL



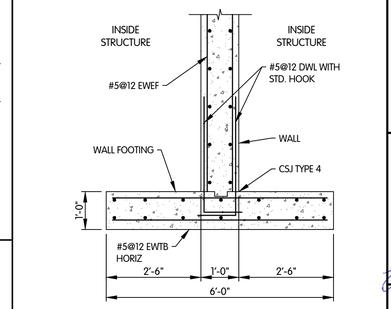
SCD-2.15 SLAB JOINT DETAIL



SCD-2.16 SLAB JOINT DETAIL

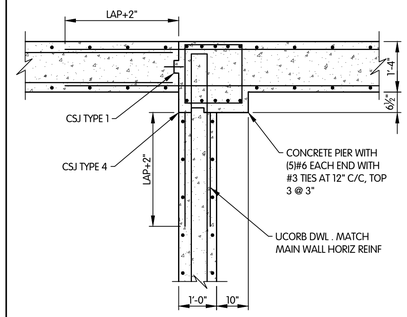


SCD-2.17 SLAB JOINT DETAIL



NOTE: BACKFILL ON BOTH SIDE OF WALL AT THE SAME TIME

SCD-2.18 WALL-FOOTING ELEVATION, NTS



NOTES:
1. FOR THE PIER DOWELS PROVIDE A STANDARD 90 HOOK INTO FOOTING.
2. CONTINUE WALL HORIZONTAL REINFORCING THROUGH THE PIER.
3. TOP OF PIER EXTENDS ABOVE FLOOR TO EL. 1020.92

SCD-2.19 CONCRETE PIER PLAN

CONCRETE REINFORCEMENT DETAIL NOTES:
1. SEE THE STRUCTURES PLANS AND SECTIONS FOR MAIN WALL AND SLAB REINFORCEMENT SIZES AND ORIENTATION.
2. THE DETAIL THICKNESS AND REINFORCING SPACING ARE NOT TO SCALE (NTS). SEE THE STRUCTURES PLANS OR BUILDING SECTIONS FOR ELEMENT THICKNESS AND REINFORCEMENT SPACINGS.
3. CONTRACTOR MAY ADD REINFORCING LAPS AS REQUIRED AT CONSTRUCTION JOINTS OR WHEN LENGTH OF WALL EXCEEDS AVAILABLE REINFORCEMENT LENGTHS. CONSTRUCTION JOINT LOCATIONS NOT SHOWN ON THE DRAWINGS REQUIRE APPROVAL BY THE ENGINEER.

CONCRETE REINFORCEMENT DETAILS
NTS

STATE OF OHIO
JEAN-PIERRE D. NASSAUX
E-64177
REGISTERED
PROFESSIONAL ENGINEER
Jean-Pierre Nassaux
12/20/2024

BIOSOLIDS HANDLING BUILDING STRUCTURAL DETAILS

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

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78 OF 182

T:\0L-8084\035\01-S-2.8 BIOSOLIDS HANDLING BLDG DETAILS
12/20/2024 11:56 AM JBROWN
12/20/2024 11:55 AM

CODE REVIEW - ADMINISTRATION BUILDING

BUILDING OFFICIAL JURISDICTION:
2024 OHIO BUILDING CODE
2021 NATIONAL ELECTRICAL CODE
2021 NATIONAL PLUMBING CODE
2021 NATIONAL MECHANICAL CODE
ACCESSIBILITY CODE: ICC/ANSI A117.1 2017

PROJECT DESCRIPTION:
THE PROJECT SCOPE OF WORK INCLUDES THE CONSTRUCTION OF A NEW ADMINISTRATION BUILDING AND MISCELLANEOUS SOLIDS HANDLING FACILITIES FOR THE CITY OF GREENVILLE, OH. THE NEW ADMINISTRATION BUILDING WILL BE A TYPE IIB CONSTRUCTION, HAVE SEPARATED MIXED-USE GROUPS B & S-2, AND WILL NOT BE EQUIPPED WITH A FIRE SUPPRESSION SYSTEM OR FULL NOTIFICATION FIRE ALARM SYSTEM.

PROJECT ADDRESS:
209 N. OHIO STREET
GREENVILLE, OHIO 45331

OBC-CHAPTER 3, USE AND OCCUPANCY:
SECTION 304.1: BUSINESS, GROUP B ADMINISTRATIVE OFFICES (NS)
SECTION 311.3: LOW-HAZARD STORAGE, GROUP S-2 PARKING GARAGE (NS)

OBC-CHAPTER 4, SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY:
SECTION 406.3.2: SEPARATION. FOR OTHER THAN PRIVATE GARAGES ADJACENT TO DWELLING UNITS, THE SEPARATION OF PRIVATE GARAGES FROM OTHER OCCUPANCIES SHALL COMPLY WITH SECTION 508.

SECTION 406.2.8: MIXED OCCUPANCIES AND USES. MIXED USES SHALL BE ALLOWED IN THE SAME BUILDING AS PUBLIC PARKING GARAGES AND REPAIR GARAGES IN ACCORDANCE WITH SECTION 508.1. MIXED USES IN THE SAME BUILDING AS AN OPEN PARKING GARAGE ARE SUBJECT TO SECTIONS 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 AND 510.7.

OBC-CHAPTER 5, GENERAL BUILDING HEIGHTS AND AREAS:
TABLE 504.3/504.4/506.2/506.3: ALLOWABLE BUILDING HEIGHT / # OF STORIES / AREA FACTOR
OCCUPANCY CLASSIFICATION: B / S-2 (NON-SEPARATED)
CONSTRUCTION TYPE: 2B, NON-SPRINKLERED (NS)

ALLOWABLE BUILDING DATA: 55' / 3 STORY / 23,000 SF

ACTUAL BUILDING DATA: 22' / 1 STORY / 5,540 GSF
B ADMINISTRATIVE OFFICE AREAS: 3,510 GSF
S-2 GARAGE AREAS: 2,030 GSF

2

TABLE 508.4: OCCUPANCY: B/S-2 (NS)
REQUIRED SEPARATION: 2 HOUR

SECTION 508.4.4 SEPARATION. INDIVIDUAL OCCUPANCIES SHALL BE SEPARATED FROM ADJACENT OCCUPANCIES IN ACCORDANCE WITH TABLE 508.4.

SECTION 508.4.4.1 CONSTRUCTION. REQUIRED SEPARATIONS SHALL BE FIRE BARRIERS CONSTRUCTED IN ACCORDANCE WITH SECTION 707 OR HORIZONTAL ASSEMBLIES CONSTRUCTED IN ACCORDANCE WITH SECTION 711, OR BOTH, SO AS TO COMPLETELY SEPARATE ADJACENT OCCUPANCIES.

OBC-CHAPTER 6, TYPE OF CONSTRUCTION: TYPE IIB
TABLE 601:

STRUCTURAL FRAME:	0 HR
BEARING (EXTERIOR) WALLS:	0 HR
BEARING (INTERIOR) WALLS:	0 HR
NON BEARING WALLS:	0 HR
FLOOR CONSTRUCTION:	0 HR
ROOF CONSTRUCTION:	0 HR

OBC-CHAPTER 7, FIRE & SMOKE PROTECTION
TABLE 705.5:
FIRE SEPARATION DISTANCE = X (FEET) — CONSTRUCTION TYPE: IIB, GROUP B / S-2

X< 5:	1 HR
5 <X< 10:	1 HR
10 <X< 30:	0 HR
X< 30:	0 HR

2

SECTION 707.3.9 SEPARATED OCCUPANCIES. WHERE THE PROVISIONS OF SECTION 508.4 ARE APPLICABLE, THE FIRE BARRIER SEPARATING MIXED OCCUPANCIES SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESS THAN THAT INDICATED IN TABLE 508. 4 BASED ON THE OCCUPANCIES BEING SEPARATED.

TABLE 716.1(2) FIRE BARRIER: 2 HR
MINIMUM FIRE DOOR RATING: 1 1/2 HR
DOOR VISION PANEL SIZE: 100 SQ. IN.

TABLE 721.1(2) 3-1.3 LIMESTONE, CINDERS OR AIR-COOLED SLAG
MIN. FINISHED THICKNESS FACE-TO-FACE = 7.625"
FIRE RATING = 4 HOURS

4-1.1 CARBONATE AGGREGATE CONCRETE
MIN. FINISHED THICKNESS FACE-TO-FACE = 8"
FIRE RATING = 4 HOURS

OBC-CHAPTER 8, INTERIOR FINISHES:
SECTION 803.1.1

CLASS A - FLAME SPREAD INDEX 0- 25	SMOKE DEVELOPED INDEX 0- 450	
CLASS B - FLAME SPREAD INDEX 26- 75	SMOKE DEVELOPED INDEX 0- 450	
CLASS C - FLAME SPREAD INDEX 76-200	SMOKE DEVELOPED INDEX 0- 450	

TABLE 803.11: INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY
FOR USE GROUP B/S-2, NON-SPRINKLED FACILITY:

	(USE B, NS)	(USE S-2, NS)
EXIT ENCLOSURES AND EXIT PASSAGEWAYS	A	B
CORRIDORS	B	B
ROOMS AND ENCLOSED SPACES	C	C

CHAPTER 9, FIRE PROTECTION SYSTEMS:
SECTION 903.2.10 NOT REQUIRED, NOT PROVIDED
SECTION 906.1 PORTABLE FIRE EXTINGUISHERS: WHERE REQUIRED
PORTABLE FIRE EXTINGUISHERS SHALL BE INSTALLED:
- IN GROUP B / S-2 OCCUPANCIES
SECTION 907.2.10 NOT REQUIRED, NOT PROVIDED

OBC-CHAPTER 10, MEANS OF EGRESS:
TABLE 1004.5

ACCESSORY MECHANICAL ROOM AREAS:	300 SF / GROSS
BUSINESS AREAS:	150 SF / GROSS
PARKING GARAGE AREAS:	200 SF / GROSS

CALCULATED OCCUPANT LOAD:

ADMINISTRATIVE OFFICE AREAS:	3,510 GSF = 24 OCCUPANTS
PARKING GARAGE AREAS:	2,030 GSF = 11 OCCUPANTS

TABLE 1017.2 OCCUPANCY: B / NS / MAX TRAVEL DIST.: 200 FEET
OCCUPANCY: S-2 / NS / MAX TRAVEL DIST.: 300 FEET

OBC-CHAPTER 11, ACCESSIBILITY:
1103.1: WHERE REQUIRED, SITES, BUILDINGS, STRUCTURES, FACILITIES, ELEMENTS AND SPACES, TEMPORARY OR PERMANENT, SHALL BE ACCESSIBLE TO INDIVIDUALS WITH DISABILITIES.

CHAPTER 29, PLUMBING SYSTEMS:
TABLE 2902.1

MIN. REQUIRED :	USE: B	WC: 1/25	LAV: 1/40	DF: 1/100	SERV. SK.: 1
	USE: S-2	WC: 1/100	LAV: 1/100	DF: 1/1000	SERV. SK.: 1
ACTUAL PROVIDED:		WC: 3/35	LAV: 3/35	DF: 2/35	SERV. SK.: 2

SECTION 2902.3.2 LOCATION OF TOILET FACILITIES IN OCCUPANCIES OTHER THAN MALLS. IN OCCUPANCIES OTHER THAN COVERED AND OPEN MALL BUILDINGS, THE REQUIRED PUBLIC AND EMPLOYEE TOILET FACILITIES SHALL BE LOCATED NOT MORE THAN ONE STORY ABOVE OR BELOW THE SPACE REQUIRED TO BE PROVIDED WITH TOILET FACILITIES, AND THE PATH OF TRAVEL TO SUCH FACILITIES SHALL NOT EXCEED A DISTANCE OF 500 FEET (152 M).

LIFE SAFETY LEGEND

EXIT — TACTILE EXIT SIGN IN COMPLIANCE WITH ICC A117.1, SECTION 703.
MOUNTING HEIGHT = 48" AFF TO CHARACTER BASELINE.
MINIMUM CHARACTER HEIGHT = 5/8".

PATH OF EGRESS

ROOM NAME / 000 — ROOM NAME AND NUMBER

EXIT / XXX — EGRESS LOAD SPLIT BETWEEN TWO EXIT ROUTES; TOTAL OCCUPANT LOAD FROM SPACE

16 / 240 — ACTUAL OCCUPANT LOAD FOR THIS EXIT; ALLOWABLE OCCUPANT LOAD FOR THIS EXIT

F.E.C. — FIRE EXTINGUISHER AND CABINET; EXISTING

1-HOUR FIRE RATING

F.E. — BRACKET MOUNTED FIRE EXTINGUISHER

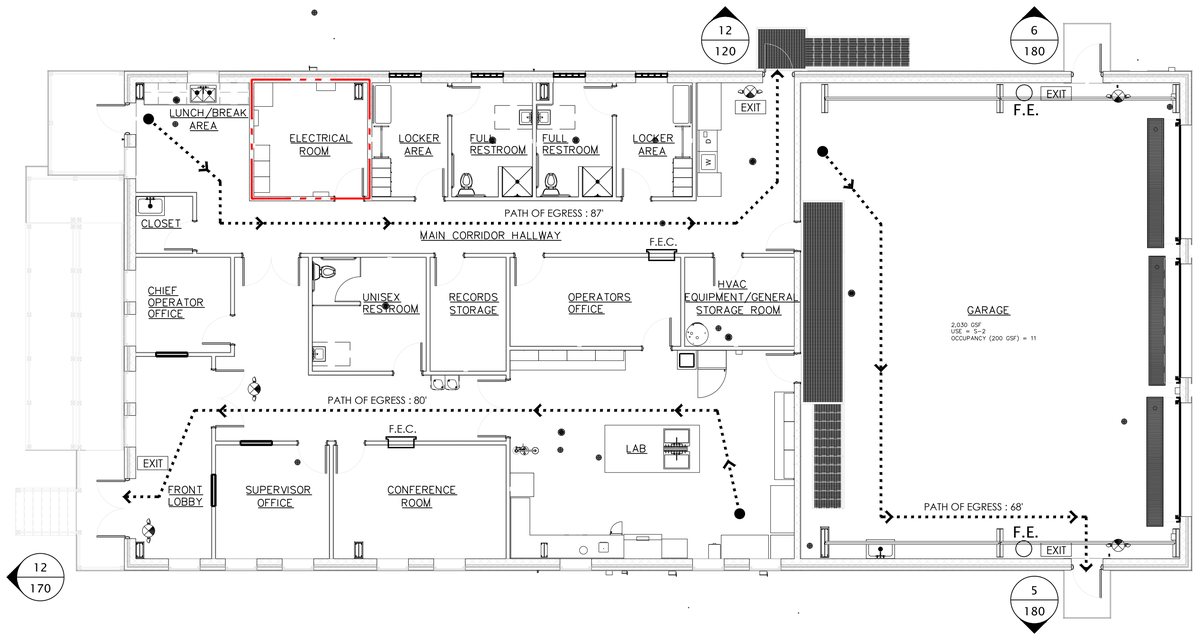
2-HOUR FIRE RATING

EXIT SIGNAGE - SEE ELEC. DRAWINGS

SD — SMOKE DETECTOR - BY FIRE ALARM CONTRACTOR

EGRESS LIGHTING - SEE ELECTRICAL DRAWINGS

X — ROOM OCCUPANT LOAD AND ROOM AREA



ADMINISTRATIVE BUILDING LIFE SAFETY PLAN
SCALE: 1/8" = 1'-0"

STATE OF OHIO
ANDREW R. KNOPP
17352
REGISTERED ARCHITECT
Andrew R. Knopp License #1817352
Expiration Date 12/31/2025

THOMAS PORTER ARCHITECTS

ADMINISTRATION BUILDING
CODE REVIEW & LIFE SAFETY PLAN
CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

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48 OF 172

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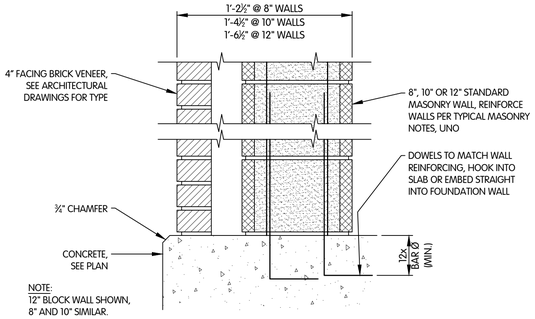
12/30/2024 2:07 PM - ANDY.KNOPP
12/30/2024 4:47 PM

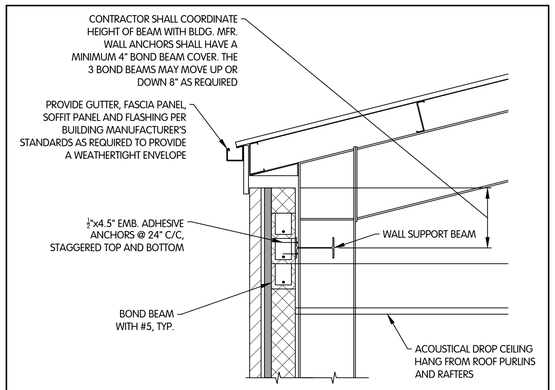


WBS-5.01 WALL/BASE CONNECTION DETAIL

NOTES:
1. ALL 4" FACING BRICK VENEER UNITS ARE SHOWN AS STANDARD TYPE, REFER TO ARCHITECTURAL ELEVATIONS FOR SPECIFIC VENEER TYPE.

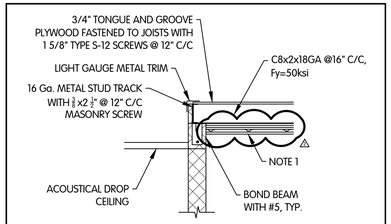
MASONRY WALL DETAILS

(MULTI-WYTHE BLOCK WALLS) NTS



NOTE: THE PRE-ENGINEERED BUILDING SHALL BE DESIGNED TO SUPPORT THE WALL SUPPORT BEAMS. THE BEAMS HAVE A 3200# LATERAL WIND REACTION FORCE, BOTH WAYS, AT EACH END OF EACH BEAM. THE BUILDING MFR SHALL TO PROVIDE BEAM CONNECTION TO FRAME

WBCS-5.01 ROOF EAVE DETAIL



NOTE:
1. 2 HR FIRE RATED ASSEMBLY: BASE LAYER 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 1 1/8" TYPE S-12 SCREWS @12" C/C. SECOND LAYER 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 1 5/8" TYPE S-12 SCREWS @12" C/C, WITH JOINTS OFFSET BY 24" FROM BASE LAYER. THIRD LAYER, 5/8" TYPE X GYPSUM BOARD, FASTENED PERPENDICULAR TO FRAMING, WITH 2 3/8" TYPE S-12 SCREWS @12" C/C, WITH JOINTS OFFSET BY 12" FROM SECOND LAYER. FORTH LAYER, 5/8" TYPE X GYPSUM BOARD, FASTENED WITH 1 1/8" TYPE S-12 SCREWS AT 12" C/C TO 7/8" LIGHT GAUGE HAT CHANNELS AT 12" C/C LAID PERPENDICULAR TO FRAMING ON TOP OF THIRD LAYER. FASTENED HAT CHANNELS WITH 2 3/8" TYPE S-12 SCREWS TO EACH FRAMING MEMBER.
2. ADD ADDITIONAL 18 Ga. STUD BLOCKING AS REQUIRED TO SUPPORT THE MECHANICAL EQUIPMENT.

WBCS-5.02 ELECTRICAL ROOM CEILING DETAIL

STATE OF OHIO
JEAN-PIERRE D. NASSAUX
E-64177
REGISTERED PROFESSIONAL ENGINEER
Jean-Pierre Nassaux
12/20/2024

ADMINISTRATION BUILDING
STRUCTURAL
DETAILS

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5			
4			
3			
2			
1	12/19/24	DETAIL UPDATE	JDN

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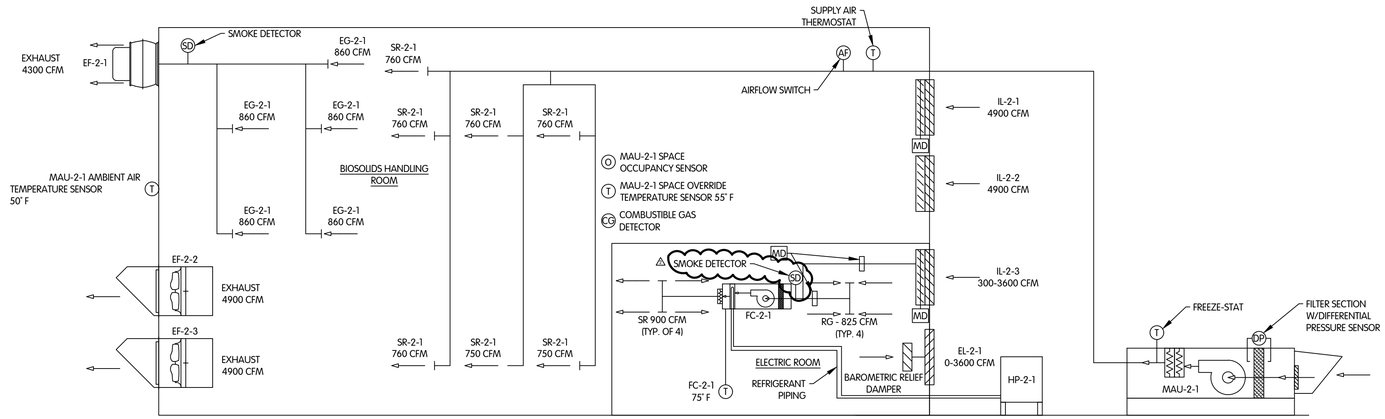
DESIGNED JDN | DRAWN LKB | CHECKED
STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO. S-5.8
92 OF 182

T:\DL-8084\003\10-S-5.8 ADMIN BUILDING DETAILS
12/20/2024 11:56 AM JBROWN
12/20/2024 11:56 AM



BIOSOLIDS HANDLING BUILDING (2) AIRFLOW SCHEMATIC

BIOSOLIDS HANDLING HEATING AND VENTILATION SEQUENCE OF OPERATION:

HEATING AND VENTILATION FOR THE BIOSOLIDS HANDLING BUILDING SHALL BE SUPPLIED BY A NATURAL GAS INDIRECT FIRED ROOF TOP TYPE MAKE-UP AIR HANDLING UNIT INSTALLED AT GRADE MAU-2-1 AND WALL MOUNTED CENTRIFUGAL EXHAUST FANS EF-2-1. THE SYSTEM SHALL RUN CONTINUOUSLY AND PROVIDE 6 AIR CHANGES PER HOUR OF 100 PERCENT OUTSIDE AIRFLOW TO THE BIOSOLIDS HANDLING ROOM. THE BIOSOLIDS HANDLING ROOM SHALL HAVE AN NEC AREA CLASSIFICATION RATING OF UNCLASSIFIED. THE SUPPLY AIRFLOW SHALL BE LARGER THAN THE EXHAUST AIRFLOW IN ORDER TO PROVIDE A POSITIVE PRESSURE TO THE SPACE.

MAU-2-1 SHALL BE CONTROLLED BY AN H-O-A SWITCH, CONTROL PANEL, AND DUCT AND ROOM THERMOSTATS. WHEN THE BIOSOLIDS HANDLING ROOM IS UN-OCCUPIED, WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 50 DEGREES F, AND COMBUSTIBLE GAS DETECTOR HAS NOT BEEN ACTIVATED, MAU-2-1 SHALL RUN CONTINUOUSLY WITH FAN AIRFLOW REDUCED TO NOT LESS THAN 50% OF OUTSIDE AIR ENTERING THE UNIT. EF-2-1 SHALL BE ENERGIZED. A DUCT THERMOSTAT LOCATED IN THE SUPPLY DUCTWORK DOWNSTREAM OF THE UNIT SHALL SENSE THE DISCHARGE AIR TEMPERATURE AND CONTROL THE HEAT OUTPUT BY MODULATION OF THE GAS VALVE. MAU-2-1 GAS VALVE SHALL ELECTRONICALLY MODULATE BETWEEN 100 AND 40 PERCENT RATED INPUT TO SATISFY SUPPLY AIR DUCT THERMOSTAT SETTING. A WALL MOUNTED SPACE THERMOSTAT SHALL OVERRIDE THE SUPPLY AIR DUCT THERMOSTAT AND SHALL CAUSE THE UNIT TO GO TO FULL HEATING WHEN THE ROOM TEMPERATURE FALLS BELOW THE OVERRIDE ROOM THERMOSTAT SETPOINT OF 55 DEGREES F. WHEN THE BIOSOLIDS HANDLING ROOM IS OCCUPIED, OUTSIDE AMBIENT AIR TEMPERATURE IS ABOVE 50 DEGREES F, AND THE COMBUSTIBLE GAS DETECTOR SENSES A LOWER EXPLOSIVE LIMIT OF 10% OR GREATER, MAU-2-1 SUPPLY FAN SHALL GO TO 100% TO ALLOW 100% OF OUTSIDE AIR TO ENTER THE UNIT. EF-2-1 SHALL BE ENERGIZED.

SAFETY AND AIRFLOW DEVICES SHALL CONSIST OF THE FOLLOWING. A DUCT MOUNTED FREEZE PROTECTION THERMOSTAT LOCATED DOWNSTREAM OF THE UNIT IN THE SUPPLY DUCTWORK SHALL DEACTIVATE MAU-2-1 WHENEVER IT SENSES A TEMPERATURE BELOW 40 DEGREES F. A SIGNAL ALARM LIGHT "MAU-2-1 FREEZE" ON THE MAU-2-1 CONTROL PANEL. A DUCT MOUNTED SMOKE DETECTOR (SD) LOCATED IN THE SUPPLY DUCTWORK DOWNSTREAM OF THE UNIT SHALL DEACTIVATE MAU-2-1 WHENEVER SMOKE IS DETECTED AND SIGNAL ALARM LIGHT "SMOKE" ON MAU-2-1 CONTROL PANEL. DIFFERENTIAL PRESSURE SWITCH (PS) SHALL SIGNAL INDICATOR LIGHT "FAN ON" ON MAU-2-1 CONTROL PANEL WHENEVER FAN IS IN OPERATION. DIFFERENTIAL PRESSURE SWITCH (PS) SHALL SIGNAL INDICATOR LIGHT "DIRTY FILTER" ON MAU-2-1 CONTROL PANEL UPON SENSING A CLOGGED FILTER ON MAU-2-1.

BIOSOLIDS HANDLING HEATING AND VENTILATION SEQUENCE OF OPERATION (CONT.):

ADDITIONAL VENTILATION FOR THE BIOSOLIDS HANDLING BUILDING SHALL BE PROVIDED BY EXHAUST FANS EF-2-2 AND EF-2-3, AND INTAKE LOUVERS WITH MOTORIZED BACKDRAFT DAMPERS IL-2-1 AND IL-2-2. EF-2-2 & EF-2-3 SHALL BE CONTROLLED BY AN H-O-A SWITCH. IN THE HAND POSITION, THE EXHAUST FAN MOTORS ARE ACTIVATED. IN THE AUTO POSITION, SINGLE TEMPERATURE WALL MOUNTED THERMOSTATS SHALL CYCLE THE FAN MOTORS. WHEN THE ROOM TEMPERATURE REACHES 80 DEGREES, EXHAUST FAN EF-2-2 SHALL BE ACTIVATED & INTERLOCKED LOUVER IL-2-1 SHALL BE ACTIVATED OPEN. WHEN THE ROOM TEMPERATURE REACHES 90 DEGREES, EXHAUST FAN EF-2-3 SHALL BE ACTIVATED & INTERLOCKED LOUVER IL-2-2 SHALL BE ACTIVATED OPEN. THE MOTORIZED BACKDRAFT DAMPERS SHALL BE ACTIVATED OPEN WHENEVER THE EXHAUST FAN MOTOR IS ACTIVATED. WHENEVER THE EXHAUST FAN MOTOR IS DEACTIVATED, THE MOTORIZED BACKDRAFT DAMPER SHALL BE DEACTIVATED AND GO THE THE CLOSED POSITION.

ELECTRIC ROOM HVAC SEQUENCE OF OPERATION:

HEAT AND COOL THE ELECTRIC ROOM BY A SPLIT SYSTEM CONSISTING OF AN INDOOR FAN COIL UNIT FC-2-1 AND OUTDOOR AIR COOLED HEAT PUMP CONDENSER HP-2-1. CONTROL THE SYSTEM BY A SINGLE STAGE HEAT/SINGLE STAGE COOL, WALL MOUNTED THERMOSTAT WITH MANUAL/AUTOMATIC HEAT-COOL CHANGEOVER. ENERGIZE FAN COIL UNIT FAN AND CONDENSING UNIT COMPRESSOR WHENEVER THE THERMOSTAT CALLS FOR COOLING TO MAINTAIN SET-POINT. COMPRESSOR SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS. DE-ENERGIZE THE COOLING AND FAN WHEN THERMOSTAT HAS REACHED SET-POINT. ENERGIZE FC-2-1 FAN AND STAGE ELECTRIC RESISTANCE HEATING COIL WHENEVER THE THERMOSTAT CALLS FOR HEATING TO MAINTAIN SET-POINT. THE HEATING COIL SHALL BE ACTIVATED IN STAGES. DE-ENERGIZE THE HEATING COIL, AND FAN WHEN THE THERMOSTAT HAS REACHED SET-POINT.

DUCT MOUNTED SMOKE DETECTOR SD LOCATED IN THE RETURN DUCT TO FC-2-1 SHALL DEACTIVATE THE FAN IF SMOKE IS DETECTED. SD SHALL AUTOMATICALLY BE RESET.

THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM 300 CFM OF OUTSIDE AIR DURING ALL HOURS.

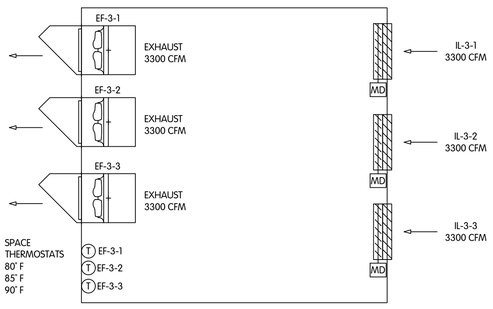
THE FAN COIL CONTROL PANEL SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE OUTSIDE AND RETURN AIR DAMPERS TO MAINTAIN A SETPOINT 2° F LESS THAN THE COOLING SUPPLY AIR TEMPERATURE SETPOINT. THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65 °F.
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 22 BTU/LB.
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
- AND THE SUPPLY FAN STATUS IS ON.

THE OUTSIDE AIR DAMPER SHALL GO TO ITS MINIMUM POSITION WHENEVER:

- MIXED AIR TEMPERATURE DROPS FROM 40 °F TO 35 °F
- OR ON LOSS OF SUPPLY FAN STATUS

THE BAROMETRIC RELIEF DAMPER ASSOCIATED WITH EL-2-1 SHALL MODULATE AS NECESSARY TO REDUCE BUILDING PRESSURE.



BIOSOLIDS STORAGE BUILDING (3) AIRFLOW SCHEMATIC

BIOSOLIDS STORAGE VENTILATION SEQUENCE OF OPERATION:

VENTILATION SHALL BE PROVIDED BY EXHAUST FANS EF-3-1, EF-3-2, AND EF-3-3, AND INTAKE LOUVERS WITH MOTORIZED BACKDRAFT DAMPERS IL-3-1, IL-3-2, AND IL-3-3. EF-3-1, EF-3-2, & EF-3-3 SHALL BE CONTROLLED BY AN H-O-A SWITCH. IN THE HAND POSITION, THE EXHAUST FAN MOTORS ARE ACTIVATED. IN THE AUTO POSITION, SINGLE TEMPERATURE WALL MOUNTED THERMOSTATS SHALL CYCLE THE FAN MOTORS. WHEN THE ROOM TEMPERATURE REACHES 80 DEGREES, EXHAUST FAN EF-3-1 SHALL BE ACTIVATED & INTERLOCKED LOUVER IL-3-1 SHALL BE ACTIVATED OPEN. WHEN THE ROOM TEMPERATURE REACHES 85 DEGREES, EXHAUST FAN EF-3-2 SHALL BE ACTIVATED & INTERLOCKED LOUVER IL-3-2 SHALL BE ACTIVATED OPEN. WHEN THE ROOM TEMPERATURE REACHES 90 DEGREES, EXHAUST FAN EF-3-3 SHALL BE ACTIVATED AND INTERLOCKED LOUVER IL-3-3 SHALL BE ACTIVATED OPEN. THE MOTORIZED BACKDRAFT DAMPERS SHALL BE ACTIVATED OPEN WHENEVER THE EXHAUST FAN MOTOR IS ACTIVATED. WHENEVER THE EXHAUST FAN MOTOR IS DEACTIVATED, THE MOTORIZED BACKDRAFT DAMPER SHALL BE DEACTIVATED AND GO THE THE CLOSED POSITION.

STATE OF OHIO
BRIAN J. MOSHMANN
E-58395
12/12/2024
REGISTERED
PROFESSIONAL ENGINEER

MECHANICAL
SEQUENCE OF OPERATIONS AND AIR FLOW SCHEMATICS

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
1	12/20/24	SMOKE DETECTOR ADDITION	BJT
2			
3			
4			
5			

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ASB	ASB	

STATUS: ISSUED FOR BID

DATE: NOVEMBER 2024

SHEET NO.
M-0.8
129 OF 182

TOL-8084.003\M-0.8 SEQUENCE OF OPERATIONS
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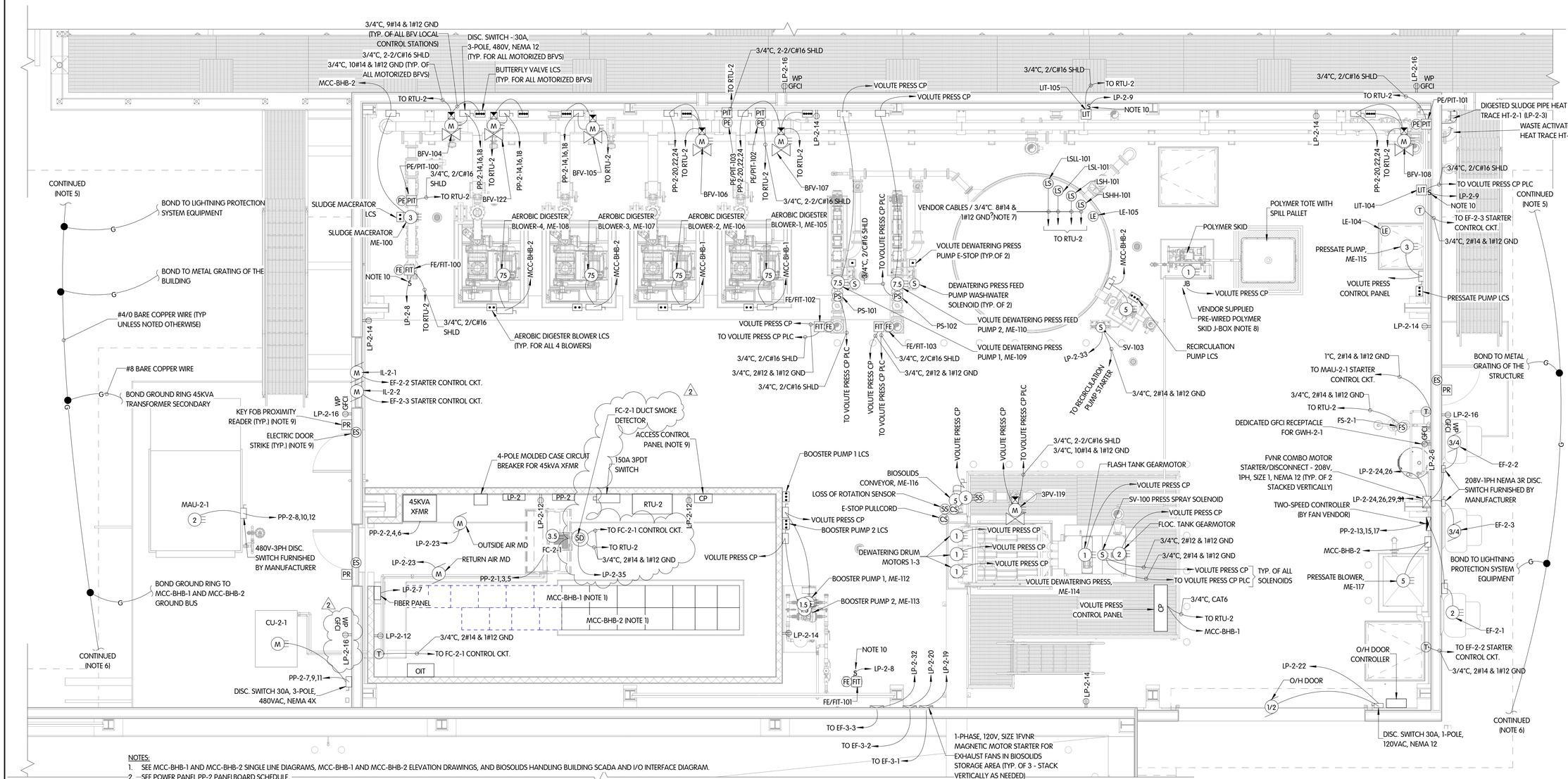

NOTES:

1. SEE MCC-BHB-1 AND MCC-BHB-2 SINGLE LINE DIAGRAMS, MCC-BHB-1 AND MCC-BHB-2 ELEVATION DRAWINGS, AND BIOSOLIDS HANDLING BUILDING SCADA AND I/O INTERFACE DIAGRAM.
2. SEE POWER PANEL PP-2 PANELBOARD SCHEDULE.
3. SEE POWER PANEL LP-2 PANELBOARD SCHEDULE.
4. NUMBER OF GROUND RODS SHOWN IS AN APPROXIMATION. CONTRACTOR SHALL FURNISH AND INSTALL GROUND AS NECESSARY TO MEET NEC ARTICLE 250 OHMIC REQUIREMENTS.
5. SEE AEROBIC DIGESTER TANKS POWER PLAN FOR CONTINUATION OF THE GROUND RING.
6. SEE BIOSOLIDS STORAGE BUILDING POWER PLAN FOR CONTINUATION OF THE GROUND RING.
7. TERMINATE FIBER OPTIC FLOAT SWITCH VENDOR CABLES IN 6"x6"x8" J-BOX CONTAINING SPEICIFED FIBER OPTIC TRANSCIEVER. CONTINUE 3/4"C, 8#14 & 1#12 GND FROM J-BOX TO RTU-2.
8. LOCATION SHOWN IS ARBITRARY- CONFIRM J-BOX LOCATION WITH VENDOR. SEE MCC-BHB-1 SINGLE LINE DIAGRAM & P&ID SHEETS FOR POLYMER SKID J-BOX WIRING TO THE VOLUTE PRESS CONTROL PANEL PLC.
9. REFER TO ACCESS CONTROL DOOR ENLARGED DETAIL AND ACCESS CONTROL INTERCONNECTION DIAGRAM ON "MCC ELEVATIONS AND CONTROL DIAGRAMS" ADMINISTRATION BUILDING ELECTRICAL SHEET. ACCESS CONTROL EQUIPMENT SHALL BE PROVIDED BY NUWAVE TECHNOLOGY. MAKE CONDUIT/WIRE PROVISIONS TO INDICATED ACCESS CONTROL LOCATIONS AS DEPICTED IN THE ACCESS CONTROL DOOR ENLARGED DETAIL. COORDINATE WITH NU WAVE TECHNOLOGY.
10. PROVIDE TOGGLE SWITCH WITH LOCKING HASP. TYPICAL OF INDICATED FLOW METERS FE/FIT-100 AND FE/FIT-101. TYPICAL OF INDICATED LEVEL TRANSMITTERS LIT-104 AND LIT-105.

POWER PLAN

1/4" = 1'-0"

STATE OF OHIO
PAUL EDWARD McNICHOL
EXPIRES: 12/31/2024
REGISTERED PROFESSIONAL ENGINEER
12/20/2024

BIOSOLIDS HANDLING BUILDING ELECTRICAL POWER PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
2	12/20/24	SMOKE DETECTOR ADD/ELEC UPDATES	EBK
1	4		

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EBK	LKB	XXX

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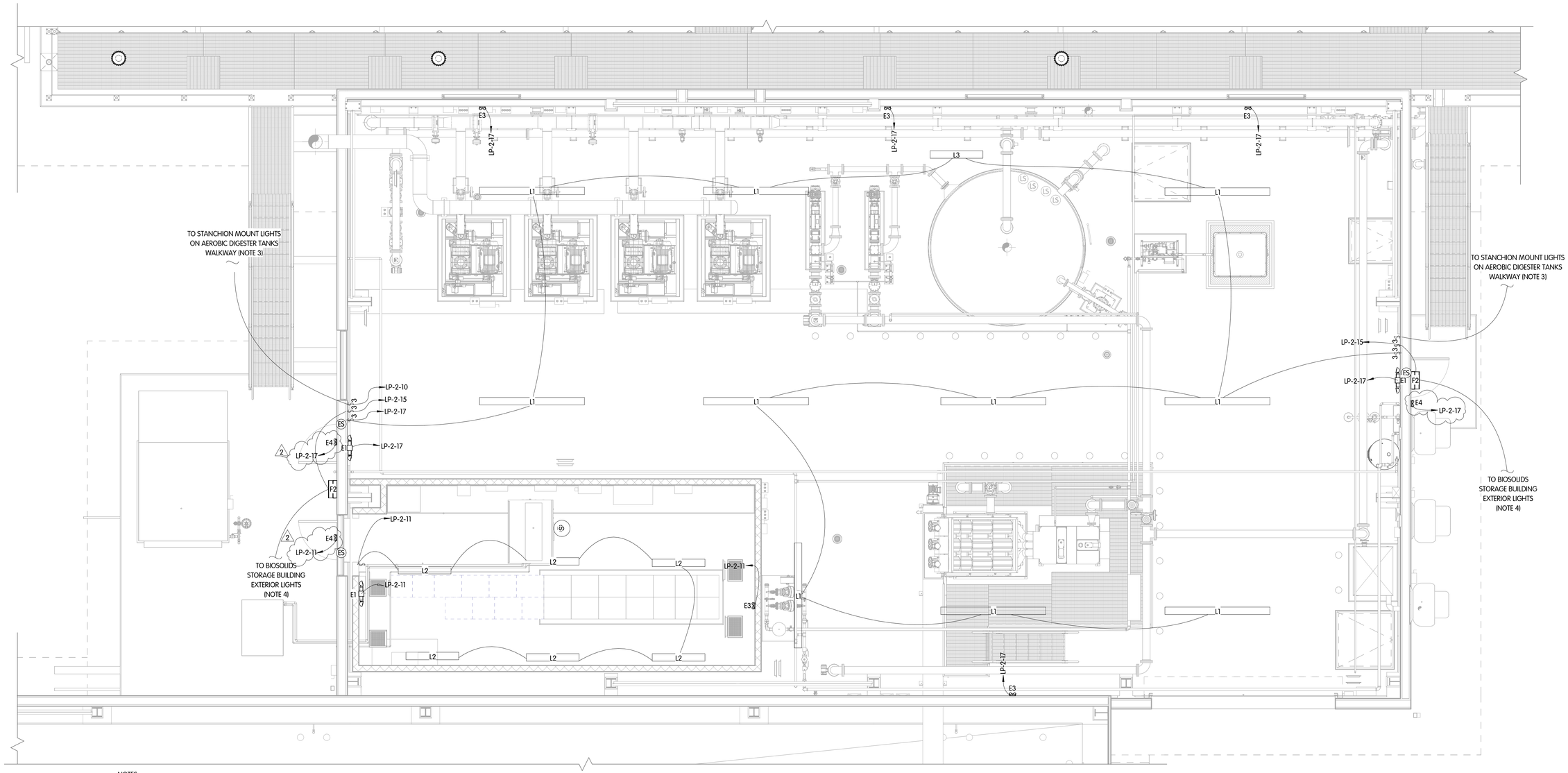
DATE:	NOVEMBER 2024

SHEET NO.

E-2.1

153 OF 182



NOTES:

1. SEE LP-2 PANELBOARD SCHEDULE.
2. SEE BIOSOLIDS HANDLING LIGHTING FIXTURE SCHEDULE THIS SHEET.
3. SEE AEROBIC DIGESTER TANKS LIGHTING PLAN FOR CONTINUATION.
4. SEE BIOSOLIDS STORAGE BUILDING LIGHTING PLAN FOR CONTINUATION.

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

NORTH

BIOSOLIDS HANDLING BUILDING - LIGHTING FIXTURE SCHEDULE

TAG/ID	DESCRIPTION
E1	LITHONIA CAT. NO. LHQM-LED-R-HO / ELA-T-SD-Q-L0309 - COMBO EXIT/EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50˚ - 104˚ OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOSTICS, 4 WATTS, TWIN LED HEADS. MOUNTED AT 8' AFF. WIRE AHEAD OF SWITCH FOR LIGHTS SERVING AREA
E3	LITHONIA CAT. NO. EU2L. EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50˚-104˚ OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOSTICS. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 8'-0" AFF.
E4	LITHONIA CAT. NO. EU2L. EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50˚-104˚ OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOSTICS. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 8'-0" AFF.
F2	LITHONIA CAT. NO. TWXT-LED-P2-40K-MVOLT-PE-DBLXD. LED WALL LUMINAIRE, PERFORMANCE PACKAGE 2, 4000K COLOR TEMPERATURE, MULTIVOLT, BUTTON-STYLE PHOTOCELL, BLACK FINISH. 22 WATTS. MOUNTED AT 9'-0" ABOVE GRADE.
L1	LITHONIA CAT. NO. FEM-L96-12000LM-IMACD-MD-MVOLT-40K-80CRI. LOW-PROFILE ENCLOSED AND GASKETED LINEAR LED LUMINAIRE, 96 INCHES LONG, 12000 LUMENS, ACRYLIC CLEAR DEEP LENS, MEDIUM DISTRIBUTION, MULTIVOLT, 4000K COLOR TEMPERATURE, 80 CRI COLOR RENDERING INDEX. 75.5 WATTS. MOUNTED 16'-0" AFF.
L2	LITHONIA CAT. NO. FEM-L48-4000LM-IMACD-MD-MVOLT-40K-80CRI. LOW-PROFILE ENCLOSED AND GASKETED LINEAR LED LUMINAIRE, 48 INCHES LONG, 4000 LUMENS, ACRYLIC CLEAR DEEP LENS, MEDIUM DISTRIBUTION, MULTIVOLT, 4000K COLOR TEMPERATURE, 80 CRI COLOR RENDERING INDEX. 24 WATTS. MOUNTED 8'-0" AFF.
L3	LITHONIA CAT. NO. FEM-L48-12000LM-IMACD-MD-MVOLT-40K-80CRI. LOW-PROFILE ENCLOSED AND GASKETED LINEAR LED LUMINAIRE, 48 INCHES LONG, 4000 LUMENS, ACRYLIC CLEAR DEEP LENS, MEDIUM DISTRIBUTION, MULTIVOLT, 4000K COLOR TEMPERATURE, 80 CRI COLOR RENDERING INDEX. 75 WATTS. MOUNTED 16'-0" AFF.

STATE OF OHIO
PAUL EDWARD McNICHOL
REGISTERED PROFESSIONAL ENGINEER
Electronically signed 12/20/24

BIOSOLIDS HANDLING BUILDING ELECTRICAL LIGHTING PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	BY
2	12/20/24	EBK
1	EMERGENCY LIGHTING ADDITIONS	
0	REVISIONS AFTER ISSUED FOR BID	

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EBK	LKB	XXX

STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO.
E-2.2
154 OF 182

C:\USERS\LBROWN\DOCUMENTS\8084003-RM_LBROWN@JHENG.COM.RVT
12/20/2024 11:50:34 AM

PANELBOARD DESIGNATION/TAG	**LP-2**															
LOCATION:	ELECTRICAL ROOM 2-2			**VOLTS:**	208Y/120V					**A.I.C. (FULLY RATED):**	10 kA					
FEEDER SIZE:	2"C, 4#1/0 & 1#6 GND			**PHASES:**	3					**BREAKERS:**	BOLT-ON					
FED FROM:	PP-2 VIA 45KVA XFMR			**WIRES:**	4					**MAINS RATING:**	225 A					
MOUNTING:	SURFACE			**AVAILABLE CIRCUIT...**	54					**MCB RATING:**	150 A					
ENCLOSURE:	NEMA 12			**% SOLID NEUTRAL:**	100%					**SPD:**	INTERNAL					
Notes:																

CKT	CIRCUIT DESCRIPTION	WIRE SIZE	AMP	POLES	A	B	C	A	B	C	POLES	AMP	WIRE SIZE	CIRCUIT DESCRIPTION	CKT
1	LIGHTING- BIOSOLIDS STORAGE EMERGENCY...	#12	20 A	1	4 VA			150 VA			1	15 A	#12	MOTORIZED LOUVER, IL-3-2	2
3	DIGESTED SLUDGE PIPE HEAT TRACE, HT-2-1	#12	20 A	1		15 VA			150 VA		1	15 A	#12	MOTORIZED LOUVER, IL-3-3	4
5	WAS PIPE HEAT TRACE, HT-2-2	#12	20 A	1			20 VA			180 VA	1	20 A	#10	RECEPTACLE- GAS WATER HEATER GWH-2-1	6
7	FIBER PANEL	#12	15 A	1	200 VA			300 VA			1	15 A	#12	FLOW METERS FE/FIT-100,101	8
9	LEVEL TRANSMITTERS LE/LIT-104,105	#12	15 A	1		200 VA			350 VA		1	20 A	#10	LIGHTING - DIGESTER TANKS EXT.	10
11	LIGHTING - ELECTRICAL ROOM INT.	#10	20 A	1			231 VA			540 VA	1	20 A	#12	RECEPTACLES - ELECTRICAL ROOM	12
13	LE/LIT-101,102,103 AND AE/AIT-101,102,103	#12	15 A	1	600 VA			1080 VA			1	20 A	#6	RECEPTACLES - SOLIDS HANDLING BLDG.INT.	14
15	LIGHTING- SOLIDS STORAGE BLDG. EXT.	#6	20 A	1		610 VA			900 VA		1	20 A	#10	RECEPTACLES - SOLIDS HANDLING BLDG. EXT.	16
17	LIGHTING - SOLIDS HANDLING BLDG. INT.	#8	20 A	1			838 VA			1176 VA	1	20 A	#8	ROLL-UP DOOR - BIOSOLIDS STORAGE AREA	18
19	EXHAUST FAN, EF-3-1	#10	20 A	1	1176 VA			1176 VA			1	20 A	#8	EXHAUST FAN, EF-3-2	20
21	RECEPTACLES - SOLIDS STORAGE BLDG....	#8	20 A	1		900 VA			1176 VA		1	20 A	#10	ROLL-UP DOOR - BIOSOLIDS HANDLING AREA	22
23	OUTSIDE & RETURN AIR MOTORIZED DAMPERS	#12	20 A	1			200 VA			791 VA	2	20 A	#10	EXHAUST FAN, EF-2-2	24
25	LIGHTING- EAST SITE POLE-MOUNTED LIGHTS	#10	20 A	2	278 VA			791 VA							26
27						278 VA			3225 VA		2	45 A	#2/0	LIGHTING - SOLIDS STORAGE BLDG. INT.	28
29	EXHAUST FAN, EF-2-3	#12	20 A	2			791 VA			3225 VA					30
2 31					791 VA			1176 VA			1	20 A	#8	EXHAUST FAN, EF-3-3	32
33	SOLENOID VALVE SV-103		20 A	1		100 VA			0 VA		1	20 A	--	SPARE	34
35	FC-2-1 SMOKE DETECTOR	#12	20 A	1			30 VA			0 VA	1	20 A	--	SPARE	36
37	SPARE	--	20 A	1	0 VA			0 VA			1	20 A	--	SPARE	38
39	SPARE	--	20 A	1		0 VA			0 VA		1	20 A	--	SPARE	40
41	SPARE	--	20 A	1			0 VA			0 VA	1	20 A	--	SPARE	42
43	SPACE	--	--	1	--			--			1	--	--	SPACE	44
45	SPACE	--	--	1		--			--		1	--	--	SPACE	46
47	SPACE	--	--	1			--			--	1	--	--	SPACE	48
49	SPACE	--	--	1	--			--			1	--	--	SPACE	50
51	SPACE	--	--	1		--			--		1	--	--	SPACE	52
53	SPACE	--	--	1			--			--	1	--	--	SPACE	54
				Total Load:	7722 VA			7934 VA 2		7992 VA					
				Total Amps:	64 A			66 A		67 A					

PANELBOARD DESIGNATION/TAG	**PP-2**															
LOCATION:	ELECTRICAL ROOM 2-2			**VOLTS:**	480V					**A.I.C. (FULLY RATED):**	42 kA					
FEEDER SIZE:	1-1/2"C, 3#1/0 & 1#6 GND			**PHASES:**	3					**BREAKERS:**	BOLT-ON					
FED FROM:	MCC-BHB-1 & MCC-BHB-2			**WIRES:**	3					**MAINS RATING:**	250 A					
MOUNTING:	SURFACE			**AVAILABLE CIRCUIT...**	42					**MCB RATING:**	150 A					
ENCLOSURE:	NEMA 12			**% SOLID NEUTRAL:**	100%					**SPD:**	INTERNAL					
Notes:																

CKT	CIRCUIT DESCRIPTION	WIRE SIZE	AMP	POLES	A	B	C	A	B	C	POLES	AMP	WIRE SIZE	CIRCUIT DESCRIPTION	CKT
1					3773 VA			15000 VA							2
3	FAN COIL, FC-2-1	#12	20 A	3		3773 VA			15000 VA		3	70 A	#4	45KVA XFMR FOR LP-2	4
5							3773 VA			15000 VA					6
7					5625 VA			1330 VA							8
9	HEAT PUMP, HP-2-1	#10	30 A	3		5625 VA			1330 VA		3	20 A	#12	MAKE UP AIR UNIT, MAU 2-1	10
11							5625 VA			1330 VA					12
13					942 VA			1746 VA							14
15	EXHAUST FAN, EF-2-1	#12	20 A	3		942 VA			1746 VA		3	20 A	#10	MOTORIZED BUTTERFLY VALVES: BFV-104, BFV-106, AND BFV-122	16
17							942 VA			1746 VA					18
19					0 VA			1746 VA							20
21	SPARE	--	20 A	3		0 VA			1746 VA		3	20 A	#10	MOTORIZED BUTTERFLY VALVES: BFV-106, BFV-107, AND BFV-108	22
23							0 VA			1746 VA					24
25					0 VA			0 VA							26
27	SPARE	--	20 A	3		0 VA			0 VA		3	20 A	--	SPARE	28
29							0 VA			0 VA					30
31					0 VA			0 VA							32
33	SPARE	--	20 A	3		0 VA			0 VA		3	20 A	--	SPARE	34
35							0 VA			0 VA					36
37					--			--							38
39	SPACE	--	--	3		--			--		3	--	--	SPACE	40
41							--			--					42
				Total Load:	30162 VA			30162 VA		30162 VA					
				Total Amps:	109 A			109 A		109 A					

STATE OF OHIO
PAUL EDWARD McNICHOL
Elevated
12/20/24
REGISTERED PROFESSIONAL ENGINEER

BIOSOLIDS HANDLING BUILDING
ELECTRICAL
SCHEDULES

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
2	12/20/24	PANEL SCHEDULE REVISIONS	EBK
1			

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SCALE:

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EBK	LKB	XXX

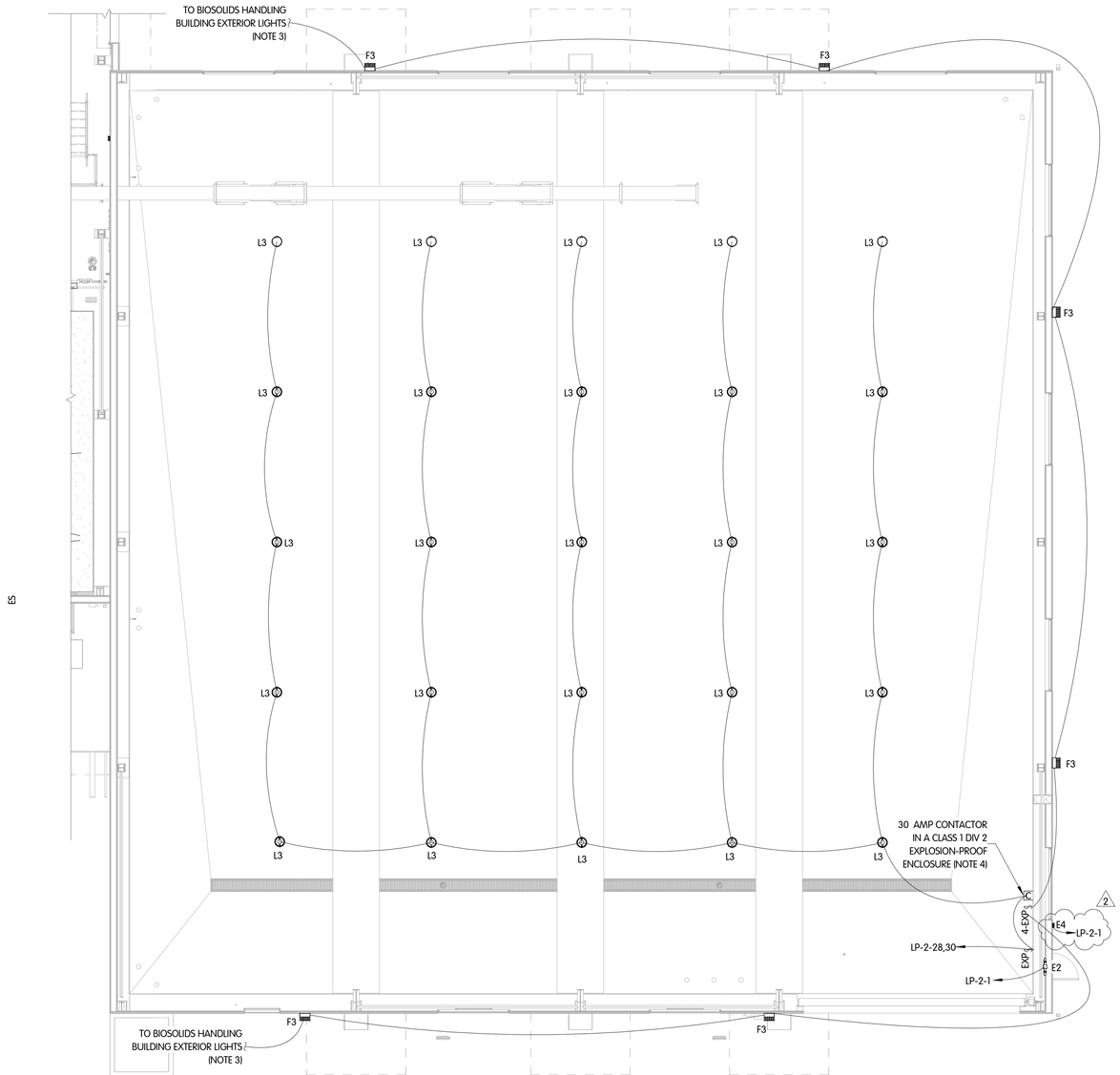
STATUS: ISSUED FOR BID

DATE: NOVEMBER 2024

SHEET NO.

E-2.4

156 OF 182



LIGHTING PLAN

1/8" = 1'-0"

NORTH

NOTES:

1. SEE LP-2 PANELBOARD SCHEDULE.
2. SEE BIOSOLIDS STORAGE LIGHTING FIXTURE SCHEDULE THIS SHEET.
3. SEE BIOSOLIDS HANDLING BUILDING LIGHTING PLAN FOR CONTINUATION.
4. SEE BIOSOLIDS STORAGE BUILDING HIGH BAY LIGHTING SCHEMATIC ON BIOSOLIDS STORAGE BUILDING ELECTRICAL SCHEMATICS SHEET.

BIOSOLIDS STORAGE BUILDING - LIGHTING FIXTURE SCHEDULE

TAG/ID	DESCRIPTION
E2	EATON CAT. NO. ELPAM2-EXS-GBM. CLASS 1 DIV 1 RATED EMERGENCY LED, TWO LUMINARIES, SINGLE SIDED. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 8'-0" AFF.
E4	LITHONIA CAT. NO. EU2L. EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50'-104' OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOSTICS. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 8'-0" AFF.
F3	LITHONIA CAT. NO. DSXW2-LED-20C-1000-40K-T2S-MVOLT-PE-DBLXD. D-SERIES SIZE 2 LED WALL LUMINARIE, 20 LEDS, 1000 MILLIAMP DRIVER, TYPE 2 SHORT DISTRIBUTION, MULTIVOLT, BUTTON STYLE PHOTOCELL, BLACK FINISH. 73 WATTS. MOUNTED AT ELEVATION 1017.00
L3	HOLOPHANE CAT. NO. HPLED-56LED-L5-MVOLT-40K-700MA-DGXD. PETROLUX HAZARDOUS AREA (CLASS 1, DIV 2) LED HIGH BAY, 56 LEDS (14790 LUMENS), TYPE 5 LOW ANGLE DISTRIBUTION, MULTIVOLT, 4000K COLOR TEMPERATURE, 700 MILLIAMP DRIVER, GRAY FINISH. 129 WATTS. MOUNTED 23'-0" AFF.

STATE OF OHIO
PAUL EDWARD McNICHOL
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BIOSOLIDS STORAGE BUILDING ELECTRICAL LIGHTING PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	BY
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1	EMERGENCY LIGHTING ADDITIONS	
	REVISIONS AFTER ISSUED FOR BID	

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EBK	LKB	XXX

STATUS: ISSUED FOR BID
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160 OF 182

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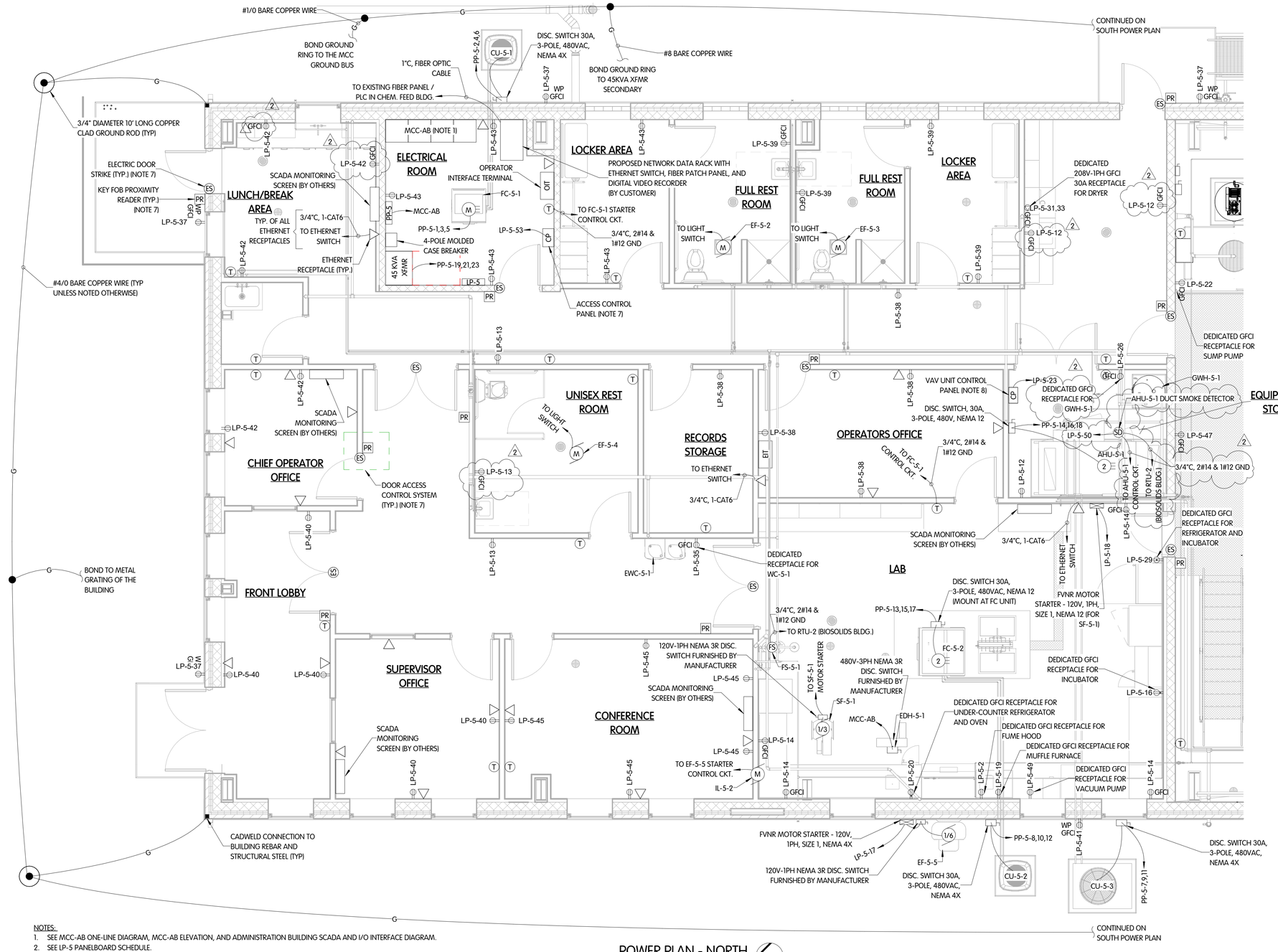

NOTES:

1. SEE MCC-AB ONE-LINE DIAGRAM, MCC-AB ELEVATION, AND ADMINISTRATION BUILDING SCADA AND I/O INTERFACE DIAGRAM.
2. SEE LP-5 PANELBOARD SCHEDULE.
3. SEE PP-5 PANELBOARD SCHEDULE.
4. ALL CONNECTIONS OF GROUND RING TO STRUCTURAL STEEL AND REBAR SHALL BE EXOTHERMIC.
5. NUMBER OF GROUND RODS SHOWN IS AN APPROXIMATION. CONTRACTOR SHALL FURNISH AND INSTALL GROUND RODS AS NECESSARY TO MEET NEC ARTICLE 250 OHMIC REQUIREMENTS.
6. REFER TO PROPOSED NETWORK DIAGRAM FOR ETHERNET/FIBER OPTIC CABLE CONNECTIONS BETWEEN MTU, OPERATOR/ENGINEER INTERFACE TERMINALS, ETHERNET SWITCH/FIBER PATCH PANEL ON NETWORK DATA RACK (BY CUSTOMER), ETC.
7. REFER TO ACCESS CONTROL DOOR ENLARGED DETAIL AND ACCESS CONTROL INTERCONNECTION DIAGRAM ON "MCC ELEVATIONS AND CONTROL DIAGRAMS" ADMINISTRATION BUILDING ELECTRICAL SHEET. ACCESS CONTROL EQUIPMENT SHALL BE PROVIDED BY NUWAVE TECHNOLOGY. MAKE CONDUIT/WIRE PROVISIONS TO INDICATED ACCESS CONTROL LOCATIONS AS DEPICTED IN THE ACCESS CONTROL DOOR ENLARGED DETAIL. COORDINATE WITH NU WAVE TECHNOLOGY.
8. REFER TO "VARIABLE AIR VOLUME UNIT INTERCONNECTION DIAGRAM" ON ADMINISTRATION BUILDING MCC ELEVATION AND CONTROL DIAGRAMS ELECTRICAL SHEET.

POWER PLAN - NORTH

1/4" = 1'-0"

KEY PLAN

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PAUL EDWARD McNICHOLAS
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12/20/24

ADMINISTRATION BUILDING ELECTRICAL POWER PLAN - NORTH

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

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1	12/20/2	SMOKE DETECTOR ADD/ELEC UPDATES	EBK
2	4		

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SCALE:	1/4" = 1'-0"

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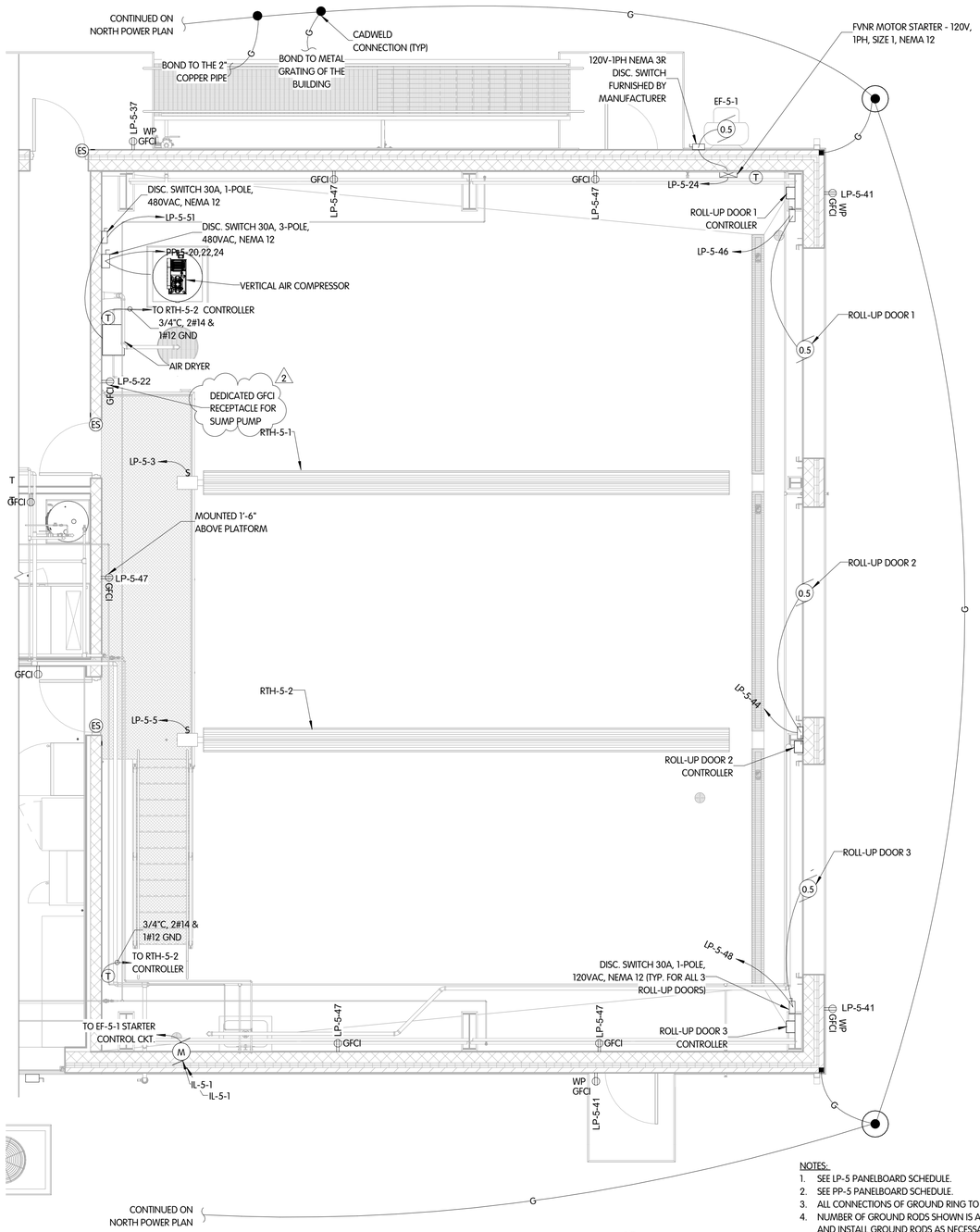
EBK	LKB	XXX

STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO.
E-5.2
164 OF 182



NOTES:
1. SEE LP-5 PANELBOARD SCHEDULE.
2. SEE PP-5 PANELBOARD SCHEDULE.
3. ALL CONNECTIONS OF GROUND RING TO STRUCTURAL STEEL AND REBAR SHALL BE EXOTHERMIC.
4. NUMBER OF GROUND RODS SHOWN IS AN APPROXIMATION. CONTRACTOR SHALL FURNISH AND INSTALL GROUND RODS AS NECESSARY TO MEET NEC ARTICLE 250 OHMIC REQUIREMENTS.

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

KEY PLAN

STATE OF OHIO
PAUL EDWARD McNICHOLAS
Electronically signed and sealed 12/20/24
REGISTERED PROFESSIONAL ENGINEER

ADMINISTRATION BUILDING ELECTRICAL POWER PLAN - SOUTH

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
1	12/20/24	SMOKE DETECTOR ADD/ELEC. UPDATES	EBK

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EBK	LKB	XXX

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165 OF 182

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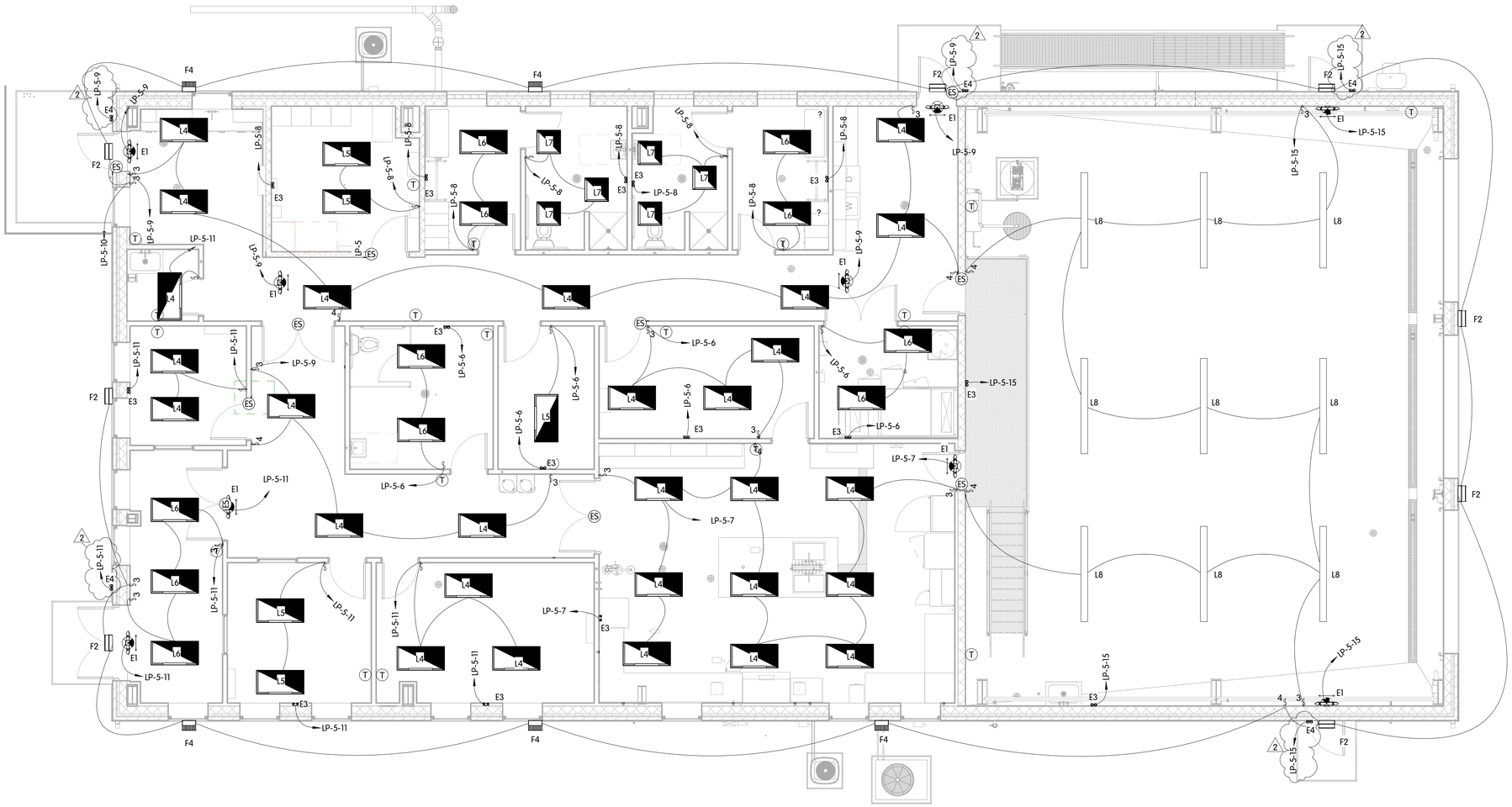

LIGHTING PLAN
3/16" = 1'-0"

NOTE:
1. SEE LP-5 PANELBOARD SCHEDULE.
2. SEE ADMINISTRATION BUILDING LIGHTING FIXTURE SCHEDULE ON THIS SHEET.

ADMINISTRATION BUILDING - LIGHTING FIXTURE SCHEDULE

TAG/ID	DESCRIPTION
5 - ADMINISTRATION BUILDING	
E1	LITHONIA CAT. NO. LHQM-LED-R-HO / ELA-T-SD-Q-L0309 - COMBO EXIT/EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50' - 104' OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOTICS, 4 WATTS, TWIN LED HEADS. MOUNTED AT 8' AFF. WIRE AHEAD OF SWITCH FOR LIGHTS SERVING AREA
E3	LITHONIA CAT. NO. EU2L EMERGENCY LED, WHITE HOUSING W/ RED LETTERS, 120/277V, 50'-104' OPERATION, 90-MINUTE NI-CAD BATTERY, SELF-DIAGNOSTICS. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 8'-0" AFF.
E4	LITHONIA CAT. NO. WLTU-LED-ERE-GY-T-WP-SQ-M12. INDURA EMERGENCY LED UNIT WITH TWIN LED OUTDOOR REMOTE HEADS, 4 VA. WIRE AHEAD OF SWITCH SERVING AREA. MOUNTED AT 9'-0" ABOVE GRADE.
F2	LITHONIA CAT. NO. TWXI-LED-P2-40K-MVOLT-PE-DBLXD. LED WALL LUMINAIRE, PERFORMANCE PACKAGE 2, 4000K COLOR TEMPERATURE, MULTIVOLT, BUTTON-STYLE PHOTOCELL, BLACK FINISH. 22 WATTS. MOUNTED AT 9'-0" ABOVE GRADE.
F4	LITHONIA CAT. NO. DSXWI-20C-700-40K-T2S-MVOLT-PE-HS-DBLXD. D-SERIES LED WALL LUMINAIRE, 20 LEDS, 700 mA DRIVE CURRENT, 4000K COLOR TEMP., TYPE 3 SHORT DISTRIBUTION, MULTIVOLT, BUTTON STYLE PHOTOCELL, HOUSE-SIDE SHIELD, BLACK FINISH, 120 V / 46 W. MOUNTED AT ELEVATION 1021'-0".
L4	LITHONIA CAT. NO. CPX-4X2-4000LM-80CRI-40K-SWL-MVOLT. LAY-IN 2'x2' LED PANEL, 4000 LUMEN, 80 COLOR RENDERING INDEX, 4000K COLOR TEMPERATURE, SATIN WHITE DIFFUSER, MULTIVOLT. 120V / 36.7 W. LAID IN CEILING.
L5	LITHONIA CAT. NO. CPX-4X2-6000LM-80CRI-40K-SWL-MVOLT. LAY-IN 2'x2' LED PANEL, 6000 LUMEN, 80 COLOR RENDERING INDEX, 4000K COLOR TEMPERATURE, SATIN WHITE DIFFUSER, MULTIVOLT. 120V / 41.8 W. LAID IN CEILING.
L6	LITHONIA CAT. NO. CPX-4X2-3000LM-80CRI-40K-SWL-MVOLT. LAY-IN 2'x2' LED PANEL, 3000 LUMEN, 80 COLOR RENDERING INDEX, 4000K COLOR TEMPERATURE, SATIN WHITE DIFFUSER, MULTIVOLT. 120V / 24.6 W. LAID IN CEILING.
L7	LITHONIA CAT. NO. CPX-2X2-3200LM-80CRI-40K-SWL-MVOLT. LAY-IN 2'x2' LED PANEL, 3200 LUMEN, 80 COLOR RENDERING INDEX, 4000K COLOR TEMPERATURE, SATIN WHITE DIFFUSER, MULTIVOLT. 120V / 15.6 W. LAID IN CEILING.
L8	FEM-LED-L96-9000LM-IMACD-MD-MVOLT-40K-80CRI. LINEAR LED, 9000 LUMENS, ACRYLIC CLEAR DEEP LENS, MEDIUM DISTRIBUTION, MULTIVOLT, 4000K TEMP., 80 COLOR RENDERING INDEX, 120V / 64 W. MOUNTED AT 22" AFF.

KEY PLAN

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STATE OF OHIO
PAUL EDWARD McNICHOLAS
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REGISTERED PROFESSIONAL ENGINEER

ADMINISTRATION BUILDING
ELECTRICAL
LIGHTING PLAN

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
4	12/20/24	EMERGENCY LIGHTING ADDITIONS	EBK
2			
1			

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SCALE: 3/16" = 1'-0"
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DESIGNED	DRAWN	CHECKED
EBK	LKB	XXX

STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO.
E-5.4
166 OF 182

PANELBOARD DESIGNATION/TAG	LP-5														
LOCATION:	ELECTRICAL ROOM 5-11			**VOLTS:**	208Y/120V					**A.I.C. (FULLY RATED):**	10 kA				
FEEDER SIZE:	2"C, 4#1/0 & 1#6 GND			**PHASES:**	3					**BREAKERS:**	BOLT-ON				
FED FROM:	PP-5 VIA 45KVA XFMR			**WIRES:**	4					**MAINS RATING:**	225 A				
MOUNTING:	SURFACE			**AVAILABLE CIRCUIT...**	72					**MCB RATING:**	150 A				
ENCLOSURE:	NEMA 12			**% SOLID NEUTRAL:**	100%					**SPD:**	INTERNAL				
Notes:															

CKT	CIRCUIT DESCRIPTION	WIRE SIZE	AMP	POLES	A	B	C	A	B	C	POLES	AMP	WIRE SIZE	CIRCUIT DESCRIPTION	CKT
1	NETWORK DATA RACK DVR	#12	20 A	1	100 VA			180 VA			1	20 A	#12	RECEPTACLE- FUME HOOD EQUIPMENT	2
3	RADIANT TUBE HEATER, RTH-5-1	#12	15 A	1		120 VA			300 VA		1	20 A	#10	FRONT GATE ACCESS CONTROL P-O-E SWITCH	4
5	RADIANT TUBE HEATER, RTH-5-2	#12	15 A	1			120 VA			300 VA	1	20 A	#12	LIGHTING - HVAC, OPERATORS OFFIE,...	6
7	LIGHTING- LAB AREA	#12	20 A	1	338 VA			404 VA			1	20 A	#12	LIGHTING - LOCKER ROOMS 1&2, BATHROOM,...	8
9	LIGHTING- HALLWAY	#12	20 A	1		383 VA			406 VA		1	20 A	#8	LIGHTING - EXTERIOR	10
11	LIGHTING - CHIEF OP. OFFICE, LOBBY,...	#12	20 A	1			398 VA			540 VA	1	20 A	#12	RECEPTACLES- HALLWAY & HVAC ROOM	12
13	RECEPTACLES- HALLWAY & RESTROOM	#12	20 A	1	540 VA			720 VA			1	20 A	#10	RECEPTACLES- GENERAL LAB OUTLETS	14
15	LIGHTING- GARAGE	#8	20 A	1		592 VA			720 VA		1	20 A	#10	RECEPTACLES- LAB INCUBATOR	16
17	EXHAUST FAN, EF-5-5	#12	20 A	1			628 VA			864 VA	1	20 A	#12	SUPPLY FAN, SF-5-1	18
19	RECEPTACLE- LAB MUFFLE FURNACE	#10	20 A	1	1060 VA			1320 VA			1	20 A	#10	RECEPTACLE- LAB FRIDGE & OVEN	20
21	FRONT GATE OPERATOR / MOTOR	#2	25 A	1		1920 VA			180 VA		1	20 A	#12	RECEPTACLE- SUMP PUMP SP-5-1	22
23	VAV UNIT CP	#12	20 A	1			1000 VA			1276 VA	1	20 A	#10	EXHAUST FAN, EF-5-1	24
25	LIGHTING- NORTHWEST SITE POLE-MOUNTED LIGHTS	#10	20 A	2	278 VA			180 VA			1	20 A	#12	RECEPTACLE- GAS WATER HEATER GWH-5-1	26
27						278 VA			185 VA		2	20 A	#10	LIGHTING- SOUTHWEST SITE POLE-MOUNTED LIGHTS	28
29	RECEPTACLE- LAB REFRIGERATOR (FULL-SIZE)	#10	20 A	1			1620 VA			185 VA					30
31	RECEPTACLE- 208V FOR DRYER	#8	30 A	2	2000 VA			200 VA			1	20 A	#10	FRONT GATE ACCESS CONTROL NETWORK...	32
33						2000 VA			200 VA		1	20 A	#10	FRONT GATE ETHERNET SWITCH / FIBER...	34
35	RECEPTACLE- WATER COOLER EWC-5-1	#12	20 A	1			180 VA			200 VA	1	20 A	#12	NETWORK DATA RACK FIBER PATCH PANEL	36
37	RECEPTACLES- NORTH & EAST EXTERIOR...	#8	20 A	1	720 VA			900 VA			1	20 A	#12	RECEPTACLES- HALLWAY, OPERATORS...	38
39	RECEPTACLES- RESTROOM & LOCKER ROOM	#12	20 A	1		720 VA			900 VA		1	20 A	#8	RECEPTACLES- LOBBY & SUPERVISOR OFFICE	40
41	RECEPTACLES- SOUTH & WEST EXTERIOR...	#12	20 A	1			720 VA			900 VA	1	20 A	#12	RECEPTACLES- LUNCH & CHIEF OPERATOR...	42
43	RECEPTACLES- ELECTRICAL & LOCKER ROOM	#12	20 A	1	900 VA			1176 VA			1	20 A	#10	ROLL UP DOOR 2	44
45	RECEPTACLES- CONFERENCE ROOM	#12	20 A	1		900 VA			1176 VA		1	20 A	#10	ROLL-UP DOOR 1	46
47	RECEPTACLES- GARAGE	#8	20 A	1			900 VA			1176 VA	1	20 A	#10	ROLL-UP DOOR 3	48
49	RECEPTACLE- VACUUM PUMP	#12	20 A	1	180 VA			30 VA			1	20 A	#12	AHU-5-1 SMOKE DETECTOR	50
51	AIR DRYER	#12	20 A	1		160 VA			0 VA		1	20 A	--	SPARE	52
53	ACCESS CP 12VDC POWER SUPPLY	#12	20 A	1			500 VA			0 VA	1	20 A	--	SPARE	54
55	SPARE	--	20 A	1	0 VA			0 VA			1	20 A	--	SPARE	56
57	SPARE	--	20 A	1		0 VA			0 VA		1	20 A	--	SPARE	58
59	SPARE	--	20 A	1			0 VA			0 VA	1	20 A	--	SPARE	60
61	SPACE	--	--	1	--			--			1	--	--	SPACE	62
63	SPACE	--	--	1		--			--		1	--	--	SPACE	64
65	SPACE	--	--	1			--			--	1	--	--	SPACE	66
67	SPACE	--	--	1	--			--			1	--	--	SPACE	68
69	SPACE	--	--	1		--			--		1	--	--	SPACE	70
71	SPACE	--	--	1			--			--	1	--	--	SPACE	72
				Total Load:	11196 VA			11140 VA			11507 VA				
				Total Amps:	93 A			93 A			96 A				

PANELBOARD DESIGNATION/TAG	PP-5														
LOCATION:	ELECTRICAL ROOM 5-11			**VOLTS:**	480V					**A.I.C. (FULLY RATED):**	200 kA				
FEEDER SIZE:	1-1/2"C, 3#2/0 & 1#6 GND			**PHASES:**	3					**BREAKERS:**	BOLT-ON				
FED FROM:	MCC-AB			**WIRES:**	3					**MAINS RATING:**	250 A				
MOUNTING:	SURFACE			**AVAILABLE CIRCUIT...**	42					**MCB RATING:**	175 A				
ENCLOSURE:	NEMA 12			**% SOLID NEUTRAL:**	100%					**SPD:**	INTERNAL				
Notes:															

CKT	CIRCUIT DESCRIPTION	WIRE SIZE	AMP	POLES	A	B	C	A	B	C	POLES	AMP	WIRE SIZE	CIRCUIT DESCRIPTION	CKT
1					2245 VA			2217 VA							2
3	FAN COIL, FC-5-1	#12	20 A	3		2245 VA			2217 VA		3	20 A	#12	CONDENSING UNIT, CU-5-1	4
5							2245 VA			2217 VA					6
7					4545 VA			2217 VA							8
9	CONDENSING UNIT, CU-5-3	#10	30 A	3		4545 VA			2217 VA		3	20 A	#12	CONDENSING UNIT, CU-5-2	10
11							4545 VA			2217 VA					12
13					2245 VA			942 VA							14
15	FAN COIL, FC-5-2	#12	20 A	3		2245 VA			942 VA		3	20 A	#12	AIR HANDLING UNIT, AHU-5-1	16
17							2245 VA			942 VA					18
19					15000 VA			2106 VA							20
21	45 KVA XFMR FOR LP-5	#4	70 A	3		15000 VA			2106 VA		3	20 A	#12	VERTICAL AIR COMPRESSOR	22
23							15000 VA			2106 VA					24
25					0 VA			0 VA							26
27	SPARE	--	20 A	3		0 VA			0 VA		3	20 A	--	SPARE	28
29							0 VA			0 VA					30
31					0 VA			0 VA							32
33	SPARE	--	20 A	3		0 VA			0 VA		3	20 A	--	SPARE	34
35							0 VA			0 VA					36
37					0 VA			0 VA							38
39	SPARE	--	20 A	3		0 VA			0 VA		3	20 A	--	SPARE	40
41							0 VA			0 VA					42
				Total Load:	31517 VA			31517 VA			31517 VA				
				Total Amps:	114 A			114 A			114 A				

STATE OF OHIO
PAUL EDWARD McNICHOLAS
Elevated
12/20/24
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ADMINISTRATION BUILDING
ELECTRICAL
SCHEDULES

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	BY
2	12/20/24	EBK
1	PANEL SCHEDULE REVISIONS	
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DATE: NOVEMBER 2024

SHEET NO.

E-5.6

168 OF 182

REMOTE TELEMETRY UNIT RTU-2 (SOLIDS HANDLING BUILDING)

VOLUTE DEWATERING PRESS CONTROL PANEL PLC

VOLUTE DEWATERING PRESS 1 CONTROL PANEL

FIELD

VIA ETHERNET TO REMOTE TELEMTRY UNIT RTU-2 (BIOSOLIDS HANDLING BUILDING)

PV-119 POSITION FEEDBACK
PV-119 POSITION SETPOINT
PV-119 FULL OPEN
PV-119 FULL CLOSE
PV-119 IN REMOTE
PV-119 FAULT
PV-119 IN SERVICE

CONVEYOR IN SERVICE
CONVEYOR IN AUTO
CONVEYOR IN FORWARD
CONVEYOR IN REVERSE
CONVEYOR RUNNING IN FORWARD
CONVEYOR RUNNING IN REVERSE
CONVEYOR COMMON FAULT
CONVEYOR SAFETY STOP
CONVEYOR OVERLOAD
CONVEYOR LOSS OF ROTATION
CONVEYOR E-STOP ACTIVATED

POLYMER SYSTEM 1 FEEDRATE
POLYMER SYSTEM 1 FEEDRATE SETPOINT
POLYMER SYSTEM 1 START/STOP
POLYMER SYSTEM 1 AUTO (REMOTE)
POLYMER SYSTEM 1 RUNNING
POLYMER SYSTEM 1 FAULT
POLYMER SYSTEM 1 LOW WATER

PRESSATE BLOWER REMOTE E-STOP OPERATED

SV-100 OPEN/CLOSE

480V

2

FOR NEAT POLYMER PUMP
AUTO JJ
RUNNING JJ
KEYPAD
START HN
STOP HN
MOTOR HIGH TEMP EY JJ
VARIABLE FREQUENCY DRIVE (11835)

FOR POLYMER MIXING CHAMBER
AUTO JJ
RUNNING JJ
KEYPAD
START HN
STOP HN
MOTOR HIGH TEMP EY JJ
VARIABLE FREQUENCY DRIVE (11835)

VOLUTE DEWATERING PRESS CONTROL PANEL

MCC-BHB-2

PRE-WIRED TO INTELLIGENT MCC-BHB-2 ETHERNET SWITCH AND TRANSMITTED TO SCADA VIA ETHERNET/FIBER

PRESSATE BLOWER START/STOP
PRESSATE BLOWER RUNNING
PRESSATE BLOWER MOTOR HIGH TEMP. FAULT
PRESSATE BLOWER IN AUTO
PRESSATE BLOWER IN SERVICE
START HN
STOP HN
JJ RUNNING
JJ HAND
STARTER
JJ FAULT
JJ AUTO

BOOSTER PUMP SKID CONTROL PANEL

OPEN JJ
CLOSED JJ
HS LOCAL/REMOTE
ZC
HN OPEN
HN STOP
HN CLOSE
M
(15250) VALVE ACTUATOR 3PV-119

CONVEYOR SEE SHEET I-0.10
(14551)

POLYMER SKID JUNCTION BOX

PI
DILN WATER SOLENOID VALVE
FE ROTAMETER FLOW SENSOR
PS
PI
FE THERMAL FLOW SENSOR
POLYMER MIXING CHAMBER
M NEAT POLYMER PUMP
NEAT POLYMER FROM POLYMER TOTE TANK (T-105)

VOLUTE DEWATERING PRESS POLYMER SYSTEM (POLYMER SKID) ME-111 (11223)

ELECTRICAL DESIGN OF THE LIQUID POLYMER SYSTEM MAY VARY DEPENDING ON MANUFACTURER SELECTED. ELECTRICAL DESIGN SHALL NEED TO BE CONFIRMED AND UPDATED DURING THE SHOP DRAWINGS PHASE OF THE PROJECT.

H-O-A HS
HN EMERGENCY STOP (16902 - 2.05E) NEMA 12 LOCAL CONTROL STATION

IN SERVICE / CONTROL CKT. SHUTDOWN

TO SHEET I-0.8

LIQUID POLYMER FEED

NONPOTABLE WATER FROM BOOSTER PUMP SKID

120 VAC VOLUTE PRESS CP
S
PRESS SPRAY HEADER SOLENOID SV-100

NONPOTABLE WATER FROM BOOSTER PUMP SKID

FROM VOLUTE DEWATERING PRESS PUMP 1 ME-109 OR VOLUTE DEWATERING PRESS PUMP 2 ME-110 (SHEET I-0.8)

PV-124

PV-126

PRESS BYPASS TO LIQUID SLUDGE TRUCK FILL (SHEET I0.8)

M FLASH TANK GEARMOTOR
M FLOC. TANK GEARMOTOR
MIXING TANK
FLOC. TANK

VOLUTE DEWATERING PRESS ME-114
M DEWATERING DRUM MOTOR (TYP. OF 3)
SPRAY HEADS
3 DEWATERING DRUMS

DEWATERED CAKE TO BIOSOLIDS CONVEYOR (ME-116), SEE I-0.10

FLOCCULATION TANK DRAIN

FILTRATE

PV-121

3PV-119

PRESSATE AND PROCESS DRAIN TO HEADWORKS

BLOWER AIR INLET FILTER

TS
M
AIR
PRESSATE BLOWER ME-117 (11239)

FROM PRESSATE PUMP (SEE SHEET I-0.10)

FILTRATE TO PRESSATE HOLDING TANK (SEE SHEET I-0.10)

AIR TO PRESSATE HOLDING TANK (SEE SHEET I-0.10)

PRESSATE FROM PRESSATE HOLDING TANK

STATE OF OHIO
PAUL EDWARD MCNICHOL
REGISTERED PROFESSIONAL ENGINEER
12/20/24

DEWATERING SYSTEM P & ID

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5			
4			
3			
2	12/20/24	VFD ADDITIONS/SPEC NUM UPDATE	EBK
1			

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JOB NO. 039-8084.003
SCALE AS NOTED
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DKP	LKB	

STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO. I-0.9
179 OF 182

TOL-8084\005109-I-0.9 DEWATERING SYSTEM P & ID
12/20/2024 10:23 AM - LBROWN
12/20/2024 1:23 PM

VOLUTE DEWATERING PRESS CONTROL PANEL PLC

VIA ETHERNET TO REMOTE TELEMTRY UNIT RTU-2
(BIOSOLIDS HANDLING BUILDING)

PRESSATE PUMP REMOTE E-STOP OPERATED
PRESSATE PUMP MOTOR HIGH TEMP.
PRESSATE PUMP SPEED FEEDBACK
PRESSATE PUMP SPEED SETPOINT
PRESSATE PUMP DRIVE FAULT
PRESSATE PUMP START/STOP
PRESSATE PUMP RUNNING
PRESSATE PUMP IN AUTO
PRESSATE PUMP IN SERVICE
PRESSATE TANK LEVEL

BOOSTER PUMP 1 MOTOR HIGH TEMP.
BOOSTER PUMP 1 SPEED FEEDBACK
BOOSTER PUMP 1 SPEED SETPOINT
BOOSTER PUMP 1 DRIVE FAULT
BOOSTER PUMP 1 START/STOP
BOOSTER PUMP 1 RUNNING
BOOSTER PUMP 1 IN AUTO
BOOSTER PUMP 1 IN SERVICE

CONVEYOR IN SERVICE
CONVEYOR IN AUTO
CONVEYOR IN FORWARD
CONVEYOR IN REVERSE
CONVEYOR RUNNING FORWARD
CONVEYOR RUNNING IN REVERSE
CONVEYOR COMMON FAULT
CONVEYOR START/STOP
CONVEYOR OVERLOAD
CONVEYOR LOSS OF ROTATION
CONVEYOR E-STOP ACTIVATED

GATE 1 OPENED
GATE 1 OPEN
GATE 1 CLOSED
GATE 1 CLOSE
GATE 1 FAULT
GATE 1 IN AUTO
GATE 1 IN SERVICE

GATE 2 OPENED
GATE 2 OPEN
GATE 2 CLOSED
GATE 2 CLOSE
GATE 2 FAULT
GATE 2 IN AUTO
GATE 2 IN SERVICE

VOLUTE DEWATERING PRESS 1 CONTROL PANEL

480V
AUTO JJ
RUNNING JJ
KEYPAD
START HN
STOP HN
MOTOR HIGH TEMP JJ
EY
VARIABLE FREQUENCY DRIVE (11835)

BOOSTER PUMP SKID CONTROL PANEL

480V
AUTO JJ
RUNNING JJ
KEYPAD
START HN
STOP HN
MOTOR HIGH TEMP JJ
EY
VARIABLE FREQUENCY DRIVE (16230)
IN SERVICE / CONTROL CKT. SHUTDOWN

VOLUTE DEWATERING PRESS CONTROL PANEL

480V
HS F/O/R
HN START
JJ RUNNING
JJ OVERLOAD
HS H/O/A
HN STOP
JJ RUNNING
JJ ZERO SPEED
RVSS STARTER
HS JOG
JJ FAULT
JJ E-STOP
(11835)

480V
HS H-O-A
JJ FAULT
HN OPEN
JJ OPEN
HN CLOSED
JJ CLOSED
(14551) 2
M (14551)

480V
HS H-O-A
JJ FAULT
HN OPEN
JJ OPEN
HN CLOSED
JJ CLOSED
(14551) 2
M (14551)

FIELD

H-O-A HS
HN
EMERGENCY STOP
(16902 - 2.05E) NEMA 4X
LOCAL CONTROL STATION

IN SERVICE / CONTROL CKT. SHUTDOWN
TS
M

IN SERVICE / CONTROL CKT. SHUTDOWN
M (14551)

TS
M

BLADDER TANK

(TYP OF BOOSTER PUMP 1)

TO VOLUTE DEWATERING PRESS (SEE SHEET I-0.9)

NONPOTABLE WATER FROM BOOSTER PUMP SKID

120 VAC UP-2

LIT 104 (16902 - 2.07B)

(11735) PRESSATE PUMP ME-115

BOOSTER PUMP 1 ME-112 (11735)

BOOSTER PUMP 2 ME-113 (11735)

BOOSTER PUMP SKID

AIR VENT

FROM VALVE 3PV-119 (SEE SHEET I-0.9)

LE 104

PRESSATE HOLDING TANK T-106

AIR FROM PRESSATE BLOWER ME-117 (SEE SHEET I-0.9)

NONPOTABLE WATER

RPZ

AIR VENT

FERRIC CHLORIDE

TO HOSE BIB

TO HOSE BIB

TO HEADWORKS (SEE SHEET I-0.9)

DEWATERED CAKE FROM VOLUTE DEWATERING PRESS (ME-114) (SEE SHEET I-0.9)

LOSS OF ROTATION SENSOR SS

E-STOP PULLCORD CS

E-STOP PULLCORD CS

E-STOP PULLCORD CS

GATE 1

BIOSOLIDS CONVEYOR ME-116

GATE 2

PROCESS TO DRAIN

DEWATERED CAKE DROP FROM BIOSOLIDS CONVEYOR (ME-116) TO BIOSOLIDS STORAGE BUILDING

DEWATERED CAKE DROP FROM BIOSOLIDS CONVEYOR (ME-116) TO BIOSOLIDS STORAGE BUILDING

DEWATERED CAKE DROP FROM BIOSOLIDS CONVEYOR (ME-116) TO BIOSOLIDS STORAGE BUILDING

STATE OF OHIO
PAUL EDWARD McNICHOLAS
Electronically signed and sealed
12/20/24
REGISTERED PROFESSIONAL ENGINEER

DEWATERING SYSTEM P & ID

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5	12/20/24	SPEC NUMBER CORRECTIONS	EBK

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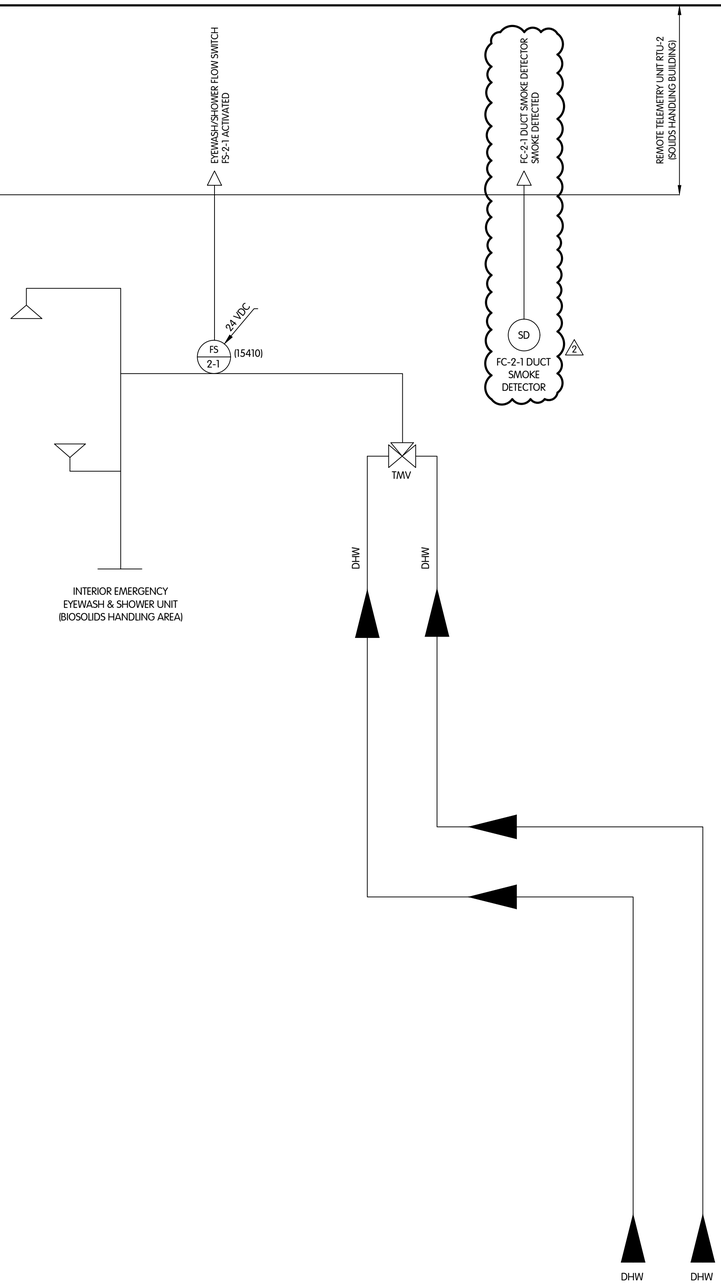
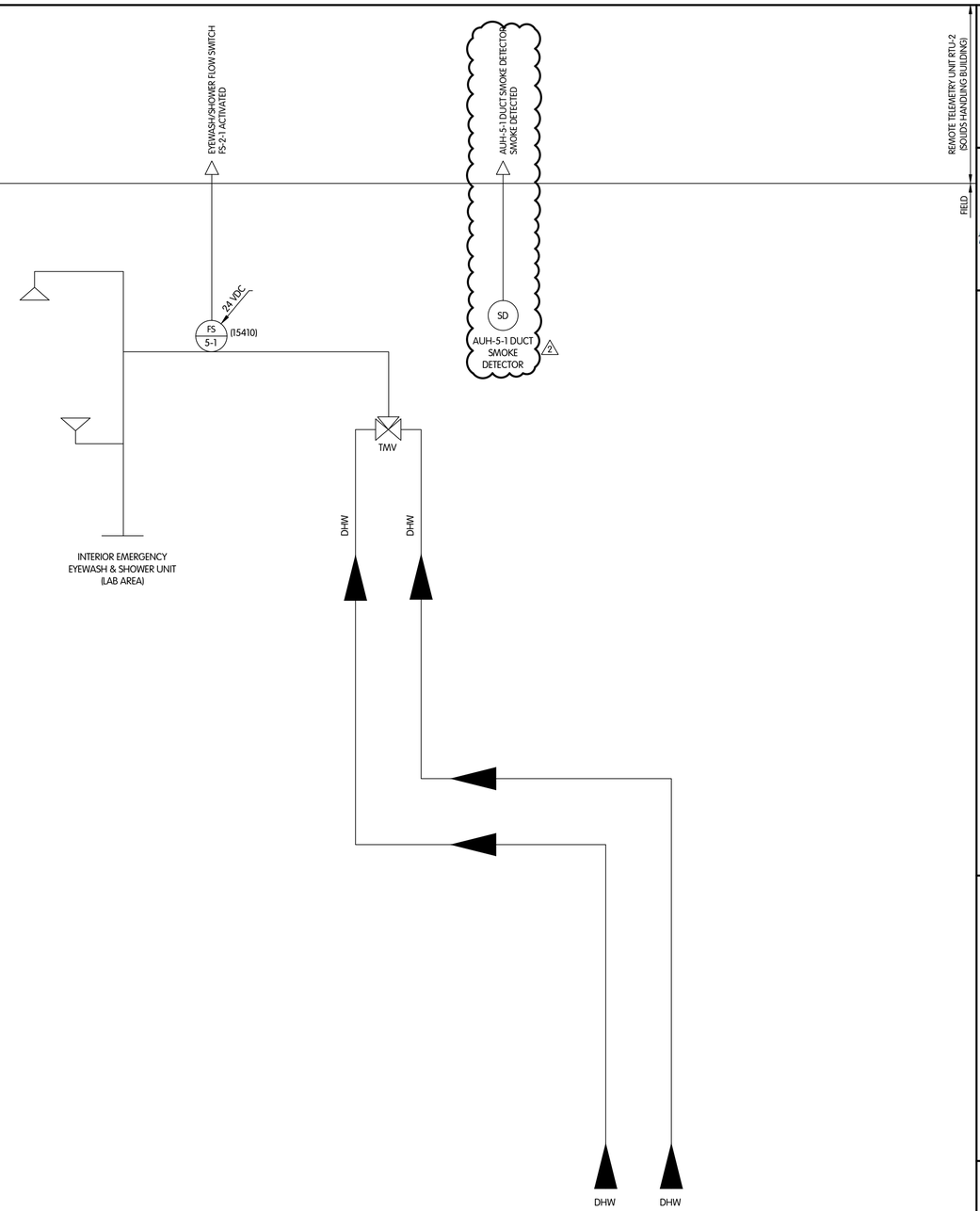
DKP	LKB	

STATUS: ISSUED FOR BID
DATE: NOVEMBER 2024
SHEET NO.
I-0.10
180 OF 182

T:\DL-8084\003\D-I-0.10 DEWATERING SYSTEM P & ID
12/20/2024 11:24 AM LBROWN
12/20/2024 11:25 AM



BIOSOLIDS HANDLING BUILDING
EMERGENCY EYEWASH AND SHOWER UNIT



ADMINISTRATION BUILDING LAB
EMERGENCY EYEWASH AND SHOWER UNIT

STATE OF OHIO
PAUL EDWARD McNICHOLAS
Electronically signed and sealed
12/20/24
REGISTERED PROFESSIONAL ENGINEER

INSTRUMENTATION AND CONTROLS
EMERGENCY EYEWASH/SHOWER UNIT AND SMOKE DETECTORS
P&ID

CITY OF GREENVILLE, OHIO
WWTP SOLIDS HANDLING FACILITY AND ADMINISTRATION BUILDING

NO.	DATE	REVISIONS AFTER ISSUED FOR BID	BY
5			
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2	12/20/24	SMOKE DETECTORS	ESK
1			

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	SJW	

STATUS: ISSUED FOR BID

DATE: NOVEMBER 2024

SHEET NO.
I-0.12
182 OF 182

T:\OL-8084\003\12-I-0.12 EMERGENCY EYEWASH & SHOWER UNITS
12/20/2024 9:22 AM - LBROWN
12/20/2024 11:26 AM -