

Krebs Engineering, Inc.  
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Birmingham, AL 35244  
205-987-7411  
May 2, 2022

## **ADDENDUM NO. 1**

CONTRACT NO.: 20065  
OWNER: CITY OF LaGRANGE  
PROJECT: LONG CANE CREEK POLLUTION CONTROL PLANT IMPROVEMENTS  
BID DATE: ~~May 12, 2022~~ **MAY 18, 2022**  
TO: ALL PROSPECTIVE BIDDERS

The changes, modifications, and/or additions covered by and outlined in this Addendum No.1 shall become part of and be incorporated in the Specifications, Contract Documents, and Bid Documents for the above-referenced project:

### **BIDDING REQUIREMENTS TO BE MODIFIED BY ADDENDUM:**

#### **AD1.1 INSTRUCTIONS TO BIDDERS**

BID DATE REVISION: Sealed Proposals will be received by the **City of LaGrange at 200 Ridley Avenue, LaGrange, GA 30240, Conference Room No. 2 (Located on Third Floor)** where bids will be received, until **2:00 PM Eastern Time on May 18, 2022**,

### **CONTRACT CLARIFICATIONS TO BE PROVIDED BY ADDENDUM:**

#### **AD1.2 ALTERNATE BID ITEM NO. 3 – MODIFICATIONS TO AERATION BASINS**

1. Addendum No. 1 includes HVAC modifications required at the Headworks Electrical Building (Plans and Specifications included in Alternate Bid Items 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11, 1.12, 1.13, 1.14, 1.21, 1.22, 1.28, 1.29, 1.30, 1.31). The modifications are only required with the work associated with Alternate Bid Item No. 3 – Modifications to Aeration Basins. All costs associated with the HVAC modifications to include electrical service shall be included in Alternate Bid Item No. 3.

### **SPECIFICATIONS TO BE ADDED BY ADDENDUM:**

#### **AD1.3 SPECIFICATION SECTION 230500 – MECHANICAL GENERAL**

1. Add the attached specification Section 230500 – Mechanical General in its entirety.

- AD1.4      **SPECIFICATION SECTION 230505 – MECHANICAL SUBMITTALS**
1. Add the attached specification Section 230505 – Mechanical Submittals in its entirety.
- AD1.5      **SPECIFICATION SECTION 230510 – BASIC MATERIALS AND METHODS**
1. Add the attached specification Section 230510 – Basic Materials and Methods in its entirety.
- AD1.6      **SPECIFICATION SECTION 230593 – TESTING, ADJUSTING, AND BALANCING**
1. Add the attached specification Section 230593 – Testing, Adjusting, and Balancing in its entirety.
- AD1.7      **SPECIFICATION SECTION 230700 – HVAC INSULATION**
1. Add the attached specification Section 230700 – HVAC Insulation in its entirety.
- AD1.8      **SPECIFICATION SECTION 230933 – TEMPERATURE CONTROLS**
1. Add the attached specification Section 230933 – Temperature Controls in its entirety.
- AD1.9      **SPECIFICATION SECTION 232301 – REFRIGERANT PIPING SYSTEMS**
1. Add the attached specification Section 232301 – Refrigerant Piping Systems in its entirety.
- AD1.10     **SPECIFICATION SECTION 233131 – LOW PRESSURE DUCTWORK**
1. Add the attached specification Section 233131 – Low Pressure Ductwork in its entirety.
- AD1.11     **SPECIFICATION SECTION 233713 – REGISTERS, GRILLES, AND DIFFUSERS**
1. Add the attached specification Section 233713 – Registers, Grilles, and Diffusers in its entirety.
- AD1.12     **SPECIFICATION SECTION 234105 – AIR FILTERS**
1. Add the attached specification Section 234105 – Air Filters in its entirety.
- AD1.13     **SPECIFICATION SECTION 236201 – AIR COOLED CONDENSING UNITS**
1. Add the attached specification Section 236201 – Air Cooled Condensing Units in its entirety.

**AD1.14      SPECIFICATION SECTION 238126 – SPLIT SYSTEM DX AIR HANDLING UNITS**

1. Add the attached specification Section 238126 – Split System DX Air Handling Units in its entirety.

**SPECIFICATIONS TO BE REPLACED BY ADDENDUM:****AD1.15      PROPOSAL FORM**

1. Replace the PROPOSAL FORM in its entirety with the attached. An updated cost provided for the WWTP SCADA System, Line Item No. 3.

**AD1.16      SECTION 331215 – HYDRAULIC GATES**

1. Replace Specification Section 331215 – Hydraulic Gates in its entirety with the attached.

**AD1.17      SECTION 444226.21 – SEPTAGE RECEIVING STATION**

2. Replace Specification Section 444226.21 – Septage Receiving Station in its entirety with the attached.

**AD1.18      APPENDIX A – SCADA SCOPE OF WORK**

1. Replace Appendix A – SCADA SCOPE OF WORK in its entirety with the attached.

**SPECIFICATIONS TO BE REVISED BY ADDENDUM:****AD1.19      ABB/GE SHALL BE ADDED AS AN APPROVED MANUFACTURER TO THE FOLLOWING SPECIFICATION SECTIONS:**

1. 260573 – POWER DISTRIBUTION SYSTEM ELECTRICAL STUDIES
2. 262413 – SWITCHBOARDS
3. 262417 – LIGHTING PANELBOARDS

**AD1.20      SECTION 444626 – CLARIFIER AND THICKENER EQUIPMENT**

1. Specification Section 444626 – Clarifier and Thickener Equipment, 1.2.A, Remove the following:
  1. Algae Sweep Automation Clarifier Cleaning System
  2. Scraper Type Sludge Thickener

**PLANS TO BE ADDED BY ADDENDUM:****AD1.21     SHEET M0-01 – MECHANICAL LEGEND, ABBREV., SCHEDULES AND DETAILS**

1. Add the attached Plan Sheet M0-01 – Mechanical Legend, Abbrev., Schedules and Details in its entirety.

**AD1.22     SHEET M1-01 – ELECTRICAL BUILDING FLOOR PLAN MECHANICAL**

1. Add the attached Plan Sheet M1-01 – Electrical Building Floor Plan Mechanical in its entirety.

**PLANS TO BE REVISED BY ADDENDUM:****AD1.23     SHEET C3-03 – AERATION BASIN IMPROVEMENTS ENLARGED PLAN & DETAIL**

1. Add the attached Plan Sheet C3-03 – Aeration Basin Improvements Enlarged Plan & Detail in its entirety. Equipment grout is identified under the new surface aerator.

**AD1.24     SHEET C6-03 – AEROBIC DIGESTER MODIFICATIONS PLAN**

1. Sheet C6-03 – Aerobic Digester Modifications Plan has been modified to show a wall penetration for the 8-inch D.I. Septage Effluent.

**AD1.25     SHEET C6-04 – AEROBIC DIGESTER MODIFICATIONS SECTIONS**

1. Sheet C6-04 – Aerobic Digester Modifications Sections has been modified to show a wall penetration for the 8-inch D.I. Septage Effluent.

**Plan Sheet  
AD1.26     SHEET C9-01 – NEW SEPTAGE RECEIVING STATION PLAN & SECTION (ALT. BID ITEM NO. 2)**

1. Sheet C9-01 – New Septage Receiving Station Plan & Section (Alt. Bid Item No. 2) has been modified to provide spot elevations for the septage receiving station concrete slab.

**AD1.27     SHEET DT-03 – MISCELLANEOUS DETAILS**


1. Sheet DT-03 – Miscellaneous Details has been modified to remove the dumpster floor drain detail.

**AD1.28     SHEET E0-01 – ELECTRICAL LEGEND**

1. Add the attached Plan Sheet E0-01 – Electrical Legend in its entirety.

- AD1.29     **SHEET E0-02 – ELECTRICAL NOTES & FIXTURE SCHEDULE**
1. Add the attached Plan Sheet E0-03 – Electrical Notes & Fixture Schedule in its entirety.
- AD1.30     **SHEET E0-06 – ELECTRICAL SCHEDULES**
1. Add the attached Plan Sheet E0-06 – Electrical Schedules in its entirety.
- AD1.31     **SHEET E10-02 – HEADWORKS ELECTRICAL ROOM ELECTRICAL PLAN**
1. Add the attached Plan Sheet E10-02 – Headworks Electrical Room Electrical Plan in its entirety.
- AD1.32     **SHEET EC-04 – NPDES PERMIT REQUIREMENTS**
1. Add the attached Plan Sheet EC-04 NPDES Permit Requirements in its entirety.
- AD1.33     **SHEET EC-07 – EROSION CONTROL PLAN**
1. Add the attached Plan Sheet EC-07 Erosion Control Plan in its entirety. The sheet has been updated to identify the Clearing Phase Requirements.
- AD1.34     **SHEET EC-08 – EROSION CONTROL PLAN**
1. Add the attached Plan Sheet EC-08 Erosion Control Plan in its entirety. The sheet has been updated to identify the Grading Phase Requirements.
- AD1.35     **SHEET EC-09 – EROSION CONTROL PLAN**
1. Add the attached Plan Sheet EC-09 Erosion Control Plan in its entirety. The sheet has been updated to identify the Final Phase Requirements.
- AD1.36     **SHEET EC-10 – EROSION & SEDIMENT CONTROL DETAILS**
1. Add the attached Plan Sheet EC-10 Erosion & Sediment Control Details in its entirety. The sheet has been renamed to move to the correct location in the Plan Set.

Krebs Engineering, Inc.

By   
Scott T. Lee, P.E.  
Sr. Associate

## **SECTION 23 05 00 - MECHANICAL GENERAL**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS:

- A. The "General Conditions", "Supplementary Conditions", Statutory Declarations, Special Conditions and Division 1 of the specifications as written and referred to are adopted and made part of Division 23.

#### 1.2 SUBMITTALS:

- A. Submittals shall include the documents listed below:
  - 1. Certificates of Inspection and Approval.
  - 2. Qualifications of Superintendent.
  - 3. Schedule of utility or service interruptions.
  - 4. "Work Around" Plans for interrupting systems and providing temporary utilities.
  - 5. Warranties.
  - 6. List of proposed material manufacturers.
  - 7. Coordination drawings.
  - 8. Operating and Maintenance Manuals.
  - 9. Record as-built prints.
  - 10. Record electronic as-built drawings.

#### 1.3 DESCRIPTION OF WORK:

- A. Provide equipment, labor, material, etc., required to make a complete working installation as shown or as specified.
- B. Equipment and materials used in the work shall be:
  - 1. In accordance with the contract documents.
  - 2. The best quality and grade for the use intended.
  - 3. New and unused.
  - 4. The manufacturer's latest standard or current model.

- C. All equipment and method shall be installed and connected in accordance with the best engineering practices and in accordance with the manufacturer's recommendations.
1. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.
  2. The term "conveniently accessible" is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.
  3. Contractor is responsible for dimensions and sizes of equipment. Inform Prime Engineer in writing of equipment differing from that shown.

D. Mechanical work includes, but is not limited to:

1. Obtain all permits and inspections including: building permits and health department permits.
2. Disconnect, remove and re-install mechanical services located on or crossing through contract limits, above or below grade, obstructing construction of project or conflicting with completed project or any applicable codes.
3. Maintain existing systems in operating condition to serve the continued operation for partial building occupancy spaces that must remain in operation during the construction period.
4. Modify, extend or tie-into existing mechanical services or systems.
5. Complete alterations and additions to ventilating systems.
6. Complete the ductwork.
7. Complete the casing and plenums.
8. Install devices furnished by the Temperature Controls sub-contractor.
9. Testing and Balancing will be by Independent Agency paid by this Contractor.

1.4 WORK IN EXISTING BUILDINGS:

- A. Existing mechanical systems serving spaces involved in construction, or areas affected by construction, must be maintained and protected.
- B. Contractor shall protect existing systems to keep them operational, or shall relocate the systems to keep them operational.

- C. Temporary systems shall maintain the same level of capacity, protection, and safety provided by the permanent system being modified.
- D. Coordinate routing of temporary systems and scheduling of interruptions with General Contractor , other trades, and Owner.
- E. Disconnect and remove temporary systems when permanent systems are installed and running.
- F. Contractor shall prepare drawings showing proposed methods of modifying existing systems (Work Around Plans) to maintain services to existing spaces during construction.

1.5 WORK NOT INCLUDED:

- A. Finish painting of piping, ductwork or equipment.
- B. Electrical wiring and conduits shown on the electrical drawings.
- C. Asbestos removal.

1.6 RELATED WORK SPECIFIED ELSEWHERE:

- A. Electrical: Division 26.

1.7 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Obtain and pay for all permits required for the work. Comply with all ordinances pertaining to work described herein.
- B. Install the work under this Division in accordance with drawings and specifications and the standards and codes (latest edition) that apply to this work. In the event of a conflict, install work in accordance with the most stringent code requirements determined by Architect or Engineer.
- C. Arrange, pay for and complete work to pass required tests by agencies having authority over work. Deliver to Prime Engineer Certificates of Inspection and approval issued by authorities.

1.8 QUALIFICATION OF CONTRACTOR:

- A. Has completed minimum two projects same size and scope in past five (5) years.
- B. This qualification applies to Sub-Contractors.
- C. Use workmen experienced in their respective trade. Submit qualifications of Superintendent for review.
- D. Owner reserves right to reject bid of any Contractor failing to meet these qualifications.



## 1.9 GENERAL JOB REQUIREMENTS:

### A. Drawings and Specifications:

1. Work for the mechanical trades are shown on the drawings series M (HVAC).
2. Drawings and specifications are complementary. Work called for by one is binding as if called for by both.
3. Drawings are drawn to a small scale and are diagrammatic only. The drawings indicate size and general arrangement of equipment.
4. Do not scale drawings for exact locations. Refer to architectural drawings. Field measurements take precedence.

### B. Provide necessary offsets, elbows and fittings as required to avoid conflict with equipment of other Divisions and to obtain proper headroom and clear passageways. This shall be done at no additional cost to the Owner.

### C. Visit to Site/Work in other Division:

1. Examine not only the plans and specifications for this Division, but plans and specifications of the other Divisions of work and visit the site to become acquainted with existing conditions. Execution of Contract is evidence that Contractor has examined all drawings and specifications, and that all conditions which have a bearing in any way on the manner of installing the work in this Division are known. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.

### D. Underground Utilities/Concealed Utilities:

1. All utilities and services, whether shown on the drawings or not, shall be suitably protected and maintained, and any damages thereto shall be promptly repaired. Owner shall be advised immediately of any damages sustained. If any extra expense is incurred due to the existence of buried utilities not shown on the drawings, or the location of which is not made known to the Contractor, the contract price shall be adjusted in accordance with the General Conditions. The Contractor shall advise the Owner three (3) days in advance of any operation which could possibly disrupt any underground utility. The Contractor shall utilize locator services to mark any underground utilities in the area he is working in, and shall make any other measure deemed necessary to avoid utility disruption.

### E. Definitions:

1. Concealed: Materials or systems not visible. Work installed above a ceiling, furred behind a wall or enclosed in a chase.
2. Exposed: Materials or systems that are visible. Work installed in a

room without a ceiling. Work not enclosed by walls.

3. Provide: Furnish, install and make complete.
4. Install: Receive, unload, move into place, and make connections.
5. Work: Materials completely installed and connected.
6. ADC: Air Diffusion Council.
7. AGA: American Gas Association.
8. AMCA : Air Movement and Control Association.
9. ANSI: American National Standard Institute.
10. API: American Petroleum Institute.
11. ARI: American Refrigeration Institute.
12. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers.
13. ASME: American Society of Mechanical Engineers.
14. ASTM: American Society of Testing Materials.
15. AWS : American Welding Society.
16. FM: Association of Factory Mutual Fire Insurance Company.
17. INT'L: Building Code, Gas Code, Mechanical Code, Plumbing Code.
18. MSS: Manufacturer's Standard Society of the Valve and Fittings Industry, Inc.
19. NEC: National Electrical Code.
20. NEMA: National Electrical Manufacturer's Association.
21. NFPA: National Fire Protection Association.
22. NRCA : National Roofing Contractors Association.
23. OSHA: Occupational Safety and Health Act.
24. SMACNA: Sheet Metal and Air Conditioning Contractors National Association.
25. UL: Underwriters Laboratories.

F. Workmanship, Warranty and Acceptance:

1. Work under this Division shall be first class with emphasis on neatness and workmanship.
2. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. Installation subject to Architect's or Engineer's observation, final approval, and acceptance. Architect or Engineer may reject unsuitable work.
3. Furnish Prime Engineer written warranty, stating that if workmanship and/or materials executed under this Division is proven defective within one (1) year after final acceptance, such defects and other work damaged will be repaired and/or replaced.
4. In event that project is occupied or system placed in operation in several phases at Owner's request, warranty will begin on date each system or item of equipment is accepted by Owner.

G. Observations of Work and Demonstration of Operation:

1. When observations are scheduled, provide sufficient personnel to expedite removal of access doors, coverplates, manholes covers, etc.
2. Contractor to assist Architect or Engineer in demonstration of operation of new systems to satisfaction of Owner. Contractor to have manpower available for demonstration of systems where requested by Owner.

H. Materials and Substitutions:

1. All materials shall be new. All materials and equipment for which a UL Standard, an AGA approval, an AWWA standard, FM listing or ASME requirements is established, shall be so approved and labeled or stamped.
2. Wherever in these specifications products are specified by manufacturer's name, bids shall be based on the named products. Where more than one manufacturer's name is mentioned, the one first listed establishes the standard for that product. If the bidder desires to submit a product of a manufacturer other than listed first, it must be the equivalent of the one listed first.
3. The drawings are based on the use of products specified and listed first. If any revision in piping, conduit work, foundations, anchor bolts, connections, etc., is required by other named products or approved substitutions, it shall be the Contractor's responsibility to make such revisions at no additional expense to the Owner.
4. If any bidder desires to submit products of manufacturers not listed, he may submit a request for prior approval to the Engineer no later than 10 days prior to the bid date. If the Engineer decides to accept the manufacturers, they will be listed as "Approved" by written addendum.

5. If the manufacturers are not listed as approved either by addendum or in the specifications, they will not be accepted.
  6. Submit to Prime Engineer a complete list of proposed material manufacturers. List does not preclude submission of shop drawings. Approval of manufacturer or list does not constitute approval of specific material or equipment.
- I. Coordination Drawings:
1. Prepare coordination plan drawings. Drawings shall be drawn at not less than 1/4" equals 1 foot scale on architectural building background.
  2. Drawings shall identify:
    - a. Structural elevations
    - b. Gravity piping elevations
    - c. Ductwork elevations
    - d. Piping elevations
    - e. Conduit (3" and larger) elevations
    - f. Equipment
    - g. Cable tray/bus duct elevations
- J. Operating and Maintenance Manuals:
1. Provide maintenance and operating manuals bound in 8-1/2" x 11" hardback, three-post binders. Manuals shall contain written instructions for each system, shop drawings, schematic drawings, equipment catalog cuts, manufacturer's instructions, manufacturers warranties, and valve tag list.
  2. Arrange information in the following sequence: title of job, Owner, address, date of submittal, name of Contractor, name of Engineer, index, shop drawings, operating instruction, Contractor's purchase order numbers, supplier's name and address, date of start-up of each piece of equipment and valve tag list.
  3. Submit one (1) copy for review. Make required corrections, and submit two (2) record copies.
- K. Record As-Built:
1. Provide Record as-builts at the completion of job. Keep set of prints on job and record day to day changes to Contract drawings with red pencil. Indicate actual location of piping, ductwork, valves, dampers, and equipment. Turn over prints to Prime Engineer at final observation.
  2. Provide the following items for Owner at time of substantial completion:
    - a. Certificates of inspection and approval from authorities having jurisdiction.

- b. Warranties.
- c. Record as-built prints.
- d. Record as-built electronic plans in auto cad format.
- e. Operating and Maintenance Manuals - Printed Binders (3 copies).
- f. Operating and Maintenance Manuals - PDF Files on CD-Rom (1 Disk).
- g. Spare Parts (furnish receipt).
- h. Affidavit of Owner Instruction (1 copy).
- i. Release of Liens.

1.10 PROTECTION AND STORAGE:

- A. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury.
- B. Protect all equipment and materials, from damage by weather, entrance of water or dirt. Cap open piping, use plastic covers made for that purpose. Do not use rags or construction debris.
- C. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
- D. Protect all surfaces from weld spatter, solder and cutting oil.
- E. Deliver equipment and materials to job site in original, unopened, labeled container. Store to prevent damage and injury. Store ferrous materials to prevent rusting. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Storage space on site and in building designated by Owner/Prime Engineer.

END OF SECTION 23 05 00

## **SECTION 23 05 05 - MECHANICAL SUBMITTALS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY:**

- A. This Section includes procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

#### **1.3 DEFINITIONS:**

- A. Action Submittals: Written and graphic information that requires Engineer's through the Prime Engineer's responsive action.

#### **1.4 SUBMITTAL PROCEDURES:**

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals for a fee.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Concurrent Review: Where concurrent review of submittals by other

consultants, Owner, or other parties is required, allow 21 days for initial review of each submittal.

- a. Division 23 equipment requiring electrical connection
3. If intermediate submittal is necessary, process it in same manner as initial submittal.
  4. Allow 15 days for processing each resubmittal.
  5. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
  3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name and address of Contractor.
    - e. Name and address of Sub-Contractor.
    - f. Name and address of supplier.
    - g. Name of manufacturer.
    - h. Unique identifier, including revision number.
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- G. Number of Copies:
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
  2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Transmittal: Package submittals into binders or booklets.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
3. Transmittal Form: Provide locations on form for the following information:
  - a. Project name.
  - b. Date.
  - c. Destination (To:).
  - d. Source (From:).
  - e. Names of subcontractor, manufacturer, and supplier.
  - f. Category and type of submittal.
  - g. Submittal purpose and description.
  - h. Submittal and transmittal distribution record.
  - i. Remarks.
  - j. Signature of transmitter.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Engineer in connection with construction.

## PART 2 - PRODUCTS

### 2.1 SUBMITTALS:

- A. General: Prepare and submit Submittals required by individual Specification Sections.
  1. Number of Copies: Submit 6 copies of each submittal, unless otherwise indicated. Engineer will return 4 copies. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.



3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operating and maintenance manuals.
    - k. Compliance with recognized trade association standards.
    - l. Compliance with recognized testing agency standards.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shopwork manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Design calculations.
    - j. Compliance with specified standards.
    - k. Notation of coordination requirements.
    - l. Notation of dimensions established by field measurement.
  2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-½ by 11 inches, but no larger than 30 by 40 inches.
  4. Number of Copies: Submit one correctable, translucent, reproducible print and one blue- or black-line print of each submittal. Engineer through Architect will return the reproducible print.
  5. Number of Copies: Submit 6 prints where prints are required for operation and maintenance manuals. Engineer and Architect will retain one print each; remainder will be returned.

D. Coordination Drawings:

1. Coordination drawings shall be prepared on sheets the same size as the contract drawings.
2. Number of submittal copies: Submit one reproducible copy of the coordination drawing. Engineer through Architect will return the reproducible.
3. Number of copies after approval: After approval, submit one black line copy of the coordination drawings for the record copy.
4. Refer to Division One for additional coordination requirements.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Review of submittals by Engineer is to insure general quality conformance with the contract documents. The contractor assumes all responsibility for dimensions, quantities, conditions that pertain to the fabrication and installation, and for processes and techniques of construction.
- B. Review of submittals or shop drawings by Engineer does not relieve Contractor of responsibility for errors or omissions during the submittal process. Submittal review does not relieve the contractor of any obligation in the contract documents.
- C. Products of one manufacturer have been scheduled or specified as the basis of design. Any modifications to ductwork, piping, wiring, building structure, etc. that results from the use of any other products shall be coordinated by this contractor with all trades prior to delivery of approved product from the manufacturer. All modifications required shall be performed without incurring any additional cost to the Contract. Contractor shall document all modifications on the as-built record plans.

3.2 CONTRACTOR'S REVIEW:

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.3 ENGINEER'S ACTION:

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. Approved - Fabrication/Installation may be undertaken.
  2. Approved as Noted - Fabrication/Installation may be undertaken.
  3. Revise and Resubmit - Fabrication/Installation MAY NOT be undertaken. In resubmitting, limit corrections to items marked.
  4. Rejected - Fabrication/Installation MAY NOT be undertaken. In resubmitting, limit corrections to items marked.
- C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

3.4 SUBMITTAL SCHEDULE:

- A. See Attachment.

END OF SECTION 23 05 05

## SECTION 23 05 05 – ATTACHMENT

### SUBMITTAL SCHEDULE

23 0500..... Mechanical General

- Certificates of Inspection and Approval.
- Qualification of Superintendent.
- Schedule of utility interruptions.
- "Work Around" Plans for interrupting systems and providing temporary utilities.
- Warranties.
- List of proposed material manufacturers.
- Coordination drawings.
- Operating and Maintenance Manuals.
- Record as-built prints.
- Record electronic as-built drawings.

23 0505..... Mechanical Submittals

- N/A.

23 0510..... Basic Materials and Methods

- Miscellaneous stainless steel
- Equipment identification

23 0593..... Testing, Adjusting, and Balancing

- 6 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.

23 0600..... Louvers

- Manufacturer's complete and current product data, including test data certifying compliance.
- Submit product finish color to Engineer for written approval before ordering.
- Shop drawings,
- Plans
- Elevations and details of sections and connections to adjoining work
- Indicate other information showing compliance with requirements:
  - Materials,
  - Finishes,
  - Fasteners,
  - Joining,
- Technical Data:
  - Provide performance capacity data for louvers at area, velocity, etc., of the scheduled louvers and provide same data for a standard 48" x 48" size louver at 1000 fpm velocities.

23 0700.....HVAC Insulation

- ❑ Insulation
- ❑ Jacketing
- ❑ Tapes
- ❑ Hardware
- ❑ Mastics
- ❑ Adhesives
- ❑ Submittals shall use pages from Midwest Insulation Contractors Association - "Commercial and Industrial Insulation Standards" for defining how insulation materials will be applied.

23 3113..... Low Pressure Ductwork

- ❑ Sheet Metal:
  - ❑ Gages by sizes.
  - ❑ ASTM Standards.
- ❑ Duct Fabrication Standards and Reinforcement:
  - ❑ Joint construction.
  - ❑ Fitting construction.
  - ❑ Joint and reinforcement spacing.
  - ❑ Splitter damper and duct tap details.
  - ❑ Flange details.
- ❑ Hangers:
  - ❑ Rods - sizes by duct.
  - ❑ Straps.
  - ❑ Trapeze.
  - ❑ Spacing.
- ❑ Duct sealers.
- ❑ Control Dampers.
- ❑ Actuators.
- ❑ Testing or listing certification, dimensional data and manufacturers literature on all manufactured products.

23 3423..... Power Ventilators

- ❑ Dimensional information.
- ❑ Electrical connection and motor data.
- ❑ List of accessories or auxiliary items.
- ❑ Sound power levels at the mid frequency of each band.

15850.01..... Split System DX Air Handling Units

- ❑ Unit Housing:
  - ❑ Certified dimensional drawings.
  - ❑ Casing Construction.
  - ❑ Insulation.
- ❑ Fan:
  - ❑ Fan curves.
  - ❑ RPM.
  - ❑ Break Horsepower.
- ❑ Motor:

- Manufacturer's data sheet.
- Coils:
  - Manufacturer's data sheet.
  - Coil selection input/output using an ARI-410 certified selection program.
- Filter:
  - Manufacturer's data sheet.
  - Filter frame size and quantity of filters.
- Sound Power Level:
  - Octave band reference 10-12 watt.
  - Inlet and outlet.

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## SECTION 23 05 10 - BASIC MATERIALS AND METHODS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK:

- A. Provide equipment, labor, materials, etc. required to make a complete working installation as shown or as specified.

#### 1.2 SUBMITTALS:

- A. Provide submittals for:
  - 1. Miscellaneous stainless steel
  - 2. Equipment identification

### PART 2 - PRODUCTS

#### 2.1 MISCELLANEOUS STAINLESS STEEL:

- A. ASTM A-276 Structural Stainless Steel

### PART 3 - EXECUTION

#### 3.1 CUTTING AND PATCHING:

- A. Contractor shall be responsible for cutting and patching.
- B. Cut walls, floors, ceilings, partitions, etc., required for the installation of this work in a neat and careful manner. Core drill for pipe sleeves and other openings through floors and walls. Sawcut larger openings. Cutting shall be kept to a minimum. Obtain approval of Prime Engineer before cutting or drilling.
- C. Replace or repair ductwork, conduit, piping, etc., that is cut. Patch around opening cut by this Contractor or provided by others for him. Patching shall be done by an approved qualified contractor, but shall be paid for by this Contractor. Finished patching shall retain fire and smoke ratings of the assembly and shall match surrounding finish.

#### 3.2 ANCHORS:

- A. Mount all equipment, brackets, hangers, anchors, etc. to safely resist the vibration or thrust forces and support the unit's weight. Anchors, brackets, etc. shall be structural stainless steel.

#### 3.3 EQUIPMENT IDENTIFICATION:

- A. Identify each piece of equipment with a 1/8 inch thick engraved melamine plastic laminate nameplate. Letters shall be 1/2 inch high standard style. Names, abbreviations, and numbering shall agree with the corresponding equipment designations shown on the drawings. Use black letters cut in a white background



for all equipment on standard electrical power and use white letters cut in a red background for all equipment on emergency power. (Coordinate with Division 26 "Electrical" Contractor).

- B. Fasten nameplates to equipment in a conspicuous location using contact epoxy adhesive.

END OF SECTION 23 05 10

## **SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. This section specifies the requirements and procedures for total mechanical systems testing, adjusting, and balancing (T/A/B) as required to meet design specifications, plus recording and reporting the results.

#### **1.2 SUMMARY:**

- A. Prior to acceptance and before final inspection, test and balance the air systems as listed herein and as specified hereinafter and submit reports as specified hereinafter.
- B. The mechanical contractor has numerous responsibilities associated with the test and balance, it is imperative that the test and balance contractor coordinate these responsibilities with them.
- C. Test, adjust, and balance the following mechanical systems:
  - 1. Supply air systems, all pressure ranges;
  - 2. Return air systems;
  - 3. Exhaust air systems;
  - 4. Verify temperature control system operation.
- D. This Section does not include:
  - 1. Testing boilers and pressure vessels for compliance with safety codes;
  - 2. Specifications for materials for patching mechanical systems;
  - 3. Specifications for materials and installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing, refer to the respective system sections for materials and installation requirements.

#### **1.3 CODES AND STANDARDS:**

- A. Applicable publications: The following publications form a part of this specification, to the extent that they represent minimum standards. Where this specification exceeds these standards, this specification shall be followed.
- B. Associated Air Balance Council (AABC) National Standards or Field Measurement and Instrumentation, latest edition.

- C. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbook - Fundamentals, latest edition.
- D. Chapters on Testing, Adjusting, and Balancing of Environmental Systems and Related Subjects, ASHRAE Handbook - Systems, latest edition.
- E. National Environmental Balancing Bureau (NEBB)
- F. Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems, latest edition.
- G. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) HVAC System - Testing, Adjusting and Balancing, latest edition.

#### 1.4 QUALIFICATIONS FOR TEST AND BALANCE CONTRACTOR:

- A. The test and balance contractor shall be an independent contractor that regularly performs air systems testing and balancing. Minimum qualifications for acceptance shall be general membership in NEBB or AABC, except that affiliation with manufacturers, installing, contractors, or engineering firms may not preclude acceptance.
- B. Supervisor directly in charge of the air testing and balancing work shall be a registered professional engineer, in the state where the project is located, with not less than five (5) years experience in the mechanical contracting industry and not less than two (2) years experience in testing and balancing of heating, ventilating, and air conditioning systems. The supervisor shall stamp the title page of the test and balance report with his professional engineer's stamp.
- C. The supervisor and the lead test and balance mechanic shall be certified as test and balance technicians by one or more of the following groups, AABC, NEBB, SMACNA, ASHRAE, or the Sheet Metal Workers Union.
- D. Instrument calibration: Calibrate all instruments required for air and water balancing within a period of six months prior to their use on this project, per NEBB or AABC standards and the instrument manufacturers.
- E. Tests shall be conducted in presence of the Architect-Engineer and/or the Owner or their representatives. Notify the Architect-Engineer and Owner in writing five working days before the start of testing.

#### 1.5 DEFINITIONS:

- A. Adjust: To regulate flow rate and air patterns at the terminal equipment, such as to increase or reduce fan speeds or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including sub-mains, branches, and terminals, according to design quantities.
- C. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow,

whereby more heat is withdrawn from a person's skin than is normally dissipated.

- D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- E. Report Forms: Test data sheets for recording test data in logical order.
- F. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- G. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- H. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- I. Test: A procedure to determine quantitative performance of a system or equipment.
- J. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.
- K. AABC: Associated Air Balance Council.
- L. AMCA: Air Movement and Control Association.
- M. ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.
- N. NEBB: National Environmental Balancing Bureau.
- O. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

#### 1.6 SUBMITTALS:

- A. Certified Testing, Adjusting, and Balancing Reports: Submit 6 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting, and balancing Agent.

#### 1.7 QUALITY ASSURANCE:

- A. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by either AABC or NEBB.
- B. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports

2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
- C. Testing, Adjusting, and Balancing Reports: Use testing, adjusting, and balancing Agent's standard forms approved by the Engineer.
- D. Instrumentation Type, Quantity, and Accuracy: As described in AABC national standards.
- E. Instrumentation Calibration: Calibrate instruments at least every 6 months or more frequently if required by the instrument manufacturer.

#### 1.8 COORDINATION:

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.
- B. Notice: Provide 7 days' advance notice for each test. Include scheduled test dates and times.
- C. Perform testing, adjusting, and balancing after leakage and pressure tests on air distribution systems have been satisfactorily completed.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

##### 3.1 THE MECHANICAL CONTRACTOR'S RESPONSIBILITIES:

- A. Furnish the test and balance contractor one complete set of accepted equipment data and one complete set of accepted mechanical shop drawings.
- B. The mechanical contractor shall be responsible for advising the test and balance contractor of any change(s) made to the system(s) during the construction process.
- C. Mechanical contractor shall provide drawings, specifications, shop drawings, control diagrams, etc. detailing the change(s) to the test and balance contractor.
- D. Replace and/or install pulleys, belts and dampers as required for the correct balance as directed by the test and balance contractor.
- E. Allocate time in the construction schedule for test and balance procedure.
- F. Assist the test and balance contractor in coordinating work with the other trades.
- G. Place all systems and necessary allied devices required, and only those

required, for each working day of the testing and balancing procedures into "Full Call" operation. At the completion of the testing and balancing procedures for the day, the mechanical contractor shall return the systems to normal operation or shut them down.

- H. Prepare the air side system for testing and balancing as follows, (all new and existing devices are included):
1. Mechanically check all rotating air devices, to insure that the devices are capable of operation under normal design modes and have correct rotation and the related automatic controls are functional and calibrated.
  2. All balancing, splitter, volume and control dampers shall be in their respective neutral position or fully open. All locking devices shall be functional and secured.
  3. All air distribution inlet and outlet devices (i.e., grilles, registers, diffusers, and etc.) shall be fully open. All locking devices shall be functional and secured.
  4. All automatic controls (i.e., direct digital, electronic, electric, pneumatic, and/or any combination thereof) shall be mechanically and electrically checked and be available to operate under design conditions.
  5. Air control locking devices (i.e., control rods, quadrants, and etc.) shall be permanently marked to represent the true position of their respective control surfaces. The locking devices markings shall be inconspicuous in occupied areas.
  6. Install new air filters before the start of testing and as directed by the test and balance contractor in order to meet design conditions of the air handling devices. Provide air control devices, such as balancing dampers, as per the drawings and specifications, and as directed by the test and balance contractor in order to obtain the proper balance conditions.

### 3.2 EXAMINATION:

- A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
  2. Verify that balancing devices are installed as required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.

- C. Examine equipment performance data, including fan curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce the performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- D. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.
- E. Examine system and equipment test reports.
- F. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- G. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- H. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

### 3.3 PREPARATION:

- A. Prepare a testing, adjusting, and balancing plan that includes strategies and step-by-step procedures.
- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
  - 1. Permanent electrical power wiring is complete.
  - 2. Automatic temperature-control systems are operational.
  - 3. Equipment and duct access doors are securely closed.
  - 4. Balance and fire dampers are open.
  - 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  - 6. Windows and doors can be closed so design conditions for system operations can be met.

### 3.4 GENERAL TESTING AND BALANCING PROCEDURES:

- A. Perform testing and balancing procedures on each system according to the procedures contained in 2019 ASHRAE Applications Handbook Chapter 39, AABC or NEBB national standards and this Section.
- B. Cut insulation, ducts,, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.
- C. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, fan-speed-control levers, and similar controls and devices, to show final settings.

### 3.5 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES:

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- D. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling unit components.

### 3.6 CONSTANT-VOLUME AIR SYSTEMS' BALANCING PROCEDURES:

- A. Adjust fans to deliver total design airflow within the maximum allowable rpm listed by the fan manufacturer.
  - 1. Measure fan static pressures to determine actual static pressure as follows:



- a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
  - b. Measure static pressure directly at the fan outlet or through the flexible connection.
  - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
  - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
2. Measure static pressure across each air-handling unit component.
    - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
  3. Measure static pressures entering and leaving other devices such as sound traps under final balanced conditions.
  4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. The Contractor shall make recommended corrective changes to align design and actual conditions.
  5. Adjust fan speed higher or lower than design, as necessary to attain design flow and pressure values. The Contractor shall make required replacements or adjustments to pulleys and belts to accommodate fan-speed changes.
  6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure no overload will occur. Measure amperage in full cooling, full heating, and economizer modes to determine the maximum required brake horsepower. The Contractor shall replace any equipment that does not perform as stated in the submitted product literature.
- B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to design airflows within specified tolerances.
1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
  2. Where sufficient space in sub-mains and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  3. Remeasure each sub-main and branch duct, after all have been adjusted. Continue to adjust sub-mains and branch ducts to design airflows within specified tolerances.

- C. Measure terminal outlets and inlets without making adjustments.
  - 1. Measure terminal outlets using a direct-reading hood or the outlet manufacturer's written instructions and calculating factors.
- D. Adjust terminal outlets and inlets for each space to design airflows within specified tolerances of design values. Make adjustments using volume dampers rather than extractors and the dampers at the air terminals.
  - 1. Adjust each outlet in the same room or space to within specified tolerances of design quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  - 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

### 3.7 TOLERANCES:

- A. Set HVAC system airflow rates within the following tolerances:
  - 1. Supply, Return, and Exhaust Fans: Plus 5 to plus 10 percent.
  - 2. Air Outlets and Inlets: 0 to minus 10 percent.

### 3.8 INITIAL REPORTING:

- A. Based on examination of the Contract Documents as specified in "Examination" Article above, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.9 FINAL REPORT:

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems. All data may not apply to all project devices, provide data as applicable to the piece of equipment being tested.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
  - 1. Include a list of the instruments used for procedures, along with proof of calibration.

- C. Final Report Contents: In addition to the certified field report data, include the following:
1. Fan curves.
  2. Manufacturers' test data.
  3. Field test reports prepared by system and equipment installers.
  4. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.
- D. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
1. Title page.
  2. Name and address of testing, adjusting, and balancing Agent.
  3. Project name.
  4. Project location.
  5. Engineer's name and address.
  6. Contractor's name and address.
  7. Report date.
  8. Signature of testing, adjusting, and balancing Agent who certifies the report.
  9. Summary of contents, including the following:
    - a. Design versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  10. Nomenclature sheets for each item of equipment.
  11. Data for terminal units, including manufacturer, type size, and fittings.
  12. Notes to explain why certain final data in the body of reports vary from design values.
  13. Test conditions for fans performance forms, including the following:
    - a. Settings for outside-, return-, and exhaust-air dampers.
    - b. Conditions of filters.

- c. Cooling coil, wet- and dry-bulb conditions.
  - d. Fan drive settings, including settings and percentage of maximum pitch diameter.
  - e. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air distribution systems. Present with single-line diagrams and include the following:
  - 1. Quantities of outside, supply, return, and exhaust airflows.
  - 2. Duct, outlet, and inlet sizes.
  - 3. Terminal units.
  - 4. Balancing stations.
- F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
  - 1. Unit Data: Include the following:
    - a. Unit identification.
    - b. Location.
  - 2. Motor Data: Include the following:
    - a. Horsepower and rpm.
    - b. Volts, phase, and hertz.
    - c. Full-load amperage and service factor.
  - 3. Test Data: Include design and actual values for the following:
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Filter static-pressure differential in inches wg.
    - f. Outside airflow in cfm.
    - g. Return airflow in cfm.
    - h. Outside-air damper position.
    - i. Return-air damper position.
- G. Fan Test Reports: For supply, exhaust, and ventilation fans, include the following:
  - 1. Fan Data: Include the following:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Sheave make, size in mm, and bore.

- e. Sheave dimensions, center-to-center and amount of adjustments in inches.
2. Motor Data: Include the following:
    - a. Horsepower and rpm.
    - b. Volts, phase, and hertz.
    - c. Full-load amperage and service factor.
    - d. Sheave make, size in inches, and bore.
    - e. Sheave dimensions, center-to-center and amount of adjustments in inches.
    - f. Number of belts, make, and size.
  3. Test Data: Include design and actual values for the following:
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Suction static pressure in inches wg.
- H. Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data: Include the following:
    - a. System and air-handling unit number.
    - b. Location and zone.
    - c. Traverse air temperature in deg F.
    - d. Duct static pressure in inches wg.
    - e. Duct size in inches.
    - f. Duct area (sq. ft).
    - g. Design airflow rate in cfm.
    - h. Design velocity in fpm.
    - i. Actual airflow rate in cfm.
    - j. Actual average velocity in fpm.
    - k. Barometric pressure in psig.
- I. Air-Terminal-Device Reports: For terminal units, include the following:
1. Unit Data: Include the following:
    - a. System and air-handling unit identification.
    - b. Location and zone.
    - c. Test apparatus used.
    - d. Area served.
    - e. Air-terminal-device make.
    - f. Air-terminal-device number from system diagram.
    - g. Air-terminal-device type and model number.
    - h. Air-terminal-device size.

2. Test Data: Include design and actual values for the following:

- a. Airflow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary airflow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final airflow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

J. Instrument Calibration Reports: For instrument calibration, include the following:

1. Report Data: Include the following:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

### 3.10 ADDITIONAL TESTS:

- A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

END OF SECTION 23 05 93

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## SECTION 23 07 00 - HVAC INSULATION

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK:

- A. All work covered in this section consists of furnishing all labor, equipment, materials and accessories, and performing all operations required, for the correct fabrication and installation of thermal insulation applied to piping, equipment, and ductwork.

#### 1.2 DEFINITIONS:

- A. Exposed piping and ductwork is that which can be seen when the building is complete without opening or removing access door panels, or ceilings tiles. This also includes all mechanical equipment rooms and pipe tunnels.
- B. Concealed piping and ductwork are those elements above ceilings, in chases, interstitial space and pipe spaces. Other piping and ductwork is considered to be exposed.
- C. Exterior piping and ductwork is that which is exposed to the weather and/or outside the building envelope. Piping and ductwork protected by overhangs, areaways, etc., exterior to the building envelope are considered exterior.
- D. ASJ: All service jacket, white finish facing or jacket.
- E. Air conditioned space: Space directly supplied with heated or cooled air.
- F. Cold: Equipment, ductwork or piping handling media at design temperature of 60 degrees F or below.
- G. FRK: Foil reinforced kraft facing.
- H. FSK: Foil-scrim-kraft facing.
- I. Hot: Ductwork handling air at design temperature above 60 degrees F; equipment or piping handling media above 105 degrees F.
- J. Pcf: Density, pounds per cubic foot.
- K. Runout: Branch pipe connection up to one inch nominal size to a one terminal piece of equipment (fan coil, terminal box).
- L. Thermal conductance: Heat flow rate through materials.
  - 1. Flat surface: BTU per hour per square foot.
  - 2. Pipe or cylinder: BTU per hour per linear foot.
  - 3. Thermal conductivity (k): BTU per inch thickness, per hour, per square foot, per degree Fahrenheit temperature difference.



1.3 QUALITY ASSURANCE:

- A. Products of the manufacturers, herein, will be acceptable for use for the specific functions noted. All materials shall be compatible with the materials to which they are applied, and shall not corrode, soften or otherwise attack such materials in either the wet or dry state.
- B. Materials shall be applied subject to their temperature limits. Any methods of application of insulation materials or finishes not specified in detail herein shall be in accordance with the particular manufacturer's published recommendations.
- C. Insulation shall be applied by experienced workers regularly employed for this type work.

1.4 RATING:

- A. All insulation shall have composite surface burning characteristic rating as tested by ASTM E 84, UL 723, or NFPA 255 not exceeding:

Flame Spread	25
Smoke Developed	50

- B. Composite shall include insulation, jacketing and adhesive used to secure jacketing or facing. All accessory items such as PVC jacketing and fittings, adhesive, mastic, cement, tape and cloth shall have the same component rating as specified above.

1.5 STANDARDS:

- A. International Energy Conservation Code.
- B. ANSI/ASHRAE Standard 90.1 Energy Standard for Buildings Except Low-rise Residential Buildings.
- C. Midwest Insulation Contractors Association "Commercial and Industrial Insulation Standards" - Third Edition.

1.6 SUBMITTALS:

- A. Submittals shall include all materials used, including:
  - 1. Insulation
  - 2. Jacketing
  - 3. Tapes
  - 4. Hardware
  - 5. Mastics
  - 6. Adhesives
- B. Submittals shall be formatted to include a list of materials for each service:
- C. Submittals shall use pages from Midwest Insulation Contractors Association - "Commercial and Industrial Insulation Standards" for defining how insulation

materials will be applied.

## PART 2 - PRODUCTS

### 2.1 GLASS FIBER INSULATION:

#### A. Ductwork (Insulation):

1. Insulation shall be 250 deg. F rated as manufactured by Owens Corning, Manville, Knauf, or Certainteed.
2. Duct Wrap: 1.0 PCF with aluminum or FRK facing, having a maximum vapor transmission of .02 perms.
3. Insulation Board: 3 PCF with FRK facing.

### 2.2 FINISHES:

- #### A. Metal jacketing, smooth .016 in. thick, type T 3003 aluminum with laminated moisture barrier. Jacketing shall be Childers, aluminum roll jacketing with Polykraft moisture barrier.

### 2.3 MISCELLANEOUS:

#### A. Adhesives:

1. Glass & Mineral Fiber - Foster 85-20 / Vimasco 795.
2. Cellular Glass - Pittcote 300 / Childers CP-30.

#### B. Mastic (Weather Barrier):

1. Foster 35-00 Mastic / Vimasco.
2. Childers Vi-Cryl CP10/11.
3. Vimasco WC-5.

#### C. Coatings:

1. Foster - Monolar Coating / Vimasco
2. Foster Sealfas 30-36 / Vimasco
3. Foster Tite-Fit 30-56 / Vimasco
4. Pittcote 300

#### D. Vapor Barrier Sealant: Foster Flextra 95-50

#### E. FSK tape 3 in. wide, equal to Nashua FSK.

- F. Insulpins
- G. Roll on Corner bead (2 in. x 2 in., 26 ga. galvanized steel).
- H. Fiber reinforced tape - Nashua 357, or 398.
- I. Insulation protection shields - Grinnell fig 167.
- J. Rigid insulation inserts - Hamfab.
- K. Reinforcing Cloth - Vimasco, Elastafab 894, conforming to ASTM D1668.
- L. Bands - .020 in., aluminum, ½ in. wide, embossed continuously with the legend "No Asbestos".
- M. Hexagonal Wire Netting - One inch mesh, 22 ga. galvanized steel.

### PART 3 - EXECUTION

#### 3.1 GENERAL:

- A. Insulation shall be applied to clean and dry surfaces after tests and approvals required by this specification have been completed.
- B. On cold surfaces where a vapor barrier must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation.
- C. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation.
- D. All duct insulation shall be continuous through walls, ceiling or floor openings, or sleeves; except where firestop or firesafing materials are required.
- E. Insulate items mounted in ductwork with the same thickness of insulation as specified for ductwork.
- F. Standing seams and other projections in ductwork or casings shall have insulation applied so that at least ½" of insulation will cover such projections.
- G. Ductwork covered with metal jacketing systems shall have the joints made to shed water. Laps shall be positioned in the bottom quadrant.

#### 3.2 HVAC SYSTEMS:

- A. Interior Ductwork:
  - 1. Apply jacketed ductwrap to all concealed ductwork providing conditioned air, or outside air.

2. Pull insulation snug, but do not compress insulation more than 1/4 inch.
3. Secure ductwrap insulation to ductwork using adhesive. Secure insulation on bottom on sides of horizontal ductwork and all sides of vertical ductwork with insulpins welded to duct on 12 to 18 inch centers and with clips slipped over the pins. Apply clips without compressing insulation. Make joints by lapping the facing a minimum of 2 inch and stapling with T-5 flared staples. Vapor - seal with Childers CP-30 Low Odor at all staples, clip locations and other penetrations. Seal joints with 3 inch wide FSK tape.
4. See schedule at end of this section for insulation thicknesses.

**B. Exterior Ductwork:**

1. Apply insulation board with FRK facing to all exterior ductwork.
2. Secure insulation with insulpins (all surfaces) welded to duct on 12 to 18 in. centers and with clips slipped over pins. Seams and joints shall be vapor sealed with 3 in. wide FSK tape. Corners and edges of ductwork shall be reinforced with roll-on corner bead.
3. Seal all break and punctures with vapor barrier sealant and FSK tape.
4. See schedule at end of this section for insulation thicknesses.
5. Exterior ductwork shall be covered with aluminum jacketing. Covering shall be hemmed, and flanged. Secure with self tapping screws on eight inch centers. Do not puncture vapor barrier. Completely caulk and weather seal all seams and screw locations.

MINIMUM DUCT INSULATION REQUIREMENTS		
	UNCONDITIONED SPACES	INSIDE CONDITIONED SPACES
<b>SUPPLY DUCT</b>		
Duct wrap	R-8	R-6
Insulation board	R-8	--
<b>RETURN DUCT</b>		
Duct wrap	R-8	R-6
Insulation board	R-8	--

END OF SECTION 23 07 00

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## **SECTION 23 09 33 - TEMPERATURE CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. The work included in this specification consists of furnishing all labor, material, accessories and equipment necessary for the temperature control system.

#### **1.2 CODES AND STANDARDS:**

- A. Furnish and install an electric system of automatic temperature control as specified herein and as shown on the Contract drawings as manufactured by Honeywell, Johnson Controls, Invensys, or prior approved equal.
- B. Extra costs incurred by use of other than base bid control system, such as wiring, contract drawings changes, changes in design, added supervision, etc., shall be the responsibility of the Temperature Control SubContractor (TCSC).

#### **1.3 SUBMITTALS:**

- A. System documentation shall include the following:
  - 1. Manufacturer's data sheets of all products (original copies).
  - 2. Complete description of operation of all control loops, including recommended setpoints and ranges of adjustment.
  - 3. Fully labeled elementary diagram (electrical ladder diagram).
  - 4. Lists of all proposed devices and equipment.

### **PART 2 - PRODUCTS**

#### **2.1 THERMOSTATS:**

- A. HVAC Units:
  - 1. Provide thermostat with the following features:
    - a. Seven Day Programming
    - b. Two Occupied/Two Unoccupied periods per day
    - c. Automatic heat/cool changeover with 5°F minimum dead band
    - d. Heating Stage control (as required by equipment)
    - e. Cooling Stage control (as required by equipment)
    - f. Touchscreen Display
    - g. Temperature Override
    - h. Economizer Control
    - i. Remote Temperature Sensor
    - j. 5 Year Warranty
  - 2. Thermostat shall be Honeywell VisionPro 8000 or equal.

B. REMOTE TEMPERATURE SENSOR:

1. Remote temperature sensor shall be Honeywell C7189 or equal.

2.2 TEMPERATURE CONTROL WIRING:

- A. In Office areas, all control wiring and conduit required to complete the temperature control system shall be provided by the Temperature Control Sub-Contractor. Wiring and conduit shall be per electrical specifications.
- B. In Process areas, all control wiring and conduit required to complete the temperature control system shall be per the conduit and wiring shown the electrical plans. Close coordination with electrical contractor required for routing, installation etc.

2.3 SEQUENCE OF OPERATIONS:

A. Split System HVAC Units:

1. Normal Operation:

- a. Units shall be controlled by space thermostat. Fan shall operate continuously during occupied mode and intermittently during unoccupied mode.
- b. Heating and cooling shall be enabled by thermostat.
- c. Cooling setpoint shall be 73°F (adjustable).
- d. Heating setpoint shall be 68°F (adjustable).

2. Safeties:

- a. Unit shall shutdown on alarm from smoke detector or fire alarm system.
- b. Smoke detector alarm/trouble pilot shall be indicated on remote panel.

PART 3 - EXECUTION

3.1 GENERAL:

- A. The entire control system, including low voltage wiring, with the exception of duct mounted automatic dampers and smoke detectors, shall be installed by the temperature control contractor, who shall make all tests and adjustments. All controls shall be field-tested and field-calibrated.
- B. Set points of all controlling instruments are indicated at a specific point; however, all set points shall be adjustable up and down from the point indicated.
- C. Contractor shall submit tentative locations of all control devices and components (including temperature sensors) to the Architect for written approval prior to installation.
- D. Contractor shall pay particular attention to location of control devices and components to location of control devices and components. Effects of drafts,

radiant heat, vibration, etc are to be considered when installing control devices and components.

- E. Prior to ordering factory assembled equipment which contains integral control devices and components, the Contractor shall obtain a written statement from both the manufacturer and the installing contractor that they have reviewed the appropriate submittal data and are aware of the make, model, type, size, characteristics, etc. of the factory assembled control devices and components which they shall be required to interface to and/or control.
- F. All control devices (both field and panel mounted) shall be labeled to indicate both their control systems designation, e.g., RTU-1 THERMOSTAT. Unless indicated otherwise, abbreviations and acronyms for all ID tags and panel faceplates shall be approved by the Engineer.
- G. All control devices are to be mounted in accessible locations. All devices exposed to the weather shall be housed in weatherproof enclosures.

### 3.2 DRAWINGS:

- A. At the completion of the job, TCSC shall correct his drawings to include any changes made during construction.
- B. TCSC shall provide color-coded drawings indicated all temperature zones and equipment (3 copies).

### 3.3 ELECTRIC WIRING:

- A. Electric connections between the various unit control cabinets shall be made by the TCSC. All wiring must be tagged on both ends with panel number and terminal number.
- B. The TCSC is responsible for all required process and electrical connections to all equipment, control devices, and field instruments.
- C. TCSC shall furnish and install all conduits, raceways, etc., required. TCSC shall furnish and install all control and interlock wiring.
- D. All wiring shall conform to standards and specifications outlined in Electrical Division Plans and Specifications. Wire size shall be in accordance with manufacturer's recommendations and National Electric Code. Minimum conduit shall be 1/2 inch diameter.
- E. TCSC shall furnish and install all required auxiliary starter contacts or relays not furnished with electrical package for a complete electrical interlock and control wiring system.
- F. TCSC shall coordinate all control power requirements with electrical contractor prior to bid.

### 3.4 OPERATION TEST:

- A. At completion, TCSC shall operate the system for a period of at least three days of



eight hours each on the new systems to demonstrate fulfillment of the requirements of the contract. During this time, all adjustments shall be made to the equipment so that it is in first-class operating condition. The entire system is to be left in operating condition acceptable to the Engineer.

3.5 OWNER'S INSTRUCTION:

- A. Upon completion of the work and acceptance by the Owner, TCSC shall provide one scheduled four-hour period of formal instruction to the Owner's operating personnel who have responsibility for the mechanical system.

END OF SECTION 23 0933

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## **SECTION 23 23 01 - REFRIGERANT PIPING SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. The work required under this section includes all work necessary for a complete installation of refrigerant piping and accessories.

#### **1.2 CODES AND STANDARDS:**

- A. ANSI/ASHRAE 15-1992 Safety Code for Mechanical Refrigeration
- B. ANSI/ASME B31.5 Refrigeration Piping Code
- C. US EPA Clean Air Act 1990-CFR 40 Part 608

#### **1.3 SUBMITTALS:**

- A. Submit manufacturers literature on all products and accessories.
  - 1. Piping
  - 2. Fittings
  - 3. Valves
  - 4. Filter Driers
  - 5. Distributors
  - 6. Sight Glass/Gauge Glass/Moisture Indicators
  - 7. Flexible Connectors
  - 8. Strainers

### **PART 2 - PRODUCTS**

#### **2.1 PIPING:**

- A. General:
  - 1. Refrigerant piping, valves, fittings, and accessories shall be in accordance with ASHRAE 15 and ASME B31.5, except as specified herein. Refrigerant piping, valves, fittings, and accessories shall be compatible with the fluids used and capable of withstanding the pressures and temperatures of the service. Refrigerant piping, valves, and accessories used for refrigerant service shall be cleaned, dehydrated, and sealed (capped or plugged) prior to shipment from the manufacturer's plant.
  - 2. Refrigerant piping shall be type L, hard drawn copper tubing conforming to ASTM Specification B-280, cleaned and capped and marked "ACR".
  - 3. Joints in refrigerant lines shall be flared, brazed, or flanged.
  - 4. Flared joints are only permitted on lines 5/8" OD and smaller.
  - 5. Brazed joints shall be made up in accordance with ANSI B9.1.

6. Flanged joints (used on systems over 100 tons) shall be solder type, four bolt, forged brass, tongue and groove type.

B. Fittings:

1. Cast copper alloy fittings for flared copper tube shall conform to ASME B16.26 and ASTM B 62. Wrought copper and bronze solder-joint pressure fittings shall conform to ASME B16.22 and ASTM B 75M ASTM B 75. Joints and fittings for brazed joint shall be wrought-copper or forged-brass sweat fittings. Cast sweat-type joints and fittings shall not be allowed for brazed joints. Brass or bronze adapters for brazed tubing may be used for connecting tubing to flanges and to threaded ends of valves and equipment.

C. Joints:

1. Solder shall conform to ASTM B 32, grade Sb5, tin-antimony alloy for service pressures up to 150 psig. Solder flux shall be liquid or paste form, non-corrosive and conform to ASTM B 813.
2. Brazing filler metal shall conform to AWS A5.8, Type BAg-5 with AWS Type 3 flux, except Type BCuP-5 or BCuP-6 may be used for brazing copper-to-copper joints.

2.2 Valves:

- A. Valves shall be designed, manufactured, and tested specifically for refrigerant service. Valve bodies shall be of brass, bronze. Valves 1 inch and smaller shall have brazed connections. Valves larger than 1 inch shall have tongue-and-groove flanged end connections. Threaded end connections shall not be used, except in pilot pressure or gauge lines where maintenance disassembly is required and welded flanges cannot be used. Internal parts shall be removable for inspection or replacement without applying heat or breaking pipe connections. Valve stems exposed to the atmosphere shall be stainless steel or corrosion resistant metal plated carbon steel. Direction of flow shall be legibly and permanently indicated on the valve body. Control valve inlets shall be fitted with integral or adapted strainer or filter where recommended or required by the manufacturer. Purge, charge and receiver valves shall be of manufacturer's standard configuration.

B. Isolation Valves:

1. Isolation valves shall be Henry Valve Co., 900 series ball valves. Sporlan and Alco are approved equal.

C. Charging Valves:

1. Charging valve shall be a Henry Valve Co. type 927 or approved equal. Sporlan and Alco are approved equal.

D. Check Valves:

1. Valve shall be the swing or lift type as required to provide positive shutoff at the differential pressure indicated. Valve shall be provide with resilient seat.

## 2.3 Piping Accessories:

### A. Filter Driers:

1. Driers shall conform to ARI 710. Sizes 5/8 inch and larger shall be the full flow, replaceable core type. Sizes 1/2 inch and smaller shall be the sealed type. Cores shall be of suitable desiccant that will not plug, cake, dust, channel, or break down, and shall remove water, acid, and foreign material from the refrigerant. Filter driers shall be constructed so that none of the desiccant will pass into the refrigerant lines. Minimum bursting pressure shall be 1,500 psi.

### B. Gauge Glass/Liquid Level Indicator/Sight Glass:

1. Units shall be pressure- and temperature-rated and constructed of materials suitable for the service. Glass shall be borosilicate type. Ferrous components subject to condensation shall be electro-galvanized.
2. Gauge glass shall include top and bottom isolation valves fitted with automatic checks, and packing followers; red-line or green-line gauge glass; elastomer or polymer packing to suit the service; and gauge glass guard.
3. Bull's-eye and inline sight glass reflex lens shall be provided for dead-end liquid service. For pipe line mounting, two plain lenses in one body suitable for backlighted viewing shall be provided.
4. Moisture Indicator shall be a self-reversible action, moisture reactive, color changing media. Indicator shall be furnished with full-color-printing tag containing color, moisture and temperature criteria.
5. Sight glass shall be Henry Valve Co. MI 31 series double port style with extended ends for soldering for lines 5/8 inch OD or larger. Use MI 30 series single port for lines 1/2 inch OD and smaller. Sporlan and Alco are approved equal.

### C. Flexible Pipe Connectors:

1. Connector shall be a composite of interior corrugated phosphor bronze or Type 300 Series stainless steel, as required for fluid service, with exterior reinforcement of bronze, stainless steel or monel wire braid. Assembly shall be constructed with a safety factor of not less than 4 at 300 degrees F.
2. End connectors shall be female copper tube type. Units shall be Southeastern Hose, Inc., Superior or Anaconda.

### D. Strainers:

1. Strainers used in refrigerant service shall have brass or cast iron body, Y-or angle-pattern, cleanable, not less than 60-mesh noncorroding screen of an area to provide net free area not less than ten times the pipe diameter with pressure rating compatible with the refrigerant service. Screens shall be stainless steel or monel and reinforced spring-loaded where necessary for

bypass-proof construction.

## PART 3 - EXECUTION

### 3.1 GENERAL:

- A. Furnish and install the refrigeration equipment, piping and accessories, listed herein or shown on the drawings. Perform pressure and leakage tests. Evacuate the system, provide refrigerant charge and oil to properly operate the system. Adjust control devices for proper operation.
- B. The refrigeration system piping and accessories shall be installed in accordance with the Safety Code for Mechanical Refrigeration ANSI/ASHRAE 15 and the Refrigeration Piping Code ANSI/ASME B31.5.
- C. The refrigerant tube sizes, and installation of tubing shall be in accordance with the equipment manufacturer's recommendations.
- D. Refrigerant suction line size shall limit the temperature rise to two degrees F at full load and hold the refrigerant gas velocity to not less than 500 ft. per min. (fpm) in the horizontal nor less than 1000 fpm in the vertical at minimum load.
- E. Refrigerant liquid line size shall limit the pressure drop between 4 and 6 psi at full load.
- F. Provide trapped double suction risers on systems with unloading capability, when required for proper oil return.
- G. Refrigerant lines shall not contact building structure. Isolate piping with resilient liner in pipe support or elastomeric insulation.

### 3.2 PIPING:

- A. Tubing shall be cut square, shall have burrs removed by reaming, and shall permit free expansion and contraction without causing damage to the building structure, pipe, joints, or hangers.
- B. Open ends of refrigerant lines or equipment shall be properly capped or plugged during installation to keep moisture, dirt, or other foreign material out of the system. Tubing shall remain capped until installation.
- C. Brazed Connections:
  - 1. Brazing shall be performed in accordance with AWS BRH, except as modified herein. During brazing, the pipe and fittings shall be filled with a pressure regulated inert gas, such as nitrogen, to prevent the formation of scale. Before brazing copper joints, both the outside of the tube and the inside of the fitting shall be cleaned with a wire fitting brush until the entire joint surface is bright and clean. Brazing flux shall not be used. Surplus brazing material shall be removed at all joints. Steel tubing joints shall be made in accordance with the manufacturer's recommendations.
  - 2. Tubing shall be protected against oxidation during brazing by continuous

purging of the inside of the piping using nitrogen. Piping shall be supported prior to brazing and not be sprung or forced.

D. Flared Connections:

1. When flared connections are used, a suitable lubricant shall be used between the back of the flare and the nut in order to avoid tearing the flare while tightening the nut.

3.3 VALVES:

A. Refrigerant Stop Valves:

1. Valves shall be installed on each side of each piece of equipment such as compressors, to provide partial system isolation as required for maintenance or repair. Stop valves shall be installed with stems horizontal unless otherwise indicated. Valves shall be furnished to match line size, unless otherwise indicated or approved.

B. Charging Valves:

1. Valves shall be installed to permit charging of gas and liquid.

C. Check Valves:

1. Valves shall be installed where indicated.

D. Charging Valve:

1. Charging valve shall be installed in each liquid refrigerant line between the condenser and the filter drier.

3.4 PIPING ACCESSORIES:

A. Filter Driers:

1. A liquid line filter dryer shall be provided on each refrigerant circuit located such that all liquid refrigerant passes through a filter dryer. Dryers shall be sized in accordance with the manufacturer's recommendations for the system in which it is installed. Dryers shall be installed in the horizontal position except replaceable core filter dryers may be installed in the vertical position with the access flange on the bottom.
2. Install isolation valves to permit core replacement without total system evacuation. Install charging and relief valve in isolation section.

B. Sight Glass Moisture Indicators:

1. Sight glass moisture indicator shall be installed in each liquid refrigerant line at the evaporator coil. Sight glasses shall be full line size.
2. Provide flexible connectors on liquid line, and suction line at the condensing unit.

3. Pipe shall be clamped on side of flexible connector away from vibrating equipment.
- C. Strainers shall be provided immediately ahead of solenoid valves and expansion devices.

### 3.5 CLEANING AND ADJUSTING:

- A. Clean uncontaminated system(s) by evacuation and purging procedures currently recommended by refrigerant and refrigerant equipment manufacturers, to remove small amounts of air and moisture. Systems containing moderate amounts of air, moisture, contaminated refrigerant, or any foreign matter shall be considered contaminated systems. Restoring contaminated systems to clean condition including disassembly, component replacement, evacuation, flushing, purging, and re-charging, shall be performed using currently approved refrigerant and refrigeration manufacturer's procedures. Restoring contaminated systems shall be at no additional cost to the Owner. Water shall not be used in any procedure or test.

### 3.6 REFRIGERANT PIPING TESTS:

- A. After all components of the refrigerant system have been installed and connected, the entire refrigeration system shall be subjected to pressure test, evacuation test, and startup test. Any material, equipment, instruments, and personnel required for the test shall be provided by the Contractor. The services of a qualified technician shall be provided as required to perform all tests and procedures indicated herein.
- B. Preliminary Procedures:
  1. Prior to pressure testing, equipment which has been factory tested and refrigerant charged as well as equipment which could be damaged or cause personnel injury by imposed test pressure, positive or negative, shall be isolated from the test pressure or removed from the system. Safety relief valves and rupture discs, where not part of factory sealed systems, shall be removed and openings capped or plugged.
- C. Pressure Test (Pneumatic):
  1. Pressure control and excess pressure protection shall be provided at the source of test pressure. Valves shall be wide open, except those leading to the atmosphere. Test gas shall be dry nitrogen, with minus 70 degree F dewpoint and less than 5 ppm oil. Test pressure shall be applied in two stages before any refrigerant line is insulated or covered. First stage test shall be at 10 psi with every joint being tested with a thick soap or color indicating solution. Second stage tests shall raise the system to the minimum refrigerant leakage test pressure specified in ASHRAE 15 with a maximum test pressure 25 percent greater. Pressure above 100 psig shall be raised in 10 percent increments with a pressure acclimatizing period between increments. The initial test pressure shall be recorded along with the ambient temperature to which the system is exposed. Final test pressures of the second stage shall be maintained on the system for a minimum of 24 hours. At the end of the 24 hour period, the system pressure

will be recorded along with the ambient temperature to which the system is exposed. A correction factor of 0.3 psi will be allowed for each degree F change between test space initial and final ambient temperature, plus for increase and minus for a decrease. If the corrected system pressure is not exactly equal to the initial system test pressure, then the system shall be investigated for leaking joints. To repair leaks, the joint shall be taken apart, thoroughly cleaned, and reconstructed as a new joint. Joints repaired by caulking, remelting, or back-welding/brazing shall not be acceptable. Following repair, the entire system shall be retested using the pneumatic tests described above. The entire system shall be reassembled once the pressure tests are satisfactorily completed.

D. Evacuation Test:

1. Following satisfactory completion of the pressure tests, the pressure shall be relieved and the entire system shall be evacuated to an absolute pressure of 300 micrometers. During evacuation of the system, the ambient temperature shall be higher than 35 degrees F. No more than one system shall be evacuated at one time by one vacuum pump. Once the desired vacuum has been reached, the vacuum line shall be closed and the system shall stand for 1 hour. If the pressure rises over 500 micrometers after the 1 hour period, then the system shall be evacuated again down to 300 micrometers and let set for another 1 hour period. The system shall not be charged until a vacuum of at least 500 micrometers is maintained for a period of 1 hour without the assistance of a vacuum line. If during the testing the pressure continues to rise, check the system for leaks, repair as required, and repeat the evacuation procedure. During evacuation, pressures shall be recorded by a thermocouple-type, electronic-type, or a calibrated-micrometer type gauge.

E. System Charging and Startup Test:

1. Following satisfactory completion of the evacuation tests, the system shall be charged with the required amount of refrigerant by raising pressure to normal operating pressure and in accordance with manufacturer's procedures. Following charging, the system shall operate with high-side and low-side pressures and corresponding refrigerant temperatures, at design or improved values. The entire system shall be tested for leaks. Fluorocarbon systems shall be tested with halide torch or electronic leak detectors.

F. Refrigerant Leakage:

1. If a refrigerant leak is discovered after the system has been charged, the leaking portion of the system shall immediately be isolated from the remainder of the system and the refrigerant pumped into the system receiver or other suitable container. Under no circumstances shall the refrigerant be discharged into the atmosphere.

G. Contractor's Responsibility:

1. The Contractor shall, at all times during the installation and testing of the refrigeration system, take steps to prevent the release of refrigerants into



the atmosphere. The steps shall include, but not be limited to, procedures which will minimize the release of refrigerants to the atmosphere and the use of refrigerant recovery devices to remove refrigerant from the system and store the refrigerant for reuse or reclaim. At no time shall more than 3 ounces of refrigerant be released to the atmosphere in any one occurrence. Any system leaks within the first year shall be repaired in accordance with the requirements herein at no cost to the Owner including material, labor, and refrigerant if the leak is the result of defective equipment, material, or installation.

3.7 DEMONSTRATIONS:

- A. Contractor shall conduct a training course for two members of the operating staff designated by the Owner. The training period shall consist of a total two hours of normal working time and start after the system is functionally completed but prior to final acceptance tests. The field posted instructions shall cover all of the items contained in the approved operation and maintenance manuals as well as demonstrations of routine maintenance operations.

END OF SECTION 23 2301

## **SECTION 23 31 13 - LOW PRESSURE DUCTWORK**

### **PART 1 - GENERAL**

#### **1.1 SCOPE OF WORK:**

- A. The work required under this section includes all work necessary for a complete installation of ductwork and accessories.

#### **1.2 CODES AND STANDARDS:**

- A. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
  - 1. HVAC Duct Construction Standards: Metal and Flexible
  - 2. HVAC Air Duct Leakage Test Manual
- B. National Fire Protection Association (NFPA):
  - 1. 90A - Standard for the Installation of Air Conditioning and Ventilating Systems
  - 2. 90B - Standard for the Installation of Warm Air Heating and Air Conditioning System
  - 3. 101 - Life Safety Code
- C. American Society of Heating, Refrigerating and Air Conditioning Engineering (ASHRAE):
  - 1. Fundamentals Handbook
  - 2. Equipment Handbook

#### **1.3 SUBMITTALS:**

- A. Submittals (for each duct system) shall include the following:
  - 1. Sheet Metal:
    - a. Gages by sizes
    - b. ASTM Standards
  - 2. Duct Fabrication Standards and Reinforcement:
    - a. Joint construction
    - b. Fitting construction
    - c. Joint and reinforcement spacing
    - d. Splitter damper and duct tap details
    - e. Flange details

3. Hangers:
    - a. Rods - sizes by duct
    - b. Straps
    - c. Trapeze
    - d. Spacing
  4. Duct sealers
  5. Flexible connectors
  6. Flexible ductwork
  7. Manual Dampers
  8. Control Dampers
  9. Actuators
- B. Submittals shall include testing or listing certification, dimensional data and manufacturers literature on all manufactured products.

## PART 2 - PRODUCTS

### 2.1 GENERAL:

- A. Ductwork shall be fabricated from sheet metal products conforming to the following material standards:
  1. Galvanized Steel - ASTM A653 (G60)
  2. Aluminum - ASTM B209
  3. Stainless Steel - ASTM A480
- B. Duct system shall be fabricated with sheet metal thicknesses and reinforced in accordance with SMACNA as shown on the drawings and as described herein.
- C. Unless noted otherwise the minimum pressure/velocity classification shall be 2 inch W.G. plus or minus, at 2500 ft. per minute, duct seal class "A".
- D. Ducts 18 inches and larger on any side shall be stiffened by beading on not to exceed 12 inch centers.
- E. All longitudinal seams shall be grooved, double or Pittsburgh type (except on watertight ducts or on heavy gauge ducts).
- F. Branch connections in supply ducts shall be fabricated per the following schedule:

Maximum Branch Size

Branch Connection

Up to, Rectangular equivalent to 12 inch round	45 deg. tap collar with volume damper in branch
All other duct branches	Proportioned duct, with adjustable splitter damper

- G. Branch connections in return or exhaust ductwork shall be made with 45 degree entry fittings. If ducts are the same depth use parallel branch connection.
- H. Where acoustical or thermal insulation is applied on the inside of ductwork, size of ductwork shall be increased so that the duct size shown on the drawings are the dimensions of the inside of the insulation.

## 2.2 GALVANIZED STEEL DUCTWORK:

- A. All junctions, bends, turns or elbows in all ducts or risers shall have a large radius (centerline radius equal to 1-½ times duct width) in the throat in order to minimize the frictional resistance.
- B. Vanes shall be provided in elbows with 90 degree throats and throat radii less than 1-½ times duct width, and shall be located in accordance with ASHRAE standards. Double-vane airfoil-type turning vanes shall be provided for all square turns.
- C. Replacement ductwork for office areas shall be galvanized steel. Refer to plans for duct materials in other facility areas.

## 2.3 ALUMINUM DUCTWORK:

- A. Ducts shall be fabricated from .050 inch thick aluminum and shall be reinforced at joints and at intermediate points not exceeding 2 ft. 0 inch. Intermediate reinforcement shall be aluminum flat stock welded to duct. Joint reinforcement shall be welded companion flanges. All reinforcements shall be aluminum. Refer to SMACNA.
- B. Exposed ductwork shall have stainless steel hangers.
- C. All duct surfaces that contact uncoated steel or copper shall be di-electrically isolated with two coats of zinc chromate paint, one layer of asphalt impregnated paper, or one coat of bituminous paint.

## 2.4 STAINLESS STEEL DUCTWORK:

- A. All exposed ductwork and supports in finished areas shall be constructed of stainless steel including companion angle flanges.

## 2.5 HANGERS AND SUPPORTS:

- A. Building Attachments: Concrete inserts or structural steel fasteners appropriate for building materials.
- B. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.

1. Hangers installed in non-conditioned spaces and outdoors: Electrogalvanized, all-thread rod or galvanized rods with threads painted after installation.
  2. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.
- C. Hanger Materials: Stainless, sheet steel or round, threaded stainless steel rod.
1. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.
- D. Duct Attachments: Sheet metal screws, blind rivets or self-tapping metal screws; compatible with duct materials.
- E. Trapeze and Riser Supports: Steel shapes complying with ASTM A36.
1. Supports for Stainless-Steel Ducts: Stainless-steel support materials.
  2. Supports for Aluminum Ducts: Aluminum support materials, unless materials are electrolytically separated from ductwork.

## 2.6 SEALANT MATERIAL:

- A. Duct Sealer: Solvent or water based type U.L. classified meeting NFPA 90A Class 1 with zero fire and smoke development rating. Sealer shall be United Sheet Metal, United Duct Sealer, or Hardcast Iron Grip No. 601.

## 2.7 FLEXIBLE CONNECTORS:

- A. Flexible connectors shall be U.L. listed, neoprene coated heavy glass fabric. Fabric shall be Ventglas, manufactured by Ventfabrics, Inc.

## 2.8 FLEXIBLE DUCTWORK:

- A. Flexible duct shall be UL listed and labeled as Class 1, Air Duct Connector, in accordance with U.L. Standard 181 and shall meet the requirements of the latest NFPA Bulletin, No. 90A and No. 90B for flame spread and smoke development rating.
- B. Flexible duct shall be rated for a maximum pressure of 6 inch positive and 5 inch negative and 5500 fpm maximum velocity. Air duct shall consist of: CPE liner, coated spring steel wire helix, fiberglass insulating blanket, fiberglass scrim and reinforced aluminum vapor barrier. Insulation valve shall be a minimum of R-6. Edges of liner shall be protected by sheet-metal noisings.
- C. Duct shall be Flexmaster Type 8M or prior approved equal.

## 2.9 MANUAL DAMPERS:

A. Single Blade Dampers:

1. Single Blade Dampers shall be constructed of 22 gauge galvanized steel (blade and frame). Single blade dampers shall be limited to a 12 inch high blade. Blade edges shall be crimped or reinforced. Damper levers shall indicate positively the open and closed position. End bearings shall be molded synthetic. Dampers shall be Ruskin MD25 or approved equal (Ruskin MDRS25 for round ducts).

B. Multiblade Dampers:

1. Multiblade dampers shall be constructed of sheet metal the same material as the adjacent ductwork. Damper frame shall be not less than 16 ga., damper blades not wider than 6 inches crimped or reinforced. Damper levers shall indicate positively the open and closed position. End bearings shall be molded synthetic. Damper shall be Ruskin MD35 or approved equal.

C. Manual dampers shall be Ruskin, Greenheck, Air Balance or prior approved equal.

2.10 AUTOMATIC CONTROL DAMPERS:

- A. All control dampers shall be standard products of damper or temperature control manufacturers unless noted otherwise. Local fabrication of dampers is not allowed.
- B. Dampers and seals suitable for temperature ranges of -40 to 200 degrees F. Dampers shall be opposed blade type, and the Contractor shall submit construction data for all control dampers with the temperature control submittal. Damper shall be leakage Class 1A.
- C. Dampers shall be Ruskin Model CD50. Greenheck and Air Balance are approved equals.

2.11 ELECTRIC ACTUATORS:

- A. Actuators shall be spring return type, which returns actuator shaft to its full normal mechanical travel upon power failure. Damper motor drive mechanism will include holding brake to keep the return spring from drawing the actuator from driving toward its normal position unless power is interrupted. Housing shall be die-cast aluminum.
- B. Actuators shall be provided with mounting brackets, shaft linkage assemblies, and end switches as required by sequence of operations.
- C. Actuators shall include the following features:
  1. Two position (on/off) control or modulating as required by sequence of operations.
  2. Torque: 44 in lb.

- 3. Voltage: 120 volts AC.
  - 4. Operating Speed: 45 seconds for 2-position.
- D. Two position actuators shall be Honeywell MS8105 series or approved equal.

**PART 3 - INSTALLATION**

**3.1 GENERAL:**

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction - Metal and Flexible," unless noted otherwise.
- B. Ductwork hangers shall be supported from fasteners attached to structure.
- C. Provide angles (same material as duct) at points where duct penetrates walls, to close off space between wall opening and duct.
- D. Duct material and pressure classes have been identified on the drawings. Any duct shown on the drawing but not identified shall be low pressure galvanized steel. (2 inch W.G. 2500 fpm).

**3.2 INDOOR DUCTWORK:**

- A. Suspend horizontal ducts on not to exceed 6 ft. spacing by galvanized steel straps 1 inch x no. 16 ga. for sizes up to 60 inch width, 1-1/2 inch x no. 16 ga. for sizes up to 96 inch width, and 2 x 2 x 1/4 inch trapeze shelf angles for ducts wider than 96 inches. Unless noted otherwise straps shall be fastened to sides of ducts with not less than two sheet metal screws. Bottom ends of straps shall hook 2 inches under ducts and be secured with a sheet metal screw through bottom of ducts (except watertight ducts).
- B. Vertical ducts shall be supported at each floor by steel angles attached to the long sides of the duct. Angles shall rest on floor or steel framework and be secured to duct with sheet metal screws.
- C. Support angles shall be sized according to duct size:

<u>Duct Size</u>	<u>Riser Support Size</u>
Up to 36"	1-1/4 x 1-1/4 x 1/4
Up to 48"	1-1/2 x 1-1/2 x 1/4
Up to 60"	2-1/2 x 2-1/2 x 1/4
Up to 72"	3 x 3 x 5/16
Up to 84"	3 x 3 x 5/16
Up to 96"	4 x 4 x 1/4

**3.3 OUTDOOR DUCTWORK:**

- A. Provide supports from roof or wall brackets for ductwork mounted outdoors.

- B. Slope ductwork to prevent water accumulating on ducts. Duct slope shall be a minimum of 1:24.
- C. Duct shall be supported on mill galvanized steel angle brackets, bolted, flashed and counter flashed to roof.
- D. Vertical ducts shall be supported on welded angle bracket supports anchored to wall. Brackets shall be hot dip galvanized after fabrication.

#### 3.4 DUCT SEALER:

- A. All ductwork shall be as airtight as possible. Transverse seams shall be taped and sealed with two layers of United Sheet Metal, Uni-Cast or caulked with duct sealer.

#### 3.5 FLEXIBLE CONNECTORS:

- A. Install flexible connectors at all supply and exhaust fans and other air handling units with inlet and outlet duct or casing connections.
- B. Connectors shall be suitable for the pressure of the units involved and shall be sealed airtight.
- C. Connectors shall be not less than 4 inches long (in clear) and properly attached to duct and fan connection collar by 1 x 1/8 inch draw band (fabricated of the same material as adjacent ductwork) firmly clamped around collars in such a manner as to be airtight and secured to collars with sheet metal screws. Connectors shall not be painted.
- D. Connectors shall not be used as transition pieces between fan and ductwork.

#### 3.6 FLEXIBLE DUCTWORK:

- A. Flexible ducts shall be used for straight runs of duct or offsets up to 45 degrees, but not exceeding 48 inches in length. The use of flexible ducts as elbows with more than a 45 degree bend will not be permitted.
- B. Flexible ductwork shall be secured to rigid ductwork and unit openings by sliding the flexible duct over the rigid duct, sealing with an approved adhesive, clamping with a suitable clamp and taping.

#### 3.7 MANUAL DAMPERS:

- A. Install dampers where shown or called for on the drawing. Install damper operating hardware.

#### 3.8 LOUVERS:

- A. Make connections to louvers. Where duct size is less than full louver opening, close off remaining unused louver opening with an insulated panel assembly consisting of 24 ga stainless sheet metal screwed to the louver, 2 in. thick 3 PCF



fiberglass rigid board and covered with a 22 ga stainless sheet metal outer skin.  
Seal all openings.

3.9 ELECTRIC ACTUATORS:

- A. Provide electric motor operators for all control dampers as required by the sequence of operations.

3.10 AUTOMATIC DAMPERS:

- A. Install all motor operated control dampers in louver plenums.

END OF SECTION 23 31 13

## SECTION 23 37 13 - REGISTERS, GRILLES, AND DIFFUSERS

### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK:

- A. This specification describes the air distribution outlets, exhaust and return air devices, and the accessories required for complete installation.

#### 1.2 CODES AND STANDARDS:

- A. *ANSI/ASHRAE 70 Method of Testing For Rating The Performance of Air Outlets and Inlets.*
- B. *ASHRAE 113 Method of Testing For Room Air Diffusion.*

#### 1.3 SUBMITTALS:

- A. Submittals shall include the following:
  - 1. Manufacturers technical literature for
    - a. Performance
    - b. Static pressure drop
    - c. Throw
    - d. Sound pressure loss (NC)
  - 2. Pictorial literature.

#### 1.4 ACCEPTABLE MANUFACTURERS:

- A. Acceptable Manufacturers are Titus, Price, Krueger or prior approved equal.

### PART 2 - PRODUCTS

#### 2.1 GENERAL:

- A. Product performance data shall be taken from tests conducted in accordance with ANSI/ASHRAE 70, and ARI-890.
- B. Grilles and registers including volume controllers shall be constructed of the same materials specified for the grille.
- C. The grille finish shall be white unless noted otherwise. The finish shall be an anodic acrylic paint baked at 315°F for 30 minutes.
- D. Refer to architectural drawings for the various types of ceilings, i.e., mineral tile or plaster to assure that air devices have the correct type of mounting. Refer to drawings of reflected ceiling plans for location of ceiling diffusers and grilles.
- E. Supplier shall check all air distribution and return air devices for proper performance, noise and accessories. Any device exceeding noise level herein

specified shall be brought to the attention of the Engineers.

- F. Contractor shall coordinate openings in hard ceilings, furred walls, masonry walls, and floors.
- G. The nominal or duct connection size of grilles (not overall dimensions) is given on plans.
- H. Mounting frames shall be provided for all grilles and registers mounted in drywall, plaster, concrete or masonry openings.
- I. Devices are defined in the following manner in this section:

<u>Device</u>	<u>Abbreviation used on the Drawings</u>
Sidewall Grille	SG

- J. A third letter following these abbreviations refers to the type of device which is defined herein.

## 2.2 SIDEWALL GRILLES:

- A. Type A - Titus Model 300 FS aluminum supply grille. Grille shall include double deflection blades spaced on 3/4 inch centers. Blades shall be individually adjustable to provide air pattern as shown on drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION:

- A. Provide air devices as indicated on the drawings. Mount each device securely to avoid rattling and vibration
- B. Devices shall be parallel to the plane of the surfaces they are mounted.

END OF SECTION 23 3713

## **SECTION 23 41 05 - AIR FILTERS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. This specification describes the filter elements and accessories necessary for a complete installation.

#### **1.2 CODES AND STANDARDS:**

- A. NFPA 90A Installation of Air Conditioning and Ventilating Systems
- B. NFPA 90B Warm Air Heating and Air Conditioning Systems
- C. ASHRAE 52.1-1992 Gravimetric and Dust-Spot procedures for testing air-cleaning devices.
- D. ASHRAE 52.2-1999 Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size.

#### **1.3 SUBMITTALS:**

- A. Submittals shall include manufacturer's literature and UL listing information.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL:**

- A. Air filters shall be Camfil Farr Company, American Air Filter, Flanders Filters, or approved equal.
- B. Filters shall have the efficiencies indicated based upon the ASHRAE Standard 52.1-1992 and ASHRAE Standard 52.2-1999.
- C. Complete filters shall be Underwriters Laboratories approved, Class II.
- D. Prior to submission of drawings for filters, Contractor shall verify the size and number of filter cells for each air handling device.
- E. Filter thicknesses shall be specified as below and as noted in HVAC equipment specifications.
- F. Media support grid shall be welded wire on 1" centers with an open area of not less than 96%. Grid shall be bonded to the media to eliminate oscillation and pull away. The grid shall be formed to effect a radial pleat, allowing total use of media.
- G. Enclosing frame shall be a rigid, high wet-strength beverage board, with diagonal support members bonded to the air entering and air exiting side of each pleat. The enclosing frame shall be chemically bonded to the filter pack.

#### **2.2 PLEATED FILTERS:**

- A. MERV 7, 25-30% Efficient Filters:
  - 1. Pleated air filters shall have an average efficiency of 25-30%, average arrestance of 90-92%, and MERV 7 in accordance with ASHRAE Standard 52.1 and 52.2. Filter shall be Camfil Farr 30/30 or approved equal.
  - 2. 2 inch filter face area shall contain not less than 15 pleats per linear foot. Initial resistance at 500 fpm shall not exceed .28" w.g.
  - 3. 1 inch filter face shall contain not less than 16 pleats per linear foot. Initial resistance at 350 fpm shall not exceed .25" w.g.

## PART 3 - EXECUTION

### 3.1 INSTALLATION:

- A. Provide air filters as noted in equipment specifications and in accordance with the schedule indicated on drawings.
- B. For each filter bank, furnish and install F.W. Dwyer Manufacturing Co., or approved equal, differential pressure gauges with all accessories. Gauges shall be series 2000 Magnehelic. Draft gauges shall be located on the outside of the casing or filter housing in a convenient location.
- C. Interconnecting wiring for power and controls shall be by this Contractor.
- D. Two complete sets of spare filters shall be supplied for use during the construction and testing and balancing period.

END OF SECTION 23 4105

## **SECTION 23 62 01 - AIR COOLED CONDENSING UNITS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. The work required under this section includes all work necessary for a complete installation of air cooled refrigerant condensing units.

#### **1.2 SUBMITTALS:**

- A. Shop drawings shall include complete manufacturer's data on the following:
  - 1. Unit capacity
  - 2. Dimensions
  - 3. Power Requirements
  - 4. Connections
  - 5. Sound Power Level
  - 6. Control & Wiring Diagrams

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL:**

- A. Units shall be assembled on minimum 10 gauge steel mounting/lifting rails and shall be weather proofed. Unit shall include hermetic compressor(s), plate fin condenser coil, fans and motors, controls and holding charge of refrigerant. Operating Range shall be between 115 degrees F and 35 degrees F in cooling as standard from factory. Units shall be UL listed, and rated in accordance with ARI Standard 240 and 270.

#### **2.2 CASING:**

- A. Unit casing shall be constructed of minimum 18 gauge G-210, heavy galvanized steel. Exterior surfaces shall be cleaned, phosphatized and finished with a weather-resistant baked enamel finish. Coating system shall have been tested 500 hours in salt spray test (ASTM B117). Units shall have removable panels which allow access to all major components and controls.

#### **2.3 REFRIGERATION SYSTEM:**

- A. Units less than 7½ tons:
  - 1. Compressor shall be scroll type, hermetically sealed and mounted on rubber vibration isolators. Compressor shall include internal over temperature and pressure protection, thermostatically controlled sump heater, and internal spring mounts.
  - 2. Units shall have a single refrigeration circuit. Circuit shall include factory installed liquid line drier, low pressure switch. Liquid line and suction line service valve with gauge port.

#### **2.4 CONDENSER COIL:**

- A. Coils shall be internally finned or smooth bore 3/8 inch copper tubes mechanically bonded to configured aluminum plate fin as standard.
- B. Condenser coil shall be leak tested to 150 PSIG, pressure tested to 450 PSIG, and qualified to UL 1995 burst tested at 1775 PSIG.

2.5 CONDENSER FAN AND MOTOR(S):

- A. Units shall have direct-drive, statically and dynamically balanced fan(s) with aluminum blades and electro-coated steel hubs shall be mounted in draw-through vertical discharge position. Permanently lubricated totally enclosed type motors shall be provided and shall have built in current and thermal overload protection. Condenser fan discharge shall include safety guards.

2.6 CONTROLS:

- A. Units shall be completely factory wired with necessary controls and contactor with pressure lugs or terminal block for power wiring. Control wiring shall be 24-volt control circuit which includes fusing and control transformer.

2.7 DEFROST CONTROLS:

- A. Electronic timed initiated, temperature terminated defrost system with choice of 50, 70, or 90 minute cycle. Timed override limits defrost cycle to 10 minutes.

2.8 LOW AMBIENT HEAD PRESSURE:

- A. Modulate the RPM of unit outdoor fan motor in response to outdoor ambient temperatures and unit head pressure. Provides unit cooling operation to outdoor temperature 0 degrees F.

2.9 TIME DELAY RELAY:

- A. Prevent compressors in dual compressor unit from coming on line simultaneously. Timer shall be 24-volt, 60 cycle, with four minutes timing period.

2.10 ANTI-SHORT-CYCLE TIMER:

- A. Prevent rapid on-off compressor cycling in light load conditions by not allowing compressor to operate for 5-7 minutes upon shutdown. Timer shall consist of a solid state timing device, 24-volt, 60 cycle with either 5 or 7 minute fixed-off timing period.

2.11 CONDENSER COIL GUARD:

- A. Metal grille with PVC coating shall be provided to alleviate coil damage.

2.12 WARRANTY:

- A. Provide a written warranty agreeing to replace components that fail in materials and workmanship within the specified warranty period, provided manufacturer's written instructions for installation, operation, and maintenance have been followed.

- B. Warranty Period: Manufacturers standard, but not less than five (5) years from date of Substantial Completion for compressor(s) and one (1) year for all other components.

#### 2.13 ACCEPTABLE MANUFACTURERS:

- A. Trane, Carrier, York or prior approved equal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION:

- A. Install condensing units according to manufacturers written instructions.
- B. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.
- C. Install ground-mounted units on concrete housekeeping pad 4 inches larger than condensing unit on each side. Anchor unit to pad.
- D. Connect refrigerant piping to air-cooled condensing units; maintain required access to unit. Install furnished field-mounted accessories. Provide refrigerant accessories shown on the drawings.
- E. Route control wiring in conduit.
- F. Provide sleeves for piping and conduit through walls. Seal wall penetrations.

#### 3.2 TESTING:

- A. After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks and replace lost refrigerant oil. Use electronic leak detector to test for leakage.
- B. After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements. Record suction pressure.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units with new units and retest.

#### 3.3 MISCELLANEOUS:

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Clean units to remove dirt and construction debris and repair damaged finishes.
- B. Insulate suction piping. Paint insulation that is not covered by aluminum jacket.

END OF SECTION 23 6201



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## **SECTION 23 81 26 - SPLIT SYSTEM DX AIR HANDLING UNITS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK:**

- A. The work required under this sections includes all work necessary for a complete installation of split system DX air handling units.

#### **1.2 COORDINATION:**

- A. The air handling units of one manufacturer have been used as the basis of design. Any modifications to ductwork, piping, wiring, or building structure, that results from the use of any other units shall be coordinated with all trades prior to delivery of approved equipment from the manufacturer. Any modifications required shall be performed without incurring any additional cost to the Contract.

#### **1.3 CODES AND STANDARDS:**

- A. NFPA 90A Installation of Air conditioning and Ventilation Systems.
- B. ANSI/AFBMA 9 Load Ratings and Fatigue Life for Ball Bearings.
- C. SMACNA HVAC Duct Construction Standards.
- D. ARI 410 Standard for Forced Circulation Air-cooling and Air-Heating Coils.
- E. ANSI/UL 900 Test Performance of Air Filter Units.
- F. AMCA 301 Method for Publishing Sound Ratings for Air Moving Devices.
- G. NFPA 70 National Electrical Code
- H. UL 1995 Heating and Cooling Equipment

#### **1.4 SUBMITTALS:**

- A. Submittals shall include the following:

- 1. Unit Housing
  - a. Certified dimensional drawings
  - b. Casing Construction
  - c. Insulation
- 2. Fan
  - a. Fan curves
  - b. RPM
  - c. Brake horsepower
- 3. Motor

- a. Manufacturers data sheet
- 4. Coils
  - a. Manufacturers data sheet
  - b. Coil selection input/output using an ARI-410 certified selection program
- 5. Filter
  - a. Manufacturers data sheet
  - b. Filter frame size and quantity of filters
- 6. Sound Power Level
  - a. Octave band reference  $10^{-12}$  watt
  - b. Inlet and outlet

1.5 ACCEPTABLE MANUFACTURERS:

- A. Carrier Model 40RM is basis of design. Trane and AAON are approved equals.

PART 2 - PRODUCTS:

A. General:

- 1. Air handling units shall be completely factory assembled including coil, condensate drain pan, fan motor(s), filters and controls in an insulated casing that can be applied in either vertical or horizontal configuration.
- 2. Units shall be rated and tested in accordance with ARI standard 210, 360, and 270 (Cooling only). Units shall be UL listed and labeled in accordance with UL 465 and UL 1995 for indoor blower coil units.

B. Casing:

- 1. Unit casing shall be constructed of zinc coated, minimum 20 gauge, G-90 galvanized steel. Casing shall be completely insulated with fire-retardant, permanent, odorless glass fiber material with R-value not less than 4. Knockouts shall be provided for unit electric power and refrigerant piping connections.

C. Direct Expansion Coil:

- 1. Coils shall consist of copper tubes with aluminum fins bonded to the tubes by mechanical expansion. Coil tubing shall be internally rifled to maximize heat transfer. Suction and liquid line connections or supply and discharge connections shall be made on the same side of the coil.
- 2. Direct-expansion coils shall include factory-installed thermostatic expansion valves (TXVs) for refrigerant control. The TXVs shall be capable of external adjustment.

3. Coils shall be leak tested at a pressure of not less than 375 psig.

D. Electric Heaters:

1. Provide unit mounted electric heaters as scheduled.
2. Electric heat assembly shall be UL, ETL, and CSA approved for direct installation on fan discharge.
3. Heater assembly shall have single-point power wiring and include contactors with 24 volt coils, power wiring, 24 volt control wiring terminal blocks, and a hinged access panel.
4. Electric heater elements shall be constructed of heavy-duty nickel chromium elements.

E. Condensate Drain Pans:

1. Drain pans shall be one-piece, corrosion resistant, and fully drainable.
2. Coil shall be mounted above, not in, the drain pan to allow full inspection or cleaning of drain pan.
3. Unit shall contain condensate drain pans for both horizontal and vertical applications. Drain pans shall have connections on both sides of the unit.

F. Fan:

1. Double inlet, double width, forward curved, centrifugal-type fan(s) with adjustable belt drive shall be standard. Thermal overload protection shall be standard on motor. Fan and motor bearings shall be permanently lubricated.

G. Controls:

1. Magnetic motor starter, low voltage terminal strip, and single point power entry shall be included. All necessary controls shall be factory-insulated and wired.
2. Evaporator defrost control shall be included to prevent compressor slugging by temporarily interrupting compressor operation when low evaporator coil temperatures are encountered.

H. Filter:

1. Filters shall be one inch. Filters shall be accessible from either side through the coil access panel.

## PART 3 - EXECUTION

### 3.1 EXAMINATION:

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in of refrigerant and condensate drainage piping systems and electrical services to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION:

- A. Install units in accordance with manufacturer's written instructions.
- B. Install floor mounted units on concrete housekeeping pads.
- C. Arrange installation of units to provide access space around air handling units for service and maintenance.
- D. Install piping adjacent to machine to allow service and maintenance.
- E. Connect condensate piping to drain pans. Extend to nearest floor drain. Drain line shall be installed with a slope of not less than 1/8 inch per foot down in the direction of flow.
- F. Connect to supply and return coil tapings with shutoff or balancing valve and union or flange at each connection. Refer to details shown on drawings.
- G. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connections.
- H. Comply with applicable requirements in Division 16 Sections for power wiring, switches, and motor controls.
- I. Charge refrigerant coils with refrigerant and test for leaks. Repair leaks and retest until no leaks exist.
- J. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
- K. Clean air handling units internally, on completion of installation, according to manufacturer's written instructions. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face. Comb coil fins as required.
- L. After completing system installation and testing, adjusting, and balancing air handling and air-distribution systems, clean filter housings and install new filters.

END OF SECTION 23 81 26

**PROPOSAL FORM**

MADE BY \_\_\_\_\_

ADDRESS \_\_\_\_\_

TO: **City of LaGrange**

The undersigned, as Bidder, proposes and agrees, if this Bid is accepted, to enter into a Contract with **City of LaGrange**, in the form of Contract specified and shown in the attached Contract Documents, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the construction of the **Long Cane Creek Pollution Control Plant Improvements – Krebs Project No. 20065** as described in the Advertisement for Bids, and in the Contract Documents, which are hereby referred to and made a part of the same extent as if fully set out herein, and in full and complete accordance with the shown, noted, described and reasonably intended requirements of the Contract Documents, to the full and entire satisfaction of the Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the attached Instructions to Bidders, General Conditions, and other Contract Documents, based on the following pricing:

**PROPOSAL FORM**

ITEM NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEM	UNIT PRICE	TOTAL PRICE FOR ITEM
1.	Complete	<b>Long Cane Creek Pollution Control Plant Improvements:</b> Furnish and install all labor, materials, equipment, and appurtenances for the construction of the Plant expansion/ improvements including demolition, sitework, yard piping, improvements to preaeration basins, secondary clarifier splitter boxes, clarifiers, thickeners, digesters, solids holding basins, and other modifications/improvements. Lump Sum	Lump Sum	\$
2.	Complete	<b>Electrical:</b> Furnish and install all labor, materials, equipment, and appurtenances for the electrical work associated with this project Lump Sum	Lump Sum	\$
3.	Complete	<b>WWTP SCADA System:</b> Furnish and install all labor, materials, equipment and appurtenances for the SCADA System work as identified in Appendix "A", SCADA Scope of Work Lump Sum	Lump Sum	\$143,761.00
4.	200	Undercut (Below Subgrade) Unsuitable Soils, Haul, and Dispose Off-Site, as directed by the Engineer	\$ /CY	\$
5.	200	Backfill Undercut Areas w/ Crushed Stone (Including Hauling and Compaction), as directed by the Engineer	\$ /CY	\$
6.	200	Backfill Undercut Areas w/ suitable Soil from On-Site (Including Hauling and Compaction), as directed by the Engineer	\$ /CY	\$
7.	600	Concrete Sidewalk furnish and install to include all required grading, backfill, materials, and labor, in areas directed by the Engineer and not already identified on the Contract Documents	\$ /SF	\$

8.	100	Replacement of Structural Member Metals in Pre and Post Thickeners, in areas directed by the Engineer and not already identified on the Contract Documents	\$ /LF	\$
9.	80	Replacement of Steel Plate in Pre and Post Thickeners, in areas directed by the Engineer and not already identified on the Contract Documents	\$ /SF	\$
Total Amount of Base Bid				\$

**BASE BID:** For construction complete as shown and specified in table above, the sum of

Dollars \$

**ADDENDA:** The Bidder acknowledges receipt of Addenda Nos. \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

**ALTERNATES:** If alternates as set forth in the Contract Documents are accepted, the following adjustments are to be made to the Base Bid.

ITEM NO.	ALTERNATE DESCRIPTION	TOTAL ADD FOR ITEM
A1.	Modifications to the Existing Pre-Aeration Basin to Include Demolition Work, Installation of FRP Baffle Walls, Submersible Mixers, Instrumentation, Miscellaneous Metals, and Associated Electrical Work as identified in the Contract Documents  Lump Sum	\$
A2.	New Septage Receiving Station to Include All Required Mechanical Equipment, Concrete, Paving, Pipe Work, and All Associated Electrical Work as identified in the Contract Documents  Lump Sum	\$
A3.	Modifications to the Aeration Basins to Include Replacement of the Surface Aerators, Controls, Instrumentation, and All Associated Electrical Work as identified in the Contract Documents  Lump Sum	\$

The award of the Contract will be based on the total/sum of the base bid price and the alternates (if any) selected by the Owner. The Owner will receive bids and all pricing will be read aloud, but



the project will not be awarded until the bids are evaluated and a determination is made on which alternates are selected (if any). Once the Alternates have been selected, the final bid amount will be calculated (base bid price plus adjustments for any alternate selected) for each bid submitted, and if an award is made, the project will be awarded to the responsive bidder with the lowest final bid amount.

The Bidder declares that he/she has examined the site of the work, and has familiarized himself/herself with the existing and proposed/new facilities (including the location, nature, sizes/dimensions, current and intended future use, etc.). The Bidder declares that he/she has fully informed himself/herself of conditions that would affect the proposed work, that, prior to the tender of his/her bid, he/she has examined the Contract Documents for the work and has read all special instructions and provisions contained in the Documents, and that he/she has satisfied himself/herself with respect to the quality and extent of work to be performed. The Bidder declares that the firm, the project manager and the superintendent are qualified and meet or exceed the experience requirements as outlined in the Instructions to Bidders and/or elsewhere in the Contract Documents.

The Bidder declares that he/she understands that, when quantities of work for which unit price bids are requested in the Proposal, such quantities are approximate only and are subject to either increase or decrease, that, should the quantities of any of the work items be increased, the Bidder proposes to perform the additional work at the unit prices bid by him, that, should the quantities of any of the work items be decreased, payment will be made only for the actual quantities of work performed and such payment will be based upon the unit prices bid by him/her, and that he/she shall make no claim for profits anticipated on the decrease in quantities of work. Actual quantities will be paid for as the work progresses, in accordance with the provisions of the Contract Agreement, and such quantities shall be subject to final measurements and determinations made upon completion of the work.

The Bidder understands that the Owner reserves the right, in the Owner's discretion, to reject any or all bids, to waive any informality in any bid, and to accept any bid considered to be advantageous to the Owner.

The Bidder agrees that his/her bid shall be valid for a period of sixty (60) calendar days after the date set for receipt of bids, and shall not be withdrawn for a period of sixty (60) calendar days after the date set for receipt of bids.

The Bidder has attached hereto a Bid Bond executed by a Surety Company authorized to do business in the state in which the project is located (with valid Power-of-Attorney attached), in favor of (made payable to) **City of LaGrange**, the amount of 5% of the bid amount (total).

The Bidder agrees that, should he/she be notified that his/her Bid on the work has been accepted, he/she will, within ten (10) days from receipt of such notice, execute the formal Contract Agreement bound herein, and will furnish with the Contract evidence of Insurance Coverage of his/her construction operations and all of his/her operations associated with the project, all in accordance with the requirements of the General Conditions.

The Bidder further agrees that, in case of failure on his/her part to execute said Contract Agreement, and to furnish all Bonds required by the Contract Documents, within ten (10) consecutive calendar days after receipt of notice of award of Contract to him, the monies payable to the Obligee of his/her Bid Bond, in accordance with the terms and conditions of the Bond, shall be paid to the Owner as liquidated damages for the delay and additional expense to the Owner caused by such failure on the part of the Bidder.

The Bidder hereby agrees that, should the work under the Contract be awarded to him/her, he/she will commence work under this Contract on or before a date to be specified in written "Notice to Proceed" given by the Owner, and that he/she will achieve Substantial Completion of the Contract within 545 consecutive calendar days following the Notice to Proceed, and will achieve Final Completion of the Contract within 605 consecutive calendar days following the Notice to Proceed. No additional time will be added to the Contract should any of the alternatives be selected. The Bidder agrees to pay, as liquidated damages, the sum of **\$1,500** for each consecutive calendar day after the date set for Substantial Completion of the work until such time as Substantial Completion has been achieved. Once Substantial Completion has been achieved, the Bidder will not be assessed additional liquidated damages unless and until he/she fails to meet the Final Completion Date. If the Bidder fails to meet the Final Completion date, then he/she agrees to pay, as liquidated damages, the sum of **\$1,000** for each consecutive calendar day after the date set for Final Completion of the work, all as provided in the General Conditions. At no time shall the Bidder pay more than **\$1,500** per calendar day for liquidated damages. **The Bidder agrees that, once the Substantial and/or Final Completion dates have passed, the Owner/Engineer will begin deducting liquidated damages from the monthly progress payments.** The Bidder further agrees that he/she will not make any claim for extra compensation should completion of work under the Contract be effected in advance of the time specified hereinabove.

The undersigned Bidder states that he/she fully understands the meaning of "low, responsive, responsible Bidder", as defined in these Documents, and that these criteria will be applied in the evaluation of this Bid.

The undersigned, as Bidder, hereby declares that the name (or names) of the only person (or persons) interested in this Proposal, as principal (or principals), is (or are) as herein below set out and that no person other than that (or those) herein below stated has any interest in this Proposal, or in the Contract to be entered into; that this Proposal is made without connection with any other person, firm or corporation making a proposal; and that it is in all respect fair and in good faith, without collusion or fraud.

Following are the names and addresses of all persons, firms, and corporation interested in the foregoing bid:

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(Type or Print Name and Address of Firm)

\_\_\_\_\_  
(Type or Print Contractor License No.)

\_\_\_\_\_  
(Type or Print Name and Title of Officer/Legal Representative of Firm Submitting Bid)

\_\_\_\_\_  
(Signature of Officer/Legal Representative of Firm Submitting Bid)

\_\_\_\_\_  
(Type or Print Date)

## **SECTION 33 12 15 - HYDRAULIC GATES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Weir Gates
  - 2. Slide Gates

#### **1.3 SUBMITTALS**

- A. Product Data:
  - 1. Furnished specialties
  - 2. Size
  - 3. Accessories
  - 4. Details of construction relative to materials
  - 5. Dimensions of individual components
  - 6. Profiles
  - 7. Finishes.
  - 8. Description of all materials.
  - 9. Complete bill of materials.
  - 10. Complete motor data (if applicable).
  - 11. Structural design calculations.
  - 12. Description of surface preparation, shop priming, and finish painting of gates.
  - 13. Detail each equipment assembly, include make, model weight, and indicate installation details, dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
  - 14. Complete catalog information, descriptive literature, materials of construction, wheels, gears and bearing, trolley drive system, brakes, stator system, variable speed drive system, conductors (bus bar, festoon, cable reel), controls, remote control system, and accessories.
- B. Shop Drawings Showing:
  - 1. Complete dimensional data.
  - 2. Gate locations.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with

project names and addresses, names and addresses of Engineer and owners, and other information specified.

- D. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent professional engineer, indicate compliance of gates for applicable codes, based on comprehensive testing within the last two years of current products.
- E. Maintenance Data: For gates to include in the maintenance manuals specified in Division 1. Include name, address, and telephone number of manufacturer's nearest authorized service representative.
- F. Certification from Contractor and Manufacturer/Suppliers: During the bid period and again prior to submitting/ordering and installing materials, products and equipment, the Contractor and all manufacturers and suppliers shall thoroughly review the materials, products and equipment being supplied and shall familiarize themselves with the existing and proposed/new facilities, as well as connections to existing facilities/utilities. This shall include field verification of the location, nature, size/dimensions, current and intended future use, etc. Prior to ordering and installation, the Contractor shall coordinate with all manufacturers and suppliers to provide all needed information including field dimensions, photographs, information on related materials and equipment, etc.). The Contractor and all manufacturers and suppliers shall include written confirmation (with the submittal) of the following:
  - 1. The materials, products, and equipment being supplied are of the correct size, materials and type.
  - 2. The materials, products and equipment being supplied do not conflict with existing or proposed/new facilities.
  - 3. The products/equipment being supplied are intended for use in this application.
  - 4. All manufacturer(s) and supplier(s) shall provide (either with submittals or separately) written concurrence/acknowledgement of their review/coordination and concurrence with the items above.
  - 5. Shop drawings and product data submitted for review by the Engineer shall bear the Contractor's certification that he has reviewed, checked, and approved the submittals, that they comply with the requirements of the project and with the provisions of the Contract Documents, and that he has verified all sizes, dimensions, locations, field measurements, construction criteria, materials, catalog numbers, and similar data. Field dimensions, sizes and other pertinent information shall be clearly shown on the shop drawings/submittals. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and that the Contractor's warranty and guaranty will fully apply.

#### 1.4 QUALITY ASSURANCE

- A. The equipment specified herein shall be located as shown or described and installed in conformance with the manufacturer's suggested method as approved by the Engineer.
- B. Source Limitations: Obtain each gate component as a complete unit from one source and by a single manufacturer. Comply with all safety regulations for gates.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store gate in a manner to avoid significant or permanent damage to equipment.
  - 1. In general, comply with the manufacturer's written instructions for storage of gates.
  - 2. The equipment shall be stored in a clean, dry location free from construction dust, precipitation and excess moisture.

## 1.6 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Gate Warranty: Submit a written warranty, executed by manufacturer, agreeing to repair or replace gate components that fail in materials or workmanship within the specified warranty period.
- C. Warranty Period: One year from date of Substantial Completion.
  - 1. Warranty shall be for unlimited usage of the equipment for the specified rated capacity over the term of the warranty.

## 1.7 MAINTENANCE SERVICE

- A. Contractor shall provide a manufacturer's technical representative for the equipment specified at the jobsite and/or classroom designated by the Owner for the minimum person days listed for the services listed below:
  - 1. One (1) person days for installation assistance, inspection, functional and performance testing, and certification of the installation.
  - 2. One (1) person day for plant start up.
  - 3. Start up services shall be at times requested by the Contractor and as finally approved by the Owner.
- B. Spare Parts
  - 1. Contractor shall furnish to the Owner one set of all special tools required for the proper servicing of all equipment supplied under these specifications.
  - 2. Contractor shall furnish all spare parts not including required lubrication as recommended by the manufacturer for one year's normal operation and maintenance of the equipment.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Slide Gates – Stainless Steel
    - a. Whipps
    - b. Waco Products, Inc
    - c. Golden Harvest
    - d. Fontaine
    - e. Waterman Industries
    - f. Hydro-Gate
  
  2. Weir Gates – Stainless Steel
    - a. Whipps, Inc.
    - b. Fontaine
    - c. Hydro-Gate
    - d. Waco Products, Inc.
    - e. Golden Harvest
    - f. Waterman Industries
  
  3. Heavy Duty Electric Wrenches (Portable)
    - a. Milwaukee.
    - b. Approved Equivalent.

### 2.2 GATE SCHEDULE

TYPE	QTY	SIZE (W x H)	LOCATION	OPERATOR
NON-SELF-CONTAINED FRAME SLIDE GATE (OWNER FURNISHED)	2	42" x 42"	SECONDARY CLARIFIERS NOS. 1 & 2 SPLITTER BOX; SECONDARY CLARIFIERS NOS. 1 & 2 INFLUENT PIPELINE	HAND CRANK
NON-SELF-CONTAINED WEIR GATE (OWNER FURNISHED)	2	60" x 72"	SECONDARY CLARIFIERS NOS. 1 & 2 RAS/WAS WET WELL; SECONDARY CLARIFIERS NOS. 1 & 2 EFFLUENT PIPELINE	HAND CRANK & ELECTRIC ACTUATED
SELF-CONTAINED WEIR GATE	2	72" x 36"	SECONDARY CLARIFIERS NOS. 1 & 2 SPLITTER BOX; SECONDARY CLARIFIERS NOS. 1 & 2 INFLUENT PIPELINE	HAND CRANK & MODULATING ELECTRIC ACTUATED
NON-SELF-CONTAINED SLIDE GATE	1	42" x 42"	SECONDARY CLARIFIERS NOS. 3-5 SPLITTER BOX; INFLUENT PIPELINE CONNECTION	HAND CRANK
NON-SELF-CONTAINED WEIR GATE	3	36" x 48"	SECONDARY CLARIFIERS NOS. 3-5 SPLITTER BOX; SECONDARY CLARIFIERS NOS. 3-5 INFLUENT PIPELINE	HAND CRANK & MODULATING ELECTRIC ACTUATED

### 2.3 SLIDE GATES (STAINLESS STEEL)

#### A. General:

1. Gates shall be as specified herein and have the characteristics and dimensions shown on the Contract Drawings.
2. Maximum allowable leakage for stainless steel slide gates shall be 1/2 the allowable leakage listed in the latest revision of AWWA C561.
3. The gate shall utilize self-adjusting seals. Due to the difficulty of accessing gates when they are in service, gates that utilize adjustable wedges, wedging devices or pressure pads are not acceptable.
4. All structural components of the frame and slide shall be fabricated of 304 stainless steel having a minimum thickness of 1/4-inch and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.
5. Slide gate frames shall be shipped fully assembled with the invert member welded

to the side frames and the slide installed in the frame unless the overall width of the slide gate exceeds 96 inches or the overall height of the slide gate exceed 25 feet.

6. All welds shall be performed by welders with AWS D1.6 certification.
7. Finish: Mill finish on stainless steel. Welds shall be sandblasted to remove weld burn and scale. All iron and steel components shall be properly prepared and shop coated with a primer.

B. Frame:

1. The frame assembly, including the guide members, invert member and yoke members, shall be constructed of formed stainless steel plate with a minimum thickness of 1/4-inch.
2. Frame design shall allow for embedded mounting, mounting directly to a wall with stainless steel anchor bolts and grout or mounting to a wall thimble with stainless steel mounting studs and a mastic gasket material. Mounting style shall be as shown on the Contract Drawings.
3. All wall mounted or wall thimble mounted gates shall have a flange frame. Flat frame gates are not acceptable.
4. The structural portion of the frame that incorporates the seat/seals shall be formed into a one-piece shape for rigidity. Guide members that consist of two or more bolted structural members are not acceptable. Guide member designs where water loads are transferred through the assembly bolts are specifically not acceptable.
5. Gussets shall be provided as necessary to support the guide members in an unseating head condition. The gussets shall extend to support the outer portion of the guide assembly and shall be positioned to ensure that the load is transferred to the anchor bolts or the wall thimble studs.
6. The frame shall extend to accommodate the entire height of the slide when the slide is in the fully opened position on upward opening gates or downward opening weir gates.
7. On self-contained gates, a yoke shall be provided across the top of the frame. The yoke shall be formed by two structural members affixed to the top of the side frame members to provide a one-piece rigid assembly. The yoke shall be designed to allow removal of the slide.
8. A rigid stainless steel invert member shall be provided across the bottom of the opening. The invert member shall be of the flushbottom type on upward opening gates.
9. A rigid stainless steel top seal member shall be provided across the top of the opening on gates designed to cover submerged openings.
10. A rigid stainless steel member shall be provided across the invert of the opening on downward opening weir gates.

C. Slide:

1. The slide and reinforcing stiffeners shall be constructed of stainless steel plate. All structural components shall have a minimum thickness of 1/4-inch.
2. The slide shall not deflect more than 1/360 of the span or 1/16 inch, whichever is smaller, under the maximum design head.
3. When the width of the gate opening multiplied by the maximum design head is greater than 120 square feet, the portion of the slide that engages the guide members shall be of a "thick edge" design. Minimum material thickness of all



- members of the slide shall be ¼ inch (6 mm).
4. Reinforcing stiffeners shall be welded to the slide and mounted horizontally. Vertical stiffeners shall be welded on the outside of the horizontal stiffeners for additional reinforcement.
  5. The stem connector shall be constructed of two angles or plates. The stem connector shall be welded to the slide. A minimum of two bolts shall connect the stem to the stem connector.

D. Stems:

1. A threaded operating stem shall be utilized to connect the operating mechanism to the slide. On rising stem gates, the threaded portion shall engage the operating nut in the manual operator or motor actuator. On non-rising stem gates, the threaded portion shall engage the nut on the slide.
2. The threaded portion of the stem shall have a minimum outside diameter of 1-1/2 inches. Stem extension pipes are not acceptable.
3. The stem shall be constructed of solid stainless steel bar for the entire length, the metal having a tensile strength of not less than 75,000 psi.
4. The stem shall be threaded to allow full travel of the slide unless the travel distance is otherwise shown on the Contract Drawings.
5. Maximum L/R ratio for the unsupported part of the stem shall not exceed 200.
6. In compression, the stem shall be designed for a critical buckling load caused by a 40 lb effort on the crank or handwheel with a safety factor of 2, using the Euler column formula.
7. The stem shall be designed to withstand the tension load caused by the application of a 40 lb effort on the crank or handwheel without exceeding 1/5 of the ultimate tensile strength of the stem material.
8. The threaded portion of the stem shall have machine rolled threads of the full Acme type with a 16 microinch finish or better. Stub threads are not acceptable.
9. Stems of more than one section shall be joined by stainless steel or bronze couplings. The coupling shall be bolted to the stems.
10. Stems, on manually operated gates, shall be provided with adjustable stop collars to prevent over closing of the slide.

E. Seals:

1. All gates shall be provided with a self-adjusting seal system to restrict leakage in accordance with the requirements listed in this specification.
2. All gates shall be equipped with UHMW polyethylene seat/seals to restrict leakage and to prevent metal to metal contact between the frame and slide.
3. The seat/seals shall extend to accommodate the 1-1/2 x the height of the slide when the slide is in the fully closed or fully opened position.
4. All upward opening gates shall be provided with a resilient seal to seal the bottom portion of the gate. The seal shall be attached to the invert member or the bottom of the slide and it shall be held in place with stainless steel attachment hardware.
5. All downward opening weir gates shall be provided with UHMW polyethylene seat/seals across the invert member.
6. The seal system shall be durable and shall be designed to accommodate high velocities and frequent cycling without loosening or suffering damage.
7. All seals must be bolted or otherwise mechanically fastened to the frame or slide. Arrangement with seals that are force fit or held in place with adhesives are

unacceptable.

8. The seals shall be mounted so as not to obstruct the water way opening.
9. Gates that utilize rubber "J" seals or "P" seals are not acceptable.
10. The seal system shall have been factory tested to confirm negligible wear (less than 0.01") and proper sealing. The factory testing shall consist of an accelerated wear test comprised of a minimum of 25,000 open-close cycles using a well-agitated sand/water mixture to simulate fluidized grit.

F. Manual Operators:

1. Unless otherwise shown on the Drawings, gates shall be operated by a manual handwheel or a manual crank-operated gearbox. The operator shall be mounted on the yoke of self-contained gates or on the pedestal of non-self-contained gates.
2. The gate manufacturer shall select the proper gear ratio to ensure that the gate can be operated with no more than a 25 lb effort when the gate is in the closed position and experiencing the maximum operating head.
3. An arrow with the word "OPEN" shall be permanently attached or cast onto the operator to indicate the direction or rotation to open the gate.
4. Handwheel operators shall be fully enclosed and shall have a cast aluminum housing.
  - a. Handwheel operators shall be provided with a threaded cast bronze lift nut to engage the operating stem.
  - b. Handwheel operators shall be equipped with roller bearings above and below the operating nut.
  - c. Positive mechanical seals shall be provided above and below the operating nut to exclude moisture and dirt and prevent leakage of lubricant out of the hoist.
  - d. The handwheel shall be removable and shall have a minimum diameter of 16 inches.
5. Crank-operated gearboxes shall be fully enclosed and shall have a cast aluminum or ductile iron housing.
  - a. Gearboxes shall have either single or double gear reduction depending upon the lifting capacity required.
  - b. Gearboxes shall be provided with a threaded cast bronze lift nut to engage the operating stem.
  - c. Bearings shall be provided above and below the flange on the operating nut to support both opening and closing thrusts.
  - d. Gears shall be steel with machined cut teeth designed for smooth operation.
  - e. The pinion shaft shall be stainless steel and shall be supported on ball or tapered roller bearings.
  - f. Positive mechanical seals shall be provided on the operating nut and the pinion shafts to exclude moisture and dirt and prevent leakage of lubricant out of the hoist.
  - g. The crank shall be cast aluminum or cast iron with a revolving nylon grip and have a minimum radius of 12".
  - h. The crank shall be removable.
6. All gates having widths in excess of 72 inches and widths greater than twice their height shall be provided with two gearboxes connected by an interconnecting shaft for simultaneous operation.
  - a. Interconnecting shafting shall be constructed of aluminum or stainless steel.

- b. Flexible couplings shall be provided at each end of the interconnecting shaft. Couplings shall be stainless steel or non-metallic.
  - c. One crank shall be provided to mount on the pinion shaft of one of the gearboxes.
7. An extended operator system utilizing chain and sprockets shall be furnished by the manufacturer when the centerline of the crank or handwheel, on a non-gear operator, is located over 48-in above the operating floor. Chain wheels are not acceptable.
- a. A removable stainless steel or aluminum cover shall be provided to enclose chain and sprockets.
  - b. The extended operator system shall lower the centerline of the pinion shaft to 36-in above the operating floor.
  - c. A handwheel may be utilized in conjunction with a gearbox in lieu of the extended operator system if the centerline of the pinion shaft is 60-in or less above the operating floor.
8. Pedestals shall be constructed of stainless steel. Aluminum pedestals are not acceptable.
- a. The pedestal height shall be such that the handwheel or pinion shaft on the crank-operated gearbox is located approximately 36-in above the operating floor.
  - b. Wall brackets shall be used to support floor stands where shown on the Drawings and shall be constructed of stainless steel.
  - c. Wall brackets shall be reinforced to withstand in compression at least two times the rated output of the operator with a 40 lb effort on the crank or handwheel.
  - d. The design and detail of the brackets and anchor bolts shall be provided by the gate manufacturer and shall be approved by the ENGINEER. The gate manufacturer shall supply the bracket, anchor bolts and accessories as part of the gate assembly.
9. Operators shall be equipped with fracture-resistant clear butyrate or lexan plastic stem covers.
- a. The top of the stem cover shall be closed and have a ventilation hole.
  - b. The bottom end of the stem cover shall be mounted in a housing or adapter for easy field mounting.
  - c. Stem covers shall be complete with indicator markings to indicate gate position.
10. When shown on the Contract Drawings, provide 2 inch square nut, mounted in a floor box, with a non-rising stem.
- a. The square nut shall be constructed of bronze.
  - b. The floor box shall be constructed of stainless steel or cast iron and shall be set in the concrete floor above the gate as shown.
  - c. Provide one aluminum or stainless steel T-handle wrench for operation.

G. Anchor Bolts:

- 1. Anchor bolts shall be provided by the gate manufacturer for mounting the gates and appurtenances.
- 2. If epoxy type anchor bolts are provided, the gate manufacturer shall provide the studs and nuts.

3. Anchor bolts shall have a minimum diameter of 1/2-inch.

H. Leakage:

1. Maximum allowable leakage for stainless steel slide gates shall be 0.1 gallons per minute per foot of wetted perimeter under head of 20 feet, regardless of the direction of the unbalanced head.

## 2.4 WEIR GATES

- A. Weir gates shall be similar in construction to that specified for Slide Gates (Ultra Leak Tight Service), and shall be so designed such that upper edge of slide functions as an adjustable weir.
- B. The section of gate below the liquid level shall be tightly sealed against the frame and bottom closure member such that a water tight shut off can be achieved.
- C. Tandem lifts and stems shall be utilized for gates 5 feet or wider, or when the gate width is greater than twice the height.
- D. Where crank operated floorstands are used, adaptor brackets for electric wrenches shall be provided.
- E. Electrically activated lifting devices shall be provided where indicated

## 2.5 ELECTRIC WRENCHES

- A. Electric wrenches shall:
  - 1. Shall be double insulated capable of being operated with safety in adverse wet conditions.
  - 2. Adjustable height tri-pod stand
  - 3. Be suitable for operation on 120 volt, single phase 60 Hz.
  - 4. Reversing switch, over-torque protection clutch, and 20 foot cord
  - 5. Maximum output torque by the clutch shall match the requirement for manual input to prevent damage to the operator or gate, and potential injury to personnel.
  - 6. Operator speed shall move the gate at approximately 12 inches per minute rate.
- B. A total of one (1) electric wrench shall be delivered to the Owner.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of gates.

### 3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's detailed written instructions for installing gates.
- B. Electrical Connections: Rough-in electrical connections according to requirements.

### 3.3 CLEANING AND PROTECTING

- A. Restore marred, abraded surfaces to their original condition.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure gate is without damage or deterioration at the time of Substantial Completion.

### 3.4 DEMONSTRATION

- A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
  - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
  - 3. Once the gates have been installed correctly and are operating as intended, the service representatives shall perform sixteen (16) hours of on-site start-up assistance and operator training.
  - 4. Schedule training with Owner with at least seven days' advance notice.

### 3.5 TESTING

- A. The Contractor shall test each gate installation as to verify any gate leakage is within the confines as specified herein. Testing shall be solely the responsibility of the Contractor.

END OF SECTION 33 12 15

## **SECTION 44 42 26.21 – SEPTAGE RECEIVING STATION**

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. This section includes requirements for providing the following equipment:

1. Septage Receiving Station

#### 1.2 SUBMITTALS

A. Certification from Contractor and Manufacturer/Suppliers: During the bid period and again prior to submitting/ordering and installing materials, products and equipment, the Contractor and all manufacturers and suppliers shall thoroughly review the materials, products and equipment being supplied and shall familiarize themselves with the existing and proposed/new facilities, as well as connections to existing facilities/utilities. This shall include field verification of the location, nature, size/dimensions, current and intended future use, etc. Prior to ordering and installation, the Contractor shall coordinate with all manufacturers and suppliers to provide all needed information including field dimensions, photographs, information on related materials and equipment, etc.). The Contractor and all manufacturers and suppliers shall include written confirmation (with the submittal) of the following:

1. The materials, products, and equipment being supplied are of the correct size, materials and type.
2. The materials, products and equipment being supplied do not conflict with existing or proposed/new facilities.
3. The products/equipment being supplied are intended for use in this application.
4. All manufacturer(s) and supplier(s) shall provide (either with submittals or separately) written concurrence/acknowledgement of their review/coordination and concurrence with the items above.
5. Shop drawings and product data submitted for review by the Engineer shall bear the Contractor's certification that he has reviewed, checked, and approved the submittals, that they comply with the requirements of the project and with the provisions of the Contract Documents, and that he has verified all sizes, dimensions, locations, field measurements, construction criteria, materials, catalog numbers, and similar data. Field dimensions, sizes and other pertinent information shall be clearly shown on the shop drawings/submittals. The Contractor shall also certify that the work represented by the shop drawings is recommended by the Contractor and that the Contractor's warranty and guaranty will fully apply.

- B. Product data including rated capacities, accessories, details of construction relative to materials, dimensions of individual components, profiles, finishes, description of all materials, complete bill of materials, complete motor data, performance data, operational and maintenance data, and any other pertinent information.
- C. Shop Drawings:
  - 1. Drawings showing complete dimensional data, mounting details, motor locations, instrument locations, and assembly information.
- D. Maintenance Data: Septage receiving systems shall include the maintenance manuals specified in Division 1. Include name, address, and telephone number of manufacturer's nearest authorized service representative.

### 1.3 QUALITY ASSURANCE

- A. Identification: Equipment shall be provided with a corrosion resistant nameplate which shall contain at a minimum the manufacturer's name and address, equipment model number and serial number.
- B. Manufacturer, at request, shall provide a list of reference sites for similar equipment installations for verification by the Engineer.
- C. Manufacturer shall conduct factory testing and verification prior to shipment.
- D. Source Limitations: Obtain septage receiving system as a complete unit from one source.
- E. Unit shall be fully assembled and shop tested to confirm fit and function of the unit. A certificate of the shop test shall be supplied with the shipping documents. Ancillary components may be removed to prevent damage during shipment.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store septage receiving equipment in a manner to avoid significant or permanent damage to equipment.
  - 1. In general comply with manufacturer's written instructions for storage of equipment.
  - 2. The septage receiving equipment shall be stored in a clean, dry location free from construction dust, precipitation and excess moisture.

## 1.5 WARRANTY

### A. Warranty Period: One year from date of Substantial Completion

1. Warranty shall be for unlimited usage of the equipment for the specified rated capacity over the term of the warranty.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

#### A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

##### 1. Septage Receiving System

- a. SAVI Beast Septage Station, Model VFA-800-DM, as supplied by SAVÉCO North America, Inc.

### 2.2 SEPTAGE RECEIVING SYSTEM

#### A. General

1. The septage receiving system shall effectively separate, wash and dewater septic waste that has been delivered to the system. It shall be a fully automatic, self-cleaning unit incorporating a perforated plate rotating drum screen and an integral screenings washing, conveying and dewatering/compacting system contained within a stainless steel tank. The tank mounted rotating drum screen unit will be provided with an angle-of-inclination of 25° from horizontal.
2. The septage receiving system shall include the hauler station, flow meter, and Flo-Logic Software Package.

#### B. Performance

1. The septage receiving system shall wash, compact the screenings, and discharge to a dumpster. A grinder or rock trap should **not** be included with the system.



Conditions	Unit
Number of units	One (1)
Influent Type	Municipal Septage
Influent Solids Concentration (mg/l)	3-4%
Design Flow per unit (gpm)	300-400
Peak Flow Capacity per unit (gpm)	450
Perforation Size (mm)	6
Drum Basket Nominal Diameter (inches)	30
Inlet Connection	4-inch flanged
Outlet Connection	8-inch flanged
Beast discharge height from operating level (feet)	4.9
Drum Installation Angle	25°
Drum Motor HP	1.5
Screw Motor HP	2.0

### C. Design Requirements

#### 1. General

- a. Equipment provided shall be a fully automatic, self-cleaning receiving unit incorporating a perforated plate rotating drum screen and an integral screenings washing, conveying and dewatering/compacting system contained within a stainless steel tank. The tank mounted rotating drum screen unit will be provided with an angle-of-inclination of 25° from horizontal.
- b. Each rotating drum screen unit shall be provided with a rotating screen basket, exterior basket cleaning spray bar(s), exterior basket cleaning brush, concentric transport screw with integral screenings washing, dewatering and screenings compaction zone.
- c. All parts and assemblies shall be fabricated using type 304 stainless steel unless otherwise noted.

#### 2. Rotating Drum Screen Basket

- a. The Drum Screen Basket shall be designed and built to withstand the maximum possible static hydraulic forces exerted on the screen by the liquid flow. Structural and functional parts shall be sized to prevent deflections or vibrations that may impair the screening, conveying, washing and compacting operations.
- b. The drum screen basket shall be mounted at the drive end using a large diameter, single row, heavy duty industrial bearing assembly with integral ring gear comprising part of the drive system. The bearing assembly shall have a built in grease fitting.

- c. The drum screen basket shall be of a cylindrical shape with perforations around the entire basket.
  - d. The drum screen basket shall be perforated plate with maximum openings of 6 mm. Bar screens, wire mesh or wedge wire, or stationary screens of any type will not be acceptable screen media.
  - e. The drum screen basket shall have angled lifting vanes to retain loose solids during rotation and lift them up and into the screw auger trough. Helical shaped vanes which can tumble screenings rather than lift screenings shall not be accepted.
  - f. The screenings collection trough shall extend beyond the screen opening at the influent end to maximize solids capture and reduce screenings recycle.
  - g. The drum screen shall have no support arms on the influent side of the screen basket to snag and accumulate long stringy solids. Screens with influent side support arms will not be accepted.
  - h. The drum screen basket shall be provided with a seal system incorporating an HDPE seal. Any unit which does not incorporate this design will not be accepted.
3. Drum Screen Basket Cleaning Brush and Spray Bar(s)
- a. The exterior of the rotating drum screen basket assembly shall be cleaned by a high pressure stainless steel spray bar and a stainless steel backed polypropylene brush. The drum screen basket shall continuously rotate in one direction during the cleaning cycle and pass through the topmost portion where it is cleaned by the spray bar and brush.
  - b. The exterior cleaning brush shall be mounted on a holding device which keeps the brush in constant contact with the screen basket and can be adjusted to compensate for brush wear.
4. Screenings Transport Screw and Dewatering Zone
- a. The screenings transport screw shall be constructed of an epoxy coated high strength alloy steel for maximum torsion resistance in the screw. The screw shall be near-white blasted, primed with an inorganic zinc primer and coated with a 2 part epoxy.
  - b. The screenings collection trough shall be attached to the screenings transport tube by a drum support flange. The screw drive assembly shall be attached via a drive support flange welded to the upper end of the screenings transport tube.
  - c. The concentric transport/dewatering screw shall be designed to transport and dewater the screened material. The unit shall be provided with screw flights of constant pitch approaching the compaction zone to prevent clogging in the compaction zone. Designs incorporating a decreasing pitch screw will not be accepted.

- d. The screenings transport screw shall be supported by a sealed, self-lubricating lower bronze bushing. The lower bushing shall be designed such that it does not take any thrust load from the transport screw. Designs requiring bearings of any type or externally lubricated bushing(s) or water injection into the housing shall not be accepted.
- e. The compaction zone shall be integral to the transport screw and compaction tube. The compaction zone shall be designed to form a screenings plug and return water released from the screened material back to the tank through circular holes that are machined into the screenings compaction tube.
- f. The compaction zone housing shall be fabricated entirely of stainless steel. The lower body shall be a welded construction with a minimum of 10 mm end plates for maximum torsion resistance. The bottom of the compaction zone shall be curved to promote maximum cleaning and minimum depositing of materials. Units utilizing a fiberglass reinforced compaction zone housing will not be accepted.
- g. The compaction zone shall be furnished with a latched, hinged access cover with a gasket. The access cover shall incorporate a safety interlock switch to prevent operation of the unit with the access cover open. Units which require the use of any tools to gain access to the compaction zone will not be accepted.

## 5. Spray Wash Systems

- a. Drum and flush spray systems shall each be furnished with an automatically controlled electrically actuated full port stainless steel ball valve, stainless steel piping and fittings, flexible reinforced hoses and spray nozzles.
- b. Compaction zone spray system shall be furnished with a control solenoid valve, stainless steel piping and fittings, flexible reinforced hoses and spray system.
- c. A drum wash system shall be located over the rotating perforated drum which utilizes a spray bar(s) with adequate spray nozzles to ensure a consistent spray pattern over the entire length of the drum.
- d. A screenings spray wash system shall be located in the lower section of the transport tube to break up and return organic materials to the flow stream and to ensure maximum screenings washing.
- e. A compaction zone wash system shall be provided which periodically cleans the compaction and dewatering zone via a stainless steel wash system located in the uppermost end of the compaction/dewatering chamber. The header shall be designed to completely wash the full surface of the transport tube drainage area.

## 6. Screen Tank

- a. The septage receiving unit shall be supplied with a two-stage stainless steel tank. The bottom of the influent section of the tank shall be sloped toward the screen to eliminate sedimentation. The inlet section shall be sized to match the inlet shape of the drum to prevent a wall for solids to dam and collect. Units with rectangular tanks which encourage sedimentation shall not be accepted.
- b. The second stage tank shall house the rotating drum screen unit.
- c. The inlet stage of the tank shall be provided with a flush wash system.

#### 7. Drive Units

- a. The septage receiving unit shall be a dual drive system which allows the drum and screw to be driven independently to optimize solids removal.
- b. Gear reducers shall be a helical gear type as manufactured by NORD or approved equal. Provide a cast iron frame; design in accordance with AGMA recommendations for wastewater service.
- c. Transport screw shall be directly driven by a flange mounted gear reducer.
- d. The transport screw gear reducer shall be bolted to a machined flange welded to the upper end of the transport tube.
- e. The rotating screen drum basket shall be driven by a flange mounted gear reducer using a spur gear and bull gear assembly.
- f. Gear reducers shall be driven by 240/480V, 3 ph, 60 hz motors rated for the installation environment location.
- g. Chain drives, belt drives, friction drives, or hydraulic drives will not be accepted.
- h. Designs incorporating a separate upper bearing for the transport screw will not be accepted.

#### 8. Drum Retraction

- a. The complete screen assembly must be able to be retracted away from the front seal plate to allow for replacement of the seal without pivoting the screen or requiring lifting devices such as cranes or come along hoists.
- b. Units that require pivoting of the screen for seal replacement shall be required to provide a complete workable lifting system.

#### 9. Pivot Assembly

- a. The complete screen assembly must be able to pivot out of the tank without requiring the removal of the drive unit, screw or drum. Units that require disassembly of the unit shall not be allowed.

#### D. Inlet Connection

1. Provide a 4-inch aluminum male cam and grove style inlet connection with removable cap.

G. Tank Assembly

1. Tank shall have a class 150 4-inch inlet flange.
2. Tank shall have an 8-inch straight pipe discharge.
3. Tank shall be constructed of passivated 304 stainless steel.
4. Tank shall include lifting points for slings and forklift forks.
5. Tank shall include mounting points for spray wash assemblies.
6. Tank shall have a removable cover.

H. Spray Wash Assemblies

1. Piping and fittings shall be constructed of 304 stainless steel.
2. Spray nozzles shall be constructed of 303 stainless steel.
3. Exposed spray wash piping shall be insulated and heat traced.
4. Solenoid valves shall be brass body construction with a 120 volt AC coil and shall be suitable for Class I, Division 2, Group D hazardous area.
5. Manual ball valves shall be constructed of 304 stainless steel.

I. Inclined Screw Conveyor

1. Perforated/Bar Screen Trough
  - a. Screen shall be constructed of 304 stainless steel and polished to remove burrs.
  - b. Perforations shall be maximum ¼-inch in diameter.
2. Transport Tube Assembly
  - a. Transport tube shall be constructed of passivated 304 stainless steel.
  - b. The transport tube shall have 304 stainless steel flanges for attachment to the screen and the dewatering zone.
3. Dewatering Zone
  - a. The dewatering zone shall be constructed of passivated 304 stainless steel.
  - b. Dewatering zone shall be dual compartment design.
4. Motor
  - a. The motor shall be manufactured by TECO, WEG, or approved equivalent.
  - b. The Motor shall be 2 hp, TEFC, 1725 rpm, 230/460 volt, 3 phase, 60 Hz.
  - c. Motor shall have a minimum service factor of 1.15, 84% minimum efficiency factor full load, minimum 81% power factor at full load.

J. Controller

1. Enclosure
  - a. Main enclosure shall be 316 stainless steel NEMA 4x and house the control devices, motor starters, emergency stop and PLC.
2. Start & Stop Pushbuttons
  - a. Pushbuttons shall be rated NEMA 4x.
  - b. Start pushbutton shall initiate operation of the system.
  - c. Stop pushbutton shall initiate a stop of the system and immediately stop the grinder motor and close the pinch valve. The tank spray wash solenoid shall energize and operate along with the auger motor and auger spray wash for the duration of the cleaning cycle.
3. Grinder
  - a. A grinder is not being provided with this scope of supply, however, the control panel shall have provisions for adding a grinder to the system in the future.
4. Auger ON/OFF/AUTO Selector Switch
  - a. In the ON position, the auger shall run continuously.
  - b. In the AUTO position, the auger shall be controlled by the START and STOP pushbuttons.
5. Pinch Valve OPEN/CLOSE/AUTO Selector Switch
  - a. In the OPEN position, the valve will open.
  - b. In the CLOSE position, the valve will close.
  - c. In the AUTO position, the valve will be controlled by the ultrasonic level sensor mounted on the tank.
6. RESET Switch
  - a. Reset switch shall be NEMA 4X
  - b. Reset switch shall clear any fault condition and shall reset the system for normal operation.
7. Pilot Lights
  - a. Lights shall be LED type rated NEMA 4X.
  - b. Lights shall indicate AUGER RUN, PINCH VALVE OPEN, and FAIL.
8. Emergency Stop Pushbutton
  - a. Emergency Stop Pushbutton shall be rated NEMA 4X.
  - b. When activated, Emergency Stop shall close the plug valve, stop all motors and de-energize solenoid valves.

## K. Electrical Controls and Devices

1. Control Panel: 480 volt primary control panel shall be provided with a type 304, stainless steel, NEMA 4X enclosure. Refer to Specification Section 26 29 00 ("Manufactured Control Panels") for additional control panel requirements. Panel shall be suitable for wall mounting with the following electrical components to provide proper operation of the equipment:
  - a. Main disconnect with through door interlock handle
  - b. Step down control transformer
  - c. Branch circuit protection
  - d. Motor starter, soft start w/ overload (drum motor)
  - e. Motor starter, reversing w/ overload (screw motor)
  - f. Emergency stop pushbutton
  - g. Hand-Off-Auto selector switches for drum and screw drive
  - h. Open-Close-Auto switches for screen drum and tank flush wash water electrically actuated ball valves
  - i. Open-Close-Auto switch for compaction zone wash water solenoid valve
  - j. Load monitors shall provide overload protection for drum and screw by sensing motor power factor
  - k. Hour meter for each motor
  - l. Control power on, run and fault indicating lights
  - m. Alarm reset pushbutton
  - n. Allen-Bradley MicroLogix 1400 with Ethernet and required IO
  - o. Operator Interface Unit, Allen Bradley PanelView 800 with 4 inch screen
  - p. Run and alarm auxiliary dry contacts for use by the customer (for SCADA monitoring)
  - q. Intrinsically safe conductivity liquid level control relay
  - r. Panel Heater, with Thermostat
  - s. UL508A
2. Safety Microswitch: One (1) safety interlock switch suitable for the area classification shall be factory mounted to the compaction/discharge zone access door. Interlock switch shall prevent operation of the screen while the door is open.
3. Electrically Actuated Ball Valves: Provide two (2) electrically actuated full port 316 stainless steel ball valve to control flow to the drum spray wash and tank flush assemblies. The full port ball valve shall be 2-piece body, threaded ends, cast body from CF8M, 316 stainless steel, ball and stem from 316 stainless steel, and RTFE seats. Each valve shall be controlled by a weatherproof NEMA 7/4X electric actuator with a housing from cast aluminum with thermally bonded polyester power coating, stainless steel output shaft, stainless steel fasteners, 120 volt, single phase, 60 Hz, two SPDT limit switches, and visual indication on valve position.
4. Solenoid Valve: Provide one (1) weatherproof NEMA 7/4X solenoid valve to control flow to the compaction zone spray wash assembly. Valve shall have a brass body. Valve shall be 120 volt, single phase, 60 Hz.

5. Level Control: Provide one (1) non-contacting radar transmitter for operation of the unit by screen start level and high level. Unit shall not be affected by FOG, debris or foam. The radar unit shall provide a 4-20mA level signal and be rated for installation in a Class 1, Div. 1/Div. 2 area when using an intrinsically safe circuit. The sensor shall be supplied with 33 feet of integral cable.
6. Inlet Pinch Valve: Provide one (1) 4-inch inlet pinch-type valve for controlling flow into the unit. Pinch valve to be Red Valve Type A, full port design with cast iron body, ANSI Class 125/150 flanges and Buna-N elastomers. One (1) ½-inch 3-way brass body solenoid valve to control pinch valve operation, suitable for 120 VAC operation with electrical rating as noted on Plan Sheet E9-01, Note 2.1. (Shipped loose)

#### L. Heat Tracing/Freeze Protection

1. The wash water lines shall be fitted with 120V, single phase, 60 Hz flexible self-regulating heat tracing wire and covered with a transport tube custom fitted insulation blanket. Heat tracing shall be rated for Class 1, Division 2 application.
2. Compaction zone with heat pad and with custom stainless steel cover.
3. Transition between influent tank and main tank shall be heated with two (2) heat pads, insulation and protective 304 stainless covers.
4. Wiring from the wash water heat trace cables shall terminate in a factory mounted junction box for field connection by contractor.
5. The control panel shall include integrated heat trace circuits rated for the appropriate wattage as determined by the manufacturer.
6. GFCI-EPD (30mA ground fault trip) circuit breaker(s) shall be provided within the control panel as required to power the heat tracing and heat pad circuit(s).
7. One (1) ambient temperature thermostat shall be provided to control power to the heat trace cable. The thermostat shall be 120 Volt, single phase, 60 Hz with a NEMA 7/4X housing. The temperature set point shall be selectable by an adjustable dial.

#### M. Hauler Access Station

1. Panel shall include the following components:
  - a. Power Required: 120VAC, 5A
  - b. Enclosure, NEMA 4X 304 Stainless Steel, 24" x 24", with interior door and sub-panel



- c. Heavy Duty Key Lockable enclosure handle, with 3 Point door mechanism
  - d. Panel Heater Kit, Heavy Duty with Thermostat
  - e. Keypad, Stainless Steel, USB Type.
  - f. User Display, Stainless Steel Bezel, Full Color, 1000 NIT Brightness.
  - g. Thermal Printer, Large Capacity paper roll and feeder, with illuminated print done chute.
  - h. Power Supply, 24 VDC.
  - i. Communication Controller, Solid State Storage, Dual LAN.
  - j. Local I/O Control as required.
  - k. UL Label, Industrial Control Assembly.
2. The manufacturer shall provide a secured Hauler Access Station that shall identify waste haulers and be configurable to interface with associated equipment such as doors, gates, valves, samplers, and screens & washers.
  3. Hauler access shall be established using a keypad, non- insertion proximity card, or long-range proximity card.
  4. The Hauler Access Station shall be constructed with an outer door that can be closed to enable a wash down of the area without damaging the internal mounted devices.
  5. The hauler can access the station by opening the door to the enclosure and entering a truck ID number using the keypad or by using an assigned card. The card type shall be non-insertion proximity card.
  6. If additional security measures are required by the facility, haulers shall use an additional card or pin number to access the front gate or door of the facility.
  7. The Hauler Access Station shall include a daylight visible display and outdoor-rated robust keypad. The display shall provide log-on instructions for the hauler and prompt the hauler for additional information as required.
  8. The Hauler Access Station shall include a receipt printer and integral light. The printer shall quickly print and cut each receipt and the integral light shall inform the hauler that a receipt has been printed.
  9. Each printed receipt shall include the following:
    - a. Date and Time of Transaction
    - b. Station ID and Ticket Number
    - c. Hauler ID number
    - d. Volume Unloaded
    - e. Elapsed Time
    - f. Alarm ID

g. Waste Type

10. The Hauler Access Station shall continue to function normally even without a network connection to the office. All hauler transaction data shall be stored in a local solid state drive. If a network connection is established, all transaction data shall be automatically synchronized and stored securely in an IT managed SQL database.

N. FLOW METER

1. One (1) ABB 4-inch Flow meter, Hard Rubber liner, Hastelloy C-4 measuring electrodes, carbon steel Class 150 ANSI flanges, stainless steel grounding rings, ½-inch NPT conduit entry, HART, 20mA, or Pulse output signal types, suitable for Class I, Division 2, Group D hazardous area with integral mount transmitter. (Shipped loose).

O. SOFTWARE

1. The software shall monitor the Hauler Access Station(s) and automatically upload hauler transaction data.
2. An unlimited number of users shall have access to the Flo-Logic web interface for hauler and data management.
3. The data from each hauler transaction shall be collected and stored in a secure SQL database. The following data shall be collected:
  - a. Site ID
  - b. Station ID
  - c. Ticket Number
  - d. Hauler ID
  - e. Date and Time of Transaction
  - f. Volume Unloaded
  - g. Additional Process Analyzer Data (if configured)
  - h. Product Type ID
  - i. Alarm ID
  - j. Five (5) additional fields will be available for the administrator to define
4. The software shall be used to configure the hauler's identification method as well as their PIN used at the Hauler Access Station(s).
5. The software shall be used to configure scalable devices communicating with the Hauler Access Station(s), such as: flow meters, pH analyzers, conductivity sensors, acoustic sensors, and others.

6. The software shall allow the facility to periodically initiate an automatic sampler. Samples can be taken automatically for each transaction or periodically for selected trucks. The software will collect data to show specifically which loads were sampled.
7. A user-friendly interface shall be provided to allow the facility to view hauler transaction data and enter/edit information when necessary. The software shall have a built in sorting tool that allows the user to create multiple data views. The software shall have a "Main Screen" view that displays all transaction data divided into the following sections:
  - a. Transaction Log
  - b. Customers
  - c. Truck Status
  - d. Customer Balances
  - e. Link to Reports
8. The software shall allow the facility to define the Hauler Access Station's operating time schedule. If the station is closed, a message will alert the hauler that the station is closed.
9. Customer (Hauler) and Truck Features:
  - a. The software shall allow the facility to create a list of customers that will be billed for use of the Hauler Access Station(s). The software shall not limit the facility as to the number of customer accounts that can be created.
  - b. The software shall allow the facility to create multiple truck accounts and link these accounts to the corresponding customers. The software shall not limit the facility as to the number of trucks that can be assigned to each customer.
  - c. The facility shall be able to enter customer ID numbers, pin numbers, and details regarding the truck including capacity, weight, and vehicle information into the system.
  - d. Each customer shall receive a Hauler ID number and 4-digit PIN number for each truck. PIN number assignment can be unique per owned truck or common to all owned trucks, depending on the facility and customer preference. The software shall auto-generate customer PIN numbers or shall allow the administrator to manually assign pin numbers to customers.
  - e. The software shall allow the facility to enable or disable a truck's access privilege. Once disabled, a hauler's access will immediately be denied at all sites. A message shall be displayed at log-in at the hauler station informing the hauler to contact the office.
10. Waste Type Features:
  - a. The software shall allow the facility to define a list of permitted waste types and an associated rate to be charged per 1000 units of waste unloaded.

The software shall allow the facility to define these units. (Gallons, Liters, etc...) The facility shall also be able to set different rates for the same waste type. (Ex. Charging In-county/city customer vs. out-of-county/city customer).

- b. When accessing the station, the customer shall be prompted at log-in to identify the waste type that shall be unloaded.

11. Status and Alarm Features:

- a. The software shall allow the facility to monitor the Hauler Access Station in real-time. The facility shall be able to monitor the current customers/trucks total flow, waste types, valve status, equipment faults, and additional user-defined variables.
- b. The software shall allow the facility to monitor alarms at the Hauler Access Station. Alarms make the station unusable or may prevent a hauler from unloading. These alarms include:
  - i. E-Stop pressed
- c. Printer Low on Paper
- d. Equipment Fault
- e. Storage Tank at High Level
- f. Optional User-Defined Alarm (20 Available)

12. Reporting, Billing, and Payment Features:

- a. The software shall allow the facility to manage each customer on a debit or credit basis. The facility shall choose whether customers shall pay prior to using the Hauler Access Station or after.
- b. The software shall debit account balances automatically and auto-deactivate the truck's access privilege should the customer's balance drop below the set minimum. The facility shall be able to set the minimum.
- c. The software shall allow the facility to bill on a truck capacity basis, a metered basis (flow-meter or scale), or by manual entry.
- d. The software shall allow the facility to enter payments if required. The total balance shall automatically recalculate once a payment is applied. A customer's account that is deactivated shall be automatically reactivated once money is received.
- e. The facility shall be able to use the features of the software to substantiate the data recorded from each transaction and accurately calculate the total cost on a per customer basis.
- f. The software shall have multiple pre-formatted reports that will, at a minimum, show activity with daily totals, statements, customer and truck usage. The software shall also allow the facility to generate billing statements that can be exported for accounting use. The reports and billing statements shall be easily exported into PDF, CSV, XLS, and other formats.



## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. An adequate concrete equipment pad shall be provided (by others) for installation of the septage receiving station and ancillary equipment.

### 3.2 INSTALLATION

- A. The equipment shall be installed as indicated within the Contract Documents and in conformance with manufacturer's instructions.
- B. Install the system on a concrete equipment pad poured level as indicated on the Contract Documents.
- C. It shall be the Contractor's responsibility to provide any an items not specifically provided by the Manufacturer in order to provide a complete and functional system.

### 3.3 SPARE PARTS

- A. The manufacturer shall provide a list of required spare parts including:
  - 1. Five (5) spare spray nozzles.
  - 2. One (1) solenoid valve rebuild kit.
  - 3. One (1) HDPE drum seal.

### 3.4 START-UP ASSISTANCE AND TRAINING

- A. Startup Services: Engage a factory-authorized service representative to perform start-up services and to train Owner's maintenance personnel as specified below:
  - 1. Once the septage receiving station has been installed correctly and is operating as intended, the service representative shall perform sixteen (16) hours of on-site start-up assistance and operator training.
  - 2. Schedule training with Owner with at least seven days advance notice.

### 3.5 ADJUSTING AND CLEANING

- A. Information on minor periodic adjustments and cleaning is contained in the Operating and Maintenance Manual.

END OF SECTION 44 42 26.21



NATIONWIDE SYSTEM INTEGRATION
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\*\*\*REVISED\*\*\*

April 11, 2022

PROJECT: LONG CANE CREEK WATER POLLUTION CONTROL PLANT IMPROVEMENTS
OWNER: CITY OF LA GRANGE, GEORGIA
ENGINEER: KREBS ENGINEERING
SECTION: 27 60 00 – SCADA System
27 60 05 – SCADA Instrumentation

Gentlemen:

Control Instruments, Inc. (C2i) proposes to furnish equipment and services for the above referenced Section(s) of the specifications.

C2i will provide: Submittals, drawings, equipment, freight, spare parts, sunshades, startup, testing, operation and maintenance manuals, and training as specified. C2i will assume full responsibility ONLY for the equipment and services enumerated herein in accordance with the Contract Drawings and Specifications.

C2i will retain ownership of all design of software by C2i for this project.

C2i will not provide: Equipment installation, mounting hardware, field wiring, field tubing, terminations, or taxes unless otherwise explicitly stated within the body of this Scope of Supply.

\*\*\*\*\*

BASE BID SCOPE

27 60 00 – SCADA System

One (1) Lot of modifications to include I/O additions.
Tag: PLC-DE, RW, G

Note: Spare I/O points will be utilized. No additional I/O is included.

One (1) Lot of PLC modifications.
Tag: PLC-DE, RW, G

One (1) Lot of HMI program/screen additions.

One (1) Lot of modification to existing panel drawing.

One (1) Lot of Operational Readiness Test (ORT).

One (1) Lot of Functional Acceptance Test (FAT).

One (1) Day training.

**27 60 05 – SCADA Instrumentation**

Four (4) Ultrasonic level transmitter.  
Tag: LIT 205, 304, 315, 325

One (1) Spare ultrasonic level transducer.

Two (2) Magnetic flow transmitter.  
Tag: FIT 305 (8")  
FIT 324 (24")

Two (2) Dissolved oxygen analyzer.  
Tag: AIT 314, 324

One (1) Lot surge sun shields for the above devices.

One (1) Lot surge protection for the above devices.

One (1) Lot startup and calibration.

One (1) Day training.

Two (2) Spare surge protection modules.

**ALTERNATE A1 SCOPE**

One (1) Lot of PLC modifications.

One (1) Lot of HMI program/screen additions.

One (1) Lot of testing

**ALTERNATE A1 SCOPE**

One (1) Lot of HMI program/screen additions.

One (1) Lot of modification to existing network drawing.

One (1) Lot of testing.

\*\*\*\*\*

**PRICING**

Base Bid: .....	\$ <u>143,761.00</u>
Alternate A1: .....	\$5,750.00
Alternate A2: .....	\$N/A
Alternate A3: .....	\$ <u>11,810.00</u>



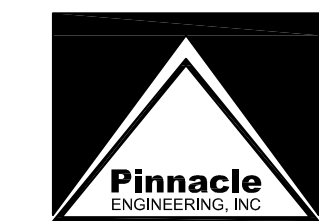
\*\*\*\*\*  
Addenda received as of 4/11/22:               0            
Addenda received at time of bid:              0          

\*\*\*\*\*

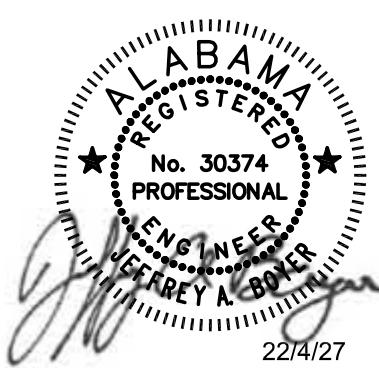
Should you have any questions regarding this quotation, please contact Mark Healey of C2i at (404) 351-1085, or Templeton Engineering at (404) 219-1547.

Sincerely,

Mark G. Healey  
CONTROL INSTRUMENTS, INC./C2i  
MGH/jw



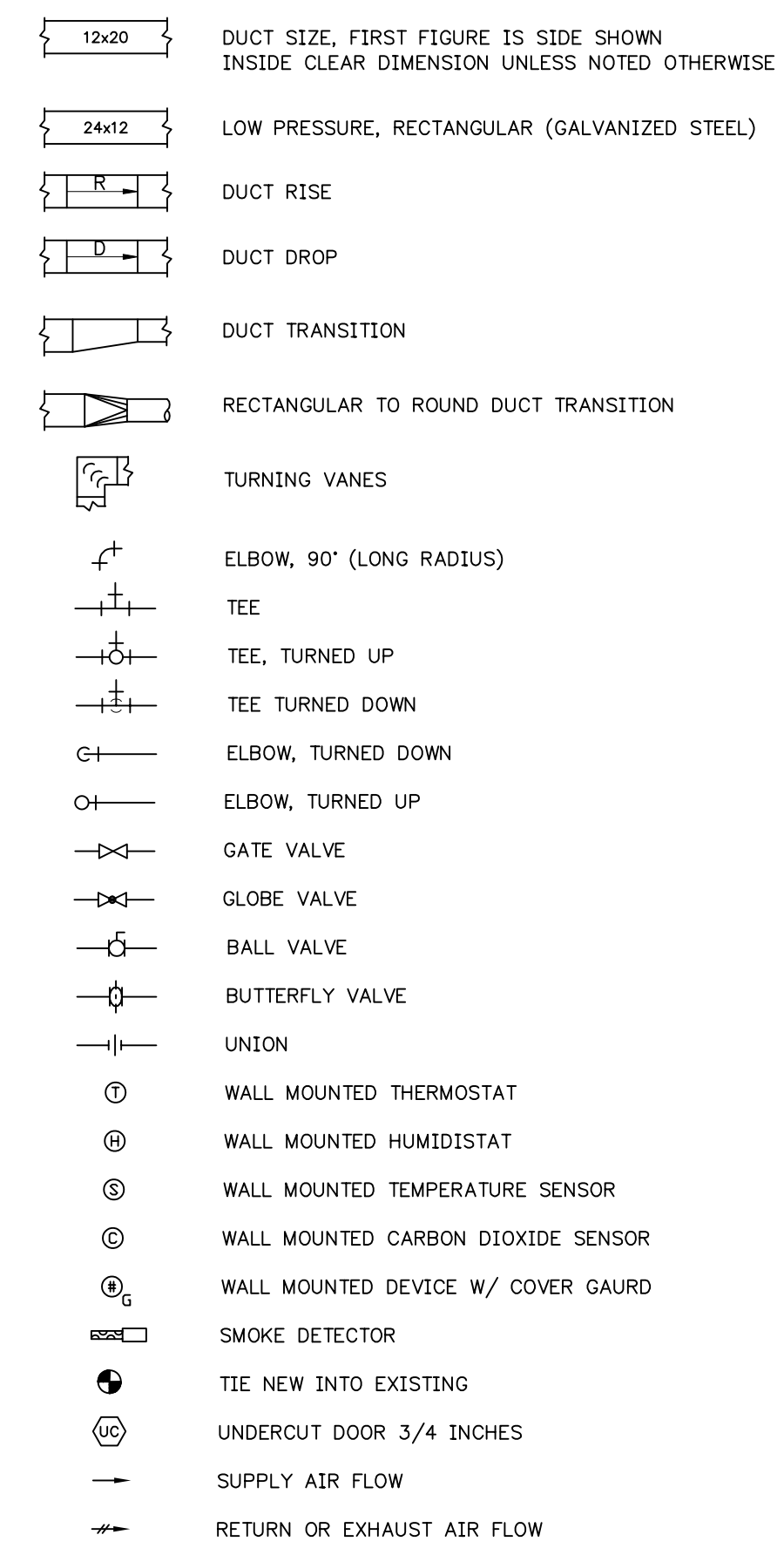
Engineering & Design Consultants  
2111 Parkway Office Circle, Suite 125  
Birmingham, AL 35244  
(205) 733-6912 FAX: (205) 733-6913  
Job No.: 22095 File: 22095D01



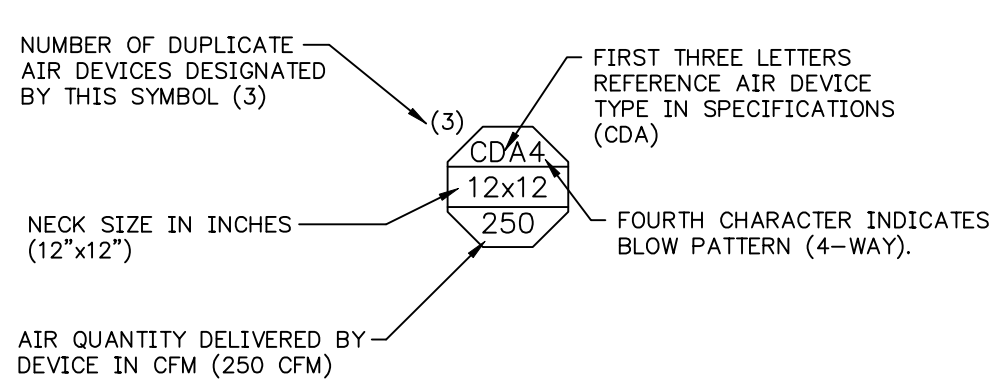
CITY OF LAGRANGE, GEORGIA  
LONG CANE CREEK  
POLLUTION CONTROL  
PLANT IMPROVEMENT  
LAGRANGE, GEORGIA

Designed	CA	Project No.							
Drawn	CA		20065						
Checked	JAB								
Revisions	<table border="1"> <thead> <tr> <th>No.</th> <th>Date</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>00/00/00</td> <td>TWO LINE DESCRIPTION</td> </tr> </tbody> </table>			No.	Date	Description	1	00/00/00	TWO LINE DESCRIPTION
No.	Date	Description							
1	00/00/00	TWO LINE DESCRIPTION							
Sheet Title	MECHANICAL LEGEND, ABBREVIATIONS, SCHEDULES AND DETAILS								
Issue Date	APR, 2022	Sheet No.	M0-01						
Sequence	- of -								

**LEGEND**



NOTE: THIS LEGEND IS FOR REFERENCE ONLY. ALL SYMBOLS WHICH APPEAR WITHIN THE LEGEND MAY NOT APPLY TO THIS PROJECT.



**5 AIR DEVICE LEGEND**  
M0-01 NO SCALE

**ABBREVIATIONS**

- |          |                                           |
|----------|-------------------------------------------|
| AB, CL'G | ABOVE CEILING                             |
| ABV.     | ABOVE                                     |
| AC       | ALTERNATING CURRENT                       |
| A/C      | AIR COMPRESSOR                            |
| AFF      | ABOVE FINISHED FLOOR                      |
| AHU      | AIR HANDLING UNIT                         |
| AI       | ANALOG INPUT                              |
| ALT.     | ALTERNATE                                 |
| AMP      | AMPERE                                    |
| AO       | ANALOG OUTPUT                             |
| APPROX.  | APPROXIMATELY                             |
| ARCH.    | ARCHITECTURAL                             |
| AVG      | AVERAGE                                   |
| B        | BOILER                                    |
| BTU      | BRITISH THERMAL UNIT                      |
| CFM      | CUBIC FEET PER MINUTE                     |
| CH       | CHILLER                                   |
| CHWP     | CHILLED WATER PUMP                        |
| CLG      | CEILING                                   |
| CT       | COOLING TOWER                             |
| CU       | CONDENSING UNIT                           |
| CWP      | CONDENSER WATER PUMP                      |
| DEFL     | DEFLECTION                                |
| DET      | DETAIL                                    |
| DI       | DIGITAL INPUT                             |
| DIA      | DIAMETER                                  |
| Ø        | DIAMETER                                  |
| DO       | DIGITAL OUTPUT                            |
| EDB      | ENTERING DRY BULB                         |
| ELEC.    | ELECTRICAL                                |
| ELEV.    | ELEVATION                                 |
| EWB      | ENTERING WET BULB                         |
| EWT      | ENTERING WATER TEMPERATURE                |
| EXH      | EXHAUST                                   |
| EXIST.   | EXISTING                                  |
| F        | FEET                                      |
| F        | FEET PER SECOND                           |
| FT       | FOOT OR FEET                              |
| HD       | HEAD                                      |
| HP       | HORSE POWER                               |
| HR       | HOUR(S)                                   |
| HT       | HEIGHT                                    |
| HTR      | HEATER                                    |
| HVAC     | HEATING, VENTILATION AND AIR CONDITIONING |
| HWP      | HOT WATER PUMP                            |
| HX       | HEAT EXCHANGER                            |
| HZ       | FREQUENCY (HERTZ)                         |
| ID       | INSIDE DIAMETER                           |
| IN.      | INCHES                                    |
| KW       | KILOWATT                                  |
| KWH      | KILOWATT HOUR                             |
| MAX      | MAXIMUM                                   |
| MBH      | 1000 BTU PER HOUR                         |
| MECH.    | MECHANICAL                                |
| MFR.     | MANUFACTURER                              |
| MIN      | MINIMUM                                   |
| NO.      | NUMBER                                    |
| N/A      | NOT APPLICABLE                            |
| NC       | NOISE CRITERIA                            |
| O.D.     | OUTSIDE DIAMETER                          |
| OA       | OUTSIDE AIR                               |
| Ø        | OVAL DUCTWORK                             |
| ORIG.    | ORIGINAL                                  |
| PH       | PHASE                                     |
| PIU      | POWERED INDUCTION UNIT                    |
| PRESS    | PRESSURE                                  |
| RTN      | RETURN AIR                                |
| RTU      | ROOFTOP AIR HANDLING UNIT                 |
| SDC      | STAND ALONE DIGITAL CONTROLLER            |
| SENS.    | SENSIBLE                                  |
| SQ.      | SQUARE                                    |
| SPLY     | SUPPLY                                    |
| TEMP     | TEMPERATURE                               |
| VAV      | VARIABLE AIR VOLUME                       |
| W        | WATT                                      |
| W/       | WITH                                      |
| W.P.D.   | WATER PRESSURE DROP                       |

**AIR HANDLING UNIT SCHEDULE**

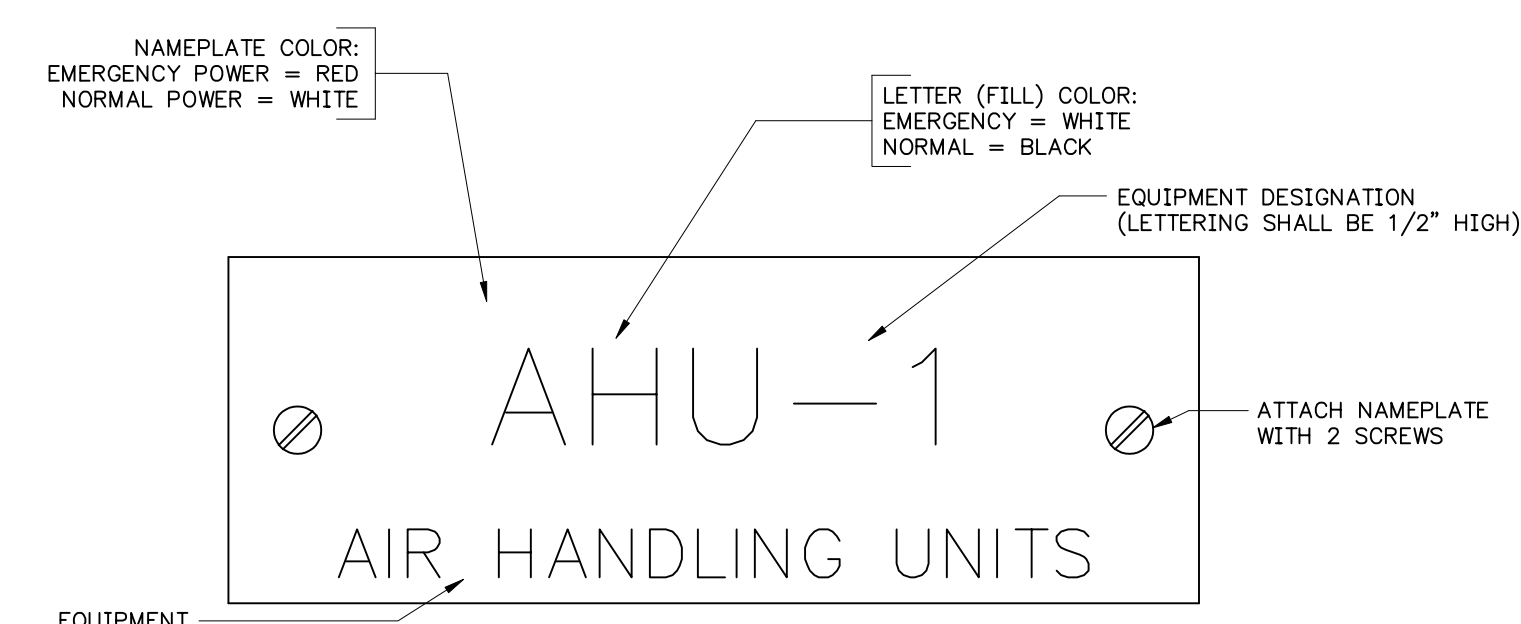
EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	CFM	O.A. CFM	E.S.P. (IN. W.C.)	FAN HP	COOLING COIL	ELECTRIC HEAT	ELECTRICAL		VIBRATION TYPE	ISOLATION DEFL. (IN.)	MOUNTING BASE	REMARKS		
								MCA	MOC						
AHU-1	TRANE TEM6A0D60	1950	0	0.5	0.75	CC-1	10 KW	18	20	480/3/60	2	0.25	A	HORIZONTAL	1), 2)
AHU-2	TRANE TEM6A0D60	1950	0	0.5	0.75	CC-1	10 KW	18	20	480/3/60	2	0.25	A	HORIZONTAL	1), 2)

REMARKS:  
1) PROVIDE MANUFACTURER'S FILTER RACK.  
2) PROVIDE SINGLE POINT WARREN HEATER AT 480V WITH STEPDOWN TX FOR AHU POWER.

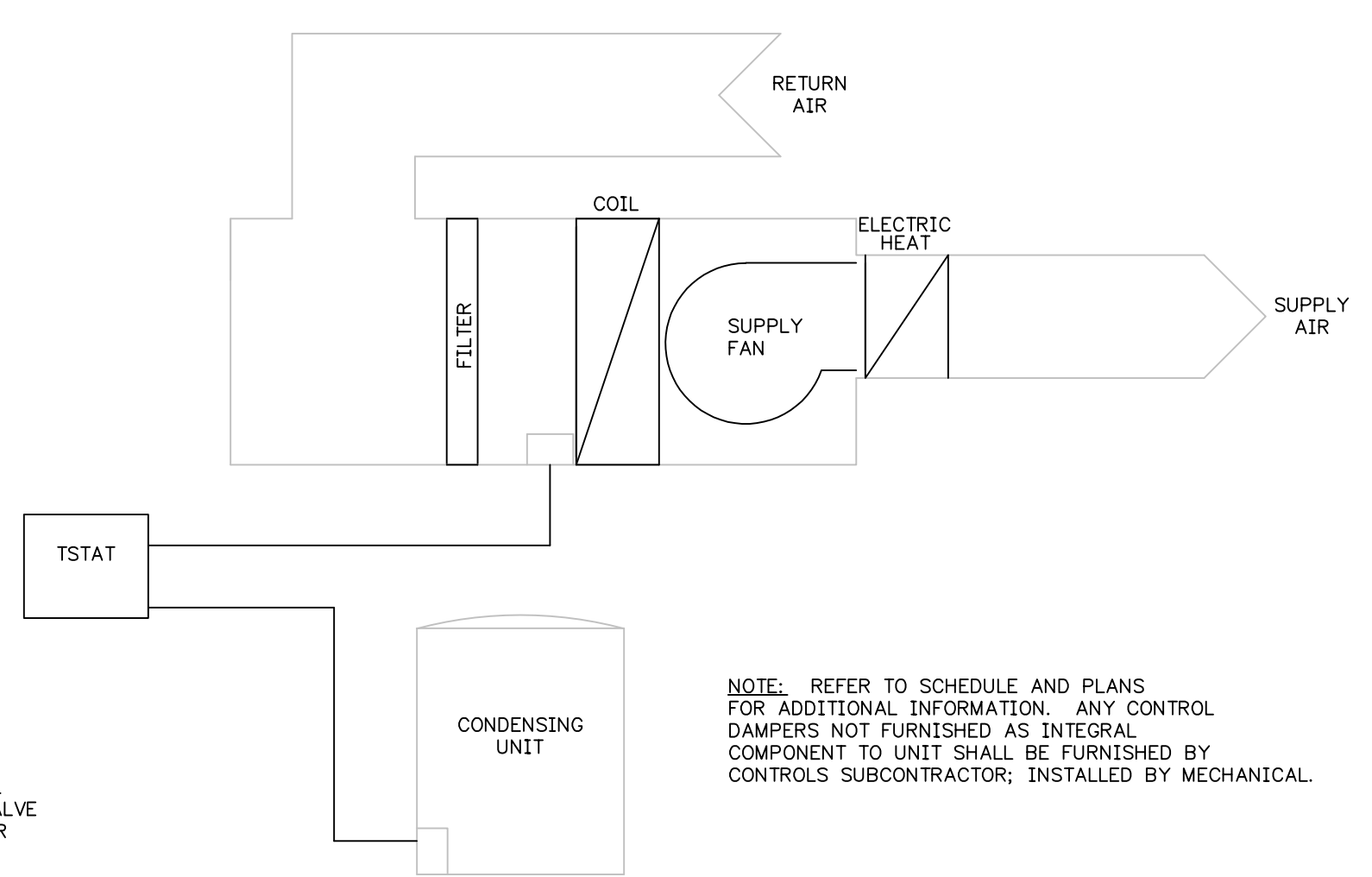
**AIR COOLED CONDENSING UNIT SCHEDULE**

EQUIPMENT NO.	MANUFACTURER/ MODEL NO.	SERVICE	NOMINAL CAPACITY (TONS)	DISCONNECT	ELECTRICAL		VIBRATION TYPE	ISOLATION DEFL. (IN.)	REMARKS
					MCA	MOC			
CU-1	TRANE 4TTA4060	AHU-1	5	BY DIV 26	9	15	480/3/60	-- --	1), 2)
CU-2	TRANE 4TTA4060	AHU-1	5	BY DIV 26	9	15	480/3/60	-- --	1), 2)

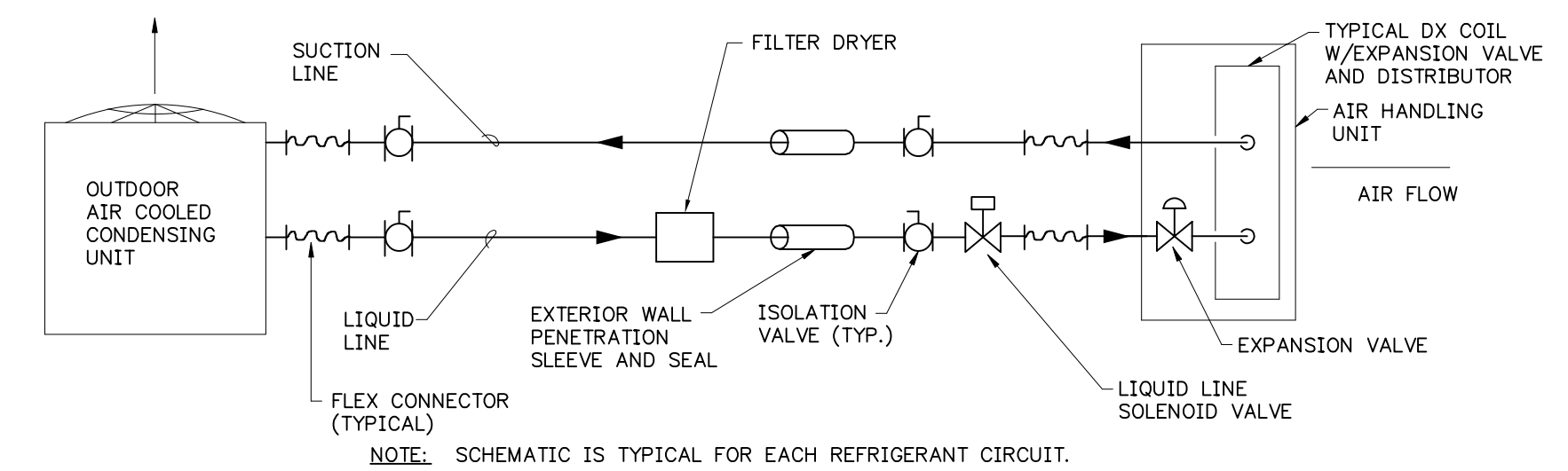
REMARKS:  
1) LOCATE UNIT ON CONCRETE HOUSEKEEPING PAD.  
2) PROVIDE WITH LOW AMBIENT CONTROLS.



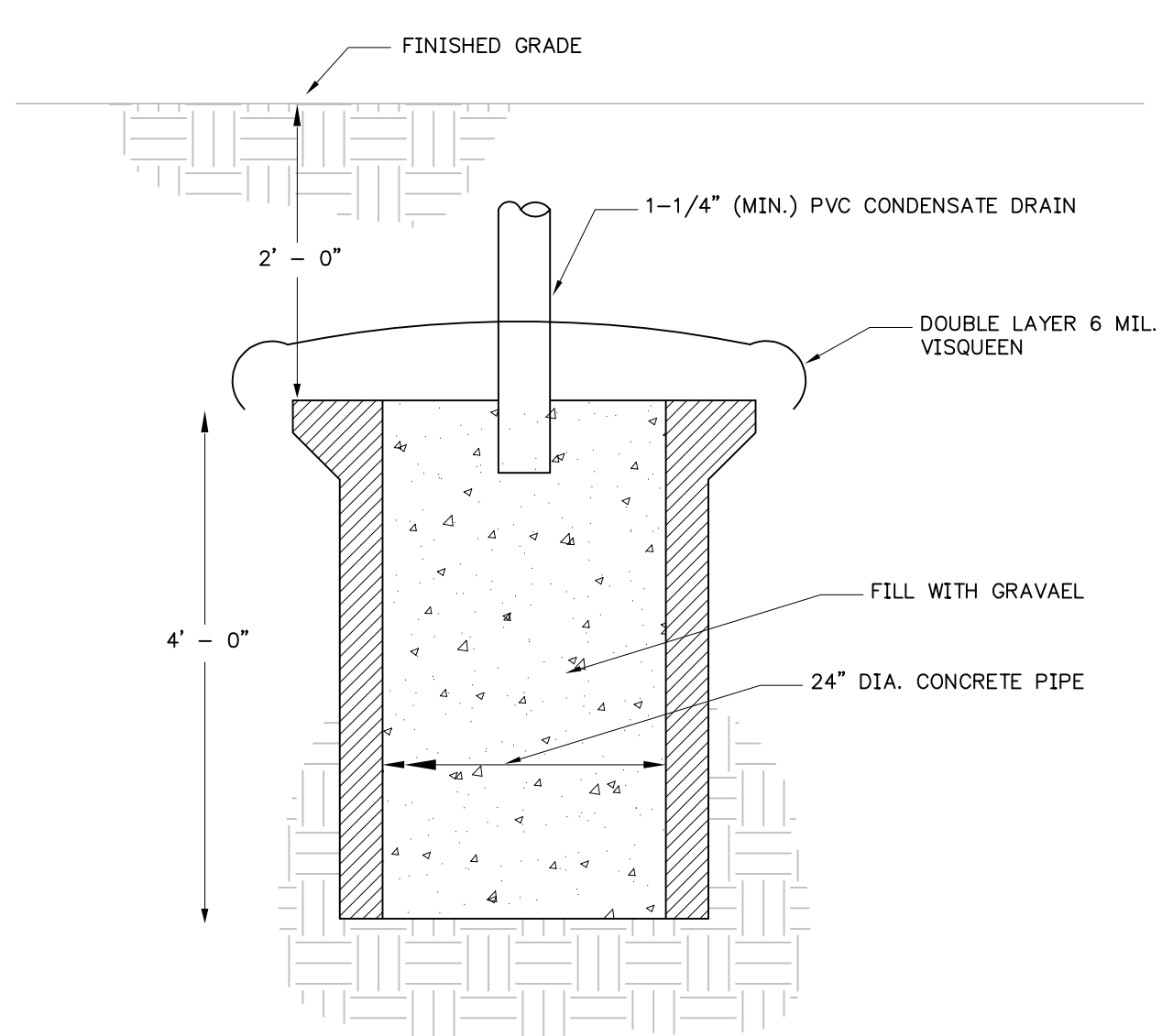
**3 MECHANICAL EQUIPMENT NAMEPLATE DETAIL**  
M0-01 NO SCALE



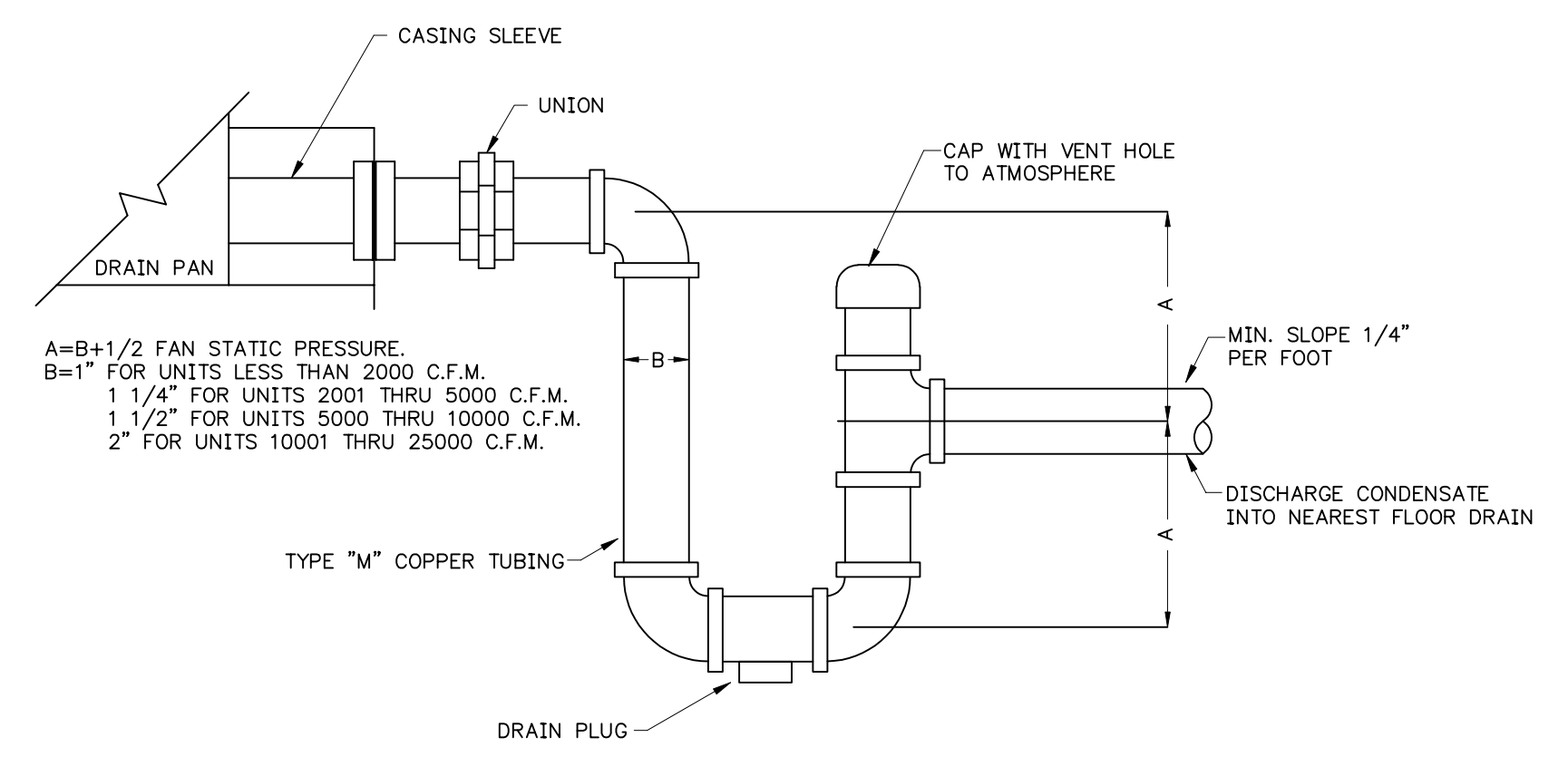
**1 HVAC CONTROL DIAGRAM**  
M0-01 NO SCALE



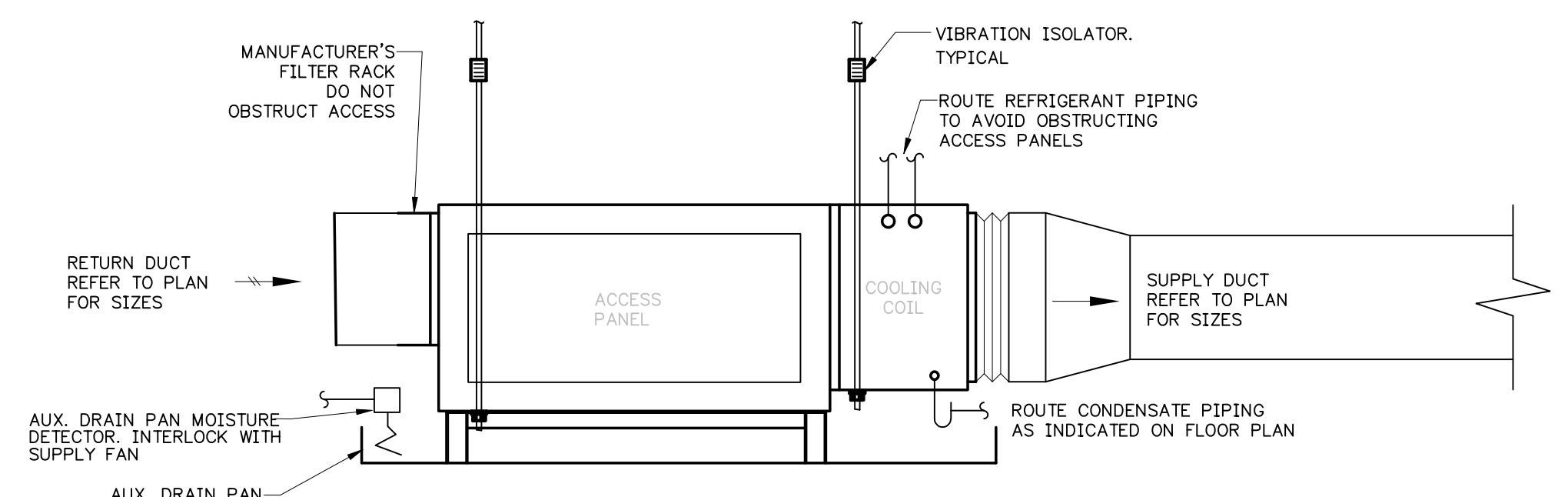
**4 REFRIGERANT PIPING DETAIL**  
M0-01 NO SCALE



**2 CONDENSATE DISPOSAL WELL DETAIL**  
M0-01 NO SCALE

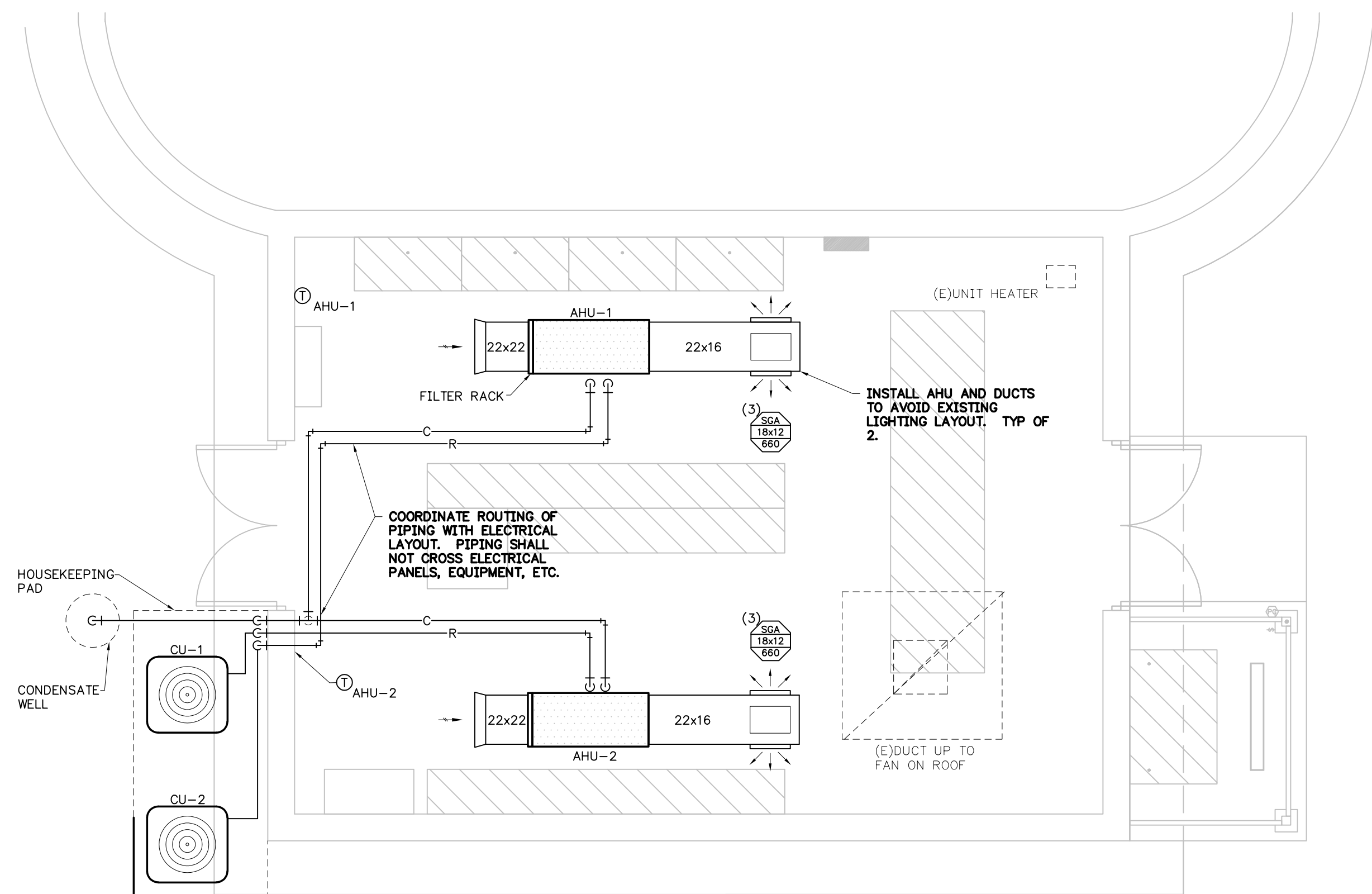


**6 AIR CONDITIONING UNIT DRAIN TRAP DETAIL**  
M0-01 NO SCALE



**6 INDOOR HEAT PUMP UNIT DETAIL**  
M0-01 NO SCALE

M  
L  
K  
J  
H  
G  
F  
E  
D  
C  
B  
A



**TREATMENT BUILDING FLOOR PLAN**  
MECHANICAL -- NEW WORK  
0 1 2 3 4 8  
GRAPHIC SCALE (FEET)

NEW WORK LEGEND	
---	EXISTING
---	NEW WORK

- GENERAL NOTES:**
- ① VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
  - ② PROVIDE NECESSARY OFFSETS IN PIPING, ELECTRICAL CONDUIT, AND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW WORK. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL DETAILS NOR CHANGES IN DUCTWORK [PIPING] ELEVATIONS NECESSARY FOR COMPLETE INSTALLATION.
  - ③ MOUNT TEMPERATURE CONTROLS 4"-6" ABOVE FINISHED FLOOR. COORDINATE EXACT LOCATION WITH ARCHITECT.
  - ④ SPILL CONDENSATE FROM AHUs INTO NEAREST FLOOR DRAIN.
  - ⑤ SET AHU THERMOSTATS WITH 3 DEGREE OFFSET. AHU-1 SHALL BE SET AT 75 DEGREES(ADJ) AHU-2 SHALL BE SET AT 78 DEGREES(ADJ). ALTERNATE SETTING UNITS TO 75/78 DEGREES TO FUNCTION AS LEAD/LAG SETUP.

**Pinnacle**  
ENGINEERING, INC.  
Engineering & Design Consultants  
2111 Parkway Office Circle, Suite 125  
Birmingham, AL 35244  
(205) 733-6912 FAX: (205) 733-6913  
Job No.: 22095 File: 22095M01

**KREBS ENGINEERING**

ALABAMA REGISTERED PROFESSIONAL ENGINEER  
No. 30374  
JERRY KREBS  
22/4/27

CITY OF LAGRANGE, GEORGIA  
LONG CANE CREEK  
POLLUTION CONTROL  
PLANT IMPROVEMENT  
LAGRANGE, GEORGIA

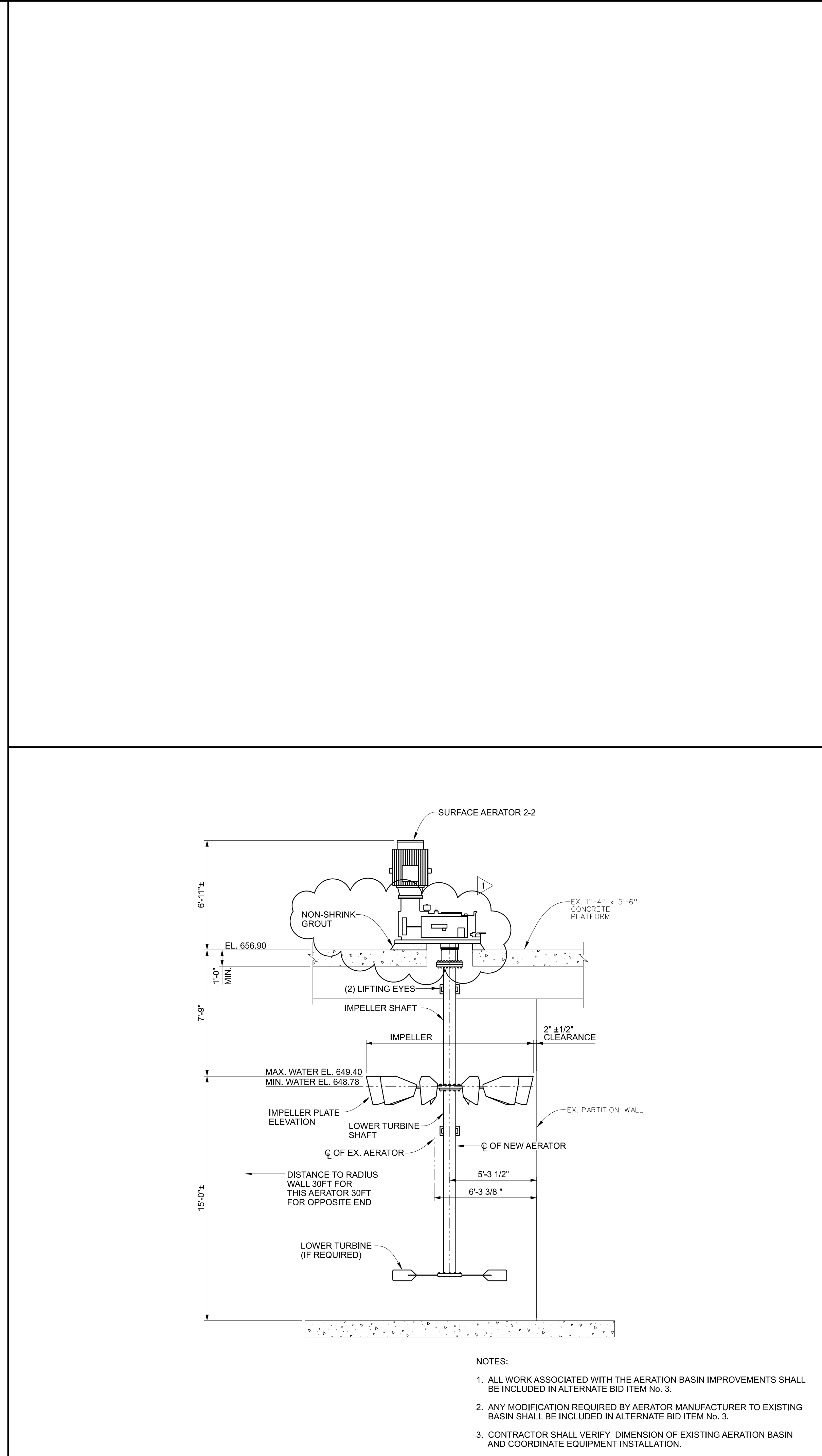
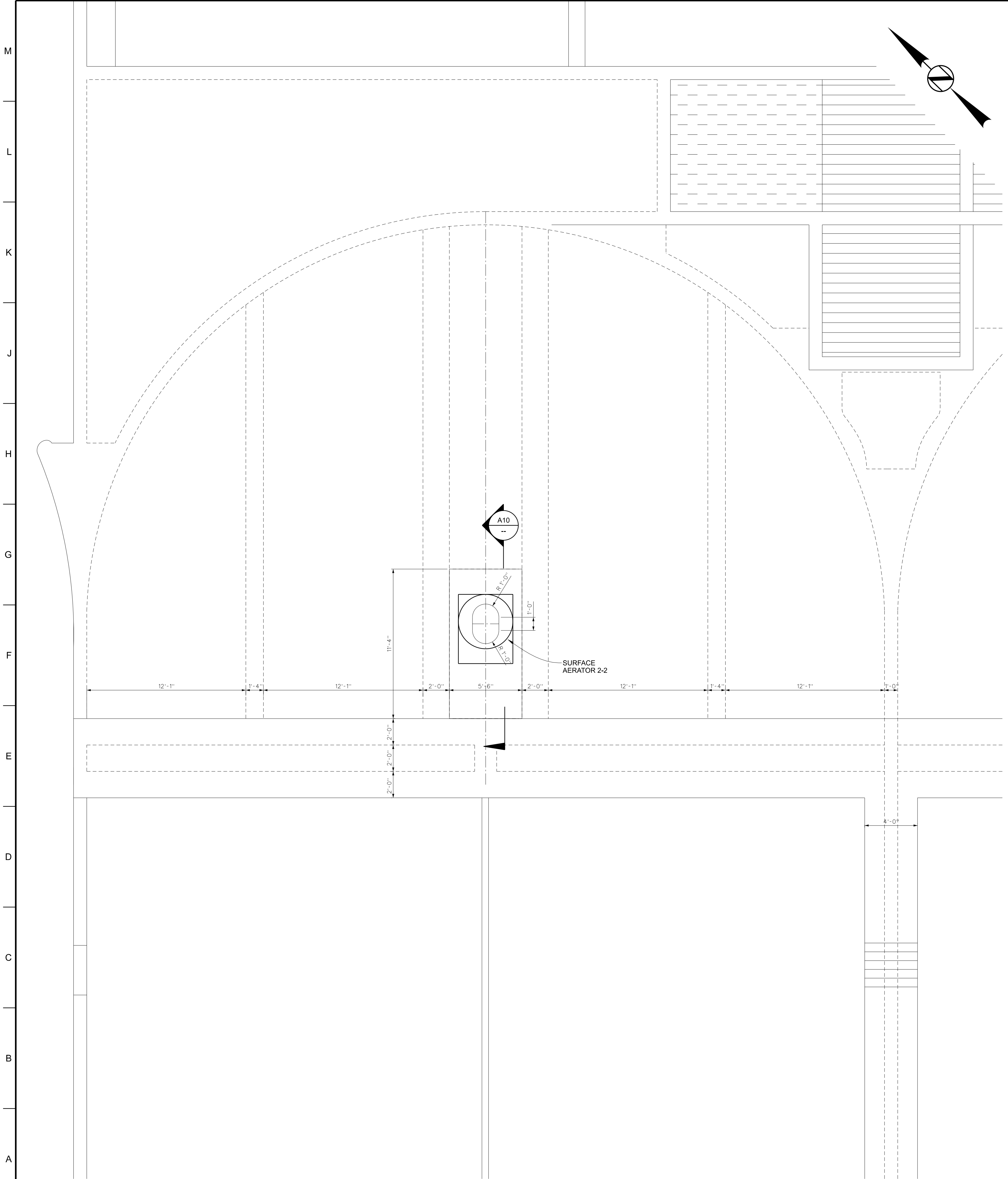
Designed	CA	Project No.	20065
Drawn	CA		
Checked	JAB		
Revisions			
No.	Date	Description	
1	00/00/00	TWO LINE DESCRIPTION	

Sheet Title  
**ELECTRICAL BUILDING FLOOR PLAN MECHANICAL**

Issue Date	APR, 2022	Sheet No.	M1-01
Sequence	- of -		

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

SPACE  
STATES  
SHINES  
SPICES



- NOTES:
- ALL WORK ASSOCIATED WITH THE AERATION BASIN IMPROVEMENTS SHALL BE INCLUDED IN ALTERNATE BID ITEM No. 3.
  - ANY MODIFICATION REQUIRED BY AERATOR MANUFACTURER TO EXISTING BASIN SHALL BE INCLUDED IN ALTERNATE BID ITEM No. 3.
  - CONTRACTOR SHALL VERIFY DIMENSION OF EXISTING AERATION BASIN AND COORDINATE EQUIPMENT INSTALLATION.



**CITY OF LAGRANGE, GEORGIA**  
**LONG CANE CREEK**  
**POLLUTION CONTROL**  
**PLANT IMPROVEMENT**  
**LAGRANGE, GEORGIA**

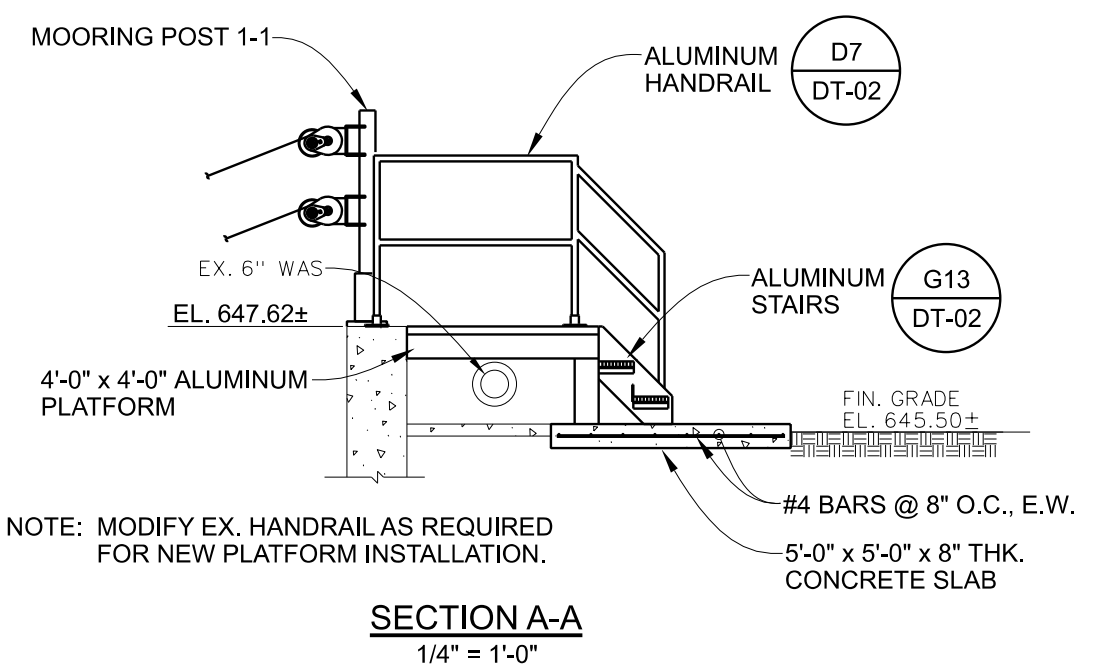
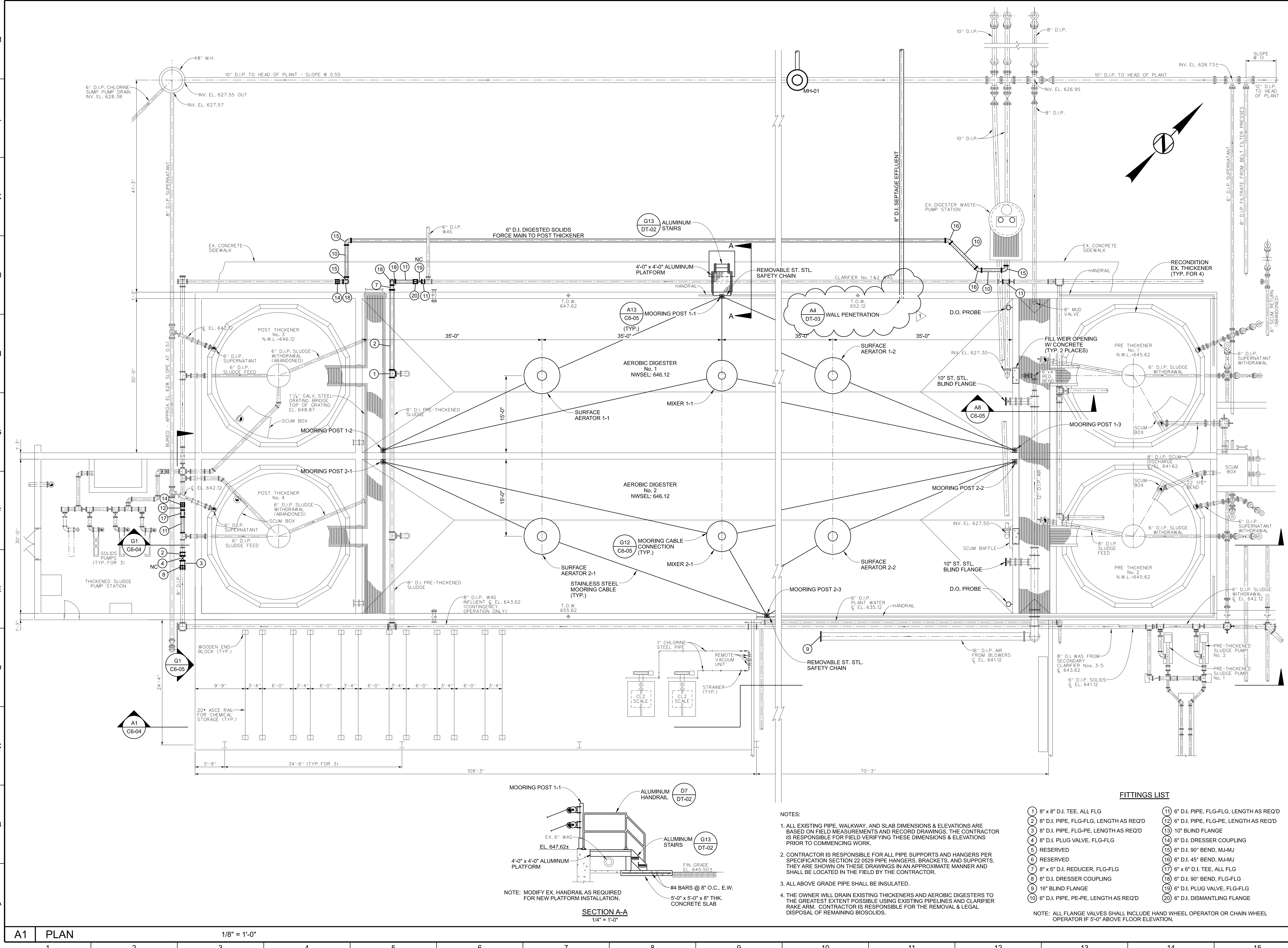


Designed: STL  
 Drawn: NTS / CLM  
 Checked: JMM  
 Project No: 20065

Revisions	No.	Date	Description
1	05/03/22	ADDENDUM No. 1	

Sheet Title
AEROBIC DIGESTER MODIFICATIONS PLAN

Issue Date: APR, 2022  
 Sheet No: C6-03  
 Sequence: 32 of 80

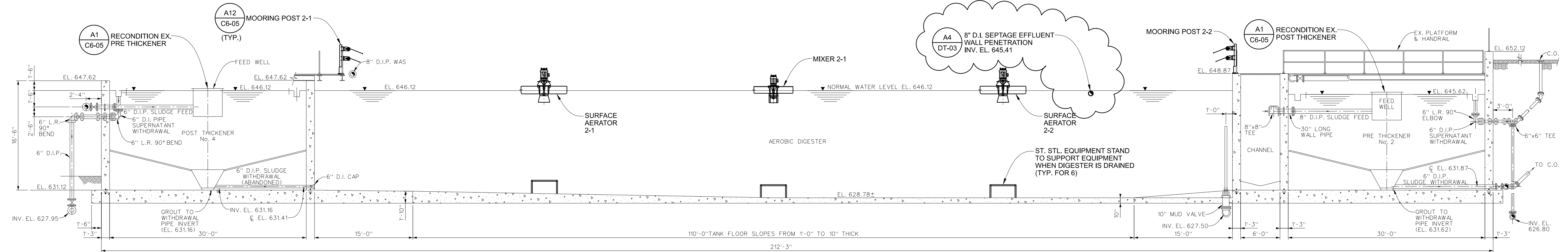


- NOTES:**
- ALL EXISTING PIPE, WALKWAY, AND SLAB DIMENSIONS & ELEVATIONS ARE BASED ON FIELD MEASUREMENTS AND RECORD DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THESE DIMENSIONS & ELEVATIONS PRIOR TO COMMENCING WORK.
  - CONTRACTOR IS RESPONSIBLE FOR ALL PIPE SUPPORTS AND HANGERS PER SPECIFICATION SECTION 22 0529 PIPE HANGERS, BRACKETS, AND SUPPORTS. THEY ARE SHOWN ON THESE DRAWINGS IN AN APPROXIMATE MANNER AND SHALL BE LOCATED IN THE FIELD BY THE CONTRACTOR.
  - ALL ABOVE GRADE PIPE SHALL BE INSULATED.
  - THE OWNER WILL DRAIN EXISTING THICKENERS AND AEROBIC DIGESTERS TO THE GREATEST EXTENT POSSIBLE USING EXISTING PIPELINES AND CLARIFIER RAKE ARM. CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL & LEGAL DISPOSAL OF REMAINING BIOSOLIDS.

**FITTINGS LIST**

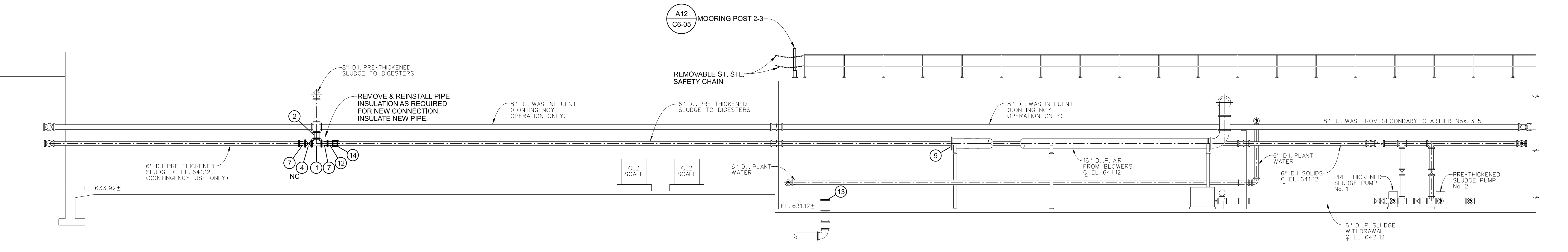
1	8" x 8" D.I. TEE, ALL FLG	11	6" D.I. PIPE, FLG-FLG, LENGTH AS REQ'D
2	8" D.I. PIPE, FLG-FLG, LENGTH AS REQ'D	12	6" D.I. PIPE, FLG-PE, LENGTH AS REQ'D
3	8" D.I. PIPE, FLG-PE, LENGTH AS REQ'D	13	10" BLIND FLANGE
4	8" D.I. PLUG VALVE, FLG-FLG	14	6" D.I. DRESSER COUPLING
5	RESERVED	15	6" D.I. 90° BEND, MJ-MJ
6	RESERVED	16	6" D.I. 45° BEND, MJ-MJ
7	8" x 6" D.I. REDUCER, FLG-FLG	17	6" x 6" D.I. TEE, ALL FLG
8	8" D.I. DRESSER COUPLING	18	6" D.I. 90° BEND, FLG-FLG
9	16" BLIND FLANGE	19	6" D.I. PLUG VALVE, FLG-FLG
10	6" D.I. PIPE, PE-PE, LENGTH AS REQ'D	20	6" D.I. DISMANTLING FLANGE

NOTE: ALL FLANGE VALVES SHALL INCLUDE HAND WHEEL OPERATOR OR CHAIN WHEEL OPERATOR IF 5'-0" ABOVE FLOOR ELEVATION.



- NOTES:
1. APPLY NEW PROTECTIVE COATING SYSTEM ON THICKENER COLLECTION MECHANISM, BRIDGE SUPPORT SYSTEM, FEED WELL, SKIMMER ARM/ SCUM ARM, SCUM BOX, INFLUENT / EFFLUENT PIPE, WEIRS, WEIR BAFFLES & APPURTENANCES (ALL FERROUS METAL).
  2. AT A MINIMUM, ONE PRE THICKENER AND ONE POST THICKENER SHALL REMAIN IN OPERATION AT ALL TIMES.
  3. EXISTING BRIDGES, STEPS, ETC. NOT SHOWN FOR CLARITY.

G1 SECTION 1/8" = 1'-0"

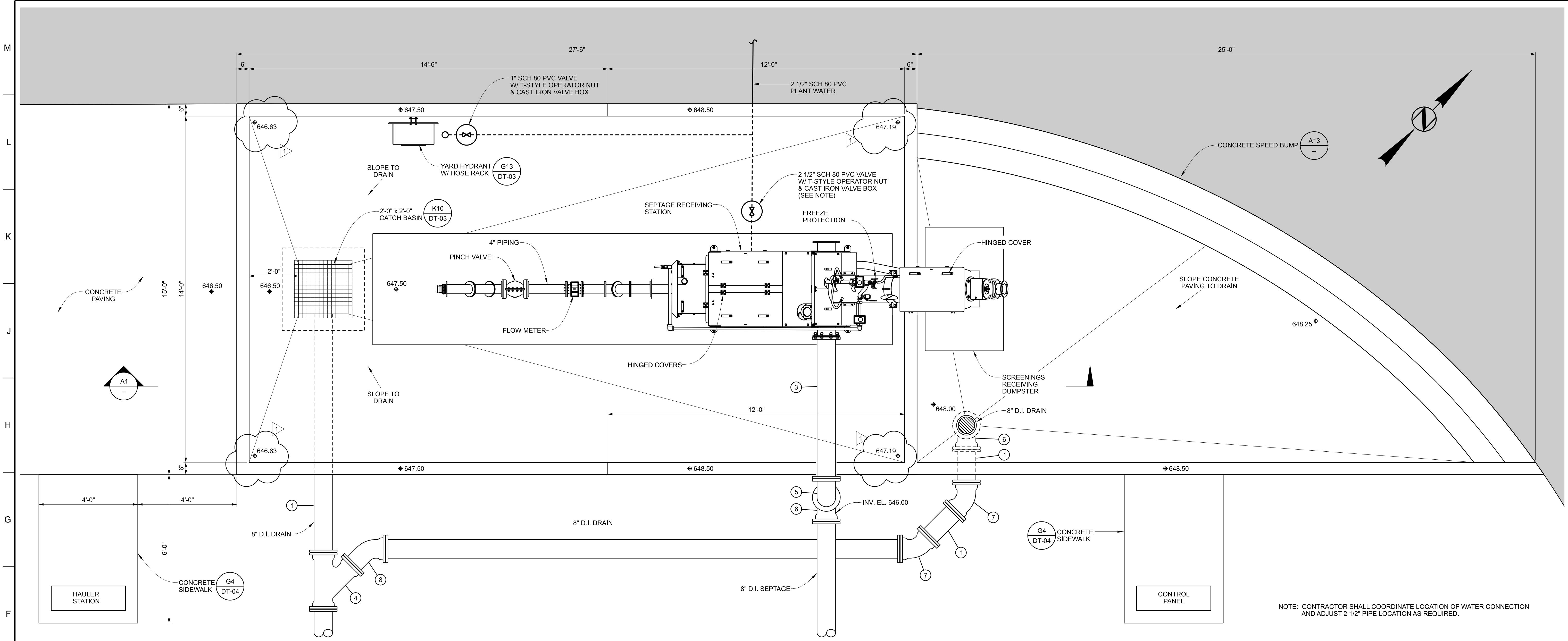


- FITTINGS LIST**
- |                                          |                                           |
|------------------------------------------|-------------------------------------------|
| 1 8" x 8" D.I. TEE, ALL FLG              | 11 6" D.I. PIPE, FLG-FLG, LENGTH AS REQ'D |
| 2 8" D.I. PIPE, FLG-FLG, LENGTH AS REQ'D | 12 6" D.I. PIPE, FLG-PE, LENGTH AS REQ'D  |
| 3 8" D.I. PIPE, FLG-PE, LENGTH AS REQ'D  | 13 10" BLIND FLANGE                       |
| 4 8" D.I. PLUG VALVE, FLG-FLG            | 14 6" D.I. DRESSER COUPLING               |
| 5 RESERVED                               | 15 6" D.I. 90° BEND, MJ-MJ                |
| 6 RESERVED                               | 16 6" D.I. 45° BEND, MJ-MJ                |
| 7 8" x 6" D.I. REDUCER, FLG-FLG          | 17 6" x 6" D.I. TEE, ALL FLG              |
| 8 8" D.I. DRESSER COUPLING               | 18 6" D.I. 90° BEND, FLG-FLG              |
| 9 16" BLIND FLANGE                       | 19 6" D.I. PLUG VALVE, FLG-FLG            |
| 10 6" D.I. PIPE, PE-PE, LENGTH AS REQ'D  | 20 6" D.I. DISMANTLING FLANGE             |

NOTE: ALL FLANGE VALVES SHALL INCLUDE HAND WHEEL OPERATOR OR CHAIN WHEEL OPERATOR IF 5'-0" ABOVE FLOOR ELEVATION.

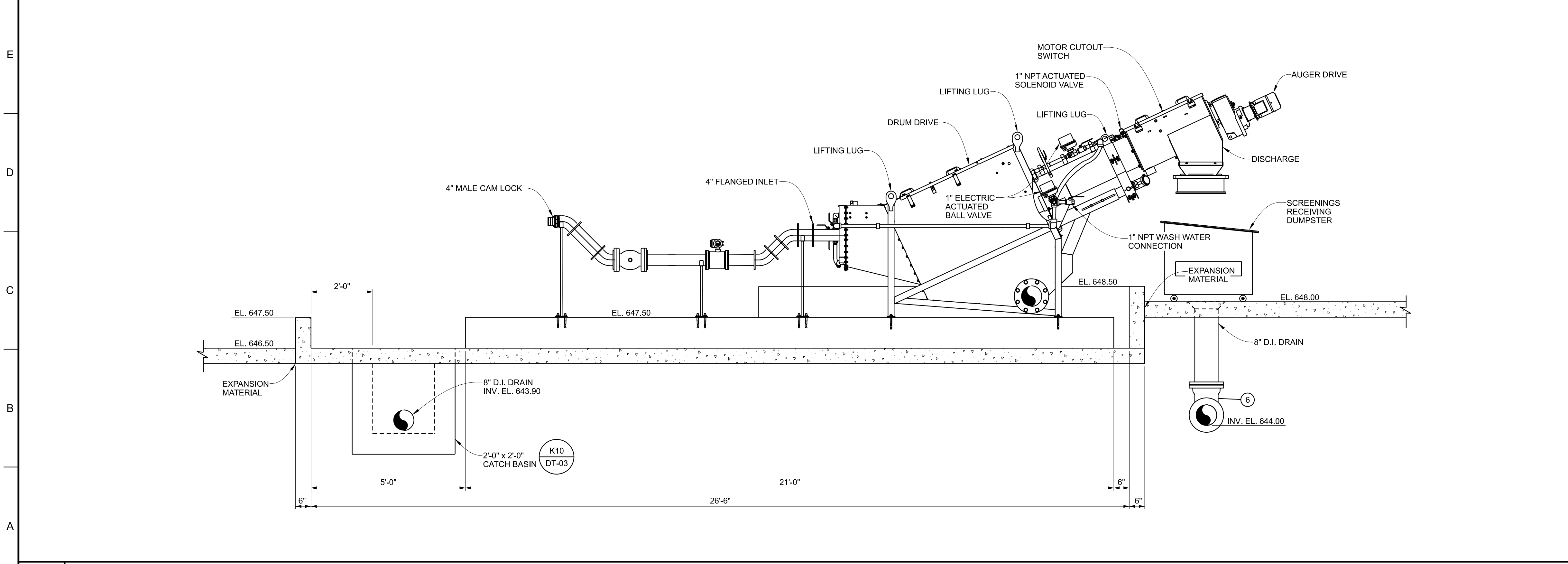
A1 SECTION 1/8" = 1'-0"

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 5/2/2022  
 6:00:02 PM  
 P:\3036\lamm\20065\_LongCaneCreekWWTP\PlantDrawings\20065C6-04.dgn



NOTE: CONTRACTOR SHALL COORDINATE LOCATION OF WATER CONNECTION AND ADJUST 2 1/2\"/>

**F1 PLAN** 1/2" = 1'-0"



**FITTINGS LIST**

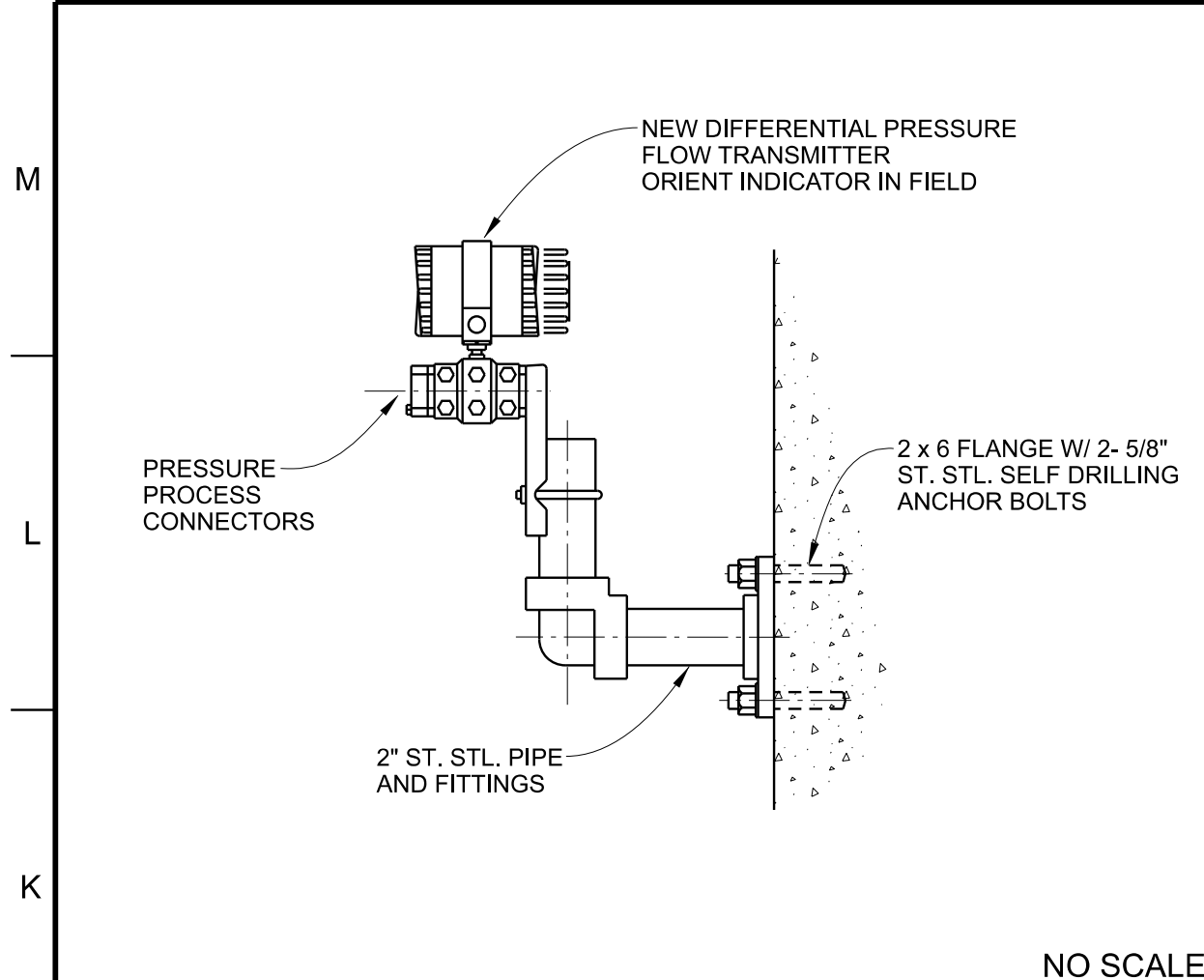
- ① 8" D.I. PIPE, PE-PE, LENGTH AS REQ'D
- ② 8" D.I. PIPE, FLG-PE, LENGTH AS REQ'D
- ③ 8" D.I. PIPE, FLG-FLG, LENGTH AS REQ'D
- ④ 8" x 8" D.I. WYE, ALL MJ
- ⑤ 8" D.I. 90° BEND, FLG-FLG
- ⑥ 8" D.I. 90° BEND, MJ-MJ
- ⑦ 8" D.I. 45° BEND, MJ-MJ
- ⑧ 8" D.I. 45° BEND, MJ-PE

CONCRETE SPEED BUMP DETAIL

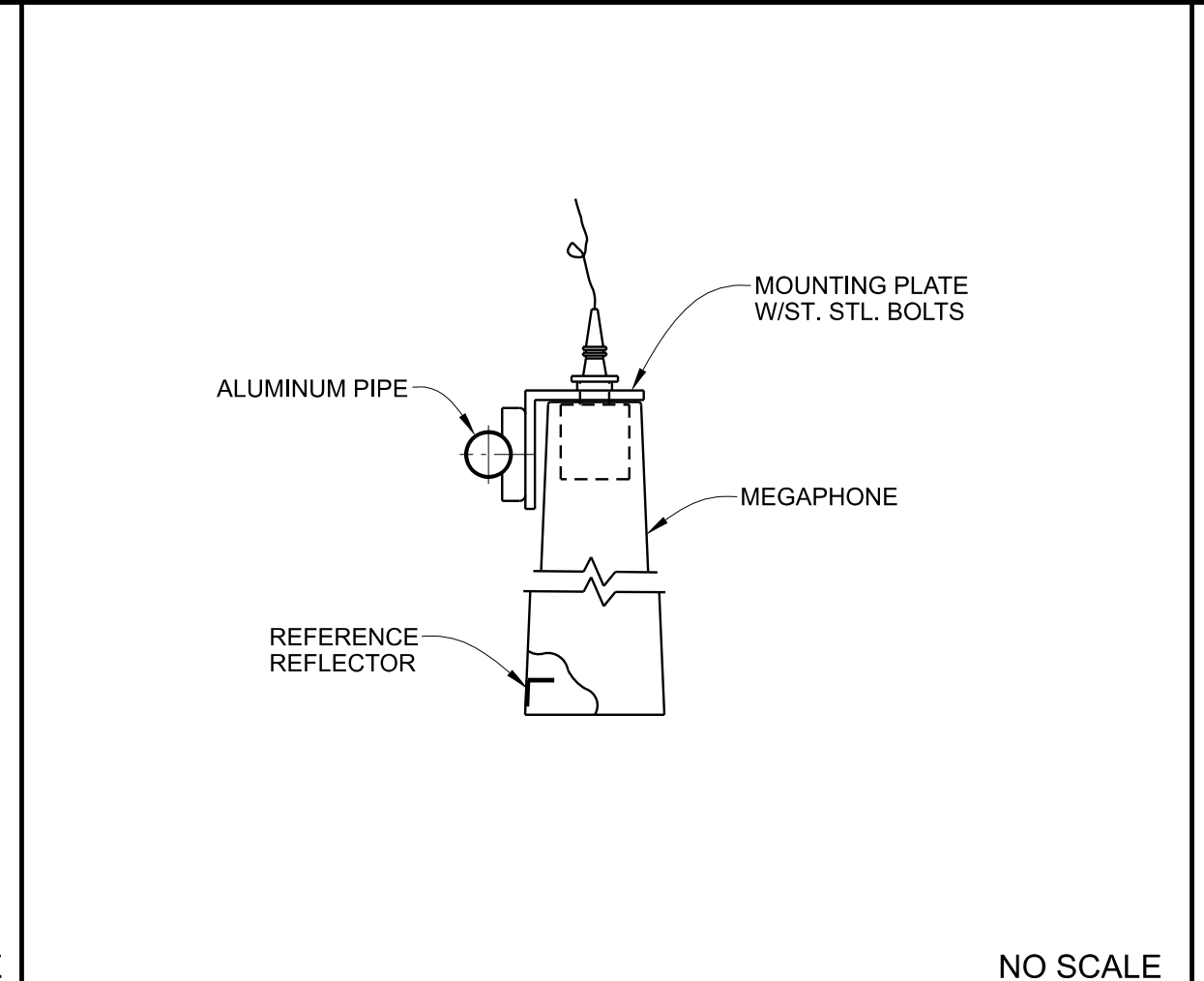
Designed	STL	Project No.	
Drawn	NTS / CLM	20065	
Checked	JMM		

Revisions	No.	Date	Description
1	05/03/22		ADDENDUM No. 3

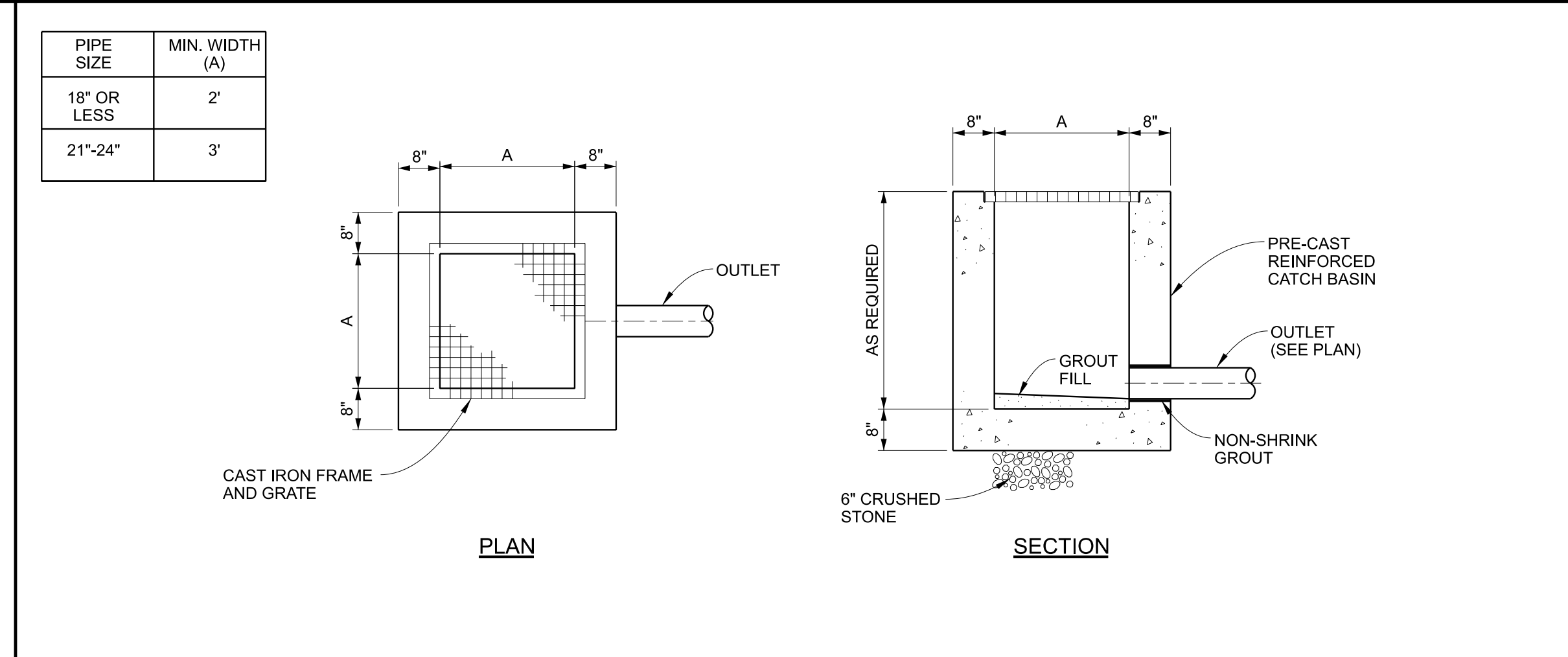
NEW SEPTAGE RECEIVING STATION  
 PLAN & SECTION  
 (ALTERNATE BID ITEM No. 2)



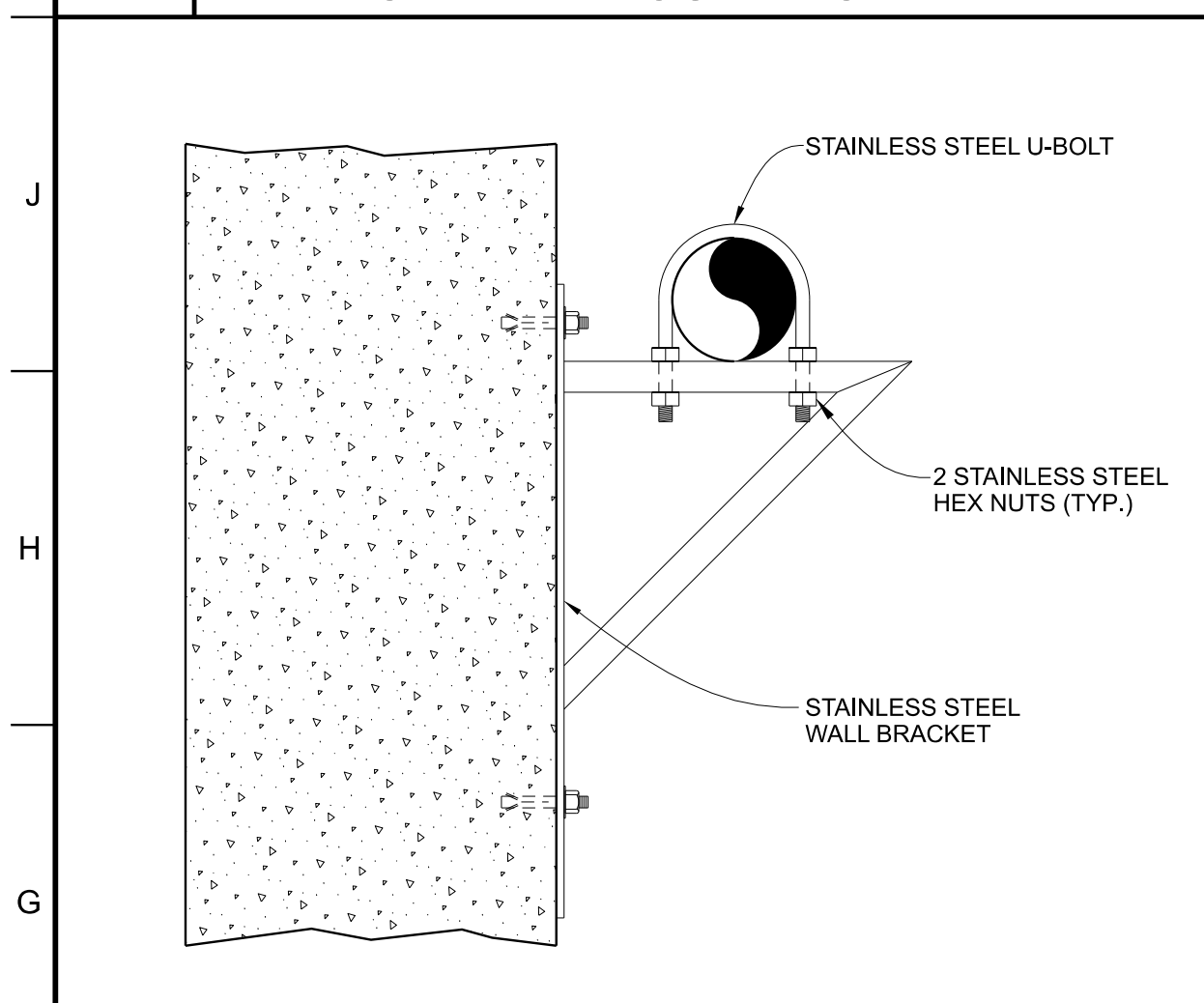
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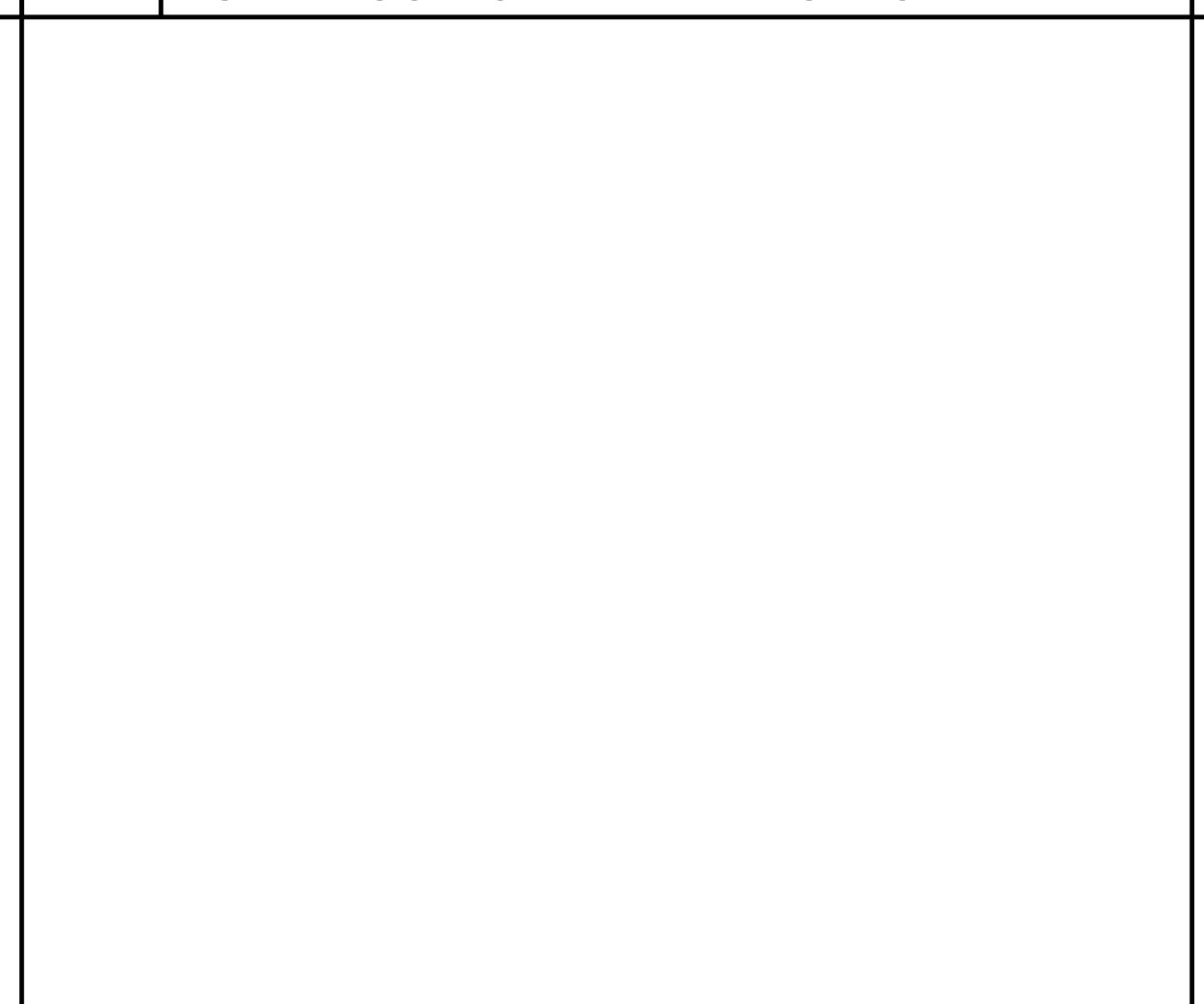
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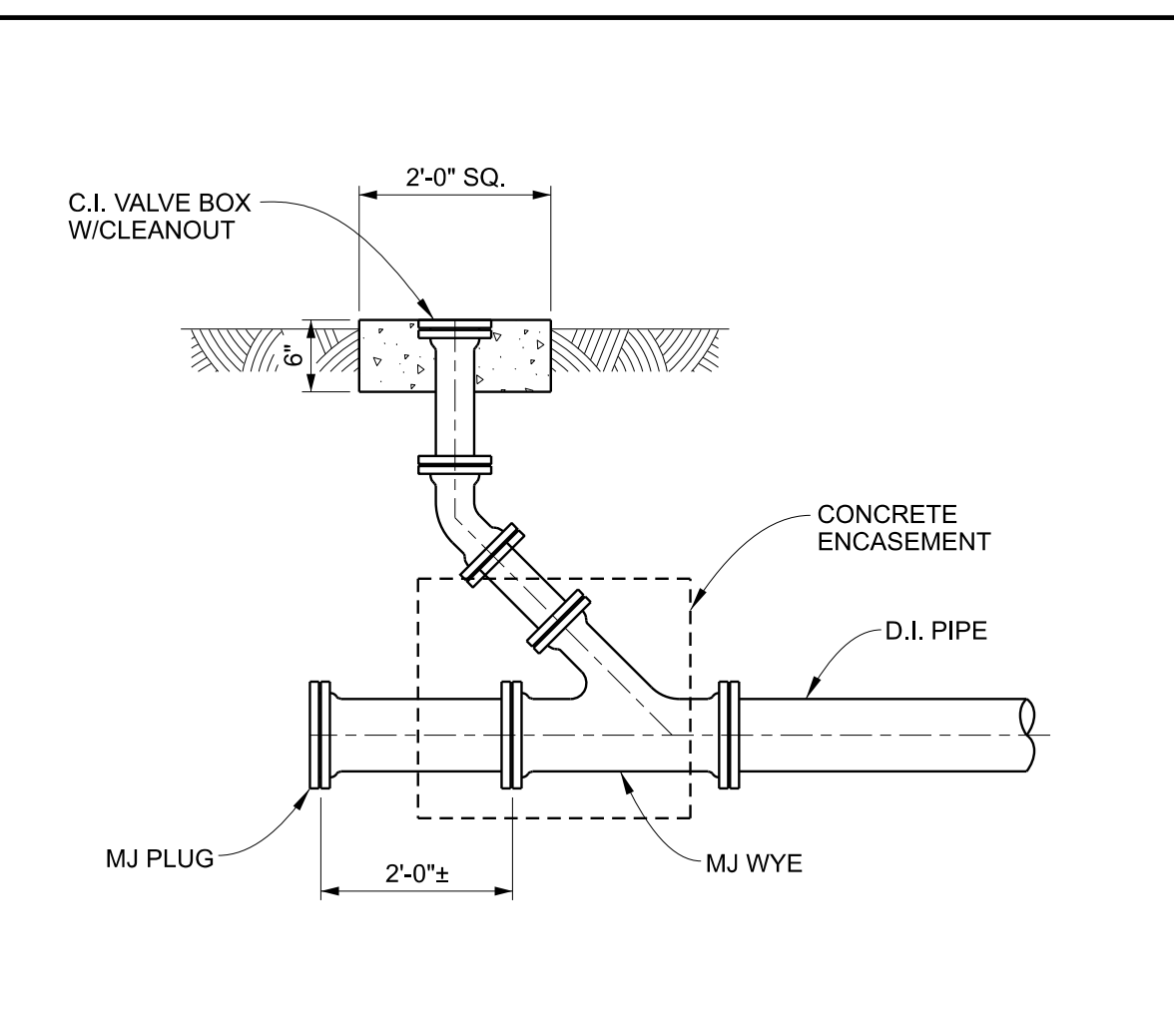
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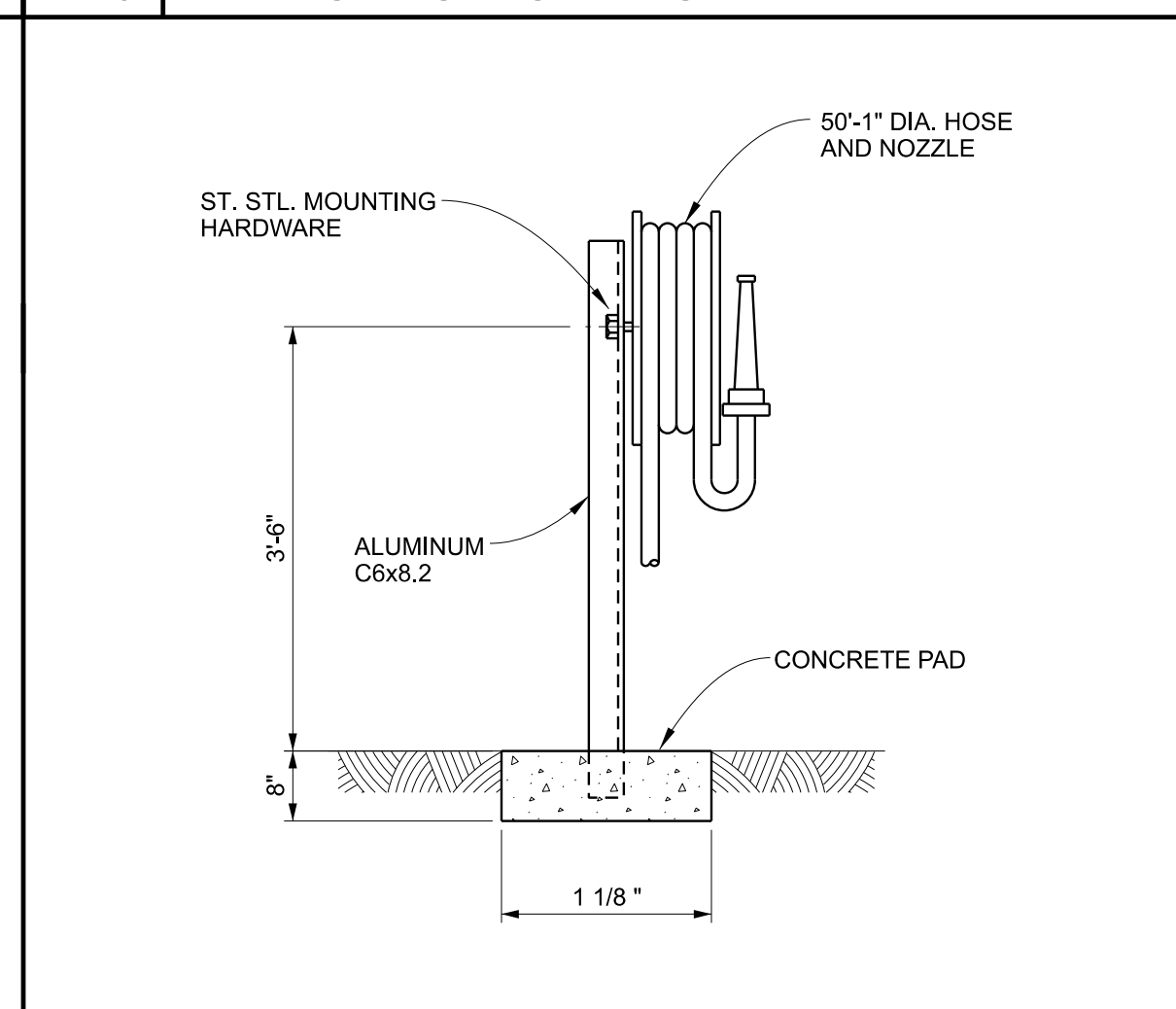
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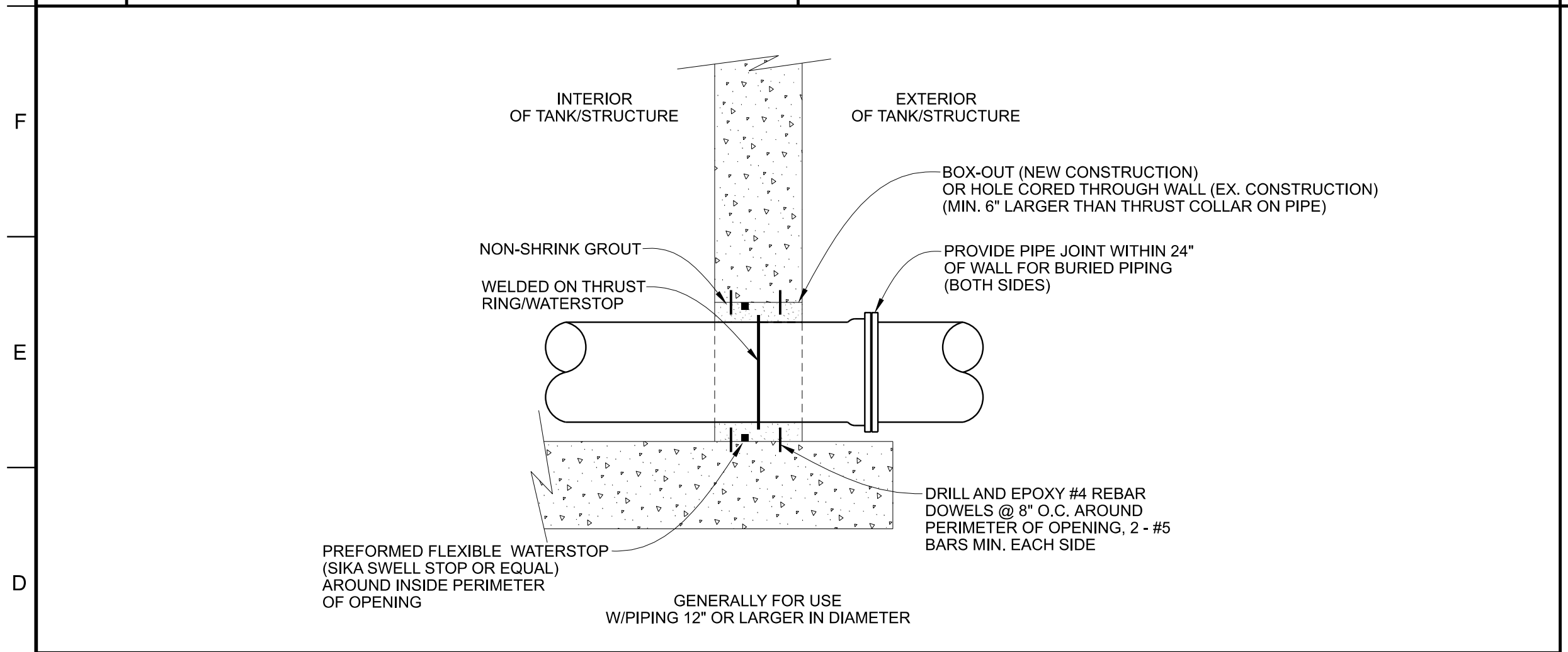
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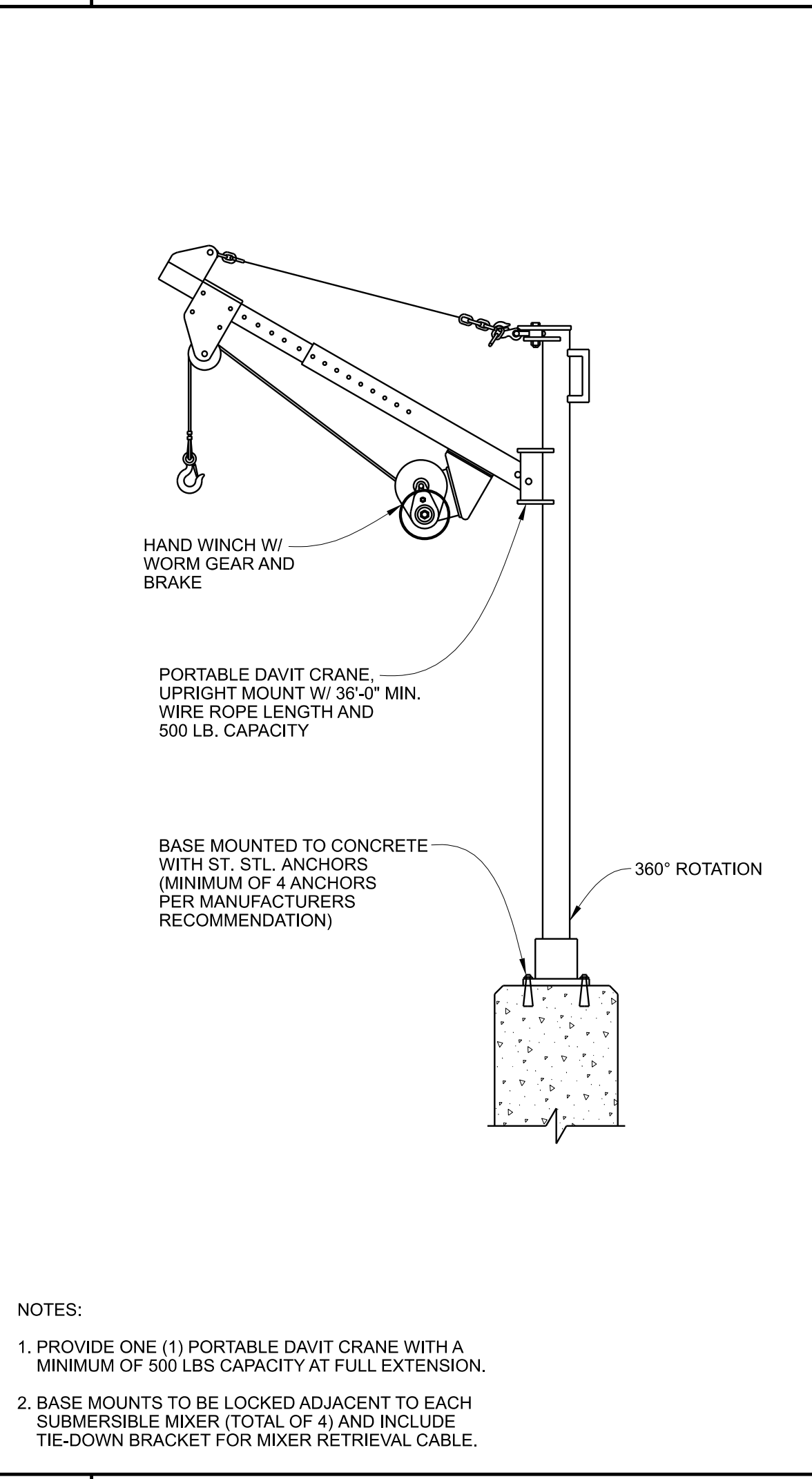
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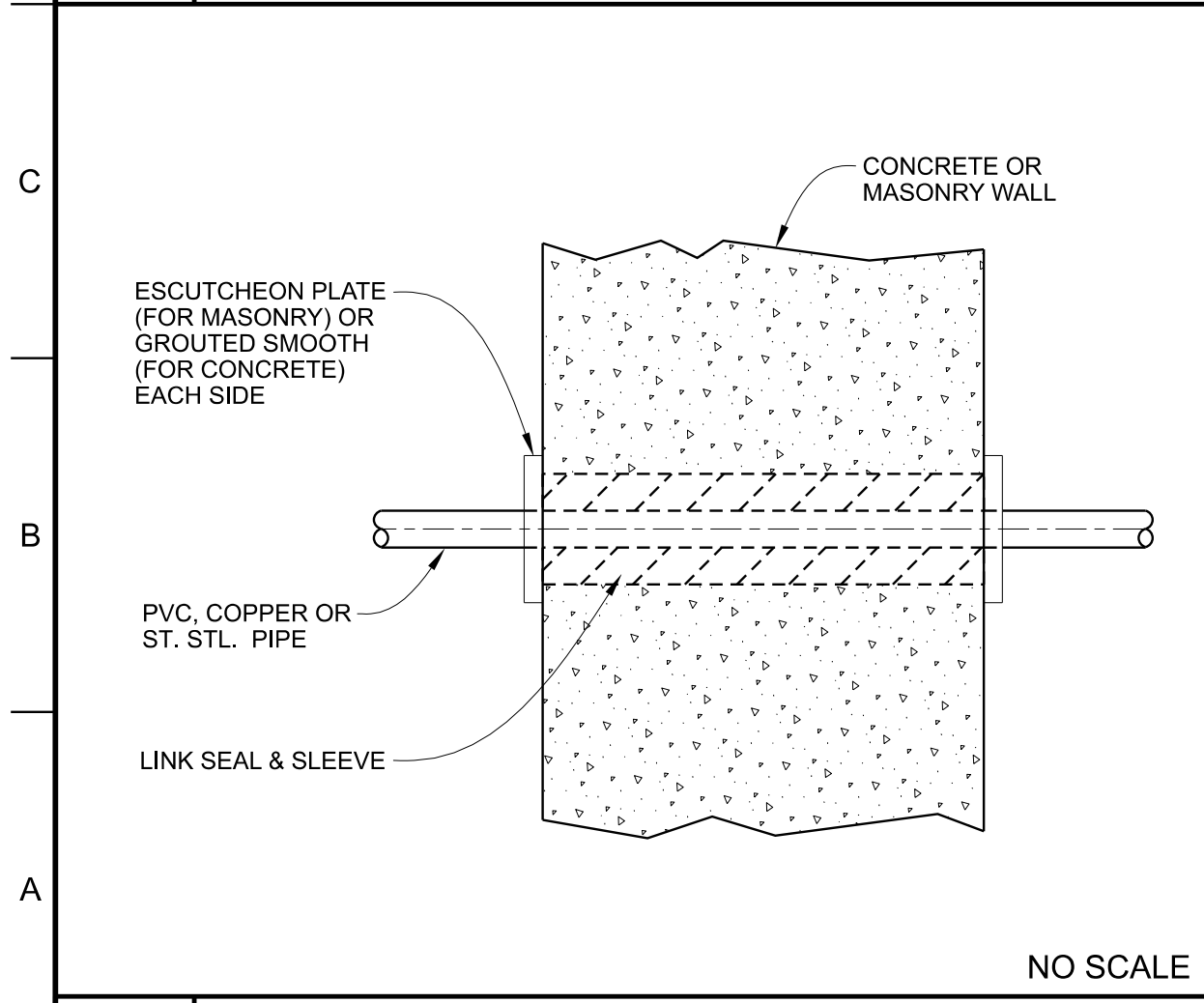
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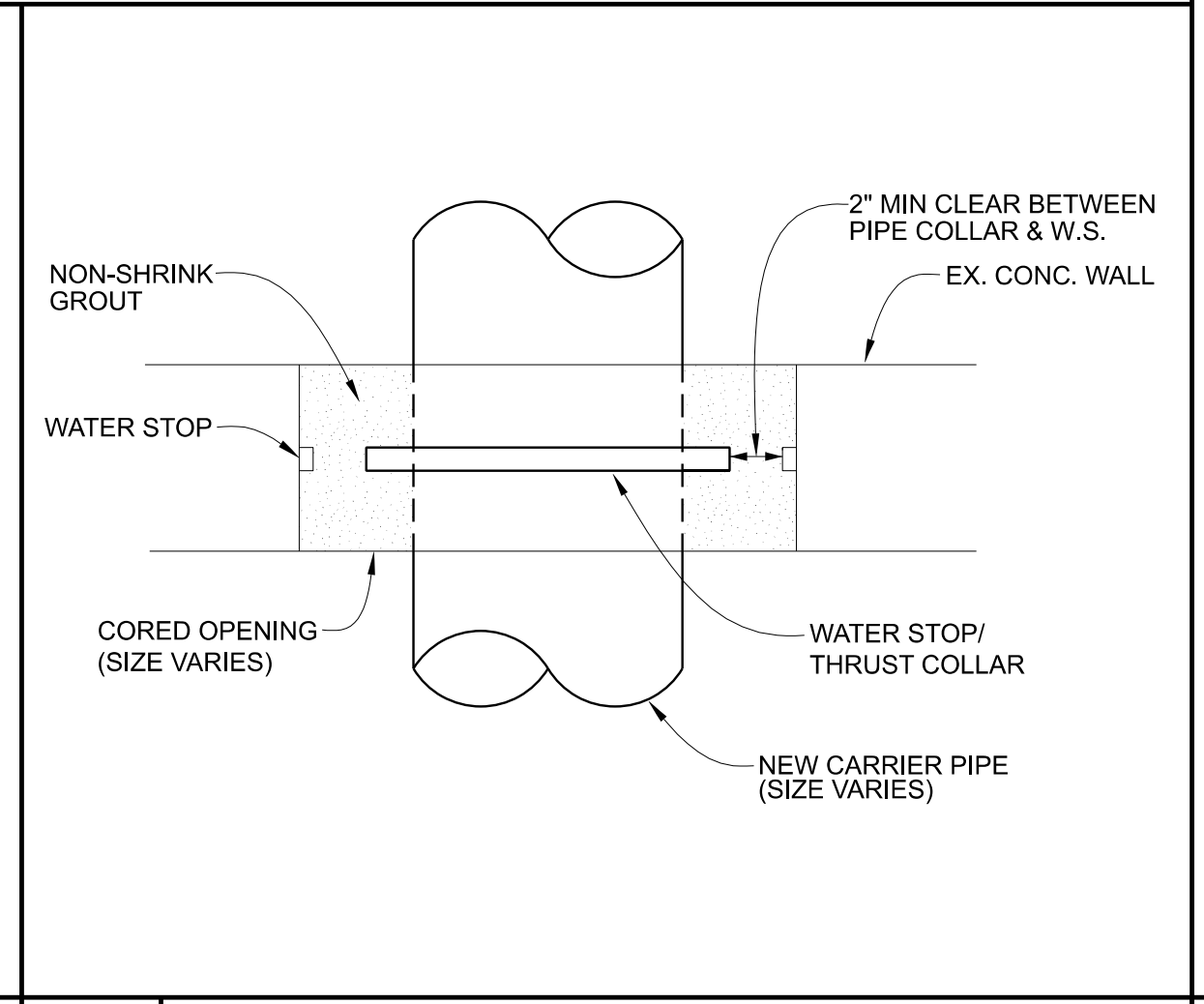
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NOTES:  
 1. PROVIDE ONE (1) PORTABLE DAVIT CRANE WITH A MINIMUM OF 500 LBS CAPACITY AT FULL EXTENSION.  
 2. BASE MOUNTS TO BE LOCKED ADJACENT TO EACH SUBMERSIBLE MIXER (TOTAL OF 4) AND INCLUDE TIE-DOWN BRACKET FOR MIXER RETRIEVAL CABLE.

CITY OF LAGRANGE, GEORGIA  
 LONG CANE CREEK  
 POLLUTION CONTROL  
 PLANT IMPROVEMENT  
 LAGRANGE, GEORGIA



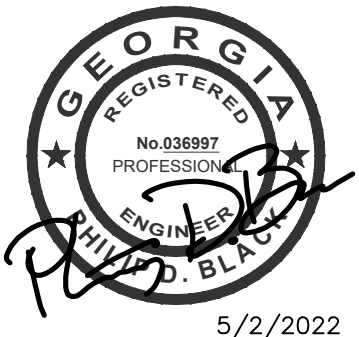
Designed	STL	Project No.	20065
Drawn	NTS / CLM		
Checked	JMM		

No.	Date	Description
1	05/03/22	ADDENDUM No. 1


MISCELLANEOUS DETAILS	
Issue Date	Sheet No.
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Drawn	ZJG		
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Revisions		
No.	Date	Description
1	5/2/2022	ADDENDUM 1

Sheet Title  
**ELECTRICAL LEGEND**

Issue Date	APR, 2022	Sheet No.	E0-01
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**GENERAL ELECTRICAL LEGEND**

**NORMAL EMERGENCY**

FIXTURE OUTLET - POLE LIGHT FIXTURE - QUANTITY AND ORIENTATION(S) OF LUMINAIRES AS INDICATED ON PLANS.  
 FIXTURE OUTLET - LINEAR - SURFACE OR PENDANT MOUNTED.

**FIXTURE OUTLET DESIGNATIONS:**

A FIXTURE TYPE "A" - MAY BE USED WITH OTHER TYPES.  
 b SWITCH LEG TO WHICH FIXTURE IS CONNECTED - MAY BE USED WITH OTHER LOWER-CASE LETTERS.  
 2 CIRCUIT NUMBER - MAY BE USED WITH OTHER NUMBERS.

SWITCH OUTLET - S.P.S.T. - 20A - 120-277VAC.  
 SWITCH OUTLET - CONTROLS OUTLET "o", ETC.  
 SWITCH OUTLET - MANUAL MOTOR STARTER - TOGGLE TYPE - 2 POLE - SQUARE "D" TYPE K01 WITH ENCLOSURE AS REQUIRED BY APPLICATION - PROVIDE LOCK-OFF HARDWARE.  
 SWITCH OUTLET - MANUAL MOTOR STARTER - TOGGLE TYPE - 3 POLE - SQUARE "D" TYPE K02 WITH ENCLOSURE AS REQUIRED BY APPLICATION - PROVIDE LOCK-OFF HARDWARE.  
 SWITCH OUTLET - S.P.S.T. - 20A - 120VAC - WEATHERPROOF OIL-TIGHT, 2-POSITION, MAINTAINED CONTACT, 30MM SELECTOR SWITCH WITH "AUTO-OFF" LEGEND PLATE - LABEL FUNCTION WITH ENGRAVED NAMEPLATE (SUCH AS "CLARIFIER LIGHTS") - SEE DETAIL "E-CS".  
 PHOTOELECTRIC CONTROL - S.P.S.T. - 120VAC OR 277VAC - 2000W - TORK 2101 FOR 120V CIRCUITS & TORK 2104 FOR 277V CIRCUITS - MOUNT AS NOTED FACING NORTH.

**DUPEX**

WALL OUTLET - RECEPTACLE - 20A - 125V - 2P - 3W - GROUNDING - NEMA 5-20R - SINGLE PLATE.  
 WALL OUTLET - RECEPTACLE - 20A - 125V - 2P - 3W - GROUNDING - "GFI" TYPE - WEATHER RESISTANT - NEMA 5-20R - SINGLE PLATE.

**OUTLET DESIGNATIONS (APPLY TO ALL OUTLETS, DEVICES & EQUIPMENT):**

ES EQUIPMENT MOUNTED TO ALUMINUM SUPPORT FRAME - SEE DETAIL "E-ES".  
 HR DEVICE SHALL BE HANDRAIL MOUNTED - SEE DETAIL "E-HR".  
 SRS PROVIDE SUN/RAIN SHIELD FOR DEVICE/EQUIPMENT PER DETAIL "E-SRS".  
 VL VERIFY EXACT OUTLET LOCATION WITH EQUIPMENT SUPPLIER OR OWNER PRIOR TO ROUGH-IN.  
 W WEATHER PROOF - OUTLET SHALL BE INSTALLED WITH WEATHERPROOF, IN-USE, CAST COVER.

FLOOR OR SURFACE-MOUNTED OUTLET - JUNCTION BOX.  
 WALL OUTLET - JUNCTION BOX - FLUSH MOUNTED.  
 CEILING OUTLET - JUNCTION BOX.

BRANCH/FEEDER CIRCUIT - CONCEALED IN WALLS OR CEILING.  
 BRANCH/FEEDER CIRCUIT - EXPOSED ON WALLS OR CEILING.  
 BRANCH/FEEDER CIRCUIT - CONCEALED IN FLOOR SLAB OR DIRT FILL.  
 BRANCH/FEEDER CIRCUIT - OVERHEAD BETWEEN POLES.  
 BRANCH/FEEDER CIRCUIT - TO BE DEMOLISHED - MAY BE USED WITH OTHER LINE TYPES.  
 BRANCH/FEEDER CIRCUIT - HOMERUN - CAN BE USED WITH OTHER BRANCH/FEEDER TYPES.

**BRANCH/FEEDER CIRCUIT MODIFIERS:**

: 2#12 & 1#12G UNLESS NOTED OTHERWISE.  
 : 3#12 & 1#12G, ETC. UNLESS NOTED OTHERWISE (TICK MARKS INDICATE CONDUCTOR QUANTITY NOT INCLUDING GROUND WIRE).  
 -10 : 2#10 & 1#10G UNLESS NOTED OTHERWISE (NUMBER INDICATES WIRE AWG).

SIZE CONDUIT PER N.E.C. UNLESS INDICATED OTHERWISE.

FLEXIBLE CONNECTION TO EQUIPMENT.  
 CONCRETE-ENCASED DUCT BANK - SEE DETAIL "E-DR".  
 POWER DISTRIBUTION EQUIPMENT.  
 LIGHTING PANEL - SURFACE MOUNTED.  
 TRANSFORMER - POWER.

TYPICAL CONTROL & INSTRUMENTATION WIRING MARK (WHERE "\*" REPRESENTS A UNIQUE IDENTIFIER CONSISTING OF LETTERS AND NUMBERS) - SEE CONTROL & INSTRUMENTATION WIRING SCHEDULES.

DISCONNECT SWITCH - FUSED.  
 MAGNETIC MOTOR STARTER.  
 DISCONNECT SWITCH - INTEGRAL TO EQUIPMENT.  
 MOTOR OUTLET - SIZE AS SHOWN.  
 HEAT TRACING WITH INSULATION - VERIFY EXACT TERMINATION LOCATIONS(S) WITH SUPPLIER(S) PRIOR TO ROUGH-IN.  
 CONTROL STATION - SEE DETAIL "E-CS".  
 MOTORIZED VALVE/GATE ACTUATOR.  
 POWER PULL BOX - SEE DETAIL "E-PB1".  
 INSTRUMENTATION PULL BOX - SEE DETAIL "E-PB1".  
 THERMOSTAT - AIR CONDITIONING - LOW VOLTAGE - WALL MOUNTED AT 48" A.F.F. - LABEL FUNCTION WITH ENGRAVED NAMEPLATE.

BARE SUPPLEMENTAL GROUND WIRE - #4/0G IF NOT INDICATED OTHERWISE - INSTALLED A MINIMUM OF 24" BELOW GRADE AND 24" MINIMUM FROM STRUCTURES WHERE POSSIBLE.  
 SUPPLEMENTAL GROUNDING SYSTEM - GROUND ROD - 3/4" x10'-0" COPPER-CLAD - TOP DRIVEN A MINIMUM OF 24" BELOW GRADE.  
 SUPPLEMENTAL GROUNDING SYSTEM - GROUND CONNECTION - CADWELD WHERE BELOW GRADE OR CONCEALED.  
 SUPPLEMENTAL GROUNDING SYSTEM - CAST GROUND PLATE ASSEMBLY (ERICO OR EQUAL) - CAST FLUSH WITHIN CONCRETE WITH FLEXIBLE BARE COPPER GROUND WIRE CONNECTIONS VIA COMPRESSION LUGS TO EQUIPMENT.  
 SUPPLEMENTAL GROUNDING SYSTEM - GROUND CONNECTION - TO EQUIPMENT OR STRUCTURE AS FOLLOWS (UNLESS NOTED OTHERWISE):  
 GEQ #4/0 BARE COPPER GROUND WIRE - BOND TO EQUIPMENT/MOTOR/PANEL/TRANSFORMER, ETC.  
 GES #2 BARE COPPER GROUND WIRE - BOND TO EQUIPMENT STAND.  
 GS #4/0 BARE COPPER GROUND WIRE - BOND TO STRUCTURE/REBAR/WIRE MESH REINFORCEMENT.

DISSOLVED OXYGEN SENSOR.  
 FLOW ELEMENT.  
 LEVEL PROBE(S).  
 LEVEL SWITCH OR LIMIT SWITCH.  
 ORP SENSOR.  
 SOLENOID VALVE.  
 ULTRASONIC LEVEL TRANSDUCER.

AIR-BURST COMPRESSOR EQUIPMENT - PROVIDE 120V POWER & CONTROL INTERCONNECTIONS (WITH CONDUITS PER N.E.C.) TO ADJACENT ASSOCIATED INSTRUMENT TRANSMITTER AS DIRECTED BY SUPPLIER.  
 ANALOG INDICATING TRANSMITTER.  
 FLOW INDICATING TRANSMITTER.  
 LEVEL INDICATING TRANSMITTER.  
 PRESSURE INDICATING TRANSMITTER.

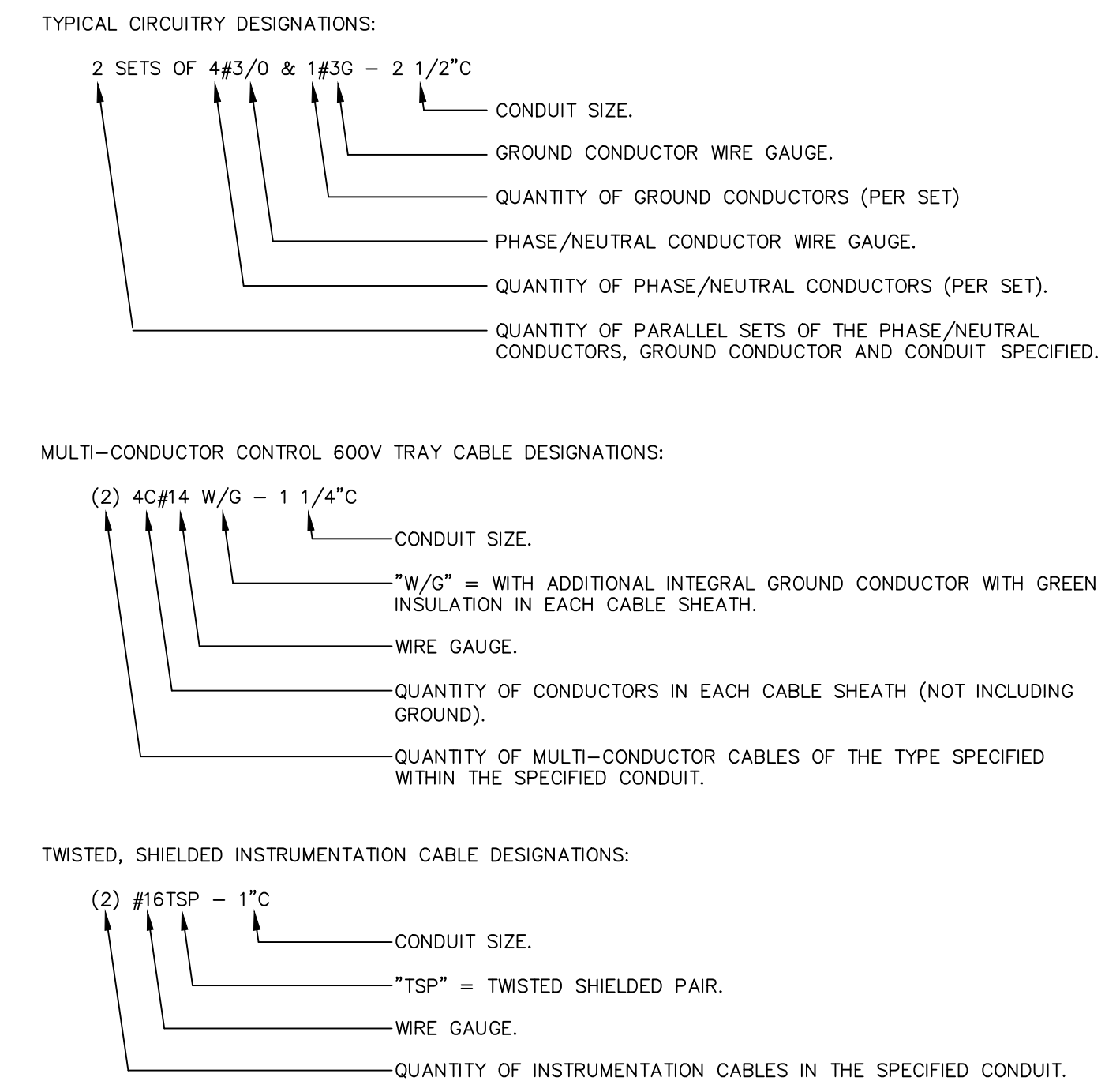
**DETAIL DESIGNATOR - "A" INDICATED DETAIL MARK - "E-1" INDICATED SHEET NUMBER WHERE DETAIL IS LOCATED (TYPICAL).**

**GENERAL ABBREVIATIONS:**

(EX) EXISTING TO REMAIN.  
 (EX-R) EXISTING TO BE REMOVED - REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING CONNECTIONS TO OTHER ELECTRICAL ITEMS.  
 (EX-RL) EXISTING TO BE RELOCATED - REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT, DEVICES, CONDUIT AND WIRING AT EXISTING LOCATION. RELOCATE ITEM TO NEW LOCATION SHOWN ON ELECTRICAL PLANS.  
 (EX-RP) EXISTING TO BE REPLACED - EXTEND AND RECONNECT EXISTING CONDUIT AND WIRING TO REPLACED ITEM.

**ELECTRICAL ABBREVIATIONS:**

A AMPERES.	NSV NEW, SPARE OR VACATED.
AIC AMPERES INTERRUPTING CAPACITY.	OC ON CENTER.
AFF ABOVE FINISHED FLOOR.	P POLES.
AL ALUMINUM.	PF POWER FACTOR.
ATS AUTOMATIC TRANSFER SWITCH.	φ PHASE.
AWG AMERICAN WIRE GAUGE.	PVC POLYVINYL CHLORIDE.
C CONDUIT.	SLD SINGLE LINE DIAGRAM.
CU COPPER.	SS STAINLESS STEEL.
EC EMPTY CONDUIT, OR ELECTRICAL CONTRACTOR.	UL UNDERWRITERS LABORATORY.
FPN FUSE PER NAMEPLATE.	UNO UNLESS NOTED OTHERWISE.
G GROUND CONDUCTOR.	V VOLTS.
KVA KILOVOLT-AMPERES.	W WIRES.
KW KILOWATT.	
LV LOW VOLTAGE.	CFCI CONTRACTOR FURNISHED, CONTRACTOR INSTALLED.
MCM THOUSAND CIRCULAR MILS.	CFOI CONTRACTOR FURNISHED, OWNER INSTALLED.
MV MEDIUM VOLTAGE.	OFOI OWNER FURNISHED, CONTRACTOR FURNISHED.
N NEUTRAL.	OFOI OWNER FURNISHED, OWNER INSTALLED.
NEC NATIONAL ELECTRICAL CODE.	OFOI OWNER FURNISHED, CONTRACTOR INSTALLED.
NEMA NATIONAL ELECTRICAL MANUFACTURER ASSOCIATION.	
NIC NOT IN CONTRACT.	



LIGHTING FIXTURE SCHEDULE									
MARK	MANUFACTURER	CATALOG NUMBER	VOLTAGE	LAMPS			MOUNTING HEIGHT	MOUNTING TYPE	REMARKS
				NUMBER	WATTS	TYPE			
A	LITHONIA COLUMBIA DAY-BRITE	FEM-L48-6000LM-IMAFD-MD-40K-80CRI-WLF-STSL	20	1	39 (6,004 LUMENS)	LED	BOULDER STRUCTURE/ CEILING	SURFACE OR BALL-SWIMEL PENDANT	
Y	LITHONIA COLUMBIA DAY-BRITE	DSX0-LED-P4-40K-T4M-RPA-FA0-PIR-DOBXD	20	1	92 (13,395 LUMENS)	LED	MOUNT TO 12" ROUND, TAPERED ANODIZED ALUMINUM DARK BRONZE POLE - SEE DETAIL "E-LP1"	INTEGRAL MOTION PHOTOCELL CONTROL	

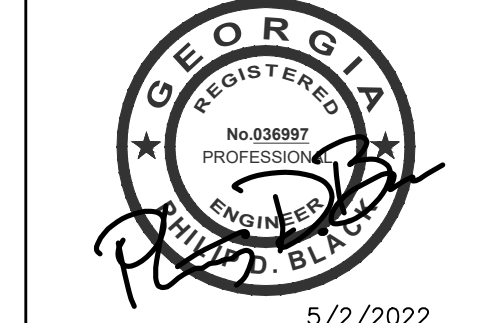
**LIGHTING FIXTURE SCHEDULE GENERAL NOTES:**

- ALL LAMPS SHALL BE 4000K WITH A MINIMUM CRI OF 80 UNLESS NOTED OTHERWISE.
- ALL FIXTURES AND BALLASTS/DRIVERS SHALL BE RATED FOR OPERATION IN AMBIENT TEMPERATURES UP TO 55 DEGREES CELSIUS.
- TO ENSURE PROPER COORDINATION AND LONG TERM SUPPORT FOR THE OWNER, ALL LIGHTING FIXTURES SHALL BE PURCHASED THROUGH MANUFACTURER'S REPRESENTATIVES AND DISTRIBUTORS LOCATED WITHIN 150 MILES OF THE PROJECT SITE. SUBMITTALS RECEIVED THAT DO NOT COMPLY WITH THIS REQUIREMENT WILL BE REJECTED WITHOUT REVIEW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS CAUSED BY NON-COMPLIANCE WITH THIS REQUIREMENT.

- GENERAL ELECTRICAL NOTES**
- SPECIAL ATTENTION IS CALLED TO THE FACT THAT THE REQUIRED WORK IS AT OPERATING FACILITIES, AND AS SUCH, NO UNNECESSARY SHUTDOWNS WILL BE ALLOWED. ANY NECESSARY SHUTDOWNS SHALL BE APPROVED IN WRITING BY THE PLANT MANAGER A MINIMUM OF TWO (2) WEEKS IN ADVANCE. TEMPORARY/PORABLE PUMPING PROVISIONS (AND OTHER TEMPORARY PROVISIONS AS REQUIRED FOR OPERATION OF THE EXISTING SYSTEMS) SHALL BE PROVIDED BY THE CONTRACTOR IF OWNER-MANDATED MAXIMUM SHUTDOWN PERIODS ARE ANTICIPATED OR ARE POSSIBLE.
  - ELECTRICAL PLANS & DETAILS INDICATE TYPICAL WIRING REQUIREMENTS FOR PROCESS EQUIPMENT. VERIFY EXACT WIRING REQUIREMENTS & ALL DEVICE LOCATIONS WITH APPROVED MANUFACTURERS SHOP DRAWINGS PRIOR TO ROUGH-IN. NO ADDITIONAL COMPENSATION WILL BE PAID FOR MINOR CIRCUITRY ADJUSTMENTS REQUIRED TO COMPLY WITH MANUFACTURERS INSTALLATION DETAILS.
  - THIS CONTRACTOR SHALL VERIFY EXACT REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT FROM MANUFACTURER'S RECOMMENDATIONS PRIOR TO ROUGHING IN CONDUIT AND SHALL ADJUST CONDUIT SIZE, WIRE SIZE AND CIRCUIT PROTECTION SIZE ACCORDINGLY. IF REQUIREMENTS ARE LARGER THAN CALLED FOR ON ELECTRICAL PLANS NOTIFY ENGINEER IMMEDIATELY.
  - CONTRACTOR SHALL VISIT THE SITE(S) OF THE WORK PRIOR TO SUBMITTING BID TO EXAMINE CAREFULLY LOCAL CONDITIONS AND DIFFICULTIES TO BE ENCOUNTERED. ANY DISCREPANCY BETWEEN PLANS AND EXISTING CONDITIONS SHALL IMMEDIATELY BE CALLED TO THE ATTENTION OF THE ENGINEER.
  - ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH NEC.
  - THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION AND MOUNTING OF ALL INSTRUMENTATION DEVICES (EXCLUDING THOSE PRE-INSTALLED ON SKIDS BY THE MANUFACTURER). SEE INSTALLATION DETAILS ON CIVIL & ELECTRICAL DRAWINGS AND PROVIDED BY SUPPLIERS. COORDINATE ALL REQUIREMENTS WITH SUPPLIERS PRIOR TO ROUGH-IN.
  - THESE PLANS GENERALLY REQUIRE NEW CONDUITS FOR NEW CIRCUIT HOMERUNS, WHERE EXISTING OR SPARE CONDUITS ARE AVAILABLE THAT MEET OR EXCEED THE PROJECT REQUIREMENTS (FOR MATERIAL, TYPE AND SIZE) AND ARE FOUND TO BE IN SERVICEABLE CONDITION, THESE EXISTING OR SPARE CONDUITS MAY BE UTILIZED.
  - REMOVE ALL EXISTING ELECTRICAL EQUIPMENT AND WIRING MADE OBSOLETE BY THIS RENOVATION AND DISPOSE OF AS DIRECTED BY THE ENGINEER.
  - THIS CONTRACTOR SHALL FURNISH ALL MATERIALS AND LABOR NECESSARY TO EXTEND CIRCUITS AND MAKE RECONNECTIONS TO ANY ACTIVE ELECTRICAL DEVICES ON WHICH THE BRANCH CIRCUIT IS INTERRUPTED BY THIS ALTERATION. CARE SHALL BE TAKEN TO INSURE THAT EXISTING PANEL AND FEEDER RATINGS ARE NOT EXCEEDED.
  - WET OR PROCESS AREAS (FOR USE IN DETERMINING TYPES OF MATERIALS REQUIRED PER ELECTRICAL SPECIFICATIONS) SHALL BE DEFINED AS ALL AREAS WITHIN THE PROJECT SCOPE EXCEPT THE FOLLOWING:
    - OFFICES, RESTROOMS, BREAK ROOMS, MAINTENANCE ROOMS, ELECTRICAL ROOMS AND OTHER SIMILAR, ANCILLARY, NON-PROCESS CONDITIONED SPACES.
  - ALL INDICATING TRANSMITTER DEVICES (D.O. TRANSMITTERS, LEVEL TRANSMITTERS, ETC.) LOCATED IN EXTERIOR ENVIRONMENTS SHALL BE INSTALLED WITHIN SUN/RAIN SHIELDS PER DETAIL "E-SRS". CONTRACTOR SHALL PROVIDE SUN/RAIN SHIELDS (INCLUDING FOR INSTRUMENTS FURNISHED BY EQUIPMENT SUPPLIERS). CONTRACTOR SHALL COORDINATE WITH INSTRUMENT SUPPLIER(S) PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING 120V AND ANALOG SURGE PROTECTION DEVICES AT ALL INSTRUMENTS LOCATED IN EXTERIOR ENVIRONMENTS. CONTRACTOR SHALL COORDINATE WITH INSTRUMENT SUPPLIER(S) PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
    - SURGE PROTECTION DEVICES AT 2-WIRE INSTRUMENTS SHALL BE DEHN DEHNPIPE SERIES (IP67 STAINLESS STEEL DEVICE WITH 10KA TOTAL NOMINAL DISCHARGE CURRENT PER LINE) (NO EQUAL ALLOWED).
    - SURGE PROTECTION DEVICES AT 4-WIRE INSTRUMENTS SHALL BE DEHN BLITZDUCTOR XT SERIES (FOR THE ANALOG SIGNAL) PLUS DEHNGUARD SERIES (FOR THE POWER INPUT) COMBINED INTO ONE OVERALL NEMA 4X ENCLOSURE WITH VIEWING WINDOW PER SPEC SECTION 27 60 05 REQUIREMENTS. SPD'S SHALL BE 10KA DISCHARGE CURRENT PER LINE FOR ANALOG, 15KA DISCHARGE CURRENT PER LINE FOR 120V POWER).
  - CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING IDENTIFICATION/LABELING FOR ALL NEW OR MODIFIED INSTRUMENTS, UTILIZATION EQUIPMENT (PUMPS, MIXERS, ETC.), CONTROL DEVICES, CONTROL PANELS, STARTERS, POWER PANELS, ETC. (REGARDLESS OF WHICH ENTITY PROVIDES THE EQUIPMENT) PER DETAILED REQUIREMENTS OF SPECIFICATION SECTION 26 05 53.
  - ENTIRE ELECTRICAL INSTALLATION WITHIN HAZARDOUS AREAS AS DEFINED BY NFPA 820 SHALL COMPLY WITH ALL APPLICABLE NEC REQUIREMENTS FOR CONDUIT SEALS, RACEWAY TYPES, MATERIAL/DEVICE TYPES, ETC. PLANS DO NOT ATTEMPT TO INDICATE CODE-REQUIRED LOCATIONS OF EACH CONDUIT SEAL. CONDUIT SEALS SHALL BE PROVIDED AT EACH CONDUIT TERMINATION IN HAZARDOUS AREAS AND WHERE CONDUITS PASS FROM HAZARDOUS TO NON-HAZARDOUS AREAS PER CODE REQUIREMENTS. ALL DISCONNECT SWITCHES, RECEPTACLES, LIGHT SWITCHES, CONTROL STATIONS, J-BOXES, INSTRUMENTS, ETC. THROUGHOUT THIS AREA SHALL BE INSTALLED FULLY OUTSIDE HAZARDOUS (CLASSIFIED) LOCATIONS UNLESS SPECIFICATIONS SHOWN OTHERWISE. ALL CONDUITS PASSING THROUGH HAZARDOUS (CLASSIFIED) LOCATIONS (BUT NOT TERMINATING WITHIN HAZARDOUS LOCATIONS) SHALL BE UNBROKEN, WITH NO COUPLINGS, ETC. WITHIN THE HAZARDOUS AREA.

- ELECTRICAL DEMOLITION NOTES**
- THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL SCOPE OF DEMOLITION WORK TO BE ACCOMPLISHED UNDER THIS CONTRACT. IT IS NOT THE INTENT OF THESE PLANS TO DETAIL ALL ELECTRICAL ITEMS THAT MUST BE REMOVED. THE ELECTRICAL CONTRACTOR SHALL REFER TO ALL OTHER DEMOLITION PLANS IN THIS SET OF DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO EXTENT AND SCOPE OF DEMOLITION WORK. REFER TO ELECTRICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. VERIFY ALL REQUIREMENTS AT JOB SITE PRIOR TO BID.
  - EXISTING SALVAGEABLE MATERIALS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO OWNER'S DESIGNATED STORAGE FACILITY. ANY MATERIALS REMOVED THAT THE OWNER DOES NOT WISH TO RETAIN SHALL BE DISPOSED OF BY THE CONTRACTOR.
  - NO EXISTING ELECTRICAL ITEMS SHALL BE REMOVED WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER. THE EXISTING PLANT SHALL BE KEPT OPERATIONAL THROUGHOUT THE CONSTRUCTION PROCESS UNTIL THE NEW PLANT IS IN SERVICE.
  - ALL EXISTING ELECTRICAL EQUIPMENT, CONDUIT, WIRING, DEVICES, ETC. THAT BECOME OBSOLETE WITHIN THIS PROJECT SHALL BE DEMOLISHED COMPLETELY (OTHER ITEMS SHALL REMAIN IN SERVICE).
  - ALL EXISTING WIRING MADE OBSOLETE BY THIS PROJECT SHALL BE DEMOLISHED COMPLETELY. ALL EXISTING EXPOSED CONDUITS, OUTLET BOXES, WIREWAYS, J-BOXES, ETC. MADE OBSOLETE SHALL BE DEMOLISHED COMPLETELY. EXISTING DUCTBANK CONDUITS MADE OBSOLETE SHALL BE KEPT AS SPARES (WITH CONDUITS REMOVED).
  - WHERE NEW LIGHTING, RECEPTACLES, INSTRUMENTS, EQUIPMENT, DEVICES OR CIRCUITRY IS SHOWN WITHIN THESE PLANS, EXISTING DEVICES OR CIRCUITRY THAT BECOMES OBSOLETE AS A RESULT SHALL BE DEMOLISHED.
  - REFER TO OTHER ELECTRICAL AND CIVIL PLANS FOR ADDITIONAL DEMOLITION WORK TO BE PERFORMED.
  - COVER ALL UNUSED EXISTING OUTLET BOXES WITH BLANK COVERS.

- ADDITIVE ALTERNATE BID ITEMS SUMMARY**
- ADDITIVE ALTERNATE BID ITEM NO. 1:** MODIFICATIONS TO THE EXISTING PRE-AERATION BASINS TO INCLUDE DEMOLITION OF ALL EXISTING AND INSTALLATION OF NEW BREAKERS, DISCONNECTS, CONTROLS, CIRCUITRY, MCC MODIFICATIONS, DUCTBANKS, ETC. AS SHOWN ON ELECTRICAL SCHEDULES, SHEETS E0-04, E1-01, E2-01, E2-02, E10-01, & E10-02.
  - ADDITIVE ALTERNATE BID ITEM NO. 2:** NEW SEPTAGE RECEIVING STATION TO INCLUDE INSTALLATION OF NEW BREAKERS, DISCONNECTS, CONTROLS, CIRCUITRY, MCC MODIFICATIONS, DUCTBANKS, ETC. AS SHOWN ON ELECTRICAL SCHEDULES AND SHEETS E1-01, E9-01, E9-02.
  - ADDITIVE ALTERNATE BID ITEM NO. 3:** REPLACEMENT OF EXISTING AERATION BASIN SURFACE AERATORS AND CONTROLS TO INCLUDE DEMOLITION OF ALL EXISTING AND INSTALLATION OF NEW VFDs, SWITCHBOARD, CONTROL PANELS, BREAKERS, DISCONNECTS, CONTROLS, CIRCUITRY, MCC MODIFICATIONS, DUCTBANKS, HVAC ELECTRICAL EQUIPMENT, ETC. SHOWN ON ELECTRICAL SCHEDULES AND SHEETS E0-03, E0-04, E1-01, E3-01, E10-01, & E10-02. ALTERNATE SHALL INCLUDE INSTALLATION OF MSB-A4 AND ALL ASSOCIATED WORK BENEATH CANOPY AS SHOWN ON SHEET E10-02.



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**CITY OF LAGRANGE, GEORGIA**  
**LONG CANE CREEK POLLUTION CONTROL PLANT IMPROVEMENTS**  
**LAGRANGE, GEORGIA**



Designed	PDB	Project No.	20065
Drawn	ZJG		
Checked	PDB		
Revisions	No. Date Description		
1	5/2/2022	ADDENDUM 1	

Sheet Title

**ELECTRICAL NOTES & FIXTURE SCHEDULE**

Issue Date	Sheet No.
APR, 2022	E0-02
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Designed	PDB	Project No.	
Drawn	ZJG	20065	
Checked	PDB		
Revisions			
No.	Date	Description	
1	5/2/2022	ADDENDUM 1	

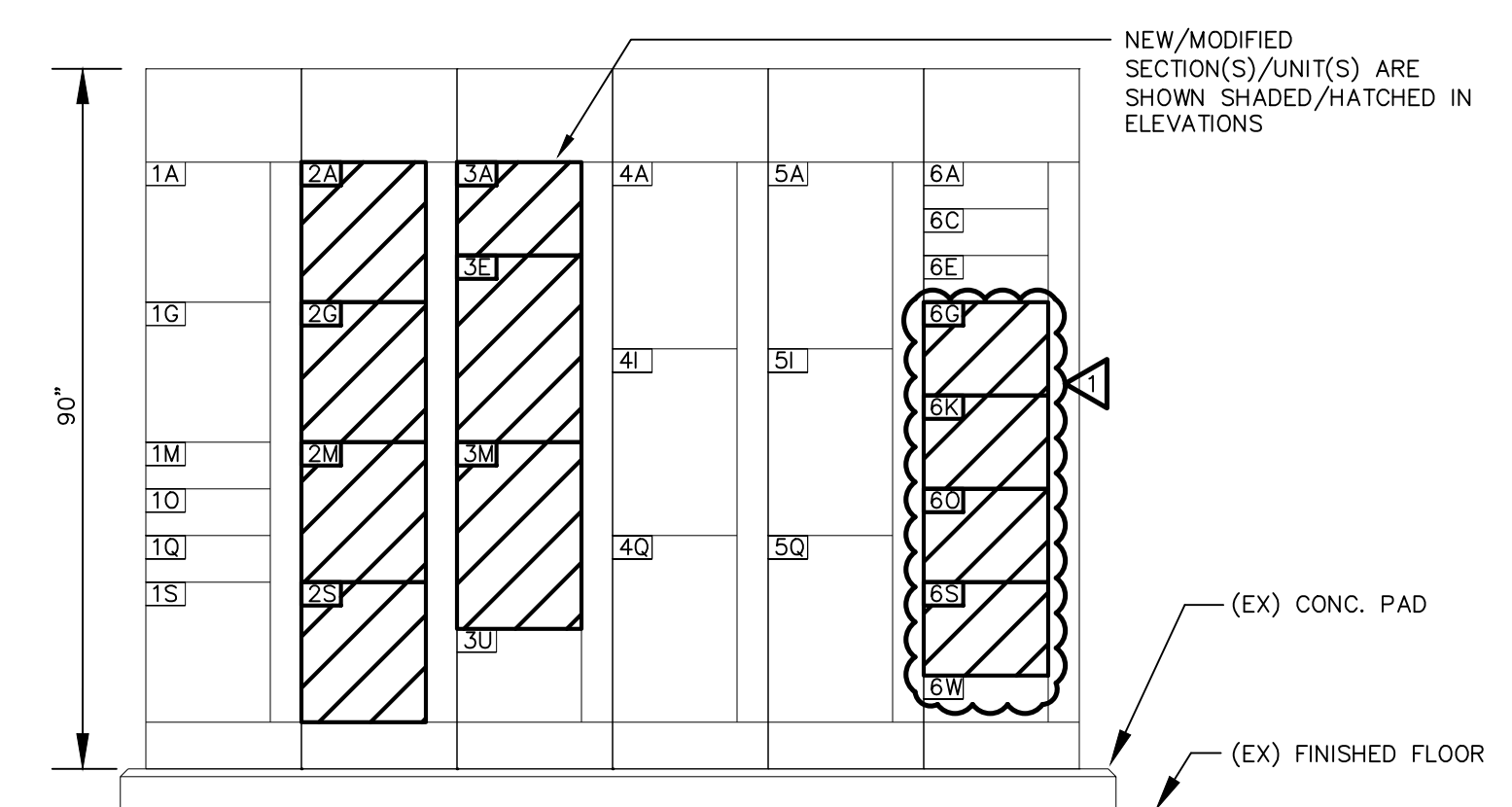
Sheet Title	ELECTRICAL SCHEDULES
Issue Date	APR., 2022
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EXISTING MOTOR CONTROL CENTER SCHEDULE - MCC-A3														
MCC TYPE: CUTLER-HAMMER UNITROL MOTOR CONTROL CENTER				AC RATING: (EX) 65KVA										
VOLTAGE: 480V-3P-3W				LOCATION: SEE PLANS										
MAIN AMPS: 1600 AMP - MLO				REMARKS:										
FED FROM: MCC-A2				FEEDER: EXISTING										
UNIT NO.	NAMEPLATE DESCRIPTION	MCC UNIT TYPE	ELECT. EQUIP. CHARACTERISTICS					STARTER NEMA OR AMPERAGE RATING	CIR. BKR. OR MCP	ELEM. DIAG. NO.	LOCAL SAFETY SWITCH RATING	WIRE AND COND. SIZE	REMARKS	
			V	P	HP	KW OR KVA	AMPS							
1 A	(EX) EXHAUST FAN NO. 1	EXISTING STARTER	460	3	7 1/2			EXISTING	EXISTING		-	EXISTING	EXISTING	
1 G	(EX) EXHAUST FAN NO. 2	COMBINATION FVNR STARTER WITH MCP	460	3	7 1/2			EXISTING	EXISTING		-	EXISTING	EXISTING	
1 M	(EX) UNIT HEATER UH-2-5	EXISTING BREAKER	460	3		7.5		EXISTING	EXISTING		-	EXISTING	EXISTING	
1 O	(EX) UNIT HEATER UH-2-6	EXISTING BREAKER	460	3		7.5		EXISTING	EXISTING		-	EXISTING	EXISTING	
1 Q	(EX) SUMP PUMP	EXISTING BREAKER	460	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
1 U	(EX) MAIN LUGS	EXISTING	460	3				EXISTING	EXISTING		-	EXISTING	EXISTING	
2 A	PRE-AERATION SUBMERSIBLE MIXER NO. 1-1	FVNR S STARTER WITH MCP	480	3	10			NEMA 2	MCP PER MANUF.	2	-	3#10 & 1#10G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
2 G	PRE-AERATION SUBMERSIBLE MIXER NO. 1-2	FVNR S STARTER WITH MCP	480	3	10			NEMA 2	MCP PER MANUF.	2	-	3#10 & 1#10G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
2 M	PRE-AERATION SUBMERSIBLE MIXER NO. 2-1	FVNR S STARTER WITH MCP	480	3	10			NEMA 2	MCP PER MANUF.	2	-	3#10 & 1#10G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
2 S	PRE-AERATION SUBMERSIBLE MIXER NO. 2-2	FVNR S STARTER WITH MCP	480	3	10			NEMA 2	MCP PER MANUF.	2	-	3#10 & 1#10G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
3 A	(EX) LOW LEVEL CUT-OFF CONTROLS		120	1							-		RELABEL EXISTING "LOW LEVEL CUT-OFF CONTROLS" AS "SPACE" (NOTE 1)	
3 E	SPARE STARTER	EXISTING STARTER	480	3							-		RELABEL EXISTING "PREAERATION BASIN AERATOR NO. 1" AS "SPARE STARTER"	
3 M	SPARE STARTER	EXISTING STARTER	480	3							-		RELABEL EXISTING "PREAERATION BASIN AERATOR NO. 2" AS "SPARE STARTER"	
3 U	SPACE	EXISTING						EXISTING	EXISTING		-	EXISTING	EXISTING	
4 A	(EX) EQUALIZATION BASIN GATE NO. 1	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
4 I	(EX) EQUALIZATION BASIN GATE NO. 2	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
4 Q	(EX) PREAERATION BASIN GATE NO. 3	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
5 A	(EX) PREAERATION BASIN NO. 1 INFLUENT WEIR	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
5 I	(EX) PREAERATION BASIN NO. 2 INFLUENT WEIR	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
5 Q	(EX) PREAERATION BASIN GATE NO. 2	EXISTING STARTER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
6 A	(EX) OXYGEN PLANT FLOW CONTROL VALVE	EXISTING BREAKER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
6 C	(EX) EQUALIZATION BASIN FLOW CONTROL VALVE	EXISTING BREAKER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
6 E	(EX) EQUALIZATION BYPASS WEIR GATE	EXISTING BREAKER	480	3	1			EXISTING	EXISTING		-	EXISTING	EXISTING	
6 G	AHU-1	BREAKER	480	3			16.2		20/3		30/3 - F20	3#12 & 1#12G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
6 K	CU-1	BREAKER	480	3			8.1		15/3		30/3 - F15	3#12 & 1#12G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
6 O	AHU-2	BREAKER	480	3			16.2		20/3		30/3 - F20	3#12 & 1#12G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
6 S	CU-2	BREAKER	480	3			8.1		15/3		30/3 - F15	3#12 & 1#12G-3/4" C	REPLACE EXISTING UNIT & ALL LABELING (NOTE 2)	
6 U	SPACE	EXISTING	480	3				EXISTING	EXISTING		-	EXISTING	EXISTING	
			TOTAL CONNECTED LOAD:			133.3 KVA			NOTES:					
			TOTAL DEMAND LOAD:			166.6 AMPS			1. FOR INDICATED UNITS, REMOVE ALL (EX) INTERIOR COMPONENTS & ALL DOOR-MOUNTED DEVICES (PROVIDE BLANK COVERS) AND CONVERT UNIT TO BLANK SPACE UNLESS NOTED OTHERWISE.					
			TOTAL COMPUTED LOAD:			133.3 KVA			2. FOR INDICATED UNITS, REMOVE ALL (EX) INTERIOR COMPONENTS AND PROVIDE NEW COMPONENTS AS REQUIRED. REPLACE UNIT DOOR WITH NEW DOOR AND ALL NEW DOOR-MOUNTED COMPONENTS. SEE ASSOCIATED ELEMENTARY DIAGRAM FOR ALL NEW REQUIREMENTS.					
						166.6 AMPS								

NEW/MODIFIED SECTION(S)/UNIT(S) WITHIN EXISTING MCC'S ARE SHOWN UNSHADED, IN SCHEDULES (TYPICAL)

SEE NOTE 1

SEE NOTE 2



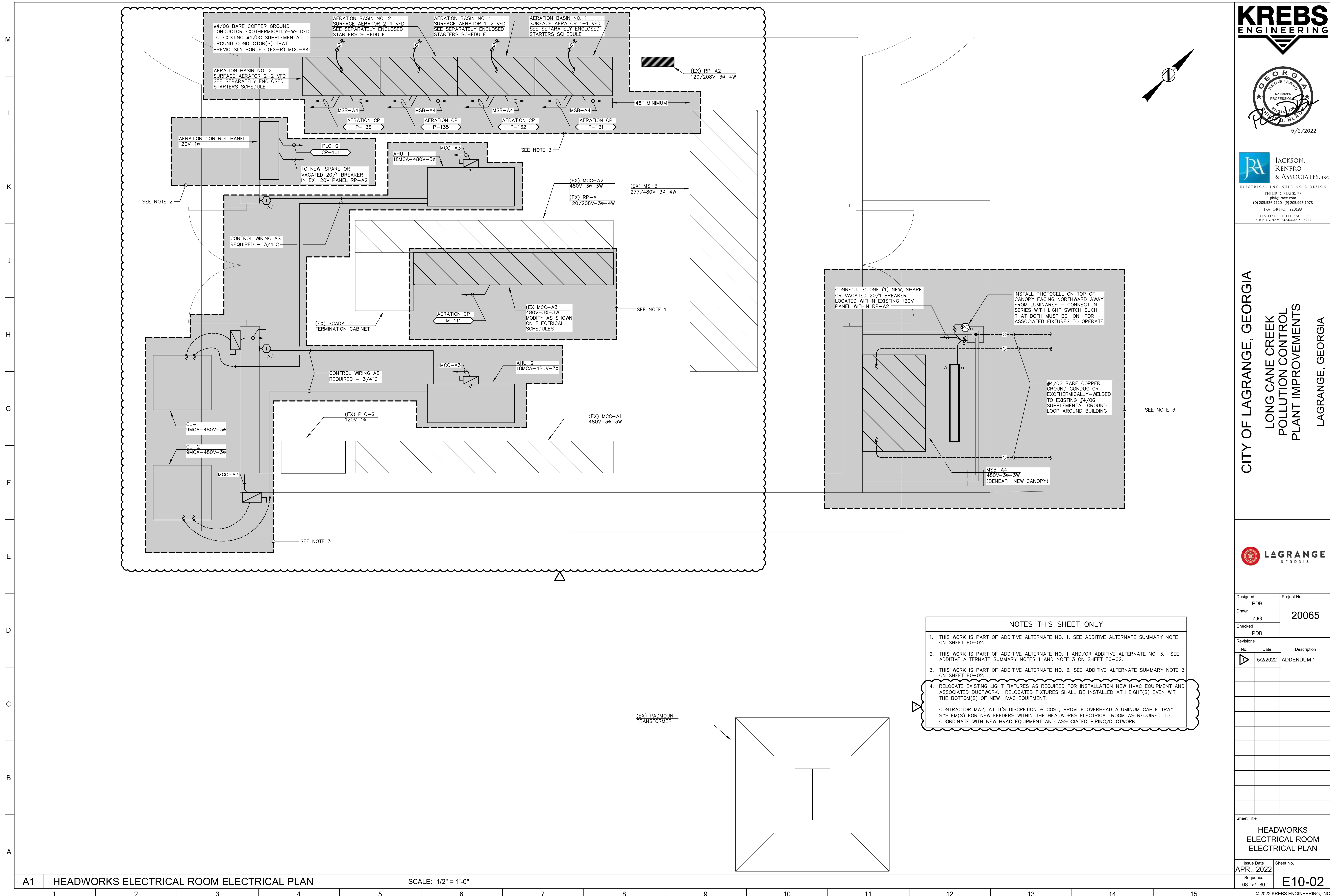
**(EX) MCC-A3 ELEVATION**  
 SCALE : 1/2" = 1'-0"

NOTES THIS SHEET ONLY

- THIS WORK IS PART OF ADDITIVE ALTERNATE NO. 1. SEE ADDITIVE ALTERNATE SUMMARY NOTE 1 ON SHEET E0-02.
- THIS WORK IS PART OF ADDITIVE ALTERNATE NO. 3. SEE ADDITIVE ALTERNATE SUMMARY NOTE 3 ON SHEET E0-02.

ELECTRICAL SCHEDULE LEGEND

MCC-A3
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CITY OF LAGRANGE, GEORGIA  
 LONG CANE CREEK  
 POLLUTION CONTROL  
 PLANT IMPROVEMENTS  
 LAGRANGE, GEORGIA



Designed	PDB	Project No.	20065
Drawn	ZJG		
Checked	PDB		

No.	Date	Description
1	5/2/2022	ADDENDUM 1

- NOTES THIS SHEET ONLY**
- THIS WORK IS PART OF ADDITIVE ALTERNATE NO. 1. SEE ADDITIVE ALTERNATE SUMMARY NOTE 1 ON SHEET E0-02.
  - THIS WORK IS PART OF ADDITIVE ALTERNATE NO. 1 AND/OR ADDITIVE ALTERNATE NO. 3. SEE ADDITIVE ALTERNATE SUMMARY NOTES 1 AND NOTE 3 ON SHEET E0-02.
  - THIS WORK IS PART OF ADDITIVE ALTERNATE NO. 3. SEE ADDITIVE ALTERNATE SUMMARY NOTE 3 ON SHEET E0-02.
  - RELOCATE EXISTING LIGHT FIXTURES AS REQUIRED FOR INSTALLATION NEW HVAC EQUIPMENT AND ASSOCIATED DUCTWORK. RELOCATED FIXTURES SHALL BE INSTALLED AT HEIGHT(S) EVEN WITH THE BOTTOM(S) OF NEW HVAC EQUIPMENT.
  - CONTRACTOR MAY, AT IT'S DISCRETION & COST, PROVIDE OVERHEAD ALUMINUM CABLE TRAY SYSTEM(S) FOR NEW FEEDERS WITHIN THE HEADWORKS ELECTRICAL ROOM AS REQUIRED TO COORDINATE WITH NEW HVAC EQUIPMENT AND ASSOCIATED PIPING/DUCTWORK.

EROSION AND SEDIMENTATION CONTROL NOTES

WHEN ANY CONSTRUCTION BORDERS A DRAINAGE COURSE, THE CONTRACTOR HEREBY AGREES TO STOP ALL WORK AND RESTORE THESE AREAS IMMEDIATELY UPON NOTIFICATION BY THE CITY OR COUNTY INSPECTOR AND/OR THE DESIGN PROFESSIONAL.

FAILURE TO INSTALL, OPERATE OR MAINTAIN ALL EROSION CONTROL MEASURES WILL RESULT IN ALL CONSTRUCTION BEING STOPPED ON THE CONSTRUCTION SITE UNTIL SUCH MEASURES ARE CORRECTED BACK TO COUNTY/STATE STANDARDS.

A RESPONSE TO A NOTIFICATION OF NONCOMPLIANCE OR INADEQUATE MEASURES SHALL BE MADE WITHIN 24 HOURS AFTER RECEIVING SUCH NOTIFICATION, UNLESS OTHERWISE SPECIFIED FOR CONDITIONS DEEMED CRITICAL.

IMPLEMENTATION AND MAINTENANCE: THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE IMPLEMENTATION OF ALL EROSION, SEDIMENTATION AND POLLUTION CONTROL AS SHOWN ON THE DRAWINGS.

- A) IMPLEMENTATION:
1. THE PRIMARY PERMITTEE SHALL SUBMIT THE NPDES NOI AS REQUIRED BY THE PERMIT AND OBTAIN THE LOCAL LAND DISTURBANCE PERMIT. PROVIDE ALL NECESSARY DOCUMENTATION AND FEES AS REQUIRED.
2. NOTIFY THE APPROPRIATE DEPARTMENT(S) PRIOR TO COMMENCING WORK.
3. NO CLEARING, GRADING, FILLING, OR OTHER LAND DISTURBING ACTIVITIES SHALL BE PERMITTED UNTIL APPROVED EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED, EXCEPT THOSE OPERATIONS NEEDED TO INSTALL SUCH MEASURES.
4. THE PRIMARY PERMITTEE MUST RETAIN THE DESIGN PROFESSIONAL WHO PREPARED THE ES&PC PLAN, EXCEPT WHEN THE PRIMARY PERMITTEE HAS REQUESTED IN WRITING AND EPD HAS AGREED TO AN ALTERNATE DESIGN PROFESSIONAL, TO INSPECT THE INSTALLATION OF THE CONTROL MEASURES (BMP'S) WHICH THE DESIGN PROFESSIONAL REQUIREMENTS AND PERIMETER CONTROL BMP'S.
5. THESE EROSION AND SEDIMENT CONTROL MEASURES SHALL APPLY TO ALL FEATURES OF THE CONSTRUCTION SITE, INCLUDING BUT NOT LIMITED TO STREET AND UTILITY INSTALLATIONS AS WELL AS TO THE PROTECTION OF INDIVIDUAL LOTS.
B) MAINTENANCE: ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONTINUOUSLY MAINTAINED BY THE DEVELOPER/OWNER OR PERMITTEE DURING THE CONSTRUCTION PHASE OF THE DEVELOPMENT AND UNTIL PERMANENT STABILIZATION OF DITCHES, SHOULDERS, SLOPES AND ALL DISTURBED AREAS IS ACCOMPLISHED TO ELIMINATE THE NEED FOR THE TEMPORARY CONTROL MEASURES WHICH SHALL THEN BE REMOVED BY SAME.

AMENDMENTS TO THE ES&PC PLANS WHICH HAVE A SIGNIFICANT EFFECT ON BMP'S WITH HYDRAULIC COMPONENT MUST BE CERTIFIED BY THE DESIGN PROFESSIONAL.

SUBMITTAL OF N.O.T. IS THE SOLE RESPONSIBILITY OF THE PRIMARY PERMITTEE

BEST MANAGEMENT PRACTICES:

STRIPPING OF VEGETATION, RE-GRADING, AND OTHER DEVELOPMENT ACTIVITIES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO MINIMIZE EROSION.

CUT AND FILL OPERATIONS SHALL BE KEPT TO A MINIMUM.

DEVELOPMENT PLANS MUST CONFORM TO TOPOGRAPHY AND SOIL TYPE, SO AS TO CREATE THE LOWEST PRACTICABLE EROSION POTENTIAL.

WHENEVER FEASIBLE, NATURAL VEGETATION SHALL BE RETAINED, PROTECTED, AND SUPPLEMENTED.

DISTURBED SOIL SHALL BE STABILIZED AS QUICKLY AS PRACTICABLE.

TEMPORARY VEGETATION OR MULCHING SHALL BE EMPLOYED TO PROTECT EXPOSED CRITICAL AREAS DURING DEVELOPMENT.

PERMANENT VEGETATION AND STRUCTURAL EROSION CONTROL MEASURES SHALL BE INSTALLED AS SOON AS PRACTICABLE.

TO THE EXTENT NECESSARY, SEDIMENT IN RUNOFF WATER SHALL BE TRAPPED BY THE USE OF DEBRIS BASINS, SILT TRAPS, OR SIMILAR MEASURES UNTIL THE DISTURBED AREA IS STABILIZED.

ADEQUATE PROVISIONS SHALL BE PROVIDED TO MINIMIZE DAMAGE FROM SURFACE WATER TO THE CUT FACE OF SLOPES OR THE SLOPING SURFACES OF FILLS; ALL FILL SLOPES SHALL HAVE SILT FENCING AT THE TOE.

PROVISIONS SHALL BE MADE FOR TREATMENT OR CONTROL OF ANY SOURCE OF SEDIMENTS AND OTHER CRITICAL WASTE DISPOSAL, SANITARY SEWER, OR PRELUDE SEDIMENTATION OF ADJACENT WATERS BEYOND THE LEVELS SPECIFIED IN THE NPDES PERMIT.

FILLS SHALL NOT ENCROACH UPON NATURAL WATER COURSES OR CONSTRUCTED CHANNELS IN A MANNER SO AS TO ADVERSELY AFFECT OTHER PROPERTY OWNERS. NO CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED WITHIN A 25 FOOT BUFFER ALONG THE BANKS OF ALL STATE WATERS. EXCEPTIONS INCLUDE AN APPROVED VARIANCE OR WHERE A DRAINAGE STRUCTURE OR A ROADWAY DRAINAGE STRUCTURE MUST BE CONSTRUCTED, PROVIDED THAT ADEQUATE EROSION CONTROL MEASURES ARE INCORPORATED IN THE PROJECT PLANS AND SPECIFICATIONS AND ARE IMPLEMENTED.

NO CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED WITHIN A BUFFER AND A BUFFER SHALL REMAIN IN ITS NATURAL, UNDISTURBED, STATE OF VEGETATION UNTIL ALL LAND-DISTURBING ACTIVITIES ON THE CONSTRUCTION SITE ARE COMPLETED.

VELOCITY DISSIPATION DEVICES SHALL BE PLACED AT DISCHARGE LOCATIONS AND ALONG THE LENGTH OF ANY OUTFALL CHANNEL FOR THE PURPOSE OF PROVIDING A NON-EROSIVE VELOCITY FLOW FROM THE STRUCTURE TO A WATER COURSE SO THAT THE NATURAL PHYSICAL AND BIOLOGICAL CHARACTERISTICS AND FUNCTIONS ARE MAINTAINED AND PROTECTED. (E) IF SIGNIFICANT CHANGES IN THE HYDROLOGICAL REGIME OF THE RECEIVING WATER(S).

WASTE DISPOSAL, SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL NOT BE DISCHARGED TO WATERS OF THE STATE, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.

ALL PERMITTEES SHALL ENSURE AND DEMONSTRATE THAT THEIR PLANS IS IN COMPLIANCE WITH APPLICABLE STATE WASTE DISPOSAL, SANITARY SEWER, AND SEPTIC SYSTEM REGULATIONS. LOCATION OF ON SITE FACILITIES SHALL BE OUT OF HIGH FLOW AREAS AND REGULAR SERVICING BY A QUALIFIED DOMESTIC WASTE HAULER IS REQUIRED.

EXCEPT AS PROVIDED IN PARAGRAPHS (A) AND (B) BELOW, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED.

- A) WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14 " DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASE IS PRECLUDED BY SNOW COVER OR OTHER ADVERSE WEATHER CONDITIONS, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE.
B) WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 21 DAYS FROM WHEN ACTIVITIES CEASED, (E.G., THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY CEASED IS LESS THAN 21 DAYS) THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE BY THE 14 " DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY CEASED.

NOTE: THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.

ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.

REPORTING:

1. THE APPLICABLE PERMITTEES ARE REQUIRED TO SUBMIT THE SAMPLING RESULTS TO THE EPD BY THE FIFTEENTH DAY OF THE MONTH FOLLOWING THE REPORTING PERIOD. REPORTING PERIODS ARE MONTHS DURING WHICH SAMPLES ARE TAKEN IN ACCORDANCE WITH THIS PERMIT. SAMPLING RESULTS SHALL BE IN A CLEARLY LEGIBLE FORMAT UPON WRITTEN NOTIFICATION. EPD MAY REQUIRE THE APPLICABLE PERMITTEE TO SUBMIT THE SAMPLING RESULTS ON A MORE FREQUENT BASIS, SAMPLING AND ANALYSIS OF ANY STOR WATER DISCHARGE(S) OR THE RECEIVING WATER(S) BEYOND THE MINIMUM FREQUENCY STATED IN THIS PERMIT MUST BE REPORTED IN A SIMILAR MANNER TO THE EPD. SAMPLING REPORTS MUST BE SUBMITTED TO EPD USING THE EPD SUBMITTAL SERVICE PROVIDED BY EPD. SAMPLING REPORTS MUST BE SUBMITTED TO EPD UNTIL SUCH TIME AS A NOT IS SUBMITTED IN ACCORDANCE WITH PART VI.

2. ALL SAMPLING REPORTS SHALL INCLUDE THE FOLLOWING INFORMATION:
A. THE RAINFALL AMOUNT, DATE, EXACT PLACE AND TIME OF SAMPLING OR MEASUREMENTS;
B. THE NAME(S) OF THE CERTIFIED PERSONNEL WHO PERFORMED THE SAMPLING AND MEASUREMENTS;
C. THE DATE(S) ANALYSES WERE PERFORMED;
D. THE TIME(S) ANALYSES WERE INITIATED;
E. THE NAME(S) OF THE CERTIFIED PERSONNEL WHO PERFORMED THE ANALYSES;
F. REFERENCES AND WRITTEN PROCEDURES, WHEN AVAILABLE, FOR THE ANALYTICAL TECHNIQUES OR METHODS USED;
G. THE RESULTS OF SUCH ANALYSES, INCLUDING THE BENCH SHEETS, INSTRUMENT READOUTS, COMPUTER DISKS OR TAPES, ETC., USED TO DETERMINE THESE RESULTS;
H. RESULTS WHICH EXCEED 1000 NTU SHALL BE REPORTED AS "EXCEEDS 1000 NTU;" AND
I. CERTIFICATION STATEMENT THAT SAMPLING WAS CONDUCTED AS PER THE PLAN.

2. ALL WRITTEN CORRESPONDENCE REQUIRED BY THIS PERMIT SHALL BE SUBMITTED BY RETURN RECEIPT CERTIFIED MAIL (OR SIMILAR SERVICE) TO THE APPROPRIATE DISTRICT OFFICE OF THE EPD ACCORDING TO THE SCHEDULE IN APPENDIX A OF THIS PERMIT. THE PERMITTEE SHALL RETAIN A COPY OF THE PROOF OF SUBMITTAL AT THE CONSTRUCTION SITE OR THE PROOF OF SUBMITTAL SHALL BE READILY AVAILABLE AT A DESIGNATED LOCATION FROM COMMENCEMENT OF CONSTRUCTION UNTIL SUCH TIME AS A NOT IS SUBMITTED IN ACCORDANCE WITH PART VI.

INFORMATION SHALL BE SUBMITTED TO: WEST CENTRAL DISTRICT OFFICE, GEORGIA ENVIRONMENTAL PROTECTION DIVISION, 2640 SHAWING DRIVE, MACON, GA 31211, (478)751-6612

RETENTION OF RECORDS:

1. THE PRIMARY PERMITTEE SHALL RETAIN THE FOLLOWING RECORDS AT THE CONSTRUCTION SITE OR THE RECORDS SHALL BE READILY AVAILABLE AT A DESIGNATED ALTERNATE LOCATION FROM COMMENCEMENT OF CONSTRUCTION UNTIL SUCH TIME AS A N.O.T. IS SUBMITTED IN ACCORDANCE WITH PART VI.

A. A COPY OF ALL NOTICES OF INTENT SUBMITTED TO EPD;
B. A COPY OF THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN REQUIRED BY THIS PERMIT;
C. THE DESIGN PROFESSIONAL REPORT OF THE RESULTS OF THE INSPECTION CONDUCTED IN ACCORDANCE WITH PART IV.A.5. OF THIS PERMIT;
D. A COPY OF ALL SAMPLING INFORMATION, RESULTS, AND REPORTS REQUIRED BY THIS PERMIT;
E. A COPY OF ALL INSPECTION REPORTS GENERATED IN ACCORDANCE WITH PART IV.D.4.A. OF THIS PERMIT;
F. A COPY OF ALL VIOLATION SUMMARIES AND VIOLATION SUMMARY REPORTS GENERATED IN ACCORDANCE WITH PART III.D.2. OF THIS PERMIT; AND
G. DAILY RAINFALL INFORMATION COLLECTED IN ACCORDANCE WITH PART IV.D.4.A.(2). OF THIS PERMIT.

2. COPIES OF ALL NOTICES OF INTENT, NOTICES OF TERMINATION, INSPECTION REPORTS, SAMPLING REPORTS (INCLUDING ALL CALIBRATION AND MAINTENANCE RECORDS AND ALL ORIGINAL STRIP CHART RECORDINGS FOR CONTINUOUS MEASUREMENT), OR OTHER REPORTS REQUESTED BY THE EPD, EROSION, SEDIMENTATION AND POLLUTION CONTROL PLANS, RECORDS OF ALL DATA USED TO COMPLETE THE NOTICE OF INTENT TO BE COVERED BY THIS PERMIT AND ALL OTHER RECORDS REQUIRED BY THIS PERMIT SHALL BE RETAINED BY THE PERMITTEE WHO EITHER PRODUCED OR USED IT FOR A PERIOD OF AT LEAST THREE YEARS FROM THE DATE THAT THE NOT IS SUBMITTED IN ACCORDANCE WITH PART VI OF THIS PERMIT. THESE RECORDS MUST BE MAINTAINED AT THE PERMITTEE'S PRIMARY PLACE OF BUSINESS OR AT A DESIGNATED ALTERNATE LOCATION ONCE THE CONSTRUCTION ACTIVITY HAS CEASED AT THE PERMITTED SITE. THIS PERIOD MAY BE EXTENDED BY REQUEST OF THE EPD AT ANY TIME UPON WRITTEN NOTIFICATION TO THE PERMITTEE.

INSPECTIONS:

(A) PERMITTEE REQUIREMENTS.

(1). EACH DAY WHEN ANY TYPE OF CONSTRUCTION ACTIVITY HAS TAKEN PLACE AT A PRIMARY PERMITTEE'S SITE, CERTIFIED PERSONNEL PROVIDED BY THE PRIMARY PERMITTEE SHALL INSPECT: (A) ALL AREAS AT THE PRIMARY PERMITTEE'S SITE WHERE PETROLEUM PRODUCTS ARE STORED, USED, OR HANDLED FOR SPILLS AND LEAKS FROM EQUIPMENT AND (B) ALL LOCATIONS AT THE PRIMARY PERMITTEE'S SITE WHERE VEHICLES ENTER OR EXIT THE SITE FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING. THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.

(2). MEASURE AND RECORD RAINFALL WITHIN DISTURBED AREAS OF THE SITE THAT HAVE NOT MET FINAL STABILIZATION ONCE EVERY 24 HOURS EXCEPT ANY NON-WORKING SATURDAY, NON-WORKING SUNDAY AND NON-WORKING FEDERAL HOLIDAY. THE DATA COLLECTED FOR THE PURPOSE OF COMPLIANCE WITH THIS PERMIT SHALL BE REPRESENTATIVE OF THE MONITORED ACTIVITY. MEASUREMENTS AND EQUIPMENT MAY BE SUSPENDED IF AREAS MAY BE SUSPENDED IF THE SITE HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION.

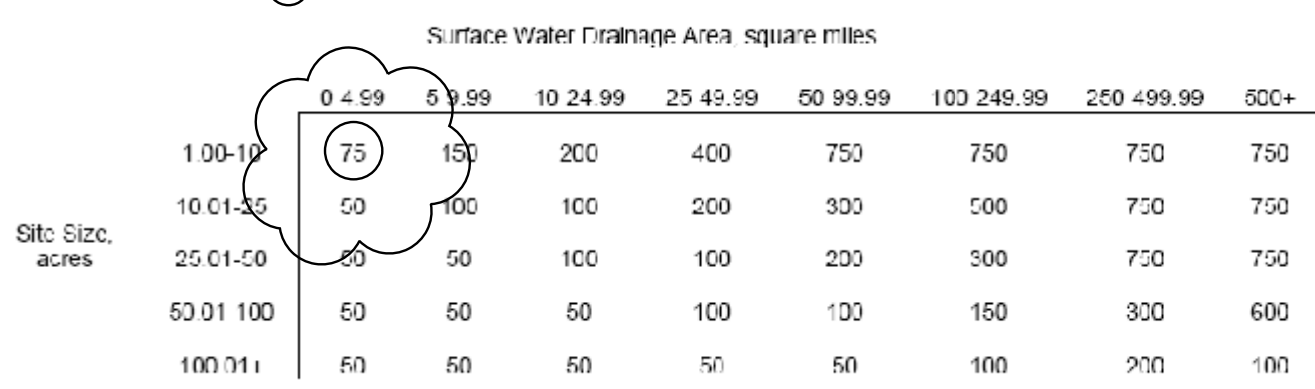
(3). CERTIFIED PERSONNEL (PROVIDED BY THE PRIMARY PERMITTEE) SHALL INSPECT THE FOLLOWING AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM THAT IS 0.5 INCHES RAINFALL OR GREATER (UNLESS SUCH STORM ENDS AFTER 5:00 PM ON ANY FRIDAY OR NON-WORKING SATURDAY, NON-WORKING SUNDAY OR ANY NON-WORKING FEDERAL HOLIDAY IN WHICH CASE THE INSPECTION SHALL BE COMPLETED BY THE END OF THE NEXT BUSINESS DAY AND/OR WORKING DAY, WHICHEVER OCCURS FIRST); (A) DISTURBED AREAS OF THE PRIMARY PERMITTEE'S CONSTRUCTION SITE; (B) AREAS USED BY THE PRIMARY PERMITTEE FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION; AND (C) STRUCTURAL CONTROL MEASURES. EROSION AND SEDIMENT CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATER(S). FOR AREAS OF A SITE THAT HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION, THE PERMITTEE MUST COLLECT AND RECORD THE FOLLOWING DATA: (A) THESE INSPECTIONS MUST BE CONDUCTED UNTIL A NOTICE OF TERMINATION IS SUBMITTED.

(4). CERTIFIED PERSONNEL (PROVIDED BY THE PRIMARY PERMITTEE) SHALL INSPECT AT LEAST ONCE PER MONTH DURING THE TERM OF THIS PERMIT (I.E., UNTIL A NOTICE OF TERMINATION IS SUBMITTED TO EPD) THE AREAS OF THE SITE THAT HAVE UNDERGONE FINAL STABILIZATION OR ESTABLISHED A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET PERENNIALS APPROPRIATE FOR THE REGION. THESE AREAS SHALL BE INSPECTED FOR EVIDENCE OF: OR THE POTENTIAL FOR POLLUTANTS ENTERING THE DRAINAGE SYSTEM AND THE RECEIVING WATER(S). EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN SHALL BE OBSERVED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. WHERE DISCHARGE LOCATIONS OR POINTS ARE ACCESSIBLE, THEY SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATER(S).

(5). BASED ON THE RESULTS OF EACH INSPECTION, THE SITE DESCRIPTION AND THE POLLUTION PREVENTION AND CONTROL MEASURES IDENTIFIED IN THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN. THE PLAN SHALL BE REVISED AS APPROPRIATE NOT LATER THAN SEVEN (7) CALENDAR DAYS FOLLOWING EACH INSPECTION. IMPLEMENTATION OF SUCH CHANGES SHALL BE MADE AS SOON AS PRACTICAL BUT IN NO CASE LATER THAT SEVEN (7) CALENDAR DAYS FOLLOWING EACH INSPECTION.

(6). A REPORT OF EACH INSPECTION THAT INCLUDES THE NAME(S) OF CERTIFIED PERSONNEL MAKING EACH INSPECTION, THE DATE(S) OF EACH INSPECTION, CONSTRUCTION PHASE (I.E., INITIAL, INTERMEDIATE OR FINAL), MAJOR OBSERVATIONS RELATING TO THE IMPLEMENTATION OF THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN, AND ACTIONS TAKEN IN ACCORDANCE WITH PART IV.D.4.A.(5). OF THE PERMIT SHALL BE MADE AND RETAINED AT THE SITE OR BE READILY AVAILABLE AT A DESIGNATED ALTERNATE LOCATION UNTIL THE ENTIRE SITE OR THAT PORTION OF A CONSTRUCTION SITE THAT HAS BEEN PHASED HAS UNDERGONE FINAL STABILIZATION AND SUBMITTED TO EPD. SUCH REPORTS SHALL BE READILY AVAILABLE BY THE END OF THE SECOND BUSINESS DAY AND/OR WORKING DAY AND SHALL IDENTIFY ALL INCIDENTS OF BEST MANAGEMENT PRACTICES THAT HAVE NOT BEEN PROPERLY INSTALLED AND/OR MAINTAINED AS DESCRIBED IN THE PLAN. WHERE THE REPORT DOES NOT IDENTIFY ANY INCIDENTS, THE PERMITTEE SHALL PROVIDE A STATEMENT THAT THE BEST MANAGEMENT PRACTICES ARE IN COMPLIANCE WITH THE EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN. THE REPORT SHALL BE SIGNED IN ACCORDANCE WITH PART V.G.2. OF THIS PERMIT.

Warm Water (Supporting Warm Water Fisheries)



24 HOUR CONTACT: JASON CLIFTON CELL: (706) 302-4689

NPDES SAMPLING REQUIREMENTS:

1. SAMPLING REQUIREMENTS. THIS PERMIT REQUIRES THE MONITORING OF NEPHELOMETRIC TURBIDITY IN RECEIVING WATER(S) OR OUTFALLS IN ACCORDANCE WITH THIS PERMIT. THE FOLLOWING PROCEDURES CONSTITUTE EPD'S GUIDELINES FOR SAMPLING TURBIDITY.

A. SAMPLING REQUIREMENTS SHALL INCLUDE THE FOLLOWING:

(1). A USGS TOPOGRAPHIC MAP, A TOPOGRAPHIC MAP OR A DRAWING (REFERRED TO AS A TOPOGRAPHIC MAP) THAT IS A SCALE EQUAL TO OR MORE DETAILED THAN A 1:24000 MAP SHOWING THE LOCATION OF THE INFRASTRUCTURE CONSTRUCTION; (A) THE LOCATION OF ALL PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES, OR A COMBINATION THEREOF, PROVIDED FOR IN AND IN ACCORDANCE WITH PART IV.D.6.C. (2). OF THIS PERMIT. PRIMARY PERMITTEES ON AN INFRASTRUCTURE CONSTRUCTION PROJECT MAY SAMPLE THE REPRESENTATIVE PERENNIAL AND INTERMITTENT STREAMS, OTHER WATER BODIES OR OUTFALLS, OR A COMBINATION THEREOF. SAMPLES TAKEN FOR THE PURPOSE OF COMPLIANCE WITH THIS PERMIT SHALL BE REPRESENTATIVE OF THE MONITORED ACTIVITY AND REPRESENTATIVE OF THE WATER QUALITY OF THE RECEIVING WATER(S) AND/OR THE STORM WATER OUTFALLS USING THE FOLLOWING MINIMUM GUIDELINES:

(2). A WRITTEN NARRATIVE OF SITE SPECIFIC ANALYTICAL METHODS USED TO COLLECT AND ANALYZE THE SAMPLES INCLUDING QUALITY CONTROL/QUALITY ASSURANCE PROCEDURES. THIS NARRATIVE MUST INCLUDE PRECISE SAMPLING METHODOLOGY FOR EACH SAMPLING LOCATION;

(3). WHEN THE PERMITTEE HAS DETERMINED THAT SOME OR ALL OUTFALLS WILL BE SAMPLED, A RATIONALE MUST BE INCLUDED ON THE PLAN FOR THE NTU LIMIT(S) SELECTED FROM APPENDIX B. THIS RATIONALE MUST INCLUDE THE SIZE OF THE CONSTRUCTION SITE, THE CALCULATION OF THE SIZE OF THE SURFACE WATER DRAINAGE AREA, AND THE TYPE OF RECEIVING WATER(S) (I.E., TROUT STREAM OR SUPPORTING WARM WATER FISHERIES); AND

(4). ANY ADDITIONAL INFORMATION EPD DETERMINES NECESSARY TO BE PART OF THE PLAN. EPD WILL PROVIDE WRITTEN NOTICE TO THE PERMITTEE OF THE INFORMATION NECESSARY AND THE TIME LINE FOR SUBMITTAL.

B. SAMPLE TYPE. ALL SAMPLING SHALL BE COLLECTED BY "GRAB SAMPLES" AND THE ANALYSIS OF THESE SAMPLES MUST BE CONDUCTED IN ACCORDANCE WITH METHODOLOGY AND TEST PROCEDURES ESTABLISHED BY 40 CFR PART 136 (UNLESS OTHER TEST PROCEDURES HAVE BEEN APPROVED). THE GUIDANCE DOCUMENT TITLED "NPDES STORM WATER SAMPLING GUIDANCE DOCUMENT, EPA 833-B-92-001" AND GUIDANCE DOCUMENTS THAT MAY BE PREPARED BY THE EPD.

(1). SAMPLE CONTAINERS SHOULD BE LABELED PRIOR TO COLLECTING THE SAMPLES.

(2). SAMPLES SHOULD BE WELL MIXED BEFORE TRANSFERRING TO A SECONDARY CONTAINER.

(3). LARGE MOUTH, WELL CLEANED AND RINSED GLASS OR PLASTIC JARS SHOULD BE USED FOR COLLECTING SAMPLES. THE JARS SHOULD BE CLEANED THOROUGHLY TO AVOID CONTAMINATION.

(4). MANUAL, AUTOMATIC OR RINSING STAGE SAMPLING MAY BE UTILIZED. SAMPLES REQUIRED BY THIS PERMIT SHOULD BE ANALYZED IMMEDIATELY, BUT IN NO CASE LATER THAN 48 HOURS AFTER COLLECTION. HOWEVER, SAMPLES FROM AUTOMATIC SAMPLERS MUST BE COLLECTED NO LATER THAN THE NEXT BUSINESS DAY AFTER THE ACCUMULATION, UNLESS FLOW THROUGH AUTOMATED ANALYSIS IS UTILIZED. IF AUTOMATIC SAMPLING IS UTILIZED AND THE AUTOMATIC SAMPLER IS NOT ACTIVATED DURING THE QUALIFYING EVENT, THE PERMITTEE MUST UTILIZE MANUAL SAMPLING OR RINSING STAGE SAMPLING DURING THE NEXT QUALIFYING EVENT. DILUTION OF SAMPLES IS NOT REQUIRED. SAMPLES MAY BE ANALYZED DIRECTLY WITH A PROPERLY CALIBRATED TURBIDIMETER. SAMPLES ARE NOT REQUIRED TO BE COOLED.

(5). SAMPLING AND ANALYSIS OF THE RECEIVING WATER(S) OR OUTFALLS BEYOND THE MINIMUM FREQUENCY STATED IN THIS PERMIT MUST BE REPORTED TO THE EPD AS SPECIFIED IN PART IV.E.

C. SAMPLING POINTS

(1). FOR CONSTRUCTION ACTIVITIES THE PRIMARY PERMITTEE MUST SAMPLE ALL PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES SHOWN ON THE USGS TOPOGRAPHIC MAP AND ALL OTHER FIELD VERIFIED PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES, OR ALL OUTFALLS INTO SUCH STREAMS AND OTHER WATER BODIES, OR A COMBINATION THEREOF, PROVIDED FOR IN AND IN ACCORDANCE WITH PART IV.D.6.C. (2). OF THIS PERMIT. PRIMARY PERMITTEES ON AN INFRASTRUCTURE CONSTRUCTION PROJECT MAY SAMPLE THE REPRESENTATIVE PERENNIAL AND INTERMITTENT STREAMS, OTHER WATER BODIES OR OUTFALLS, OR A COMBINATION THEREOF. SAMPLES TAKEN FOR THE PURPOSE OF COMPLIANCE WITH THIS PERMIT SHALL BE REPRESENTATIVE OF THE MONITORED ACTIVITY AND REPRESENTATIVE OF THE WATER QUALITY OF THE RECEIVING WATER(S) AND/OR THE STORM WATER OUTFALLS USING THE FOLLOWING MINIMUM GUIDELINES:

(A). THE UPSTREAM SAMPLE FOR EACH RECEIVING WATER(S) MUST BE TAKEN IMMEDIATELY UPSTREAM OF THE CONFLUENCE OF THE FIRST STORMWATER DISCHARGE FROM THE PERMITTED ACTIVITY (I.E., THE DISCHARGE FARTHEST UPSTREAM AT THE SITE) BUT DOWNSTREAM OF ANY OTHER STORM WATER DISCHARGES NOT ASSOCIATED WITH THE PERMITTED ACTIVITY. WHERE APPROPRIATE, SEVERAL UPSTREAM SAMPLES FROM ACROSS THE RECEIVING WATER(S) MAY NEED TO BE TAKEN AND THE ARITHMETIC AVERAGE OF THE TURBIDITY OF THESE SAMPLES USED FOR THE UPSTREAM TURBIDITY VALUE.

(B). THE DOWNSTREAM SAMPLE FOR EACH RECEIVING WATER(S) MUST BE TAKEN DOWNSTREAM OF THE CONFLUENCE OF THE LAST STORMWATER DISCHARGE FROM THE PERMITTED ACTIVITY (I.E., THE DISCHARGE FARTHEST DOWNSTREAM AT THE SITE) BUT UPSTREAM OF ANY OTHER STORMWATER DISCHARGE NOT ASSOCIATED WITH THE PERMITTED ACTIVITY. WHERE APPROPRIATE, SEVERAL DOWNSTREAM SAMPLES FROM ACROSS THE RECEIVING WATER(S) MAY NEED TO BE TAKEN AND THE ARITHMETIC AVERAGE OF THE TURBIDITY OF THESE SAMPLES USED FOR THE DOWNSTREAM TURBIDITY VALUE.

(C). IDEALLY THE SAMPLES SHOULD BE TAKEN FROM THE HORIZONTAL AND VERTICAL CENTER OF THE RECEIVING WATER(S) OR THE STORMWATER OUTFALL CHANNEL(S).

(D). CARE SHOULD BE TAKEN TO AVOID STIRRING THE BOTTOM SEDIMENTS IN THE RECEIVING WATER(S) OR IN THE OUTFALL STORMWATER CHANNEL.

(E). THE SAMPLING CONTAINER SHOULD BE HELD SO THAT THE OPENING FACES UPSTREAM.

(F). THE SAMPLES SHOULD BE KEPT FREE FROM FLOATING DEBRIS.

(G). PERMITTEES DO NOT HAVE TO SAMPLE SHEET FLOW THAT FLOWS ONTO UNDISTURBED NATURAL AREAS OR AREAS STABILIZED BY THE PROJECT. FOR PURPOSES OF THIS SECTION, STABILIZED SHALL MEAN: FOR UNPAVED AREAS AND AREAS NOT COVERED BY PERMANENT STRUCTURES, 100% OF THE SOIL SURFACE IS UNIFORMLY COVERED IN PERMANENT VEGETATION WITH A DENSITY OF 70% OR GREATER, OR LANDSCAPED ACCORDING TO THE PLAN (UNIFORMLY COVERED WITH LANDSCAPING MATERIALS IN PLANNED LANDSCAPE AREAS), OR EQUIVALENT PERMANENT STABILIZATION MEASURES AS DEFINED IN THE MANUAL (EXCLUDING A CROP OF ANNUAL VEGETATION AND A SEEDING OF TARGET CROP PERENNIALS APPROPRIATE FOR THE REGION); FOR INFRASTRUCTURE CONSTRUCTION PROJECTS ON LAND USED FOR AGRICULTURAL OR SILVICULTURAL PURPOSES, FINAL STABILIZATION MAY BE ACCOMPLISHED BY STABILIZING THE DISTURBED LAND FOR ITS AGRICULTURAL OR SILVICULTURAL USE.

(H). ALL SAMPLING PURSUANT TO THIS PERMIT MUST BE DONE IN SUCH A WAY (INCLUDING GENERALLY ACCEPTED SAMPLING METHODS, LOCATIONS, TIMING, AND FREQUENCY) AS TO ACCURATELY REFLECT WHETHER STORMWATER RUNOFF FROM THE CONSTRUCTION SITE IS IN COMPLIANCE WITH THE STANDARD SET FORTH IN PARTS III.D.3. OR III.D.4., WHICHEVER IS APPLICABLE.

(I). FOR INFRASTRUCTURE CONSTRUCTION PROJECTS, THE PERMITTEE IS NOT REQUIRED TO SAMPLE A PERENNIAL OR INTERMITTENT STREAM OR OTHER WATER BODIES (OR THE ASSOCIATED OUTFALL, IF APPLICABLE) IF THE DESIGN PROFESSIONAL PREPARING THE PLAN CERTIFIES THAT AN INCREASE IN THE TURBIDITY OF A SPECIFIC IDENTIFIED RECEIVING WATER BODY WILL BE REPRESENTATIVE OF THE INCREASE IN THE TURBIDITY OF A SPECIFIC IDENTIFIED UN-SAMPLED RECEIVING WATER. A WRITTEN JUSTIFICATION AND DETAILED ANALYSIS SHALL BE PREPARED BY THE DESIGN PROFESSIONAL JUSTIFYING SUCH PROPOSED SAMPLING. A SUMMARY CHART OF THE JUSTIFICATION AND ANALYSIS FOR THE REPRESENTATIVE SAMPLING MUST BE INCLUDED ON THE PLAN. THE JUSTIFICATION AND ANALYSIS SHALL INCLUDE THE LOCATION AND DESCRIPTION OF THE SPECIFIED SAMPLED AND UN-SAMPLED RECEIVING WATER AND SHALL CONTAIN A DETAILED COMPARISON AND DISCUSSION OF EACH SUCH RECEIVING WATER IN THE FOLLOWING AREAS:

(A). SITE LAND DISTURBANCES AND CHARACTERISTICS;

(B). RECEIVING WATER WATERSHED SIZES AND CHARACTERISTICS; AND

(C). SITE AND WATERSHED RUNOFF CHARACTERISTICS UTILIZING AND METHODS IN APPENDIX A-1 (UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE'S TR-55, URBAN HYDROLOGY FOR SMALL WATERSHEDS) OF THE MOST RECENT VERSION OF THE "MANUAL FOR EROSION AND SEDIMENTATION CONTROL IN GEORGIA" FOR THE VARIOUS PRECIPITATION EVENTS AND ANY OTHER SUCH CONSIDERATIONS NECESSARY TO SHOW THAT THE INCREASE IN TURBIDITY OF A SPECIFIC IDENTIFIED SAMPLED RECEIVING WATER WILL BE REPRESENTATIVE OF THE INCREASES IN THE TURBIDITY OF A SPECIFIC IDENTIFIED UN-SAMPLED RECEIVING WATERS.

3. FOR INFRASTRUCTURE CONSTRUCTION PROJECTS, WHEN THE PERMITTEE DETERMINES THAT SOME RECEIVING WATER(S) WILL NOT BE SAMPLED DUE TO REPRESENTATIVE SAMPLING, THE DESIGN PROFESSIONAL MAKING THIS DETERMINATION AND PREPARING THE PLAN MUST INCLUDE AND SIGN THE FOLLOWING CERTIFICATION IN THE PLAN:

"I CERTIFY THAT THE PERMITTEE'S EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN PROVIDES FOR THE MONITORING OF: (A) ALL PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES SHOWN ON THE USGS TOPOGRAPHIC MAP AND ALL OTHER FIELD VERIFIED PERENNIAL AND INTERMITTENT STREAMS AND OTHER WATER BODIES, OR (B) WHERE ANY SUCH SPECIFIC IDENTIFIED PERENNIAL OR INTERMITTENT STREAM AND OTHER WATER BODY IS NOT PROPOSED TO BE SAMPLED, I HAVE DETERMINED IN MY PROFESSIONAL JUDGEMENT, UTILIZING THE FACTORS REQUIRED IN THE GENERAL NPDES PERMIT NO. GAW00002, THAT THE INCREASE IN THE TURBIDITY OF EACH SPECIFIC IDENTIFIED SAMPLED RECEIVING WATER WILL BE REPRESENTATIVE OF THE INCREASE IN THE TURBIDITY OF A SPECIFIC IDENTIFIED UN-SAMPLED RECEIVING WATER."

(4). FOR INFRASTRUCTURE CONSTRUCTION PROJECTS, IF AT ANY TIME DURING THE LIFE OF THE PROJECT A SELECTED RECEIVING WATER NO LONGER REPRESENTS ANOTHER RECEIVING WATER, THE PERMITTEE SHALL SAMPLE THE LATTER RECEIVING WATER UNTIL SELECTION OF AN ALTERNATE REPRESENTATIVE RECEIVING WATER.

(5). FOR INFRASTRUCTURE CONSTRUCTION PROJECTS, IF AT ANY TIME DURING THE LIFE OF THE PROJECT A RECEIVING WATER IS DETERMINED NOT TO BE REPRESENTED AS CERTIFIED IN THE PLAN, THE PERMITTEE SHALL SAMPLE THAT RECEIVING WATER UNTIL A NOTICE OF TERMINATION IS SUBMITTED OR UNTIL THE APPLICABLE PHASE IS STABILIZED IN ACCORDANCE WITH THIS PERMIT.

(6). FOR INFRASTRUCTURE CONSTRUCTION PROJECTS, MONITORING OBLIGATIONS SHALL CEASE FOR ANY PHASE OF THE PROJECT THAT HAS BEEN STABILIZED IN ACCORDANCE WITH PART IV.D.6.C.(1),(G).

D. SAMPLING FREQUENCY.

(1). THE PRIMARY PERMITTEE MUST SAMPLE IN ACCORDANCE WITH THE PLAN AT LEAST ONCE FOR EACH RAINFALL EVENT DESCRIBED BELOW, FOR A QUALIFYING EVENT, THE PERMITTEE SHALL SAMPLE AT THE BEGINNING OF ANY STORMWATER DISCHARGE TO A MONITORED RECEIVING WATER AND/OR FROM A MONITORED OUTFALL LOCATION WITHIN FORTY-FIVE (45) MINUTES OR AS SOON AS POSSIBLE.

(2). HOWEVER, WHERE MANUAL AND AUTOMATIC SAMPLING ARE IMPOSSIBLE (AS DEFINED IN THIS PERMIT), OR ARE BEYOND THE PERMITTEE'S CONTROL, THE PERMITTEE SHALL TAKE SAMPLES AS SOON AS POSSIBLE, BUT IN NO CASE MORE THAN TWELVE (12) HOURS AFTER THE BEGINNING OF THE STORMWATER DISCHARGE.

(3). SAMPLING BY THE PERMITTEE SHALL OCCUR FOR THE FOLLOWING QUALIFYING EVENTS:

(A). FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL, THE FIRST RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH WITH A STORMWATER DISCHARGE THAT OCCURS DURING NORMAL BUSINESS HOURS AS DEFINED IN THIS PERMIT AFTER ALL CLEARING AND GRUBBING OPERATIONS HAVE BEEN COMPLETED, BUT PRIOR TO COMPLETION OF MASS GRADING OPERATIONS, IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE REPRESENTATIVE SAMPLING LOCATION;

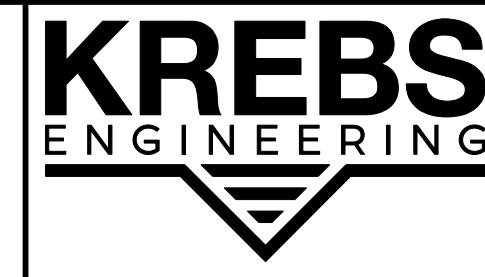
(B). IN ADDITION TO (A) ABOVE, FOR EACH AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL, THE FIRST RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH WITH A STORMWATER DISCHARGE THAT OCCURS DURING NORMAL BUSINESS HOURS AS DEFINED IN THIS PERMIT EITHER 90 DAYS AFTER THE FIRST SAMPLING EVENT OR AFTER ALL MASS GRADING OPERATIONS HAVE BEEN COMPLETED, BUT PRIOR TO SUBMITTAL OF A NOT, IN THE DRAINAGE AREA OF THE LOCATION SELECTED AS THE REPRESENTATIVE SAMPLING LOCATION, WHICHEVER COMES FIRST;

(C). AT THE TIME OF SAMPLING PERFORMED PURSUANT TO (A) AND (B) ABOVE, IF BMP'S IN ANY AREA OF THE SITE THAT DISCHARGES TO A RECEIVING WATER OR FROM AN OUTFALL ARE NOT PROPERLY DESIGNED, INSTALLED AND MAINTAINED, CORRECTIVE ACTION SHALL BE DEFINED AND IMPLEMENTED WITHIN TWO (2) BUSINESS DAYS, AND TURBIDITY SAMPLES SHALL BE TAKEN FROM DISCHARGES FROM THAT AREA OF THE SITE FOR EACH SUBSEQUENT RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH DURING NORMAL BUSINESS HOURS" UNTIL THE SELECTED TURBIDITY STANDARD IS ATTAINED, OR UNTIL POST-STORM EVENT INSPECTIONS DETERMINE THAT BMP'S ARE PROPERLY DESIGNED, INSTALLED AND MAINTAINED;

(D). WHERE SAMPLING PURSUANT TO (A), (B) OR (C) ABOVE IS REQUIRED BUT NOT POSSIBLE (OR NOT REQUIRED BECAUSE THERE WAS NO DISCHARGE), THE PERMITTEE, IN ACCORDANCE WITH PART IV.D.4.A. (6), MUST INCLUDE A WRITTEN JUSTIFICATION IN THE INSPECTION REPORT OF WHY SAMPLING WAS NOT PERFORMED, PROVIDING THIS JUSTIFICATION DOES NOT RELIEVE THE PERMITTEE OF ANY SUBSEQUENT SAMPLING OBLIGATIONS UNDER (A), (B) OR (C) ABOVE; AND

(E). EXISTING CONSTRUCTION ACTIVITIES, I.E., THOSE THAT ARE OCCURRING ON OR BEFORE THE EFFECTIVE DATE OF THIS PERMIT, THAT HAVE MET THE SAMPLING REQUIRED BY (A) ABOVE SHALL SAMPLE IN ACCORDANCE WITH (B), THOSE EXISTING CONSTRUCTION ACTIVITIES THAT HAVE MET THE SAMPLING REQUIRED BY (B) ABOVE SHALL NOT BE REQUIRED TO CONDUCT ADDITIONAL SAMPLING OTHER THAN REQUIRED BY (C) ABOVE.

\*NOTE THAT THE PERMITTEE MAY CHOOSE TO MEET THE REQUIREMENTS OF (A) AND (B) ABOVE BY COLLECTING TURBIDITY SAMPLES FROM ANY RAIN EVENT THAT REACHES OR EXCEEDS 0.5 INCH AND ALLOWS FOR SAMPLING AT ANY TIME OF THE DAY OR WEEK.



GSWCC NO.: 0000079762

CITY OF LAGRANGE, GEORGIA
LONG CANE CREEK
POLLUTION CONTROL
PLANT IMPROVEMENT
LAGRANGE, GEORGIA



Table with project details: Designated STL, Project No. 20065, Draw NTS / CLM, Checked JMM, Revisions table with No. 1, Date 04/29/2022, Description ADDENDUM 1, Sheet Title

NPDES PERMIT REQUIREMENTS

Issue Date APR., 2022, Sheet No. EC-04, Sequence 76 of 80

**CLEARING PHASE - EROSION CONTROL NOTES**

PRIOR TO THE LAND DISTURBING CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE AREA SITE DEVELOPMENT INSPECTOR.

THE CONTRACTOR SHALL FOLLOW THE PROJECT SEQUENCE SHOWN ON THE PLANS. THE CONTRACTOR SHALL MAINTAIN CAREFUL SCHEDULING AND PERFORMANCE TO INSURE THAT THE LAND STRIPPED OF ITS NATURAL COVER IS EXPOSED ONLY IN SMALL QUANTITIES.

NO STAGING AREAS, MATERIAL STORAGE, CONCRETE WASH OUT AREAS, OR DEBRIS BURN AND BURIAL HOLES SHALL BE LOCATED WITHIN 500 FEET OF DESIGNATED TREE PROTECTION AREAS.

A COPY OF THE APPROVED LAND DISTURBANCE PLAN AND PERMIT SHALL BE PRESENT ON THE SITE AT ALL TIMES.

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND-DISTURBING ACTIVITIES.

PRIOR TO COMMENCING LAND DISTURBANCE ACTIVITY, THE LIMITS OF LAND DISTURBANCE SHALL BE CLEARLY AND ACCURATELY DEMARCATED WITH STAKES, RIBBONS, OR OTHER APPROPRIATE MEANS. THE LOCATION AND EXTENT OF ALL AUTHORIZED LAND DISTURBANCE ACTIVITY SHALL BE DEMARCATED FOR THE DURATION OF THE CONSTRUCTION ACTIVITY. NO LAND DISTURBANCE SHALL OCCUR OUTSIDE THE APPROVED LIMITS INDICATED ON THE PLANS.

PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT EACH POINT OF ENTRY TO OR EXIT FROM THE SITE OR ONTO ANY PUBLIC ROADWAY.

THE FOLLOWING INITIAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY.

1. THE CONSTRUCTION EXIT CONSISTING OF A MINIMUM PAD SIZE OF 20 FEET BY 50 FEET WITH A MINIMUM OF 6" THICK STONE, SHALL BE PLACED AS SHOWN ON THE PLAN. THE STONE SIZE SHOULD CONSIST OF COURSE AGGREGATE BETWEEN 1 1/2" & 3 1/2" IN DIAMETER AND OVERLAID ON A GEOTEXTILE UNDERLINER. THE GEOTEXTILE UNDERLINER SHALL MEET THE REQUIREMENTS OF AASHTO M288-96, SECTION 7.3 SEPARATION REQUIREMENTS.
2. IMMEDIATELY AFTER ESTABLISHMENT OF CONSTRUCTION ENTRANCE/ EXITS, ALL PERIMETER EROSION CONTROL AND STORM WATER MANGEMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE CLEARING PHASE EROSION CONTROL PLAN.
3. TYPES "A" AND "C" SILT FENCE SHOULD BE INSTALLED AT THE PERIMETER OF THE DISTURBED AREA AS SHOWN ON THE PLAN. THE SILT FENCE SHOULD BE PLACED IN ACCORDANCE WITH THE MANUAL FOR EROSION CONTROL IN GEORGIA, TABLE 6-2.2. THE SILT FENCE SHOULD BE KEPT ERECT AT ALL TIMES AND REPAIRED WHEN REQUESTED BY THE SITE INSPECTOR OR THE PROJECT DESIGN PROFESSIONAL OF RECORD. SILT SHOULD BE REMOVED WHEN ACCUMULATION REACHES ONE HALF THE HEIGHT OF THE BARRIER. THE PERIMETER SILT FENCE SHOULD BE INSPECTED DAILY FOR ANY FAILURES. ANY FAILURES OF SAID FENCING SHOULD BE REPAIRED IMMEDIATELY.
4. INLET SEDIMENT PROTECTION MEASURES SHALL BE INSTALLED ON ALL EXISTING STORM STRUCTURES
5. STONE CHECK DAMS SHALL BE INSTALLED IN AREAS OF CONCENTRATED FLOWS AS SHOWN ON THE PLAN.
6. TREE PROTECTION FENCING SHOULD BE INSTALLED PRIOR TO THE START OF ANY LAND DISTURBANCE ACTIVITY AND MAINTAINED UNTIL FINAL LANDSCAPE IS INSTALLED. THE TREE PROTECTION FENCING SHOULD BE INSPECTED DAILY. ANY FAILURES OF SAID FENCING SHOULD BE REPAIRED IMMEDIATELY.

AFTER INSTALLATION OF INITIAL EROSION CONTROL MEASURES THE SITE CONTRACTOR SHALL SCHEDULE AN INSPECTION BY THE PROJECT DESIGN PROFESSIONAL. NO OTHER CONSTRUCTION ACTIVITIES SHALL OCCUR UNTIL THE PROJECT DESIGN PROFESSIONAL APPROVES THE INSTALLATION OF SAID EROSION CONTROL MEASURES. IF UNFORESEEN CONDITIONS EXIST IN THE FIELD THAT WARRANT ADDITIONAL EROSION CONTROL MEASURES, THE CONTRACTOR MUST CONSTRUCT ANY ADDITIONAL EROSION CONTROL DEVICES DEEMED NECESSARY BY THE SITE INSPECTION.

AFTER APPROVAL OF THE INITIAL EROSION CONTROL INSTALLATION, THE CONTRACTOR MAY PROCEED WITH CLEARING AND GRUBBING ACTIVITIES. AS CLEARING AND GRUBBING PERMITS THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SEDIMENT PONDS AND DIVERSION DIKES AS SHOWN ON THE CLEARING PHASE PLAN TO CONTROL EROSION AND STORM WATER RUN OFF.

THE CONTRACTOR CAN UTILIZE CLEARED TREES AS BARRIER BRUSH SEDIMENT CONTROL IN AREAS SHOWN ON PLAN WHERE INITIAL GRADING ACTIVITIES WILL NOT OCCUR.

NO BURN OR BURY PITS SHALL BE PERMITTED ON THE CONSTRUCTION SITE.

ADDITIONAL SILT BARRIERS MUST BE PLACED AS SHOWN ON THE PLAN AS ACCESS IS OBTAINED DURING CLEARING. NO GRADING SHALL TAKE PLACE UNTIL SILT BARRIER INSTALLATION IS CONSTRUCTED AS SHOWN ON THE CLEARING PHASE EROSION CONTROL PLAN.

ALL EROSION CONTROL MEASURES SHALL MEET THE REQUIREMENT OF THE MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA, LATEST EDITION

MULCH OR TEMPORARY GRASSING SHALL BE APPLIED TO ALL EXPOSED AREAS WITHIN 7 DAYS OF LAND DISTURBANCE.

ALL DISTURBED AREAS LEFT MULCHED AFTER 30 DAYS SHALL BE STABILIZED WITH TEMPORARY VEGETATION.

SEDIMENT AND EROSION CONTROL MEASURES SHOULD BE CHECKED AFTER EACH RAIN EVENT. EACH DEVICE IS TO BE MAINTAINED OR REPLACED IF SEDIMENT ACCUMULATION HAS REACHED ONE HALF THE CAPACITY OF THE DEVICE. ADDITIONAL DEVICES MUST BE INSTALLED IF NEW CHANNELS HAVE DEVELOPED.

THE CONSTRUCTION EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACK OR FLOW OF MUD ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 1 - 3" OF STONE, AS CONDITIONS DEMAND. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLE ONTO PUBLIC ROADWAY OR INTO STORM DRAIN MUST BE REMOVED IMMEDIATELY.

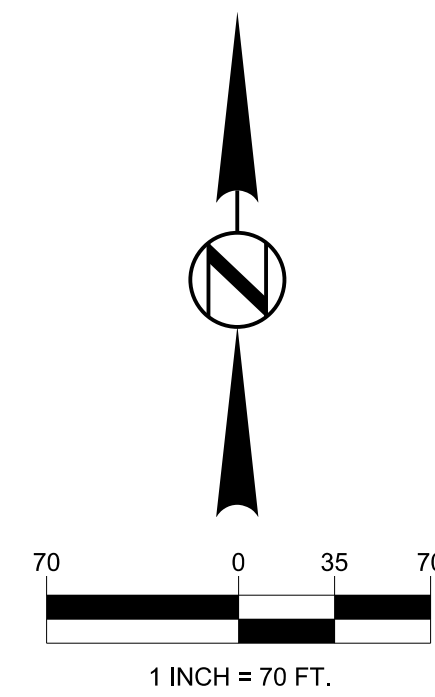
CONTRACTOR SHALL INSPECT CONTROL MEASURES AT THE END OF EACH WORKING DAY TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AS DIRECTED BY THE ON SITE INSPECTOR OR THE CIVIL ENGINEER.

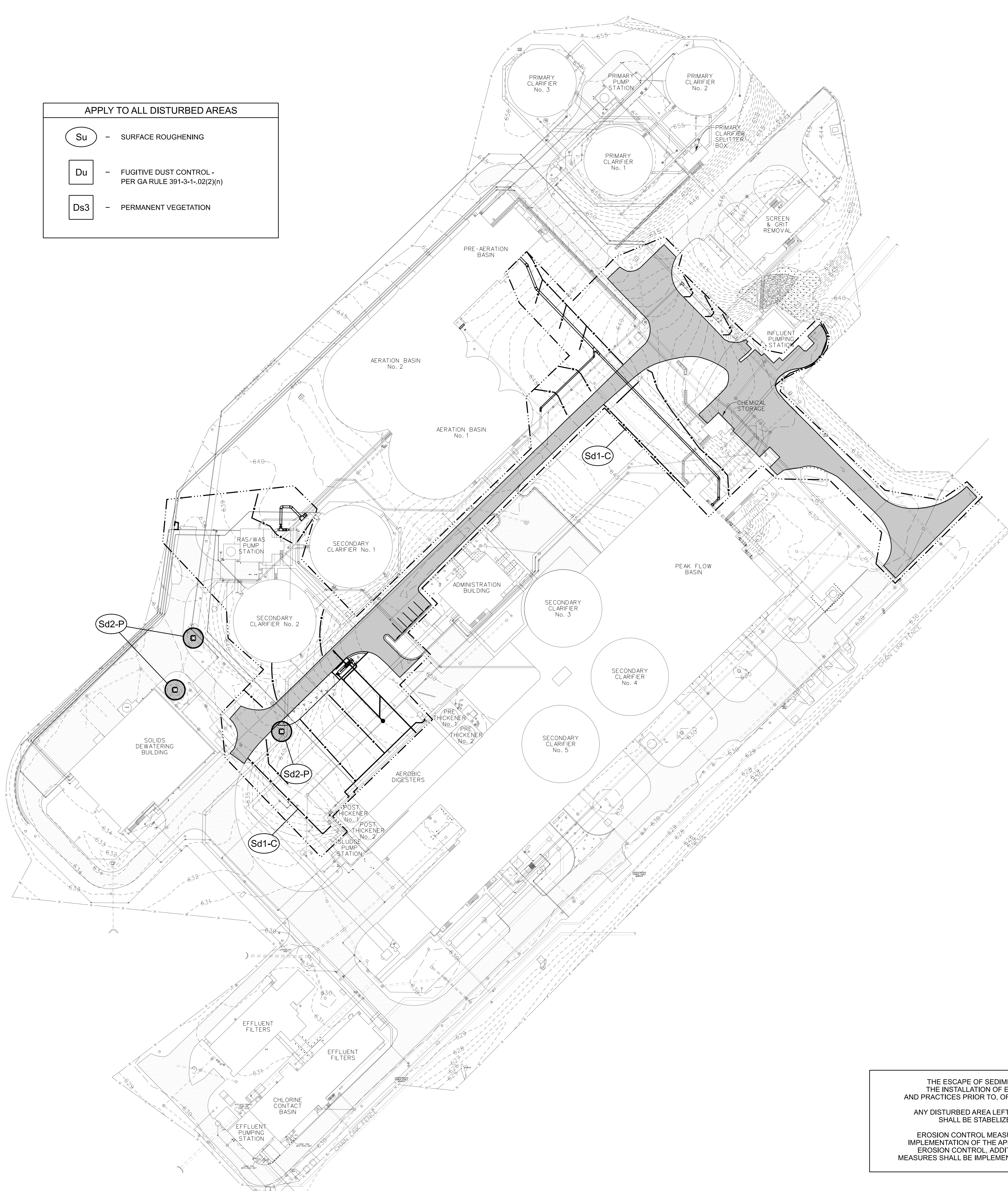
FAILURE TO INSTALL, OPERATE, OR MAINTAIN ALL EROSION CONTROL MEASURES WILL RESULT IN ALL CONSTRUCTION BEING STOPPED ON THE JOB UNTIL SUCH MEASURES ARE CORRECTED BACK TO THE APPROVED EROSION CONTROL PLANS.

CONTRACTOR SHALL PROVIDE TWO FORMS OF CONTAINMENT AROUND ALL PETROLEUM PRODUCT STORAGE TANKS, GENERATORS AND RE-FUELING AREAS IN ACCORDANCE WITH THE REQUIREMENTS.

CONTRACTOR SHALL MAINTAIN A SPILL PREVENTION PLAN.



APPLY TO ALL DISTURBED AREAS	
	- SURFACE ROUGHENING
	- FUGITIVE DUST CONTROL - PER GA RULE 391-3-1-.02(2)(n)
	- PERMANENT VEGETATION



LEGEND	
BAFFLE BOX INLET SEDIMENT TRAP - SD2-B	
FRAMED FILTERED FABRIC INLET SEDIMENT TRAP - SD2-F	
SILT FENCE	
TREE PROTECTION FENCE	
DISTURBANCE LIMITS	
CHECK DAM	
SOIL BOUNDARY	
SOIL SYMBOL	(NkC3)

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 7 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.

CITY OF LAGRANGE, GEORGIA  
 LONG CANE CREEK  
 POLLUTION CONTROL  
 PLANT IMPROVEMENT  
 LAGRANGE, GEORGIA



Designed: STL	Project No.:
Drawn: NTS / CLM	20065
Checked: JMM	
Revisions:	
No. 1	Date: 04/29/2022 Description: ADDENDUM 1

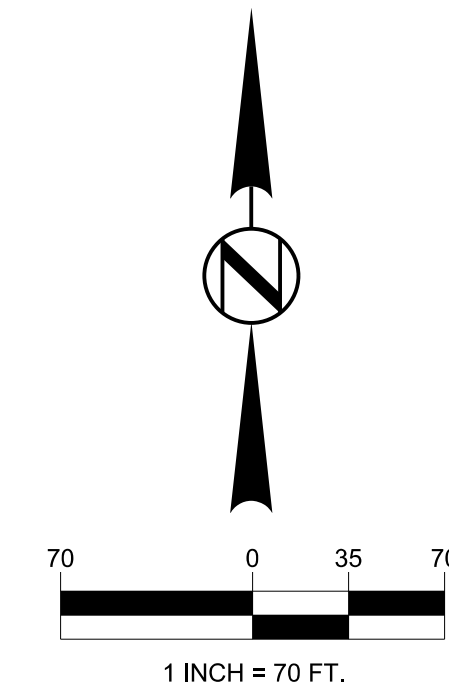

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EROSION CONTROL PLAN	
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**GRADING PHASE - EROSION CONTROL NOTES**

DURING CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN CAREFUL SCHEDULING AND PERFORMANCE TO ENSURE THAT LAND STRIPPED OF ITS NATURAL GROUND COVER IS EXPOSED ONLY IN SMALL QUANTITIES AND THEREFORE LIMITED DURATIONS, BEFORE PERMANENT EROSION PROTECTION IS ESTABLISHED.

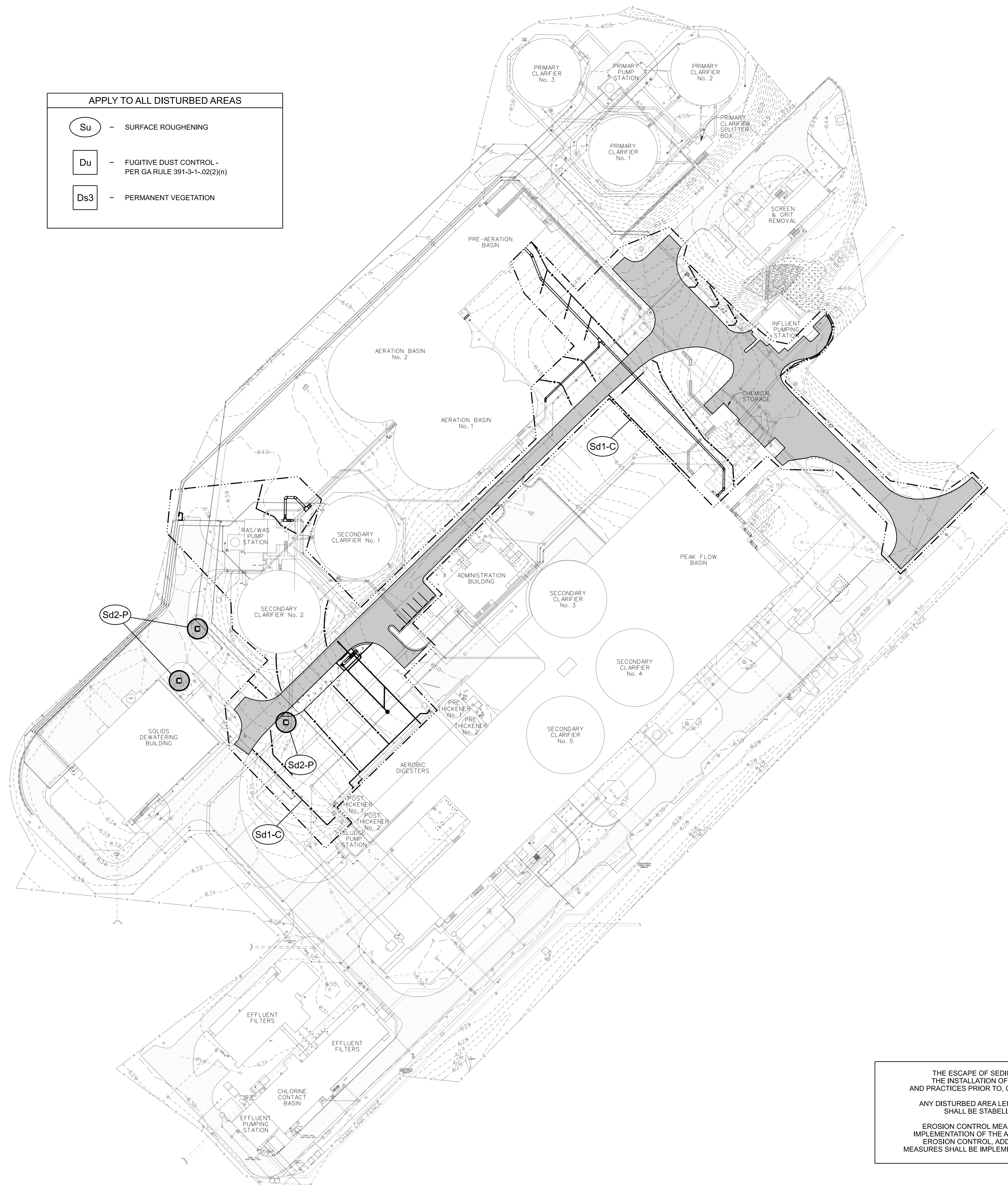
THE FOLLOWING EROSION CONTROL MEASURES SHALL BE IMPLEMENTED DURING THE PRELIMINARY GRADING PHASE OF CONSTRUCTION.

1. SEDIMENT SHALL NOT BE WASHED INTO INLETS. IT SHALL BE REMOVED FROM THE SEDIMENT TRAPS AND DISPOSED OF AND STABILIZED SO THAT IT WILL NOT ENTER THE INLETS AGAIN.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED IMMEDIATELY AFTER GROUND DISTURBANCE OCCURS. THE LOCATION OF SOME OF THE EROSION CONTROL DEVICES MAY HAVE TO BE ALTERED FROM THAT SHOWN ON THE APPROVED PLANS IF DRAINAGE PATTERNS DURING CONSTRUCTION ARE DIFFERENT FROM THE PROPOSED DRAINAGE PATTERNS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCOMPLISH EROSION CONTROL FOR ALL DRAINAGE PATTERNS CREATED AT VARIOUS STAGES DURING CONSTRUCTION. ANY DIFFICULTY IN CONTROLLING EROSION DURING ANY PHASE OF CONSTRUCTION SHALL BE REPORTED TO THE DESIGN PROFESSIONAL IMMEDIATELY.
3. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES WHILE ROADWAY FRONTAGE IMPROVEMENTS ARE BEING MADE.
4. THE SILT FENCE SHOULD BE PLACED IN ACCORDANCE WITH THE MANUAL FOR EROSION CONTROL IN GEORGIA, TABLE 6-20.2. THE SILT FENCE SHALL BE MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED. SILT SHALL BE REMOVED WHEN ACCUMULATION REACHES HEIGHT OF THE BARRIER. SEE SEPARATE DETAILS FOR ADDITIONAL INFORMATION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING BARRIERS AT THE TOE OF SLOPES UNDER CONSTRUCTION. THESE BARRIERS SHALL BE AS SHOWN IN THE PLANS. THESE BARRIERS MAY BE RELOCATED AND REUSED AFTER PERMANENT SLOPE STABILIZATION BECOMES FULLY ESTABLISHED. AS THEY ARE RELOCATED, ANY DEFECTIVE MATERIALS IN THE BARRIER SHALL BE REPLACED IN ADDITION. ALL DEBRIS AND SILT AT THE PREVIOUS LOCATION SHALL BE REMOVED.
6. TEMPORARY CUT AND FILL SLOPES ARE NOT TO EXCEED "1.5H:1V". PERMANENT CUT AND FILL SLOPES ARE NOT TO EXCEED "2H:1V".
7. TYPE "A" SILT FENCE SHALL BE PLACED AT THE TOE OF ALL DIRT STOCK PILE AREAS. SEE SEPARATE DETAILS FOR ADDITIONAL INFORMATION.
8. STONE CHECK DAMS SHALL BE INSTALLED IN AREAS OF CONCENTRATED FLOWS AS SHOWN ON THE PLAN. SEE SEPARATE DETAIL FOR ADDITIONAL INFORMATION.
9. AREAS THAT ARE NOT AT FINAL GRADE SHALL BE APPLIED WITH CRUSHED STONE, MULCH OR VEGETATIVE COVER WITHIN 7 DAYS OF LAND DISTURBANCE.
10. ALL DISTURBED AREAS LEFT MULCHED AFTER 30 DAYS SHALL BE STABILIZED WITH CRUSHED STONE OR TEMPORARY GRASSING.
11. SEDIMENT AND EROSION CONTROL MEASURES SHOULD BE CHECKED AFTER EACH RAIN EVENT. EACH DEVICE IS TO BE MAINTAINED OR REPLACED IF SEDIMENT ACCUMULATION HAS REACHED ONE HALF THE CAPACITY OF THE DEVICE. ADDITIONAL DEVICES MUST BE INSTALLED IF NEW CHANNELS HAVE DEVELOPED.
12. THE CONSTRUCTION EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACK OR FLOW OF MUD ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 1-3" OF STONE, AS CONDITIONS DEMAND. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACED FROM VEHICLE ONTO PUBLIC ROADWAY OR INTO STORM DRAIN MUST BE REMOVED IMMEDIATELY.
13. SOIL STOCKPILE AREA, IF REQUIRED, SHALL BE LOCATED IN A FLAT AREA AWAY FROM ANY CONCENTRATED FLOW AND SURROUNDED BY SILT FENCE.
14. CONTRACTOR SHALL INSPECT CONTROL MEASURES AT THE END OF EACH WORKING DAY TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
15. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AS DIRECTED BY THE ON SITE INSPECTION OR THE CIVIL ENGINEER.
16. FAILURE TO INSTALL, OPERATE, OR MAINTAIN ALL EROSION CONTROL MEASURES WILL RESULT IN ALL CONSTRUCTION BEING STOPPED ON THE JOB UNTIL SUCH MEASURES ARE CORRECTED BACK TO THE APPROVED EROSION CONTROL PLANS.
17. ALL STORM DRAINS THAT CAN/WILL RECEIVE STORM WATER FROM THE SITE SHALL BE PROTECTED WITH SEDIMENT TRAPS (SD2). CONTRACTOR SHALL PROVIDE TWO FORMS OF CONTAINMENT AROUND ALL PETROLEUM PRODUCT STORAGE TANKS, GENERATORS AND RE-FUELING AREAS.
18. CONTRACTOR SHALL MAINTAIN A SPILL PREVENTION PLAN AS STATED ON SHEET EC-03.
19. DURING CONSTRUCTION ACTIVITIES, DOUBLE THE WIDTH OF THE 25 FOOT UNDISTURBED VEGETATED BUFFER ALONG ALL STATE WATERS REQUIRING A BUFFER AND THE 50 FOOT UNDISTURBED VEGETATED BUFFER ALONG ALL STATE WATERS CLASSIFIED AS "TROUT STREAMS" REQUIRING A BUFFER. DURING CONSTRUCTION ACTIVITIES, EPD WILL NOT GRANT VARIANCES TO ANY SUCH BUFFERS THAT ARE INCREASED IN WIDTH.
20. PLACE A LARGE SIGN (MINIMUM 4 FEET X 8 FEET) ON THE SITE VISIBLE FROM THE ROADWAY IDENTIFYING THE CONSTRUCTION SITE, THE PERMITTEE(S), AND THE CONTACT PERSON(S) AND TELEPHONE NUMBER(S).



**APPLY TO ALL DISTURBED AREAS**

- Su - SURFACE ROUGHENING
- Du - FUGITIVE DUST CONTROL - PER GA RULE 391-3-1-.02(2)(n)
- Ds3 - PERMANENT VEGETATION



**LEGEND**

- Sd2-B Baffle Box Inlet Sediment Trap - SD2-B
- Sd2-F Framed Filtered Fabric Inlet Sediment Trap - SD2-F
- SILT FENCE
- TREE PROTECTION FENCE
- DISTURBANCE LIMITS
- ◀◀◀ CHECK DAM
- SOIL BOUNDARY
- (NkC3) SOIL SYMBOL

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.

ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 7 DAYS SHALL BE STABILIZED WITH MULCH OR TEMPORARY SEEDING.

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.

CITY OF LAGRANGE, GEORGIA  
LONG CANE CREEK  
POLLUTION CONTROL  
PLANT IMPROVEMENT  
LAGRANGE, GEORGIA



Designed	STL	Project No.	
Drawn	NTS / CLM		20065
Checked	JMM		

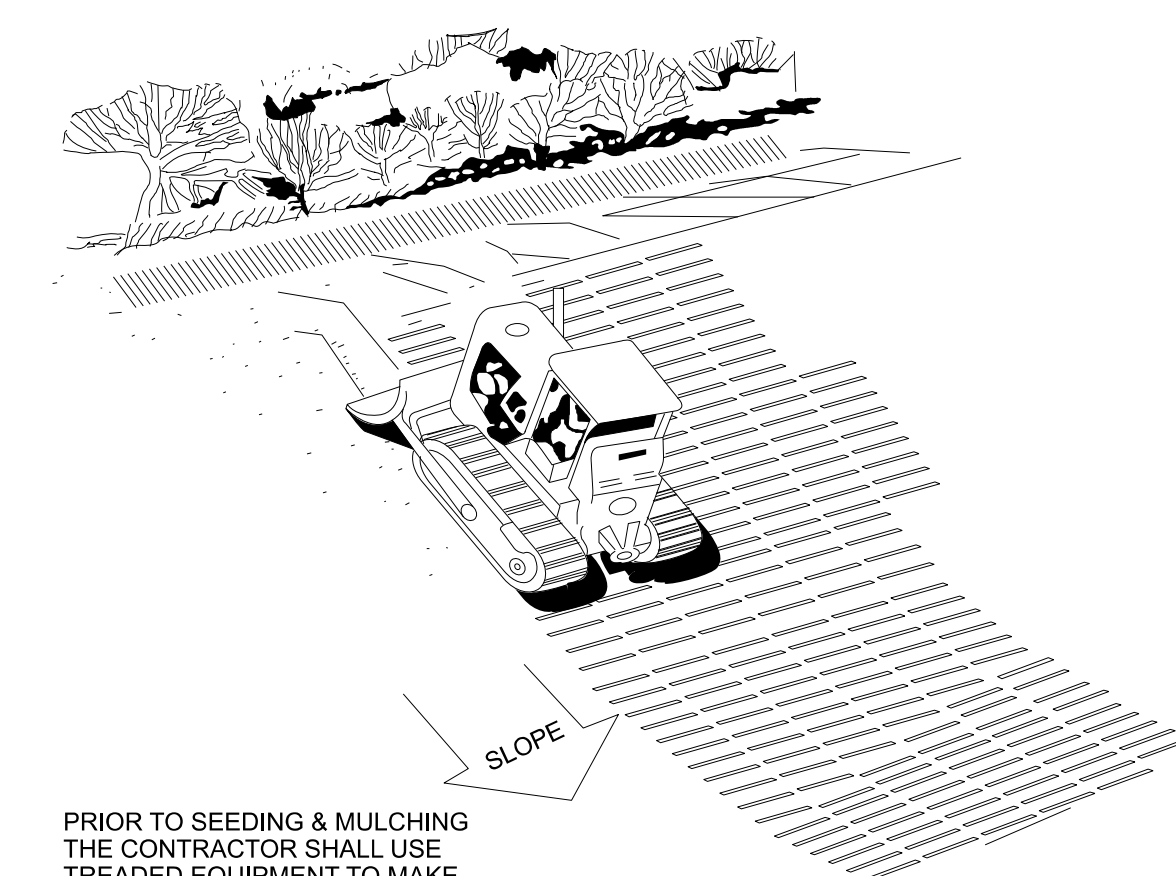
Revisions	No.	Date	Description
	1	04/29/2022	ADDENDUM 1

Sheet Title  
**EROSION CONTROL PLAN**

Issue Date	APR., 2022	Sheet No.	EC-08
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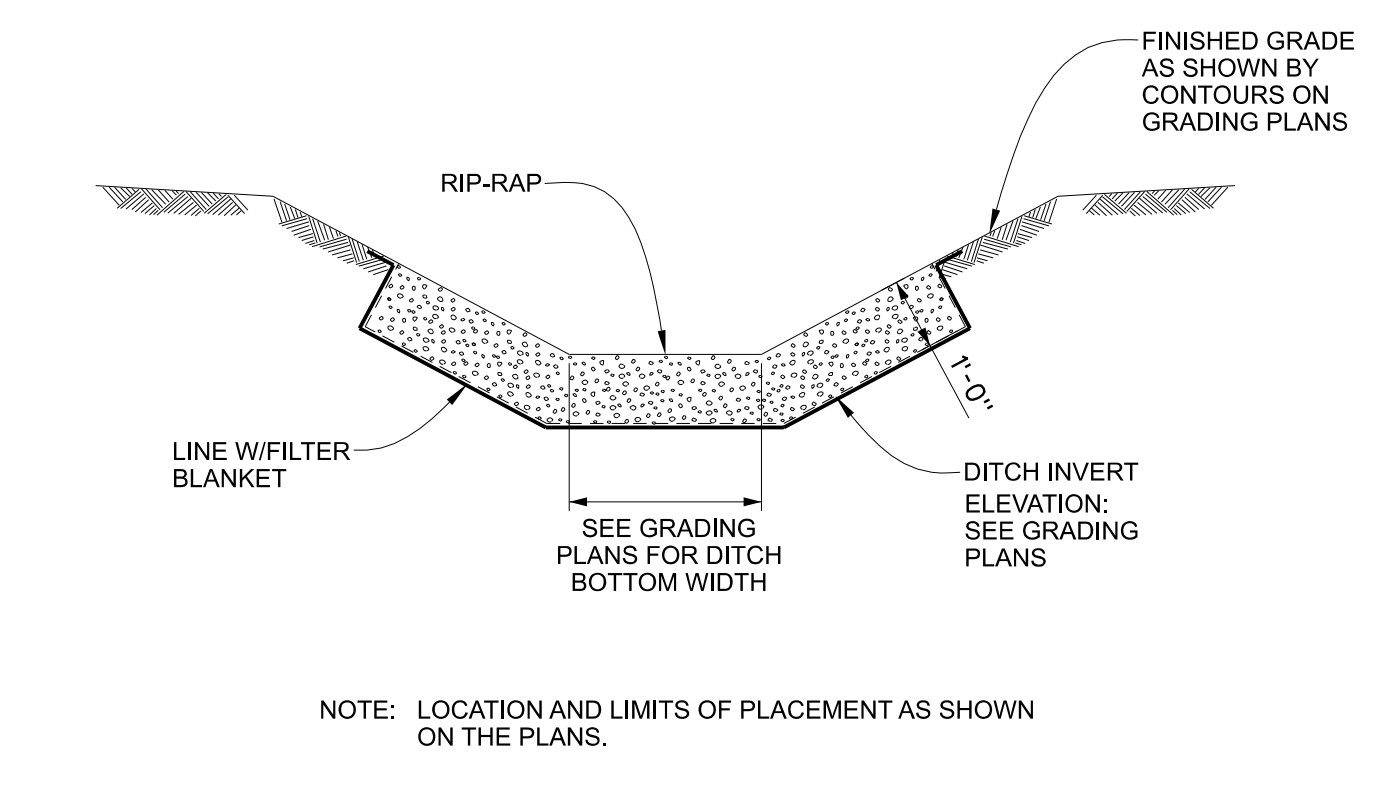




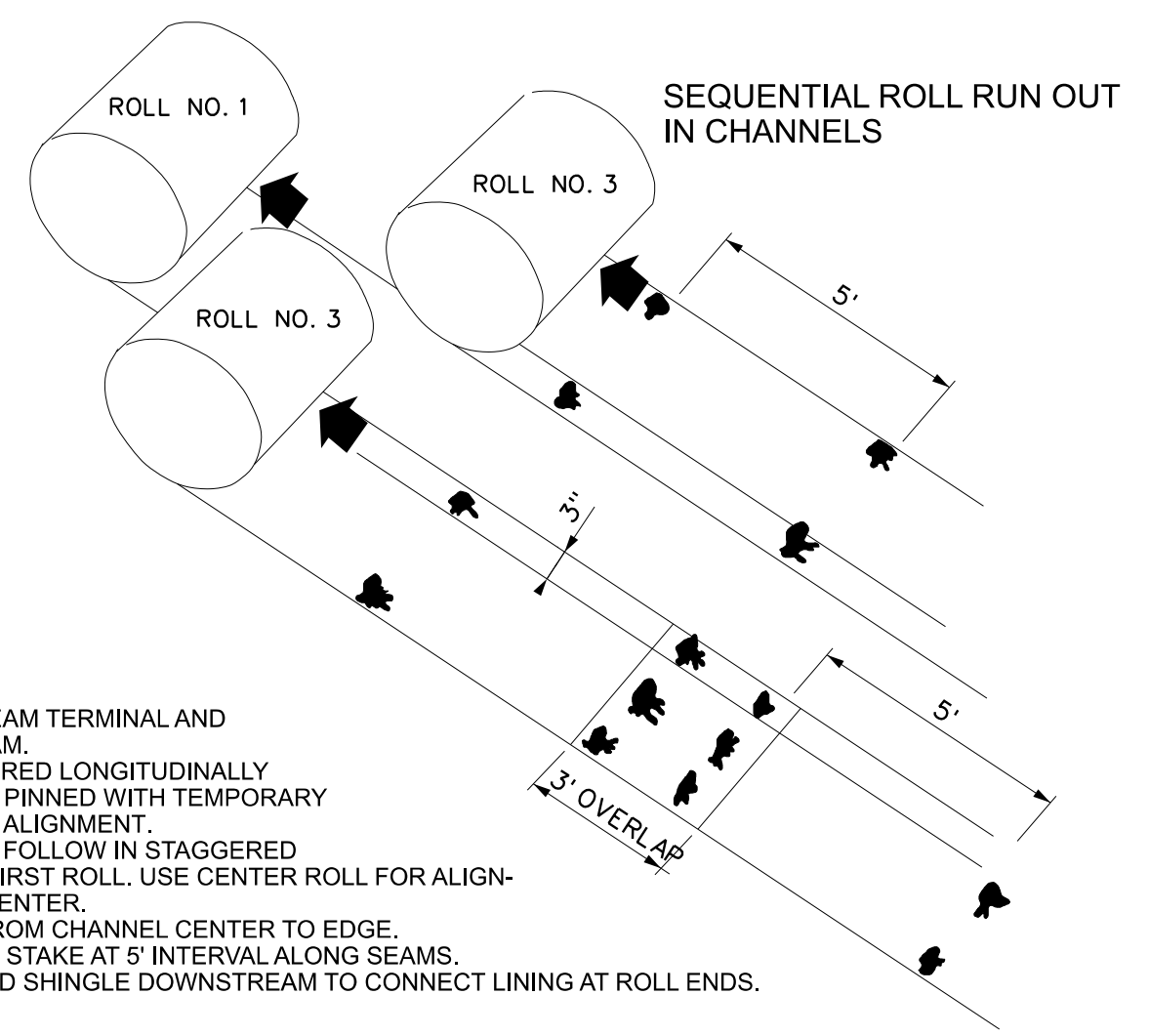
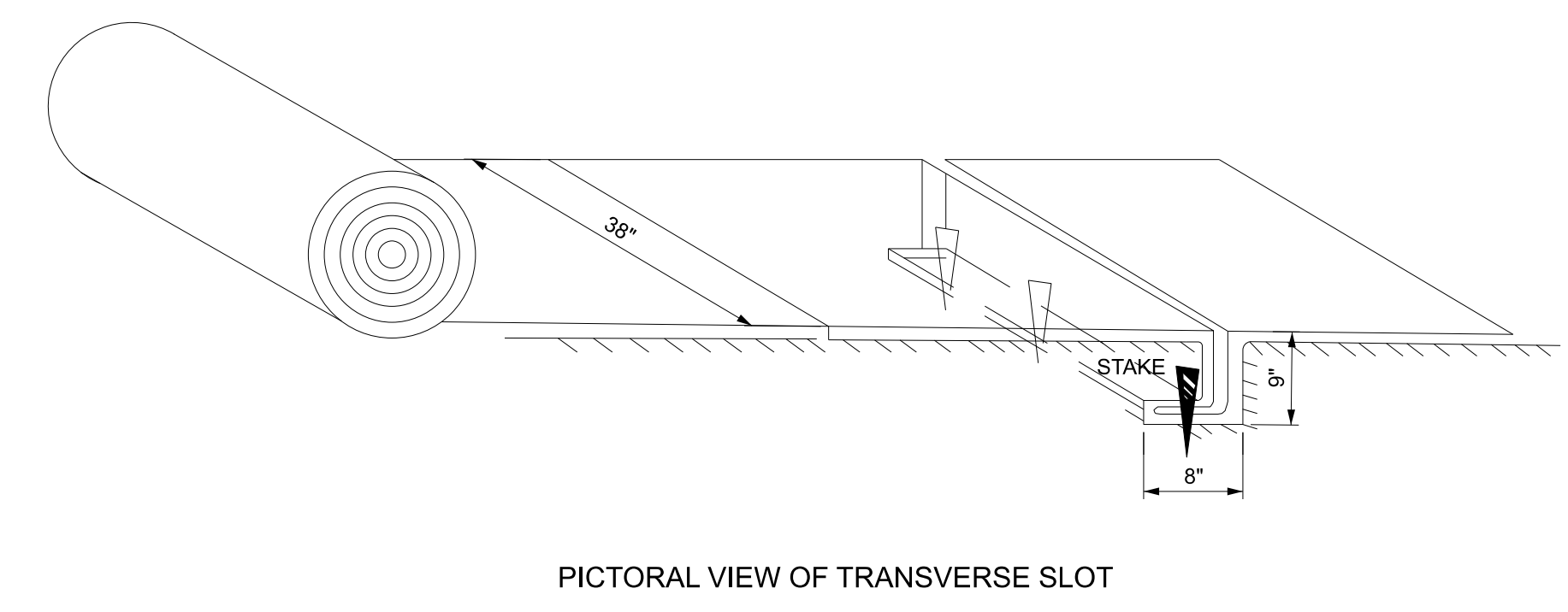
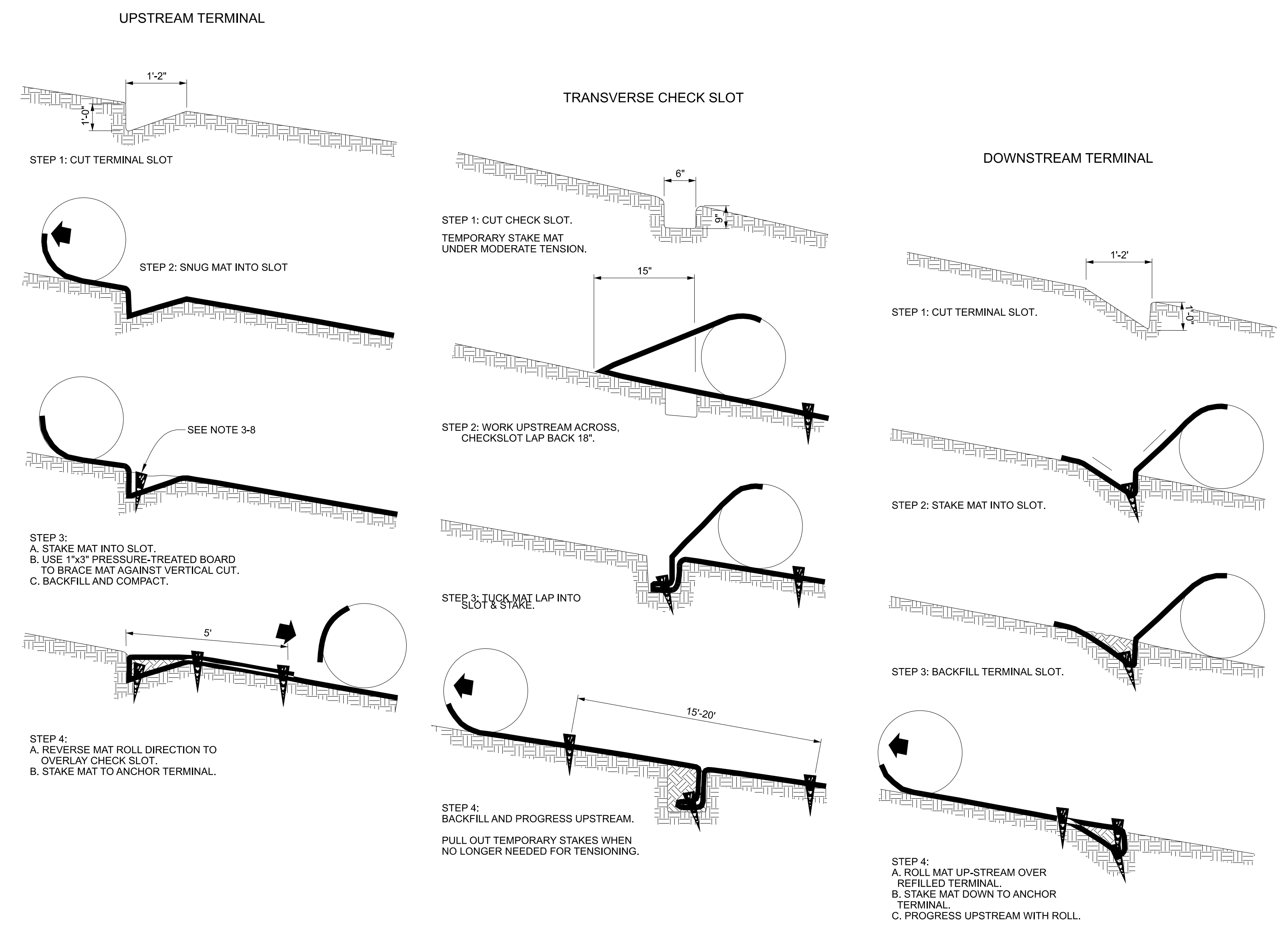


PRIOR TO SEEDING & MULCHING THE CONTRACTOR SHALL USE TREADED EQUIPMENT TO MAKE DEPRESSIONS IN SPREAD TOPSOIL PARALLEL TO THE SLOPE CONTOURS. THIS PROCESS IS COMMONLY KNOWN AS "TRACKWALKING"

**SR SURFACE ROUGHENING**  
NTS



**Ch-Rp CHANNEL LINING**  
NTS



1. START AT DOWNSTREAM TERMINAL AND PROGRESS UPSTREAM.
2. FIRST ROLL IS CENTERED LONGITUDINALLY IN MID CHANNEL AND PINNED WITH TEMPORARY STAKES TO MAINTAIN ALIGNMENT.
3. SUSSEQUENT ROLLS FOLLOW IN STAGGERED SEQUENCE BEHIND FIRST ROLL. USE CENTER ROLL FOR ALIGNMENT TO CHANNEL CENTER.
4. WORK OUTWARDS FROM CHANNEL CENTER TO EDGE.
5. USE 3" OVERLAP AND STAKE AT 5' INTERVAL ALONG SEAMS.
6. USE 3" OVERLAPS AND SHINGLE DOWNSTREAM TO CONNECT LINING AT ROLL ENDS.

**Mb MATTING AND BLANKETS**  
NTS

**THIS IS THE LAST PAGE**

Attachments to Addendum No. 1 preceding this page:

1. Specification Section 230500 – Mechanical General
2. Specification Section 230505 – Mechanical Submittals
3. Specification Section 230510 – Basic Materials and Methods
4. Specification Section 230593 – Testing, Adjusting, and Balancing
5. Specification Section 230700 – HVAC Insulation
6. Specification Section 230933 – Temperature Controls
7. Specification Section 232301 – Refrigerant Piping Systems
8. Specification Section 233131 – Low Pressure Ductwork
9. Specification Section 233713 – Registers, Grilles, and Diffusers
10. Specification Section 234105 – Air Filters
11. Specification Section 236201 – Air Cooled Condensing Units
12. Specification Section 238126 – Split System DX Air Handling Units
13. Proposal Form
14. Specification Section 331215 – Hydraulic Gates
15. Specification Section 444226.21 – Septage Receiving Station
16. Appendix A – SCADA Scope of Work
17. Plan Sheet M0-01 – Mechanical Legend, Abbrev., Schedules and Details
18. Plan Sheet M1-01 – Electrical Building Floor Plan Mechanical
19. Plan Sheet C3-03 – Aeration Basin Improvements Enlarged Plan & Detail
20. Plan Sheet C6-03 – Aerobic Digester Modifications Plan
21. Plan Sheet C6-04 – Aerobic Digester Modifications Sections
22. Plan Sheet C9-01 – New Septage Receiving Station Plan & Section (Alt. Bid Item No. 2)
23. Plan Sheet DT-03 – Miscellaneous Details
24. Plan Sheet E0-01 – Electrical Legend
25. Plan Sheet E0-02 – Electrical Notes & Fixture Schedule
26. Plan Sheet E0-06 – Electrical Schedules
27. Plan Sheet E10-02 – Headworks Electrical Room Electrical Plan
28. Plan Sheet EC-04 – NPDES Permit Requirements
29. Plan Sheet EC-07 – Erosion Control Plan
30. Plan Sheet EC-08 – Erosion Control Plan
31. Plan Sheet EC-09 – Erosion Control Plan
32. Plan Sheet EC-10 – Erosion & Sediment Control Details

A total of 130 pages or sheets of drawings (including this page) have been included in Addendum No. 1. General Contractors are requested to return this page as an acknowledgement that you have received this Addendum by e-mail. This will NOT be mailed. A copy of this Addendum may be picked up at the office of the Engineer.

Return acknowledgement to Krebs Engineering, Inc. by email to Shelly Fritz – Shelly.Fritz@krebseng.com

Received By \_\_\_\_\_

Contractor \_\_\_\_\_

Date \_\_\_\_\_