

# ADDENDUM #2

Name of Project:	Idaho Falls Community Policing Facility –	
	Site plan, Main Building & Auxiliary Building	
	ADG Project Number: 1047	
Issue Date:	March 09, 2022	
Architect of Record	l: Architects Design Group, Inc.	
Assoc. Architect:	NBW Architects, P.A.	
<b>Owner:</b>	City of Idaho Falls, Idaho	
Subject:	Addendum #2 – Bid Issue clarifications	

This addendum is issued to clarify the original Drawings and Revise and Add to the Project Manual & Specifications and is hereby made a part of the Contract Documents.

# RECEIPT OF THIS ADDENDUM SHALL BE ACKNOWLEDGED ON THE BID FORM.

# PLEASE INSERT THIS ADDENDUM IN THE PROJECT MANUAL AND DRAWINGS.

# Any proposals that do not include this signed addendum shall be considered Non-Responsive.

The following items are to be incorporated into the contract documents; all other provisions of the documents will remain unless specifically modified by this document.

# **TABLE OF CONTENTS:**

- 1. Attention Items
- 2. Project Manuals
- 3. Drawings

**1. ATTENTION ITEMS:** These items are being called to your attention for information or clarification only and do not necessarily represent any changes in the bid documents:

- 1. Note: City of Idaho Falls will offer the bid as virtual or in person at the citys annex conference room.
- Question regarding delegated design requirements: Response: Delegated design is typically in accordance with the "Performance Requirements" article in the specs. Please advise if any of the specific requirements are not clear. Several specs delegated design requirements are related only to Seismic requirements. Whether the engineering is done by the Manufacturer or a separate engineer, the calculations should be reviewed by a licensed engineer.
- Question regarding 5 lbs. (a) L/240 horizontal deflection requirement can be maintained with 20gauge metal studs, is this acceptable?
   Response: 20-gauge metal studs is acceptable if the design criteria is met for load & deflection.
- *Question regarding 092216 2.2 5. a. notes all jamb studs and headers to be 16 gauge, please confirm.* Response: Follow specs, any changes per delegated design shall be submitted as a substitution request.
- Description regarding 099216 3.4 E.2. b. notes to install a cripple stud <sup>1</sup>/<sub>2</sub>" away from jamb stud for install of a control joint. Industry standard is every 30lf, please clarify.
   Response: Control joint placement shall be coordinated with one side of a door or window located at or adjacent to the required maximum distance per specifications.
- S101 X. Light Gauge Steel Framing G Notes to use a fast top clip 3 or similar at interior framing. To address cost concerns, is a 2 <sup>1</sup>/<sub>2</sub>" Leg slotted slip track acceptable?
   Response: Yes, 2 <sup>1</sup>/<sub>2</sub>" leg slotted slip track is acceptable.
- Question regarding scissor lifts (Genie 19-30) allowed (a) the upper floor slab on deck?
   Response: Yes, the "Genie-1930" scissor lift is an acceptable scissor lift to be used on the second-floor concrete floor.

# 2. PROJECT MANUALS: (Modify or Add Section to Contract Manual as noted below):

# PROJECT MANUAL – OWNERS INSTRUCTIONS TO BIDDERS

- DOCUMENT 00 41 13 BID FORM Stipulated Sum (Single-Prime Contract) Modified:
  - At 1.2 A, **added** "Alternate Bid"; added line for Add Alternate No. 1 dollar amount; added line for Unit Price #1 and Unit Price #2 dollar amounts per cubic yard.
  - At 1.3, changed to "...30 days after receipt of bid".
  - At 1.7, added line-item B for Fire Sprinkler system installer.

#### PROJECT MANUALS, VOLUME 1 AND 2 PROJECT SPECIFICATIONS

- 00 00 00B Table of Contents-ADD-02 **Modified:** "Revised ADD-02 or Added ADD-02" added for tracking.
- 01 22 00 Unit Prices Added
- 05 50 00 Metal Fabrications Added
- 07 27 26 Air and Water Resistive Barriers: **Modified:** Added manufacturers.
- 07 54 19 PVC Roofing: **Modified:** Added manufacturers.
- 08 88 53 Security Glazing **Modified:** Use <sup>1</sup>/<sub>2</sub>" thick ACCESSGARD forced-entry security glazing, for IW-6 and IW-8 transaction windows.
- 09 22 16 Non-structural metal framing **Modified:** Use G40 studs behind wet walls.

 333 N. Knowles Ave
 Winter Park, FL 32789
 407.647.1706

 325 N. St. Paul Street, Suite 4250
 Dallas, TX 75201
 469.501.5540

- 26 25 50 Generator Docking Station Added
- 26 32 13 Packaged Engine Generators and Transfer Switches Modified
- 26 36 00 Transfer Switches Modified

**3. DRAWINGS:** (Modified or Add Sheet to Contract Drawings as noted below):

# CIVIL PACKAGE

- C.5.0 Overall Utility Plan Modified: Added Sheet Note.
- L.1.0 Landscape Overview Modified: Updated Reference Notes Schedule quantities
- L.1.1 Landscape Plan North -Modified: Updated Reference Notes Schedule quantities
- L1.1.2 Landscape Plan South Modified: Updated Reference Notes Schedule quantities

# MAIN BUILDING

- G-201 Wall Type Details/UL Details **Modified:** Revised Partition P3 to show 13 gauge flattened expanded steel mesh. Revised P5 & P6 to show 1/2" resilient channels. Revised P7 through P10A as shown. P8, P9 and P10 will terminate at bottom of deck.
- A-101 Lower Floor Plan Overall **Modified:** Missing wall tags included in rooms 108D,115,125,163,163,166,167, 169,170, 171; **Revised** height of locker exhaust shaft west of room 128. Shaft will start from top of lockers. Refer to RCP plans for locations of lockers exhaust shafts.
- A-102 Upper Floor Plan Overall **Modified:** Missing wall tags included in rooms 240,241,242,244,246,258A; Revised wall tags in room 231. South walls to show P8 (extend gypsum board to underside of deck)
- A-112 Reflected Ceiling Plan, Upper Level **Modified:** Revised to show Metal Ceiling System on the vestibule area. Two square fixtures were added to the soffit above the signage wall at the entrance.
- A-115 Ceiling Details **Modified:** added note for AMC-2 specialty ceiling clarifications.
- A-161 Furniture Plan Lower **Modified:** Revised 110 Bag and Tag Chair Tag. Revised 158 Armorer Chair Tag. Revised 165 Briefing Room Table Tags.
- A-162 Furniture Plan Upper **Modified:** 213A Training Room and 213B Training Room Table Tags Revised. Revised 242 Volunteer/Intern Chair Tag.
- A-163 Furniture Schedule **Modified:** Table CG26 revised to CG26A. Added Table CG26B. Corrected typo for table CG32. Revised S2 count. Revised Chair S4 count. Revised S6 description. Revised chair S13 count. Added chair S14.
- A-502 Interior Window Schedule **Clarification:** Changed glazing schedule symbols for clarification. Edited glazing schedules tag in IW-1, IW-2, IW-3, IW-6, IW-7 and IW-8.
- ID-401 Interior Finish Legend **Modified:** Revised finish legend for AMC-1. Added finish AMC-2. Removed ACT-2. Renamed ACT-3 to be ACT-2. Modified finish comments.
- ID-403 Interior Finish Schedule Modified: Updated room finish schedule.
- ID-404 Interior Finish Schedule -Modified: Updated room finish schedule.
- E-001 Site Electrical Plan **Modified:** Revised Pad B layout to include location of CT cabinet and relocate communication vaults and pedestals to east of transformer.
- E-003 Site Electrical Plan **Modified:** Revised Pad B layout to include location of CT cabinet and relocate communication vaults and pedestals to east of transformer.
- E-101A Lower Floor Lighting Plan Area A Added locations of key note #4.
- E-201A Upper Floor Lighting Plan Area A Added light type L at building sign. Added locations of key note #4. Revised controls in Large Conference 231. Revised controls in Reception 237.
- E-201B Upper Floor Lighting Plan Area B Added light type to lights in IT Admin 254.
- E-201B Upper Floor Lighting Plan Area B Added dimmer in Lactation 250.

- E-301 Switchboard Elevations Removed Accessories for MSD and HSD.
- E-500 Lighting Details Added light type L.
- Lighting Approved Alternates:
  - a. Type B3 Maxlite ML2-L2-12-S-WH-18-9CS-MSV
  - **b.** Type BE Prescolite LBSE-8RD-CS9-WH
  - c. Type S1 Eaton VVT4-4L/5L/6L-U-40-FRL
  - **d.** Type S1 Columbia LXEM4-40ML-RP-ED1U
  - e. Type E Bock Lighting BA42 W/ G12 W/ LBAC1-2-6000-40K W/ 643-10FT CORD.
  - f. Type OHW Contech CY3T-2-40K-MVD2-AW-X-\*-\*
- M-001 Mechanical General Notes And Legend Modified: Added VRF note.
- M-101B Lower Mechanical Floor Plan Area B **Modified**: Added keynote 53
- P-001 Plumbing General Notes And Legends Modified: Added backflow general note
- P-101A1 Lower Plumbing Plan Area A Waste, Vent, and Gas **Modified**: Added keynote P27 and icemaker floor sink.
- P-101A1 Lower Plumbing Plan Water **Modified**: Added icemaker wall box.
- P-102A1 Upper Plumbing Plan Area A Waste, Vent, and Gas Modified: Added icemaker floor sink.
- P-102A1 Upper Plumbing Plan Water **Modified**: Added icemaker wall box.
- P-503 Typical Details Modified: Added dishwasher detail.
- P-601 Plumbing Schedules **Modified**: Added additional approved manufacturers for water heater, plumbing fixtures, mixing valve, and water softener.

### AUXILIARY BUILDING

- AB A-101 **Modified:** Added East elevation for Warm Vehicle Storage.
- AB ID-101 Finish Floor Plan **Modified:** Finishes revised as shown.
- AB ID-201 Interior Elevations **Modified:** Elevation finishes revised as shown. Added East elevation of Warm Vehicle Storage.
- AB ID-403 Interior Finish Schedule Modified: Room Finish Schedule updated.
- AB E-102 Auxiliary Building Power Plan **Modified** transformer disconnect.
- AB E-200 Added Surge protection to panel AL1

# END OF ADDENDUM #2

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#### DOCUMENT 00 4113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

#### 1.1 BID INFORMATION

- A. Bidder:
- B. Project Name: Police Station Headquarters & Auxiliary Building for City of Idaho Falls.
- C. Project Location: West side of Northgate Mile; addressed as 775 Northgate Mile and 316 Elva St Idaho Falls, Idaho.
- D. Owner: City of Idaho Falls, 380 Constitution Way, P.O. Box 50220, Idaho Falls, Idaho 83405-0220.
- E. Associate Architect (local): NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403. Telephone: 208-522-8779. Fax: 208-522-8785. Architect of Record: Architects Design Group, 333 N. Knowles Ave., Winter Park, FL 32789. Telephone: 407-647-1706. Fax: 407-605-5525.

#### 1.2 CERTIFICATIONS AND BID

A. Base Bid, Alternate Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by ADG Architects and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1.	Base Bid	Dollars (\$	_).
2.	Alternate #1 (ref. Spec Section 01 23 00 for description)	ADD Dollars (\$	).
3.	Unit Price #1	_Dollars per cubic yard (\$ otion).	<u>).</u>
4.	Unit Price #2 (Rock Removal - ref. Spec Section 01.22.00 for description)	_Dollars per cubic yard (\$	).

#### **1.3 BID GUARANTEE**

A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 45 30 days after receipt of bid.

#### 1.4 SUBCONTRACTORS AND SUPPLIERS

A. The following companies will perform the indicated portions of the Work if the undersigned bidder is awarded the Contract:

1.	Plumbing Work (Name):	
	(Address):	
	Idaho Plumbing Contractor's License No.	
2.	HVAC Work (Name):	
	(Address):	
	Idaho Contractor's License No.	
3.	Electrical Work (Name):	
	(Address):	
	Idaho Electrical Contractor's License No.	

B. Attach Subcontractors List Form.

#### **1.5 TIME OF COMPLETION**

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect and shall substantially complete the Work within 548 calendar days.

#### 1.6 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
  - 1. Addendum No. 1, dated \_\_\_\_\_
  - 2. Addendum No. 2, dated \_\_\_\_\_\_
  - 3. Addendum No. 3, dated \_\_\_\_\_\_.

#### 1.7 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in Idaho Falls, Idaho, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

# B. Bidder acknowledges that the Fire Sprinkler system installer shall possess or obtain a Life Safety License subject to approval of the Idaho Falls Fire Department.

#### 1.8 SUBMISSION OF BID

Respectfully submitted this \_\_\_\_\_ day of \_\_\_\_\_\_, 2022.

Submitted By:

(Name of bidding firm or corporation)

Authorized Signature:

(Handwritten signature)

Signed By:

(Type or print name)

Title:

(Owner/Partner/President/Vice President)

Street Address:

City, State, Zip

Phone:

License No.:

Federal ID No .:

(Affix Corporate Seal Here)

#### END OF DOCUMENT 00 4113

City of I.F., Police & Aux Bldg. 19013

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# Note: Project Manual covers both buildings unless specifically noted: (Main Bldg.) or (Auxiliary Bldg.)

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SECTION 01 2200 - UNIT PRICES

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section includes administrative and procedural requirements for unit prices.
- 1.2 DEFINITIONS
  - A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.
- 1.3 PROCEDURES
  - A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
  - B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
  - C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
  - D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION
- 3.1 SCHEDULE OF UNIT PRICES
  - A. Unit Price No. 1 Additional Excavation:
    - 1. Description: Provide a cost per cubic yard of additional excavation, including haul off, and import and placement of structural fill/backfill, should it be required for removal of existing native materials (does not include rock removal that requires blasting or chipping).
    - 2. Unit of Measurement: Cubic Yard.

- B. Unit Price No. 2 Rock Removal:
  - 1. Description: Provide a cost per cubic yard of rock requiring removal via blasting or chipping and haul off.
  - 2. Unit of Measurement: Cubic Yard.

END OF SECTION 01 2200

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
  - A. Section Includes:
    - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
    - 2. Elevator machine beams, hoist beams.
    - 3. Steel shapes for supporting elevator door sills.
    - 4. Slotted channel framing.
    - 5. Metal ladders.
    - 6. Ladder safety cages.
    - 7. Elevator pit sump covers.
    - 8. Expanded steel security mesh.
    - 9. Miscellaneous steel trim including steel angle corner guards.
    - 10. Metal bollards.

#### 1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Nonslip aggregates and nonslip-aggregate surface finishes.
  - 2. Fasteners.

- 3. Shop primers.
- 4. Shrinkage-resisting grout.
- 5. Slotted channel framing.
- 6. Manufactured metal ladders.
- 7. Ladder safety cages.
- 8. Metal bollards.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
  - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 2. Elevator machine beams, hoist beams.
  - 3. Steel shapes for supporting elevator door sills.
  - 4. Metal ladders.
  - 5. Ladder safety cages.
  - 6. Elevator pit sump covers.
  - 7. Miscellaneous steel trim including steel angle corner guards.
  - 8. Metal bollards.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegateddesign engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.

#### 1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code Steel."

#### 1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

#### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### 2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
  - 2. Material: Galvanized steel, ASTM A653/A653M, structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.
- F. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

#### 2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

- 1. Provide stainless steel fasteners for fastening aluminum and stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

#### 2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 09 91 00 "Painting."
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

#### 2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

#### 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

#### 2.7 METAL LADDERS

- A. General:
  - 1. Comply with ANSI A14.3, except for elevator pit ladders.
  - 2. For elevator pit ladders, comply with ASME A17.1/CSA B44.
- B. Steel Ladders:
  - 1. Space siderails 18 inches apart unless otherwise indicated.
  - 2. Siderails: Continuous, size as indicated, steel flat bars, with eased edges.
  - 3. Rungs: 1-inch-diameter, steel bars.
  - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

- 5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
- 6. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 1/2 inch in least dimension.
- 7. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
- 8. Galvanize and prime ladders, including brackets.
- 9. Provide minimum 72-inch-high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

#### 2.8 LADDER SAFETY CAGES

- A. General:
  - 1. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless steel fasteners.
  - 2. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet o.c. Provide secondary intermediate hoops spaced not more than 48 inches o.c. between primary hoops.
  - 3. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless steel fasteners unless otherwise indicated.
- B. Steel Ladder Safety Cages:
  - 1. Primary Hoops: 1/4-by-4-inch flat bar hoops.
  - 2. Secondary Intermediate Hoops: 1/4-by-2-inch flat bar hoops.
  - 3. Vertical Bars: 3/16-by-1-1/2-inch flat bars secured to each hoop.
  - 4. Galvanize and prime ladder safety cages, including brackets and fasteners.
  - 5. Prime ladder safety cages, including brackets and fasteners, with zinc-rich primer.

#### 2.9 ELEVATOR PIT SUMP COVERS

- A. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than 1/2 inch in least dimension.
- B. Provide steel angle supports unless otherwise indicated.

#### 2.10 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and prime miscellaneous steel trim.

#### 2.11 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 80 steel pipe.
  - 1. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
  - 2. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.
- B. Prime steel bollards with zinc-rich primer.

#### 2.12 METAL SECURITY BOLLARDS

- A. Fabricate metal bollards from Schedule 80 stainless steel, No. 4/180-grit finish.
- B. Basis of Design Product and Manufacturer; Amiguard 9310 Fixed Bollard.
  - 1. Impact resistance Rating M30.
  - 2. Cap bollards with 1/4-inch- thick, stainless steel, ASTM A480/A480M, No. 4 finish plate with flat top.
  - 3. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
  - 4. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

#### 2.13 BOLLARD COVERS

A. Install yellow 1/8" polyethylene bollard covers with Double Reflective Red, stripping below the cap on all bollards.

#### 2.14 STEEL MESH FOR SECURITY PARTITIONS

- A. Basis of Design Product and Manufacturer; Clark Dietrich, BM75, carbon steel in diamond pattern.
  - 1. Gauge: 916 gauge.
  - 2. Overall Thickness: .108.048".
  - 3. Diamond: 3/4".
  - 4. Bond Size (Center to Center): .923" x 2.10"

- 5. Weight 1.5747 lbs per square foot.
- 6. Percent Open Area: 6576%.
- B. Accessories: Provide Clark Dietrich BM-Clip, Barrier Mesh Clip.
  - 1. 2.75" long x 1.5" wide high Strength Steel Clips, for attaching mesh to framing.

#### 2.15 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

#### 2.16 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with primers specified in Section 09 91 00 "Painting" unless indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Installer must examine the areas and conditions under which miscellaneous and ornamental items are to be installed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Metal Mesh; Verify framing in place is 18-gauge minimum, prior to installing mesh.

#### 3.2 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  - 1. Cast Aluminum: Heavy coat of bituminous paint.
  - 2. Extruded Aluminum: Two coats of clear lacquer.

#### 3.3 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports securely to, and rigidly brace from, building structure.

#### 3.4 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.

#### 3.5 INSTALLATION OF METAL SECURITY BOLLARDS

- A. Install steel reinforcing, concrete and covers in accordance with Manufacturers requirements to meet impact rating indicated.
- B. Anchor bollards in place with concrete footings in accordance with Manufacturers requirements to meet impact rating indicated.

#### 3.6 INSTALLING SECURITY MESH

- A. Install security mesh in strict accordance with the manufacturers written installation instructions. Provide all items and accessories as required for a complete installation in every respect.
  - 1. Fasten to steel stud and top and bottom runners using either screws or weld attachment. Screws or weld shall be space at 6-inches on center maximum, with all corners fastened to framing. Mesh splices shall occur at studs only Splice between supports is not permitted unless splice is continuously welded top to bottom or mesh is overlapped 3-inches and fastened or welded every 6-inches, Steel framing receiving metal mesh shall be 18-gauge minimum.

### 3.7 REPAIRS

- A. Touchup Painting:
  - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

- a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- 2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 00 "Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 50 00

SECTION 07 27 26 – AIR AND WATER RESISTIVE BARRIERS

PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Air and Water Resistive Barrier, also indicated as "Weather Barrier" on the drawings.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review air-barrier requirements and installation, special details, mockups, airleakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
  - 1. Show locations and extent of air-barrier materials, accessories, and assemblies specific to Project conditions.
  - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 3. Include details of interfaces with other materials that form part of air barrier.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by Installer, who work on Project.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- D. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
  - 1. Installer to be licensed by ABAA according to ABAA's Quality Assurance Program and to employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
  - 1. Build integrated mockups of exterior wall assembly, 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
    - a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
    - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
    - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on field mockups.
- B. Mockup Testing: Air-barrier assemblies must comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
  - 1. Air-Leakage-Location Testing: Mockups will be tested for evidence of air leakage according to ASTM E1186, chamber depressurization with detection liquids.
  - 2. Air-Leakage-Volume Testing: Mockups will be tested for air-leakage rate according to ASTM E783 or ASTM E2357.

- 3. Adhesion Testing: Mockups will be tested for required air-barrier adhesion to substrate according to ASTM D4541.
- 4. Notify Architect seven days in advance of the dates and times when mockups will be tested.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
  - 1. Protect substrates from environmental conditions that affect air-barrier performance.
  - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E2357.

#### 2.3 HIGH-BUILD AIR BARRIERS, VAPOR RETARDING

- A. High-Build, Vapor-Retarding Air Barrier Modified Bituminous Type: Modified bituminous membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils or thicker over smooth, void-free substrates.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Master Builders Solutions, MasterSeal AWB 665 or a comparable product by one of the following:
    - a. Carlisle Coatings & Waterproofing Inc.
    - b. Henry Company.
    - c. W. R. Meadows, Inc.
    - d. Soprema, Inc.
    - e. TK Products.
- B. Physical and Performance Properties:
  - 1. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E2178.
  - 2. Vapor Permeance: Maximum 10 perms; ASTM E96/E96M, Procedure B, Water Method.
  - 3. Adhesion to Substrate: Minimum 1.5 lbf/sq. in. when tested according to ASTM D4541.
  - 4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

#### 2.4 ACCESSORY MATERIALS

- A. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, 0.0187 inch thick, and Series 300 stainless steel fasteners.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
  - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
  - 3. Verify that substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D4263.
  - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- H. Bridge joints discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with airbarrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

#### 3.3 ACCESSORIES INSTALLATION

- A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
  - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
  - 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
  - 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
- B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
  - 1. Transition Strip: Roll firmly to enhance adhesion.
  - 2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

## 3.4 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

- A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.
  - 1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
  - 2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.
  - 3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.
- B. Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
  - 1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements.
- C. Do not cover air barrier until it has been tested and inspected by testing agency.
- D. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

### 3.5 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
  - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
  - 2. Air-barrier dry film thickness.
  - 3. Continuous structural support of air-barrier system has been provided.
  - 4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.

- 5. Site conditions for application temperature and dryness of substrates have been maintained.
- 6. Maximum exposure time of materials to UV deterioration has not been exceeded.
- 7. Surfaces have been primed, if applicable.
- 8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
- 9. Termination mastic has been applied on cut edges.
- 10. Strips and transition strips have been firmly adhered to substrate.
- 11. Compatible materials have been used.
- 12. Transitions at changes in direction and structural support at gaps have been provided.
- 13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
- 14. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
  - 1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, chamber depressurization using detection liquids.
  - 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E783 or ASTM E2357.
  - 3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.
  - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
  - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.

# 3.6 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
  - 1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the

overexposed materials according to air-barrier manufacturer's written instructions.

- 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION 07 27 26

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SECTION 07 54 19 - POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
  - A. Section Includes:
    - 1. Mechanically Fastened polyvinyl chloride (PVC) roofing system.
    - 2. Accessory roofing materials.
    - 3. Walkways.

### 1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

### 1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
  - 5. Review structural loading limitations of roof deck during and after roofing.
  - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.

- 7. Review governing regulations and requirements for insurance and certificates if applicable.
- 8. Review temporary protection requirements for roofing system during and after installation.
- 9. Review roof observation and repair procedures after roofing installation.
- B. Preinstallation Roofing Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  - 5. Review structural loading limitations of roof deck during and after roofing.
  - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
  - 7. Review governing regulations and requirements for insurance and certificates if applicable.
  - 8. Review temporary protection requirements for roofing system during and after installation.
  - 9. Review roof observation and repair procedures after roofing installation.

### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
  - 1. Layout and thickness of insulation.
  - 2. Base flashings and membrane terminations.
  - 3. Flashing details at penetrations.
  - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
  - 1. Roof membrane and flashing, of color required.
  - 2. Walkway pads or rolls, of color required.
- D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates:
  - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
    - a. Submit evidence of compliance with performance requirements.
  - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.
- D. Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Field Test Reports:
  - 1. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
- F. Field quality-control reports.
- G. Sample Warranties: For manufacturer's special warranties.

### 1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

### 1.8 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturers: A qualified manufacturer that is listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.
  - 2. Installers: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

# 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

## 1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, and other components of roofing system.
  - 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, cover boards, and walkway products, for the following warranty period:
  - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings to remain watertight.
  - 1. Accelerated Weathering: Roof membrane to withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
  - 2. Impact Resistance: Roof membrane to resist impact damage when tested according to ASTM D3746, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials to be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
  - 1. Zone 1 (Roof Area Field): As indicated.
  - 2. Zone 2 (Roof Area Perimeter): As indicated.
    - a. Location: From roof edge to distance indicated inside roof edge.
  - 3. Zone 3 (Roof Area Corners): As indicated.
    - a. Location: From roof edge to distance indicated inside roof edge.
- D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.
- E. ENERGY STAR Listing: Roofing system to be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

# 2.2 POLYVINYL CHLORIDE (PVC) ROOFING

A. PVC Sheet Type III: ASTM D4434/D4434M, fabric reinforced.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sika Sarnafil; Sika Corporation; S 327-18 EL, or a comparable product by one of the following:
  - a. Johns Manville; a Berkshire Hathaway company.
  - b. Soprema, Inc.
  - c. GAF.
  - d. Carlisle Syntec Systems.
- 2. Thickness: 60 mils.
- 3. Exposed Face Color: Reflective Gray.
- B. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.

### 2.3 ACCESSORY ROOFING MATERIALS

- A. General: Accessory materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
  - 1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Roof Vents: As recommended by roof membrane manufacturer.
  - 1. Size: Not less than 4-inch diameter.
- E. Bonding Adhesive: Manufacturer's standard.
- F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

#### 2.4 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surfacetextured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
  - 1. Size: Approximately 36 by 60 inches.
  - 2. Color: Contrasting with roof membrane.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
  - 1. Submit test result within 24 hours of performing tests.
    - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

#### 3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

# 3.4 INSTALLATION OF MECHANICALLY FASTENED ROOF MEMBRANE

- A. Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.
- D. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- E. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- F. Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. In-Seam Attachment: Secure one edge of PVC sheet using fastening plates or metal battens centered within seam, and mechanically fasten PVC sheet to roof deck.
- I. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

# 3.5 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

#### 3.6 INSTALLATION OF WALKWAYS

- A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
  - 1. Install flexible walkways at the following locations:
    - a. Locations indicated on Drawings, and as required by roof membrane manufacturer's warranty requirements.
  - 2. Provide 6-inch clearance between adjoining pads.
  - 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### 3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

## 3.9 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS \_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
  - 1. Owner: <**Insert name of Owner**>.
  - 2. Owner Address: < Insert address>.
  - 3. Building Name/Type: <**Insert information**>.
  - 4. Building Address: < Insert address>.
  - 5. Area of Work: <**Insert information**>.
  - 6. Acceptance Date: \_\_\_\_\_
  - 7. Warranty Period: <Insert time>.
  - 8. Expiration Date: \_\_\_\_\_\_.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
  - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. lightning;
    - b. peak gust wind speed exceeding <Insert mph>;
    - c. fire;
    - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

- f. vapor condensation on bottom of roofing; and
- g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
- 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
- 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
- 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
- 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
- 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
- 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
- E. IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_\_\_ day of \_\_\_\_\_\_, \_\_\_\_\_.
  - 1. Authorized Signature: \_\_\_\_\_
  - 2. Name: \_\_\_\_\_\_.
  - 3. Title: \_\_\_\_\_\_.

END OF SECTION 07 54 19

SECTION 08 88 53 - SECURITY GLAZING

PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
  - A. Section includes glass-clad polycarbonate.

#### 1.3 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- 1.4 PREINSTALLATION MEETINGS
  - A. Preinstallation Conference: Conduct conference at Project site.
    - 1. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - 2. Review temporary protection requirements for security glazing during and after installation.
- 1.5 ACTION SUBMITTALS
  - A. Product Data: For each type of product.
  - B. Security Glazing Samples: For each type of security glazing; 12 inches square.
  - C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
  - D. Delegated-Design Submittal: For security glazing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installers.
- B. Product Certificates: For each type of product indicated, from manufacturer.
- C. Product Test Reports: For each type of security glazing, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Preconstruction adhesion and compatibility test reports.
- E. Sample Warranties: For special warranties.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program.
- B. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
  - 1. H. P. White Laboratory, Inc.
  - 2. Underwriters Laboratories, Inc.
  - 3. Wiss, Janney, Elstner Associates, Inc.
- C. Sealant Testing Agency Qualifications: Qualified according to ASTM C 1021 for testing indicated.

#### 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each security glazing type, tape sealant, gasket, glazing accessory, and glazing-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing will not be required if data based on previous testing of current sealant products and glazing materials match those submitted.
  - 2. Use ASTM C 1087 to determine whether priming and other specific jointpreparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to security glazing, tape sealants, gaskets, and glazing channel substrates.
  - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  - 4. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

### 1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

#### 1.10 WARRANTY

- A. Manufacturer's Special Warranty for Glass-Clad Polycarbonate: Manufacturer agrees to replace glass-clad polycarbonate that deteriorates within specified warranty period. Deterioration of glass-clad polycarbonate is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass-clad polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type indicated.
- B. Source Limitations for Glazing Sealants and Gaskets: Obtain from single source from single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General:
  - 1. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

### 2.3 SECURITY GLAZING, GENERAL

A. Glazing Publications: Comply with published recommendations of security glazing and glazing material manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

- 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glazing, glass thickness, and safety glazing standard with which glazing complies.

## 2.4 GLASS-CLAD POLYCARBONATE GLAZING

- A. Glass-clad polycarbonate and contains an exposed polycarbonate surface with an abrasion resistant coating on the witness (safe) side.
  - 1. Basis of Design Product and Manufacturer; Global Security Glazing, model Secur-Tem + Poly SP412.
  - 2. Ballistic Glazing per UL 752 Level 4.
  - 3. Nominal Thickness: 1.22".

# 2.5 LAMINATED SECURITY GLAZING

- A. Basis of Design product and Manufacturer; Global Security Glazing, model ACCESSGARD.
  - 1. Thickness:  $\frac{1}{2}$ -inch.

### 2.52.6 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C 920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C 661.

## 2.62.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by security glazing manufacturer to maintain security glazing lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

### 2.72.8 FABRICATION OF SECURITY GLAZING

- A. Fabricate security glazing in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Grind smooth and polish exposed security glazing edges and corners.

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing for security glazing, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Minimum required face or edge clearances.

- 3. Minimum required bite.
- 4. Effective sealing between joints of framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

A. Clean glazing channels and other framing members receiving security glazing immediately before glazing. Remove coatings not firmly bonded to substrates.

#### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.
- F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.

- H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

## 3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between security glazing and glazing stops to maintain face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to security glazing and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial washaway from security glazing.

## 3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.
- C. Wash security glazing on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

END OF SECTION 08 88 53

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
  - A. Section Includes:
    - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
    - 2. Suspension systems for interior gypsum ceilings and soffits.

### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - Studs and Runners: Provide documentation that framing members' certification is according to SFIA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members". SFIA's program certifies that studs and runners comply with the IBC, ASTM C 645, AISI S100, and AISI S220. Mechanical properties, coatings, dimensions, and labeling are checked.
  - 2. Manufacturers' limiting tables indicating products provided.
  - 3. Manufacturer's Certification: Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products.
  - 4. Evaluation Reports: For Metal Framing, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
- B. Delegated-Design by Specialty Structural Engineer (SSE) Delegated-Design Submittal: For steel framing, ceiling framing, and related fasteners, accessories and support. The design professional, individual or organization having responsibility for the design of the specialty items. This responsibility shall be in accordance with the state's statues and regulations governing the professional registration and certification of architects or engineers.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For firestop tracks post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

### 1.5 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft..
- D. Delegated Design: Engage a qualified professional engineer to design steel framing systems.
  - Design framing systems in accordance with American Iron and Steel Institute Publication S220 "North American Specification for the Design of Cold-Formed Steel Framing – Non-Structural Members", except as otherwise shown or specified.
  - 2. Design loads: 5 PSF minimum as required by the Building Code.
  - 3. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of 1/240 inches and including finish material.

- E. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- F. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Interior Wall Framing: Horizontal deflection of L/240 of the wall height under a horizontal load of 5 lbf/sq. ft.
- 2.2 NON-LOAD-BEARING STEEL FRAMING, GENERAL
  - A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
    - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      - a. ClarkDietrich Building Systems
      - b. MarinoWARE.
      - c. MRI Steel Framing, LLC.
      - d. SCAFCO Steel Stud Company.
    - 2. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
    - 3. Protective Coating: ASTM A 653/A 653M, G40 Typical, <del>G60 at framing behind</del> wet walls, hot-dip galvanized.
    - 4. Depth: As indicated on Drawings.
    - 5. Minimum Base-Metal Thickness: 0.0296 inch, except as indicated below.
      - a. Framed openings (heads and jambs of door and window openings).
        - 1) (2) studs at each jamb, full height, and horizontal headers Steel, 0.053-inch minimum base-metal thickness.
  - A. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
    - 1. Depth: As indicated on Drawings.
    - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
  - B. Slip-Type Head Joints: Where indicated, provide one of the following:
    - 1. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inchesof the top of studs to provide lateral bracing.

- 2. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inchdeep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
- 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- C. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. SLP-TRK by Slip Track Systems
    - b. Snap Track by Total Steel Solutions
    - c. Slotted Stud by Steeler Inc.
- D. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Depth: As indicated on Drawings.
- E. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical or hat shaped.
- F. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: As indicated on Drawings.
  - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inchdiameter wire, or double strand of 0.048-inch-diameter wire.
- G. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
- H. Backerplates: Except grab bars for the handicapped, and railings use 6 in. wide 18 ga. galvanized sheet steel per ASTM A164, latest edition, type RS or heavier, lengths of backerplates as required, minimum length of 4 studs, fastened to studs for the attachment of surface mounted accessories, shelving locations, etc., at required locations and where indicated.

### 2.3 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inchdiameter wire, or double strand of 0.0475-inch-diameter wire.
- B. Hanger Attachments to Concrete:
  - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES as appropriate for the substrate.
    - a. Uses: Securing hangers to structure.
    - b. Type: Torque-controlled, expansion anchor torque-controlled, adhesive anchor or adhesive anchor.
    - c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.
- E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a basemetal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
  - 3. Protective Coating: ASTM A 653/A 653M, G90, hot-dip galvanized.
- F. Furring Channels (Furring Members):
  - 1. Cold-Rolled Channels: 0.0329-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
  - 2. Steel Studs and Tracks: ASTM C 645.
  - 3. Protective Coating: ASTM A 653/A 653M, G90, hot-dip galvanized.
    - a. Minimum Base-Metal Thickness: 0.0329 inch.
    - b. Protective Coating: ASTM A 653/A 653M, G90, hot-dip galvanized.
    - c. Depth: As indicated on Drawings.
- G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

- a. Armstrong World Industries, Inc.; Drywall Grid Systems.
- b. USG Corporation; Drywall Suspension System.

### 2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
  - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollowmetal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:
  - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

# 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.

### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types and other assembly components indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Stud Spacing: 16-inches on center maximum.
- E. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
  - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.

- b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
- c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
- 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistancerated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
  - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
  - a. At locations indicated install sound isolation clips.
  - b. Basis of Design Product and Manufacturer; Pac-International RSIC-1, or a comparable product by one of the following:
    - 1) Clark Dietrich.
    - 2) Marinoware.
  - c. At locations indicated install (2) layers of 1/8-inch thick sound membrane, joints shall be fully-taped and staggered.
    - 1) Basis of design Product and Manufacturer; Acoustical Solutions, AudioSeal Sound Barrier.
- 6. Curved Partitions:
  - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
  - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.
- F. Direct Furring:
  - 1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  - 1. Hangers: 48 inches o.c.
  - 2. Carrying Channels (Main Runners): 48 inches o.c.
  - 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Do not attach hangers to steel roof deck.
  - 5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  - 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  - 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
  - 8. Attach hangers to concrete slab only. In no case should anchors be drilled or shot in to precast structural concrete beams or joists.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

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SECTION 26 25 50 – GENERATOR DOCKING STATION

PART 1 - GENERAL

### 1.1 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ETL/UL LISTED to 1008 Standards
- C. UL 50 LISTED

### 1.2 COORDINATION

A. Coordinate layout and installation of Generator Docking Station, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels

### 1.3 GUARANTEE/WARRANTY

- A. Manufacturer Warranty shall be provided for a minimum of 1 Year.
- B. The equipment installed under this contract shall be left in proper working order
- C. New materials and equipment shall be guaranteed against defects in composition, design or workmanship. Guarantee certificates shall be furnished.

### PART 2 - PRODUCTS

### 2.1 DOCKING STATION

A. Manufacturers: Subject to compliance with requirements below. Docking station shall be provided by the generator supplier so as to maintain a single source of responsibility.

# 2.2 GENERAL REQUIREMENTS

A. Enclosure

- 1. NEMA 3R Rain-Tight Aluminum Enclosure
  - a. Pad-lockable front door shall include a hinged access plate at the bottom for entry of temporary cabling that prevents unauthorized tampering while in use.
  - b. NEMA 3R Integrity shall be maintained while temporary cabling is connected during use
  - c. Front and Side shall be accessible for maintenance
  - d. Top, Side, and Bottom shall be accessible for permanent cabling
- 2. Powder coat
  - a. Paint after fabrication shall be Hammer tone Gray
- B. Phase, Neutral, and Ground Busbar
  - 1. Material: Silver-plated Copper
  - 2. Equipment Ground Bus: bonded to box.
  - 3. Isolated Ground Bus: insulated from box.
  - 4. Ground Bus: 50% of phase size.
  - 5. Neutral Bus: Neutral bus rated 100 percent of phase bus.
- C. Temporary generator connectors shall be Camlok style mounted on gland plate.
  - 1. Camlok shall be 16 Series model and color coded according to system voltage requirements.
  - 2. Camlok connections shall be Bus Bar Style. Cabling or Double Set Screw is not acceptable.
  - 3. Camlok connection shall be protected against accidental contact while not in use.
- D. Permanent Connection shall be factory installed broad range set-screw mechanical type, located behind a physical barrier
- E. Short Circuit & Withstand Rating
  - 1. Shall be minimum 65 KAIC unless otherwise indicated on drawings
- F. Voltage & Amperage
  - 1. 277/480 VAC, 3000 Amps.
- G. Factory Installed Phase Rotation Monitor Device:
  - a. Phase monitoring relay to be Siemens 3U4512-1AR20 or equal and factory installed.
- H. The docking station shall be a manual transfer switch type, which provides isolation between the permanent and temporary power sources. Docking stations which do not

provide this integral isolation are not acceptable. Kirk-key type interlocks with the permanent generator breaker are also not acceptable.

- I. Additional accessories shall be included in submittal drawing as follows:
  - 1. A: Two Wire Auto Start
  - 2. B: Battery Charger Receptacle 20A GFCI 125V
  - 3. C: Block Heater Receptacle 30A L5-30 125V
  - 4. D: 50A Twist-Lock 125V/250V
  - 5. E: SCADA Terminal Port
  - 6. F: Strip Heater & Thermostat

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine elements and surfaces to receive Generator Docking Station for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected

### 3.2 INSTALLATION

- A. Base Mounted: Determined by Application
  - 1. Install anchor bolts to elevations required for proper attachment to Generator Docking Station.

#### 3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- C. Label each enclosure with engraved metal or laminated-plastic nameplate.

#### 3.4 FACTORY COMMISSIONING

- A. Upon completion of the installation, the docking station shall be commissioned by the Manufacturer's factory authorized technician.
- B. SCOPE OF WORK SHALL INCLUDE:

- 1. Review and verify the installation of all components and verify the correct electrical flow as depicted on the one-line drawings.
- 2. Factory training for on-site personnel to educate them on how to connect the GDS to a portable generator.
- 3. The Manufacturer's factory authorized technician shall, upon completion of the commissioning provide a written report to the electrical contractor and electrical engineer indicating the completion of the work.
- 4. Any issue that is found during the start-up that is determined at that time to be a warranty issue will be covered by Manufacturer. Any issues that are specific to the scope for the electrical installing contractor are the sole responsibility of the installing contractor.

# 3.5 FIELD QUALITY CONTROL

- A. Third Party Tests and Inspections to include the following:
  - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- B. Prepare test and inspection reports, including a certified report that identifies Generator Docking Station and that describes scanning results. Include notation

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# SECTION 26 32 13 - PACKAGED ENGINE GENERATORS AND TRANSFER SWITCHES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. This Section includes packaged engine-generator sets suitable for use in mission critical applications with the features as specified and indicated. Engine generators will be used as the Standby power source for the system, but shall be capable of providing reliable power with no run-time limitations while the primary source of power is unavailable.

## 1.3 DEFINITIONS

- A. Emergency Standby Power (ESP): Per ISO 8528: The maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the ESP unless otherwise agreed by the RIC engine manufacturer.
- B. Prime Power (PRP): Per ISO 8528: The maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as a prescribed by the manufacturer. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 70 percent of the PRP unless otherwise agreed by the RIC engine manufacturer.
- C. Limited Time running Power (LTP): Per ISO 8528: The maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 hours of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers.
- D. Continuous Operating Power (COP): Per ISO 8528: The maximum power which a generating set is capable of delivering continuously whilst supplying a constant electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as a prescribed by the manufacturer.

- E. Data Center Continuous (DCC): The maximum power which a generating set is capable of delivering continuously whilst supplying a variable or constant electrical load when operated for an unlimited number of hours in a data center application under the agreed operating conditions with the maintenance intervals and procedures being carried out as a prescribed by the manufacturer. The permissible average power output (Ppp) over 24 hours of operation shall not exceed 100 percent of the DCC rating.
- F. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
  - 1. Thermal damage curve for generator.
  - 2. Time-current characteristic curves for generator protective device.
  - 3. Sound test data, based on a free field requirement.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, and location and size of each field connection.
  - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
  - 2. Wiring Diagrams: Control interconnection, Customer connections.
- C. Certifications:
  - 1. Submit statement of compliance which states the proposed product(s) is certified to the emissions standards required by the location for No Preference.

# 1.5 INFORMATIONAL SUBMITTALS

- A. Source quality-control test reports.
  - 1. Certified summary of prototype-unit test report. See requirements in Part 2 "Source Quality Control" Article Part A. Include statement indicating torsional compatibility of components.
  - 2. Certified Test Report: Provide certified test report documenting factory test per the requirements of this specification, as well as certified factory test of generator set sensors per NFPA110 level 1.
  - 3. List of factory tests to be performed on units to be shipped for this Project.
  - 4. Report of exhaust emissions and compliance statement certifying compliance with applicable regulations.
- B. Warranty:

1. Submit manufacturer's warranty statement to be provided for this Project.

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within Idaho Falls of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- D. Comply with NFPA 37 (Standard For the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- E. Comply with NFPA 70 (National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702).
- F. Comply with NFPA 110 (Emergency and Standby Power Systems) requirements for Level 1 emergency power supply system.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
  - 1. Ambient Temperature: 0.0 deg C (32.0 deg F) to 25.0 deg C (77.0 deg F).
  - 2. Relative Humidity: 0 to 95 percent.
  - 3. Altitude: Sea level to 4600.0 feet (1402.0 m).

#### 1.8 WARRANTY

A. Package Warranty: The manufacturer's warranty shall in no event be for a period of less than 5 years (60 months) from date of initial start-up of the system and shall include repair parts, labor, travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to no less than 2500 hours for the system warranty by both the manufacturer and servicing distributor. This warranty shall include voltage regulators, digital control board, engine components and generator alternator. There shall be NO deductibles and warranty shall not be pro-rated during the complete 5 year term. Warranty shall include emergency parts freight. Submittals received without written warranties as specified will be rejected in their entirety. Parts, labor and travel shall be covered for the full five years. The manufacturers ten year warranty shall include a rental (temporary) generator for the owner in the event a warrantable repair is not completed within 48

hours of initial technician visit. Warranties that do not provide the emergency rental protection will be rejected.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

A. Manufacturers: The basis for this specification is Cummins Power Generation equipment, approved equals may be considered if equipment performance is shown to meet the requirements herein.

## 2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
  - 1. Rigging Information: Indicate location of each lifting attachment, generator-set center of gravity, and total package weight in submittal drawings.
- C. Capacities and Characteristics:
  - 1. Power Output Ratings: Electrical output power rating for Standby operation of notless than 800kW, at 80 percent lagging power factor, 277/480, Series Wye, Three phase, 4 -wire, 60 hertz.
  - Alternator shall be capable of accepting maximum 4200.0 kVA in a single step and be capable of recovering to a minimum of 90% of rated no load voltage. Following the application of the specified kVA load at near zero power factor applied to the generator set.
  - 1. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component. The engine-generator nameplate shall include information of the power output rating of the equipment.
- D. Generator-Set Performance:
  - 1. Steady-State Voltage Operational Bandwidth: 0.5 percent of rated output voltage from no load to full load.
  - 2. Transient Voltage Performance: Not more than 7 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 1 seconds. On application of a 100% load step the generator set shall recover to stable voltage within 10 seconds.
  - 3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.
  - 4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
  - 5. Transient Frequency Performance: Not more than 3 percent variation for 50

percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within 1 seconds. On application of a 100% load step the generator set shall recover to stable frequency within 10 seconds.

- 6. Output Waveform: At full load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for any single harmonic. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.
- 7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 8 seconds without damage to generator system components. For a 1-phase, bolted short circuit at system output terminals, system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.
- 8. Start Time: Comply with NFPA 110, Level 1, Type 10, system requirements.
- 9. Ambient Condition Performance: Engine generator shall be designed to allow operation at full rated load in an ambient temperature under site conditions, based on highest ambient condition. Ambient temperature shall be as measured at the air inlet to the engine generator for enclosed units, and at the control of the engine generator for machines installed in equipment rooms.
- 10. Load Sharing: Engine generator shall share real and reactive load proportionally within plus or minus 3 percent with all other engine generators in the system.

## 2.3 ENGINE

- A. Fuel: ASTM D975 #2 Diesel Fuel
- B. Rated Engine Speed: 1800RPM.
- C. Lubrication System: The following items are mounted on engine or skid:
  - 1. Lube oil pump: shall be positive displacement, mechanical, full pressure pump.
  - 2. Filter and Strainer: Provided by the engine manufacturer of record to provide adequate filtration for the prime mover to be used.
  - 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Engine Fuel System: The engine fuel system shall be installed in strict compliance to the engine manufacturer's instructions
- E. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
- F. Governor: Adjustable isochronous, with speed sensing. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate as appropriate to the state of the engine generator. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various

isochronous states.

- G. Cooling System: Closed loop, liquid cooled
  - 1. The generator set manufacturer shall provide prototype test data for the specific hardware proposed demonstrating that the machine will operate at rated standby load in an outdoor ambient condition of 40 deg C.
  - 2. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  - 3. Size of Radiator overflow tank: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  - 4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
  - 5. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
  - 6. Duct Flange: Generator sets installed indoors shall be provided with a flexible radiator duct adapter flange.
- H. Muffler/Silencer: Selected with performance as required to meet sound requirements of the application, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements. For generator sets with outdoor enclosures the silencer shall be inside the enclosure.
- I. Air-Intake Filter: Engine-mounted air cleaner with replaceable dry-filter element and restriction indicator.
- J. Starting System: 12 or 24V, as recommended by the engine manufacturer; electric, with negative ground.
  - 1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
  - 2. Cranking Cycle: As required by NFPA 110 for level 1 systems.
  - 3. Battery Cable: Size as recommended by engine manufacturer for cable length as required. Include required interconnecting conductors and connection accessories.
  - 4. Battery Compartment: Factory fabricated of metal with acid-resistant finish.
  - 5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation. The battery charging alternator shall have sufficient capacity to recharge the batteries with all parasitic loads connected within 4 hours after a normal engine starting sequence.
  - 6. Battery Chargers: Unit shall comply with UL 1236, provide fully regulated, constant voltage, current limited, battery charger for each battery bank. It will include the following features:
    - a. Operation: Equalizing-charging rate based on generator set manufacturer's recommendations shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at

battery terminals. Unit shall then be automatically switched to a lower floatcharging mode and shall continue to operate in that mode until battery is discharged again.

- b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 20 deg C to plus 40 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
- c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
- d. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
- e. Provide LED indication of general charger condition, including charging, faults, and modes. Provide a LCD display to indicate charge rate and battery voltage. Charger shall provide relay contacts for fault conditions as required by NFPA110.
- f. Enclosure and Mounting: NEMA, Type 1, wall-mounted cabinet.
- g. Jacket Water Heater: Jacket water heater shall be high-efficiency pump style and shall be sized to ensure that genset will start within the specified time period and ambient conditions. Additionally the coolant heater shall be pre-wired through a disconnect relay that will disable heater while engine is running. The heater shall be pre-wired to the internal distribution panel provided by generator supplier.

## 2.4 FUEL OIL STORAGE

- A. Comply with NFPA 30.
- B. Sub Base-Mounted Fuel Oil Tank: Provide a double wall secondary containment type sub base fuel storage tank. The tank shall be constructed of corrosion resistant steel and shall be UL 142 listed and labeled. The fuel tank shall include the following features:
  - 1. Capacity: Fuel for 48 Hour(s) continuous operation at 100 percent rated power output.
  - 2. Tank rails and lifting eyes shall be rated for the full dry weight of the tank, genset, and enclosure.
  - 3. Electrical stub up(s)
  - 4. Normal & emergency vents
  - 5. Lockable fuel fill
  - 6. Mechanical fuel level gauge
  - 7. High and low level switches to indicate fuel level
  - 8. Leak detector switch
  - 9. Sub base tank shall include a welded steel containment basin, sized at a minimum of 130% of the tank capacity to prevent escape of fuel into the

environment in the event of a tank rupture.

- 10. Fill port with overfill prevention valve (OFPV)
- 11. 5 gallon fill/spill dam or bucket
- 12. Tank design shall meet the regional requirements for the Project location

## 2.5 CONTROL AND MONITORING

- A. Engine generator control shall be microprocessor based and provide automatic starting, monitoring, protection and control functions for the unit.
- B. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. (Switches with different configurations but equal functions are acceptable.) When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.
- C. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of the local (generator set-mounted) and/or remote emergency-stop switch also shuts down generator set.
- D. Configuration: Operating and safety indications, protective devices, system controls, engine gages and associated equipment shall be grouped in a common control and monitoring panel. Mounting method shall isolate the control panel from generator-set vibration. AC output power circuit breakers and other output power equipment shall not be mounted in the control enclosure.
- E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
  - 1. AC voltmeter (3-phase, line to line and line to neutral values).
  - 2. AC ammeter (3-phases).
  - 3. AC frequency meter.
  - 4. AC kW output (total and for each phase). Display shall indicate power flow direction.
  - 5. AC kVA output (total and for each phase). Display shall indicate power flow direction.
  - 6. AC Power factor (total and for each phase). Display shall indicate leading or lagging condition.
  - 7. Ammeter-voltmeter displays shall simultaneously display conditions for all three phases.
  - 8. Emergency Stop Switch: Switch shall be a red "mushroom head" pushbutton device complete with lock-out/tag-out provisions. Depressing switch shall cause the generator set to immediately stop the generator set and prevent it from

operating.

- 9. Fault Reset Switch: Supply a dedicated control switch to reset/clear fault conditions.
- 10. DC voltmeter (alternator battery charging).
- 11. Engine-coolant temperature gauge.
- 12. Engine lubricating-oil pressure gauge.
- 13. Running-time meter.
- 14. Generator-voltage and frequency digital raise/lower switches. Rheostats for these functions are not acceptable. The control shall adjustment of these parameters in a range of plus or minus 5% of the voltage and frequency operating set point (not nominal voltage and frequency values.) The voltage and frequency adjustment functions shall be disabled when the paralleling breaker is closed.
- 15. Fuel tank derangement alarm.
- 16. Fuel tank high-level shutdown of fuel supply alarm.
- 17. AC Protective Equipment: The control system shall include over/under voltage, reverse kVAR, reverse kW, over load (kW) short circuit, over current, loss of voltage reference, and over excitation shut down protection. There shall be a ground fault alarm for generator sets rated over 1000 amps, overload warning, and overcurrent warning alarm.
- 18. Status LED indicating lamps to indicate remote start signal present at the control, existing shutdown condition, existing alarm condition, not in auto, and generator set running.
- 19. A graphical display panel with appropriate navigation devices shall be provided to view all information noted above, as well as all engine status and alarm/shutdown conditions (including those from an integrated engine emission control system). The display shall also include integrated provisions for adjustment of the gain and stability settings for the governing and voltage regulation systems.
- 20. Panel lighting system to allow viewing and operation of the control when the generator room or enclosure is not lighted.
- 21. Data Logging: The control system shall log the latest 20 different alarm and shut down conditions, the total number of times each alarm or shutdown has occurred, and the date and time the latest of these shutdown and fault conditions occurred.
- 22. DC control Power Monitoring: The control system shall continuously monitor DC power supply to the control, and annunciate low or high voltage conditions. It shall also provide an alarm indicating imminent failure of the battery bank based on degraded voltage recover on loading (engine cranking).
- 23. Paralleling Breaker control switches: The control shall include manual open and close provisions for the paralleling breaker, and LED status lamps indicating whether the breaker is open or closed.
- F. Control Heater: Generator sets that are installed in outdoor enclosures, or are in tropical or coastal environments shall be provided with control heaters for anti-condensation protection.
- G. Remote Alarm Annunciator: Comply with NFPA 110. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition.

# 2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Circuit Breaker: Provide a 3 pole 1600 amp generator-mounted 100% rated, molded case circuit breaker that is suitable for use as service equipment. The breaker shall have an LSI trip unit. The breaker shall be UL/CSA Listed and connected via shunt trips to engine/generator safety shutdowns. Breakers shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker. 80% rated circuit breakers will not be acceptable. The generator protective controls shall perform the following functions:
  - 1. Initiates a generator kW overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
  - 2. Under single phase or multiple phase fault conditions, or on overload conditions, indicates an alarm conditions when the current flow is in excess of 110% of rated current for more than 10 seconds.
  - 3. Under single phase or multiple phase fault conditions, operates to switch off alternator excitation at the appropriate time to prevent damage to the alternator.
  - 4. The operator panel shall indicate the nature of the fault condition as either a short circuit or an overload.
  - 5. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot greater than 120% of nominal voltage.
  - 6. The protective system provided shall not include an instantaneous trip function.
- B. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

# 2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H
- D. Temperature Rise: 125 C / Class H, Standby environment.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, over speed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Permanent Magnet Generator (PMG) shall provide excitation power for optimum motor starting and short circuit performance.
- G. Enclosure: Drip-proof.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as

specified. The voltage regulation system shall be microprocessor-controlled, 3-phase true RMS sensing, full wave rectified, and provide a pulse-width modulated signal to the exciter. No exceptions or deviations to these requirements will be permitted.

- I. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding. Alternators operating at voltage higher than 690VAC shall be provided with formwound stator coils.
- J. Subtransient Reactance: 12 percent maximum, based on the rating of the engine generator set.

## 2.8 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Sound Attenuated Steel housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Instruments, control, and battery system shall be mounted within enclosure.
- B. Construction:
  - 1. Louvers: Equipped with bird screen to permit air circulation when engine is not running while excluding birds and rodents.
  - 2. Hinged Doors: With padlocking provisions. Restraint/Hold back hardware to prevent door to keep door open at 180 degrees during maintenance. Rain lips over all doors.
  - 3. Exhaust System:
  - 4. Muffler Location: Within enclosure.
  - 5. Hardware: All hardware and hinges shall be stainless steel.
  - 6. Mounting Base: Suitable for mounting on sub-base fuel tank or housekeeping pad.
  - 7. A weather protective enclosure shall be provided which allows the generator set to operate at full rated load with a static pressure drop equal to or less than 0.5 inches of water.
- C. Engine Cooling Airflow through Enclosure: Housing shall provide ample airflow for engine generator operation at rated load in an ambient temperature of 40 deg C.
  - 1. Louvers: Fixed-engine, cooling-air inlet and discharge.
  - 2. Motorized Louvers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating. Dampers shall be of a "fail open" design to allow airflow in the event of failure
- D. Sound Performance: Reduce the sound level of the engine generator while operating at full rated load to a maximum of 75 dBA measured at any location 23 ft from the engine generator in a free field environment.
- E. Electrical Provisions
  - 1. Compliance with NEC: Package shall comply with the requirements of the National Electrical Code for all wiring materials and component spacing.
  - 2. External Electrical Connections: All power and control interconnections shall be

made within the perimeter of the enclosure.

- F. Site Provisions:
  - 1. Lifting: Complete assembly of engine generator, enclosure, and sub base fuel tank (when used) shall be designed to be lifted into place as a single unit, using spreader bars.

#### 2.9 VIBRATION ISOLATION DEVICES

A. Vibration Isolation: Generators installed on grade shall be provided with elastomeric isolator pads integral to the generator, unless the engine manufacturer requires use of spring isolation.

#### 2.10 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Powder-coated and baked over corrosion-resistant pretreatment and compatible primer. Manufacturer's standard color or as directed on the drawings.
- 2.11 SOURCE QUALITY CONTROL
  - A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
    - 1. Tests: Comply with NFPA 110, Level 1 Energy Converters. In addition, the equipment engine, skid, cooling system, and alternator shall have been subjected to actual prototype tests to validate the capability of the design under the abnormal conditions noted in NFPA110. Calculations and testing on similar equipment which are allowed under NFPA110 are not sufficient to meet this requirement.
  - B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
    - 1. Test engine generator set manufactured for this Project to demonstrate compatibility and functionality.
    - 2. Full load run.
    - 3. Maximum power.
    - 4. Voltage regulation.
    - 5. Steady-state governing.
    - 6. Single-step load pickup.
    - 7. Simulated safety shutdowns.
    - 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.

### 3.1 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation, application, and alignment instructions and with NFPA 110.
- B. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.
- C. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.
- D. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.
- E. Equipment shall be initially started and operated by representatives of the manufacturer. All protective settings shall be adjusted as instructed by the consulting engineer.
- F. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.
- G. On completion of the installation by the electrical contractor, the generator set supplier shall conduct a site evaluation to verify that the equipment is installed per manufacturer's recommended practice.

## 3.2 ON-SITE ACCEPTANCE TEST

- A. The complete installation shall be tested to verify compliance with the performance requirements of this specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests. The generator set manufacturer shall provide a site test specification covering the entire system. Tests shall include:
- B. Prior to start of active testing, all field connections for wiring, power conductors, and bus bar connections shall be checked for proper tightening torque.
- C. Installation acceptance tests to be conducted on site shall include a "cold start" test, a two hour full load (resistive) test, and a one-step rated load pickup test in accordance

with NFPA 110. Provide a resistive load bank and make temporary connections for full load test, if necessary.

D. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

### 3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

### 3.4 SERVICE AND SUPPORT

- A. The generator set supplier shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The inventory shall have a commercial value of \$3 million or more. The manufacturer of the generator set shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including engines, alternators, control systems, paralleling electronics, and power transfer equipment.
- B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within Idaho Falls of the site.
- C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

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SECTION 26 36 00 - TRANSFER SWITCHES

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to the project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosure type, and accessories.

### 1.2 SUMMARY

- A. This Section includes transfer switches rated 600 V and less, including the following:
  - 1. Contactor-type service entrance automatic transfer switches.
  - 2. Contactor-type service entrance nonautomatic transfer switches.
  - 3. Transfer switch accessories.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.
  - 3. Include network register map for the transfer switch control
- B. Shop Drawings:
  - 1. Include outlines drawings, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
  - 2. Include material lists for each switch specified.
  - 3. Include Building Information Models (BIM) for the transfer switches
  - 4. Single-line diagram: show connections between transfer switch, power sources,

- and load; and show interlocking provisions for each combined transfer switch
- 5. Interconnection wiring diagrams, showing recommended conduit runs and pointto-point terminal connections to generator sets
- 6. Riser Diagram: Show interconnection wiring between transfer switches, annunciators, and control panels.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer-authorized service representative testing agency.
- B. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Seismic certifications shall be third-party certified and based on testing. Certification based on calculations does not meet this requirement.
  - 2. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational both during and after the seismic event.
  - 3. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 4. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer and Supplier Qualification Data
  - 1. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.
  - 2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
  - 1. Include the following:

a. Features and operating sequences, both automatic and nonautomatic. b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.
 c. Factory test reports

## 1.6 QUALITY ASSURANCE

- A. Only approved bidders shall supply equipment provided under this contract.
- B. Manufacturer Qualifications: The equipment manufacturer shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch, generator sets, and remote monitoring equipment (if applicable) at the site within a response period of less than eight from time of notification.
  - 1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set manufacturer.
  - 2. The manufacturer shall have a service organization that is factory-certified in both generator set and transfer switch service. The service organization shall be on call 24 hours per day, 365 days per year
  - 3. The manufacturer shall maintain an inventory of critical replacement parts at the local service organization, and in-service vehicles.
  - 4. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.
  - 5. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.
- C. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.

## 1.7 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:
  - 1. Notify Architect, Construction Manager, and Owner no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Architect's, Construction Manager's, and Owner's written permission.
  - 3. Do not energize any new service or distribution equipment without notification and permission of the (Architect, Construction Manager, Owner).

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship for a minimum of five (5) years from the warranty start date.
  - 1. Warranty Period: The warranty start date is the date of registered commissioning and start up or eighteen (18) months from date of shipment, whichever is sooner.
- B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc. during the minimum noted warranty period described above.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cummins Power Generation
  - 2. ASCO
  - 3. Caterpillar
  - 4. Kohler
  - 5. Others with prior approval
- B. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by other manufacturers that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.
- C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.
- D. For switches installed in systems having ground fault protective devices, and/or wired so as to be designated a separately derived system by the NEC, a 4th pole shall be provided. This additional pole shall isolate the normal and emergency neutrals. The neutral pole shall have the same withstand and operational ratings as the other poles and shall be arranged to break last and make first to minimize neutral switching transients. Add-on or accessory poles that are not of identical construction and withstand capability will not be considered.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.
- B. Comply with NEMA ICS 10.
- C. IEEE 446 Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- D. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701, 702 and 708 (Critical Operations Power Systems, COPS)
- E. Comply with NFPA 110 Level 1, Type 10.
  - 1. shall be permanently marked to identify it as a service disconnect.
- F. Service entrance transfer switches rated at 1000A and above shall be
  - 1. UL891 listed with UL1008 recognized transfer switch
  - 2. Labeled as "Suitable for use only as service entrance."
  - 3. Labeled as suitable for use in emergency, legally required, and optional standby applications.
  - 4. Service disconnect shall be permanently marked to identify it as a service disconnect.
- G. The transfer switch shall contain a disconnect device on the normal source as well as a disconnect link on the utility neutral and a disconnect link between neutral and ground.
- H. EN 61000-6-2 Generic Immunity Standard
- I. EN 61000-4-3 Radiated Immunity
- J. EN 61000-4-4 Electrical Fast Transients
- K. EN 61000-4-2 Electrostatic Discharge
- L. EN 61000-4-6 Conducted Immunity
- M. EN 61000-4-8 Power Frequency Magnetic Field
- N. Fault-Current Withstand and Closing Ratings (WCR): UL 1008 WCR must be listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. WCR shall be based on use of the same set of contacts for the withstand test and the closing test. WCR shall be adequate for duty imposed by protective devices at installation locations in Project under the fault conditions

- indicated, based on testing according to UL 1008.
- 1. Transfer switches shall have a time-duration Withstand and Closing Rating (WCR) of at least 0.05 seconds (3 cycles at 60 Hz).
- 2. Short-time WCR shall be rated for a duration of 0.5 seconds (30 cycles at 60 Hz).
- 3. Transfers switches with Withstand Ratings only and without Closing Rating shall not be acceptable. This applies for Short-time and Time Duration WCR Ratings
- 4. Transfer switches which are not tested and labeled with 0.05 seconds (3 cycles at 60 Hz) time-based ratings, or applicable 0.5 seconds (30 cycles at 60 Hz) short-time rating(s) and have series, or specific breaker ratings only, are not acceptable
- O. The transfer switch shall be rated to close on and withstand the available RMS symmetrical short circuit current at the service entrance transfer switch terminals with the type of overcurrent protection shown on the plans.
- P. Repetitive Accuracy of Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of 40 to + 60 degrees C (- 40 to + 140 degrees F).
- Q. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- R. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric- motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- S. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously. The neutral poles shall have the same ratings as the phase poles. Overlapping neutral contacts shall not be accepted.
- T. Neutral Terminal: Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.
- U. Heater: Equip switches exposed to outdoor temperatures and humidity, and other units indicated, with an internal heater. Provide thermostat within enclosure to control heater.
- V. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.
- W. Control: Transfer switch control shall be capable of communicating with the genset

control, other switches and remote programming devices over a high-speed network interface.

- X. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism
- Y. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.
- Z. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:
  - 1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.
  - 2. Exterior cabinet doors shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.
  - 3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.
  - 4. Enclosure type: NEMA 250: Type 3R,

# 2.3 DISCONNECTING AND OVERCURRENT PROTECTION DEVICE

- A. For service entrance transfer switches rated 3000 amps, the normal connection shall be provided with a 4-pole, air circuit breaker with current ratings as shown on the plans. The circuit breaker shall be provided with LSIG Trip Unit. The circuit breaker shall have means to be racked out.
- B. An Energy Reduction Maintenance Switch (ERMS) shall be provided where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200 amps or higher.
- C. The transfer switch service entrance breaker shall be equipped with Ground Fault Protection (GFP) per NEC, requirements if applicable.

## 2.4 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
  - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-

case circuit-breaker components are unacceptable.

- 2. Switch Action: Double throw; mechanically held in both directions.
- 3. Neutral switching: Where four pole switches are indicated, provide neutral pole switched simultaneously with phase poles. The neutral bus shall be sized to carry 100% of the current designated on the switch rating. Overlapping neutral shall not be accepted
- 4. The transfer switch operation shall include the ability to switch to an open position (both sources disconnected) for load shedding from the generator set.
- 5. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.
- 6. During fault conditions, the switch shall be both electrical and mechanically held during a fault condition. For switches rated at 400A or less, and fault currents less than 65kA, transfer switch contacts which are only mechanically held shall be acceptable.
- 7. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- 8. Switches rated 150 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts. For transfer switches 400A and below, blow-off construction shall be acceptable.
- 9. Switch contacts shall be encapsulated to increase phase to phase isolation and reduce the possibility of arcing between phases.
- 10. All major switching components and controls shall be from the same manufacturer for ease maintenance and commonality of parts.
- 11. Main switch contacts shall be high pressure silver tungsten alloy brazed-on. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
- 12. Contacts shall be 100% Restriction of Hazardous Substances (RoHS) compliant
- 13. Conductor Connectors: Suitable for use with conductor material and sizes.
- 14. Where neutral conductors are to be solidly connected as shown on the plans, a 100% rated neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
- 15. Main and Neutral Lugs: Mechanical Type, unless shown differently on drawings.
- 16. Ground Lugs and Bus-Configured Terminators: Compression or Mechanical type. Bus stabs are also acceptable.
- 17. Ground bar shall be provided.
- 18. Connectors shall be marked for conductor size and type according to UL 1008.
- C. Automatic Open-Delayed Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer-switch controller. Interlocked to prevent the load from being closed on both sources at the same time.
  - 1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
  - 2. Fully automatic break-before-make operation with center off position.

- 3. Fully automatic break-before-make operation when two sources have near zero phase difference.
- D. Automatic Open-Fast Transition Sync: No delays but waits for the sources to be synchronized for all three parameters: phase, voltage and frequency intended for relatively small stored energy loads such as small motors.
- E. Automatic Open-Fast Transition No Sync: No time delays and no synchronization needed, intended for resistive loads only
- F. Manual Operation. Instruction and equipment shall be provided for safe manual nonelectric transfer in the event the transfer switch malfunctions. Authorized personnel shall be available and familiar with manual operation of the transfer switch and shall be capable of determining the adequacy of the alternate source of power prior to manual transfer.
  - 1. Manual operation with the transfer switch door open must be performed by qualified personnel under no-load conditions only.
- G. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- H. Automatic Transfer-Switch Control Features:
  - 1. The transfer switch shall have a microprocessor-based control with a sealed membrane panel incorporating tactile pushbuttons for operator-controlled functions, and LED indicator lights for system status indicators. The control panel shall also include a color alphanumeric display for detailed system information.
  - 2. The control shall operate over an ambient temperature range: -40 °C to +70 °C (-40 °F to +158 °F) surrounding the control
  - 3. LCD display shall operate over an ambient temperature range of -20 °C to +70 °C (-4 °F to 158 °F) without a heater.
  - 4. The control shall operate after being exposed to storage temperatures in the range of -40 °C to +80 °C (-40 °F to 176 °F).
  - 5. The LCD display shall function after being exposed to storage temperatures of -30 °C to +80 °C (-22 °F to 176 °F).
  - 6. The control shall operate over the altitude range of 0-5,000 m (16,404 ft) above sea level.
  - 7. Control and Display, as installed in the transfer switch enclosure, shall have an ingress protection rating of IP65
  - 8. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.
  - 9. All transfer switch sensing shall be configurable from the control or from a PCbased service tool. Designs utilizing DIP switches or other electromechanical devices are not acceptable.

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- 10. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator set.
- 11. Controller shall operate through a period of loss of control power.
- 12. Controller shall have an integrated DC power supply with:

a. At least three diode isolated inputs to connect to three independent sources

b. Ability to automatically switch between the isolated inputs and utilize the best available DC source.

c. A minimum of 10 second ride-through, long enough for the emergency source to start

- 13. The controller shall have direct three phase sensing on both sources (S1, S2) without external transformers.
- 14. True RMS voltage sensing shall be provided.
- 15. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase- to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. The delay shall be from 0.1 seconds to 1 seconds.
- 16. Overvoltage Sensing for Each Phase of Normal and Alternate Source: Sense high phase- to-ground voltage on each phase. Pickup voltage shall be adjustable from 95 to 100 percent of nominal, and dropout voltage shall be adjustable from 105 to 135 percent of pickup value. The delay shall be from 0.5 seconds to 120 seconds.
- 17. Underfrequency Sensing for both Normal and Alternate Source: The underfrequency dropout shall be between 0.5 percent and 10 percent and a delay of 0.1 seconds to 30 seconds. The underfrequency pickup shall be between 0 percent to 100%.
- 18. Over-frequency Sensing for both Normal and Alternate Source: The overfrequency dropout shall be between 0.5 percent and 10 percent and a delay of 0.5 seconds to 120 seconds. The underfrequency pickup shall be between 0 percent to 100%.
- 19. The control shall have the ability to detect loss of phase on all three phases
- 20. The control shall have the ability to monitors a source (three-phase system only) to detect when there is a significant voltage difference between the different phases of the source.
- 21. The control shall have the ability to monitors and compares the phase rotation of each source against the system phase rotation.
- 22. The control shall have the ability to monitors a source (three-phase system only) to detect when there is a significant voltage difference between the different phases of the source.
- 23. The control shall have the ability to monitor both sources to detect when a neutral current exceeds the current threshold.
- 24. The control shall have a sync check function with the ability to determine when both sources of power are within specified tolerances of frequency, voltage, and relative phase difference before transferring load.

a. Sync checks that only based on frequency and phase measurements but not voltage measurements shall not be accepted.

25. The transfer switch shall have the following adjustable time delays all built into the transfer switch control, external modules to accomplish these delays shall not

be permitted:

a. Normal to Emergency Time Delay: A time delay shall be provided on transfer to emergency, adjustable from 0 to 15,549 seconds for controlled timing of transfer of loads to emergency.

b. Time Delay Retransfer: A time delay shall be provided for the preferred source to stabilize before the load retransfers to the preferred source, adjustable from 0 to 15,549 seconds for controlled timing of transfer of loads to emergency.

c. Program Transition Time Delay: A time delay shall be provided to allow the transfer switch to pause in the neutral position for an adjustable duration of 0 seconds to 600 seconds whenever there is a transfer from one source to another. The time delay shall be factory set for one second. Time delays shall be adjustable in 0.1 second increments. The time delay shall start at the loss of the source.

d. Time Delay Engine Start: A time delay shall be provided to delay the start of the standby generator set to prevent nuisance starts during short power interruptions of the preferred source, adjustable from 0 to 3,600 seconds for controlled timing of transfer of loads to emergency.

e. Time Delay Engine Cooldown: A time delay shall be provided to allow the generator set to run without load and cool down for a duration before stopping, adjustable from 0 to 3,600 seconds for controlled timing of transfer of loads to emergency.

f. Elevator Time Delay: A time delay shall be provided to allow an elevator to attempt to reach the nearest floor and open its doors, prior to a loss of power. adjustable from 0 to 600 seconds for controlled timing of transfer of loads to emergency.

g. Elevator Post Transfer Time Delay: A time delay shall be provided to energize the elevator pre-transfer output for an additional period after connecting to the destination source, adjustable from 0 to 600 seconds for controlled timing of transfer of loads to emergency.

- 26. The control shall have a test switch to simulate a normal-source failure.
- 27. The control shall have a dedicated test button to initiate or cancel a test request
- 28. The control shall have an override button to terminate an active exercise period
- 29. The control shall have an override button to terminate or bypass the following time-delays:
  - a. Transfer

a.

- b. Retransfer
- c. Engine start
- 30. The control shall have a reset button to reset any existing faults.
- 31. The control shall have the following LED indicator lights which indicate the following:
  - Which source the load is connected to (Source 1 or Source 2)
  - Source 1 shall be green
  - Source 2 shall be yellow
  - b. Which source or sources are available
  - c. When switch is not set for automatic operation
  - d. When the control is disabled
  - e. When the switch is in test/exercise mode
  - f. When there is a warning event flagged by the control

- 32. The control shall have pushbuttons that allow the operator to activate the following functions:
  - a. Activate pre-programmed test sequence
  - b. Override programmed delays, and immediately go to the next operation
  - c. Reset the control by clearing any faults
  - d. Test all the LEDs by lighting them simultaneously
  - e. Navigate the menus to view and adjust settings and parameters
- 33. The control display shall be a UV-protected, colored alphanumeric display which immediately shows the following information:
  - a. Date and time
  - b. Source 1/Source 2 voltage
  - c. Load KVA
  - d. Transfer switch name
  - e. Whether the control is password protected
  - f. Source availability
  - g. To which source the load is connected
  - h. Preferred source indication
  - i. Active banner that shows time delays, inhibits and test statuses
  - j. The color for source 1 shall be green and the color for source 2 shall be yellow.
- 34. The control shall have the following three levels of password security designed to restrict user access and the display shall display visually if the password is enabled:

a. User Level: Modifiable password that prevents unauthorized users from accessing the setup screen and initiating tests using the test button on the operator panel.

b. Advanced: Password that allows users access to the advanced parameters.

c. Service: password that allows users (authorized services technicians only) access to the advanced and service screens.

- 35. The control shall display all active alerts listed in chronological order, beginning with the most recent alert. The active alert shall have:
  - a. Alert type
    - (i) Not in auto
    - (ii) Warning
    - (iii) Information
  - b. Fault code name
  - c. Fault code description
  - d. Date and time of occurrence
  - e. Fault Code Number
- 36. The control shall display information on a minimum of 256 events displayed in chronological order, beginning with the most recent event, about either source. The event information shall include the following:
  - a. Fault codes
  - b. Active time delays

- c. Power system changes
- d. Tests and exercises
- e. User-driven inputs (e.g., override, transfer inhibit)
- 37. The control shall display the following source statistics:
  - a. Total Time Load Energized
  - b. Number of Transfers
  - c. Number of Retransfers
  - d. S1 Number of Failures
  - e. S2 Number of Failures
  - f. S1 Connected and Available
  - g. Total Time on S1
  - h. S2 Connected and Available
  - i. Total Time on S2
  - j. Transfer Time
  - k. Last Transfer Due to Failure
- 38. The control shall display real-time power source data for three phase, two phase, single phase configurations (Source 1 and Source 2):
  - a. Connected Time
  - b. Frequency
  - c. Line to line
  - d. Line to Neutral
  - e. Total Harmonic Distortion (THD)
  - f. Average THD
  - g. Phase angle
  - h. Phase rotation
- 39. Load metering capability shall be fully integrated to the main transfer switch control. External modules shall not be acceptable. The following parameters shall be measured and displayed with the minimum accuracies listed in parenthesis
  - a. Line and neutral current (0.25 %)
  - b. Line to Line and Line to Neutral Voltage (0.25 %)
  - c. Frequency (0.03 Hz)
  - d. Power Factor (0.25 %)
  - e. Apparent Power (0.25%)
  - f. Active Power (0.25 %)
  - g. Reactive Power (0.50 %)
  - h. Apparent Energy (0.50 %)
  - i. Active Energy (0.50 %)
  - j. Reactive Energy (0.70 %)
  - k. Total Harmonic Distortion (THD) (Current) (< 1.00 %)
  - I. Average THD, Current (< 1.00 %)
  - m. Total Harmonic Distortion THD (Voltage) (< 1.00 %)
  - n. Average THD, Voltage (< 1.00 %)
- 40. The control shall have an "About" display that shows general information about the transfer switch and controller
  - a. Controller Name
  - b. Application Software (S/W) Version
  - c. Calibration Part Number

- d. Controller Hardware (H/W) Version
- e. Transfer Switch Model Number
- f. Transfer Switch Serial Number
- g. System DC Voltage
- 41. The control shall have integrated generator set exerciser function capable of starting the generator set and transferring to it from normal source for a preset time, then retransfer and shuts down engine after a preset cool-down period. The exercise shall have the capability to support a minimum of 12 preset exercise schedules and 12 exceptions.
  - a. The exercise scheduler shall have the following configuration:
    - Test type
      - Test without load
      - Test with load
      - Transfer to standby
        - Transfers and keeps the load connected to the generator set (standby source) for a specified duration, regardless of the preferred source availability.
      - Repeat interval
        - Once
        - First week
        - Second week
        - Third week
        - Fourth week
        - Fifth week
        - Every other week
        - Every week
      - Day of week
      - Start hour
    - Start minute
    - Start date
    - Start month
    - Start year
    - Duration hours
    - Duration minutes
  - b. The exercise scheduler exceptions shall have the following configuration
    - Repeat interval
      - Once
      - Yearly
    - Start hour
    - Start minute
    - Start date
    - Start month
    - Start year
    - Duration days
    - Duration hours
    - Duration minutes

- 42. The control shall have built-in downstream load control (on/off sequencing) of at least two independent loads to prevent overloading the generator set source while continuing to power higher priority loads. Auxiliary hardware to achieve this function shall not be accepted. This functionality shall have the capability to do the following:
  - a. Add load:
    - Block Load (Load 1 and Load 2 simultaneously), or
    - Sequential time dependent load add (Load 1 then Load 2).
       The time delay shall be adjustable from (0-180 seconds).
  - b. Shed load:
    - Source frequency and time-delay dependent
    - Sheds lowest priority first

c. This feature shall also be capable of automatically re-adding load(s) after an overload occurs. This feature shall be capable of being enabled or disabled.

- 43. Customer Inputs, Outputs, Dry-Contacts The transfer switch control shall have a minimum of the following Inputs/Outputs/Dry-Contacts:
  - Remote Test
  - Remote Override
  - Transfer to Standby
  - Transfer Inhibit
    - Transfer Inhibit: Shall keep the transfer switch connected to normal power source regardless of condition of emergency source.
  - Re-transfer Inhibit
    - Re-Transfer Inhibit: Shall keep the transfer switch connected to emergency power source as long as it is available regardless of condition of normal source.
  - Battery Charger Fault (accepts a wired input from an external battery charger and allows for custom text message to be displayed on the screen)
  - S1 Shutdown Fault Active
  - S2 Shutdown Fault Active
  - External Fault Input
  - Load Shed
  - Dual Standby Start Inhibit
  - S1 Standby Start
  - S2 Standby Start
  - S1 Available
  - S2 Available
  - S1 Connected
  - S2 Connected
  - Test Active
  - Up to four Fault Codes (Configurable to any fault code supported by the transfer switch control)
  - Elevator Pretransfer
  - Elevator Post Transfer
  - Synchronizer Enable
  - Load Contact 1
  - Load Contact 2

- Quantity 2 digital inputs
  - Quantity 6 digital outputs
- Quantity 1 dry Form-C contacts driven through the control onboard relays
- 44. Transfer Switch Auxiliary Contacts:

a. Auxiliary contacts shall be driven by the transfer switch mechanism and shall be rated 10 A at 250-VAC, 5A at 30-VDC minimum. Contacts shall be the following:

- Quantity 2 for each source indicating source connection
- Auxiliary contacts shall be isolated.

b. Optional Auxiliary contacts. The transfer switch shall have additional optional auxiliary contacts and the contacts shall be driven by the transfer switch mechanism and shall be rated 10 A at 250-VAC, 5A at 30-VDC minimum. Contacts shall be the following:

- Quantity 2 for each source indicating source connection
- 45. Network communication protocols: The controls shall have integrated communication capabilities. External and additional modules shall not be accepted. The communication protocols shall be
  - a. Modbus RTU RS485 (Isolated). At least one port.
  - b. Modbus Ethernet TCP/IP (Isolated). At least two ports
    - The control shall have the capability to turn off the Ethernet ports, if needed.
  - c. USB B-Type service-tool port with dust cover.
- I. Large-Motor-Load Power Transfer:
  - 1. Programmed Neutral Switch Position: Switch mechanism shall have a neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, adjustable time-controlled pause at midpoint during transfer.

#### 2.5 NONAUTOMATIC TRANSFER SWITCHES (OPTIONAL)

- B. General information: Non-automatic is a transition type, where the control continues to monitor the sources to display source availability on the screen but does not operate the transfer switch mechanism, requiring the user to operate the transfer switch using manual selector switches.
- C. The following hardware shall be provided to use in non-automatic transition:
- 1. Two selector switches shall be installed on the front panel of the transfer switch:

a. Local/Remote Selector Switch (2-position switch) shall be provided. When the selector switch is moved to local, the source selection is chosen based on the Source Selector switch. When Remote is selected, the source selection signal will come from the terminal block connection point, where a user can have an external/remote switch to request the transfer

b. Source Selector Switch (3 position switch) shall be provided to switch between Source 1 or Source 2 and spring-return to center position once released.

- 2. Wiring harness that connects the switches to the control as well the terminal block.
- B. Transfer Operation: Shall be electrically actuated by the Source Selector Switch to switch the load to either Source 1 or Source 2 if the source is energized.
- C. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism
- D. Terminals for Interconnection: Terminals shall be screw type and appropriate for all field wiring for interconnecting to the transfer switch. Communication wiring over Ethernet TCP/IP shall be the standard RJ45 connection. Communication wiring over Serial RTU shall be screw-type connection.

# 2.6 TRANSFER SWITCH ADD-ONS/ACCESSORIES

- A. Source Surge Protection Device (SPD):
  - 1. The SPDs shall be factory installed and wired and shall include a display and LED indicators.
  - 2. Source 1: Transfer switch shall include a 3-phase SPD for Source 1 and a door mounted display that indicates when a phase has seen a surge event. Individual phase modules shall be replaceable after surge events. SPD shall be designed for electrical surges up to 120kA/240 kA on WYE Systems
- B. Remote Annunciator System:
  - 1. Source Limitations: shall be same manufacturer as transfer switch in which installed.
  - 2. Functional Description: remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:

a. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.

- b. Switch position.
- c. Switch in test mode.
- d. Failure of communication link.

- 3. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
  - a. Indicating Lights: Grouped for each transfer switch monitored.

b. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.

- c. Switch in test mode.
- d. Lamp Test: Push-to-test or lamp-test switch on front panel.
- 4. Malfunction of annunciator or communication link shall not affect functions of transfer switch. In the event of failure of communication link, transfer switch automatically reverts to stand-alone, self-contained operation.
- 5. Transfer switch sensing, controlling, or operating function shall not depend on remote panel for proper operation. The remote annunciation system shall not prevent transfer to the alternate source when the primary power source fails, nor prevent return to the primary source if the alternate source fails.
- C. Heater:
  - 1. The transfer switch heater and thermostats shall be factory installed and wired.
- D. Digital Meter:
  - 1. Digiatl Meter: Measures and displays true RMS volts, amps, power, energy, power factor, THD and frequency in a three-phase power system. Available with no communication capabilities.

# 2.7 SOURCE QUALITY CONTROL

- A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.
- B. Factory shall provide end of line test reports shipped with each transfer switch.
- C. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.

#### 3.1 INSTALLATION

- A. Floor-Mounting Switch: Anchor to floor by bolting.
  - 1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in- Place Concrete."
  - 2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
  - 3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
  - 4. Provide workspace and clearances required by NFPA 70.
- B. Annunciator Panel Mounting: Flush Mount in wall unless otherwise indicated.
- C. Identify components according to Section 260553 "Identification for Electrical Systems."
- D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- E. Comply with NECA 1.
- F. Provide certification of IBC Seismic compliance

#### 3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, motor controls, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary, to accommodate required wiring.
- B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
  - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

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- D. Transfer switch shall be provided with AL/CU mechanical lugs or compression lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.
- E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- F. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- G. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- H. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."
- I. Connect twisted pair cable according to Section 271513 "Communications Copper Horizontal Cabling."
- J. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.
- K. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."

#### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: The manufacturer of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.
- B. Manufacturer's representative shall perform tests and inspections and prepare test reports.
- C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.
  - 1. Perform recommended installation tests as recommended in manufacturer's installation and service manuals.
  - 2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.

a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.

- b. Verify time-delay settings.
- c. Verify that the transfer switch is accurately metering AC voltage.

d. Test functional modes and related automatic transfer-switch operations.

e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
  - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
  - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  - 3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

#### 3.4 DEMONSTRATION

- A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.
  - 1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures.
  - 2. The class duration shall be at least 8 hours in length and include practical operation with the installed equipment.

#### 3.5 SERVICE AND SUPPORT

- A. The transfer switch manufacturer shall maintain service parts inventory for the entire power system at a central location which is accessible to the service location 24 hours per day, 365 days per year. The inventory shall have a commercial value of \$3 million or more. The manufacturer of the transfer switch shall maintain a central parts inventory to support the supplier, covering all the major components of the power system, including engines, alternators, control systems, paralleling electronics, and power transfer equipment.
- B. The transfer switch shall be serviced by a local service organization that is trained and factory certified in transfer switch service. The supplier shall maintain an inventory of critical power system replacement parts in the local service location. Service vehicles shall be stocked with critical replacement parts. The service organization shall be on call 24 hours per day, 365 days per year. The service organization shall be physically located within 90 miles of the site.

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C. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

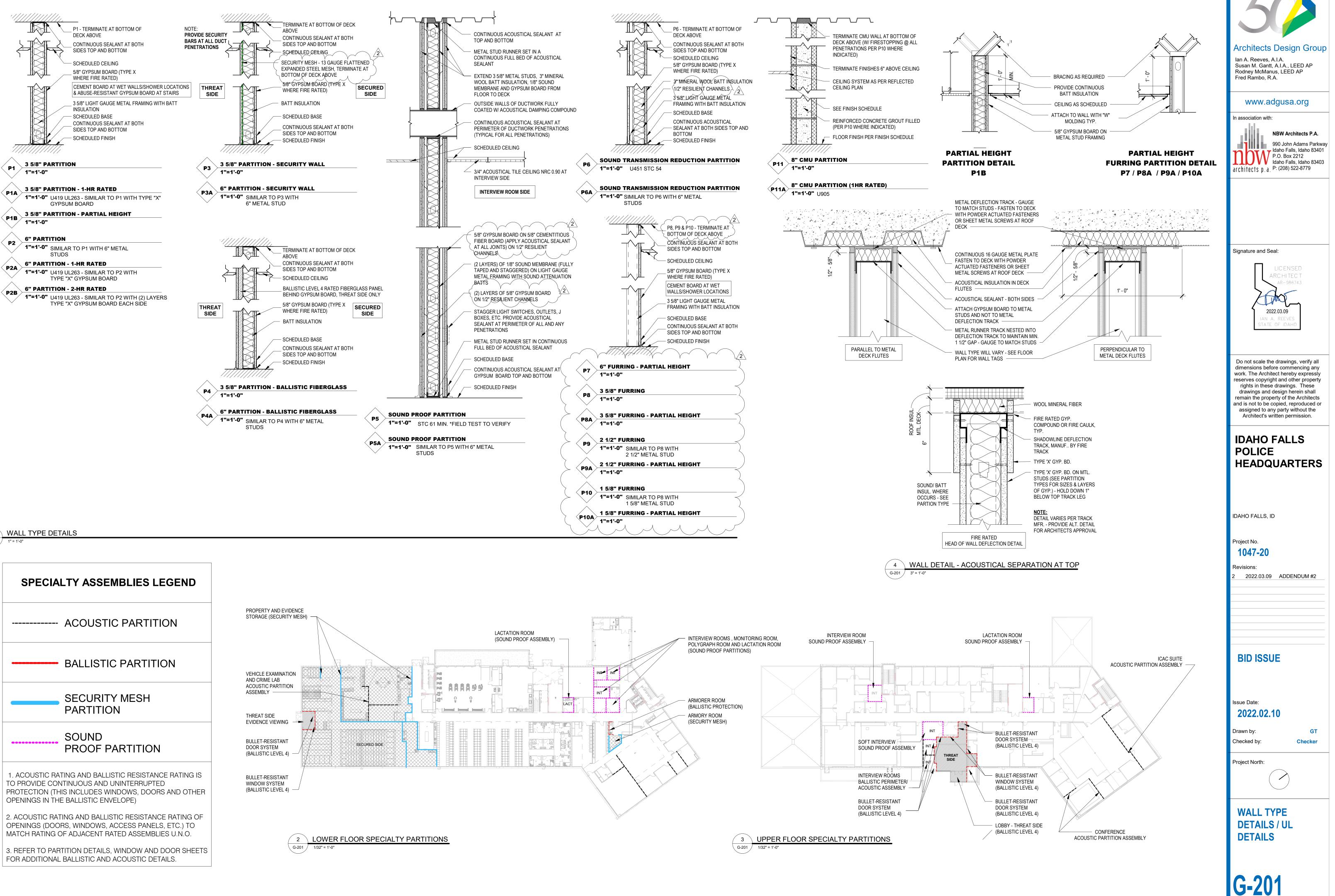
#### 3.6 SERVICE AGREEMENT:

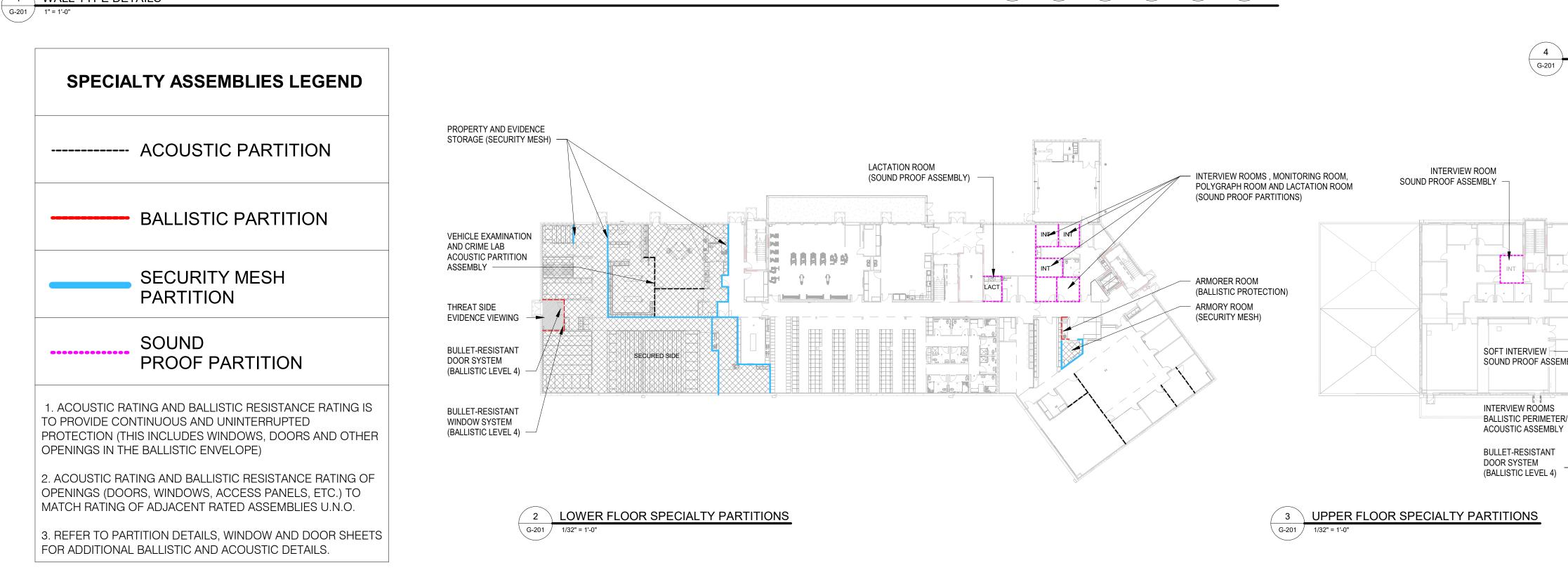
- A. The supplier shall include in the base price, a one-year service agreement. The maintenance shall be performed by factory authorized service technicians capable of servicing both the engine generator set and the transfer switch (es). This agreement shall include the following:
  - 1. All electrical controls maintenance and settings as recommended by the manufacturer.
  - 2. All auxiliary equipment as a part of the emergency systems.
  - 3. The supplier shall guarantee emergency service.
  - 4. All expendable maintenance items are to be included in this agreement.
  - 5. A copy of this agreement and a schedule shall be given to the Owner at the time acceptance, showing what work is to be accomplished and when.

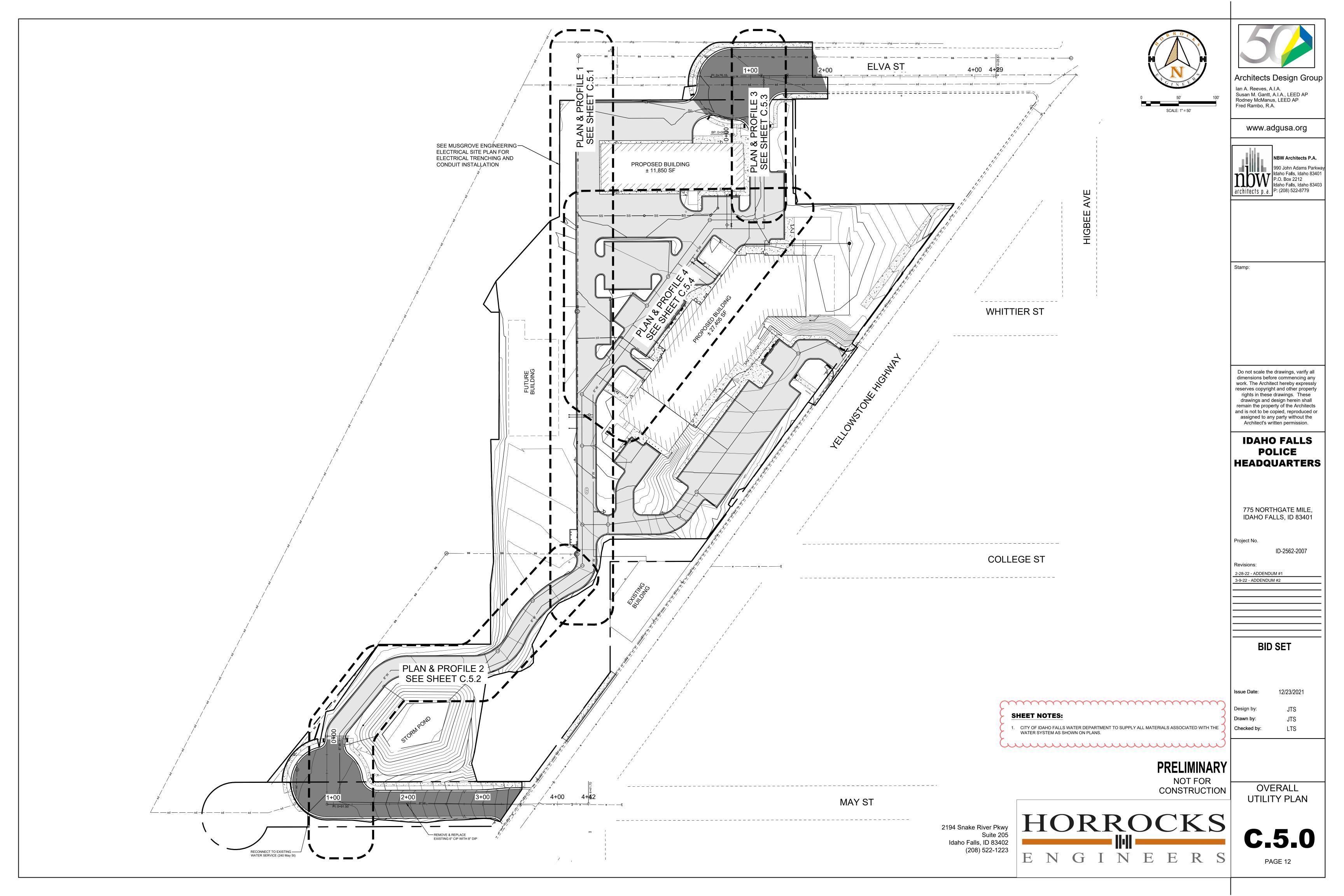
#### 3.7 TRAINING

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

END OF SECTION 26 36 00



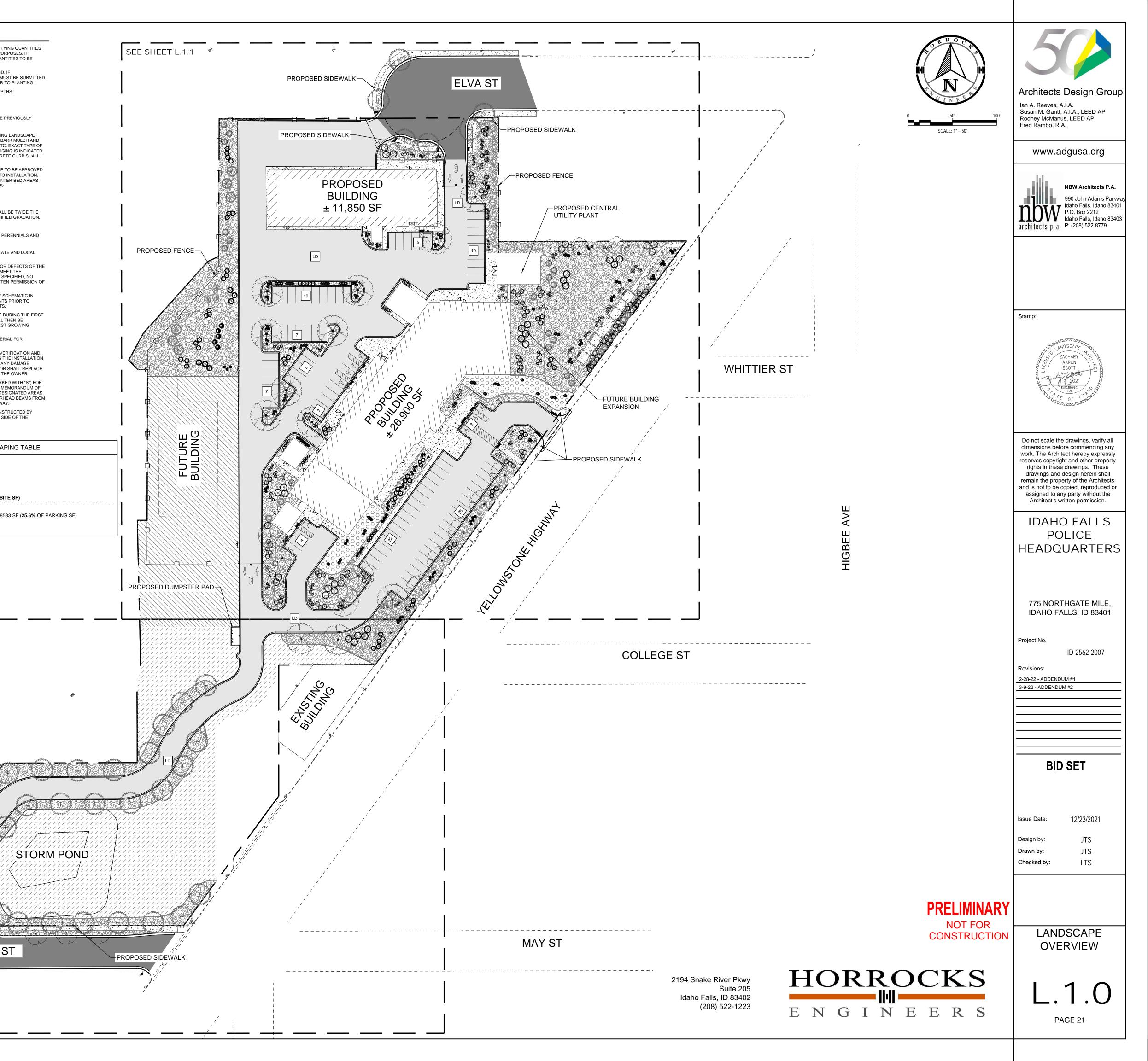


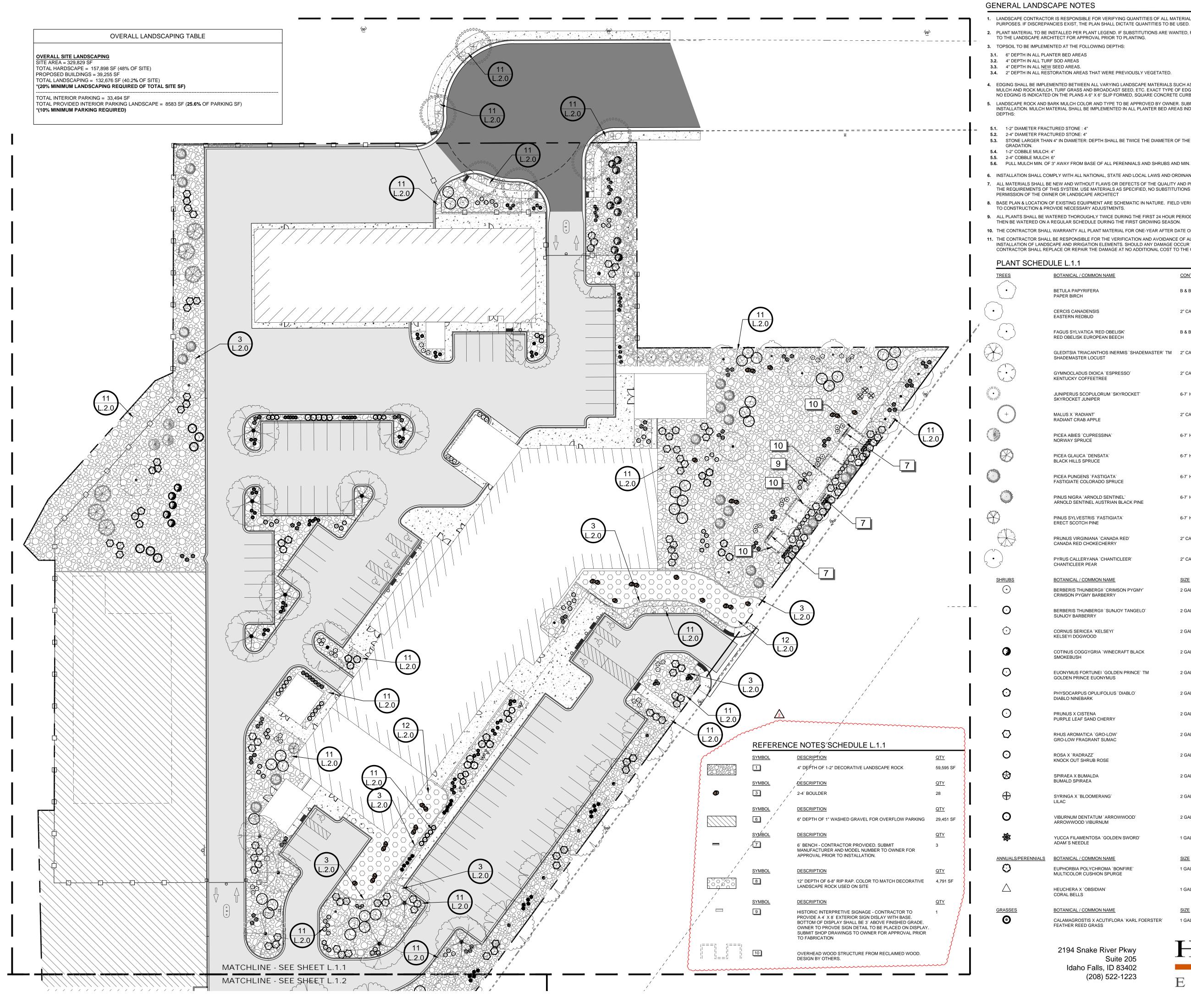


		BOTANICAL / COMMON NAME	CONT	CAL	<u>c</u>
<	}	BETULA PAPYRIFERA PAPER BIRCH	B & B	2"	4
•		CERCIS CANADENSIS EASTERN REDBUD	2" CAL.	B&B	8
•		FAGUS SYLVATICA 'RED OBELISK' RED OBELISK EUROPEAN BEECH	B & B	2"	6
		GLEDITSIA TRIACANTHOS INERMIS `SHADEMASTER` TM SHADEMASTER LOCUST	2" CAL.	B&B	ç
E.		GYMNOCLADUS DIOICA `ESPRESSO`	2" CAL.	B&B	1
		KENTUCKY COFFEETREE	6-7` HT.	B&B	2
N MIL	Ĵ	SKYROCKET JUNIPER KOELREUTERIA PANICULATA `JFS-SUNLEAF` TM	B & B	2"	6
+ ***	)	SUMMERBURST GOLDENRAIN TREE	2" CAL.	_	3
,		RADIANT CRAB APPLE			
کی 172		PICEA ABIES `CUPRESSINA` NORWAY SPRUCE	6-7` HT.	B&B	3
an a water a		PICEA GLAUCA `DENSATA` BLACK HILLS SPRUCE	6-7` HT.	B&B	e
	eres Ba	PICEA PUNGENS `FASTIGATA` FASTIGIATE COLORADO SPRUCE	6-7` HT.	B&B	2
		PINUS NIGRA `ARNOLD SENTINEL` ARNOLD SENTINEL AUSTRIAN BLACK PINE	6-7` HT.	B&B	2
		PINUS SYLVESTRIS `FASTIGIATA` ERECT SCOTCH PINE	6-7` HT.	B&B	1
No.		PRUNUS VIRGINIANA `CANADA RED` CANADA RED CHOKECHERRY	2" CAL.	B&B	3
	ç)	PYRUS CALLERYANA `CHANTICLEER` CHANTICLEER PEAR	2" CAL.	B&B	2
	2	BOTANICAL / COMMON NAME	SIZE		
$\odot$		BERBERIS THUNBERGII `CRIMSON PYGMY` CRIMSON PYGMY BARBERRY	2 GAL		1
•		BERBERIS THUNBERGII `SUNJOY TANGELO` SUNJOY BARBERRY	2 GAL.		2
$\bigcirc$		CORNUS SERICEA `KELSEYI` KELSEYI DOGWOOD	2 GAL		:
3		COTINUS COGGYGRIA `WINECRAFT BLACK SMOKEBUSH	2 GAL		1
$\odot$		EUONYMUS FORTUNEI `GOLDEN PRINCE` TM GOLDEN PRINCE EUONYMUS	2 GAL		1
Ō		PHYSOCARPUS OPULIFOLIUS `DIABLO` DIABLO NINEBARK	2 GAL		:
$\odot$		PRUNUS X CISTENA PURPLE LEAF SAND CHERRY	2 GAL		3
$\langle \cdot \rangle$		RHUS AROMATICA `GRO-LOW` GRO-LOW FRAGRANT SUMAC	2 GAL		ę
0		ROSA X `RADRAZZ`	2 GAL		(
⊗		SPIRAEA X BUMALDA	2 GAL		e
- -		BUMALD SPIRAEA SYRINGA X `BLOOMERANG`	2 GAL		3
⊕ ⊙		LILAC	2 GAL		(
~		ARROWWOOD VIBURNUM			
*	0/777	YUCCA FILAMENTOSA `GOLDEN SWORD` ADAM`S NEEDLE	1 GAL		25 3
	<u>_S/PERENNIALS</u>	BOTANICAL / COMMON NAME EUPHORBIA POLYCHROMA `BONFIRE` MULTICOLOR CUSHION SPURGE	<u>SIZE</u> 1 GAL.		
$\bigtriangleup$		HEUCHERA X `OBSIDIAN`	1 GAL		
GRASSE	<u>=S</u>	CORAL BELLS BOTANICAL / COMMON NAME	SIZE		
0		CALAMAGROSTIS X ACUTIFLORA `KARL FOERSTER` FEATHER REED GRASS	1 GAL		1
$\frown$	$\checkmark$		$\frown$		~
		ENCE_NOTES_SCHEDULE		QTY	
	1	4" DEPTH OF 1-2" DECORATIVE LANDSCAPE ROCK		78,521	SF
	SYMBOL 3	DESCRIPTION 2-4 <sup>°</sup> BOULDER		<u>QTY</u> 28	
· · · · ·	SYMBOL	DESCRIPTION		<u>QTY</u>	_
	5	HYDRO SEED NATIVE VEGETATION AREA 6" DEPTH OF 1" WASHED GRAVEL FOR OVERFLOW PA	ARKING	45,326 30,395	
6 <u>SYMBOL</u>		DESCRIPTION		<u>QTY</u>	~•
	7	6` BENCH - CONTRACTOR PROVIDED. SUBMIT MANUFACTURER AND MODEL NUMBER TO OWNER FO APPROVAL PRIOR TO INSTALLATION.	OR	3	
	SYMBOL	DESCRIPTION		<u>QTY</u>	
00	8	12" DEPTH OF 6-8" RIP RAP. COLOR TO MATCH DECO LANDSCAPE ROCK USED ON SITE	RATIVE	4,791 S	F
	SYMBOL 9	DESCRIPTION HISTORIC INTERPRETIVE SIGNAGE - CONTRACTOR T	0	<u>QTY</u> 1	
	-	PROVIDE A 4` X 8` EXTERIOR SIGN DISLAY WITH BASE BOTTOM OF DISPLAY SHALL BE 3` ABOVE FINISHED O OWNER TO PROVDE SIGN DETAIL TO BE PLACED ON	E. GRADE. DISPLAY.		
	ī	SUBMIT SHOP DRAWINGS TO OWNER FOR APPROVAL TO FABRICATION			
= = = <sub>آ</sub>	10	OVERHEAD WOOD STRUCTURE FROM RECLAIMED W			

GE	ENERAL LANDSCAPE NOTES	
1.	LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITIES OF ALL MATERIALS FOR BIDDING AND INSTALLATION PURPOSES. IF DISCREPANCIES EXIST, THE PLAN SHALL DICTATE QUANTITIES TO BE USED.	
	PLANT MATERIAL TO BE INSTALLED PER PLANT LEGEND. IF SUBSTITUTIONS ARE WANTED, PROPOSED CHANGES MUST BE SUBMITTED TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO PLANTING.	
3. 3. 3.	<ul> <li>TOPSOIL TO BE IMPLEMENTED AT THE FOLLOWING DEPTHS:</li> <li><b>1.</b> 6" DEPTH IN ALL PLANTER BED AREAS</li> <li><b>2.</b> 4" DEPTH IN ALL TURF SOD AREAS</li> <li><b>3.</b> 4" DEPTH IN ALL <u>NEW</u> SEED AREAS.</li> <li><b>4.</b> 2" DEPTH IN ALL RESTORATION AREAS THAT WERE PREVIOUSLY VEGETATED.</li> </ul>	
4.	MATERIALS SUCH AS TURF GRASS AND BARK MULCH, BARK MULCH AND ROCK MULCH, TURF GRASS AND BROADCAST SEED, ETC. EXACT TYPE OF EDGING SHALL BE INDICATED ON THE PLANS. IF NO EDGING IS INDICATED ON THE PLANS A 6" X 6" SLIP FORMED, SQUARE CONCRETE CURB SHALL	
5.	BE USED. LANDSCAPE ROCK AND BARK MULCH COLOR AND TYPE TO BE APPROVED BY OWNER. SUBMIT SAMPLES FOR APPROVAL PRIOR TO INSTALLATION. MULCH MATERIAL SHALL BE IMPLEMENTED IN ALL PLANTER BED AREAS INDICATED ON THE PLANS AT THE FOLLOWING DEPTHS:	
5.: 5.: 5.:		
6.	SHRUBS AND MIN. 6" AWAY FROM ALL TREES.	
7.	LAWS AND ORDINANCES. ALL MATERIALS SHALL BE NEW AND WITHOUT FLAWS OR DEFECTS OF THE QUALITY AND PERFORMANCE SPECIFIED, AND SHALL MEET THE REQUIREMENTS OF THIS SYSTEM. USE MATERIALS AS SPECIFIED, NO SUBSTITUTIONS SHALL BE PERMITTED WITHOUT WRITTEN PERMISSION OF THE OWNER OR LANDSCAPE ARCHITECT	
8.	BASE PLAN & LOCATION OF EXISTING EQUIPMENT ARE SCHEMATIC IN NATURE. FIELD VERIFY ALL BASE & EXISTING ELEMENTS PRIOR TO CONSTRUCTION & PROVIDE NECESSARY ADJUSTMENTS.	
9.	ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL THEN BE WATERED ON A REGULAR SCHEDULE DURING THE FIRST GROWING SEASON.	
10.	THE CONTRACTOR SHALL WARRANTY ALL PLANT MATERIAL FOR ONE-YEAR AFTER DATE OF FINAL ACCEPTANCE.	
11.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION AND AVOIDANCE OF ALL UNDERGROUND UTILITIES DURING THE INSTALLATION OF LANDSCAPE AND IRRIGATION ELEMENTS. SHOULD ANY DAMAGE OCCUR TO UNDERGROUND UTILITIES THE CONTRACTOR SHALL REPLACE OR REPAIR THE DAMAGE AT NO ADDITIONAL COST TO THE OWNER.	
12.	CAREFULLY SALVAGE AND REMOVED ARTIFACTS (MARKED WITH "S") FOR RE-USE PER STATE HISTORIC PRESERVATION OFFICE MEMORANDUM OF AGREEMENT (SHPO MOA). RELOCATE ARTIFACTS TO DESIGNATED AREAS ON SITE. RESET 8 SETS OF EXISTING POSTS AND OVERHEAD BEAMS FROM THE STOCKYARD, EVENLY SPACED ALONG THE PATHWAY.	
13.	PADS FOR BENCHES SHOWN ON PLANS SHALL BE CONSTRUCTED BY CONTRACTOR AND SHALL BE LOCATED ON THE WEST SIDE OF THE PATHWAY SO THEY FACE EAST.	
	OVERALL LANDSCAPING TABLE	
	RALL SITE LANDSCAPING AREA = 329.829 SF	
TOTA PROF	AL HARDSCAPE = 157,898 SF (48% OF SITE) POSED BUILDINGS = 39,255 SF AL LANDSCAPING = 132,676 SF (40.2% OF SITE)	
*(20%	6 MINIMUM LANDSCAPING REQUIRED OF TOTAL SITE SF)	
ΤΟΤΑ	AL PROVIDED INTERIOR PARKING LANDSCAPE = 8583 SF (25.6% OF PARKIN 6 MINIMUM PARKING REQUIRED)	G SF)
SE	EE SHEET L.1.2	
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	-0990a-	-0004
	PROPOSED SIDEWALK	00000000
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1. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITIES OF ALL MATERIALS FOR BIDDING AND INSTALLATION

2. PLANT MATERIAL TO BE INSTALLED PER PLANT LEGEND. IF SUBSTITUTIONS ARE WANTED, PROPOSED CHANGES MUST BE SUBMITTED TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO PLANTING.

3.4. 2" DEPTH IN ALL RESTORATION AREAS THAT WERE PREVIOUSLY VEGETATED.

4. EDGING SHALL BE IMPLEMENTED BETWEEN ALL VARYING LANDSCAPE MATERIALS SUCH AS TURF GRASS AND BARK MULCH, BARK MULCH AND ROCK MULCH, TURF GRASS AND BROADCAST SEED, ETC. EXACT TYPE OF EDGING SHALL BE INDICATED ON THE PLANS. IF NO EDGING IS INDICATED ON THE PLANS A 6" X 6" SLIP FORMED, SQUARE CONCRETE CURB SHALL BE USED. 5. LANDSCAPE ROCK AND BARK MULCH COLOR AND TYPE TO BE APPROVED BY OWNER. SUBMIT SAMPLES FOR APPROVAL PRIOR TO

INSTALLATION. MULCH MATERIAL SHALL BE IMPLEMENTED IN ALL PLANTER BED AREAS INDICATED ON THE PLANS AT THE FOLLOWING

5.3. STONE LARGER THAN 4" IN DIAMETER: DEPTH SHALL BE TWICE THE DIAMETER OF THE SMALLEST STONE IN THE SPECIFIED

5.6. PULL MULCH MIN. OF 3" AWAY FROM BASE OF ALL PERENNIALS AND SHRUBS AND MIN. 6" AWAY FROM ALL TREES.

6. INSTALLATION SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL LAWS AND ORDINANCES.

7. ALL MATERIALS SHALL BE NEW AND WITHOUT FLAWS OR DEFECTS OF THE QUALITY AND PERFORMANCE SPECIFIED, AND SHALL MEET THE REQUIREMENTS OF THIS SYSTEM. USE MATERIALS AS SPECIFIED, NO SUBSTITUTIONS SHALL BE PERMITTED WITHOUT WRITTEN PERMISSION OF THE OWNER OR LANDSCAPE ARCHITECT

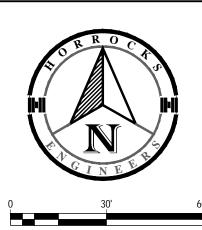
8. BASE PLAN & LOCATION OF EXISTING EQUIPMENT ARE SCHEMATIC IN NATURE. FIELD VERIFY ALL BASE & EXISTING ELEMENTS PRIOR TO CONSTRUCTION & PROVIDE NECESSARY ADJUSTMENTS. 9. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL

THEN BE WATERED ON A REGULAR SCHEDULE DURING THE FIRST GROWING SEASON. 10. THE CONTRACTOR SHALL WARRANTY ALL PLANT MATERIAL FOR ONE-YEAR AFTER DATE OF FINAL ACCEPTANCE.

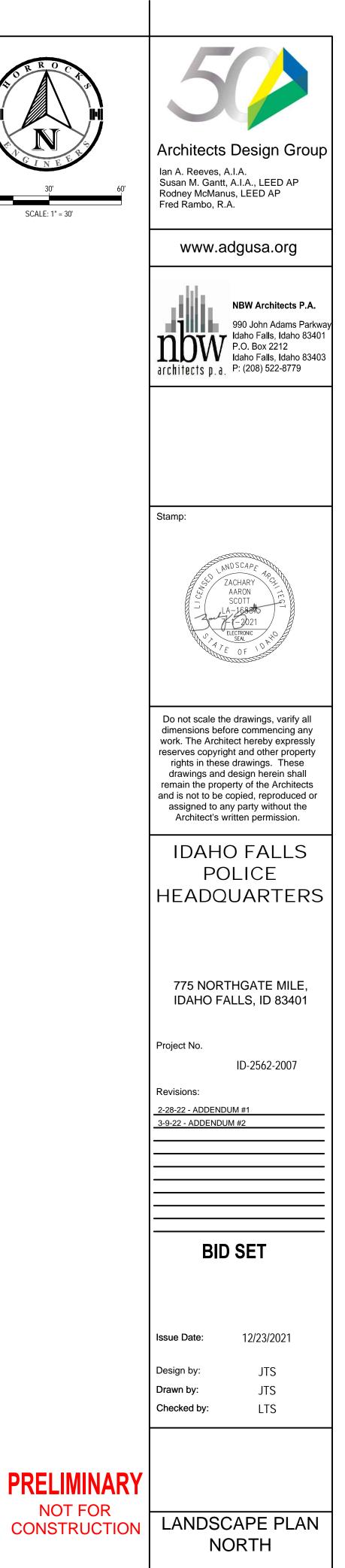
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION AND AVOIDANCE OF ALL UNDERGROUND UTILITIES DURING THE INSTALLATION OF LANDSCAPE AND IRRIGATION ELEMENTS. SHOULD ANY DAMAGE OCCUR TO UNDERGROUND UTILITIES THE CONTRACTOR SHALL REPLACE OR REPAIR THE DAMAGE AT NO ADDITIONAL COST TO THE OWNER.

BOTANICAL / COMMON NAME	CONT	CAL	<u>QTY</u>
BETULA PAPYRIFERA PAPER BIRCH	B & B	2"	4
CERCIS CANADENSIS EASTERN REDBUD	2" CAL.	B&B	8
FAGUS SYLVATICA 'RED OBELISK' RED OBELISK EUROPEAN BEECH	B & B	2"	6
GLEDITSIA TRIACANTHOS INERMIS `SHADEMASTER` TM SHADEMASTER LOCUST	2" CAL.	B&B	9
GYMNOCLADUS DIOICA `ESPRESSO` KENTUCKY COFFEETREE	2" CAL.	B&B	8
JUNIPERUS SCOPULORUM `SKYROCKET` SKYROCKET JUNIPER	6-7` HT.	B&B	24
MALUS X `RADIANT` RADIANT CRAB APPLE	2" CAL.	B&B	6
PICEA ABIES `CUPRESSINA` NORWAY SPRUCE	6-7` HT.	B&B	3
PICEA GLAUCA `DENSATA` BLACK HILLS SPRUCE	6-7` HT.	B&B	6
PICEA PUNGENS `FASTIGATA` FASTIGIATE COLORADO SPRUCE	6-7` HT.	B&B	2
PINUS NIGRA `ARNOLD SENTINEL` ARNOLD SENTINEL AUSTRIAN BLACK PINE	6-7` HT.	B&B	20
PINUS SYLVESTRIS `FASTIGIATA` ERECT SCOTCH PINE	6-7` HT.	B&B	1
PRUNUS VIRGINIANA `CANADA RED` CANADA RED CHOKECHERRY	2" CAL.	B&B	3
PYRUS CALLERYANA `CHANTICLEER` CHANTICLEER PEAR	2" CAL.	B&B	2
BOTANICAL / COMMON NAME	<u>SIZE</u>		
BERBERIS THUNBERGII `CRIMSON PYGMY` CRIMSON PYGMY BARBERRY	2 GAL		12
BERBERIS THUNBERGII `SUNJOY TANGELO` SUNJOY BARBERRY	2 GAL.		20
CORNUS SERICEA `KELSEYI` KELSEYI DOGWOOD	2 GAL		33
COTINUS COGGYGRIA `WINECRAFT BLACK SMOKEBUSH	2 GAL		14
EUONYMUS FORTUNEI `GOLDEN PRINCE` TM GOLDEN PRINCE EUONYMUS	2 GAL		11
PHYSOCARPUS OPULIFOLIUS `DIABLO` DIABLO NINEBARK	2 GAL		38
PRUNUS X CISTENA PURPLE LEAF SAND CHERRY	2 GAL		32
RHUS AROMATICA `GRO-LOW` GRO-LOW FRAGRANT SUMAC	2 GAL		89
ROSA X `RADRAZZ` KNOCK OUT SHRUB ROSE	2 GAL		68
SPIRAEA X BUMALDA BUMALD SPIRAEA	2 GAL		67
SYRINGA X `BLOOMERANG` LILAC	2 GAL		3
VIBURNUM DENTATUM `ARROWWOOD` ARROWWOOD VIBURNUM	2 GAL		6
YUCCA FILAMENTOSA `GOLDEN SWORD` ADAM`S NEEDLE	1 GAL		22
BOTANICAL / COMMON NAME EUPHORBIA POLYCHROMA `BONFIRE`	<u>SIZE</u> 1 GAL.		3
MULTICOLOR CUSHION SPURGE			-
HEUCHERA X `OBSIDIAN` CORAL BELLS	1 GAL		11
BOTANICAL / COMMON NAME	<u>SIZE</u>		
CALAMAGROSTIS X ACUTIFLORA `KARL FOERSTER` FEATHER REED GRASS	1 GAL		105

2194 Snake River Pkwy Suite 205 Idaho Falls, ID 83402 (208) 522-1223



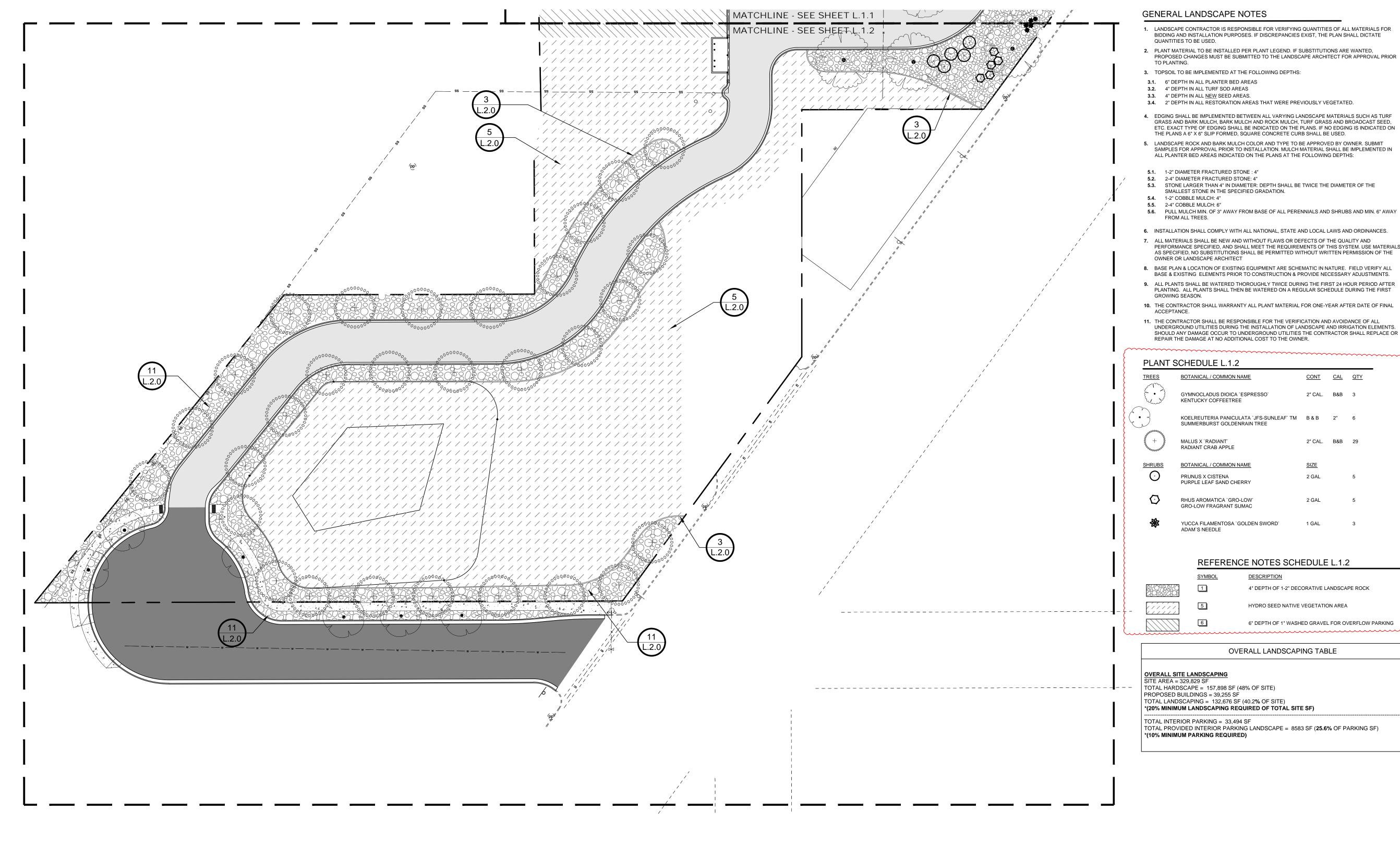
SCALE: 1" = 30'



PAGE 22

HORROCKS ENGINEERS

NOT FOR



1. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITIES OF ALL MATERIALS FOR BIDDING AND INSTALLATION PURPOSES. IF DISCREPANCIES EXIST, THE PLAN SHALL DICTATE

2. PLANT MATERIAL TO BE INSTALLED PER PLANT LEGEND. IF SUBSTITUTIONS ARE WANTED, PROPOSED CHANGES MUST BE SUBMITTED TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR

3. TOPSOIL TO BE IMPLEMENTED AT THE FOLLOWING DEPTHS:

3.4. 2" DEPTH IN ALL RESTORATION AREAS THAT WERE PREVIOUSLY VEGETATED.

 EDGING SHALL BE IMPLEMENTED BETWEEN ALL VARYING LANDSCAPE MATERIALS SUCH AS TURF GRASS AND BARK MULCH, BARK MULCH AND ROCK MULCH, TURF GRASS AND BROADCAST SEED, ETC. EXACT TYPE OF EDGING SHALL BE INDICATED ON THE PLANS. IF NO EDGING IS INDICATED ON THE PLANS A 6" X 6" SLIP FORMED, SQUARE CONCRETE CURB SHALL BE USED.

 LANDSCAPE ROCK AND BARK MULCH COLOR AND TYPE TO BE APPROVED BY OWNER. SUBMIT SAMPLES FOR APPROVAL PRIOR TO INSTALLATION. MULCH MATERIAL SHALL BE IMPLEMENTED IN ALL PLANTER BED AREAS INDICATED ON THE PLANS AT THE FOLLOWING DEPTHS:

5.3. STONE LARGER THAN 4" IN DIAMETER: DEPTH SHALL BE TWICE THE DIAMETER OF THE SMALLEST STONE IN THE SPECIFIED GRADATION.

6. INSTALLATION SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL LAWS AND ORDINANCES. 7. ALL MATERIALS SHALL BE NEW AND WITHOUT FLAWS OR DEFECTS OF THE QUALITY AND PERFORMANCE SPECIFIED, AND SHALL MEET THE REQUIREMENTS OF THIS SYSTEM. USE MATERIALS

8. BASE PLAN & LOCATION OF EXISTING EQUIPMENT ARE SCHEMATIC IN NATURE. FIELD VERIFY ALL BASE & EXISTING ELEMENTS PRIOR TO CONSTRUCTION & PROVIDE NECESSARY ADJUSTMENTS. 9. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL THEN BE WATERED ON A REGULAR SCHEDULE DURING THE FIRST

10. THE CONTRACTOR SHALL WARRANTY ALL PLANT MATERIAL FOR ONE-YEAR AFTER DATE OF FINAL

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERIFICATION AND AVOIDANCE OF ALL UNDERGROUND UTILITIES DURING THE INSTALLATION OF LANDSCAPE AND IRRIGATION ELEMENTS. SHOULD ANY DAMAGE OCCUR TO UNDERGROUND UTILITIES THE CONTRACTOR SHALL REPLACE OR REPAIR THE DAMAGE AT NO ADDITIONAL COST TO THE OWNER.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
EDULE L.1.2		~~~~	~~~~
ANICAL / COMMON NAME	<u>CONT</u>	CAL	<u>QTY</u>
NOCLADUS DIOICA `ESPRESSO` TUCKY COFFEETREE	2" CAL.	B&B	3
LREUTERIA PANICULATA `JFS-SUNLEAF` TM MERBURST GOLDENRAIN TREE	B & B	2"	6
US X `RADIANT` IANT CRAB APPLE	2" CAL.	B&B	29
ANICAL / COMMON NAME	SIZE		
NUS X CISTENA PLE LEAF SAND CHERRY	2 GAL		5
S AROMATICA `GRO-LOW` -LOW FRAGRANT SUMAC	2 GAL		5
CA FILAMENTOSA `GOLDEN SWORD`	1 GAL		3

### **REFERENCE NOTES SCHEDULE L.1.2**

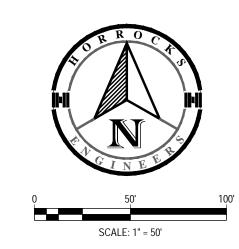
YMBOL	DESCRIPTION	<u>QTY</u>
1	4" DEPTH OF 1-2" DECORATIVE LANDSCAPE ROCK	18,926 SF
5	HYDRO SEED NATIVE VEGETATION AREA	45,326 SF
6	6" DEPTH OF 1" WASHED GRAVEL FOR OVERFLOW PARKING	945 SF

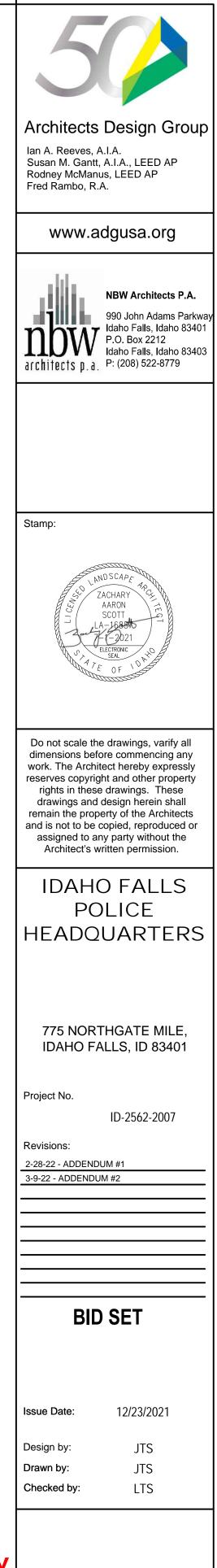
OVERALL LANDSCAPING TABLE

TOTAL HARDSCAPE = 157,898 SF (48% OF SITE)

\*(20% MINIMUM LANDSCAPING REQUIRED OF TOTAL SITE SF)

TOTAL PROVIDED INTERIOR PARKING LANDSCAPE = 8583 SF (25.6% OF PARKING SF)







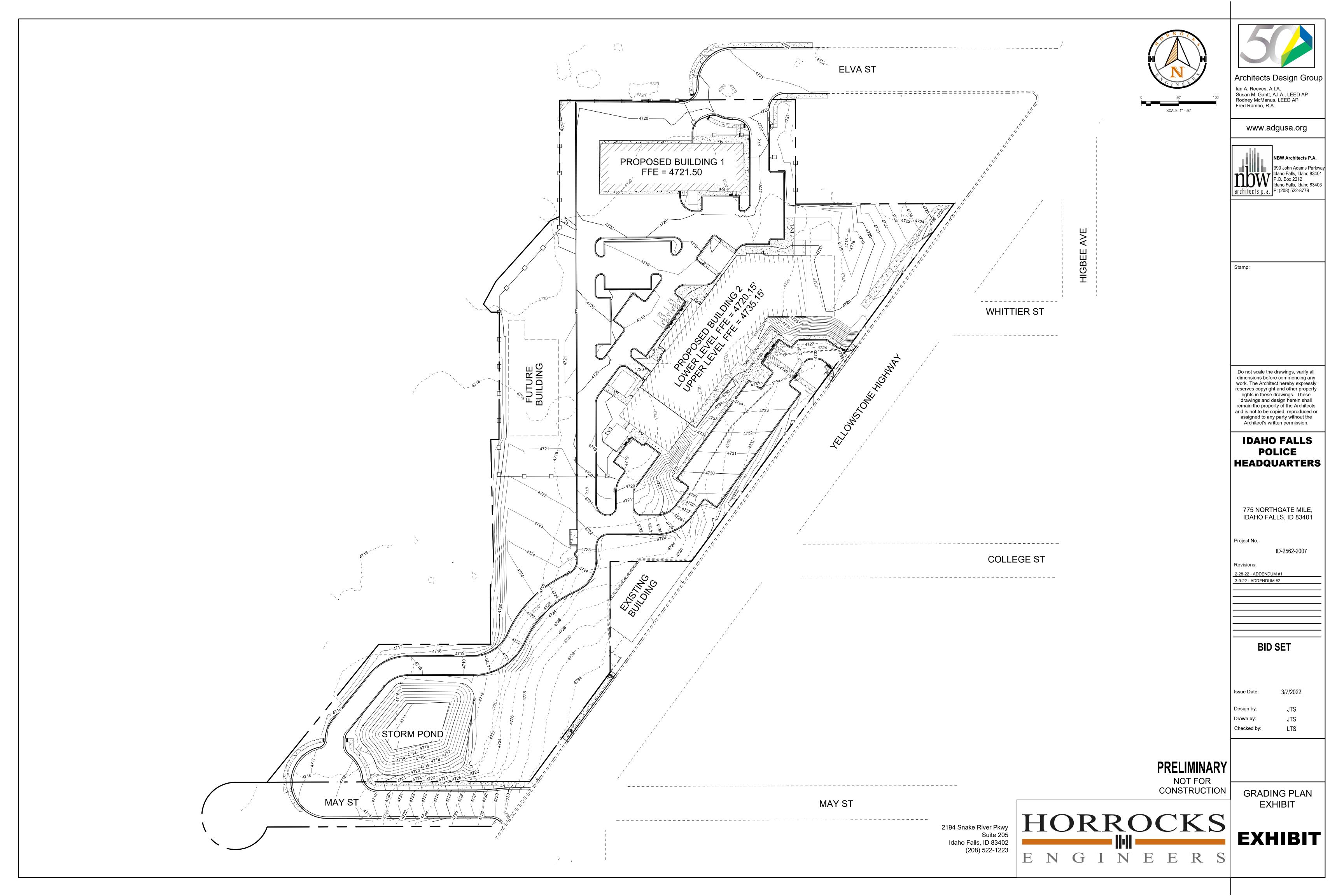
CONSTRUCTION

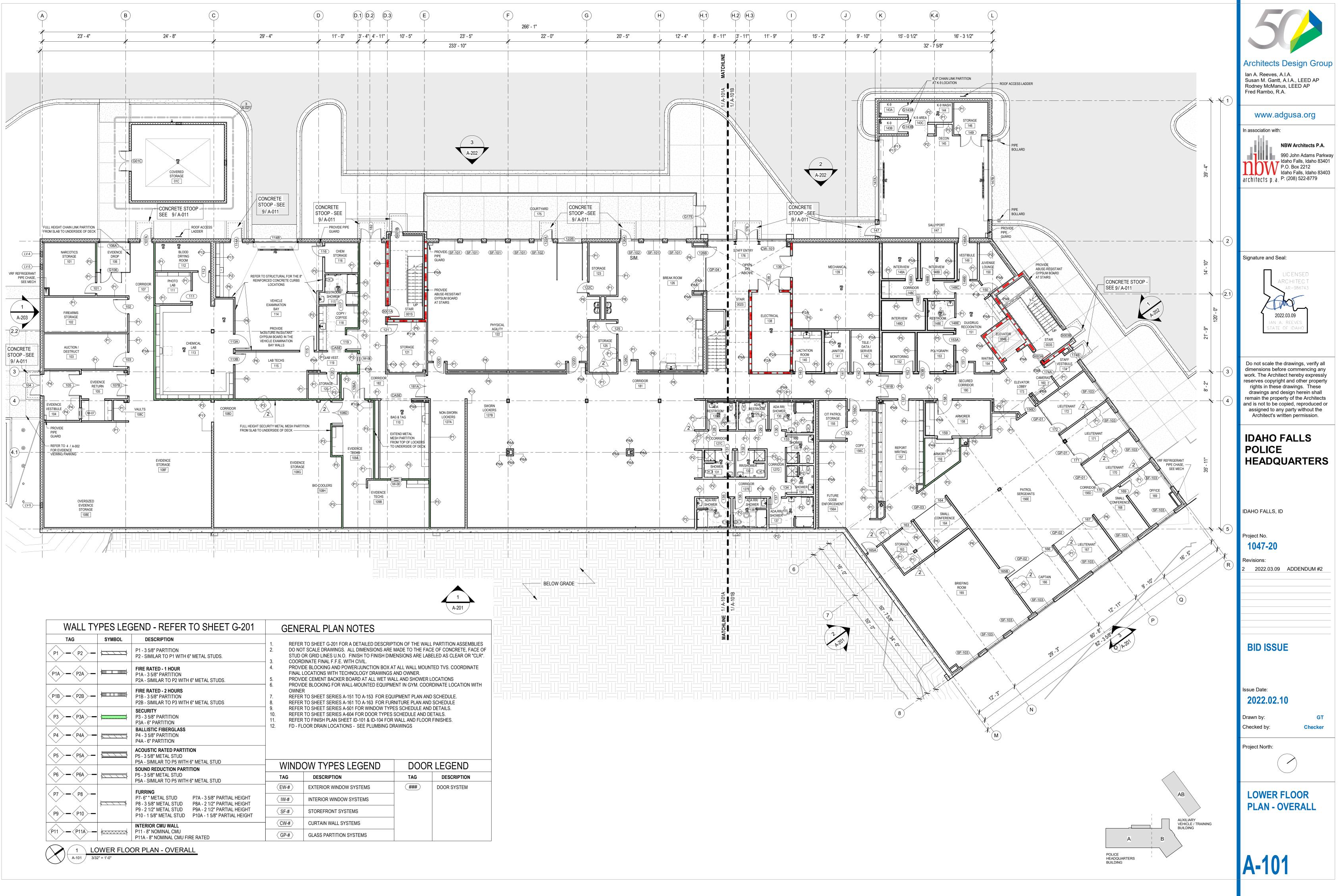


LANDSCAPE PLAN

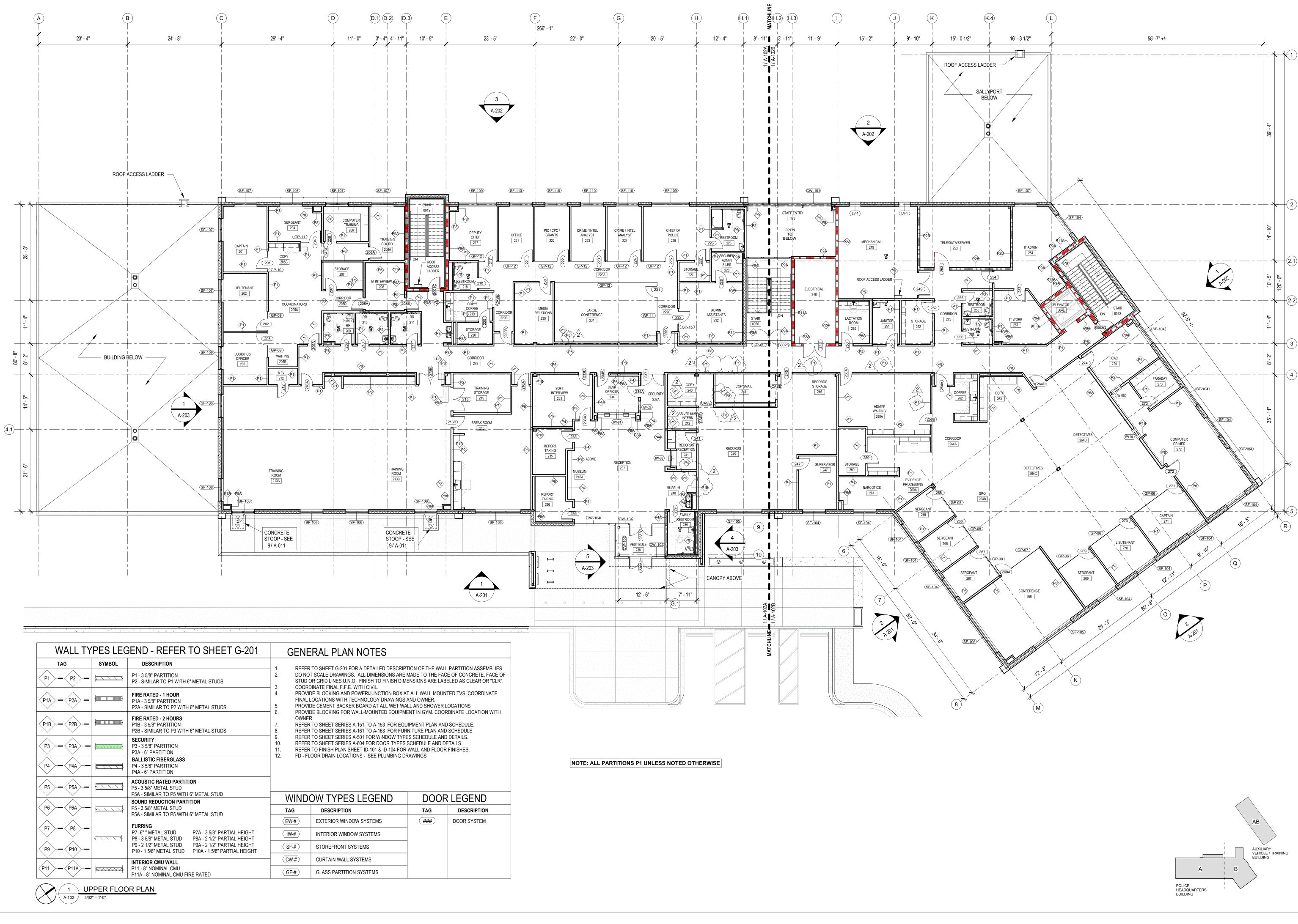
SOUTH

2194 Snake River Pkwy Suite 205 Idaho Falls, ID 83402 (208) 522-1223

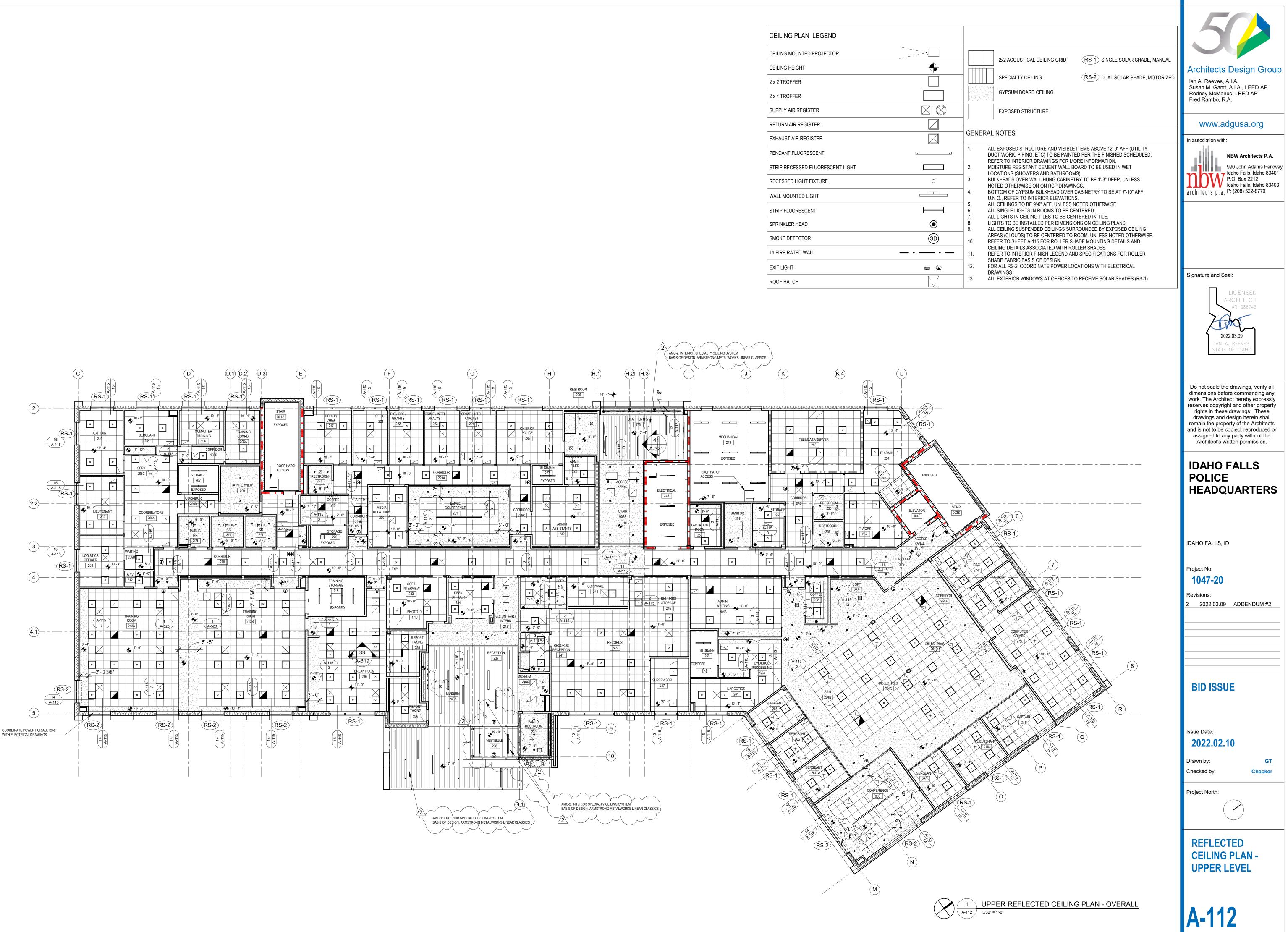




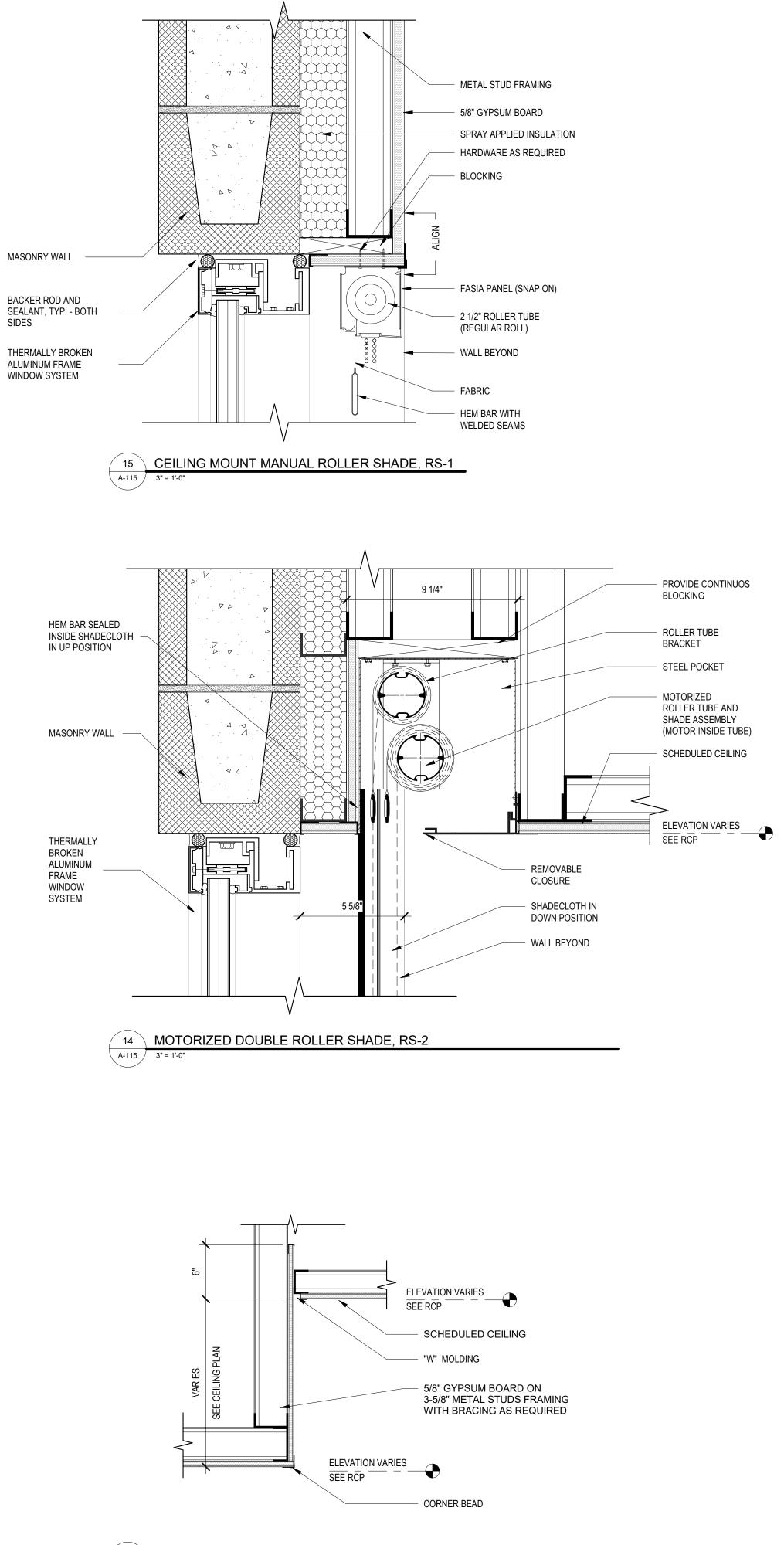
WALL TY	PES LEC	GEND - REFER TO SHEET G-201	GENERAL PLAN NOTES						
TAG	SYMBOL	DESCRIPTION							
P1 - P2 -		P1 - 3 5/8" PARTITION P2 - SIMILAR TO P1 WITH 6" METAL STUDS.	2. DO NO STUD	R TO SHEET G-201 FOR A DETAILED DESCRIP OT SCALE DRAWINGS. ALL DIMENSIONS ARE OR GRID LINES U.N.O. FINISH TO FINISH DIM DINATE FINAL F.F.E. WITH CIVIL.	MADE TO THE FAC	E OF CONCRE			
P1A P2A -		FIRE RATED - 1 HOUR P1A - 3 5/8" PARTITION P2A - SIMILAR TO P2 WITH 6" METAL STUDS.	4. PROV FINAL 5. PROV	IDE BLOCKING AND POWER/JUNCTION BOX A LOCATIONS WITH TECHNOLOGY DRAWINGS IDE CEMENT BACKER BOARD AT ALL WET WA IDE BLOCKING FOR WALL-MOUNTED EQUIPM	AND OWNER. ILL AND SHOWER I	OCATIONS			
P1B - P2B -		FIRE RATED - 2 HOURS P1B - 3 5/8" PARTITION P2B - SIMILAR TO P3 WITH 6" METAL STUDS	OWNE 7. REFER 8. REFER	R R TO SHEET SERIES A-151 TO A-153 FOR EQU R TO SHEET SERIES A-161 TO A-163 FOR FUR	JIPMENT PLAN ANI NITURE PLAN AND	) SCHEDULE. ) SCHEDULE			
P3 - P3A -		SECURITY P3 - 3 5/8" PARTITION P3A - 6" PARTITION	<ul> <li>9. REFER TO SHEET SERIES A-501 FOR WINDOW TYPES SCHEDULE AND DE</li> <li>10. REFER TO SHEET SERIES A-604 FOR DOOR TYPES SCHEDULE AND DETA</li> <li>11. REFER TO FINISH PLAN SHEET ID-101 &amp; ID-104 FOR WALL AND FLOOR FIN</li> <li>12. FD - FLOOR DRAIN LOCATIONS - SEE PLUMBING DRAWINGS</li> </ul>						
P4 - P4A -		BALLISTIC FIBERGLASS P4 - 3 5/8" PARTITION P4A - 6" PARTITION			Viiii100				
P5 - P5A -		ACOUSTIC RATED PARTITION P5 - 3 5/8" METAL STUD P5A - SIMILAR TO P5 WITH 6" METAL STUD							
P6 - P6A -				OW TYPES LEGEND	DUUF				
		P5 - 3 5/8" METAL STUD P5A - SIMILAR TO P5 WITH 6" METAL STUD	TAG	DESCRIPTION	TAG	DESCRIF			
		FURRING	<b>EW-#</b>	EXTERIOR WINDOW SYSTEMS		DOOR SYS			
P7 - P8 -		P7- 6" " METAL STUD P7A - 3 5/8" PARTIAL HEIGHT P8 - 3 5/8" METAL STUD P8A - 2 1/2" PARTIAL HEIGHT	IW-#	INTERIOR WINDOW SYSTEMS					
P9 - P10 -		P9 - 2 1/2" METAL STUD         P9A - 2 1/2" PARTIAL HEIGHT           P10 - 1 5/8" METAL STUD         P10A - 1 5/8" PARTIAL HEIGHT	<b>SF-#</b>	STOREFRONT SYSTEMS					
		INTERIOR CMU WALL	(CW-#)	CURTAIN WALL SYSTEMS					
P11 - P11A -		P11 - 8" NOMINAL CMU P11A - 8" NOMINAL CMU FIRE RATED	(GP-#)	GLASS PARTITION SYSTEMS					
		OR PLAN - OVERALL							





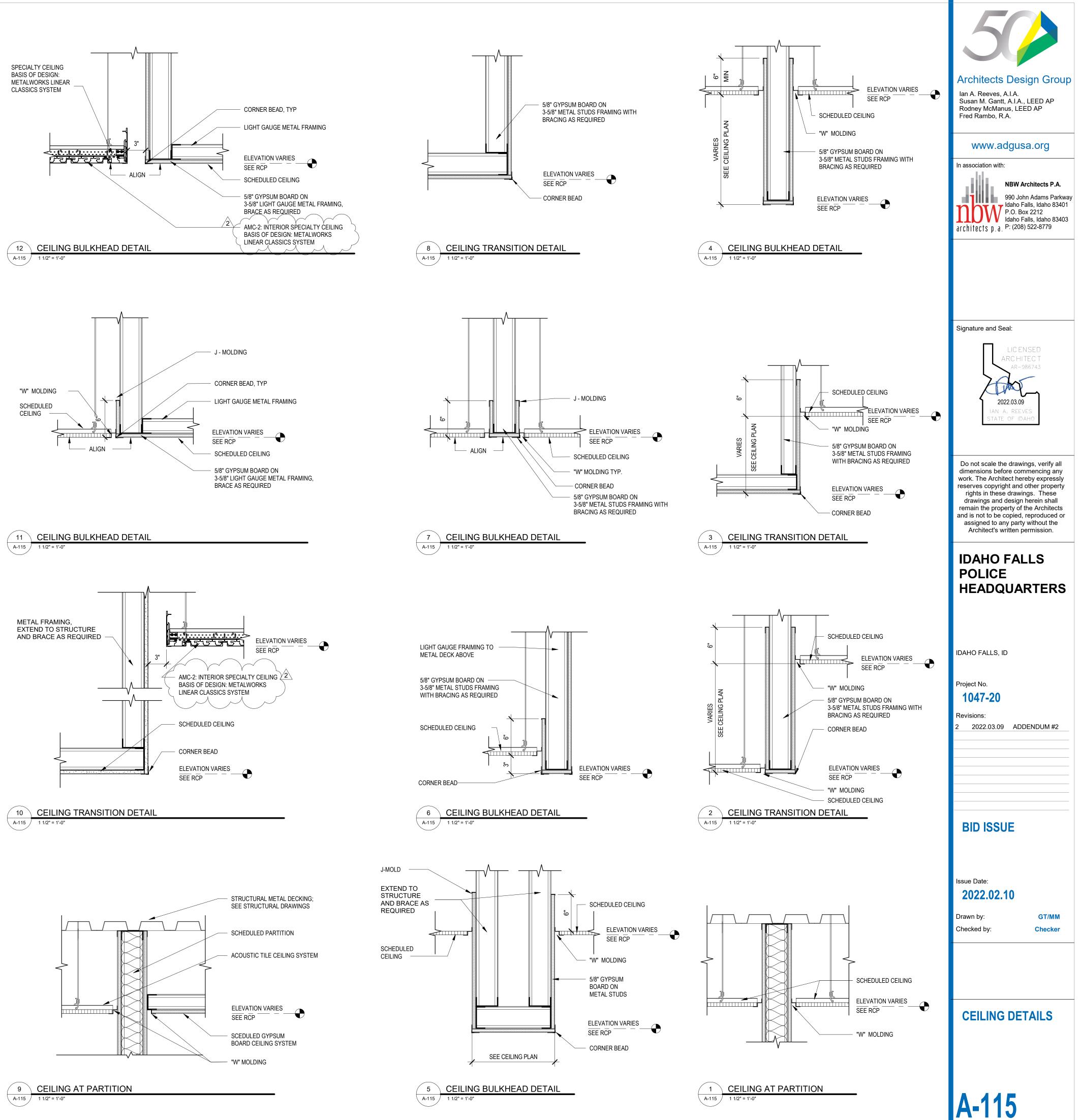


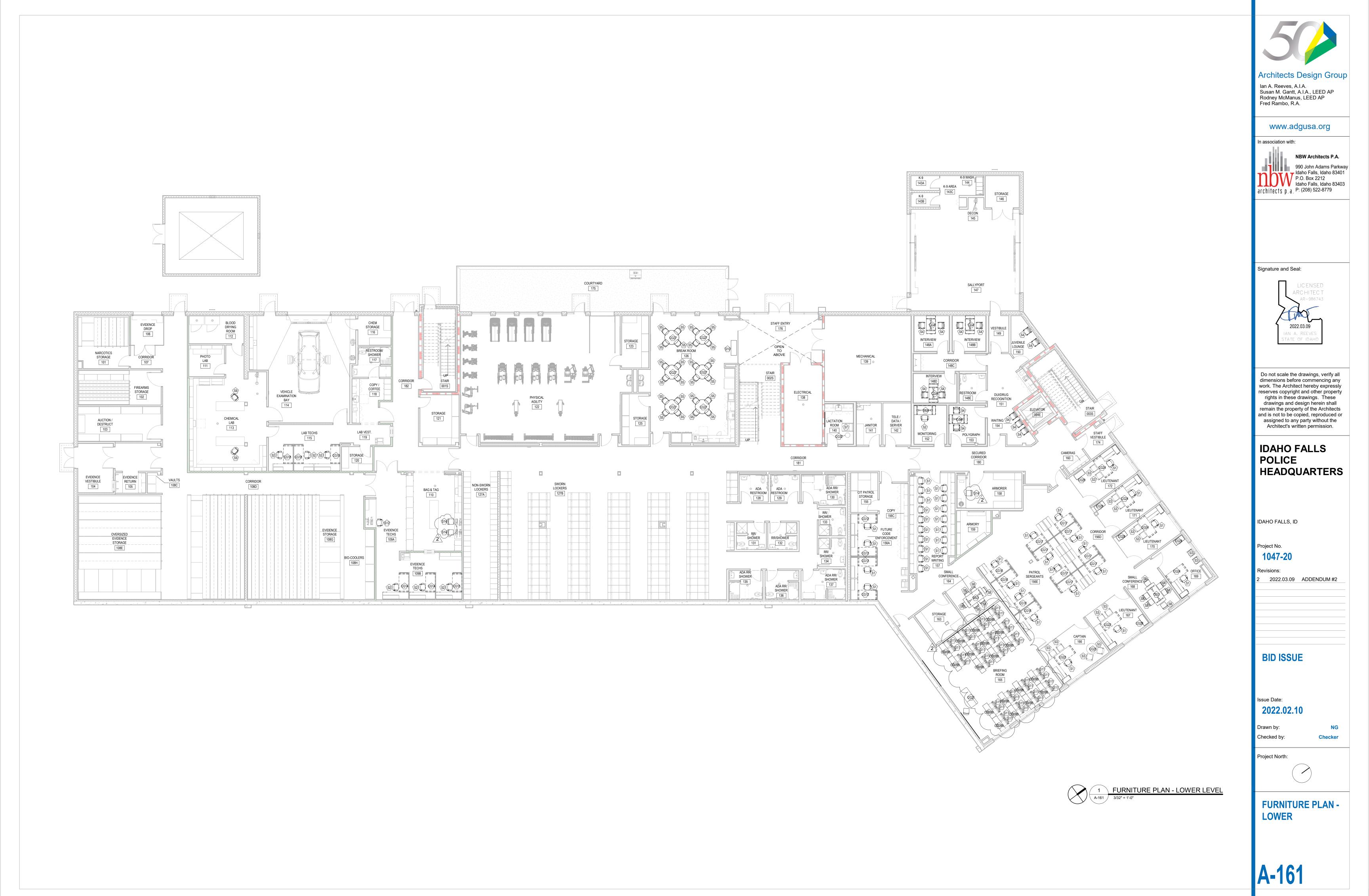
CEILING PLAN LEGEND
CEILING MOUNTED PROJECTOR
CEILING HEIGHT
2 x 2 TROFFER
2 x 4 TROFFER
SUPPLY AIR REGISTER
RETURN AIR REGISTER
EXHAUST AIR REGISTER
PENDANT FLUORESCENT
STRIP RECESSED FLUORESCENT LIGHT
RECESSED LIGHT FIXTURE
WALL MOUNTED LIGHT
STRIP FLUORESCENT
SPRINKLER HEAD
SMOKE DETECTOR
1h FIRE RATED WALL
EXIT LIGHT
ROOF HATCH

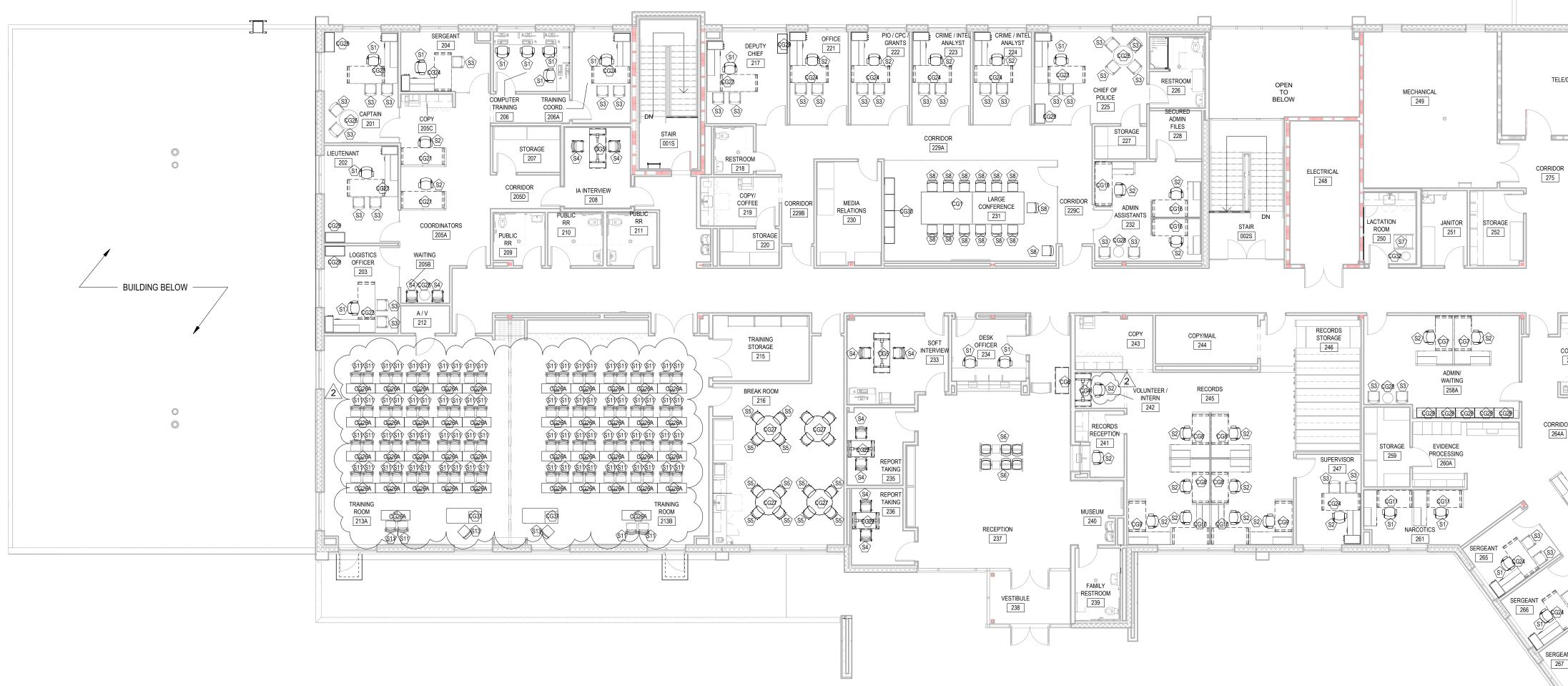


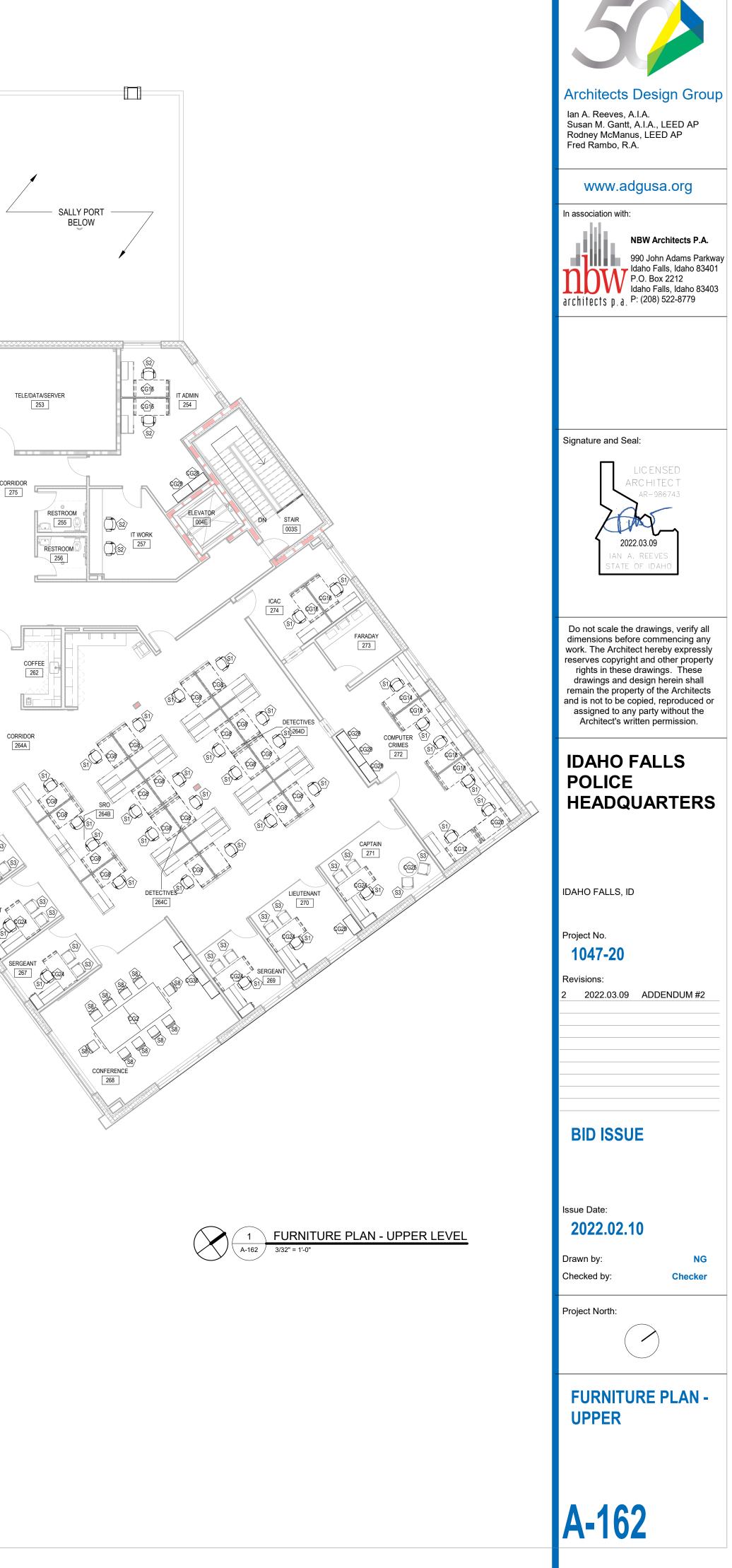
 13
 CEILING TRANSITION DETAIL

 A-115
 1 1/2" = 1'-0"



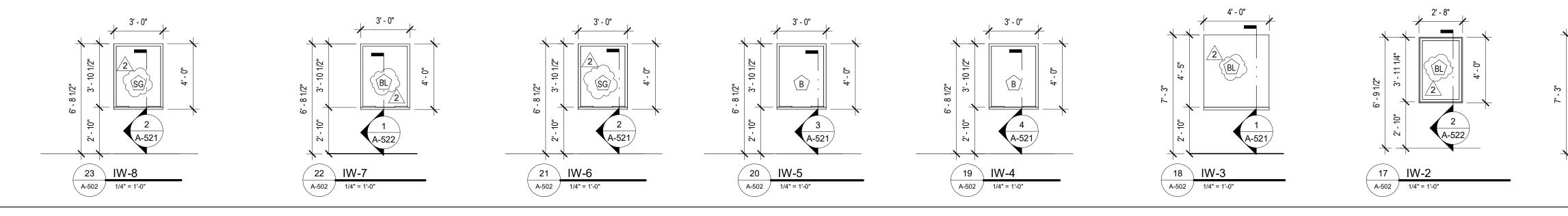


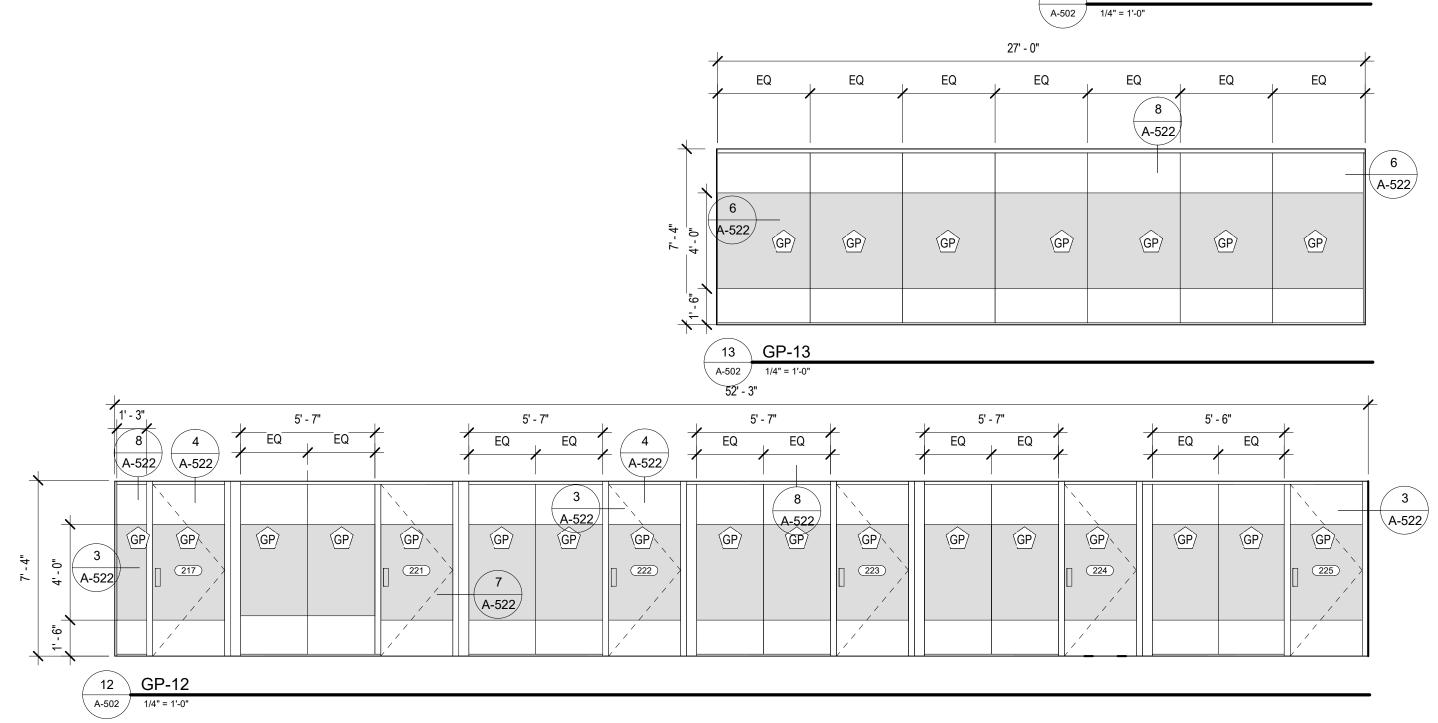




TAG	QTY	RESPONSIBILITY	DESCRIPTION
	<b>Q</b>		
CG1	1	OPOI	CONFERENCE TABLE - 16' W
CG2	1	OPOI	CONFERENCE TABLE - 12' W
CG3	2	OPOI	CONFERENCE TABLE - 6' W
CG4	5	OPOI	INTERVIEW TABLE - 5' W
CG5	3	OPOI	INTERVIEW TABLE - 6' W
CG6	1	OPOI	SECURITY TABLE - 4' W
CG7	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG8	24	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG9	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG10	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG11	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG12	3	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG13	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG14	3	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG15	2	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG16	10	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG17	8	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG18	5	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG19	1	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG20	1	OPOI	L-SHAPED WORKSTATION WITH PRIVACY PANELS
CG21	2	OPOI	RECTANGULAR WORKSTATION WITH WITH PRIVACY PANELS
CG22	2	OPOI	REPORT TABLE - 4' W
CG23	7	OPOI	LARGE L-SHAPED DESK
CG24	17	OPOI	L-SHAPED DESK
CG25	4	OPOI	ROUND OFFICE TABLE
CG26A	42	ÓPOI	TRAINING TABLE, 18" X 54"
CG26月人	19	<b>ΦΡΟΙ</b> Λ Λ	TRAINING TABLE, 18" X 54", NO MODESTY
CG27	10	OPOI	DINING TABLE
CG28	3	OPOI	SIDE TABLE
CG29	21	OPOI	LATERAL FILE, 4 DRAWERS - 36" W x 18" D
CG30	2	OPOI	CREDENZA
CG31	3	OPOI	LECTERN
CG32	2		LACTATION SIDE TABLE
<u>S1</u>	88	OPOI	FLEXIBLE OR ARMLESS TASK CHAIR
	35	OPOI	TASK CHAIR
<u>S3</u>	61	OPOI	GUEST CHAIR
<u>S4</u>		OPOI	INTERVIEW CHAIR
<u> </u>	40	OPOI	
<u>S6</u>	2		TANDEM SEATING, WITH ATTACHED TABLE
<u>53</u> S7	2		QUIET ROOM LOUNGE CHAIR
<u>S8</u>	36	OPOI	CONFERENCE CHAIR
<u>S9</u>	2	OPOI	STOOL TASK CHAIR - CHEMICAL LAB
S10	1	OPOI	BENCH
S11	122	OPOI	TRAINING CHAIR
S12	1	OPOI	STOOL TASK CHAIR - COUNTER HEIGHT
A	3		STOOL TASK CHAIR ARMLESS - COUNTER HEIGHT
<u>813</u> 814	3		STOOL TASK CHAIR ARMLESS COONTER THEIGHT
			HEIGHT

- NOT IN CONTRACT	
REQUIREMENTS	
POWER AND DATA TO TABLE	Architects Design Group
POWER AND DATA TO TABLE	Ian A. Reeves, A.I.A. Susan M. Gantt, A.I.A., LEED AP Rodney McManus, LEED AP
	Fred Rambo, R.A.
POWER AND DATA TO WORKSTATION POWER AND DATA TO WORKSTATION	www.adgusa.org
POWER AND DATA TO WORKSTATION	In association with:
POWER AND DATA TO WORKSTATION POWER AND DATA TO WORKSTATION	NBW Architects P.A.
POWER AND DATA TO WORKSTATION POWER AND DATA TO WORKSTATION	990 John Adams Parkway Idaho Falls, Idaho 83401 P.O. Box 2212
POWER AND DATA TO WORKSTATION POWER AND DATA TO WORKSTATION	Image: Second system       Image: Second system         Image: Second
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POWER AND DATA TO TABLE	LIC ENSED ARC HITEC T
POWER AND DATA TO TABLE	AR-986743
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	IAN A. REEVES STATE OF IDAHO
A/V INTEGRATION, POWER AND DATA TO LECTERN	
	Do not scale the drawings, verify all dimensions before commencing any
	work. The Architect hereby expressly reserves copyright and other property rights in these drawings. These
	drawings and design herein shall remain the property of the Architects and is not to be copied, reproduced or
	assigned to any party without the Architect's written permission.
	IDAHO FALLS
	POLICE
	HEADQUARTERS
JNTER	
	IDAHO FALLS, ID
	Project No.
	1047-20
	Revisions:22022.03.09ADDENDUM #2
	BID ISSUE
	Issue Date:
	2022.02.10
	Drawn by: NG
	Checked by: Checker
	FURNITURE
	A-163



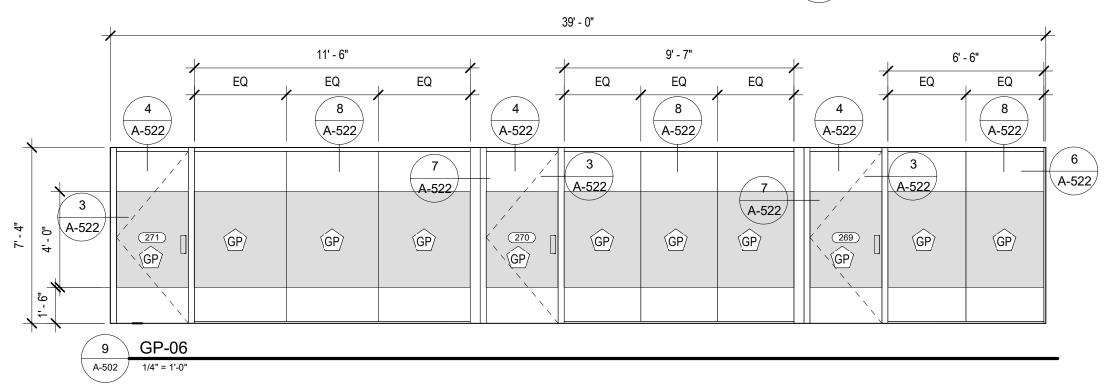


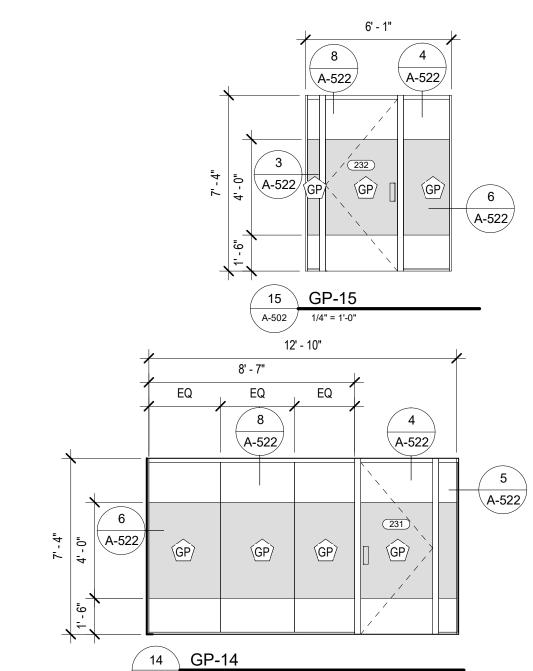
INTERIOR GLASS PARTITION NOTES:

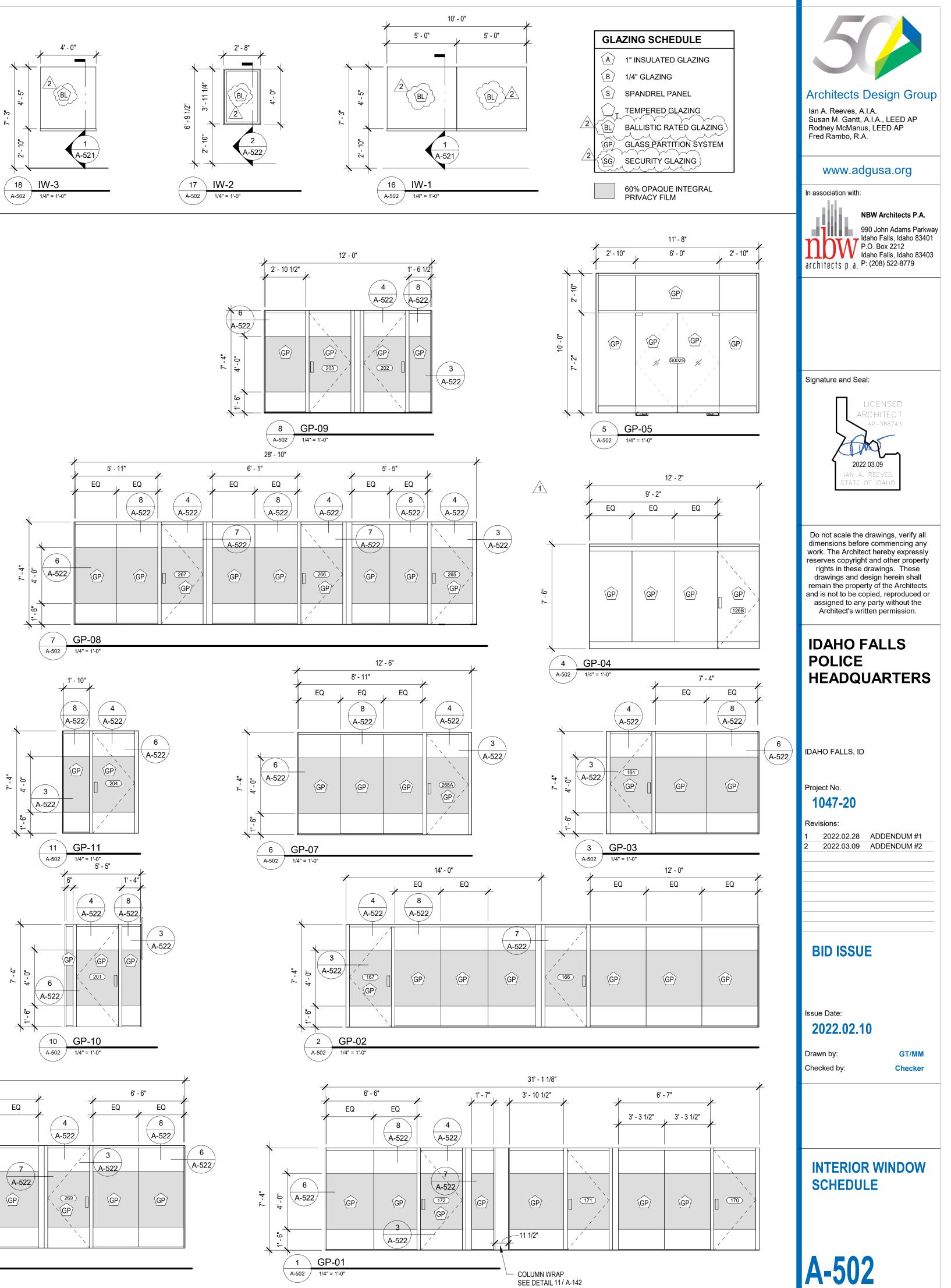
GP-04: BASIS OF DESIGN: ASSA ABLOY P-STYLE GLASS OPENING SYSTEM

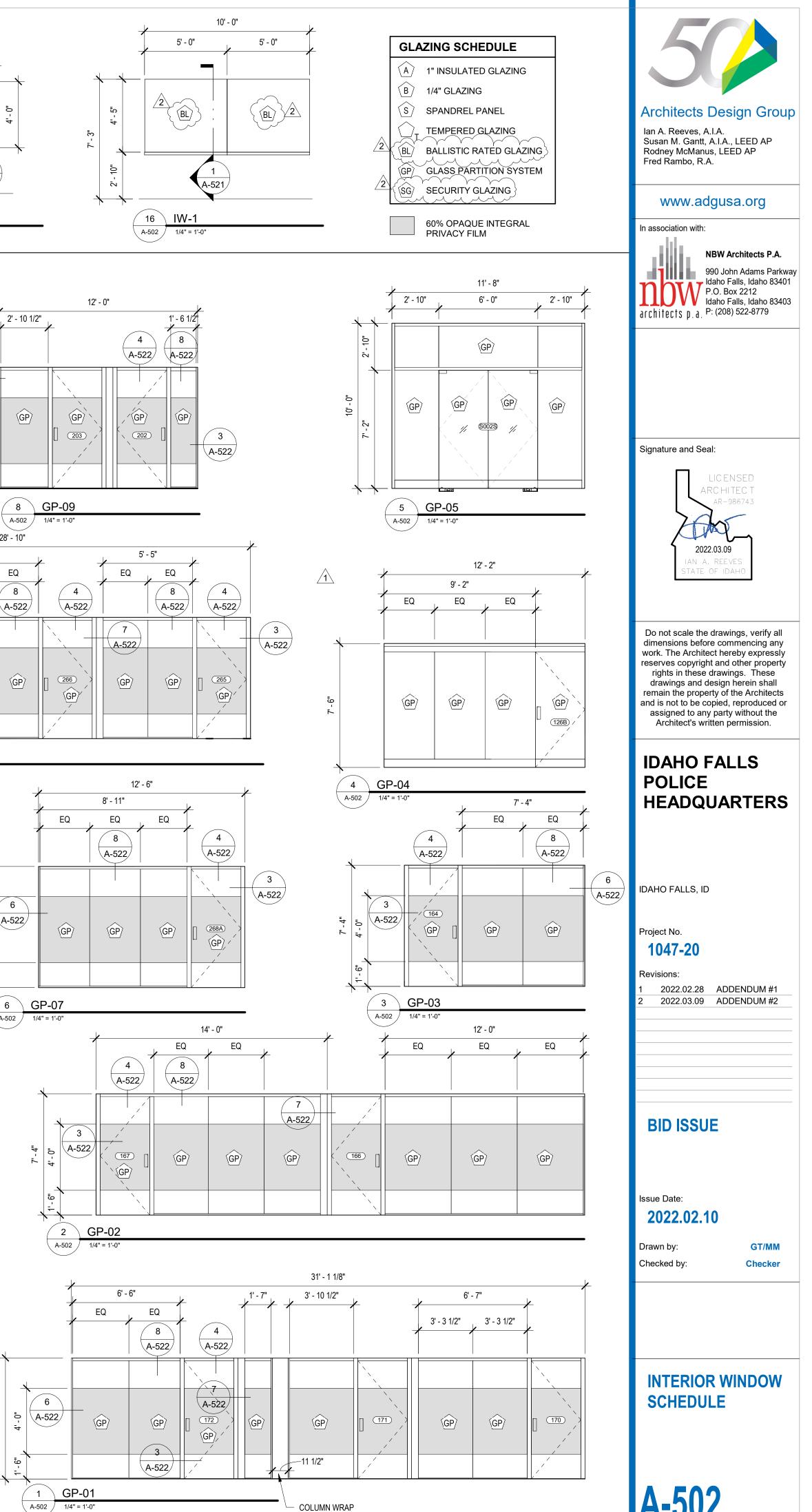
GP-05: BASIS OF DESIGN: ASSA ABLOY **BP -STYLE GLASS OPENING SYSTEM** 

ALL OTHERS: BASIS OF DESIGN: STEELCASE LITESCALE GLASS PARTITION SYSTEM









NISH TAG	MATERIAL	MANUFACTURER	INTERIOR FINISH LEGEND - CD PAG STYLE		SIZE	COMMENTS	
095423	Acoustical Metal Ceilings	MANUFACTURER		COLOR / FINISH	SIZE	COMMENTS	
AMC-1	Acoustical Metal Ceiling	Armstrong Ceiling	MetalWorks Linear Classics,	5493 Effects Sesame FXSE2	8" x 96" x 5/8"	Exterior Ceiling, refer to A-112 for location	Architects D
AMC-2	Acoustical Metal Ceiling	Armstrong Ceiling	MetalWorks Linear Classics, 0.70 NRC Square Edge with extended flange, M2 Perforations	5493 Effects Sesame FXSE	8" x 96" x 5/8"	Interiors Ceilings: Staff Entry, Reception, and Vestibule 238	lan A. Reeves, A.I. Susan M. Gantt, A.
095113	Acoustical Ceiling Tile						Rodney McManus, Fred Rambo, R.A.
ACT-1	Acoustical Ceiling Tile	Rockfon	Alaska, NRC 0.90, Square Tegular Narrow Edge, Fine Texture, 9/16" Suspension Grid SLN Tempra	White	24" x 24" x 3/4"	General Corridors and Office Areas, Conference & Briefing Rooms	www.adg
ACT-2	Acoustical Ceiling	Armstrong Ceiling	Soundscapes, Blades; Linear Acoustical Panels, Fine Texture, 15/16" Prelude XL; Vertical Panel Rectangular	7193; Stone, SE	94"W x 16"H x 2" thick	Breakroom 126	In association with:
096536	Resilient Flooring - ESD						пре
ESD-1	Electrostatic-Dissipative Vinyl Tile	Roppe	StatProtect	Cumulus White 750	24" x 24" x 1/8" thick	IT, Tele/Data Server Rooms, & Faraday	
096513	Resilient Wall Base						architects p.a. P: (
RB-1	Rubber Base	Roppe	Pinnacle (Type TS)	Dark Gray 150	4", 1/8" thick straight	Straight base at carpet	
RB-2	Rubber Base	Roppe	Pinnacle (Type TS)	Dark Gray 150	4", 1/8" thick coved	Resilient and concrete flooring	
RB-3	Rubber Base	Roppe	Pinnacle (Type TS)	Black 100	4", 1/8" thick coved	Physical Agility & Defensive Tactics	
RA-1	Rubber Transition Strips	Johnsonite/Tarkett	Slim Line Transition, SLT-20-J	Charcoal WG, 20	TBD at Time of Installation	Carpet to Sealed Concrete	
RA-2	Rubber Transition Strips	Johnsonite/Tarkett	Wheeled Traffic Transition, CTA-20-K	Charcoal WG, 20	TBD at Time of Installation	Porcelain Tile to Sheet Vinyl	Signature and Seal:
RA-3	Rubber Transition Strips	Johnsonite/Tarkett	Reducer, CRS-20-A	Charcoal WG, 20	TBD at Time of Installation	Carpet to Epoxy	
RA-4	Rubber Transition Strips	Johnsonite/Tarkett	Slim Line Transition, SLT-20-F	Charcoal WG, 20	TBD at Time of Installation	Porcelain Tile to Carpet Tile	Zak
RA-5	Rubber Transition Strips	Johnsonite/Tarkett	Reducer, RRS-20-C	Charcoal WG, 20	TBD at Time of Installation	ESD to Concrete	2022.03 IAN A. RE
RA-6	Rubber Transition Strips	Johnsonite/Tarkett	T-Molding, CE-40-C	Black B, 40	TBD at Time of Installation	Carpet to Rubber Athletic Flooring	STATE OF
RA-7	Rubber Transition Strips	Johnsonite/Tarkett	Wheeled Traffic Transition, CTA-20-PL	Charcoal WG, 20	TBD at Time of Installation	Porcelain Tile to Concrete	
RA-8	Rubber Transition Strips	Johnsonite/Tarkett	Slim Line Transition, SLT-20-A	Charcoal WG, 20	TBD at Time of Installation	Carpet to Sheet Vinyl	Do not scale the dra dimensions before c work. The Architect h
							reserves copyright ar rights in these draw drawings and desig
RA-9	Rubber Transition Strips	Johnsonite/Tarkett	Reducer, RRS-20-C	Charcoal WG, 20	TBD at Time of Installation	Resilient Flooring to Epoxy	remain the property and is not to be copie assigned to any pa
RA-10	Rubber Transition Strips	Johnsonite/Tarkett	Reducer, RRS-20-C	Charcoal WG, 20	TBD at Time of Installation	Resilient Flooring to Concrete	Architect's writte
RA-11	Rubber Transition Strips	Johnsonite/Tarkett	Reducer, CRS-40-B	Black B, 40	TBD at Time of Installation	Rubber Athletic Flooring to Concrete	
096516	Resilient Sheet Flooring				39" W/ x 16-30vds L x 1/8"	Interview, Soft Interview, Interview Waiting, Report Taking Rooms, Juvenile Lou	POLICE
RF-1	Resilient Flooring	FlexiFlor	Rubber Sheet Flooring		thickness	Polygraph & DUI Drug Recog.; Seams to be heat welded, color to match.	HEADQU
RF-2	Resilient Flooring	FlexiFlor	Rubber Sheet Flooring	Gray Dawn 746, Smooth	39" W x 16-30yds L x 1/8" thickness	Copy Coffee and Lacation Rooms; Seams to be heat welded, color to match.	
096566	Resilient Athletic Flooring						
RAF-1 096723	Rubber Athletic Flooring  Resinous Flooring	eCORE Commercial	ECOnights	Big Bang Blue 629A	23" x 23" x 8mm thick	Physical Agility	IDAHO FALLS, ID
EF-1	Epoxy (Quartz) Flooring	Sherwin Williams	Decorative Mosaic WB Coating System; 3 coats of clear sealer	Color "D" CU16	20 mils - 1/16" thick	Vehicle Examination, Chemical Lab, Photo Lab, & Blood Drying	Project No.
EB-1		Sherwin Williams		Color "D" CU16		Vehicle Examination, Chemical Lab, Photo Lab, & Blood Drying	1047-20
EB-1	Epoxy (Quartz) Integral Base		Decorative Mosaic WB Coating System; 3 coats of clear sealer		4" high	venicle Examination, Chemical Lab, Photo Lab, & Blood Drying	Revisions: 2 2022.03.09 AI
							BID ISSUE
							Issue Date:
							Issue Date:
							Issue Date: <b>2022.02.10</b> Drawn by:
							Issue Date: 2022.02.10
							Issue Date: <b>2022.02.10</b> Drawn by:
							Issue Date: <b>2022.02.10</b> Drawn by:
							Issue Date: <b>2022.02.10</b> Drawn by:
							Issue Date: 2022.02.10 Drawn by: Checked by: INTERIOR
							Issue Date: <b>2022.02.10</b> Drawn by:
							Issue Date: 2022.02.10 Drawn by: Checked by: INTERIOR
							Issue Date: 2022.02.10 Drawn by: Checked by: INTERIOR

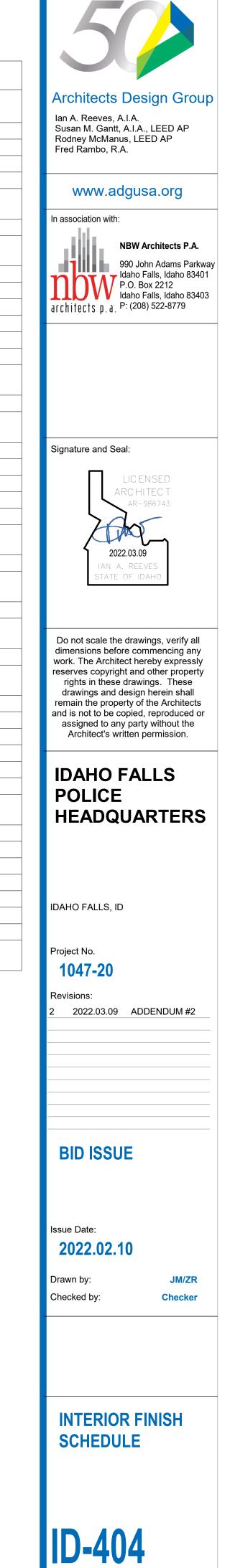
		FLOOR	BASE	NORTH WALL	SOUTH WALL	EAST WALL	WEST WALL		
ROOM #	ROOM NAME	FLOOR	FINISH	FINISH	FINISH	FINISH	FINISH	CEILING FINISH	COMMENTS
)1C	COVERED STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	COMMENTS
)01S	STAIR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXR/PM-2	
02S	STAIR	PTF-1	PTB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6 2	
035	STAIR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
04E	ELEVATOR	PTF-1	PTB-1	-	-	-	-	-	REFER TO FINISH LEGENI FOR ELEVATOR CAB FINISHES
.4	TOWEL ALCOVE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
01	NARCOTICS STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
02	FIREARMS STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
03	AUCTION / DESTRUCT	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
04	EVIDENCE VESTIBULE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
05	EVIDENCE RETURN	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
06	EVIDENCE DROP	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
07	CORRIDOR	CPT-1/SC-1	RB-1/RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08C	VAULTS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08C	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08E	OVERSIZED EVIDENCE STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08F	EVIDENCE STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08G	EVIDENCE STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
08H	BIO-COOLERS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
09A	EVIDENCE TECHS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
09B	EVIDENCE TECHS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
10	BAG & TAG	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
11	PHOTO LAB	EF-1	EB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
12	BLOOD DRYING ROOM	EF-1	EB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
13	CHEMICAL LAB	EF-1	EB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
14	VEHICLE EXAMINATION BAY	EF-1	EB-1	PT-1	PT-1	PT-1	P-1	EXP/PM-2	
15	LAB TECHS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
16	CHEM STORAGE	EF-1	EB-1	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
17	RESTROOM/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	
18	COPY / COFFEE	RF-2	RB-2	PT-1	PT-1	PT-1/PT-5	PT-1	ACT-1, GYP/PT-6	
19	LAB VEST.	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
20	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
	STORAGE				PT-1		PT-1		
21 22	PHYSICAL AGILITY	SC-1 RAF-1	RB-2 WP-1/RB-3	PT-1 PT-2	PT-2/WP-1	PT-1 PT-1/PT-2/PT- 3/PT-5		EXP/PM-2 EXP/PM-2	WP-1, 22"H AT WEIGHTS WALL
23	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
25	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
26	BREAK ROOM	SC-1	RB-2	PT-1	PT-1/PT-3	PT-1/PT-3	PT-1/PT-5	EXP/PM-2, GYP/PT-6, ACT-3	
27A	NON-SWORN LOCKERS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6	
27B	SWORN LOCKERS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6	
27C	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
270 27D	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
27E	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
28									
	ADA RESTROOM	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PT-1	GYP/PT-9	
29	ADA RESTROOM	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
30	ADA RR/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	
31	RR/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PTW-1/PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
32	RR/SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	PT-1	GYP/PT-9	
33	RR/ SHOWER	PTF-2	PTB-2	PT-1	PTW-1/PT-1	PTW-1/PT-1	PT-1	GYP/PT-9	
34	RR/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	1

				FINIS	H SCHEDULE -	LEVEL 1			
			<b>D</b> 4 0 <b>E</b>						
ROOM #	ROOM NAME	FLOOR FINISH	BASE FINISH	FINISH	SOUTH WALL	EAST WALL FINISH	WEST WALL FINISH	CEILING FINISH	COMMENTS
135	ADA RR/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	FINISH PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	COMMENTS
136	ADA RR/ SHOWER	PTF-2	PTB-2	PT-1	PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	
137	ADA RR/ SHOWER	PTF-2	PTB-2	PTW-1/PT-1	PTW-1/PT-1	PTW-1/PT-1	PT-1	GYP/PT-9	
138	ELECTRICAL	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
139	MECHANICAL	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
140	LACTATION	CPT-4/PTF-1	RB-1/PTB-1	PT-1	PT-1	PT-1	PT-4/AWP-2	ACT-1 & GYP/PT-6	
	ROOM								
141	JANITOR	SC-1	RB-2	PT-1/FRP-1	PT-1	PT-1	PT-1/FRP-1	GYP/PT-6	
142	TELE / DATA / SERVER	ESD-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
143A	K-9	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
143B	K-9	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
143C	K-9 AREA	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
144	K-9 WASH	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
145	DECON	SC-1	RB-2	PT-1, PT-5, PE-1	PT-1, PT-5, PE-1	PT-1	PT-1	EXP/PM-2	
146	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
147	SALLYPORT	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
148A	INTERVIEW	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
148B	INTERVIEW	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
148C	CORRIDOR	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
148D	INTERVIEW	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
148E	RESTROOM	EF-1	EB-1	PTW-1/PT-1	PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
149	VESTIBULE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
150	JUVENILE LOUNGE		RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
151	DUI/DRUG RECOGNITION	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
152	MONITORING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
153	POLYGRAPH	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
154	WAITING	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
155 156A	CIT PATROL STORAGE FUTURE CODE ENFORCEMENT	SC-1 CPT-3	RB-2 RB-1	PT-1 PT-1	PT-1 PT-1	PT-1 PT-1	PT-1 PT-1	EXP/PM-2 ACT-1	
156C	СОРҮ	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
156D	CORRIDOR	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
156E	PATROL SERGEANTS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
157	REPORT WRITING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6	
158	ARMORER	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6	
159	ARMORY	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
160	CAMERAS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
163	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
164	SMALL CONFERENCE	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
165	BRIEFING ROOM	CPT-5	RB-1	PT-4/AWP-1	PT-1	PT-4/AWP-1	PT-1/AWP-1	ACT-1, GYP/PT-6	
166	CAPTAIN	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
167	LIEUTENANT	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
168	SMALL CONFERENCE	CPT-3	RB-1	PT-1	PT-2	PT-1	PT-1	ACT-1	
169	OFFICE	CPT-3	RB-1	PT-1	PT-1	PT-2	PT-1	ACT-1	
170		CPT-3	RB-1	PT-2	PT-1	PT-1	PT-1	ACT-1	
171		CPT-3	RB-1	PT-2	PT-1	PT-1	PT-1	ACT-1	
172		CPT-3	RB-1	PT-2	PT-1	PT-1	PT-1	ACT-1	
173	ELEVATOR LOBBY	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
174	STAFF VESTIBULE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
175		SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	- AMC-2 2	
176		PTF-1/CPT-1		PT-1	PT-5	PT-5	PT-1		
180	SECURED CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6	
181	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6	
182	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	

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IDAHO FALLS POLICE HEADQUARTERS
IDAHO FALLS, ID
Project No. 1047-20
Revisions: 2 2022.03.09 ADDENDUM #2
BID ISSUE
Issue Date: 2022.02.10
Drawn by: JM/ZR
Checked by: Checker
INTERIOR FINISH
SCHEDULE
ID-403

ROOM #	ROOM NAME	FLOOR FINISH	BASE FINISH	NORTH WALL FINISH	SOUTH WALL FINISH	EAST WALL FINISH	WEST WALL FINISH	CEILING FINISH	COMMENTS
201		CPT-3	RB-1	PT-2	PT-1	PT-1	PT-1	ACT-1	COMMENTS
201		CPT-3	RB-1	PT-2	PT-1	PT-1	PT-1	ACT-1	
202	LOGISTICS OFFICER	CPT-3	RB-1	PT-1	PT-2	PT-1	PT-1	ACT-1	
203	SERGEANT	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
204 205A	COORDINATORS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
205A 205B	WAITING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
205B 205C	COPY	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	
205C 205D	CORRIDOR	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
2050		CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
206A	TRAINING COORD.	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
206A 206B	CORRIDOR	CPT-3 CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
2006	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
207	IA INTERVIEW	CPT-3	RB-1	PT-1	PT-1 PT-1	PT-1	PT-1	GYP/PT-6	
208	PUBLIC	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
210	PUBLIC RR	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PT-1	GYP/PT-9	
210	PUBLIC RR	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
212	A/V	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
213A	TRAINING ROOM	CPT-5	RB-1	PT-4/AWP-1	PT-1	-	PT-4/AWP-1	ACT-1, GYP/PT-6	
213B	TRAINING ROOM	CPT-5	RB-1	PT-4/AWP-1/P T-1	PT-1	PT-4/AWP-1	-	ACT-1, GYP/PT-6	
215	TRAINING STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
216	BREAK ROOM	PTF-1	PTB-1	PT-3	PT-1	PT-1	PT-1/PT-3	ACT-1 & GYP/PT-6	
217	DEPUTY CHIEF	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
218	RESTROOM	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PT-1	PTW-1/PT-1	GYP/PT-9	
219	COPY/ COFFEE	RF-2	RB-2	PT-1	PT-5	PT-1	PT-1	ACT-1, GYP/PT-6	
220	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
221	OFFICE	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
222	PIO / CPC / GRANTS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
223	CRIME / INTEL ANALYST	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
224	CRIME / INTEL ANALYST	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
225	CHIEF OF POLICE	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1	
226	RESTROOM	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9	
227	STORAGE	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
228	SECURED ADMIN FILES	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
229A	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
229B	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
229C	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
230	MEDIA RELATIONS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
231	LARGE CONFERENCE	CPT-4	RB-1	PT-1	PT-1	PT-1	PT-4	ACT-1, GYP/PT-6	
232	ADMIN ASSISTANTS	CPT-3	RB-1	PT-1	PT-1	PT-2	PT-1	ACT-1	
233	SOFT INTERVIEW	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
234	DESK OFFICER	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
235	REPORT TAKING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
236	REPORT TAKING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	
237	RECEPTION	PTF-3	PTB-3	PT-1/WC-1	PT-1	PT-1	PT-1/PT-8	AMC-2 & 2 GYP/PT-6	
237A	SECURITY	PTF-3	PTB-3	PT-1	PT-1	PT-1	PT-1	GYP/PT-6	

				FINISH S	SCHEDULE - LE	VEL 2		
		FLOOD		NORTH WALL	SOUTH WALL	EAST WALL	WEST WALL	
ROOM #	ROOM NAME	FLOOR FINISH	BASE FINISH	FINISH	FINISH	FINISH	FINISH	CEILING
238	VESTIBULE	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	AMG-2
239	FAMILY RESTROOM	PTF-2	PTB-2	PT-1	PTW-1/PT-1	PTW-1/PT-1	PT-1	GYP/PT-9
233	MUSEUM	PTF-3	PTB-3	PT-1	PT-1	PT-1/PT-5	PT-1	GYR/PT-6
240 240A	MUSEUM	PTF-3	PTB-3	PT-1	PT-1	PT-1	PT-1/PT-8	GYP/PT-6/2
240	RECORDS RECEPTION	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1,
				1 1-1	1 1-1	1 1-1	1 1-1	GYP/PT-6
242	VOLUNTEER / INTERN	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
243	COPY	CPT-3	RB-1	PT-5	PT-1	PT-1	PT-1	ACT-1,
								GYP/PT-6
244	COPY/MAIL	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
245	RECORDS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
246	RECORDS STORAGE	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
247	SUPERVISOR	CPT-3	RB-1	PT-1	PT-1	PT-2	PT-1	ACT-1
248	ELECTRICAL	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2
249	MECHANICAL	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2
250	LACTATION ROOM	CPT-4/PTF-1	RB-1/PTB-1	PT-1	PT-1	PT-1	PT-4/AWP-2	ACT-1, GYP/PT-6
251	JANITOR	SC-1	RB-2	PT-1/FRP-1	PT-1	PT-1	PT-1/FRP-1	GYP/PT-6
252	STORAGE	ESD-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1,
202				1 1-1	1 1-1	1 1-1		GYP/PT-6
253	TELE/DATA/SERVER	ESD-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1
254	IT ADMIN	CPT-2	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1
255	RESTROOM	PTF-2	PTB-2	PT-1	PTW-1/PT-1	PTW-1/PT-1	PT-1	GYP/PT-9
256	RESTROOM	PTF-2	PTB-2	PTW-1/PT-1	PT-1	PTW-1/PT-1	PTW-1/PT-1	GYP/PT-9
257	IT WORK	RF-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1
258A	ADMIN/ WAITING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6
259	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2
260A	EVIDENCE PROCESSING	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1, GYP/PT-6
261	NARCOTICS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
262	COFFEE	RF-2	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1 & GYP/PT-6
263	СОРҮ	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	GYP/PT-6
264A	CORRIDOR	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1 &
								GYP/PT-6
264B	SRO	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
264C	DETECTIVES	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
264D	DETECTIVES	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
265	SERGEANT	CPT-3	RB-1	PT-1	PT-2	PT-1	PT-1	ACT-1
266	SERGEANT	CPT-3	RB-1	PT-1	PT-2	PT-1	PT-1	ACT-1
267	SERGEANT	CPT-3	RB-1	PT-1	PT-2	PT-1	PT-1	ACT-1
268	CONFERENCE	CPT-4	RB-1	PT-1	PT-1	PT-4	PT-1	ACT-1, GYP/PT-6
269	SERGEANT	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1
270	LIEUTENANT	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1
271	CAPTAIN	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-2	ACT-1
272	COMPUTER CRIMES	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
273	FARADAY	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
274	ICAC	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1
275	CORRIDOR	CPT-2	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1
278	CORRIDOR	CPT-2	RB-1	PT-1	PT-1	PT-1/PT-5	PT-1	ACT-1 & GYP/PT-6



## REFRIGERATION

### INSTALLATION

ONLY NON CFC REFRIGERANT MAY BE UTILIZED IN EQUIPMENT (R-410 OR EQUAL).

EQUIPMENT MANUFACTURER TO PROVIDE REFRIGERANT PIPING LAYOUT, SIZING, AND ALL REQUIRED COMPONENTS FOR ENGINEER REVIEW.

REFRIGERANT PIPING ON FLOOR PLANS IS SHOWN AS SINGLE LINE FOR CLARITY INSTALL REFRIGERANT SUCTION, REFRIGERANT LIQUID, AND REFRIGERANT GAS PER MANUFACTURER RECOMMENDATIONS. ROUTE ALL PIPING IN CONCEALED LOCATIONS ABOVE CEILINGS AND WITHIN WALLS UNLESS NOTED OTHERWISE. PIPING TO MEET MANUFACTURER MAXIMUM LENGTH REQUIREMENTS INCLUDING ALL RELEVANT FITTINGS.

### INSULATION

INSULATE REFRIGERANT PIPING PER INSULATION TABLE. PROVIDE ALUMINUM JACKET ON ALL INSULATION LOCATED OUTDOORS.

#### SUPPORT

SUPPORT ALL FLOOR, GROUND, OR ROOF SUPPORTED REFRIGERATION PIPING WITH UNISTRUT SUPPORTS. INSTALL DURA-BLOK ROOFTOP SUPPORT PADS OR EQUAL.

## COMMISSIONING

#### CONTRACTOR

- A COMMISSIONING AUTHORITY HAS BEEN RETAINED BY THE OWNER TO PERFORM COMMISSIONING FOR THIS PROJECT (UNVC). THE INSTALLING CONTRACTORS WILL BE RESPONSIBLE TO ASSIST UNVC WITH THE COMMISSIONING SCOPE FOR ALL MECHANICAL SYSTEMS. THE INSTALLING CONTRACTORS WILL BE RESPONSIBLE FOR THE FOLLOWING:
- 1. COMPLETE ALL PRE-FUNCTIONAL TESTING FORMS THAT UNVC PROVIDES FOR ALL OF THE MECHANICAL SYSTEMS. 2. COMPLETE ALL FUNCTIONAL TESTING FORMS THAT UNVC PROVIDES FOR ALL OF
- THE MECHANICAL SYSTEMS. 3. INSTALLING CONTRACTORS WILL BE RESPONSIBLE FOR ADDITIONAL TESTING IF
- THE SYSTEMS FAIL DURING UNVC TESTING. 4. THE CONTROL CONTRACTOR WILL BE PRESENT FOR UNVC TESTING OF 20% OF THE SEQUENCES OF OPERATION.
- 5. UNVC WILL REVIEW THE O&M MANUALS

## DUCTWORK

INSTALL AND SUPPORT ALL DUCTWORK PER SMACNA AND INTERNATIONAL MECHANICAL CODE REQUIREMENTS.

INSTALLATION

#### COORDINATE ALL DIFFUSER AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELECTRICAL DRAWINGS.

COORDINATE ALL STRUCTURAL PENETRATIONS FOR DUCT WORK WITH GENERAL ARE TO BE COORDINATED WITH JOIST LAYOUT.

CLOSE ENDS OF DUCTWORK AND PIPING AND COVER FLOOR DRAINS DURING CONSTRUCTION. CLEAN ALL EQUIPMENT, PIPING, AND DUCTWORK AT COMPLETION OF PROJECT.

CONSTRUCT ALL DUCT TEES, BENDS, AND ELBOWS WITH RADIUS NOT LESS THAN 1.5 ALL MOTORIZED DAMPERS ARE TO BE 24V UNLESS NOTED OTHERWISE. TIMES THE WIDTH OF THE DUCT. WHERE PHYSICAL CONSTRAINTS PROHIBIT RADIUSED ELBOWS, PROVIDE RECTANGULAR ELBOW WITH TURNING VANES. ALL BRANCH TAKEOFFS TO BE CONSTRUCTED OF 90° WYE WITH 45° ENTRY.

DUCT DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS.

PAINT DUCT INTERIORS VISIBLE THROUGH REGISTERS, GRILLES, DIFFUSERS, AND LOUVERS FLAT BLACK.

CONCEALED VENTS, DUCTS, AND ALL PIPING INSTALLED THROUGH FRAMING MEMBERS MUST BE PROTECTED FROM FASTENER PENETRATION BY A STEEL SHIELD FILTERS PLATE (MINIMUM THICKNESS OF 1/16") UNLESS THE DISTANCE FROM THE FACE EDGE ALL AIR MOVING HVAC EQUIPMENT TO HAVE PRE-FILTER. ALL FILTERS TO BE OF THE FRAMING IS NOT LESS THAN 1.5".

PROVIDE MINIMUM 2.5 WHEEL DIAMETERS OF STRAIGHT DUCT BEFORE OFFSETS OR PROVIDE NEW FILTERS ON ALL FORCED AIR SYSTEMS AND NEW BELTS FOR ALL BENDS FOR ALL INLET AND OUTLET DUCTWORK FOR FANS.

ALL AIR DEVICE RUNOUTS TO MATCH NECK SIZE UNLESS NOTED OTHERWISE.

COMPLY WITH SMACNA REQUIREMENTS FOR ALL DUCT SUPPORT SIZING, SPACING, AND MATERIAL. ALL HANGERS IN CORROSIVE ENVIRONMENTS TO BE ELECTROGALVANIZED ALL-THREAD RODS.

PROVIDE EXPANSION JOINTS FOR ALL DUCT WORK PER SMACNA AND MECHANICAL CODE REQUIREMENTS BASED ON FINAL FIELD ROUTING.

INSTALL EXPANSION JOINTS IN ALL DUCTWORK CROSSING A BUILDING EXPANSION JOINT. EXPANSION JOINTS MUST MEET THE REQUIREMENTS FOR EXPANSION AS DESCRIBED IN THE STRUCTURAL DRAWINGS.

ALL ROUND EXPOSED DUCTWORK TO BE SPIRAL DUCT SUPPORTED WITH STEEL CABLE AND SADDLE SUPPORTS. CREATE SMOOTH AND UNIFORM EXPOSED SEALANT BEADS FOR CLEAN APPEARANCE.

SUPPORT ALL OUTDOOR DUCTWORK WITH UNISTRUT SUPPORT STANDS AND DURA-BLOK ROOFTOP SUPPORT PADS OR EQUAL. SLOPE TOP OF OUTDOOR DUCTS TO PREVENT MOISTURE ACCUMULATION.

#### MATERIALS

ALL DUCT TO BE CONSTRUCTED OF GALVANIZED METAL UNLESS NOTED OTHERWISE. ALL ROUND EXPOSED DUCT TO BE SPIRAL DUCT. CONSTRUCT ALL

DUCT TO THE FOLLOWING SMACNA STANDARDS: 1. LOW PRESSURE SUPPLY DUCT AND RETURN DUCT - 2" W.G. PRESSURE CLASS AND OUTDOOR INSTALLATION. SEAL CLASS B.

2. EXHAUST DUCT - 1" W.G. PRESSURE CLASS AND SEAL CLASS B.

ALL DUCTS ABOVE RATED CEILINGS TO BE MINIMUM 24-GAUGE SHEET METAL

ALL DUCTWORK, HANGERS, ACCESSORIES, AND AIR DEVICES LOCATED IN AN NDOOR POOL ROOM AND ADJACENT SPACES TO BE ALUMINUM OR STAINLESS STEEL.

#### ACCESS

PROVIDE ACCESS PANELS FOR ALL EQUIPMENT, DAMPERS, ACTUATORS, AND FILTERS. ENSURE ADEQUATE ACCESS TO ALL SYSTEM COMPONENTS FOR MAINTAINABILITY. PROVIDE DOUBLE WALL DUCT ACCESS DOORS FOR ALL MOTORIZED DAMPERS, FIRE/SMOKE DAMPERS, FIRE DAMPERS, FILTERS, DUCT COILS, TURNING VANES, DUCTWORK CONNECTING TO LOUVERS, AND OTHER DEVICES THAT REQUIRE ACCESS. DOORS TO BE 12" SQUARE FOR TWO HAND ACCESS AND 25"X14" FOR BODY ACCESS.

#### INSULATION AND LINER

CONDITIONED SPACES INCLUDE ALL SPACES THAT ARE DIRECTLY HEATED OR COOLED WITHIN THE BUILDING THERMAL ENVELOPE. CONDITIONED SPACES ALSO INCLUDE AREAS THAT ARE INDIRECTLY HEATED OR COOLED WITHIN THE BUILDING THERMAL ENVELOPE WHERE THEY ARE SEPARATED FROM CONDITIONED SPACES BY UNINSULATED WALLS, FLOORS, OR CEILINGS. THESE SPACES INCLUDE AREAS ABOVE CEILINGS THAT ARE WITHIN THE BUILDING THERMAL ENVELOPE.

LINE ALL LOW PRESSURE RECTANGULAR SUPPLY AND RETURN DUCT A MINIMUM OF 20 FEET FROM ALL AIR HANDLING EQUIPMENT, SPECIFIC DUCT SYSTEMS REQUIRE ALL EQUIPMENT LOCATED ON ROO ADDITIONAL LINED DUCT AS INDICATED ON DRAWINGS WITH DUCT HATCH. LINE ALL EQUIPMENT RAIL. ROOF CURB OF RETURN TRANSFERS AND GRILLE PLENUM BOXES. DUCT LINER TO BE KNAUF ATMOSPHERE DUCT LINER OR EQUAL AND MINIMUM R-4.2 (1"). DUCT DIMENSIONS HEIGHT TO ENSURE 14" MINIMUM LISTED ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS. ADD LINER DIMENSIONS TO OF EQUIPMENT (ROOF INSULATION DUCT DIMENSIONS LISTED ON DRAWINGS FOR ACTUAL DUCT DIMENSIONS. TRIM AND SEAL ALL JOINTS AND INSTALL PER MANUFACTURER REQUIREMENTS.

DUCT WRAP TO BE KNAUF ATMOSPHERE OR EQUAL WITH VAPOR BARRIER FOR ALL SUPPLY AND OUTSIDE AIR DUCT. INSULATE ALL CONCEALED UNLINED SUPPLY DUC TO MANUFACTURER REQUIREMENTS. THE MANUFACTURER TO SIZE THE PIPING AND LOCATED IN CONDITIONED SPACE WITH MINIMUM R-4.5 - 1-1/2" (AT 25% COMPRESSION). INSULATE ALL SUPPLY AND RETURN DUCT, INCLUDING LINED DUCT, COORDINATED WITH ALL TRADES. THE MANUFACTURER TO PERFORM ON-SITE LOCATED IN UNCONDITIONED SPACE AND OUTDOORS WITH MINIMUM R-12 - 4" (AT 25% COMPRESSION). ALL DUCT LOCATED OUTDOORS TO BE DOUBLE WALL WITH SLOPED TOP AND ANNULAR INSULATION. INSULATE ALL OUTSIDE AIR DUCT WITH MINIMUM R-6 - 2" (AT 25% COMPRESSION).HRV SUPPLY AND RETURN DUCTWORK WILL NOT BE INSULATED WITH EXCEPTION OF DUCT FROM INTAKE LOUVER TO HRV.

ROUND FLEXIBLE DUCT TO BE THERMAFLEX PRO SERIES OR APPROVED EQUAL FLEXIBLE SUPPLY DUCT IN CONDITIONED SPACE TO BE MINIMUM R-4.2. FLEXIBLE DUCT RUNS TO BE MAXIMUM 8 FEET IN LENGTH AND FREE OF KINKS AND TIGHT BENDS. FLEXIBLE DUCT TO MEET UL 181 AND FASTENERS TO MEET UL181B. UNLISTED DUCT TAPE IS PROHIBITED.

#### RATED ASSEMBLIES

PROVIDE FIRE, FIRE/SMOKE, SMOKE, AND CEILING RADIATION DAMPERS WHERE REQUIRED. INSTALL DAMPERS PER UL 555, UL 555S, AND UL 555C AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE FIRE SAFING ON ALL PENETRATIONS THROUGH FIRE RATED SEPARATIONS WITH UL RATED FIRE SAFING MATERIAL. REFER TO ARCHITECTURAL DRAWINGS FOR RATED ASSEMBLY LOCATIONS AND DESCRIPTIONS.

#### TEST AND BALANCE

PROVIDE BALANCE VALVES AND DAMPERS TO ALLOW COMPLETE BALANCE OF HVAC SYSTEMS (OPPOSED BLADE DAMPERS (OBD'S) THAT ARE INTEGRAL TO AIR DEVICES ARE NOT CONSIDERED BALANCE DAMPERS UNLESS NOTED OTHERWISE).

BALANCE ALL HVAC EQUIPMENT AND AIR DEVICES PER PLAN BY AN APPROVED INDEPENDENT TEST AND BALANCE CONTRACTOR. BALANCE REPORT TO BE GIVEN TO ENGINEER, OWNER, AND O&M MANUAL.

## SYSTEM TYPE

VRF/VRV DX CONDENSING

#### PROVIDE ACCESS PANELS FOR ALL EQUIPMENT, DAMPERS, ACTUATORS, AND FILTERS. ENSURE ADEQUATE ACCESS TO ALL SYSTEM COMPONENTS FOR MAINTAINABILITY.

ELECTRICAL REQUIREMENTS

ACCESS

CONTRACTOR AND STRUCTURAL ENGINEER. DUCT PENETRATIONS THROUGH ROOF PROVIDE STARTERS AND CONTACTORS NECESSARY TO OPERATE ALL MECHANICAL EQUIPMENT. COORDINATE ALL REQUIREMENTS WITH ELECTRICAL.

> CONTRACTOR MUST COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL EQUIPMENT WITH ELECTRICAL CONTRACTOR ONCE REVIEWED SUBMITTALS ARE RECEIVED.

CONTRACTOR TO COORDINATE CONTROL OF MOTORIZED DAMPERS WITH ASSOCIATED EQUIPMENT AND PROVIDE ALL CONTROL WIRING BETWEEN THE MOTORIZED DAMPER AND SERVING EQUIPMENT.

MAY BE SPECIFIED IN ELECTRICAL DRAWINGS.

MINIMUM MERV-8.

BELT DRIVEN EQUIPMENT WITHIN ONE WEEK PRIOR TO SUBSTANTIAL COMPLETION. INSTALLATION

GENERAL REQUIREMENTS

PROVIDE ONE YEAR PARTS AND LABOR WARRANTY ON INSTALLATION.

PROVIDE SUBMITTALS ON ITEMS LISTED IN SCHEDULES TO ENGINEER FOR REVIEW PRIOR TO ORDER, PURCHASE, OR INSTALLATION. PROVIDE ALL HVAC CONSTRUCTION COSTS FOR ENGINEER DATA BASE AS PART OF SUBMITTALS.

10 DAYS PRIOR TO BID DATE.

EQUIPMENT.

COORDINATE EXACT LOCATION OF THERMOSTATS/SENSORS WITH ARCHITECT PRIOR TO INSTALLATION. PROVIDE VENTILATED LOCKABLE COVERS FOR ALL THERMOSTATS AND SENSORS LOCATED IN PUBLIC ACCESSIBLE LOCATIONS. PROVIDE AND INSTALL CONTROL WIRING BETWEEN THERMOSTAT/SENSOR AND AIR HANDLING EQUIPMENT. PROVIDE INSULATED BASE FOR ALL THERMOSTATS/SENSORS LOCATED ON AN EXTERIOR WALL.

ALL DETAILS INCLUDED IN DESIGN DRAWINGS MUST BE APPLIED TO ALL RELEVANT MECHANICAL EQUIPMENT INSTALLED OUTDOORS TO BE LISTED AND LABELED FOR INSTALLATIONS REFERRED TO IN THE DETAIL. EACH DETAIL WILL NOT BE SPECIFICALLY REFERENCED ON THE DRAWINGS.

PROVIDE WATER LEVEL DETECTOR FOR ALL DOWNFLOW UNITS WITHOUT SECONDARY DRAIN PANS. DISABLE EQUIPMENT UPON DETECTION OF WATER.

ALL FANS TO BE SELECTED WITH MEDIUM DRIVE LOSS.

CONTRACTOR IS RESPONSIBLE FOR FULLY FUNCTIONING AND COMPLETE MECHANICAL SYSTEMS INCLUDING ALL INSTALLATION REQUIREMENTS, SERVICE AND MAINTENANCE REQUIREMENTS, CONTROL AND OPERATION REQUIREMENTS,

#### INSTALLATION

SUPPORT

MANUFACTURER AND ARCHITECT

THE EDGE OF THE ROOF.

# EQUIPMENT

COORDINATE ALL ELECTRICAL AND CONTROL REQUIREMENTS WITH ELECTRICIAN

CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING CONDUIT. CONDUIT IS REQUIRED FOR ALL INACCESSIBLE LOCATIONS INCLUDING INSIDE WALLS, ABOVE HARD CEILINGS, AND IN FLOORS. REFER TO ELECTRICAL PLANS AND SPECIFICATIONS FOR ALL CONDUIT REQUIREMENTS. SOME LOW VOLTAGE CONDUIT

#### ALL MOTORS TO BE PREMIUM EFFICIENCY MOTORS. ALL MOTORS POWERED THROUGH A VFD TO CONFORM TO MG-1, PART 31 FOR INVERTER DUTY.

ALL MANUFACTURER SUBSTITUTIONS MUST BE SUBMITTED THROUGH ARCHITECT AND APPROVED THROUGH AN ADDENDUM. PRIOR APPROVALS MUST BE SUBMITTED FACTOR.

PROVIDE OPERATIONS AND MAINTENANCE MANUAL INCLUDING ALL HVAC

ALL EQUIPMENT MOUNTED ON THE ROOF TO BE INSTALLED A MINIMUM OF 10' FROM

PROVIDE CONCRETE HOUSEKEEPING PADS (4" MINIMUM) FOR ALL INDOOR AND OUTDOOR HVAC EQUIPMENT LOCATED AT GRADE OR ON THE FLOOR. EXTEND CONCRETE BEYOND EDGE OF EQUIPMENT MIN 4" (ALL DIRECTIONS). COORDINATE PAD REQUIREMENTS WITH GENERAL CONTRACTOR.

PROVIDE VIBRATION ISOLATION FOR ALL FAN OR COMPRESSOR DRIVEN EQUIPMENT. PROVIDE FLEXIBLE CONNECTIONS TO EQUIPMENT.

OF TO BE SECURED TO A ROOF CURB OR	
R EQUIPMENT RAIL TO BE INSTALLED PER ROOFING	
URAL REQUIREMENTS. MINIMUM CURB OR RAIL	
DISTANCE BETWEEN TOP OF ROOF AND BOTTOM	
N ETC. THICKNESS TO BE ADDED TO 14" FOR CURB	

SYSTEMS BASED ON ACTUAL PIPING ROUTING AND SYSTEM LOCATIONS ONCE

STARTUP AND COMMISSIONING OF THE ENTIRE VRF SYSTEM INCLUDING TWO SITE VISITS DURING CONSTRUCTION PRIOR TO SYSTEM STARTUP.

## GENERAL REQUIREMENTS

INSTALL ALL MECHANICAL SYSTEMS IN ACCORDANCE WITH THE ADOPTED VERSIONS OF THE INTERNATIONAL BUILDING CODE. INTERNATIONAL MECHANICAL CODE. INTERNATIONAL FUEL GAS CODE, INTERNATIONAL ENERGY CONSERVATION CODE, AND UNIFORM PLUMBING CODE AND ALL OTHER LOCAL CODES AND ADOPTED ORDINANCES.

CLOSELY COORDINATE ALL MECHANICAL WITH ELECTRICAL, ARCHITECTURAL, AND STRUCTURAL. DUCTWORK AND PIPING IS APPROXIMATE AND DIAGRAMMATIC AND IS NOT TO BE SCALED. PROVIDE ALTERNATE ROUTING, OFFSETS, AND TRANSITIONS AS REQUIRED FOR COORDINATION OF ALL WORK WITHOUT ADDITIONAL COST TO THE OWNER.

FIELD VERIFY ALL MECHANICAL PRIOR TO COMMENCING NEW WORK. DO NOT FABRICATE OR INSTALL ANY MECHANICAL BEFORE VERIFYING DIMENSIONS AND ROUTING WITH BUILDING CONDITIONS AND ALL OTHER TRADES.

CONTRACTOR IS RESPONSIBLE FOR ALL APPLICABLE PERMITS AND FEES.

IF DISCREPANCIES EXIST BETWEEN BUILDING CODES, DRAWINGS, NOTES, AND SPECIFICATIONS, THE MOST STRINGENT REQUIREMENT WILL BE REQUIRED UNLESS CLARIFIED BY PROJECT ENGINEER IN AN OFFICIAL ADDENDUM OR SUPPLEMENTAL INSTRUCTION.

REQUESTS FOR INFORMATION: THE CONTRACTOR ACKNOWLEDGES ITS RESPONSIBILITY TO BE FAMILIAR WITH THE CONTRACT DOCUMENTS. REQUESTS FOR INFORMATION (RFI'S) WILL BE RESPONDED TO WITHIN FIVE WORKING DAYS OF RECEIPT. TIME SPENT REVIEWING RFI'S IN WHICH THE INFORMATION REQUESTED IS CLEARLY INCLUDED IN THE DRAWINGS OR SPECIFICATIONS WILL BE CHARGED TO THE CONTRACTOR AT ENGINEERING SYSTEM SOLUTIONS' STANDARD BILLING RATES.

CONTRACTOR

PROVIDE SEISMIC RESTRAINTS FOR HVAC EQUIPMENT, DUCTWORK, AND PIPING. RESTRAINTS ARE TO COMPLY WITH SEISMIC DESIGN CRITERIA LISTED IN THE STRUCTURAL GENERAL NOTES AND IN ACCORDANCE WITH ASCE/SEI 7-10 AND BUILDING CODE. CONTRACTOR IS RESPONSIBLE TO PROVIDE INSTALLATION DETAILS THAT ARE STAMPED BY A PROFESSIONAL ENGINEER, LICENSED IN THE LOCAL JURISDICTION. DETAILS ARE TO ACCOUNT FOR SEISMIC, WIND, AND GRAVITY LOADING REQUIREMENTS. WHEN ENGINEERING SYSTEM SOLUTIONS (ES2) PROVIDES THE STRUCTURAL ENGINEERING, GENERIC INSTALLATION DETAILS MAY BE INCLUDED IN THE STRUCTURAL DOCUMENTS AND MAY BE FOLLOWED WHERE APPLICABLE. REFER TO STRUCTURAL GENERAL NOTES FOR SEISMIC DESIGN CATEGORY, SITE CLASS, RISK CATEGORY, SHORT PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION COEFFICIENT (SDS), ONE SECOND PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION COEFFICIENT (SD1), AND IMPORTANCE

PIPING, DUCTWORK, AND EQUIPMENT HANGERS CENTERED ON STEEL I-BEAMS (CONCENTRIC HANGERS) ARE PREFERRED OVER HANGERS SUPPORTED FROM A SINGLE SIDE OF THE BOTTOM I-BEAM FLANGE. IF USING HANGERS SUPPORTED FROM A SINGLE SIDE OF THE BOTTOM FLANGE, THE MAXIMUM WEIGHT LIMIT PER HANGER IS 200 POUNDS UNLESS DIRECTED OTHERWISE BY THE PROJECT STRUCTURAL ENGINEER.

CAULK AND SEAL ALL PENETRATIONS THROUGH CEILINGS, WALLS, AND FLOORS. PROVIDE ESCUTCHEON COVERS OR SHEET METAL FLANGES ON ALL VISIBLE PENETRATIONS.

DUCTWORK AND PIPING MAY DIFFER IN DIMENSIONS THAN WHAT IS INDICATED ON DRAWINGS BASED ON EASIER PROCUREMENT, CONSISTENT SIZES, OR FIELD INSTALLATION CONDITIONS. PIPING MUST BE LARGER THAN WHAT IS INDICATED ON THE DRAWINGS AND THE CONTRACTOR MUST COORDINATE ROUTING OF LARGER PIPING WITH FIELD CONDITIONS. THE INSIDE FREE AREA FOR ALL DUCTWORK MUST MATCH OR EXCEED THE INSIDE FREE AREA OF THE DUCTWORK ON THE DRAWINGS AND EXHIBIT THE SAME OR BETTER PRESSURE LOSS CHARACTERISTICS. THE ASPECT RATIO OF MODIFIED DUCT MUST NOT EXCEED 3 TO 1 WITHOUT PRIOR ENGINEER APPROVAL. ROUTING FOR ALL MODIFIED DUCTWORK MUST BE COORDINATED WITH ALL FIELD CONDITIONS.

INSTALL ALL EQUIPMENT AND DEVICES PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE A MINIMUM OF THREE DUCT DIAMETERS OF STRAIGHT DUCT BEFORE EACH AIR DEVICE WHERE SPACE ALLOWS. AIR DEVICE PERFORMANCE DATA (PRESSURE, THROW, AND SOUND) AS SHOWN IN THE AIR DEVICE SCHEDULE IS BASED ON THREE DUCT DIAMETERS OF STRAIGHT DUCTWORK.

	SHEET INDEX	
HEET NO.	SHEET TITLE	REVISION
M-001	MECHANICAL GENERAL NOTES AND LEGEND	2
M-101A	LOWER MECHANICAL FLOOR PLAN – AREA A	
M-101B	LOWER MECHANICAL FLOOR PLAN – AREA B	2
M-102A	UPPER MECHANICAL FLOOR PLAN – AREA A	
M-102B	UPPER MECHANICAL FLOOR PLAN – AREA B	
M-103A	LOWER MECHANICAL PIPING FLOOR PLAN – AREA A	
M-103B	LOWER MECHANICAL PIPING FLOOR PLAN – AREA B	
M-104A	UPPER MECHANICAL PIPING FLOOR PLAN – AREA A	
M-104B	UPPER MECHANICAL PIPING FLOOR PLAN – AREA B	
M-201	MECHANICAL CONTROLS	
M-202	MECHANICAL SCHEMATICS	
M-203	MECHANICAL SCHEMATICS	
M-204	MECHANICAL SCHEMATICS	
M-310	MECHANICAL SECTIONS	
M-501	MECHANICAL DETAILS	
M-502	MECHANICAL DETAILS	
M-601	MECHANICAL SCHEDULES	
M-602	MECHANICAL SCHEDULES	

# STANDARD ABBREVIATIONS (E) EXISTING

(E)	EXISTING	
(N)	NEW ABOVE FINISHED FLOOR	
AFF Al	ABOVE FINISHED FLOOR ANALOG INPUT	Φ
ALT	ALTERNATE	
AO	ANALOG INPUT	
APD	AIR PRESSURE DROP	
BOD	BOTTOM OF DUCT	
BOP	BOTTOM OF PIPE	М
BTU/H	BRITISH THERMAL UNITS PER HOUR	
CAP.	CAPACITY	
CFM	CUBIC FEET PER MINUTE	
CV		Ŕ
DB DI	DRY BULB DIGITAL INPUT	$\sim$
IA OR Ø	DIAMETER	
DO	DIGITAL OUTPUT	
EA	EXHAUST AIR	
EAT	ENTERING AIR TEMPERATURE	
EFF	EFFICIENCY	
ELEV	ELEVATION	Ψ
ESP	EXTERNAL STATIC PRESSURE	$\neg \neg \neg$
EWT FA	ENTERING WATER TEMPERATURE FREE AREA	<b>F</b>
FPM	FEET PER MINUTE	
FT	FEET	
FV	FACE VELOCITY	
FW	FRESH WATER	
GA	GAUGE	
GAL	GALLON	T
GPM		F
HP HR	HORSEPOWER HOUR	T
HT	HEIGHT	
IAQ	INDOOR AIR QUALITY	$\square$
IN.	INCH	
INWC	INCHES OF WATER COLUMN	
INWG	INCHES OF WATER GAUGE	I
LAT		
LBS		
LWT MAX	LEAVING WATER TEMPERATURE	
MBH	THOUSAND BRITISH THERMAL	
	UNITS/HOUR	
MECH	MECHANICAL	<del></del>
MIN	MINIMUM	<del></del> +
MVD	MANUAL VOLUME DAMPER	
NC	NOISE CRITERIA	
NIC NO.	NOT IN CONTRACT NUMBER	
NOM	NOMINAL	
NTS	NOT TO SCALE	
OBD	OPPOSED BLADE DAMPER	
OSA	OUTSIDE AIR	
PD	PRESSURE DROP	
PSI	POUNDS PER SQUARE INCH	
PSIG	POUNDS PER SQUARE INCH GAUGE	
RA SA	RETURN AIR SUPPLY AIR	<u> </u>
SEN	SENSIBLE	
SL	SEA LEVEL	Ψ
SP	STATIC PRESSURE	<b>—</b> —— CHI
SQ FT	SQUARE FEET	
SS	SERVICE SINK OR STAINLESS STEEL	
TOD TSP		
TSP UNO	TOTAL STATIC PRESSURE UNLESS NOTED OTHERWISE	RPBP
VAV	VARIABLE AIR VOLUME	
VFD	VARIABLE FREQUENCY DRIVE	
VOL	VOLUME	
W/	WITH	
W/O	WITHOUT	
WB WPD	WET BULB WATER PRESSURE DROP	<u> </u>
WT	WATER FRESSORE DROP WEIGHT	
	-	(TEMP)°F
		<b></b>
		++++++
		**
		NOT- 11
		NOTE: NOT AL

ACCEPTABLE R
RED COPPEF
२
0 PVC
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MINIMUM I	MECHANICAL	PIPING I	NSULATIO	ON TH	IICKNESS

	FLUID OPERATING	INSULATION CON		NOMINAL PIPE OR TUBE SIZE				
PES	TEMPERATURE RANGE AND USAGE (°F)	CONDUCTIVITY (BTU * IN./ (H * FT. <sup>2</sup> * °F))	MEAN RATING TEMPERATURE (°F)	< 1	1 TO < 1 1/2	1 1/2 TO <4	4 TO < 8	≥8
/	141 - 200	0.25 - 0.29	125	1.5	1.5	2.0	2.0	2.0
IG UNIT	40 - 60	0.21 - 0.27	75	0.5	0.5	1.0	1.0	1.0

BASED ON THE 2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC). PROVIDE PVC JACKET ON ALL EXPOSED PIPING INSULATION IN MECHANICAL ROOM. REFER TO SPECIFICATIONS FOR ADDITIONAL INSULATION REQUIREMENTS.

TOTAL NO. OF SHEETS: 18

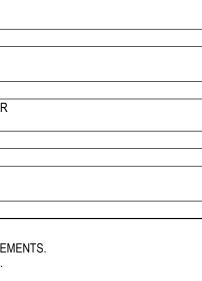
MECHANICA	AL LEGEND	
		SUPPLY DIFFUSER
/ALVE		RETURN GRILLE
	$\square$	EXHAUST GRILLE
E	$\overline{\square} \bigcirc$	RETURN AIR DUCT SECTION
/ALVE OPERATOR	$\overline{\square}$	RETURN AIR DUCT TURNED UP
E (SWING OR LIFT AS REQ'D)		RETURN AIR DUCT DOWN
LVE	$\overline{\mathbf{X}}$	SUPPLY AIR DUCT SECTION
CONTROL VALVE (2-WAY)	$\square$	SUPPLY AIR DUCT TURNED UP
		SUPPLY AIR DUCT DOWN
		EXHAUST AIR DUCT SECTION
		EXHAUST AIR DUCT TURNED UP
R GAUGE COCK		EXHAUST AIR DUCT DOWN
		ACCESS PANEL
		MANUAL VOLUME DAMPER
		GRAVITY BACKDRAFT DAMPER
		MOTORIZED DAMPER
W/METER		FIRE DAMPER
		COMBINATION FIRE/SMOKE DAMPER
		DUCT SIZE (FIRST FIGURE IS SIZE SHOWN) BURIED OR UNDERFLOOR DUCT
	€	
EN		
		FLEXIBLE DUCT CONNECTION
N		DUCT TRANSITION
		ELBOW W/ TURNING VANES
		TEE W/45 DEGREE ENTRY
SILLCOCK		WYE W/ 45 DEGREE ENTRY
		THERMOSTAT OR TEMP SENSOR
LVE	(H)	HUMIDISTAT OR HUMIDITY SENSOR
		POINT OF REMOVAL FROM EXISTING
NT/ROOF HYDRANT		POINT OF CONNECTION TO EXISTING
I	M##	KEYED NOTE
	(#/###)	AIR DEVICE TAG MARK/CFM
O GRADE (CTG)		
NOUT (FCO)	SHEET#	SECTION CUT LINE
DUT (WCO)	DET#	
OINT		DETAIL TAG
E CONNECTION	$\bigcirc$	
ESSURE BACKFLOW PREVENTER	CHS	CHILLED WATER SUPPLY
CK BACKFLOW PREVENTER	CHR	CHILLED WATER RETURN
DLD WATER (DCW)	CD	CONDENSATE DRAIN
DT WATER (DHW)	CWS	CONDENSER WATER SUPPLY
DT WATER RECIRC. (DHWR)		CONDENSER WATER RETURN
DT WATER (SPECIFIED TEMP.)	FS	FIRE SPRINKLER SERVICE
NT (VT)	HWS	HEATING WATER SUPPLY
WER ABOVE GRADE (SS)	HWR	HEATING WATER RETURN
WER BELOW GRADE (SS)	LP	LIQUID PROPANE
G	NG	NATURAL GAS
N GRADE (**SYS. ABR.)	OD	OVERFLOW ROOF DRAIN
	RD	ROOF DRAIN
		REFRIGERANT LIQUID
		REFRIGERANT SUCTION
	S	STEAM
	MECCHANICA         /ALVE         /ALVE         /ALVE OPERATOR         E (SWING OR LIFT AS REQ'D)         ALVE         CONTROL VALVE (2-WAY)         CONTROL VALVE (3-WAY)         EDUCING VALVE (3-WAY)         EDUCING VALVE (3-WAY)         CONTROL VALVE (3-WAY)         CONTROL VALVE (3-WAY)         CONTROL VALVE (3-WAY)         VALVE         RAUGE COCK         FLOW CONTROL VALVE         METER         RE & PRESSURE TEST PLUG         H         RE SENSOR         AUGE W/GAUGE COCK         ER         SILLCOCK         IVE         NI/ROOF HYDRANT         J         O GRADE (CTG)         NOUT (FCO)         OUT (WCO)         OINT         E CONNECTION         E SURE BACKFLOW PREVENTER         C BACKFLOW PREVENTER         D WATER (DEW)         D'WATER RECIRC. (DHWR)         D'WATER RECIRC. (DHWR)	E WALVE OPERATOR E (SWING OR LIFT AS REQD) ALVE CONTROL VALVE (2-WAY) CONTROL VALVE (2-WAY) CONTROL VALVE (3-WAY) EDUCING VALVE VALVE R GAUGE COCK CLOW CONTROL VALVE WETER RE & PRESSURE TEST PLUG H RE & PRESSURE TEST PLUG H RE & SENSOR AUGE W/GAUGE COCK ER SILLCOCK ER SILLCOCK C D OGRADE (CTG) NOUT (FCO) DUT (WCO) OINT E CONNECTION ESSURE BACKFLOW PREVENTER CCK BACKFLOW PREVENTER

Architects Design Group
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ENGINEERING SYSTEM SOLUTIONS
www.es2eng.com JOB NUMBER: 21.3011-B21
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POLICE BADQUARTERS
POLICE HEADQUARTERS
POLICE HEADQUARTERS

MECHANICAL
GENERAL NOTES
AND LEGEND

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PIPING MATERIAL





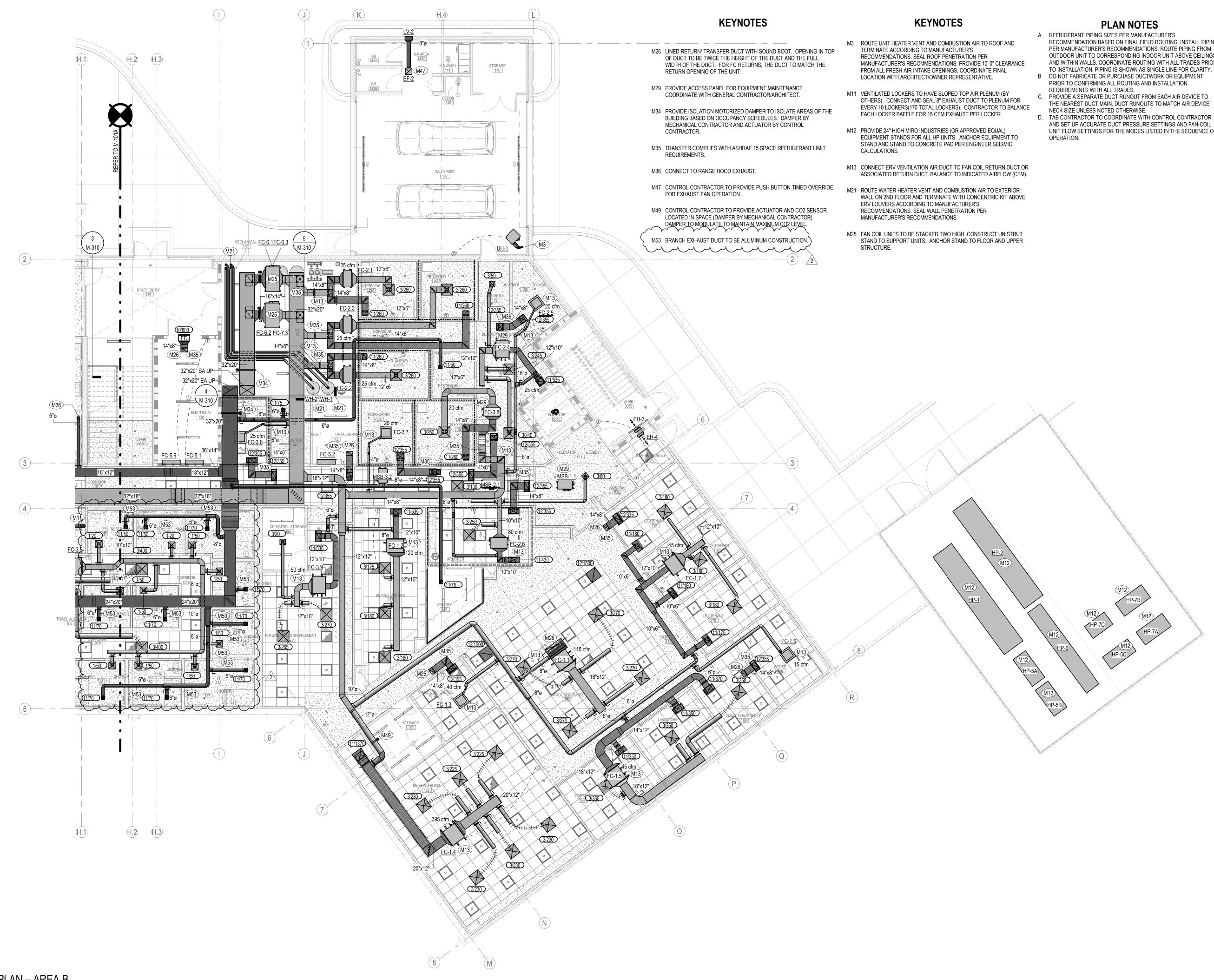
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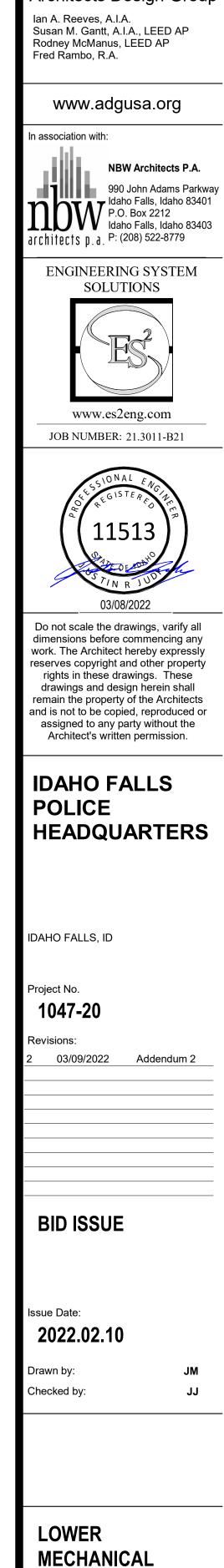
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RECOMMENDATION BASED ON FINAL FIELD ROUTING. INSTALL PIPING PER MANUFACTURER'S RECOMMENDATIONS. ROUTE PIPING FROM OUTDOOR UNIT TO CORRESPONDING INDOOR UNIT ABOVE CEILINGS AND WITHIN WALLS. COORDINATE ROUTING WITH ALL TRADES PRIOR TO INSTALLATION. PIPING IS SHOWN AS SINGLE LINE FOR CLARITY.

AND SET UP ACCURATE DUCT PRESSURE SETTINGS AND FAN-COIL UNIT FLOW SETTINGS FOR THE MODES LISTED IN THE SEQUENCE OF

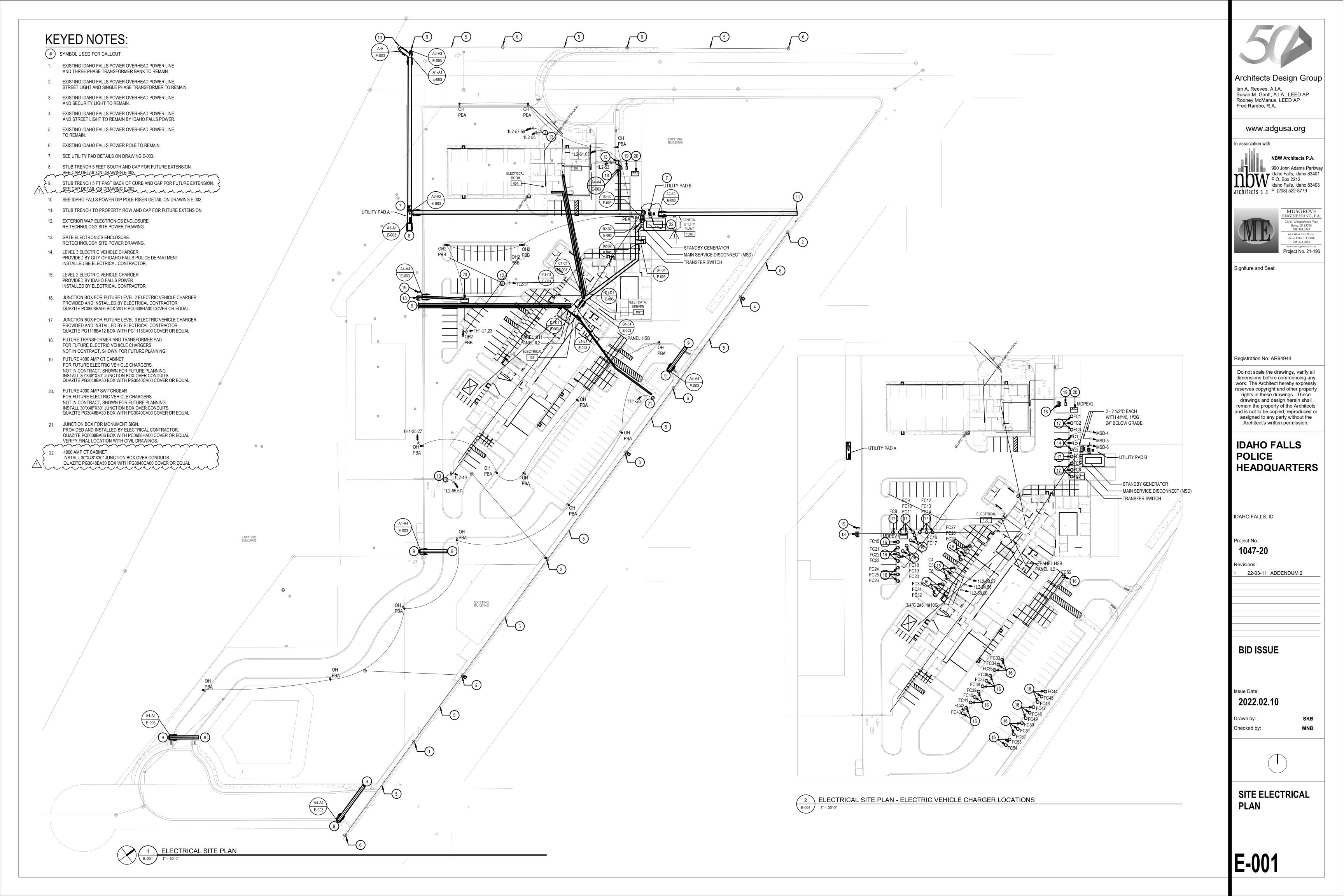


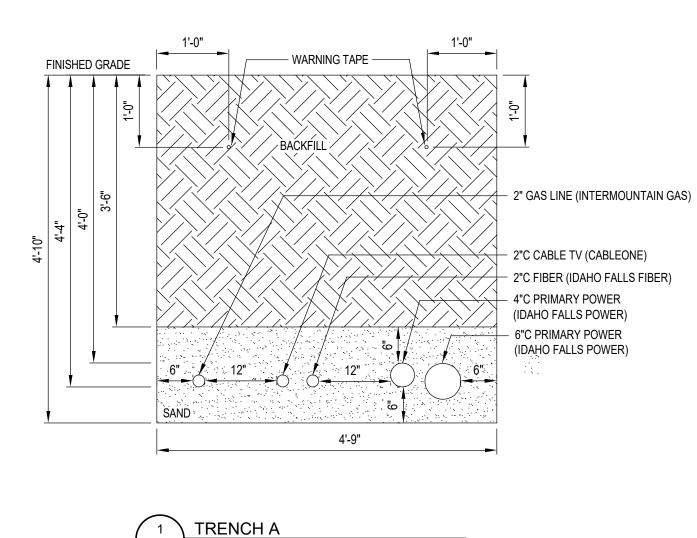
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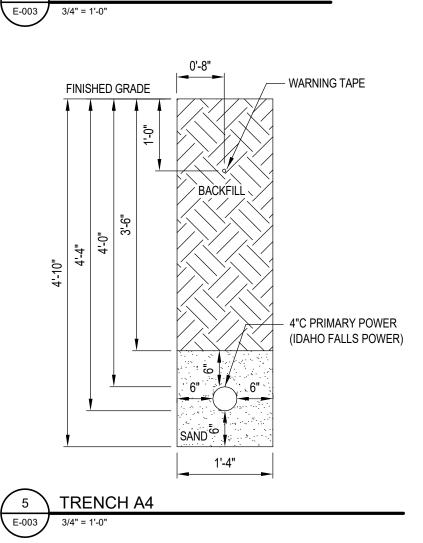
**M-101B** 

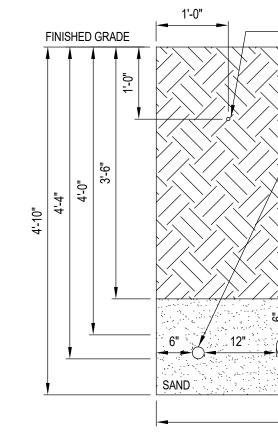
AREA B

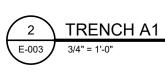
FLOOR PLAN -

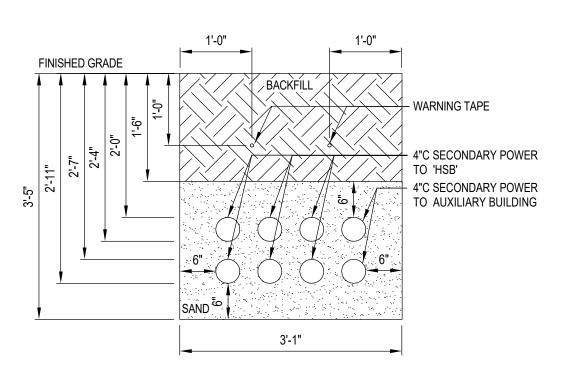




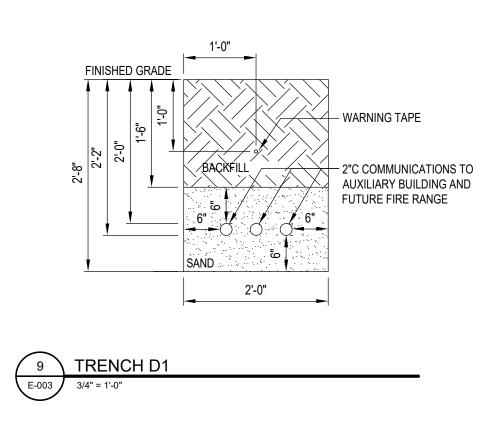


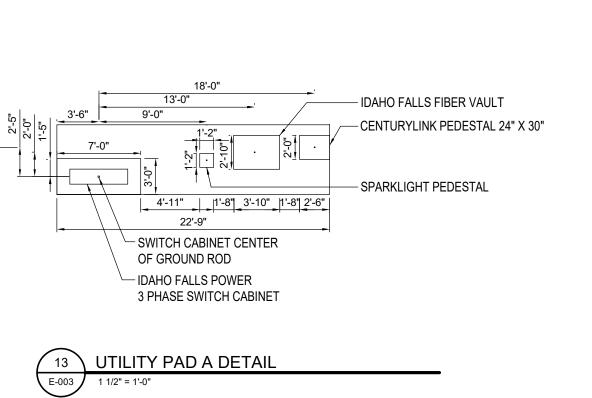


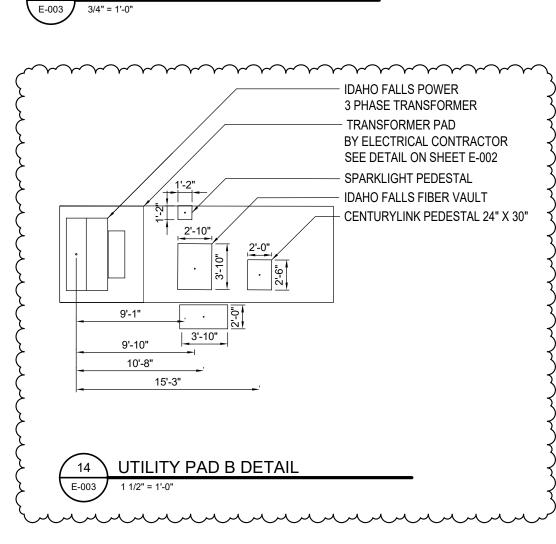


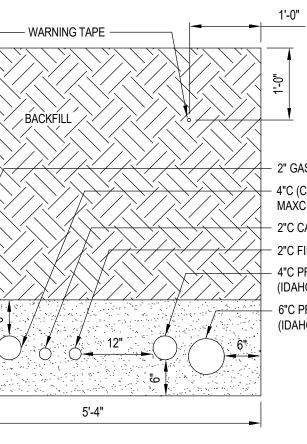




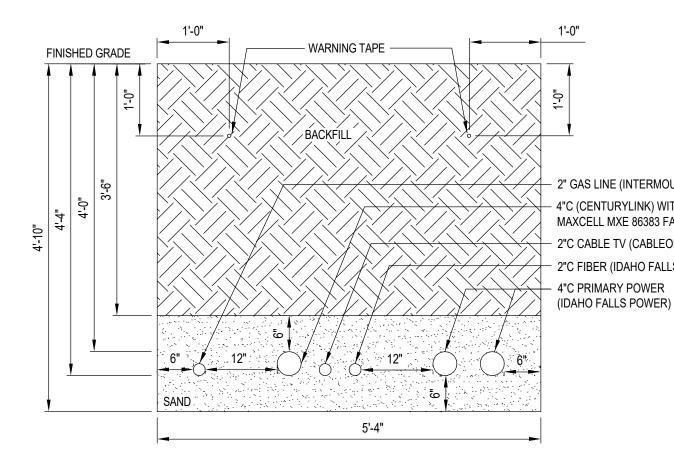




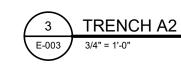




# - 2" GAS LINE (INTERMOUNTAIN GAS) - 4"C (CENTURYLINK) WITH MAXCELL MXE 86383 FABRIC INNERDUCT - 2"C CABLE TV (CABLEONE) - 2"C FIBER (IDAHO FALLS FIBER) - 4"C PRIMARY POWER (IDAHO FALLS POWER) — 6"C PRIMARY POWER (IDAHO FALLS POWER)



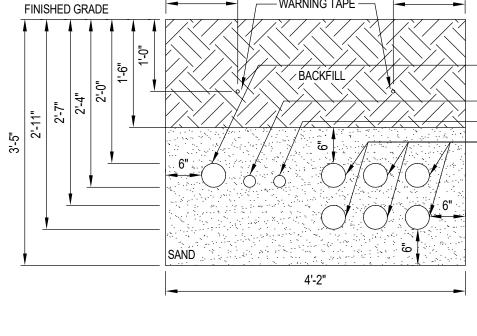




1'-0"

4"C (CENTURYLINK) WITH MAXCELL MXE 86383 FABRIC INNERDUCT 2"C CABLE TV (CABLEONE) - 2"C FIBER (IDAHO FALLS FIBER) 4"C SECONDARY POWER

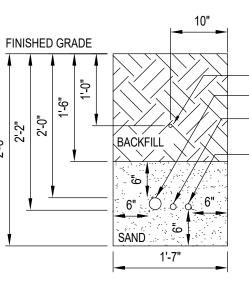
1'-0"



TRENCH B2

3/4" = 1'-0"

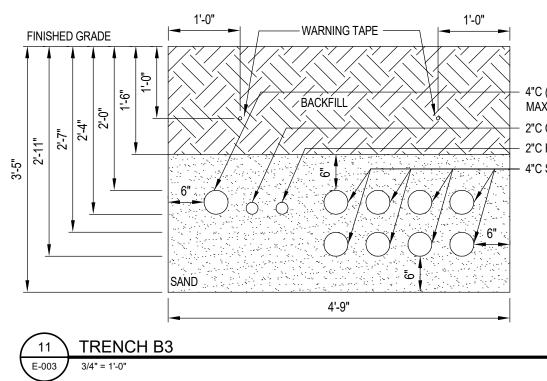
E-003



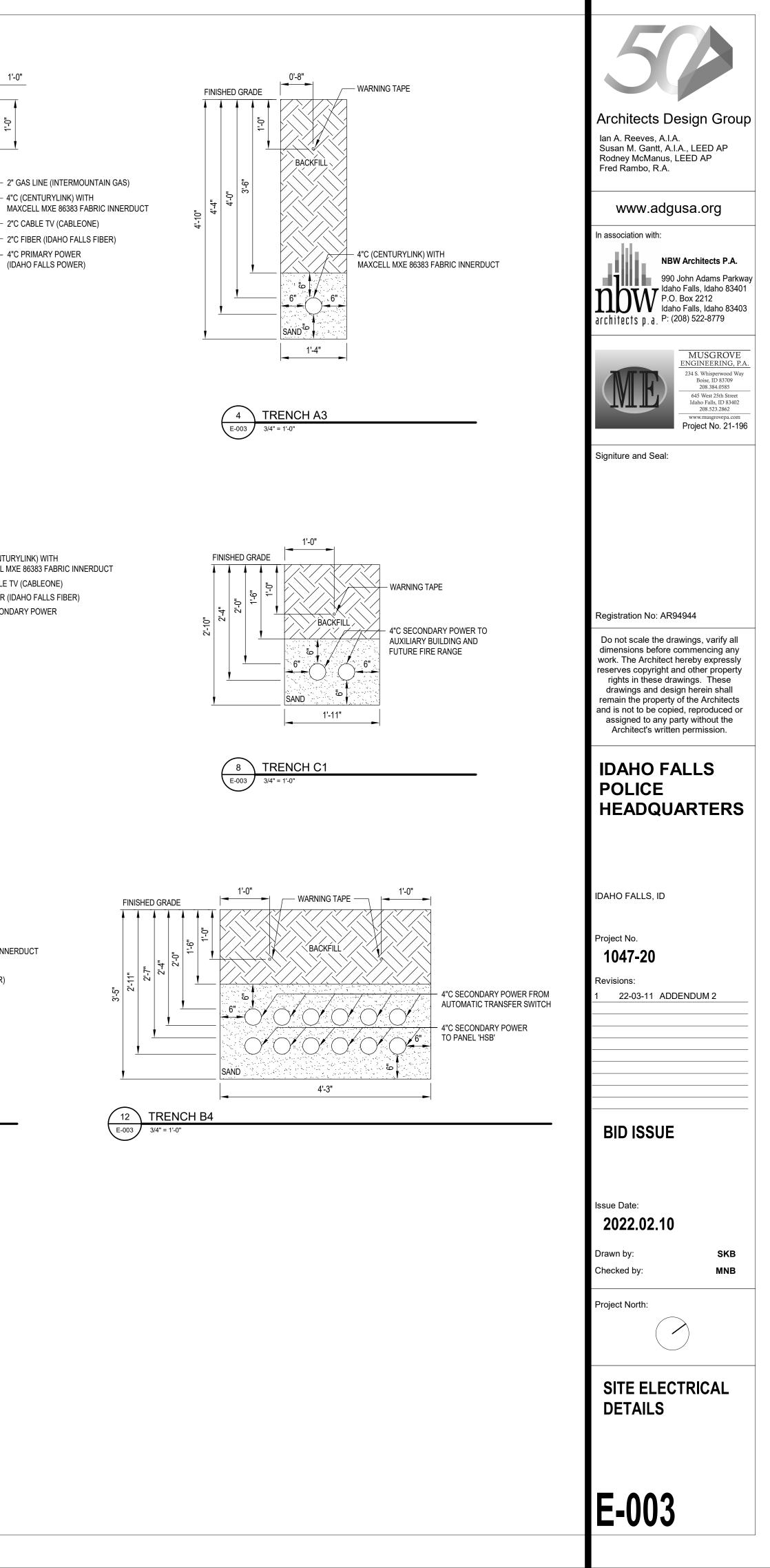
- WARNING TAPE – 2"C HISTORICAL SITE POWER - 1"C MONUMENT SIGN POWER CIRCUIT - 1"C TO MONUMENT SIGN - SPARE

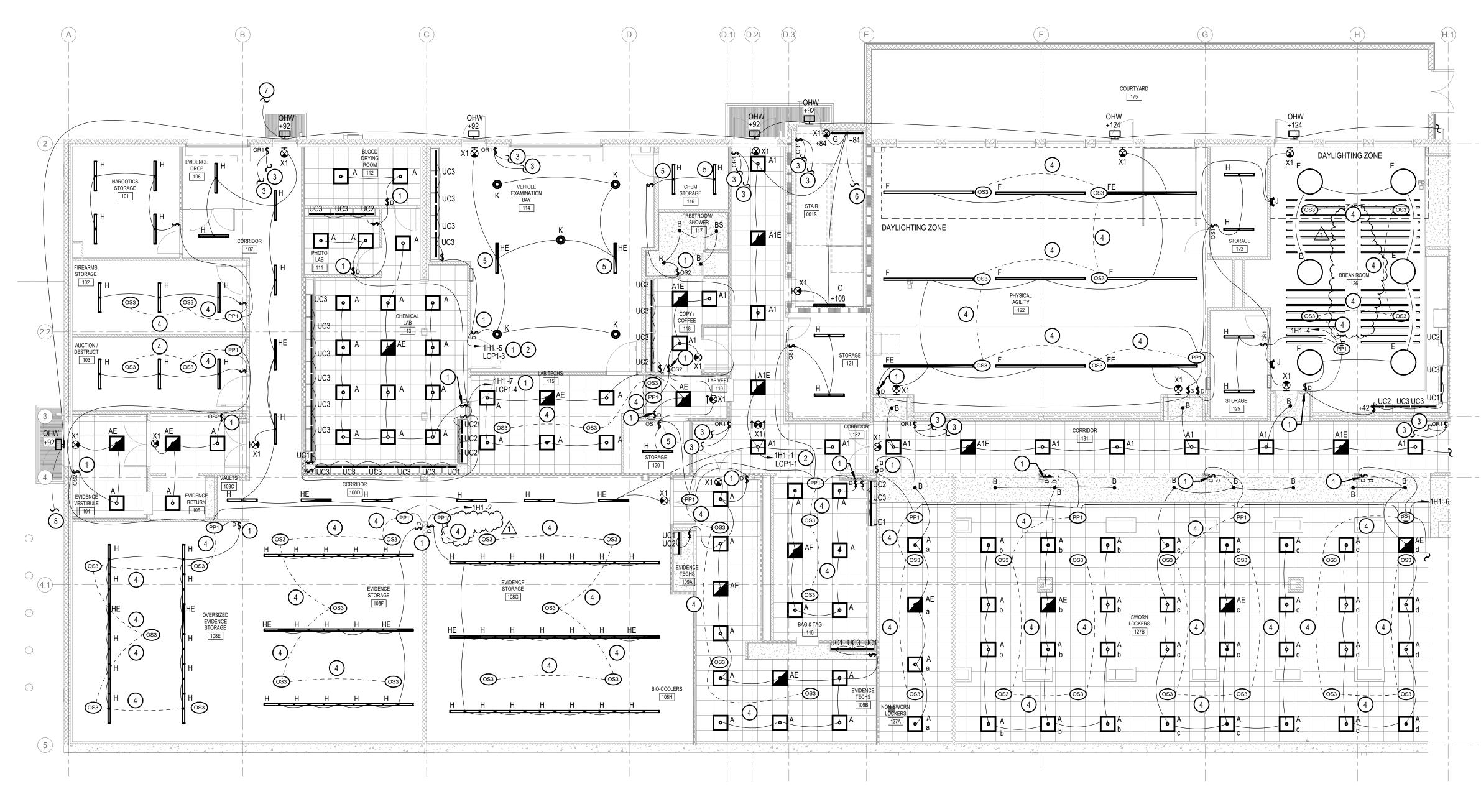
1

# 10 TRENCH E1



- 4"C (CENTURYLINK) WITH MAXCELL MXE 86383 FABRIC INNERDUCT 2"C CABLE TV (CABLEONE) - 2"C FIBER (IDAHO FALLS FIBER) - 4"C SECONDARY POWER



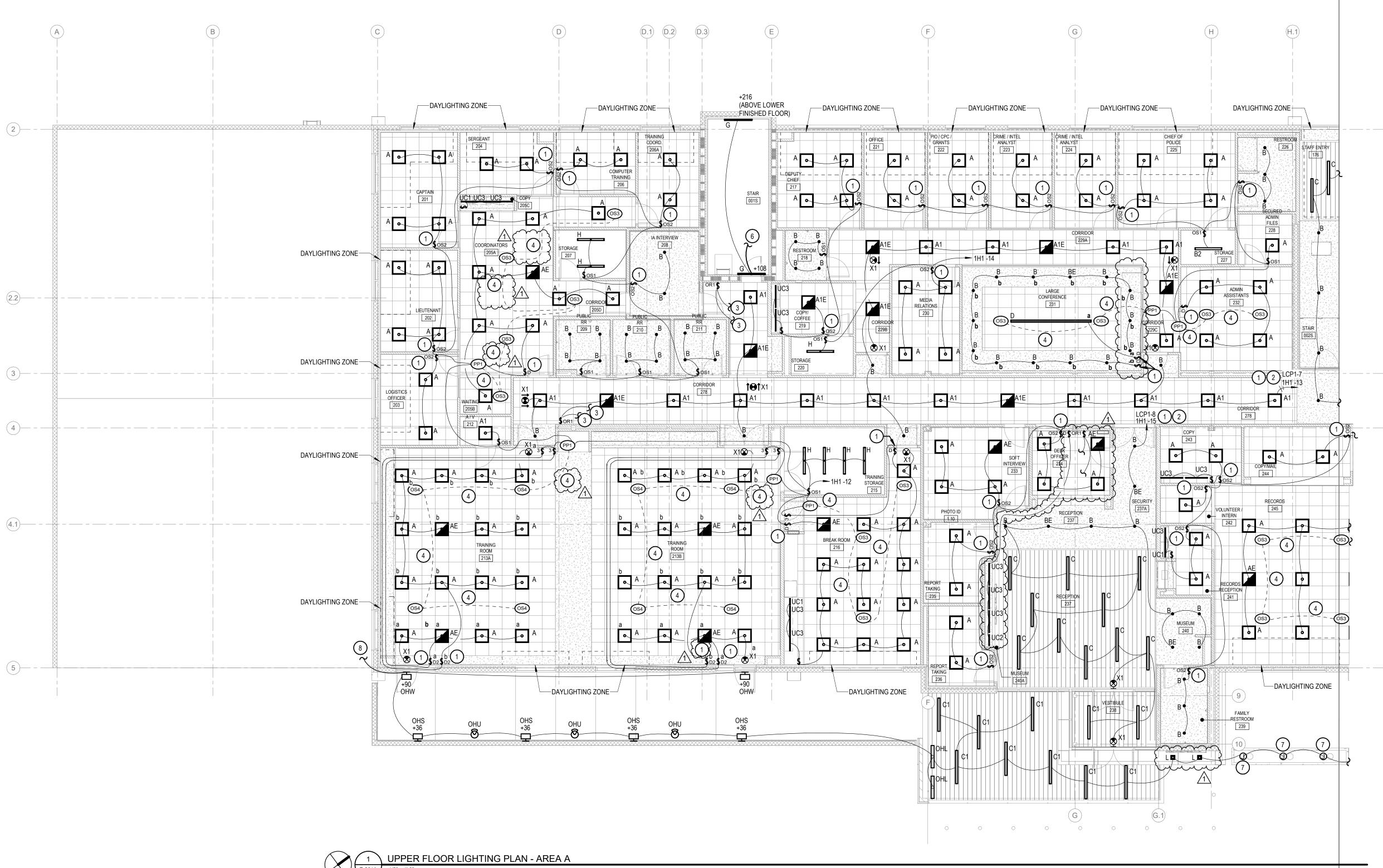




# SYMBOL USED FOR CALLOUT

- 1. INSTALL 0-10V DIMMING CONDUCTORS FROM SWITCH TO ALL LIGHTS CONTROLLED BY THIS SWITCH IN ACCORDANCE WITH MANUFACTURE'S INSTALLATION INSTRUCTIONS. VERIFY INSTALLATION REQUIREMENTS WITH SUBMITTALS PRIOR TO INSTALLATION.
- 2. TO LIGHTING CONTROL PANEL CIRCUIT INDICATED. SEE DETAIL ON DRAWING E-501.
- LIGHTING CONTROL PANEL LOW VOLTAGE INTERCONNECTING CABLE. SEE DETAIL ON DRAWING E-501.
- 4. PROVIDE AND INSTALL 18/3C UTP 24 VOLT CABLE BETWEEN POWER PACK AND OCCUPANCY SENSORS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 5. CHAIN HANG LIGHT FIXTURE BELOW STRUCTURE.
- 6. UP TO STAIRWELL LIGHT.
- 7. TO EXTERIOR LIGHT ON COVERED STORAGE 01C.
- 8. TO EXTERIOR LIGHT AT TRAINING ENTRANCE.







# SYMBOL USED FOR CALLOUT

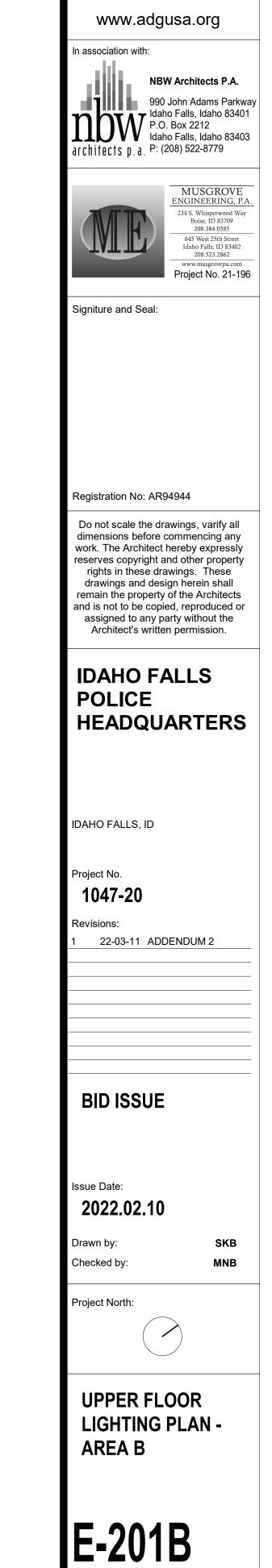
- INSTALL 0-10V DIMMING CONDUCTORS FROM SWITCH TO ALL LIGHTS CONTROLLED BY THIS SWITCH IN ACCORDANCE WITH MANUFACTURE'S INSTALLATION INSTRUCTIONS. VERIFY INSTALLATION REQUIREMENTS WITH SUBMITTALS PRIOR TO INSTALLATION.
- 2. TO LIGHTING CONTROL PANEL CIRCUIT INDICATED. SEE DETAIL ON DRAWING E-501.
- LIGHTING CONTROL PANEL LOW VOLTAGE INTERCONNECTING CABLE. SEE DETAIL ON DRAWING E-501.
- PROVIDE AND INSTALL 18/3C UTP 24 VOLT CABLE BETWEEN POWER PACK AND OCCUPANCY SENSORS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 6. DOWN TO STAIRWELL LIGHT.
- 7. JUNCTION BOX FOR CONNECTION TO FLAG POLE LIGHTS.
- 8. TO EXTERIOR LIGHT AT EVIDENCE ENTRANCE.





# SYMBOL USED FOR CALLOUT

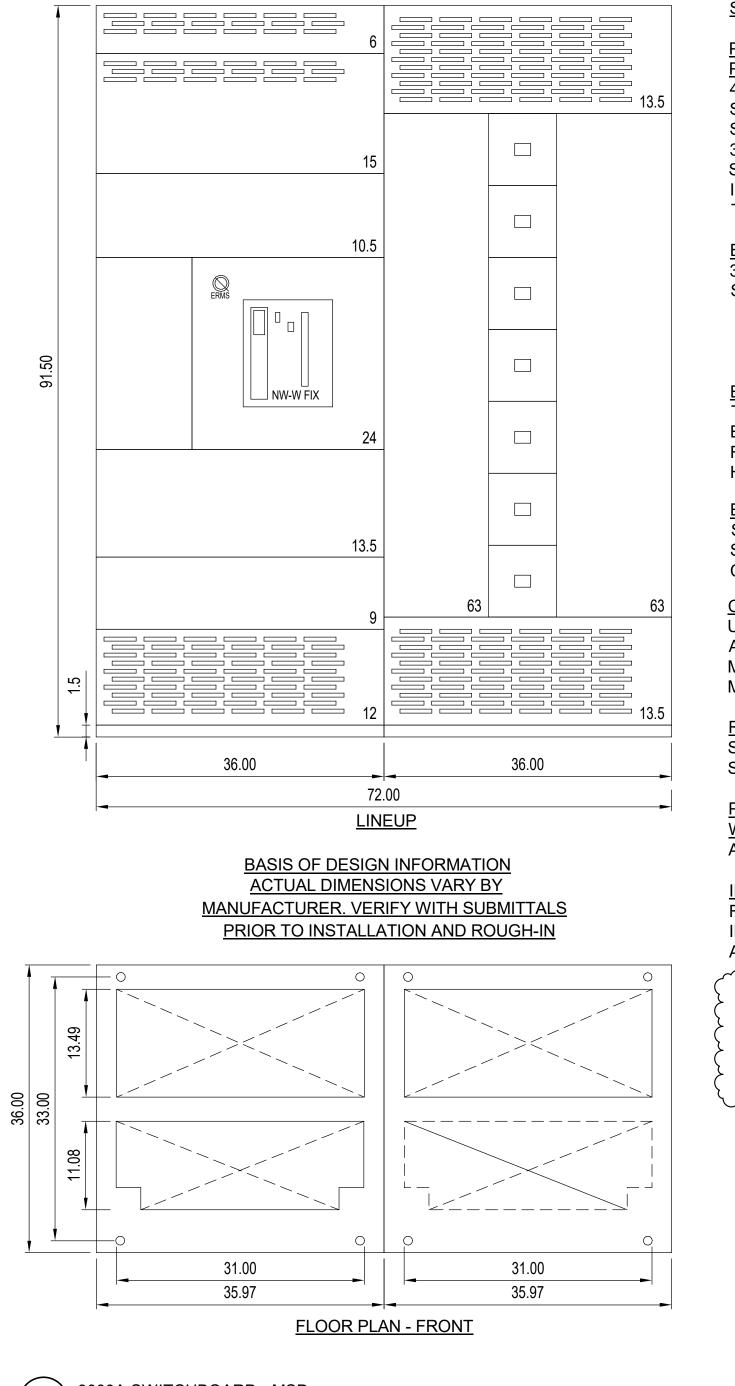
- INSTALL 0-10V DIMMING CONDUCTORS FROM SWITCH TO ALL LIGHTS CONTROLLED BY THIS SWITCH IN ACCORDANCE WITH MANUFACTURE'S INSTALLATION INSTRUCTIONS. VERIFY INSTALLATION REQUIREMENTS WITH SUBMITTALS PRIOR TO INSTALLATION.
- 2. TO LIGHTING CONTROL PANEL CIRCUIT INDICATED. SEE DETAIL ON DRAWING E-501.
- 3. LIGHTING CONTROL PANEL LOW VOLTAGE INTERCONNECTING CABLE. SEE DETAIL ON DRAWING E-501.
- 4. PROVIDE AND INSTALL 18/3C UTP 24 VOLT CABLE BETWEEN POWER PACK AND OCCUPANCY SENSORS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 5. CHAIN HANG LIGHT FIXTURE BELOW STRUCTURE.
- 6. DOWN TO STAIRWELL LIGHT.



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Fred Rambo, R.A.



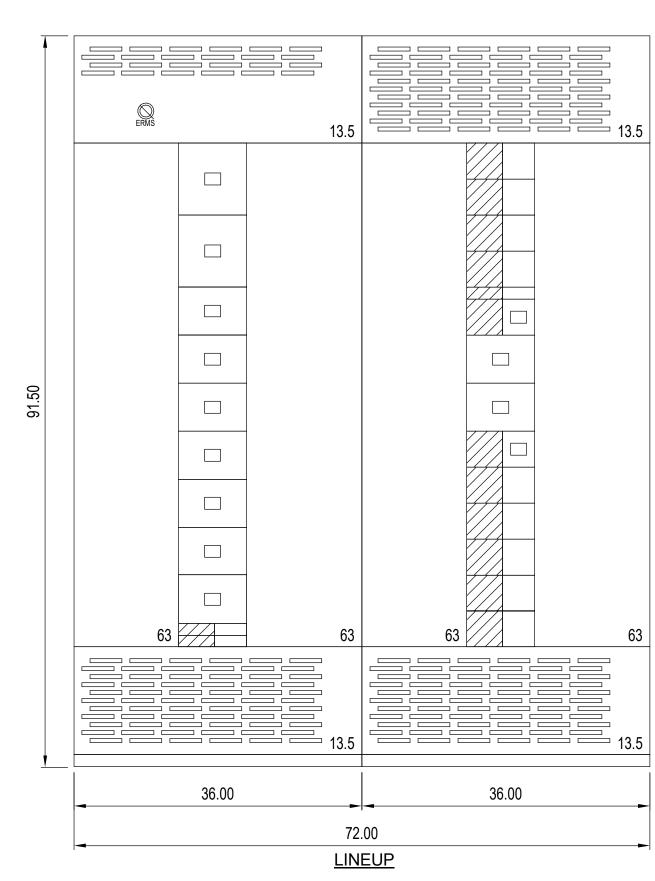
E-301

3000A SWITCHBOARD - MSD

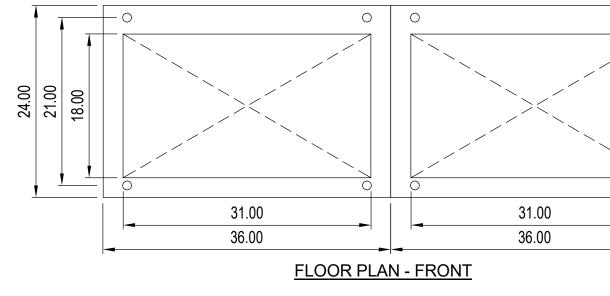
30kA RMS

WIRING:

## SWITCHBOARD GENERAL NOTES PRODUCT DESCRIPTION AND RATINGS POWER SYSTEM DATA: 480Y/277V, 3PH, 4W, 60Hz/3 PHASE WYE SOLIDLY GROUNDED SYSTEM SHORT CIRCUIT RATING: SYSTEM SHORT CIRCUIT RATING: 30KA RMS **INCOMING SECTION 1 CABLE -**THROUGH THE BOTTOM LEFT OF LINEUP BUS SYSTEM: 3000A TIN/ALUMINUM AND SILVER/COPPER MAIN BUS (8) .25x2.00 IN/6x51mm AL BUS BAR PER PHASE (3) .25x5.50 IN/6x140mm AL BUS BAR PER NEUTRAL (1) .25x2.0 IN/6x51mm AL GROUND BUS **ENCLOSURE DATA:** TYPE 1 FREE STANDING EXTERIOR PAINT COLOR: ANSI 49 FRONT ACCESSIBILITY ONLY REQUIRED HANDLING: ROLLERS AND LIFTING ASSEMBLIES ESTIMATE SHIPPING WEIGHT SHIPPING SPLIT 1 1080.00 LBS / 489.89 KGS SHIPPING SPLIT 2 1135.00 LBS / 514.84 KGS COMPLETE LINEUP 2215.00 LBS / 1004.72 KGS CODE STANDARDS: U.L. DEADFRONT AND SUITABLE FOR USE AS SERVICE ENTRANCE WHEN NOT MORE THAN SIX (6) DISCONNECTING MEANS ARE PROVIDED. RATING NAMEPLATES: ST1 - SERVICE ENTRANCE - SECTION BUS 3000A ST2 - DEADFRONT - SECTION BUS 3000A PRODUCT INFORMATION ALL WIRING TO BE MACHINE TOOL WIRE TYPE **INSTRUCTION BULLETINS:** REFERENCE 80043-055 FOR HANDLING, INSTALLATION, ANCHORING, INSPECTION AND MAINTENANCE INFORMATION $\overline{\phantom{a}}$



## BASIS OF DESIGN INFORMATION ACTUAL DIMENSIONS VARY BY MANUFACTURER. VERIFY WITH SUBMITTALS PRIOR TO INSTALLATION AND ROUGH-IN



2 1200A SWITCHBOARD - HSB E-301 1" = 1'-0

## SWITCHBOARD GENERAL NOTES

PRODUCT DESCRIPTION AND RATINGS POWER SYSTEM DATA: 480/277V, 3PH, 4W, 60Hz/3 PHASE WYE SOLIDLY GROUNDED SYSTEM SHORT CIRCUIT RATING: 30kA RMS SYSTEM SHORT CIRCUIT RATING: 30KA RMS INCOMING SECTION 1 CABLE -THROUGH THE BOTTOM LEFT OF LINEUP

## BUS SYSTEM: 1200A TIN/ALUMINUM AND

- SILVER/COPPER MAIN BUS
- (2) .25x2.00 IN/6x51mm AL BUS BAR PER PHASE (2) .25x3.38 IN/6x86mm AL BUS BAR PER NEUTRAL
- (1) .25x1.50 IN/6x38mm AL GROUND BUS

## ENCLOSURE DATA:

TYPE 1 FREE STANDING EXTERIOR PAINT COLOR: ANSI 49 FRONT ACCESSIBILITY ONLY REQUIRED HANDLING: ROLLERS AND LIFTING ASSEMBLIES

ESTIMATE SHIPPING WEIGHT SHIPPING SPLIT 1 947.00 LBS / 429.56 KGS SHIPPING SPLIT 2 757.00 LBS / 343.38 KGS COMPLETE LINEUP 1704.00 LBS / 772.93 KGS

### CODE STANDARDS: U.L. DEADFRONT

RATING NAMEPLATES: ST1 - DEADFRONT - SECTION BUS 1200A ST2 - DEADFRONT - SECTION BUS 1200A

PRODUCT INFORMATION WIRING: ALL WIRING TO BE MACHINE TOOL WIRE TYPE

**INSTRUCTION BULLETINS:** REFERENCE 80043-055 FOR HANDLING, INSTALLATION, ANCHORING, INSPECTION AND MAINTENANCE INFORMATION  $\overline{\phantom{a}}$ 



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MUSGROVE ENGINEERING, P.A.234 S. Whisperwood Way Boise, ID 83709 208.384.0585645 West 25th Street Idaho Falls, ID 83402 208.523.2862www.musgrovepa.comProject No. 21-196
Registration No: AR94944
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IDAHO FALLS, ID
Project No. <b>1047-20</b> Revisions:
1 22-03-11 ADDENDUM 2

# **BID ISSUE**

Issue Date: 2022.02.10

Drawn by: Checked by

Author Checker

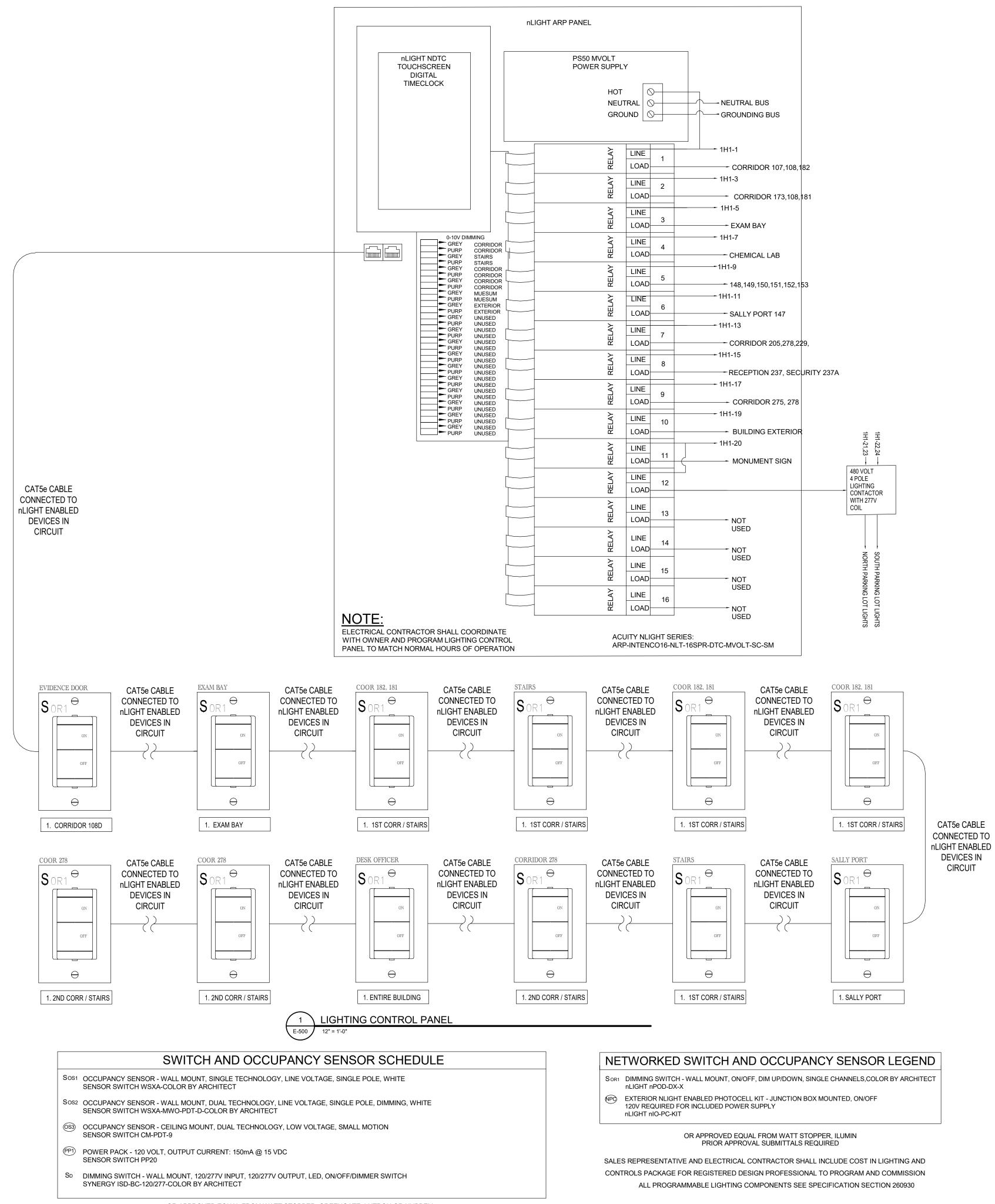
Project North:





**E-301** 

63



OR APPROVED EQUAL FROM WATT STOPPER, GREENGATE, LUTRON OR HUBBELL PRIOR APPROVAL SUBMITTALS REQUIRED

PE	DESCRIPTION	MTG.			JLE (21-196)	CATALOG NUMBER
<u>PE</u>	2x2 LED EDGELIT FLAT PANEL 4,155 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE	RECESSED	LAMPS LED 4000K	40	MANUFACTURER HE WILLIAMS LITHONIA COLUMBIA LITETRONICS	CATALOG NUMBER         LP-22-L40-840-DIM-UNV         EPANL-2X2-4000LM-80CRI-40K-MIN10-ZT-MVOLT         CBT22-LSCS         PT24018
E	2x2 LED EDGELIT FLAT PANEL 4,155 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE EMERGENCY LIGHT	RECESSED	LED 4000K	40	HE WILLIAMS LITHONIA COLUMBIA LITETRONICS	LP-22-L40-840-DIM-UNV-EM/10WRM EPANL-2X2-4000LM-80CRI-40K-MIN10-ZT-MVOLT-E10WCP CBT22-LSCS-ELL10 PT24018
1	2x2 LED EDGELIT FLAT PANEL 2,135 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE	RECESSED	LED 4000K	20	HE WILLIAMS LITHONIA COLUMBIA LITETRONICS	LP-22-L20-840-DIM-UNV EPANL-2X2-2000LM-80CRI-40K-MIN10-ZT-MVOLT CBT22-LSCS PT240-EB10
E	2x2 LED EDGELIT FLAT PANEL 2,135 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE EMERGENCY LIGHT	RECESSED	LED 4000K	20	HE WILLIAMS LITHONIA COLUMBIA LITETRONICS	LP-22-L20-840-DIM-UNV-EM/10WRM EPANL-2X2-2000LM-80CRI-40K-MIN10-ZT-MVOLT-E10WCP CBT22-LSCS-ELL10 PT240-EB10
	4" DOWNLIGHT ROUND 1,863 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE OPEN, WIDE, WHITE REFLECTOR AND TEXTURED TRIM	RECESSED	LED 4000K	20	HE WILLIAMS GOTHAM PRESCOLITE	4DR-TL-L20-840-DIM-UNV-O-W-OF-WH-MWT EVO4-40/20-WR-WD-MVOLT-GZ10 LTR-4RD-H-ML20L-DM1 w/LTR-4RD-T-ML40K8WD-SS HC420D010/HM412840/41MDW
Ξ	4" DOWNLIGHT ROUND 1,863 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE OPEN, WIDE, WHITE REFLECTOR AND TEXTURED TRIM	RECESSED	LED 4000K	20	HE WILLIAMS GOTHAM PRESCOLITE HALO	4DR-TL-L20-840-DIM-UNV-O-W-OF-WH-MWT EVO4-40/20-WR-WD-MVOLT-GZ10 LTR-4RD-H-ML20L-DM1 w/LTR-4RD-T-ML40K8WD-SS HC420D010/HM412840/41MDW
6	4" DOWNLIGHT ROUND, SHOWER LIGHT - IP65 1,863 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE OPEN, WIDE, WHITE REFLECTOR AND IP TRIM	RECESSED	LED 4000K	20	HE WILLIAMS	4DR-TL-L20-840-DIM-UNV-S-W-OF-WH-IP EVO4SH-40/20-DFF-SOL-MVOLT-EZ10 LTR-4RD-H-ML20L-DM1 w/LTR-4RD-T-SHML40K8-WT HC420D010/HM412840/41PSMDW
2	4" DOWNLIGHT ROUND 1,863 LUMENS, 80 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE OPEN, WIDE, WHITE REFLECTOR AND TEXTURED TRIM	RECESSED	LED 4000K	20	HE WILLIAMS GOTHAM PRESCOLITE	4DR-TL-L20-840-DIM-UNV-O-W-OF-WH-MWT EVO4-40/20-WR-WD-MVOLT-GZ10 LTR-4RD-H-ML20L-DM1 w/LTR-4RD-T-ML40K8WD-SS HC420D010/HM412840/41MDW
3	ROUND SURFACE MOUNTED LED 1,300 LUMENS, 90 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE WHITE REFLECTOR AND TRIM	SURFACE	LED 4000K	15	ESL VISON JUNO KEYSTONE	ESL-DDSK-R9-20W-130-WH JSF-11IN 13LM - 40K-90CRI-MVOLT ZT-WH KT-LED-11DL-6C-9CSH-DIM
	4 INCH WIDE RECESSED LINEAR LED 941 LUMENS, 90 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE CAST SQUARE, WHITE TRIM	RECESSED	LED 4000K	9	FINELITE FOCALPOINT PRESCOLITE PORTFOLIO	HP4-R-D-X-V-840-F-96-277-SC-FC-10%-VF FLC44W-SO-SW-2000L-UNV-L11-BH-LC44-SDO-2000L-940K-W-WH-WP LTR-4SQD-H-ML25L-DM1 w/LTR-4SSQW-T-ML40K9LWW-SSWT LDSQ4B30D010/EU4B30409040/4LBSQLWW2H/HB26
l	4 INCH WIDE RECESSED LINEAR LED, WET LOCATION 941 LUMENS, 90 CRI, DIMMING DRIVER, UNIVERSAL VOLTAGE CAST SQUARE, WHITE TRIM	RECESSED	LED 4000K	10	FINELITE FOCALPOINT PRESCOLITE	HP4-WL-R-V-840-F-6-277-SC-FC-10%-VF FLC44W-SO-SW-3000L-UNV-L11-BH-LC44-SDO-2000L-940K-W-WH-WP LTR-4SQD-H-ML25L-DM1 w/LTR-4SQD-T-ML40K9WD-SSWT
2	4" VANDAL RESISTANT DOWNLIGHT ROUND 1,800 LUMENS, WHITE FLANGE, 80 CRI	RECESSED	LED 4000K	17	PORTFOLIO LIGHTHEADED GOTHAM PRESCOLITE	LDSQ4B40D010/EU4B30409040/4LBSQ2H/HB26 2-116-T-01-BRO60-40-8018-D4B-FVR-R-T EVO2VR-40/20-SOL-WD-MVOLT-UGZ-DWH LF4SL-4LFSL20L40K8VR EL D4BX20D010/EELI4B1/28040/E4LBXV/M2LIBL84/HB26
E	4" VANDAL RESISTANT DOWNLIGHT ROUND 1,800 LUMENS, WHITE FLANGE, 80 CRI	RECESSED	LED 4000K	17	GOTHAM PRESCOLITE	FLD4BX20D010/FEU4B1/28040/F4LBXVM2LIBL84/HB26         2-116-T-01-BRO60-40-8018-D4B-FVR-R-T (PROVIDE MICRO-INVERTER)         EVO2VR-40/20-SOL-WD-MVOLT-UGZ-DWH (PROVIDE MICRO-INVERTER)         LF4SL-4LFSL20L40K8VR-EMR         ELD4BX20D010/FEU4B1/28040/E4LBX/M2LIBL84/HB26_EM7
	EXTRUDED ALUMINUM LINEAR LED DIRECT INDIRECT 5,514 LUMENS, 80 CRI, UNIVERSAL VOLTAGE, ADJUSTABLE CABLE OPEN END, DUAL CIRCUIT, 1" T-BAR CEILING,	SUSPENDED	LED 4000K	45	FAIL-SAFE FINELITE PEERLESS PINNACLE	FLD4BX20D010/FEU4B1/28040/F4LBXVM2LIBL84/HB26- EM7           H04-ID-R0-XX-H-B-840-WSO-OPN-FA-OE-DC-C1           OPM4-LLP-4FT-MSL4-80CRI-40K-I910LMF-510LMF-DARK-ZT-120-DCT-F1/48F-C041-DU-SEP           CDI-BW-840HO-840-**-AC48G1-U-OL2-1-0-W           UA4-ID_XYC-D_S440HO-840-**-AC48G1-U-OL2-1-0-W
	40 INCH SPUN ALUMINUM LED RLM 6,120 LUMENS, UNIVERSAL VOLTAGE, BRUSHED ALUMINUM EXTERIOR AND COPPER INSERT	SUSPENDED	LED 4000K	72	FINELITE SCOTT ARCH ANP LIGHTING	HO4-ID-XX-B-B-840-WSO-OPN-FA-OE-DC-C1 S2696-L72-40K-BA-CT-UNV OSAB42-M037LDD-W-40K-SSC-DCC-BLC-5W-78-71
	12 FOOT LED INDUSTRIAL PENDANT 2,370 LUMENS, 80 CRI, UNIVERSAL VOLTAGE	SUSPENDED	LED 4000K	22	HE WILLIAMS LITHONIA COLUMBIA VISCOR	MX4UD-L12-840-A-F-ACD-96-DIM-UNV CLX-L48-5000LM-SEF-RDL-MVOLT-GZ10-40K-80CRI-WH w/CLXRW48WH MPS4-40HL-CW-EDU -MOD RELFECTORS SYMREFL LCOM48-LED840K044LUNV-R08
	12 FOOT LED INDUSTRIAL PENDANT 2,370 LUMENS, 80 CRI, UNIVERSAL VOLTAGE	SUSPENDED	LED 4000K	22	HE WILLIAMS LITHONIA COLUMBIA VISCOR	MX4UD-L12-840-A-F-ACD-96-DIM-UNV-EM/7WRM CLX-L48-5000LM-SEF-RDL-MVOLT-GZ10-40K-80CRI-WH w/CLXRW48WH-PS1050 MPS4-40HL-CW-EDU -MOD RELFECTORS SYMREFL-ELL14 LCOM48-LED840K044LUNV-R08-B39
	4 FOOT LED WALL MOUNT WITH EM BATTERY 9,300 LUMENS, UNIVERSAL VOLTAGE	WALL MOUNT	LED 4000K	90	PARAMOUNT LITHONIA COLUMBIA	PMC5-4-SF-UNV-4K-PZ-L9W-LD-BBUR2 CLX-L48-9000LM-SEF-RDL-120-GZ10-40K-80CRI-PS1050-SPD-MSDPDT7-WH MPS4-40XL-CW-EDU-ELL14-NXS
	4 FOOT LED STRIP WITH ROUNDED LENS UNIVERSAL VOLTAGE	SURFACE	LED 4000K	50	METALUX HE WILLIAMS LITHONIA COLUMBIA	4SWLED-80HL-LW-UNV-EL14W-L840-CD1-SVPD1-U 76R-4-L77-840-DRV-UNV CLX-L48-7000LM-SEF-RDLMVOLT-GZ10-40K-80CRI-WH MPS4-40VL-CW-EDU
Ē	4 FOOT LED STRIP WITH ROUNDED LENS UNIVERSAL VOLTAGE	SURFACE	LED 4000K	50	METALUX HE WILLIAMS LITHONIA COLUMBIA	4SNLED-LD5-74HL-LN-UNV-L840-CD1-U         76R-4-L77-840-DRV-UNV-EM/10W         CLX-L48-7000LM-SEF-RDLMVOLT-GZ10-40K-80CRI-WH-PS1050         MPS4-40VL-CW-EDU-ELL14         10NH EDU-ESTATION (0.00 ODD 100 ODD 1000 ODD 1000 ODD 100 ODD 100 ODD 100 ODD 100 ODD 100 OD
	EMERGENCY LIGHT	WALL	LED 220	5	METALUX MULE LITHONIA BEGHELLI	4SNLED-LD5-74HL-LN-UNV-L840-CD1-U-EL7W SQ-LED-W ELM2L PEH-1
	LED LOW BAY 0-10V DIMMING, UNIVERSAL VOLTAGE		LED 4000K	100	COMPASS SPECGRADE LITETRONICS COLUMBIA	CU2           HBF-70-40K-120-V01-WT-SM-VDIM-FL-80CRI           HBC115W40DLP           CRB-40LX-EDU
<u>~ ``</u>	LED 6" SQUARE UNIVERSAL VOLTAGE	RECESSED	LED 4000K	13		LDN6SQ-10LM-40K-LSW6-AR-LS-WD-MVOLT-UGZ-AL01
1	PLUG IN POWER SUPPLY UNIVERSAL VOLTAGE	SURFACE	4000K	6	SSL LITHONIA PRECISE	UNLE-T-4K-WH-PPS36W UCEL-12IN-30K-90CRI-SWR-WH LMMT-AG-12-24V-95C-40K
2	APPROXIMATE LENGTH: 12" LOW PROFILE UNDERCABINET LED FIXTURE PLUG IN POWER SUPPLY UNIVERSAL VOLTAGE	SURFACE	LED 4000K	6	SSL LITHONIA PRECISE	UNLE-2-4K-WH-PPS36W UCEL-24IN-30K-90CRI-SWR-WH LMMT-AG-24-24V-95C-40K
3	APPROXIMATE LENGTH: 24" LOW PROFILE UNDERCABINET LED FIXTURE PLUG IN POWER SUPPLY UNIVERSAL VOLTAGE	SURFACE	LED 4000K	6	SSL LITHONIA PRECISE	UNLE-3-4K-WH-PPS36W UCEL-36IN-30K-90CRI-SWR-WH LMMT-AG-36-24V-95C-40K
	APPROXIMATE LENGTH: 36" LED THERMOPLASTIC EXIT UNIVERSAL VOLTAGE	WALL OR UNIVERSAL	LED RED	5	BEGHELLI LITHONIA COMPASS	VA4RSA EXRG-EL-M6 CER
ł	ARM MOUNT LED SITE LUMINAIRE30FT ALUMINUM POLE 30FT ALUMINUM POLE	POLE	LED 4000K	186	MULE GARDCO LITHONIA HUBBELL	MXBRU ECF-S-48L1.2-NW-G2-AR-3-UNV-BK-w/SSS-CB-4-7-30-D1-DT5-BK RSX2-LED-P3-40K-R3-MVOLT-SPA-DBLXD-w/SSS-30-4G-DM19AS-DBLXD RAR1-320L-165-4K7-3-UNV-ASQ-BLT-w/RSA-H-30-60-C-1-B3-BLT
2	TWIN ARM MOUNT LED SITE LUMINAIRE 30FT ALUMINUM POLE	POLE	LED 4000K	372	GARDCO LITHONIA HUBBELL	ECF-S-48L1.2-NW-G2-AR-3-UNV-BK-w/SSS-CB-4-7-30-D2-DT5-BK (2X) - RSX2-LED-P3-40K-R3-MVOLT-SPA-DBLXD-w/SSS-30-4G-DM28AS-DBLXD (2X) - RAR1-480L-295-4K7-3-UNV-ASQ-BLT-w/RSA-H-30-60-C-1-B3-BLT
N	TRAPEZIODAL FULL CUT OFF LED WALL SCONCE	WALL	LED 4000K	70	MCGRAW-EDISON GARDCO LITHONIA HUBBELL	(2X) - GALN-SA-740-U-T3-BK-w/SSA-4-X-30-W-BK-G-2 101L-32L-1000-NW-G2-3-UNV-X WST-LED-P3-40K-VF-MVOLT-DBLXD RWL2-160L-45-4K7-3-UNV-BLT
/2	LED WALL SCONCE	WALL	LED 4000K	40		IST-SA1E-740-U-T3-BK 66-519-4K VA1-010A-08-NF-FINISH BY OWNER-LED2/40K-UNV-DM1 S3835N-UNV-14
U	GROUND MOUNTED LED UPLIGHT LINEAR SPREAD GRAZE LENS	GROUND	LED 4000K	56	WE-EF LUMENPULSE INSIGHT	139-1905/300-0461 LBG-120-40K-NAS-LSLH-BK-NO-SY-UL-10FT-BK-w/TN2 PS9-HO40K-HSL-TR-UNV-DIM-TBL
L	LINEAR LED INGRADE WALL GRAZE OPTIC	GROUND	LED 4000K	44	WE-EF LUMENPULSE INSIGHT	186-0375 LOI-HO-120/277-48-40K-8X8-TS2.5-NO MIG-HO-40K-**-48-UNV-DIM-AS
s	SURFACE MOUNTED LED STEPLIGHT	WALL	LED 4000K	6	FC LIGHTING SISTEMALUX INTERLUX	FCSL595-UNV-4K-CRI85-4L-SL S.6260N-JB-UNV-14 E97169-N-07
	SURFACE MOUNTED LED STRIP LIGHT VAPOR TIGHT, 4000K MOUNTED 50" ABOVE PIT FLOOR	WALL	LED 4000K	20	ESL VISION LITHONIA	ESLX-VP4-25W-1-40 CSVT-L48-5000LM-MVOLT-40K-80CRI

ects Design Group eeves, A.I.A. I. Gantt, A.I.A., LEED AP /IcManus, LEED AP nbo, R.A. /w.adgusa.org on with: NBW Architects P.A. 990 John Adams Parkway 🗛 🖵 Idaho Falls, Idaho 83401 P.O. Box 2212 V Idaho Falls, Idaho 83403 S p. d. P: (208) 522-8779 MUSGROVE ENGINEERING, P.A 234 S. Whisperwood Way Boise, ID 83709 208.384.0585 645 West 25th Street Idaho Falls, ID 83402 208.523.2862 vww.musgrovepa.co Project No. 21-196 and Seal: on No: AR94944 cale the drawings, varify all ns before commencing any Architect hereby expressly copyright and other property n these drawings. These s and design herein shall e property of the Architects to be copied, reproduced or d to any party without the ect's written permission. HO FALLS ICE DQUARTERS LLS, ID -20 3-11 ADDENDUM 2 SSUE .02.10 SKB MNB

# **HTING DETAILS**

E-500

## DOMESTIC WATER

ACCESS PROVIDE ACCESS PANELS FOR ALL VALVES LOCATED IN WALLS OR ABOVE HARD LID CEILINGS. PROVIDE A RATED ACCESS PANEL WHERE LOCATED IN OR ABOVE A FIRE RATED ASSEMBLY. COORDINATE FINAL LOCATION WITH GENERAL CONTRACTOR AND ARCHITECT. COORDINATE ACCESS PANEL COLOR WITH ARCHITECT.

#### INSTALLATION

CONTRACTOR TO PROVIDE FLOW TEST FOR DOMESTIC WATER SUPPLY ON SITE AT BEGINNING OF CONSTRUCTION TO ENGINEER TO CONFIRM AVAILABLE PRESSURE, PRIOR TO PURCHASE AND INSTALLATION OF BOOSTER PUMP/PRV.

PROVIDE AND INSTALL WATER METER PER LOCAL JURISDICTION REQUIREMENTS. COORDINATE LOCATION WITH CIVIL. INSTALL WATER METER READING DEVICE PER LOCAL JURISDICTION REQUIREMENTS.

PROVIDE AND INSTALL DOUBLE CHECK BACKFLOW PREVENTER THAT IS APPROVED BY LOCAL JURISDICTION ON DOMESTIC WATER SERVICE. COORDINATE LOCATION WITH CIVIL.

PROVIDE WATER HAMMER ARRESTOR IN EACH BRANCH LINE SERVING FIXTURES AND EQUIPMENT WITH AUTOMATIC VALVE OPERATORS. SIZE AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

PROVIDE ISOLATION VALVES FOR ALL BRANCH LINES SERVING THREE OR MORE FIXTURES. PROVIDE BALANCING VALVES FOR EACH DOMESTIC HOT WATER RETURN PIPING OF TWO BRANCHES OR MORE.

ALL DOMESTIC WATER PIPING ROUTED BELOW SLAB TO HAVE MINIMAL TO NO JOINTS OR FITTINGS BELOW SLAB.

ROUTE WATER PIPING IN HEATED AREAS ONLY. DO NOT ROUTE PIPING IN NON-INSULATED ATTIC, CEILING AND WALL SPACES.

PRESSURE TEST ALL DOMESTIC WATER PIPING PER PLUMBING CODE REQUIREMENTS.

DISINFECT DOMESTIC WATER PIPING PER PLUMBING CODE REQUIREMENTS.

INSULATE ALL DOMESTIC HOT WATER PIPING AND RECIRCULATION PIPING AND DOMESTIC COLD WATER PIPING PER INSULATION TABLE. PROVIDE ALUMINUM JACKET ON ALL INSULATION LOCATED OUTDOORS.

## SANITARY SEWER

INSTALLATION

INSULATION

WASTE PIPING SMALLER THAN 4" IS TO BE SLOPED AT 1/4" PER FOOT. ALL WASTE PIPING 4" AND LARGER MAY BE INSTALLED AT 1/8" SLOPE PER FOOT UPON RECEIVING WRITTEN APPROVAL BY LOCAL JURISDICTION. VERIFY INVERT BEFORE INSTALLATION.

DRAINAGE CONNECTIONS SHALL NOT BE MADE INTO A DRAINAGE PIPING SYSTEM WITHIN 8' OF ANY VERTICAL TO HORIZONTAL CHANGE OF DIRECTION OF A STACK CONTAINING SUDS. STACKS CONTAINING SUDS ARE IDENTIFIED ON THE RISER DIAGRAMS.

PROVIDE CLEANOUTS ON INTERIOR SANITARY AND STORM PIPING ACCORDING TO LOCAL JURISDICTION AND PLUMBING CODE REQUIREMENTS.

PROVIDE GRADE CLEANOUT WHERE BUILDING SEWER CONNECTS TO SEWAGE SYSTEM.

PROVIDE VENT FOR EVERY TRAP AND TRAPPED FIXTURE. ALL VTR'S TO BE 2" MINIMUM AND TERMINATE MINIMUM 10" ABOVE ROOF AND MINIMUM 24" FROM ROOF EDGE OR PARAPET, AND 25' FROM OUTSIDE AIR INTAKE INTO BUILDING.

INSTALL PRESSURE ACTIVATED TRAP PRIMERS ON ALL FLOOR DRAINS AND FLOOR SINKS UNLESS NOTED OTHERWISE. INSTALL TRAP PRIMERS COMPLYING WITH ALL MANUFACTURER REQUIREMENTS. PROVIDE ACCESS PANEL FOR ALL TRAP PRIMERS AND COORDINATE LOCATIONS WITH GENERAL CONTRACTOR/ ARCHITECT. TRAP PRIMERS ARE INTENDED TO BE INSTALLED ABOVE ACCESSIBLE CEILINGS, IN CLOSETS, OR BELOW COUNTERS. ALL TRAP PRIMERS TO BE INSTALLED ON BRANCH PIPING SERVING REGULARLY USED FIXTURES TO ENSURE CORRECT OPERATION. TRAP PRIMER TO OPERATE BASED ON A 5 PSI OR LESS PRESSURE DROP. PROVIDE MIFAB M-500 TRAP PRIMER OR APPROVED EQUAL.

PRESSURE TEST ALL SANITARY SEWER AND VENT AND STORM PIPING TO PLUMBING CODE REQUIREMENTS.

#### INSULATION

INSULATE ALL ROOF DRAIN PIPING AND OVERFLOW DRAIN AND ROOF DRAIN BOWLS PER INSULATION TABLE. PROVIDE ALUMINUM JACKET ON ALL INSULATION LOCATED OUTDOORS.

INSULATE ALL P-TRAPS AND DRAIN BODIES THAT RECEIVE DISCHARGE FROM AN ICE MACHINE.

#### MATERIALS

ALL SANITARY WASTE AND VENT AND STORM DRAINAGE PIPING LOCATED IN A RETURN AIR PLENUM TO BE CAST IRON SV NO HUB SYSTEM.

PLUMBIN	G PIPING MATERIAL SCHEDULE
LOCATION	PIPE TYPE
DOMESTIC WATER	
BELOW GRADE	ASTM B 88 TYPE K SOLDERED COPPER
ABOVE GRADE (WHERE NOTED BY CU)	ASTM B 88 TYPE L SOLDERED COPPER
ABOVE GRADE (≤ 2")	ASTM E 84 PEX-A
WASTE	
BELOW GRADE	ASTM D 2665 PVC SCHEDULE 40, SOCKET FITTINGS DWV
ABOVE GRADE	ASTM A 888 CAST IRON, NO HUB SYSTEM
STORM DRAIN	
BELOW GRADE	ASTM D 2665 PVC SCHEDULE 40, SOCKET FITTINGS DWV
ABOVE GRADE	ASTM A 888 CAST IRON, NO HUB SYSTEM
VENT	
ALL	ASTM A 888 CAST IRON, NO HUB SYSTEM
GAS	
BELOW GRADE	ASTM D 2513 POLYETHYLENE
ABOVE GRADE	SCHEDULE 40 STEEL TO COMPLY WITH EITHER ASME B36.10, ASTM A 53, OR ASTM A 106
CONDENSATE	
ALL	ASTM B 88 TYPE L COPPER
	ONS FOR ADDITIONAL PIPING REQUIREMENTS. TTINGS FOR ALL DISSIMILAR METALS.

## EQUIPMENT AND FIXTURES

CONDENSATE PROVIDE CONDENSATE DRAINS PIPED FULL SIZE TO FLOOR DRAIN/FLOOR SINK FOR

FOR CONDENSATE TRAPPING REQUIREMENTS.

ELECTRICAL REQUIREMENTS COORDINATE ALL ELECTRICAL AND CONTROL REQUIREMENTS WITH ELECTRICIAN.

#### EQUIPMENT VENT

PROVIDE ADEQUATE COMBUSTION, VENTILATION, AND DILUTION AIR FOR ALL GAS FIRED EQUIPMENT PER INTERNATIONAL FUEL GAS CODE AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

#### GENERAL REQUIREMENTS

ALL MANUFACTURER SUBSTITUTIONS MUST BE SUBMITTED THROUGH ARCHITECT AND APPROVED THROUGH AN ADDENDUM. PRIOR APPROVALS MUST BE SUBMITTED 10 DAYS PRIOR TO BID DATE.

PROVIDE SUBMITTALS ON ITEMS LISTED IN SCHEDULES TO ENGINEER FOR REVIEW PRIOR TO ORDER, PURCHASE, OR INSTALLATION. PROVIDE ALL HVAC AND PLUMBING CONSTRUCTION COSTS FOR ENGINEER DATA BASE AS PART OF SUBMITTALS.

CONTRACTOR MUST COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL EQUIPMENT WITH ELECTRICAL CONTRACTOR AFTER SUBMITTALS ARE REVIEWED.

PROVIDE OPERATIONS AND MAINTENANCE MANUAL INCLUDING ALL PLUMBING EQUIPMENT.

REFER TO ARCHITECTURAL FOR FINAL FIXTURE AND FIXTURE ACCESSORY LOCATIONS.

#### INSTALLATION

REFER TO ARCHITECTURAL FLOOR PLANS FOR EXACT FIXTURE LOCATIONS AND MOUNTING HEIGHTS.

# AND ISOLATION VALVES FOR MAINTENANCE ON EACH PIECE OF EQUIPMENT.

INSTALL ALL EQUIPMENT AND FIXTURES PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ONE YEAR PARTS AND LABOR WARRANTY ON INSTALLATION.

T&P RELIEF VALVE TO INDIRECT DRAIN AT FLOOR DRAIN.

SET ALL FIXTURE TEMPERATURE LIMIT STOPS TO 110°F UNLESS INDICATED OTHERWISE.

INSULATE HANDICAP LAVATORY TAIL PIECE, P-TRAP, TRAP ARM, HOT AND COLD WATER SUPPLY WITH HANDI LAV-GUARD.

LOCATION OF IGNITION SOURCES FOR GAS FIRED EQUIPMENT LOCATED IN GARAGES TO BE 18" MINIMUM AFF

GAS FIRED ROOFTOP UNITS TO BE TESTED IN ACCORDANCE WITH ANSIZ21.40.1 OR ANSIZ21.40.2.

IN ADDITION TO THE BUILDING BACKFLOW PREVENTER, PROVIDE AND INSTALL BACKFLOW PREVENTERS FOR THE FOLLOWING: IRRIGATION SYSTEMS CONNECTED TO THE DOMESTIC WATER PIPING, ICE MAKERS, COFFEE MAKERS, JUICE DISPENSERS, AND DCW/DHW SUPPLY LINES SERVING ALL CLOTHES WASHERS. BACKFLOW PREVENTERS TO MEET LOCAL JURISDICTION REQUIREMENTS.

ALL WATER HEATERS WITH AN INPUT ABOVE 199 MBH OR STORAGE CAPACITY GREATER THAN 119 GALLONS MUST COMPLY WITH LOCAL BOILER CODE AND ASME WATER HEATERS MUST BE ASME CERTIFIED. INITIAL AND PERIODIC INSPECTIONS AND CERTIFICATIONS MUST BE ARRANGED. PROVIDE CARBON MONOXIDE DETECTOR IN WATER HEATER ROOM. PROVIDE EMERGENCY PUSH BUTTON SHUT OFF THAT CONTROLS GAS SHUT-OFF VALVE AT ENTRANCE TO WATER HEATER ROOM.

#### SUPPORT

PROVIDE CONCRETE HOUSEKEEPING PAD (MIN 3" ABOVE GROUND LEVEL) FOR ALL WATER HEATERS.

## **GAS PIPING**

INSTALLATION PRIME AND PAINT ALL GAS PIPING LOCATED ON ROOF. ALL PIPING TO BE INSTALLED 4" MINIMUM ABOVE ROOF SURFACE.

GAS CONNECTION TO APPLIANCES TO BE CSST AND GAS CONNECTION TO COMMERCIAL COOKING APPLIANCES TO COMPLY WITH ANSI Z21.69. CONNECTORS FOR RANGES AND DOMESTIC CLOTHES DRYERS TO HAVE A MAXIMUM LENGTH OF 6 FT. CONNECTORS FOR ALL OTHER APPLIANCES TO HAVE A MAXIMUM LENGTH OF 3 FT. SHUTOFF VALVES TO BE INSTALLED AHEAD OF CONNECTORS. CONNECTOR INSTALLATION TO COMPLY WITH MANUFACTURER REQUIREMENTS.

ALL PIPING LOCATED IN A RETURN AIR PLENUM TO BE WELDED.

ALL COMBUSTION VENTILATION PIPING FOR GAS EQUIPMENT TO BE UL 1738 LISTED. BASIS OF DESIGN TO BE IPEX SYSTEM 1738 OR EQUAL.

#### TESTING

NEW OR MODIFIED GAS PIPING TO BE TESTED AND INSPECTED PER INTERNATIONAL FUEL GAS CODE AND LOCAL JURISDICTION PRIOR TO INITIAL OPERATION. THE TEST PRESSURE TO BE NOT LESS THAN 1-1/2 TIMES THE PROPOSED MAXIMUM WORKING PRESSURE, AND NOT LESS THAN 3 PSIG. TEST DURATION TO BE A MINIMUM 10 MINUTES OR NOT LESS THAN 1/2 HOUR FOR EACH 500 FT<sup>3</sup> OF PIPE VOLUME. AREAS OF PIPING WHERE LEAKS OR OTHER DEFECTS ARE LOCATED TO BE REPLACED OR REPAIRED AND RETESTED.

ALL AIR CONDITIONING EQUIPMENT AND HIGH EFFICIENCY FURNACES AND BOILERS. SLOPE ALL CONDENSATE AT MIN 1/8" PER FT. ALL CONDENSATE PIPING TO BE 3/4" DIA. UNLESS NOTED OTHERWISE. REFER TO MANUFACTURER'S RECOMMENDATIONS

PROVIDE BALANCE VALVES TO ALLOW COMPLETE BALANCE OF PLUMBING SYSTEMS

## GENERAL REQUIREMENTS

CONTRACTOR CLOSELY COORDINATE ALL PLUMBING WITH ELECTRICAL, ARCHITECTURAL, AND STRUCTURAL, COORDINATE FIRE LINE STUB REQUIREMENTS IN FIRE RISER ROOM WITH GENERAL CONTRACTOR/FIRE PROTECTION CONTRACTOR. PIPING IS APPROXIMATE AND DIAGRAMMATIC AND IS NOT TO BE SCALED. PROVIDE ALTERNATE ROUTING, OFFSETS, AND TRANSITIONS AS REQUIRED FOR COORDINATION OF ALL WORK WITHOUT ADDITIONAL COST TO THE OWNER.

FIELD VERIFY ALL PLUMBING PRIOR TO COMMENCING NEW WORK. DO NOT FABRICATE OR INSTALL ANY PLUMBING BEFORE VERIFYING DIMENSIONS AND ROUTING WITH BUILDING CONDITIONS AND ALL OTHER TRADES.

CONTRACTOR IS RESPONSIBLE FOR ALL APPLICABLE PERMITS AND FEES.

IF DISCREPANCIES EXIST BETWEEN BUILDING CODES, DRAWINGS, NOTES, AND SPECIFICATIONS, THE MOST STRINGENT REQUIREMENT WILL BE REQUIRED UNLESS CLARIFIED BY PROJECT ENGINEER IN AN OFFICIAL ADDENDUM OR SUPPLEMENTAL INSTRUCTION.

ALL DETAILS INCLUDED IN DESIGN DRAWINGS MUST BE APPLIED TO ALL RELEVANT INSTALLATIONS REFERRED TO IN THE DETAIL. EACH DETAIL WILL NOT BE SPECIFICALLY REFERENCED ON THE DRAWINGS.

REQUESTS FOR INFORMATION: THE CONTRACTOR ACKNOWLEDGES ITS RESPONSIBILITY TO BE FAMILIAR WITH THE CONTRACT DOCUMENTS. REQUESTS FOR INFORMATION (RFI'S) WILL BE RESPONDED TO WITHIN FIVE WORKING DAYS OF RECEIPT. TIME SPENT REVIEWING RFI'S IN WHICH THE INFORMATION REQUESTED IS CLEARLY INCLUDED IN THE DRAWINGS OR SPECIFICATIONS WILL BE CHARGED TO THE CONTRACTOR AT ENGINEERING SYSTEM SOLUTIONS' STANDARD BILLING RATES.

### INSTALLATION

PROVIDE SEISMIC RESTRAINTS FOR PLUMBING EQUIPMENT AND PIPING. RESTRAINTS ARE TO COMPLY WITH SEISMIC DESIGN CRITERIA LISTED IN THE STRUCTURAL GENERAL NOTES AND IN ACCORDANCE WITH ASCE/SEI 7-10 AND BUILDING CODE. CONTRACTOR IS RESPONSIBLE TO PROVIDE INSTALLATION DETAILS THAT ARE STAMPED BY A PROFESSIONAL ENGINEER, LICENSED IN THE LOCAL JURISDICTION, DETAILS ARE TO ACCOUNT FOR SEISMIC, WIND, AND GRAVITY LOADING REQUIREMENTS. WHEN ENGINEERING SYSTEM SOLUTIONS (ES2) PROVIDES THE STRUCTURAL ENGINEERING, GENERIC INSTALLATION DETAILS MAY BE INCLUDED IN THE STRUCTURAL DOCUMENTS AND MAY BE FOLLOWED WHERE APPLICABLE. REFER TO STRUCTURAL GENERAL NOTES FOR SEISMIC DESIGN CATEGORY, SITE CLASS, RISK CATEGORY, SHORT PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION COEFFICIENT (SDS), ONE SECOND PERIOD DESIGN SPECTRAL RESPONSE ACCELERATION COEFFICIENT (SD1), AND IMPORTANCE FACTOR.

CLOSE ENDS OF PIPING AND COVER FLOOR DRAINS DURING CONSTRUCTION. CLEAN ALL EQUIPMENT AND PIPING AT COMPLETION OF PROJECT.

CAULK AND SEAL ALL PENETRATIONS THROUGH CEILINGS, WALLS, AND FLOORS. PROVIDE ESCUTCHEON COVERS OR SHEET METAL FLANGES ON ALL VISIBLE PENETRATIONS.

COORDINATE ALL STRUCTURAL AND TOP PLATE PENETRATIONS FOR PIPING WITH GENERAL CONTRACTOR AND STRUCTURAL ENGINEER.

CONCEALED VENTS, DUCTS, AND ALL PIPING INSTALLED THROUGH FRAMING MEMBERS MUST BE PROTECTED FROM FASTENER PENETRATION BY A STEEL SHIELD PLATE (MINIMUM THICKNESS OF 1/16") UNLESS THE DISTANCE FROM THE FACE EDGE OF THE FRAMING IS NOT LESS THAN 1.5".

PROVIDE AND INSTALL EXPANSION JOINTS FOR ALL PIPING SYSTEMS PER CODE AND LOCAL JURISDICTION REQUIREMENTS. AT A MINIMUM, PROVIDE EXPANSION JOINTS WHEN JOINING SEPARATE PIPING MATERIAL AND FOR ALL DWV AND ROOF DRAIN STACKS SERVING MORE THAN TWO FLOORS.

INSTALLING CONTRACTOR MUST INSTALL ALL PIPING TO MEET PIPING MANUFACTURER RECOMMENDATIONS FOR THERMAL EXPANSION. INSTALL EXPANSION LOOPS AND/ OR BENDS AS RECOMMENDED. AS A MINIMUM REQUIREMENT: ALL PIPING CONVEYING FLUIDS OF TEMPERATURES GREATER THAN 100 DEGREES, ALL PIPING WITH STRAIGHT RUNS LONGER THAN 100 FEET, ALL PEX-A PIPING, AND ALL OTHER MANUFACTURER RECOMMENDED APPLICATIONS TO INCORPORATE EXPANSION LOOPS AND/ OR BENDS TO MINIMIZE THERMAL EXPANSION STRESSES. ALL PEX-A PIPING LARGER THAN 3/4 IN DIA TO INCORPORATE PIPE SUPPORT CHANNEL PER MANUFACTURER RECOMMENDATIONS.

PROVIDE DRAIN PANS UNDER ALL PIPING LOCATED OVER ELECTRICAL PANELS AND UNDER ALL WATER HEATERS.

ANY PIPE THAT PASSES THROUGH A FOUNDATION WALL TO BE PROVIDED WITH A PIPE SLEEVE. THE SLEEVE TO BE TWO PIPE SIZES GREATER THAN THE PIPE PASSING THROUGH THE WALL. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL REQUIREMENTS. COORDIANTE ANY PENETRATIONS NOT LISTED ON DRAWINGS WITH STRUCTURAL ENGINEER PRIOR TO INSTALLATION.

PROVIDE FIRE SAFING ON ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES WITH UL RATED FIRE SAFING MATERIAL. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE RATED ASSEMBLY LOCATIONS AND DESCRIPTIONS.

PIPING MAY DIFFER IN DIMENSIONS THAN WHAT IS INDICATED ON DRAWINGS BASED ON EASIER PROCUREMENT OR CONSISTENT SIZES. PIPING MUST BE LARGER THAN WHAT IS INDICATED ON THE DRAWINGS AND THE CONTRACTOR MUST COORDINATE ROUTING OF LARGER PIPING WITH FIELD CONDITIONS.

PIPE SIZE RUNOUTS TO INDIVIDUAL PLUMBING FIXTURES TO MATCH SIZE SHOWN IN PLUMBING FIXTURE SCHEDULE UNLESS NOTED OTHERWISE.

PROVIDE PIPE ACOUSTIC ISOLATION SUPPORTS (HOLDRITE OR APPROVED EQUAL) FOR ALL PIPING LOCATED IN INTERROGATION WALLS AND ABOVE INTERROGATION CEILINGS. ACOUSTIC ISOLATION SUPPORTS TO BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

#### SUPPORT

PIPING AND EQUIPMENT HANGERS CENTERED ON STEEL I-BEAMS (CONCENTRIC HANGERS) ARE PREFERRED OVER HANGERS SUPPORTED FROM A SINGLE SIDE OF THE BOTTOM I-BEAM FLANGE. IF USING HANGERS SUPPORTED FROM A SINGLE SIDE OF THE BOTTOM FLANGE, THE MAXIMUM WEIGHT LIMIT PER HANGER IS 200 POUNDS UNLESS DIRECTED OTHERWISE BY THE PROJECT STRUCTURAL ENGINEER.

HANGERS AND SUPPORTS TO BE DESIGNED AND MANUFACTURED IN CONFORMANCE WITH ANSI/MSS SP-58

## COMMISSIONING

#### CONTRACTOR

A COMMISSIONING AUTHORITY HAS BEEN RETAINED BY THE OWNER TO PERFORM COMMISSIONING FOR THIS PROJECT (UNVC). THE INSTALLING CONTRACTORS WILL BE RESPONSIBLE TO ASSIST UNVC WITH THE COMMISSIONING SCOPE FOR ALL PLUMBING SYSTEMS. THE INSTALLING CONTRACTORS WILL BE RESPONSIBLE FOR THE FOLLOWING: 1. COMPLETE ALL PRE-FUNCTIONAL TESTING FORMS THAT UNVC PROVIDES FOR ALL

OF THE PLUMBING SYSTEMS. 2. COMPLETE ALL FUNCTIONAL TESTING FORMS THAT UNVC PROVIDES FOR ALL OF

THE PLUMBING SYSTEMS. 3. INSTALLING CONTRACTORS WILL BE RESPONSIBLE FOR ADDITIONAL TESTING IF THE SYSTEMS FAIL DURING UNVC TESTING.

4. UNVC WILL REVIEW THE O&M MANUALS.

#### ANALOG INPUT AI ALT ALTERNATE AO ANALOG OUTPUT $\longrightarrow$ BFF BELOW FINISHED FLOOR CAP. CAPACITY CD CONDENSATE DRAIN Μ CTG CLEANOUT TO GRADE CV CONSTANT VOLUME $\neg \neg \vdash$ CWFU COLD WATER FIXTURE UNITS DFU DRAINAGE FIXTURE UNITS -X-DI DIGITAL INPUT -X-DIA OR Ø DIAMETER DO DIGITAL OUTPUT --DSN DOWNSPOUT NOZZLE DW DISHWASHER EFF EFFICIENCY ELEV ELEVATION EWT ENTERING WATER TEMPERATURE FREE AREA FA FCO FLOOR CLEANOUT FLOOR DRAIN FD FPM FEET PER MINUTE FS FLOOR SINK FT FEET FW FRESH WATER \_\_\_\_\_\_ GA GAUGE GAL GALLON $-\Box$ GD GARAGE DRAIN GPM GALLONS PER MINUTE HP HORSEPOWER HR HOUR HEIGHT HT HWFU HOT WATER FIXTURE UNITS IAQ INDOOR AIR QUALITY IN. IINCH INWC INCHES OF WATER COLUMN INWG INCHES OF WATER GAUGE LBS POUNDS LWT LEAVING WATER TEMPERATURE MAX MAXIMUM MBH THOUSAND BRITISH THERMAL UNITS/HOUR MECH MECHANICAL \_\_\_\_\_<u></u> MIN MINIMUM NOISE CRITERIA NC \_\_\_\_\_+ NOT IN CONTRACT NIC NO. NUMBER NOM NOMINAL $\longrightarrow$ NTS NOT TO SCALE OD OVERFLOW DRAIN \_\_\_\_\_ OSA OUTSIDE AIR PD PRESSURE DROP $-\bigcirc$ PRV PRESSURE REDUCING VALVE PSI POUNDS PER SQUARE INCH PSIG POUNDS PER SQUARE INCH GAUGE ROOF DRAIN RD RPBP REDUCED PRESSURE BACKFLOW PREVENTER **—** —— (0— SL SEA LEVEL SP STATIC PRESSURE \_ \_\_\_\_ SQ FT SQUARE FEET STORY RISER SS SERVICE SINK OR STAINLESS STEEL \_\_\_\_ TSP TOTAL STATIC PRESSURE UNO UNLESS NOTED OTHERWISE VAV VARIABLE AIR VOLUME ----RPBP-VFD VARIABLE FREQUENCY DRIVE VOL VOLUME \_\_\_\_\_ZZ-VTR VENT THROUGH ROOF W/ WITH W/O WITHOUT WCO WALL CLEANOUT

**STANDARD ABBREVIATIONS** 

EXISTING

AFF ABOVE FINISHED FLOOR

## MINIMUM PLUMBING PIPING INSULATION THICKNESS

SYSTEM TYPES	FLUID OPERATING TEMP RANGE AND USAGE (°F)	CONDUCTIVITY (BTU*IN/(h*FT <sup>2*°</sup> F))	MEAN RATING TEMP (°F)	≤ 1	1 1/4	1 1/2	≥2
DHW (120°F), DHWR (120°F)	105 - 140	0.21 - 0.28	100	1.0	1.25	1.5	2.0
DCW	40 - 60	0.21 - 0.27	75	0.5	0.5	1.0	1.0
ROOF DRAINS	ALL	0.27	N/A	0.5	0.5	0.5	0.5

BASED ON THE INTERNATIONAL ENERGY CONSERVATION CODE AND THE UNIFORM PLUMBING CODE. 2. PROVIDE ALUMINUM JACKETS ON ALL PIPING INSULATION LOCATED EXTERIOR OF THE BUILDING. PROVIDE PVC JACKET ON ALL EXPOSED PIPING INSULATION

IN MECHANICAL ROOM. INSULATE ALL ROOF DRAIN PIPING WITH MINIMUM 1/2" INSULATION. INSULATE ALL ROOF DRAIN AND OVERFLOW DRAIN BOWLS WITH MINIMUM 1" INSULATION.

INSULATION TO BE 0.27 BTU\*IN/(H\*FT2\*°F). PROVIDE PROTECTIVE SHIELDING PIPE COVERS ON ALL PIPES EXPOSED AT ADA PLUMBING FIXTURES. PROTECTIVE SHIELDING PIPE COVERS TO COMPLY WITH ADA REQUIREMENTS.

. PROVIDE 1 1/2" MINERAL FIBER, TYPE I, PREFORMED PIPE INSULATION FOR INDOOR HEAT TRACED SANITARY WASTE PIPING. PROVIDE 2" CELLULAR GLASS

WPD WATER PRESSURE DROP

WT WEIGHT

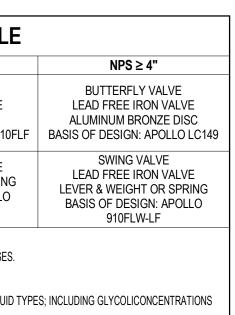
PIPE INSULATION FOR OUTDOOR HEAT TRACED SANITARY WASTE PIPING. . REFER TO SPECIFICATIONS FOR ADDITIONAL INSULATION REQUIREMENTS.

	VALVE SCHEDULI	
ACTION	NPS ≤ 2"	2" < NPS < 4"
SHUT-OFF SERVICE	BALL VALVE LEAD FREE BRONZE VALVE TWO-PIECE FULL PORT BASIS OF DESIGN: APOLLO 77FLF FOR GAS: APOLLO 80-100	GATE VALVE LEAD FREE IRON VALVE FULL PORT BASIS OF DESIGN: APOLLO 610
CHECK VALVE	SWING VALVE LEAD FREE BRONZE VALVE BASIS OF DESIGN: APOLLO 161TLF	LEAD FREE IRON VALVE LEVER & WIEGHT OR SPRINC BASIS OF DESIGN: APOLLO 910FLW-LF

- PROVIDE SHUT-OFF VALVES & UNIONS AT INLETS & OUTLETS OF ALL EQUIPMENT FOR SERVICING PURPOSES. 2. USE DIELECTRIC UNIONS FOR ALL DISSIMILAR METALS.
- . USE CORRECT ADAPTERS AND COUPLINGS FOR THE SPECIFIED PIPING MATERIALS.
- 4. ALL VALVES MUST BE COMPATIBLE WITH ANTICIPATED FLUID PRESSURES, FLUID TEMPERATURES, AND FLUID TYPES; INCLUDING GLYCOLICONCENTRATIONS AND POTABLE WATER REQUIREMENTS, ETC.
- 5. ALL VALVES MUST MEET A MINIMUM PRESSURE RATING OF 125 PSI AT A TEMPERATURE OF 200 °F. 6. BRONZE VALVES TO BE MADE WITH DEZINCIFICATION-RESISTANT MATERIALS.

## PLUMBING LEGEND

	BALL VALVE		DOMESTIC COLD WATER (DCW)
	BUTTERFLY VALVE		DOMESTIC HOT WATER (DHW)
	GATE VALVE		DOMESTIC HOT WATER RECIRC. (DHWR)
X	GLOBE VALVE	S-DCW	SOFTENED DOMESTIC COLD WATER
Μ	MOTORIZED VALVE OPERATOR		UNSOFTENED DOMESTIC COLD WATER
	CHECK VALVE (SWING OR LIFT AS REQ'D)	FS-DCW	FUTURE SOFTENED DOMESTIC COLD WATER
X	SOLENOID VALVE	(TEMP)°F	DOMESTIC HOT WATER (SPECIFIED TEMP.)
R	AUTOMATIC CONTROL VALVE (2-WAY)	—DHWR (TEMP)°F—	DOMESTIC HOT WATER RECIRC. (DHWR-SPECIFIED TEMP.)
	AUTOMATIC CONTROL VALVE (3-WAY)		SANITARY VENT (VT)
X	PRESSURE REDUCING VALVE		SANITARY SEWER ABOVE GRADE (SS)
	P & T RELIEF VALVE		SANITARY SEWER BELOW GRADE (SS)
	PET COCK OR GAUGE COCK	<del></del>	HEAT TRACING
	AUTOMATIC FLOW CONTROL VALVE		CHILLED WATER SUPPLY
	WATER HAMMER ARRESTOR		CHILLED WATER RETURN
	AIR VENT (AUTOMATIC)	CD	CONDENSATE DRAIN
	STRAINER	CWS	CONDENSOR WATER SUPPLY
	VENTURI FLOW METER	CWR	CONDENSOR WATER RETURN
T	TEMPERATURE & PRESSURE TEST PLUG	FS	FIRE SPRINKLER SERVICE
	FLOW SWITCH	HWS	HEATING WATER SUPPLY
<u> </u>	TEMPERATURE SENSOR	HWR	HEATING WATER RETURN
	PRESSURE GAUGE W/GAUGE COCK	LP	LIQUID PROPANE
	THERMOMETER	NG	NATURAL GAS
	PUMP	OD	OVERFLOW ROOF DRAIN
Э	ELBOW DOWN		ROOF DRAIN OR EXTERIOR DRAIN
0	ELBOW UP		REFRIGERANT LIQUID
	TEE DOWN		REFRIGERANT SUCTION
	HOSE BIB OR SILLCOCK	S	STEAM
]	PIPE CAP	SD	STORM DRAIN
D	REDUCER VALVE	**	PIPING BELOW GRADE (**SYS. ABR.)
	UNION		POINT OF REMOVAL FROM EXISTING
	YARD HYDRANT/ROOF HYDRANT	$\bullet$	POINT OF CONNECTION TO EXISTING
	FLOOR DRAIN	P##	KEYED NOTE
	FLOOR SINK		
<u> </u>	CLEANOUT TO GRADE (CTG)	SEC# SHEET#	SECTION CUT LINE
	FLOOR CLEANOUT (FCO)		
——————————————————————————————————————	WALL CLEANOUT (WCO)	4 P5.1	DETAIL TAG
	EXPANSION JOINT	r 3. 1	
	FLEXIBLE PIPE CONNECTION		
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER		
	DOUBLE CHECK BACKFLOW PREVENTER		
		NOTE: NOT ALL SYMBOL	S MAY BE USED



# SHEET INDEX

SHEET NO.	SHEET TITLE	REVISIO
P-001	PLUMBING GENERAL NOTES AND LEGEND	2
P-100	PLUMBING SITE PLAN	
P-101A1	LOWER PLUMBING FLOOR PLAN - AREA A - WASTE, VENT, AND GAS	2
P-101A2	LOWER PLUMBING FLOOR PLAN - AREA A - WATER	2
P-101B1	LOWER PLUMBING FLOOR PLAN - AREA B - WASTE, VENT, AND GAS	
P-101B2	LOWER PLUMBING FLOOR PLAN - AREA B - WATER	2
P-102A1	UPPER PLUMBING FLOOR PLAN - AREA A - WASTE, VENT, AND GAS	2
P-102A2	UPPER PLUMBING FLOOR PLAN - AREA A - WATER	2
P-102B1	UPPER PLUMBING FLOOR PLAN - AREA B - WASTE, VENT, AND GAS	
P-102B2	UPPER PLUMBING FLOOR PLAN - AREA B - WATER	
P-103A	PLUMBING ROOF PLAN - AREA A	
P-103B	PLUMBING ROOF PLAN - AREA B	
P-201	PLUMBING CALCULATIONS AND SCHEMATICS	
P-501	TYPICAL DETAILS	
P-502	TYPICAL DETAILS	
P-503	TYPICAL DETAILS	2
P-601	PLUMBING SCHEDULES	2
TOTAL NO. O	F SHEETS: 17	

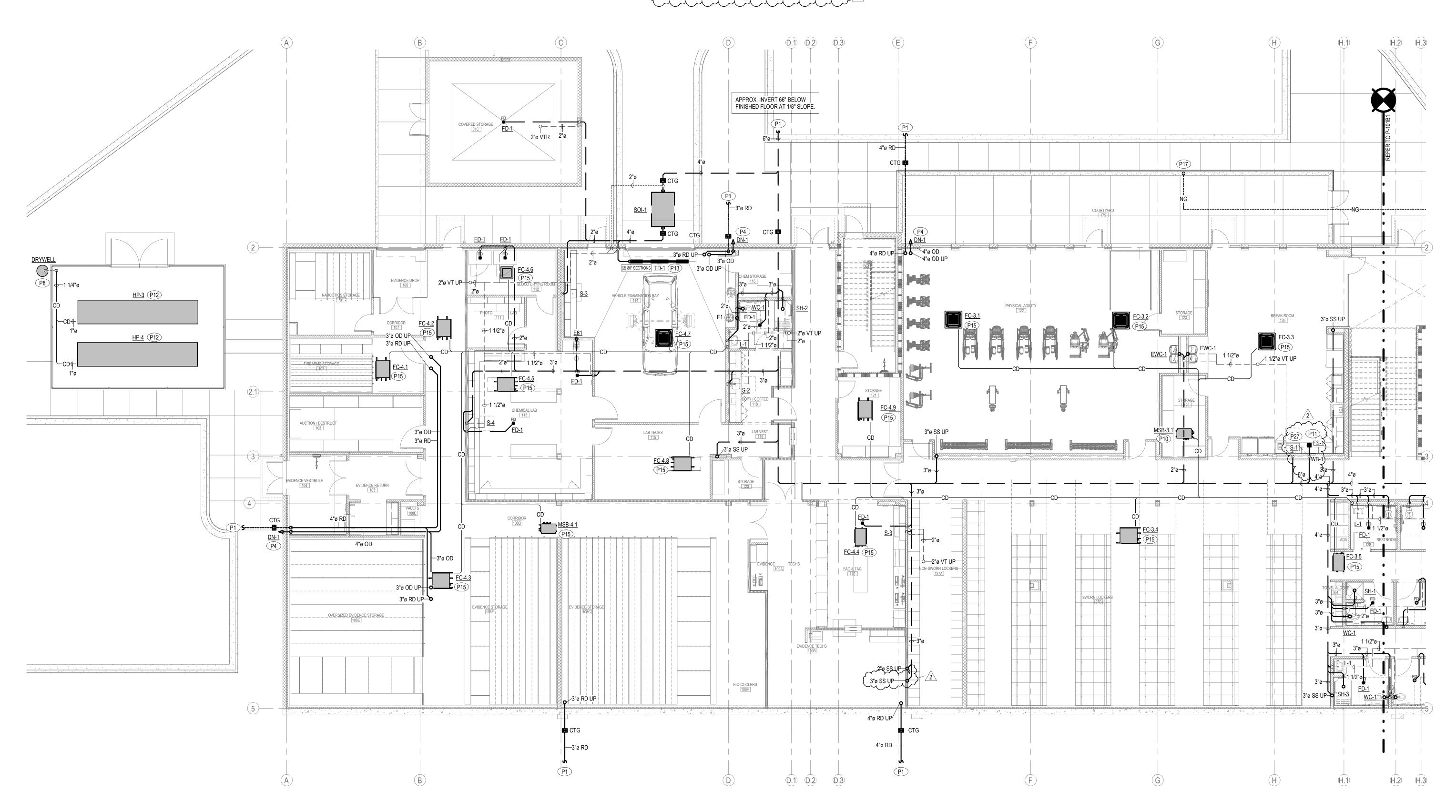
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# PLUMBING **GENERAL NOTES** AND LEGEND





# **KEYNOTES**

- P15 INDIRECT PRIMARY CONDENSATE DRAIN FROM HVAC EQUIPMENT INTO THE TAILPIECE OF LAVATORY.
- P17 ROUTE NG PIPING BELOW GRADE TO BBQ. REFER TO ARCHITECTURAL SITE PLAN FOR FINAL BBQ LOCATION. PROVIDE WITH A SHUTOFF VALVE AND CONNECT NG PIPING TO BBQ PER MANUFACTURER'S INSTRUCTIONS. PROVIDE WITH A FIRE MAGIC #3090 3-HOUR TIMER AT BBQ CONNECTION. INSTALL TIMER PER MANUFACTURER'S INSTRUCTIONS.
- P27 CONNECT DHW FROM SINK TO DISHWASHER. DISHWASHER TO DRAIN TO SINK GARBAGE DISPOSAL. REFER TO TYPICAL AIR GAP DEVICE FOR DISHWASHER DETAIL.

# **KEYNOTES**

- P12 PRIMARY CONDENSATE DRAIN FROM HVAC EQUIPMENT TO DRAIN INTO FUNNEL DRAIN. FUNNEL DRAIN TO CONNECT TO CD PIPING. CD PIPING TO TERMINATE AT DRYWELL. CD PIPING TO BE LOCATED ON UNISTRUT STANDS. ALL CD PIPING TO BE HEAT TRACED. INSULATE ALL OUTDOOR HEAT TRACED CONDENSATE PIPING WITH 2" CELLULAR GLASS PIPE INSULATION WITH ALUMINUM JACKET. REFER TO TYPICAL CONDENSATE DRYWELL TERMINATION DETAIL FOR INSTALLATION REQUIREMENTS.
- P13 PROVIDE A P-TRAP CONNECTION AT TRENCH DRAIN OUTLET WITH TRAP PRIMER.

CONTRACTOR.

# **KEYNOTES**

## P1 REFER TO CIVIL FOR CONTINUATION OF PIPING.

P4 TERMINATE OVERFLOW DRAIN LOW AT EXTERIOR WALL WITH DOWNSPOUT. COORDINATE TERMINATION HEIGHTS WITH GENERAL

- P8 VERIFY DRYWELL FINAL LOCATION WITH GENERAL CONTRACTOR.
- P10 INDIRECT PRIMARY CONDENSATE DRAIN FROM HVAC EQUIPMENT AT NEAREST FLOOR DRAIN OR FLOOR SINK.

P11 PROVIDE WITH UNDER COUNTER GREASE TRAP. INSTALL PER CITY OF IDAHO FALLS SPECIFICATION DRAWINGS.

# PLAN NOTES

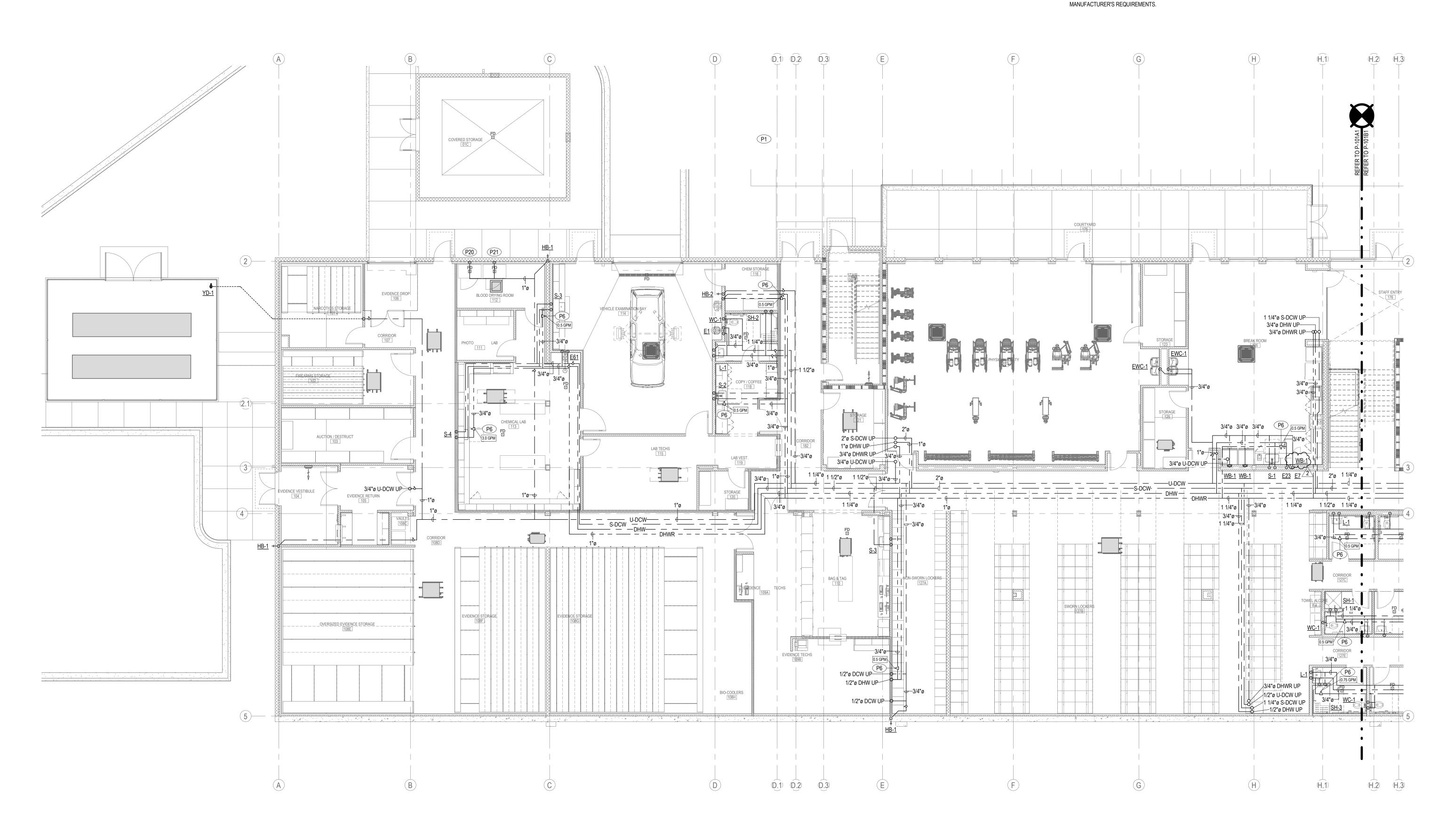
A. REFER TO GAS SCHEMATIC FOR GAS PIPE SIZING AND

- REQUIREMENTS. B. CONDENSATE PIPING TO BE 3/4"Ø UNLESS OTHERWISE SPECIFIED. SLOPE ALL CONDENSATE PIPING AT MIN 1/8" PER FT. CONDENSATE PIPING IS INTENDED TO BE ROUTED ABOVE CEILINGS AND WITHIN WALLS. COORDINATE ROUTING WITH ALL TRADES PRIOR TO INSTALLATION. C. ROOF DRAINS SIZED FOR 1.2 IN/HR (0.012 GPM/SQFT) AT 1/8" PER FOOT
- SLOPE.
- D. ROUTE PIPING FROM EACH FIXTURE TO NEAREST MAINLINE. REFER TO PLUMBING FIXTURE SCHEDULE FOR REQUIRED PIPE CONNECTIONS AND PIPE RUNOUT SIZES.



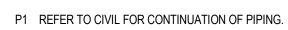
**P-101A1** 

VENT, AND GAS



LOWER PLUMBING FLOOR PLAN - AREA A - WATER

SCALE: 1/8" = 1'-0"



- REQUIREMENTS.

# **KEYNOTES**

P6 REFER TO TYPICAL THERMOSTATIC FLOW CONTROL VALVE DETAIL FOR INSTALLATION REQUIREMENTS. THERMOSTATIC FLOW CONTROL VALVE TO BE SIZED TO PROVIDE GPM AS INDICATED.

P20 PROVIDE DCW TO FUMING CHAMBER. VERIFY FINAL EQUIPMENT WITH ARCHITECT/GENERAL CONTRACTOR. INSTALL PER MANUFACTURER'S

P21 PROVIDE DCW TO BLOOD DRYING CABINET. VERIFY FINAL EQUIPMENT WITH ARCHITECT/GENERAL CONTRACTOR. INSTALL PER

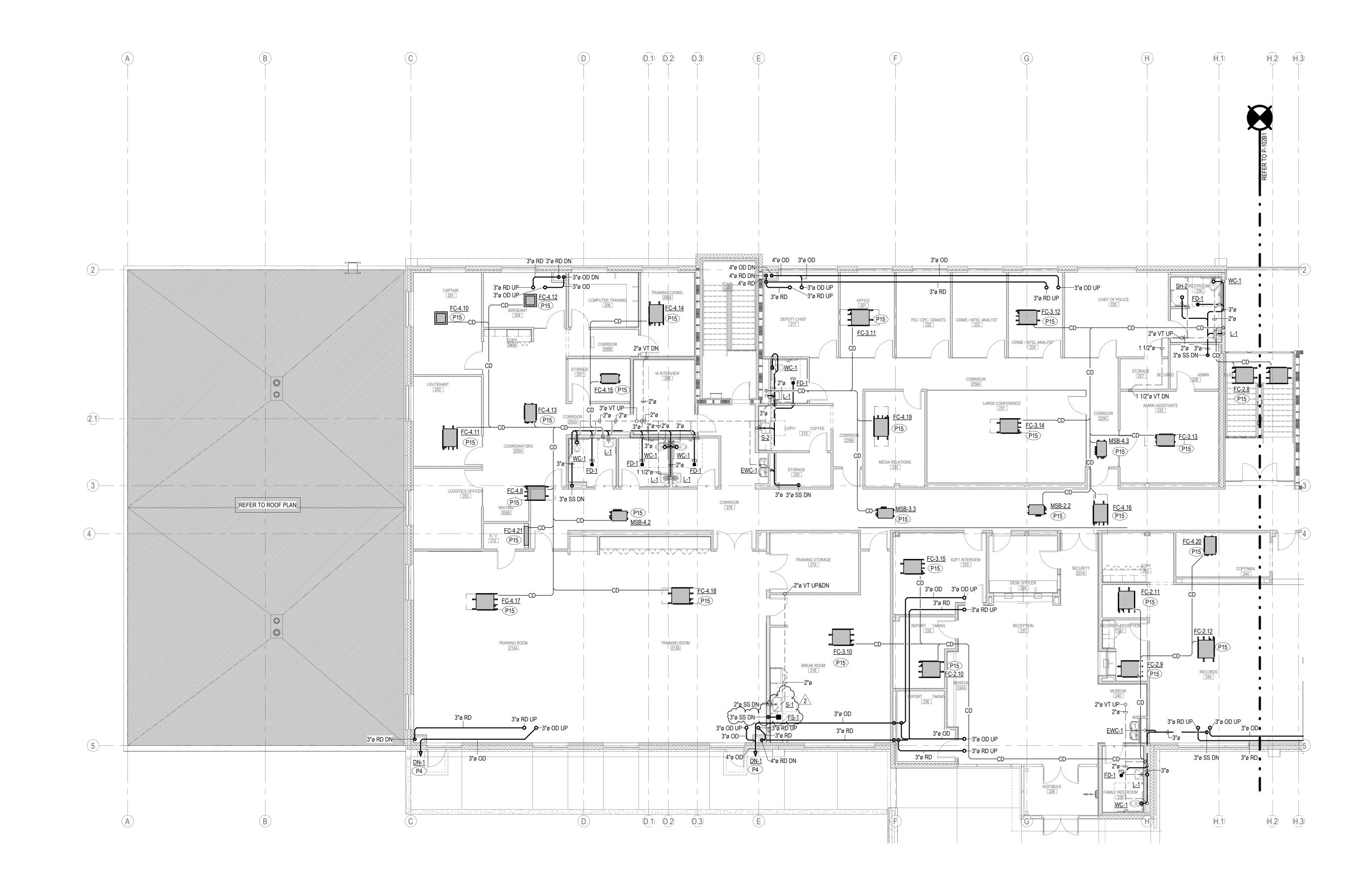
# PLAN NOTES

A. REFER TO GAS SCHEMATIC FOR GAS PIPE SIZING AND

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- SLOPE. D. ROUTE PIPING FROM EACH FIXTURE TO NEAREST MAINLINE. REFER TO
- PLUMBING FIXTURE SCHEDULE FOR REQUIRED PIPE CONNECTIONS AND PIPE RUNOUT SIZES.



**P-101A2** 



UPPER PLUMBING FLOOR PLAN - AREA A - WASTE, VENT, AND GAS SCALE: 1/8" = 1'-0"

# **KEYNOTES**

P4 TERMINATE OVERFLOW DRAIN LOW AT EXTERIOR WALL WITH DOWNSPOUT. COORDINATE TERMINATION HEIGHTS WITH GENERAL

P15 INDIRECT PRIMARY CONDENSATE DRAIN FROM HVAC EQUIPMENT INTO THE TAILPIECE OF LAVATORY.

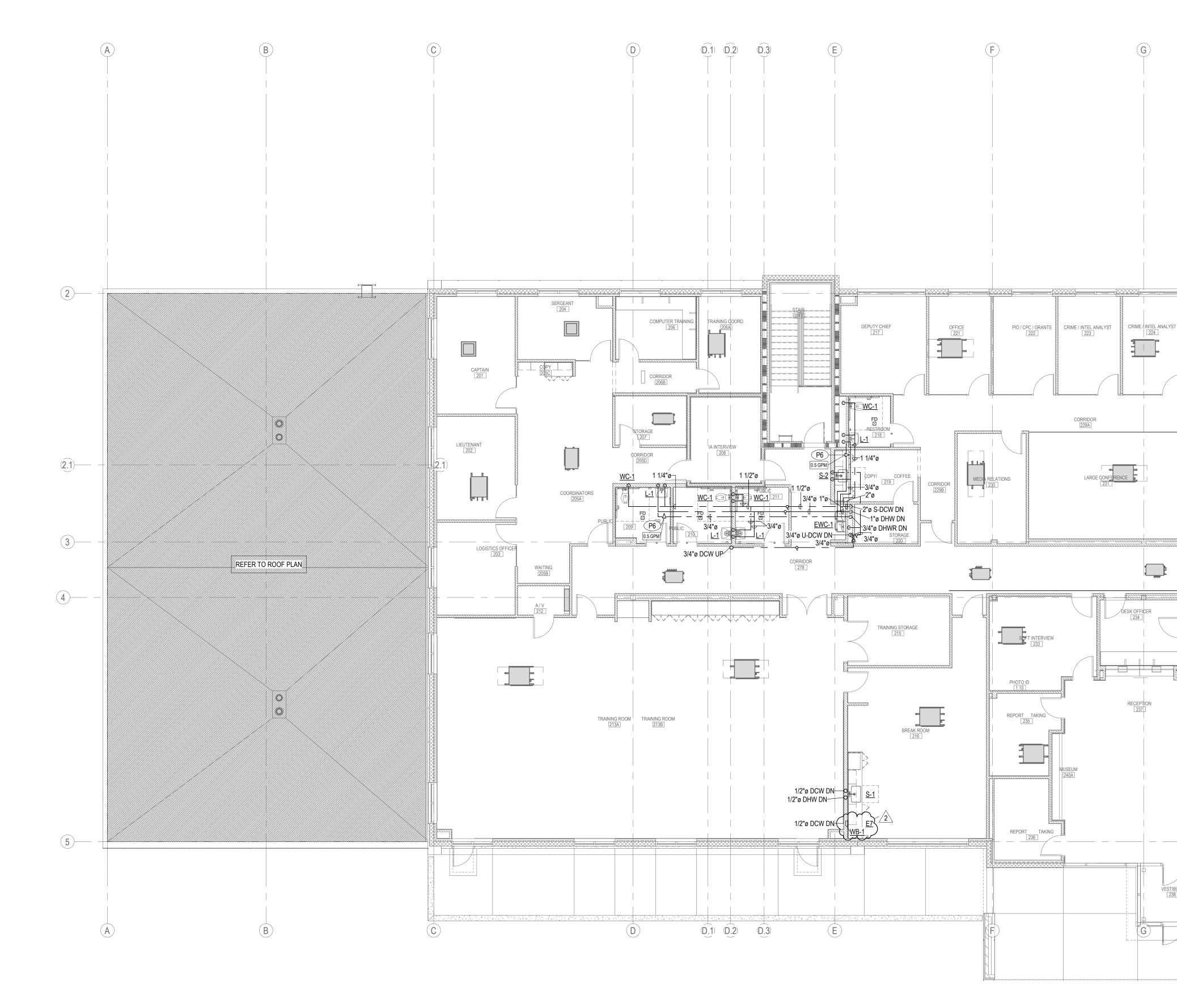
# PLAN NOTES

A. REFER TO GAS SCHEMATIC FOR GAS PIPE SIZING AND

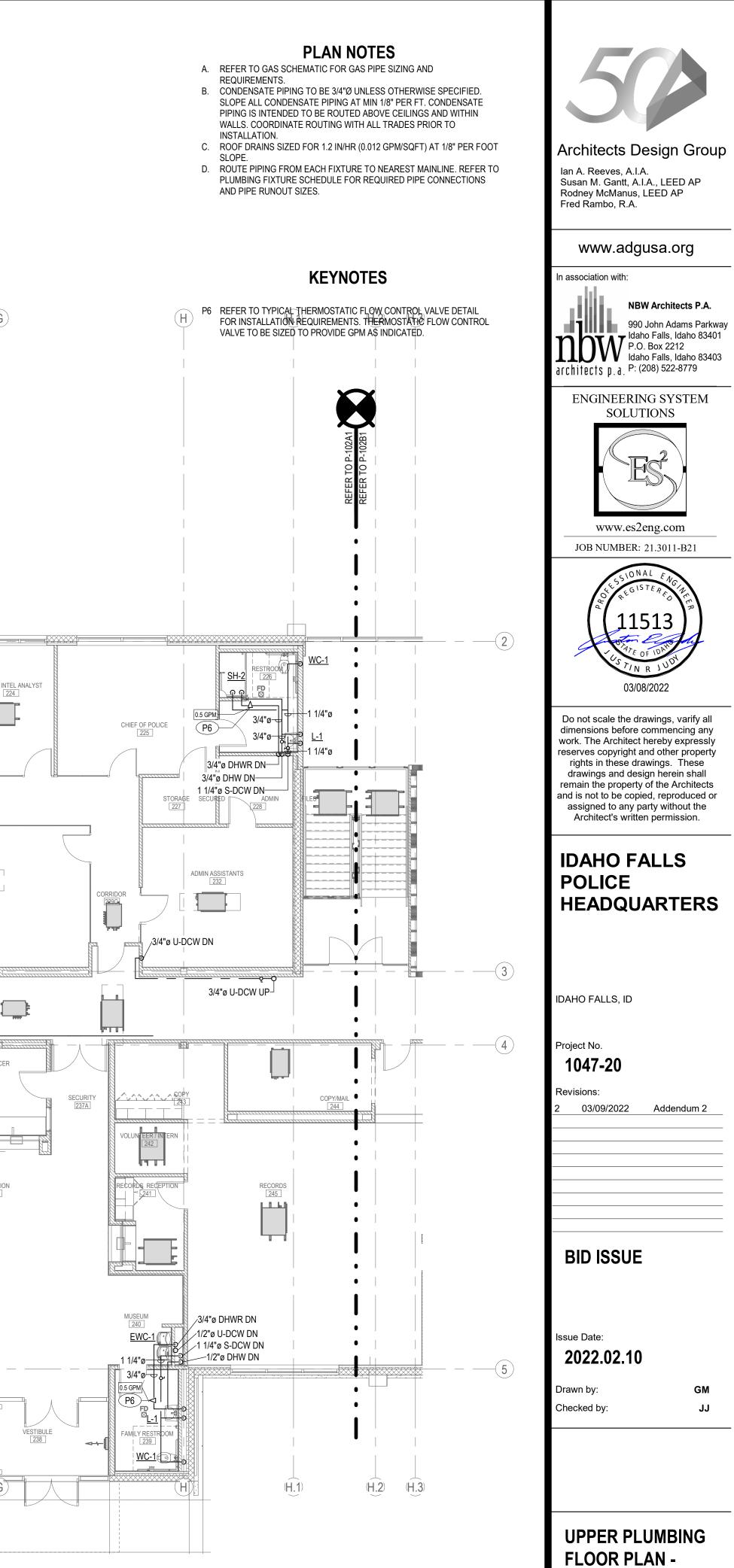
- REQUIREMENTS. B. CONDENSATE PIPING TO BE 3/4"Ø UNLESS OTHERWISE SPECIFIED. SLOPE ALL CONDENSATE PIPING AT MIN 1/8" PER FT. CONDENSATE PIPING IS INTENDED TO BE ROUTED ABOVE CEILINGS AND WITHIN WALLS. COORDINATE ROUTING WITH ALL TRADES PRIOR TO INSTALLATION.
- C. ROOF DRAINS SIZED FOR 1.2 IN/HR (0.012 GPM/SQFT) AT 1/8" PER FOOT SLOPE.
- D. ROUTE PIPING FROM EACH FIXTURE TO NEAREST MAINLINE. REFER TO PLUMBING FIXTURE SCHEDULE FOR REQUIRED PIPE CONNECTIONS AND PIPE RUNOUT SIZES.

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BID ISSUE	
Issue Date: <b>2022.02.10</b>	
Drawn by: Checked by:	GM JJ
UPPER PLUM FLOOR PLAN AREA A - WA	

P-102A1



UPPER PLUMBING FLOOR PLAN - AREA A - WATER SCALE: 1/8" = 1'-0"

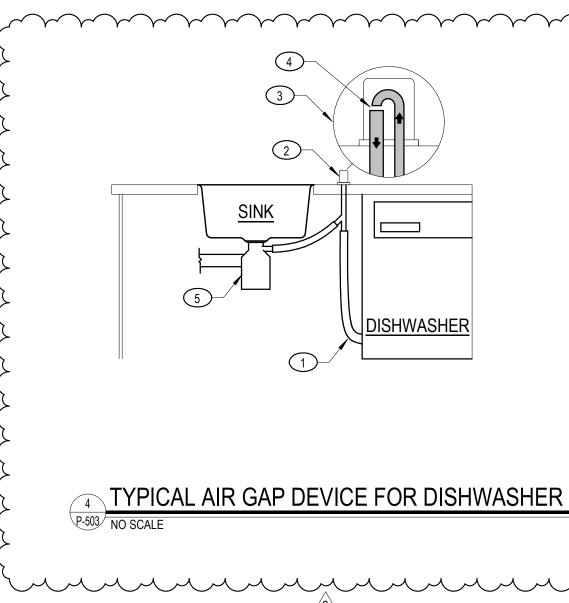


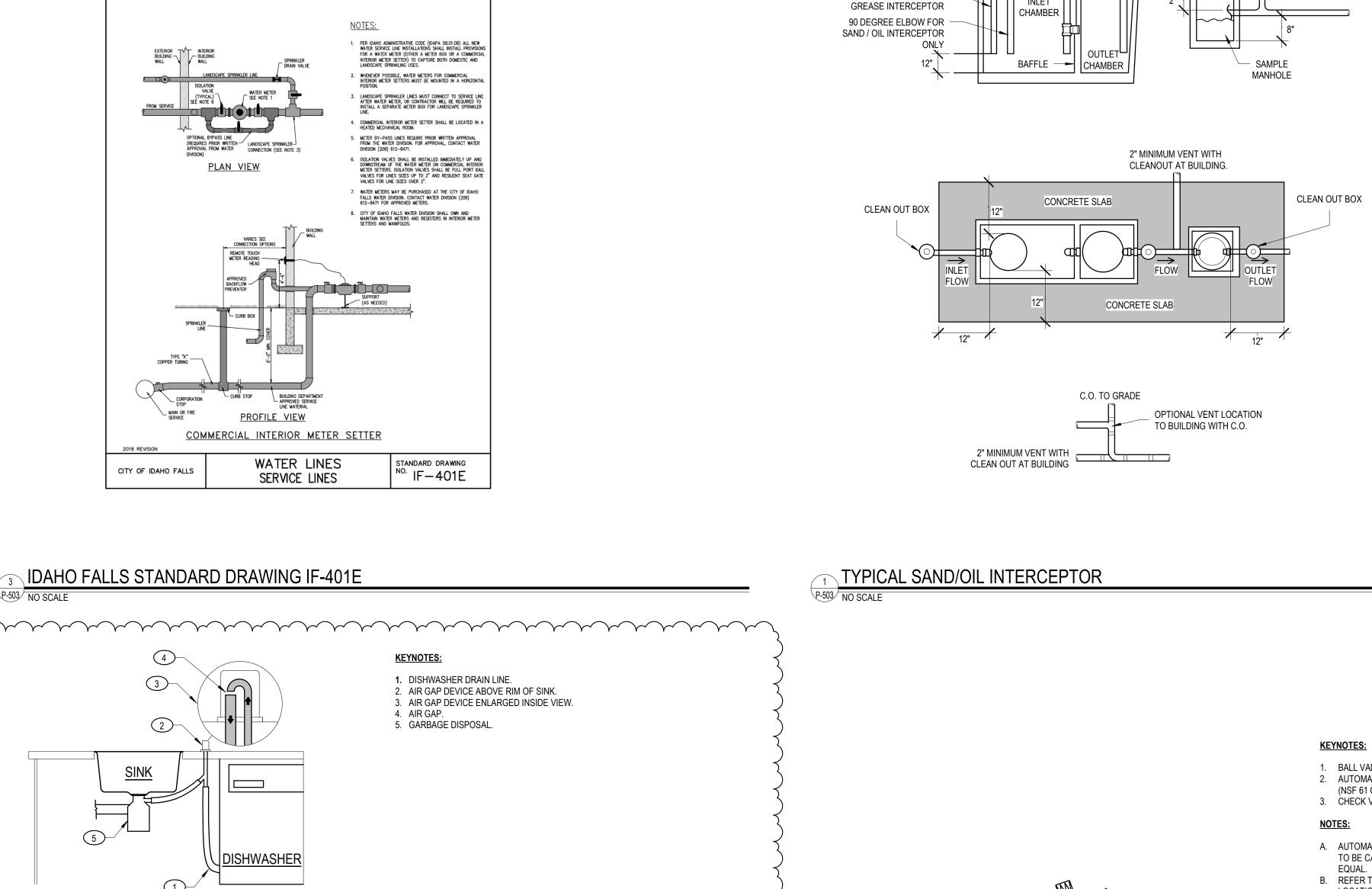
P-102A2

AREA A - WATER

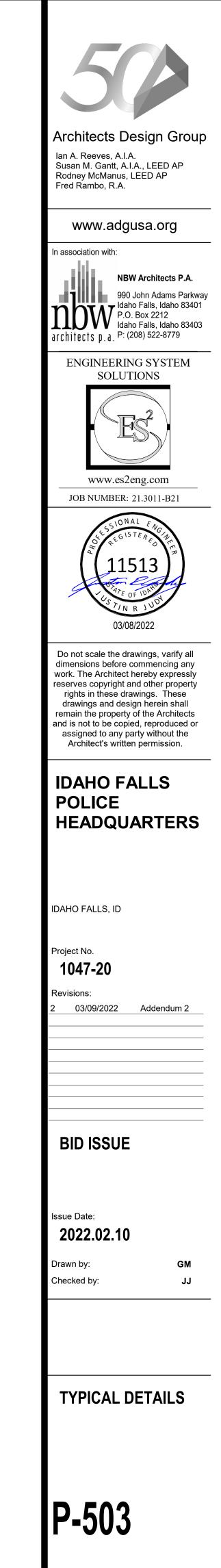


# P-503 NO SCALE





P-503 NO SCALE



# 2" MINIMUM VENT WITH CLEANOUT AT BUILDING. CLEAN OUT BOX \_∕\\_\_ CLEAN OUT BOX - FINISHED GRADE 8" CONCRETE SLAB, SEE NOTE 9.

MANHOLE COMPONENTS STACKED OVER 18" SHALL BE 36" DIAMETER

INLET

CLEAN OUT BOX

SANITARY TEE FOR

FINISHED-

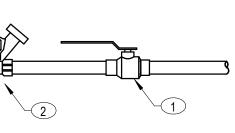
GRADE

## NOTES:

- A. DESIGN FOR TRAFFIC LOAD IF SAND / OIL INTERCEPTOR IS LOCATED IN A VEHICLE OR PEDESTRIAN TRAVEL AREA.
- B. CLEAN OUT BOX SHALL BE TRAFFIC RATED. C. EACH CHAMBER IS REQUIRED TO HAVE (1) 24" CAST IRON MANHOLE RING AND COVER WITH GASKET THAT PROVIDES A GAS TIGHT SEAL. MAXIMUM OF 10' BETWEEN MANHOLES OR OVER EACH BAFFLE TEE.
- D. ALL INTERCEPTOR COVERS SHALL BE PERMANENTLY MARKED "INTERCEPTOR" AND COVERS FOR SAMPLING BOX SHALL BE PERMANENTLY MARKED "SAMPLE."
- E. SAND / OIL AND SAMPLING MANHOLE SHALL BE LEVEL. F. REQUEST FOR VARIANCE MUST BE
- SUBMITTED IN WRITING WITH AS-BUILT OF EXISTING CONDITIONS TO THE SERVICES SECTION OF THE UTILITIES DEPARTMENT. G. BACKFILL SHALL BE FLOWABLE MIX, TYPE II OR PER SOILS REPORT. NO PEA GRAVEL
- SHALL BE ALLOWED FOR BACKFILL. H. PROVIDE A SINGLE REINFORCED CONCRETE MAT WITH #4 REBAR IN A 8" THICK CONCRETE SLAB. THE CONCRETE SLABSHALL EXITED 12" OUTSIDE EACH MANHOLE RING AND COVERS. A #4 REBAR SHALL BE PLACED WITHIN 6" OF EACH
- MANHOLE RING AND COVER. I. LANDSCAPING AND PAVEMENT SHALL BE GRADED AWAY FROM SAND / OIL GREASE INTERCEPTORS SO NOT TO ALLOW STANDING WATER AT MANHOLE RING AND
- COVERS. J. ALL SAND / OIL INTERCEPTORS SHALL BE
- UPC OR IAPMO APPROVED. K. WATER TEST THE SAND / OIL BY FILLING TO THE OUTLET INVERT IN PRESENCE OF INSPECTOR.

- 1. BALL VALVE (TYP).
- 2. AUTOMATIC FLOW CONTROL VALVE (NSF 61 CERTIFIED). 3. CHECK VALVE.

- A. AUTOMATIC FLOW CONTROL VALVE TO BE CALEFFI 01325/20 NA OR
- B. REFER TO DRAWINGS FOR LOCATIONS OF AUTOMATIC FLOW
- CONTROL VALVES. C. GPM REQUIRED FOR EACH AUTOMATIC FLOW CONTROL VALVE IS
- INDICATED ON DRAWINGS.
- D. INSTALL PER MANUFACTURERS RECOMMENDATIONS.



TYPICAL THERMOSTATIC FLOW CONTROL VALVE

						G	AS FI	KED V	VATEF	KHEA	IER	K (WH	)					
	INPUT	OUTPL	л	<sub>(0/)</sub> FL	JEL C	AP F	RECOVERY	, TEMP	FLUE	FLUE	DIN	MENSION	NS (IN)			MANUFACTUR	ER &	NOTEO
Mark	(MBH)	(MBH	)   EFF	(%) TY	/PE (G	ial)	(Gal/hr)	RISE (°F)	DIA (IN)	TYPE		н	D	OPER W	VI (LBS)	MODEL		NOTES
WH-1	200	190	9	-		00	233	90	4	PVC	_	72	28	25		PVI CONQUES		1,2,3
WH-2 DTES:	200	190	9	5   N	₩G   1	00	233	90	4	PVC		72	28	25	00	PVI CONQUE	ST	1,2,3
PROVIDE	IOT, PVI, RHEE E WITH CONDE E WITH ELECTF	NSATE NE	UTRALIZA	TION-KIT		. \	NVAR ARE AF	PROVED MA	ANUFACTUREI	RS. REFER TO	) MANU	FACTURER	AND MOI	DEL FOR BA	SIS OF DES	IGN.		
							E	<b>KPAN</b>	SION 1	ANK	(ET)	)						
MARK	SYST SERV		WATE TEMP		ANK VOL (GAL)		ep vol Gal)	PRE CHARGE DIMENSIONS (IN) (PSI) H D			· /	OPER WT (LBS) MANUFACTURER & I				DEL	NOTES	
ET-1	DHV	V	140		26		17.5	40	)	34		16	10	0	V	ATTS DETA		1,2
	WATTS, AND T. ITABLE FOR PC			D MANUFAC	TURERS. RE	FER TO M	ANUFACTUR	Er and moi	DEL FOR BASI	S OF DESIGN	l.							
							ļ	MIXIN	G VAL	VE (M	V)							
		.OW GPI		INL					DIMENS	<u>`</u> ,	.,		MA	NUFACT	URER & I	NODEL	Ν	IOTES
MV-1	MIN 1.5		<b>MAX</b> 45		(IN) 2	- (	( <b>IN)</b> 2	L 27		<b>V</b>	H 60			BRA	DLEY HL			1,2,3
IOTES:	1.0		~~~		-	1	-	21		-	00			11/1	I I I L			.,_,•
	e with Housin O have a max					LED FLOW												
				1		1	WA	ATER	SOFT		•	<u> </u>						T
MARK	CONTINU FLOW RA PER TAN		# OF INERAL TANKS	HAR (GRA	ILET DNESS INS PER	HAR	OUTLET RDNESS INS/ GAL)	VALVE SIZE (IN)	PD	ELECTR				D X H (IN BRINE				NOTE
WS-1	(GPM) 87		1		<b>LLON)</b> 14		3	2	15	120 1	5	30 >	X 72	30 X 50	1000	WATER TECH SM		
NOTES:		!				$\boldsymbol{\mathcal{C}}$	$\overline{\frown}$					-1				•		
. CULLIGA	N, WATER IEC	ch, aquioi	N, COLUM	BIAWATER	CONDITIONI			EVOQUA AH	RE APPROVEL	MANUFACI	JRER. R	EFER IO M	IANUFAC	I URER AND	MODEL FOR	R BASIS OF DESIGN.		
							CIF	RCUL	ATOR	PUMP	(CF	)						
MARK	DU	τv	G	PM I	Head (FT)		ELEC	TICAL	0	PER WT (LI	BC)	MAI		URER &	MODEI		NOTES	•
					、	H			PH		53)	IVIAI						
CP-1 CP-2	DHV DHV			15 15	15 15	0.2		20 20	1	100 100			GRUNDFOS MAGNA GRUNDFOS MAGNA			1,2,3,4 1,2,3,4		
2. PROVIDE 3. PUMPS T	os, Taco, and E With Aquas To Alternate To be Suitabl	TAT KIT. USE.			ROVED MANU	JFACTURE	RS. REFER 1	O MANUFAC	CTURER AND I	MODEL FOR E	BASIS O	f design.						
							В	800S		JMP (I	BP)							
Mark	TYPE	DUTY		umps/ <del>i</del>			imum Let	Max Outlet	MIN EFF	E HP PER	LECTF			oper Wt	MANUFA	CTURER & MOD	DEL	NOTES
			RE	DUNDAN	T GPM			RESSURE	(%)	PUMP	VOL	LT   F	Ъ.	(LBS)				
BP-1	BOOSTER	DCW		2/1	87		36	80	70	3	480	0	3	250	GRUND	OS BOOSTERPA	AQ	1,2,3,4
. PUMPS T VERTICA MANUFA . BOOSTEI		ED WITH EQ PANSION WIREMEN VE A TOTA	CM MOTO TANK FOF TS. AL OF (2) F	RS. BOOSTE R POTABLE V PUMPS, PRC	ER SYSTEM 1 WATER WITH OVIDE WITH S	O BE PRO REPLACE	OVIDED WITH ABLE BLADD	PRESSURE ER (MAX DE CAL. ELECT	SENSOR AND SIGN PRESSU	CONTROL PA RE OF 125 PS SIZED TO HA	ANEL TC SI, AMTF NDLE AL	) Maintain Rol, Taco, Ll Pumps F	Pressui Watts, ( Running	RE SET POII OR APPROV AT THE SAM	nt throug Ed Equal). 1e time.	H CONTROL PANEL. EXPANSION TANK T		
								SUM	IP PUN	NP (SP	·)							
MARK	D	UTY		GPM	HE	ad (FT)	HF		ELECT	•	<u> </u>	OPER W (LBS)	T	MANU	FACTURE	R & MODEL		NOTES
SP-1			_	50		15	0.5		120	<b>F</b> f1 1		50			STANCO			12

STANCOR SV

1,2

							· · /	
	MADK	DUTY	GPM	HEAD (FT)	HP	ELECT	rical	OPER WT
MARK SP-1 NOTES:	DOT	GFIVI	nead (FI)	ΠF	VOLT	PH	(LBS)	
	SP-1	ELEVATOR PIT	50	15	0.5	120	1	50
	1. ZOELLE	R, LIBERTY, STANCOR, AND GROU E WITH OIL MINDER CONTROLS.	JNDFOS ARE APPR	OVED MANUFACTU	RERS. REFER TO	MANUFACTURER	AND MODEL FOR	BASIS OF DESIGN.

MARK	DESCRIPTION	CW	HW	WASTE	VENT	VOLT	NOTES
DN-1	DOWNSPOUT NOZZLE, PERFORATED HINGED COVER			SEE			J.R. SMITH FIG.#1775
E1	EMERGENCY EYE WASH	1/2"	1/2"	PLAN 1 1/2"	1 1/2"	-	EQUIPMENT BY OTHERS. REFER TO FURNITURE & EQUIPMENT PLANS
E7	ICE MAKER	1/2"	-	-	-	100	SCHEDULE EQUIPMENT BY OTHERS. REFER TO FURNITURE & EQUIPMENT PLANS SCHEDULE
E23	DISHWASHER		1/2"			100	EQUIPMENT BY OTHERS. REFER TO FURNITURE & EQUIPMENT PLANS
E49	DOG GROOMING TUB	1/2"	1/2"	2"	1 1/2"		SCHEDULE EQUIPMENT BY OTHERS. REFER TO FURNITURE & EQUIPMENT PLANS
E61	EMERGENCY SHOWER AND EYE WASH STATION	1 1/4"	1 1/4"	2"	1 1/2"	-	SCHEDULE EQUIPMENT BY OTHERS. REFER TO FURNITURE & EQUIPMENT PLANS SCHEDULE
	INDOOR BI-LEVEL ELECTRIC WATER COOLER, ADA, REFRIGERATED, FILTERED	1/2"	-	1 1/2"	1 1/2"	120	ELKAY LZSTL8WSSP
FD-1	FLOOR DRAIN, TRAP PRIMER CONNECTION, VANDAL-PROOF SECURED	-	-	2"	1 1/2"	-	ZURN Z415S-DP
	FLOOR SINK, VERIFY GRATE SIZE W/ FLOOR SINK APPLICATION	-	-	3"	1 1/2"	-	ZURN Z1910
	FLOOR SINK, VERIFY GRATE SIZE W/ FLOOR SINK APPLICATION	-	-	4"	2"		ZURN Z1901
	FUNNEL DRAIN WITH P-TRAP	-	-	3"	2"	-	ZURN Z1019
	AUTO DRAIN, NON-FREEZE WALL HYDRANT W/ INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION, "T" HANDLE KEY, BREAKER PLATE	3/4"	-	-	-	-	ZURN Z1321-C
	HOT & COLD WALL HYDRANT W/ INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION, "T" HANDLE KEY, BREAKER PLATE	3/4"	3/4"	-	-	-	WOODFORD B22
	LAVATORY, WALL MOUNTED LAVATORY, ADA, BATTERY-POWERED FAUCET, MIXING VALVE (ASSE 1070), DRAIN ASSEMBLY	1/2"	1/2"	1 1/2"	1 1/2"	-	BASIN: ZURN Z5360-PED FAUCET: ZURN Z6915-XL MIXING VALVE: LEONARD 270-LF SET AT 110°F
RD-1	12" DIAMETER COMBINATION MAIN ROOF AND OVERFLOW DRAIN WITH LOW SILHOUETTE DOMES AND DOUBLE TOP-SET DECK PLATE	-	-	SEE PLAN	-	-	ZURN Z164
	ROOF HYDRANT, NO DRAIN LINE, BACKFLOW PREVENTOR, ROOF FLUSH MOUNT, 3/4" HOSE CONNECTION.	3/4"	-	-	-	-	PRIER P-RH1
S-1	BREAKROOM SINK, ADA, SINGLE COMPARTMENT, W/ FAUCET, DRAIN ASSEMBLY, 1/2 HP GARBAGE DISPOSER W/ CORD AND PLUG.	1/2"	1/2"	2"	1 1/2"	120	BASIN: ELKAY ELUHAD281655 FAUCET: ELKAY LKGT4083 DRAIN: ELKAY LK99 GARBAGE DISPOSER: BADGER 5
S-2	SINK, ADA, SINGLE COMPARTMENT, DRAIN ASSEMBLY, W/ FAUCET	1/2"	1/2"	2"	1 1/2"	-	BASIN: ELKAY ELUHAD211555PD FAUCET: ELKAY LKGT4083 DRAIN: ELKAY LK99
S-3	INTEGRAL SINK, 23-1/2"L X 18-1/4"W X 5-3/8"D	1/2"	1/2"	2"	1 1/2"	-	BASIS OF DESIGN: ONEPOINTE FAUCET: ZURN Z826U4-XL
S-4	INTEGRAL SINK 39"L X 18"W X 12"D	1/2"	1/2"	2"	1 1/2"	-	BASIS OF DESIGN: ONEPOINTE FAUCET: ZURN Z826U4-XL
	SHOWER, PRESSURE BALANCING MIXING VALVE, TEMPERATURE LIMIT STOPS, SHOWER PAN, SHOWER HEAD, DRAIN ASSEMBLY	1/2"	1/2"	2"	1 1/2"	-	TRIM & VALVE: DELTA T14267-LHD (LESS SHOWER HEAD), R10000-UNV SHOWER HEAD: DELTA RP48590 LINEAR DRAIN: ZURN ZS880
	ADA, ROLL-IN SHOWER, PRESSURE BALANCING MIXING VALVE, TEMPERATURE LIMIT STOPS, TUB SPOUT, SHOWER HEAD, HAND HELD SHOWER W/ SHOWER HEAD, DIVERTER VALVE, DRAIN ASSEMBLY	1/2"	1/2"	2"	1 1/2"	-	TRIM & VALVE: DELTA T14267-LHD (LESS SHOWER HEAD), R10000-UNV SHOWER HEAD: DELTA RP48590 HAND HELD SHOWER: DELTA 55424 LINEAR DRAIN: ZURN ZS880
	ADA, ROLL-IN SHOWER, PRESSURE BALANCING MIXING VALVE, TEMPERATURE LIMIT STOPS, TUB SPOUT, SHOWER HEAD, HAND HELD SHOWER W/ SHOWER HEAD, DIVERTER VALVE, DRAIN ASSEMBLY, VERIFY FINAL PAN SIZE	1/2"	1/2"	2"	1 1/2"	-	TRIM & VALVE: DELTA T14267-LHD (LESS SHOWER HEAD), R10000-UNV SHOWER HEAD: DELTA RP48590 HAND HELD SHOWER: DELTA 55424 LINEAR DRAIN: ZURN ZS880
	500 GALLON SAND/OIL INTERCEPTOR, TRAFFIC RATED COVER	-	-	4"	2"	-	
	SERVICE SINK, VACUUM BREAKER FAUCET, HOSE HOLDER, MOP HANGER, WALL GUARD TRENCH DRAIN,TRAFFIC RATED, PROVIDE P-TRAP AT TRENCH DRAIN	1/2"	1/2"	3"	2"	-	BASIN: E.L. MUSTEE & SONS 62M FAUCET: E.L. MUSTEE & SONS 63.600A ZURN Z886
	OUTLET WITH TRAP PRIMER, TRENCH DRAIN COMES IN 80" SECTIONS, REFER TO FLOOR PLAN FOR NUMBER OF SECTIONS	-	-	4"	2"	-	
WB-1	ICE MAKER WALL BOX, GALVANIZED METAL	1/2"	-	-	-	-	RATED: GUY GRAY FR-12 NOT RATED: GUY GRAY BIM875
WB-2	WASHING MACHINE BOX, GALVANIZED METAL	1/2"	1/2"	2"	1 1/2"	-	RATED: GUY GRAY FR-12 NOT RATED: GUY GRAY B200
	ADA WATER CLOSET, FLOOR MOUNTED, BATTERY POWERED FLUSH VALVE, W/ OPEN SEAT W/O COVER	1"	-	3"	2"	-	BOWL: KOHLER K-96057 FLUSH VALVE: AMERICAN STANDARD 6065.121.002
	ADA WATER CLOSET, FLOOR MOUNTED, REMOTE FLUSHOMETER, W/ OPEN SEAT W/O COVER	1"	-	3"	2"	-	BOWL: KOHLER K-96057 FLUSHOMETER: SLOAN ROYAL 952
	YARD HYDRANT, FREEZELESS W/ BACKFLOW PREVENTOR EPTANCE OF ALL PLUMBING FIXTURES WITH ARCHITECT, AND OWNER PRIOR TO PURCHASE A	1"	-	-	-		WOODFORD Y2

<u>∕2∖</u>

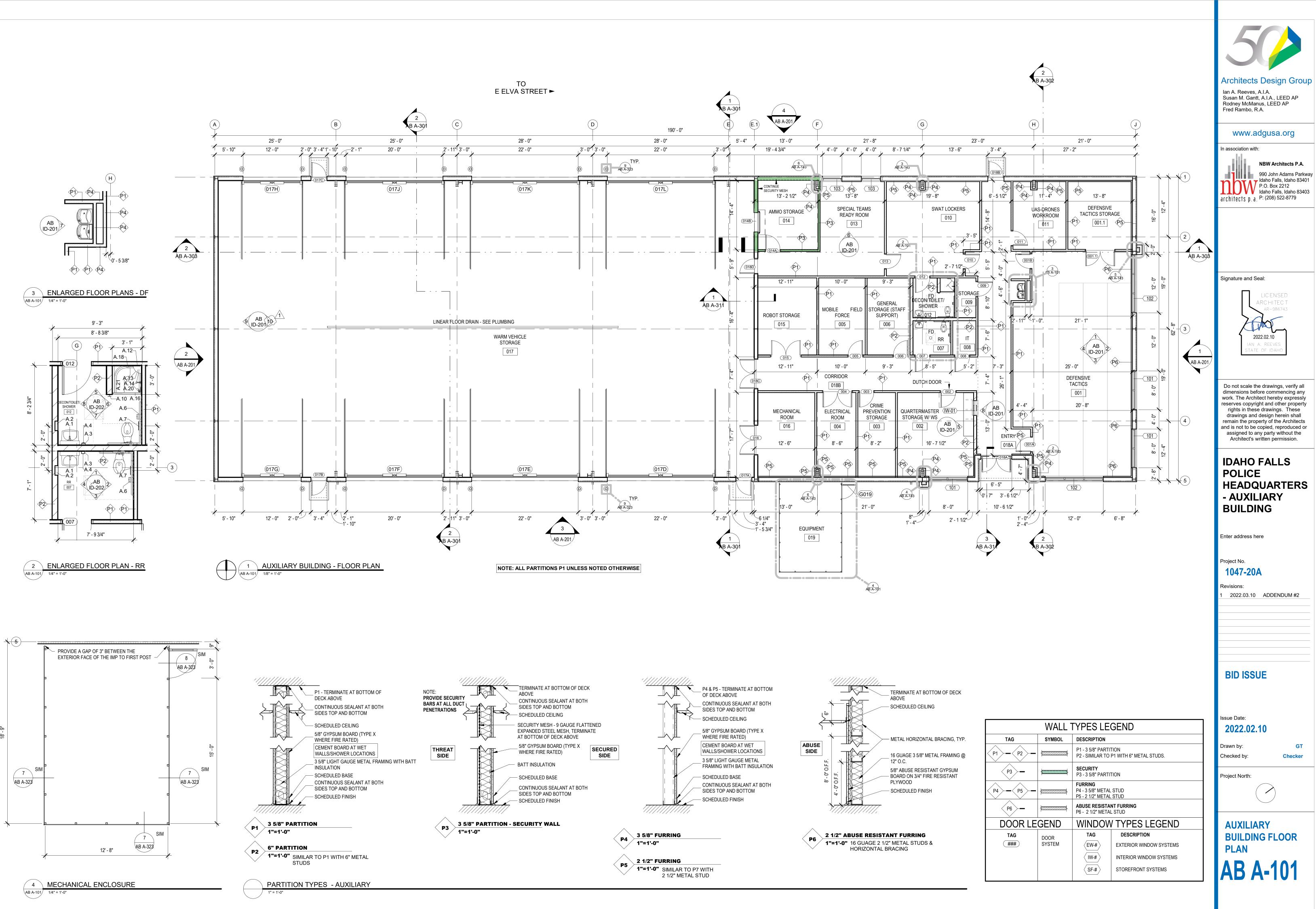
2. IN ADDITION TO APPROVED FIXTURE MANUFACTURERS LISTED IN THE SPECIFICATIONS, SLOAN, WATTS, AND LAWLER ARE APPROVED MANUFACTURERS

FIXTURE FLOW RATE												
FIXTURE	MAX FLOW RATE											
SINKS	2.2 GPM											
SHOWER HEADS	2.5 GPM											
WATER CLOSETS	1.6 GAL/FLUSH											
METERING FAUCETS	0.25 GAL/CYCLE											
NOTES: A. FIXTURES EXCLUDED: CLINICAL SINKS SERVICE SINKS	, LAUNDRY TRAYS, AND											

ALL EQUIPMENT SELECTED AT SITE ELEVATION (4700') UNLESS NOTED OTHERWISE.

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IDAHO FALL	<u> </u>
POLICE	C
HEADQUAR	FERS
IDAHO FALLS, ID	
IDANO I ALLO, ID	
Project No.	
Project No. <b>1047-20</b> Revisions:	
<b>1047-20</b> Revisions:	endum 2
1047-20 Revisions: 2 03/09/2022 Adde	endum 2
1047-20 Revisions: 2 03/09/2022 Adde	endum 2
1047-20 Revisions: 2 03/09/2022 Adde	endum 2
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1047-20         Revisions:         2       03/09/2022         Adde	
1047-20   Revisions:   2 03/09/2022   Adde     3     BID ISSUE   Issue Date:    2022.02.10   Drawn by:	GM
1047-20   Revisions:   2 03/09/2022   Adde     3     BID ISSUE   Issue Date:    2022.02.10   Drawn by:	GM
1047-20         Revisions:         2       03/09/2022         Adde	GM
1047-20   Revisions:   2 03/09/2022   Adde   BID ISSUE Issue Date: 2022.02.10 Drawn by: Checked by: PLUMBING	GM
1047-20         Revisions:         2       03/09/2022         Adde	GM
1047-20   Revisions:   2 03/09/2022   Adde   BID ISSUE Issue Date: 2022.02.10 Drawn by: Checked by: PLUMBING	GM

**P-601** 



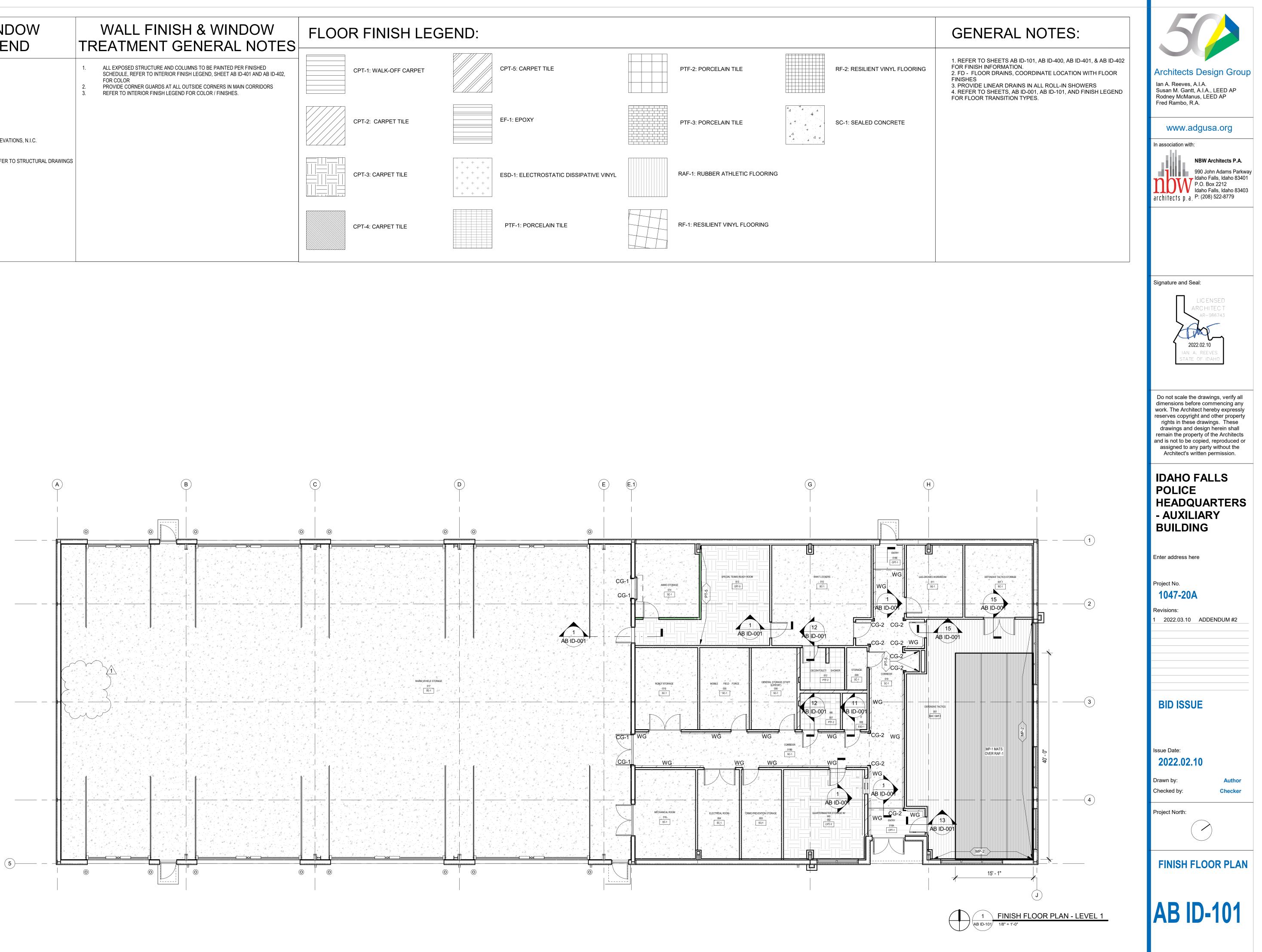
	WALL 7	TYPES LE	GEND							
TAG	SYMBOL	DESCRIPTION								
P1 - P2 -		P1 - 3 5/8" PARTITION P2 - SIMILAR TO P1 WITH 6" METAL STUDS.								
P3 -		SECURITY P3 - 3 5/8" PARTITION								
P4 P5 -	21111111111	FURRING P4 - 3 5/8" METAL STUD P5 - 2 1/2" METAL STUD								
P6 -	2000000	ABUSE RESISTANT FURRING P6 - 2 1/2" METAL STUD								
DOOR LE	GEND	WINDOW	/ TYPES LEGEND							
TAG	DOOR	TAG	DESCRIPTION							
(###)	SYSTEM	EW-#	EXTERIOR WINDOW SYSTEMS							
		<ul><li>IW-#</li></ul>	INTERIOR WINDOW SYSTEMS							
		SF-#	STOREFRONT SYSTEMS							

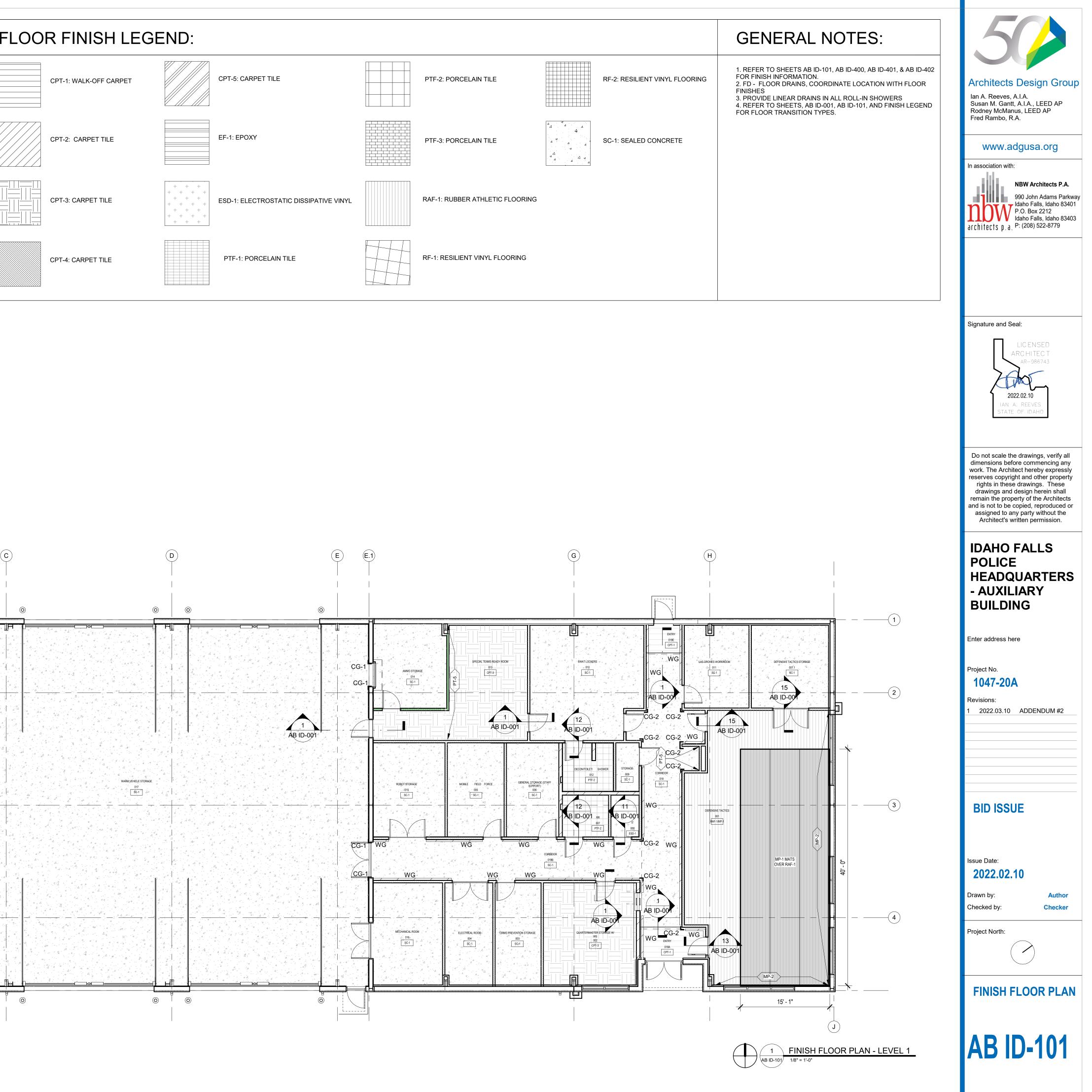
# WALL FINISH & WINDOW TREATMENT LEGEND

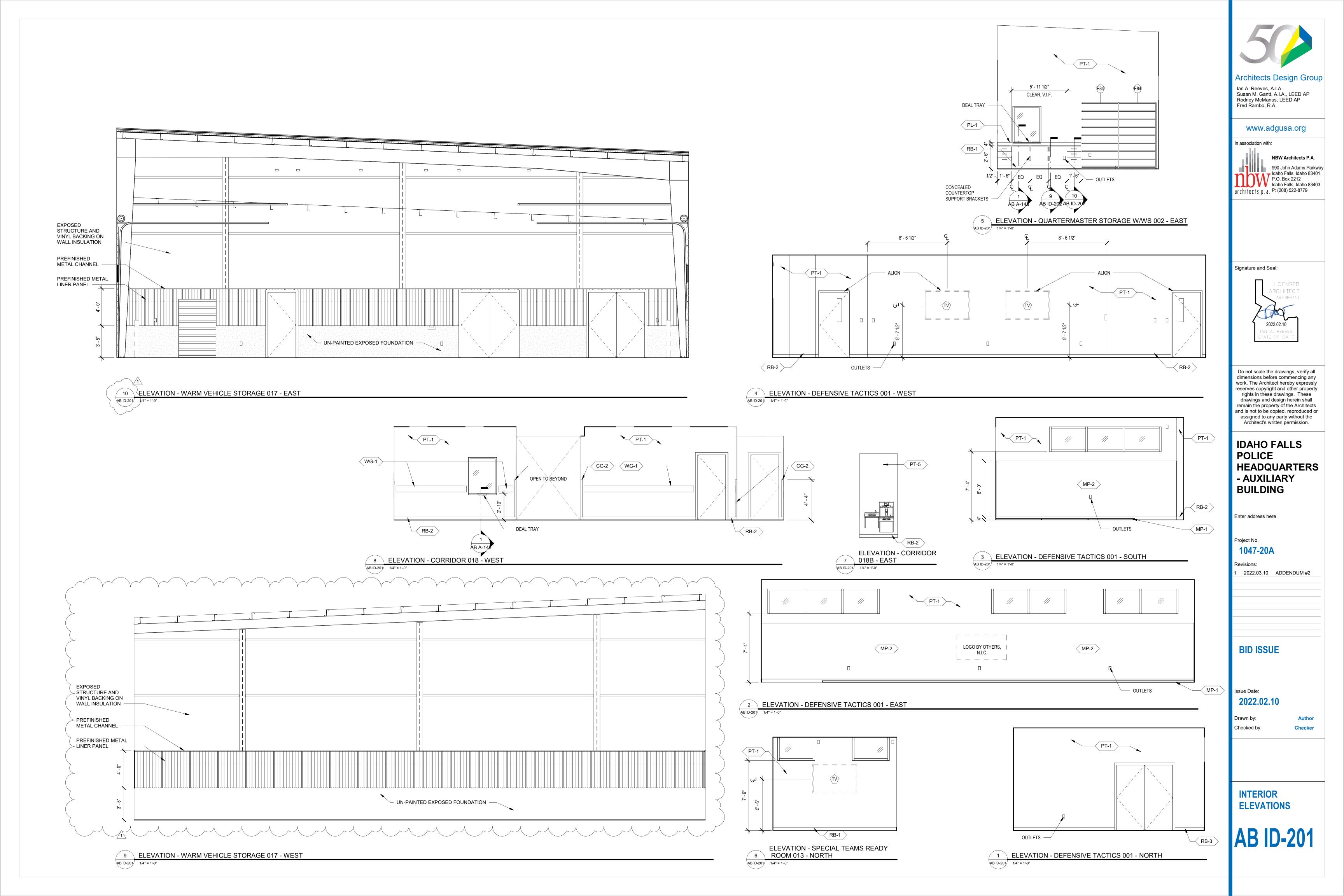
WG	WALL PROTECTION RAIL OR STRIP	1.	ALL EX SCHE FOR C
CG-1	STAINLESS STEEL CORNER GUARD	2. 3.	PROV REFE
CG-2	VINYL CORNER GUARD		
P	WALL FINISH TAG		
_ · _ · _	'SUPER-GRAPHIC' LOCATIONS, REFER TO ELEVATIONS, N.I.C.		
	SEALED CONCRETE - CONTROL JOINTS - REFER TO STRUCTURAL DRAWINGS		

# WALL FINISH & WINDOW

RCOLOR OVIDE CORNER GUARDS AT ALL OUTSIDE CORNERS IN MAIN CORRIDORS FER TO INTERIOR FINISH LEGEND FOR COLOR / FINISHES.



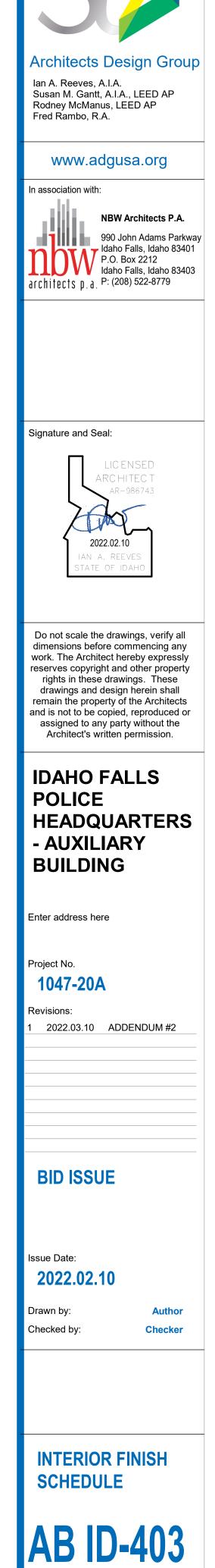


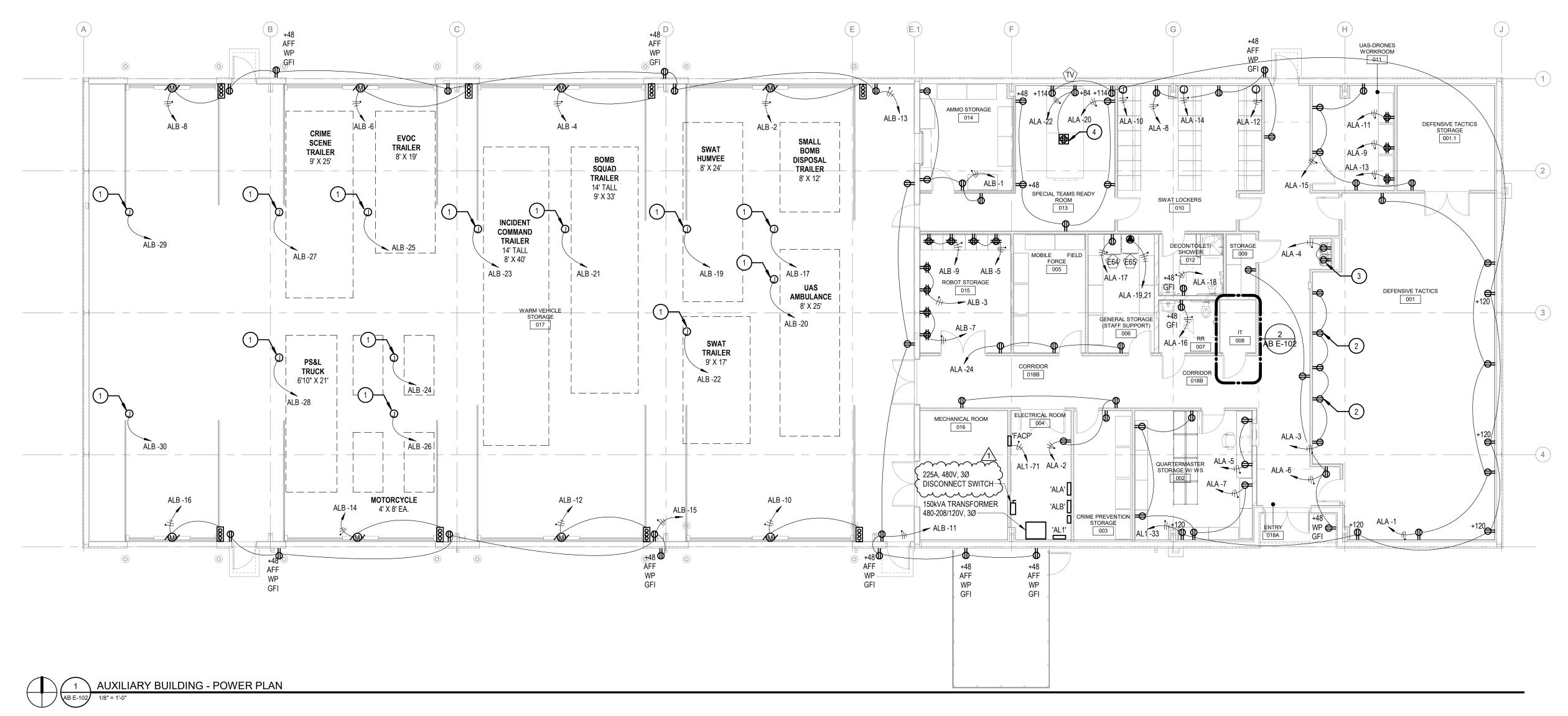


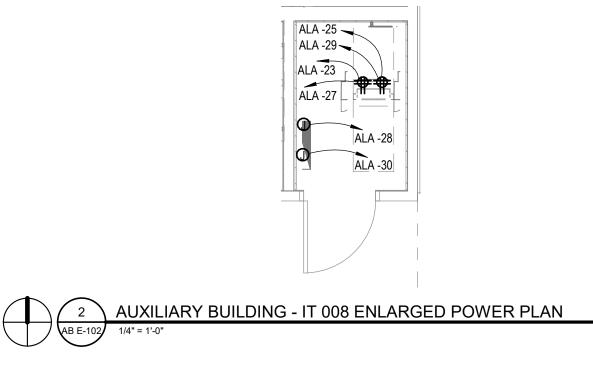
## ROOM FINISH SCHEDULE - AUXILIARY BUILDING

			RUUI		ULE - AUXILIAR I	BUILDING			
				NORTH WALL	SOUTH WALL	EAST WALL	WEST WALL	CEILING	
ROOM #	# ROOM NAME	FLOOR FINISH	BASE FINISH	FINISH	FINISH	FINISH	FINISH	FINISH	COMMENTS
001	DEFENSIVE TACTICS	RAF-1/MP-1	RB-3	PT-1	PT-1/MP-2	PT-1/MP-2	PT-1	ACT-1	
001.1	DEFENSIVE TACTICS STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
002	QUARTERMASTER STORAGE W/ WS	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
003	CRIME PREVENTION STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
004	ELECTRICAL ROOM	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
005	MOBILE FIELD FORCE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
006	GENERAL STORAGE (STAFF SUPPORT)	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
007	RR	PTF-2	PTB-2	PTW-1 / PT-1	PT-1	PTW-1 / PT-1	PT-1	GYP/PT-9	REFER TO AB ID-202 FOR TILE LAYOUT
800	IT	ESD-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
009	STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
010	SWAT LOCKERS	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
011	UAS-DRONES WORKROOM	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
012	DECON/TOILET/ SHOWER	PTF-2	PTB-2	PTW-1 / PT-1	PTW-1 / PT-1	PTW-1 / PT-1	PT-1	GYP/PT-9	REFER TO AB ID-202 FOR TILE LAYOUT
013	SPECIAL TEAMS READY ROOM	CPT-3	RB-1	PT-1	PT-1	PT-1	PT-5	ACT-1	
014	AMMO STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
015	ROBOT STORAGE	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
016	MECHANICAL ROOM	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	EXP/PM-2	
		SC-1			<b>-</b>	- Y Y Y			REFER TO AB ID-201 FOR PREFABRICATED ARCHITECTURAL
Jer 1	<u>Manna</u>				$\square$	$\square$		pr 1	MATERIALS
018	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1/PT-5	PT-1	ACT-1/PT-6	
018A	ENTRY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1/PT-6	
018B	CORRIDOR	SC-1	RB-2	PT-1	PT-1	PT-1	PT-1	ACT-1	
018E	ENTRY	CPT-1	RB-1	PT-1	PT-1	PT-1	PT-1	ACT-1	

NOTE: REFER TO SHEET AB ID-400, AB ID-401 AND AB ID-402 FOR FINISH LEGEND.







# SYMBOL USED FOR CALLOUT

- 1. INSTALL POWER CORD DROP FOR VEHICLE CHARGING. SEE DETAIL ON DRAWING ABE-201. VERIFY FINAL LOCATION WITH OWNER AND ACTUAL VEHICLE POWER CONNECTION LOCATION.
- 2. MOUNT RECEPTACLE AT 66" A.F.F. FOR TV. VERIFY MOUNTING HEIGHT AND LOCATION PRIOR TO ROUGH-IN.
- 3. INSTALL GROUND FAULT INTERRUPTING CIRCUIT BREAKER IN ELECTRICAL PANEL.
- 4. MULTI-SERVICE FLOOR BOX. WITH DEVICE PLATES, CARPET FLANGE WITH INSERT AND ALL REQUIRED DEVICES FOR A COMPLETE INSTALLATION. RE:SPECIAL SYSTEMS PLANS.

50	
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IDAHO FALLS POLICE HEADQUARTERS - AUXILIARY BUILDING	
Enter address here	
Project No. <b>1047-20A</b>	
Revisions: 1 22-03-11 ADDENDUM 2	
BID ISSUE	
Issue Date: <b>2022.02.10</b>	
Drawn by: SKB Checked by: MNB	
Project North:	

AUXILIARY **BUILDING - POWER** PLAN

**AB E-102** 

Branch Panel: AL1

Location: ELECTRICAL ROOM 004 Supply From: HSB - MAIN BUILDING Mounting: SURFACE Enclosure: NEMA 1

скт	Circuit Description	Ckt Note s	Trip	Poles		4		3		C	Poles	Trip	Ckt Note s	Circuit Description	скт
	ANEL ALA		100 A	3	7604 VA	6240 VA					3	100 A		PANEL ALB	2
3							7484 VA	6060 VA							4
5									5100 VA	4700 VA					6
7 F-	1A		15 A	1	1308 VA	876 VA					1	15 A		UNIT HEATER UH-1A	8
9 F-	2A		20 A	1			816 VA	876 VA			1	15 A		UNIT HEATER UH-2A	10
11 F-	3A		20 A	1					816 VA	876 VA	1	15 A		UNIT HEATER UH-3A	12
13 F-	4A		20 A	1	816 VA	876 VA					1	15 A		UNIT HEATER UH-4A	14
15 F-	5A		20 A	1			816 VA	1920 VA			1	20 A		IWH-1	16
17 E	F3A, EF4A		15 A	1					254 VA	826 VA	1	20 A		CP-3	18
19 SI	PARE		20 A	1	0 VA	1740 VA					1	20 A		RECEPTS - MECHANICAL ROOM	20
21 H	P-1A		30 A	2			2122 VA	2777 VA			2	40 A		CU-1A	22
23									2122 VA	2777 VA					24
25 C	J-2A		20 A	2	1560 VA	1290 VA					2	20 A		CU-3A	26
27							1560 VA	1290 VA							28
29 C	J-4A		20 A	2					1290 VA	1778 VA	2	25 A		CU-5A	30
31					1290 VA	1778 VA									32
33 R	ECEPTS - AUTOMATIC BLINDS		20 A	1			1260 VA	0 VA			1	20 A		SPARE	34
35 SI	PARE		20 A	1					0 VA	0 VA	1	20 A		SPARE	36
37 SI	PARE		20 A	1	0 VA	0 VA					1	20 A		SPARE	38
39 SI	PARE		20 A	1			0 VA	0 VA			1	20 A		SPARE	40
41 SI	PARE		20 A	1					0 VA	0 VA	1	20 A		SPARE	42
43 SI	PARE		20 A	1	0 VA	0 VA					1	20 A		SPARE	44
45 SI	PARE		20 A	1			0 VA	0 VA			1	20 A		SPARE	46
47 SI	PARE		20 A	1					0 VA	0 VA	1	20 A		SPARE	48
49 SI	PARE		20 A	1	0 VA	0 VA					1	20 A		SPARE	50
51 SI	PARE		20 A	1			0 VA	0 VA			1	20 A		SPARE	52
53 SI	PARE		20 A	1					0 VA	0 VA	1	20 A		SPARE	54
55 L	G - WARM VEHICLE 17 WEST		20 A	1	600 VA	0 VA					1	20 A		SPARE	56
57 L	G - WARM VEHICLE 17 EAST		20 A	1			600 VA	0 VA			1	20 A		SPARE	58
59 L	G - WARM VEHICLE 17 E. CENT		20 A	1					300 VA	0 VA	1	20 A		SPARE	60
61 L	G - EXTERIOR		20 A	1	910 VA	0 VA					1	20 A		SPARE	62
63 SI	PARE		20 A	1			0 VA	0 VA			1	20 A		SPARE	64
65 L	G - RMS 1,1.1,10,11,13,14		20 A	1					1515 VA	0 VA	1~	20 A	$\sim$	SPARE	66
67 L	G - RMS 2-9,12,15,16		20 A	1	1212 VA					ς	3			SURGE PROTECTION DEVICE	68
69 L	G - CORRS		20 A	1			360 VA					-			70
71 FI	RE ALARM CONTROL PANEL		20 A	1					180 VA	(					72
			Total	Load:	2810	0 VA	2794	0 VA	2253	3 VA	Ī	īn	ىرىر	mmm	J

# **GENERAL NOTES:**

- A. CONDUIT, CONDUCTORS AND AIC CALCULATIONS FOR ALL SERVICE, PANEL AND EQUIPMENT FEEDERS INDICATED ON THE ONE-LINE HAVE BEEN SIZED BASED ON COPPER. THE CONTRACTOR MAY USE COMPRESSED ALUMINUM CONDUCTORS FOR THESE FEEDERS PROVIDING THE CONDUIT, CONDUCTOR SIZES AND AIC CALCULATIONS ARE ADJUSTED AS REQUIRED TO MEET ALL NATIONAL ELECTRICAL CODE REQUIREMENTS.
- B. FURNISH AND INSTALL ENGRAVED LABEL ON THE FRONT OF THE MAIN SERVICE EQUIPMENT NOTING THE AVAILABLE FAULT CURRENT VALUE SHOWN.

MSB, 480Y/277, 3000A 3Ø, 4W, 30K AIC (PART OF HEADQUARTERS WORK SCOPE)

5 <u>200A</u> / 3P ------1-4" 3#3/0, 1; 1-4" SPARE 24" BELOW ( 200A DISCONNECT SWITCH 480V 3Ø 4W 150 KVA TRANSFORMER 480 DELTA - 208/120V WYE ₹ 3Ø4W ulu  $\underline{\underline{A}}$ #4 TO \_\_\_\_\_\_ BUILDING STEEL AUXILIARY BUILDING PANEL 'AL1' N 11,612

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AUXILIARY

BUILDING BUILDING

10,612 10,612

PANEL 'ALA' PANEL 'ALB'

RE:AB E-20 ----



Volts: 120/208 Wye Phases: 3 Wires: 4

A.I.C. Rating: 22kA Mains Type: MCB Mains Rating: 400 A

# Branch Panel: ALA

Location: ELECTRICAL ROOM 004 Supply From: AL1 Mounting: FLUSH Enclosure: NEMA 1

1. PROVIDE AND INSTALL GROUND FAULT INTERRUPTER BREAKER.

		Ckt Note											Ckt Note		
СКТ	Circuit Description	S	Trip	Poles		4	I	3	(		Poles	Trip	S	Circuit Description	СКТ
1	RECEPTS - DEFENCE 1 WALLS		20 A	1	900 VA	720 VA					1	20 A		RECEPTS - STORAGE 3,5,6, ELEC	. 2
3	RECEPTS - DEFENCE 1 TV WALL		20 A	1			1540 VA	360 VA			1	20 A	1	<b>RECEPTS - DRINKING FOUNTAIN</b>	4
5	RECEPTS - Q.M. 2 DESK		20 A	1					680 VA	720 VA	1	20 A		RECEPTS - ENTRY, STOR. 9, RR 7	6
7	RECEPTS - Q.M. 2 STORAGE		20 A	1	900 VA	720 VA					1	20 A		RECEPTS - SWAT LOCKERS 10	8
9	RECEPT - WORKROOM 11 SHELF		20 A	1			360 VA	1260 VA			1	20 A		JBOX - SWAT LOCKERS 10	10
11	RECEPT - WORKROOM 11 SHELF		20 A	1					360 VA	1260 VA	1	20 A		JBOX - SWAT LOCKERS 10	12
13	RECEPT - WORKROOM 11 SHELF		20 A	1	360 VA	1260 VA					1	20 A		JBOX - SWAT LOCKERS 10	14
15	RECEPTS - WORKROOM 11		20 A	1			900 VA	180 VA			1	20 A		RECEPT - RR 7	16
17	RECEPT - STOR 6 WASHER	1	20 A	1					500 VA	180 VA	1	20 A		RECEPT - DECON 12	18
19	RECEPT - STOR 6 DRYER	1	50 A	2	1664 VA	900 VA					1	20 A		RECEPTS - READY ROOM 13	20
21							1664 VA	540 VA			1	20 A		RECEPTS - READY ROOM TV 13	22
23	RECEPT - IT 8 DATA RACK		20 A	1					180 VA	540 VA	1	20 A		RECEPTS - STOR. 5, 6, 15	24
25	RECEPT - IT 8 DATA RACK		20 A	1	180 VA	0 VA					1	20 A		SPARE	26
27	RECEPT - IT 8 DATA RACK		20 A	1			180 VA	500 VA			1	20 A		ACCESS CONTROL SYSTEM IT 8	28
29	RECEPT - IT 8 DATA RACK		20 A	1					180 VA	500 VA	1	20 A		DOOR HARDWARE POWER IT 8	30
			Tota	Load:	7604	4 VA	7484	4 VA	5100	) VA					
			Total	Amps:	66	βA	65	δA	43	A	_				
Lege	end:														

Volts: 120/208 Wye

Phases: 3

Wires: 4

# **Branch Panel: ALB**

Location: ELECTRICAL ROOM 004 Supply From: AL1 Mounting: FLUSH Enclosure: NEMA 1

скт	Circuit Description	Ckt Note s	Trip	Poles		4		В	C	2	Poles	Trip	Ckt Note s	Circuit Description	скт
1	RECEPTS - STORAGE 14		20 A	1	720 VA	1000 VA					1	30 A		DOOR OPERATOR - STORAGE 17 N	-
3	RECEPTS - STORAGE 15		20 A	1			720 VA	1000 VA			1	30 A		DOOR OPERATOR - STORAGE 17 N	<b>J</b> 4
5	RECEPTS - STORAGE 15		20 A	1					720 VA	1000 VA	1	30 A		DOOR OPERATOR - STORAGE 17 N	16
7	RECEPTS - STORAGE 15		20 A	1	720 VA	1000 VA					1	30 A		DOOR OPERATOR - STORAGE 17 N	18
9	RECEPTS - STORAGE 15		20 A	1			720 VA	1000 VA			1	30 A		DOOR OPERATOR - STORAGE 17 S	S 10
11	RECEPTS - MECH 16, STOR 17		20 A	1					1080 VA	1000 VA	1	30 A		DOOR OPERATOR - STORAGE 17 S	5 12
13	RECEPTS - STORAGE 17 N		20 A	1	1080 VA	1000 VA					1	30 A		DOOR OPERATOR - STORAGE 17 S	3 14
15	RECEPTS - STORAGE 17 S		20 A	1			900 VA	1000 VA			1	30 A		DOOR OPERATOR - STORAGE 17 S	5 16
17	CORD DROP - STOR. 17 N		20 A	1					180 VA	0 VA	1	20 A		SPARE	18
19	CORD DROP - STOR. 17 N		20 A	1	180 VA	180 VA					1	20 A		CORD DROP - STOR. 17 S	20
21	CORD DROP - STOR. 17 N		20 A	1			180 VA	180 VA			1	20 A		CORD DROP - STOR. 17 S	22
23	CORD DROP - STOR. 17 N		20 A	1					180 VA	180 VA	1	20 A		CORD DROP - STOR. 17 S	24
25	CORD DROP - STOR. 17 N		20 A	1	180 VA	180 VA					1	20 A		CORD DROP - STOR. 17 S	26
27	CORD DROP - STOR. 17 N		20 A	1			180 VA	180 VA			1	20 A		CORD DROP - STOR. 17 S	28
29	CORD DROP - STOR. 17 N SPARE		20 A	1					180 VA	180 VA	1	20 A		CORD DROP - STOR. 17 S SPARE	30
			Total	Load:	624	0 VA	606	0 VA	4700	) VA					
			Total A	Amps:	54	A	52	2 A	39	A					

Volts: 120/208 Wye Phases: 3 Wires: 4

A.I.C. Rating: 22kA Mains Type: MCB Mains Rating: 100 A

A.I.C. Rating: 22kA

Mains Type: MCB

Mains Rating: 100 A

