ADDENDUM NO. ONE (1)
CITY OF BALDWIN, GEORGIA
WATER TREATMENT FACILITY PRETREATMENT SYSTEM
ISSUED May 7, 2024

RE: WATER TREATMENT FACILITY PRETREATMENT SYSTEM
EMI PROJECT No. 20-043

FROM: ENGINEERING MANAGEMENT, INC.
303 SWANSON DRIVE
LAWRENCEVILLE, GA 30043
Greg Bennett, P.E.
770-962-1387

TO: PROSPECTIVE BIDDERS

This Addendum forms a part of the Contract Documents and Drawings and modifies the original bidding documents dated April 2024.

The following items of the Contract Documents are modified as part of this Addendum:

Specifications

- Specification Section 13120 has been modified as follows. See attached revised page 5 of section 13120 (revisions are in bold and italics)

    - ***ACI Building Systems, LLC has been added as an approved building manufacturer on page 5.***

- Additional Specifications Sections

  The following electrical sections have been added to the technical specifications:
    - ***Section 16010: General Electrical Provisions***
    - ***Section 16111: Conduit***
    - ***Section 16120: Wire and Cable***
    - ***Section 16130: Boxes***
    - ***Section 16160: Panelboards***
    - ***Section 16170: Motor Disconnect Switches***
    - ***Section 16450: Grounding***

  A revised copy of the Table of Contents and all sections are included.

Plans

- *Plan Sheet G1 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***A revised Sheet Index is included on sheet G1.***

- *Plan Sheet A1 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***A callout has been added for the transfer pump concrete pads.***

- *Plan sheet S0.1 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***Notes on this sheet have been rearranged.***

- *Plan sheet S1.1 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***Transfer pump concrete pads have been included.***

- *Plan sheet S2.1 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***The Recess Threshold @ Overhead Door detail has been revised.***

- *Plan sheet S2.2 has been revised as follows. See attached revised plan sheets. (revisions are shown with revision clouds)*

    - ***Transfer pump concrete pad details have been added.***

- Additional Plan Sheets

  The following electrical and HVAC plan sheets have been added to the project plans:

    - ***E1: Electrical Legend Notes, and Abbreviations***
    - ***E2: One Line Diagram***
    - ***E3: Electrical Site Plan***
    - ***E4: Building Power and Grounding***
    - ***E5: Building Lighting***
    - ***E6: Schematics***
    - ***E7: Electrical Details***
    - ***H1: Pretreatment Building Plan – HVAC***
    - ***H2: Pretreatment Building – HVAC Details***
    - ***H3: Pretreatment Building – HVAC Details***

END OF ADDENDUM NO. 1

CONTRACT DOCUMENTS & TECHNICAL SPECIFICATIONS

WATER TREATMENT FACILITY PRETREATMENT SYSTEM FOR THE CITY OF BALDWIN

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B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair to replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Inland Buildings, Inc.
2. Alliance Steel, Inc.
3. American Buildings Company
4. American Steel Building Co., Inc.
5. ***ACI Building Systems, LLC***
6. Or approved equal

2.02 METAL BUILDING SYSTEM PERFORMANCE

A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer registered in the State of Georgia, using performance requirements and design criteria indicated.

B. All code references are to the International Building Code (IBC), latest edition.

C. Combinations of loads shall be in compliance with IBC, Section 1605.

D. Roof Loads shall be applied in compliance with IBC, Section 1607.12 (Roof Live Loads) and IBC, Section 1608 (Snow Loads), and shall not be less than:

1. Dead Load: Weight of all building components furnished by the metal building system manufacturer.

2. Roof Live Load shall be as specified in IBC, Table 1607.1.

3. Roof Snow Load shall be determined using: Pf = Pg * Ce * I
Ground Snow Load Pg, (IBC, Figure 1608.2) = 5 psf
Snow Exposure Factor, ce (ASCE7, Table 7.2) = .7
Snow Importance Factor, I (ASCE 7, Table 1.5-2) = 1.0

4. Collateral and Mechanical Loads – 5.00 psf

a. This includes the weight of non-structural material and equipment supported by the structure, included (but not limited to) HVAC units,

SECTION 16010

GENERAL ELECTRICAL PROVISIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. Furnish and install all materials, equipment, labor, supervision and services necessary to complete all electrical work specified herein, and shown on the Drawings.

B. Principal Features
1. Complete system of conduits, cables and conductors to supply electrical energy throughout the facility.
2. All interconnecting wiring and conduit associated with the installation of a fully functional Westech HSR Package System consisting of two Clarification Units.
3. Reviewing Westech's shop drawings to field locate all instruments, valves, motors, etc.
4. Installation of light fixtures and receptacles.
5. Installing a new 200A, 480V, 3P breaker in an existign GE 8000 Motor Control Center.
6. All other work shown on the contract documents.

1.2 APPLICABLE STANDARDS AND CODES

A. Local, State, and National Electrical Codes.

B. National Electrical Code, latest edition.

C. Rules of the Electrical Utility and the National Electrical Safety Code.

D. Life Safety Code 101.

E. NECA Standard of Installation.

F. NFPA (National Fire Protection Association).

1.3 FEES AND TESTS

A. Contractor shall be responsible for all fees for permits, inspections, and tests necessary to complete this work. Contractor shall demonstrate to the Owner and the Engineer that all items of equipment installed are completely operational and free of defects in all modes.

1.4 COORDINATION WITH OTHER TRADES

A. Furnish and locate all anchor bolts, inserts and supports for installation by the other trades as required. Coordinate the location of all fixtures, outlets, equipment, and devices with other trades to avoid conflicts.

1.5 LIST OF PROPOSED MANUFACTURERS

A. List of Proposed Materials: The Contractor shall submit a complete list of the proposed manufacturers for each of the items listed in the following electrical specifications. Additional submittal data, sufficient to determine equality, shall be required if the Contractor proposes to substitute another manufacturer's equipment.
   1. Intent of Drawings
      a. Electrical plan drawings show only general locations of equipment, devices and raceways, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceway, subject to the review of the Engineer.
   2. Departures from Contract Documents
      a. Submit to the Engineer in writing details of any necessary, proposed departures from these Contract Documents, and the reasons therefore. Submit such requests as soon as practicable and within 30 days after award of the Contract. Make no such departures without written approval of the Engineer.

PART 2 PRODUCTS

2.1 REFERENCE TO DRAWINGS

A. Reference shall be made to Drawing Schedules, Details, Notes, and Specifications for: Manufacturer, model, catalog number, size, capacity, performance, ratings and installation of equipment and material.

2.2 CHOICE OF MATERIALS AND EQUIPMENT

A. In submitting substitutions, bidders should note the following minimum considerations: (1) capacities shown are absolute minimal and must be equaled, (2) physical size limitations for space allotted, (3) structural properties, (4) noise level, (5) interchangeability, (6) compatibility with other materials and assemblies, (7) similar items shall be same manufacture and style wherever possible.

B. All material and equipment, for which a UL, ANSI, or a NEMA Standard is established, shall be so approved and labeled or stamped.

C. Adhesives are not acceptable as a mounting, supporting, or assembling technique, unless noted otherwise.

2.3 ELECTRICAL EQUIPMENT

A. NEMA Standards shall be taken as minimum requirements for electrical equipment.

B. Equipment shall operate properly under a plus or minus 10 percent voltage variation.

2.4 SUBMITTALS DURING CONSTRUCTION

A. Provide complete manufacturers' descriptive information and shop drawings for all equipment, material and devices furnished under Division 16, Electrical, including certified outline drawings, arrangement drawings, elementary (schematic) diagrams, interconnection and connection diagrams, in accordance with provisions elsewhere in

these Contract Documents. Provide the number of copies specified herein for the Engineer, Contractor and Operation and Maintenance Manuals.

B. Provide certified shop drawings, literature and requested samples showing items proposed for use, size, dimensions, capacity, special features required, schematic (elementary) control diagrams, equipment schedules, rough-in, etc., as required by the Engineer for complete review and for use during installation. Use NEMA device designations and symbols for all electric circuit diagrams submitted. Make content of the schematic (elementary) connection or interconnection diagrams in accordance with the latest edition of NEMA ICS 1.

C. Manufacturer's standardized elementary diagrams will not be acceptable unless applicable portions of the diagram have been clearly identified and non-applicable portions deleted or crossed out.

D. The following submittals shall be made in accordance with Division 1, General Requirements.

E. Certified arrangement drawings, outline dimensions, and weights for all major (engineered) equipment including, but not limited to:
   1. Low voltage switchgear.
   2. Transformers.
   3. Motor control centers.
   4. Engine – generators.
   5. Variable frequency drives.

F. Functional description or logic diagrams for all control systems furnished under Division 16, Electrical.

G. Characteristic curves for all protective devices.

H. Certified drawings and descriptive literature for all equipment and devices furnished under Division 16, Electrical, and not listed above.

I. Schematic (elementary drawings for any electrical control and bills of material for equipment including, but not limited to:
   1. Switchgear
   2. Motor control
   3. Control systems furnished under Division 16, Electrical.
   4. Engine – generator sets.
   5. Variable frequency drives.

J. Connection diagrams showing all internal wiring and all required field connections for the following:
   1. Low voltage switchboard
   2. Low voltage motor control centers

K. The interconnection diagrams shall show terminal points, intermediate connections, device designation, terminal numbers, polarity of dc circuits, conductor identification, and any other information necessary to show which conductor connects to which point; the Contractor shall review and sign off on the control interconnection diagrams.

L. In addition to submittals for specific items mentioned above, furnish shop drawing information on the following items:
   1. Low voltage fuses.
   2. Panelboards.
   3. Separately mounted circuit breakers, fused switches, and nonfused disconnect switches.
   4. Conduit, tubing, and fittings.
   5. Power conductors.
   6. Wireway.
   7. Outlet and device boxes.
   8. Pull boxes and junction boxes.
   9. Terminal junction boxes.
   10. 600-volt conductors.
   11. Control cable.

M. Electrical Systems Analyses:
   1. Womack Lumsden & Associates (OWNER'S electrical engineer) will complete the electrical system analysis. The study will include short circuit analysis, protection coordination and arc flash analysis.
   2. Contractor shall set the circuit breakers in accordance with the study results.
   3. Contractor shall affix arc flash labels to equipment. Womack Lumsden & Associates (770-458-3005) will provide labels to contractor.
   4. Contractor shall include in his bid an allowance of $6,000.00 as a fee to the OWNER'S electrical engineer for this study.

PART 3 EXECUTION

3.1 WIRING ELECTRICALLY OPERATED EQUIPMENT

A. The Contractor shall be responsible for electrical connections to all equipment requiring electrical power. This responsibility applies to equipment furnished under this and other Divisions and by the Owner.

3.2 RECORD AND AS-BUILT DOCUMENTS

A. Maintain at the job site a set of Contract Documents kept current by indicating thereon all changes, revisions and substitutions, between work as specified and as installed.

B. Furnish Owner with Four (4) complete sets of Operation and Maintenance Manuals.

3.3 EQUIPMENT OPERATION

A. This Division is responsible for: (1) proper rotation, (2) observing that lubrication has been properly performed, (3) that motors operate within nameplate limits, and (4) adjustment of circuit breaker and MCP trip settings.

3.4 CLEANING AND PAINTING

A. Fixtures, panels and equipment shall be thoroughly cleaned. All equipment shall be touched up or repainted as required to present a clean professional appearance. Paint all ferrous metal that is not otherwise protected against corrosion. Paint exposed pipe threads with Bitumastic No. 50.

3.5 IDENTIFICATION

A. Identify all major items of equipment including controls, panels, switches, contactors, motor starters, junction boxes and metering by permanent nameplates, with wording approved by Engineer. Secure metal nameplate frame with screws or brads. Adhesives are acceptable on components within NEMA 1 enclosures.

B. Nameplates after installation shall be easily visible and shall bear notations corresponding to those shown on record drawings.

C. All conduits shall be identified with a stamped stainless steel tag system (Brady or approved equal). Conduit tags shall be permanently attached to each exposed end of conduit runs such as in manholes, pull boxes, panels, MCC's, junction boxes, etc. and at each point of entry into a structure or building. Each tag shall be stamped with the appropriate conduit number per the conduit and cable schedules.

D. Each instrument shall be identified with a stamped stainless steel tag system (Brady or approved equal). Instrument tags shall be permanently attached to each individual instrument and stamped with the appropriate number per instrument specification section.

E. Each cable shall be identified with a permanent labeling system (Brady Catalog Number B-292 with printed legends or approved equal). Instrumentation cables shall be labeled with the appropriate instrument number of the originating signal (Ex. FT-2020-1). Multiplex cables, power and control cables shall be labeled with the appropriate cable number per the conduit and cable schedules.

F. All switchgears, MCC's, MCC compartments, power panels, lighting panels, control panels, control cabinets, etc. shall be identified with permanently mounted phenolic labels.

G. All power and lighting panels shall have typed schedules mounted on panel doors.

H. All terminals and associated wires shall be numbered and labeled respectively, and wiring diagrams shall be installed in the MCC or electrical panel doors.

3.6 TEST PERIOD

A. Each piece of equipment shall continue to meet performance specifications throughout the first year of actual operation. Contractor shall replace or repair any defect due to faulty workmanship or material which shall develop within 1 year from date of acceptance. This guaranty shall cover both material and labor.

B. For first year after final acceptance, Contractor shall provide, at no cost to Owner, any required maintenance and service necessary to assure the proper operation of the system. Date of acceptance shall be certified by Engineer as that date on which the contract has been satisfactorily completed in accordance with the Contract Documents.

3.7 GROUNDING

A. See Specification 16450.

3.8 ELECTRICAL TESTING AND START-UP

A. General
   1. Prior to energizing any equipment, the electrical contractor shall thoroughly vacuum clean the equipment with an industrial type vacuum cleaner. The outside of all electrical equipment shall be cleaned and paint touched up as required to leave equipment in an “as purchased” condition.
   2. During start-up of new equipment, the electrical contractor shall provide sufficient personnel to aid with start-up of the electrical equipment to remove any faults, and to make the necessary adjustment for proper operation of electrical equipment and installation. This includes sufficient personnel to aid equipment service personnel in their check-out of the electrical equipment and service.
   3. All testing equipment shall be furnished by the Contractor.
   4. All failures under tests due to defective material or poor workmanship shall be corrected by the Contractor at no expense to the Owner.
   5. The electrical contractor shall not, under any circumstances, energize any electrical equipment covered by these Specifications without first obtaining permission from the Engineer.

B. Grounding
   1. After all connections have been made to the ground, ground tests shall be made to verify its adequacy.

C. Typewritten directories shall be inserted in all panels showing the designation of each circuit. All power and replacement fuses necessary for testing shall be furnished and paid for under this item.

3.9 INSTALLATION OF EQUIPMENT

A. The electrical contractor shall coordinate with the Contractor and Owner in order to have electric power available when required.

3.10 TEMPORARY ELECTRIC POWER

A. Refer to General Conditions in these Contract Documents for necessary provisions for electric power used during construction.

END OF SECTION

SECTION 16111

CONDUIT

PART 1 GENERAL

1.1 SCOPE

A. Work covered by this section includes furnishing all labor, equipment, and materials required to install electrical conduit and fittings as specified herein and/or shown on the Drawings.

B. The Contractor's attention is called to the fact that all conduits and conduit fittings are not necessarily shown completely on the Drawings, as the Drawings are more or less schematic. However, the Contractor shall furnish and install all conduits and conduit fittings indicated or required for the proper connection and operation of the equipment.

1.2 SHOP DRAWINGS AND ENGINEERING DATA

A. Shop drawings and engineering data shall be submitted in accordance with requirements of the section entitled "Shop Drawings, Product Data and Samples" of these Specifications.

1.3 STORAGE AND PROTECTION

A. Store and protect conduit and fittings in accordance with the manufacturer's recommendations and requirements of the section entitled "General Equipment Stipulations" of these Specifications. Conduit shall be stored aboveground and adequately supported.

1.4 GUARANTEE

A. Provide a guarantee against defective equipment and workmanship in accordance with requirements of the section entitled "Warranties and Bonds" of these Specifications.

PART 2 PRODUCTS

2.1 GENERAL

A. Unless otherwise shown or specified, all conduits shall be rigid metal. See the paragraph on Conduit Application for additional information.

B. Conduit terminations at electrical equipment such as electric motors, dry type transformers and heaters shall be made using liquid-tight, flexible metal conduit.

C. Damaged, dented, flattened, or kinked conduit shall not be used.

2.2 RIGID METAL CONDUIT

A. Rigid metal conduit shall be heavy wall, mild steel conduit conforming to ANSI C80.1 and Federal Specification WW-C-581, hot dip galvanized both inside and out. All conduits shall bear the approved stamp of the Underwriters Laboratories.

B. Rigid metal conduit shall be by Allied Tube & Conduit, Republic, or equal.

2.3 RIGID NONMETALLIC CONDUIT

A. Rigid nonmetallic conduit for voltages 600V and less shall be Schedule 40 heavy wall polyvinyl chloride (PVC) electrical conduit rated for 90 degrees C conductors and conforming to NEMA TC-2, Type EPC-40-PVC. It shall be listed by Underwriters Laboratories in conformance with the National Electrical Code. Conduit fittings, elbows, and joint cement shall be produced by the same manufacturer as the conduit. Conduits shall be as manufactured by Carlon, Borg-Warner, or equal.

B. Rigid nonmetallic conduit for voltages higher than 600V shall be polyvinyl chloride (PVC) power duct rated for 90 degrees C conductors and conforming to NEMA TC-6, Type EB. Conduit fittings, elbows, and joint cement shall be produced by the same manufacturer as the conduit. Conduit shall be as manufactured by Carlon, Olin, or equal.

2.4 PLASTIC-COATED RIGID METAL CONDUIT

A. Rigid metal conduit prior to application of plastic coating shall conform to Part 2.02, Rigid Metal Conduit, of this section.

B. Plastic coating shall be polyvinyl chloride (PVC) bonded to the metal a uniform thickness of 40 mils the full length of the conduit except the threads. The bond between the metal and PVC coating shall be equal or greater than the tensile strength of the PVC coating.

C. A coupling shall be furnished loose with each length of conduit and shall have a PVC sleeve extending 1 pipe diameter, or 2-inches, whichever is least, beyond the end of the coupling. Elbows shall have the same thickness of PVC coating as on the conduit. All threaded conduit and elbow ends shall have plastic thread protectors.

D. The rigid steel galvanized PVC coated conduit and fittings shall be KorKap as manufactured by Plastic Applicators, Houston, Texas; Plasti-Bond as manufactured by Pittsburgh Std. Div. of Robroy Industries, Verone, Pa.; or equal.

E. PVC-coated rigid conduit shall meet the ASTM D870 Boil Test.

2.5 RIGID ALUMINUM CONDUIT

A. Rigid aluminum conduit shall be manufactured of 6063 alloy in temper designation T-1. The fittings shall be of the same alloy.

B. All conduits shall bear the approved stamp of the Underwriters Laboratories and be manufactured to ANSI C80.5 and Federal Specification WW-C-540c.

C. Rigid Aluminum conduit shall be by Republic, Allied Tube and Conduit, or equal.

2.6 LIQUID-TIGHT FLEXIBLE METAL CONDUIT

A. Flexible conduit shall have an oil-resistant, liquid-tight jacket in combination with flexible metal reinforcing tubing and shall be designed for use with waterproof fittings. An integral ground wire shall be included. Flexible conduit shall be American Brass Sealtite Type UA as manufactured by Electric-Flex Company; Flexible Metallic Conduit as manufactured by Ideal Industries, Inc; or equal. Only Underwriter's Laboratories approved fittings shall be used.

2.7 CONDUIT FITTINGS AND BUSHINGS

A. Wherever conduits terminate in sheet steel boxes, double bonding type locknuts and bushings shall be used except when terminating in cast hubs. All bushings shall be insulated metallic type, equal to O. Z. Electrical Manufacturing Company, Type B; T & B Company, 1200 Series; Appleton Electric Company, Type BU-I; or equal.

B. Where conduits terminate in steel or cast NEMA 4 enclosures with no factory-installed threaded hubs, a threaded hub shall be installed equal to Myers Electric Products, Inc., Type ST or STG; Appleton Electric Company, Type HUB; Crouse-Hinds, Type HUB; or equal.

C. All conduits terminating at motor control centers shall be suitably grounded to the motor control center ground bus using grounded type insulated bushings equal to O. Z. Electrical Manufacturing Company, BLB or IGB; Appleton, Type BIB; Thomas and Betts, 3800 Series; or equal.

D. Conduit expansion fittings shall be O. Z. Electrical Manufacturing Company, Type EX with Bonding Jumper, Type XJ; Appleton, Type SJ with Type XJB4 Bonding Jumpers; Crouse-Hinds, Type XJ with GC100 Bonding Jumper; or equal.

2.8 CONDUIT BOXES

A. Exposed conduit boxes and pulling elbows shall be of die-cast, copper-free aluminum with threaded body and removable neoprene- gasketed cover. Conduit boxes shall conform to Federal Specification W-C-586a and shall be Crouse-Hinds "Condulet," Appleton "Unilet Form 85," or equal.

PART 3 EXECUTION

3.1 GENERAL

A. Minimum size conduit shall be 3/4 inch aboveground and 1 inch below ground except where noted otherwise, and no conduit shall have more than 40 percent of its internal area occupied by conductors.

B. During construction all installed conduits shall be temporarily plugged, capped, or otherwise protected from the entrance of dust, trash, moisture, etc., and any conduits that may become clogged shall be replaced. No conductor shall be pulled in until all work that might cause damage to the conduit or conductors has been completed.

C. Conduit connections to sheet metal enclosures shall be securely fastened by double lock nuts inside and outside and shall have grounding bushings.

D. Conduit straps or brackets secured to concrete, brick, or masonry shall be by means of expansion bolts, toggle bolts, or approved drill anchors. No wood plugs will be permitted.

E. Conduits supported from building walls shall be installed with at least 1/4-inch clearance from the wall using pipe spacers equal to Appleton Electric Company, T & B Company, Steel City, or equal. Clamp back to prevent the accumulation of dirt and moisture behind the conduit.

F. Unless otherwise shown or specified, exposed rigid conduit shall be installed parallel or at right angles to structural members, surfaces, and building walls.

G. Two or more conduits in the same general routing shall be parallel with symmetrical bends.

H. Conduits shall be at least 12 inches from high temperature piping, ducts, and flues.

I. Conduit installed horizontally shall allow headroom of at least 7 feet, except where it may be installed along structures, piping, equipment, or in other areas where headroom cannot be maintained because of other considerations.

J. Wherever necessary conduit boxes and pulling elbows shall be inserted in the lines. Gaskets shall be used to ensure a dust and watertight installation on all conduit boxes and fittings.

K. All bends and turns in conduits shall have a bend radius of not less than 6 times the internal diameter of the conduit. Bends shall be made using an approved bender to provide smooth bends with no kinks, dents, or flattening.

L. All concealed conduit shall be placed in walls, floors, ceilings, or slabs at the proper time in accordance with the progress of the work. The Contractor shall cooperate in every respect in meeting schedules and shall not delay the structural work unnecessarily. Conduits embedded in concrete shall be blocked and braced in place by use of adequate conduit separators to prevent displacement during pouring of the concrete. Where conduit interferes with structural steel, steel reinforcement, or in the opinion of the Engineer occupies too much space in the slab, the conduits shall be rearranged or installed exposed as directed by the Engineer. No additional payment will be made for such rearrangement of conduit whether or not additional conduit or fittings might be required.

M. Conduit wall seals with water stops shall be installed in outside walls below grade for all incoming or outgoing underground conduit emerging directly into the building area. The conduit wall seals shall have a pressure ring and sealing grommet to ensure a watertight installation.

N. Conduit expansion fittings and ground bonding jumpers shall be installed on all conduits passing through building expansion joints to provide movement in the conduit system.

O. Where groups of conduits terminate together or pass through floors, provide template to hold conduits in proper relation to each other and to building.

P. Conduits shall be plugged or capped with plastic caps during construction to protect threads and prevent entrance of dirt and water.

Q. Conduits shall be adequately supported at intervals as required by the National Electrical Code. One to two exposed conduits running parallel to each other may be supported by strap anchors, or 1-hole clamps (walls only). Exposed conduits larger than 2 inches or groups of more than 2 conduits run parallel shall be supported by means of minimum 12 gauge, slotted steel channels fitted with 2-piece, bolted pipe clamps. All conduit supports, clamps, straps and brackets shall be heavily hot dip galvanized for corrosion resistance.

R. Runs of conduit shall not contain more than four 90-degree bends (360-degrees total) between conduit boxes panelboards, or terminations. In general and to the extent practical length of conduit runs between conduit boxes or similar means of access shall not exceed 100 feet.

S. Exposed service entrance conduits and main feeder conduits shall be identified using stenciled letters at intervals not to exceed 20 feet. Size of letters shall be equal to one-half the diameter of the conduit or 2 inches, whichever is less.

T. All conduits located in conditioned spaces (office, labs, restrooms, work areas, etc.) shall be concealed.

U. All conduit terminations outside and in wet enviroments shall utilize rain tight Myer's type hubs.

3.2 INSTALLATION OF RIGID METAL CONDUIT

A. Terminations and connections of rigid metal conduit shall be threaded. Conduits shall be reamed free of burrs and terminated with insulated metallic conduit bushings.

B. Conduit threads shall be coated with a petroleum base corrosion-inhibitor with low electrical contact resistance before assembly equal to Burndy Engineering Company, Inc., Penetrax "A" or equal screw thread lubricant (zinc-petroleum or zinc-chromate compounds are permissible).

C. All conduits shall be suitably grounded to the plant ground grid using grounded type insulated bushings, O. Z. Electrical Manufacturing Company, Type BLG or IGB, T & B Company, Appleton Electric Company, or equal.

D. Conduit across structural joints where structural movement is allowed shall have bonded, weathertight expansion and deflection fitting the same size as the conduit.

E. Support spacing for conduits 1 inch and smaller shall not exceed 6 feet, and conduits 1¼ inches and larger shall not exceed 10 feet. Supports shall be as specified under basic electrical materials and methods. Conduits 1½-inch and smaller may be supported by 1-hole conduit straps and 2 inches and larger shall be supported by 2-hole conduit straps. Conduit racks shall be as manufactured by Unistrut, Kindorf, or equal. Conduit racks shall be PVC coated or 316 stainless steel.

F. Conduit joints shall be made up tight using a pipe wrench. Channel lock pliers will not be permitted, and unions shall be used as necessary to aid in the installation. Conduits shall be cut square and the ends reamed smooth after threading to prevent injury to conductors. Conduit joints in concrete or exposed to weather or damp locations shall be drawn up tight and coated with insulating paint before casting in concrete or painting exposed conduit system.

G. Plastic-coated rigid metal conduit and fittings shall be installed in accordance with the manufacturer's specifications and recommendations. Any damage to the plastic coating shall be repaired in accordance with the manufacturer's requirements. The manufacturer shall certify the installers before installation can be started.

H. Aluminum conduits encased in concrete shall be coated in accordance with Section 3.5(F).

3.3 INSTALLATION OF RIGID NONMETLALIC CONDUIT

A. Field bending of polyvinyl chloride conduit shall be made with appropriate equipment. No torches or flame-type devices shall be used.

B. When joints are to be made with polyvinyl chloride conduit, the conduit shall be cut with a fine-tooth saw and deburred. Conduit ends shall be wiped clean of dust, dirt, and shavings and shall be dry. Solvent cement shall be applied to bond the joint. The joint should be watertight.

C. Polyvinyl chloride conduit shall be installed in accordance with the manufacturers' specifications and recommendations.

3.4 INSTALLATION OF LIQUID-TIGHT FLEXIBLE METAL CONDUIT

A. Terminations at motors shall be made with flexible liquid-tight metal conduit from conduit stub to terminal box; flexible connection shall be made as short as possible. Flexible conduit shall be Type UA, black. Underwriter's Laboratories approved flexible liquid-tight conduit connectors shall be as manufactured by Thomas and Betts Company, Appleton Electric Company, or equal.

B. Uncoated flexible metal conduit may be used for short connections between junction boxes and lighting fixtures or speakers installed in suspending ceiling systems. Flexible metal conduit shall be connected using Underwriters Laboratories approved grounding connectors.

3.5 INSTALLATION OF UNDERGROUND CONDUIT

A. All underground conduits shall be concrete-encased unless otherwise noted on the Drawings or directed by the Engineer. No conduit shall be concealed or encased until the Engineer has inspected the conduit for proper installation and accurate placement.

B. The Contractor shall be responsible for all excavating, draining trenches, forming of duct assembly and protective concrete envelope, backfilling, and removal of excess earth.

C. Underground conduit shall be installed with a minimum 3-inch per 100-foot downward slope for drainage. Drains shall be provided at all low points.

D. Bends and turns shall be made using long sweeps. Ninety-degree bends will be used only where required and shall be kept at a minimum.

E. Where rigid nonmetallic conduits emerge from underground, an adapter from rigid nonmetallic conduit to rigid metal conduit shall be installed and all exposed conduit shall be rigid metal conduit.

F. All rigid metal conduit risers shall be protected with 2 coats of a Bitumastic compound before concrete is poured from a point 12 inches below grade to a point not less than 6 inches above grade or surface of concrete. All stub-ups shall extend upward with one length of rigid metal conduit until after concrete is poured to assure vertical alignment.

G. Conduits shall be encased in concrete with 3-inch minimum concrete cover all around.

H. Concrete for concrete encasement shall be Class B concrete conforming to requirements of the section entitled “Cast-In-Place Concrete,” of these Specifications. Longitudinal and lateral steel reinforcement shall be provided as shown on the Drawings.

I. All underground conduit runs for voltages less than 600 volts shall be at least 24 inches below grade and shall have a minimum conduit separation of 4 inches.

J. All underground conduit runs for voltages over 600 volts shall be at least 36 inches below grade and shall have a minimum conduit separation of 4 inches. Conduit shall have a minimum 4-inch concrete cover on all sides.

K. All underground conduit runs shall be rodded and a mandrel drawn through followed by a swab to clean out any obstructions that may cause cable abrasions. The mandrel shall be 12 inches in length and the diameter ½ inch less than the inside diameter of the conduit.

L. All underground conduit runs shall be marked by a strip of permanently colored red polyethylene tape, 0.004 inch thick and 6 inches wide, buried above the conduit and 6 inches below finished grade.

M. All spare conduits shall be provided with permanent waterproof caps at stub-ups and shall be furnished with a No. 8 aluminum pulling wire. Waterproof raceway tags shall be attached to the pulling cords, at each end and at each intermediate pulling point. The raceway tags shall identify the origin and destination of the conduit.

3.6 CONDUIT APPLICATION

A. Install the following conduit types, unless otherwise shown on the drawings.
   1. Outdoors, Exposed (Not Buried): Aluminum Rigid Conduit
   2. Indoors
      a. Dry Areas Aluminum Rigid Conduit
      b. Wet Areas Aluminum Rigid Conduit
   3. Underground (Under Slabs-on-Grade, Encased or Embedded in Concrete)
      a. PVC Schedule 40
   4. Hazardous Gas Areas
      a. Galvanized Rigid Steel
   5. Corrosive Areas
      a. PVC Schedule 80
   6. Transition Areas and Final Connections to Equipment
      a. Motor Connections – Flexible metal, liquid-tight conduit.
      b. Light Fixture Connections – Flexible metal non liquid-tight conduit in dry areas and liquid-tight in wet areas.

END OF SECTION

SECTION 16120

WIRE AND CABLE

PART 1 GENERAL

1.1 SCOPE

A. Work covered by this section includes furnishing all labor, equipment, and materials required to install, connect, and test all wire and cable, including splices, terminations, connectors, and accessories for a complete installation as shown on the Drawings and/or specified herein.

B. The Contractor's attention is directed to the fact that all wires and cables are not necessarily shown on the Drawings, which are more or less schematic. However, the Contractor shall be responsible for furnishing and installing all wire and cable indicated or required to properly connect and place into operation all equipment and services requiring such wiring and/or cable.

1.2 QUALITY ASSURANCE

A. Samples of all wire and cable, clearly marked and long enough to show complete identification, shall be submitted to the office of the Engineer for approval prior to wiring installation.

B. No defective or damaged wire and cable shall be incorporated into the work.

1.3 SIZING OF CONDUCTORS

A. Unless otherwise required or directed by the Engineer, conductors shall be furnished in the sizes shown on the Drawings. No wire for lighting, power, or motor control circuits shall be smaller than No. 12 AWG. Motor control circuits carrying less than 8 amps may be No. 14 AWG. No wire for instrumentation and low-level signal transmission pairs shall be smaller than No. 16 AWG for single pairs or No. 20 AWG for bundled cable.

B. All wires and cables shall be of such size as to conform to the regulations of the current edition of the National Electrical Code for current carrying capacity.

C. Where the size of lighting wiring is not given on the Drawings, it shall be of such size that the voltage drop from the main panel to the lighting panel is not more than 1 percent, and the drop in the branch circuit is not more than 2 percent. The voltage drop in motor feeder, when the wire size is not specified, shall not be more than 3 percent at full load from the Motor Control Center to the motor terminal.

1.4 SHOP DRAWINGS AND ENGINEERING DATA

A. Complete shop drawings and engineering data shall be submitted in accordance with requirements of the section entitled "Shop Drawings, Product Data and Samples" of these Specifications.

1.5 STORAGE AND PROTECTION

A. Store and protect all wire and cable in accordance with the manufacturer's recommendations and requirements of the section entitled "General Equipment Stipulations" of these Specifications.

B. Wire and cable shall be stored indoors in a dry and warm location and in its original packaging.

1.6 GUARANTEE

A. Provide a guarantee against defective materials and workmanship in accordance with requirements of the section entitled "Warranties and Bonds" of these Specifications.

PART 2 PRODUCTS

2.1 CONDUCTORS - GENERAL

A. Conductors shall be solid or Class B concentric stranded, soft or annealed, uncoated copper free from kinks and defects in accordance with ASTM B 3 or B 8.

B. Conductors should have a conductivity not less than 97 percent.

C. The wire and cable shall have size, grade of insulation, voltage, and manufacturer's "E-Number" permanently marked on the outer covering at not more than 2-foot intervals.

D. All wires shall conform to the latest Standards of the ASTM and ICEA and shall be tested for their full length by these Standards.

E. Insulation thickness shall be not less than that specified by the National Electrical Code.

F. All control circuit wiring and all wiring No. 8 AWG and larger shall be stranded. Lighting branch circuits No. 12 and No. 10 AWG may be solid. Wiring shall be stranded as follows:
   1. No. 14 thru No. 2 AWG shall have a minimum of 7 strands.
   2. No. 1 thru No. 4/0 AWG shall have a minimum of 19 strands.
   3. No. 250 MCM thru No. 500 MCM shall have a minimum of 37 strands.
   4. All circuits except control and instrumentation circuits shall have a separate grounding conductor carried in the conduit.

2.2 CONDUCTORS FOR WIRE AND CABLE

A. XHHW-2 - For service entrance, motor branch, and feeder circuits operating at 240 and 480 volts, the conductors shall be single-conductor, cable rated, 600 volts. The single-conductor cable shall consist of uncoated annealed copper, Class B stranded per ASTM B 8 and insulated with corona, ozone, heat and moisture resisting cross-linked polyethylene insulation rated to withstand a copper temperature of 90 degrees C, Underwriter's approved Type XHHW and shall be as manufactured by Southwire, General Cable Corporation, Okonite Company or equal.

B. THWN-2 - For general lighting and receptacle branch circuits operating at 115 volts, the conductor shall be single-conductor cable rated 600 volts. The single-conductor cable shall be uncoated annealed copper. No. 12 and No. 10 AWG may be solid, or stranded; larger cables shall be stranded per ASTM B 8 and insulated with polyvinyl chloride insulation rated to withstand a copper temperature of 75 degrees C, Underwriter's approved Type THWN-2, and shall be as manufactured by Southwire, General Cable Corporation, Okonite Company, or equal.

C. For lighting fixture drop wire or for running in fluorescent units, the conductors shall be single-conductor cable rated 600 volts. The single-conductor cable shall be stranded tinned copper with a 31-mil-thick wall silicone insulation and a glass braid jacket overall rated to withstand a copper temperature of 150 degrees C, Underwriter's approved silicone insulated fixture wire type SFF-2, and shall be as manufactured by General Cable Corporation, General Electric Company, or equal.

D. For control circuits the conductors may be single or multi-conductor cable rated 600 volts. The conductors shall consist of uncoated annealed copper Class B stranded per ASTM B 8 and shall be No. 14 or No. 12 AWG, 7-strand, identified at each end using Brady wire markers B-500 vinyl cloth, Thomas and Betts "E-Z Code" wire markers, or equal.
   1. Single-conductor cable shall have 45-mil-thick wall of cross-linked polyethylene or polyvinyl chloride insulation, color red, to withstand a copper temperature of 90 degrees C, Underwriter's Laboratories approved Type RHH-RHW, and shall be as manufactured by General Electric Company, Phelps Dodge, General Cable, Okonite, or equal.
   2. Multi-conductor cable shall consist of single-conductor cables rated 600 volts and insulated to withstand a copper temperature of 90 °C cabled together to form a cable assembly which is Underwriter's Laboratories approved for installation in conduit. The core shall be color coded in accordance with ICEA, Method 1, with a plastic tape cover and a PVC or neoprene jacket overall.

E. Bare grounding conductor shall be Class A or B medium hard drawn, high conductivity bare copper, sized as shown on the Drawings. Conductors No. 6 AWG and smaller may be solid. Conductors No. 4 AWG and larger shall be stranded.

F. Flexible power cords shall be moisture-resistant, oil-resistant, neoprene-sheathed service cable designed for extra hard usage, Type SO, rated 600 volts at 90 degrees C continuous conductor temperature. Flexible heater cords shall be moisture-resistant, oil-resistant, neoprene and cotton sheathed service cable designed for extra hard usage, Type HSO, rated 600 volts at 90 degrees C continuous. Insulation shall be thermoplastic ethylene-propylene conforming to ICEA S-68-516. Neoprene shall conform to ASTM D 752. All flexible cords shall be UL listed.

2.3 INSTRUMENTATION AND THERMOCOUPLE EXTENSION WIRING

A. Instrumentation and low level DC signal wiring shall be shielded, twisted pair conductors. Single twisted pairs shall consist of 2, Class B stranded, No. 16 AWG annealed copper conductors, 1 white and 1 black, with 15 mils of PVC insulation rated for 600 volts and 90 degrees C minimum continuous conductor temperature. Pairs shall be twisted to a lay of 1.5 to 2.5 inches. A 0.35 mil by 0.50 mil aluminum-mylar tape shield with stranded, bare No. 18 AWG, tinned copper drain wire in contact with the aluminum side of the shield shall be applied helically around the

twisted pair. An overall jacket of 90 degrees C black PVC at least 30 mils in thickness shall be applied to the outside. Shield coverage shall be full 100 percent. All instrumentation wiring shall be UL listed.

B. Twisted, Shielded Triad Instrumentation Cable for RTD circuits: Stranded copper conductors, size #16 AWG. Insulate conductors individually with color-coded PVC. Provide shield for each triad and tinned-copper drain wire. Provide flame-retardant PVC outer jacket. Cable shall be rated 600 volts and 90 degrees C. Cable shall be designed for noise rejection for use in process control signals.

2.4 AUDIO SIGNAL WIRING

A. Audio signal wiring for public address and sound systems shall be shielded, twisted pair instrumentation cable with 2 No. 16 AWG conductors constructed in accordance with the requirements of Part 2.03 of this section.

2.5 TELEPHONE AND COMMUNICATION WIRING

A. Indoor telephone and communication cable shall consist of solid, minimum No. 22 AWG, annealed copper conductors insulated and standard telephone color coded with polyethylene and twisted together in pairs. Pairs shall be cabled together and protected with a metal tape shield and a polyethylene or PVC jacket overall. Cable shall be suitable for installation in ducts.

B. Buried telephone cable shall be REA approved for aerial installation on messenger wire, installation in underground ducts, and direct burial. Cable shall consist of solid, minimum No. 22 AWG annealed copper conductors insulated and standard telephone color coded with polypropylene or polyethylene and twisted together in pairs. Each pair shall be twisted to a different lay length. Cable with more than 25 pairs shall be assembled from oscillated, bundled, 25-pair subunits. Bundled pairs shall be covered by a nonhygroscopic tape, an inner jacket of polyethylene, a shield of aluminum or tinned copper, and an outer jacket of black, high-molecular weight polyethylene copolymer. Cable core shall be completely filled with a nontoxic, petrolatum-polyethylene weatherproofing compound. Jacket shall be sequentially marked to indicate footage.

2.6 SPLICES AND TERMINATIONS

A. Splices, taps and attachment of fittings and lugs shall be electrically and mechanically secure, and approved solderless lugs and connectors shall be used. Lugs and connectors shall be top quality product of Burndy, O-Z, Thomas and Betts, or equal manufacturer. Conductors shall not bind at bushings. Lugs shall be of the correct sizes for the conductors joined and strands shall not be cut from a conductor.

B. Splices, taps, and terminations of cable rated 600 volts and less requiring tape shall be half lap and at least 3 layers. Taping shall be neatly done and form a permanent insulation equal in mechanical and electrical strength to the insulation of the conductor. Taping shall be as follows:
   1. Rubber Insulation
      a. Inner Layer: Okonite Rubber Tape, 3M “Scotchfil” Electrical Insulation Putty, Plymouth “Plysafe” Tape, or equal.

b. Outer Layer: 3M “Scotch No. 88” Tape, Permacel No. 295 Tape, Slipknot Grey Tape, or equal.
c. Thermoplastic Insulation: 3M “Scotch No. 88” Tape, Permacel No. 295 Tape, Slipknot Grey Tape, or equal.

2. Terminations at motor junction boxes shall be sealed with 3M “Scotchkote” Electrical Coating over the outer layer of tape. All splices 600 volts and less in No. 8 AWG and larger sizes shall be made using approved bolted connectors properly taped as specified herein.

C. For No. 10 AWG and smaller branch circuit and fixture conductors operating at 277 volts or less, live spring pressure connectors rated for 600 volts may be used for splices and junctions. When installed in a fixture, connectors shall be rated for 1,000 volts.

2.7 GROUND RODS

A. Ground rods shall be Copperweld, sectional type. Ground rods shall be UL listed and REA approved and shall conform to ANSI C33.8.

B. Connections between grounding conductors and grounding rods shall be mechanical if above ground, thermal if underground.

PART 3 EXECUTION

3.1 INSTALLATION

A. All interconnecting wiring shall be installed in approved conduit or cable trays and connected as shown on the Drawings and/or specified herein. Unless otherwise shown or specified, all wiring shall be run in conduit.

B. Unless otherwise shown on the Drawings, wiring shall be run by the most direct route keeping overall circuit length to a minimum.

C. Instrumentation and low level signal wiring shall not be located in the same conduit as motor wiring, feeder wiring, branch circuit wiring, or control wiring. Control wiring shall not be located in the same conduit as feeder wiring, or instrumentation wiring.

D. All control and circuit wiring in cabinets, boxes, gutters, etc. shall be neatly tied and held using nylon cable ties and mounting brackets.

E. After installation, conductors shall not have dents, scars, cuts, pressure indentations, abraded areas, etc.

F. Conductors 600 volts and below shall not be bent to a radius less than 12 times the cable diameter. Conductors above 600 volts shall not be bent to a radius of not less than 24 times the cable diameter.

G. Wiring run in metallic conduits shall be arranged such that there are an equal number of conductors of each phase in each conduit. Under no circumstances shall metallic conduits contain one single conductor or several conductors of only one phase. This requirement shall not apply to single, bare grounding conductors run in conduit to grounding rods or grids.

H. Conductors may be coated with talc, soapstone, Ideal "Yellow 77" or "Wire Lube", Electro-Compound "Y-ER EAS," or equal, to facilitate pulling into raceways, but in no case may they be greased or coated with any substance injurious to conductor insulation and jacket. Pulling tension shall be exerted primarily on the strongest component of conductors, normally the metallic conductors themselves and not on the insulation jacket. When installing cable in conduit with pulling eye attached to copper conductor, the tension shall not exceed 0.008 pound per circular mil area of the conductor nor 5,000 pounds, whichever is smaller. When a basket grip is used over the outer jacket of the cable, the maximum pulling tension shall not exceed 0.008 pound per circular mil area of the conductor nor 1,000 pounds, whichever is smaller. In no case shall pulling tensions recommended by the wire manufacturer be exceeded. The maximum sidewall pressure exerted on the insulation and sheath at a cable bend shall not exceed 300 pounds per foot of conduit bending radius. Conductors shall not be pulled "through" any outlet, condulet or box. Separate "pulls" shall be made on each side of such point.

I. Unless otherwise specified, splices shall be made at outlet or conduit boxes, pull or junction boxes, manholes, or vaults. No splice shall be drawn into a conduit. Splices in wiring rated 600 volts and below shall be made with enough spare wire for 2 splices to be remade with the wire at the same location.

J. All instrumentation and thermocouple extension wire shields shall be grounded. Shields on individual circuits shall be electrically continuous and shall be grounded at only 1 point in the circuit. Shields on thermocouple extension wire shall be grounded at the thermocouple only.

K. Surge suppressors shall be installed with the shortest line lead possible, but in no case longer than 18 inches unless otherwise shown on the drawings.

L. Inside manholes, all cables are to have racks with insulator supports. Supports are to be within 6 inches of each side of a splice and spaced not farther than 3 feet apart.

M. All conductors are to be identified. Branch circuits, motor feeders, and lightning wiring shall be identified by color coding as follows:

	277/480V	**120/208/240V**
Phase A	Brown	Black
Phase B	Orange	Red
Phase C	Yellow	Blue
Neutral	Grey	White
Ground	Bare	Bare or Green

N. The color coding on No. 8 AWG and smaller conductors shall be continuous in length. No taping, painting or other means of coding will be acceptable. Conductors No. 6 AWG and larger and conductors operating above 600 volts shall be black with color coded tape visible at each point of access or view.

O. All circuits shall be identified at each termination and at all accessible locations such as manholes, hand holes, and pull-boxes. A circuit name shall be assigned based on the equipment at the load end of the circuit. Add a suffix letter if necessary to make the circuit number unique. Utilize sleeves for conductor sizes #2 AWG and smaller, and marker plates attached with nylon tie cords for larger conductor sizes. Taped-on markers or markers relying on adhesives shall not be allowed.

P. Conductors used for temporary construction power shall not be used for the permanent installation, and the permanent conductor system shall not be used for construction power unless authorized in writing by the Engineer. Circuit protective devices shall never be temporarily bypassed.

Q. Cables shall be pulled and installed without splices. Splices shall only be made with the Engineer's approval.

R. Apply fireproofing tape to cables in hand holes and manholes, and in other locations such as vaults, throughout their exposed length. Follow the tape manufacturer's installation instructions closely.

3.2 TESTING

A. Perform visual and mechanical inspection of each individual exposed power cable #6 AWG and larger for physical damage, correct terminations in accordance with the Drawings, cable bends in accordance with bending radius requirements, proper circuit identification, proper lug type, tightness of bolted connections with proper torque level per NETA ATS, Table 10.12 or manufacturer's specifications, and proper grounding.

B. Perform Insulation Resistance Testing of all conductors #6 AWG and larger with respect to ground and each adjacent conductor. Apply 1,000 volts dc for one minute on 600 volts insulated conductors in accordance with NETA. Minimum insulation resistance values shall not be less than 50 meg-ohms. Investigate all deviations between adjacent phases.

C. Perform Continuity test by ohmmeter method to ensure proper cable connections of all conductors #6 AWG and larger.

END OF SECTION

SECTION 16130

BOXES

PART 1 GENERAL

1.1 SCOPE

A. All boxes required throughout the electrical raceway system shall be furnished and installed in accordance with the requirements which follow.

1.2 SECTION INCLUDES

A. Outlet boxes.

B. Pull and junction boxes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Boxes shall be equal to Appleton, Crouse Hinds, Raco, or Steel City.

2.2 MATERIALS

A. Outlet Boxes

1. Sheet Metal Outlet Boxes: NEMA OS-1, UL 514; galvanized steel, with ½ inch male fixture studs where required.
2. Cast Boxes: Cast feralloy with galvanized or cadmium finish, deep type, gasketed cover, threaded hubs for use with steel conduit, UL 514.
3. Floor Boxes: Full adjustable, steel, water and concrete tight equal to T&B model number 68 D.
4. Except as indicated otherwise on the drawings or in these specifications, all junction boxes or pull boxes 4 inch trade size or smaller in any dimension shall be galvanized malleable iron or acceptable equal cast ferrous metal for use with steel conduit.

B. Pull and Junction Boxes

1. Junction boxes and pull boxes shall be as indicated on the drawings and as specified in these specifications. Where no type or size is indicated elsewhere for junction boxes or pull boxes, they shall be in accordance with the requirements of the NEC, Article 314, Paragraphs 28, 29, 40 and 41 for use on systems with a nominal rating of 600 volts and less, and Section IV for use on systems with a nominal rating of over 600 volts.
   a. Sheet Metal Boxes: NEMA OS-1; galvanized steel. Boxes larger than 12-inches in any dimension are hinged enclosure. Equal to Hoffman Bulletin A-51.

b. Cast Metal Boxes: NEMA 250; Type 4, galvanized cast iron box and cover, neoprene gasket, stainless steel cover screws, UL listed as raintight. Provide flat-flanged type for surface mounting and outside flange recessed cover type for underground use. Boxes for sidewalk or other traffic areas to have appropriate duty cover with non-skid finish.

c. Corrosion Resistant Boxes: UL 508 Type 4X, gasketed screw cover. For boxes larger than 12-inches in any dimension provide hinge on one side and stainless steel toggle latches (equal to Hoffman A-FC412SS) on the other three sides. Equal to Type 304 stainless steel equal to Hoffman Bulletin A-51.

d. Floor Boxes: Floor boxes shall be cast iron with bolted covers. The boxes shall be approximately 12 inches square and 10 inches deep, and shall be located as shown on the drawings with the lid flush with the finished floor. Floor boxes shall be Neenah No. R-7517-DB or alternate acceptable to the Engineer.

e. Boxes shall be of the same material as the conduit.

2. Electrical enclosures, except junction boxes and pull boxes 4 inch trade size and smaller and other enclosures of cast metal, shall be constructed from steel plate reinforced as required to provide true surfaces and adequate support for devices mounted thereon.

3. Except as indicated otherwise in these specifications or on the drawings, all junction boxes and pull boxes larger than 4 inch trade size for use in indoor locations shall be sheet steel hot-dip galvanized after fabrication and those for use in outdoor locations shall be 316 stainless steel.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordination of Box Locations

1. Provide boxes as shown on Drawings, and as required for splices, taps, wire pulling and equipment connections.

2. Box locations shown on the Drawings are approximate unless dimensioned. Verify box locations prior to rough-in. Coordinate mounting heights and locations of outlet mounted above counters, benches, backsplashes, and other furnishings. Any outlet may be relocated by up to 10 feet before it is permanently installed without incurring additional cost.

3.2 INSTALLATION

A. Box Installation

1. Do not install boxes back-to-back in walls. Provide minimum 6-inch separation, except provide minimum 24-inch separation in acoustic-rated walls.
2. Locate boxes in masonry walls to require cutting of masonry unit comer only. Coordinate masonry cutting to achieve neat openings for boxes.
3. Support boxes independently of conduits openings.
4. Use multiple-gang boxes where more than one device is mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
5. In inaccessible ceiling areas, position outlets and junction boxes within 6-inches of recessed luminaires to be accessible through luminaire ceiling opening.
6. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
7. Align wall-mounted outlet boxes for switches, thermostats, and similar devices. Align adjacent devices at different elevations in one vertical line. Set floor boxes level and flush with finish flooring material.
8. Unless otherwise noted, use only cast outlet boxes. Galvanized steel boxes shall be used only in finished areas where they are completely concealed within walls or ceiling.
9. Conduit openings in boxes shall be made with a hole saw or shall be punched. Field locate holes in junction and pull boxes so as to afford the maximum bending radius for the conductors.
10. Boxes mounted on concrete shall be secured by self-drilling anchors. Mounting on steel shall be by drilled and tapped screw holes, or by special support channels welded to the steel, or by both. Boxes larger than 4 inch trade size shall be leveled and fastened to the mounting surface with not less than 1/4 inch air space between the enclosure and mounting surface. All mounting holes in the enclosure shall be used.
11. Except as prevented by the location of other work, all junction boxes and outlet boxes shall be centered on structures.
12. Label cover of junction boxes with circuit numbers of conductors in the box.
13. All boxes shall be of the same material as the conduit type. If aluminum conduit is used, boxes should be aluminum. If PVC coated rigid steel conduit is used, boxes should be PVC coated rigid steel.
14. Unless indicated otherwise on the drawings or in these specifications, electrical enclosures except junction boxes and pull boxes 4 inch trade size and smaller, shall be as follows:

Location	Enclosure Type
Indoor (Nonhazardous) Dry Areas	NEMA 1
Areas where moisture conditions are more severe than those for which NEMA 1 enclosures are intended	NEMA 4
Outdoor (Nonhazardous)	NEMA 4X
Class 1, Division 2	NEMA 7

END OF SECTION

SECTION 16160

PANELBOARDS

PART 1 GENERAL

1.1 SCOPE

A. Panelboards shall be furnished in the quantities and with components, devices, and materials meeting the requirements indicated in the panelboard list on the drawings.

B. Panelboards shall be designed and fabricated in accordance with NEMA standards for panelboards. Each panelboard, or all current controlling devices in each panelboard, shall bear the UL label.

1.2 SECTION INCLUDES

A. Panelboards.

1.3 SUBMITTALS

A. Submit shop drawings.

1.4 REFERENCE STANDARDS

A. Design, manufacturing and assembly of elements of panelboards and devices herein specified shall be in accordance with the standards of the below listed organizations.

1. American National Standards Institute (ANSI)
2. National Electrical Manufacturers Association (NEMA)
3. National Fire Protection Association (NFPA)
4. National Electrical Code, NFPA-70 (NEC)
5. Underwriters Laboratories, Inc. (UL)

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Equipment shall be manufactured by ABB-GE, Square D, Eaton/Cutler-Hammer, or approved equal.

2.2 MATERIALS

A. Panelboards: NEMA PB-1; UL 67.

B. Rating: Voltage and ampere ratings are shown on the Drawings. Unless otherwise indicated, interrupting ratings (RMS symmetrical) are 14,000 amps for 480 volt panelboards and 10,000 amps for 240 and 208 volt panelboards.

C. Cabinets: Indoor panelboards shall be in NEMA 1 cabinets. The cabinet shall be code gage gasketed steel. It shall consist of a box with a removable front complete with hinged door, latch and master keying lock. The box shall be flanged galvanized sheet steel. Boxes shall be a minimum of 20 inches wide and 5-7/8 inches deep. Code gauge galvanized steel; sized to accommodate devices indicated and afford wire bending space in accordance with NEC requirements.

D. Fronts: Surface or flush as indicated, door-in-door construction, finished in light grey enamel over a rust inhibitor. Furnish flush lock for fronts less than 48-inches high and vault type handle with three point catch for fronts 48-inches and higher. Key all locks alike.

E. Bus:
1. Rigid buses of copper or copper alloy shall be installed to provide consecutive phasing of branch circuit connections.
2. The solid neutral bus shall have solderless connectors, numbered to agree with branch circuits. The bus shall be insulated from the cabinet with provisions for grounding.
3. The equipment grounding bus with main lug shall have solderless connectors, numbered to agree with branch circuits.

F. Circuit Breakers:
1. NEMA AB-1; molded case type, thermal-magnetic trip with internal common trip on multi-pole breakers.
2. Protective overcurrent devices for branch circuits shall be of the size and type indicated on the drawings.
3. Panelboard branch circuit breakers shall be the thermal magnetic, bolt-in, individually front replaceable type and shall indicate "On", "Off", and "Tripped". Circuit breakers indicated as multiple pole shall be common trip.
4. Continuous and interrupting ratings shall be as shown on the drawings. Provide breaker fully rated for interrupting ratings noted; series ratings are not acceptable.

G. Provide engraved nameplates giving the voltage rating and panel designation as indicated. Provide a UL service entrance label for panelboards used as service entrance equipment.

H. Surge Protection: Where indicated, provide transient voltage surge suppressors.

PART 3 EXECUTION

3.1 INSTALLATION

A. All panelboards shall be installed so that circuit breakers are not more than 6 feet above the finished floor and not lower than 24-inches above the floor. Panels shall be installed in accordance with the requirements of NEC Article 312 Paragraph 8, Article 408 and the following articles.

B. The cabinets shall be leveled and securely fastened to the mounting surface, utilizing all of the mounting holes provided in the panelboard cabinets.

C. Each cabinet shall be installed, conduits connected, and wires pulled before the panel interior is installed. A heavy cardboard panel front shall be temporarily secured to the front of the panelboard to protect the interior from dirt or damage until the permanent metal front is installed.

D. Each panelboard front shall be carefully aligned and adjusted until its edges are parallel to the panelboard interior and the building lines, and then shall be firmly secured with the fasteners provided.

E. For flush mounted panels provide a 3/4-inch empty raceway for each three unused spaces and spare poles. Terminate in a junction box located above the ceiling or other approved accessible location for future extension.

F. Prior to energizing panelboards clean out construction dirt and debris. Paint any scratches on the trims or dead front barriers. Megger each phase to phase and ground to insure that no short circuits exist.

G. Adjust panel barriers so that no openings occur between them and panel front. Provide filler plates and plugs as necessary to maintain dead front integrity.

H. A circuit directory cardholder and card with a clear plastic covering shall be provided on the inside of each cabinet door. The directory card shall provide a space to identify each circuit in the panelboard. The directory for each panelboard shall be accurately typed with the names of the load served by each breaker to permit ready location of the protective devices controlling circuit loads. Note spare circuits in pencil.

I. Each panelboard shall be identified with a suitable engraved nameplate mounted at the top of the front plate. Each nameplate shall be engraved with the panelboard identification indicated on the drawings.

END OF SECTION

SECTION 16170

MOTOR DISCONNECT SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Three phase motor disconnect switches.

B. Single phase motor disconnect switches under 1 horsepower.

C. Single phase motor disconnect switches over 1 horsepower.

1.2 SUBMITTALS

A. Submit shop drawings.

PART 2 PRODUCTS

2.1 THREE PHASE MOTORS

A. Disconnect switches for three phase motors shall be a heavy duty type rated 600 volts, and shall be UL listed. Outdoor switches shall be in NEMA 4X enclosures; indoor switches in non-corrosive atmospheres shall be in NEMA 1 enclosures; indoor switches in corrosive atmospheres shall be in NEMA 4X enclosures.

B. Switches shall be single throw non-fusible with provisions for padlocking the handle in the open position.

C. Unless noted otherwise, disconnect switches shall be rated for 600V.

2.2 SINGLE PHASE MOTORS UNDER 1 HORSEPOWER

A. Disconnect devices for single phase motors up to 1 horsepower, not controlled with magnetic starters, shall be toggle operated manual motor starters rated 240 volts ac. Outdoor switches shall be in NEMA 3R enclosures; indoor switches in non-corrosive atmospheres shall be in NEMA 1 enclosures; indoor switches in corrosive atmospheres shall be in NEMA 4 enclosures.

B. Switches shall be non-fusible type with a thermal overload trip assembly. The handle shall include a handle guard with provisions for padlocking the handle in the open position. Continuous ratings shall be as shown on the drawings.

2.3 SINGLE PHASE MOTORS OVER 1 HORSEPOWER

A. Disconnect switches for single phase motors over 1 horsepower in non-corrosive atmospheres and having separate overload protection and control shall be general duty rated for 240 volts ac. Outdoor switches

shall be in NEMA 4X enclosures and indoor switches shall be in NEMA 1 enclosures.

B. Disconnect switches for single phase motors over 1 horsepower in corrosive atmospheres and having separate overload protection and control shall be heavy duty rated for 600 volts ac in NEMA 4X enclosures.

C. Switches shall be 2 pole non-fusible, single throw type with provisions for padlocking in the open position. Continuous ratings shall be as shown on the drawings.

2.4 NAMEPLATES

A. Nameplates shall be provided for each motor disconnect switch to identify the load served. Nameplates shall be engraved with 3/16 inch minimum height black letters on a white background, and shall be mounted on the front of the enclosure with stainless steel screws.

2.5 ACCEPTABLE MANUFACTURERS

A. Disconnect switches shall be manufactured by General Electric, Cutler Hammer, Square D, or approved equal.

PART 3 INSTALATION

3.1 INSTALLATION

A. Install in accordance with the manufacturer's instructions.

3.2 FIELD QUALITY CONTROL

A. TESTS
1. Megger each bus, phase-to-phase and phase-to-ground.

END OF SECTION

SECTION 16450

GROUNDING

PART 1 GENERAL

1.1 STANDARDS

A. All electrical systems shall be grounded in accordance with the National Electrical Code, Local Codes, these Specifications and the contract drawings.

PART 2 PRODUCTS

2.1 CABLE AND EQUIPMENT

A. Use green colored and bare stranded copper conductors.

B. Use approved ground clamp manufactured for such purpose.

C. Use approved grounding electrodes and rod.

D. Make permanent ground connection with thermoweld method.

PART 3 EXECUTION

3.1 GENERAL

A. In general, alternating current circuits of 600 volts and below, surge suppressors, conductor raceway systems, and platform steel framework shall be effectively and permanently connected to a grounding system by means of copper conductors having cross section as required by the National Electrical Code and of capacity sufficient to ensure continuity and continued effectiveness of the ground connections under conditions of excess current. If some of the equipment to be grounded is not covered herein by detailed instructions or is not shown completely and clearly on the Drawings, such provisions of the National Electrical Code as may apply are to be considered minimum requirements for the work.

B. All metallic conduit systems, whether used for power or lighting wiring, shall be installed in such a manner as to produce electrical continuity and shall be bound together at one or more points and connected to the building system ground, except that isolated sections of conduit not exceeding 4 feet in length are not to be grounded or bonded unless specifically called for.

C. Rigid metal conduit systems made up with fittings, boxes, and apparatus housings having fully-threaded hubs need no additional provisions for continuity of ground. If the conduit system contains cutouts, pull boxes, junction boxes, switchboxes, etc., to which the conduit is fastened by means of locknuts and bushings, such interruptions in the grounding continuity shall be eliminated by bonding the conduit to the housings or by separately grounding each box and conduit sections, etc., that are so isolated. Grounding wedge lugs shall be used between all bushing and metal boxes. Paint and

other nonconducting material shall be removed from the surface of conduit, fittings, and metal housings prior to connecting grounding clamps, straps, or other devices.

D. Equipment Grounding: Panel, starters, lighting fixtures, motor control center, etc., for power and lighting constitute the fundamental center of the associated distribution systems. As such, the metallic enclosures, frames, and other noncurrent carrying metal parts of this equipment shall be connected by one or more grounding conductors to the grounding system. Install a ground connection from the ground bus of switchgears, MCCs, and other electrical panels with ground bus to the ground grid.

E. All motor frames shall be grounded. The ground conductor shall be run inside the conduit containing the power conductors. In the case of most 3-phase circuits, this means a fourth conductor in each branch circuit. The grounding conductor may be as large as the power conductor or as small as allowed by Section 250 of the NEC but shall not be smaller than No. 12 AWG. The grounding conductor shall be stranded, with green insulation through No. 4 AWG; larger sizes may be bare stranded. Ground connection at the motor shall be terminal lug or servit post inside motor conduit box and the other end connected to the ground bus in the motor control center.

F. Transformer Grounding: Bond the neutrals of outdoor substation transformers and distribution transformers within buildings to system ground network, and any additional grounding electrodes shown near the transformers. Connect the case of the transformer to the grounding system as well.

G. In making ground connections, the surfaces to all parts that will touch shall be thoroughly cleaned to ensure making good electrical contacts.

H. All clamped joints shall be made up firmly. Thermal joints shall be equal to Caldwell Type TA. Where exposed to mechanical injury, the grounding conductor shall be suitably protected by pipe or other substantial guard. If guards are iron pipe or other magnetic material, the grounding conductor shall be electrically connected to both ends of the guard to reduce impedance of the circuit.

I. Grounding conductors shall be without splice or joint if applicable and shall be straight and short except that when laid underground they shall be laid slack to prevent their being readily broken unless otherwise mechanically protected.

J. No fuse, switch, circuit breaker, or similar disconnecting devices shall be inserted in the grounding conductor or connection throughout the entire installation.

K. Grounding conductors shall be medium hard drawn, stranded bare copper wire sized as required by the National Electrical Code Article 250. Conductors Size No. 6 and smaller may be solid; Size No. 4 and larger shall be stranded. Ground wire shall be carried in conduit to the grounding point.

L. Ground rods where required, shall be of copper-clad steel not less than ¾-inch in diameter, 10 feet long or as shown on the Contract Drawings, and driven full length into the earth. The maximum resistance of a single driven ground shall not exceed 5 ohms under normally dry conditions. If this resistance cannot be obtained with a single rod, a minimum of 2 additional rods shall be installed not less than 10 feet on center. Connections between grounding conductors and ground rods shall be mechanical if exposed, thermal if buried.

M. Except where specifically indicated otherwise, all exposed noncurrent-carrying metallic parts of electrical equipment, raceway systems, and neutral conductor of the wiring system shall be grounded. The ground connection shall be made at the main service equipment and shall be extended to driven rods on the exterior of the building.

N. All neutral conductor shall be continuous throughout the system and shall be grounded only at the point of origin of the service neutral.

O. All receptacles shall have provision for grounding conductor connection, and shall be grounded to the grounding conductor and outlet box.

P. All exposed steel columns, tanks, ladders, towers, and elevated platform shall be effectively grounded using No. 4/0 or larger bare copper grounding conductors and driven ground rods. Where multiple columns or tanks must be grounded, ground points shall be interconnected by minimum No. 4/0 bare copper grounding conductors buried approximately 18 inches below finished grade.

Q. Anchor bolts securing exposed electrical equipment, structures, metal enclosures, and tanks located outdoors shall be electrically connected to the steel reinforcement in the concrete foundation or footing. Connection shall consist of minimum No. 2/0 bare copper conductors and mechanical grounding clamps.

R. Surge arrestor ground terminals shall be connected to the equipment ground bus. Ground paths for lightning and surge arresters and capacitors shall be kept as short and direct as practical. If possible, arresters shall be connected in direct shunt relationship to the equipment terminals. Supporting brackets shall be connected directly to the equipment frame.

S. Grounding resistors, where specified, shall have a resistance within the boundary limits specified in IEEE Standard 142 in order to minimize transient overvoltages during ground faults. Ground fault current shall not be less than that required to operate protective devices or 25 amps, whichever is greater.

T. Lightning and surge arresters used with grounded-wye systems which do not have effectively grounded neutrals as defined by IEEE Standard 100 shall have a voltage rating not less that the maximum phase-to-phase voltage of the system.

U. The grounding system equivalent resistance shall not exceed 5 ohms for the entire system under normally dry conditions unless otherwise specified. After the grounding system has been installed and all connections made, tests shall be made by the Electrical Contractor to determine the resistance to earth. If the resistance of the entire system exceeds the specified maximum, additional ground rods shall be driven to reduce the resistance to this value.

V. Gas piping or piping conveying flammable liquids shall not be used as grounding electrodes.

W. The use of salts or electrolytes to reduce earth resistance shall not be permitted.

X. Permanently connect the green ground conductor to each receptacle junction box (self-tapping screw).

Y. Install a ground rod inside each manhole. Connect any metallic raceway and all noncurrent-carrying metal parts to the ground rod with a No. 6 AWG (min.) copper conductor. Similarly, provide a ground rod for every pole-mounted site lighting and make grounding connections.

Z. Bond the standby generator neutral to the grounding system with a properly sized grounding conductor. Ground the generator frame to the ground grid.

AA. Ground metallic fences when used to enclose electrical equipment.

3.2 TESTING

A. Ground resistance testing shall be done in accordance with IEEE standard 81-1993 to confirm that the resistance of the grounding system is 10 ohms or less (test shall not be run within 72 hours of last rain fall). Ground resistance testing shall be done with the power off and the grounding electrode conductor isolated from the utility, and the service to prevent coupling. The testing equipment shall use the fall of potential method of earth resistance measurement. The test equipment must be designed to reject the effects of stray ac and dc currents on readings.

B. A test report shall be submitted to the engineer and included in the O & M manual for the project. The report shall include but not be limited to:

- Date of test
- Time of day
- Weather condition (ex. 82°F, 82% RH, cloudy)
- Date of last rain fall ≥ ½" in a 24 hour period
- Soil type
- Minimum of five (5) readings
- A plot of all readings indicating a level spot in the curve at the system resistance.

C. All ground resistance testing shall be done in the presence of the Engineer. If test measurements indicate a grounding system resistance of greater than 10 ohms, additional grounding cable shall be buried in locations and at the direction of the Engineer. Ground resistance testing as described herein shall be repeated after the additional ground cable has been installed. The installation of grounding cable and repeat testing shall be done until the 10 ohm grounding system resistance has been achieved.

D. Test equipment for ground resistance measurement shall be Vibroground by Associated Research, Megger null balance by Biddle, or alternate approved by the Engineer.

END OF SECTION

WATER TREATMENT FACILITY PRETREATMENT SYSTEM

FOR THE

CITY OF BALDWIN

HABERSHAM COUNTY, GEORGIA

APRIL 2024

MAYOR
STEPHANIE ALMAGNO

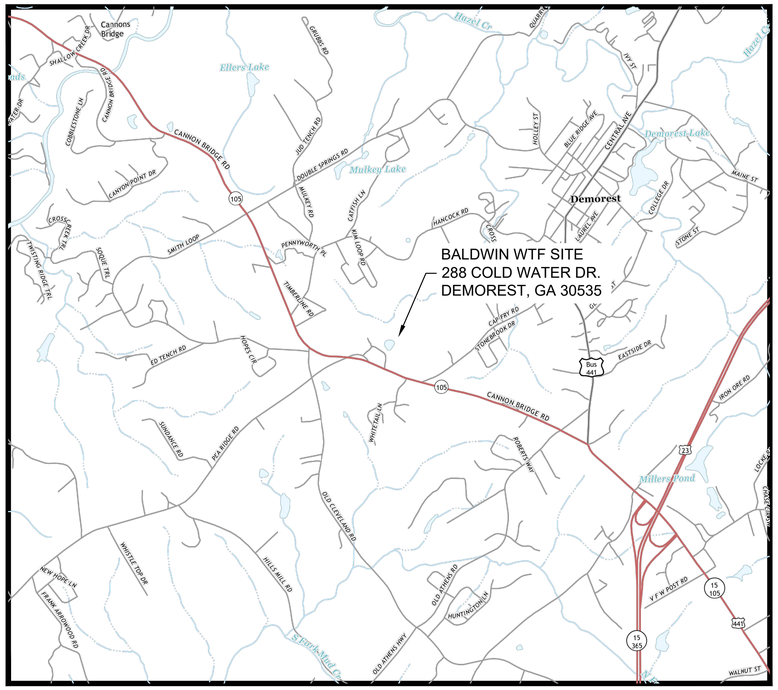
CITY COUNCIL MEMBERS
ERIK KEITH
JOSEPH SATTERFIELD
KERRI DAVIS
MAARTEN VENTER
ALICE VENTER

CHIEF ADMINISTRATIVE OFFICER
EMILY WOODMASTER

PUBLIC WORKS DIRECTOR
SCOTT BARNHART

OWNER:

CITY OF BALDWIN
CITY HALL
186 US HIGHWAY 441
BALDWIN, GA. 30511
PHONE (706)-778-6341



PROJECT MAP
N.T.S.

GEORGIA811
Utilities Protection Center, Inc.
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SHEET INDEX	
SHEET NO.	DESCRIPTION
G1	COVER SHEET
G2	GENERAL NOTES & LEGEND
G3	PROCESS FLOW SCHEMATIC
C1	EXISTING SITE CONDITIONS
C2	DEMOLITION PLAN
C3	GRADING PLAN
C4	STORM DRAINAGE PROFILES
Y1	PROCESS PIPING PLAN
Y2	PROCESS PIPING PROFILES
A1	PRETREATMENT BUILDING FOUNDATION LAYOUT & DETAILS
A2	PRETREATMENT BUILDING FLOOR PLAN
A3-A4	PRETREATMENT BUILDING ELEVATIONS
A5	PRETREATMENT BUILDING SECTIONS
P1	PRETREATMENT BUILDING PROCESS PIPING PLAN
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P4	EXISTING TREATMENT BUILDING PROCESS PIPING EXISTING LAYOUT
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P6	EXISTING TREATMENT BUILDING PROCESS PIPING PROPOSED ELEVATIONS
PL1	PRETREATMENT BUILDING PLUMBING-DOMESTIC WATER PLAN
PL2	PRETREATMENT BUILDING PLUMBING-DRAIN PLAN
PL3	PRETREATMENT BUILDING CHEMICAL FEED SCHEMATIC
PL4	PRETREATMENT BUILDING CHEMICAL FEED & SAMPLING PLAN
S0.1	STRUCTURAL NOTES
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S2.1-S2.2	SECTIONS & DETAILS
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E1	ELECTRICAL LEGEND, NOTES AND ABBREVIATIONS
E2	ONE LINE DIAGRAM
E3	ELECTRICAL SITE PLAN
E4	BUILDING POWER AND GROUNDING
E5	BUILDING LIGHTING
E6	SCHEMATICS
E7	ELECTRICAL DETAILS
H1	PRETREATMENT BUILDING - BUILDING PLAN - HVAC
H2-H3	PRETREATMENT BUILDING - BUILDING - HVAC DETAILS
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EC5	EROSION CONTROL PRE DEVELOPMENT CONDITIONS
EC6	EROSION CONTROL POST DEVELOPMENT CONDITIONS

DATE	NO.	DESCRIPTION
04/16/24	0	RELEASED FOR BID
05/03/24	1	REVISED PER ADDENDUM 1

STATE OF GEORGIA
REGISTERED
NO. 35581
PROFESSIONAL
4/12/24
ENGINEER
GREGORY K. BENNETT

STAMP

G1

SHEET NO.

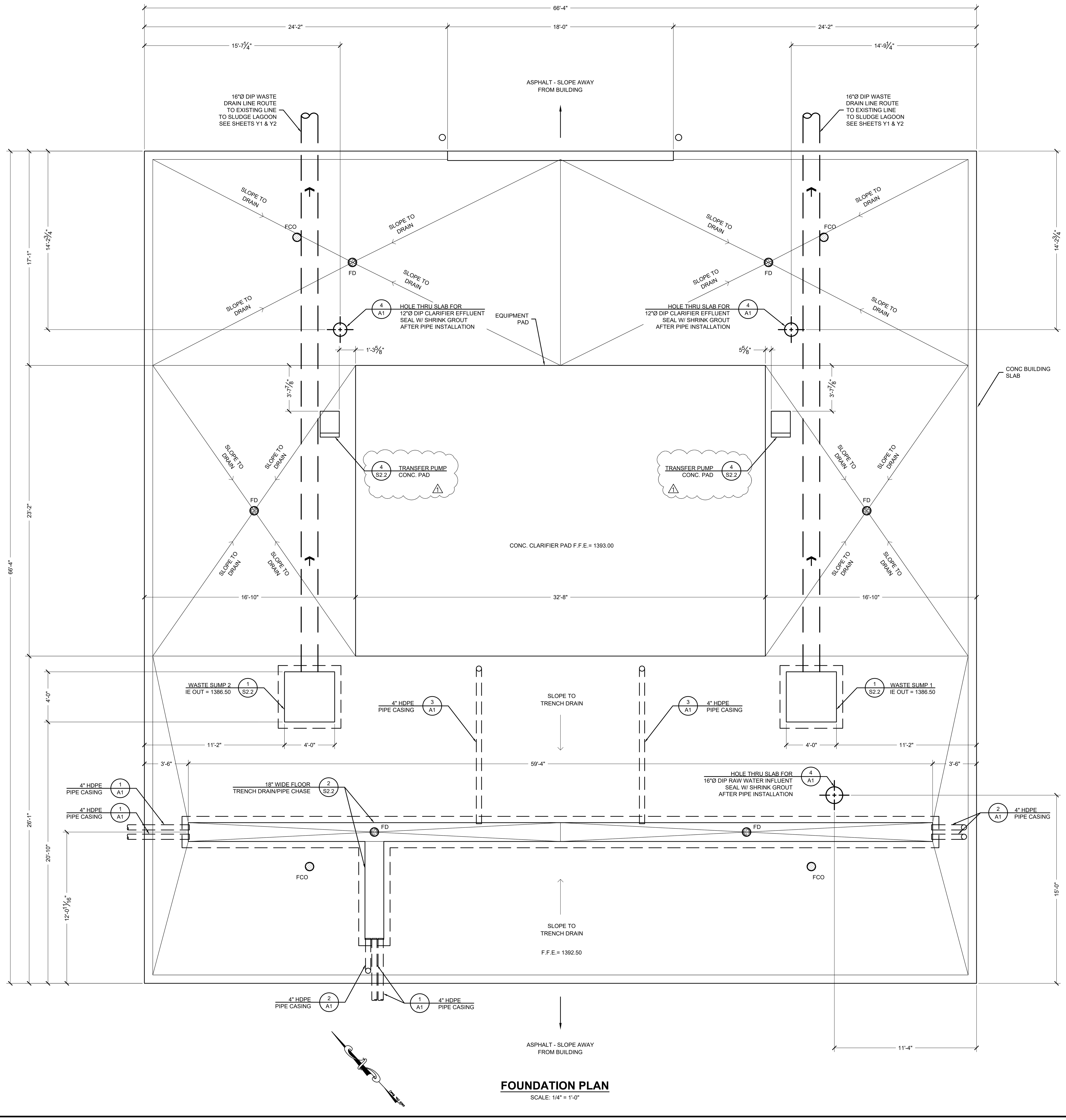
PATH & FILE: Z:\PROJECTS\20\20043-Baldwin Pretreatment System\Design Stage\20043 Base.dwg

PROJECT ENGINEER:

ENGINEERING MANAGEMENT
Experience ■ Trust ■ Solutions

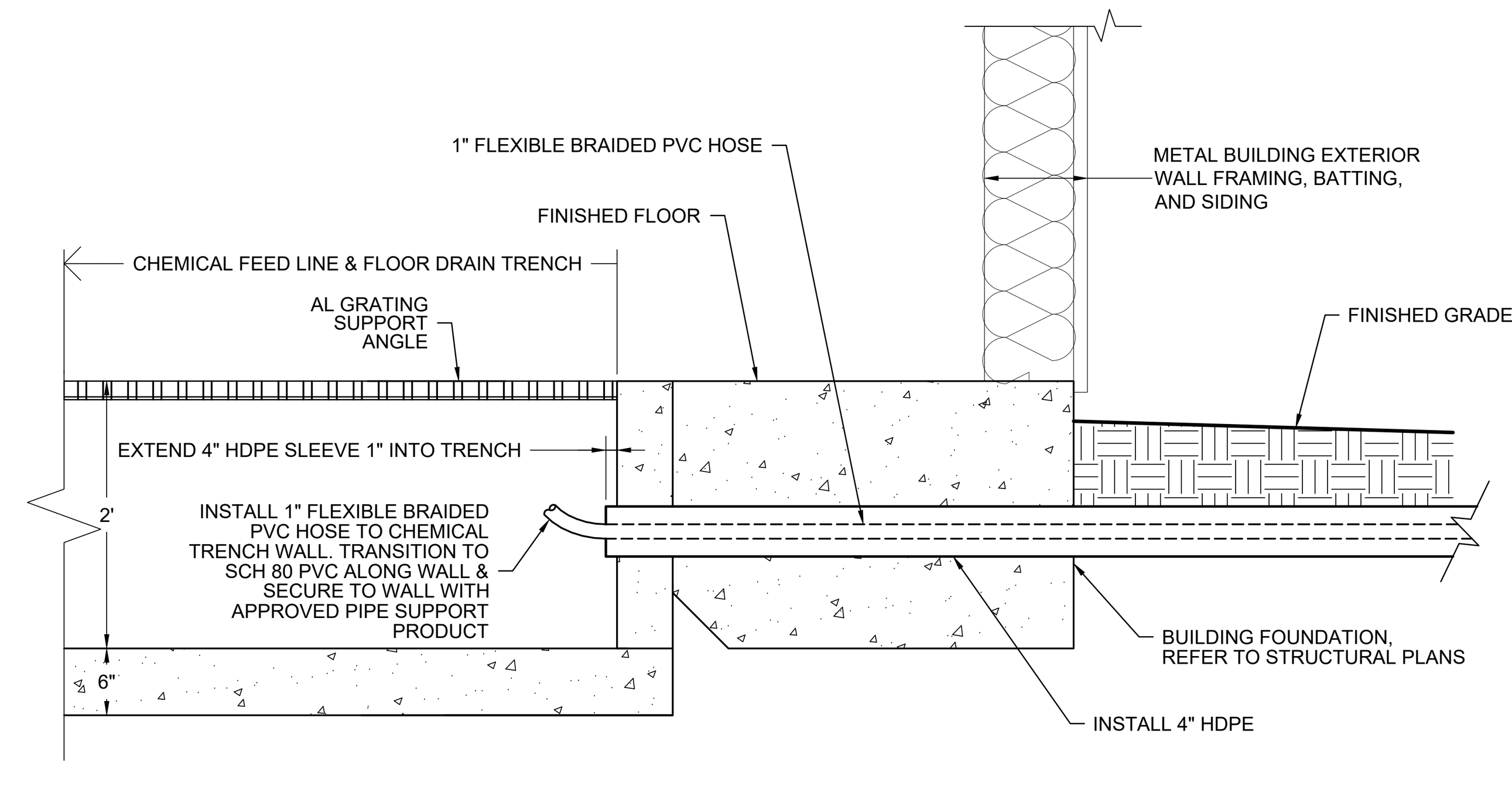
303 Swanson Drive, Lawrenceville, GA 30043
phone 770-962-1387 fax # 770-962-8010
www.eminc.biz

PROJECT CONTACT: GREG BENNETT, P.E.



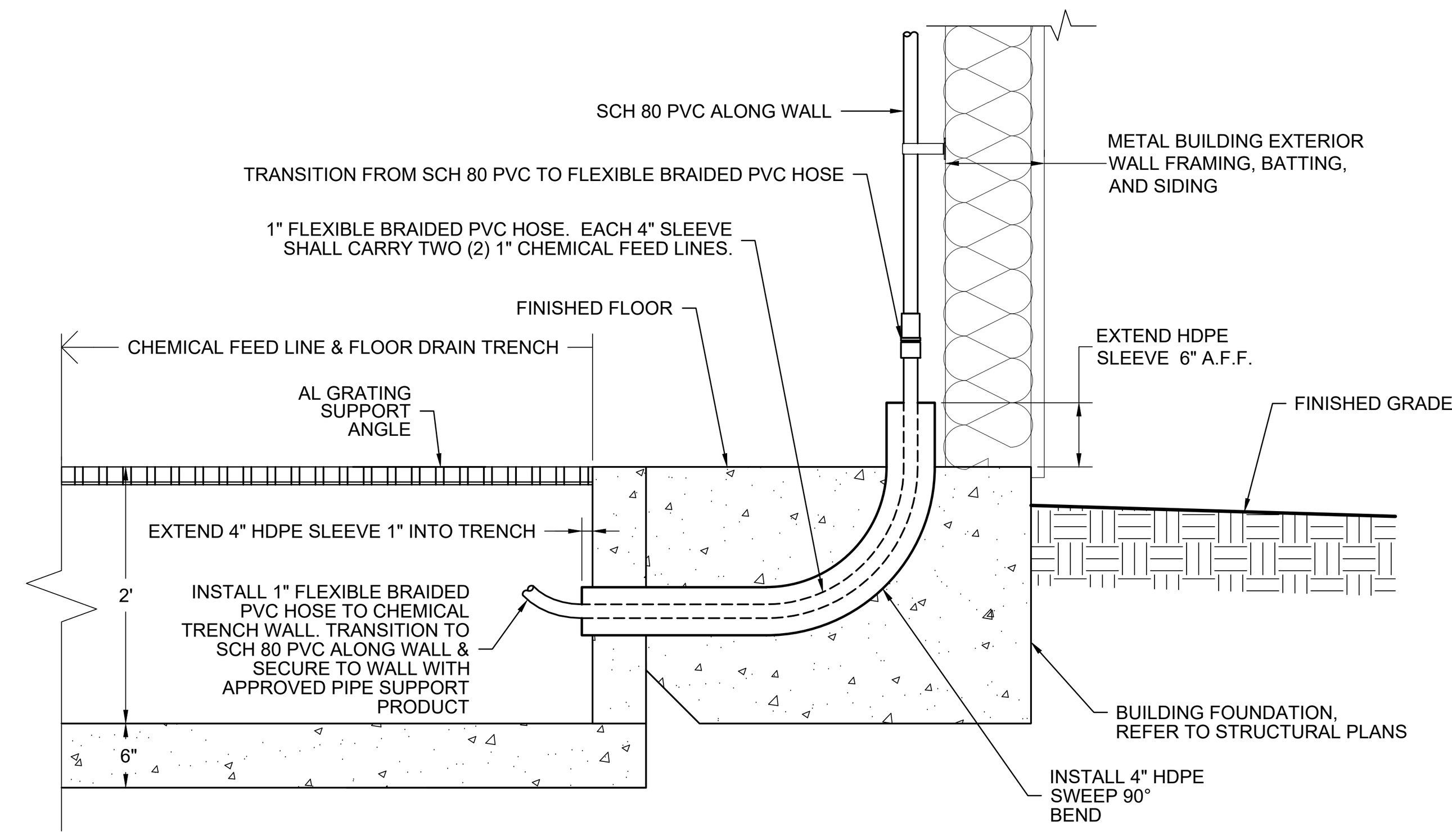
FOUNDATION PLAN

SCALE: 1/4" = 1'-0"



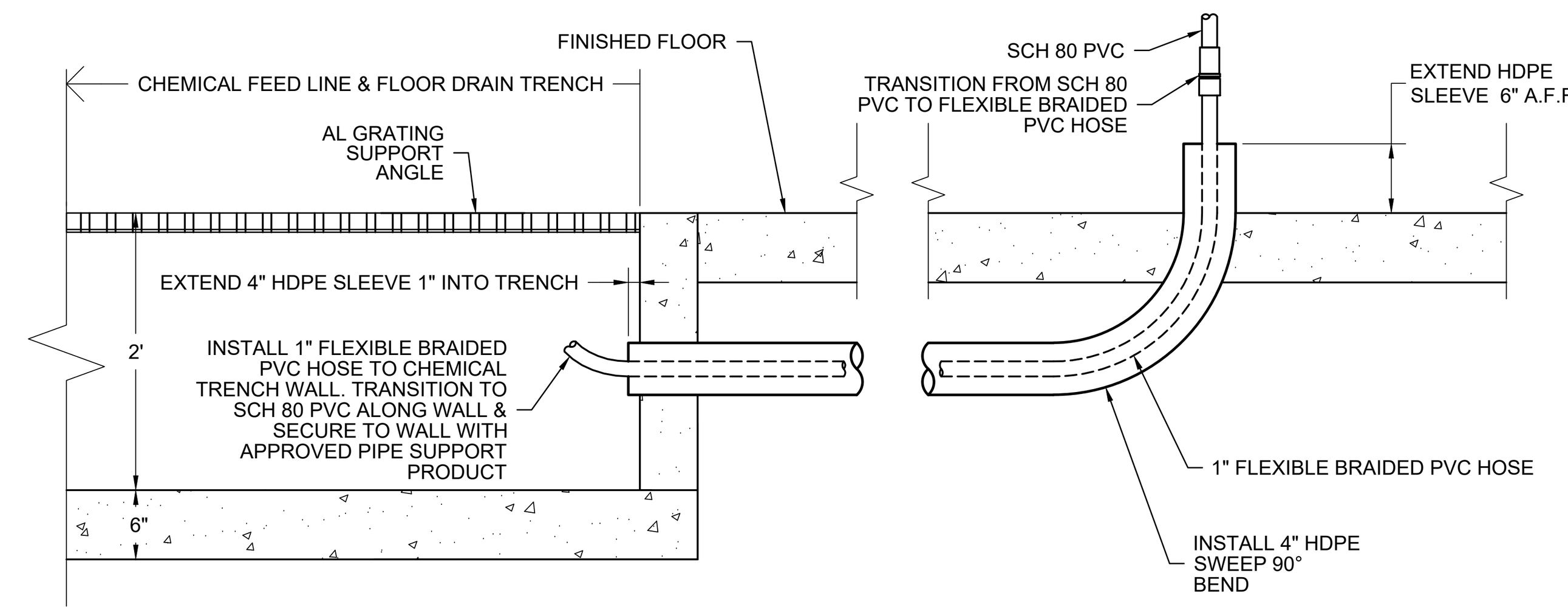
1 / A1 **4" HDPE PIPE CASING TO BUILDING EXTERIOR**

SCALE: NTS



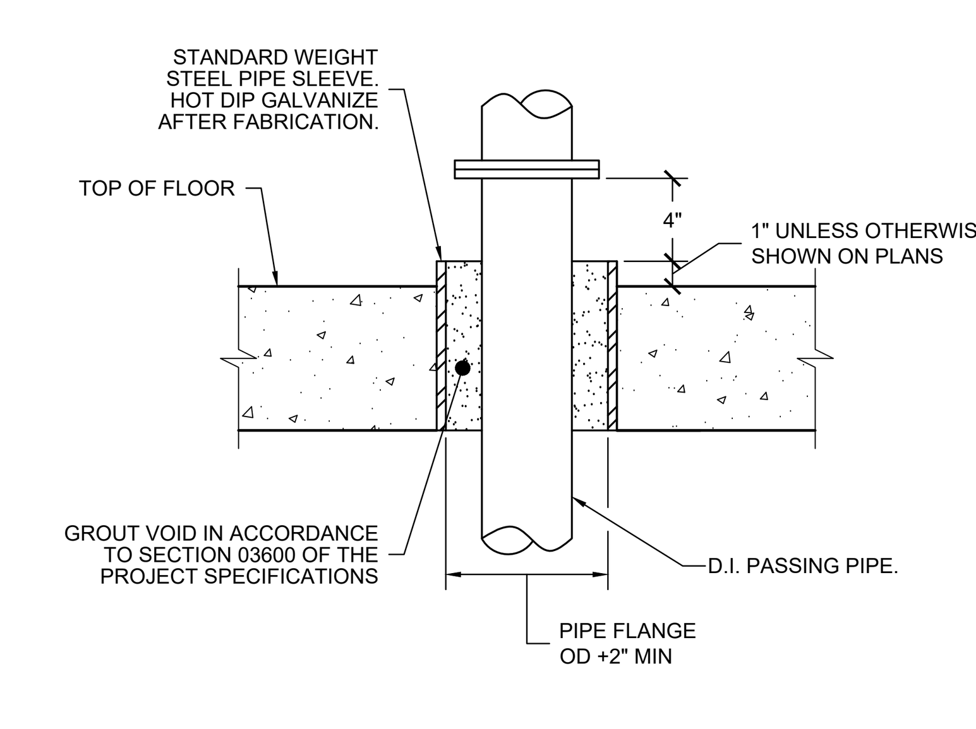
2 / A1 **4" HDPE PIPE CASING TO BUILDING INTERIOR**

SCALE: NTS



3 / A1 **4" HDPE PIPE CASING @ CLARIFICATION UNIT**

SCALE: NTS



4 / A1 **FLOOR PIPE PENETRATION**

SCALE: NTS

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DATE	NO.	DESCRIPTION
04/16/24	0	RELEASED FOR BID
05/03/24	1	REVISED PER ADDENDUM 1

REVISION

ENGINEERING MANAGEMENT
Experience ▪ Trust ▪ Solutions
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www.eminc.biz

WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

PRETREATMENT BUILDING FOUNDATION LAYOUT & DETAILS

SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
GKB	DFW	GKB

GEORGIA REGISTERED NO. 35581 PROFESSIONAL 4/14/24 ENGINEER GREGORY K. BENNETT

STAMP

4/19/2023
DATE

20043
JOB NUMBER

z: \projects
FILE LOCATION

A1

SHEET

PATH & FILE: Z:\PROJECTS\20\20043-Baldwin Pretreatment System\Design Stage\20043 Architectural

DESIGN:

BUILDING CODE: INTERNATIONAL BUILDING CODE 2018 (IBC) W/GEORGIA STATE AMENDMENTS

WIND:

V_{ULT}: 107 MPH
V_{ASD} 82.9 MPH
RISK CATAEGORY: II
EXPOSURE CATEGORY: B
INTERNAL PRESSURE COEFFICIENT: ±0.18

COMPONENTS AND CLADDING ELEMENTS NOT SPECIFICALLY DESIGNED ON THESE DRAWINGS SHALL BE DESIGNED ACCORDING TO THE WIND PRESSURES STIPULATED BY IBC 2018 FOR THE TRIBUTARY AREA OF THE SPECIFIC COMPONENT.

SEISMIC:

RISK CATEGORY II
I_e = 1.0 I_e = 1.0
S_S = 0.228 S_1 = 0.091
SITE CLASS = D
S_{DS} = 0.243 S_{D1} = 0.144
SEISMIC DESIGN CATEGORY = C

BASE SEISMIC FORCE-RESISTING SYSTEM(S):
- BY METAL BUILDING MANUFACTURER

SNOW

GROUND SNOW LOAD = 15 PSF
Is = 1.0
FLAT ROOF SNOW LOAD = 10.5 PSF
SNOW EXPOSURE FACTOR Ce = 1.0
SNOW THERMAL FACTOR Ct = 1.0

SHEET INDEX:

FOUNDATIONS:

1. FOOTINGS SHALL BEAR ON SOIL CAPABLE OF SUSTAINING AN ASSUMED NET ALLOWABLE BEARING PRESSURE OF 2.5 KSF FOR INDIVIDUAL COLUMN FOOTINGS AND 2.5 KSF FOR CONTINUOUS WALL FOOTINGS UNDER FULL SERVICE LIVE AND DEAD LOAD.
2. THE SITE SHALL BE PREPARED IN ACCORDANCE WITH CIVIL DRAWINGS, PROJECT SPECIFICATIONS, AND 'GEOTECHNICAL INVESTIGATION' REPORT PREPARED BY SAILORS ENGINEERING ASSOCIATES, INC. (PROJECT NO. 241-053 DATED MARCH 13 2024). A QUALIFIED GEOTECHNICAL ENGINEER SHALL VERIFY ALL ASSUMPTIONS AND REPORT ANY VARIATIONS OR DISCREPANCIES TO THE ENGINEER.
3. THE FOOTINGS HAVE BEEN POSITIONED AT THE ESTIMATED ELEVATION WHICH WILL PROVIDE SUITABLE BEARING. HOWEVER, IF ADEQUATE BEARING CAPACITY IS NONEXISTENT AT THESE ESTIMATED ELEVATIONS, THE FOOTING SHALL BE LOWERED TO AN ELEVATION WHERE THE PRESCRIBED SAFE BEARING CAPACITY EXISTS (AS RECOMMENDED BY A QUALIFIED GEOTECHNICAL ENGINEER).
4. FOOTINGS MAY BE CAST INTO AN EARTH-FORMED TRENCH IF SOIL CONDITIONS PERMIT.
5. EXCAVATION FOR FOOTINGS SHALL BE CUT TO ACCURATE SIZE AND DIMENSIONS AS SHOWN ON PLANS. ALL SOIL BELOW SLABS AND FOOTINGS SHALL BE PROPERLY COMPACTED AND SUBGRADE BROUGHT TO A REASONABLE TRUE AND LEVEL PLANE BEFORE PLACING CONCRETE.
6. IN AREA OF THE BUILDING, EXISTING ORGANIC MATERIAL UNSUITABLE SOIL, ABANDONED FOOTINGS AND ANY OTHER EXISTING UNSUITABLE MATERIALS SHALL BE REMOVED. ANY CUT AND FILL REQUIREMENTS SPECIFIED BY CIVIL SHALL BE AS INSTALLED PURSUANT TO THE GEOTECHNICAL REPORT NOTED IN ITEM 2 OF THIS SECTION.
7. FOOTING CONCRETE SHALL BE CAST ON THE SAME DAY THE EXCAVATION IS APPROVED. IF THE BEARING SURFACE IS ALLOWED TO BECOME DISTURBED IN ANY WAY, IT SHALL BE REWORKED TO THE SATISFACTION OF AN INDEPENDENT TESTING AGENCY PRIOR TO CASTING OF THE CONCRETE.
8. ALL EXCAVATIONS AND STRUCTURE BEARING PADS SHALL BE INSPECTED BY AN INDEPENDENT TESTING AGENCY PRIOR TO CONCRETE PLACEMENT. THE INDEPENDENT TESTING AGENCY SHALL BE THE SOLE JUDGE AS TO THE SUITABILITY OF THE BEARING MATERIAL.
9. BOTTOM OF ALL EXTERIOR FOOTINGS SHALL BEAR A MINIMUM OF 1'-6" BELOW FINAL GRADE FOR FROST PROTECTION.
10. NO EXCAVATION SHALL BE CLOSER THAN AT A SLOPE OF 2:1 (2 HORIZONTAL TO 1 VERTICAL) TO A FOOTING, PROVIDE SHORING AND PROTECTION FOR EXCAVATION BANKS AS NECESSARY TO PRESERVE SAFETY AND PREVENT CAVING.
11. ALL BEARING STRATA SHALL BE ADEQUATELY DRAINED BEFORE FOUNDATION CONCRETE IS PLACED.
12. BACKFILL AGAINST WALLS SHALL BE PLACED IN 8" LIFTS AND SHALL BE DEPOSITED EVENLY AGAINST EACH SIDE OF WALL UNTIL THE LOWER FINAL GRADE IS REACHED. BACKFILL SHALL NOT BE PLACED AGAINST WALLS DEPENDENT UPON TOP AND BOTTOM SLABS/FOUNDATION FOR SUPPORT UNTIL SUCH SLABS HAVE ATTAINED MINIMUM SUFFICIENT BRACING AND SHORING FOR ALL WORK DURING THE CONSTRUCTION PROCESS. RETAINING WALLS ARE NOT DESIGNED TO CANTILEVER AT ANY TIME UNLESS EXPLICITLY NOTED ON DRAWINGS.
13. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE DRAINAGE SYSTEM FOR ALL BACKFILL CONDITIONS PER CIVIL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
14. COLUMN FOOTINGS AND WALL FOOTINGS SHALL BE POURED MONOLITHIC WITH TOPS OF ADJACENT FOOTINGS AT THE SAME ELEVATION.
15. THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN ANY FOOTING WITHOUT PRIOR WRITTEN APPROVAL FROM ENGINEER.

MISCELLANEOUS:

1. THE FOLLOWING NOTES APPLY TO ALL PROJECT RELATED STRUCTURAL DRAWINGS. THIS INCLUDES THESE DRAWINGS, FIELD SKETCHES AND RESPONSES TO REQUESTS FOR INFORMATION (RFIS), UNLESS OTHERWISE INDICATED.
2. THESE GENERAL NOTES SUPPLEMENT THE PROJECT SPECIFICATIONS.REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. STRUCTURAL DRAWINGS SHALL BE COORDINATED WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING PERTINENT ASPECTS OF ALL DISCIPLINES INTO THEIR SHOP DRAWINGS AND WORK, AND SHALL NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR OMISSIONS.
4. NO OPENINGS OR MODIFICATIONS SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ARCHITECT.
5. NO CHANGE IN SIZE OR DIMENSION OF STRUCTURAL MEMBERS SHALL BE MADE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ARCHITECT.
6. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL DESIGN, ADEQUACY, SAFETY AND STABILITY OF TEMPORARY BRACING AND SHORING THAT MAY BE REQUIRED AS A RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED ON THE STRUCTURAL FRAMING. APPLIED CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF ANY STRUCTURAL BUILDING ELEMENT.
7. THE CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION LIFECYCLE.
8. DO NOT SCALE THESE DRAWINGS; USE DIMENSIONS. FOR DIMENSIONS NOT SHOWN ON THE STRUCTURAL CONTRACT DOCUMENTS, SEE ARCHITECTURAL DRAWINGS.
9. THE CONTRACTOR SHALL INFORM THE PROFESSIONAL OF RECORD IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY OF SUCH DEVIATION BY THE PROFESSIONAL OF RECORD, REVIEW OF SHOP DRAWINGS, PRODUCT DATA, ETC. UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE PROFESSIONAL OF RECORD OF SUCH DEVIATION AT THE TIME OF SUBMISSION AND THE ARCHITECT HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.
10. WHERE A SECTION OR DETAIL IS CUT ON THE PLAN, IT IS UNDERSTOOD TO BE REPRESENTATIVE OF ALL LIKE OR SIMILAR CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING SUCH REQUIREMENTS INTO THEIR SHOP DRAWINGS AND WORK.
11. AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONDITIONS OF THE JOBSITE INCLUDING SAFETY OF PERSONS AND PROPERTY. THE ARCHITECTS OR ENGINEERS PRESENCE AT THE JOB SITE OR REVIEW OF WORK DOES NOT IMPLY CONFIRMATION OF THE ADEQUACY OF THE CONTRACTORS MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLIANCE WITH OSHA REGULATIONS.
12. CONSULT ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATION, SIZES, AND EXTENT OF CHASES, INSERTS, RECESSES, RIDGES, FINISHES, DEPRESSIONS, ETC., NOT SHOWN ON THE STRUCTURAL DRAWINGS.
13. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF RECORD IN WRITING OF ALL CONDITIONS ENCOUNTERED IN THE FIELD THAT ARE CONTRADICTORY TO THOSE SHOWN ON THE STRUCTURAL DRAWINGS.
14. STRUCTURAL CONTRACT DOCUMENTS SHALL NOT INCLUDE SHOP DRAWINGS, VENDOR DRAWINGS, OR ANY MATERIAL PREPARED AND SUBMITTED BY THE CONTRACTOR OR SUBCONTRACTOR.
15. REFERENCE TO STANDARD SPECIFICATIONS OF ANY TECHNICAL SOCIETY, ORGANIZATION OR ASSOCIATION OR TO CODES OF LOCAL OR STATE AUTHORITIES, SHALL MEAN THE LATEST STANDARD, CODE, SPECIFICATION OR TENTATIVE SPECIFICATION ADOPTED AND PUBLISHED AT THE DATE OF TAKING BIDS, UNLESS SPECIFICALLY STATED OTHERWISE.
16. SEE ARCHITECTURAL DRAWINGS FOR FLOOR ELEVATIONS, SLOPE, AND LOCATION OF DEPRESSED FLOOR AREAS. THE CONTRACTOR SHALL COMPARE STRUCTURAL SECTIONS WITH THE ARCHITECTURAL SECTIONS AND REPORT ANY DISCREPANCY TO THE ARCHITECT PRIOR TO FABRICATING OR INSTALLING STRUCTURAL MEMBERS.
17. PRINCIPAL OPENINGS THROUGH THE FRAMING ARE SHOWN ON THESE DRAWINGS. OPENINGS 1'-4" IN WIDTH OR LENGTH (AND LESS) ARE GENERALLY NOT SHOWN ON THE STRUCTURAL DRAWINGS. THE GENERAL CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR ALL REQUIRED OPENINGS. ALL MECHANICAL OPENING LOCATIONS, UNIT OPERATING WEIGHTS, AND SIZES SHALL BE VERIFIED WITH THE MECHANICAL CONTRACTOR PRIOR TO FABRICATION. ANY DEVIATION FROM THE OPENINGS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION FOR APPROVAL.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES IN ORDER TO COMPLY WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.

SUBMITTALS:

1. STRUCTURAL DRAWINGS GIVE REPRESENTATIVE DETAILS AND ARE NOT INTENDED TO SHOW ALL CONDITIONS THAT MAY BE PRESENT. SHOP DRAWINGS SHALL DETAIL ALL CONDITIONS IN ACCORDANCE WITH THE SPECIFIC REQUIREMENTS AS INDICATED IN THE PROJECT DOCUMENTS.
2. CONTRACTOR SHALL SUBMIT A SCHEDULE OF SHOP DRAWING SUBMITTAL DATES TO ARCHITECT AT LEAST 30 DAYS PRIOR TO FIRST SUBMITTAL. FAILURE TO SUBMIT DRAWINGS ON DESIGNATED DATE MAY IMPACT REVIEW SCHEDULE.
3. ANY MATERIALS OR PRODUCTS SUBMITTED FOR APPROVAL THAT ARE DIFFERENT FROM THE MATERIALS OR PRODUCTS SPECIFIED IN THE STRUCTURAL CONTRACT DOCUMENTS WILL BE CONSIDERED ONLY IF THE FOLLOWING CRITERIA ARE SATISFIED:
   A. A COST SAVINGS TO THE OWNER IS DOCUMENTED AND SUBMITTED WITH THE REQUEST.
   B. THE MATERIAL OR PRODUCT HAS BEEN APPROVED BY THE INTERNATIONAL CODE COUNCIL (ICC) AND THE ICC-ES REPORT IS SUBMITTED WITH THE REQUEST. SUBMITTALS NOT SATISFYING THE ABOVE CRITERIA WILL NOT BE CONSIDERED.
4. REVIEW OF SUBMITTALS OR SHOP DRAWINGS BY THE STRUCTURAL ENGINEER OF RECORD DOES NOT RELIEVE THE CONTRACTOR OF THE SOLE RESPONSIBILITY TO REVIEW AND CHECK SHOP DRAWINGS BEFORE SUBMITTAL TO THE STRUCTURAL ENGINEER OF RECORD. THE CONTRACTOR REMAINS SOLELY RESPONSIBLE FOR ERRORS AND OMISSIONS ASSOCIATED WITH THE PREPARATION OF SHOP DRAWINGS AS THEY PERTAIN TO MEMBER SIZES, DETAILS AND DIMENSIONS SPECIFIED IN THE CONTRACT DOCUMENTS.
5. COMPLETE SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL FABRICATED AND SPECIALTY BUILDING COMPONENTS INCLUDING (BUT NOT LIMITED TO) WINDOW SYSTEMS, CANOPY SYSTEMS, AND METAL STAIRS. SHOP DRAWINGS SHALL BE SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF GEORGIA.
6. ALL APPROVED SUBMITTALS, INCLUDING BUT NOT LIMITED TO SHOP DRAWINGS, SHALL BE MADE AVAILABLE ON THE JOBSITE FOR REVIEW BY THE INSPECTOR.
7. REPRODUCTION OF CONTRACT DOCUMENTS FOR USE AS SHOP DRAWINGS IS NOT PERMITTED.

CONCRETE:

1. ALL CONCRETE DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318-14.
2. CEMENT USED SHALL BE TYPE I OR II CONFORMING TO ASTM C-150. CONCRETE SHALL DEVELOP A MINIMUM 28 DAY STRENGTH AND DENSITY AS FOLLOWS:

	STRENGTH (PSI)	DENSITY (PCF)
ALL ELEMENTS	4000	145 - 150

3. AGGREGATE SHALL BE WELL GRADIATED AND SHALL CONFORM TO THE FOLLOWING:
   ALL ELEMENTS 1" COARSE AGGREGATE
   (DENSITY 145 - 150 PCF) (ASTM C-33)
4. CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS FOR REVIEW IN ADVANCE OF CONCRETE PLACEMENT. CONCRETE MIX DESIGN SHALL INCLUDE ALL STRENGTH DATA NECESSARY TO SHOW COMPLIANCE WITH THE PROJECT SPECIFICATIONS BY EITHER THE TRIAL BATCH OR FIELD EXPERIENCE METHOD AND SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF GEORGIA. RESULTS OF ALL COMPRESSIVE STRENGTH TEST SHALL BE MADE AVAILABLE AT THE JOB SITE FOR REVIEW BY THE INSPECTOR.
5. ALL MIXING, TRANSPORTING, PLACING AND CURING OF CONCRETE SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE AMERICAN CONCRETE INSTITUTE.
6. NO ADDITIONAL WATER SHALL BE ADDED TO CONCRETE AT THE JOB SITE.
7. MINIMUM CONCRETE COVER UNLESS NOTED OTHERWISE:
   A. #11 BARS AND SMALLER: 3/4 INCHES
   B. UNFORMED SURFACE IN CONTACT WITH THE GROUND: 3 INCHES
   C. C. BASEMENT WALLS: 2 INCHES EXTERIOR; 3/4 INCHES INTERIOR
   D. FORMED SURFACES EXPOSED TO EARTH OR WEATHER:
      #6 BARS AND LARGER: 2 INCHES
      #5 BARS AND SMALLER: 1 1/2 INCHES
   E. FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER:
      BEAMS, GIRDERS AND COLUMNS: 1 1/2 INCHES
      SLABS, WALLS, AND JOISTS: 3/4 INCHES
8. SLAB-ON-GRADE SHALL BE SAW CUT NO MORE THAN 12 HOURS AFTER CONCRETE HAS BEEN FINISHED. CONTRACTOR TO SUBMIT LAYOUT AND CONSTRUCTION SCHEDULE ('SOFT-CUT INTERNATIONAL OR SIM.)
9. PLACEMENT OF CONCRETE, COLD WEATHER AND HOT WEATHER PRECAUTIONS, MATERIAL AND PROPORTIONING REQUIREMENTS, REBAR COVER AND DETAILING SHALL CONFORM TO REQUIREMENTS OF THE AMERICAN CONCRETE INSTITUTE (ACI) 318-14.
10. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS AND SPECIFICATIONS FOR SLAB FINISHES, SLAB DEPRESSIONS, ELEVATIONS AND ENCASED OR EMBEDDED ITEMS.
11. PIPES AND CONDUITS EMBEDDED IN CONCRETE SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
    A. NO MATERIAL HARMFUL TO CONCRETE (SUCH AS , BUT NOT LIMITED TO, ALUMINUM) IS PERMITTED.
    B. NO EMBEDMENT OR PENETRATION WHICH IMPAIRS THE STRUCTURAL STRENGTH OR INTEGRITY IS PERMITTED.
    C. CONDUITS AND PIPES SHALL NOT HAVE A DIAMETER THAT EXCEEDS 1/3 THE OVERALL THICKNESS OF THE STRUCTURAL ELEMENT IN WHICH THEY ARE EMBEDDED.
    D. MINIMUM CENTER TO CENTER SPACING SHALL NOT BE CLOSER THAN 3 DIAMETERS OR WIDTHS.
    E. PLACEMENT SHALL OCCUR ABOVE BOTTOM LAYER OF REINFORCEMENT AND BELOW TOP LAYER OF REINFORCEMENT AND SHALL NOT CAUSE REINFORCEMENT TO BE CUT, BENT OR DISPLACED IN ANY MANNER.
    F. PLACEMENT SHALL MAINTAIN A MINIMUM CLEARANCE FROM REINFORCEMENT OF 3 REINFORCING BAR DIAMETERS OR 3/4" FROM WELDED WIRE FABRIC REINFORCEMENT.
    G. PLUMBING AND ELECTRICAL CONDUITS SHALL BE PLACED BELOW SLAB ON GRADE.
12. UNLESS NOTED OTHERWISE, PROVIDE CONTROL JOINTS IN SLABS ON GRADE NOT TO EXCEED 15 FEET ON CENTER IN EACH DIRECTION, UNLESS OTHERWISE APPROVED BY THE STRUCTURAL ENGINEER.
13. FORMING SHALL BE OF WOOD, STEEL, OR FIBERGLASS OF SATISFACTORY QUALITY AND CONDITION.
14. NO ADMIXTURES SHALL BE ADDED TO THE CONCRETE UNLESS APPROVED BY THE ENGINEER.
15. REINFORCING SHALL CONFORM TO ASTM A615, GR60 UNLESS NOTED OTHERWISE.
16. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 GRADE 60.
17. REINFORCING STEEL AND ACCESSORIES SHALL BE DETAILED IN ACCORDANCE WITH ACI 315 (MANUAL OF STANDARD PRACTICE FOR DETAILING CONCRETE STRUCTURES) AND CRSI MSP-1 (MANUAL OF STANDARD PRACTICE), LATEST EDITION.
18. ALL 'CONTINUOUS' REINFORCEMENT SHALL HAVE MINIMUM LAP OF 'B' TYPE (ACI 318-14, SECTION 25.5.2) AT SPLICES UNLESS NOTED OTHERWISE.
19. PROVIDE REINFORCING CHAIRS FOR ALL SLAB-ON-GRADE REINFORCING.
20. SUBMIT REINFORCING PLACEMENT AND DETAIL (SHOP) DRAWINGS FOR REVIEW. NO REINFORCING BARS SHALL BE INSTALLED UNTIL THE SHOP DRAWINGS HAVE BEEN REVIEWED AND RETURNED.
21. ALL REINFORCING SHALL BE SUPPORTED IN FORMS SPACED WITH NECESSARY ACCESSORIES AND SHALL BE SECURELY WIRED TOGETHER IN ACCORDANCE WITH CRSI 'MANUAL OF STANDARD PRACTICE' (27TH EDITION).
22. WHERE WELDED WIRE FABRIC REINFORCEMENT IS SPECIFIED IN SLABS ON GRADE PLACEMENT SHALL BE 1" BELOW TOP OF SLAB. OVERLAP EACH REINFORCING SHEET TWO FULL PANELS AND TIE CROSS WIRES ON EACH SIDE.
23. SCHEDULED OR DETAILED REINFORCING STEEL SHALL NOT BE TACK WELDED FOR ANY REASON. WELDED REINFORCING STEEL AND/OR SPLICES ARE PERMITTED ONLY WHERE SHOWN ON DRAWINGS. WHERE WELDING IS PERMITTED IT SHALL CONFORM TO AWS D1.4, STRUCTURAL WELDING CODE - REINFORCING STEEL.
24. BASE PLATES, ANCHOR RODS, SUPPORT ANGLES, ETC. BELOW GRADE SHALL BE COVERED WITH A MINIMUM OF 4" OF CONCRETE.
25. WHERE FOOTINGS, WALLS, OR OTHER STRUCTURAL ELEMENTS INTERSECT, CORNER OR TEE, PROVIDE CORNER BARS WITH REQUIRED LAP LENGTHS TO PROVIDE CONTINUITY OF HORIZONTAL STEEL REINFORCING UNLESS NOTED OTHERWISE.

PRE-ENGINEERED METAL BUILDING:

1. FRAMES SHALL NOT EXCEED L/240 VERTICAL DEFLECTION UNDER TOTAL LOAD.
2. STORY DRIFT SHALL BE LIMITED TO H/240 HORIZONTAL.
3. METAL BUILDING DESIGNER SHALL PROVIDE MAXIMUM AND MINIMUM VERTICAL AND HORIZONTAL REACTIONS FROM METAL BUILDING COLUMNS TO BUILDING FOUNDATIONS.
4. METAL BUILDING DESIGNER SHALL INCLUDE FRAMING SUPPORT FOR ALL OPENINGS, VENEER CANOPIES, AWNINGS, & OTHER COMPONENTS IMPARTING LOAD TO THE STRUCTURE.

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PROJECT

WATER TREATMENT FACILITY
PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

SHEET TITLE: STRUCTURAL NOTES

DESIGN BY: STS | DRAWN BY: STS | CHECKED BY: WJP

GEORGIA REGISTERED No. PE030054 STRUCTURAL ENGINEER WILLIAM JOHN PELTIER

STAMP

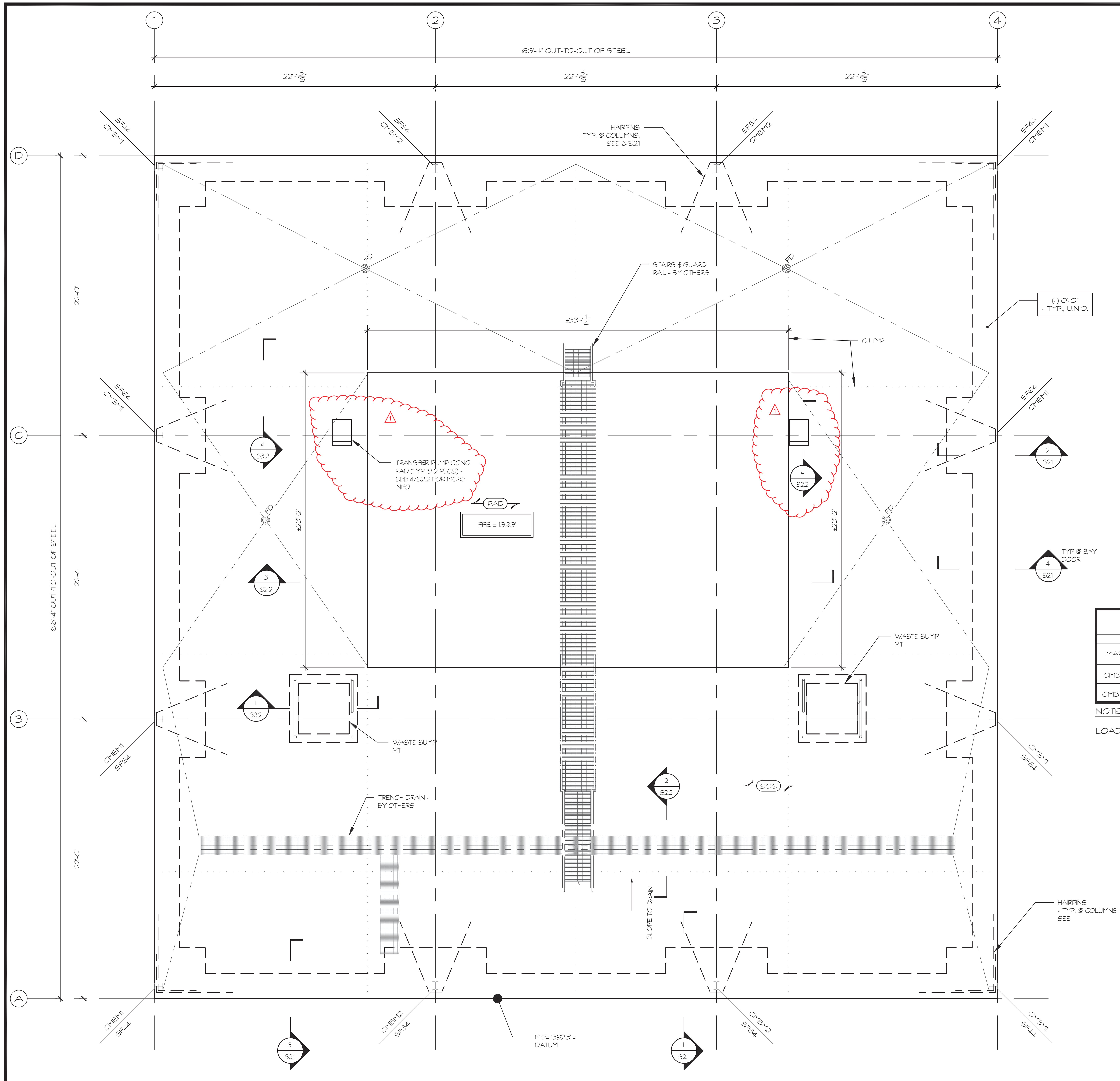
4/12/2024 DATE

JOB NUMBER

FILE LOCATION

PATH & FILE:

SHEET S0.1



SLAB & FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

TYPICAL SLAB & FOUNDATION NOTES:

1. SOG — SLAB ON GRADE SHALL BE 6" CONC SLAB (4000 PSI) ON VAPOR RETARDER ON 4" GAB (GRADED AGGREGATE BASE) W/ #4 @ 12" O.C. E.W. 2" CLEAR FROM TOP, UNO ON PLAN. ALL SLOPES SHALL BE ACCOMPLISHED BY SLOPING BOTTOM AND TOP OF SLAB AT THE SAME RATE, (SEE 6/S2.1). SEE ARCH DRAWINGS FOR FFE.
2. PAD — EQUIPMENT PAD SHALL BE 12" CONC SLAB (4000 PSI) W/ #5 @ 12" O.C. TOP BARS, E.W. 2" CLEAR FROM TOP & #5 @ 12" O.C BOTT. BARS 2" CLEAR FROM BOTT. SEE CIVIL DRAWINGS FOR FFE.
3. "CJ" — INDICATES CONTROL JOINTS IN SLAB. ALIGN JOINTS WITH EQUIPMENT PAD EDGE. SEE GENERAL NOTES AND S2.1 FOR ADDITIONAL INFORMATION.
4. -X'-XX" — INDICATES TOP OF FOOTING ELEVATION. T/FTG. = FFE, U.N.O.
5. "CMBMx" INDICATES COLUMNS DESIGNED BY METAL BUILDING MANUFACTURER
6. FOUNDATIONS HAVE BEEN DESIGNED BASED ON ASSUMED LOADING FROM METAL BUILDING. WJPA SHALL REVIEW THE PRE-ENGINEERED SHOP DRAWINGS FOR ACTUAL LOADS PRIOR TO CONSTRUCTION OF THIS STRUCTURE. SUBMIT SHOP DRAWINGS FOR FINAL REVIEW AND COORDINATION.

NOTE TO CONTRACTOR:

THE CONTRACTOR SHALL REFER TO THE PLUMBING, MECHANICAL, & ELECTRICAL DRAWINGS AND NOTE THE LOCATION OF ALL UNDERGROUND OR UNDER FLOOR PIPING & CONDUITS. THE CONTRACTOR SHALL INCORPORATE ALL FOOTING STEPS NECESSARY PER THE REQUIREMENTS OF ALL UNDERGROUND OR UNDER FLOOR PLUMBING, MECHANICAL, AND ELECTRICAL PIPING. THE CONTRACTOR SHALL REFER TO THE FOUNDATION DETAILS 8 THRU 10 ON S2.1 WHEN PERFORMING THIS WORK.

SLAB FOOTING SCHEDULE (INDICATED AS "SFX")

MARK	SIZE	REINFORCING	REMARKS
SF44	4'-0" x 4'-0" x 2'-0"	(4) #5 SW BOT, (4) #5 LW BOT	
SF64	6'-0" x 4'-0" x 2'-0"	(6) #5 SW BOT, (4) #5 LW BOT	
SF84	8'-0" x 4'-0" x 2'-0"	(8) #5 SW BOT, (4) #5 LW BOT	

PRE-ENGINEERED COLUMN LOAD SCHEDULE*

MARK	MAX VERT	MIN VERT	LATERAL THRUST	ANCHOR RODS
CMBM11	8.7 KIPS	-3.5 KIPS	-2.2 KIPS	(4) AR1
CMBM12	17.1 KIPS	-6.4 KIPS	10.1 KIPS	(4) AR2

NOTE:

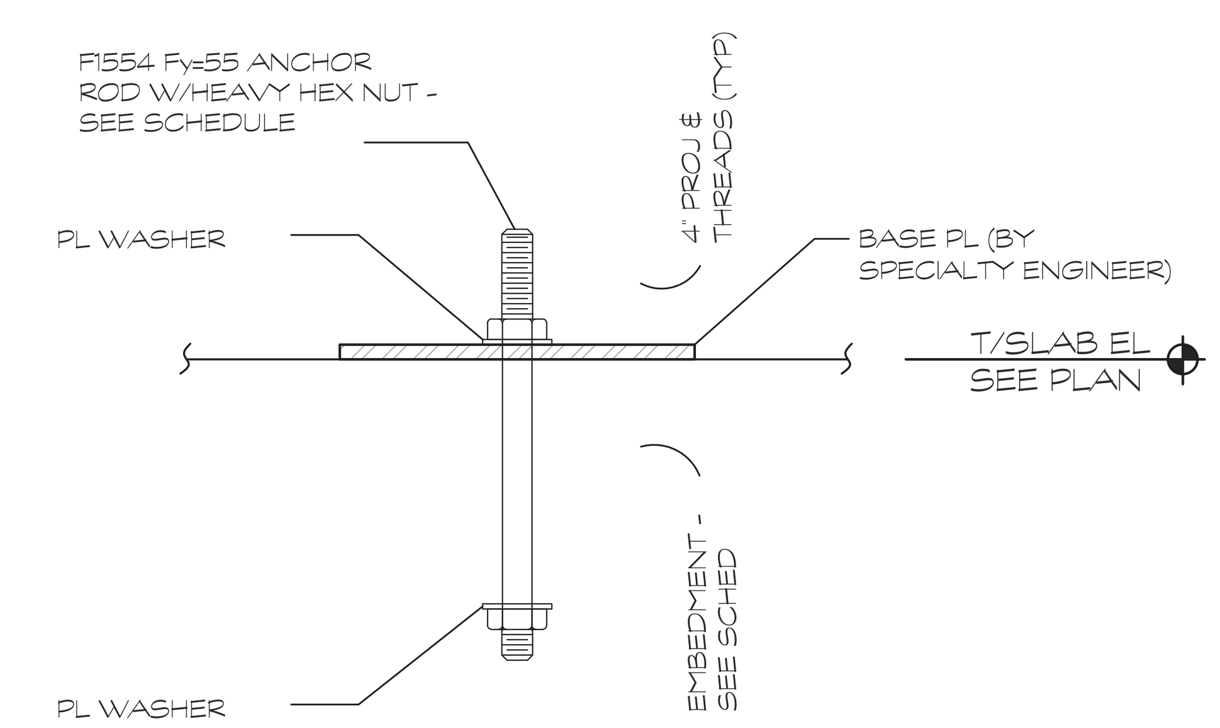
LOADS SHOWN ARE MAX REACTIONS - SEE PRE-ENGINEERED BUILDING DRAWINGS

ANCHOR ROD SCHEDULE

MARK	ANCHOR ROD SIZE	EMBEDMENT
AR1	5/8" Ø AR (GRADE 55)	12"
AR2	3/4" Ø AR (GRADE 55)	14"

NOTE:

SEE PRE-ENGINEERED BUILDING DRAWINGS FOR BASE PLATE AND ANCHOR ROD SPACINGS



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PROJECT

WATER TREATMENT FACILITY
PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

SHEET TITLE

FOUNDATION PLAN

DESIGN BY	DRAWN BY	CHECKED BY
STS	STS	WJP

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GEORGIA REGISTERED No. SE000054 STRUCTURAL ENGINEER WILLIAM JOHN PELTIER 4/25/2024

DATE: 4/12/2024
JOB NUMBER
FILE LOCATION
PATH & FILE:

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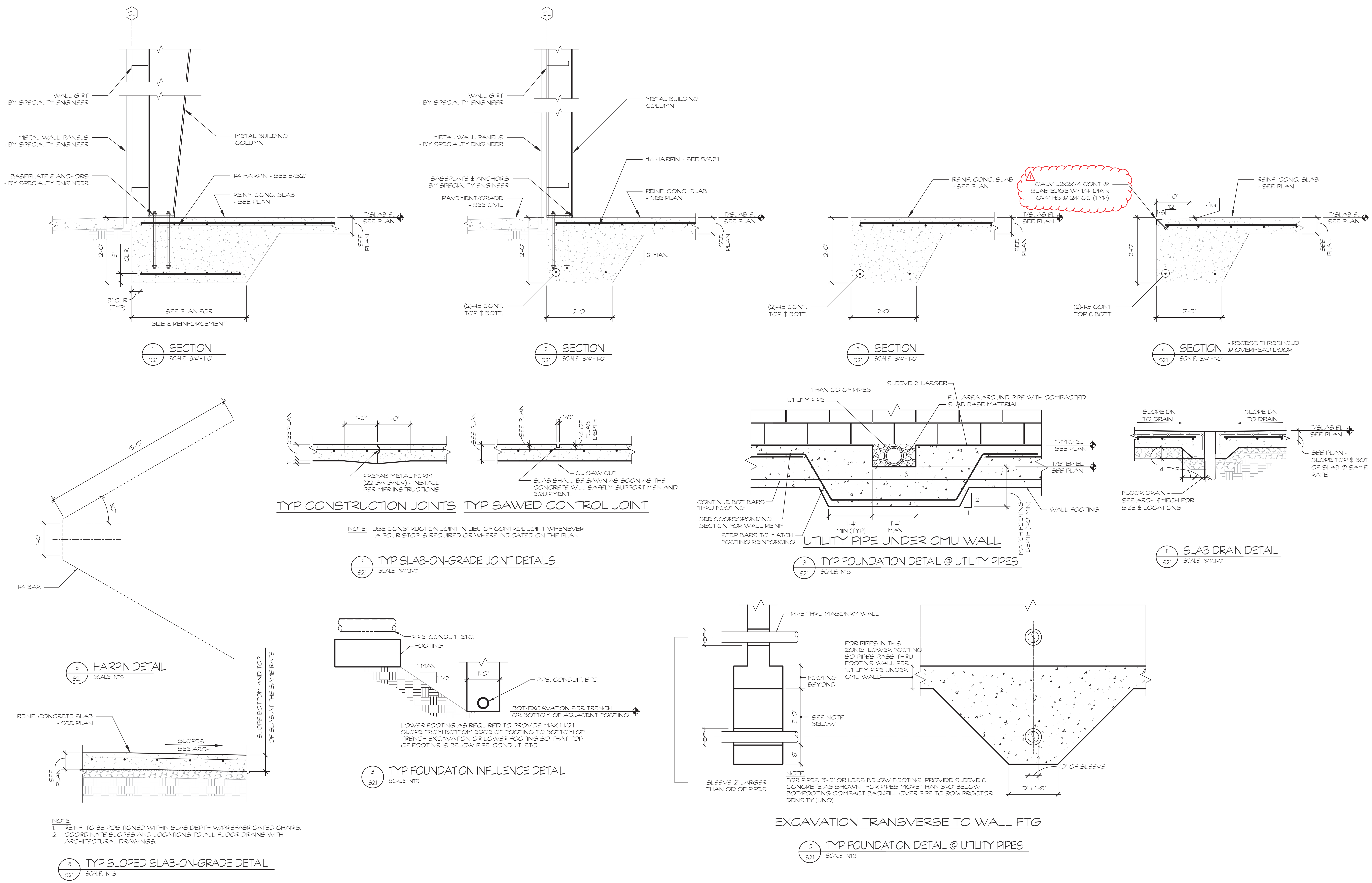
S1.1



WALL GIRT - BY SPECIALTY ENGINEER
METAL WALL PANELS - BY SPECIALTY ENGINEER
BASEPLATE & ANCHORS - BY SPECIALTY ENGINEER
METAL BUILDING COLUMN
#4 HAIRPIN - SEE 5/S2.1
REINF. CONC. SLAB - SEE PLAN
T/SLAB EL SEE PLAN
SEE PLAN
3" CLR (TYP)
SEE PLAN FOR SIZE & REINFORCEMENT
1 SECTION S2.1 SCALE: 3/4" = 1'-0"
PAVEMENT/GRADE - SEE CIVIL
2 MAX. 1
(2)-#5 CONT. TOP & BOTT.
2'-0"
2 SECTION S2.1 SCALE: 3/4" = 1'-0"
3 SECTION S2.1 SCALE: 3/4" = 1'-0"
GALV L2x2x1/4 CONT @ SLAB EDGE W/ 1/4" DIA x 0'-4" HS @ 24" OC (TYP)
4 SECTION - RECESS THRESHOLD @ OVERHEAD DOOR S2.1 SCALE: 3/4" = 1'-0"
6'-0"
30°
1'-0"
#4 BAR
5 HAIRPIN DETAIL S2.1 SCALE: NTS
SLOPE BOTTOM AND TOP OF SLAB AT THE SAME RATE
REINF. CONCRETE SLAB - SEE PLAN
SLOPES SEE ARCH
NOTE:
1. REINF. TO BE POSITIONED WITHIN SLAB DEPTH W/PREFABRICATED CHAIRS.
2. COORDINATE SLOPES AND LOCATIONS TO ALL FLOOR DRAINS WITH ARCHITECTURAL DRAWINGS.
6 TYP SLOPED SLAB-ON-GRADE DETAIL S2.1 SCALE: NTS
PREFAB METAL FORM (22 GA GALV) - INSTALL PER MFR INSTRUCTIONS
CL SAW CUT
SLAB SHALL BE SAWN AS SOON AS THE CONCRETE WILL SAFELY SUPPORT MEN AND EQUIPMENT.
1/4 OF SLAB DEPTH
TYP CONSTRUCTION JOINTS
TYP SAWED CONTROL JOINT
NOTE: USE CONSTRUCTION JOINT IN LIEU OF CONTROL JOINT WHENEVER A POUR STOP IS REQUIRED OR WHERE INDICATED ON THE PLAN.
7 TYP SLAB-ON-GRADE JOINT DETAILS S2.1 SCALE: 3/4" = 1'-0"
PIPE, CONDUIT, ETC.
FOOTING
1 MAX 1 1/2
BOT/EXCAVATION FOR TRENCH OR BOTTOM OF ADJACENT FOOTING
LOWER FOOTING AS REQUIRED TO PROVIDE MAX 1:1/2 SLOPE FROM BOTTOM EDGE OF FOOTING TO BOTTOM OF TRENCH EXCAVATION OR LOWER FOOTING SO THAT TOP OF FOOTING IS BELOW PIPE, CONDUIT, ETC.
8 TYP FOUNDATION INFLUENCE DETAIL S2.1 SCALE: NTS
UTILITY PIPE
SLEEVE 2" LARGER THAN OD OF PIPES
FILL AREA AROUND PIPE WITH COMPACTED SLAB BASE MATERIAL
T/FTG EL SEE PLAN
T/STEP EL SEE PLAN
CONTINUE BOT BARS THRU FOOTING
SEE COORESPONDING SECTION FOR WALL REINF
STEP BARS TO MATCH FOOTING REINFORCING
1'-4" MIN (TYP)
1'-4" MAX
MATCH FOOTING DEPTH (1'-0" MIN)
WALL FOOTING
UTILITY PIPE UNDER CMU WALL
9 TYP FOUNDATION DETAIL @ UTILITY PIPES S2.1 SCALE: NTS
SLOPE DN TO DRAIN
SEE PLAN - SLOPE TOP & BOT OF SLAB @ SAME RATE
4" TYP
FLOOR DRAIN - SEE ARCH &MECH FOR SIZE & LOCATIONS
11 SLAB DRAIN DETAIL S2.1 SCALE: 3/4" = 1'-0"
PIPE THRU MASONRY WALL
FOR PIPES IN THIS ZONE: LOWER FOOTING SO PIPES PASS THRU FOOTING WALL PER "UTILITY PIPE UNDER CMU WALL"
FOOTING BEYOND
SEE NOTE BELOW
SLEEVE 2" LARGER THAN OD OF PIPES
'D' OF SLEEVE
'D' + 1'-6"
NOTE:
FOR PIPES 3'-0" OR LESS BELOW FOOTING, PROVIDE SLEEVE & CONCRETE AS SHOWN. FOR PIPES MORE THAN 3'-0" BELOW BOT/FOOTING COMPACT BACKFILL OVER PIPE TO 90% PROCTOR DENSITY (UNO)
EXCAVATION TRANSVERSE TO WALL FTG
10 TYP FOUNDATION DETAIL @ UTILITY PIPES S2.1 SCALE: NTS

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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

PROJECT

SECTIONS & DETAILS
SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
STS	STS	WJP

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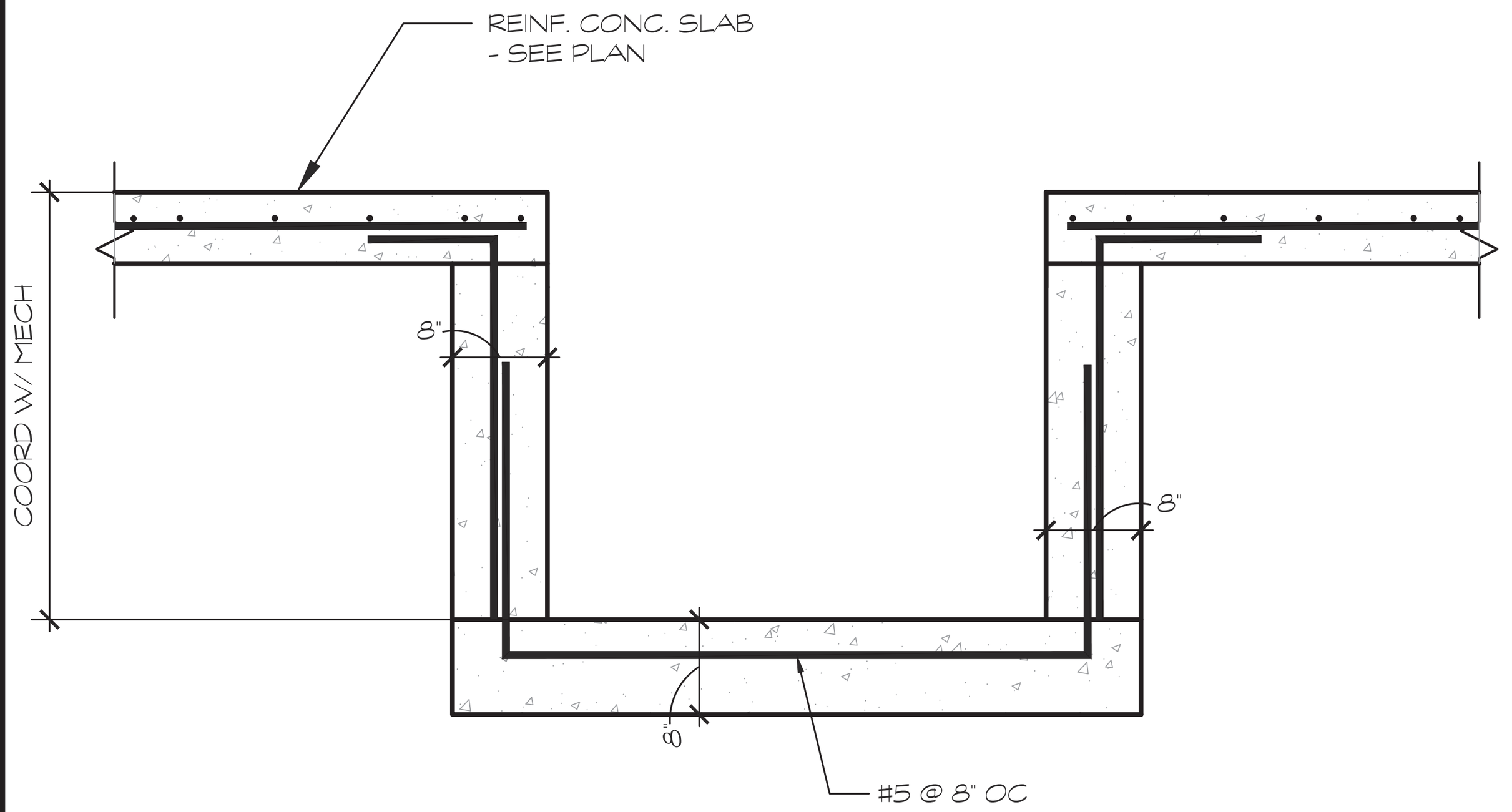
SHEET S2.1



SECTION 1 / S2.2
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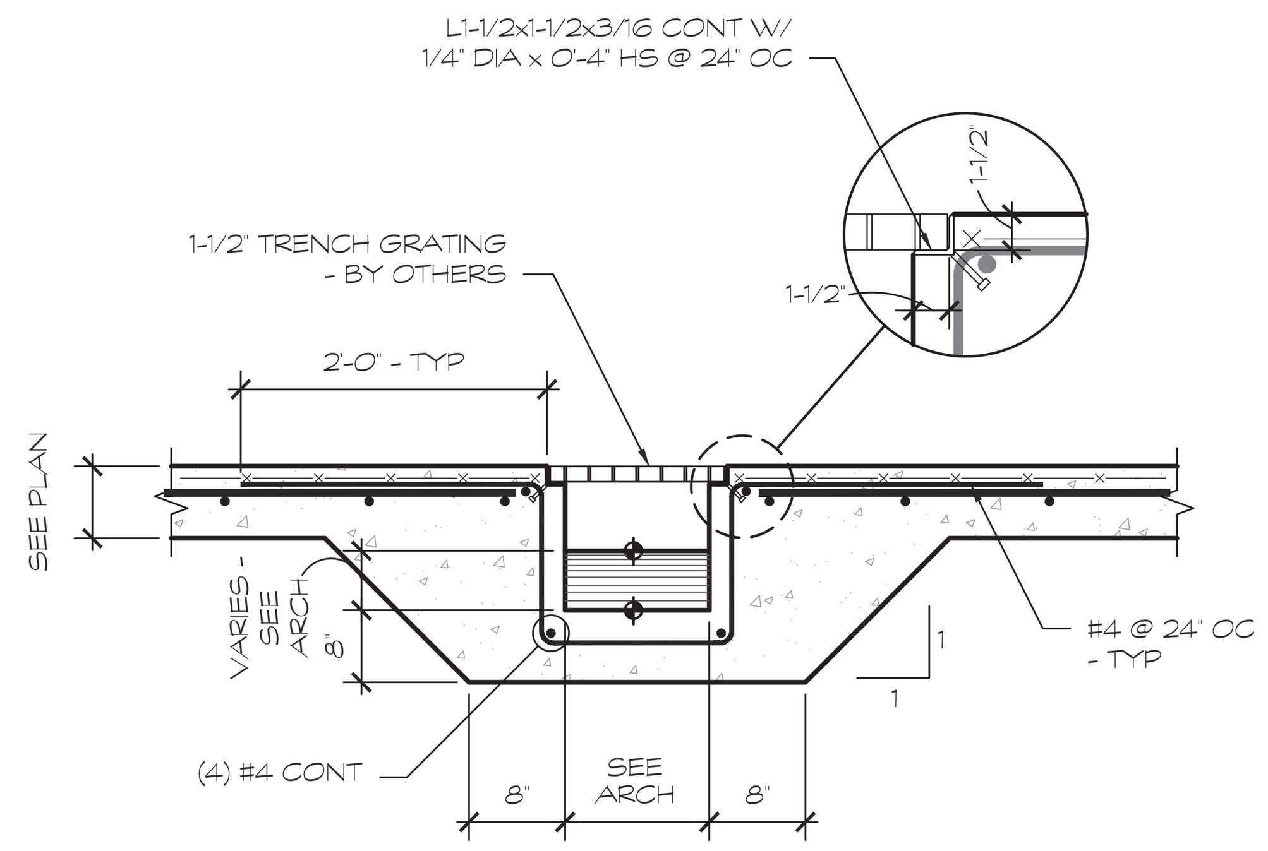

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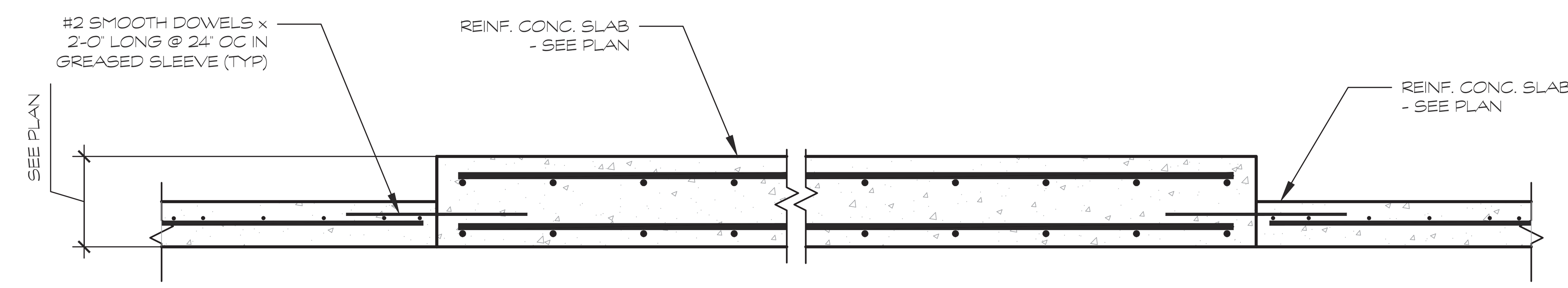

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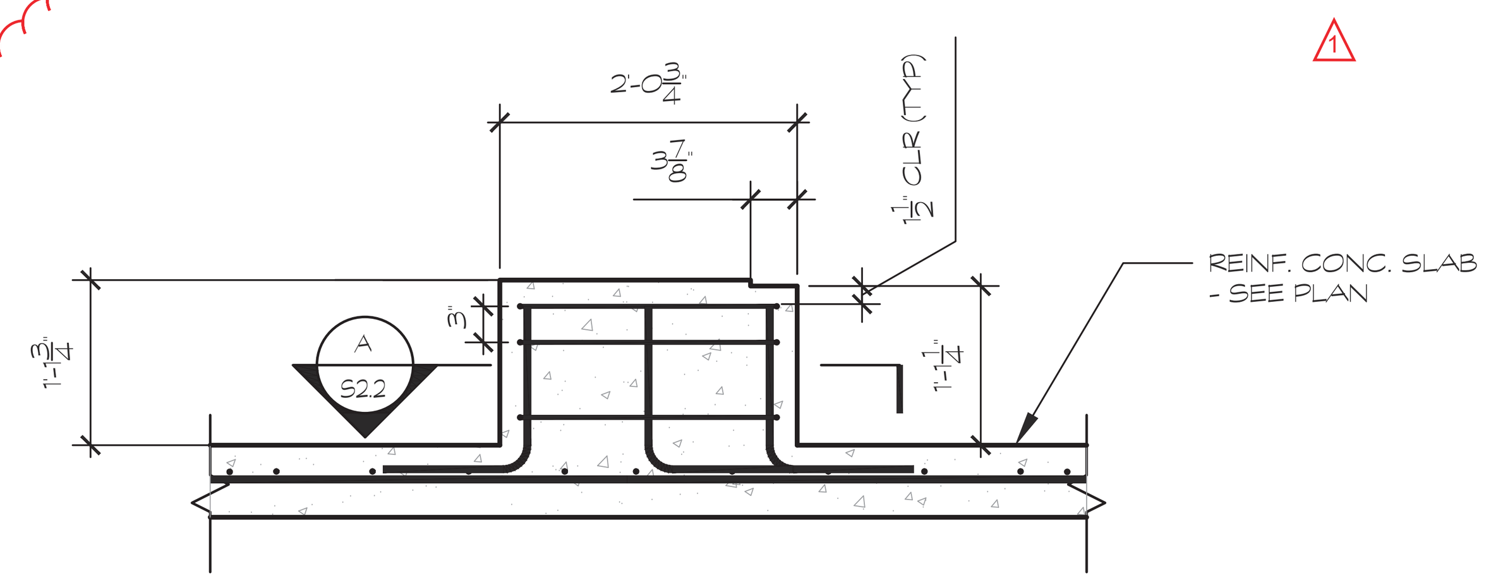

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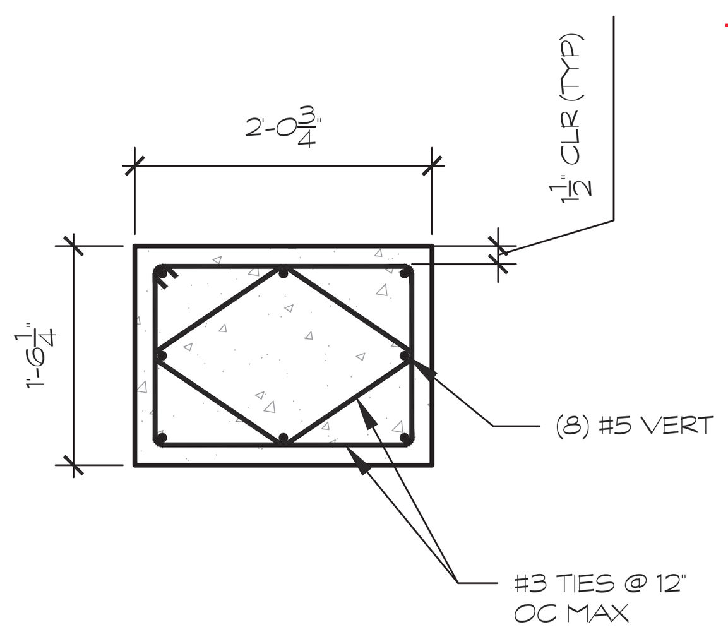

SECTION A / S2.2
SCALE: 3/4"=1'-0"

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CONTROL AND ONE LINE DIAGRAMS

Symbol	Description
	CONDUCTORS CONNECTED
	CONDUCTORS NOT CONNECTED
	CONNECTION POINT
XX	TERMINAL POINT FOR OUTGOING CONDUCTORS, WITH IDENTIFICATION. "XX" DENOTES CONTRACTOR ASSIGNED.
MCP/3	MAGNETIC-ONLY CIRCUIT BREAKER (MCP), WITH CURRENT RATING
100/30	CIRCUIT BREAKER, THERMAL-MAGNETIC UNLESS OTHERWISE NOTED, WITH FRAME SIZE AND TRIP RATING
FU# SIZE	FUSE WITH SIZE AND OPTIONAL IDENTIFICATION.
30 AMP	DISCONNECT SWITCH. RATING OPTIONAL. 30 AMP 600V MINIMUM UNLESS OTHERWISE NOTED.
M	MOTOR (PHASES AS REQUIRED)
WATTS	SPACE HEATER, WATTAGE AS INDICATED.
PRI-V VA SEC-V	CONTROL POWER TRANSFORMER, PRIMARY AND SECONDARY VOLTAGE SHOWN. SIZE AS SHOWN OR SPECIFIED.
P/S	CURRENT TRANSFORMER. PRIMARY/SECONDARY TURNS RATIO SHOWN.
	HORN
OHMS	RESISTOR: OPTIONAL VALUE SHOWN
	RECTIFIER
	TRIAD
	SURGE SUPPRESSOR
10mF	CAPACITOR: OPTION VALUE SHOWN
INDICATORS X STATUS	X = LENS COLOR; DIRECT CONNECTION; A = AMBER, B = BLUE, G = GREEN, R = RED, W = WHITE
X STATUS	PUSH TO TEST TEST VOLTAGE TERMINAL SHOWN
TEST C DESCPTN	REMOTE TEST TEST BUS TERMINAL SHOWN
THERMAL OL	RELAY COIL WITH OPTIONAL PREFIX. OL = THERMAL OVERLOAD RELAY
METER ETM	METER WITH ALPHA IDENTIFIERS: ETM = ELAPSED TIME METER
INTERLOCK CONTACTS 12 CR, 9 CR	CONTROL RELAY CONTACTS WITH NUMERIC PREFIX.
5 TR INST, 6 TR INST	TIME DELAY RELAY INSTANTANEOUS CONTACTS WITH NUMERIC PREFIX.
CB# SIZE 800AF/600AT	LOW VOLTAGE POWER CIRCUIT AND BREAKER DRAWOUT TYPE, FRAME TRIP SHOWN
CB# SIZE 50AF/40AT	MOULDED CASE CIRCUIT BREAKER, FRAME AND TRIP ID SHOWN
	LIGHTNING ARRESTOR AND GROUND
300A	DISCONNECT OR ISOLATING SWITCH: CONTINUOUS RATING SHOWN
CB# SIZE MCP/7A	MAGNETIC-ONLY CIRCUIT BREAKER (MCP), DRAWOUT TYPE, WITH CURRENT RATING
FUSE SWITCH	FUSED SWITCH: FUSE AND SWITCH CONTINUOUS RATINGS SHOWN
KVA Z% PRI-V TO SEC-V	POWER TRANSFORMER: PRIMARY & SECONDARY VOLTAGES, %Z, SIZE SHOWN
KVA Z% PRI-V TO SEC-V	ISOLATION TRANSFORMER PRIMARY & SECONDARY VOLTAGES, %Z, SIZE SHOWN
[N] PRI PWDG SEC SWDG	POTENTIAL TRANSFORMER PRIMARY & SECONDARY VOLTAGES & WINDINGS SHOWN. (x) UNITS
250/5 3	CURRENT TRANSFORMER: RATIO SHOWN (3 INDICATES NO. OF CT'S)
SW	METER SWITCH, xS: AS - AMMETER SWITCH VS - VOLTMERE SWITCH FS - FREQUENCY SWITCH
DEV SPAN UNIT	METER: A - AMMETER W - WATTMETER KWH - WATT-HOUR METER F - FREQUENCY METER VAR - VAR METER V - VOLTMETER
#M # [N]	ANSI C37.2 DEVICE
	WINDING CONFIGURATION: PER ANSI DELTA
	WYE (GROUNDED)
	I/A OR PLC ANALOG INPUT OR OUTPUT
1 FVNR	FULL VOLTAGE, NON-REVERSING MAGNETIC MOTOR STARTER. NEMA SIZE INDICATED

GROUNDING SYMBOLS

Symbol	Description
	GROUND ROD, 3/4" x 10'-0", COPPERCLAD (UNLESS OTHERWISE NOTED)
	GROUND ROD AND WELL
	COMPRESSION TYPE GROUNDING BOND TO MOTOR CASING OR EQUIPMENT
GG	BARE COPPER GROUNDING CONDUCTOR - #6 UNLESS OTHERWISE NOTED.
G	BURIED BARE COPPER GROUNDING CONDUCTOR - #4/0 UNLESS OTHERWISE NOTED
	CADWELD CONNECTION TO GROUND RING

GENERAL ABBREVIATIONS

AR	ALARM RELAY
AS	AMMETER SELECTOR SWITCH
A, AMP	AMP(S), AMPERE(S)
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AHAP	AS HIGH AS POSSIBLE
AIC	AMPS INTERRUPTING CAPACITY, SYMM.
AL	ALUMINUM
AT	AMPERE TRIP
AF	AMPERE FRAME
AUTO	AUTOMATIC
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE
BC	BARE COPPER CONDUCTOR
BKR	BREAKER
C	CONDUCTOR/CONTACTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CR	CONTROL RELAY
CND	CONDUIT
CONC	CONCRETE
CS	CONTROL SWITCH
CONT	CONTROL
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
D	DIAMETER
DB	DUCT BANK
DC	DIRECT CURRENT
DET	DETAIL
DIAG	DIAGRAM
DPSH	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRIC(AL)
EMER	EMERGENCY
ENCL	ENCLOSURE/ENCLOSED
EP	EXPLOSION PROOF
EQUIP	EQUIPMENT
EX	EXISTING
FCP	FURNISHED WITH EQUIPMENT PANEL
FDR	FEEDER
FLA	FULL LOAD AMPS
FPP	FIBER OPTIC DISTRIBUTION PANEL
FS	FLOW SWITCH
FU	FUSE
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
GALV	GALVANIZED
GEN	GENERATOR
GFR	GROUND FAULT RELAY
GRD	GROUND
GRS	GALVANIZED RIGID STEEL
H	HIGH
HGT	HEIGHT
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HS	HAND STATION (SWITCH)
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
HZ	HERTZ (CYCLES PER SECOND)
HOA	HAND/OFF/AUTO
HMH	HIGH VOLTAGE MANHOLE
ID	INSIDE DIAMETER
IMC	INDIVIDUAL MOTOR CONTROLLER
INTLK	INTERLOCK
INST	INSTANTANEOUS
INSTR	INSTRUMENT
I/O	INPUT-OUTPUT
JB	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT-AMPERE
KVAR	KILOVOLT-AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT-HOUR
KAIC	KILO AMPERE INTERRUPTING CURRENT
L-O-R	LOCAL-OFF-REMOTE
L	LONG
LC	LIGHTING CONTACTOR
LCS	LOCAL CONTROL STATION
LP	LIGHTING PANEL
LOS	LOCK-OUT STOP
LSL	LEVEL SWITCH LOW
LSO	LIMIT SWITCH OPEN
LSC	LIMIT SWITCH CLOSED
LTG	LIGHTING
LV	LOW VOLTAGE
LSH	LEVEL SWITCH HIGH
M	MOTOR CONTACTOR
mA	MILLIAMPERE
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CONTROL PANEL/ MOTOR CIRCUIT PROTECTOR
MECH	MECHANICAL
MFR	MANUFACTURE(R)
MH	MANHOLE
MIC	MICROPHONE
MIN	MINIMUM
MISC	MISCELLANEOUS
mM	MILLIMETER
mV	MILLIVOLT
MCM	MILLI CIRCULAR MILLS
MOP	MOTOR OPERATOR PANEL
MPR	MOTOR PROTECTION RELAY
MCB	MAIN CIRCUIT BREAKER
MTR	MOTOR
MVS	MEDIUM VOLTAGE STARTER
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEUT,N	NEUTRAL
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NP	NAMEPLATE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OL'S	OVERLOADS
OT	OIL TIGHT
P	POLE
PA	PUBLIC ADDRESS
PB	PUSHBUTTON, PULLBOX
PE	PHOTO ELECTRIC CELL
PF	POWER FACTOR
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PM	PHASE MONITOR
PNL	PANEL
PP	POWER PANEL
PR	PAIR
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PWR	POWER
QSH	SHEAR PIN LIMIT SWITCH
RCPT	RECEPTACLE
RCT	REACTOR
REF	REFERENCE
REQD	REQUIRED
RMS	ROOT MEAN SQUARE
RTD	RESISTANCE TEMPERATURE DETECTOR
SCH	SCHEDULE
SEC	SECONDARY
SEL	SELECTOR
SPDT	SINGLE POLE DOUBLE THROW
SPEC	SPECIFICATION
SPHTR	MOTOR SPACE HEATER
SPKR	SPEAKER
SS	SPEED SWITCH
SUB	SUBSTATION
SW	SWITCH
SYMM	SYMMETRICAL
SYS	SYSTEM
SV	SOLENOID OPERATED VALVE
SPB	SIGNAL PULL BOX
TCB	TERMINAL CABINET
TB	TERMINAL BOX
TEL	TELEPHONE
TEMP	TEMPERATURE
TFR	TRANSFORMER
TH	THERMOSTAT
TJB	TERMINAL JUNCTION BOX
TSH	TEMPERATURE SWITCH HIGH
TV	TELEVISION
TYP	TYPICAL
TR	TIMING RELAY
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TSP	TWISTED SHIELDED PAIR
UG	UNDERGROUND
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT AMPERE
VAR	VOLT AMPERE REACTIVE
VFD	VARIABLE FREQUENCY DRIVE
VSH	VIBRATION SWITCH
W	WATT, WIRE, WIDE
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
WSH	OVERLOAD TORQUE SWITCH
ZS	POSITION (LIMIT) SWITCH
ZSH	POSITION (LIMIT) SWITCH OPEN
ZSL	POSITION (LIMIT) SWITCH CLOSED

GENERAL NOTES

1. SCOPE:

A. FURNISH ALL LABOR, MATERIAL, EQUIPMENT AND TOOLS REQUIRED TO COMPLETE INSTALLATION OF THE ELECTRICAL SYSTEM INCLUDING BUT NOT LIMITED TO WIRING, BOXES, LIGHT FIXTURES, PANELS, SWITCHES, RECEPTACLES, DISCONNECTS, STARTERS, AND ALL OTHER WORK INDICATED ON THE DRAWINGS OR AS SPECIFIED HEREIN.

B. OBTAIN ALL PERMITS, INSPECTIONS, AND APPROVALS AS REQUIRED BY THE LOCAL AUTHORITIES HAVING JURISDICTION AND DELIVER CERTIFICATE OF APPROVAL TO THE GENERAL CONTRACTOR. ALL ASSOCIATED FEES SHALL BE PAID BY THE CONTRACTOR.

C. ALL MATERIALS AND EQUIPMENT OF THE ELECTRICAL SYSTEM NECESSARY FOR ITS PROPER OPERATION, BUT NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL CHARGE.

D. WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2023 NATIONAL ELECTRICAL CODE, THE LATEST STANDARD BUILDING CODE, NFPA 820, AND LOCAL AUTHORITIES HAVING JURISDICTION.

2. ALL SUBSTITUTIONS FOR EQUIPMENT AND MATERIAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

3. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ACTUAL LOCATION OF EQUIPMENT, DUCTWORK, PIPING, ETC. AND COORDINATE THE INSTALLATION ACCORDINGLY.

4. UNLESS OTHERWISE NOTED ON THE DRAWINGS, CONTRACTOR SHALL ROUTE 3 #12 IN 3/4" CONDUIT TO ALL 120V, 20A, 1P LOADS (LIGHTS, RECEPTACLES, ETC) AS SHOWN IN THE PANELBOARD SCHEDULES.

5. DO NOT INSTALL CONDUITS ON EXTERIOR OF BUILDING WALLS, UNLESS APPROVED BY THE ENGINEER.

6. ALL EXTERIOR CONNECTIONS TO PANELS, INSTRUMENTS, BOXES, ETC. SHALL USE WATER TIGHT, MYERS TYPE HUBS. ALL CONNECTIONS SHALL ENTER FROM BOTTOM.

8. ALL EXTERIOR AND INTERIOR CONDUIT SHALL BE ALUMINUM RIGID. ALL UNDERGROUND CONDUIT SHALL BE PVC-40 WITH RIGID GALVANIZED STEEL ELBOWS.

9. FLEXIBLE CONDUIT SHALL BE METALLIC AND SHLL NOT EXCEED 3 FEET.

10. CONTRACTOR SHALL LABEL ALL CONDUCTORS AND PROVIDE TERMINATIONS TO CONTROL PANELS, INSTRUMENTS, ETC.

11. THE FOLLOWING SCADA WORK SHALL BE DONE BY PROCESSWORX, LLC AND PAID FOR BY THE CONTRACTOR:
- INCORPORATING NEW TRIDENT SYSTEM INTO EXISTING HMI, INCLUDING BUT NOT LIMITED TO, HMI SCREEN UPGRADES, PLC PROGRAMMING, CHEMICAL CONTROL, FLOW RATES, AND COORDINATING WITH WESTECH.

CONTACT MR. CARY HESTER AT 678-570-4652 FOR COSTS.

MOTOR AND EQUIPMENT SYMBOLS

Symbol	Description
M	MOTOR CONNECTION
	MOTOR STARTER, INDIVIDUAL--NOT LOCATED IN AN MCC OR SIMILAR GROUP ASSEMBLY
	COMBINATION MOTOR STARTER--NOT LOCATED IN AN MCC OR SIMILAR GROUP ASSEMBLY
	UNLESS OTHERWISE NOTED, DISCONNECT SWITCHES ARE HEAVY DUTY, SINGLE THROW, WITH NEMA 4X ENCLOSURE. MOUNT AT 4'-8" TO CENTER UON.
	DISCONNECT, NON-FUSED. PROVISION FOR CLASS R FUSES.
	FIELD INSTRUMENT CONNECTION
	NEMA 4X START/STOP HAND STATION MOUNTED TO HANDRAIL
$	120V, 20A, 1P TOGGLE SWITCH. MOUNT 48" AFF UNO.
	DUPLEX 120V RECEPTACLE, 120V, 20A, 1P. MOUNT 18" AFF UNO. - ALL OUTDOOR RECEPTACLES SHALL BE GFCI, WP - ALL RECEPTACLES ADJACENT TO SINKS OR WATER SHALL BE GFCI
$m	120V MOTOR RATED TOGGLE SWITCH, NEMA 4X SS.
J	JUNCTION BOX

CIRCUIT AND RACEWAY SYMBOLS

Symbol	Description
	RACEWAY OR WIRING SYSTEM ABOVE FLOOR LEVEL BELOW CEILING, EXPOSED UON.
PBD A-1,3,5	HOME RUN - SEE PANELBOARD SCHEDULE FOR CIRCUIT INFORMATION EXAMPLE: HOME TO PANELBOARD PBD A, CIRCUITS 1, 3, AND 5
	LIGHTING, RECEPTACLE, AND MISCELLANEOUS BRANCH CIRCUITING NOT SPECIFIED IN RACEWAY SCHEDULE: RUNS WITHOUT HATCH LINES SHALL CONTAIN TWO WIRES OF MINIMUM SIZE (#12) REQUIRED BY THE SPECS FOR THAT SYSTEM. OTHER CONDUCTOR QUANTITY SPECIFIED WITH HATCH LINES: NEUTRAL CONDUCTOR (#12), IF USED--HALF STROKE PHASE CONDUCTORS #12, AS APPLICABLE--FULL STROKE #12 MINIMUM EQUIPMENT GROUNDING CONDUCTOR ALWAYS REQUIRED. FOR MINIMUM SIZE PERMITTED REFER TO NEC TABLE 250-95. CONDUIT FILL PER NEC OR MINIMUM SIZE OF 3/4 INCH EXPOSED, 1 INCH ALL OTHER INSTALLATIONS, EXCEPT FLEX - 3/4 INCH.

ESAD PROJECT #23061

ESAD, LLC
885 WOODSTOCK ROAD
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ROSWELL, GA 30075
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DATE	NO.	DESCRIPTION
05/07/24	1	ELECTRICAL AND HVAC PLANS ISSUED

REVISION

EMI ENGINEERING MANAGEMENT
Experience ▪ Trust ▪ Solutions
303 Swanson Drive, Lawrenceville, GA 30043
phone 770-962-1387 fax # 770-962-8010
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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

ELECTRICAL LEGEND, NOTES AND ABBREVIATIONS
SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
DMZ	AP	DMZ

GEORGIA [illegible] PROFESSIONAL ENGINEER DAVID M. ZIMMER 4/26/24

STAMP

4/19/2023
DATE
20043
JOB NUMBER
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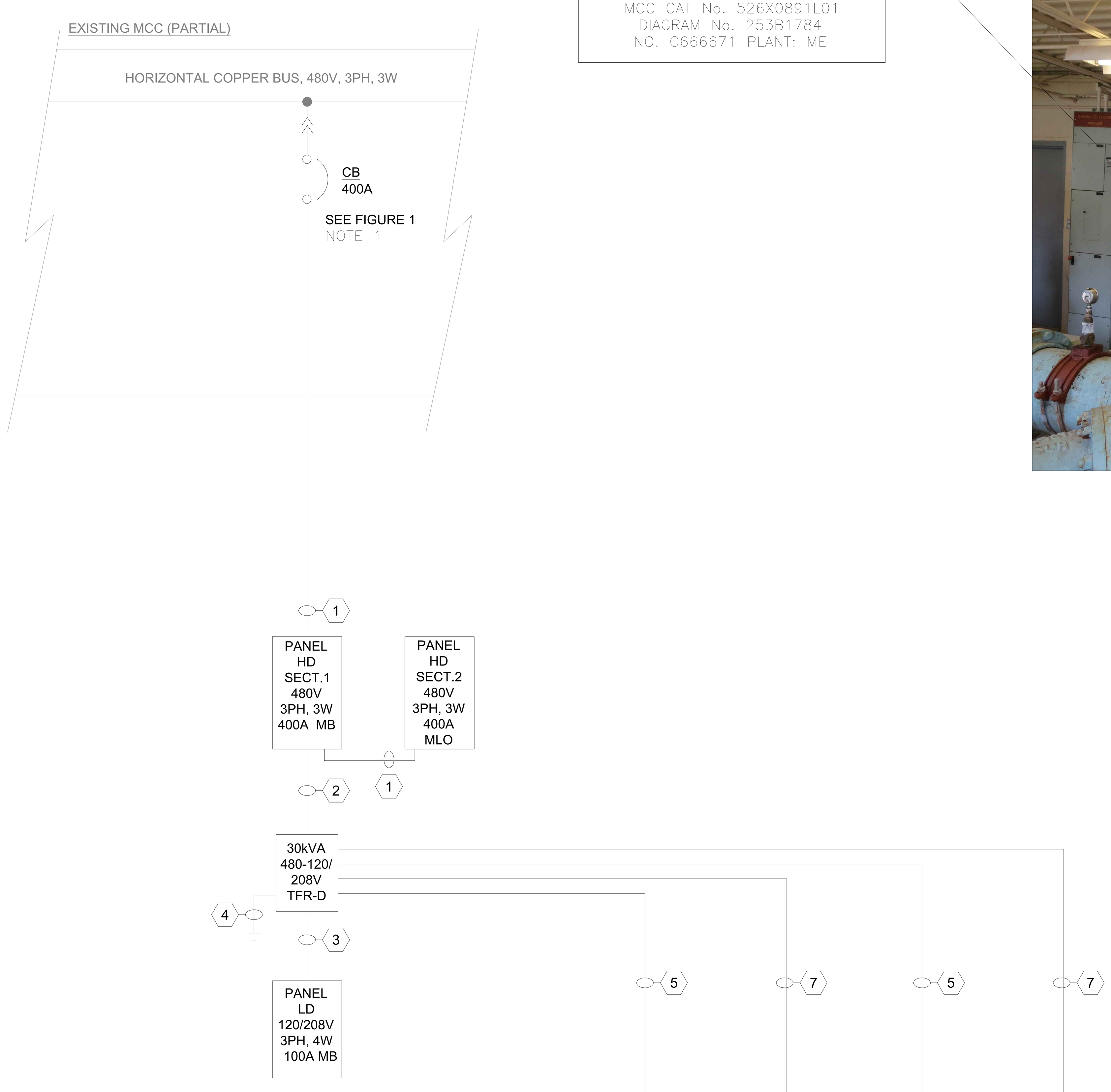
FILE LOCATION

PATH & FILE: E:\ESAD, LLC\Projects\23061-EM Baldwin WTP\Drawings\E-1 Legend

SHEET
E1



EXISTING MCC - ONE LINE DIAGRAM

GENERAL ELECTRIC 8000 LINE
MOTOR CONTROL CENTER
460V, 3 PHASE, 60 HZ
25 KAIC
MCC CAT No. 526X0891L01
DIAGRAM No. 253B1784
NO. C666671 PLANT: ME

NOTE 1

FIGURE 1 - EXISTING MCC

NOTES:

1. CONTRACTOR SHALL INSTALL A NEW 400A, 480V, 3P CIRCUIT BREAKER IN THE EXISTING MOTOR CONTROL CENTER FOR POWER TO NEW PANEL HD LOCATED IN THE NEW BUILDING. NEW BREAKER SHALL INCLUDE NEW BUCKET, STAB, AND ALL OTHER COMPONENTS / MODIFICATIONS TO ALLOW THE NEW BREAKER TO FIT INTO THE EXISTING SPACE. NEW BREAKER SHALL BE OF THE SAME MANUFACTURER AND HAVE THE SAME AIC RATING AS THE EXISTING BREAKERS.
2. VFDs ARE PROVIDED BY WESTECH AND SHALL BE INSTALLED BY THE CONTRACTOR.

CONDUCTOR/CONDUIT SCHEDULE

1	3-500 Kcmil & 1 #3 GND IN 3" C.
2	3 #6 & 1 #10 IN 3/4" C.
3	4 #1 & 1 #8 IN 1.5" C.
4	1 #6 GND IN 3/4" PVC C.
5	3 #12 & 1 #12 GND IN 3/4" C.
6	3 #12, 2 #14, & 1 #12 GND IN 3/4" C.
7	3 #8 & 1 #10 GND IN 3/4" C.
8	3 #10, 2 #14 & 1 #10 GND IN 3/4" C.

PANEL HD SECTION 1

VOLTAGE: 480V — 3 PHASE, 3 WIRE — AMPS: 400 MB — TOTAL LOAD: 81.4 KVA — MOUNTING: SURFACE — AIC: 42,000 — NOTES: NEMA 12 / FEED THRU LUGS

No.	SERVES	LOAD (KVA)						BRKR		PH			BRKR		LOAD (KVA)						SERVES	No.
		LTG	RCPT	MTR	A/C	KITCH	MISC	TRIP	P	A	B	C	P	TRIP	MISC	KITCH	A/C	MTR	RCPT	LTG		
1	UNIT #1 TRANSFER PUMP VFD (15HP)			5.90						15.90					10.00						TRANSFORMER TFR-D 30kVA	2
3				5.90				40	3		15.90		3	50	10.00							4
5				5.90								15.90			10.00							6
7	UNIT #1 RECIRCULATION PUMP VFD (3HP)			1.33						1.33											SPARE	8
9				1.33				15	3		1.33		3	15								10
11				1.33								1.33										12
13	UNIT #2 TRANSFER PUMP VFD (15HP)			5.90						5.90											SPARE	14
15				5.90				40	3		5.90		3	20								16
17				5.90								5.90										18
19	UNIT #2 RECIRCULATION PUMP VFD (3HP)			1.33						1.33											SPARE	20
21				1.33				15	3		1.33		3	20								22
23				1.33								1.33										24
25	EXHAUST FAN #1 MS-EF1 (3HP)			1.33						1.33											SPACE	26
27				1.33				15	3		1.33										SPACE	28
29				1.33								1.33									SPACE	30
31	EXHAUST FAN #2 MS-EF2 (3HP)			1.33						1.33											SPACE	32
33				1.33				15	3		1.33										SPACE	34
35				1.33								1.33									SPACE	36
37	SPACE									0.00											SPACE	38
39	SPACE										0.00										SPACE	40
41	SPACE											0.00									SPACE	42
	PRVOIDE WITH INTEGAL SURGE PROTECTION DEVICE									27.12	27.12	27.12			30.00	0.00	0.00	51.36	0.00	0.00	CONNECTED KVA 81.36	

NOTES:
1. PROVIDE WITH INTEGRAL SURGE PROTECTION DEVICE.
2. PROVIDE WITH FEED THRU LUGS.

PANEL HD SECTION 2

VOLTAGE: 480V — 3 PHASE, 3 WIRE — AMPS: 400 MLO — TOTAL LOAD: 79.9 KVA — MOUNTING: SURFACE — AIC: 42,000 — NOTES: NEMA 12

No.	SERVES	LOAD (KVA)						BRKR		PH			BRKR		LOAD (KVA)						SERVES	No.
		LTG	RCPT	MTR	A/C	KITCH	MISC	TRIP	P	A	B	C	P	TRIP	MISC	KITCH	A/C	MTR	RCPT	LTG		
43	UNIT HEATER #1 10 KW						3.33			6.66					3.33						UNIT HEATER #5 10 KW	44
45							3.33	20	3		6.66		3	20	3.33							46
47							3.33					6.66			3.33							48
49	UNIT HEATER #2 10 KW						3.33			6.66					3.33						UNIT HEATER #6 10 KW	50
51							3.33	20	3		6.66		3	20	3.33							52
53							3.33					6.66			3.33							54
55	UNIT HEATER #3 10 KW						3.33			6.66					3.33						UNIT HEATER #7 10 KW	56
57							3.33	20	3		6.66		3	20	3.33							58
59							3.33					6.66			3.33							60
61	UNIT HEATER #4 10 KW						3.33			6.66					3.33						UNIT HEATER #81 10 KW	62
63							3.33	20	3		6.66		3	20	3.33							64
65							3.33					6.66			3.33							66
67	SPACE									0.00											SPACE	68
69											0.00										SPACE	70
71												0.00									SPACE	72
73	SPACE									0.00											SPACE	74
75											0.00										SPACE	76
77												0.00									SPACE	78
79	SPACE									0.00											SPACE	80
81	SPACE										0.00										SPACE	82
83	SPACE											0.00									SPACE	84
										26.64	26.64	26.64			79.92	0.00	0.00	0.00	0.00	0.00	CONNECTED KVA 79.92	

PANEL LD

VOLTAGE: 208Y/120V — 3 PHASE, 4 WIRE — AMPS: 100 MB — TOTAL LOAD: 16.2 KVA — MOUNTING: SURFACE — AIC: 10,000 — NOTES: NEMA 12

No.	SERVES	LOAD (KVA)						BRKR		PH			BRKR		LOAD (KVA)						SERVES	No.
		LTG	RCPT	MTR	A/C	KITCH	MISC	TRIP	P	A	B	C	P	TRIP	MISC	KITCH	A/C	MTR	RCPT	LTG		
1	INT. LIGHTS	1.00						20	1	1.50			1	20	0.50						UNIT #1 CONTROL PANEL	2
3	INT LIGHTS	1.00						20	1		1.50		1	20	0.50						UNITE #2 CONTROL PANEL	4
5	RECEPT (7) (NOTE 1)		1.26					20	1			1.76	1	20	0.50						MASTER CONTROL PANEL	6
7	RECEPT (5) (NOTE 1)		0.90					20	1	1.40			1	20	0.50						UNIT #1 TURBIDIMETER	8
9	POLY RECEPT.						1.00	20	1		2.00		1	20	1.00						UNIT #1 POLY UNIT	10
11	EXT. LIGHTS (14)	1.40						20	1			1.90	1	20	0.50						UNIT #2 TURBIDIMETER	12
13	WATER HEATER						2.50	30	2	3.50			1	20	1.00						UNIT #2 POLY UNIT	14
15							2.50				2.50		1	20							SPARE	16
17	LIGHTING CONTACTOR						0.10	20	1			0.10	1	20							SPARE	18
19	SPARE							20	1	0.00			1	20							SPARE	20
21	SPARE							20	1				1	20							SPARE	22
23	SPARE							20	1			0.00	1	20							SPARE	24
25	SPARE							20	1	0.00			1	20							SPARE	26
27	SPARE							20	1				1	20							SPARE	28
29	SPARE							20	1			0.00	1	20							SPARE	30
31	SPARE							20	1	0.00			1	20							SPARE	32
33	SPARE							20	1		0.00		1	20							SPARE	34
35	SPARE							20	1			0.00	1	20							SPARE	36
37	SPARE							20	1	0.00			1	20							SPACE	38
39	SPARE							20	1		0.00		1	20							SPACE	40
41	SPARE							20	1			0.00	1	20							SPACE	42
										6.40	6.00	3.76			10.60	0.00	0.00	0.00	2.16	3.40	CONNECTED KVA 16.16	

NOTES:
1. PROVIDE A GROUND FAULT CIRCUIT BREAKER RATED FOR RECEPTACLES.

ESAD PROJECT #23061
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ENGINEERING MANAGEMENT
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WATER TREATMENT FACILITY
PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

ONE LINE DIAGRAM

SHEET TITLE

DESIGN BY: DMZ — DRAWN BY: AP — CHECKED BY: DMZ

GEORGIA REGISTERED No. 38080 PROFESSIONAL ENGINEER 4/26/24 DAVID M. ZIMMER

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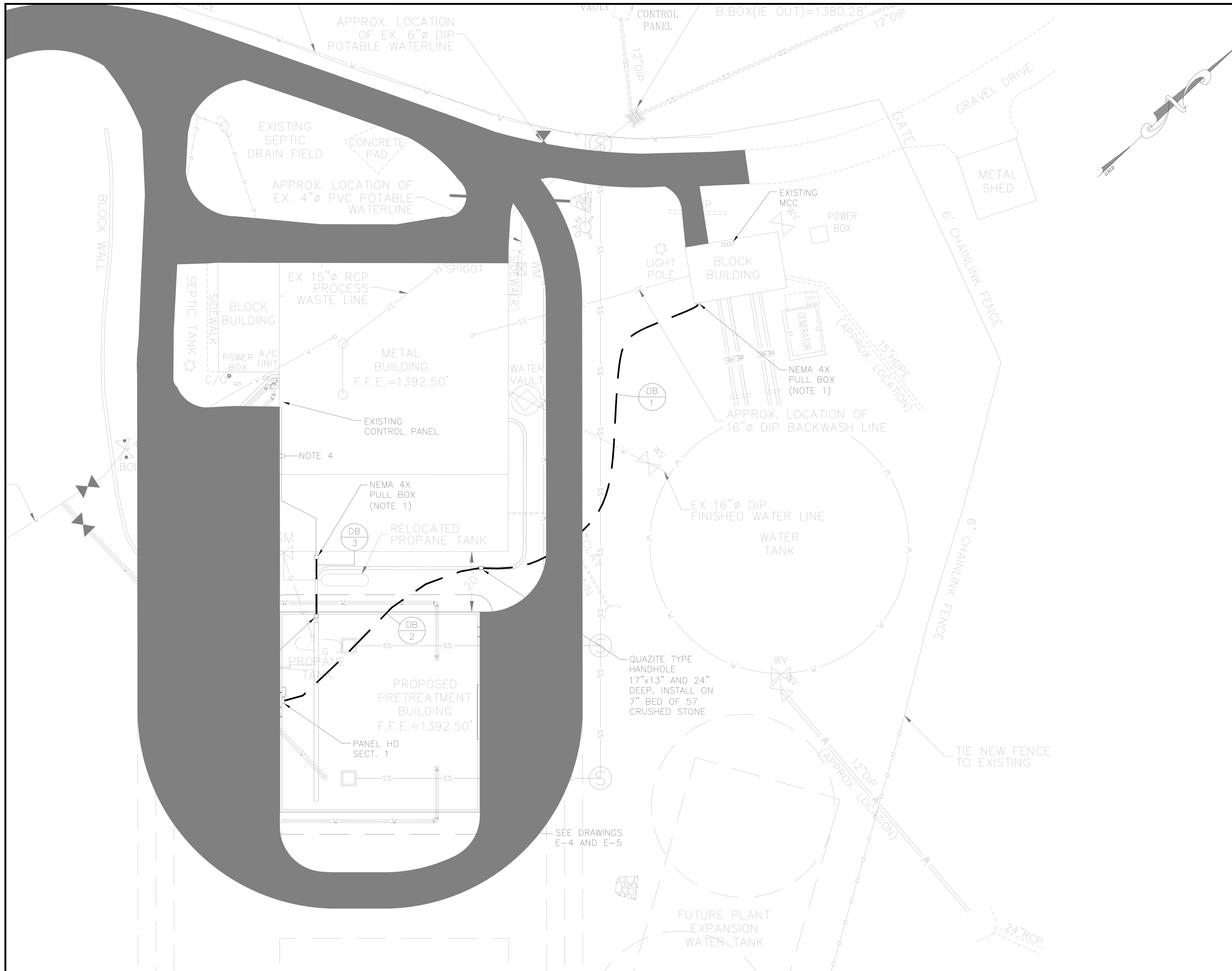
SHEET E2



GRAPHIC SCALE

0 10 20 40 60

(IN FEET)

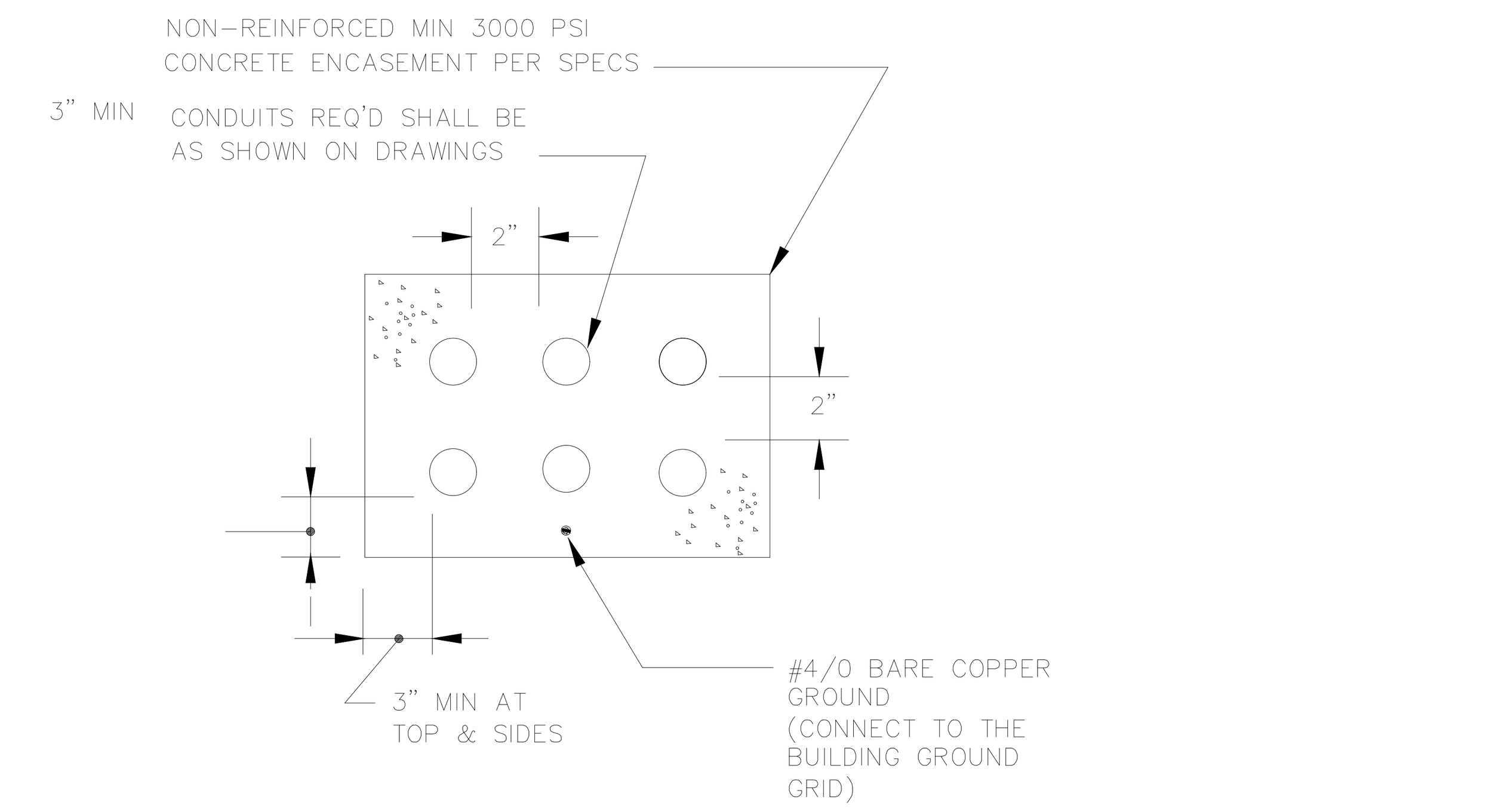
ELECTRICAL SITE PLAN
SCALE: 1" = 20'-0"

①②
DUCT BANK 1
1 – 3" PVC C. (480V POWER)
2 – 3" PVC C. (SPARE)

①②
DUCT BANK 2
1 – 3" PVC C. (480V POWER)
2 – 3" PVC C. (SPARE)

①② ③④
DUCT BANK 3
1 – 2" RGS C. (CAT 6E ETHERNET)
2 – 2" PVC C. (SPARE)
3 – 2" PVC C. (SPARE)
4 – 2" PVC C. (SPARE)

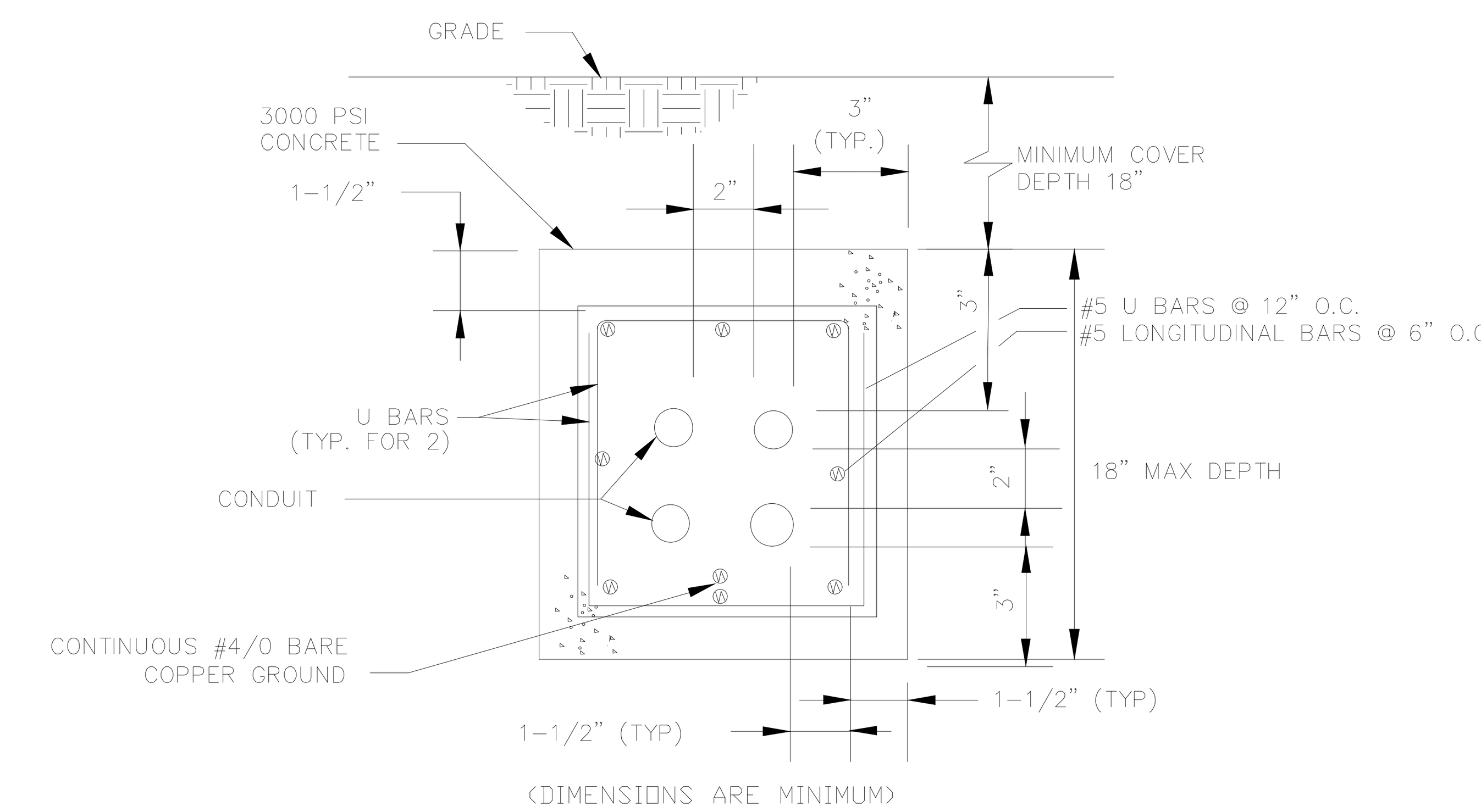
NOTES:
1. INSTALL NEMA 4X SS PULL BOX ON EXTERIOR WALL FOR TRANSITION OF DUCTBANK CONDUITS INTO BUILDING. MOUNT ON EXTERIOR WALL 36" ABOVE GRADE.
2. INSTALL NEMA 4X SS PULL BOX ON INTERIOR WALL FOR TRANSITION OF DUCTBANK CONDUITS INTO BUILDING. MOUNT ON INTERIOR WALL 36" ABOVE FLOOR.
3. ALL DUCTBANKS SHALL BE CONCRETE ENCASED REINFORCE UNDER ROAD WAYS.
4. ROUTE A CAT 6E ETHERNET CABLE IN 1"C. TO NEW CONTROL PANEL IN NEW FILTER BUILDING.



NON-REINFORCED DUCT BANK SECTION

DETAIL A/E3

SCALE: NONE



(DIMENSIONS ARE MINIMUM)

NOTES:
1. INSTALL IN VERTICAL AND HORIZONTAL PLANES, AT TRANSITION, PROVIDE 24" X 24" BENT BARS FOR SPLICING.
2. PROVIDE REINFORCED DUCT BANK TO 2-FEET BEYOND STRUCTURE, BUILDING, OR ROAD.
3. PROVIDE REINFORCED DUCTS UNDER ROADS, BUILDINGS, AND STRUCTURES. AT BUILDINGS, INSTALL ABOVE OR BELOW THICKENED FOOTING AS REQUIRED. DO NOT PASS THROUGH THICKENED FOOTING. DUCTBANKS AT BUILDINGS AND STRUCTURES SHALL NOT BE LOW POINTS
4. SLOPE DUCTBANKS DOWN AND AWAY FROM BUILDING AND STRUCTURES.54. SPLICE LONGITUDINAL BARS 24", MINIMUM, WHERE REQUIRED.

REINFORCED DUCT BANK SECTION

DETAIL B/E3

SCALE: NONE

ESAD PROJECT #23061

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ROSWELL, GA 30075
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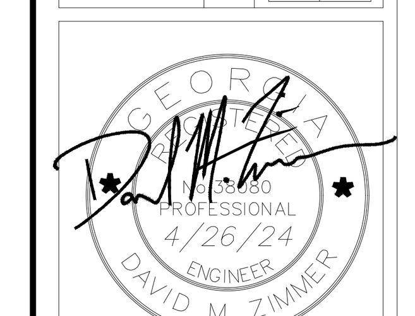
WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

ELECTRICAL SITE PLAN

SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
DMZ	AP	DMZ



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FILE LOCATION

E3

SHEET

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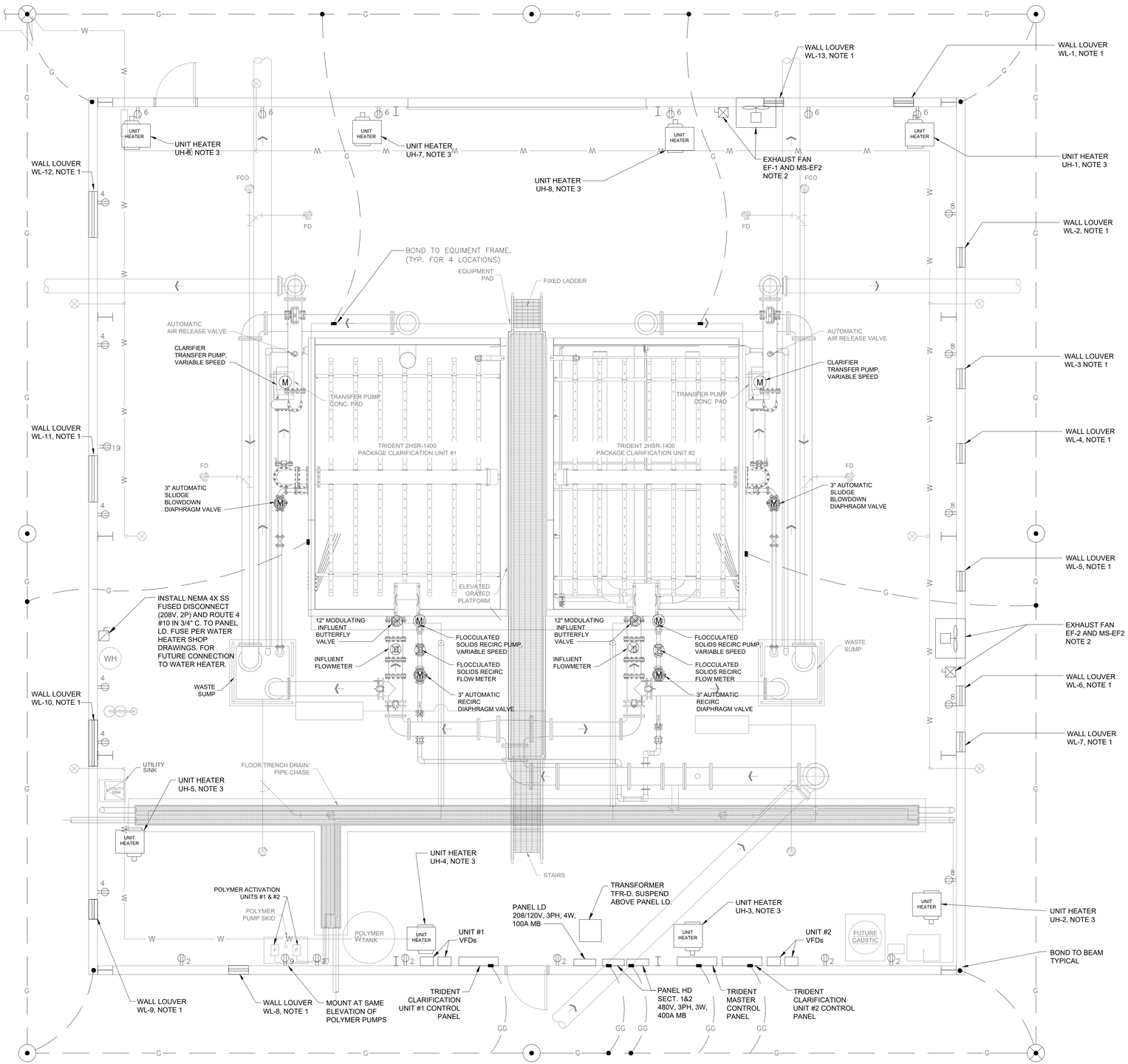

BUILDING POWER AND GROUNDING PLAN VIEW
SCALE: 1/4" = 1'-0"

NOTES:

1. PROVIDE A 120V, 1P, 1/8HP, NEMA 12, SQUARE D MOTOR TOGGLE SWITCH FOR EACH LOUVER. ROUTE 3 #12 IN 3/4" C. FROM LOUVER, TO TOGGLE SWITCH , AND THEN TO MOTOR STARTER MS-EF1 OR MS-EF2. FIELD COORDINATE WHICH STARTER WITH HVAC CONTRACTOR.
2. WALL MOUNTED EXHAUST FAN. CONTRACTOR SHALL INSTALL A COMBINATION MOTOR STARTER / DISCONNECT FOR THE 3HP, 480V, 3P EXHAUST FAN. SEE WIRING DIAGRAM ON 1-E.3 FOR REQUIREMENTS. ROUTE 3 #12 & 1 #12 GND IN 3/4" C. FROM MOTOR STARTER TO PANEL HD. INTERLOCK WITH LOUVERS.
3. ELECTRIC UNIT HEATER. PROVIDE 480V, 3P, 30A, NEMA 4X DISCONNECT UNDER HEATER. MOUNT APPROXIMATELY 5'-0" AFF AND LABEL. ROUTE 3 #12 & 1 #12 GND IN 3/4" CONDUIT FROM HEATER TO SWITCH AND THEN TO PANEL HD.
4. ALL CONDUIT SHALL BE RIGID ALUMINUM.
5. ALL RECEPTACLES SHOWN SHALL BE WP, 120V, DUPLEX, 20A WITH ALUMINUM PLATES. MOUNT 18" A.F.F.
6. ALL FREESTANDING EQUIPMENT (TRANSFORMERS) SHALL BE INSTALLED ON A 4" HOUSE KEEPING PAD.
7. CONTRACTOR SHALL ROUTE AS MUCH CONDUIT IN FLOOR. COORDINATE EXACT STUB UP LOCATIONS WITH HUBER SHOP DRAWINGS.
8. ALL CONDUIT SHALL ENTER ENCLOSURES (PANEL HD, PANEL LD, CONTROL PANELS, ETC. FROM BOTTOM OR SIDE. DO NOT ENTER FROM TOP.
9. CONTRACTOR SHALL NOTE THAT THE TRIDENT EQUIPMENT LOCATIONS ARE APPROXIMATE. FOR EXACT LOCATIONS, REFER TO TRIDENT SHOP DRAWINGS.
10. CONTRACTOR SHALL ROUTE 2 #12 & 1 #12 GND IN 3/4" C. TO ALL 120V, 1P, 20A LOADS INCLUDING, BUT NOT LIMITED TO, LIGHTS, UNIT HEATERS, SWITCHES, AND RECEPTACLES.
11. CONTRACTOR SHALL REFER TO WESTECH'S SHOP DRAWINGS FOR THE EXACT LOCATION OF ALL FIELD MOUNTED EQUIPMENT. THE LOCATIONS SHOWN ARE APPROXIMATE AND WILL DEVIATE FROM THE SHOP DRAWINGS.

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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

BUILDING POWER AND GROUNDING

SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
DMZ	AP	DMZ

GEORGIA PROFESSIONAL 4/26/24 ENGINEER DAVID M. ZIMMER

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E4 SHEET

PATH & FILE: E:\ESAD, LLC\Projects\23061-EM Baldwin WTP\Drawings\E-4 Filter Unit Building Plan_Power and Grounding

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SUITE 430-231
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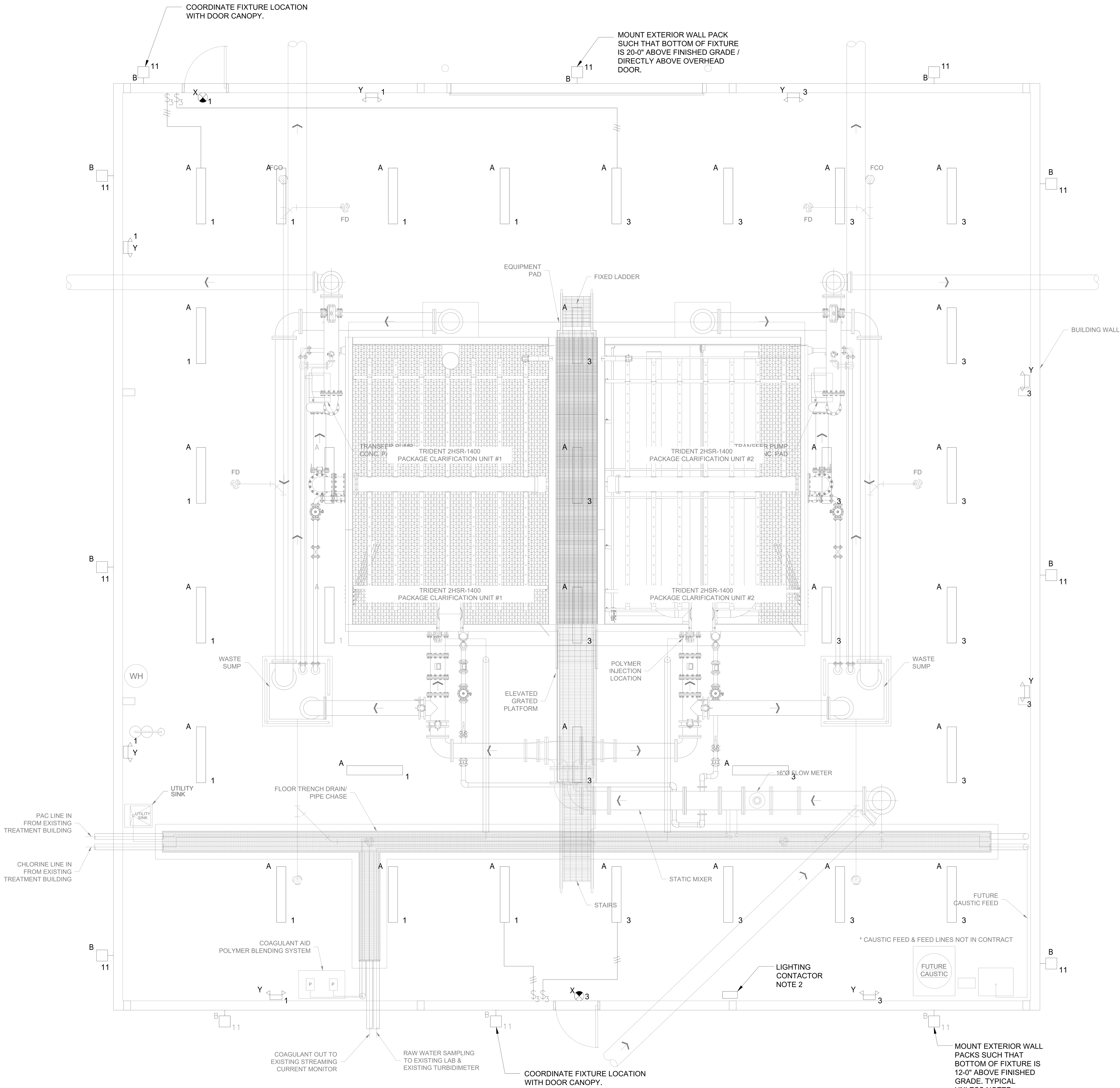
PH: 678-469-5196



BUILDING LIGHTING PLAN VIEW
SCALE: 1/4" = 1'-0"

NOTES:
1. ALL CONDUIT SHALL BE RIGID ALUMINUM.
2. PROVIDE ASCO 918 LIGHTING CONTACTOR WITH 4 - 20A, 1 POLES FOR EXTERIOR LIGHTS, NEMA 4X ENCLOSURE WITH H-O-A SWITCH, AND REMOTE PHOTOCELL. ROUTE 2 #14 IN 3/4" C. BETWEEN PHOTOCELL AND PANEL FOR AUTO CONTROL. ROUTE EXTERIOR LIGHTING CIRCUITS (LD-11) THROUGH CONTACTORS. LOCATE PHOTOCELL ON EXTERIOR WALL FACING NORTH.
3. THE 1'x4' LIGHT FIXTURES TYPE "A" SHALL BE MOUNTED APPROXIMATELY 15'-0" OFF THE FLOOR. FIXTURES SHALL BE MOUNTED AT THE SAME HEIGHT. FIELD LOCATE LIGHTS SUCH THAT THEY ARE NOT LOCATED ABOVE EQUIPMENT.
4. CONTRACTOR SHALL ROUTE AS MUCH CONDUIT IN FLOOR. COORDINATE EXACT STUB UP LOCATIONS WITH HUBER SHOP DRAWINGS.
5. DO NOT ROUTE CONDUIT EXPOSED ON WALL. DO NOT USE FLEX FOR CONNECTION TO FIXTURES..
6. CONTRACTOR SHALL ROUTE 2 #12 & 1 #12 GND IN 3/4" C. TO ALL 120V, 1P, 20A LOADS INCLUDING, BUT NOT LIMITED TO, LIGHTS, SWITCHES, AND RECEPTACLES.
7. SUSPEND TYPE A FIXTURES FROM CEILING SUCH THAT BOTTOM OF FIXTURE IS 14' -0" ABOVE FINISHED GRADE.

LIGHTING FIXTURE SCHEDULE

	SYMBOL	DESCRIPTION	MANUFACTURER	MOUNTING	VOLT/PHASE	LAMP
		1'x4' LED, WET LOCATION WITH CORROSION RESISTANCE, FIBERGLASS HOUSING	LITHONIA CAT#FEM L48 6000LM IMAFL MD MVOLT GZ10 40K 80CRI STAINLESS STEEL LATCHES	CEILING	120V/1PH	LED / INCLUDED
		LED WALL PACK. DARK BRONZE LOCATED OUTDOORS (250W EQUIVALENT)	LITHONIA CAT #TWX2 54W/6950 LUMENS LED ALO 40K MVOLT DDBTXD (NO PHOTOCELL)	WALL	120V/1PH	LED / INCLUDED
		LED EXIT SIGN WITH INTEGRAL BATTERY PACK	LITHONIA CAT# ECR LED M6-120V	WALL OR CEILING	120V/1PH	INCLUDED
Y		EMERGENCY LIGHT WITH TWO (2) 5.4W LAMPS	LITHONIA CAT# ELM2-120V	WALL	120V/1PH	INCLUDED

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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

BUILDING LIGHTING
SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
DMZ	AP	DMZ

GEORGIA REGISTERED No. 38080 PROFESSIONAL ENGINEER 4/26/24 DAVID M. ZIMMER
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FILE LOCATION

E5
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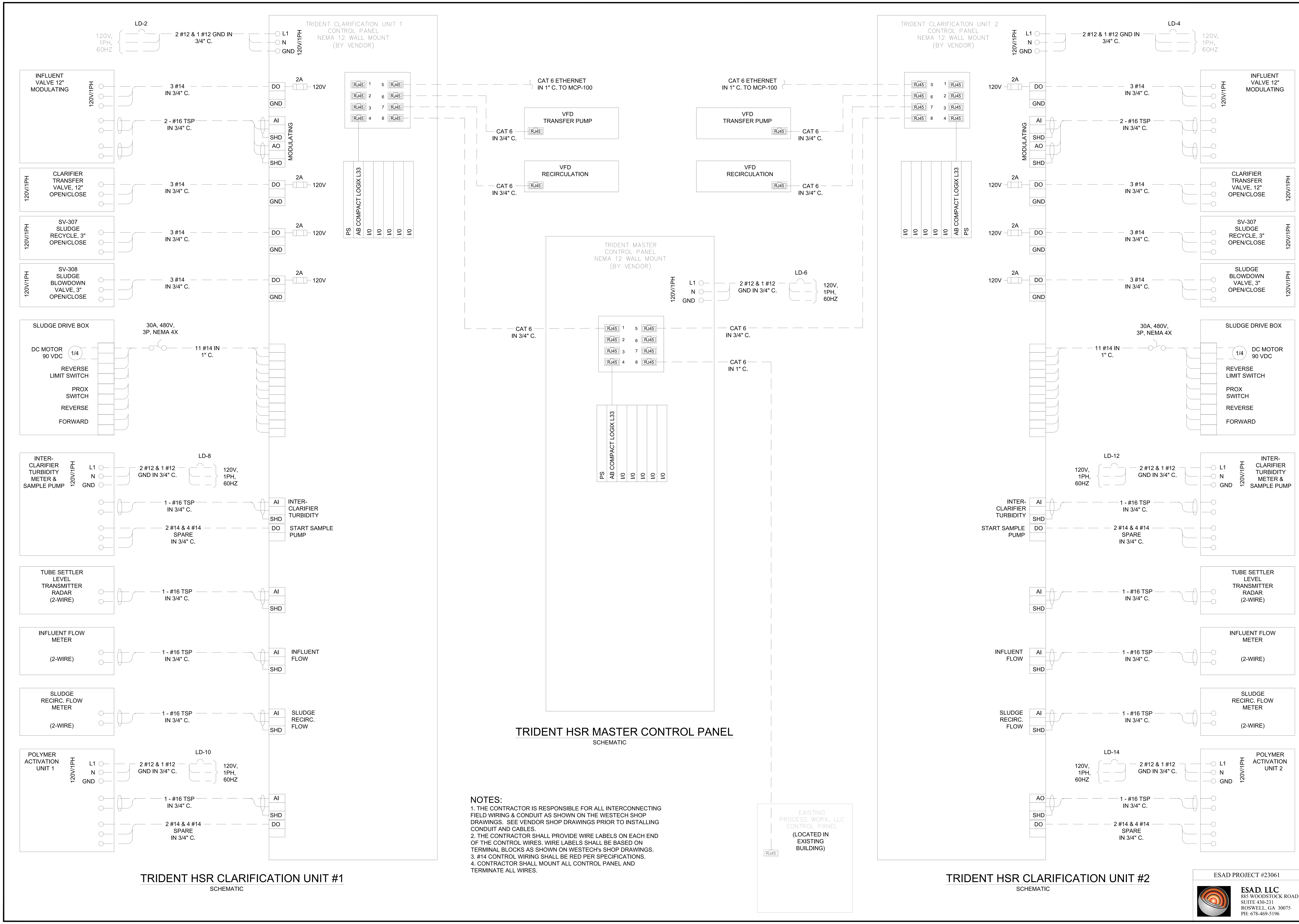

NOTES:
1. THE CONTRACTOR IS RESPONSIBLE FOR ALL INTERCONNECTING FIELD WIRING & CONDUIT AS SHOWN ON THE WESTECH SHOP DRAWINGS. SEE VENDOR SHOP DRAWINGS PRIOR TO INSTALLING CONDUIT AND CABLES.
2. THE CONTRACTOR SHALL PROVIDE WIRE LABELS ON EACH END OF THE CONTROL WIRES. WIRE LABELS SHALL BE BASED ON TERMINAL BLOCKS AS SHOWN ON WESTECH's SHOP DRAWINGS.
3. #14 CONTROL WIRING SHALL BE RED PER SPECIFICATIONS.
4. CONTRACTOR SHALL MOUNT ALL CONTROL PANEL AND TERMINATE ALL WIRES.

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ESAD, LLC
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SUITE 430-231
ROSWELL, GA 30075
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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
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HABERSHAM COUNTY, GEORGIA

SCHEMATICS
SHEET TITLE

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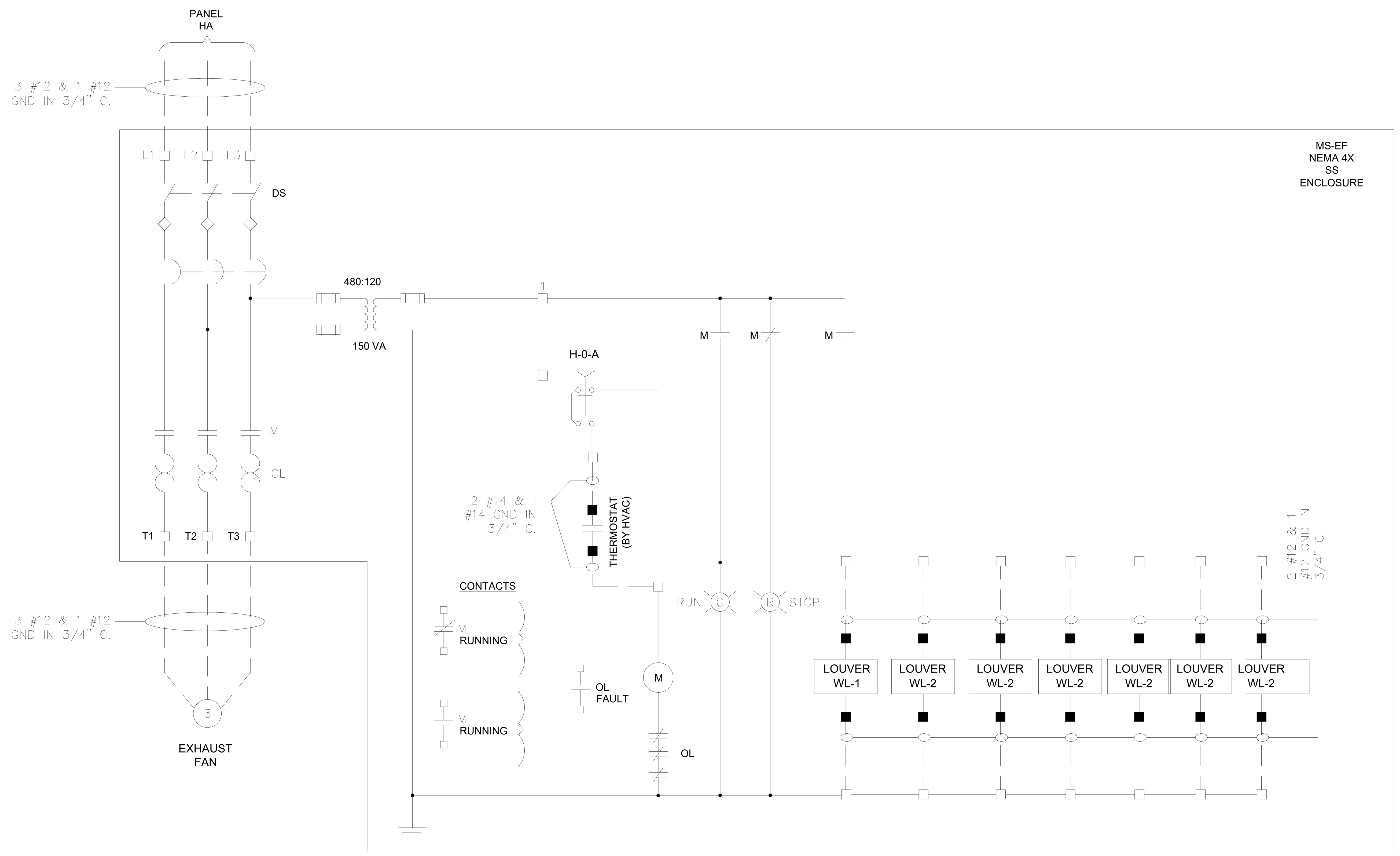
FILE LOCATION	z:\projects

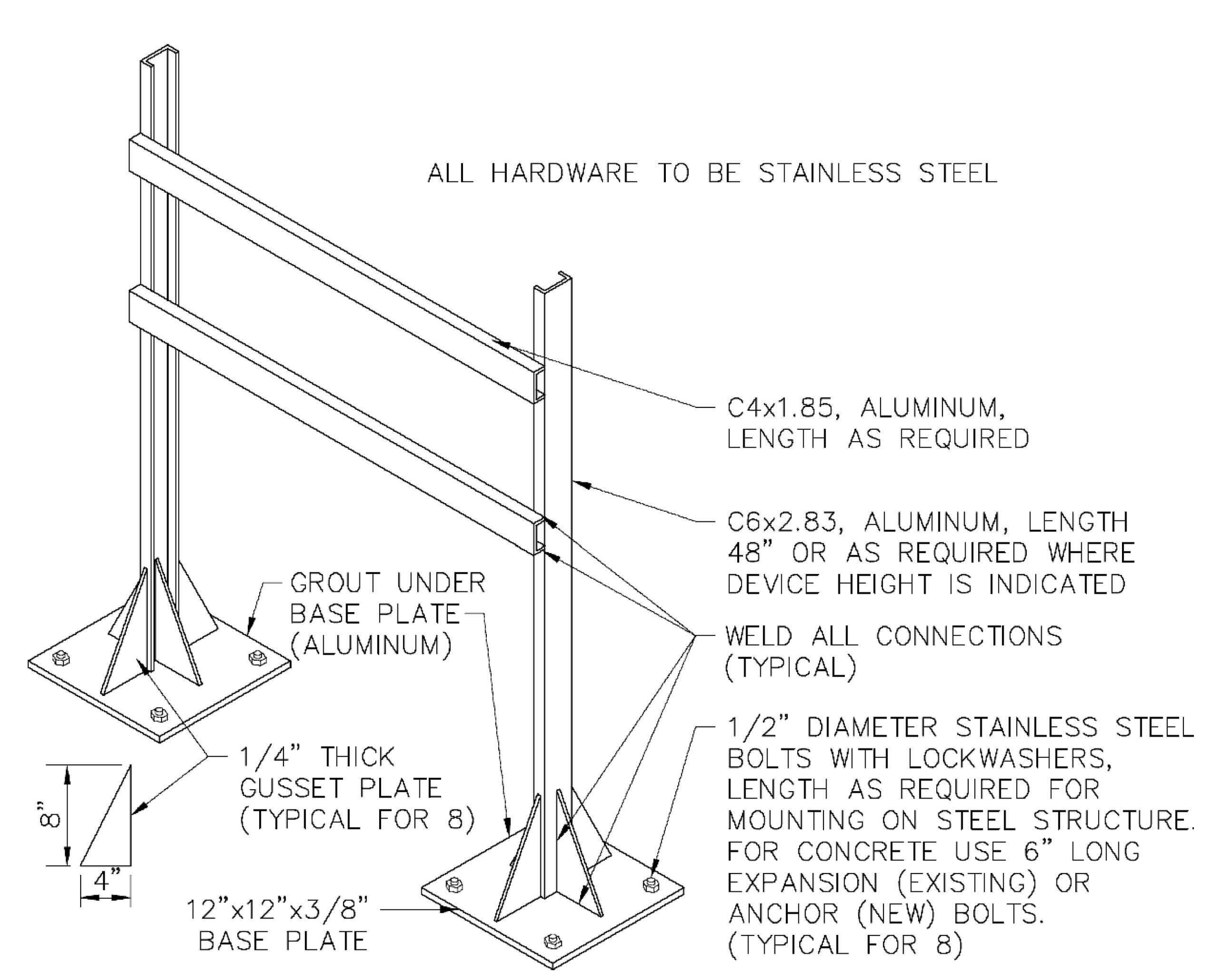
SHEET
E6

PATH & FILE: E:\ESAD, LLC\Projects\23061-EM Baldwin WTP\Drawings\E-6 & E7 Schematics



MS–EF1 & MS–EF2 SCHEMATIC

TYPICAL FOR 2

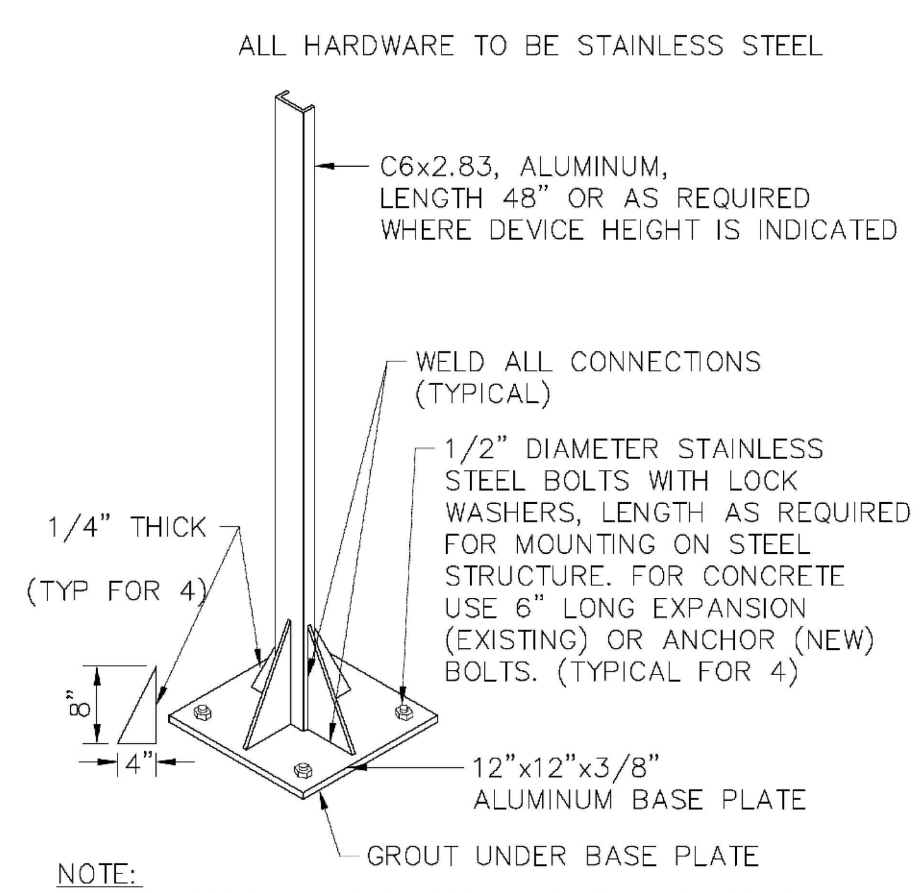


NOTE:
FOR ALUMINUM STANDS ONLY, PROVIDE BITUMINOUS PROTECTIVE COATING WHERE STAND COMES IN CONTACT WITH CONCRETE.

DUAL SUPPORT STAND / UTILITY RACK

DETAIL A / E7

SCALE: NONE

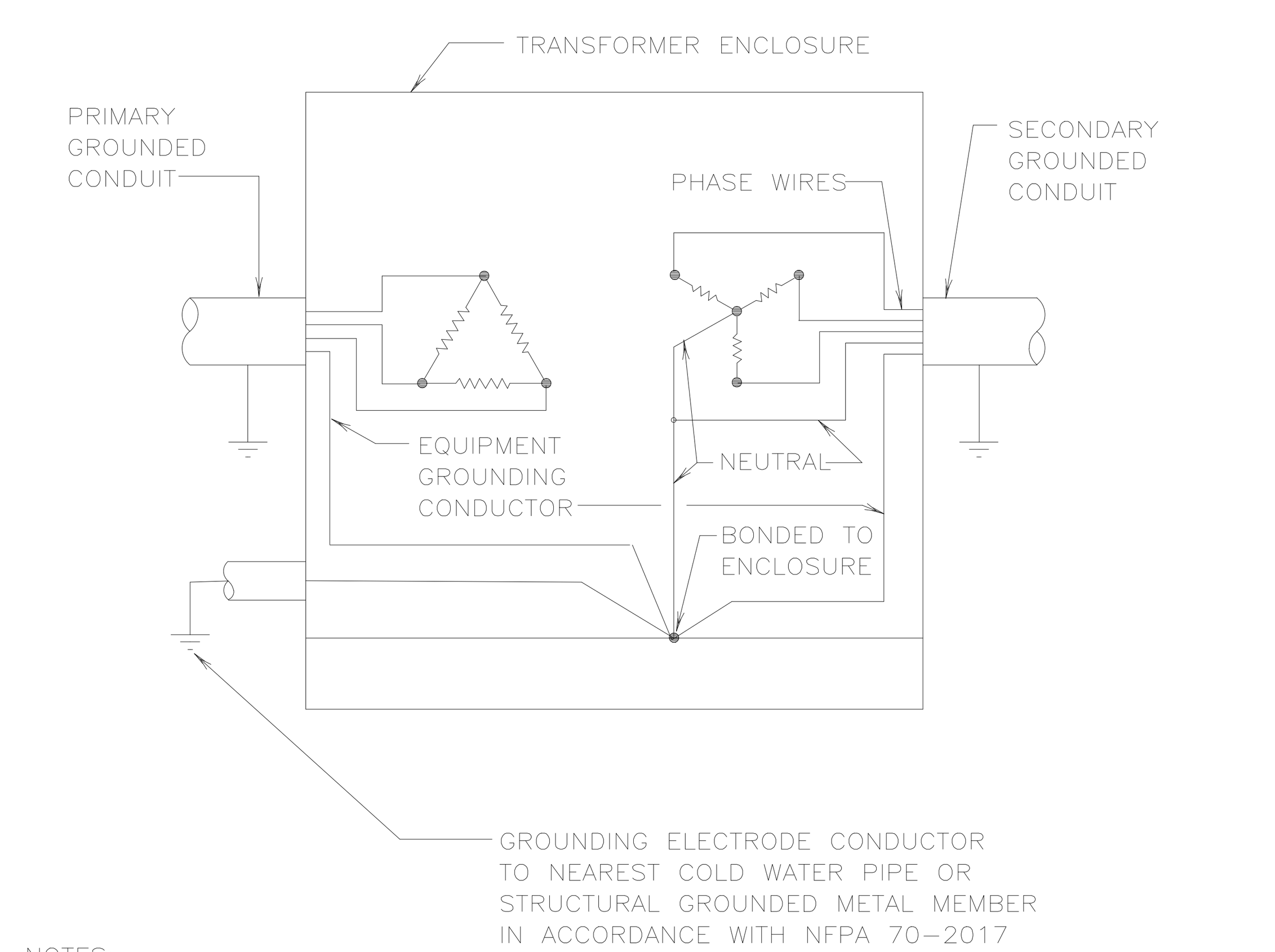


NOTE:
FOR ALUMINUM STANDS ONLY, PROVIDE BITUMINOUS PROTECTIVE COATING WHERE STAND COMES IN CONTACT WITH CONCRETE.

SINGLE SUPPORT STAND / UTILITY RACK

DETAIL B / E7

SCALE: NONE

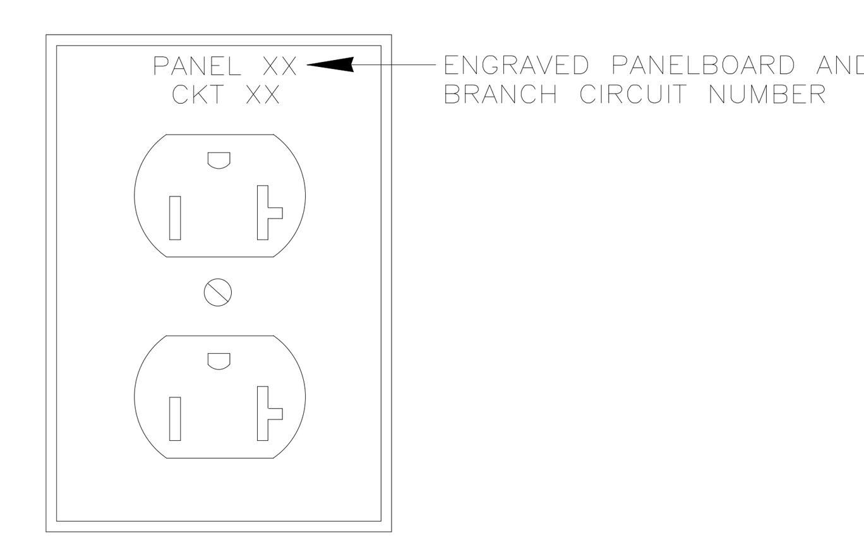


NOTES:
1. BONDING JUMPER SHALL BE SIZED IN ACCORDANCE WITH NFPA 70–2017, TABLE 250–66.
2. TRANSFORMER GROUNDING IS NOT SHOWN ON ONE LINE DIAGRAM. GROUND PER DETAIL.

GROUNDING CONNECTION FOR DRY–TYPE TRANSFORMERS

DETAIL C / E7

SCALE: NONE



COVER PLATE IDENTIFICATION

DETAIL D / E7

SCALE: NONE

NOTES:
1. ALL ELECTRICAL OUTLETS, LIGHT SWITCHES, TOGGLE SWITCHES, DISCONNECTS, ETC. SHALL INDICATE PANEL AND CIRCUIT NUMBER ON THE FRONT.
2. PRIOR TO LABELING, CONTRACTOR SHALL SUBMIT SAMPLE TO OWNER FOR APPROVAL.

ESAD PROJECT #23061

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WATER TREATMENT FACILITY
PRETREATMENT SYSTEM
FOR THE
CITY OF BALDWIN
HABERSHAM COUNTY, GEORGIA

ELECTRICAL DETAILS

SHEET TITLE

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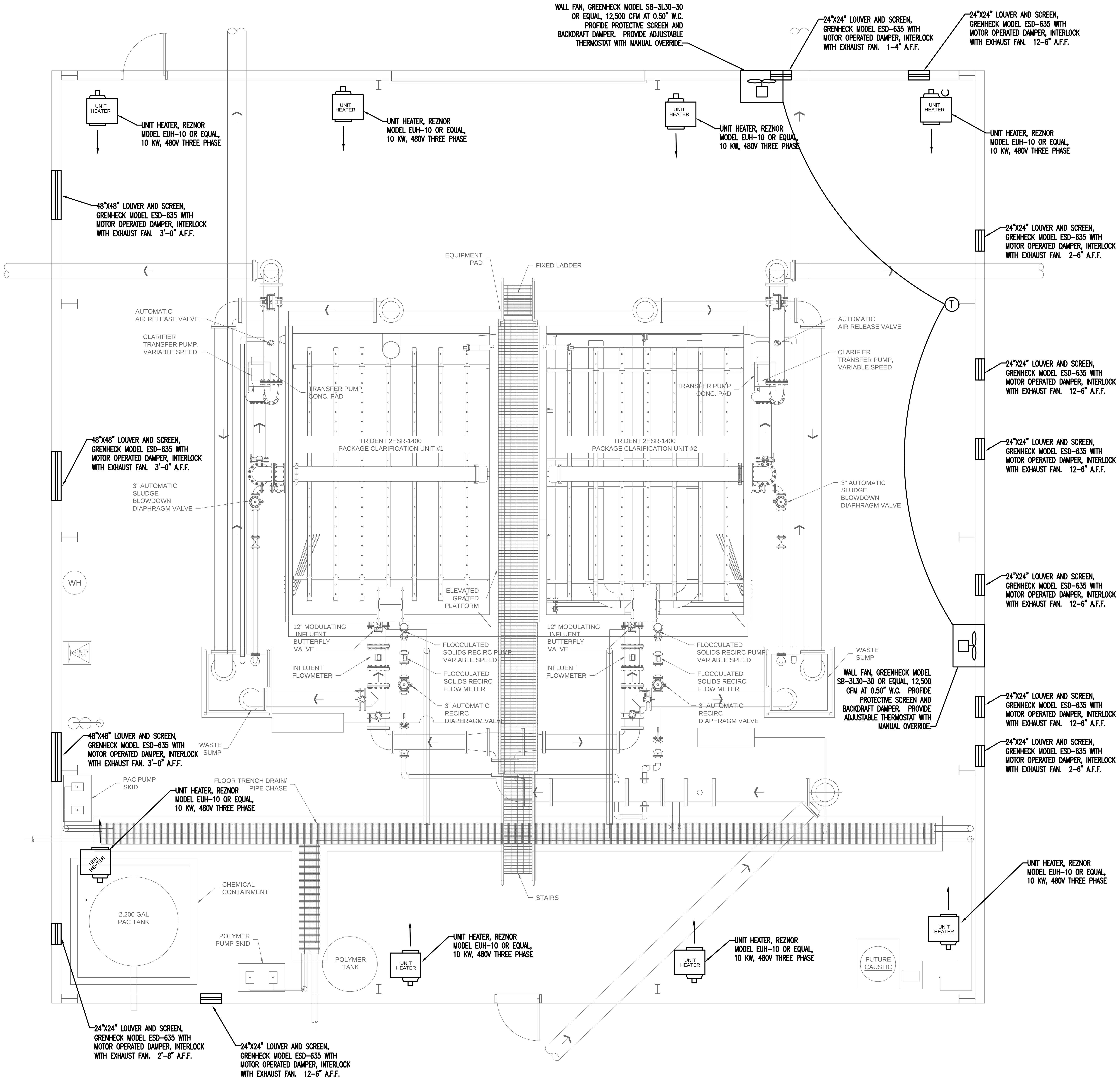
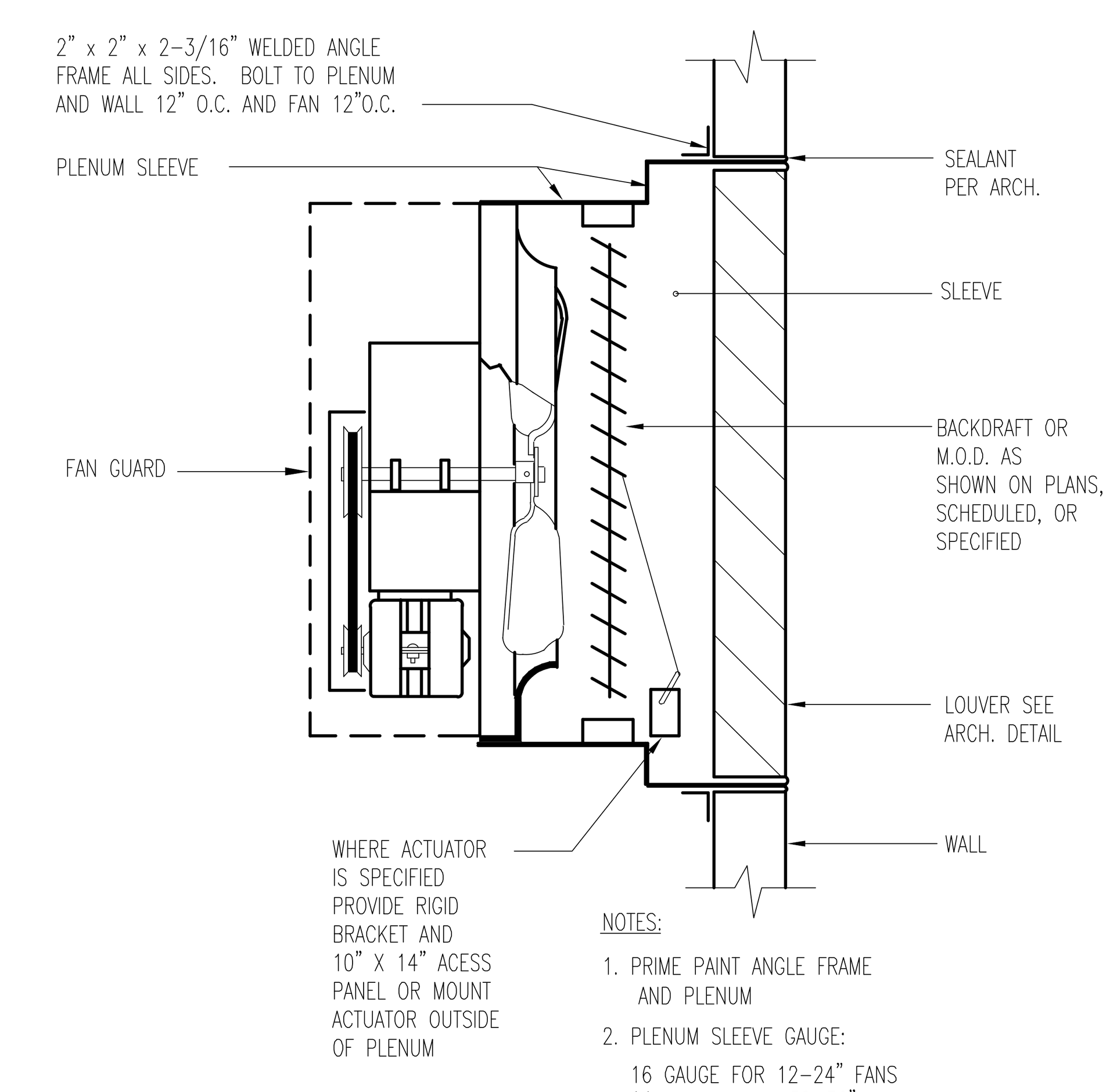


BUILDING HVAC PLAN VIEW
SCALE: 1/4" = 1'-0"

HVAC SYMBOLS AND ABBREVIATIONS

[symbol]	SUPPLY AIR DUCT UP/DOWN	CHWR	CHILLED WATER RETURN
[symbol]	RETURN/EXHAUST AIR DUCT UP/DOWN	CHWS	CHILLED WATER SUPPLY
[symbol]	NEW DUCTWORK	CU-*	CONDENSING UNIT
[symbol]	NEW DUCTWORK	DIA.	DIAMETER
[symbol]	FLEXIBLE DUCT	EF-*	EXHAUST FAN
[symbol]	VOLUME DAMPER	ES	EQUAL SPLIT
[symbol]	SUPPLY DIFFUSER	F-*	FILTER
[symbol]	RETURN OR EXHAUST GRILLE	FURN-*	FURNACE
(T)	THERMOSTAT	GA	GAUGE
—[P]	PRESSURE SENSOR	OA	OUTSIDE AIR
[S]	SMOKE DETECTER	OE	OPEN ENDED DUCT
[symbol]	FIRE DAMPER	SD	SPLITTER DAMPER
[symbol]	FIRE/SMOKE DAMPER	U/G	UNDERGROUND
[symbol]	PIPE TURNED DOWN	UH-*	UNIT HEATER
[symbol]	PIPE TURNED UP	VD	VOLUME DAMPER
[symbol]	BRANCH PIPE OFF MAIN	A/C-*	AIR CONDITIONING SYSTEM
CFM	CUBIC FEET PER MINUTE	AFF	ABOVE FINISHED FLOOR
		AHU-*	AIR HANDLING UNIT



WALL FAN INSTALLATION

JBCE PROJECT #24-30

J. B. Cobb Engineering, LLC
Mechanical/Industrial

Office: (678) 363-8754
Since 1997
Cell Phone: (404) 403-2126
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WATER TREATMENT FACILITY PRETREATMENT SYSTEM
FOR THE
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PRETREATMENT BUILDING
BUILDING PLAN - HVAC

SHEET TITLE

DESIGN BY	DRAWN BY	CHECKED BY
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GEORGIA REGISTERED No. 20349 PROFESSIONAL ENGINEER JAMES BARTLEY COBB

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Revision: EUH-TSL (08-23) REV-0

Supersedes: — (Original Version)

TECHNICAL SPECIFICATIONS FOR MODEL EUH

ELECTRIC RESISTIVE, LOW-STATIC AXIAL FAN, COMMERCIAL/INDUSTRIAL UNIT HEATERS

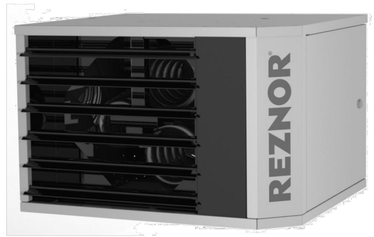

TABLE OF CONTENTS

In keeping with our policy of continuous product improvement, we reserve the right to alter, at any time, the design, construction, dimensions, weights, etc., of equipment information shown here.

Technical Data

Parameter	Unit of Measure	Unit Size (kW)							
		3	5	7	10	15	20	25	30
Heating capacity	kW	3	5	7	10	15	20	25	30
	BTUh	10,236	17,060	23,884	34,121	51,182	68,242	85,303	102,364
Control amps, 24V	amp	1.6							
Fan motor size	HP	0.03			0.07	0.17			
Fan size	inch	10			12	16		18	
Minimum air volume (limit cutout)	CFM	125	158	296	191	263	357	446	504
	meter³/minute	3.54	4.476	8.38	5.40	7.44	10.11	12.63	14.27
Maximum air volume	CFM	431	479	740	957	1215	1290	1612	1663
	meter³/minute	12.20	13.56	20.90	27.10	34.40	36.53	45.65	47.09

Parameter	Unit of Measure	Unit Size (kW)											
		3			5			7			10		
		Voltage											
		208	240	480	208	240	480	208	240	480	208	240	480
Nominal kW	kW	3			5			7			10		
Actual kW		2.3	3.0		4.0	5.3		5.5	7.3		7.5	9.9	
Minimum current ampacity, 1Ph	amp	11.6	13.3	6.9	19.9	22.9	11.7	27.3	31.4	16.0	37.0	42.2	21.3
Full load amps, 1Ph*		11.1	12.8	6.4	19.4	22.4	11.2	26.8	30.9	15.5	36.5	41.7	20.8
Minimum current ampacity, 3Ph		7.0	8.0	4.4	11.8	13.5	7.2	16.0	18.4	9.6	21.6	24.6	12.7
Full load amps, 3Ph*		6.5	7.5	3.9	11.3	13.0	6.7	15.5	17.9	9.1	21.1	24.1	12.2
Maximum overcurrent protection**		20.0	15.0		25.0	15.0		30.0	20.0		45.0	60.0	30.0
Temperature rise	°F	22			33			32			33		
*Includes fan motor.													
**Circuit breaker size.													

Setting	Parameter	Unit of Measure	Unit Size (kW)							
			15			20			25	30
			Voltage							
			208	240	480	240	480	480	480	480
—	Minimum current ampacity, 3Ph	amp	32.5	37.4	19.3	49.4	25.4	31.4	37.4	
Low heat	Nominal kW	kW	7.4	10.0					15.0	20.0
	Actual kW		5.6							
	Full load amps, 3Ph*	amp	26.8	41.3	20.6	41.7	20.8	31.3	25.0	
	Maximum overcurrent protection**		40.0	45.0	25.0	60.0	40.0		45.0	
	Temperature rise	°F	19	26		24		29	28	
High heat	Nominal kW	kW	15.0	15.0		20.0		25.0	30.0	
	Actual kW		11.3							
	Full load amps, 3Ph*	amp	31.5	36.4	18.3	48.4	24.4	30.4	36.4	
	Maximum overcurrent protection**		40.0	45.0	25.0	60.0	40.0		45.0	
	Temperature rise	°F	39			49			57	
*Includes fan motor.										
**Circuit breaker size.										

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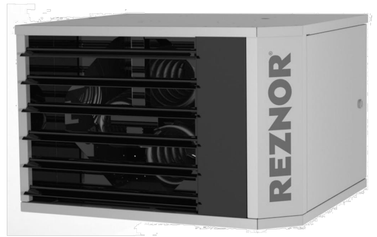
TECHNICAL SPECIFICATIONS FOR MODEL EUH

ELECTRIC RESISTIVE, LOW-STATIC AXIAL FAN, COMMERCIAL/INDUSTRIAL UNIT HEATERS



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In keeping with our policy of continuous product improvement, we reserve the right to alter, at any time, the design, construction, dimensions, weights, etc., of equipment information shown here.

Louver Selection Guide

GREENHECK Building Value in Air.

In an effort to help located and select the louver you need, this catalog organizes the more than 100 standard Greenheck louver models into easily navigated categories, organized by your application requirements.

Conventional Application Louvers

Fixed Blade

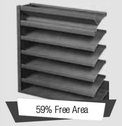
These conventional fixed blade louvers are among our most popular. All shown are AMCA Licensed for Air Performance and Water Penetration and may be applied in conventional intake or exhaust applications where provisions to manage water are present or some nuisance weather infiltration is acceptable or accounted for. These louvers shown are among the most economical options.

EDJ-401
4-inch depth
Stationary
Drainable Head
Extruded Aluminum
J-Blade

ESJ-401
4-inch depth
Stationary
Non-Drainable
Extruded Aluminum
J-Blade

ESD-435
4-inch depth
Stationary
Drainable Blades
Drainable Head
Extruded Aluminum

ESJ-602
6-inch depth
Stationary
Non-Drainable
Extruded Aluminum
J-Blade



ESD-635
6-inch depth
Stationary
Drainable Blades
Drainable Head
Extruded Aluminum

Louver Selection Guide

GREENHECK Building Value in Air.

Louvers		Airflow		Aesthetics		AMCA Certifications					
Type	Model	Free Area 48 x 48 in. (sq. ft.)	Free Area 48 x 48 in. (%)	Depth (in.)	Blade Alignment	Wind Driven Rain	Water Penetration	Air Performance	Sound	AMCA 540	AMCA 550
Drainable Blade *page 9*	EDD-401	8.22	51	4	H		✓	✓			
	EDD-601	8.21	51	6	H		✓	✓			
	EHM-601	7.91	49	6	H		✓	✓			
	ESD-202	6.01	38	2	H		✓	✓			
	ESD-403	8.00	50	4	H		✓	✓			
	ESD-435	8.92	56	4	H		✓	✓			
	ESD-603	8.36	52	6	H		✓	✓			
	ESD-635	9.41	59	6	H		✓	✓			
Drainable Head *page 10*	EDJ-401	8.32	52	4	H		✓	✓			
	EDJ-430	8.35	52	4	H		✓	✓			
	EDJ-601	8.69	54	6	H		✓	✓			
	EDK-402	8.49	53	4	H		✓	✓			
	EDK-430	8.80	55	4	H		✓	✓			
	ESID-430 DISCHARGE	10.88	68	4	H						
	ESID-430 INTAKE	7.66	48	4	H						
Non-Drainable *page 11*	ESJ-202	6.01	38	2	H		✓	✓			
	ESJ-401	8.44	53	4	H		✓	✓			
	ESJ-602	8.73	55	6	H		✓	✓			
	ESK-402	8.45	53	4	H		✓	✓			
Adjustable Blade *page 12*	EAD-401	6.54	41	4	H		✓	✓			
	EAD-601	7.34	46	6	H		✓	✓			
	EAD-635	8.73	55	6	H		✓	✓			
	EAH-401	6.48	41	4	H		✓	✓			
	EAH-690 (45° BLADE)	6.32	40	6	H			✓			
	EAH-690 (90° BLADE)	10.87	68	6	H			✓			
Combination Louver/Damper *page 13*	EAC-401	6.34	40	4	H		✓	✓			
	EAC-601	7.41	46	6	H		✓	✓			
	EACA-601	7.68	48	6	H		✓	✓			
	EACC-401	5.41	34	4	H						
	EACC-601	6.20	39	6	H						
	EACN-601	7.18	45	6	H		✓	✓			
	ECD-401	7.60	48	4	H		✓	✓			
	ECD-601	7.32	46	6	H		✓	✓			
	GCE-402	6.36	40	4	H						
	GCI-402	6.39	40	4	H						

Drainable Blade

GREENHECK Building Value in Air.

- Drainable blades offer excellent resistance to water penetration
- Drain gutters located on every blade to capture water
- Integral downspouts located within the jambs to channel water downward to sloped sill for drainage away from the louver
- **EDD Series** incorporates dual drainable blades for additional water capture
- **EHM Series** incorporates recessed mullion design for continuous blade appearance for multi-width sections
- Models **ESD-435** and **ESD-635** lend 56% and 59% free area respectfully

EDD-401

EHM-601

ESD-403

ESD-435

ESD-603

ESD-635

Model Name	Depth (in.)	Blade Style	Blade Thickness (in.)	Frame Thickness (in.)	AMCA Licensed Ratings	Free Area 4' x 4' Unit ft²	Free Area 4' x 4' Unit %	Beginning Point of Water Penetration (ft/min)	Pressure Drop @ 6,000 CFM Intake Velocity (in. wg)	Max Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
EDD-401	4	DD	0.081	0.081	AP, WP	8.22	51	992	0.08	8154	8312
EDD-601	6	DD	0.081	0.081	AP, WP	8.21	51	1107	0.08	9088	8399
EHM-601	6	DD	0.081	0.081	AP, WP	7.91	49	1065	0.09	8424	6577
ESD-202	2	D	0.063	0.063	AP, WP	6.01	38	1058	0.15	6359	5963
ESD-403	4	D	0.081	0.081	AP, WP	8.00	50	1007	0.08	8056	8188
ESD-435	4	D	0.081	0.081	AP, WP	8.92	56	989	0.06	8822	9219
ESD-603	6	D	0.081	0.081	AP, WP	8.36	52	1027	0.08	8586	8359
ESD-635	6	D	0.081	0.081	AP, WP	9.41	59	1250	0.06	11763	9954

DD = Dual Drainable, D = Drainable

AP = Air Performance, WP = Water Penetration

JBCE PROJECT #24-30

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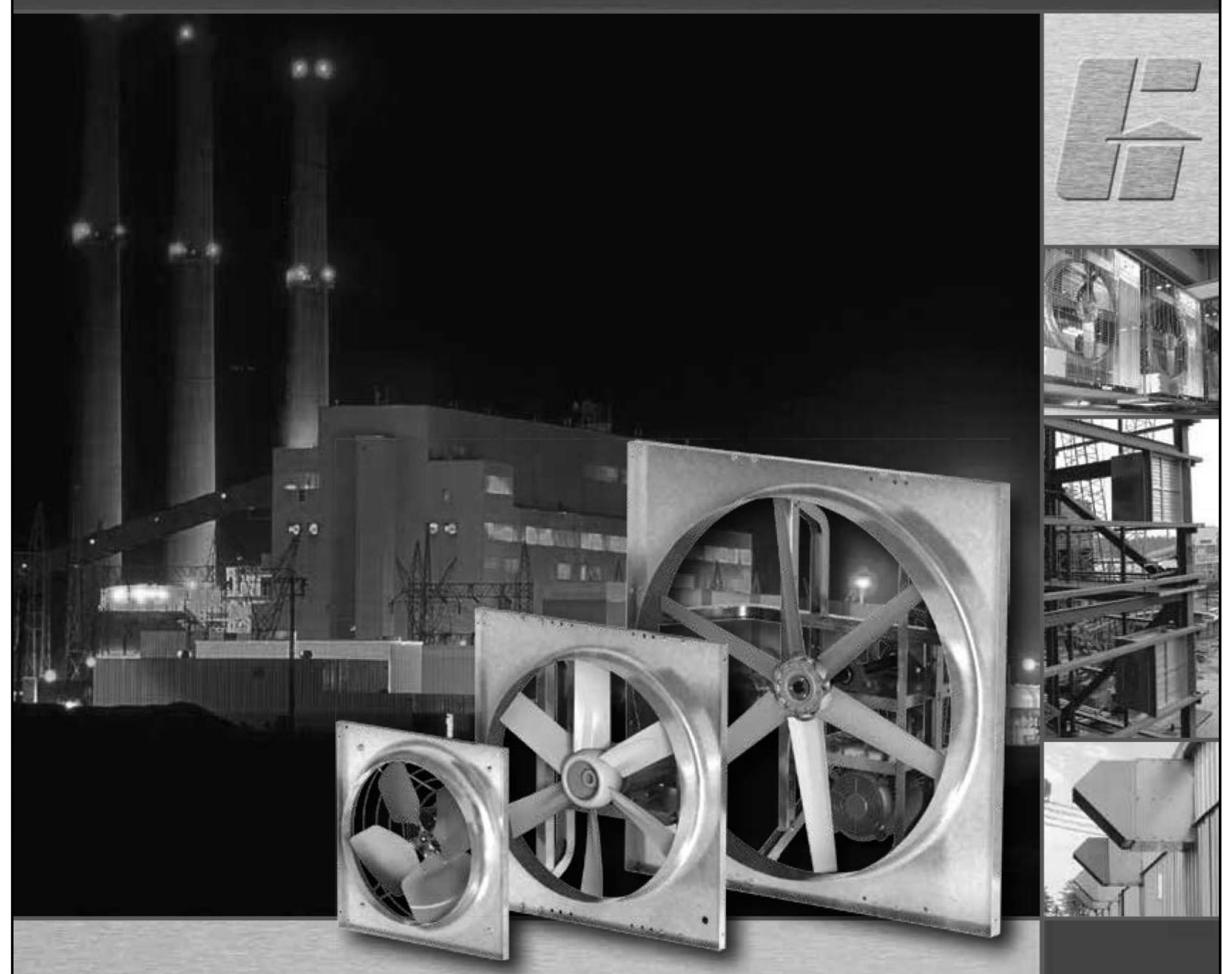
Sidewall Propeller Fans

Belt and Direct Drive

Exhaust, Supply and Reversible



GREENHECK
Building Value in Air.

October 2015

Belt Drive
Construction and Material Data

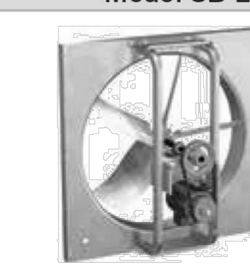
GREENHECK
Building Value in Air.

	Level 1	Level 2	Level 3 and Reversible	
Model Sizes	20 - 54	20 - 60	24 - 36	42 - 72
Panel/Drive Frame	Galvanized steel with one-piece drawn venturi, bolted structural steel channels and one-piece motor/bearing plate			Galvanized steel with one-piece drawn venturi, bolted structural steel channels and two piece motor/bearing plate
	(paint optional)		(all-welded panel/drive frame optional, paint optional)	
Propeller	Galvanized steel, riveted blades (aluminum optional)	Reinforced galvanized steel, riveted blades, keyed hub (excluding the 2L)	SB - Heavy duty, welded, reinforced, powder-coated steel blades. All with keyed hubs.	SB - Heavy duty, welded, reinforced, powder-coated steel blades. All with keyed hubs. SBC - Heavy duty, cast aluminum blades. All with keyed hubs.
Bearings	Stamped steel pillow blocks up to size 36 and cast pillow blocks for size 42 and larger	Cast iron pillow blocks with grease fittings		

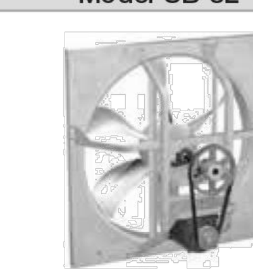
Fan Size	Fan Panel	Drive Frame	Propeller Hub L	Propeller Hub H	Propeller Blade L	Propeller Blade H	Shaft Size	Max Motor Frame Size	Approx. Weight (lbs.)
Level 1 (Model SB-1H)									
20	18	14	14		16	18	3/4	56	60
24	18	14	14		16	18	3/4	56	70
30	18	12	14	12	16		3/4	56	95
36	18	12	14	12	16		3/4	145T	110
42	16	12	12	10	14		1	145T	150
48	16	12	12	10	14		1	145T	175
54	14	12	12	10	14		1	145T	205
Level 2 (Model SB-2L)									
20	18	14	14		16	18	3/4	143T	65
24	18	14	14		16	18	3/4	145T	75
30	18	12	14	12	16		1	184T	100
36	18	12	14	12	16		1	184T	115
42	16	12	12	10	14		1 1/4	184T	160
48	16	12	12	10	14		1 1/4	184T	260
54	16	12	12	10	14		1 1/4	184T	315
60	14	12	10		12		1 1/2	215T	370
Level 3 and Reversible (Model SB-3L, Model SBCR)									
24	18	14	12		*16		3/4	145T	90
30	16	12	12		*16		1	184T	140
36	16	12	12		*16		1 1/4	184T	260
42	14	12	10		*14		1 1/2	215T	320
48	14	12	10		*14		1 1/2	215T	420
54	14	10	10		*14		1 1/2	254T	590
60	14	10	3/16 in.		*12		1 3/4	256T	755
72	12	10	3/16 in.		*12		2	256T	1050

Models: Model SB-1H

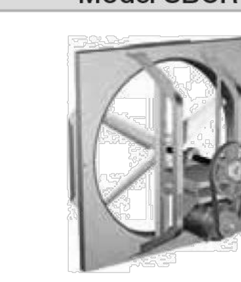
Model SB-2L



Model SB-3L



Model SBCR



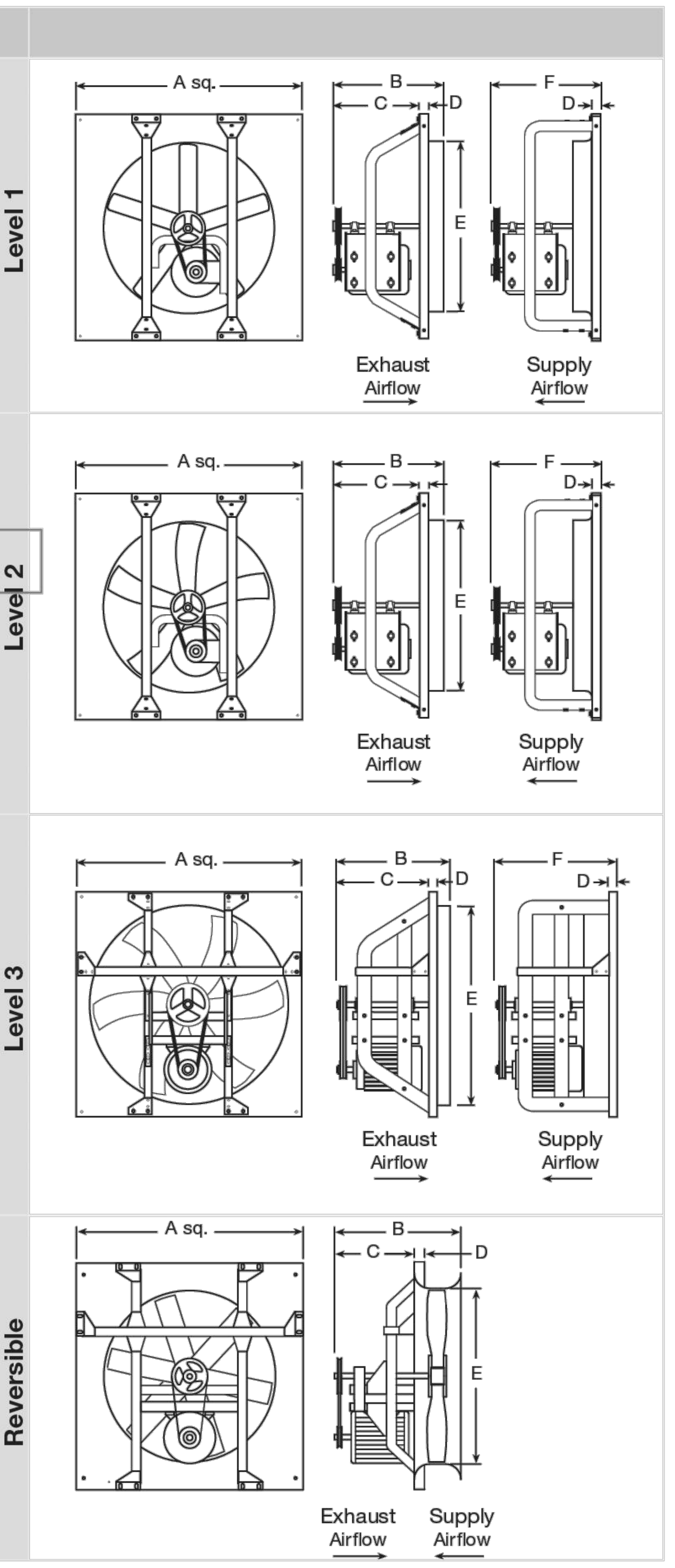
Note: Approximate weight does not include accessories.
* SBCR uses cast aluminum propeller. Propeller blade gauge column does not apply.

Belt Drive
Dimensional Data

GREENHECK
Building Value in Air.

Fan Size	A Panel**	B	C	D	E	F*	Damper Size**
Level 1							
20	26 (660)	19½ (495)	16¼ (413)	1 (25)	20½ (521)	20 (508)	22 (559)
24	32 (813)	19½ (495)	16⅛ (410)	1¼ (32)	24⅝ (625)	20 (508)	26 (660)
30	38 (965)	22½ (572)	18¼ (464)	1¼ (32)	30⅝ (778)	21 (533)	32 (813)
36	44 (1118)	21½ (546)	16½ (419)	2 (51)	36⅝ (930)	23 (584)	38 (965)
42	50 (1270)	25 (635)	20 (508)	2 (51)	42¾ (1086)	23 (584)	44 (1118)
48	56 (1422)	25 (635)	19 (483)	2 (51)	48¾ (1238)	23 (584)	50 (1270)
54	62 (1575)	25 (635)	19½ (495)	2 (51)	55¼ (1403)	24 (610)	56 (1422)
Level 2							
20	26 (660)	19½ (495)	16¼ (413)	1 (25)	20½ (521)	20 (508)	22 (559)
24	32 (813)	19½ (495)	16⅛ (410)	1¼ (32)	24⅝ (625)	20 (508)	26 (660)
30	38 (965)	21½ (546)	17¼ (438)	1¼ (32)	30⅝ (778)	21 (533)	32 (813)
36	44 (1118)	21½ (546)	16½ (419)	2 (51)	36⅝ (930)	22 (559)	38 (965)
42	50 (1270)	25 (635)	20 (508)	2 (51)	42¾ (1086)	25½ (648)	44 (1118)
48	56 (1422)	25 (635)	19 (483)	2 (51)	48¾ (1238)	25½ (648)	50 (1270)
54	62 (1575)	26 (660)	20½ (546)	2 (51)	55¼ (1403)	24 (610)	56 (1422)
60	68 (1727)	28 (711)	21⁷⁄₁₆ (545)	2 (51)	61¼ (1556)	24 (610)	62 (1575)
Level 3 & Reversible							
24	32 (813)	19 (483)	15⅝ (397)	1¼ (32)	24⅝ (625)	20½ (521)	26 (660)
30	38 (965)	21½ (546)	17¼ (438)	1¼ (32)	30⅝ (778)	20 (508)	32 (813)
36	44 (1118)	28 (711)	23 (584)	2 (51)	36⅝ (930)	27 (686)	38 (965)
42	50 (1270)	28 (711)	23 (584)	2 (51)	42¾ (1086)	29¼ (743)	44 (1118)
48	56 (1422)	31½ (800)	27½ (699)	2 (51)	48⅞ (1238)	30½ (775)	50 (1270)
54	62 (1575)	35¾ (908)	30¼ (768)	2 (51)	55¼ (1403)	36¼ (921)	56 (1422)
60	68 (1727)	35 (889)	28⁷⁄₁₆ (722)	2 (51)	61¼ (1556)	35½ (902)	62 (1575)
72	82 (2083)	35 (889)	28¼ (718)	2⅛ (54)	73¼ (1861)	35½ (902)	74 (1880)

All dimensions given in inches (mm). **Square dimension.



SB-30 Belt Drive
Fabricated Propeller

GREENHECK
Building Value in Air.

CFM values shown in black are the most efficient selections. Values shown in gray are not recommended.

Model Number	Motor HP	Fan RPM	Max BHP	*Sones	0.00	0.10	0.125	0.15	0.20	0.25	0.30	0.375	0.50	0.625	0.75	1.00
					CFM / Static Pressure in Inches WG											
Level 1 Performance		Max RPM L - 696 H - 882			Max Motor Frame Size - 56								TS = RPM x 7.854			
SB-1L30-4	1/4	390	0.16	9.5	6453											
		448	0.25	10.9	7413	5790										
		475	0.30	11.6	7860	6394	5880									
SB-1H30-4	1/4	503	0.17	9.4	5747	4619	4164									
		577	0.25	11.8	6593	5682	5389	5018								
		610	0.30	12.6	6970	6129	5860	5559	4743							
SB-1L30-3	1/3	491	0.33	12.1	8125	6742	6249									
		523	0.40	13.0	8654	7427	6970	6503								
SB-1H30-3	1/3	631	0.33	13.1	7210	6396	6156	5888	5163							
		675	0.41	14.1	7713	6950	6763	6515	5939	5160						
SB-1L30-5	1/2	564	0.50	14.3	9333	8261	7862	7436								
		598	0.60	15.5	9895	8898	8583	8185	7366							
SB-1H30-5	1/2	725	0.50	15.5	8284	7571	7398	7213	6746	6145						
		769	0.60	16.9	8787	8112	7949	7785	7376	6876	6248					
SB-1L30-7	3/4	645	0.75	17.2	10673	9766	9508	9190	8446	7562						
		685	0.9	18.7	11335	10496	10253	10009	9332	8622						
SB-1H30-7	3/4	827	0.75	19.1	9450	8819	8667	8515	8188	7779	7279	6326				
		882	0.90	22	10078	9484	9342	9199	8914	8560	8174	7424				
SB-1L30-10	1	696	0.94	19.2	11517	10696	10456	10217	9570	8874						
Level 2 Performance		Max RPM L - 950 H - 1221			Max Motor Frame Size - 184T								TS = RPM x 7.854			
SB-2L30-7	3/4	645	0.75	17.2	10673	9766	9508	9190	8446	7562						
		685	0.90	18.7	11335	10496	10253	10009	9332	8622						
SB-2H30-7	3/4	827	0.75	19.1	9450	8819	8667	8515	8188	7779	7279	6326				
		882	0.90	22	10078	9484	9342	9199	8914	8560	8174	7424				
SB-2L30-10	1	710	1.00	19.7	11748	10949	10714	10479	9872	9192	8383					
		754	1.20	21	12477	11736	11519	11298	10806	10175	9528					
SB-2H30-10	1	917	1.00	23	10478	9906	9768	9631	9357	9049	8680	8012				
		968	1.20	26	11061	10519	10385	10255	9996	9736	9403	8847	7570			
SB-2L30-15	1-1/2	812	1.50	24	13436	12749	12570	12364	11954	11426	10838	9893				
		864	1.81	27	14297	13650	13489	13309	12923	12522	11971	11132				
SB-2H30-15	1-1/2	1048	1.50	29	11975	11474	11349	11227	10987	10747	10507	10029	9071			
		1110	1.80	31	12683	12211	12092	11974	11747	11521	11294	10901	10090	9019		
SB-2L30-20	2	895	2.00	29	14810	14186	14030	13868	13496	13123	12633	11830				
		950	2.41	32	15720	15132	14985	14838	14503	14152	13790	13039	11760			
SB-2H30-20	2	1152	2.00	33	13163	12708	12594	12480	12259	12041	11823	11483	10749	9811		
		1221	2.40	36	13951	13522	13414	13307	13095	12889	12683	12374	11734	10955	9980	
Level 3 Performance		Max RPM L - 1100 H - 1432			Max Motor Frame Size - 184T								TS = RPM x 7.854			
SB-3L30-20	2	824	1.51	23	13052	12289	12098	11898	11483	11006	10403	9137				
		905	2.01	26	14335	13640	13467	13293	12924	12540	12102	11263	9366			
		961	2.40	29	15222	14568	14404	14241	13905	13549	13167	12519	10795			
SB-3H30-20	2	1076	1.53	30	11401	11026	10932	10833	10601	10369	10102	9652	8854	7967	6444	
		1182	2.04	35	12524	12182	12097	12012	11820	11609	11398	11026	10338	9590	8780	5817
		1260	2.46	38	13351	13030	12950	12870	12708	12510	12312	12015	11376	10705	9980	8065
SB-3L30-30	3	1036	3.01	35	16410	15803	15651	15500	15196	14874	14544	13993	12801	11093		
		1100	3.61	41	17423	16852	16709	16566	16281	15991	15680	15201	14241	12775	11254	
SB-3H30-30	3	1353	3.01	44	14336	14037	13963	13888	13739	13574	13390	13113	12580	11984	11343	9939
		1432	3.53	49	15173	14891	14820	14750	14609	14468	14297	14036	13586	13022	12446	11176

Performance certified is for installation type A: free inlet, free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values are for installation type A: free inlet hemispherical sone levels. *Sones shown apply to the highest cataloged CFM in black type at each fan RPM. For selections at other CFM and static pressure points, refer to CAPS®, the Computer Aided Product Selection Program.

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PRETREATMENT BUILDING
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PATH & FILE: \\JBCE\Projects\2024\24-30\H-1 HVAC-ELECTRIC