

BUTTE REGIONAL TRANSIT OPERATIONS CENTER ON-SITE PACKAGE

BUTTE COUNTY ASSOCIATION OF GOVERNMENTS

ADDENDUM NO. 1

PROJECT ADDRESS
**326 Huss Lane
Chico, Ca. 95928**

OWNER
**Butte County Association of
Governments
2580 Sierra Sunrise Terrace,
Suite 100
Chico, Ca. 95928**

DATE
07/18/14

TLCD PROJECT NUMBER
11054.00



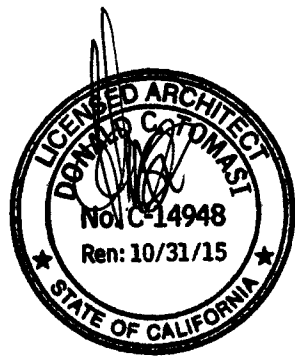
Note: The following changes, modifications and additions to the Project Manual and Drawings described within this Addendum are made a part thereof and are subject to all of the requirements thereof as if originally specified.

ADDENDUM NO. 1

BUTTE REGIONAL TRANSIT OPERATIONS
CENTER
ON-SITE PACKAGE

Butte County Association of Governments
2850 Sierra Sunrise Terrace, Suite 100
Chico, Ca. 95928

STAMPS, SIGNATURES AND APPROVALS

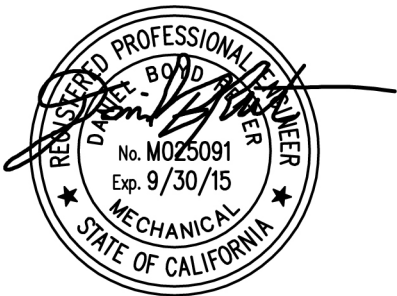
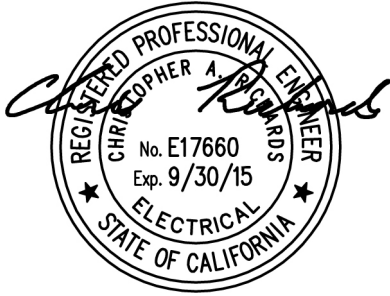

	
	

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Butte County Association of Governments
2850 Sierra Sunrise Terrace, Suite 100
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STAMPS, SIGNATURES AND APPROVALS

ADDENDUM NO. 1

To the Plans and Specifications for:

BUTTE REGIONAL TRANSIT OPERATIONS CENTER ON-SITE PACKAGE

Butte County Association of Governments
2850 Sierra Sunrise Terrace, Suite 100
Chico, Ca. 95928

Date: 7-18-14

GENERAL INFORMATION FOR BIDDERS

- Add Site Logistics Plan Sheet AA 2.0

REVISIONS TO SPECIFICATIONS

1.1 REVISION TO SECTION 00 1116 INSTRUCTIONS TO BIDDERS:

- A. Page 2, paragraph describing Pre-Bid Conference, revise *partial* paragraph to read: "There will be a non-mandatory Pre-Bid conference for this Project. Location and times as below:
 1. Tuesday, July 29th, 10 a.m.. at: *Courtyard Chico* 2481 Carmichael Dr., Chico, Ca. 95928.
- B. *Bidder Note: all other text in paragraph remains unchanged.*

1.2 REVISION TO TABLE OF CONTENTS:

- A. Revise Division 27 Communications, Item Audio/Video Systems to read: "27 4100 Audio / Video Systems".

1.4 REVISION TO SECTION 05 3100 STEEL DECK:

- A. Replace Section 05 3100 Steel Deck in its entirety.

1.5 REVISION TO SECTION 05 4000 COLD FORMED METAL FRAMING:

- A. Replace Section 05 4000 Cold Formed Metal Framing in its entirety

- 1.6 REVISION TO SECTION 21 0500 COMMON WORK RESULTS FOR FIRE SUPPRESSION:
- A. Revise Part 3.1, F to read: "Install piping in concealed spaces above finished ceilings; piping shall not be exposed in Administration/Operations building Corridor 126 or 148."
- 1.7 REVISION TO SECTION 23 3010 FIBER GLASS REINFORCED PLASTIC DUCT:
- A. Replace Section 23 3010 Fiber Glass Reinforced Plastic Duct in its entirety
- 1.8 REVISION TO SECTION 32 1316 DECORATIVE CONCRETE PAVING:
- A. Replace Section 32 1316 Decorative Concrete Paving in its entirety
- 1.9 REVISION TO SECTION 32 9300 LANDSCAPE INSTALLATION:
- A. Replace Section 32 9300 Landscape Installation in its entirety

REVISIONS TO DRAWINGS

- 1.1 REVISION TO DRAWING C1.4 Site Utility Plan:
- A. Revise drawing, Add Sheet CA 1.0.
- 1.2 REVISION TO DRAWING C5.2 Civil Details 2:
- A. Revise drawing, Add Sheet CA 2.0.
- 1.3 REVISION TO DRAWING A6.1 Administration / Operations Ceiling Plan:
- A. Revise drawing, Add Sheet AA 1.0
- 1.4 REVISION TO DRAWING A6.2 Maintenance Ceiling Plan:
- A. Revise drawing, Add Sheet AA 1.0.

- 1.5 REVISION TO DRAWING S0.0 General Notes:
- A. Add Item A - General, #14 to read: "Contractor shall provide an allowance equal to 3% of the bid for structural steel, misc. iron and reinforcing steel to be used at the discretion of the structural engineer. Unused amount to revert to the Owner upon completion of the job"
- 1.6 REVISION TO DRAWING M2.1 Administration/Operations HVAC Plan:
- A. Revise drawing, Add Sheet MA 1.0.
- 1.7 REVISION TO DRAWING M2.1 Administration/Operations HVAC Plan:
- A. Revise drawing, Add Sheet MA 2.0.
- 1.8 REVISION TO DRAWING M2.1 Administration/Operations HVAC Plan:
- A. Revise drawing, Add Sheet MA 3.0.
- 1.9 REVISION TO DRAWING M2.1 Administration/Operations HVAC Plan:
- A. Revise drawing, Add Sheet MA 4.0.
- 1.10 REVISION TO DRAWING M2.3 Maintenance HVAC Plan:
- A. Revise drawing, Add Sheet MA 5.0.
- 1.11 REVISION TO DRAWING M2.3 Maintenance HVAC Plan:
- A. Revise drawing, Add Sheet MA 6.0.
- 1.12 REVISION TO DRAWING M2.3 Maintenance HVAC Plan:
- A. Revise drawing, Add Sheet MA 7.0.
- 1.13 REVISION TO DRAWING M2.3 Maintenance HVAC Plan:
- A. Revise drawing, Add Sheet MA 18.0.
- 1.14 REVISION TO DRAWING M2.4 Maintenance Hydronic Piping Plan:
- A. Revise drawing, Add Sheet MA 8.0.

- 1.15 REVISION TO DRAWING M2.4 Maintenance Hydronic Piping Plan:
- A. Revise drawing, Add Sheet MA 9.0.
- 1.16 REVISION TO DRAWING M2.5 Bus Wash and Fueling Station HVAC Plans:
- A. Revise drawing, Add Sheet MA 10.0.
- 1.17 REVISION TO DRAWING M4.1 Enlarged Mechanical Room Plans:
- A. Revise drawing, Add Sheet MA 11.0.
- 1.18 REVISION TO DRAWING M4.1 Enlarged Mechanical Room Plans:
- A. Revise drawing, Add Sheet MA 12.0.
- 1.19 REVISION TO DRAWING M5.2 Mechanical Details:
- A. Revise drawing, Add Sheet MA 13.0.
- 1.20 REVISION TO DRAWING M6.2 Maintenance Hydronic Schematic:
- A. Revise drawing, Add Sheet MA 14.0.
- 1.21 REVISION TO DRAWING M6.3 HVAC Schedules:
- A. Revise drawing, Add Sheet MA 15.0.
- 1.22 REVISION TO DRAWING M6.3 HVAC Schedules:
- A. Revise drawing, Add Sheet MA 16.0.
- 1.23 REVISION TO DRAWING M6.3 HVAC Schedules:
- A. Revise drawing, Add Sheet MA 17.0.
- 1.24 REVISION TO DRAWING P0.1 Plumbing Symbols Legend and Index:
- A. Revise drawing, Add Sheet PA 1.0.

- 1.25 REVISION TO DRAWING P2.2 Maintenance Plumbing Plan:
- A. Revise drawing, Add Sheet PA 4.0.
- 1.26 REVISION TO DRAWING P2.3 Bus Wash Plumbing Plan:
- A. Revise drawing, Add Sheet PA 5.0.
- 1.27 REVISION TO DRAWING P2.4 Fueling Station Plumbing Plan:
- A. Revise drawing, Add Sheet PA 6.0.
- 1.28 REVISION TO DRAWING P4.2 Enlarged Plumbing Plans - Maintenance:
- A. Revise drawing, Add Sheet PA 7.0.
- 1.29 REVISION TO DRAWING P5.3 Plumbing Details:
- A. Revise drawing, Add Sheet PA 2.0.
- 1.30 REVISION TO DRAWING P5.4 Fueling System Diagram:
- A. Revise drawing, Add Sheet PA 3.0.
- 1.31 REVISION TO DRAWING P6.4 Maintenance Plumbing 3d View –Waste and Vent:
- A. Revise drawing, Add Sheet PA 8.0.
- 1.32 REVISION TO DRAWING P6.5 Maintenance Plumbing 3d View –Domestic Water
- A. Revise drawing, Add Sheet PA 9.0.
- 1.33 REVISION TO DRAWING E2.1 Administration/Operations Power and Data Plan:
- A. Revise drawing, Add Sheet EA 1.0.
- 1.34 REVISION TO DRAWING E6.5 Mechanical Equipment Schedule 2:
- A. Revise drawing, Add Sheet EA 2.0.

END OF ADDENDUM NO. 1

SECTION 05 31 00 – STEEL DECK**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes, but is not necessarily limited to, the furnishing and installing of steel deck work, including headed type welded studs (shear connectors) whether welded through the decking or directly to the structure, and accessories. This Section also includes miscellaneous metal supports required for the proper installation of steel decking and which are not shown on the Drawings or specified elsewhere.
- B. Related Sections include the following:
1. Section 03 20 00, Concrete Reinforcing
 2. Section 03 30 00, Cast-in-Place Concrete
 3. Section 05 12 00, Structural Steel
 4. Section 05 50 00, Metal Fabrications
 5. Section 09 96 00, High-Performance Coatings

1.3 QUALITY ASSURANCE

- A. Reference Standards:
1. "Specifications for the Design of Light Gage Cold Formed Steel Structural Members" of the American Iron and Steel Institute (AISI).
 2. AWS D1.1 Structural Welding Code – Steel.
 3. AWS D1.3 Structural Welding Code – Sheet Steel.
 4. California Building Code, 2013 Edition.
 5. ASTM A36/A36M - Carbon Structural Steel.
 6. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
 7. ASTM A466/A466M - Weldless Chain.
 8. ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 9. ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

1.4 SUBMITTALS

- A. Shop and Erection Drawings: Indicate layout and erection details including welds, mechanical fasteners, studs, clips, reinforcement, flashings, and closures and accessories which are to be applied or installed under this section.
1. Review of drawings will cover only the general scheme and character of details but not the checking of dimensions; nor will such review relieve the Contractor from responsibility for executing the Work in accordance with the Drawings.

- B. Submit certified mill analysis and test report for each heat for review by the SFIA-hired testing agency.
- C. LEED Submittals: See Division 1 Section "LEED Requirements" for LEED NC 2.2 Documentation Submittals. Provide LEED Criteria Worksheet for each product to be incorporated into the Work. Provide LEED Product Information Forms as required by the LEED Criteria Worksheet. In addition, provide documentation of sustainable attributes of products, including but not limited to documentation for the following credits:
 - 1. LEED NC 2.2 Credit MR 4.1 and 4.2, Recycled Content: Product Data indicating percentage by weight of post-consumer and post-industrial recycled content for products having recycled content. Include a statement indicating costs for each product having recycled content.
 - 2. LEED NC 2.2 Credit MR 5.1 and 5.2, Local/Regional Materials: Product data indicating location of material manufacturer and point of extraction for regionally extracted, processed and manufactured materials.
 - 3. If only a fraction of the material is extracted and manufactured locally, indicate percentage by weight.
 - 4. Include printed statement of costs for each regionally extracted, processed and manufactured material.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Decking:
 - 1. Base Metal: Steel decking shall be formed from sheet steel conforming to ASTM A1008 or A 466 and having a minimum yield strength of 33,000 psi.
 - 2. Coating: Sheets shall have received, before being formed, a hot-dipped, zinc protective coating meeting or exceeding the requirements of ASTM A653 for G60 Coating Designation with not less than 0.60 oz. of zinc per sq. ft. of sheet (Triple Spot Test). For sheets exposed to weather, galvanizing shall meet G90 designation.
 - 3. Physical Properties: Drawings indicate sectional profiles, depths, and minimum gages required.
 - 4. Manufacturer: Verco Manufacturers Inc., the ASC Company, or equal.
 - 5. Steel deck manufacturer shall supply decking free of lubricants or oils which would significantly impair the adhesion of sprayed fireproofing.
- B. Miscellaneous Metal Items (as required): ASTM A36, shop primed if not encased in concrete or sprayed with fireproofing. Where exposed to weather, apply coating in accordance with Section 09 96 00.
- C. Accessories:
 - 1. Flashings, Closures, and Screeds: Galvanized sheet steel as specified for decking, 16 gauge.
 - 2. Venting Devices: Deck units having concrete fill and which are to receive waterproof membranes or weatherproof coatings (roofing, elastomeric coatings, etc.) shall have provisions incorporated into deck fabrication or installation for venting moisture. Individual

separating clips, or built-in venting slots formed as an integral part of deck profile, per deck manufacturer's recommendations.

- D. Welding Electrodes and Equipment: As recommended by deck manufacturer and approved for use in accordance with Article "References, Codes, and Standards".
- E. Welded Studs: Low carbon cold drawn, headed steel shear connectors for stud welded installation and having a min. yield strength of 50,000 psi and a min. tensile strength of 60,000 psi (ASTM A108, Type-B). Studs shall not be painted or galvanized.

2.2 FABRICATION

- A. Composite Construction: Decking designed for composite construction shall be formed with shear lugs to provide mechanical key to transfer horizontal shear and to prevent vertical separation with either interlocking side laps or lapping type sidelaps.

PART 3 - EXECUTION

3.1 INSPECTION OF STRUCTURE

- A. Verify that supports for decking are properly aligned and sufficiently level to permit proper bearing and report any discrepancies. Proceeding with final installation implies acceptance of conditions.

3.2 ERECTION

- A. Erect decking as per governing codes, drawing requirements and manufacturer's specifications and recommendations.
- B. Ship deck units to job site in standard widths and cut to proper lengths such that end joints occur over supporting members. Perform field cuts as required.
- C. Place deck units on supporting framework and adjust to final position with proper bearing before permanently fastening. Provide a minimum bearing of 2-1/2 inches over supporting beams.
- D. Place units in straight alignment for entire length of flute run with close alignment between flute ends.
- E. Provide flashings and closure where required to prevent concrete leakage. Fasten in place by welding.
- F. Make welds in accord with provisions of AWS Code. Use only welders certified for welding in light gauge metal.
- G. Opening reinforcement shall be as detailed on the Drawings. Cutting of holes other than those detailed on the Drawings shall be done only as specifically approved by the Design Build General Contractor. Show holes on shop drawings and coordinate required openings. Holes not shown on Structural Drawings shall be cut and reinforced in accord with details on Drawings. In general, reinforcing is not necessary for holes 6 inches or less in diameter.

H. Touch up abrasions and damaged areas in galvanized coating and painted coatings on metal deck and miscellaneous metal items.

I. Remove welding ferrules and flux from welded studs using a wire brush.

3.3 HANGER LOADS

A. The load on any wire hanger shall not exceed 50 pounds. The total load from all hangers or a single hanger with adequate spreader plate on a deck unit shall not exceed 100 pounds. Do not place such loads within the middle half of deck spans.

3.4 CLEAN-UP

A. After erection, remove metal cuttings and construction debris from flutes for entire length. Remove grease, oil, and other foreign material. Leave deck and cells in proper condition for obtaining bond with concrete fill and spray fireproofing.

3.5 QUALITY CONTROL, TESTS AND INSPECTIONS

A. Testing agency will review mill test reports, welding procedures, qualification of welders and deck and stud welding during erection. Cost associated with retests, qualification of welders and tests of unidentified material will be at Contractor's expense.

B. Qualification of welders for stud shear connectors shall conform to AWS D1.1. Such qualification procedures shall be performed prior to actual use on project.

C. Testing and inspection of steel studs welded through the steel deck to structural steel below will be in accordance with Section 7, Stud Welding, AWS D1.1 including application qualification requirements. Five percent (5%) of the studs will be bend tested in accordance with Paragraph 7.6.6.1. Each bend-tested stud shall have an additional stud of the same size welded adjacent to it whether the tested stud fails or not. All additional studs shall be paid for by the Contractor.

D. If material is not identified by certified mill analysis and test reports, one set of tension and bend tests will be made by the testing agency for each 5 tons or fraction thereof for each size or gage. Costs of such testing shall be paid by the Contractor.

END OF SECTION 05 31 00

SECTION 05 40 00 – COLD-FORMED METAL FRAMING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes, but is not necessarily limited to, the furnishing and installing of cold-formed metal framing for:
 - 1. Interior wall framing.
 - 2. Exterior wall framing.
 - 3. Joist framing.
- B. Related Sections include the following:
 - 1. Section 06 16 00, Sheathing
 - 2. Section 09 25 00, Gypsum Board

1.3 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Iron and Steel Institute (AISI) Specifications and Standards: North American Specification for the Design of Cold-Formed Steel Structural Members and Standard for Cold-Formed Steel Framing - General Provisions.
 - 2. American Welding Society (AWS) D1.1, Structural Welding Code – Steel.
 - 3. American Welding Society (AWS) D1.3, Structural Welding Code – Sheet Steel.
 - 4. California Building Code (CBC), 2013 Edition.
- B. Installer Qualifications: An experienced installer who has successfully completed work of similar scope and size as indicated for this Project.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.
- D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of cold-formed metal framing product and accessory indicated. Include specifications, installation instructions, and data substantiating that the materials comply with the specified requirements.

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- B. LEED Submittals: See Division 1 Section "LEED Requirements" for LEED NC 2.2 Documentation Submittals. Provide LEED Criteria Worksheet for each product to be incorporated into the Work. Provide LEED Product Information Forms as required by the LEED Criteria Worksheet. In addition, provide documentation of sustainable attributes of products, including but not limited to documentation for the following credits:
1. LEED NC 2.2 Credit MR 4.1 and 4.2, Recycled Content: Product Data indicating percentage by weight of post-consumer and post-industrial recycled content for products having recycled content. Include a statement indicating costs for each product having recycled content.
 2. LEED NC 2.2 Credit MR 5.1 and 5.2, Local/Regional Materials: Product data indicating location of material manufacturer and point of extraction for regionally extracted, processed and manufactured materials.
 3. If only a fraction of the material is extracted and manufactured locally, indicate percentage by weight.
 4. Include printed statement of costs for each regionally extracted, processed and manufactured material.
- C. Welding certificates: Submit welding procedure specifications and welder performance qualifications in accordance with AWS D1.1 and D1.3.
- D. Mill Certificates: Submit mill certificates or data from a qualified independent testing agency indicating steel sheet complies with specified requirements, including base metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and coating thickness.
- E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
1. Expansion anchors.
 2. Power-actuated anchors.
 3. Mechanical fasteners.
 4. Vertical deflection clips.
 5. Horizontal drift deflection clips
 6. Miscellaneous structural clips and accessories.
- F. Research/Evaluation Reports: For cold-formed metal framing.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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- A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
 - 1. CEMCO Steel Framing
 - 2. A current member of the Steel Studs Manufacturers Association
 - 3. Or equal

2.2 MATERIALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products required to achieve LEED MR Credit 4.
- B. Steel Sheet: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade 33, for all 43 mil and lighter
 - 2. Grade 50, for all 54 mil and heavier
 - 3. Coating, G90 minimum

2.3 EXTERIOR LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of sizes indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 54 mil.
 - 2. Flange Width: 1-5/8 inches, minimum.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of sizes indicated, unpunched, with unstiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: Matching steel studs.
 - 2. Flange Width: 1-1/2 inches.

2.4 JOIST FRAMING

- A. Steel Joists: Manufacturer's standard C-shaped steel sections, of sizes indicated, unpunched or punched with enlarged service holes with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 54 mil.
 - 2. Flange Width: 1-5/8 inches, minimum.

2.5 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet of same grade and coating used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Gusset plates.

8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.6 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc-coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials with approved ICC report per 2013 CBC requirements.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
- F. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- G. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035 or ASTM A 780.

2.8 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
- B. Fabricate framing assemblies using jigs or templates.
- C. Cut framing members by sawing or shearing; do not torch cut.
- D. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

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- E. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - F. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - G. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
 - H. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
 - I. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - J. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - K. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

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- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
 - C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 - D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
 - E. Cut framing members by sawing or shearing; do not torch cut.
 - F. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
 - G. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - H. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
 - I. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
 - J. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
 - K. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
 - L. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
 - M. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
 - N. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - O. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 JOIST INSTALLATION

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- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
 - B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
 - C. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
 - D. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
 - E. Space joists not more than 2 inches from abutting walls, and as indicated on the Drawings.
 - F. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
 - G. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated on Shop Drawings.
 - H. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
 - I. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
 1. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist-track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.
 - J. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 23 30 10 – FIBER GLASS REINFORCED PLASTIC DUCT

PART 1 GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish and install fiberglass reinforced plastic (FRP) duct and all appurtenances, complete and in place, all in accordance with the requirements of the Drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. 23 30 00 HVAC Air Distribution
- B. 23 05 00 Sleeves and Mechanical Sleeve seals

1.3 REFERENCED SPECIFICATIONS, CODES, AND STANDARDS

- A. Codes: All codes, as referenced herein, are specified in Section entitled “Reference Standards.”
- B. Commercial Standards
 - 1. ASTM D 3567 Practice for Determining Dimensions of “Fiberglass” (Glass-Fiber Reinforced-Thermosetting-Resin) Pipe and Fittings.
 - 2. ASTM C 582 Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.
 - 3. AWWA M-45 American Water Works Manual of Water Supply Practices “Fiberglass Pipe Design.”
 - 4. ASTM D 3982 “Standard Specification for Contact-Molded “Fiberglass” Duct and Hoods” or NBS PS 15-69 “Custom Contact-Molded Reinforced Polyester Chemical-Resistant Process Equipment.”
 - 5. ASTM D 2992 “Standard Practice for Obtaining Hydrostatic Design Basis for Fiberglass Pipe and Fittings.”
 - 6. ASTM D 2310 “Standard Classification for Machine-Made ‘Fiberglass’ Pipe.”

1.4 SUBMITTALS

- A. Shop Drawings
 - 1. The Contractor shall submit Shop Drawings of duct and fittings in accordance with the requirements in the Sections titled “HVAC Air Distribution” and “Submittals.”
 - 2. Fabrication drawings shall have details on Laminate Sequence used.
- B. Additional Submittal Information
 - 1. The Contractor shall submit a copy of this specification with check marks by each line to show full compliance or a note with attached supporting information noting any deviation for Engineer review.
 - 2. A letter from the resin supplier stating that the material used for this project will comply with the specification and meet all corrosion requirements.
 - 3. Design calculations performed by the manufacturer and stamped by a Professional Engineer for record purposes.

4. Duct manufacturer shall submit certified test results in accordance with ASTM 2992.
5. Samples shall be a representative of the ductwork (construction method and material used) to be supplied on this project.

PART 2 PRODUCTS

2.1 GENERAL

- A. Manufacturer: Basis of design manufacturer is Monoxivent.
- B. Substitutions: Provide FRP duct as manufactured by one of the following. All Equipment (Duct and fittings) shall be the product of a single manufacturer. Out-sourcing of fabrication or parts of the system will not be accepted.
 1. Belco Manufacturing
 2. Bondstrand
 3. Ershigs
- C. Service Conditions:
 1. All equipment shall be designed for a minimum working pressure of 2" WC Positive and 3" WC Negative pressure. Buried duct shall be designed per AWWA M-45 Standards and be rated for H-20 Loading. The minimum wall thickness for all FRP duct shall conform to the following:
 - a. Wall thickness for internal positive pressure should be determined by ASTM 2310 using duct manufacturers Certified ASTM 2992 HDB test results. A full copy of the HDB testing should be submitted with the wall thickness calculations.

b.

Duct Inside Diameter (Inches)	Wall Thickness (inches)
3-20	0.125
22-36-	0.1875

2. Resin:
 - a. Resin shall be premium corrosion resistant and fire retardant brominated bisphenol-A vinyl ester. Resin shall not contain pigments, dyes, colorants or fillers. Product should have a class 1 flame spread rating (25 or less).
 - b. Thixotropic agents can be added to control resin viscosity per resin manufacturer's recommendation.
 - c. Acceptable resins with 3 percent antimony trioxide shall be:
 - 1) AOC Vipel K022
 - 2) Ashland Chemical Hetron FR992
 - 3) Interplastics CoRezyn 8442
 - 4) Or approved equal.
3. Insulation:
 - a. Double-wall insulated duct: Inner and outer duct complying with requirements for "round duct" description. Closed cell polyurethane foam insulation with maximum thermal conductivity of 0.14 Btu-in/hr-sq ft-deg F at 75 deg F mean temperature (R-Value of 6).

4. Reinforcement:
 - a. Surfacing veil shall be C glass veil with a silane finish and a styrene soluble binder.
 - b. Chopped strand mat shall be Type E glass minimum 1-1/2 ounces per square foot with silane finish and styrene soluble binder.
 - c. Continuous roving for shopper gun spray up shall be Type E glass.
 - d. Woven roving shall be Type E glass minimum 24 ounces per square yard with a five by four weave.
 - e. Continuous roving for filament winding shall be Type E glass with a silane finish.

5. Construction:
 1. All FRP ductwork shall be of filament wound construction for sizes >10" diameter and hand lay-up or filament wound construction for 10" and smaller. Cast pipe with no reinforced internal corrosion barrier or press molded fittings will not be accepted.
 2. Maximum allowable deflection for any size ductwork shall be 1/2 inch between supports and for any size of duct under worst case operating conditions.
 3. FRP ductwork shall be designed using a safety factor of 10 to 1 for pressure and 5 to 1 for vacuum without exception.
 4. Out-of-roundness of duct shall be limited 1% of the diameter.
 5. Length of all flanged duct sections shall not vary more than $\pm 1/2$ inch at 70°F.
 6. All un-flanged ducts shall be square on the ends in relation to the center axis within $\pm 1/8$ inch up to and including 24-inch diameter.
 7. Laminates:
 - a. All ductwork shall have a resin-rich inner surface, an interior corrosion barrier, an interior structural layer and an exterior corrosion layer and UV resistant coating.
 - b. Inner surface: Nominal 10 mils thick composed of a single ply of the C glass surfacing veil embedded in a resin-rich surface. Resin content shall be 90%.
 - c. Interior layer: Nominal 90 mils thick composed of at least two layers of chopped strand mat. Resin content shall be 75%.
 - d. Structural layer: Type E glass to meet minimum wall thickness as specified. The total wall thickness includes the inner surface.
 - 1) Contact molded structural layer shall include alternate layers of chopped strand mat and woven roving.
 - 2) A layer of chopped strand mat or spray chop shall precede filament wound structural layer. The structural layer shall consist of a minimum of two complete cross hatched layers of continuous filaments applied in a helix angle of 55 to 65 degrees for above-ground ductwork and 75 degrees for any buried ductwork.
 - e. Exterior corrosion layer: Single A or C Veil shall be applied to all cut exterior.
 8. Fittings:
 - a. All fittings shall be hand lay-up construction fabricated from the same resin and have the same strength as the FRP ductwork.
 - b. The internal diameter of all fittings shall be equal to the adjacent duct.
 - c. The tolerance on angles of all fittings shall be ± 1 degree up to and including 24-inch diameter.
 9. Elbows:

- a. The centerline radius of all elbows shall be 1-1/2 times the diameter.
 - b. Elbows 24-inch diameter and smaller shall be smooth radius. Elbows 30-inch and larger shall be mitered. Provide a minimum of two mitered joints (3-piece) for all elbows above 45 degrees.
10. Flanges:
- a. Provide flanged connections to flexible connectors, expansion joints, vessels, demisters, fans, silencers and other locations as shown on the Drawings.
 - b. Flanges shall be hand lay-up construction. Dimensions shall be in accordance with NBS PS 15-69 and the Duct Dimension Schedule.
 - c. Flanges shall be drilled in accordance with NBS PS 15-69 – Table 2. Backs of flange face shall be flat so that washer seats fully on bolt face and flange backing.
 - d. Flange faces shall be perpendicular to the axis of the duct with 1/2 degree.
 - e. Flange faces shall be flat to within $\pm 1/32$ inch up to and including 18-inch diameter.
 - f. Gaskets shall be EPDM, full face and minimum 1/8-inch thickness.
 - g. All bolts, nuts and washers shall be Type 316 stainless steel.
11. Joints:
- a. Provide all butt and strap joints in accordance with NBS PS 15-69.
 - b. The duct manufacturer shall supply Field weld kits. All necessary fiberglass and reinforcing material shall be supplied pre-cut and individually packaged for each joint. Bulk Glass rolls will not be acceptable.
 - c. All resin, catalyst and putty shall be supplied in bulk to complete all field joints plus 10% extra for waste.

2.2 DUCT HANGERS AND SUPPORTS

- A. All duct supports, interior and exterior, shall meet the requirements of the Section titled “Pipe Supports,” except that hangers and supports for fiberglass duct shall be located as follows:

Duct Inside Diameter (inches)	Maximum Span (feet)
3 – 18	10

- B. The Contractor shall note that not all duct support locations are shown on the Drawings, and the Contractor shall follow the Specifications herein in locating additional supports as required. The Contractor shall be responsible for the design of additional supports and for the overall stability of the entire support system. Support and hanger details and a detailed layout showing the location of all duct supports and hangers shall be submitted in the shop Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: All FRP pipes shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the site to avoid interferences with structural members, architectural features, openings and equipment. Exposed pipes shall afford maximum headroom and access to equipment, and where necessary, all piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. All installations shall be acceptable to the Engineer. Contractor shall obtain training by the pipe manufacturer’s field representative in the correct installation and support of all FRP piping. Instruction shall be a minimum of one 8-hour day.

- B. Supports and Anchors: All ducting shall be firmly supported with fabricated or commercial hangers or supports in accordance with the requirement in the Section titled "Pipe Supports." Where necessary to avoid stress on equipment or structural members, the pipes shall be anchored or harnessed. Expansion joints and guides shall compensate for duct expansion due to temperature differences.

3.2 PIPE PREPARATION

- A. Prior to installation, each duct length and all fittings shall be carefully inspected, flushed clean of any debris or dust, and straightened, if not true. All duct and fittings shall be equally cleaned before assembly.

3.3 PIPE JOINTS

- A. Butt and Wrap Joints: Prior to joining, ends shall be ground smooth. All dust and debris must be fully removed. Ends shall be resin-coated to prevent corrosion. The joint should be of equal strength as the pipe. A butt and wrap sequence and thickness chart should be shown on the fabrication drawings. The laminate sequence for each size duct should be supported by a separate section in the design calculations.
- B. Supports and Anchors: All piping shall be firmly supported with fabricated or commercial hangers or supports in accordance with the requirements in the Section titled "Pipe Supports." Where necessary to avoid stress on equipment or structural members, the pipes shall be anchored or harnessed. Expansion joints and guides shall compensate for pipe expansion due to temperature differences.

3.4 INSPECTION AND FIELD TESTING

- A. Inspection: All finished installations shall be carefully inspected for proper joints and sufficient supports, anchoring, interference, and damage to pipe, fittings, and coating. Damage shall be repaired to the satisfaction of the Engineer.
- B. Field Testing: Prior to enclosure or buying, all piping systems shall be pressure tested at 1-1/2 times the maximum working pressure. The Contractor shall furnish all test equipment, labor, materials and devices at no extra cost to the Owner.
1. Leakage may be determined by loss of pressure, soap solution, chemical indicator, or other positive and accurate method. All fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines plugged or capped as required during the testing procedures.
 2. Leaks shall be repaired to the satisfaction of the Engineer and the system shall be retested until no leaks are found.

END OF SECTION

SECTION 32 1316 – DECORATIVE CONCRETE PAVING

PART 1 - GENERAL

1.1 WORK INCLUDED

Furnish all labor, materials and equipment required for the reinforcement, formwork and the construction of cast-in-place concrete sidewalks, seatwalls, stairs and mow curbs, including all other work required to produce a finished project in accordance with the Drawings and as specified herein.

1.2 SUMMARY

A. Section includes colored and antiqued concrete paving.

B. Related Sections:

1. Division 03 Section Cast-in-Place Concrete and Miscellaneous Cast-in-Place Concrete for general building applications of concrete.
2. Division 03 Section "Architectural Concrete" for general building applications of specialty finished formed concrete.
3. Division 32 Section "Concrete Paving" for cast-in-place concrete paving with other finishes, curbs and gutters, stamped detectable warnings, pavement markings, and wheel stops.
4. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within decorative concrete paving and in joints between decorative concrete paving and asphalt paving or adjacent construction.

1.3 QUALITY ASSURANCE

- A. Comply with ASTM A-615 "Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," and "Manual of Standard Practice for Detailing Reinforced Concrete Structures," publication ACI 315-65 of the American Concrete Institute.
- B. Comply with all pertinent recommendations contained in American Concrete Institute (ACI), "Recommended Practice of Concrete Formwork, ACI-347."
- C. Construct forms to sizes, shapes, lines and dimensions indicated on Drawings, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finish. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- D. Provide complete forms of such strength and construction as to prevent any spread, shifting, or settling when concrete is deposited, and tight enough to avoid any leakage or washing out of cement mortar.

1.4 JOB CONDITIONS

- A. Temperature: All concrete design mixes and methods of protecting concrete shall be resubmitted to the Landscape Architect for review when the following temperatures are anticipated:
1. The temperature is below 40° F, or when conditions indicate that the temperature will fall below 40° F within seventy-two (72) hours.
 2. The placing temperature of the concrete is, or anticipated to be, above 80° F.

1.5 COORDINATION

- A. Secure all pipe sleeves, anchors and bolts, including those for angle frames, inserts, ties and other materials in connection with concrete construction, in position before concrete is placed.
- B. Obtain information and instructions from other Trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete so provisions for their work can be made without delaying the project.
- C. Make cutting and/or patching made necessary by failure or delay in complying with these requirements at no cost to the Owner.

1.6 FORM CONSTRUCTION TOLERANCES

- A. Set form to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work so that forms can remain in place at least twenty-four (24) hours after concrete placement.
- B. Check completed formwork for grade and alignment to following tolerances:
1. Top of forms not more than one-eighth (1/8) inch in ten (10) feet vertical elevation.
 2. Vertical face on longitudinal axis not more than one-fourth (1/4) inch in ten (10) feet horizontal width.

1.7 SMOOTHNESS TOLERANCE

- A. Cement finish surfaces shall be of such smoothness and evenness that they shall contact the entire length of a 10-foot straight edge laid in any direction, with an allowable tolerance of 1/8 inch. Any operations necessary to achieve this result should be performed by the Contractor, at no additional cost to the City.
- B. No patching will be permitted to correct defective work; defective sections shall be removed and replaced. No extensions of time will be allowed for correcting defective work.

1.8 INSPECTIONS

- A. Inspections will be required. Contractor shall call for inspection a minimum of 48 hours (two working days) prior to need.

- B. The contractor shall call for inspection during specific phases of construction. They shall include the following, each prior to pour:
 - 1. All Form Work
 - 2. All Footings
 - 3. Subgrade
 - 4. Steel Reinforcing
- C. Contractor shall notify the Landscape Architect 48 hours prior to each concrete pour.
- D. Any work covered prior to inspection shall be opened to view by the Contractor at his expense.

1.9 TESTING

All testing shall be as required by the Standard Specifications and these Contract Documents.

1.10 MOCK-UPS

- A. Prior to construction, provide (1) 4-foot x 4-foot x 4-inch sample of each paving type specified on Drawings.
- B. Create Test Pour or Cast of concrete walls and column finished as specified on Drawings.
- C. Ensure that each mock-up contains joint types specified on project, i.e. construction, contraction, and isolation.
- D. Locate mock-ups in a conveniently accessible and protected place. At contractor's cost, additional mock-ups shall be provided as needed until approved. Approved mock-ups will be standard for future installation review.
- E. Remove mock-ups from site upon completion of Work and approval by Owner's Authorized Representative.

1.11 SUBMITTALS

- A. See Section 01300 – Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's data on manufactured products for approval.
- C. Shop drawings: Indicate formwork, dimensions, reinforcement, accessories and control and expansion joint layout.
- D. Mix design: Submit each class of concrete to approved inspection and testing firm and the City for review prior to commencement of concrete operations.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

PART 2 - PRODUCTS

2.1 CONCRETE REINFORCEMENT

- A. Reinforcing Bars: Deformed Billet Steel Bars, ASTM A-615, Grade 40 or Grade 60.
- B. Welded Wire Mesh: ASTM A-186 plain type and uncoated finish.
- C. Tie Wires: Black annealed, ASTM A-82, minimum 16 gauge.
- D. Chains, Bolsters, Bar supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.
- E. Stirrup Steel: ASTM A-82.
- F. Smooth dowel steel bars for construction joints: ASTM A-29, Grade 60.
 - 1. Where indicated, provide dowel sleeve at one end of greased dowel to permit longitudinal movement of dowel within concrete section.
 - 2. Provide for movement which equals joint width plus one-half (1/2) inch.

2.2 CONCRETE FORM MATERIALS

- A. Slabs, Walks, Walls, Columns and Concrete edges: Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
 - 1. Use flexible spring steel forms or laminated boards to form radius bends and foam templates for detailed edges as required.
 - 2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.
- B. Forms for Exposed Finish Concrete: Unless otherwise shown, construct formwork for exposed concrete surfaces with plywood, to provide continuous, straight, smooth, exposed surfaces. Provide plywood in largest practicable sizes to minimize number of joints. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection. Provide solid backing and form supports to insure stability of forms. On any length of wall the difference in form piece size shall not be greater than 25% plus or minus the dimension of the smallest piece and in no case smaller than two (2) inches in width.
 - 1. Use five (5) ply exterior plywood complying with U.S. Product Standard PS 1-66, "B-B (Concrete Form) Plywood," Class 1, Exterior Grade or better, with each piece bearing legible inspection trademark.
 - 2. Use form material in largest practicable sizes to minimize number of form joints. Arrange form joints orderly and symmetrically with minimum number of joints.
- C. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least two (2) edges and on one side for tight fit that is fir or pine, No. 2 common or better.

- D. Circular Concrete Footings or Columns: All round concrete footings or columns, size as indicated on Drawings, shall be formed with seamless "SONOTUBE" fiber forms as manufactured by Sonoco Products Company of Hartsville, South Carolina.
- E. Forms for Curved Exposed Surfaces: Forms shall be built up with hand sawn two (2) inch stringers, sized and carefully fitted to desired form, with segmental tacking. Exposed face surfaces shall be sheet metal, oil tempered hardboard, or one-quarter (1/4) inch waterproof plywood facing.
- F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties (break back cone ties), designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal. All form ties to be used on unexposed concrete surfaces.
- G. Chamfer Exposed Corners and Edges: Chamfer exposed corners and edges as indicated on Drawings using wood chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- H. Radius Exposed Corners: Apply concrete radius tooled edges to exposed concrete corners as dimensioned and sized on Drawings.
- I. Rough Hardware: Pipe, conduit, bolts, anchors, etc., as indicated on Drawings or needed shall be furnished and set.
- J. Chamfer Horizontal Reveal: Chamfer concrete wall horizontal reveals, as indicated on Drawings, using wood chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

2.3 CONCRETE ACCESSORIES

- A. Bonding Agent: ASTM C 1059, Type II acrylic non-redispersable type.
- B. Epoxy Bonding System: ASTM C 881, type as required by project conditions.
- C. Vapor Retarder: 6 mil (0.5 mm) thick clear polyethylene film, type recommended for below grade application.
- D. Chemical Hardener: Fluosilicate solution designed for densification of cured concrete slabs.
- E. Non-Shrink Grout ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,400 psi (17 MPa).
 - 2. Minimum Compressive Strength at 28 Days: 7,000 psi (48 MPa).
- F. Moisture-Retaining Cover: ASTM C 171; white burlap-polyethylene sheet.
- G. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent with guarantee not to leave surface residue.

H. Waterproof Barrier: Thoroseal waterproof cement-based coating, color gray.

2.4 JOINT DEVICES AND MATERIALS

- A. Expansion Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard of felt, 1/4 inch thick and full depth of concrete less 1/2 inch.
- B. Construction Joint Devices: Integral extruded plastic; 1/4 inch thick, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.
- C. Joint Cap: Plastic joint size to match expansion joint size by Sealtight or approved equal
- D. Elastomeric Sealant: Joint sealer color to match concrete.
- E. See Section 02764 Pavement Joint Sealers for additional specifications.

2.5 CONCRETE

- A. Concrete Mix:
 1. Mix concrete in accordance with ASTM C-94 and with aggregates complying with ASTM C-33 and Portland Cement ASTM C-150, Type II.
 2. All concrete mixes shall be designed by a testing laboratory approved by the City's Representative or Landscape Architect. All mixes shall conform to applicable building code requirements listed herein or on the Drawings. All mix designs shall be submitted to the Landscape Architect for approval before being used. Mix design shall show proportions of cement, fine and coarse aggregate, and water and gradation of combined aggregates. Calcium chloride shall not be added at any mix.
 3. Alteration of approved concrete mixes is not acceptable. Installation of concrete other than approved mixes shall be replaced at the expense of the contractor
 4. Concrete shall be as specified:

Item	Minimum Cement Content	28-Day Minimum Strength	Max. Slump	Max. Aggregate Size	Gal/Bag Water to Cement Ratio Max.
Slabs on Grade, Curbs, Exterior Walkways	540 lb/cu. yd.	3,500 PSI	3 in.	3/4 in.	SIX
Walls	540 lb/cu. yd.	4,000 PSI	2-1/2 in.	3/4 in.	FIVE

2.6 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C 94/C 94M.

2.7 ADMIXTURES

A. Chemical admixtures shall conform to the requirements, of Section 90-4.04 through 90-4.07 of the State Standard Specifications.

B. See Site Colored Concrete Section 03330

2.8 SILICON CARBIDE

Silicon Carbide shall be Silicarb as manufactured by Anti-Hydro, telephone number (800) 777-1773; Sparkle Grain as manufactured by Pacific Palette Concrete Products, telephone number (831) 457-4566; Carborex WSC as manufactured by Washington Mills, contact Mr. Craig Williams, telephone number (508) 839-6511, ext. 214; or an approved equivalent. Silicon carbide crystals shall have a Moh Scale hardness of at least 9 and a grit size of either 16/30 or 16/36.

2.9 PORTLAND CEMENT CONCRETE

Shall conform to the provisions in Standard Specifications Section 90 "Portland Cement".

2.10 EXPANSION JOINTS

Shall be as shown on plans and details. Submit samples of preformed material and sealant for approval by the Landscape Architect.

2.11 CONCRETE CURING COMPOUND

Plast-A-Cure Heavy Duty Curing Compound or Approved Equal: Concrete curing compound shall be a white-pigmented curing compound conforming to the requirements of Section 90-7.01 B, "Curing Compound Method" of the State Standard Specifications and shall be a product conforming to ASTM C 309, Type 2, Class B.

2.12 SCORE JOINT

Shall be as shown on the drawings and details, or as called for in the City of Oroville, Department of Public Works Standard Drawings.

PART 3 - EXECUTION

3.1 GENERAL

A. All work shall conform to the requirements of City of Oroville, Department of Public Works Standard Drawings unless noted otherwise on the plans.

- B. All work shall conform to the foundation investigation report. Slab thicknesses, reinforcement, compaction requirements, and base recommendations shall take precedence over details and plan callouts.
- C. All concrete slabs shall slope to drain. Depressions in the slab surface that hold water ("bird baths") will not be acceptable.
- D. Install concrete and cement finish work true to lines, dimensions and levels. Finishing to conform to the City of Oroville Standard Drawings unless noted otherwise on plans.
- E. Protect all finished concrete from graffiti. Contractor shall be responsible for providing concrete watchmen. A graffiti finish will not be acceptable.
- F. Remove and replace defective concrete or cement work with new materials. Permission to patch any defective area shall not be a waiver of the City's right to require complete removal of defective work if patching does not restore quality and appearance of work.
- G. Verify lines, levels, and dimensions before proceeding with work of this section.
- H. No advertising impression, stamp, or mark of any description will be permitted on surface of concrete or cement finish.

3.2 CONCRETE REINFORCEMENT PLACEMENT

- A. Fabricate reinforcement in accordance with ACI-315, providing a minimum concrete cover of two (2) inches.
- B. Place all reinforcement in the exact position shown on the Drawings and secure in position during the placing and compacting of concrete. Wire bars together with No.16 gauge wire with ties at all intersections except where spacing is less than twelve (12) inches in each direction, in which case tie alternate intersections.
- C. Overlap welded wire mesh one square plus six (6) inches to maintain a uniform strength, and securely fasten at the ends, edges and support to maintain clearances.
- D. Place all sleeves, inserts, anchors and embedded items required for adjoining work or for its support prior to concreting. Fill voids in embedded items temporarily with readily removable material to prevent entry of concrete.
- E. Give all contractors and subcontractors whose work is related to concrete or supported by it, ample notice and opportunity to introduce and/or furnish embedded items before concrete placement.

3.3 CONCRETE FORMWORK CONSTRUCTION

- A. Construct support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete.

B. Contractor assumes full responsibility in the removal of forms. The length of time forms must remain in place depends on the rate of time required for concrete to obtain a proper strength. Remove forms after the concrete is sufficiently hard to prevent damage to concrete.

C. Reuse of Forms:

1. Do not reuse forms if there is any evidence of surface wear or defect which would impair quality of surface.
2. Thoroughly clean and properly coat forms before reuse.

D. Earth Forms

Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete

3.4 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work.
- B. Locate and secure in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, inlets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement

3.6 FORM REMOVAL

Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

A. Field Quality Control:

1. Observe formwork continuously while concrete is being placed to see that there are no deviations from desired elevation, alignment, plumbness or camber.
2. If during construction any weakness develops and falsework shows undue settlement or discoloration, stop work, remove affected construction if permanently damaged, and strengthen falsework.
3. Verify that forms are clean and free of rust before applying release agent.

3.7 CONCRETE PLACEMENT AND FINISHES

A. Placing Concrete:

1. Place concrete in accordance with ACI-304 and Section 2605 of the Uniform Building Code. Immediately after depositing, compact concrete thoroughly by mechanical vibration. No vibrating of form is allowed. Mixing shall be continuous, with no interruptions from the time the truck is filled until the time it is emptied. Concrete shall be placed within one hour of the time water is first added.
2. Insure anchors, seats, plates, and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete.
3. Insure reinforcement, inserts, embedded parts, etc. are not disturbed during concrete placement.
4. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur, unless otherwise indicated on the Drawings.
5. Lines and Grades: Elevations requiring accurate placement shall be set by a competent instrument man, using a professional type instrument.
6. For all concrete placed on soil, the subgrade shall be wet and compacted prior to placing.
7. Before placing concrete mixing, conveying and finishing equipment, forms and reinforcing shall be well-cleaned. Wet form before placing concrete, unless oiled forms are used.
8. Notify Landscape Architect at least 48, hours prior to commencement of concrete placement operations.
9. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches (150 mm) and seal watertight.
10. Install joint devices in accordance with manufacturer's instructions.
11. Install construction joint devices in coordination with concrete slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
12. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
13. Place concrete continuously between predetermined expansion, control, and construction joints.
 - a. Do not interrupt successive placement; do not permit cold joints to occur

B. Concrete Finishing

1. Exterior Slabs and Sidewalks:
 - a. Concrete Sidewalks and Ramps – Finish per plan.
 - b. All exterior slabs, sidewalks and top of walls to have non-slip uniform surface per plan.
 - c. After concrete has been placed, consolidate strike off and screed uniformly to the required grades. Float concrete to a uniform surface, then steel trowel lightly to compact surface. Finish exterior slabs and sidewalks as detailed on Drawings. Exterior slabs and sidewalks shall be formed with slopes as indicated, as directed or as necessary to insure proper drainage. Exterior slabs and sidewalks adjacent to buildings shall drain away from buildings.

2. Exterior Walls and Columns:
 - a. Finish per plan.
 - b. Consolidate by vibration so that concrete is thoroughly worked around reinforcement, embedded items and into corners of forms to eliminate air or stone pockets. As-cast concrete surfaces obtained with form material as detailed on Drawings. Provide uniform concrete finish to walls as detailed on Drawings. Lightly sandblast concrete surfaces where required to eliminate form seams and marks. Fill all snap tie holes to match surrounding finish.
 - c. Repair surface defects, including tie holes, immediately after removing formwork.
3. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.

3.8 CONCRETE SURFACE WITH SILICON CARBIDE

Where noted on plans, the concrete surface shall have silicon carbide applied at the rate of 20 to 25 lbs./100 S.F., as follows, unless otherwise directed by the manufacturer.

Immediately after substrate surface has been leveled and wood floated, before bleed water has appeared, the silicon carbide shall be applied evenly while there is sufficient moisture in the slab to saturate at least two dust-on coats. Troweling must be started early enough to complete all operations without use of additional water on the surface. Distribute the silicon carbide crystals uniformly (at the rate of 20 – 25 lbs, per 100 sq.ft.) either by hand or mechanical spreader over prepared wet slab. Crystals shall be applied in three separate shake coats. Use one-third (1/3) of the required quantity of crystals for the first application. Apply second application slightly after first application is floated. Do not throw the crystals or broadcast them with a shovel. Use an evenly distributed hand broadcast.

Trowel crystals uniformly into surface after each shake coat. After the second shake coat of crystals have been troweled once, sprinkle the third coat over the surface. The surface must be uniformly coated. Use a steel trowel to leave grains at surface covered with a thin film of cement paste.

The final finish may be lightly troweled to produce a smooth surface free from defects or blemishes. Finish trowelling shall be delayed until surface has set sufficiently to avoid burying the crystals, but must be accomplished before finish has hardened.

Exposure of the silicon carbide crystals shall be accomplished with either of the following methods provided it results in a satisfactory finish:

- a) Water and a soft broom, or sponge. Allow concrete surface to set sufficiently so that light scrubbing will not cause pitting; or,
- b) A light 5% to 10% Muratic acid washing to expose grains after the concrete is at least 2 weeks old. Acid shall be removed from the finished surface with clean water within 15 minutes after application; or,
- c) Other methods, as approved by the Engineer.

3.9 CURING

- A. Beginning immediately after placement, protect concrete from premature drying, from excessively hot or cold temperatures, and from mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for a period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 7 days.
 - 2. Hairline fissures and cracks developed in first ninety (90) days shall result in replacement of concrete.
- B. Comply with requirements of ACI 308 and ASTM C171. Immediately after placement protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Cover with white burlays-polyestylene sheet.
- C. Initial curing shall be moist curing or moisture cover wring and shall continue for at least 188 emulative hours (not necessarily consecutive), during which the concrete has been exposed to air temperatures above 50 degrees F. Avoid rapid drying at the end of the curing period.
- D. Use water that is free of impurities that could etch or discolor concrete surfaces.
- E. Do not use liquid membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as other concrete, liquid floor hardener, waterproofing, damp-proof flooring, painting, and other coatings and finish materials, unless otherwise acceptable to the Inspector.
- F. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - 2. Begin final curing after initial curing but before surface is dry.
 - a. Moisture-retaining cover. Seal in place with waterproof tape or adhesive.
 - b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.10 WATERPROOF BARRIER

Place, protect and repair waterproof barrier according to manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.

- C. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- D. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd (76 cu m) or less of each class of concrete placed.
- E. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C 143/C 143M.

3.12 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to the City and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the City. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Contractor to be responsible for epoxy grouting repair of any cracks occurring in the concrete which exceed 1/8" as directed by Landscape Architect.
- E. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of the Landscape Architect for each individual area.

3.13 COORDINATION

Bench posts, bike rack posts, drinking fountain, etc. shall be set in cured footings prior to placing concrete slab. Block outs will not be permitted.

END OF SECTION

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SECTION 32 9300 - LANDSCAPE INSTALLATION**PART I - GENERAL****1.1 WORK INCLUDED**

- A. Furnish all labor, material, equipment and services necessary to provide all landscape work, complete in place, as indicated on Drawings and specified herein.

Work specified in this Section, but is not limited to the following:

1. Soil preparation
2. Root Barriers
3. Trees
4. Shrubs
5. Groundcover
6. Bulbs
7. Planting container backfill
8. Decomposed Granite
9. Mulches

- B. Related Work Specified in Other Sections

1. 32 9115 Soil Preparation
2. 32 8400 Planting Irrigation
3. 32 9500 Landscape Maintenance

1.2 QUALITY ASSURANCE

- A. Source Quality Control

1. Submit documentation to the Landscape Architect at least sixty (60) days prior to start of planting that all plant material has been ordered. Arrange procedure for observation of plant material with the Landscape Architect at time of submission.
2. Plants shall be subject to observation and approval of the Landscape Architect upon delivery for conformity to specifications. Such approval shall not impair the right of observation and rejection during progress of the work.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery

1. The Contractor, upon request by the Landscape Architect, shall provide receipts, delivery tickets, load tickets, etc. of all items delivered to the job site to verify products and total quantities.
2. Deliver fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name trademark, and conformance to State Law.
3. Deliver plants with legible identification labels.
 - a. Label trees, evergreens, bundles of containers of like shrubs, or ground cover plants.
 - b. State correct plant name and size indicated on plant list.
 - c. Use durable waterproof labels with water-resistant ink which will remain legible for at least sixty (60) days.

4. Protect plant material during delivery to prevent damage to root ball or desiccation of leaves.
5. The Contractor shall notify the Landscape Architect forty-eight (48) hours in advance of delivery of all plant materials for observation.

B. Storage

1. Store plant material in shade and protect from weather.
2. Maintain and protect plant material.

C. Handling

1. Do not drop plant materials.
2. Do not pick up container plant material by stems or trunks.

1.4 JOB CONDITIONS

- A. Planting: Perform actual planting only when weather and soil conditions are suitable in accordance with locally accepted practice.
- B. Scheduling: Install trees, shrubs, and ground cover plant material before lawn areas are installed and after irrigation system is operable.
- C. Protect work and materials from damage due to construction operations by other contractors and trades and by vandalism. Maintain protection during installation and maintenance period.

1.5 SAMPLES AND TESTS

- A. Provide one quarter cubic foot samples of wood chip, decomposed granite and crusher dust mulches to Landscape Architect for approval prior to installation.
- B. The Landscape Architect reserves the right to take and analyze samples of materials for conformity to specifications at any time; the Contractor shall furnish samples upon request by Landscape Architect. Rejected materials shall be immediately removed from the site at the Contractor's expense. Cost of testing of materials not meeting specifications shall be paid by the Contractor.

1.6 GUARANTEE AND REPLACEMENT

- A. Guarantee: All plant material and other materials installed under the Contract shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship for a period of one (1) year. Any plant found to be dead or not in a satisfactory or healthy condition due to faulty materials, workmanship, or improper maintenance as determined by the Landscape Architect, shall be replaced by the Contractor at his expense.
- B. Replacement: Any materials found to be dead, missing or not in a satisfactory or healthy condition during the maintenance period shall be replaced immediately. The Landscape Architect shall be the sole judge as to the condition of material. Material to

be replaced within the guarantee period shall be replaced by the Contractor within fifteen (15) days of written notification by the City's Representative. All replacement materials and installation shall comply with the Drawings and the Specifications.

PART 2 - PRODUCTS

2.1 GENERAL

All materials shall be of standard, approved and first-grade quality and shall be in prime condition when installed and accepted. Any commercially processed or packaged material shall be delivered to the site in the original unopened container bearing the manufacturer's guaranteed analysis. The Contractor shall supply the Landscape Architect with a sample of all supplied materials accompanied by analytical data from an approved laboratory source illustrating compliance of bearing the manufacturer's guaranteed analysis.

2.2 PRODUCTS

A. Soil Conditioner

1. Gro-Power Plus: Humus (bacteria included based fertilizer and soil conditioner with soil penetrant shall consist of the following percents by weight:
 - 5 % nitrogen
 - 3 % phosphoric acid
 - 1 % potash
 - 50 % humus
 - 15 % humic acids

B. Soil Amendment and Fir Bark Mulch

1. Nitrogen Stabilized Fir Bark Shavings: 0.56 to 0.84% N based on dry weight for fir bark mulch, treated with relative form of nitrogen (NH₃).
 - a. Particle Size: 95% - 100% passing 6.35 mm standard sieve.
80% - 100% passing 2.33 mm standard sieve.
 - b. Salinity: The saturation extract conductivity shall not exceed 3.5 millimeters/centimeter at 25 degrees (25°) centigrade as determined by saturation extract method.
 - c. Iron Content: Minimum 0.08% dilute acid soluble Fe on dry weight basis.
 - d. Ash: 0 - 6.0% (dry weight)
2. Agricultural gypsum
 - a. As per soils report recommendations

C. Fertilizer

1. Planting Pit Fertilizer: Shall be Gro-Power Plus (bacteria included) with soil penetrant and shall consist of the following percents by weight:
 - 5% nitrogen
 - 3% phosphoric acid
 - 1% potash
 - 50% humus
 - 15% humic acid

2. Planting Tablets: Slow-release 21 gram tablets as manufactured by Agriform or approved equal, containing the following percentages of nutrients by weight:

20%	nitrogen
10%	phosphoric acid
5%	potash

D. Imported Soil

1. Imported soil shall be obtained from a source approved by the Landscape Architect.
2. Imported topsoil shall be of friable sandy-loam texture free of refuse, roots, heavy or stiff clay, rocks, sticks, brush or other deleterious materials. Topsoil acidity range (pH) shall be between 6.5 to 7.5 containing a minimum of 4% and a maximum of 25% organic matter. Topsoil shall be free of all noxious weeds. Topsoil samples and analysis shall be submitted to the Landscape Architect for approval prior to delivery of any soil to the project site. Should the Landscape Architect reject any portion of the delivered soil, for any reason, it shall be removed immediately at no cost to the Owner.
3. Topsoil, if rejected, shall be amended to meet specifications. Submit amended topsoil analysis to the City Urban Forester or the Landscape Architect for verification.
4. See also 32 9115 Soil Preparation.

E. Plant Material

1. The plant material indicated on the Drawings by the listed names shall conform to "Standard Plant Names", second edition, except for names not covered therein, the established customs of the nursery trade is followed. All plants shall be true to name, above one of each bundle or lot shall be tagged with the name and size of the plant, in accordance with the standards of practice recommended by the American Association of Nurserymen. All plant materials shall meet the specifications of Federal, State and County laws, requiring observation for plant diseases and insect infestations. Plants shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant diseases, insect pests or other eggs, and shall have healthy, normal root systems, while filling their containers, but not to the point of being root bound. Use only plant materials that are first class representative of the species and cultivars specifies and that conform to all State and local laws governing the sale, transportation and observation of plant materials. Plants shall have straight, single trunks, unless otherwise specified on the plans. Those specified to be multi-trunk shall have at least three (3) main leaders from the base. Any and all plants that have any encircling roots (not root bound) shall have root balls lightly slashed on a minimum of three (3) sides to stop encircling root growth. The height and spread of all plant materials shall be measured with branches in their normal position. Sizes of plants shall be as stated on the plant list, five and fifteen (5 & 15) gallon can container stock shall have been grown in that container not less than six (6) months, but shall not have been overgrown in the containers so as to have become root bound.
2. The size of the plants will correspond with that normally expected for species and variety of commercially available nursery stock or as specified in the Special Conditions or Drawings. The minimum acceptable size of all plants, measured

before pruning with the branches in normal position, shall conform with the measurements, if any, specified on the Drawings in the list of plants to be furnished. Plants larger in size than specified may be used with the approval of the Landscape Architect, but if the use of larger plants is approved, the ball of earth or spread of roots for each plant will be increased proportionally. Plant material shall conform to the following Specifications for container stock:

SHRUBS

SIZE	TYPE	EXAMPLE	HEIGHT	SPREAD	CALLIPER
1 Gal.	low growing	Agapanthus - etc.	8-10"	6-8"	
5 Gal.	low growing	Salvia gregii - etc.	15-18"	15-18"	
5 Gal.	tall growing	Dietes bicolor. etc,	24-30"	15-18"	

TREES

5 Gal.	slow growing	Quercus - etc.	5-6'	12-18"	1/4 - 1/2"
5 Gal.	fast growing	Euc. - Prunus - etc.	6-7'	12-18"	1/2 - 3/4"
15 Gal.	slow growing	Quercus - Pyrus - etc.	7-8'	24-30"	3/4 - 1"
15 Gal.	fast growing	Euc. - Prunus - etc.	8-10'	30-36"	1- 1 1/4"
24" Box	slow growing	Quercus - Pyrus - etc.	8-10'	3-4'	1 1/2-1 3/4"
24" Box	fast growing	Euc. - Prunus - etc.	10-12'	4-5'	1 3/4-2 1/2"
30" Box	slow growing	Quercus - Pyrus - etc.	12-14'	6-7'	2 1/2 - 3"
30" Box	fast growing	Euc. - Prunus - etc.	12-14'	6-7'	2 1/2 - 3"
36" Box	slow growing	Quercus - Pyrus - etc.	14-16'	8-10'	2 1/2 - 3"
36" Box	fast growing	Euc. - Prunus - etc.	14-16'	8-10'	2 1/2 - 3"
36" Box	fast growing	Euc.- Prunus - etc.	14-16'	8-10'	2 1/2 - 3"

3. All plants not conforming to the requirements herein specified, shall be considered defective and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site of the work and replaced with new plants at the Contractor's expense. The plants shall be of the species, variety, size and condition specified herein or as shown on the Drawings. Under no conditions will there be any substitution of plants or sizes listed on the plans, except with the expressed written approval of the Landscape Architect.
4. At no time shall trees or plant materials be pruned, trimmed or topped prior to delivery and any alteration of their shape shall be conducted only with the approval and when in the presence of the Landscape Architect and/or as noted on the Planting Specifications.
5. Nursery Grown and Collected Stock
 - a. Plant materials shall conform with the best edition of ANSI Z60.1-1986 American Standard for Nursery Stock.
 - b. Grown under climatic conditions similar to those in locality of project.
 - c. Container-grown stock in vigorous, healthy condition, not root bound or with root system hardened off.
 - d. Use only liner stock plant material which is well established in removable containers or formed homogeneous soil sections.

6. Ground Cover: Ground cover plants shall be grown in flats, peat pots, or taken as cuttings, as indicated on the plans. Flat grown plants (rooted cuttings) shall remain in those flats until trans-planting. The flat's soil shall contain sufficient moisture so that it will not fall apart when lifting the plants. If plants from peat pots are used, the pots shall be protected at all times prior to planting to prevent unnecessary drying of the rootball.
- F. Mulches
1. Wood chip mulch shall be chipped trees branches and tree trunks, particle range of between $\frac{1}{2}$ " to $\frac{3}{4}$ " in diameter by 2" to 4" long, free of chipped diseased trees. Colored or dyed wood products are not acceptable.
 2. Decomposed granite mulch shall be 1/8 inch minus, gold brown in color.
 3. Crusher dust shall be $\frac{1}{4}$ chipped rock gray in color, non graded, Stony Creek , Hamilton City or equal.
 3. Nitrogen stabilized fir bark mulch per PART 2 PRODUCTS, Section A., Paragraph number 1.
- G. Pre-emergent - Pre-emergent, Ronstar or approved equal, prevent weed development in planter areas.
- H. Weed Control - Pre-emergent herbicide ronstar or equal.
- I. Tree Staking Material
1. Stakes for Tree Support
Wood Tree Stakes- Lodge pole pine stakes full-length untreated. Minimum nominal size: two (2) inches in diameter x ten feet (2" x 10') long and pointed at one (1) end (adjust length to fit tree). Stakes shall be free from knots, checks, splits, or disfigurements.
 2. Ties
32" length cinch tie as manufactured by V.I.T. Company, 1-714-871-2309 or approved equal.
- J. Decomposed Granite
"Californian Gold" decomposed granite, #4 sieve minus, available from Felton Quarry 1-831-335-3445 or approved equal.
- K. Root Barrier
By Deep Root Corp. model numbers LB-12-2 and LB-18-3 or approved equal.
- L. Miscellaneous Materials
1. Sand: wash river sand or equal.
 2. Tree wound paint: as approved. Morrison Tree Seal, Cabot Tree Paint, or approved equal.

PART 3 - EXECUTION

3.1 OBSERVATION

- A. Landscape Architect to verify that topsoil has been imported, and final grades have been established prior to beginning planting operations. Landscape Architect to observe, trees and shrub stock plant material for injury, insect infestation and improper pruning. Do not begin planting of trees until deficiencies are corrected or plants replaced.

3.2 LAYOUT OF PLANTING AREAS

- A. Stake or mark all locations for plants and outline of planting beds on ground. Do not begin excavation until plant locations and plant beds are acceptable to the Owner, the irrigation system shall be operational and approved prior to planting.
- B. If an underground construction or utility line is discovered prior to work, other locations for planting may be selected by the Owner.

3.3 FINISH GRADE

- A. Finished grading shall be complete prior to plant installation, conform to **SOIL PREPARATION** specification.

3.4 PLANT INSTALLATION

- A. General
 1. Actual planting shall be performed during those periods when weather and soil conditions are suitable and in accordance with locally accepted practice, as approved by the Owner.
 2. Only as many plants as can be planted and watered on that same day shall be distributed in a planting area.
 3. Container shall be opened and plants shall be removed in such a manner that the ball of earth surrounding the roots is not broken and they shall be planted and watered as herein specified immediately after removal from the containers. Containers shall not be opened prior to placing the plants in the planting area.
- B. Preparation of planting areas:
 1. After approximate finished grades have been established, soil shall be conditioned and fertilized according to the Horticultural Report. See section 32 9115 Soil Preparation for more information.
 2. All soil areas shall be compacted and settled by application of heavy irrigation to a minimum depth of twelve (12) inches.
 3. At time of planting, the top six (6) inches of all areas to be planted shall be free of stones, stumps, or other deleterious matter one (1) inch in diameter or larger, and shall be free from all wire plaster, or similar objects that would be a hindrance to planting and maintenance. All rock larger than 1 inch to be removed by mechanical means, either by sieve for loose rock and by heavy equipment if solid bedrock.

C. Planting of Trees and Shrubs

1. Excavation for planting shall include the stripping and stocking of all acceptable topsoil encountered within the areas to be excavated for trenches, tree holes, plant pits and planting beds. Excess soil generated from the planting holes and not used as backfill or in establishing the final grades shall be removed from the site.
2. Shape
 - a. Vertical sides and flat bottom.
 - b. Plant pits to be square for box material, circular for canned material.
 - c. Scarify sides and bottom of each pit.
3. Protect all areas from excessive compaction when trucking plants or other materials to planting site.
4. Can Removal
 - a. Cut cans on two (2) sides with an acceptable can cutter.
 - b. Do not injure the rootball.
 - c. Do not cut cans with spade or ax.
 - d. Carefully remove plants without injury or damage to rootball.
 - e. After removing plant, superficially cut edge roots with knife on three (3) sides.
5. Box Removal
 - a. Remove bottom of plant boxes before planting.
 - b. Remove sides of box without damage to root ball after positioning plant and partially backfilling.
6. Center plant in pit.
7. Face plants with fullest growth into prevailing wind.
8. Set plant plumb and hold rigidly in position until soil has been tamped firmly around ball roots.
9. Remainder of planting pit shall be backfilled with:
 - a. One (1) parts import top soil or approved on-site soil per landscape grading specification.
 - b. One (1) parts nitrogen stabilized fir bark shavings.
 - c. Eighteen (18) pounds Gro-Power Plus planting pit fertilizer per cubic yard of mix.
 - d. Specified type and quantity of planting tablets
10. All plants which settle shall be raised to the correct level. After the plant has been placed, additional backfill shall be added to the hole to cover approximately one-half (1/2) of the height of the root ball. Water shall be added to the top of the partly filled hole to thoroughly saturate the root ball and adjacent soil.
11. After the water has completely drained, planting tablets shall be placed adjacent to but not in contact with root ball.
 - a. One (1) tablet per 1-gallon container
 - b. Two (2) tablets per 5-gallon container
 - c. Three (3) tablets per 15-gallon container
12. After backfilling, an earthen basin shall be constructed around each plant. Each basin shall be of a depth sufficient to hold at least two (2) inches of water. Basin shall be of a size suitable for the individual plant. In no case shall the basin for fifteen (15) gallon plant be less than four (4) feet in diameter; a five (5) gallon plant less than three (3) feet in diameter. The basins shall be constructed of amended backfill materials, and shall not be constructed for trees in turf areas.

13. Pruning - Pruning of trees shall be limited to the minimum necessary to remove injured twigs and branches and to compensate for loss of roots during transplanting, but never to exceed one-third (1/3) of the branching structure. Upon approval of the City, pruning may be done before delivery of plant, but not before plants have been observed and approved. Prune as per specifications Landscape Maintenance Section 30 9500.
 14. Staking
 - a. Staking of all trees shall conform to tree staking details.
 - b. One (1) tree shall be staked and approved by the City prior to continued staking.
- D. Planting of Ground Cover
1. Ground cover shall be planted in straight rows and evenly spaced, unless otherwise noted, and at intervals called out in the Drawings. Triangular spacing shall be used unless otherwise noted on the Drawing.
 2. Each rooted plant shall be planted with its proportionate amount of flat soil or in a peat pot in a manner that will insure minimum disturbance of the root system, but in no case shall this depth be less than two (2) nodes. To avoid drying out, planting shall be immediately irrigated after planting until the entire area is soaked to the full depth of each hole, unless otherwise noted on the Drawing.
 3. Care shall be exercised at all times to protect the plants after planting. Any damage to plants by trampling or other operations of this Contract shall be repaired immediately.

3.5 MULCH COVER

- A. All planting areas shall be top dressed with a 2 inch layer of decomposed granite, as measured after settling.
- B. Crusher dust mulch and decomposed granite mulch shall be settled by thorough application of water applied from above and not to exceed infiltration rate. Do not compact by mechanical means and do not exceed 85% relative density. Do not compact soil grade beneath mulch by more than 85% relative density.

3.6 WEED CONTROL

- A. Apply weed control to all planting and decomposed granite areas with the exception of landscape medians. Do not apply pre-emergent to medians. Apply weed control after completion of all planting and prior to installation of mulches.
- B. Hand water to dissolve herbicide per manufacturer's specifications.
- C. Apply as per manufacturer's specifications.

3.7 OBSERVATION SCHEDULE

- A. The Contractor shall be responsible for notifying the Landscape Architect in advance for the following observations according to the time indicated:
 1. Pre-construction conference - 7 days.
 2. Finish grade review - 48 hours.

3. Plant material review - 48 hours.
4. Soil preparation, plant layout, and planting operations. One (1) tree with each type of specified shall be approved prior to planting of trees - 48 hours.
5. End of landscape installation - 48 hours.
6. End of landscape maintenance/Final Acceptance - 48 hours

B. No site visits shall commence without all items noted in previous Observation Reports, either completed or remedied, unless such compliance has been waived. Failure to accomplish punch list tasks or prepare adequately for desired observations shall make the Contractor responsible for reimbursing the City's Representative or Landscape Architect at his current billing rates per hour, plus transportation costs.

3.8 CLEAN UP

After all planting operations have been completed; remove all trash, excess soil, empty plant containers or rubbish from the property. All scars, ruts or other marks in the ground caused by this work shall be repaired and the ground left in a neat and orderly condition throughout the site. The Contractor shall pick-up all trash resulting from this work no less frequently than at the end of each day. All trash shall be removed completely from the site. The Contractor shall leave the site area broom-clean and shall wash down all paved areas within the Contract area, leaving the premises in a clean condition acceptable to the City.

3.9 LANDSCAPE MAINTENANCE

Provide Landscape Maintenance as per
LANDSCAPE MAINTENANCE – SECTION 32 9500

END OF SECTION

PROJECT NAME

**Butte Regional Transit
Operations Center**

PROJECT ADDRESS

**326 HUSS LANE
CHICO, CA 95928**

TLCD PROJECT NO:

11054.03

DATE:

07/18/2014

BY:

MGK

DESCRIPTION:

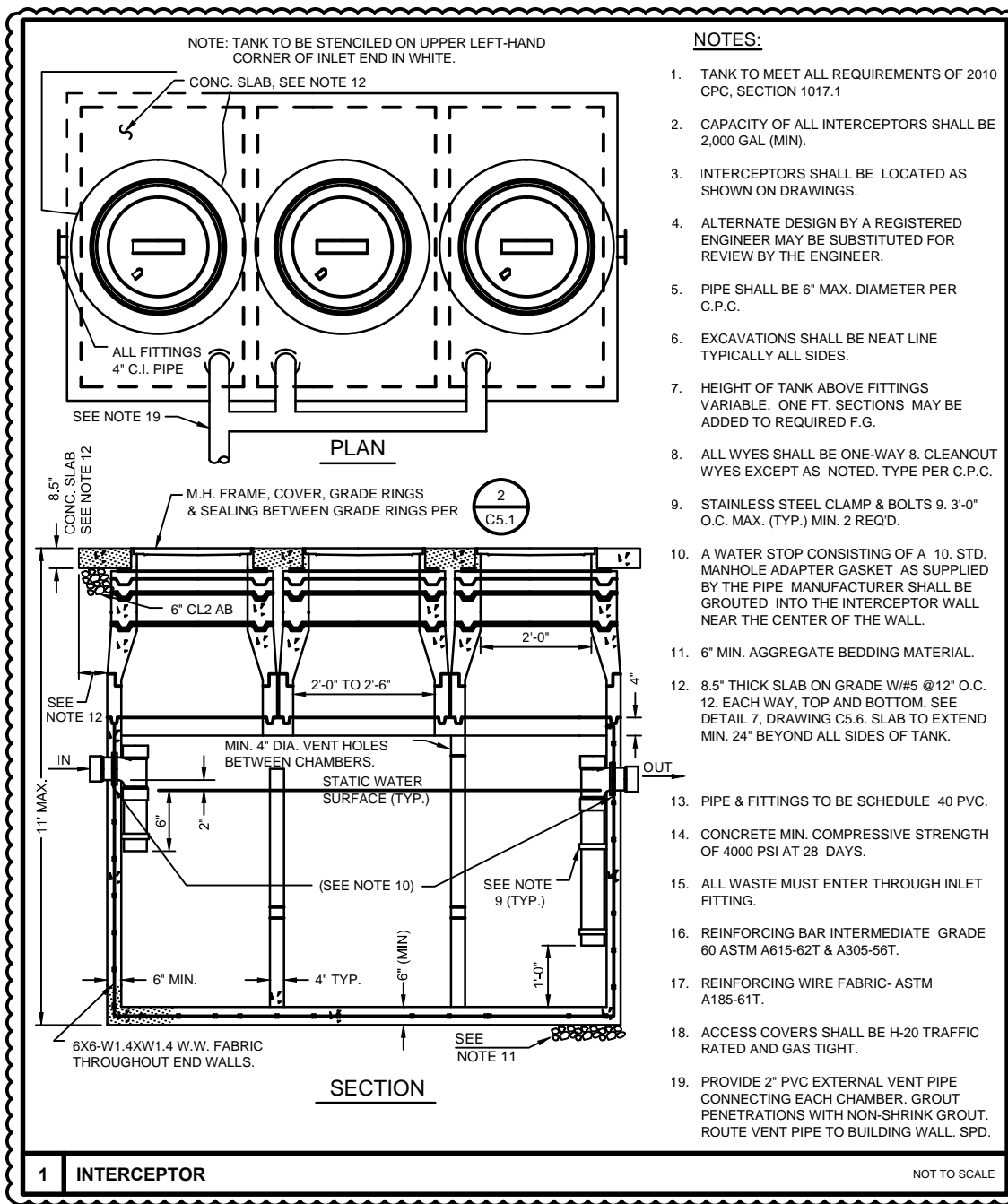
**Interceptor Vent Pipe and
Access Cover - Drawing C5.2**



Matthew Glen Kennedy

DRAWING NO:

CA 2.0



NOTES:

- TANK TO MEET ALL REQUIREMENTS OF 2010 CPC, SECTION 1017.1
- CAPACITY OF ALL INTERCEPTORS SHALL BE 2,000 GAL (MIN).
- INTERCEPTORS SHALL BE LOCATED AS SHOWN ON DRAWINGS.
- ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBSTITUTED FOR REVIEW BY THE ENGINEER.
- PIPE SHALL BE 6" MAX. DIAMETER PER C.P.C.
- EXCAVATIONS SHALL BE NEAT LINE TYPICALLY ALL SIDES.
- HEIGHT OF TANK ABOVE FITTINGS VARIABLE. ONE FT. SECTIONS MAY BE ADDED TO REQUIRED F.G.
- ALL WYES SHALL BE ONE-WAY 8. CLEANOUT WYES EXCEPT AS NOTED. TYPE PER C.P.C.
- STAINLESS STEEL CLAMP & BOLTS 9. 3'-0" O.C. MAX. (TYP.) MIN. 2 REQ'D.
- A WATER STOP CONSISTING OF A 10. STD. MANHOLE ADAPTER GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUTED INTO THE INTERCEPTOR WALL NEAR THE CENTER OF THE WALL.
- 6" MIN. AGGREGATE BEDDING MATERIAL.
- 8.5" THICK SLAB ON GRADE W/#5 @12" O.C. 12. EACH WAY, TOP AND BOTTOM. SEE DETAIL 7, DRAWING C5.6. SLAB TO EXTEND MIN. 24" BEYOND ALL SIDES OF TANK.
- PIPE & FITTINGS TO BE SCHEDULE 40 PVC.
- CONCRETE MIN. COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
- ALL WASTE MUST ENTER THROUGH INLET FITTING.
- REINFORCING BAR INTERMEDIATE GRADE 60 ASTM A615-62T & A305-56T.
- REINFORCING WIRE FABRIC- ASTM A185-61T.
- ACCESS COVERS SHALL BE H-20 TRAFFIC RATED AND GAS TIGHT.
- PROVIDE 2" PVC EXTERNAL VENT PIPE CONNECTING EACH CHAMBER. GROUT PENETRATIONS WITH NON-SHRINK GROUT. ROUTE VENT PIPE TO BUILDING WALL. SPD.



TLCD
ARCHITECTURE

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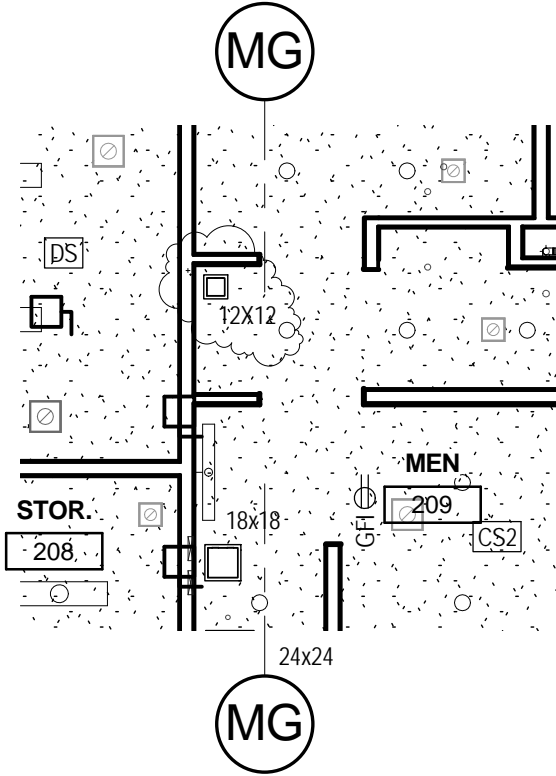
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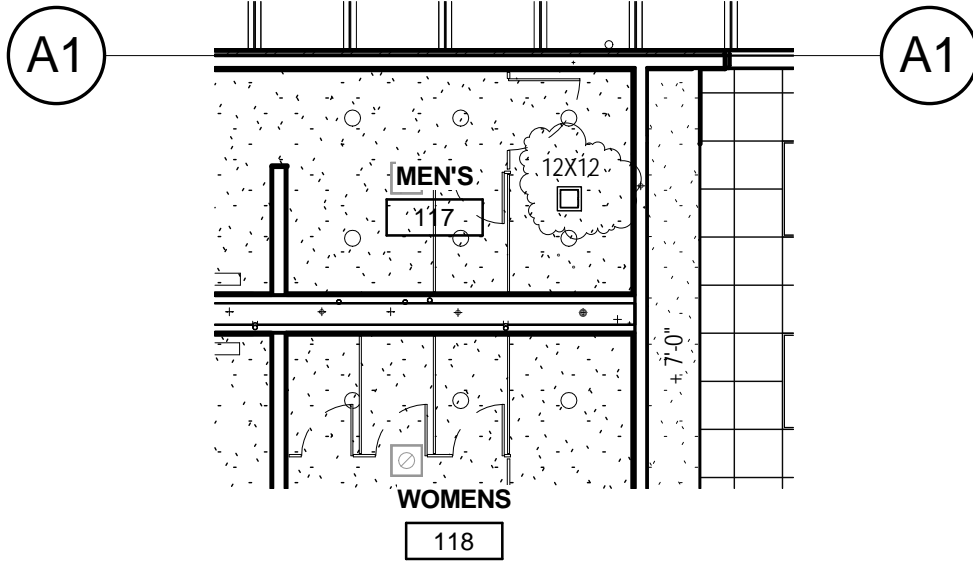
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CHICO, CA 95928**



1 ACCESS PANEL 1
1/8" = 1'-0"



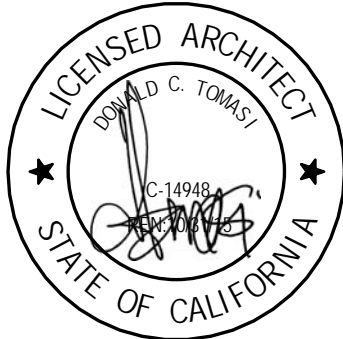
2 ACCESS PANEL 2
1/8" = 1'-0"

TLCD PROJECT NO:
11054.03

DATE:
07/14/14

BY:
KT

DESCRIPTION:
REF A6_1 AND A6_2
CEILING ACCESS
PANEL



DRAWING NO:

AA 1.0

PROJECT NAME

Butte Regional Transit
Operations Center

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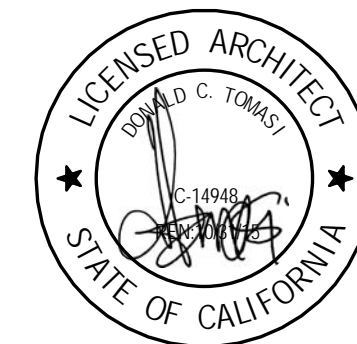
NOTE: OFF-SITE CONSTRUCTION
"AZTEC DRIVE EXTENSION AND COMANCHE
CREEK STORM DRAINAGE OUTFALL".
MULTI-PRIME SITE COOPERATION AND
COORDINATION REQUIRED. APPROXIMATE
CONTRACT DURATION: 7/28/14 TO 1/31/15

TLCD PROJECT NO:
11054.03

DATE:
07/14/14

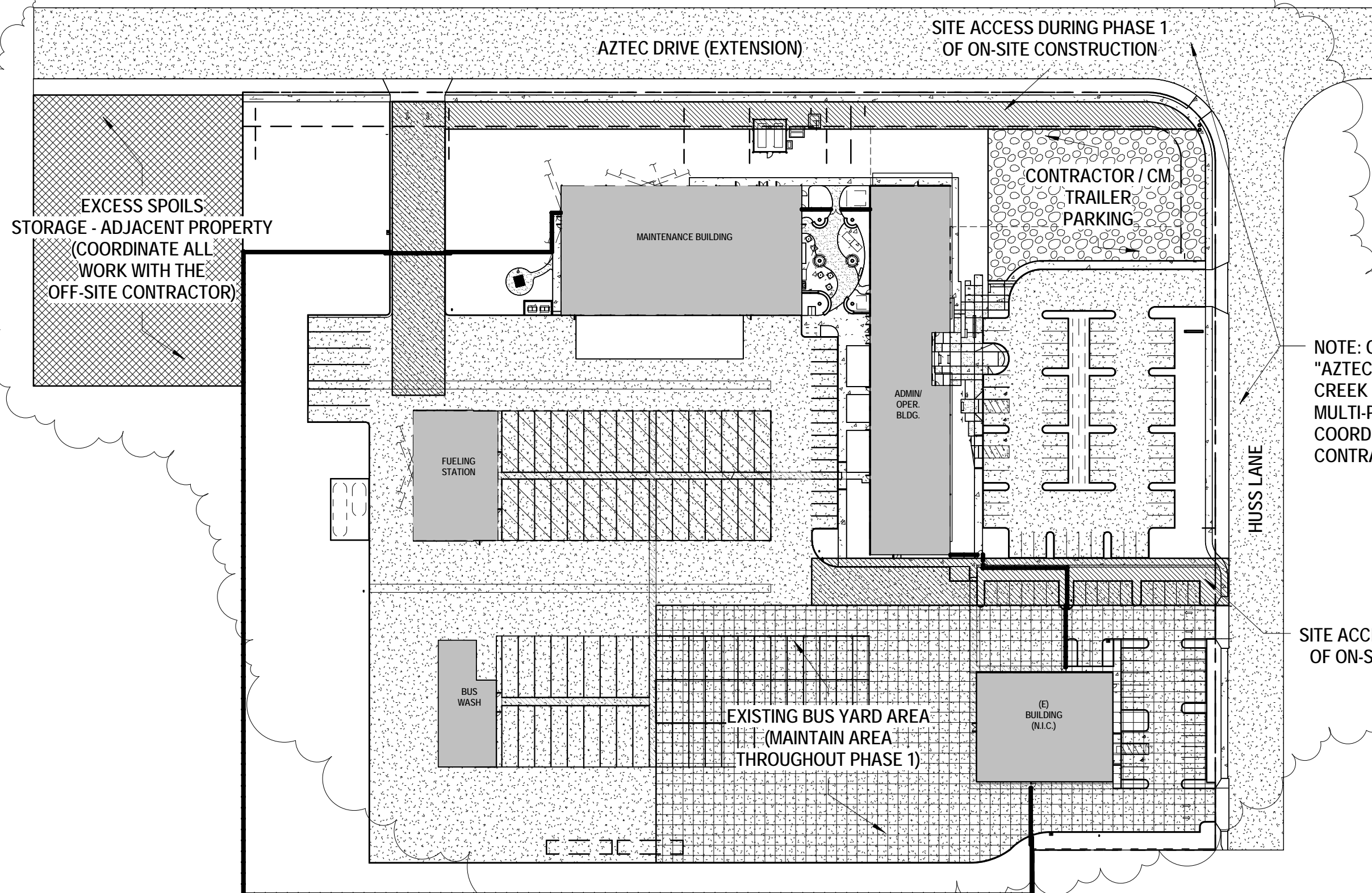
BY:
KT

DESCRIPTION:
SITE LOGISTICS PLAN



DRAWING NO:

AA 2.0



EXCESS SPOILS
STORAGE - ADJACENT PROPERTY
(COORDINATE ALL
WORK WITH THE
OFF-SITE CONTRACTOR)

AZTEC DRIVE (EXTENSION)

SITE ACCESS DURING PHASE 1
OF ON-SITE CONSTRUCTION

CONTRACTOR / CM
TRAILER
PARKING

MAINTENANCE BUILDING

ADMIN/
OPER.
BLDG.

FUELING
STATION

HUSS LANE

BUS
WASH

EXISTING BUS YARD AREA
(MAINTAIN AREA
THROUGHOUT PHASE 1)

(E)
BUILDING
(N.I.C.)

SITE ACCESS DURING PHASE 1
OF ON-SITE CONSTRUCTION

1 SITE LOGISTICS PLAN
1" = 80'-0"

NOTE: PRINT IN COLOR

PROJECT NAME

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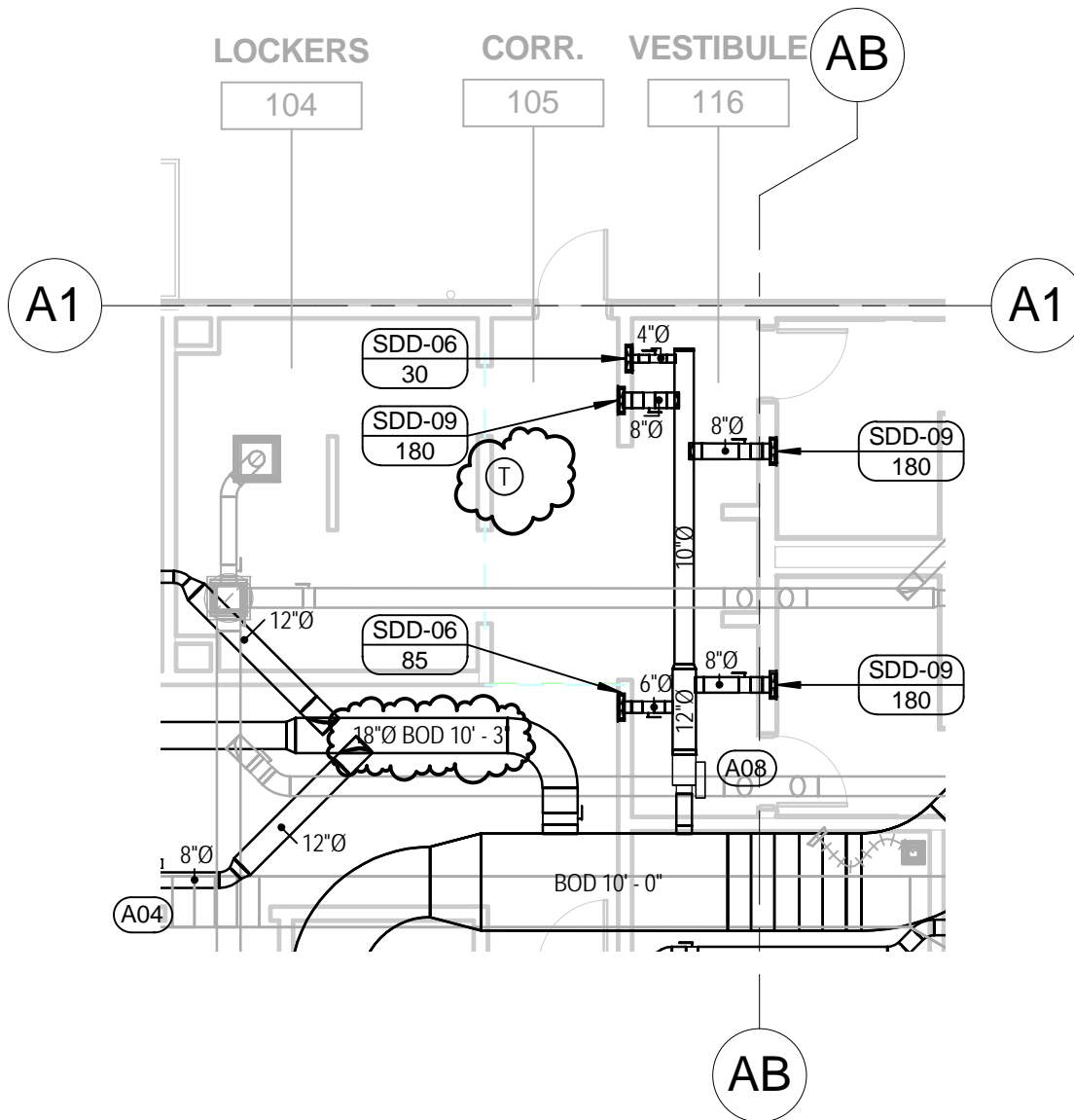
07/16/14

BY:

Author

DESCRIPTION:

**THERMOSTAT AND
DUCT RELOCATION
DRAWING M2.1**



**ADMINISTRATION / OPERATIONS HVAC -
SUPPLY**

1

1/8" = 1'-0"



Daniel Boyd Reiter
MA 1.0

PROJECT NAME
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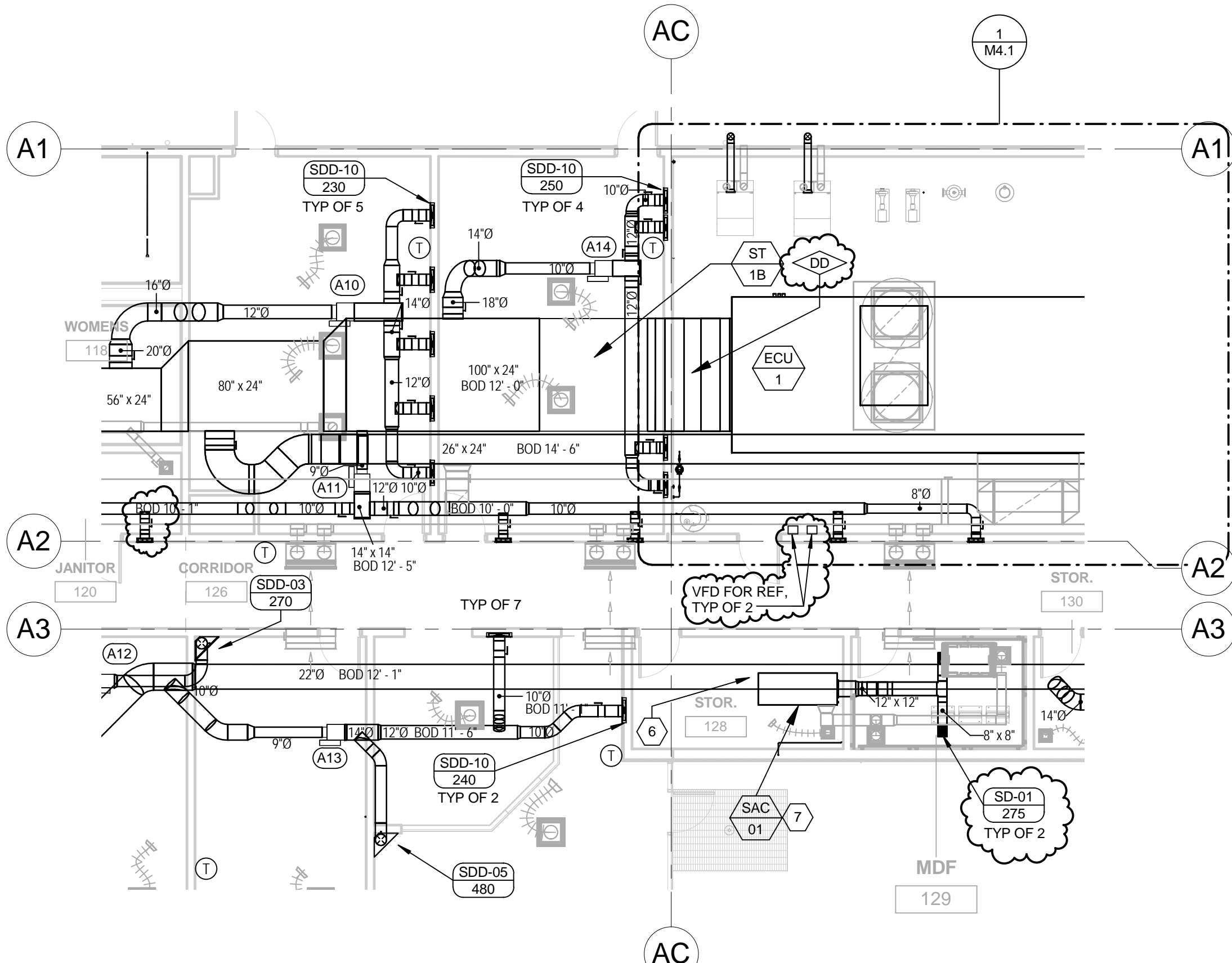
DATE:
07/15/14

BY:
Author

DESCRIPTION:
**VFDS, SMOKE
DETECTOR AND AIR
GRILLE NAME
DRAWING M2.1**



Daniel Boyd Reiter
MA 2.0



**ADMINISTRATION / OPERATIONS HVAC PLAN -
SUPPLY**

1
1/8" = 1'-0"



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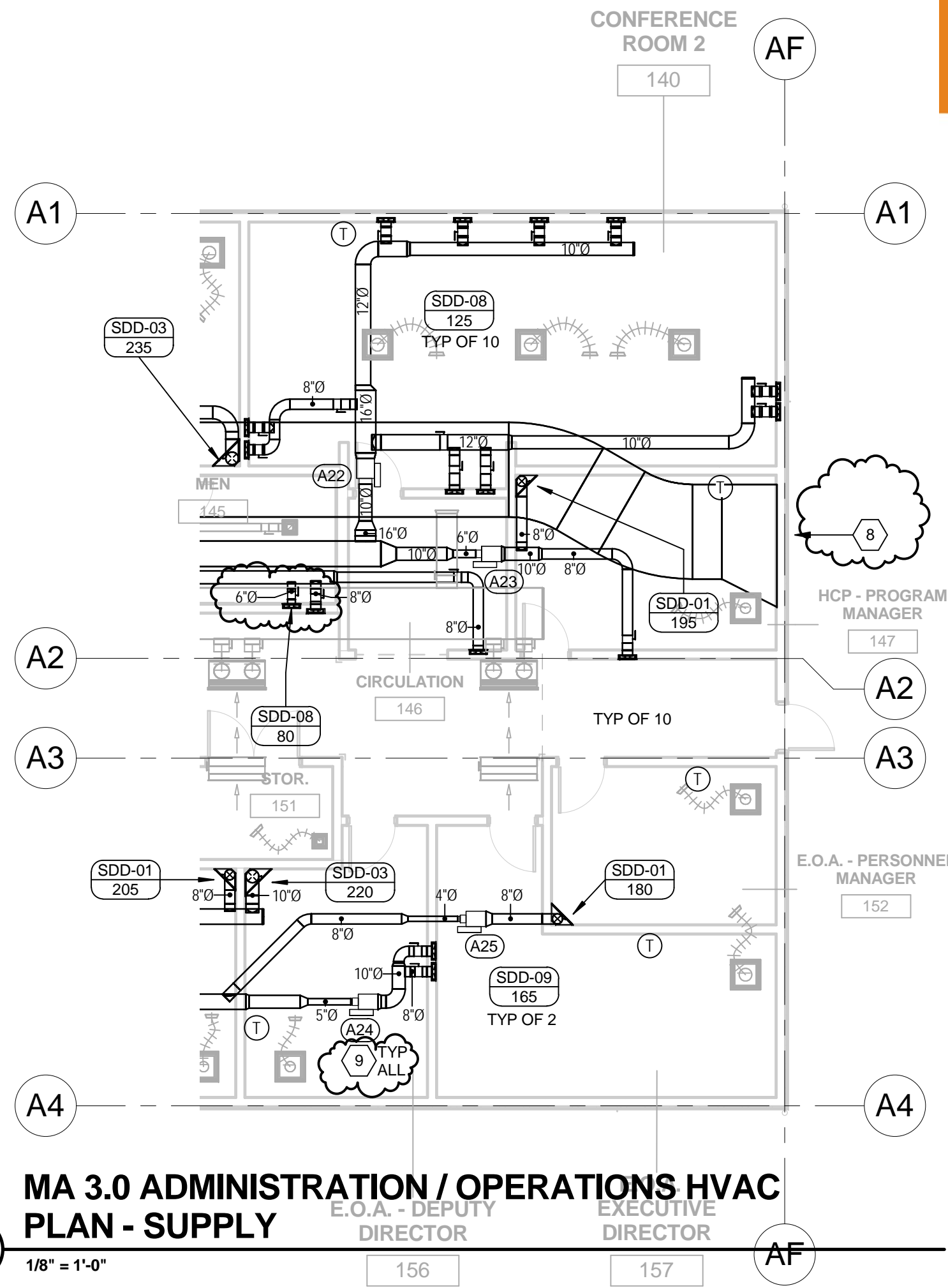
BY:
CSC

DESCRIPTION:
**KEYNOTES AND DUCT
MOVE
DRAWING M2.1**



Daniel Boyd Reiter
MA 3.0

- KEYNOTES**
- 14"x14" DUCT UP THROUGH ROOF TO REF-1E ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
 - 10"x10" DUCT UP THROUGH ROOF TO REF-1F ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
 - 40"x40" DUCT UP FROM ECU-1 THROUGH ROOF TO REF-1A & REF-1B ON ROOF. THE FANS SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
 - REF-1C & REF-1D SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER AT THE HIGHEST ROOF ELEVATION WITH-IN THE ROOM. THE ROOF OPENING SHALL BE DIRECTLY TO THE SERVED SPACE WITH NO DUCT WORK AND SHALL MATCH THE INTERIOR SIZE OF THE CURB. THE FANS SHALL BE CONTROLLED BY A THERMOSTAT IN THE SPACE. REFER TO SEQUENCE OF OPERATION.
 - SPACE STATIC PRESSURE SENSOR FOR REF-1A & REF-1B CONTROL.
 - DUCT STATIC PRESSURE SENSOR FOR ECU-1 SUPPLY AIR FAN CONTROL.
 - SELF-CONTAINED AIR CONDITIONER FOR MDF ROOM SHALL DRAW AND DISCHARGE CONDENSER AIR FROM/TO THE ROOF PLENUM.
 - SEE ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION OF THE EXTERNAL WALL LOUVER SERVING THE OUTSIDE AIR INTAKE FOR ECU-1.
 - PROVIDE MINIMUM OF 4 DUCT DIAMETERS STRAIGHT RUN INTO EACH VAV BOX.
 - ALL RETURN AIR GRILLES SHALL BE EQUIPPED WITH A VOLUME CONTROL DAMPER ADJUSTABLE THROUGH THE DIFFUSER FACE



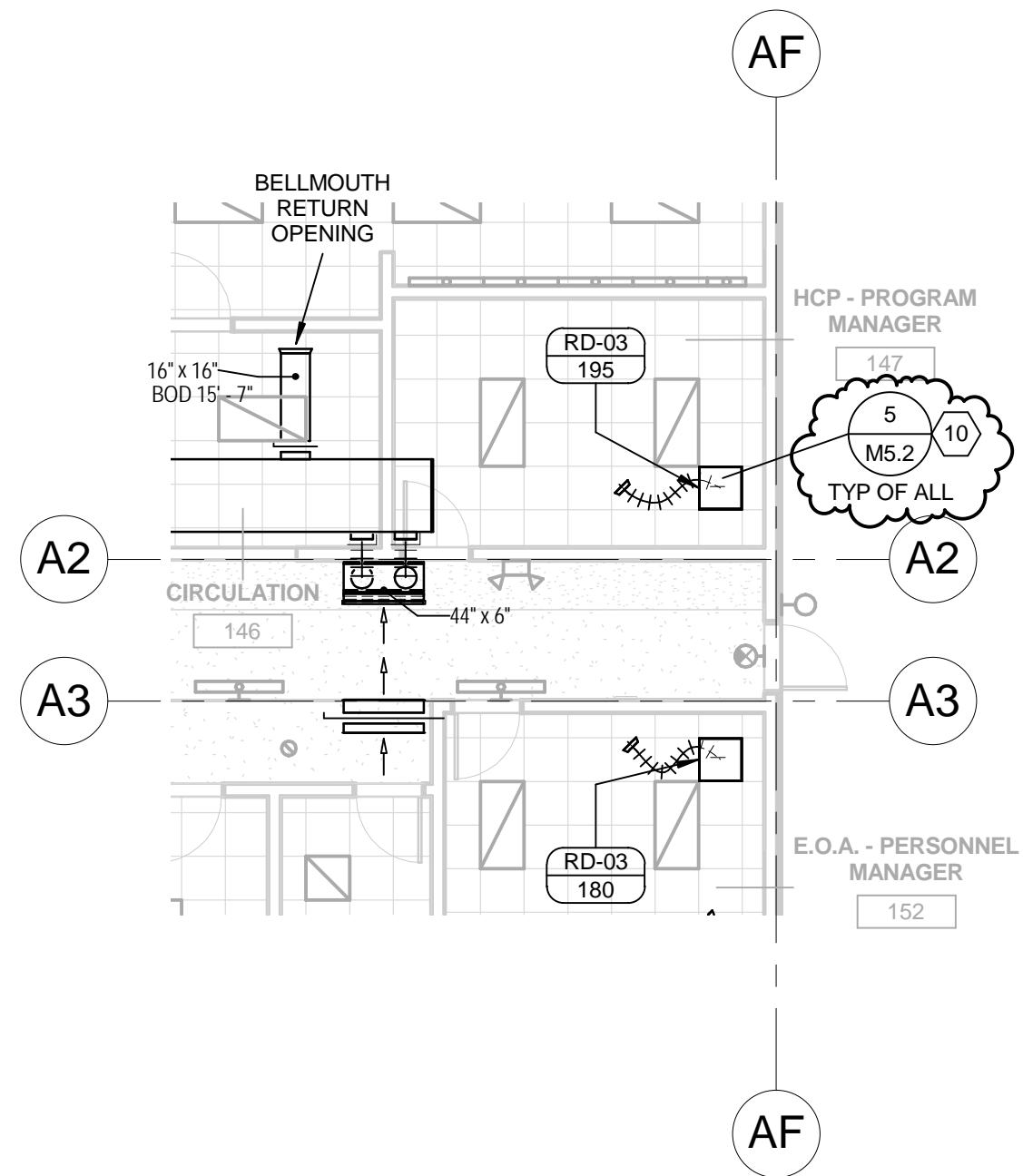
**MA 3.0 ADMINISTRATION / OPERATIONS HVAC
PLAN - SUPPLY**

E.O.A. - DEPUTY DIRECTOR
EXECUTIVE DIRECTOR

1 1/8" = 1'-0"

KEYNOTES

1. 14"x14" DUCT UP THROUGH ROOF TO REF-1E ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
2. 10"x10" DUCT UP THROUGH ROOF TO REF-1F ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
3. 40"x40" DUCT UP FROM ECU-1 THROUGH ROOF TO REF-1A & REF-1B ON ROOF. THE FANS SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
4. REF-1C & REF-1D SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER AT THE HIGHEST ROOF ELEVATION WITH-IN THE ROOM. THE ROOF OPENING SHALL BE DIRECTLY TO THE SERVED SPACE WITH NO DUCT WORK AND SHALL MATCH THE INTERIOR SIZE OF THE CURB. THE FANS SHALL BE CONTROLLED BY A THERMOSTAT IN THE SPACE. REFER TO SEQUENCE OF OPERATION.
5. SPACE STATIC PRESSURE SENSOR FOR REF-1A & REF-1B CONTROL.
6. DUCT STATIC PRESSURE SENSOR FOR ECU-1 SUPPLY AIR FAN CONTROL.
7. SELF-CONTAINED AIR CONDITIONER FOR MDF ROOM SHALL DRAW AND DISCHARGE CONDENSER AIR FROM/TO THE ROOF PLENUM.
8. SEE ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION OF THE EXTERNAL WALL LOUVER SERVING THE OUTSIDE AIR INTAKE FOR ECU-1.
9. PROVIDE MINIMUM OF 4 DUCT DIAMETERS STRAIGHT RUN INTO EACH VAV BOX.
10. ALL RETURN AIR GRILLES SHALL BE EQUIPPED WITH A VOLUME CONTROL DAMPER ADJUSTABLE THROUGH THE DIFFUSER FACE



MA 4.0 ADMINISTRATION / OPERATIONS HVAC PLAN - RETURN/EXHAUST

2

1/8" = 1'-0"

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DATE:
07/17/14

BY:
CSC

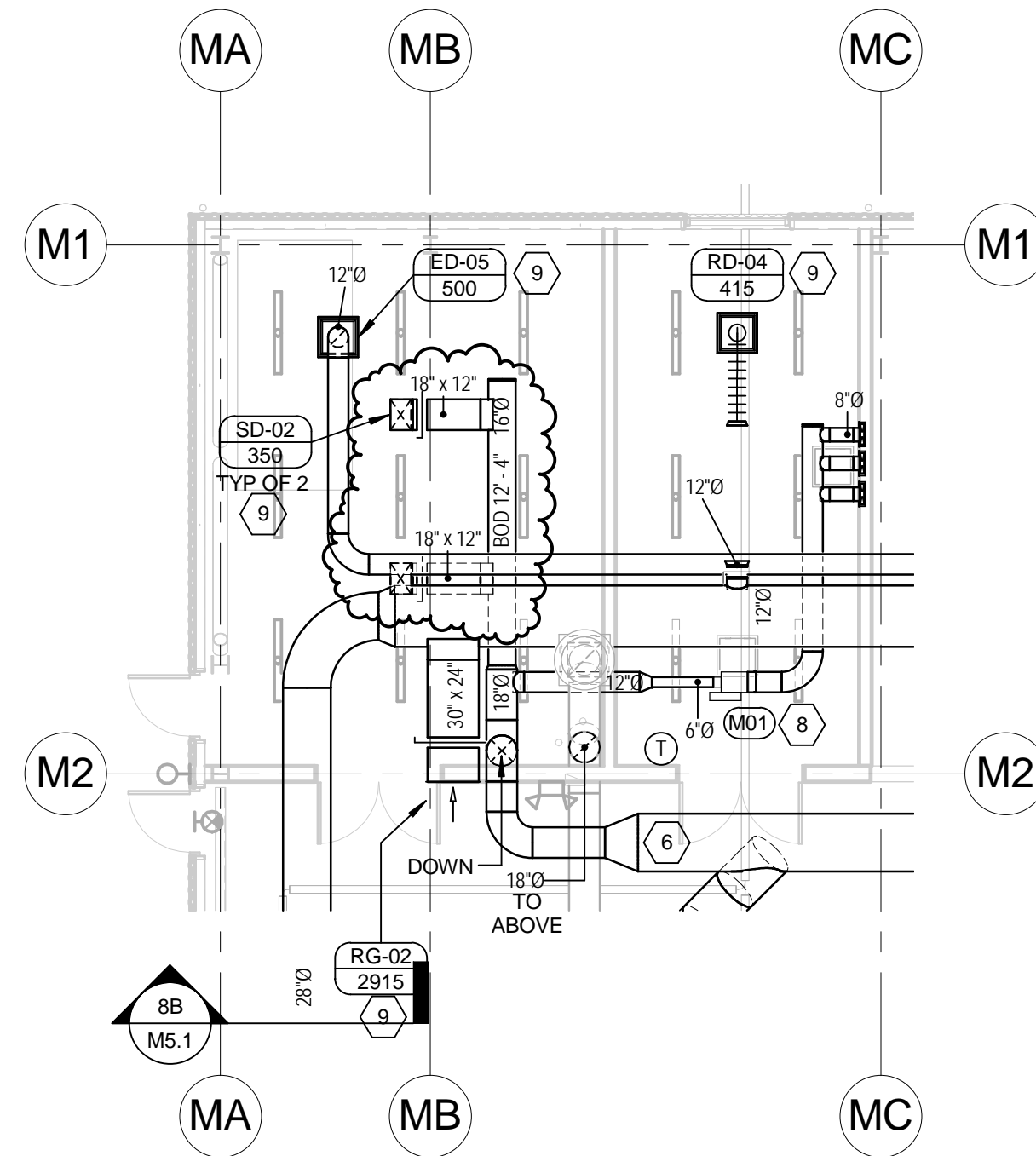
DESCRIPTION:
KEYNOTES AND
VOLUME CONTROL
DAMPER
DRAWING M2.1



Daniel Boyd Reiter
MA 4.0

KEYNOTES

1. FIBERGLASS REINFORCED PLASTIC (FRP) DUCT WORK BELOW GRADE. SEE DETAIL 5 ON SHEET M5.1. FRP DUCT SHALL START FROM A MINIMUM 6" ABOVE SLAB TO 6" INSIDE PIT WALL TO ALLOW SUITABLE SPACE FOR LINK SEAL ASSEMBLY INSTALLATION.
2. SEE ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION OF THE EXTERNAL WALL LOUVER SERVING THE OUTSIDE AIR INTAKE FOR ECU-2.
3. 40"x40" DUCT UP FROM ECU-2 THROUGH ROOF TO REF-2A & REF-2B ON ROOF. THE FANS SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
4. 18" DIA. TO 18"x18" DUCT UP THROUGH ROOF TO REF-2C ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
5. 18" DIA. TO 18"x18" DUCT UP THROUGH ROOF TO REF-2D ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
6. DUCT STATIC PRESSURE SENSOR FOR ECU-2 SUPPLY AIR FAN CONTROL.
7. DUCT STATIC PRESSURE SENSOR FOR REF-2A & REF-2B CONTROL.
8. PROVIDE MINIMUM OF 4 DUCT DIAMETERS STRAIGHT RUN INTO EACH VAV BOX.
9. AIR TERMINAL SHALL BE EQUIPPED WITH A VOLUME CONTROL DAMPER ADJUSTABLE THROUGH THE DIFFUSER FACE
10. SEE STRUCTURAL DRAWINGS FOR DETAILS OF DUCTS THROUGH WALLS AND FLOORS.



1 MAINTENANCE HVAC PLAN - FIRST FLOOR

1/8" = 1'-0"

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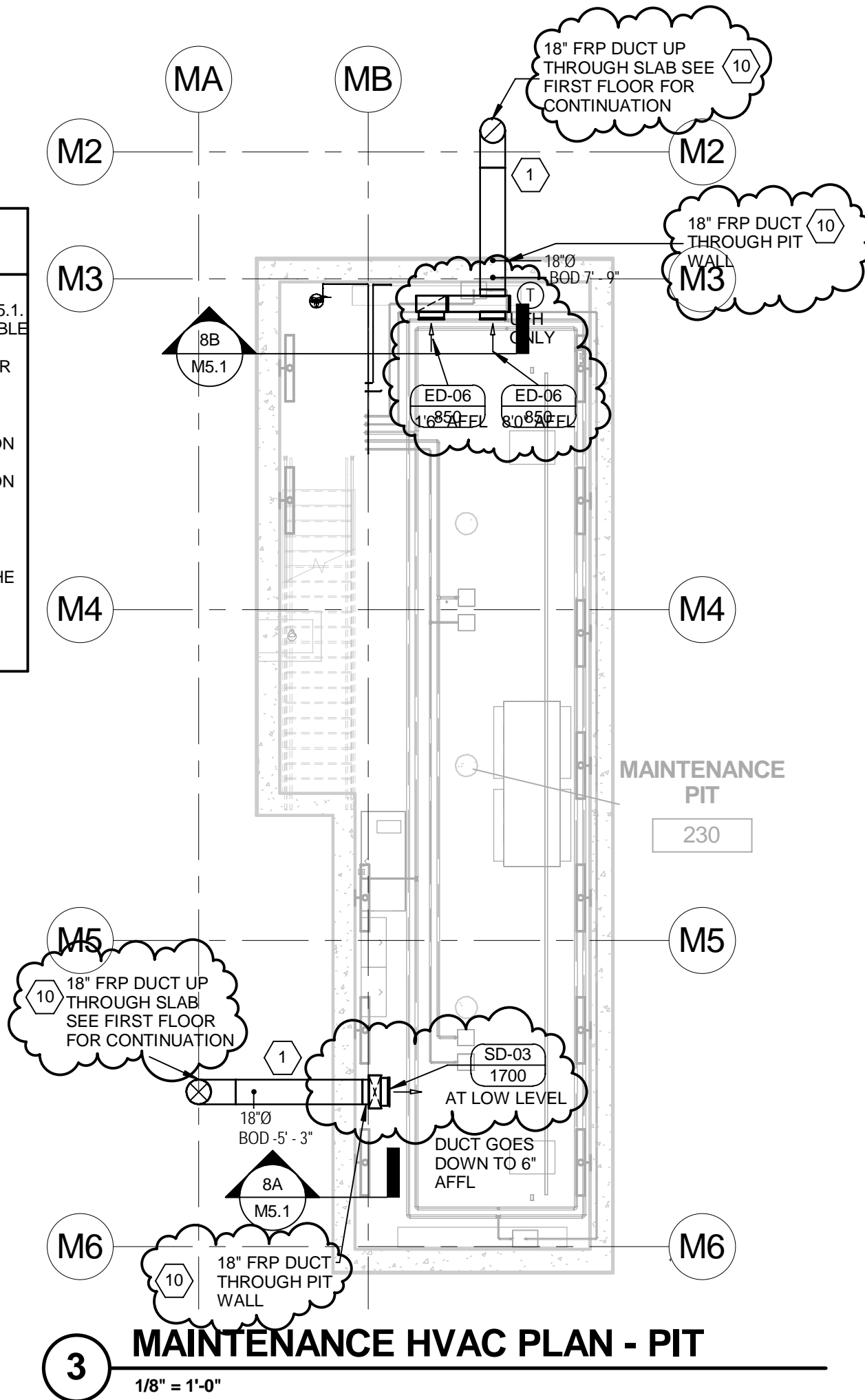
DESCRIPTION:
DUCT LAYOUT
CHANGES TO MATCH
CEILING IN RM201
DRAWING M2.3



Daniel Boyd Reiter
MA 5.0

KEYNOTES

1. FIBERGLASS REINFORCED PLASTIC (FRP) DUCT WORK BELOW GRADE. SEE DETAIL 5 ON SHEET M5.1. FRP DUCT SHALL START FROM A MINIMUM 6" ABOVE SLAB TO 6" INSIDE PIT WALL TO ALLOW SUITABLE SPACE FOR LINK SEAL ASSEMBLY INSTALLATION.
2. SEE ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION OF THE EXTERNAL WALL LOUVER SERVING THE OUTSIDE AIR INTAKE FOR ECU-2.
3. 40"x40" DUCT UP FROM ECU-2 THROUGH ROOF TO REF-2A & REF-2B ON ROOF. THE FANS SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
4. 18" DIA. TO 18"x18" DUCT UP THROUGH ROOF TO REF-2C ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
5. 18" DIA. TO 18"x18" DUCT UP THROUGH ROOF TO REF-2D ON ROOF. THE FAN SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER.
6. DUCT STATIC PRESSURE SENSOR FOR ECU-2 SUPPLY AIR FAN CONTROL.
7. DUCT STATIC PRESSURE SENSOR FOR REF-2A & REF-2B CONTROL.
8. PROVIDE MINIMUM OF 4 DUCT DIAMETERS STRAIGHT RUN INTO EACH VAV BOX.
9. AIR TERMINAL SHALL BE EQUIPPED WITH A VOLUME CONTROL DAMPER ADJUSTABLE THROUGH THE DIFFUSER FACE
10. SEE STRUCTURAL DRAWINGS FOR DETAILS OF DUCTS THROUGH WALLS AND FLOORS.



3 MAINTENANCE HVAC PLAN - PIT
1/8" = 1'-0"



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Author

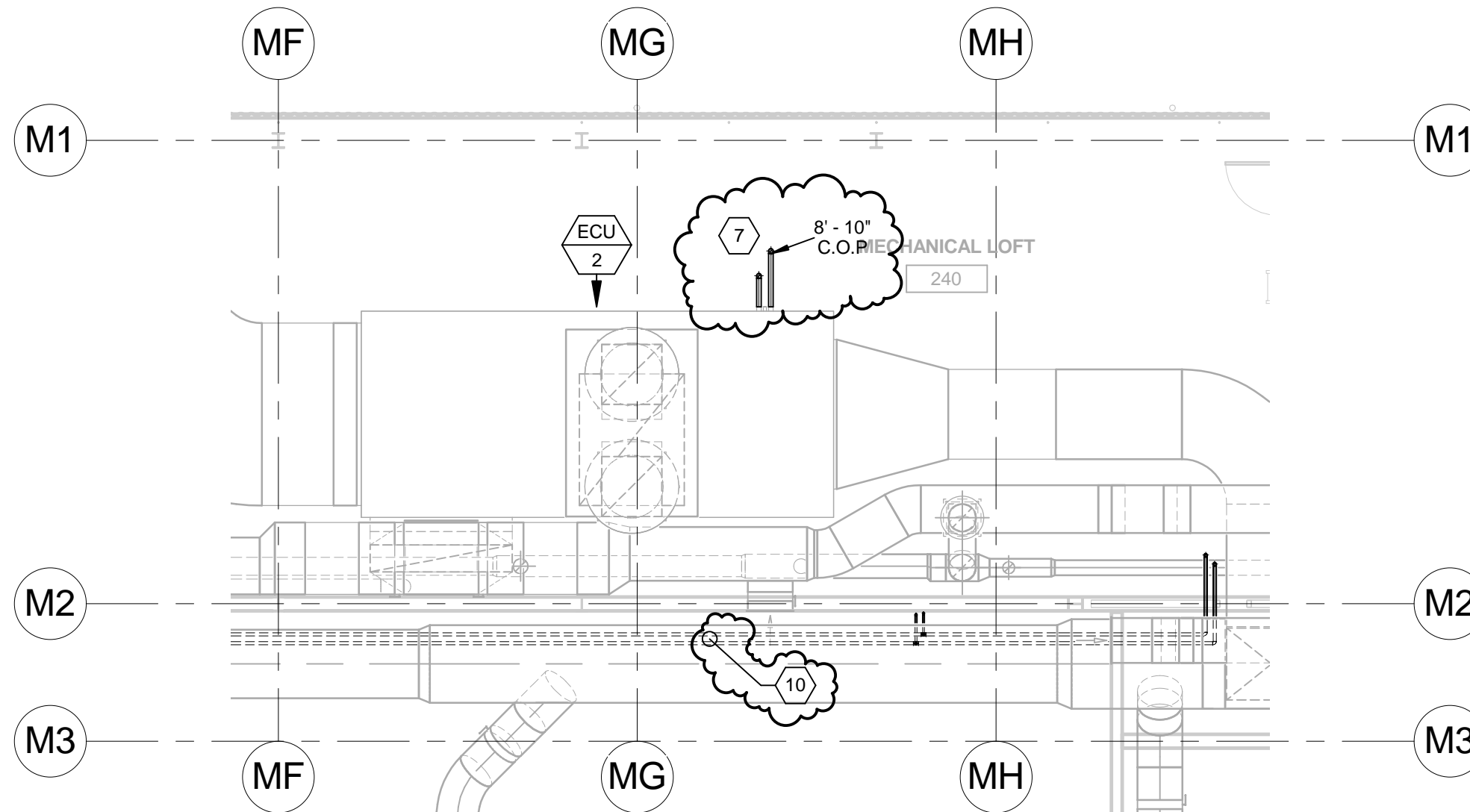
DESCRIPTION:
**MAINTENANCE PIT
DUCT WORK CHANGES
DRAWING M2.3**



Daniel Boyd Reiter
MA 7.0

KEYNOTES

1. 3/4" HHWS & R PIPES FROM ABOVE. RACK WITH Q5 PIPING. ROUTE OVERHEAD IN MAINTENANCE PIT AND DOWN TO MANIFOLD UFH-5
2. 3/4" HHWS & R PIPES DOWN TO MAINTENANCE PIT. ROUTE OVERHEAD, COORDINATE WITH Q5 PIPING AND RACK TOGETHER.
3. 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-4
4. 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-3
5. 1" HHWS & R PIPES DOWN TO MANIFOLD UFH-2
6. 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-1
7. 3" HHWS & R PIPES TO ECU-2 THROUGH FLOOR FROM FIRST FLOOR. COORDINATE WITH ALL OTHER SERVICES. RETURN LINE TO BOILER HIGH TEMPERATURE CONNECTION.
8. 3" HHWS & R PIPES UP TO LOFT THROUGH FLOOR. ROUTE AS HIGH AS POSSIBLE.
9. 2" HHWS & R PIPES TO UFH MANIFOLDS. RETURN PIPE TO BOILER LOW TEMPERATURE CONNECTION.
10. UFH HHWS & R LINES TO BE ROUTED AS HIGH AS POSSIBLE WITH RACKED EQUIPMENT PIPING. COORDINATE WITH EQUIPMENT DRAWINGS



MAINTENANCE HYDRONIC PLAN - MECHANICAL LOFT

1

1/8" = 1'-0"



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TLCD PROJECT NO:

11054.03

DATE:

07/15/14

BY:

Author

DESCRIPTION:

KEYNOTES AND
HYDRONIC MOVE
DRAWING M2.4



Daniel Boyd Reiter
MA 8.0

KEYNOTES

- 3/4" HHWS & R PIPES FROM ABOVE. RACK WITH Q5 PIPING. ROUTE OVERHEAD IN MAINTENANCE PIT AND DOWN TO MANIFOLD UFH-5
- 3/4" HHWS & R PIPES DOWN TO MAINTENANCE PIT. ROUTE OVERHEAD, COORDINATE WITH Q5 PIPING AND RACK TOGETHER.
- 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-4
- 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-3
- 1" HHWS & R PIPES DOWN TO MANIFOLD UFH-2
- 1 1/4" HHWS & R PIPES DOWN TO MANIFOLD UFH-1
- 3" HHWS & R PIPES TO ECU-2 THROUGH FLOOR FROM FIRST FLOOR. COORDINATE WITH ALL OTHER SERVICES. RETURN LINE TO BOILER HIGH TEMPERATURE CONNECTION.
- 3" HHWS & R PIPES UP TO LOFT THROUGH FLOOR. ROUTE AS HIGH AS POSSIBLE.
- 2" HHWS & R PIPES TO UFH MANIFOLDS. RETURN PIPE TO BOILER LOW TEMPERATURE CONNECTION.
- UFH HHWS & R LINES TO BE ROUTED AS HIGH AS POSSIBLE WITH RACKED EQUIPMENT PIPING. COORDINATE WITH EQUIPMENT DRAWINGS

TLCD
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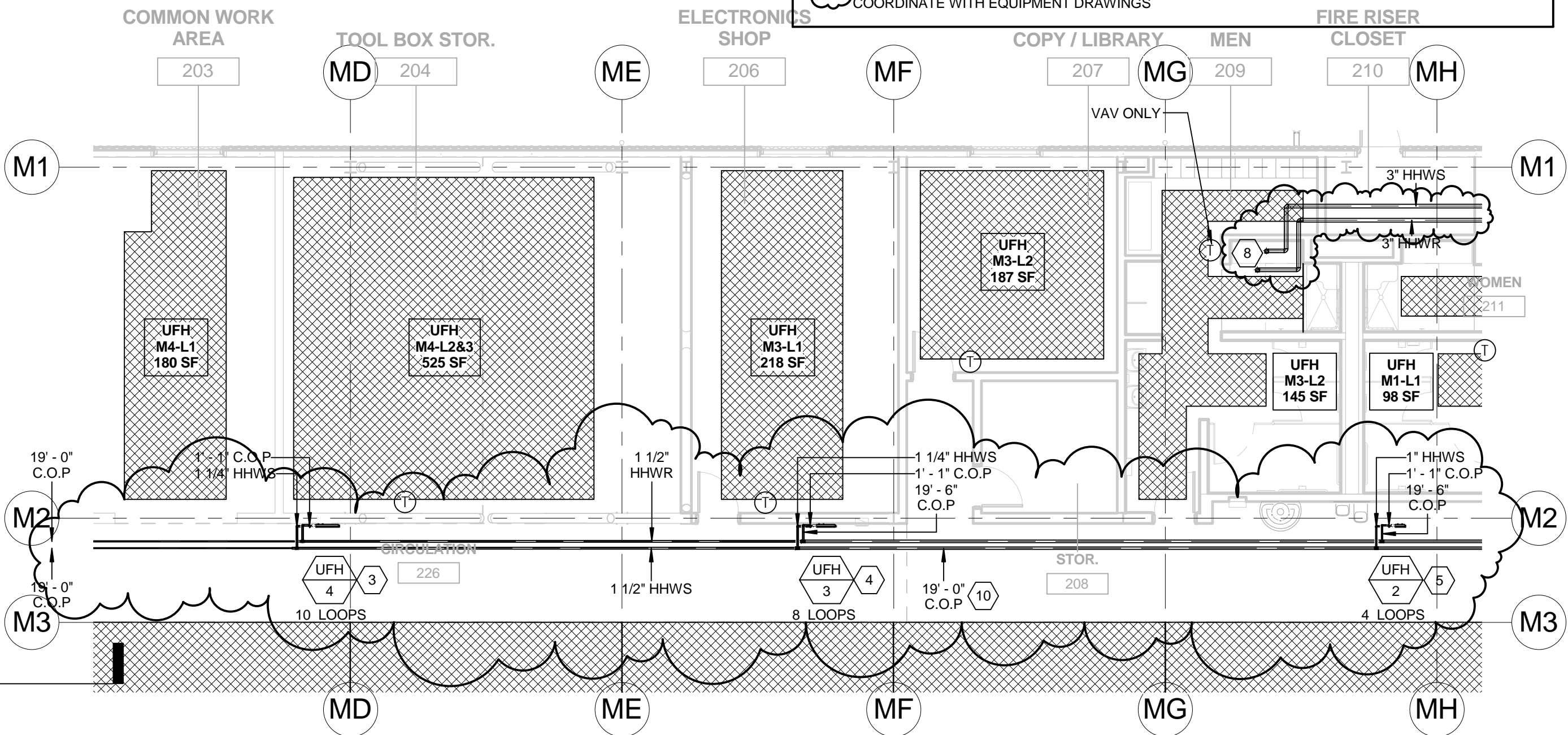
DATE:
07/15/14

BY:
Author

DESCRIPTION:
KEYNOTES AND
HYDRONIC PIPE MOVE
DRAWING M2.4



Daniel Boyd Reiter
MA 9.0



MAINTENANCE HYDRONIC PLAN - FIRST FLOOR

2

1/8" = 1'-0"

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DATE:
07/14/14

BY:
SCS

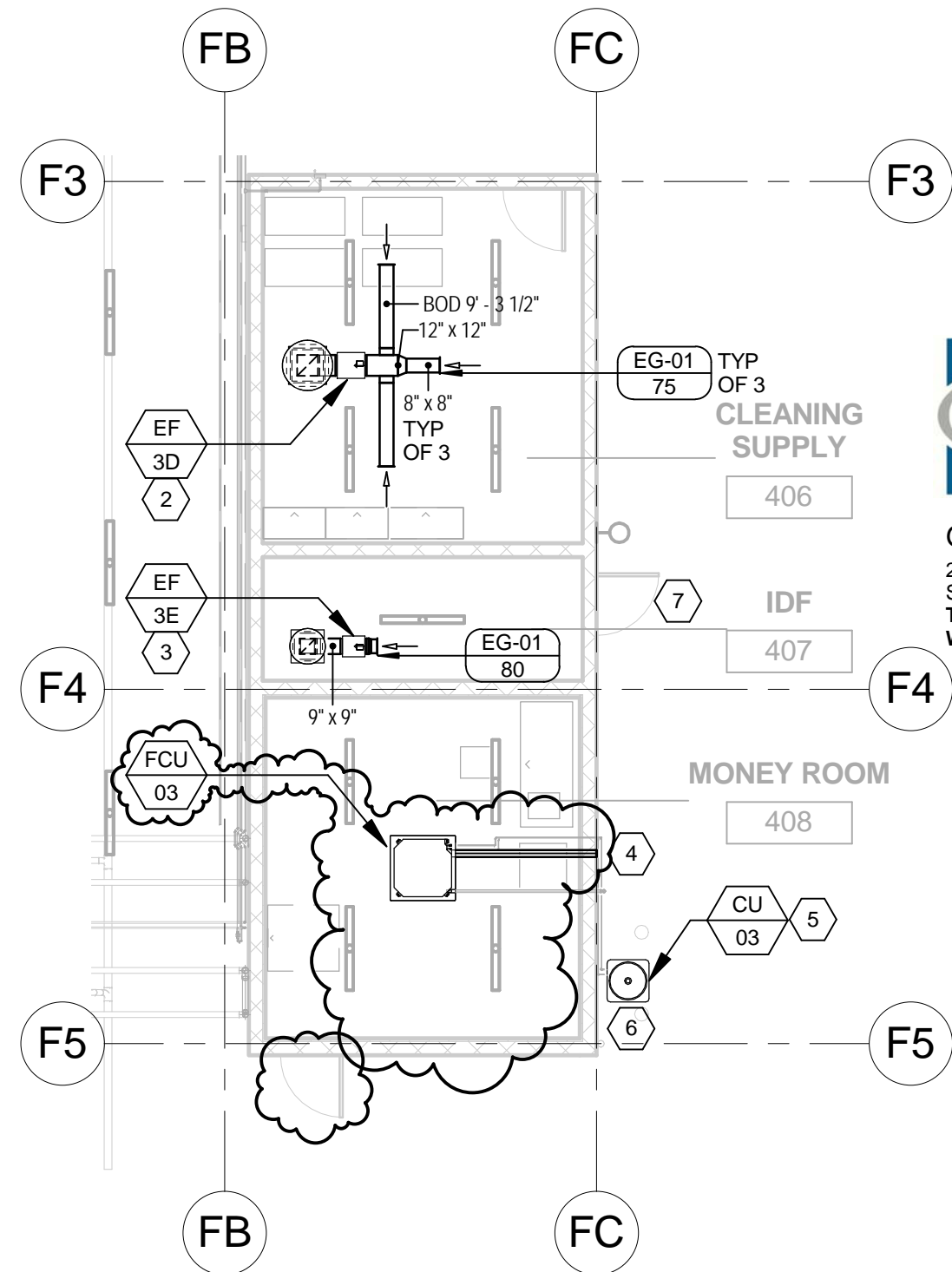
DESCRIPTION:
KEYNOTES, OMIT
DOOR LOUVER AND
RESELECT SPLIT AC
DRAWING M2.5



Daniel Boyd Reiter
MA 10.0

KEYNOTES

1. REF-4 SHALL BE MOUNTED ON ROOF CURB SUPPLIED BY FAN MANUFACTURER. THE ROOF OPENING SHALL BE DIRECTLY TO THE SERVED SPACE WITH NO DUCT WORK AND SHALL MATCH THE INTERIOR SIZE OF THE CURB. THE FANS SHALL BE INTERLOCKED WITH THE OPERATION OF THE BUSWASH. REFER TO SEQUENCE OF OPERATION BY MDG.
2. 12"x12" DUCT UP THROUGH ROOF TO ROOF CAP
3. 9"x9" DUCT UP THROUGH ROOF TO ROOF CAP
4. CORE 4" DIA. HOLE IN CONCRETE WALL FOR 4" DUCT AND PROVIDE OUTSIDE AIR WALL KIT FOR CEILING CASSETTE FAN COIL, INCLUDING WALL CAP AND SCREENED INLET. SEAL WALL PENETRATION.
5. CONDENSING UNIT TO BE MOUNTED 1" ABOVE A 4" CONCRETE PAD, SEE STRUCTURAL DWGS, WITH NEOPRENE VIBRATION ABSORPTION PADS.
6. REFRIGERANT PIPES SHALL BE INSULATED TO MANUFACTURERS REQUIREMENTS AND POWER SUPPLY TO THE FCU FROM THE CU SHALL BE CONDUITED. ALL CONNECTIONS BETWEEN THE CONDENSING UNIT TO THE WALL PENETRATION AT THE FCU SHALL BE ENCASED IN A COVER STEEL SECTION AND PAINTED TO MATCH THE BUILDING FACADE.
7. DOOR GRILLE, SEE ARCHITECTURAL DRAWINGS.
8. DOOR GRILLE, SEE ARCHITECTURAL DRAWINGS.
9. DOOR GRILLE, SEE ARCHITECTURAL DRAWINGS.



2 FUELING STATION HVAC PLAN
1/8" = 1'-0"

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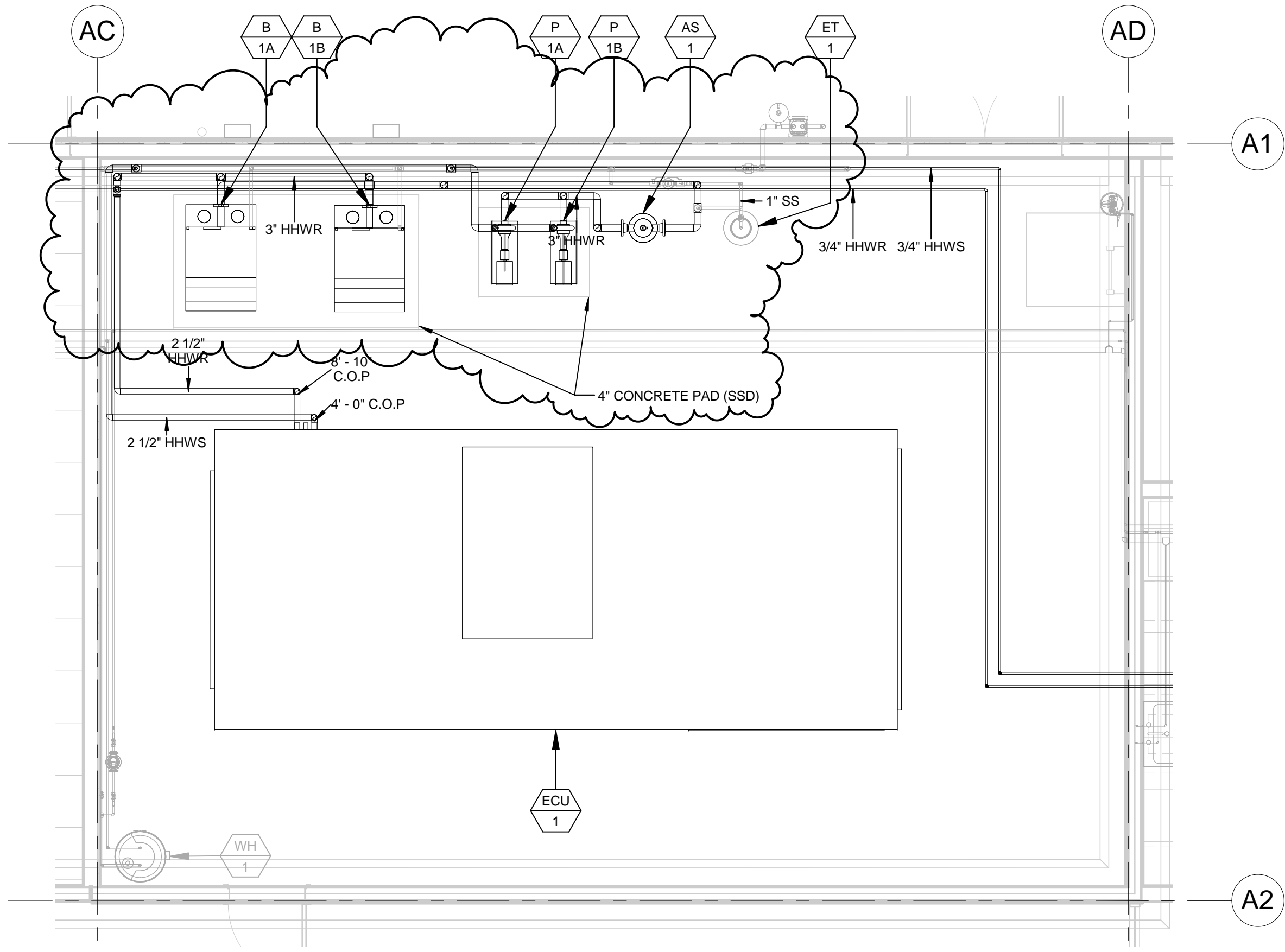
DATE:
07/15/14

BY:
Author

DESCRIPTION:
**PIPE SIZES AND
LAYOUT TO MATCH
M6.1
DRAWING M4.1**



Daniel Boyd Reiter
MA 11.0



**ENLARGED HYDRONIC PIPING PLAN - ADMIN /
OPS**

1
1/4" = 1'-0"

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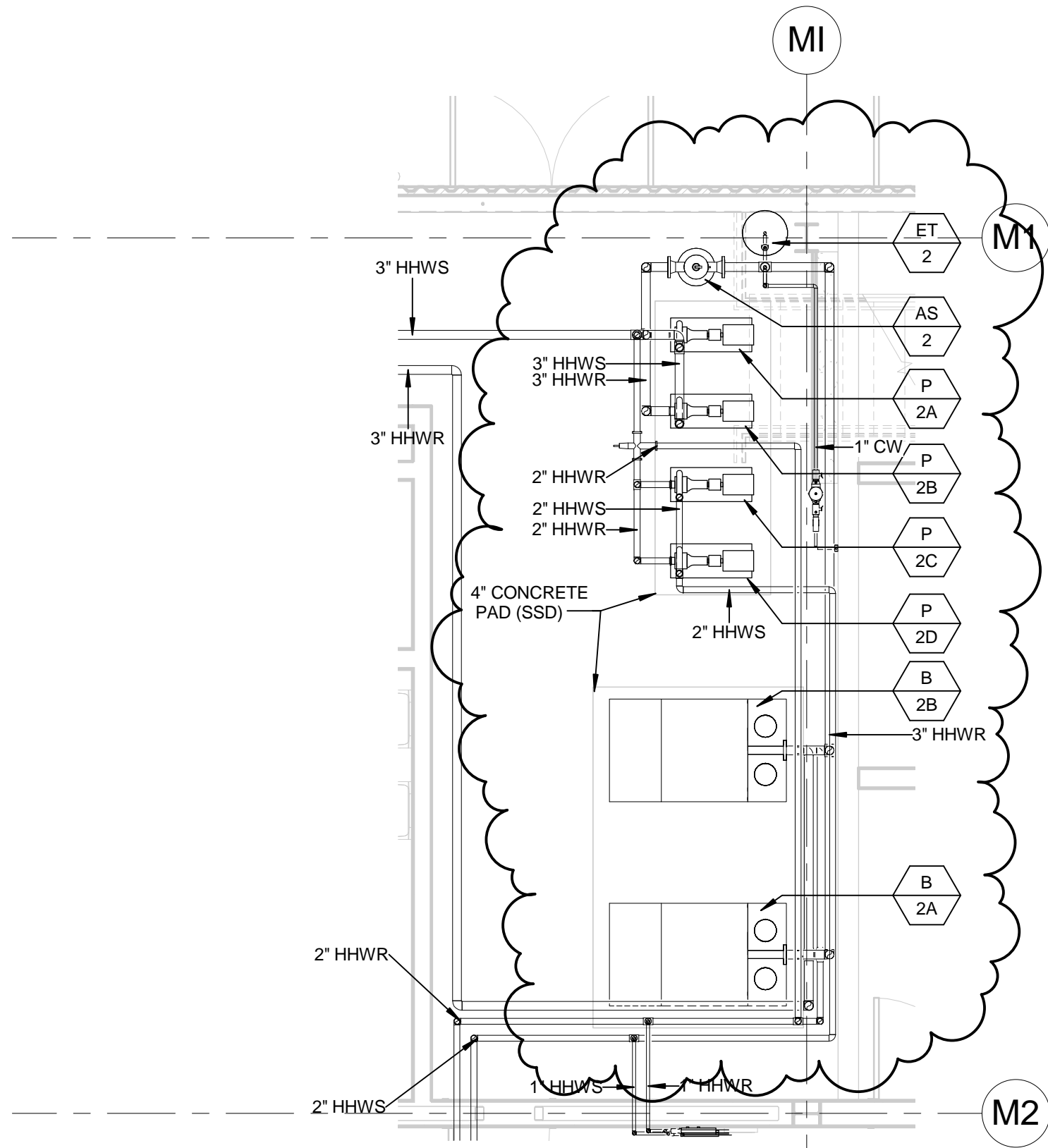
DATE:
07/15/14

BY:
Author

DESCRIPTION:
**PIPE SIZES AND
LAYOUT TO MATCH
M6.2
DRAWING M4.1**



Daniel Boyd Reiter
MA 12.0



**ENLARGED HYDRONIC PIPING PLAN -
MAINTENANCE**

2
1/4" = 1'-0"



111 SANTA ROSA AVENUE, #300
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TEL 707.525.5600
FAX 707.525.5616

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PROJECT NAME

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Operations Center**

PROJECT ADDRESS

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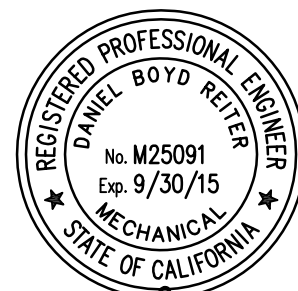
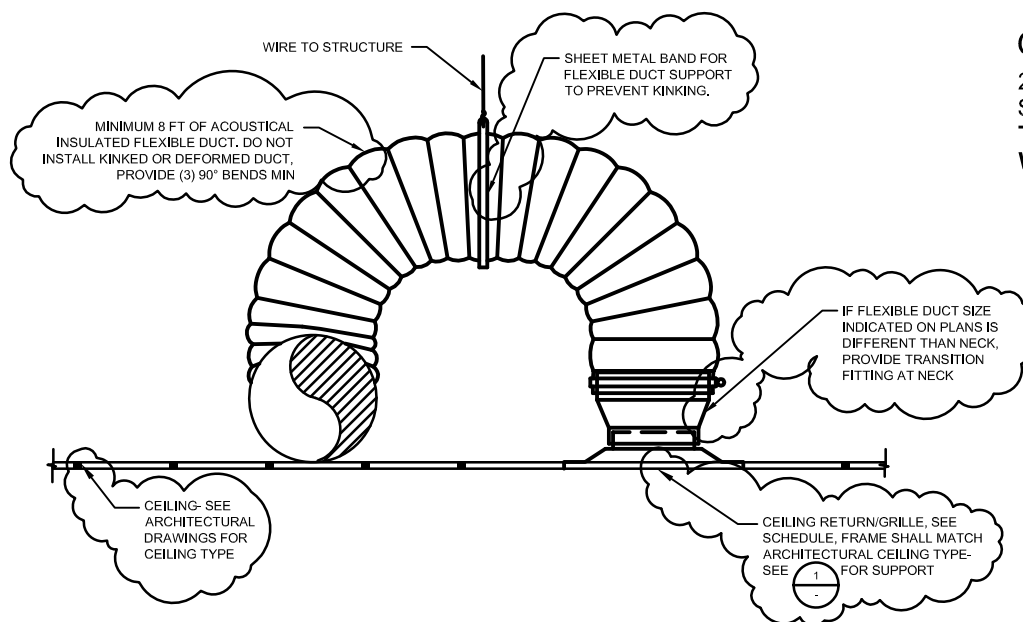
07/14/14

BY:

CSC

DESCRIPTION:

**GRILLE/TRANSFER
DUCT
DRAWING 5 / M5.2**



MA 13.0

PROJECT NAME

**Butte Regional Transit
Operations Center**

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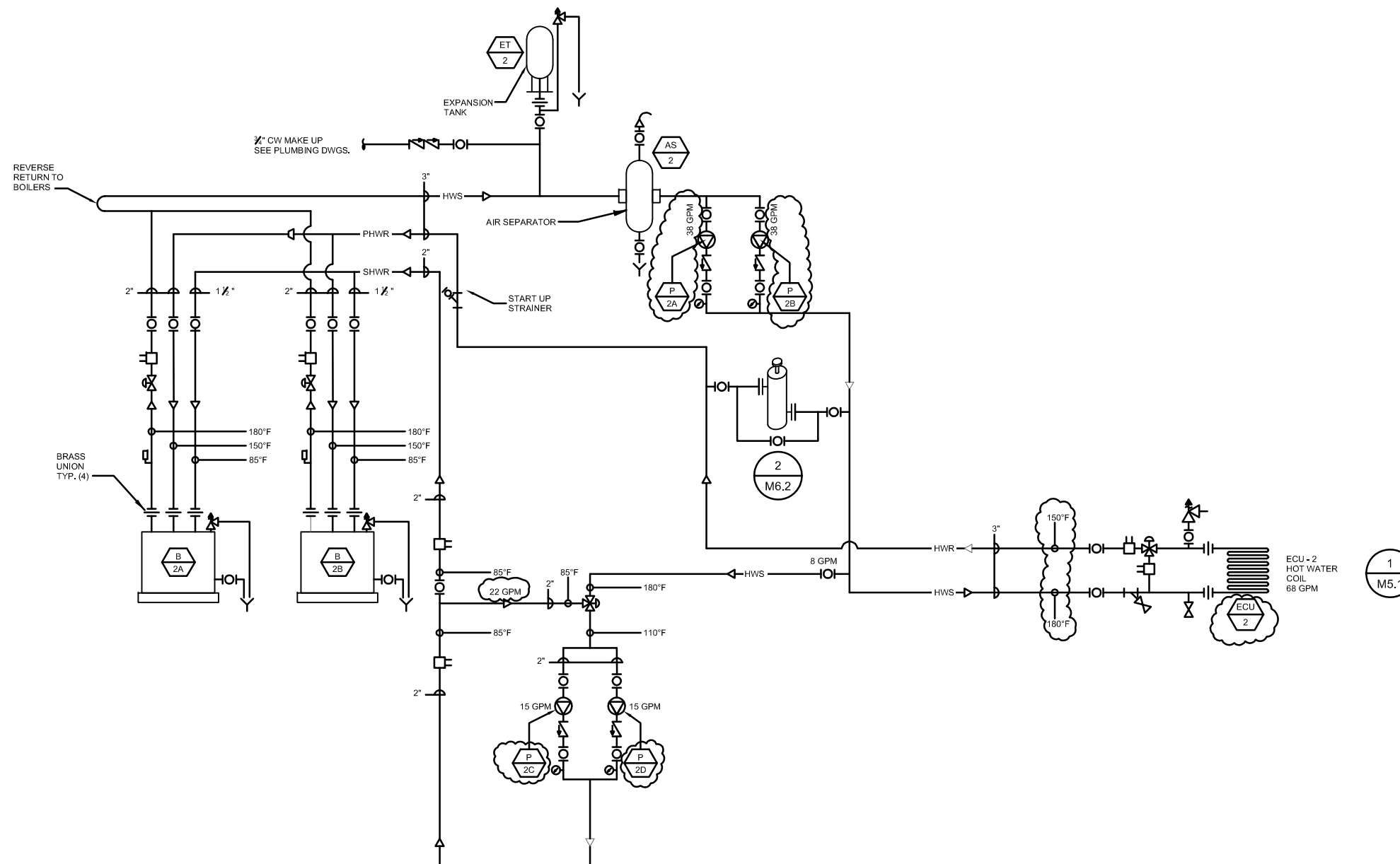
07/14/14

BY:

Author

DESCRIPTION:

**HYDRONIC EQUIPMENT
PIPING DIAGRAM
DRAWING 1 / M6.2**



1
M5.1



Daniel Boyd Reiter

MA 14.0



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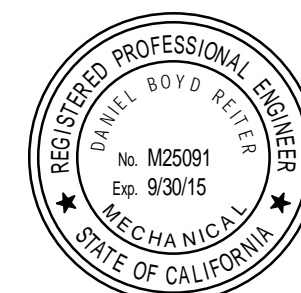
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TLCD PROJECT NO:
11054.03

DATE:
07/16/14

BY:
Author

DESCRIPTION:
UNDERFLOOR
HEATING SCHEDULE
DRAWING M6.3



Daniel Boyd Reiter
MA 15.0

HYDRONIC UNDERFLOOR HEATING MANIFOLDS

MARK	MANUFACTURER	MODEL	MANIFOLD FLOW	LOOP FLOWS	AREA SERVED	UNIT WEIGHT	MAX FLOW RATE	MAWT	MAWP	ACCESSORIES
UFH-01	Watts Radiant	Flowmeter M-6	6 GPM	1 GPM	WOMEN'S ROOM, OFFICES, BREAKROOM, PARTS STORE	17.90 lb	13 GPM	180 °F	80.00 psi	1,2,3,4,5,7
UFH-03	Watts Radiant	Flowmeter M-8	8 GPM	1 GPM	REPAIR BAY 3	21.70 lb	17 GPM	180 °F	80.00 psi	1,2,3,4,5,6
UFH-02	Watts Radiant	Flowmeter M-4	4 GPM	1 GPM	MEN'S ROOM, ELECTRONICS SHOP, REPAIR BAY 1&2	11.70 lb	9 GPM	180 °F	80.00 psi	1,2,3,4,5,7
UFH-04	Watts Radiant	Flowmeter M-10	10 GPM	1 GPM	FACILITY MAINT., LARGE REPAIR BAYS 1&2 TOOL AND EQUIPMENT STORE	34.30 lb	21 GPM	180 °F	80.00 psi	1,2,3,4,5,8
UFH-05	Watts Radiant	Flowmeter M-2	2 GPM	1 GPM	MAINTENANCE PIT	6.50 lb	5 GPM	180 °F	80.00 psi	1,2,3,4,5,6

1. VALVE ACTUATOR FOR EACH LOOP TO BE INSTALLED ON THE RETURN SIDE
2. THERMOSTAT MODEL 519 AIR/FLOOR DIGITAL W/FLOOR SENSOR, 24V
3. ZONE CONTROLLER, 4 ZONES, 24V
4. SUPPLY MANIFOLD WITH TRUNK ISOLATION KIT
5. USE 5/8" PERT TUBING AT 12" O.C. SPACING FOR FLOOR CIRCUITS, INDIVIDUAL CIRCUITS NOT TO EXCEED 375 LINEAR FT INCLUDING RUN OUT FROM MANIFOLD
6. PROVIDE AND INSTALL MANIFOLD IN FLUSH MOUNTED WALL CABINET OF 16" W x 19" H x 4 1/2" D
7. PROVIDE AND INSTALL MANIFOLD IN FLUSH MOUNTED WALL CABINET OF 24" W x 19" H x 4 1/2" D
8. PROVIDE AND INSTALL MANIFOLD IN FLUSH MOUNTED WALL CABINET OF 40" W x 19" H x 4 1/2" D

DUCT SILENCER / SOUND ATTENUATOR SCHEDULE

UNIT TYPE	MARK	MANUFACTURER	MODEL	WIDTH	DEPTH	LENGTH	ACTUAL SUPPLY AIR FLOW	VELOCITY	SILENCER PRESSURE LOSS	SYSTEM PRESSURE LOSS	63	125	250	500	1000	2000	4000	8000	WEIGHT	COMMENTS	KEYNOTE
ST	1A	VIBRO ACOUSTIC	RD-HV-FD-L15924	6' - 2"	3' - 0"	6' - 0"	18000 CFM	-1081 FPM	0.06 in-wg	0.16 in-wg	5	13	19	22	19	15	13	11	665	ECU-1 OA	1,2,3,4,5,6,7,8,9
ST	1B	VIBRO ACOUSTIC	RD-MHV-FB-L15924	8' - 4"	2' - 0"	8' - 0"	18000 CFM	1200 FPM	0.16 in-wg	0.24 in-wg	7	15	27	30	33	22	17	14	550	ECU-1 SA	1,2,3,4,5,6,7,8,10
ST	1C	VIBRO ACOUSTIC	RD-HV-FX-L15924	5' - 0"	3' - 4"	8' - 0"	16280 CFM	-1097 FPM	0.09 in-wg	0.15 in-wg	7	16	25	29	27	21	17	14	550	ECU-1 RA	1,2,3,4,5,7,8
ST	2A	VIBRO ACOUSTIC	RD-ULV-FE-L15924	10' - 2"	5' - 6"	4' - 0"	23000 CFM	-411 FPM	0.07 in-wg	0.16 in-wg	11	19	25	23	30	21	16	13	860	ECU-2 OA	1,2,3,4,5,7,8
ST	2B	VIBRO ACOUSTIC	RD-UHV-FX-L15924	5' - 0"	4' - 0"	6' - 0"	23000 CFM	1150 FPM	0.04 in-wg	0.11 in-wg	2	7	13	20	193	15	13	12	420	ECU-2 SA	1,2,3,4,5,7,8
ST	2C	VIBRO ACOUSTIC	RD-MLV-FJ-L15924	4' - 0"	4' - 0"	3' - 0"	12075 CFM	-812 FPM	0.11 in-wg	0.18 in-wg	6	12	16	13	14	10	10	9	170	ECU-2 RA	1,2,3,4,5,7,8
ST	2D	VIBRO ACOUSTIC	RD-MLV-FJ-L15924	4' - 0"	4' - 0"	3' - 0"	7600 CFM	-506 FPM	0.11 in-wg	0.18 in-wg	6	12	16	13	14	10	10	9	170	ECU-2-RA	1,2,3,4,5,7,8

SELF CONTAINED AC UNIT SCHEDULE

UNIT TYPE	MARK	MANUFACTURER	MODEL	AIR FLOW RATE	STATIC PRESSURE	SENSIBLE COOLING CAPACITY	TOTAL COOLING CAPACITY	VOLTAGE	PHASE	RATED LOAD CURRENT	MAXIMUM OVERCURRENT PROTECTION	EER	WEIGHT	KEYNOTE	COMMENTS
SAC	01	DATA AIRE	DAMA0112P	550 CFM	0.50 in-wg	12300.0 Btu/h	18400.0 Btu/h	277 V	1	21 A	30 A	9.9	425	1	MDF Server Room

SPLIT SYSTEM DX INDOOR UNIT SCHEDULE

UNIT TYPE	MARK	MANUFACTURER	MODEL	AIR FLOW RATE	OA	MAXIMUM OPERATING TEMPERATURE	SENSIBLE COOLING CAPACITY	TOTAL COOLING CAPACITY	TOTAL HEATING CAPACITY	VOLTAGE	PHASE	MCA	MFA	EER	SEER	HSPF	WEIGHT	KEYNOTE	COMMENTS
FCU	03	Daikin	FCQ18PAVJU	560 CFM	40	115 °F	14100.0 Btu/h	18000.0 Btu/h	20000.0 Btu/h	208 V	1	0.4 A	15 A	13	17.2	10.1	43	1,2,3	CONNECTED TO CU-03

1. CONDENSATE PUMP 208/230V WITH A 1" OD DISCHARGE.
2. LIQUID LINE SOLENOID VALVE.
3. REMOTE THERMOSTAT AND OUTSIDE AIR KIT WITH WALL KIT.

SPLIT SYSTEM DX OUTDOOR UNIT SCHEDULE

UNIT TYPE	MARK	MANUFACTURER	MODEL	AIR FLOW RATE	MAXIMUM OPERATING TEMP	VOLTAGE	PHASE	RLC	MCA	MOCP	WEIGHT	KEYNOTE	COMMENTS
CU	03	DAIKIN	RQZ18PVJU9	1835 CFM	115 °F	208 V	1	7.1 A	16.5 A	20 A	150	1,2,3,4,5	Serves FC-03 (Money Room)

PUMP SCHEDULE

UNIT TYPE	MARK	MANUFACTURER	MODEL	MAX FLOW	HEAD (FT)	MOTOR HP	VOLTAGE	PHASE	FREQ	MOTOR RPM	KEYNOTE	COMMENTS
P	1A	Bell & Gossett	1510-1 1/2 AC	46 GPM	40	1.5	460 V	3	60 Hz	1760	1,2	Heating Hot Water Circulation
P	1B	Bell & Gossett	1510-1 1/2 AC	46 GPM	40	1.5	460 V	3	60 Hz	1760	1,2	Heating Hot Water Circulation
P	2A	Bell & Gossett	1510-1 1/2 AC	38 GPM	45	1.5	460 V	3	60 Hz	1760	1,2	Heating Hot Water Circulation
P	2B	Bell & Gossett	1510-1 1/2 AC	38 GPM	45	1.5	460 V	3	60 Hz	1760	1,2	Heating Hot Water Circulation
P	2C	Bell & Gossett	1510-1 1/4 AC	30 GPM	29	1	460 V	3	60 Hz	3450	1,2,3	Slab Heating Hot Water Circulation
P	2D	Bell & Gossett	1510-1 1/4 AC	30 GPM	29	1	460 V	3	60 Hz	3450	1,2,3	Slab Heating Hot Water Circulation

TLCD
ARCHITECTURE

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TLCD PROJECT NO:
11054.03

DATE:
07/16/14

BY:
Author

DESCRIPTION:
EQUIPMENT MODEL
NUMBERS AND SPLIT
SYSTEM RESELECTION
DRAWING M6.3



Daniel Boyd Reiter
MA 16.0

AIR TERMINAL SCHEDULE

MARK	MANUFACTURER	MODEL	FACE SIZE	NECK SIZE	DESCRIPTION	MATERIAL	THROW	NOISE CRITERIA	PRESSURE DROP	Accessories
Supply Air										
SD-01	Titus	300RL	6 x 4	6"x4"	Adjustable Supply Grille with Double Deflection	Steel - Coated	12'	15	0.10 in-wg	w/VCD ADJUSTABLE THROUGH FACE
SD-02	Titus	300RL	18 x 12	18"x12"	Adjustable Supply Grille with Double Deflection	Steel - Coated	18'	20	0.10 in-wg	w/VCD ADJUSTABLE THROUGH FACE
SD-03	Titus	300RL	20 x 20	20"x20"	Adjustable Supply Grille with Double Deflection	Steel - Coated	32'	26	0.10 in-wg	w/VCD ADJUSTABLE THROUGH FACE
SDD-01	Price	DF1C	24 x 36	8"ø	Rectangular 1-Way Corner Displacement Diffusers	Steel - Coated	N/A	15	0.04 in-wg	VCD FITTED BEHIND DUCT COVER 6FT AFFL
SDD-02	Price	DF1C	24 x 48	8"ø	Rectangular 1-Way Corner Displacement Diffusers	Steel - Coated	N/A	15	0.06 in-wg	VCD FITTED BEHIND DUCT COVER 6FT AFFL
SDD-03	Price	DF1C	30 x 36	10"ø	Rectangular 1-Way Corner Displacement Diffusers	Steel - Coated	N/A	15	0.03 in-wg	VCD FITTED BEHIND DUCT COVER 6FT AFFL
SDD-04	Price	DF1C	30 x 48	10"ø	Rectangular 1-Way Corner Displacement Diffusers	Steel - Coated	N/A	15	0.05 in-wg	VCD FITTED BEHIND DUCT COVER 6FT AFFL
SDD-05	Price	DF1C	30 x 60	10"ø	Rectangular 1-Way Corner Displacement Diffusers	Steel - Coated	N/A	15	0.06 in-wg	VCD FITTED BEHIND DUCT COVER 6FT AFFL
SDD-06	Price	DF1W	15 x 24	12"x3"	Rectangular 1- Way In - Wall Displacement Duffusers	Steel - Coated	N/A	15	0.01 in-wg	FLUSH MOUNT WITH WALL 6" AFFL
SDD-07	Price	DF1W	15 x 30	12"x3"	Rectangular 1- Way In - Wall Displacement Duffusers	Steel - Coated	N/A	15	0.02 in-wg	FLUSH MOUNT WITH WALL 6" AFFL
SDD-08	Price	DF1W	15 x 36	12"x3"	Rectangular 1- Way In - Wall Displacement Duffusers	Steel - Coated	N/A	15	0.02 in-wg	FLUSH MOUNT WITH WALL 6" AFFL
SDD-09	Price	DF1W	15 x 48	12"x3"	Rectangular 1- Way In - Wall Displacement Duffusers	Steel - Coated	N/A	15	0.04 in-wg	FLUSH MOUNT WITH WALL 6" AFFL
SDD-10	Price	DF1W	23 x 48	18"x3"	Rectangular 1- Way In - Wall Displacement Duffusers	Steel - Coated	N/A	22	0.07 in-wg	FLUSH MOUNT WITH WALL 6" AFFL
Return Air										
RD-01	Price	PDDR	12 x 12	6"ø	Perforated Diffusers Ducted Return	Steel - Coated	N/A	15	0.01 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RD-02	Price	PDDR	16 x 16	8"ø	Perforated Diffusers Ducted Return	Steel - Coated	N/A	15	0.05 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RD-03	Price	PDDR	24 x 24	8"ø	Perforated Diffusers Ducted Return	Steel - Coated	N/A	15	0.09 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RD-04	Price	PDDR	24 x 24	10"ø	Perforated Diffusers Ducted Return	Steel - Coated	N/A	15	0.09 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RD-05	Price	PDDR	24 x 24	12"ø	Perforated Diffusers Ducted Return	Steel - Coated	N/A	15	0.15 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RG-01	Titus	350RL	44 x 6	44"x6"	Return Grille with 35 Degree Deflection	Steel - Coated	N/A	14	0.08 in-wg	w/VCD ADJUSTABLE THROUGH FACE
RG-02	Titus	350RL	30 x 24	30"x24"	Return Grille with 35 Degree Deflection	Steel - Coated	N/A	31	0.10 in-wg	w/VCD ADJUSTABLE THROUGH FACE
TG-01	Titus	350RL	44 x 6	44"x6"	Return Grille with 35 Degree Deflection	Steel - Coated	N/A	14	0.08 in-wg	w/VCD ADJUSTABLE THROUGH FACE
TG-02	Titus	300RL	18 x 6	18"x6"	Return Grille with 35 Degree Deflection	Steel - Coated	N/A	10	0.02 in-wg	
TG-03	Titus	350RL	24 x 18	24"x18"	Return Grille with 35 Degree Deflection	Steel - Coated	N/A	14	0.02 in-wg	w/VCD ADJUSTABLE THROUGH FACE
Exhaust Air										
EAL-2A	Ruskin		12 x 12	12"x12"	Weather Resistant Louver	Steel - Coated	N/A		0.18 in-wg	
EAL-2B	Ruskin		8 x 8	8"x8"	Weather Resistant Louver	Steel - Coated	N/A		0.18 in-wg	
EAL-2C	Ruskin		12 x 12	12"x12"	Weather Resistant Louver	Steel - Coated	N/A		0.18 in-wg	
ED-01	Price	PDDR	12 x 12	6"ø	Perforated Diffusers Ducted Exhaust	Steel - Coated	N/A	15	0.01 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-01A	Price	APDDR	12 x 12	6"ø	Perforated Diffusers Ducted Exhaust	Aluminum	N/A	15	0.01 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-02	Price	PDDR	16 x 16	8"ø	Perforated Diffusers Ducted Exhaust	Steel - Coated	N/A	15	0.09 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-02A	Price	APDDR	16 x 16	8"ø	Perforated Diffusers Ducted Exhaust	Aluminum	N/A	15	0.05 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-03	Price	PDDR	24 x 24	6"ø	Perforated Diffusers Ducted Exhaust	Steel - Coated	N/A	15	0.09 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-04	Price	PDDR	24 x 24	8"ø	Perforated Diffusers Ducted Exhaust	Steel - Coated	N/A	15	0.09 in-wg	w/VCD ADJUSTABLE THROUGH FACE
ED-05	Price	PDDR	24 x 24	12"ø	Perforated Diffusers Ducted Exhaust	Steel - Coated	N/A	15	0.15 in-wg	w/VCD ADJUSTABLE THROUGH FACE
EG-01	Titus	350RL	12 x 12	12"x12"	Exhaust Grille with 35 Degree Deflection	Steel - Coated	N/A	10	0.08 in-wg	w/VCD ADJUSTABLE THROUGH FACE
EG-02	Titus	350RL	12 x 12	12"x12"	Exhaust Grille with 35 Degree Deflection	Steel - Coated	N/A	10	0.08 in-wg	w/VCD ADJUSTABLE THROUGH FACE
EG-03	Titus	350RL	18 x 12	18"x12"	Exhaust Grille with 35 Degree Deflection	Steel - Coated	N/A	27	0.10 in-wg	w/VCD ADJUSTABLE THROUGH FACE



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TLCD PROJECT NO:
11054.03

DATE:
07/16/14

BY:
Author

DESCRIPTION:
**AIR TERMINALS WITH
VCD NOTES
DRAWING M6.3**



John Blat
MA 17.0

PROJECT NAME

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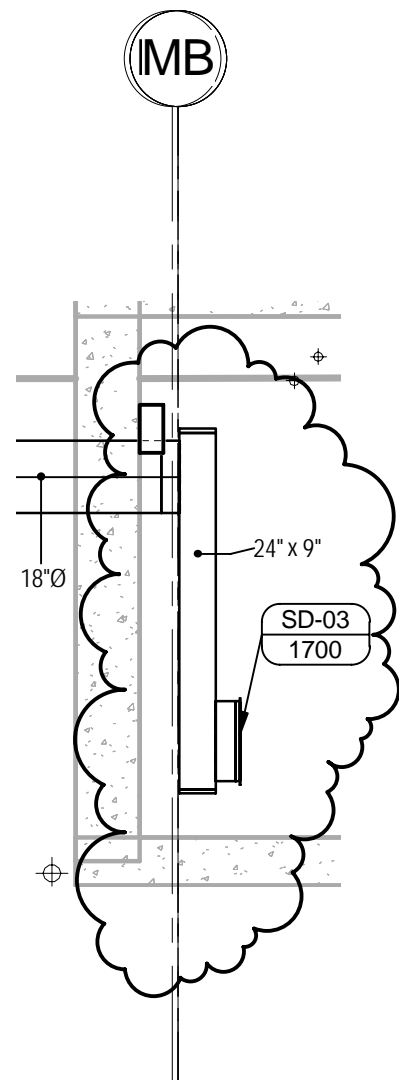
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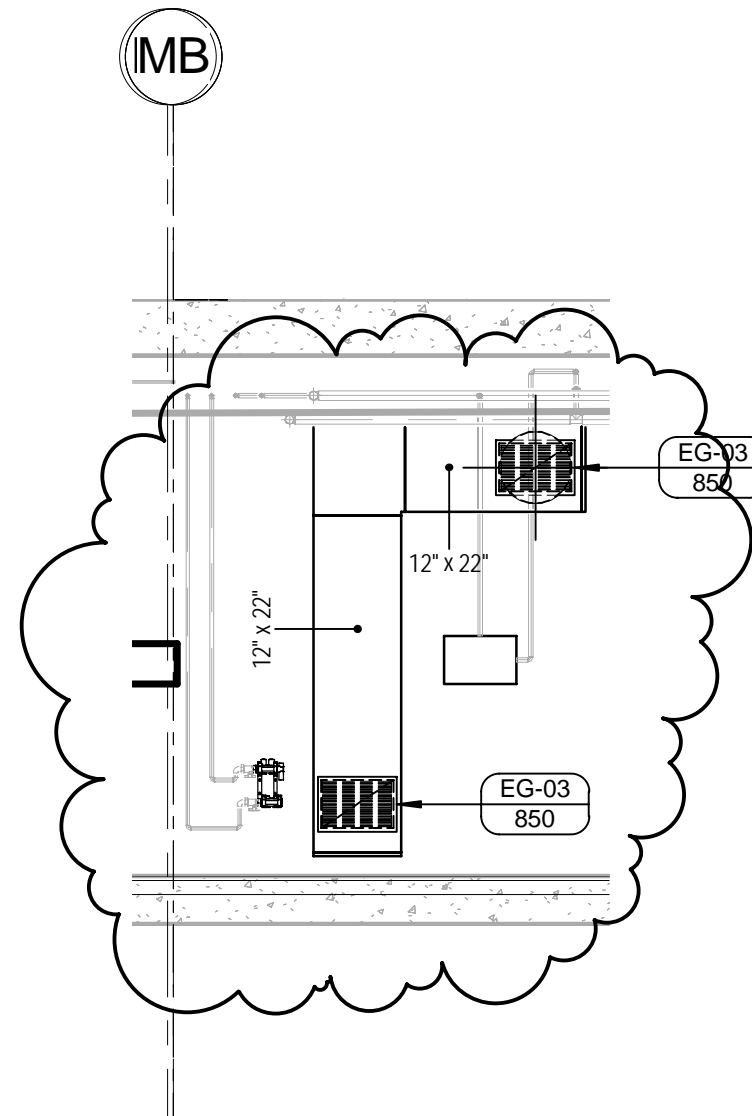
**DETAILS 8A & 8B
REVISED TO MATCH
FLOORPLAN M2.3**



Daniel Boyd Reiter
MA 18.0



1 **DETAIL 8A SHEET M5.2**
1/4" = 1'-0"



2 **DETAIL 8B SHEET M5.2**
1/4" = 1'-0"



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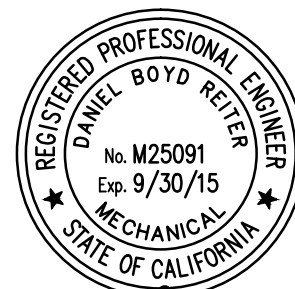
07/14/14

BY:

CSC

DESCRIPTION:

**WATER
 CALCULATION -
 DRAWING P0.1**



PA1.0

WATER SIZING - ADMIN/OPS BUILDING					
FIXTURE TYPE	QUANTITY	WASTE		COLD WATER	
		DFU	TOTAL	WSFU	TOTAL
WC	7	4	28	5	35
UR	2	2	4	4	8
LV	7	1	7	1	7
SHR	1	2	2	2	2
SK	2	2	4	1.5	3
MS	1	3	3	3	3
DF	2	0.5	1	1	2
WS	1	2	2	2	2
TOTAL FIXTURE UNITS =			51		62
SYSTEM SUMMARY					
FIXTURE UNITS:			62		
GPM			55		
SERVICE					
INCOMING PRESSURE				74	PSI
BACKFLOW PREVENTER				10	PSI
METER				8	PSI
AVAILABLE PRESSURE				56	PSI
HEIGHT		12 FT		5.196	PSI
MIN. RESIDUAL PRESSURE		25 PSI		25	PSI
TOTAL LENGTH OF PIPING		216 FT		324	FT
PRESS. AVAIL FOR FRICTION LOSS				7.9642	PSI/100 FT
WATER SIZING - MAINTENANCE BUILDING					
FIXTURE TYPE	QUANTITY	WASTE		COLD WATER	
		DFU	TOTAL	WSFU	TOTAL
WC	6	4	24	5	30
UR	2	2	4	4	8
LV	4	1	4	1	4
SHR	2	2	4	2	4
SK	1	2	2	1.5	1.5
MS	1	3	3	3	3
DF	1	0.5	0.5	1	1
TOTAL FIXTURE UNITS =			41.5		51.5
SYSTEM SUMMARY					
FIXTURE UNITS:			51.5		
GPM			51		
SERVICE					
INCOMING PRESSURE				74	PSI
BACKFLOW PREVENTER				10	PSI
METER				8	PSI
AVAILABLE PRESSURE				56	PSI
HEIGHT		12 FT		5.196	PSI
MIN. RESIDUAL PRESSURE		25 PSI		25	PSI
TOTAL LENGTH OF PIPING		260 FT		390	FT
PRESS. AVAIL FOR FRICTION LOSS				6.61641	PSI/100 FT

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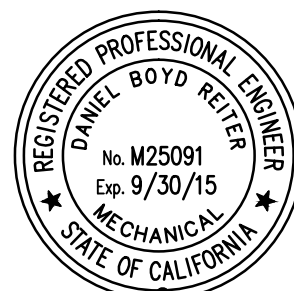
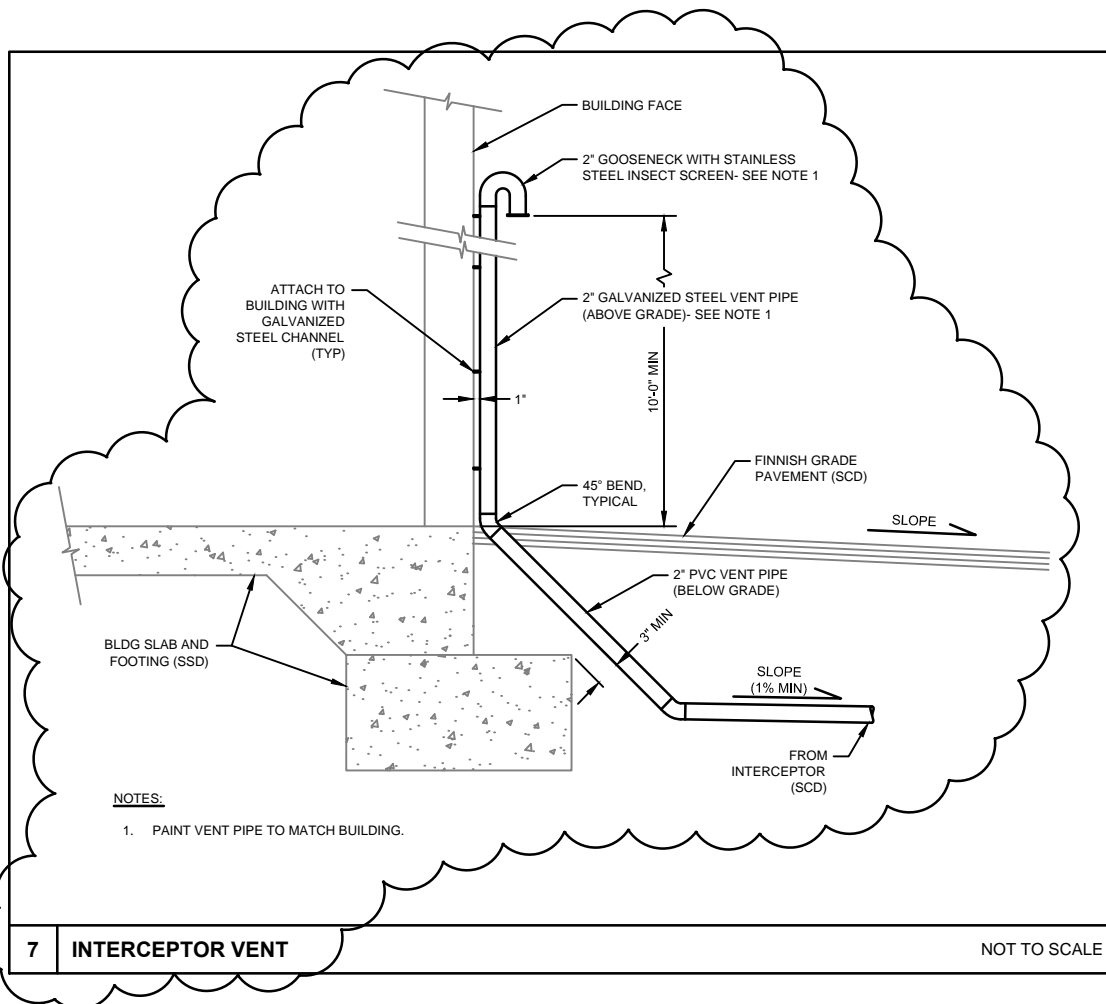
07/14/14

BY:

CSC

DESCRIPTION:

**INTERCEPTOR
VENT DETAIL -
DRAWING P5.3**



Daniel Boyd Reiter

PA2.0

KEYNOTES

1. BASIS OF DESIGN IS FRANKLIN FUELING. SUBSTITUTIONS PERMITTED.
2. BASIS OF DESIGN IS EMCO WHEATON. SUBSTITUTIONS PERMITTED.



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11054.03

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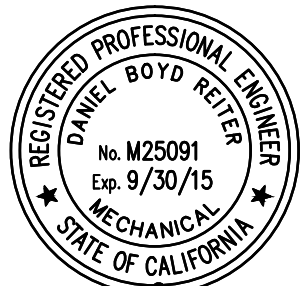
07/14/14

BY:

CSC

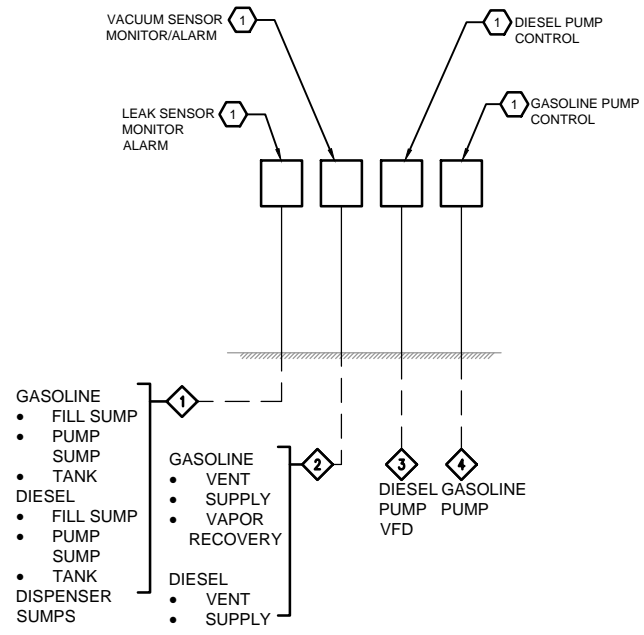
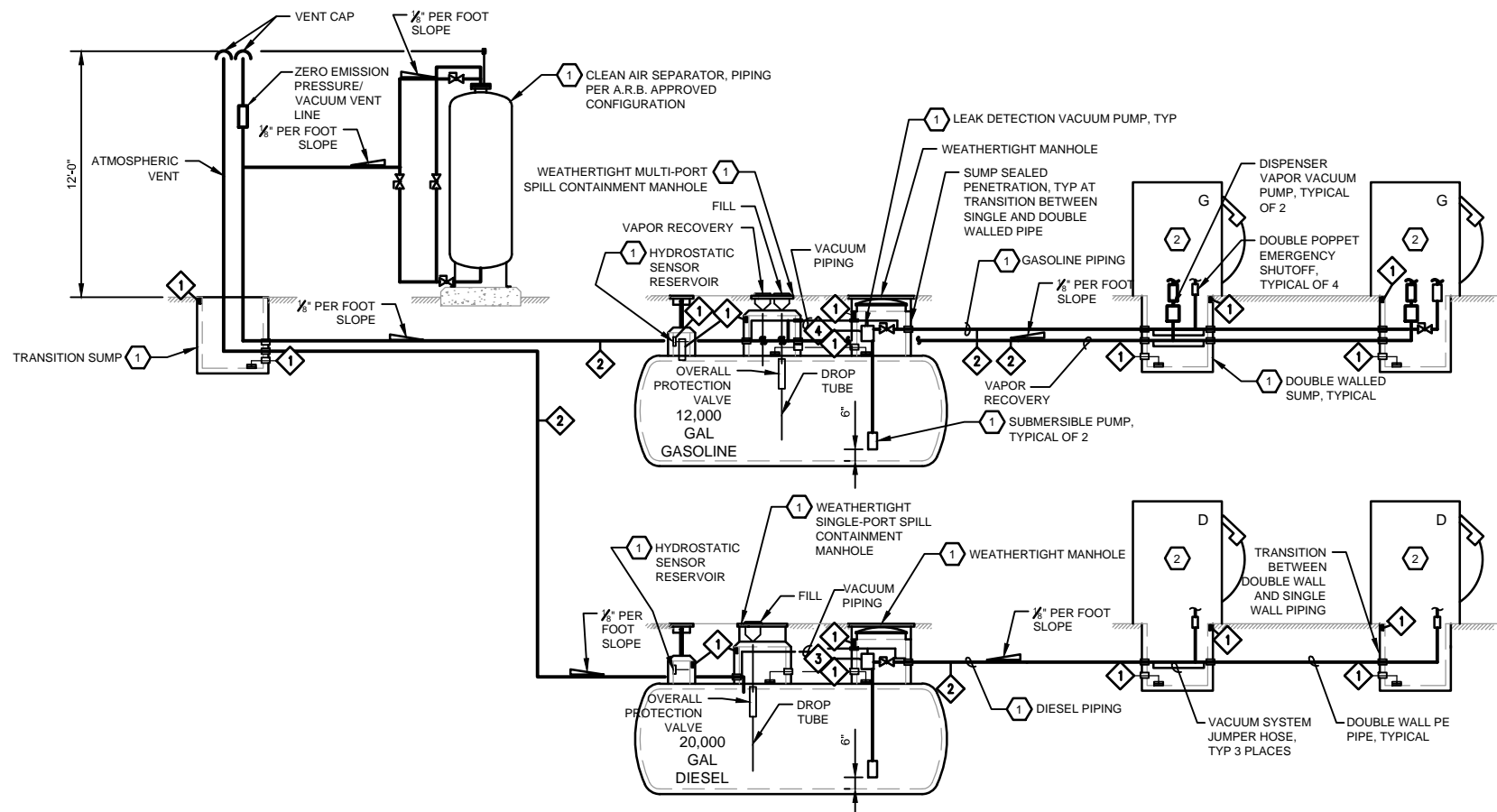
DESCRIPTION:

**FUELING MFR
 NOTES - DRAWING
 P5.4**



Daniel Boyd Reiter

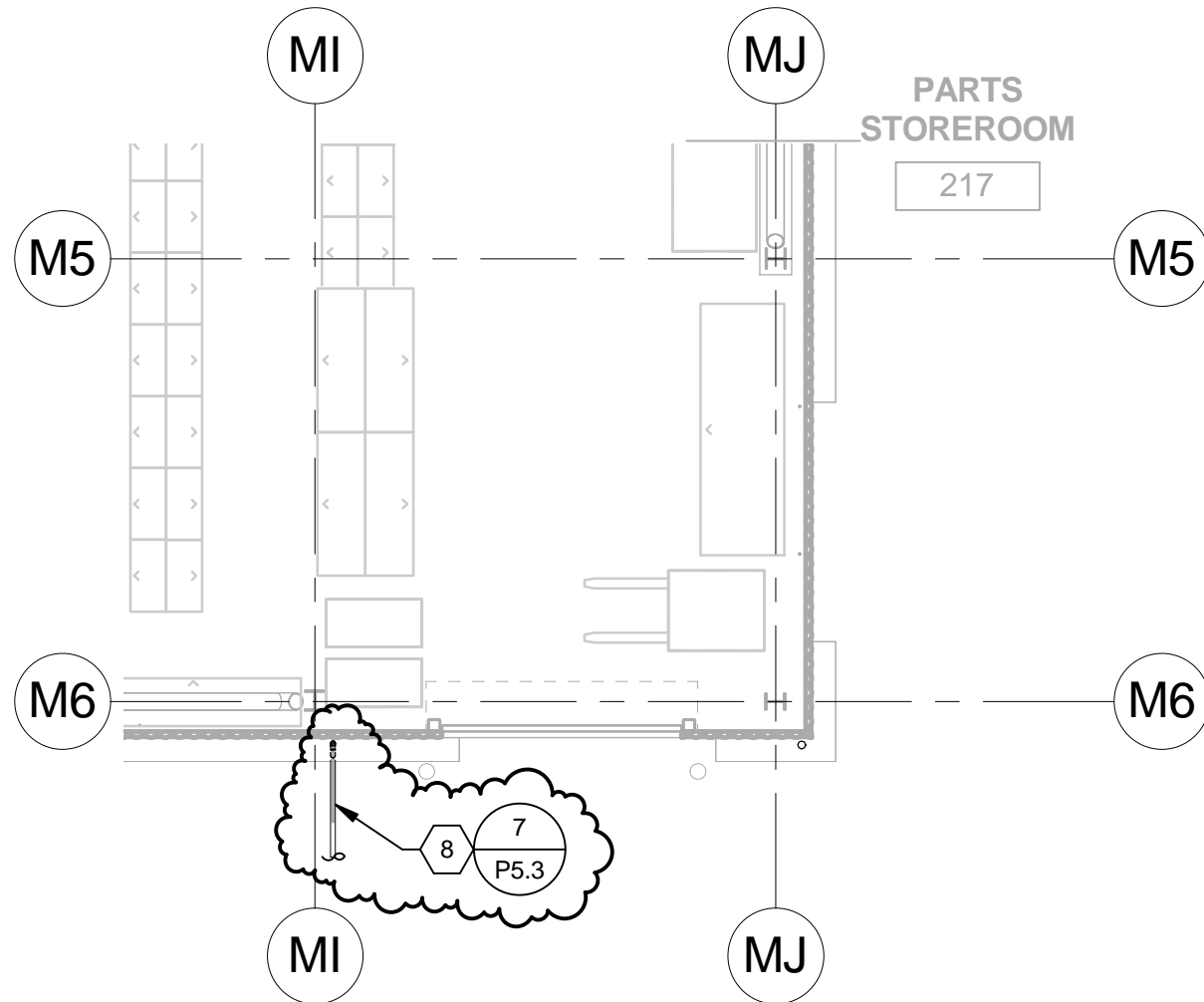
PA3.0



1 FUEL PIPING DIAGRAM

KEYNOTES

1. PROVIDE TRENCH DRAINS AT ROLLUP DOORS, CONNECT TO SANITARY SEWER.
2. PROVIDE TRENCH DRAIN IN LOWER MAINTENANCE AREA. CONNECT TO SEWER LIFT PUMP IN 5 GALLON BASIN.
3. SEE CIVIL UTILITIES PLAN FOR CONTINUATION.
4. 1 1/2" PUMP DISCHARGE TO 3" SS.
5. RUN PIPE TIGHT TO CEILING.
6. MOUNT HOSE BIBB AT 3'-0" AFG.
7. FOUNDATION DRAIN.
8. 2" V FROM INTERCEPTOR, SCD.



MAINTENANCE PLUMBING PLAN - FIRST FLOOR

1

1/8" = 1'-0"



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 07/16/14

BY:
 SAS

DESCRIPTION:
 INTERCEPTOR VENT -
 DRAWING P2.2



Daniel Boyd Reiter
PA4.0

PROJECT NAME

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 Operations Center**

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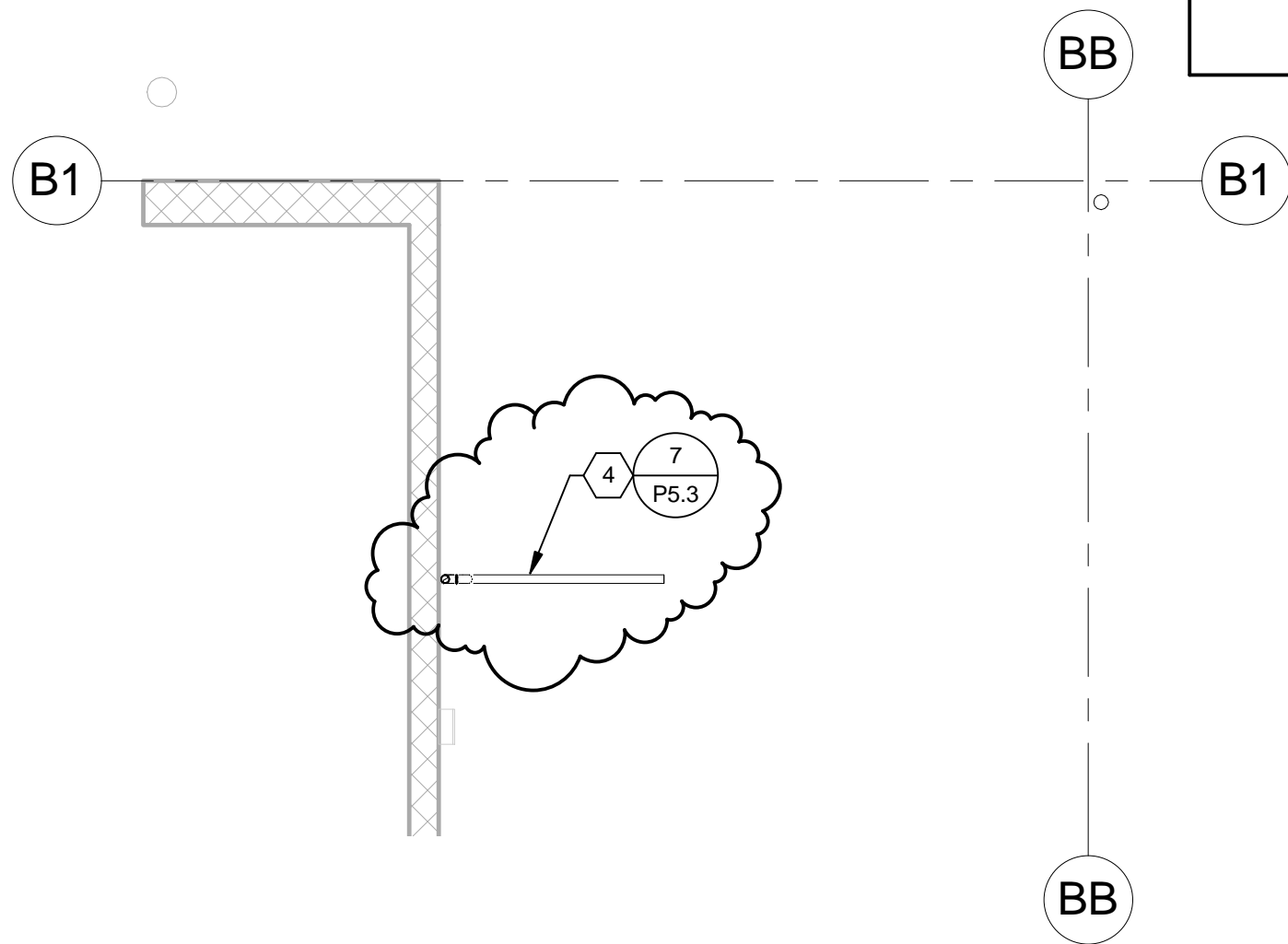
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KEYNOTES

1. SEE CIVIL UTILITIES PLAN FOR CONTINUATION
2. MOUNT HOSE BIBB AT 3'-0" AFG.
3. COORDINATE LOCATION AND MOUNTING HEIGHT WITH WASH EQUIPMENT MANUFACTURER REQUIREMENTS
4. 2" V FROM INTERCEPTOR, SCD.



1

BUS WASH PLUMBING PLAN

1/4" = 1'-0"



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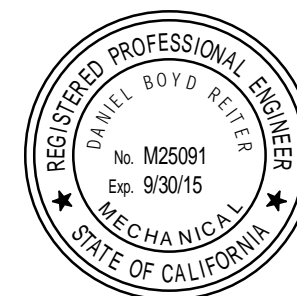
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BY:
 SAS

DESCRIPTION:
 INTERCEPTOR VENT -
 DRAWING P2.3



Daniel Boyd Reiter
PA5.0

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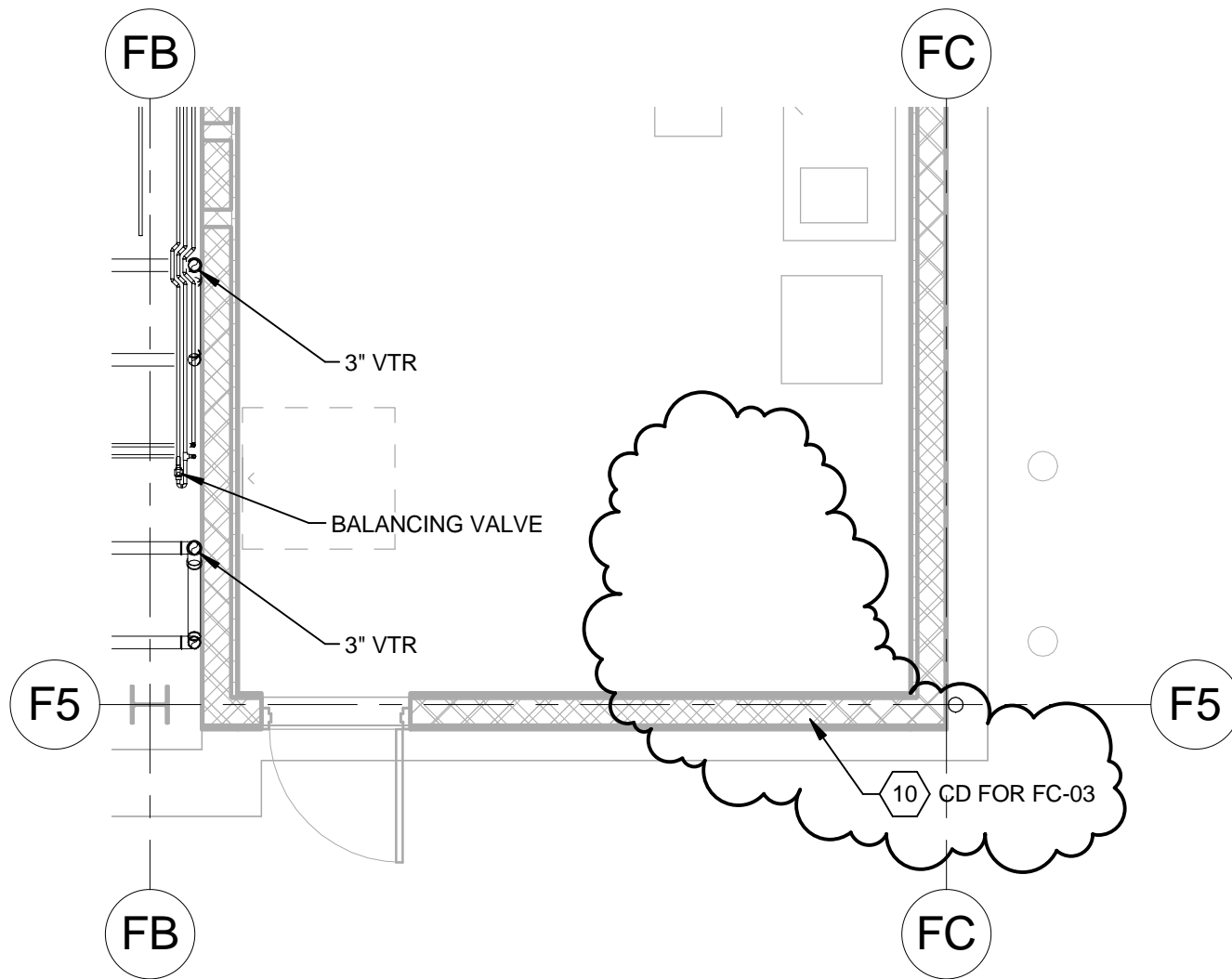
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 Operations Center**

PROJECT ADDRESS

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KEYNOTES

1. SEE CIVIL UTILITIES PLAN FOR CONTINUATION.
2. HYDROSTATIC TANK MONITORING SENSOR RESERVOIR.
3. WEATHERTIGHT MULTI-PORT SPILL CONTAINMENT MANHOLE AND VAPOR RECOVERY ACCESS.
4. WEATHERTIGHT SINGLE PORT SPILL CONTAINMENT MANHOLE.
5. WEATHERTIGHT MANHOLE WITH FUEL SUPPLY ACCESS.
6. NOT USED.
7. GASOLINE DISPENSER WITH SINGLE NOZZLE ACCESSIBLE TO FUEL LANE 2.
8. DIESEL DISPENSER SINGLE NOZZLE ACCESSIBLE TO LANE 1.
9. FUEL TANK VENTS WITH TRANSITION SUMP, SUPPORT FRAMING AND PROTECTIVE BOLLARDS.
10. WALL MOUNTED FAN COIL CONDENSATE DRAIN, ROUTE DOWN INTERIOR OF WALL, THROUGH WALL TO OUTSIDE AND ELBOW DOWN, TERMINATE 6" AFG WITH INSECT SCREEN. SEAL PENETRATION AND PROVIDE 1" SEPARATION BETWEEN TERMINATION AND BUILDING FACADE.



1 FUELING STATION PLUMBING PLAN

1/4" = 1'-0"



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DESCRIPTION:
 FC-3 CONDENSATE
 DRAIN - DRAWING P2.4



Daniel Boyd Reiter
 PA6.0

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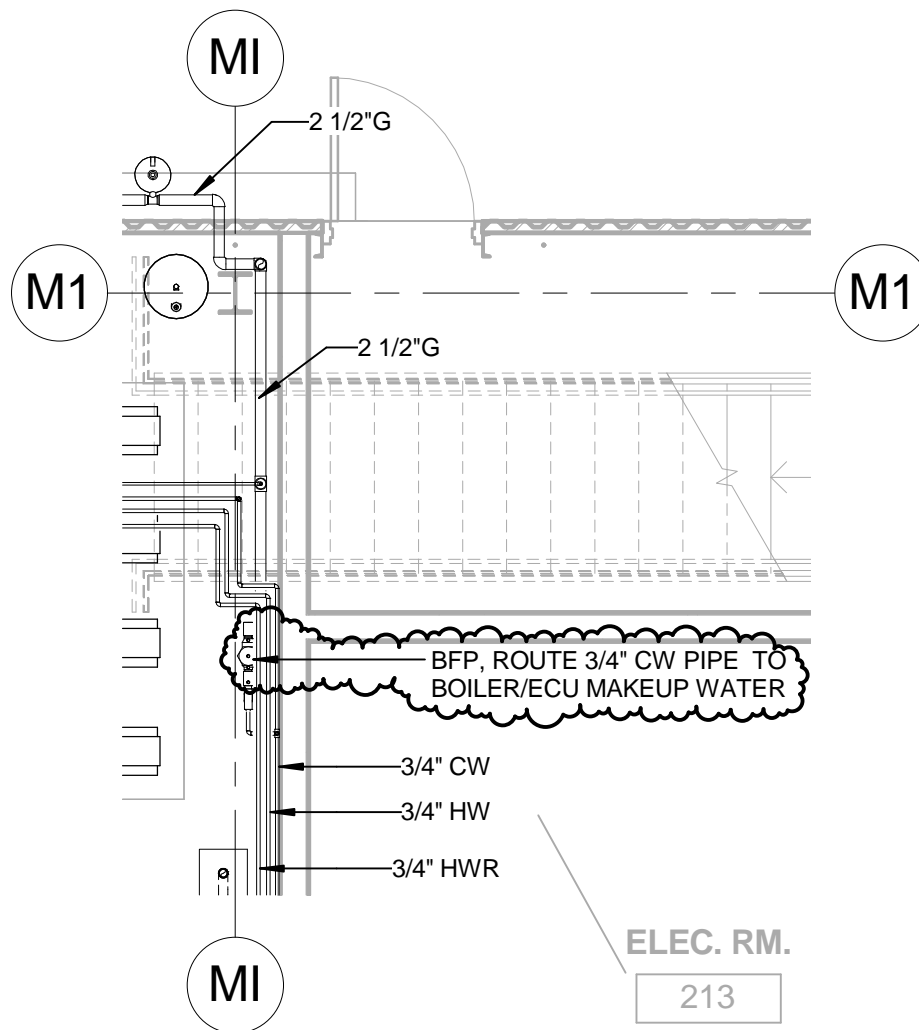
07/16/14

BY:

SAS

DESCRIPTION:

**BOILER/ECU MAKEUP
WATER - DRAWING
P4.2**



1 ENLARGED PLUMBING PLAN
1/4" = 1'-0"



Daniel Boyd Reiter
PA7.0

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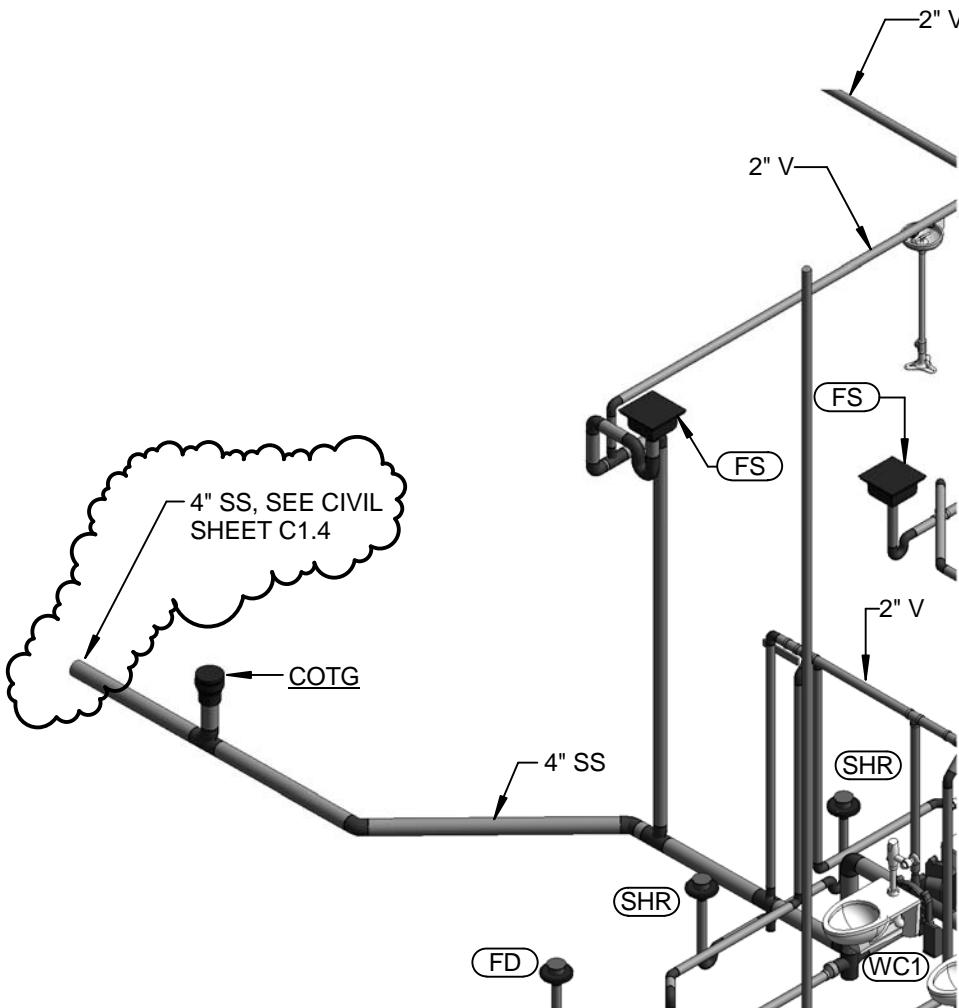
07/16/14

BY:

SAS

DESCRIPTION:

**POINT OF
CONNECTION -
DRAWING P6.4**



1 3D PLUMBING - MAINTENANCE SEWER



Daniel Boyd Reiter
PA8.0

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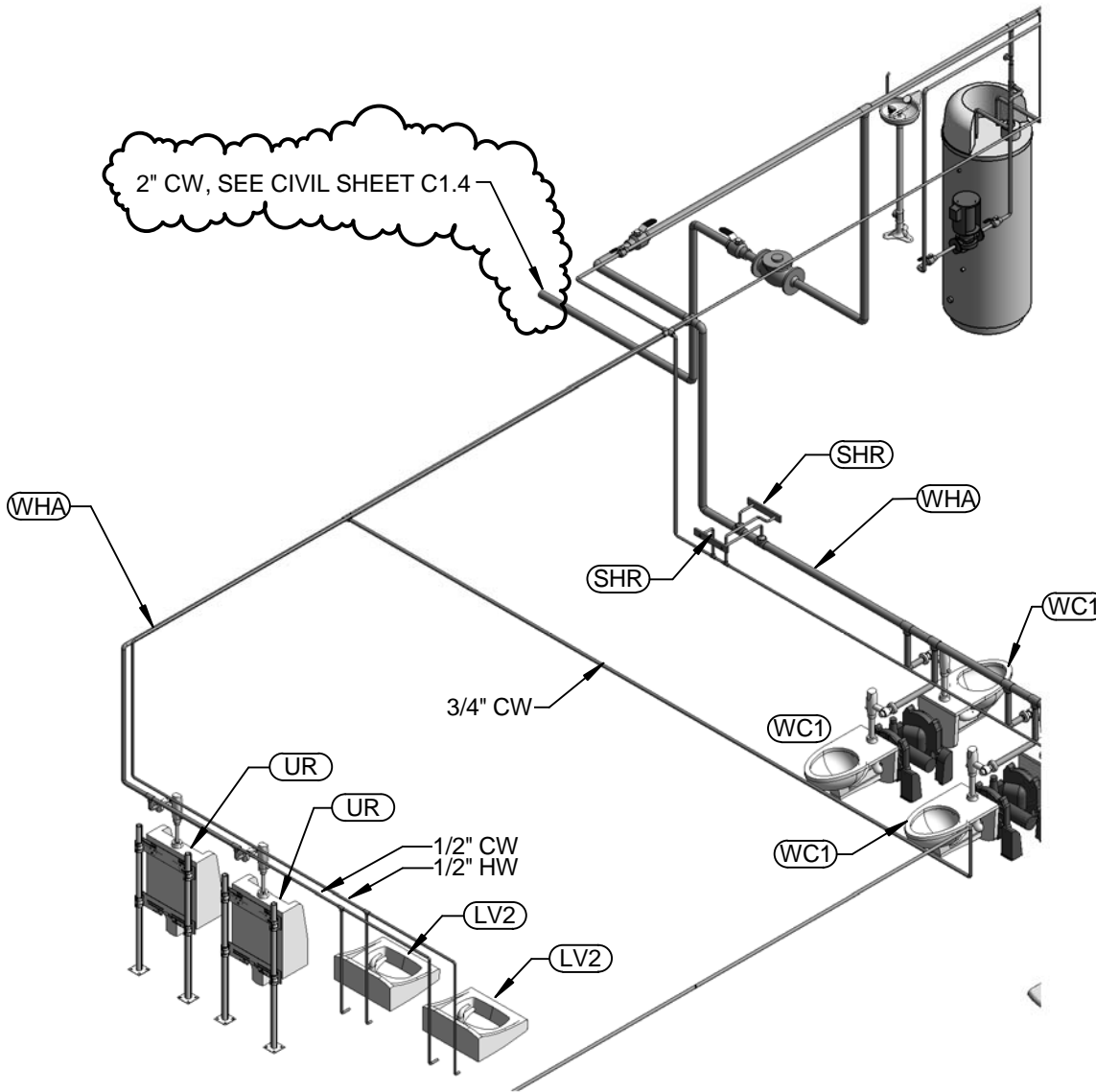
07/16/14

BY:

SAS

DESCRIPTION:

**POINT OF
CONNECTION -
DRAWING P6.5**



3D PLUMBING - MAINTENANCE DOMESTIC WATER

1



Daniel Boyd Reiter
PA9.0

KEYNOTES

8. PROVIDE ROOF EXHAUST FAN CIRCUIT TO JUNCTION BOX AND CONNECT TO WALL MOUNTED VFD (BY MECHANICAL) AND EXTEND CIRCUIT UP FROM VFD TO EXHAUST FAN DISCONNECTS FOR REF-1A AND 1B. COORDINATE EXACT LOCATION OF VFD WITH MECHANICAL.

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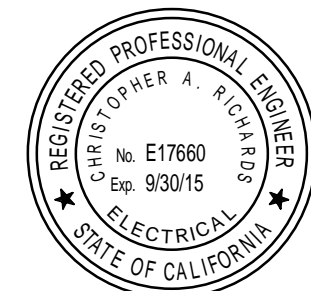
07/15/14

BY:

SEG

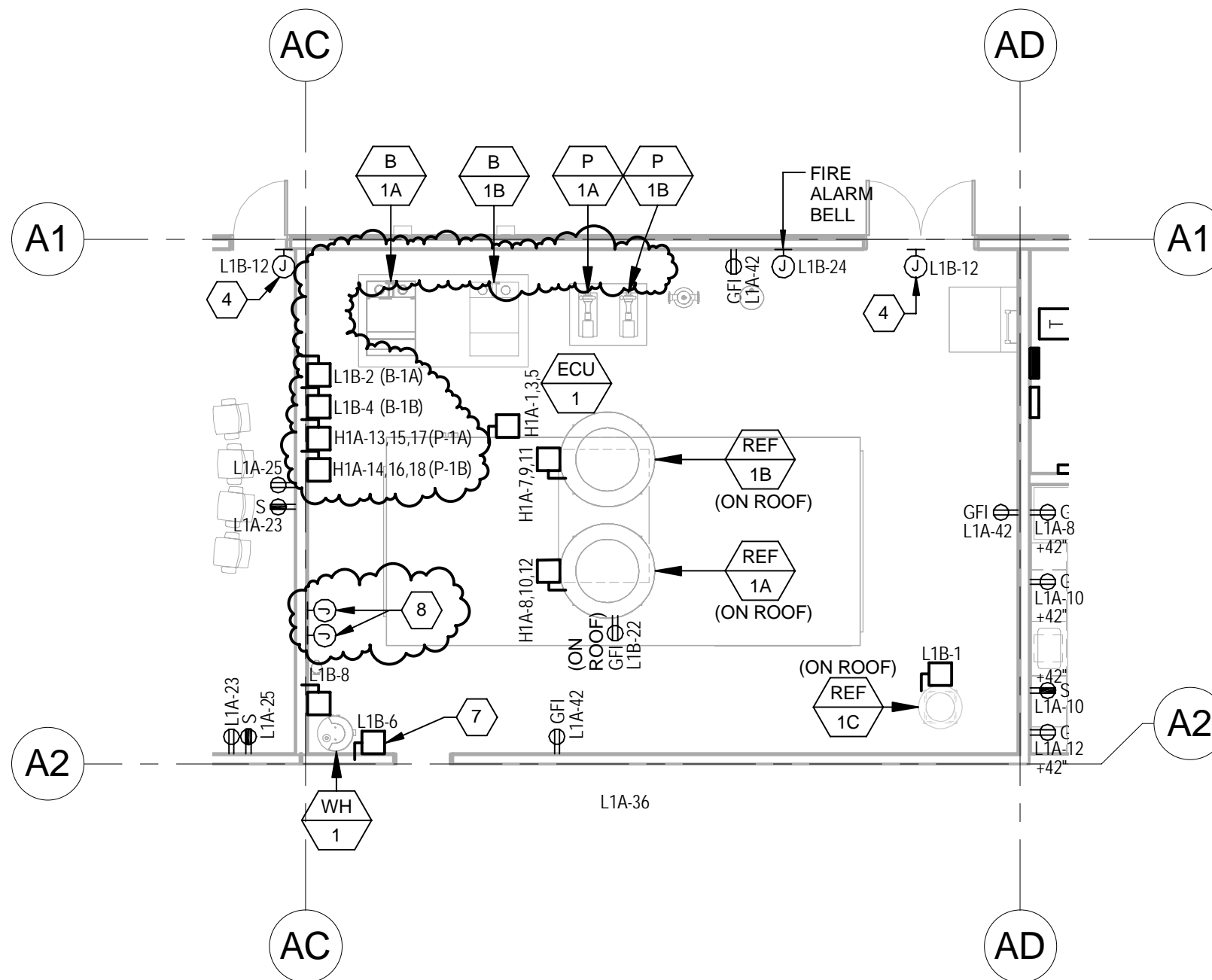
DESCRIPTION:

E2.1 ADMIN/OPS
RELOCATE
DISCONNECTS MECH
RM



Chris Richards
DRAWING NO.

EA 1.0



1 ADMIN/OPS POWER AND DATA PLAN
1/8" = 1'-0"

ELECTRICAL SCHEDULE - MECHANICAL EQUIPMENT

EQUIP NO.	EQUIPMENT NAME	LOCATION	VOLTAGE	PHASE	HP	FLA	CIRCUIT	CB	MIN. CONDUIT	WIRE (SIZES BASED ON CU, UON)	DISCONNECT	NOTES
HVAC												
P-1A	CIRCULATION	ADMIN/OPS BUILDING	480	3	1.5	3	H1A-13,15,17	15	3/4	(3) #12 & #12 GND	DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
P-1B	HEATING HOT WATER CIRCULATION	ADMIN/OPS BUILDING	480	3	1.5	3	H1A-14,16,18	15	3/4	(3) #12 & #12 GND	30/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
P-2A	HEATING HOT WATER CIRCULATION	MAINTENANCE BUILDING	480	3	1.5	3	H2B-1,3,5	15	3/4	(3) #12 & #12 GND	30/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
P-2B	HEATING HOT WATER CIRCULATION	MAINTENANCE BUILDING	480	3	1.5	3	H2B-2,4,6	15	3/4	(3) #12 & #12 GND	30/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
P-2C	SLAB HEATING HOT WATER CIRCULATION	MAINTENANCE BUILDING	480	3	1	2.1	H2B-7,9,11	15	3/4	(3) #12 & #12 GND	30/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
P-2D	SLAB HEATING HOT WATER CIRCULATION	MAINTENANCE BUILDING	480	3	1	2.1	H2B-8,10,12	15	3/4	(3) #12 & #12 GND	30/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
SAC-01	SELF-CONTAINED AC UNIT	ADMIN/OPS	277	1		21	H1A-23	30	3/4	(2) #10 & #10 GND	30A MOTOR RATED SNAP SW	
FC-3	INDOOR SPLIT SYSTEM FAN COIL	FUELING STATION	208	1		1	CU-3	15	3/4	(2) #12 & #12 GND	INTEGRAL DISCONNECT	FC-3 POWERED FROM CU-3
CU-3	OUTDOOR SPLIT SYSTEM HEAT PUMP	FUELING STATION	208	1		16	L3A-5,7	20	3/4	(2) #12 & #12 GND	20A/2P MOTOR RATED SNAP SW	
WH-1	INDIRECT WATER HEATER	ADMIN/OPS BUILDING	120	1		10	L1B-6	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
WH-2	INDIRECT WATER HEATER	MAINTENANCE BUILDING	120	1		10	L2B-33	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
WH-3	WATER HEATER	FUELING STATION	120	1		10	L3A-21	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
RCP-1	WATER HEATER RECIRC PUMP	ADMIN/OPS BUILDING	120	1		1.4	L1B-8	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
RCP-2	WATER HEATER RECIRC PUMP	MAINTENANCE BUILDING	120	1		1.4	L2B-37	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
RCP-3	WATER HEATER RECIRC PUMP	FUELING STATION	120	1		1.4	L3A-21	20	3/4	(2) #12 & #12 GND	20A MOTOR RATED SNAP SW	
ECU-1	INDIRECT-DIRECT EVAPORATIVE COOLING UNIT - 1	ADMIN/OPS BUILDING	480	3	25	123	H1A-1,3,5	150	1-1/2	(3) #1/0 & #8 GND	200/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR
ECU-2	INDIRECT-DIRECT EVAPORATIVE COOLING UNIT - 2	MAINTENANCE BUILDING	480	3	25	49	H2A-1,3,5	90	1-1/2	(3) #2 & #8 GND	100/3 NON-FUSED DISCONNECT	VFD PROVIDED BY EQUIPMENT VENDOR



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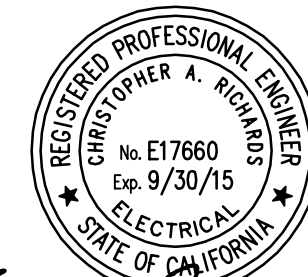
07/15/14

BY:

SEG

DESCRIPTION:

E6.5 MECHANICAL
EQUIPMENT
SCHEDULE 2



Chris Richards

DRAWING NO:

EA 2.0