

27 March 2020

ADDENDUM #2



PROJECT: Kelly Middle School Improvements & North Eugene High School Improvements

PROJECT NUMBERS: District CIP# 461.524.003

The following deletions and additions are
hereby made a part of Bidding and Contract Documents, effective this date.

PROJECT MANUAL

Item

1. Reference Document 00 01 10, Project Manual Table of Contents, Kelly Middle School Improvements Technical Specifications:

Add: Division 27 – Communications
 27 05 00 Common Work Results for Communications
 27 05 28 Pathways for Communications Systems
 27 15 00 Communications Horizontal Cabling

Add: Structural Calculations for Kelly Middle School.

2. Reference Document 00 01 10, Project Manual Table of Contents, North Eugene High School Improvements Technical Specifications:

Add: Division 27 – Communications
 27 05 00 Common Work Results for Communications
 27 05 28 Pathways for Communications Systems
 27 15 00 Communications Horizontal Cabling

Add: Structural Calculations for North Eugene School.

3. Reference Document 00 01 10, Project Manual Table of Contents, North Eugene High School Improvement Drawings:

Add: Sheet C1.2, Civil Specifications.

4. Reference Document 01 11 00, Summary of Work, 1.6 Work Under Separate Contracts, A, 5.:

Delete: 5. Low voltage cabling and terminations.

5. Reference Document 01 11 00, Summary of Work, 1.8 Owner-Furnished Products, 2.:
Add: Including coathooks mounted to 1x4 wood millwork.

KELLY MIDDLE SCHOOL IMPROVEMENTS

6. Reference Section 27 05 00, Common Work Results for Communications:
Add: 27 05 00, Common Work Results for Communications, attached.
7. Reference Section 27 05 28, Pathways for Communications Systems:
Add: 27 05 28, Pathways for Communications Systems, attached.
8. Reference Section 27 15 00, Communications Horizontal Cabling:
Add: 27 15 00, Communications Horizontal Cabling, attached.
9. Reference Structural Calculations:
Add: Structural Calculations for Kelly Middle School, attached.

NORTH EUGENE HIGH SCHOOL IMPROVEMENTS

10. Reference Section 27 05 00, Common Work Results for Communications:
Add: 27 05 00, Common Work Results for Communications, attached.
11. Reference Section 27 05 28, Pathways for Communications Systems:
Add: 27 05 28, Pathways for Communications Systems, attached.
12. Reference Section 27 15 00, Communications Horizontal Cabling:
Add: 27 15 00, Communications Horizontal Cabling, attached.
13. Reference Structural Calculations:
Add: Structural Calculations for Kelly Middle School, attached.

DRAWINGS

Item

KELLY MIDDLE SCHOOL IMPROVEMENTS

1. Reference Drawing KMS C1.1 CIVIL SPECIFICATIONS:

- Delete: Sheet C1.1 in entirety.
Add: Sheet C1.1 in entirety, with Revision 2, attached.
2. Reference Drawing KMS A212 PARTIAL FLOOR PLAN:
Delete: Sheet A212 in entirety.
Add: Sheet A212 in entirety, with Revision 2, attached.
3. Reference Drawing KMS A700 DOOR SCHEDULE, Finish Schedule, Room No. 5, Notes:
Add: PATCH FLOORING TO MATCH (E) AS REQ'D BY DEMOLITION
4. Reference Drawing KMS A800 DETAILS, DETAIL A, TYPICAL WALL TYPE, UON
Delete: NOTE: 20 GAUGE SM STUDS ACCEPTABLE IN LIEU OF WOOD FRAMING,
PROVIDE HEAVIER GAUGE IF REQ'D FOR SPAN & DEFLECTION
TOLERANCES
Add: AT (N) NON LOAD-BEARING INTERIOR WALLS, 20 GAUGE SM STUDS
ACCEPTABLE IN LIEU OF WOOD FRAMING W/ DEFLECTION TRACK @
TOP/WALL & .12X2 NOM DRIVE PINS 24" OC MAX @ BTM TRACK –
MATCH WD STUD DEPTH, PROVIDE HEAVIER GAUGE IF REQ'D FOR SPAN
& DEFLECTION TOLERANCES
5. Reference Drawing KMS E0.01 SYMBOLS, LEGENDS AND ABBREVIATIONS – ELECTRICAL:
Delete: Sheet E0.01 in entirety.
Add: Sheet E0.01 in entirety, with Revision 2, attached.
6. Reference Drawing KMS ED.1 PARTIAL DEMOLITION PLANS – ELECTRICAL:
Delete: Sheet ED.1 in entirety.
Add: Sheet ED.1 in entirety, with Revision 2, attached.
7. Reference Drawing KMS E1.0 OVERALL ELECTRICAL PLAN:
Add: Sheet E1.0 in entirety, with Revision 2, attached.
8. Reference Drawing KMS E1.1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN – A:
Delete: Sheet E1.1 in entirety.
Add: Sheet E1.1 in entirety, with Revision 2, attached.
9. Reference Drawing KMS E1.2 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN – B:
Delete: Sheet E1.2 in entirety.
Add: Sheet E1.2 in entirety, with Revision 2, attached.
10. Reference Drawing KMS E1.3 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN – C:
Delete: Sheet E1.3 in entirety.

Add: Sheet E1.3 in entirety, with Revision 2, attached.

11. Reference Drawing KMS E1.4 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN – D:

Delete: Sheet E1.4 in entirety.

Add: Sheet E1.4 in entirety, with Revision 2, attached.

12. Reference Drawing KMS E1.5 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN – F:

Delete: Sheet E1.5 in entirety.

Add: Sheet E1.5 in entirety, with Revision 2, attached.

NORTH EUGENE HIGH SCHOOL IMPROVEMENTS

13. Reference Drawing NEHS G100 General Information Wall Type A:

Delete: 5/8" TYPE 'X' GYP BD

Add: 5/8" GYPE 'X' GYP BD

- PROVIDE WR GYP BD @ WET LOCATIONS

- PROVIDE IMPACT RESISTANT GYP BD BELOW 48" @ COMMON HALLWAY LOCATIONS

Add: ACOUSTICAL SEALANT @ BASE/GYP BD

14. Reference Drawing NEHS G100 General Information Wall Type A2:

Add: - SIMPSON HTC TRUSS CLIPS EA. INTERSECTION W/ (E) TRUSS

15. Reference Drawing NEHS G100 General Information Wall Type A3:

Add: - HTC TRUSS CLIPS EA. INTERSECTION W/ (E) TRUSS

- VAPOR BARRIER @ CLASSROOM SIDE

16. Reference Drawing NEHS G100 General Information Wall Type B:

Delete: PT 2x6 WD STUDS & PLATES WHERE IN CONTACT W/ (E) CONCRETE

Add: PT WD STUDS & PLATES 24" OC MAX, CLIP STUDS TO (E) CMU WALL @ SPAN MID PT W/ SIMPSON A CLIP ANGLE

17. Reference Drawing NEHS G100 General Information Wall Type A, B, C, D:

Delete: NOTE: 20 GAUGE SM STUDS ACCEPTABLE IN LIEU OF WOOD FRAMING, PROVIDE HEAVIER GAUGE IF REQ'D FOR SPAN & DEFLECTION TOLERANCES

Add: AT (N) NON LOAD-BEARING INTERIOR WALLS, 20 GAUGE SM STUDS ACCEPTABLE IN LIEU OF WOOD FRAMING W/ DEFLECTION TRACK @ TOP/WALL & .12X2 NOM DRIVE PINS 24" OC MAX @ BTM TRACK – MATCH WD STUD DEPTH, PROVIDE HEAVIER GAUGE IF REQ'D FOR SPAN & DEFLECTION TOLERANCES

18. Reference Drawing NEHS C1.2, CIVIL SPECIFICATIONS:
Add: Sheet C1.2 in entirety, with Revision 2, attached.

19. Reference Drawing NEHS C3.0, Drawing 7 MOW BAND & WOODCHIP CONTAINMENT EDGE:
Delete: 14" TO SOFTPLAY
Add: 14" TO LAWN

20. Reference Drawing NEHS A100 SITE PLAN KEYNOTES:
Delete: Sheet A100 in entirety.
Add: Sheet A100 in entirety, with Revision 2, attached.

21. Reference Drawing NEHS A112 PARTIAL DEMOLITION:
Delete: Sheet A112 in entirety.
Add: Sheet A112 in entirety, with Revision 2, attached.

22. Reference Drawing NEHS A220 PARTIAL REFLECTED CEILING:
Delete: Sheet A220 in entirety.
Add: Sheet A220 in entirety, with Revision 2, attached.

23. Reference Drawing NEHS A700 DOOR & FINISH SCHEDULE, Finish Schedule, Room No. 315B, Floor Material:
Delete: CONC
Add: CPT-1

24. Reference Drawing NEHS E0.01 SYMBOLS, LEGENDS AND ABBREVIATIONS – ELECTRICAL:
Delete: Sheet E0.01 in entirety.
Add: Sheet E0.01 in entirety, with Revision 2, attached.

25. Reference Drawing NEHS ED.1 PARTIAL DEMOLITION PLANS:
Delete: Sheet ED.1 in entirety.
Add: Sheet ED.1 in entirety, with Revision 2, attached.

26. Reference Drawing NEHS ED.2 PARTIAL DEMOLITION PLANS:
Delete: Sheet ED.2 in entirety.
Add: Sheet ED.2 in entirety, with Revision 2, attached.

27. Reference Drawing NEHS E1.0 OVERALL ELECTRICAL PLAN:
Delete: Sheet E1.0 in entirety.
Add: Sheet E1.0 in entirety, with Revision 2, attached.

28. Reference Drawing NEHS E1.1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN:
Delete: Sheet E1.1 in entirety.

Add: Sheet E1.1 in entirety, with Revision 2, attached.

29. Reference Drawing NEHS E1.2 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN:

Delete: Sheet E1.2 in entirety.

Add: Sheet E1.2 in entirety, with Revision 2, attached.

CLARIFICATIONS

Item

1. Sheet metal framing is acceptable in lieu of wood framing at non load bearing walls.
2. Provide headers at new openings less than six feet wide. Nominal 4X8 DF #2/better at wood walls with single trimmer each side of opening. 20 gauge 6" sheet metal box header with double stud each side of opening at non load bearing sheet metal framing. Consult with Architect for openings larger than six feet in width.
3. New or relocate markerboards will be furnished by Owner for Contractor to install at locations noted in Drawings.
4. New or relocate smartboards and projectors will be installed by others and are noted in Drawings for reference only.
5. Low voltage communications cabling and terminations have been added as outlined in Division 27 Specifications and shown in revised Drawings.

PRODUCT APPROVALS

Add the following to the list of acceptable manufacturers and products as noted:

1. Reference section 09 22 26 Suspension Systems, 2.1 Manufacturers
 - a. Rockfon Chicago Metallic Drywall Grid.
2. Reference Drawing E0.02 Luminaire Schedule (Both Schools)
 - a. Type L1, Ledalite, 7406LAEQN047DE
 - b. Type L2, Legion, 4308L-2-1-LL1-ACW-UNV-DL
 - c. Type L3, Liton, LRALD8SSF101-T40
 - d. Type L4, Day-Brite, OWL440L840-UNV-DIM
 - e. Type L5, Day-Brite, 2FXP38L840-4-DS-UNV-DIM

Attachments:

1. *KMS Specification Sections 27 05 00, 27 05 28, 27 15 00, Structural Calculations*
2. *NEHS Specification Sections 27 05 00, 27 05 28, 27 15 00, Structural Calculations*
3. *Revised Drawings KMS C1.1, A212, E0.01, ED.1, E1.0, E1.1, E1.2, E1.3, E1.4, E1.5*
4. *Revised Drawings NEHS C1.2, A100, A112, A220, E0.01, ED.1, ED.2, E1.0, E1.1, E1.2*

END OF ADDENDUM TWO

SECTION 27 05 00
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Work included in Section 27 05 00 applies to Division 27, Communications work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of communications systems for proposed project:
- B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

1.2 RELATED SECTIONS

- A. Division 01, General Requirements
- B. Division 27, Communications
- C. [Section 26 05 33, Raceways and Boxes for Electrical Systems]

1.3 REFERENCES

- A. References, Codes and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 27 Sections and those listed in this section.
- B. Supervisors and Lead Installers:
 - 1. Working knowledge and understanding of the following documents and codes or their most recent updates and familiar with the requirements that pertain to this installation.
 - 2. Installers familiar with and have practical working knowledge of the requirements that pertain to this installation.
- C. Codes:
 - 1. Comply with applicable sections of the most recent editions and addenda of following for interior and exterior installations.
 - 2. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
 - a. IBC International Building Code
 - b. NEC/NFPA 70 National Electrical Code
 - c. NEXC IEEE National Electrical Safety Code
 - 3. State of Oregon:
 - a. OAR Oregon Administrative Rules
 - b. OESC Oregon Electrical Specialty Code]
 - c. OFC Oregon Fire Code
 - d. OSSC Oregon Structural Specialty Code
 - e. OEESC Oregon Energy Efficiency Specialty Code]

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

- f. Standards:
4. Comply with applicable sections of the most recent editions and addenda of the following for installations and testing of communications cabling, connectors, and related hardware.
 5. Reference standards and guidelines include but are not limited to the latest adopted editions from the following:
 - a. ANSI American National Standards Institute
 - b. NEMA National Electrical Manufacturers Association
 - c. TIA Telecommunications Industries Association
 - 1) TIA TSB-125 Guidelines for Maintaining Optical Fiber Polarity Through Reverse-Pair Positioning
 - 2) TIA TSB-140 Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems
 - 3) TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7
 - 4) T-526-14-A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – SFSTP-14
 - 5) ANSI/TIA-568.0-D Generic Telecommunications Cabling for Customer Premises
 - 6) ANSI/TIA-568.1-D Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 - 7) ANSI/TIA-568-C.2 Commercial Building Telecommunications Cabling Standard—Part 2: Balanced Twisted Pair Cabling Components
 - 8) ANSI/TIA-568-3-D Optical Fiber Cabling Components Standard
 - 9) ANSI/TIA-569-C Commercial Building Standards for Telecommunications Pathways and Spaces
 - 10) ANSI/TIA-598-C Optical Fiber Cable Color Coding
 - 11) ANSI/TIA-604.2-A FOCIS 2—Fiber Optic Connector Intermateability Standard
 - 12) ANSI/TIA-606 Administration Standard for Commercial Telecommunications Infrastructures
 - 13) ANSI/TIA/607-C Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
 - 14) ANSI/TIA-758-A Customer-owned Outside Plant Telecommunications Infrastructure Standard
 - 15) ANSI/TIA-854 A Full Duplex Ethernet Specification for 1000 Mb/s (1000BASE-TX) Operating over Category 6 Balanced Twisted-Pair Cabling
 - 16) ANSI/TIA-862-B Structured Cabling Infrastructure Standard for Intelligent Building Systems
 - 17) ANSI/TIA-4994 Standard for Sustainable Information Communications Technology
 - 18) ANSI/NECA/BICSI 568-2006 Standard for Installing Telecommunications Systems
 - d. Other Reference Materials
 - 1) ANSI/NECA/GICSI-568-2006, Standard, Installing Commercial Building Telecommunications Cabling
 - 2) COOSP BICSI - Outside Plant Design Reference Manual
 - 3) ESSDRM BICSI - Electronic Safety and Security Reference Manual
 - 4) ITSIM BICSI - Information Transport Systems Installation Methods Manual
 - 5) NDRM BICSI - Network Design Reference Manual
 - 6) TDDM BICSI - Telecommunications Distribution Methods Manual
 - 7) WDRM BICSI - Wireless Design Reference Manual
 - 8) IEEE Institute of Electrical and Electronic Engineers
 - 9) NEMA National Electrical Manufacturers Association
 - 10) UL Underwriters Laboratories Cable Certification and Follow Up Program
 - 11) ASA American Standards Association

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with contract documents and governing codes and standards.
- B. Personnel performing the work of this Section shall be thoroughly familiar with the cabling methods set forth in the latest release of the TDMM.
- C. RCDD reviews required work prior to commencing. RCDD will oversee the installation and will have the end responsibility for the quality of the installation work performed. Submitted designs and or changes to the design must be approved and signed off by the RCDD.
- D. Installed cabling systems not to generate nor be susceptible to harmful electromagnetic emission, radiation, or induction that degrades cabling systems.
- E. Backward Compatibility: The provided solution backward compatible with lower category ratings such that if higher category components are used with lower category components, the permanent link and channel measures meet or exceed the lower channel's specified parameters.
- F. Component Compliance: The provided solution's components each meet the minimum transmission specifications listed herein such that no individual component will be less than specifications for permanent and channel, regardless of the fact that tests for permanent and channel ultimately meet required specifications.
- G. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.

1.5 CONTRACTOR RESPONSIBILITY AND QUALIFICATIONS

- A. Provide components, materials, services, and labor essential for a complete and functional structured cabling system.
- B. Comply with local, state, and federal laws and regulations applicable to the work to be performed although said law, rule, or regulation is not identified herein.
- C. Examination of building and site responsibility:
 - 1. Examine site and building prior to installation to determine conditions affecting the scope of work.
 - 2. Contact Owner representative for arrangements.
 - 3. Systems and cabling are assumed working and in good condition unless Contractor documents exceptions.
- D. Respect and protect the privacy and confidentiality of Owner, its employees, processes, products, and intellectual property to the extent necessary, consistent with the legal responsibilities of the State of Oregon and Owner policies.
- E. Use of Sub-Contractors:
 - 1. Inform in writing to Owner's representative and General Contractor about the intention to use sub-contractors and the scope of work for which they are being hired.
 - 2. Owner's representative prior to the sub-contractor's hiring and start of work must approve the use of sub-contractors in writing.
- F. Provide a sufficient number of technicians for this project to stay on schedule.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

G. Contractor Qualifications:

1. Fully conversant and capable in the cabling and equipment installation of communications systems including, but not limited to:
 - a. Data/Voice Structured Cabling
 - b. Minimum of five years' experience in the design, installation, testing, and maintenance of communications systems.
2. Must employ at least one full time BICSI certified RCDD who is involved in reviewing work performed by contractor on this project.
3. Verification of current BICSI Certified Installer, or equivalent.
4. Personnel trained in the installation of pathways and support for housing horizontal and backbone cabling.
5. Installers: Only technicians certified by approved equipment manufacturer are approved.
6. Maintain a local service facility which stocks spare devices and/or components for servicing systems.
7. Have performed successful installation and maintenance of at least three projects similar in scope and size. Provide project references for these three projects, including scope of Work, project type, Owner/user contact name and telephone number.

1.6 MANUFACTURERS

- A. Equipment in these Sections are the standard products of a manufacturer regularly engaged in the manufacture of such products unless specified otherwise. Components used in the system commercial products that comply with these Specifications.
- B. Each component of equipment identifies the manufacturer's name, model, and applicable serial number. The Owner's authorized representative retains the right to reject products that reflect, in their opinion, sub-standard design practices, manufacturing procedures, support services, or warranty policies.

1.7 CHANGE ORDERS

- A. Refer to Specification 01 25 00

1.8 WARRANTY

- A. The chosen Communications Contractor provide a minimum 1 year warranty on material, installation, and workmanship.
- B. Provide a written warranty covering the work of this Division as required by the General Conditions.
- C. Apparatus:
 1. Free of defects of material and workmanship and in accord with the Contract Documents.
 2. Built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- D. Include in Contractor's warranty for Work of Division 27, Communications system damage caused by failures of system component.

1.9 ALLOWANCES

- A. Comply with Division 01, General Requirements.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.10 ALTERNATES

- A. Comply with Division 01, General Requirements.
- B. Refer to Electrical Drawings for detailed information relating to the appropriate alternates.

1.11 GENERAL

- A. Meet or exceed applicable referenced standards, federal, state, and local requirements and conform to codes and ordinances of authorities having jurisdiction.

1.12 SUBMITTALS

A. General:

1. Guidelines set forth in this Section pertain to Division 27, Communications specifications included in this project.
2. Submit the following deliverables to the Owner and Design Team prior to ordering equipment or installation of equipment.
3. Partial submittals will not be considered, reviewed, or stored, and such submittals will not be returned.
4. Materials and equipment listed that are not in accordance with specification requirements and/or not prior approved may be rejected.
5. The approval of material, equipment, systems, and shop drawings is a general approval subject to the Drawings, Specifications, and verification of measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. Carefully check and correct shop drawings prior to submission for approval.

B. Informational Submittals:

1. Field Test Reports:
 - a. Submit sample cable test reports showing report format and parameters tested.
 - b. Submit minimum of 2 weeks prior to final punch walkthrough. Maintain test equipment on-site during punch for sample proof-of-performance tests.
2. Proposed test forms for horizontal UTP cable.
3. Certificates:
 - a. Certify that field tests have been performed and that work meets or exceeds specified requirements.
 - b. Certify that factory tests have been performed and that work meets or exceeds specified requirements. Certificates may be based on recent or previous test results, provided material or products tested are identical to those proposed for this Project.
 - c. Name(s) and copy of installer's certificates as it pertains to the system design (e.g. RCDD, CTS, NICET, etc.).

C. Equipment/Product Data Submittals:

1. Submit a single package of the related submittals for the products called out in Division 27, Communications Specifications.
2. Two indexed sets of manufacturer's technical data for each product including product description, specifications including labeling or listing by an agency acceptable to the Owner, and storage requirements.
3. Submitted digitally (e.g. in PDF) and have digital bookmarks for navigating the document set, organized as follows:

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

- a. Primary division (e.g. 27)
 - 1) Submittal section (e.g. 271500)
 - a) Product name (e.g. "PATCH PANELS")
4. For each applicable section within the Division 27, Communications, organize as follows:
 - a. Cover sheet for each applicable section number.
 - 1) Include the contractor's contact information
 - b. Table of contents with the following information per line:
 - 1) Equipment Type
 - 2) Manufacturer
 - 3) Model Number
 - 4) Page Number (with hyperlink to product data sheet's page)
 - c. Apply header to each page of each sections submittals including the following:
 - 1) Title of division 27 section the products fall under (e.g. 271500 Communications Horizontal Cabling).
 - d. Apply footer to the bottom of each submittal package including the following:
 - 1) Clearly labeled page numbers
 - 2) Date of submittal (YYYY-MM-DD)
5. Where more than one product is called out on the same sheet, clearly highlight or mark which product is proposed for use.

1.13 PRODUCT ASSURANCE

- A. UL and/or ETL approved and labeled in accordance with NEC for products where labeling service normally applies.
- B. Label materials and equipment requiring UL 94, 149, or 1863. Modification of products that nullifies UL labels is not permitted.
- C. Materials and equipment provided by standard Commercial-Off-The-Shelf (COTS) products of a manufacture engaged in the manufacture of such products.
- D. Typical commercial designs that comply with the requirements specified. Materials and equipment readily available through manufacturers and/or distributors. Supply equipment complete with optional items required for proper installation.
- E. Materials or Manufactures not listed in this Division 27, Communications but are required materials to provide a complete and functioning cable infrastructure system have cut sheets and product data included in the material and procedures submittal package.
- F. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance and backward compatibility.
- G. Test fiber cable while on the reel prior to installation of the cable. Assume liability for replacement of cable should it be found defective at this time or a later date prior to customer acceptance.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.14 COORDINATION

- A. Coordinate arrangement, mounting, and support of communications equipment with Architect, Communication Design Professional or Owner Information Technology Team:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide the most efficient pathway for structured cabling endpoint devices such that the cabling never exceeds the 295-foot permanent link distance.
 - 3. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 4. To allow right-of-way for piping and conduit installed at required slope.
 - a. Racks and Communication Cabinets: 3-foot minimum.
 - b. Open Pathways – Cable Tray, J-Hooks: 12-inch clear on working side; 3-inch clear from ceiling tiles.
 - c. Closed Pathways – Conduit (Above and Below Grade):
 - 1) 3-inch clear from electrical pathways concrete encased.
 - 2) 12-inch clear in electrical pathways in dirt.
 - 3) 48-inch clear electrical Motors and transformers.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08, Openings.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07, Thermal and Moisture Protection.
- E. Responsible for coordination with all trades, to include required scheduling of materials and/or equipment with Owner and/or General Contractor for delivery, storage, and protection of equipment as required.
- F. Finishes: Where specific device finishes have not been identified, selected by Owner or Architect, finish to match surrounding surfaces.

1.15 PRE-INSTALLATION CONFERENCE

- A. Arrange and schedule pre-installation conference prior to beginning work of this Section Division 27, Communications.
- B. Agenda: Clarify questions in writing related to work to be performed, scheduling, coordination, etc., with Consultant and/or Project Manager/Owner representative.
- C. Individuals, who will be in an on-site supervisory capacity, are required to attend the pre-installation conference. This includes project managers, site supervisor, and lead installers. Individuals who do not attend the conference will not be permitted to supervise the personnel that install, terminate, or test communications cables on the project. Oversee the installation is required to attend the pre-installation conference.
- D. The manufacturer that will be providing the extended warranty is required to have a representative attend the pre-installation conference.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.16 FIELD QUALITY CONTROL

- A. Perform the following field inspections during installation and commissioning:
 - 1. Visually inspect UTP and for NRTL certification markings.
 - 2. Visually inspect cabling placements, pathways, and terminations in communications equipment rooms, telecommunications rooms, and work areas for compliance with standards and codes.
 - 3. Visually inspect installed, cable pathways, and wall penetrations for compliance with standards and codes.
- B. Responsible for field inspections and will submit a signed weekly inspection report to Owner.

1.17 ALTERNATES, SUBSTITUTIONS, AND CHANGE ORDERS

- A. Refer to Specification 01 25 00 DELIVERY AND STORAGE
- B. Assume custody and responsibility for the items upon delivery and determining that the contents are complete and in satisfactory condition for installation.
- C. Delivery, loss, storage, and protection: Materials and equipment delivered and placed in storage stored with protection from the weather, humidity, and temperature variation, dirt, and dust or other contaminants.
- D. Coordinate deliveries and submittals with the General Contractor/Owner to ensure a timely scheduled installation.
- E. Responsible for handling and control of cabling equipment and liable for material loss due to delivery and storage problems.
- F. No equipment or materials delivered to the job site more than three weeks prior to the commencement of its installation. Coordinate with General Contractor/Owner on location of storage materials.

1.18 AS-BUILTS

- A. Refer to Specification 01 25 00

1.19 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, dust, and construction debris and repair damaged finish, including chips, scratches, and abrasions. This includes touching up paint removed for grounding.
- B. Provide a clean work environment, free from trash/rubbish accumulated during and after cabling installation.
- C. Maintain construction materials and refuse within the area of work. Clean the work area at the end of each day.
- D. Keep liquids off finished floors, carpets, tiles, racks, and equipment. If liquid damages finishes or equipment, provide professional services to clean or repair scratched/soiled finishes or damaged equipment at the Contractors own expense.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.20 PAINTING

- A. Certain Division 27, Communications Sections contain the requirement of painting, it is the responsibility of the Contractor to coordinate the requirements and labor involved to complete this work with the General Contractor.
- B. Touch up marred and bared surfaces of primed, galvanized, and finish painted equipment, materials, and accessories installed.
- C. Restore patched surfaces as close to the original condition and finish as reasonably possible. Where patching occurs in smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received two coats of primer and two coats of finished paint.

PART 2 PRODUCTS

2.1 GENERAL

- A. Where specified materials or methods conflict with applicable codes, the more stringent requirement applies.
- B. Provide apparatus built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- C. Materials and Equipment:
 - 1. Use materials and equipment that are:
 - a. New
 - b. Of quality meeting or exceeding specified standards.
 - c. Free of faults and defects.
 - d. Conforming to Contract Documents.
 - e. Of size, make, type, and quality specified.
 - f. Suitable for the installation indicated.
 - g. Manufactured in accordance with NEMA, ANSI, UL, or other applicable standards.
 - h. Otherwise as specified in Division 01, General Requirements.
 - 2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer.
 - a. Component parts of the entire system need not be products of same manufacturer.
- D. Basis of Design:
 - 1. First listed manufacturer specified by performance or model number considered the Basis of Design.
 - 2. If other equipment is provided in lieu of the Basis of Design equipment, assume responsibility for changes and costs which may be necessary to accommodate this equipment, including, but not limited to:
 - a. Different sizes and locations for connections.
 - b. Different dimensions.
 - c. Different access requirements.
 - d. Different configurations of connected equipment.
 - e. Other differences.

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PART 3 EXECUTION

3.1 INSTALLATION

A. General:

1. Full and complete compliance with standards and guidelines set forth in this and subsequent specifications.
2. Field verify existing conditions prior to installation and make note of conflicts and discrepancies between these specifications and construction drawings to the Owner immediately.
 - a. Field discrepancies not noted to the Owner or Design Team prior to installation commencement the responsibility of the Contractor and repaired at no cost to the Owner.
3. Provide a complete and properly operating system for each item of equipment specified.
4. Install materials in a neat and professional manner.
5. Comply with equipment manufacturer's written instructions, the best industry practices, and the Contract Documents.

B. Clarification:

1. Where there is a conflict among manufacturer's instruction, best practice, and the Documents, request clarification from the Architect prior to rough-in.
2. Architect's decision will be final.
3. Remove and correct work installed without clarification by the Contractor at no cost to the Owner.

C. Existing concrete, block, or brick walls are considered not accessible and may require use of Surface Mounted Raceway (SMR) if existing concealed raceway and device boxes are not available for reuse or do not meet the intent of the design. Coordinate route and installation where SMR is required with the Architect/Engineer prior to rough-in. Responsible for reinstalling SMR routed without such prior approval to the Architect's satisfaction.

D. Existing stud walls (wood or metal) with or without blocking with plaster, plasterboard, or paneling finish are considered accessible with accessible ceiling, attic, tunnel, or crawl space above, below, or adjacent. Remove, patch, and repair finished surface as required to conceal rough-in for new device locations. If it is determined that a specific instance will not permit concealment of rough-in due to obstructions such as beams, headers, and other structural elements, prior approval before rough-in from the Architect is required.

3.2 INSTALLATION IN RATED CONSTRUCTION

- A. Install intumescent material around ducts, conduits, and other telecommunications elements penetrating rated construction.
- B. Comply with firestop materials manufacturer's written instructions to prevent spread of smoke or fire through sleeves or block-outs penetrating rated fire barriers.
- C. Provide firestop materials specified in Division 07, Thermal and Moisture Protection, and as follows:
 1. Capable of passing a 3-hour test per ASTM E-814 (UL 1479).
 2. Consisting of material capable of expanding nominally eight times when exposed to temperatures of 250 degrees F – 350 degrees F.
 3. An alternate method utilizing intumescent materials in caulk or putty complying with Division 07, Thermal and Moisture Protection may be used.

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3.3 EQUIPMENT SUPPORT

- A. Minimum Support Capacity:
 - 1. Provide fastening devices and supports for equipment, panels, outlets, and cabinets capable of supporting not less than four times the ultimate weight of the object or objects fastened to or suspended from the building structure.
- B. Support junction boxes, pull boxes, or other conduit terminating housings located above the suspended ceiling from the floor above, roof, or penthouse floor structure to prevent sagging or swaying.
- C. Conduits:
 - 1. Support suspended conduits 1-inch and larger from the overhead structural system with metal ring or trapeze hangers and threaded steel rod having a safety factor of four.
 - 2. Conduits smaller than one 1-inch installed in ceiling cavities may be supported on the mechanical system supports when available space and support capacity has been coordinated with the sub-contractor installing the supports.
 - 3. Anchor conduit installed in poured concrete to the steel reinforcing with 14 AWG black iron wire.
- D. Powder actuated or similar shot-in fastening devices will not be permitted for technology work except by review from the project structural engineer.

3.4 ALIGNMENT

- A. Install panels, cabinets, and equipment level and plumb, parallel with structural building lines.
- B. Install equipment and enclosures fitted neatly, without gaps, openings, or distortion.
- C. Properly and neatly close unused openings with approved devices.
- D. Fit surface panels, devices, and outlets with neat, appropriate, trims, plates, or covers without overhanging edges, protruding corners, or raw edges.

3.5 CUTTING AND PATCHING

- A. General:
 - 1. Comply with Division 01, General Requirements.
 - 2. Restore to original condition new or existing work cut or damaged by installation, testing, and removal of work.
 - 3. Patch and finish spaces around conduits passing through floors and walls to match the adjacent construction, including painting or other finishes.
 - 4. Clean up and remove dirt and debris.
- B. Make additional required openings by drilling or cutting. Use of jackhammer is prohibited.
- C. Fill holes that are cut oversize so that a tight fit is obtained around the objects passing through.
 - 1. In rated construction, comply with Division 07, Thermal and Moisture Protection.
- D. Obtain Architect's permission and direction prior to piercing beams or columns.

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- E. Where alterations disturb lawns, paving, walks, and other permanent site improvements, repair and refinish surfaces to condition existing prior to commencement of work.
- 3.6 PROTECTION OF WORK
- A. Protect telecommunication work and equipment installed under this Division against damage by other trades, weather conditions, or other causes.
 - 1. Equipment found damaged or in other than new condition will be rejected as defective.
 - B. Keep equipment, panels, outlets, and related telecommunication equipment covered or closed to exclude dust, dirt, and splashes of plaster, cement, paint, or other construction material spray.
 - 1. Equipment not free of contamination is not acceptable.
 - C. Provide enclosures and trims in new condition, free of rust, scratches, and other finish defects.
 - 1. If damaged, properly refinish in a manner acceptable to the Architect.
- 3.7 COMPLETION AND TESTING
- A. General:
 - 1. Comply with Division 01, General Requirements.
 - B. Upon completion, test systems to show that installed equipment operates as designed and specified, free of faults.
 - 1. Schedule system tests so that several occur on the same day.
 - 2. Coordinate testing schedule with construction phasing.
 - 3. Submit systems test reports for Design Team review and feedback.
 - 4. Schedule proof-of-performance testing with Design Team representative and/or Owner's representative.
 - C. A qualified contractor with required tools to conduct cable and equipment tests. Arrange to have the equipment factory representative present for those tests where the manufacturer's warranty could be impacted by the absence of a factory representative.
 - D. Perform tests per the requirements of each of the following systems:
 - 1. Horizontal data/voice structured cabling system.
 - 2. Provide a written record of final performance tests after final proof-of-performance review and acceptance, and submit with operation and maintenance data.

END OF SECTION

SECTION 27 05 28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Conduit and other Closed Pathway System
 - 2. Device Backboxes
 - 3. Cable Straps

- B. Work covered by this Section consists of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified for a complete pathways system for the communications systems.

1.2 RELATED SECTIONS

- A. Division 01, General Requirements

- B. Division 27, Communications

- C. [Section 26 05 33, Raceways and Boxes for Electrical Systems]

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

- E. Provisions of Division 27, Communications Section 27 05 00, Common Work Results for Communications, apply to this Section.

1.3 REFERENCES

- A. References, Codes and Standards as required by Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.

- B. In addition, meet the following:
 - 1. Underwriters Laboratories, Inc.:
 - a. UL 1-03 Flexible Metal Conduit
 - b. UL 5-01 Surface Metal Raceway and Fittings
 - c. UL 6-03 Rigid Metal Conduit
 - d. UL 50-03 Enclosures for Electrical Equipment
 - e. UL 360-03 Liquid-Tight Flexible Steel Conduit
 - f. UL 467-01 Grounding and Bonding Equipment
 - g. UL 514A-01 Metallic Outlet Boxes
 - h. UL 514B-02 Fittings for Cable and Conduit
 - i. UL 514C-05 Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
 - j. UL 797-03 Electrical Metallic Tubing
 - k. UL 1242-00 Intermediate Metal Conduit

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

2. National Electrical Manufacturers Association:
 - a. NEMA FB1-03 Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable

1.4 QUALITY ASSURANCE

- A. Conform to the quality assurance requirements of Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.3
- B. Low voltage system cable supports and accessories listed to Underwriter's Laboratories or other national recognized testing laboratory.
- C. Low voltage system cable supports and accessories have the manufacturers name and part number stamped on the part for identification.
- D. Pre-Installation Meetings:
 1. Setup a pre-installation meeting to discuss low voltage cable support layout work and installation guidelines.
 2. Organize meeting a minimum of 30 days prior to initiating cable support installation work.
 3. Attendees include Contractor, appropriate subcontractors, low voltage system vendors, Architect, and Owner's Representative.
- E. Purpose of meeting is to coordinate work between the parties to have a consistent layout for low voltage system cables, minimize interferences, and to make cable system accessibility for future owner modifications and maintenance high priority issue for installers.

1.5 SUBMITTALS

- A. Including, but not limited to: Product Data Sheets, etc.
- B. General:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- C. Closeout Submittals:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- D. Additional requirements specific to this Section:
 1. Firestop design basis documentation that includes each type of communication penetration, type of building construction being penetrated including the hourly resistance rating of floor, wall, or other partition of building construction into which firestop design will be installed, and firestop device or system proposed for use.

1.6 COORDINATION

- A. Responsible for coordinating the arrangement, mounting and support for communications support equipment.

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- B. Coordinate layout and installation of low voltage cable bundle supports with other construction elements to ensure adequate headroom, working clearance and access. Revise locations and elevations for those indicated as required to suit field conditions and as approved by Owner's Representative.
- C. Examine drawings and existing conditions above ceilings and include additional supports in bid price to avoid ducts, pipes, conduits, etc. Installation in existing ceilings can be very difficult. Include extra labor time involved in bid price.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Conduit and Other Closed Pathways Systems:
 - 1. Conduit:
 - a. Allied
 - b. Prime
 - c. Wheatland
 - d. Or approved equal.
 - 2. Conduit Supports:
 - a. Allied
 - b. Prime
 - c. Wheatland
 - d. Or approved equal.
- B. Device Backboxes:
 - 1. Raco
 - 2. Steel City
 - 3. Bowers
 - 4. Or approved equal.
- C. Cable Straps:
 - 1. Panduit
 - 2. Velcro
 - 3. Or approved equal.

2.2 CONDUIT AND OTHER CLOSED PATHWAY SYSTEMS

- A. Conduit Size: In accordance with the NEC, but not less than 1-inch unless otherwise shown in the Contract Drawings.
- B. Install in accordance with the construction documents, national codes, and applicable publications designated herein.
- C. Conduit:
 - 1. Following construction types:
 - 2. Electrical Metallic Tubing
 - 3. Rigid Galvanized Steel
 - 4. Flexible Non-Metallic Conduit.
 - 5. Install as recommended by the raceway manufacturer and construction documents.

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6. Flexible Metallic Conduit is not permitted in this project for interior installation.
- D. Conduit Supports:
1. Individual Conduit Hangers: Designed for the purpose, having a preassembled closure bolt and nut, and provisions for receiving a hanger rod.
 2. Install conduit supports at a maximum of 5-foot centers.
- 2.3 DEVICE BACKBOXES
- A. Flush mounted, sheet steel construction with conduit knockout.
- B. UL514A Listed
- C. Unless otherwise noted, provide:
1. 4-11/16-inch square, 2-1/8-inch deep backbox standard for Communications and Audio-Video devices.
 2. 4-inch square, 2-1/8-inch deep backbox standard for Electronic Security devices.
 3. Code minimum rated for the installed application.
- D. Gang mud rings sizes as required for the applicable device.
- 2.4 CABLE STRAPS
- A. Use within telecommunications rooms and open cable pathways (cable tray). Provide for strapping groups of cables to raceway and for controlling/managing patch cables.
- B. The use of plastic tie wraps for this purpose is not acceptable.
1. Self-gripping, reusable, constructed of Velcro, and hook-and-loop style.
 2. Plenum rated cable straps to be used in plenum air handling spaces.
- C. Quantity:
1. Provide in sufficient quantity to strap cable bundles at intervals specific to the type of cable bundle. For the purposes of determining the quantity of straps to provide, the number of cables in a cable bundle and the intervals at which straps applied are as follows:
 - a. Bundle size (use to determine strap quantity):
 - 1) For Patch Cables: Maximum of 25 patch cables per cable bundle with straps applied at 1-foot intervals.
 - 2) For horizontal cabling: Maximum of 25 station cables per cable bundle with straps applied at 3-foot intervals.
 - 3) For Backbone Cables: Maximum of 4 backbone cables per cable bundle with straps applied at 3-foot intervals.
- D. Bundling (use to determine strap quantity):
1. Bundle cables by application (patch, horizontal, backbone) and by cable type (Category X, MM Fiber, SM Fiber, etc.).
 2. Do not intermix cable applications and types within a bundle.
- E. Color: Black

PART 3 EXECUTION

3.1 CONDUIT INSTALLATION

A. Penetrations: Cutting or Holes:

1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the structural engineer prior to drilling through structural sections.
2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Owner's Information Technology as required by limited working space.

B. Fire Stop:

1. Where conduits, wire ways, and other communications raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke, and gases as specified in Division 07, Thermal and Moisture Protection, with rock wool fiber or silicone foam sealant only.
2. Completely fill and seal clearances between raceways and openings with the fire stop material.

C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Division 07, Thermal and Moisture Protection.

3.2 INSTALLATION, GENERAL

A. Install conduit as follows:

1. In complete runs before pulling in cables or wires.
2. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new undamaged material.
3. Assure conduit installation does not encroach into the ceiling height headroom, walkways, or doorways.
4. Cut square with a hacksaw, ream, remove burrs, and draw up tight.
5. Mechanically continuous.
6. Independently support conduit at 5-feet on center. No other supports allowed.
7. Support within 1-foot of changes of direction, and within 1-foot of each enclosure to which connected.
8. Close ends of empty conduit with plugs or caps at the rough-in stage to prevent entry of debris, until wires are pulled in.
9. Conduit installations under fume and vent hoods are prohibited.
10. Secure conduits to cabinets, junction boxes, pull boxes, and outlet boxes with bonding type locknuts. Do not use aluminum conduits in wet locations.
11. Unless otherwise indicated on the drawings or specified herein, install conduits concealed within finished walls, floors, and ceilings.

B. Conduit Bends:

1. Make bends only with manufacturer approved tools or fittings.
2. Do not use standard conduit bending machines.
3. Conduit hickey benders may be used for slight offsets, and for straightening stubbed out conduits.
4. Bending of conduits with a pipe tee or vise is prohibited.

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- C. Layout and Homeruns:
 - 1. Deviations: Make only where necessary to avoid interferences and only after Drawings showing the proposed deviations have been submitted approved by the Owner Information Technology Team.

3.3 CONCEALED WORK INSTALLATION

- A. In Concrete:
 - 1. Conduit: Rigid steel, IMC or EMT. Do not install EMT in concrete slabs that are in contact with soil, gravel, or vapor barriers.
 - 2. Align and run conduit in direct lines.
 - 3. Install conduit through concrete beams only when the following occurs:
 - a. Where shown on the Structural Drawings.
 - b. As approved by the Designer prior to construction, and after submittal of Drawing showing location, size, and position of each penetration.
 - 4. Installation of conduit in concrete that is less than 3-inches thick is prohibited.
 - a. Conduit outside diameter larger than 1/4 of the slab thickness is prohibited.
 - b. Space between conduits in slabs: Approximately six conduit diameters apart, except one conduit diameter at conduit crossings.
 - c. Install conduits approximately in the center of the slab so that there will be a minimum of 3/4-inch of concrete around the conduits.
 - 5. Conduit for conductors 600V and below:
 - a. Different type conduits mixed indiscriminately in the same system is prohibited.
 - 6. Align and run conduit parallel or perpendicular to the building lines.
 - 7. Connect recessed lighting fixtures to conduit runs with maximum 6 feet) of flexible metal conduit extending from a junction box to the fixture.
 - 8. Tightening set screws with pliers is prohibited.

3.4 EXPOSED WORK INSTALLATION

- A. Unless otherwise indicated on the Drawings, exposed conduit is only permitted in mechanical and electrical rooms.
- B. Conduit for Conductors 600V and below: Different type of conduits mixed indiscriminately in the system is prohibited.
- C. Align and run conduit parallel or perpendicular to the building lines.
- D. Install horizontal runs close to the ceiling or beams and secure with conduit straps.
- E. Support horizontal or vertical runs at not over 8-foot) intervals.
- F. Surface Metal Raceways:
 - 1. Use only where shown.
- G. Painting:
 - 1. Paint exposed conduit as specified in Division 09, Finishes.
 - 2. Paint conduits containing cables rated over 600V safety orange.
 - 3. Refer to Division 09, Finishes for preparation, paint type, and exact color.
 - 4. Paint legends, using 2-inch high black numerals and letters, showing the cable voltage rating.

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5. Provide legends where conduits pass through walls and floors and at maximum 20-foot intervals in between.

3.5 EXPANSION JOINTS

- A. Conduits 3-inches and larger secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.
- B. Provide conduits smaller than 3-inches with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible non-metallic conduit to produce 5-inch vertical drop midway between the ends.
- C. Install expansion and deflection couplings where shown.
- D. Seismic Areas:
 1. In seismic areas, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint.
 2. Connect conduits to junction boxes with 15-inches of slack flexible conduit.
 3. Flexible Conduit: Copper green ground bonding jumper installed.

3.6 CONDUIT SUPPORTS, INSTALLATION

- A. Safe working load not to exceed 1/4 of proof test load of fastening devices.
- B. Use pipe straps or individual conduit hangers for supporting individual conduits. Maximum distance between supports is 8-foot on center.
- C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Attach each conduit with U-bolts or other approved fasteners.
- D. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.
- E. Fasteners and Supports in Solid Masonry and Concrete:
 1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
 2. Existing Construction:
 - a. Steel expansion anchors not less than 1/4-inch bolt size and not less than 1-1/8-inch embedment.
 - b. Power set fasteners not less than 1/4-inch diameter with depth of penetration not less than 3-inches.
 - c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- F. Hollow Masonry:
 1. Toggle bolts are permitted.
- G. Bolts supported only by plaster or gypsum wallboard are not acceptable.

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- H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.
 - I. Attachment by wood plugs, raw plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.
 - J. Do not use chain, wire, or perforated strap to support or fasten conduit.
 - K. Spring steel type supports or fasteners are prohibited for uses except: horizontal and vertical supports/fasteners within walls.
 - L. Vertical Supports:
 - 1. Vertical Conduit:
 - a. Riser clamps and supports in accordance with the NEC and as shown.
 - 2. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.
- 3.7 BOX INSTALLATION
- A. Boxes for Concealed Conduits:
 - 1. Flush mounted.
 - 2. Provide raised covers for boxes to suit the wall or ceiling, construction, and finish.
 - B. Install additional boxes where needed to prevent damage to cables and wires during pulling in operations.
 - C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.
- 3.8 COMMUNICATION SYSTEM CONDUIT
- A. Minimum conduit size of 1-inch, but not less than the size shown on the Drawings.
 - B. Equip conduit ends with insulated bushings.
 - C. 4-inch conduits within buildings include pull boxes after every two 90 degree bends. Size boxes per the NEC.
 - D. Vertical conduits/sleeves through closets floors terminate not less than 3-inches below the floor and not less than 12-inches) below the ceiling of the floor below.
 - E. Terminate conduit runs to/from a backboard in a closet or interstitial space at the top or bottom of the backboard. Conduits enter communication closets next to the wall and be flush with the backboard.
 - F. Where drilling is necessary for vertical conduits, locate holes so as not to affect structural sections such as ribs or beams.
 - G. Seal empty conduits located in communication closets or on backboards with a standard non-hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.

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1. Conduit runs contain no more than 2 quarter turns (90 degree bends) between pull boxes/backboards. Minimum radius of communication conduit bends as follows (special long radius):

Sizes of Conduit Trade Size	Radius of Conduit Bends
3/4	6-inches
1	6-inch
1-1/4	7-1/5-inch
1-1/2	9-inch
2	12-inch
2-1/2	25-inch
3	30-inch
3-1/2	36-inch
4	40-inch

3.9 CONNECTIONS

- A. Connect pathways to cable trays according to requirements in NEMA VE 2-2000 and NEMA FG 1-1993 where applicable.

3.10 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections, with the assistance of a factory-authorized service representative if necessary:
 1. After installing cable trays and after cabling has been energized, survey for compliance with requirements.
 2. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable trays, vibrations, and thermal expansion and contraction conditions, which may cause or have caused damage.
 3. Verify that the number, size, and voltage of cables in cable trays do not exceed that permitted by NFPA 70. Verify that communications or data-processing circuits are separated from power circuits by physical barriers or are installed in separate cable trays. Barriers are required between different voltage types.
 4. Verify that there are no intruding items such as pipes, hangers, or other equipment in the cable tray.
 5. Remove dust deposits, industrial process materials, trash of description, and blockage of tray ventilation.
 6. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and re-torque in suspect areas.
 7. Check for improperly sized or installed bonding jumpers.
 8. Check for missing, incorrect, or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
 9. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that takeoff raceways are bonded to cable trays. Test entire cable tray system for continuity. Maximum allowable resistance is 1 Ohm.
- B. Provide test and inspection reports.

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3.11 PROTECTION

- A. Protect installed cable trays and cables.
 - 1. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction.
 - 2. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
 - 3. Repair damage to paint finishes with matching touchup coating recommended by cable tray manufacturer.

END OF SECTION

SECTION 27 15 00
COMMUNICATIONS HORIZONTAL CABLING

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Horizontal Cable
 - 2. Work Area Outlet Jacks
 - 3. Faceplates
 - 4. Horizontal cabling is the portion of the cabling system that extends from the work area to the Telecommunications Room Cross-connect.

- B. Configure horizontal cabling in a star topology. The horizontal cabling includes the horizontal cables, mechanically connected jacks, outlets, and faceplates.

- C. Minimum requirements for the following:
 - 1. Category 6 Cable and Jacks
 - 2. Installation and Termination Methods

1.2 RELATED SECTIONS

- A. Division 01, General Requirements

- B. Division 27, Communications

- C. Section 27 05 00, Common Work Results for Communications

- D. Section 27 05 28, Pathways for Communications Systems

- E. References

- F. References, Codes and Standards as required by Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.

- G. In addition, meet the following:
 - 1. ANSI/TIA/EIA - 568-B Commercial Building Telecommunications Cabling Standard
 - 2. ANSI/TIA/EIA - 569-A Commercial Building Standard for Telecommunications Pathway and Spaces
 - 3. EIA/TIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - 4. EIA/TIA-607 Commercial Building Grounding and Bonding requirements for Telecommunications
 - 5. NEMA - 250
 - 6. Federal Communications Commission 47 CFR 68.
 - 7. BICSI Telecommunications Distribution Design Manual
 - 8. BICSI Telecommunications Cabling Installation Manual

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9. ANSI/NECA/BICSI 568-2001 Standard for Installing Commercial Building Telecommunications Cabling
10. ADA - Americans with Disabilities Act
11. NFPA 70 - 2002, including:
 - a. NEC - Article 770
 - b. NEC - Article 800
12. Underwriters Laboratory

1.3 QUALITY ASSURANCE

- A. Conform to the quality assurance requirements of Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.
- B. Install cabling and connectivity components in a neat and workmanlike manner. Methods of construction that are not specifically described or indicated in the Contract Documents and subject to the control and approval of the owner's Information technology Department.
- C. Equipment and materials quality and manufacture indicated. Equipment specified is based upon the manufacturers listed.
- D. Equipment new and free of defects.
- E. Strictly adhere to Telecommunications Industry Alliance standard installation practices when installing UTP data cabling.
- F. Materials and work specified herein comply with the most current version of the publications listed in the References section of this document.

1.4 SUBMITTALS

- A. Including, but not limited to: Product Data Sheets, Shop Drawings, etc.
- B. General:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- C. Closeout Submittals:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Horizontal Cable:
 1. Nexans (Berk-Tek)
 2. Superior Essex
 3. General
 4. Or approved equal.

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- B. Work Area Outlet Jacks:
 - 1. Commscope MGS400-270
 - 2. Or approved equal.
- C. Faceplates:
 - 1. Commscope
 - 2. Or approved equal.

2.2 HORIZONTAL CABLE

- A. Performance: Transmission Characteristics: ANSI/TIA/EIA-568-B.2-10 standard for Category 6 UTP cable.
- B. Meet applicable requirements of ANSI/ICEA S-80-576.
- C. Four 24 AWG Twisted pairs.
- D. The overall diameter of the cable less than 0.28 inches.
- E. The ultimate breaking strength measured in accordance with ASTM D 4565 400 N minimum.
- F. Lead free cable jackets and rated for its installed environment.
- G. Withstand a bend radius of 1-inch at -20 degrees C without jacket or insulation cracking.
- H. Cable jacket color white
- I. The cabling used in this project manufacturer compatible with other parts of the component system for a full 20-year warranty. In order to qualify for the warranty, the structured cabling system must be installed per the following:
 - 1. Meet TIA/EIA commercial building wiring standards.
 - 2. Use products purchased from authorized distributors.
 - 3. Install installed in accordance with the manufacturer's warranty guidelines.

2.3 WORK AREA OUTLET JACKS

- A. Performance:
 - 1. Physical Characteristics:
 - a. Keystone style.
 - b. Functional from -10 degrees F to 140 degrees F.
 - c. Test in accordance with ANSI/EIA/TIA-568-B.2-1 for Category 6
 - d. Modular RJ45 jacks that snap into user configurable faceplates meeting durability requirements specified in IEC 603-7.
 - e. 110 IDC, RJ45 type suitable for eight 22-26 AWG wires and be certified Category 6 compliant.
 - f. Construct jacks of high-impact plastic.
 - g. Separate and align conductors internally by separate compartments within the jack.
 - h. Wired in accordance with EIA/TIA T568B polarization sequence.
 - i. Provide jacks in the following colors:
 - 1) Data: Gray
 - 2) FACEPLATES

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

- B. Provide high-impact plastic faceplates with labels, label faceplates according to the guidelines set forth in Section 27 08 00,
- C. Single gang faceplates, 2-3/4-inch by 4-1/2-inch
- D. Double-gang faceplates, 4-1/2-inch by 4-1/2-inch
- E. Keystone style.
- F. 2 port standard.
- G. Provide blank inserts for unfilled outlet locations.
- H. Finish: Ivory
- I. UL Listed

PART 3 EXECUTION

3.1 INSTALLATION

- A. UTP Cable:
 - 1. Conceal wiring in walls or soffits. Install in metal conduits.
 - 2. Install exposed wiring in surface raceway.
 - 3. Install wiring above ceilings in open top cable hangers.
 - 4. Support cable above accessible ceilings 3-foot on center from cable support attached to building structure.
 - 5. Do not untwist cable pairs more than 1/2-inch when terminating.
 - 6. Maximum length, 90 meters.
 - 7. No physical defects such as cuts, tears, or bulges in the outer jacket. Replace defective cables.
 - 8. Install cable in neat and workmanlike manner. Neatly bundle and tie cable in closets. Leave sufficient cable for 90 degree sweeps at vertical drops.
 - 9. Maintain the following clearances from EMI sources.
 - a. Power Cable: 6-inches
 - b. Fluorescent Lights: 12-inches
 - c. Transformers: 48-inches
 - 10. Do not install Category 6 cable with more than 25 pounds pull force, as specified in EIA/TIA and BICSI installation practices. Utilize appropriate cable lubricant in sufficient quantity to reduce pulling friction to acceptable levels on:
 - a. Long pulls inside conduit, pulls of multiple cables into a single small bore conduit, on conduit runs greater than 100 lineal feet with bends of opposing directions, and in conduit runs that exceed 180 degrees of accumulated bends.
 - b. Use of tensile rated cords (i.e., fishing line) should be used for difficult or questionable pulls – to judge to go/no-go condition of the conduit and pulling setup. Utilize thin-coat lubricants when feasible.
 - 11. Replace cables jackets that are chaffed or burned exposing internal conductor insulation or have bare copper, shiners.
 - 12. Firestop openings where cable is installed through a fire rated wall or enclosure.

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

- B. Inserts and Faceplates:
1. Terminate cables with high density modular jacks that snap into a faceplate mounted on a wall outlet box, surface raceways, or power pole.
 2. Secure outlet boxes to building with mechanical fasteners. Adhesive fasteners are not allowed.
 3. Fill extra openings with blank inserts.
 4. Terminate cable per EIA/TIA T568B standard pin assignments.
 5. Locate so that combined length of cables and cords from panel to phone or computer does not exceed 3m.

END OF SECTION

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

KMS



CIVIL | STRUCTURAL | FIRE

Structural Calculations

Kelly Middle School

850 Howard Avenue, Eugene, OR 97404

Prepared For: GMA Architect

Work Order: 22552

Date: 12 March 2020

Project Abstract:

Existing Joist was check under gravity loading for weight machine and HVAC units.

Weight machine will be placed over existing 2x12 joist @ girls gym and HVAC units will be placed over existing 2x10 over corridor next to boys gym on North side.

Weight of weight machine=969#

HV1 &HV2= 150#

KMS

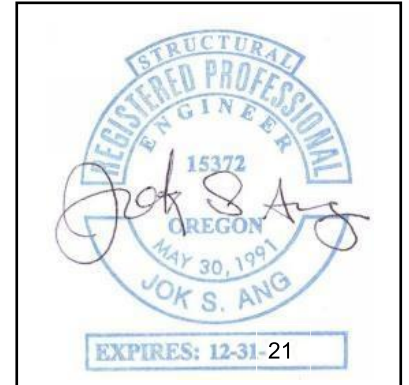
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Structural Calculations

Kelly Middle School

850 Howard Avenue, Eugene, OR 97404

Prepared For: GMA Architect
Work Order: 22552
Date: 12 March 2020



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<i>Markup drawings</i>	3-5

Title Block Line 1
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 using the "Settings" menu item
 and then using the "Printing &
 Title Block" selection.
 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 13 MAR 2020, 10:13AM

Wood Beam

jects\2XH13Z-K2TLWJD-8\2ZII2S-S\3QQXI1-1\3QMRN4-C\0XD1Z1-B\CMU Beam Design for Max. span.ec6 .
 Software copyright ENERCALC, INC. 1983-2020, Build:12.20.2.24 .

Lic. #: KW-06004985

AE GROUP

DESCRIPTION: Wood joist

Floor joist check under weight machine

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
 Load Combination Set : ASCE 7-16

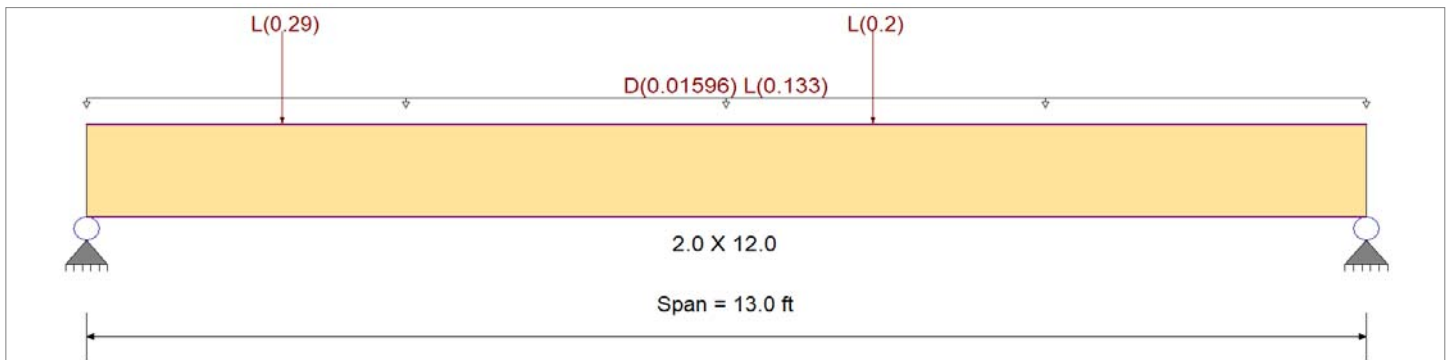
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination : ASCE 7-16

Wood Species : Douglas Fir - Larch (North)
 Wood Grade : No. 1 & Btr

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

F_b + 1150 psi E : Modulus of Elasticity
 F_b - 1150 psi E_{bend-xx} 1800ksi
 F_c - Prll 1800 psi E_{minbend-xx} 660ksi
 F_c - Perp 625 psi
 F_v 180 psi
 F_t 750 psi Density 30.59pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0120, L = 0.10 ksf, Tributary Width = 1.330 ft
 Point Load : L = 0.290 k @ 2.0 ft
 Point Load : L = 0.20 k @ 8.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.857 : 1	Maximum Shear Stress Ratio	=	0.397 : 1
Section used for this span	=	2.0 X 12.0	Section used for this span	=	2.0 X 12.0
	=	985.06psi		=	71.38 psi
	=	1,150.00psi		=	180.00 psi
Load Combination	=	+D+L+H	Load Combination	=	+D+L+H
Location of maximum on span	=	6.737 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.214 in	Ratio =		728 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.234 in	Ratio =		666 >=180
Max Upward Total Deflection		0.000 in	Ratio =		0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values						
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F _b	V	f _v	F _v			
+D+H	Length = 13.0 ft	1	0.081	0.034	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.34	84.29	1035.00	0.00	0.00	0.00	0.00	0.00	162.00
+D+L+H	Length = 13.0 ft	1	0.857	0.397	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.94	985.06	1150.00	1.14	71.38	180.00	0.00	0.00	0.00
+D+Lr+H	Length = 13.0 ft	1	0.059	0.024	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.34	84.29	1437.50	0.00	0.00	0.00	0.00	0.00	225.00
+D+S+H	Length = 13.0 ft	1	0.064	0.027	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.34	84.29	1322.50	0.00	0.00	0.00	0.00	0.00	207.00
+D+0.750Lr+0.750L+H	Length = 13.0 ft	1	0.529	0.244	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.04	759.85	1437.50	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 13.0 ft	1	0.575	0.265	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.04	759.85	1322.50	0.00	0.00	0.00	0.00	0.00	0.00

KIMS

Title Block Line 1
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 and then using the "Printing &
 Title Block" selection.
 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 13 MAR 2020, 10:13AM

Wood Beam

jects\2XH13Z-K2TLWJD-8\2ZII2S-S\3QQXI1-1\3QMRN4-C\0XD1Zl-B\CMU Beam Design for Max. span.ec6 .
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Lic. #: KW-06004985

AE GROUP

DESCRIPTION: Wood joist

Load Combination Segment Length	Span #	Max Stress Ratios		C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values					
		M	V								M	fb	F'b	V	fv	F'v			
+D+0.60W+H Length = 13.0 ft	1	0.046	0.019	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.34	84.29	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+D+0.750Lr+0.750L+0.450W+H Length = 13.0 ft	1	0.413	0.191	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.04	759.85	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+D+0.750L+0.750S+0.450W+H Length = 13.0 ft	1	0.413	0.191	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.04	759.85	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+0.60D+0.60W+0.60H Length = 13.0 ft	1	0.027	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.20	50.57	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+D+0.70E+0.60H Length = 13.0 ft	1	0.046	0.019	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.34	84.29	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+D+0.750L+0.750S+0.5250E+H Length = 13.0 ft	1	0.413	0.191	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.04	759.85	1840.00	0.00	0.00	0.00	0.00	0.00	288.00
+0.60D+0.70E+H Length = 13.0 ft	1	0.027	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.20	50.57	1840.00	0.00	0.00	0.00	0.00	0.00	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2341	6.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

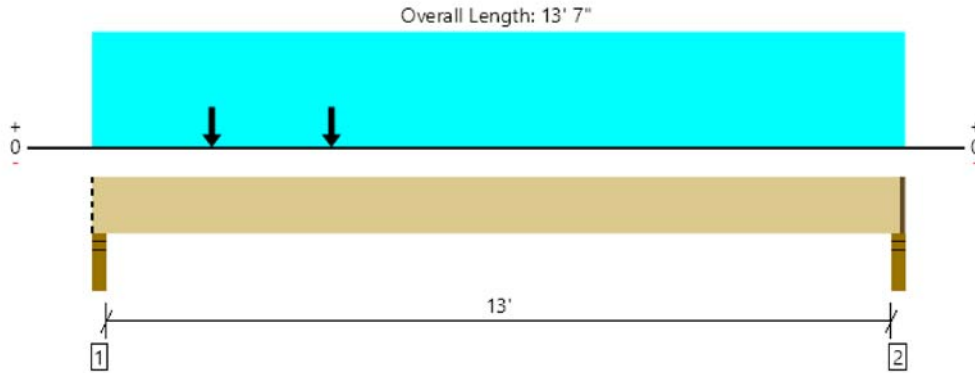
Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.291	1.136
Overall MINimum	1.187	1.032
+D+H	0.104	0.104
+D+L+H	1.291	1.136
+D+Lr+H	0.104	0.104
+D+S+H	0.104	0.104
+D+0.750Lr+0.750L+H	0.994	0.878
+D+0.750L+0.750S+H	0.994	0.878
+D+0.60W+H	0.104	0.104
+D+0.750Lr+0.750L+0.450W+H	0.994	0.878
+D+0.750L+0.750S+0.450W+H	0.994	0.878
+0.60D+0.60W+0.60H	0.062	0.062
+D+0.70E+0.60H	0.104	0.104
+D+0.750L+0.750S+0.5250E+H	0.994	0.878
+0.60D+0.70E+H	0.062	0.062
D Only	0.104	0.104
Lr Only		
L Only	1.187	1.032
S Only		
W Only		
E Only		
H Only		

Level, Floor: Joist

1 piece(s) 2 x 10 Douglas Fir-Larch No. 2 @ 16" OC

JOIST @ HVAC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	495 @ 13' 4 1/2"	2109 (2.25")	Passed (23%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	515 @ 1' 3/4"	1665	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1719 @ 6' 4"	2029	Passed (85%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.228 @ 6' 9 7/16"	0.439	Passed (L/693)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.342 @ 6' 8 5/16"	0.658	Passed (L/462)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2015
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 5' 7" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 13' 6" o/c based on loads applied, unless detailed otherwise.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	3.50"	1.50"	227	362	589	Blocking
2 - Stud wall - DF	3.50"	2.25"	1.50"	140	362	502	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 7"	16"	12.0	40.0	Default Load
2 - Point (lb)	2'	N/A	75	-	
3 - Point (lb)	4'	N/A	75	-	

Member Notes
2x10 floor joist under HVAC

Weyerhaeuser Notes
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

KMS

ForteWEB Software Operator	Job Notes
Jay Bhatt Mortier Ang (541) 484-9080 jayb@mortierang.com	



TRANSFORMER

BOTTLE RM.

SECTION
SCALE 1/2" = 1'-0"

COMPO. ROOF

HIGH
SEB
WIND
PLAO
ONE

SIDING

BRICK

TOILET RM.
6" TILE, 10" SET.

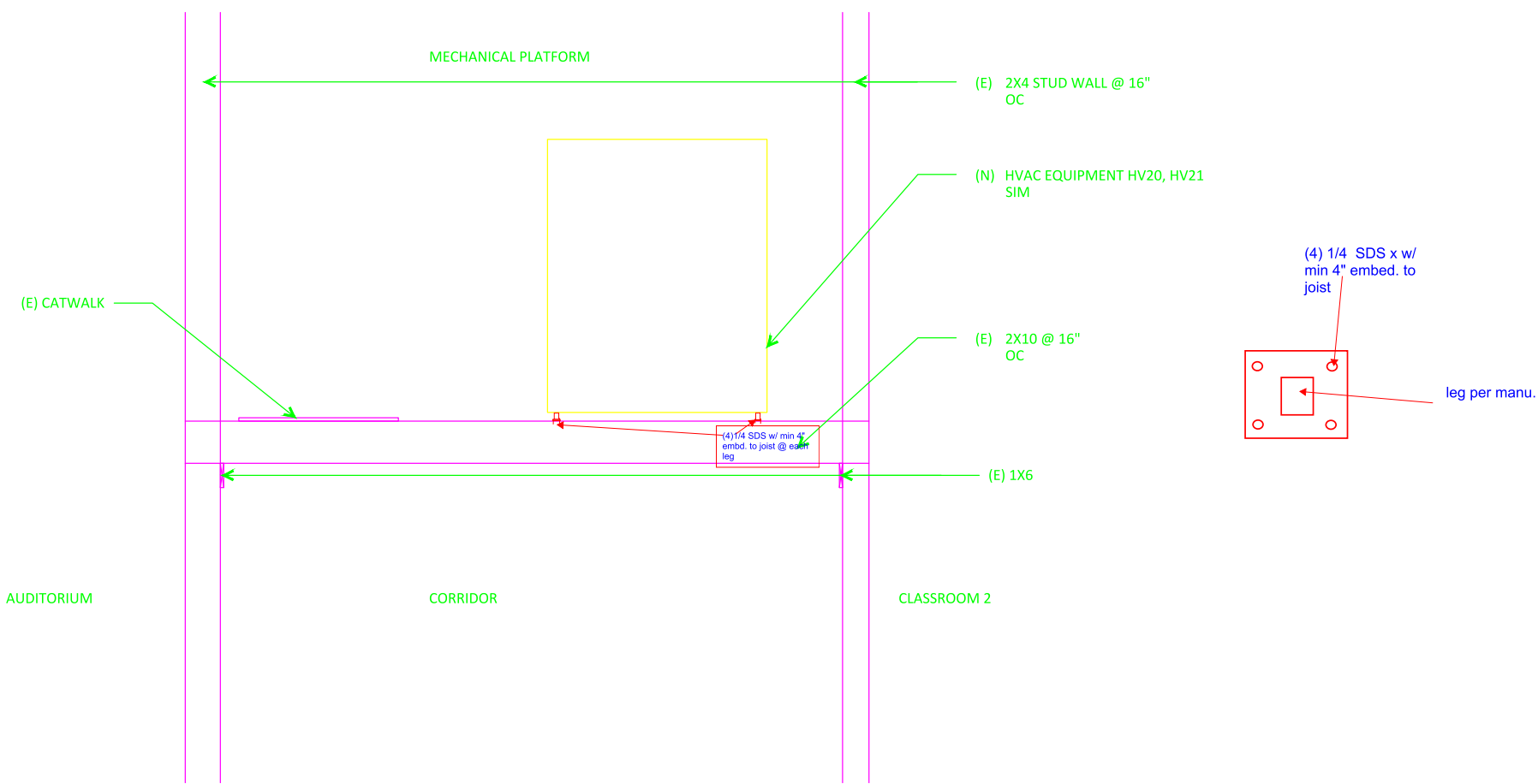
LOCKERS

CORRIDOR

CLASS R

TYPICAL SECTIONS

FACE OF BOARDS V-JOINT



1 MECHANICAL EQUIPMENT DIAGRAM - KELLY MIDDLE SCHOOL
 1/2" = 1'-0"



SECTION 27 05 00
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Work included in Section 27 05 00 applies to Division 27, Communications work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of communications systems for proposed project:
- B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

1.2 RELATED SECTIONS

- A. Division 01, General Requirements
- B. Division 27, Communications
- C. [Section 26 05 33, Raceways and Boxes for Electrical Systems]

1.3 REFERENCES

- A. References, Codes and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 27 Sections and those listed in this section.
- B. Supervisors and Lead Installers:
 - 1. Working knowledge and understanding of the following documents and codes or their most recent updates and familiar with the requirements that pertain to this installation.
 - 2. Installers familiar with and have practical working knowledge of the requirements that pertain to this installation.
- C. Codes:
 - 1. Comply with applicable sections of the most recent editions and addenda of following for interior and exterior installations.
 - 2. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
 - a. IBC International Building Code
 - b. NEC/NFPA 70 National Electrical Code
 - c. NEXC IEEE National Electrical Safety Code
 - 3. State of Oregon:
 - a. OAR Oregon Administrative Rules
 - b. OESC Oregon Electrical Specialty Code]
 - c. OFC Oregon Fire Code
 - d. OSSC Oregon Structural Specialty Code
 - e. OEESC Oregon Energy Efficiency Specialty Code]

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

- f. Standards:
4. Comply with applicable sections of the most recent editions and addenda of the following for installations and testing of communications cabling, connectors, and related hardware.
 5. Reference standards and guidelines include but are not limited to the latest adopted editions from the following:
 - a. ANSI American National Standards Institute
 - b. NEMA National Electrical Manufacturers Association
 - c. TIA Telecommunications Industries Association
 - 1) TIA TSB-125 Guidelines for Maintaining Optical Fiber Polarity Through Reverse-Pair Positioning
 - 2) TIA TSB-140 Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems
 - 3) TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7
 - 4) T-526-14-A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – SFSTP-14
 - 5) ANSI/TIA-568.0-D Generic Telecommunications Cabling for Customer Premises
 - 6) ANSI/TIA-568.1-D Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 - 7) ANSI/TIA-568-C.2 Commercial Building Telecommunications Cabling Standard—Part 2: Balanced Twisted Pair Cabling Components
 - 8) ANSI/TIA-568-3-D Optical Fiber Cabling Components Standard
 - 9) ANSI/TIA-569-C Commercial Building Standards for Telecommunications Pathways and Spaces
 - 10) ANSI/TIA-598-C Optical Fiber Cable Color Coding
 - 11) ANSI/TIA-604.2-A FOCIS 2—Fiber Optic Connector Intermateability Standard
 - 12) ANSI/TIA-606 Administration Standard for Commercial Telecommunications Infrastructures
 - 13) ANSI/TIA/607-C Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
 - 14) ANSI/TIA-758-A Customer-owned Outside Plant Telecommunications Infrastructure Standard
 - 15) ANSI/TIA-854 A Full Duplex Ethernet Specification for 1000 Mb/s (1000BASE-TX) Operating over Category 6 Balanced Twisted-Pair Cabling
 - 16) ANSI/TIA-862-B Structured Cabling Infrastructure Standard for Intelligent Building Systems
 - 17) ANSI/TIA-4994 Standard for Sustainable Information Communications Technology
 - 18) ANSI/NECA/BICSI 568-2006 Standard for Installing Telecommunications Systems
 - d. Other Reference Materials
 - 1) ANSI/NECA/GICSI-568-2006, Standard, Installing Commercial Building Telecommunications Cabling
 - 2) COOSP BICSI - Outside Plant Design Reference Manual
 - 3) ESSDRM BICSI - Electronic Safety and Security Reference Manual
 - 4) ITSIM BICSI - Information Transport Systems Installation Methods Manual
 - 5) NDRM BICSI - Network Design Reference Manual
 - 6) TDDM BICSI - Telecommunications Distribution Methods Manual
 - 7) WDRM BICSI - Wireless Design Reference Manual
 - 8) IEEE Institute of Electrical and Electronic Engineers
 - 9) NEMA National Electrical Manufacturers Association
 - 10) UL Underwriters Laboratories Cable Certification and Follow Up Program
 - 11) ASA American Standards Association

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with contract documents and governing codes and standards.
- B. Personnel performing the work of this Section shall be thoroughly familiar with the cabling methods set forth in the latest release of the TDMM.
- C. RCDD reviews required work prior to commencing. RCDD will oversee the installation and will have the end responsibility for the quality of the installation work performed. Submitted designs and or changes to the design must be approved and signed off by the RCDD.
- D. Installed cabling systems not to generate nor be susceptible to harmful electromagnetic emission, radiation, or induction that degrades cabling systems.
- E. Backward Compatibility: The provided solution backward compatible with lower category ratings such that if higher category components are used with lower category components, the permanent link and channel measures meet or exceed the lower channel's specified parameters.
- F. Component Compliance: The provided solution's components each meet the minimum transmission specifications listed herein such that no individual component will be less than specifications for permanent and channel, regardless of the fact that tests for permanent and channel ultimately meet required specifications.
- G. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.

1.5 CONTRACTOR RESPONSIBILITY AND QUALIFICATIONS

- A. Provide components, materials, services, and labor essential for a complete and functional structured cabling system.
- B. Comply with local, state, and federal laws and regulations applicable to the work to be performed although said law, rule, or regulation is not identified herein.
- C. Examination of building and site responsibility:
 - 1. Examine site and building prior to installation to determine conditions affecting the scope of work.
 - 2. Contact Owner representative for arrangements.
 - 3. Systems and cabling are assumed working and in good condition unless Contractor documents exceptions.
- D. Respect and protect the privacy and confidentiality of Owner, its employees, processes, products, and intellectual property to the extent necessary, consistent with the legal responsibilities of the State of Oregon and Owner policies.
- E. Use of Sub-Contractors:
 - 1. Inform in writing to Owner's representative and General Contractor about the intention to use sub-contractors and the scope of work for which they are being hired.
 - 2. Owner's representative prior to the sub-contractor's hiring and start of work must approve the use of sub-contractors in writing.
- F. Provide a sufficient number of technicians for this project to stay on schedule.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

G. Contractor Qualifications:

1. Fully conversant and capable in the cabling and equipment installation of communications systems including, but not limited to:
 - a. Data/Voice Structured Cabling
 - b. Minimum of five years' experience in the design, installation, testing, and maintenance of communications systems.
2. Must employ at least one full time BICSI certified RCDD who is involved in reviewing work performed by contractor on this project.
3. Verification of current BICSI Certified Installer, or equivalent.
4. Personnel trained in the installation of pathways and support for housing horizontal and backbone cabling.
5. Installers: Only technicians certified by approved equipment manufacturer are approved.
6. Maintain a local service facility which stocks spare devices and/or components for servicing systems.
7. Have performed successful installation and maintenance of at least three projects similar in scope and size. Provide project references for these three projects, including scope of Work, project type, Owner/user contact name and telephone number.

1.6 MANUFACTURERS

- A. Equipment in these Sections are the standard products of a manufacturer regularly engaged in the manufacture of such products unless specified otherwise. Components used in the system commercial products that comply with these Specifications.
- B. Each component of equipment identifies the manufacturer's name, model, and applicable serial number. The Owner's authorized representative retains the right to reject products that reflect, in their opinion, sub-standard design practices, manufacturing procedures, support services, or warranty policies.

1.7 CHANGE ORDERS

- A. Refer to Specification 01 25 00

1.8 WARRANTY

- A. The chosen Communications Contractor provide a minimum 1 year warranty on material, installation, and workmanship.
- B. Provide a written warranty covering the work of this Division as required by the General Conditions.
- C. Apparatus:
 1. Free of defects of material and workmanship and in accord with the Contract Documents.
 2. Built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- D. Include in Contractor's warranty for Work of Division 27, Communications system damage caused by failures of system component.

1.9 ALLOWANCES

- A. Comply with Division 01, General Requirements.

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1.10 ALTERNATES

- A. Comply with Division 01, General Requirements.
- B. Refer to Electrical Drawings for detailed information relating to the appropriate alternates.

1.11 GENERAL

- A. Meet or exceed applicable referenced standards, federal, state, and local requirements and conform to codes and ordinances of authorities having jurisdiction.

1.12 SUBMITTALS

A. General:

1. Guidelines set forth in this Section pertain to Division 27, Communications specifications included in this project.
2. Submit the following deliverables to the Owner and Design Team prior to ordering equipment or installation of equipment.
3. Partial submittals will not be considered, reviewed, or stored, and such submittals will not be returned.
4. Materials and equipment listed that are not in accordance with specification requirements and/or not prior approved may be rejected.
5. The approval of material, equipment, systems, and shop drawings is a general approval subject to the Drawings, Specifications, and verification of measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. Carefully check and correct shop drawings prior to submission for approval.

B. Informational Submittals:

1. Field Test Reports:
 - a. Submit sample cable test reports showing report format and parameters tested.
 - b. Submit minimum of 2 weeks prior to final punch walkthrough. Maintain test equipment on-site during punch for sample proof-of-performance tests.
2. Proposed test forms for horizontal UTP cable.
3. Certificates:
 - a. Certify that field tests have been performed and that work meets or exceeds specified requirements.
 - b. Certify that factory tests have been performed and that work meets or exceeds specified requirements. Certificates may be based on recent or previous test results, provided material or products tested are identical to those proposed for this Project.
 - c. Name(s) and copy of installer's certificates as it pertains to the system design (e.g. RCDD, CTS, NICET, etc.).

C. Equipment/Product Data Submittals:

1. Submit a single package of the related submittals for the products called out in Division 27, Communications Specifications.
2. Two indexed sets of manufacturer's technical data for each product including product description, specifications including labeling or listing by an agency acceptable to the Owner, and storage requirements.
3. Submitted digitally (e.g. in PDF) and have digital bookmarks for navigating the document set, organized as follows:

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- a. Primary division (e.g. 27)
 - 1) Submittal section (e.g. 271500)
 - a) Product name (e.g. "PATCH PANELS")
4. For each applicable section within the Division 27, Communications, organize as follows:
 - a. Cover sheet for each applicable section number.
 - 1) Include the contractor's contact information
 - b. Table of contents with the following information per line:
 - 1) Equipment Type
 - 2) Manufacturer
 - 3) Model Number
 - 4) Page Number (with hyperlink to product data sheet's page)
 - c. Apply header to each page of each sections submittals including the following:
 - 1) Title of division 27 section the products fall under (e.g. 271500 Communications Horizontal Cabling).
 - d. Apply footer to the bottom of each submittal package including the following:
 - 1) Clearly labeled page numbers
 - 2) Date of submittal (YYYY-MM-DD)
5. Where more than one product is called out on the same sheet, clearly highlight or mark which product is proposed for use.

1.13 PRODUCT ASSURANCE

- A. UL and/or ETL approved and labeled in accordance with NEC for products where labeling service normally applies.
- B. Label materials and equipment requiring UL 94, 149, or 1863. Modification of products that nullifies UL labels is not permitted.
- C. Materials and equipment provided by standard Commercial-Off-The-Shelf (COTS) products of a manufacture engaged in the manufacture of such products.
- D. Typical commercial designs that comply with the requirements specified. Materials and equipment readily available through manufacturers and/or distributors. Supply equipment complete with optional items required for proper installation.
- E. Materials or Manufactures not listed in this Division 27, Communications but are required materials to provide a complete and functioning cable infrastructure system have cut sheets and product data included in the material and procedures submittal package.
- F. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance and backward compatibility.
- G. Test fiber cable while on the reel prior to installation of the cable. Assume liability for replacement of cable should it be found defective at this time or a later date prior to customer acceptance.

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1.14 COORDINATION

- A. Coordinate arrangement, mounting, and support of communications equipment with Architect, Communication Design Professional or Owner Information Technology Team:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide the most efficient pathway for structured cabling endpoint devices such that the cabling never exceeds the 295-foot permanent link distance.
 - 3. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 4. To allow right-of-way for piping and conduit installed at required slope.
 - a. Racks and Communication Cabinets: 3-foot minimum.
 - b. Open Pathways – Cable Tray, J-Hooks: 12-inch clear on working side; 3-inch clear from ceiling tiles.
 - c. Closed Pathways – Conduit (Above and Below Grade):
 - 1) 3-inch clear from electrical pathways concrete encased.
 - 2) 12-inch clear in electrical pathways in dirt.
 - 3) 48-inch clear electrical Motors and transformers.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08, Openings.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07, Thermal and Moisture Protection.
- E. Responsible for coordination with all trades, to include required scheduling of materials and/or equipment with Owner and/or General Contractor for delivery, storage, and protection of equipment as required.
- F. Finishes: Where specific device finishes have not been identified, selected by Owner or Architect, finish to match surrounding surfaces.

1.15 PRE-INSTALLATION CONFERENCE

- A. Arrange and schedule pre-installation conference prior to beginning work of this Section Division 27, Communications.
- B. Agenda: Clarify questions in writing related to work to be performed, scheduling, coordination, etc., with Consultant and/or Project Manager/Owner representative.
- C. Individuals, who will be in an on-site supervisory capacity, are required to attend the pre-installation conference. This includes project managers, site supervisor, and lead installers. Individuals who do not attend the conference will not be permitted to supervise the personnel that install, terminate, or test communications cables on the project. Oversee the installation is required to attend the pre-installation conference.
- D. The manufacturer that will be providing the extended warranty is required to have a representative attend the pre-installation conference.

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1.16 FIELD QUALITY CONTROL

- A. Perform the following field inspections during installation and commissioning:
 - 1. Visually inspect UTP and for NRTL certification markings.
 - 2. Visually inspect cabling placements, pathways, and terminations in communications equipment rooms, telecommunications rooms, and work areas for compliance with standards and codes.
 - 3. Visually inspect installed, cable pathways, and wall penetrations for compliance with standards and codes.
- B. Responsible for field inspections and will submit a signed weekly inspection report to Owner.

1.17 ALTERNATES, SUBSTITUTIONS, AND CHANGE ORDERS

- A. Refer to Specification 01 25 00 DELIVERY AND STORAGE
- B. Assume custody and responsibility for the items upon delivery and determining that the contents are complete and in satisfactory condition for installation.
- C. Delivery, loss, storage, and protection: Materials and equipment delivered and placed in storage stored with protection from the weather, humidity, and temperature variation, dirt, and dust or other contaminants.
- D. Coordinate deliveries and submittals with the General Contractor/Owner to ensure a timely scheduled installation.
- E. Responsible for handling and control of cabling equipment and liable for material loss due to delivery and storage problems.
- F. No equipment or materials delivered to the job site more than three weeks prior to the commencement of its installation. Coordinate with General Contractor/Owner on location of storage materials.

1.18 AS-BUILTS

- A. Refer to Specification 01 25 00

1.19 CLEANING

- A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, dust, and construction debris and repair damaged finish, including chips, scratches, and abrasions. This includes touching up paint removed for grounding.
- B. Provide a clean work environment, free from trash/rubbish accumulated during and after cabling installation.
- C. Maintain construction materials and refuse within the area of work. Clean the work area at the end of each day.
- D. Keep liquids off finished floors, carpets, tiles, racks, and equipment. If liquid damages finishes or equipment, provide professional services to clean or repair scratched/soiled finishes or damaged equipment at the Contractors own expense.

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1.20 PAINTING

- A. Certain Division 27, Communications Sections contain the requirement of painting, it is the responsibility of the Contractor to coordinate the requirements and labor involved to complete this work with the General Contractor.
- B. Touch up marred and bared surfaces of primed, galvanized, and finish painted equipment, materials, and accessories installed.
- C. Restore patched surfaces as close to the original condition and finish as reasonably possible. Where patching occurs in smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received two coats of primer and two coats of finished paint.

PART 2 PRODUCTS

2.1 GENERAL

- A. Where specified materials or methods conflict with applicable codes, the more stringent requirement applies.
- B. Provide apparatus built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- C. Materials and Equipment:
 - 1. Use materials and equipment that are:
 - a. New
 - b. Of quality meeting or exceeding specified standards.
 - c. Free of faults and defects.
 - d. Conforming to Contract Documents.
 - e. Of size, make, type, and quality specified.
 - f. Suitable for the installation indicated.
 - g. Manufactured in accordance with NEMA, ANSI, UL, or other applicable standards.
 - h. Otherwise as specified in Division 01, General Requirements.
 - 2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer.
 - a. Component parts of the entire system need not be products of same manufacturer.
- D. Basis of Design:
 - 1. First listed manufacturer specified by performance or model number considered the Basis of Design.
 - 2. If other equipment is provided in lieu of the Basis of Design equipment, assume responsibility for changes and costs which may be necessary to accommodate this equipment, including, but not limited to:
 - a. Different sizes and locations for connections.
 - b. Different dimensions.
 - c. Different access requirements.
 - d. Different configurations of connected equipment.
 - e. Other differences.

COMMON WORK RESULTS FOR COMMUNICATIONS - SECTION 27 05 00

PART 3 EXECUTION

3.1 INSTALLATION

A. General:

1. Full and complete compliance with standards and guidelines set forth in this and subsequent specifications.
2. Field verify existing conditions prior to installation and make note of conflicts and discrepancies between these specifications and construction drawings to the Owner immediately.
 - a. Field discrepancies not noted to the Owner or Design Team prior to installation commencement the responsibility of the Contractor and repaired at no cost to the Owner.
3. Provide a complete and properly operating system for each item of equipment specified.
4. Install materials in a neat and professional manner.
5. Comply with equipment manufacturer's written instructions, the best industry practices, and the Contract Documents.

B. Clarification:

1. Where there is a conflict among manufacturer's instruction, best practice, and the Documents, request clarification from the Architect prior to rough-in.
2. Architect's decision will be final.
3. Remove and correct work installed without clarification by the Contractor at no cost to the Owner.

C. Existing concrete, block, or brick walls are considered not accessible and may require use of Surface Mounted Raceway (SMR) if existing concealed raceway and device boxes are not available for reuse or do not meet the intent of the design. Coordinate route and installation where SMR is required with the Architect/Engineer prior to rough-in. Responsible for reinstalling SMR routed without such prior approval to the Architect's satisfaction.

D. Existing stud walls (wood or metal) with or without blocking with plaster, plasterboard, or paneling finish are considered accessible with accessible ceiling, attic, tunnel, or crawl space above, below, or adjacent. Remove, patch, and repair finished surface as required to conceal rough-in for new device locations. If it is determined that a specific instance will not permit concealment of rough-in due to obstructions such as beams, headers, and other structural elements, prior approval before rough-in from the Architect is required.

3.2 INSTALLATION IN RATED CONSTRUCTION

- A. Install intumescent material around ducts, conduits, and other telecommunications elements penetrating rated construction.
- B. Comply with firestop materials manufacturer's written instructions to prevent spread of smoke or fire through sleeves or block-outs penetrating rated fire barriers.
- C. Provide firestop materials specified in Division 07, Thermal and Moisture Protection, and as follows:
 1. Capable of passing a 3-hour test per ASTM E-814 (UL 1479).
 2. Consisting of material capable of expanding nominally eight times when exposed to temperatures of 250 degrees F – 350 degrees F.
 3. An alternate method utilizing intumescent materials in caulk or putty complying with Division 07, Thermal and Moisture Protection may be used.

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3.3 EQUIPMENT SUPPORT

- A. Minimum Support Capacity:
 - 1. Provide fastening devices and supports for equipment, panels, outlets, and cabinets capable of supporting not less than four times the ultimate weight of the object or objects fastened to or suspended from the building structure.
- B. Support junction boxes, pull boxes, or other conduit terminating housings located above the suspended ceiling from the floor above, roof, or penthouse floor structure to prevent sagging or swaying.
- C. Conduits:
 - 1. Support suspended conduits 1-inch and larger from the overhead structural system with metal ring or trapeze hangers and threaded steel rod having a safety factor of four.
 - 2. Conduits smaller than one 1-inch installed in ceiling cavities may be supported on the mechanical system supports when available space and support capacity has been coordinated with the sub-contractor installing the supports.
 - 3. Anchor conduit installed in poured concrete to the steel reinforcing with 14 AWG black iron wire.
- D. Powder actuated or similar shot-in fastening devices will not be permitted for technology work except by review from the project structural engineer.

3.4 ALIGNMENT

- A. Install panels, cabinets, and equipment level and plumb, parallel with structural building lines.
- B. Install equipment and enclosures fitted neatly, without gaps, openings, or distortion.
- C. Properly and neatly close unused openings with approved devices.
- D. Fit surface panels, devices, and outlets with neat, appropriate, trims, plates, or covers without overhanging edges, protruding corners, or raw edges.

3.5 CUTTING AND PATCHING

- A. General:
 - 1. Comply with Division 01, General Requirements.
 - 2. Restore to original condition new or existing work cut or damaged by installation, testing, and removal of work.
 - 3. Patch and finish spaces around conduits passing through floors and walls to match the adjacent construction, including painting or other finishes.
 - 4. Clean up and remove dirt and debris.
- B. Make additional required openings by drilling or cutting. Use of jackhammer is prohibited.
- C. Fill holes that are cut oversize so that a tight fit is obtained around the objects passing through.
 - 1. In rated construction, comply with Division 07, Thermal and Moisture Protection.
- D. Obtain Architect's permission and direction prior to piercing beams or columns.

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- E. Where alterations disturb lawns, paving, walks, and other permanent site improvements, repair and refinish surfaces to condition existing prior to commencement of work.
- 3.6 PROTECTION OF WORK
- A. Protect telecommunication work and equipment installed under this Division against damage by other trades, weather conditions, or other causes.
 - 1. Equipment found damaged or in other than new condition will be rejected as defective.
 - B. Keep equipment, panels, outlets, and related telecommunication equipment covered or closed to exclude dust, dirt, and splashes of plaster, cement, paint, or other construction material spray.
 - 1. Equipment not free of contamination is not acceptable.
 - C. Provide enclosures and trims in new condition, free of rust, scratches, and other finish defects.
 - 1. If damaged, properly refinish in a manner acceptable to the Architect.
- 3.7 COMPLETION AND TESTING
- A. General:
 - 1. Comply with Division 01, General Requirements.
 - B. Upon completion, test systems to show that installed equipment operates as designed and specified, free of faults.
 - 1. Schedule system tests so that several occur on the same day.
 - 2. Coordinate testing schedule with construction phasing.
 - 3. Submit systems test reports for Design Team review and feedback.
 - 4. Schedule proof-of-performance testing with Design Team representative and/or Owner's representative.
 - C. A qualified contractor with required tools to conduct cable and equipment tests. Arrange to have the equipment factory representative present for those tests where the manufacturer's warranty could be impacted by the absence of a factory representative.
 - D. Perform tests per the requirements of each of the following systems:
 - 1. Horizontal data/voice structured cabling system.
 - 2. Provide a written record of final performance tests after final proof-of-performance review and acceptance, and submit with operation and maintenance data.

END OF SECTION

SECTION 27 05 28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Conduit and other Closed Pathway System
 - 2. Device Backboxes
 - 3. Cable Straps

- B. Work covered by this Section consists of furnishing labor, equipment, supplies, materials, and testing unless otherwise specified for a complete pathways system for the communications systems.

1.2 RELATED SECTIONS

- A. Division 01, General Requirements

- B. Division 27, Communications

- C. [Section 26 05 33, Raceways and Boxes for Electrical Systems]

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

- E. Provisions of Division 27, Communications Section 27 05 00, Common Work Results for Communications, apply to this Section.

1.3 REFERENCES

- A. References, Codes and Standards as required by Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.

- B. In addition, meet the following:
 - 1. Underwriters Laboratories, Inc.:
 - a. UL 1-03 Flexible Metal Conduit
 - b. UL 5-01 Surface Metal Raceway and Fittings
 - c. UL 6-03 Rigid Metal Conduit
 - d. UL 50-03 Enclosures for Electrical Equipment
 - e. UL 360-03 Liquid-Tight Flexible Steel Conduit
 - f. UL 467-01 Grounding and Bonding Equipment
 - g. UL 514A-01 Metallic Outlet Boxes
 - h. UL 514B-02 Fittings for Cable and Conduit
 - i. UL 514C-05 Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers
 - j. UL 797-03 Electrical Metallic Tubing
 - k. UL 1242-00 Intermediate Metal Conduit

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

2. National Electrical Manufacturers Association:
 - a. NEMA FB1-03 Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable

1.4 QUALITY ASSURANCE

- A. Conform to the quality assurance requirements of Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.3
- B. Low voltage system cable supports and accessories listed to Underwriter's Laboratories or other national recognized testing laboratory.
- C. Low voltage system cable supports and accessories have the manufacturers name and part number stamped on the part for identification.
- D. Pre-Installation Meetings:
 1. Setup a pre-installation meeting to discuss low voltage cable support layout work and installation guidelines.
 2. Organize meeting a minimum of 30 days prior to initiating cable support installation work.
 3. Attendees include Contractor, appropriate subcontractors, low voltage system vendors, Architect, and Owner's Representative.
- E. Purpose of meeting is to coordinate work between the parties to have a consistent layout for low voltage system cables, minimize interferences, and to make cable system accessibility for future owner modifications and maintenance high priority issue for installers.

1.5 SUBMITTALS

- A. Including, but not limited to: Product Data Sheets, etc.
- B. General:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- C. Closeout Submittals:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- D. Additional requirements specific to this Section:
 1. Firestop design basis documentation that includes each type of communication penetration, type of building construction being penetrated including the hourly resistance rating of floor, wall, or other partition of building construction into which firestop design will be installed, and firestop device or system proposed for use.

1.6 COORDINATION

- A. Responsible for coordinating the arrangement, mounting and support for communications support equipment.

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

- B. Coordinate layout and installation of low voltage cable bundle supports with other construction elements to ensure adequate headroom, working clearance and access. Revise locations and elevations for those indicated as required to suit field conditions and as approved by Owner's Representative.
- C. Examine drawings and existing conditions above ceilings and include additional supports in bid price to avoid ducts, pipes, conduits, etc. Installation in existing ceilings can be very difficult. Include extra labor time involved in bid price.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Conduit and Other Closed Pathways Systems:
 - 1. Conduit:
 - a. Allied
 - b. Prime
 - c. Wheatland
 - d. Or approved equal.
 - 2. Conduit Supports:
 - a. Allied
 - b. Prime
 - c. Wheatland
 - d. Or approved equal.
- B. Device Backboxes:
 - 1. Raco
 - 2. Steel City
 - 3. Bowers
 - 4. Or approved equal.
- C. Cable Straps:
 - 1. Panduit
 - 2. Velcro
 - 3. Or approved equal.

2.2 CONDUIT AND OTHER CLOSED PATHWAY SYSTEMS

- A. Conduit Size: In accordance with the NEC, but not less than 1-inch unless otherwise shown in the Contract Drawings.
- B. Install in accordance with the construction documents, national codes, and applicable publications designated herein.
- C. Conduit:
 - 1. Following construction types:
 - 2. Electrical Metallic Tubing
 - 3. Rigid Galvanized Steel
 - 4. Flexible Non-Metallic Conduit.
 - 5. Install as recommended by the raceway manufacturer and construction documents.

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6. Flexible Metallic Conduit is not permitted in this project for interior installation.
- D. Conduit Supports:
1. Individual Conduit Hangers: Designed for the purpose, having a preassembled closure bolt and nut, and provisions for receiving a hanger rod.
 2. Install conduit supports at a maximum of 5-foot centers.
- 2.3 DEVICE BACKBOXES
- A. Flush mounted, sheet steel construction with conduit knockout.
- B. UL514A Listed
- C. Unless otherwise noted, provide:
1. 4-11/16-inch square, 2-1/8-inch deep backbox standard for Communications and Audio-Video devices.
 2. 4-inch square, 2-1/8-inch deep backbox standard for Electronic Security devices.
 3. Code minimum rated for the installed application.
- D. Gang mud rings sizes as required for the applicable device.
- 2.4 CABLE STRAPS
- A. Use within telecommunications rooms and open cable pathways (cable tray). Provide for strapping groups of cables to raceway and for controlling/managing patch cables.
- B. The use of plastic tie wraps for this purpose is not acceptable.
1. Self-gripping, reusable, constructed of Velcro, and hook-and-loop style.
 2. Plenum rated cable straps to be used in plenum air handling spaces.
- C. Quantity:
1. Provide in sufficient quantity to strap cable bundles at intervals specific to the type of cable bundle. For the purposes of determining the quantity of straps to provide, the number of cables in a cable bundle and the intervals at which straps applied are as follows:
 - a. Bundle size (use to determine strap quantity):
 - 1) For Patch Cables: Maximum of 25 patch cables per cable bundle with straps applied at 1-foot intervals.
 - 2) For horizontal cabling: Maximum of 25 station cables per cable bundle with straps applied at 3-foot intervals.
 - 3) For Backbone Cables: Maximum of 4 backbone cables per cable bundle with straps applied at 3-foot intervals.
- D. Bundling (use to determine strap quantity):
1. Bundle cables by application (patch, horizontal, backbone) and by cable type (Category X, MM Fiber, SM Fiber, etc.).
 2. Do not intermix cable applications and types within a bundle.
- E. Color: Black

PART 3 EXECUTION

3.1 CONDUIT INSTALLATION

A. Penetrations: Cutting or Holes:

1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the structural engineer prior to drilling through structural sections.
2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Owner's Information Technology as required by limited working space.

B. Fire Stop:

1. Where conduits, wire ways, and other communications raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke, and gases as specified in Division 07, Thermal and Moisture Protection, with rock wool fiber or silicone foam sealant only.
2. Completely fill and seal clearances between raceways and openings with the fire stop material.

C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Division 07, Thermal and Moisture Protection.

3.2 INSTALLATION, GENERAL

A. Install conduit as follows:

1. In complete runs before pulling in cables or wires.
2. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new undamaged material.
3. Assure conduit installation does not encroach into the ceiling height headroom, walkways, or doorways.
4. Cut square with a hacksaw, ream, remove burrs, and draw up tight.
5. Mechanically continuous.
6. Independently support conduit at 5-feet on center. No other supports allowed.
7. Support within 1-foot of changes of direction, and within 1-foot of each enclosure to which connected.
8. Close ends of empty conduit with plugs or caps at the rough-in stage to prevent entry of debris, until wires are pulled in.
9. Conduit installations under fume and vent hoods are prohibited.
10. Secure conduits to cabinets, junction boxes, pull boxes, and outlet boxes with bonding type locknuts. Do not use aluminum conduits in wet locations.
11. Unless otherwise indicated on the drawings or specified herein, install conduits concealed within finished walls, floors, and ceilings.

B. Conduit Bends:

1. Make bends only with manufacturer approved tools or fittings.
2. Do not use standard conduit bending machines.
3. Conduit hickey benders may be used for slight offsets, and for straightening stubbed out conduits.
4. Bending of conduits with a pipe tee or vise is prohibited.

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- C. Layout and Homeruns:
 - 1. Deviations: Make only where necessary to avoid interferences and only after Drawings showing the proposed deviations have been submitted approved by the Owner Information Technology Team.

3.3 CONCEALED WORK INSTALLATION

- A. In Concrete:
 - 1. Conduit: Rigid steel, IMC or EMT. Do not install EMT in concrete slabs that are in contact with soil, gravel, or vapor barriers.
 - 2. Align and run conduit in direct lines.
 - 3. Install conduit through concrete beams only when the following occurs:
 - a. Where shown on the Structural Drawings.
 - b. As approved by the Designer prior to construction, and after submittal of Drawing showing location, size, and position of each penetration.
 - 4. Installation of conduit in concrete that is less than 3-inches thick is prohibited.
 - a. Conduit outside diameter larger than 1/4 of the slab thickness is prohibited.
 - b. Space between conduits in slabs: Approximately six conduit diameters apart, except one conduit diameter at conduit crossings.
 - c. Install conduits approximately in the center of the slab so that there will be a minimum of 3/4-inch of concrete around the conduits.
 - 5. Conduit for conductors 600V and below:
 - a. Different type conduits mixed indiscriminately in the same system is prohibited.
 - 6. Align and run conduit parallel or perpendicular to the building lines.
 - 7. Connect recessed lighting fixtures to conduit runs with maximum 6 feet) of flexible metal conduit extending from a junction box to the fixture.
 - 8. Tightening set screws with pliers is prohibited.

3.4 EXPOSED WORK INSTALLATION

- A. Unless otherwise indicated on the Drawings, exposed conduit is only permitted in mechanical and electrical rooms.
- B. Conduit for Conductors 600V and below: Different type of conduits mixed indiscriminately in the system is prohibited.
- C. Align and run conduit parallel or perpendicular to the building lines.
- D. Install horizontal runs close to the ceiling or beams and secure with conduit straps.
- E. Support horizontal or vertical runs at not over 8-foot) intervals.
- F. Surface Metal Raceways:
 - 1. Use only where shown.
- G. Painting:
 - 1. Paint exposed conduit as specified in Division 09, Finishes.
 - 2. Paint conduits containing cables rated over 600V safety orange.
 - 3. Refer to Division 09, Finishes for preparation, paint type, and exact color.
 - 4. Paint legends, using 2-inch high black numerals and letters, showing the cable voltage rating.

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5. Provide legends where conduits pass through walls and floors and at maximum 20-foot intervals in between.

3.5 EXPANSION JOINTS

- A. Conduits 3-inches and larger secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.
- B. Provide conduits smaller than 3-inches with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible non-metallic conduit to produce 5-inch vertical drop midway between the ends.
- C. Install expansion and deflection couplings where shown.
- D. Seismic Areas:
 1. In seismic areas, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint.
 2. Connect conduits to junction boxes with 15-inches of slack flexible conduit.
 3. Flexible Conduit: Copper green ground bonding jumper installed.

3.6 CONDUIT SUPPORTS, INSTALLATION

- A. Safe working load not to exceed 1/4 of proof test load of fastening devices.
- B. Use pipe straps or individual conduit hangers for supporting individual conduits. Maximum distance between supports is 8-foot on center.
- C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and 200 pounds. Attach each conduit with U-bolts or other approved fasteners.
- D. Support conduit independently of junction boxes, pull boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.
- E. Fasteners and Supports in Solid Masonry and Concrete:
 1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
 2. Existing Construction:
 - a. Steel expansion anchors not less than 1/4-inch bolt size and not less than 1-1/8-inch embedment.
 - b. Power set fasteners not less than 1/4-inch diameter with depth of penetration not less than 3-inches.
 - c. Use vibration and shock resistant anchors and fasteners for attaching to concrete ceilings.
- F. Hollow Masonry:
 1. Toggle bolts are permitted.
- G. Bolts supported only by plaster or gypsum wallboard are not acceptable.

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

- H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.
 - I. Attachment by wood plugs, raw plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.
 - J. Do not use chain, wire, or perforated strap to support or fasten conduit.
 - K. Spring steel type supports or fasteners are prohibited for uses except: horizontal and vertical supports/fasteners within walls.
 - L. Vertical Supports:
 - 1. Vertical Conduit:
 - a. Riser clamps and supports in accordance with the NEC and as shown.
 - 2. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.
- 3.7 BOX INSTALLATION
- A. Boxes for Concealed Conduits:
 - 1. Flush mounted.
 - 2. Provide raised covers for boxes to suit the wall or ceiling, construction, and finish.
 - B. Install additional boxes where needed to prevent damage to cables and wires during pulling in operations.
 - C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.
- 3.8 COMMUNICATION SYSTEM CONDUIT
- A. Minimum conduit size of 1-inch, but not less than the size shown on the Drawings.
 - B. Equip conduit ends with insulated bushings.
 - C. 4-inch conduits within buildings include pull boxes after every two 90 degree bends. Size boxes per the NEC.
 - D. Vertical conduits/sleeves through closets floors terminate not less than 3-inches below the floor and not less than 12-inches) below the ceiling of the floor below.
 - E. Terminate conduit runs to/from a backboard in a closet or interstitial space at the top or bottom of the backboard. Conduits enter communication closets next to the wall and be flush with the backboard.
 - F. Where drilling is necessary for vertical conduits, locate holes so as not to affect structural sections such as ribs or beams.
 - G. Seal empty conduits located in communication closets or on backboards with a standard non-hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

1. Conduit runs contain no more than 2 quarter turns (90 degree bends) between pull boxes/backboards. Minimum radius of communication conduit bends as follows (special long radius):

Sizes of Conduit Trade Size	Radius of Conduit Bends
3/4	6-inches
1	6-inch
1-1/4	7-1/5-inch
1-1/2	9-inch
2	12-inch
2-1/2	25-inch
3	30-inch
3-1/2	36-inch
4	40-inch

3.9 CONNECTIONS

- A. Connect pathways to cable trays according to requirements in NEMA VE 2-2000 and NEMA FG 1-1993 where applicable.

3.10 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections, with the assistance of a factory-authorized service representative if necessary:
 1. After installing cable trays and after cabling has been energized, survey for compliance with requirements.
 2. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable trays, vibrations, and thermal expansion and contraction conditions, which may cause or have caused damage.
 3. Verify that the number, size, and voltage of cables in cable trays do not exceed that permitted by NFPA 70. Verify that communications or data-processing circuits are separated from power circuits by physical barriers or are installed in separate cable trays. Barriers are required between different voltage types.
 4. Verify that there are no intruding items such as pipes, hangers, or other equipment in the cable tray.
 5. Remove dust deposits, industrial process materials, trash of description, and blockage of tray ventilation.
 6. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and re-torque in suspect areas.
 7. Check for improperly sized or installed bonding jumpers.
 8. Check for missing, incorrect, or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
 9. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that takeoff raceways are bonded to cable trays. Test entire cable tray system for continuity. Maximum allowable resistance is 1 Ohm.
- B. Provide test and inspection reports.

PATHWAYS FOR COMMUNICATIONS SYSTEMS - SECTION 27 05 28

3.11 PROTECTION

- A. Protect installed cable trays and cables.
 - 1. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction.
 - 2. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
 - 3. Repair damage to paint finishes with matching touchup coating recommended by cable tray manufacturer.

END OF SECTION

SECTION 27 15 00
COMMUNICATIONS HORIZONTAL CABLING

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Horizontal Cable
 - 2. Work Area Outlet Jacks
 - 3. Faceplates
 - 4. Horizontal cabling is the portion of the cabling system that extends from the work area to the Telecommunications Room Cross-connect.

- B. Configure horizontal cabling in a star topology. The horizontal cabling includes the horizontal cables, mechanically connected jacks, outlets, and faceplates.

- C. Minimum requirements for the following:
 - 1. Category 6 Cable and Jacks
 - 2. Installation and Termination Methods

1.2 RELATED SECTIONS

- A. Division 01, General Requirements

- B. Division 27, Communications

- C. Section 27 05 00, Common Work Results for Communications

- D. Section 27 05 28, Pathways for Communications Systems

- E. References

- F. References, Codes and Standards as required by Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.

- G. In addition, meet the following:
 - 1. ANSI/TIA/EIA - 568-B Commercial Building Telecommunications Cabling Standard
 - 2. ANSI/TIA/EIA - 569-A Commercial Building Standard for Telecommunications Pathway and Spaces
 - 3. EIA/TIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - 4. EIA/TIA-607 Commercial Building Grounding and Bonding requirements for Telecommunications
 - 5. NEMA - 250
 - 6. Federal Communications Commission 47 CFR 68.
 - 7. BICSI Telecommunications Distribution Design Manual
 - 8. BICSI Telecommunications Cabling Installation Manual

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

9. ANSI/NECA/BICSI 568-2001 Standard for Installing Commercial Building Telecommunications Cabling
10. ADA - Americans with Disabilities Act
11. NFPA 70 - 2002, including:
 - a. NEC - Article 770
 - b. NEC - Article 800
12. Underwriters Laboratory

1.3 QUALITY ASSURANCE

- A. Conform to the quality assurance requirements of Section 27 05 00, Common Work Results for Communications and Division 01, General Requirements.
- B. Install cabling and connectivity components in a neat and workmanlike manner. Methods of construction that are not specifically described or indicated in the Contract Documents and subject to the control and approval of the owner's Information technology Department.
- C. Equipment and materials quality and manufacture indicated. Equipment specified is based upon the manufacturers listed.
- D. Equipment new and free of defects.
- E. Strictly adhere to Telecommunications Industry Alliance standard installation practices when installing UTP data cabling.
- F. Materials and work specified herein comply with the most current version of the publications listed in the References section of this document.

1.4 SUBMITTALS

- A. Including, but not limited to: Product Data Sheets, Shop Drawings, etc.
- B. General:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.
- C. Closeout Submittals:
 1. Submit in accordance with Section 27 05 00, Common Work Results for Communications submittal requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Horizontal Cable:
 1. Nexans (Berk-Tek)
 2. Superior Essex
 3. General
 4. Or approved equal.

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

- B. Work Area Outlet Jacks:
 - 1. Commscope MGS400-270
 - 2. Or approved equal.
- C. Faceplates:
 - 1. Commscope
 - 2. Or approved equal.

2.2 HORIZONTAL CABLE

- A. Performance: Transmission Characteristics: ANSI/TIA/EIA-568-B.2-10 standard for Category 6 UTP cable.
- B. Meet applicable requirements of ANSI/ICEA S-80-576.
- C. Four 24 AWG Twisted pairs.
- D. The overall diameter of the cable less than 0.28 inches.
- E. The ultimate breaking strength measured in accordance with ASTM D 4565 400 N minimum.
- F. Lead free cable jackets and rated for its installed environment.
- G. Withstand a bend radius of 1-inch at -20 degrees C without jacket or insulation cracking.
- H. Cable jacket color white
- I. The cabling used in this project manufacturer compatible with other parts of the component system for a full 20-year warranty. In order to qualify for the warranty, the structured cabling system must be installed per the following:
 - 1. Meet TIA/EIA commercial building wiring standards.
 - 2. Use products purchased from authorized distributors.
 - 3. Install installed in accordance with the manufacturer's warranty guidelines.

2.3 WORK AREA OUTLET JACKS

- A. Performance:
 - 1. Physical Characteristics:
 - a. Keystone style.
 - b. Functional from -10 degrees F to 140 degrees F.
 - c. Test in accordance with ANSI/EIA/TIA-568-B.2-1 for Category 6
 - d. Modular RJ45 jacks that snap into user configurable faceplates meeting durability requirements specified in IEC 603-7.
 - e. 110 IDC, RJ45 type suitable for eight 22-26 AWG wires and be certified Category 6 compliant.
 - f. Construct jacks of high-impact plastic.
 - g. Separate and align conductors internally by separate compartments within the jack.
 - h. Wired in accordance with EIA/TIA T568B polarization sequence.
 - i. Provide jacks in the following colors:
 - 1) Data: Gray
 - 2) FACEPLATES

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

- B. Provide high-impact plastic faceplates with labels, label faceplates according to the guidelines set forth in Section 27 08 00,
- C. Single gang faceplates, 2-3/4-inch by 4-1/2-inch
- D. Double-gang faceplates, 4-1/2-inch by 4-1/2-inch
- E. Keystone style.
- F. 2 port standard.
- G. Provide blank inserts for unfilled outlet locations.
- H. Finish: Ivory
- I. UL Listed

PART 3 EXECUTION

3.1 INSTALLATION

- A. UTP Cable:
 - 1. Conceal wiring in walls or soffits. Install in metal conduits.
 - 2. Install exposed wiring in surface raceway.
 - 3. Install wiring above ceilings in open top cable hangers.
 - 4. Support cable above accessible ceilings 3-foot on center from cable support attached to building structure.
 - 5. Do not untwist cable pairs more than 1/2-inch when terminating.
 - 6. Maximum length, 90 meters.
 - 7. No physical defects such as cuts, tears, or bulges in the outer jacket. Replace defective cables.
 - 8. Install cable in neat and workmanlike manner. Neatly bundle and tie cable in closets. Leave sufficient cable for 90 degree sweeps at vertical drops.
 - 9. Maintain the following clearances from EMI sources.
 - a. Power Cable: 6-inches
 - b. Fluorescent Lights: 12-inches
 - c. Transformers: 48-inches
 - 10. Do not install Category 6 cable with more than 25 pounds pull force, as specified in EIA/TIA and BICSI installation practices. Utilize appropriate cable lubricant in sufficient quantity to reduce pulling friction to acceptable levels on:
 - a. Long pulls inside conduit, pulls of multiple cables into a single small bore conduit, on conduit runs greater than 100 lineal feet with bends of opposing directions, and in conduit runs that exceed 180 degrees of accumulated bends.
 - b. Use of tensile rated cords (i.e., fishing line) should be used for difficult or questionable pulls – to judge to go/no-go condition of the conduit and pulling setup. Utilize thin-coat lubricants when feasible.
 - 11. Replace cables jackets that are chaffed or burned exposing internal conductor insulation or have bare copper, shiners.
 - 12. Firestop openings where cable is installed through a fire rated wall or enclosure.

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

- B. Inserts and Faceplates:
1. Terminate cables with high density modular jacks that snap into a faceplate mounted on a wall outlet box, surface raceways, or power pole.
 2. Secure outlet boxes to building with mechanical fasteners. Adhesive fasteners are not allowed.
 3. Fill extra openings with blank inserts.
 4. Terminate cable per EIA/TIA T568B standard pin assignments.
 5. Locate so that combined length of cables and cords from panel to phone or computer does not exceed 3m.

END OF SECTION

COMMUNICATIONS HORIZONTAL CABLING - SECTION 27 15 00

NEHS



CIVIL | STRUCTURAL | FIRE

Structural Calculations

North Eugene High School
200 Silver Ln, Eugene, OR 97404

Prepared For: GMA Architects
Work Order: 22569
Date: 18 March 2020

Project Abstract:

Structural Calculation is performed to check structural capacity of existing roof member (Beam, truss) under gravity load for Rooftop unit (RTU305, RTU600, RTU600A).
Approx. weight (including curb) of units are as follows:

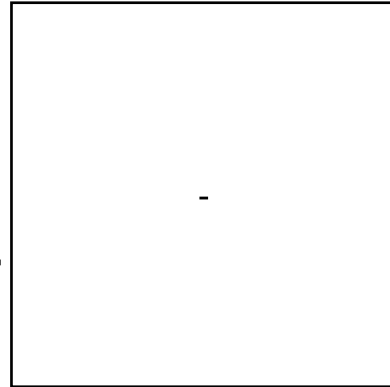
RTU305- 681#
RTU600- 522#
RTU600A- 544#

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Structural Calculations

North Eugene High School
200 Silver Ln, Eugene, OR 97404

Prepared For: GMA Architects
Work Order: 22569
Date: 18 March 2020



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<i>RTU305 Markup</i>	7-10
<i>Roof Truss Loading</i>	11-18
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200 Silver Ln, Eugene, OR 97404, USA

Latitude, Longitude: 44.0948533, -123.1316914



Date	3/17/2020, 3:53:30 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	0.729	MCE_R ground motion. (for 0.2 second period)
S_1	0.413	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.887	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.591	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

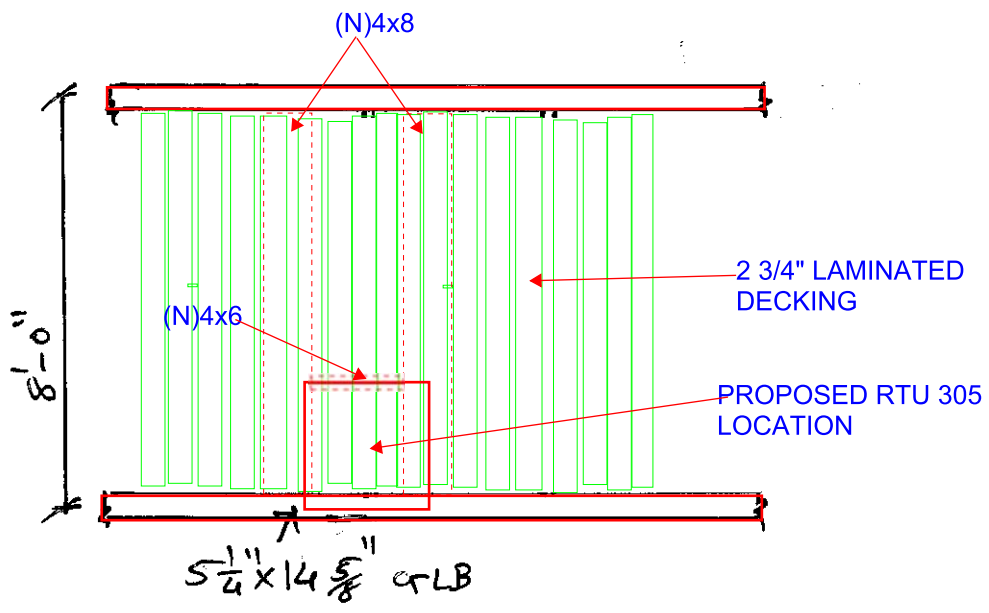
Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.217	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.347	MCE_G peak ground acceleration
F_{PGA}	1.253	Site amplification factor at PGA
PGA_M	0.435	Site modified peak ground acceleration
T_L	16	Long-period transition period in seconds
S_{sRT}	0.729	Probabilistic risk-targeted ground motion. (0.2 second)
S_{sUH}	0.836	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_{sD}	1.5	Factored deterministic acceleration value. (0.2 second)
S_{1RT}	0.413	Probabilistic risk-targeted ground motion. (1.0 second)
S_{1UH}	0.481	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S_{1D}	0.683	Factored deterministic acceleration value. (1.0 second)
$PGAd$	0.567	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.872	Mapped value of the risk coefficient at short periods
C_{R1}	0.859	Mapped value of the risk coefficient at a period of 1 s

NEHS

WORK ORDER:	PROJECT:	ENGR:	DATE:
-------------	----------	-------	-------

* RTU 305 :-

- weight of unit with curb = 681#
- location :- at ROOF above corridor
- ROOF Dead Load = 12 PSF
- ROOF Snow Load = 25 PSF
- $5\frac{1}{4}" \times 14\frac{5}{8}"$ CLB @ 8'-0" o.c.
- Assumed dimension of RTU - 3 Ft x 3 Ft x 2 Ft



(plan view - N/T/S)

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 Title Block" selection.
 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

File = C:\Users\jayb\DOCUME~1\ENERCA~1\North Eugene High School.ec6 .
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AE GROUP

DESCRIPTION: Existing GLB beam at 8'-0" OC

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
 Load Combination Set : ASCE 7-16

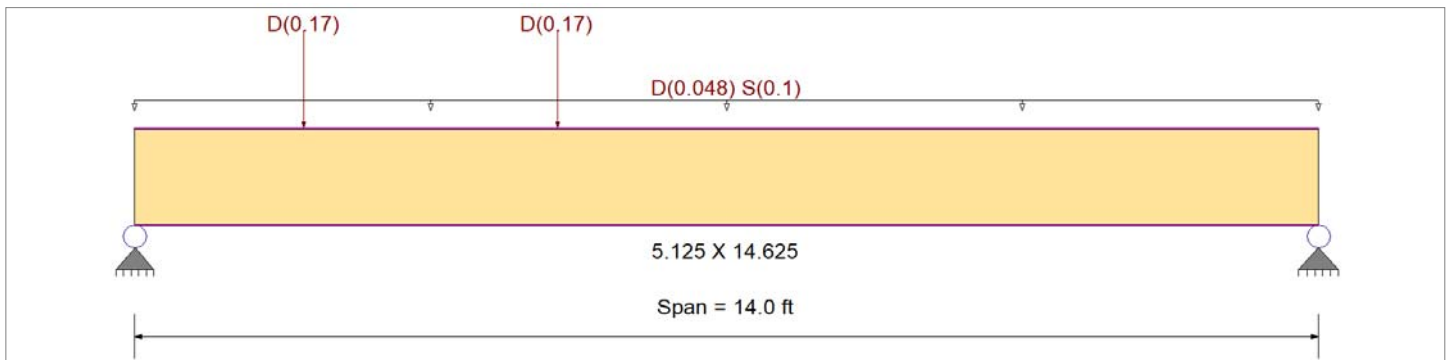
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination : ASCE 7-16

Fb +	1,000.0 psi	E : Modulus of Elasticity	
Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Fc - Perp	1,000.0 psi		
Fv	65.0 psi	Density	34.0pcf
Ft	65.0 psi		

Wood Species :
 Wood Grade :

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0480, S = 0.10, Tributary Width = 1.0 ft
 Point Load : D = 0.170 k @ 2.0 ft
 Point Load : D = 0.170 k @ 5.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.242	1	Maximum Shear Stress Ratio	=	0.299	: 1
Section used for this span	=	5.125 X 14.625		Section used for this span	=	5.125 X 14.625	
	=	278.85psi			=	22.36 psi	
	=	1,150.00psi			=	74.75 psi	
Load Combination	=	+D+S+H		Load Combination	=	+D+S+H	
Location of maximum on span	=	6.438ft		Location of maximum on span	=	0.000ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.050 in	Ratio =	3356	>=	360	
Max Upward Transient Deflection		0.000 in	Ratio =	0	<	360	
Max Downward Total Deflection		0.087 in	Ratio =	1934	>=	180	
Max Upward Total Deflection		0.000 in	Ratio =	0	<	180	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values						
			M	V	C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v			
+D+H	Length = 14.0 ft	1	0.135	0.183	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	900.00	0.00	0.00	0.00	0.00	0.00	58.50
+D+L+H	Length = 14.0 ft	1	0.121	0.165	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1000.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 14.0 ft	1	0.097	0.132	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1250.00	0.00	0.00	0.00	0.00	0.00	81.25
+D+S+H	Length = 14.0 ft	1	0.242	0.299	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.25	278.85	1150.00	0.00	0.00	0.00	0.00	0.00	74.75
+D+0.750Lr+0.750L+H	Length = 14.0 ft	1	0.097	0.132	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1250.00	0.00	0.00	0.00	0.00	0.00	81.25
+D+0.750L+0.750S+H	Length = 14.0 ft	1	0.208	0.260	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.64	238.94	1150.00	0.00	0.00	0.00	0.00	0.00	74.75

NEHS

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 Engineer:
 Project ID:
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AE GROUP

DESCRIPTION: Existing GLB beam at 8'-0" OC

Load Combination	Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values			
			M	V								M	fb	F'b	V	fv	F'v	
+D+0.60W+H	Length = 14.0 ft	1	0.076	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1600.00	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+0.450W+H	Length = 14.0 ft	1	0.076	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1600.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+0.450W+H	Length = 14.0 ft	1	0.149	0.187	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.64	238.94	1600.00	0.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 14.0 ft	1	0.045	0.062	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.11	72.76	1600.00	0.00	0.00	0.00	0.00
+D+0.70E+0.60H	Length = 14.0 ft	1	0.076	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	121.27	1600.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+0.5250E+H	Length = 14.0 ft	1	0.149	0.187	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.64	238.94	1600.00	0.00	0.00	0.00	0.00
+0.60D+0.70E+H	Length = 14.0 ft	1	0.045	0.062	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.11	72.76	1600.00	0.00	0.00	0.00	0.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0868	6.949		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.291	1.121
Overall MINimum	0.700	0.700
+D+H	0.591	0.421
+D+L+H	0.591	0.421
+D+Lr+H	0.591	0.421
+D+S+H	1.291	1.121
+D+0.750Lr+0.750L+H	0.591	0.421
+D+0.750L+0.750S+H	1.116	0.946
+D+0.60W+H	0.591	0.421
+D+0.750Lr+0.750L+0.450W+H	0.591	0.421
+D+0.750L+0.750S+0.450W+H	1.116	0.946
+0.60D+0.60W+0.60H	0.355	0.253
+D+0.70E+0.60H	0.591	0.421
+D+0.750L+0.750S+0.5250E+H	1.116	0.946
+0.60D+0.70E+H	0.355	0.253
D Only	0.591	0.421
Lr Only		
L Only		
S Only	0.700	0.700
W Only		
E Only		
H Only		

Title Block Line 1
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Wood Beam

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AE GROUP

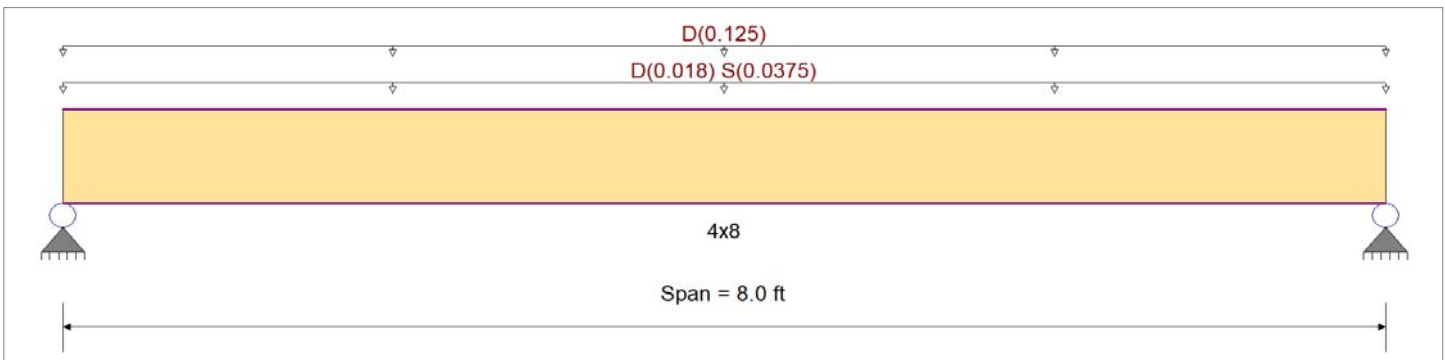
DESCRIPTION: 4X8 between the beam

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
 Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	850.0 psi	Ebend- xx
	Fc - Prll	1,400.0 psi	Eminbend - xx
Wood Species : Douglas Fir - Larch (North)	Fc - Perp	625.0 psi	
Wood Grade : No. 1/No. 2	Fv	180.0 psi	
	Ft	500.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			30.590pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
 Uniform Load : D = 0.0180, S = 0.03750, Tributary Width = 1.0 ft
 Uniform Load : D = 0.1250, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.467 : 1	Maximum Shear Stress Ratio	=	0.185 : 1
Section used for this span	=	4x8	Section used for this span	=	4x8
	=	464.61 psi		=	29.97 psi
	=	994.50 psi		=	162.00 psi
Load Combination	=	+D+H	Load Combination	=	+D+H
Location of maximum on span	=	4.000ft	Location of maximum on span	=	7.416 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.020 in	Ratio =	4911	>=360
Max Upward Transient Deflection		0.000 in	Ratio =	0	<360
Max Downward Total Deflection		0.097 in	Ratio =	990	>=180
Max Upward Total Deflection		0.000 in	Ratio =	0	<180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values						
			M	V	C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v			
+D+H	Length = 8.0 ft	1	0.467	0.185	0.90	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	994.50	0.00	0.00	0.00	0.00	0.00	162.00
+D+L+H	Length = 8.0 ft	1	0.420	0.166	1.00	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1105.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 8.0 ft	1	0.336	0.133	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1381.25	0.00	0.00	0.00	0.00	0.00	0.00
+D+S+H	Length = 8.0 ft	1	0.458	0.181	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.49	582.02	1270.75	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 8.0 ft	1	0.336	0.133	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1381.25	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 8.0 ft	1	0.435	0.172	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.41	552.66	1270.75	0.00	0.00	0.00	0.00	0.00	0.00

NEHS

Title Block Line 1
 You can change this area
 using the "Settings" menu item
 and then using the "Printing &
 Title Block" selection.
 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 18 MAR 2020, 1:42PM

Wood Beam

File = C:\Users\jrayb\DOCUME~1\ENERCA~1\North Eugene High School.ec6 .
 Software copyright ENERCALC, INC. 1983-2020, Build:12.20.2.24 .

Lic. # : KW-06004985

AE GROUP

DESCRIPTION: 4X8 between the beam

Load Combination Segment Length	Span #	Max Stress Ratios		C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values				
		M	V								M	fb	F'b	V	fv	F'v		
+D+0.60W+H Length = 8.0 ft	1	0.263	0.104	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1768.00	0.00	0.00	0.00	0.00	288.00
+D+0.750Lr+0.750L+0.450W+H Length = 8.0 ft	1	0.263	0.104	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1768.00	0.00	0.00	0.00	0.00	288.00
+D+0.750L+0.750S+0.450W+H Length = 8.0 ft	1	0.313	0.124	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.41	552.66	1768.00	0.00	0.00	0.00	0.00	288.00
+0.60D+0.60W+0.60H Length = 8.0 ft	1	0.158	0.062	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.71	278.76	1768.00	0.00	0.00	0.00	0.00	288.00
+D+0.70E+0.60H Length = 8.0 ft	1	0.263	0.104	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.19	464.61	1768.00	0.00	0.00	0.00	0.00	288.00
+D+0.750L+0.750S+0.5250E+H Length = 8.0 ft	1	0.313	0.124	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.41	552.66	1768.00	0.00	0.00	0.00	0.00	288.00
+0.60D+0.70E+H Length = 8.0 ft	1	0.158	0.062	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.71	278.76	1768.00	0.00	0.00	0.00	0.00	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0969	4.029		0.0000	0.000

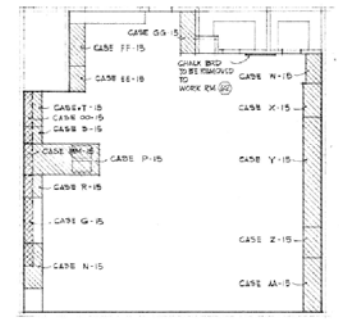
Vertical Reactions

Support notation : Far left is #1

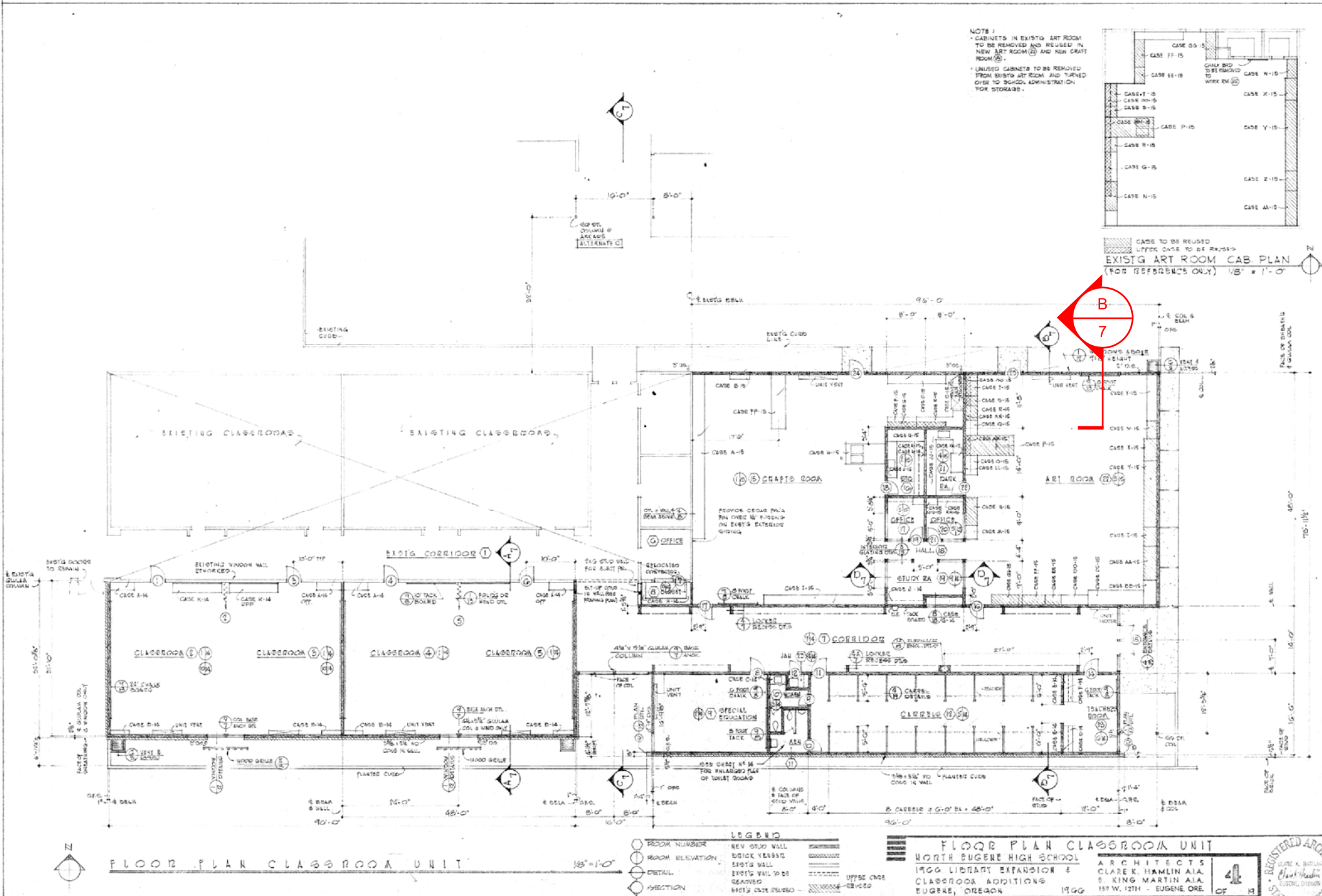
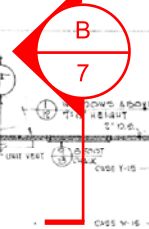
Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.744	0.744
Overall MINimum	0.150	0.150
+D+H	0.594	0.594
+D+L+H	0.594	0.594
+D+Lr+H	0.594	0.594
+D+S+H	0.744	0.744
+D+0.750Lr+0.750L+H	0.594	0.594
+D+0.750L+0.750S+H	0.706	0.706
+D+0.60W+H	0.594	0.594
+D+0.750Lr+0.750L+0.450W+H	0.594	0.594
+D+0.750L+0.750S+0.450W+H	0.706	0.706
+0.60D+0.60W+0.60H	0.356	0.356
+D+0.70E+0.60H	0.594	0.594
+D+0.750L+0.750S+0.5250E+H	0.706	0.706
+0.60D+0.70E+H	0.356	0.356
D Only	0.594	0.594
Lr Only		
L Only		
S Only	0.150	0.150
W Only		
E Only		
H Only		

NOTES:
 1. CABINETS IN EXISTING ART ROOM TO BE REMOVED AND REUSED IN NEW ART ROOM (2) AND NEW CRAFT ROOM (3).
 2. UNLISHED CABINETS TO BE REMOVED FROM EXISTING ART ROOM AND TURNED OVER TO SCHOOL ADMINISTRATION FOR STORAGE.



CASE TO BE REUSED
 UPPER CASE TO BE REUSED



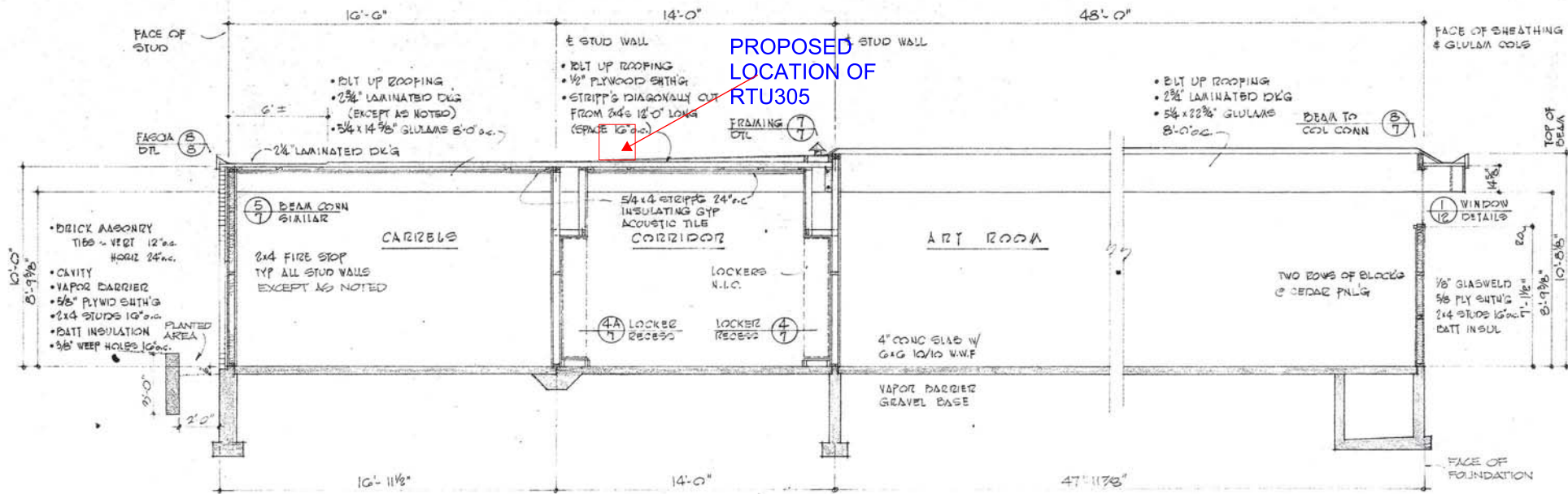
FLOOR PLAN CLASSROOM UNIT
 NORTH EUGENE HIGH SCHOOL
 1966 LIBRARY EXPANSION &
 CLASSROOM ADDITIONS
 EUGENE, OREGON 1966

ARCHITECTS
 CLARK, HAMLIN & A.A.
 B. KING MARTIN A.A.
 157 W. 12TH - EUGENE ORE.

REGISTERED ARCHITECT
 CLARK HAMLIN & A.A.
 EUGENE, OREGON

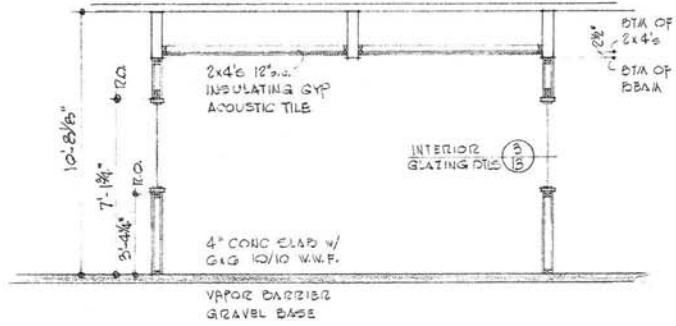
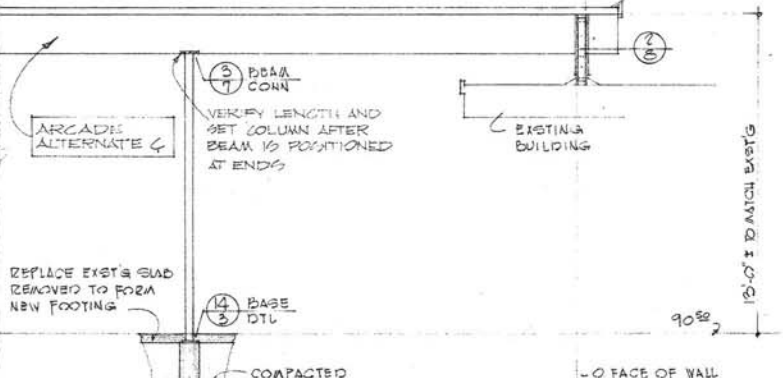
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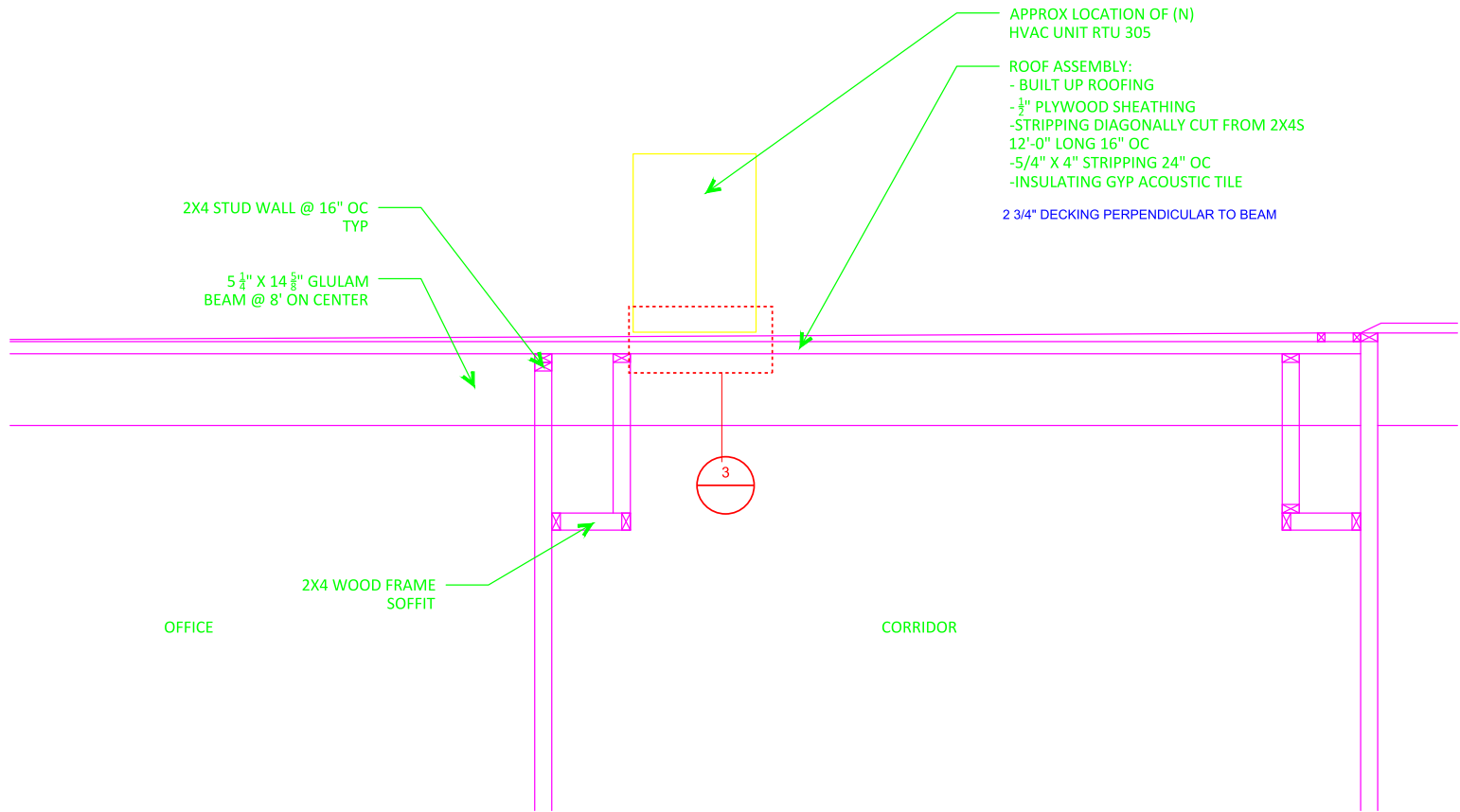
NEHS



SECTION THRU CARRELS, CORRIDOR, & ART ROOM
 1/4" = 1'-0"

BOLT UP ROOFING
 2 3/4" LAM DKG
 5/4 x 14 5/8" GLULAM





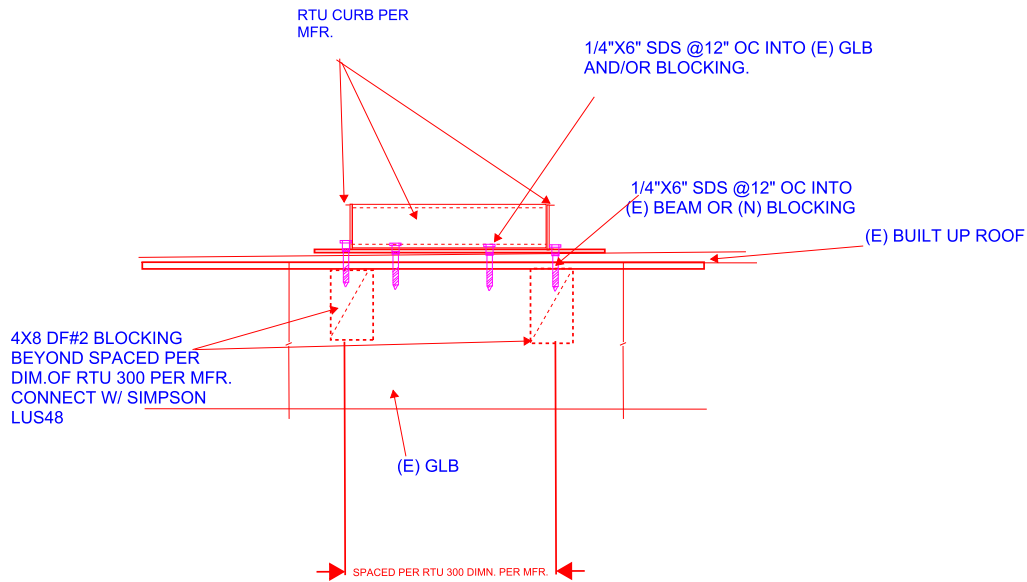
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7

ROOFTOP MECHANICAL UNIT DIAGRAM

1/2" = 1'-0"



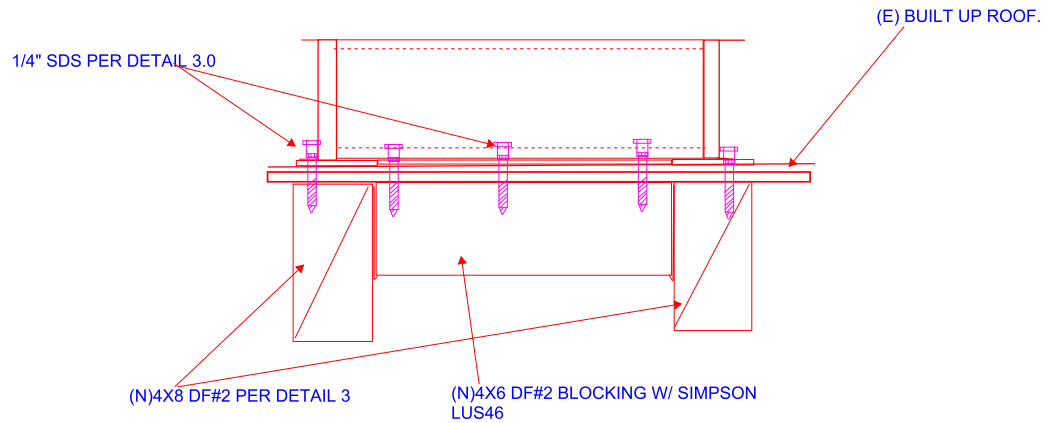
NORTH



3

ROOFTOP (RTU 305) UNIT DETAIL SECTION

N.T.S



4

ROOFTOP((RTU305) UNIT DETAIL SECTION

N.T.S



WORK ORDER:

PROJECT:

ENGR:

DATE:

Assumed Roof Dead Load :-

$\frac{3}{4}$ " plywood sheathing = 3 PSF

1" insulation = 2 PSF

mineral surface = 1.5 PSF

\Rightarrow Total Roof Dead Load = 6.8 PSF

WORK ORDER:	PROJECT:	ENGR:	DATE:
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- ROOF Dead Load = 8 PSF x 4 Ft ^{Trib.} = 32 P/F.
- RTU Dead Load = 90 P/F.
- ROOF Snow Load = 25 PSF x 4 Ft = 100 P/F.

$$D + S = (32 P/F + 90 P/F) + 100 P/F$$

$$= 222 P/F.$$

→ From table

TJ60 is similar to TJS w/ 24" depth,
4'-0" o.c., & 28ft. span.

Allowable uniform load = $0.04 \times 266 P/F + 266 P/F$

{ 4% increase is allowed per manufacturer for the members are joined by transverse load-distributing elements (decking) adequate to support the load }

∴ Allowable uniform load = $277 P/F > 222 P/F.$

--- (OK).


NEHS

STRUCTURAL PRODUCTS DESIGN MANUAL

Trus Joist is the world's leader in the manufacture and application of engineered lumber products. We provide the most comprehensive line of structural products in the industry for applications from residential and multi-family dwellings, to retail stores, office buildings, schools, hotels and other commercial structures.

For ease of use, this manual has two divisions; refer to the appropriate division for full technical information on the applications that best suit your needs.

Division I: Commercial Products

 These products are primarily intended for use in retail stores, office buildings, schools, restaurants, hotels, warehouses, nursing homes, etc. They are typically designed, manufactured and sold by Trus Joist for each specific job. For additional information, contact your Trus Joist representative or call **1-800-628-3997** for the Trus Joist representative nearest you.

Division II: Residential Products

 These products are primarily intended for use in single and multi-family dwellings. They are readily available through our nation-wide network of distributors and dealers. For additional information, contact your Trus Joist representative or call **1-800-628-3997** for the Trus Joist representative nearest you.

Introduction

Trus Joist

From its founding in Boise, Idaho, in 1960, Trus Joist has established a record of phenomenal growth, becoming one of the world's leading manufacturers of roof and floor structural components. More than 175 technical representatives serve architects, engineers and builders throughout the United States and Canada from over 90 sales offices and 16 manufacturing plants. The growth and success of the company is based upon recognition and acceptance of Trus Joist's unique product line and many years of proven performance. All products are manufactured in Trus Joist facilities to rigid standards. It is the continuing commitment of Trus Joist to maintain the highest possible standards for both product quality and customer service.

Research and Development

The Trus Joist Research and Development group is one of the most active and prolific in the wood products industry. All Trus Joist products were created and developed by this department, as was most of the machinery used in the manufacture of those products. The department is also recognized throughout the industry for having contributed a significant amount of the present technology utilized in the gluing of structural wood, as well as considerable research into the strength of various wood species. Currently, research continues into ways of achieving even more efficient utilization of wood fiber and into new and innovative product engineering.

It is through Research and Development that Trus Joist has succeeded in providing the construction industry with a line of unique structural components. These components have enabled architects to expand their design horizons, engineers to achieve new levels of structural precision, and builders to gain new efficiencies in construction.

Engineering

Trus Joist maintains a large staff of professional engineers and technical specialists charged with ensuring product and application integrity for each project. The most advanced technology in the industry helps Trus Joist design each product application quickly and with precision.

Trus Joist engineers also supervise a rigid quality control program which demands that all Trus Joist products be manufactured to precise tolerances and that they meet or exceed code requirements. Trus Joist engineers are available to advise customers with specific design or detailing requirements related to our products.

Technical Support

Trus Joist fields a sales force of more than 175 technical representatives, many of whom have design and engineering backgrounds. Their services include consultation, computer-assisted design and layout, delivery coordination and installation review. They'll suggest cost-

cutting installation techniques and check special application requirements. And, of course, they're backed by a staff of engineers who give complete technical support as needed. Special requests are accommodated wherever practical, including comprehensive cost analysis, engineering analysis, help with building code approvals, or the creation of special product applications versatile enough to accommodate bold and innovative designs. The goal of Trus Joist technical support is to help the architect or specifier achieve quality design applications with the most cost efficient product selection possible.

Installation Review

Although responsibility for proper installation lies with the contractor-builder, Trus Joist provides detailed installation suggestions and guidelines. If requested, a Trus Joist representative will visit the site to verify the contractor's understanding of proper installation. Trus Joist engineers also are available to help solve job site application problems.



Every precaution has been taken to ensure that all data and information contained in this manual are as accurate as possible. However, Trus Joist cannot assume responsibility or liability for errors or omissions resulting from the use of this Design Manual in the preparation of plans or specifications.

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www.trusjoist.com

200 E. Mallard Drive (83706) • P.O. Box 60, Boise, ID 83707 • Phone (208) 364-1200

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TJI® Joist

The TJI® joist offers a lightweight roof and floor joist for residential, multifamily, institutional, commercial and light industrial applications.

This product is available in several series to provide the most cost effective system. See page 3.1 for dimensions and details.



SIMILAR TO TJ60

TJL™, TJLX™, TJW™ Truss

The design flexibility of the TJL™, TJLX™ and TJW™ open-web trusses permit utilization in many innovative and unusual structural configurations in the midspan range.

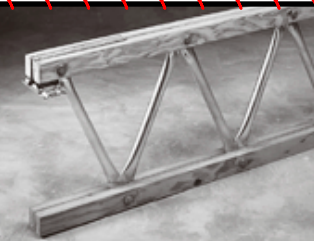
TJL™, TJLX™ and TJW™ open-web trusses are available in many different profiles, including parallel, curved, crescent, cantilevered, tapered and pitched. See page 4.1 for dimensions and details.



TJS™ Truss

The TJS™ series offers excellent profile flexibility and optimum efficiency. It carries heavier loads at longer spans than the TJL™ truss and has proven popular in schools, office complexes and other construction requiring large open areas or few load-bearing walls.

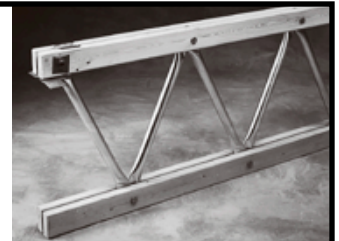
TJS™ series trusses can be designed in a wide variety of roof profiles, including parallel, tapered, pitched and curved. See page 4.1 for dimensions and details.



TJM®, TJH™ Truss

The heavier duty trusses, the TJM® and TJH™ series, can efficiently carry heavy loads with long spans in warehouses, shopping centers, auditoriums and other large area buildings.

The TJM® and TJH™ series are available in parallel, pitched or single tapered configurations. Capable of spanning up to 120' clear span, this series is the answer to your long span needs. See page 4.1 for dimensions and details.



TimberStrand® LSL

We use a patented technology to produce this remarkable new generation of engineered lumber from fast-growing species such as aspen or yellow poplar. Large TimberStrand® laminated strand lumber (LSL) billets are cut to each customer's most exacting specifications in lengths up to 48'. And every inch has the same strength, dimensional stability, nailability and reliability as the last. See page 8.2 for additional information.



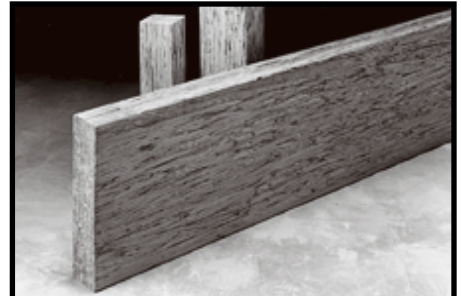
Microllam® LVL

Introduced in 1971, a result of Trus Joist's advanced technology, Microllam® laminated veneer lumber (LVL) has been acclaimed as the most significant development in utilization of wood fiber since plywood. This engineered, laminated veneer lumber makes possible design innovations, efficiencies and cost savings when used as headers or beams in all types of buildings. It is available in lengths up to 80' and in a variety of depths. See page 8.2 for additional information.

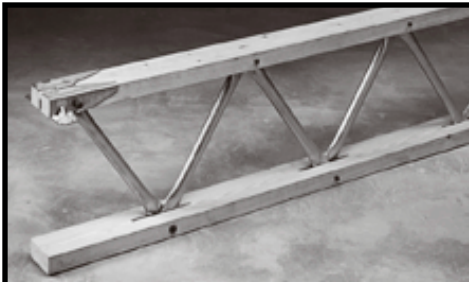


Parallam® PSL

This award-winning advanced wood fiber technology creates beams of exceptional strength, consistency and beauty. All the construction benefits of wood—and more—can be found in Parallam® parallel strand lumber (PSL). This engineered composite lumber will carry more load per section size than most any traditional wood member. It's available in lengths up to 66'. See page 8.2 for additional information.



Open-Web Truss Descriptions



TJL™, TJLX™, TJW™ Truss

Top and Bottom Chords:

TJL™ & TJLX™ Truss – 1.5" x 3.5" machine stress rated lumber

TJW™ Truss – 1.5" x 4.75" machine stress rated lumber

TJL™ trusses with Microllam® LVL top chords may be available; contact your Trus Joist representative.

Webs:

1" and 1½" diameter tubular steel members varying in gauge and diameter according to requirements. 45,000 psi minimum yield.

Weight:

TJL™, TJLX™ Truss: 3.75 to 4.25 lbs/ft
TJW™ Truss: 4.5 to 5.25 lbs/ft

Depths:

Min. depth at wall	14"
Max. depth at wall	50"
Max. pitched ridge depth	50"

Any depth between minimum and maximum is available.



TJS™ Truss

Top and Bottom Chords:

Double 1.5" x 2.3" Microllam® LVL

Webs:

1", 1¼" and 1½" diameter tubular steel members varying in gauge and diameter according to requirements. 45,000 psi minimum yield.

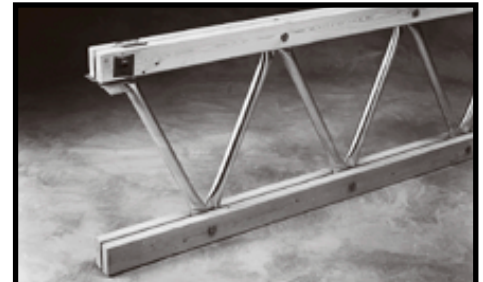
Weight:

4.75 to 5.75 lbs/ft

Depths:

Min. depth at wall	16"
Max. depth at wall	64"
Max. pitched ridge depth	84"

Any depth between minimum and maximum is available.



TJM®, TJH™ Truss

Top and Bottom Chords:

TJM® Truss — Double 1.5" x 3.5" machine stress rated lumber

TJH™ Truss — Double 1.5" x 5.5" machine stress rated lumber

Webs:

Up to 2" diameter tubular steel members varying in gauge and diameter according to requirements. 45,000 psi minimum yield.

Weight:

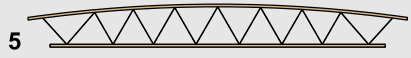
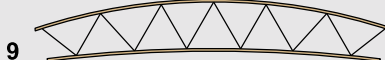
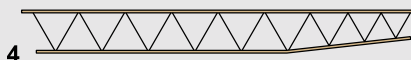
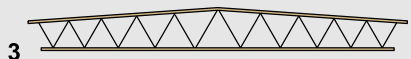
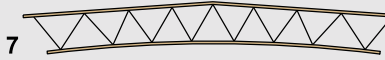
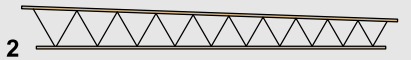
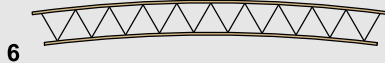
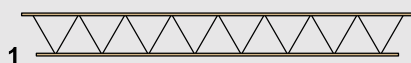
TJM® Truss — 8 to 9 lbs/ft
TJH™ Truss — 10 to 12 lbs/ft

Depths:

	TJM®	TJH™
Min. depth at wall	20"	24"
Max. depth at wall	60"	72"
Max. pitched ridge depth	72"	114"

Any depth between minimum and maximum is available.

Profiles



Tightest Curvature available:

TJL™, TJLX™, TJW™ Truss	50' Radius
TJS™ Truss	200' Radius
TJM® Truss	1100' Radius
TJH™ Truss	1400' Radius

Truss Series	Profiles Available									
	1	2	3	4	5	6	7	8	9	10
TJL™, TJLX™, TJW™	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TJS™	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TJM®	✓	✓	✓	✓				✓		
TJH™	✓	✓	✓	✓				✓		

TJW™ Series

FL=Flat roof less than 1/8" in 12" slope. SL=Sloped roof greater than 1/8" in 12" slope.

Depth	14		16		18		20		22		24		26		28		30		32		34		36		38		40		Depth	
	Span	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	Span		
14	432	432	472	472	472	472	472	472	472	472	472	472	472	454	454	436	436	418	418	403	403	387	387	371	371	356	356	14		
16	340	340	385	385	413	413	413	413	413	413	413	413	413	413	413	413	413	407	407	393	393	378	378	364	364	350	350	16		
18	284	284	322	322	360	360	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	357	357	344	344	18	
20	235	235	268	268	300	300	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	20	
22	194	194	222	222	249	249	276	276	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	22	
24	158	158	183	183	209	209	241	241	264	264	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	275	24	
26	129	135	157	157	179	179	204	204	224	224	244	244	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	26	
28	106	117	136	136	155	155	174	174	200	200	218	218	235	235	236	236	236	236	236	236	236	236	236	236	236	236	236	236	28	
30	88	103	113	119	136	136	152	152	169	169	188	188	203	203	218	218	220	220	220	220	220	220	220	220	220	220	220	220	30	
32	74	90	95	104	118	119	133	133	148	148	163	163	184	184	198	198	206	206	206	206	206	206	206	206	206	206	206	206	32	
34	63	79	81	92	100	105	118	118	131	131	144	144	157	157	170	170	186	186	194	194	194	194	194	194	194	194	194	194	34	
36	54	71	69	82	86	94	104	105	116	116	128	128	139	139	151	151	162	162	174	174	183	183	183	183	183	183	183	183	36	
38	47	62	60	73	74	84	90	94	104	104	114	114	125	125	135	135	145	145	156	156	173	173	173	173	173	173	173	173	38	
40	40	54	53	69	66	79	80	89	95	100	109	109	119	119	128	128	137	137	146	146	157	157	165	165	165	165	165	165	40	
42		46	47	62	58	71	69	79	83	88	97	97	105	105	114	114	127	127	136	136	141	141	147	147	157	157	157	157	42	
44		40	41	54	51	63	61	71	73	79	85	87	94	94	102	102	110	110	118	118	125	125	138	138	141	141	150	150	44	
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48				42	40	52	48	59	57	65	67	71	77	78	84	84	91	91	97	97	104	104	110	110	116	116	122	122	48	
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56						41	38	46	44	51	51	55	58	60	65	65	69	69	74	74	79	79	84	84	89	89	94	94	56	
58						38	43	40	48	46	52	53	56	60	61	65	65	69	69	74	74	78	78	83	83	88	88	93	93	58
60						41	45	42	49	48	53	54	57	61	61	65	65	69	69	73	73	77	77	81	81	85	85	90	90	60
62							39	43	43	46	44	50	54	56	57	61	61	65	65	69	69	73	73	77	77	81	81	85	85	62
64								40	44	44	47	46	51	51	54	57	58	61	61	65	65	68	68	72	72	76	76	80	80	64
66									42	42	45	46	50	51	54	57	58	61	61	64	64	68	68	72	72	76	76	80	80	66
68										39	43	43	46	48	49	52	54	55	58	58	61	61	64	64	68	68	72	72	68	
70											40	43	43	46	48	49	52	54	55	58	58	61	61	64	64	68	68	72	72	70

TJS™ Series

Depth	16		18		20		22		24		26		28		30		32		34		36		38		40		42		44		46		Depth
	Span	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	FL	SL	Span	
14	616	616	638	638	648	648	647	647	651	651	626	626	601	601	577	577	553	553	528	528	507	507	488	488	469	469	449	449	433	433	418	418	14
16	510	510	553	553	563	563	572	572	579	579	577	577	579	579	560	560	538	538	515	515	496	496	478	478	461	461	442	442	427	427	412	412	16
18	401	404	463	463	496	496	504	504	511	511	518	518	520	520	520	520	520	520	503	503	485	485	469	469	453	453	435	435	420	420	406	406	18
20	304	328	375	375	423	423	450	450	456	456	461	461	467	467	471	471	473	473	473	473	472	472	460	460	445	445	428	428	414	414	401	401	20
22	236	271	295	311	350	350	390	390	412	412	416	416	421	421	425	425	429	429	433	433	431	431	432	432	432	432	421	421	408	408	395	395	22
24	188	228	234	261	285	295	328	328	361	361	379	379	383	383	387	387	391	391	394	394	399	399	397	397	399	399	397	397	399	399	390	390	24
26	152	194	190	223	231	251	275	280	308	308	337	337	352	352	355	355	358	358	361	361	364	364	367	367	369	369	370	370	371	371	369	369	26
28	125	167	156	192	190	217	226	241	265	266	291	291	315	315	328	328	331	331	333	333	336	336	338	338	341	341	343	343	341	341	338	338	28
30	105	136	130	168	158	189	188	210	221	232	253	253	275	275	296	296	307	307	309	309	312	312	314	314	316	316	318	318	312	312	311	311	30
32	88	112	110	146	133	166	159	185	186	204	215	223	242	242	260	260	279	279	289	289	291	291	293	293	295	295	297	297	291	291	289	289	32
34	76	94	94	125	114	147	136	164	159	181	183	197	209	214	231	231	248	248	264	264	273	273	274	274	276	276	278	278	272	272	270	270	34
36	65	79	81	103	98	131	117	146	136	161	158	176	180	191	203	206	221	221	236	236	251	251	258	258	260	260	261	261	256	256	254	254	36
38	57	74	70	88	85	111	101	131	118	145	137	158	156	172	176	185	198	198	212	212	225	225	238	238	245	245	246	246	241	241	239	239	38
40	50	64	61	80	74	98	89	118	104	131	119	143	136	155	154	167	173	179	191	191	203	203	215	215	227	227	233	233	228	228	226	226	40
42	44	50	54	71	66	86	78	102	91	119	105	129	120	140	135	151	152	162	169	173	184	184	195	195	206	206	217	217	217	217	215	215	42
44	39	44	48	57	58	72	69	89	81	107	93	118	106	128	120	138	134	148	149	158	165	168	178	178	188	188	198	198	206	206	204	204	44
46		38	43	50	52	63	61	78	72	94	83	108	94	117	107	126	119	135	133	145	147	154	161	163	172	181	181	190	190	195	195	46	
48			39	44	46	56	55	72																									

Work Order: 22569	Project: North Eugene High School	Date: 3/17/20
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Mechanical Unit - Seismic

Notes: control cases for New RTUs

Componet Importance Factor	1	Ip
Spectral acceleration	0.591	Sds
Componet Response Factor	6	Rp
Component Amplification Factor	2.5	ap
Height in Structure (ft)	21	z
Average roof height (ft)	21	h
Component Operating Weight	1200	Wp
Overstrength Factor (lbs)	2.5	Ω
Sesimic Deisign Forces	355	
anchorage design forces with Ω		887

1/4" x 3" SDS check

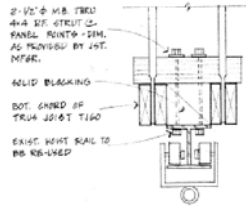
Allowable per Simpson	340
Demand in a single shear line	443
Required number	1.30

Overturning

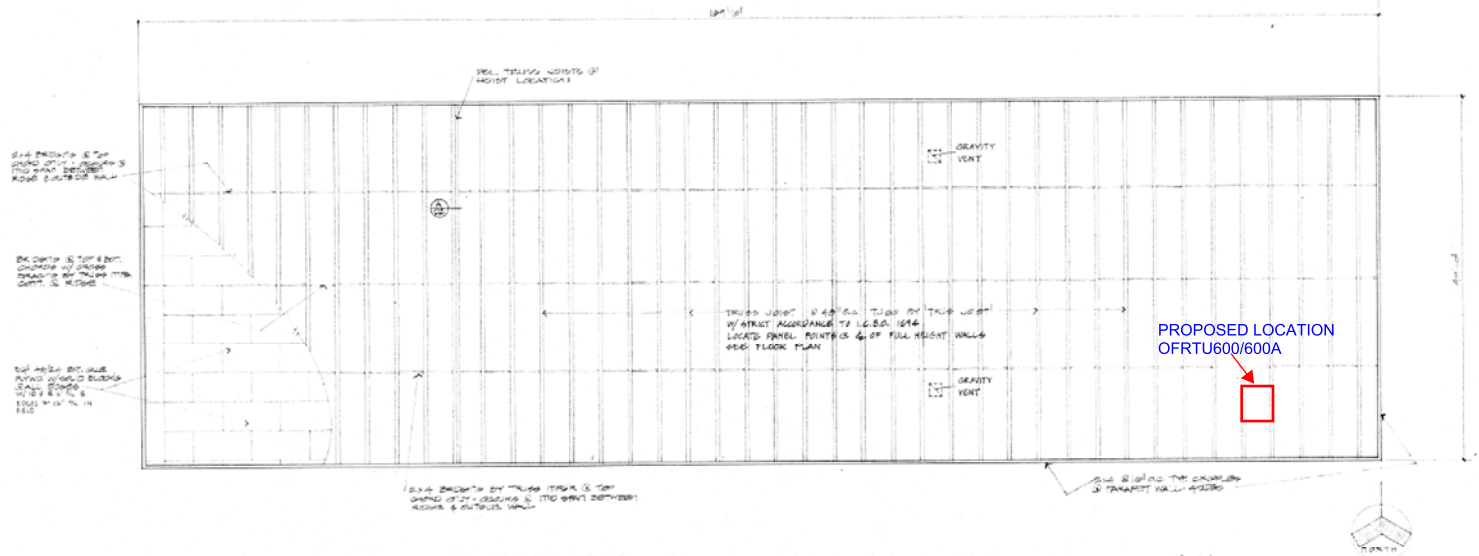
Ht to CG (in)	18
Width of unit (in)	36
Dead Load Factor	0
Tension on longintudinal side (lbs)	177

Overturning

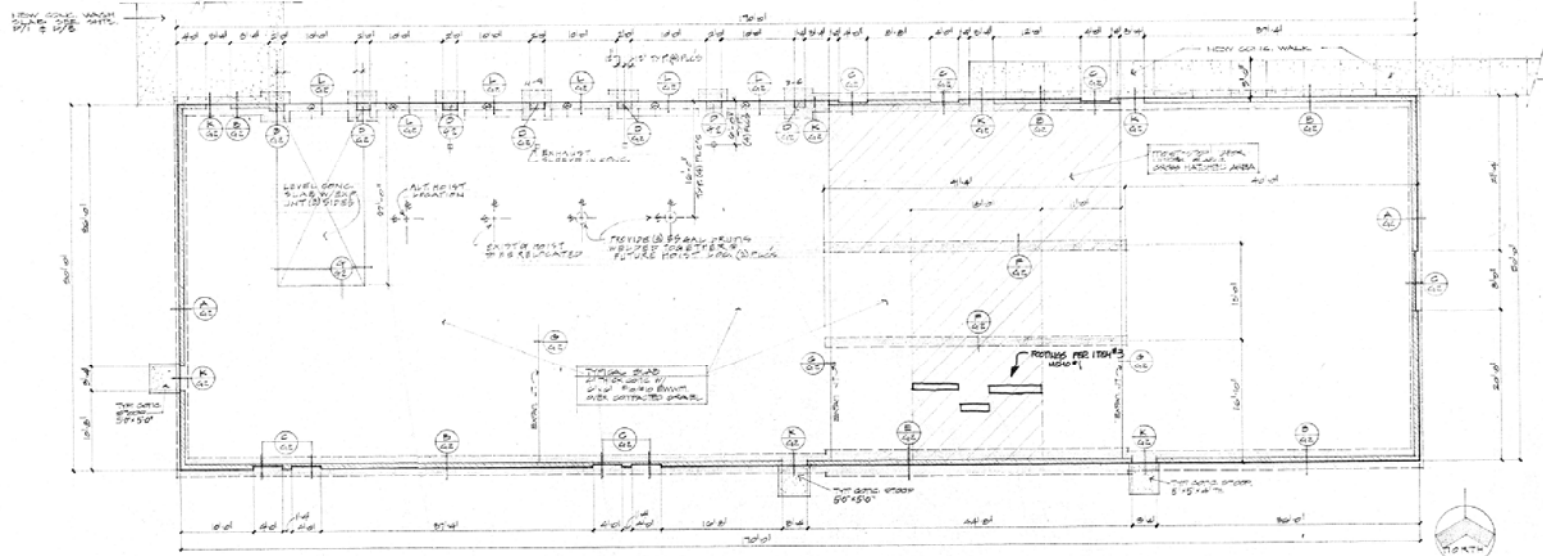
Ht to CG (in)	18
Width of unit (in)	36
Dead Load Factor	0
Tension on longintudinal side (lbs)	177



MOIST SUPPORT DTL 1/8" = 1'-0"



ROOF FRAMING PLAN 1/8" = 1'-0"



FOUNDATION PLAN 1/8" = 1'-0"

kenneth t. nagao
architect
1545 bond lane / 388 high street
eugene, oregon / 503/687-9600 / 344-1518



SCHAUDT · STEMM & WALTER INC.
engineers · surveyors · planners
388 high street · eugene, oregon, 97401 · 503/485-9393

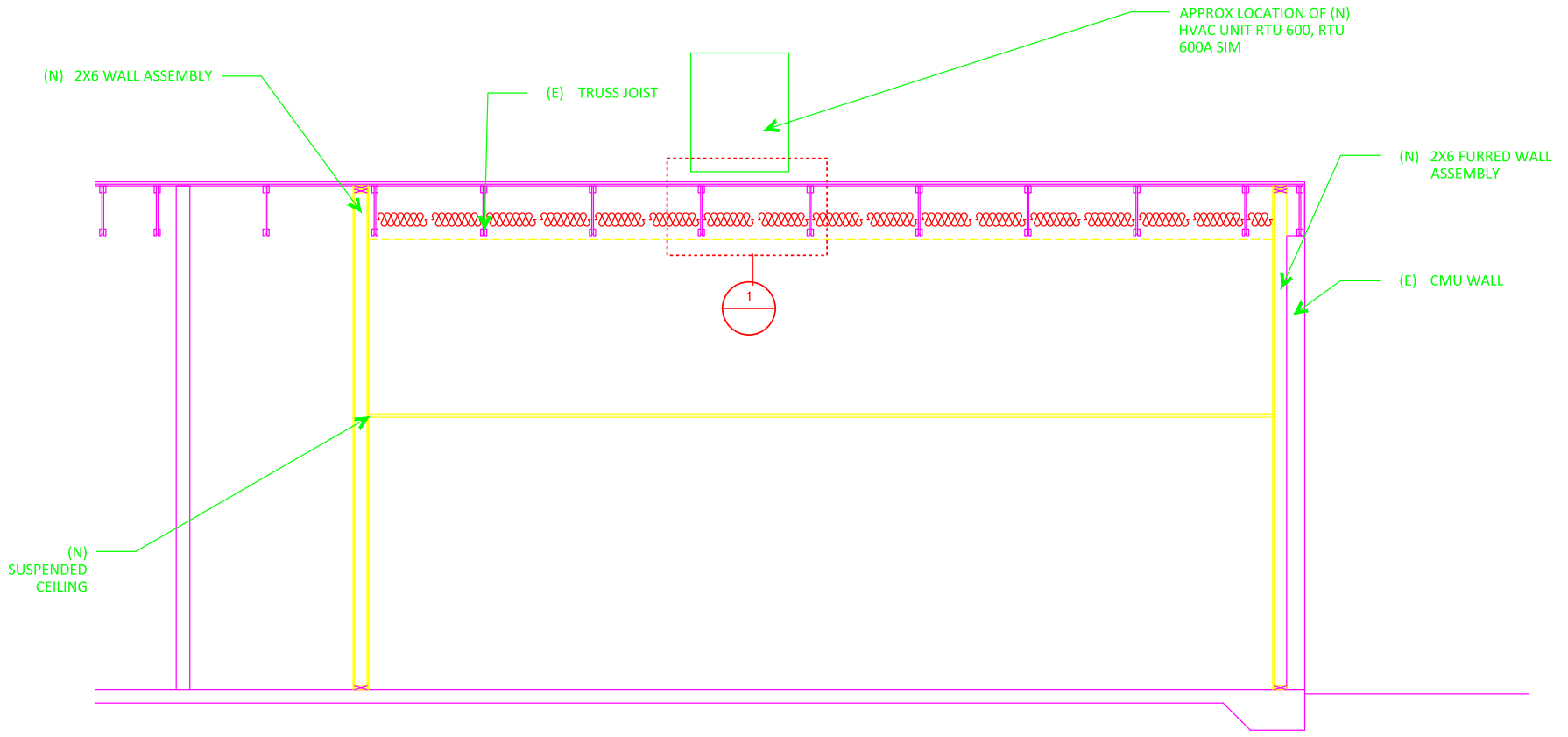
JOB NO.	DRAWN	DATE	CHECKED	FILED
20-112	H.S.T./B.A.	9/17/15	J.W.H.	

REVISIONS	APPROVALS
9-17-15 L.W.P.	CHAIRMAN OF THE BOARD
	SCHOOL SUPERINTENDENT

NEW INDUSTRIAL EDUCATION FACILITIES
SCHOOL DISTRICT 4J, LANE COUNTY
200 NORTH MONROE EUGENE, OREGON

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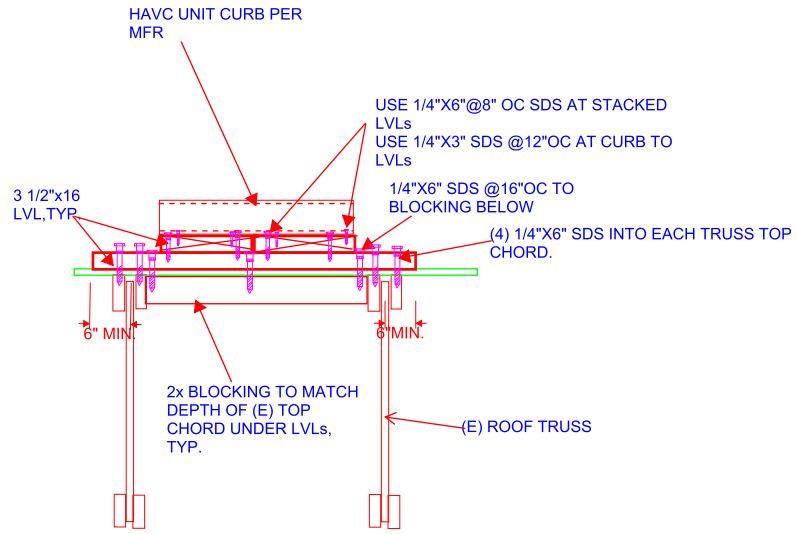
REVISIONS: 9-17-15 L.W.P.
APPROVALS: CHAIRMAN OF THE BOARD, SCHOOL SUPERINTENDENT
SHEET: **D 2** OF 22
NORTH EUGENE



ROOFTOP MECHANICAL UNIT DIAGRAM

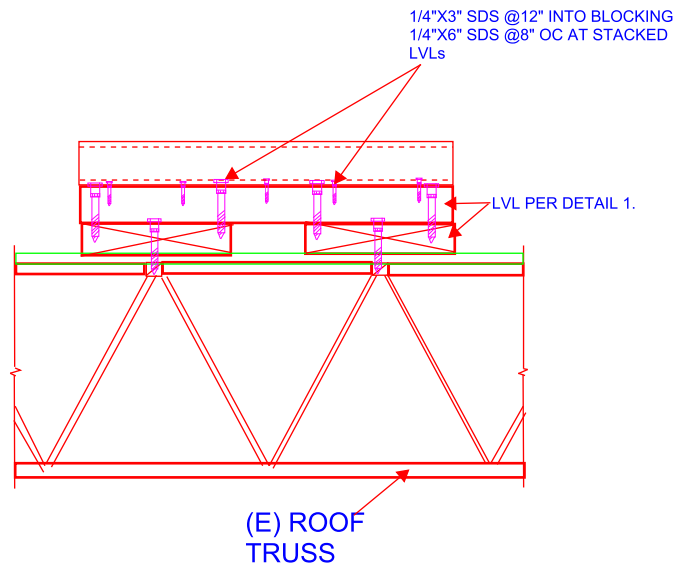
1/4" = 1'-0"





1

ROOFTOP(RTU600/600A) UNIT DETAIL SECTION



2

ROOFTOP (RTU 600/600A) UNIT DETAIL



CONSTRUCTION SPECIFICATIONS

EROSION CONTROL

PERFORMANCE REQUIREMENTS

- A. COMPLY WITH ALL REQUIREMENTS OF U.S. ENVIRONMENTAL PROTECTION AGENCY FOR EROSION AND SEDIMENTATION CONTROL, AS SPECIFIED FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), UNDER REQUIREMENTS FOR THE 2012 GENERAL PERMIT FOR DISCHARGES FROM CONSTRUCTION ACTIVITIES.
- B. COMPLY WITH CITY OF EUGENE EROSION PREVENTION PROGRAM'S OUTCOMES SHEET.
- C. MINIMIZE WIND, WATER, AND VEHICULAR EROSION OF SOIL ON PROJECT SITE DUE TO CONSTRUCTION ACTIVITIES FOR THIS PROJECT. IF EROSION OCCURS DUE TO CONSTRUCTION ACTIVITY, RESTORE ERODED AREAS AT NO COST TO OWNER.
 1. CONTROL MOVEMENT OF SEDIMENT AND SOIL FROM TEMPORARY STOCKPILES OF SOIL. USE PLASTIC SHEETING OVER STOCKPILES DURING WET WEATHER OR THE STOCKPILE IS TO REMAIN IN PLACE FOR OVER 48 HOURS.
 2. PREVENT DEVELOPMENT OF RUTS DUE TO EQUIPMENT AND VEHICULAR TRAFFIC BY PROVIDING HAUL ROADS AND CONSTRUCTION ENTRANCES.
 3. PREVENT WINDBLOWN SOIL FROM LEAVING THE PROJECT SITE.
 4. PREVENT TRACKING OF MUD ONTO PUBLIC ROADS OUTSIDE SITE.
 5. PREVENT MUD AND SEDIMENT FROM FLOWING ONTO SIDEWALKS AND PAVEMENTS.
 6. PREVENT MUD AND SEDIMENT FROM ENTERING ON-SITE OR OFF-SITE STORM DRAINS THROUGH THE USE OF INLET PROTECTION AND PERIMETER SEDIMENT BARRIERS.

FINAL STABILIZATION

- A. COMPLETELY RESTORE ALL AREAS DISTURBED BY CONSTRUCTION:
 1. FILL DEPRESSIONS CAUSED BY CONSTRUCTION WITH SATISFACTORY SOIL MATERIAL IN HORIZONTAL LAYERS NOT EXCEEDING A LOOSE DEPTH OF 8 INCHES AND COMPACT EACH LAYER TO A DENSITY EQUAL TO ADJACENT ORIGINAL GROUND.
 2. RE-SEED ALL DISTURBED AREAS WITH SEED MIXTURE ACCEPTABLE TO 4J SCHOOL DISTRICT. STABILIZE SEEDED AREAS WITH TACKIFIED MULCH, COMPOST, OR APPROVED EQUAL.

FENCE GATE HARDWARE

HINGES & ACCESSORIES

- A. CAPS: CAST STEEL GALVANIZED; SIZED TO POST DIAMETER; SET SCREW RETAINER.
- B. FITTINGS: SLEEVES, BANDS, CLIPS, RAIL ENDS, TENSION BARS, FASTENERS AND FITTINGS; STEEL.
- C. HINGES: TruClose SERIES 3, OR APPROVED EQUAL.
- D. HARDWARE FOR SINGLE SWINGING GATES: 180 DEGREE HINGES, 2 FOR GATES UP TO 60 INCHES HIGH, 3 FOR TALLER GATES; ROLLO LATCH WITH GRAVITY DROP AND PADLOCK HASP; KEEPER TO HOLD GATE IN FULLY OPEN POSITION.
- E. HARDWARE FOR DOUBLE SWINGING GATES: 180 DEGREE HINGES, 2 FOR GATES UP TO 60 INCHES HIGH, 3 FOR TALLER GATES; DROP BOLT ON INACTIVE LEAF ENGAGING SOCKET STOP SET IN CONCRETE, ACTIVE LEAF LATCHES TO INACTIVE LEAF PREVENTING RAISING OF DROP BOLT, PADLOCK HASP; KEEPER TO HOLD GATE IN FULLY OPEN POSITION.
 1. CENTER GATE STOP AND DROP ROD AT DOUBLE GATES. METAL SLEEVE SET IN CONCRETE FOR DROP ROD. PROVIDE CONCRETE CENTER DROP TO FOOTING DEPTH.
- F. HOLD-OPENS: AT EACH GATE, PROVIDE WALL OR POST MOUNTED HASP FOR LOCKING GATE IN THE OPEN POSITION.

EARTH MOVING

SOIL MATERIALS

- A. GENERAL: PROVIDE BORROW SOIL MATERIALS WHEN SUFFICIENT SATISFACTORY SOIL MATERIALS ARE NOT AVAILABLE FROM EXCAVATIONS.
- B. SATISFACTORY SOILS: SOIL CLASSIFICATION GROUPS GW, GP, GM, SW, SP, AND SM ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS; FREE OF ROCK OR GRAVEL LARGER THAN 3 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
- C. UNSATISFACTORY SOILS: SOIL CLASSIFICATION GROUPS GC, SC, CL, ML, OL, CH, MH, OH, AND PT ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS.
 1. UNSATISFACTORY SOILS ALSO INCLUDE SATISFACTORY SOILS NOT MAINTAINED WITHIN 2 PERCENT OF OPTIMUM MOISTURE CONTENT AT TIME OF COMPACTION.
- D. BASE COURSE: USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.
- E. ENGINEERED FILL: NATURALLY OR ARTIFICIALLY GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE, AND NATURAL OR CRUSHED SAND; ASTM D 2940; WITH AT LEAST 90 PERCENT PASSING A 3-INCH SIEVE AND NOT MORE THAN 12 PERCENT PASSING A NO. 200 SIEVE.
- F. BEDDING COURSE AND PIPE ZONE BACKFILL: USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.

BACKFILL AND FILL:

1. SATISFACTORY SOIL MATERIALS
2. INITIAL TRENCH BACKFILL-USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.
- H. ENGINEERED WOOD FIBER FOR SOFTPLAY: PROVIDE GT IMPAX ENGINEERED WOOD FIBER OR APPROVED EQUAL.

ACCESSORIES

- A. DETECTABLE WARNING TAPE: ACID- AND ALKALI-RESISTANT, POLYETHYLENE FILM WARNING TAPE MANUFACTURED FOR MARKING AND IDENTIFYING UNDERGROUND UTILITIES, A MINIMUM OF 6 INCHES WIDE AND 4 MILS THICK, CONTINUOUSLY INSCRIBED WITH A DESCRIPTION OF THE UTILITY, WITH METALLIC CORE ENCASED IN A PROTECTIVE JACKET FOR CORROSION PROTECTION, DETECTABLE BY METAL DETECTOR WHEN TAPE IS BURIED UP TO 30 INCHES DEEP; COLORED TO COMPLY WITH LOCAL PRACTICE OR REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION OR AS FOLLOWS:
 1. RED: ELECTRIC.
 2. YELLOW: GAS, OIL, STEAM, AND DANGEROUS MATERIALS.
 3. ORANGE: TELEPHONE AND OTHER COMMUNICATIONS.
 4. BLUE: WATER SYSTEMS.
 5. GREEN: SEWER SYSTEMS.
- B. TRACER WIRE: 12 AWG MINIMUM SOLID COPPER INSULATED HIGH MOLECULAR WEIGHT POLYETHYLENE (HMW PE) TRACER WIRE OR APPROVED EQUAL. THE TRACER WIRE INSULATION SHALL BE GREEN FOR SEWER PIPE AND BLUE FOR WATERLINES AND BE A MINIMUM OF 45 MIL. THICK. JOINTS OR SPLICES SHALL BE WATERPROOF. THE WIRE SHALL BE RATED FOR 30 VOLT.
- C. DRAINAGE FABRIC: NONWOVEN GEOTEXTILE, SPECIFICALLY MANUFACTURED AS A DRAINAGE GEOTEXTILE; MADE FROM POLYOLEFINS, POLYESTERS, OR POLYAMIDES; AND WITH THE FOLLOWING MINIMUM PROPERTIES DETERMINED ACCORDING TO ASTM D 4759 AND REFERENCED STANDARD TEST METHODS:
 1. GRAB TENSILE STRENGTH: 110 LBF (490N); ASTM D 4632.
 2. TEAR STRENGTH: 40 LBF (178 N); ASTM D 4533.
 3. PUNCTURE STRENGTH: 220 LBF (979 N); ASTM D 4833.
 4. APPARENT OPENING SIZE: NO. 40 (??MM); ASTM D 4751.
 5. PERMATIVITY (MINIMUM): 5 SEC-1; ASTM D 4491.
- E. SEPARATION FABRIC: WOVEN GEOTEXTILE, SPECIFICALLY MANUFACTURED AS A SEPARATION GEOTEXTILE; MADE FROM POLYOLEFINS, POLYESTERS, OR POLYAMIDES; AND WITH THE FOLLOWING MINIMUM PROPERTIES DETERMINED ACCORDING TO ASTM D 4759 AND REFERENCED STANDARD TEST METHODS:
 1. GRAB TENSILE STRENGTH: 180 LBF (800 N); ASTM D 4632.
 2. TEAR STRENGTH: 68 LBF (302 N); ASTM D 4533.
 3. PUNCTURE STRENGTH: 371 LBF (1650 N); ASTM D 4833.
 4. APPARENT OPENING SIZE: NO. 30; ASTM D 4751.

CONCRETE PAVING

1.1 FORMS

- A. FORM MATERIALS: PLYWOOD, METAL, METAL-FRAMED PLYWOOD, OR OTHER APPROVED PANEL-TYPE MATERIALS TO PROVIDE FULL-DEPTH, CONTINUOUS, STRAIGHT, SMOOTH EXPOSED SURFACES.
 1. USE FLEXIBLE OR CURVED FORMS FOR CURVES WITH A RADIUS 100 FEET OR LESS.
- B. FORM-RELEASE AGENT: COMMERCIALY FORMULATED FORM-RELEASE AGENT THAT WILL NOT BOND WITH, STAIN, OR ADVERSELY AFFECT CONCRETE SURFACES AND WILL NOT IMPAIR SUBSEQUENT TREATMENTS OF CONCRETE SURFACES.

1.2 CONCRETE MATERIALS

- A. CEMENTITIOUS MATERIAL: USE THE FOLLOWING CEMENTITIOUS MATERIALS, OF SAME TYPE, BRAND, AND SOURCE THROUGHOUT PROJECT:
 1. PORTLAND CEMENT: ASTM C 150, GRAY PORTLAND CEMENT TYPE I
 - a. FLY ASH: ASTM C 618, CLASS C.
 2. NORMAL-WEIGHT AGGREGATES: ASTM C 33, CLASS 4M, UNIFORMLY GRADED. PROVIDE AGGREGATES FROM A SINGLE SOURCE.
 1. MAXIMUM COARSE-AGGREGATE SIZE: 1 INCH NOMINAL.
 2. FINE AGGREGATE: FREE OF MATERIALS WITH DELETERIOUS REACTIVITY TO ALKALI IN CEMENT.
- C. WATER: POTABLE AND COMPLYING WITH ASTM C 94/C 94M.
- D. AIR-ENTRAINING ADMIXTURE: ASTM C 260.
- E. CHEMICAL ADMIXTURES: ADMIXTURES CERTIFIED BY MANUFACTURER TO BE COMPATIBLE WITH OTHER ADMIXTURES AND TO CONTAIN NOT MORE THAN 0.1 PERCENT WATER-SOLUBLE CHLORIDE IONS BY MASS OF CEMENTITIOUS MATERIAL.
 1. WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE A.
 2. WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE D.
 3. HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE F.

1.4 CURING MATERIALS

- A. ABSORPTIVE COVER: AASHTO M 182, CLASS 3, BURLAP CLOTH MADE FROM JUTE OR KENAF, WEIGHING APPROXIMATELY 9 OZ./SQ. YD. DRY.
- B. MOISTURE-RETAINING COVER: ASTM C 171, POLYETHYLENE FILM OR WHITE BURLAP-POLYETHYLENE SHEET.
- C. WATER: POTABLE.
- D. EVAPORATION RETARDER: WATERBORNE, MONOMOLECULAR, FILM FORMING, MANUFACTURED FOR APPLICATION TO FRESH CONCRETE.
- E. CLEAR, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND: ASTM C 309, TYPE 1, CLASS B.
- F. WHITE, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND: ASTM C 309, TYPE 2, CLASS B.

1.5 RELATED MATERIALS

- A. JOINT FILLERS: ASTM D 1751, ASPHALT-SATURATED CELLULOSIC FIBER IN PREFORMED STRIPS.
- C. EPOXY BONDING ADHESIVE: ASTM C 881, TWO-COMPONENT EPOXY RESIN, CAPABLE OF HUMID CURING AND BONDING TO DAMP SURFACES, OF CLASS SUITABLE FOR APPLICATION TEMPERATURE AND OF GRADE TO REQUIREMENTS.

1.6 CONCRETE MIXTURES

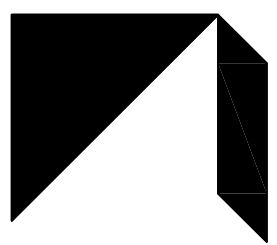
- A. PREPARE DESIGN MIXTURES, PROPORTIONED ACCORDING TO ACI 301, WITH THE FOLLOWING PROPERTIES:
 1. COMPRESSIVE STRENGTH (28 DAYS): 3300 PSI.
 2. MAXIMUM WATER-CEMENTITIOUS MATERIALS RATIO AT POINT OF PLACEMENT: 0.50.
 3. SLUMP LIMIT: 4 INCHES, PLUS OR MINUS 1 INCH.
 4. AIR CONTENT: 4-1/2 PERCENT PLUS OR MINUS 1.5 PERCENT FOR 1-INCH NOMINAL MAXIMUM AGGREGATE SIZE.
- B. CHEMICAL ADMIXTURES: USE ADMIXTURES ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

1.7 CONCRETE MIXING

- A. READY-MIXED CONCRETE: MEASURE, BATCH, AND MIX CONCRETE MATERIALS AND CONCRETE ACCORDING TO ASTM C 94/C 94M. FURNISH BATCH CERTIFICATES FOR EACH BATCH DISCHARGED AND USED IN THE WORK.
 1. WHEN TEMPERATURE IS BETWEEN 85 DEG F AND 90 DEG F, REDUCE MIXING AND DELIVERY TIME FROM 1-1/2 HOURS TO 75 MINUTES; WHEN AIR TEMPERATURE IS ABOVE 90 DEG F, REDUCE MIXING AND DELIVERY TIME TO 60 MINUTES.

1.8 PAVEMENT MARKINGS

- A. PAVEMENT-MARKING PAINT: ALKYD-RESIN TYPE, LEAD AND CHROMATE FREE, READY MIXED, COMPLYING WITH FS TT-P-115, TYPE I OR AASHTO M 248, TYPE N.
 1. COLOR: AS INDICATED.
- B. PAVEMENT-MARKING PAINT: LATEX, WATERBORNE EMULSION, LEAD AND CHROMATE FREE, READY MIXED, COMPLYING WITH FS TT-P-1952, TYPE II, WITH DRYING TIME OF LESS THAN 45 MINUTES.
 1. COLOR: AS INDICATED.
- C. PAVEMENT-MARKING PAINT: MPI #97 LATEX TRAFFIC MARKING PAINT.
 1. COLOR: AS INDICATED.



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REVISIONS
1 17 MARCH 2020
2 27 MARCH 2020

KELLY MIDDLE SCHOOL IMPROVEMENTS
200 SILVER LN, EUGENE, OR 97404
RENOVATIONS

JOB NO: 19189
ISSUE DATE: 3/13/2020

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SPECIFICATIONS

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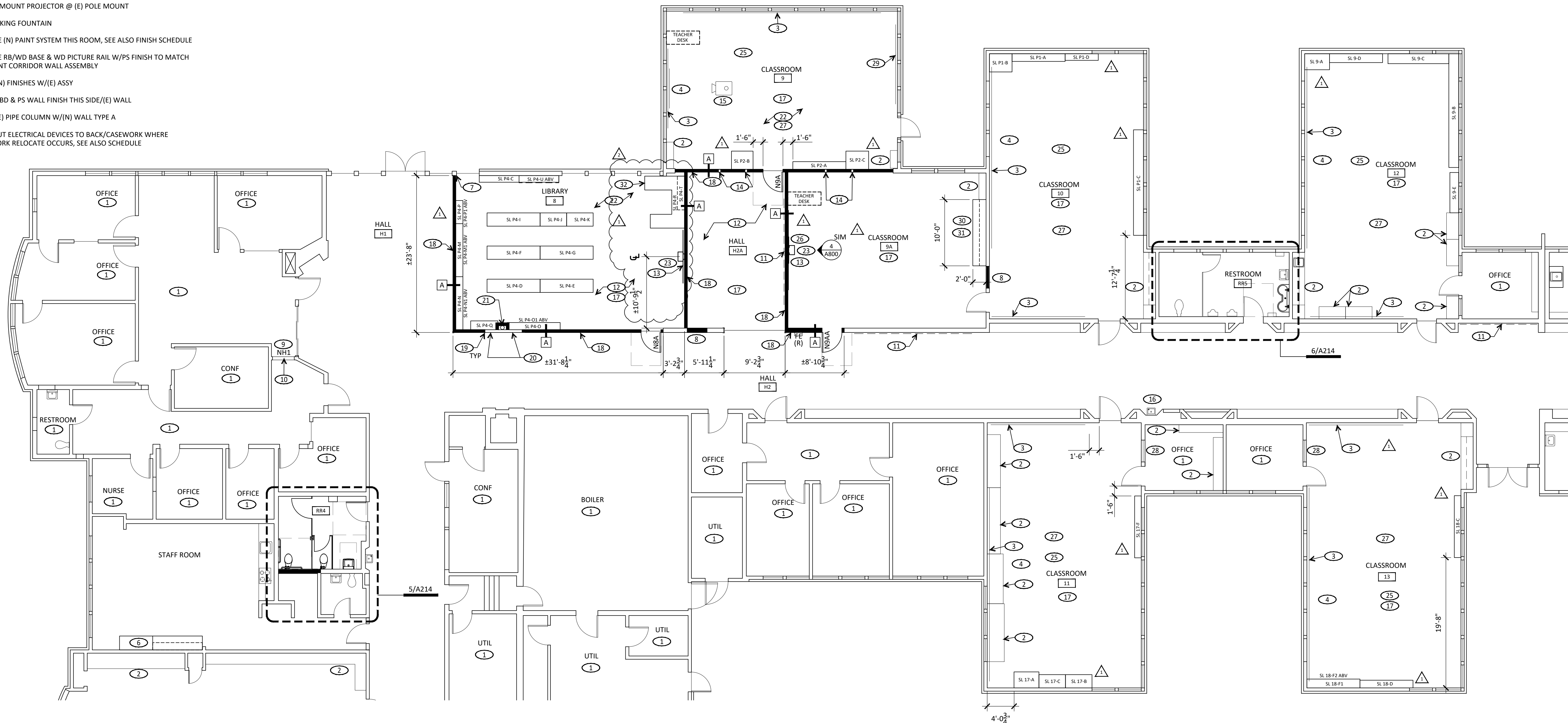
C1.1

ADDENDUM 1

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KEY NOTES

- 1 NO WORK THIS ROOM
- 2 (E) CASEWORK
- 3 (E) MARKER BOARD
- 4 (E) SMART BOARD
- 5 (E) PROJECTOR SCREEN
- 6 (R) MAILBOXES & CTOP
-PROVIDE (N) HEAVY DUTY ANGLE BRACKET @ 36" OC MAX
- 7 CENTER (N) WALL ASSY ON (E) MULLION
- 8 INFILL WALL WHERE OPENING DEMOLISHED TO MATCH ADJACENT ASSEMBLY
- 9 (N) HM CASED OPENING, SEE ALSO DOOR SCHEDULE
- 10 PATCH FLOOR AS REQ'D BY DEMOLITION
- 11 (R) WD RAIL W/ COAT HOOKS
-VFY HEIGHT & LOCATION W/ OWNER
- 12 (N) CPT FLOOR FINISH & RB THIS ROOM, SEE ALSO FINISH SCHEDULE
- 13 (N) MARKER BOARD, OFCI
- 14 (E) COLUMN TO REMAIN, ALIGN FINISHES THIS SIDE/COLUMN
- 15 (N) CLG MOUNT PROJECTOR @ (E) POLE MOUNT
- 16 (E) DRINKING FOUNTAIN
- 17 PROVIDE (N) PAINT SYSTEM THIS ROOM, SEE ALSO FINISH SCHEDULE
- 18 PROVIDE RB/WD BASE & WD PICTURE RAIL W/PS FINISH TO MATCH ADJACENT CORRIDOR WALL ASSEMBLY
- 19 ALIGN (N) FINISHES W/(E) ASSY
- 20 (N) GYP BD & PS WALL FINISH THIS SIDE/(E) WALL
- 21 WRAP (E) PIPE COLUMN W/(N) WALL TYPE A
- 22 FURR OUT ELECTRICAL DEVICES TO BACK/CASEWORK WHERE CASEWORK RELOCATE OCCURS, SEE ALSO SCHEDULE
- 23 (N) WALL MOUNTED SHORT THROW PROJECTOR, OFOI
- 24 NOT USED
- 25 (E) CEILING MOUNT PROJECTOR
- 26 (N) WALL MOUNT SMART BOARD, OFOI
- 27 PROVIDE BACKING AS REQ'D TO FURR CASEWORK BEYOND (E) ELECTRICAL RACEWAY WHERE CASEWORK RELOCATE OCCURS, SEE ALSO ELECTRICAL AND SCHEDULE
- 28 (E) RELITE TO REMAIN
- 29 (E) TACKBOARD TO REMAIN
- 30 (N) WD VENEER CASEWORK W/ ADJUSTABLE SHELVES & PLAM CLAD CTOP & BACKSLASH
- 31 (N) WD VENEER UPPER CABINETS W/ ADJUSTABLE SHELVES
- 32 (N) WD VENEER END PANEL, MATCH (R) CASEWORK



REVISIONS		
△	3/17/2020	ADD. 1
△	3/27/2020	ADD. 2

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 CONSTRUCTION DOCUMENTS

JOB NO: 19189
 ISSUE DATE: 3/3/2020

PARTIAL FLOOR PLAN

1 ENLARGED PARTIAL FLOOR PLAN
 1/8" = 1'-0"



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ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	KVAR	KILOVOLT AMPS REACTIVE
A	AMPERE (AMP)	LA	LIGHTNING ARRESTOR
AL	ALUMINUM	LTG	LIGHTING
ARCH	ARCHITECT / ARCHITECTURAL	LV	LOW VOLTAGE
ATS	AUTOMATIC TRANSFER SWITCH	MATV	MASTER ANTENNA TELEVISION
CB	CIRCUIT BREAKER	MCA	MINIMUM CIRCUIT AMPS
C	CONDUIT	MCB	MAIN CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION	MCC	MOTOR CONTROL CENTER
CKT	CIRCUIT	MDP	MAIN DISTRIBUTION PANEL
CLG	CEILING	MECH	MECHANICAL
CT	CURRENT TRANSFORMER	MH	METAL HALIDE
CU	COPPER	MLO	MAIN LUGS ONLY
DN	DOWN	MV	MERCURY VAPOR
EMERG	EMERGENCY	MTS	MANUAL TRANSFER SWITCH
EMT	ELECTRIC METALLIC TUBING	NIC	NOT IN CONTRACT
EP	EXPLOSION PROOF	NL	NIGHT LIGHT CIRCUIT
EPO	EMERGENCY POWER OFF	PA	PUBLIC ADDRESS
EWC	ELECTRIC WATER COOLER	PDZ	PRIMARY DAYLIGHT ZONE
FA	FIRE ALARM	PE	PHOTO ELECTRIC CELL
FLA	FULL LOAD AMPS	PF	POWER FACTOR
FLUOR	FLUORESCENT	PNL	PANELBOARD
FCIC	FURNISHED BY CONTRACTOR	PVC	POLYVINYL CHLORIDE CONDUIT
	INSTALLED BY CONTRACTOR	PWR	POWER
FOIC	FURNISHED BY OWNER	SDP	SUB-DISTRIBUTION PANEL
	INSTALLED BY CONTRACTOR	SDZ	SECONDARY DAYLIGHT ZONE
FOIO	FURNISHED BY OWNER	STR	STARTER
	INSTALLED BY OWNER	SV	SOLENOID VALVE
GFP	GROUND FAULT PROTECTION	SW	SWITCH
GFI	GROUND FAULT INTERRUPTER	TD	TIME DELAY
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TP	TAMPERPROOF
GRC	GALVANIZED RIGID CONDUIT	TTB	TELEPHONE TERMINAL BOARD
GRD	GROUND	TTC	TELEPHONE TERMINAL CABINET
HP	HORSEPOWER	TV	TELEVISION
HPS	HIGH PRESSURE SODIUM	TYP	TYPICAL
HV	HIGH VOLTAGE	UG	UNDERGROUND
HZ	HERTZ	UPS	UNINTERRUPTIBLE POWER SUPPLY
IG	ISOLATED GROUND	V	VOLTAGE
INC	INCANDESCENT	VA	VOLT AMPERES
JB	JUNCTION BOX	VP	VAPOR PROOF
KW	KILOWATT	W	WATTS
KWH	KILOWATT HOUR	WAP	WIRELESS ACCESS POINT
KV	KILOVOLT	WP	WEATHER PROOF
KVA	KILOVOLT AMP	XFMR	TRANSFORMER
		XFSW	TRANSFER SWITCH

LIGHTING

	CEILING LUMINAIRE: SURFACE, RECESSED
	CEILING LUMINAIRE: PENDANT MOUNTED
	CEILING LUMINAIRE: PENDANT LINEAR
	WALL LUMINAIRE: SURFACE, RECESSED
	WALL WASHER: SURFACE, RECESSED
	TRACK WITH HEADS LOCATED
	FLUORESCENT LUMINAIRE: SURFACE, RECESSED
	FLUORESCENT LUMINAIRE: WALL MOUNTED
	FLUORESCENT LUMINAIRE: BARE LAMP
	POLE LIGHT: LUMINAIRES AS SHOWN
	DESIGNATES LIGHT ON EMERGENCY CIRCUIT
	EXIT LIGHT: CEILING, WALL (ARROWS AS SHOWN)
	BOLLARD
	EMERGENCY BATTERY LIGHT: HEADS AS SHOWN
	WALL SWITCH: 1 POLE, 2 POLE
	WALL SWITCH: 3 WAY, 4 WAY
	WALL SWITCH: KEY LOCK, MOMENTARY
	WALL SWITCH: LOW VOLTAGE, PILOT
	WALL SWITCH: TIMER, MANUAL DIMMER
	DESIGNATES LUMINAIRE TYPE (SEE LUMINAIRE SCHEDULE)
	DESIGNATES NIGHT LIGHT CIRCUIT
	PHOTOELECTRIC CELL: WALL MOUNTED, CEILING MOUNTED
	OCCUPANCY SENSOR: CEILING OR WALL MOUNTED
	"X" DESIGNATES DEVICE TYPE:
	S: IN COMBINATION WITH WALL SWITCH
	U: ULTRASONIC
	R: INFRARED
	UR: DUAL TECHNOLOGY, ULTRASONIC/INFRARED

DESIGNATION SYMBOLS

	123	EQUIPMENT DESIGNATOR SEE SCHEDULE.
		DARK LINE WEIGHT INDICATES NEW WORK
		DARK AND DASHED LINE WEIGHT INDICATES DEMO WORK
		LIGHT LINE WEIGHT INDICATES EXISTING TO REMAIN
	1	NOTE

POWER

	WALL RECEPTACLE: SINGLE, DUPLEX
	WALL RECEPTACLE: EMERGENCY, 4-PLEX
	WALL RECEPTACLE: ISOLATED GROUND
	CEILING RECEPTACLE: DUPLEX
	FIRE RATED FLOOR POKE-THRU
	CONNECTION TO EQUIPMENT PROVIDED BY OTHERS
	DENOTES RECEPTACLE ABOVE COUNTER
	SPECIAL PURPOSE OUTLET AS NOTED, EMERGENCY
	CLOCK HANGER RECEPTACLE
	FLUSH IN-FLOOR OUTLET: DUPLEX, COMBINATION
	PEDESTAL OUTLET: POWER, SIGNAL, COMBINATION
	SURFACE OUTLET STRIP: DIMENSION AS SHOWN
	TELEPOWER POLE, POWER, COMBINATION
	JUNCTION BOX
	DISCONNECT SWITCH: FUSED, NON-FUSED
	MOTOR STARTER: MANUAL, MAGNETIC, COMBINATION
	MOTOR CONNECTION
	CONTACTOR, RELAY, SOLENOID
	PUSH BUTTON STATION
	WIRING CONCEALED IN CEILING OR WALL
	WIRING CONCEALED IN FLOOR OR UNDERGROUND
	INDICATES INSULATED GREEN GROUND WIRE
	HOME RUN DESTINATION SHOWN
	CONDUIT ELL: UP, DN.

TELECOMMUNICATIONS

	OUTLET TYPE: 2-PORT DATA UNLESS NOTED OTHERWISE
	WIRELESS ACCESS POINT: WALL, CEILING. PROVIDE TWO CABLES PER OUTLET (UON)

EQUIPMENT

	ELECTRICAL EQUIPMENT
	PANELBOARD: SURFACE, RECESSED
	CABINET: SURFACE, RECESSED
	TRANSFORMER
	GROUND ROD, IN TEST WELL
	GROUND PAD
	EQUIPMENT WITH DERIVED GROUND
	VOLTMETER, AMMETER
	SELECTOR SWITCH: VOLTMETER, AMMETER
	METER: KILOWATT HOUR, POWER FACTOR
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	CABLE TRAY: CENTER SUPPORT, OUTER SUPPORTS

ONE-LINE

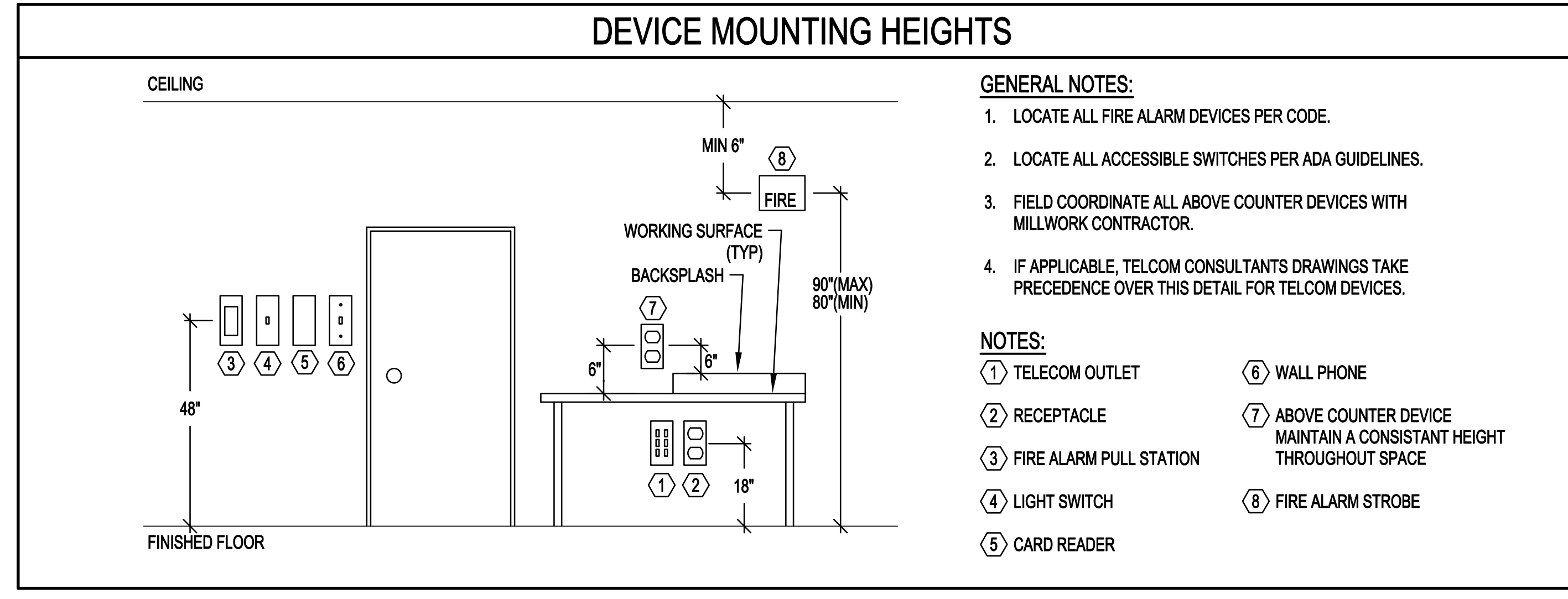
	CIRCUIT BREAKER
	SWITCH, FUSED SWITCH
	BUSS
	AUTOMATIC SWITCH
	METER
	PANEL
	FEEDER CALLOUT
	FAULT CURRENT CALLOUT
	GENERATOR

NOTE

THIS IS A STANDARD LEGEND SHEET, THEREFORE, SOME SYMBOLS MAY APPEAR ON THIS SHEET THAT DO NOT APPEAR ON THE DRAWINGS.

SHEET LIST

E0.01	SYMBOLS, LEGENDS AND ABBREVIATIONS - ELECTRICAL
E0.02	LUMINAIRE AND MECHANICAL EQUIPMENT SCHEDULE
ED.0	OVERALL DEMOLITION PLAN
ED.1	PARTIAL DEMOLITION PLANS
E1.1	ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - A
E1.2	ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - B
E1.3	ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - C
E1.4	ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - D
E2.1	ENLARGED PARTIAL LIGHTING REFLECTED CEILING PLAN - A
E2.2	ENLARGED PARTIAL LIGHTING REFLECTED CEILING PLAN - B
E2.3	ENLARGED PARTIAL LIGHTING REFLECTED CEILING PLAN - C
E2.4	ENLARGED PARTIAL LIGHTING REFLECTED CEILING PLAN - D
E2.5	ENLARGED PARTIAL LIGHTING REFLECTED CEILING PLAN - F
E7.01	DIAGRAMS - ELECTRICAL
E8.01	PANEL SCHEDULES



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EXPIRES 12-31-2020

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REVISIONS

3/17/2020	ADD. 1
3/27/2020	ADD. 2

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SYMBOLS, LEGENDS AND ABBREVIATIONS - ELECTRICAL

E0.01

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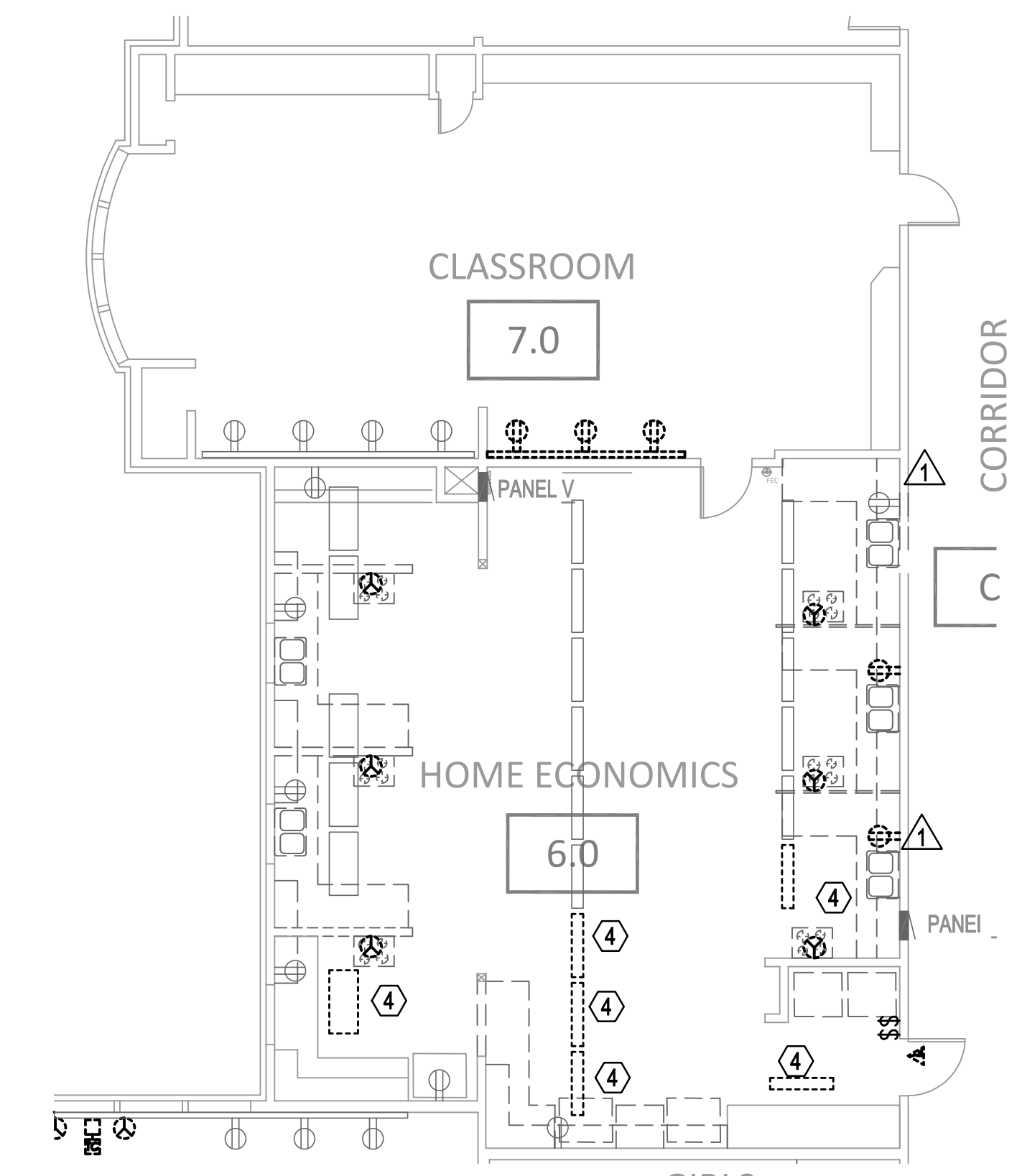
GENERAL NOTES:

A. CAREFULLY REMOVE AND OFFER TO THE OWNER ALL ELECTRICAL EQUIPMENT THAT IS TO BE REMOVED AND IN GOOD WORKING ORDER. REMOVE FROM PROJECT SITE AND PROPERLY DISPOSE ALL EQUIPMENT REJECTED BY THE OWNER.

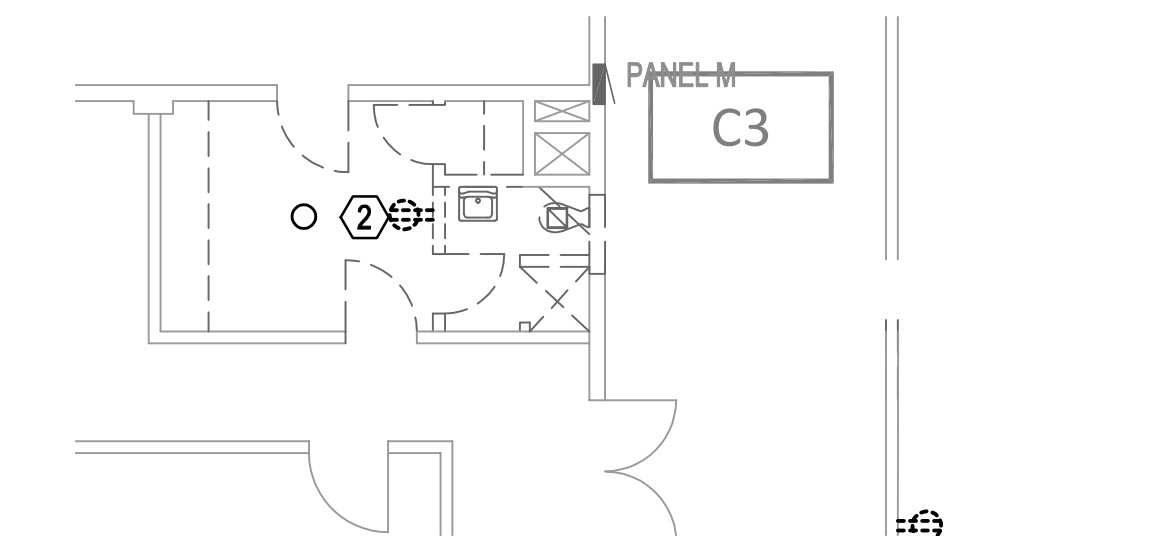
B. THE LOCATIONS OF ALL EQUIPMENT AND DEVICES MAY NOT BE SHOWN AND THESE PLANS DO NOT SHOW ALL OF THE DEMOLITION CONDITIONS. DEMOLITION INCLUDES THE REMOVAL OF ALL RACEWAY, CONDUCTORS, COMMUNICATION CABLING, LIGHT FIXTURES, DEVICES, ELECTRICAL EQUIPMENT, FIRE ALARM DEVICES, CABLES, HANGERS, AND SUPPORTS THAT ARE MADE OBSOLETE BY THE NEW WORK OR ARE ABANDONED AND NO LONGER IN USE.

REVISIONS

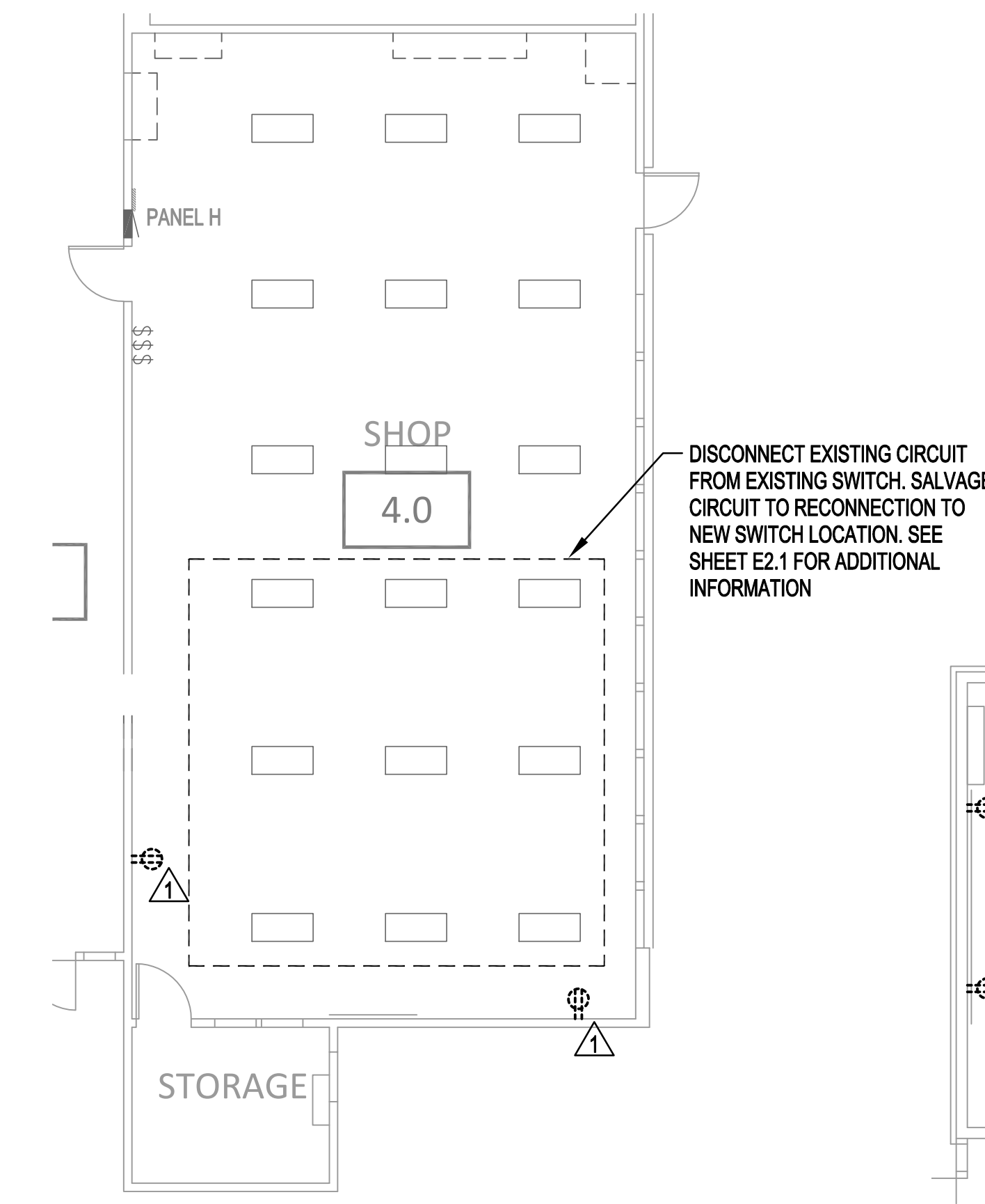
ADD. 1	3/17/2020
ADD. 2	3/27/2020



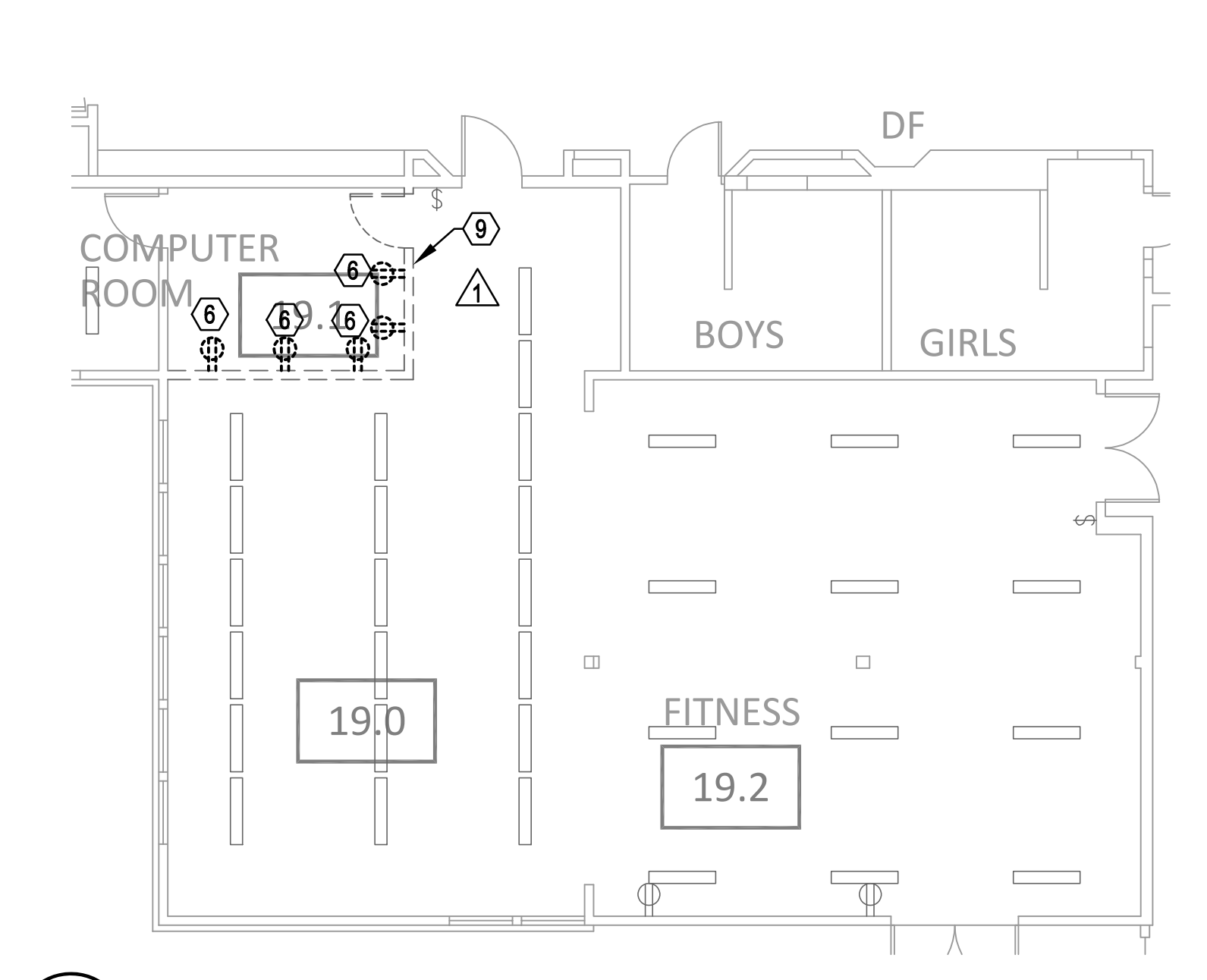
7 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



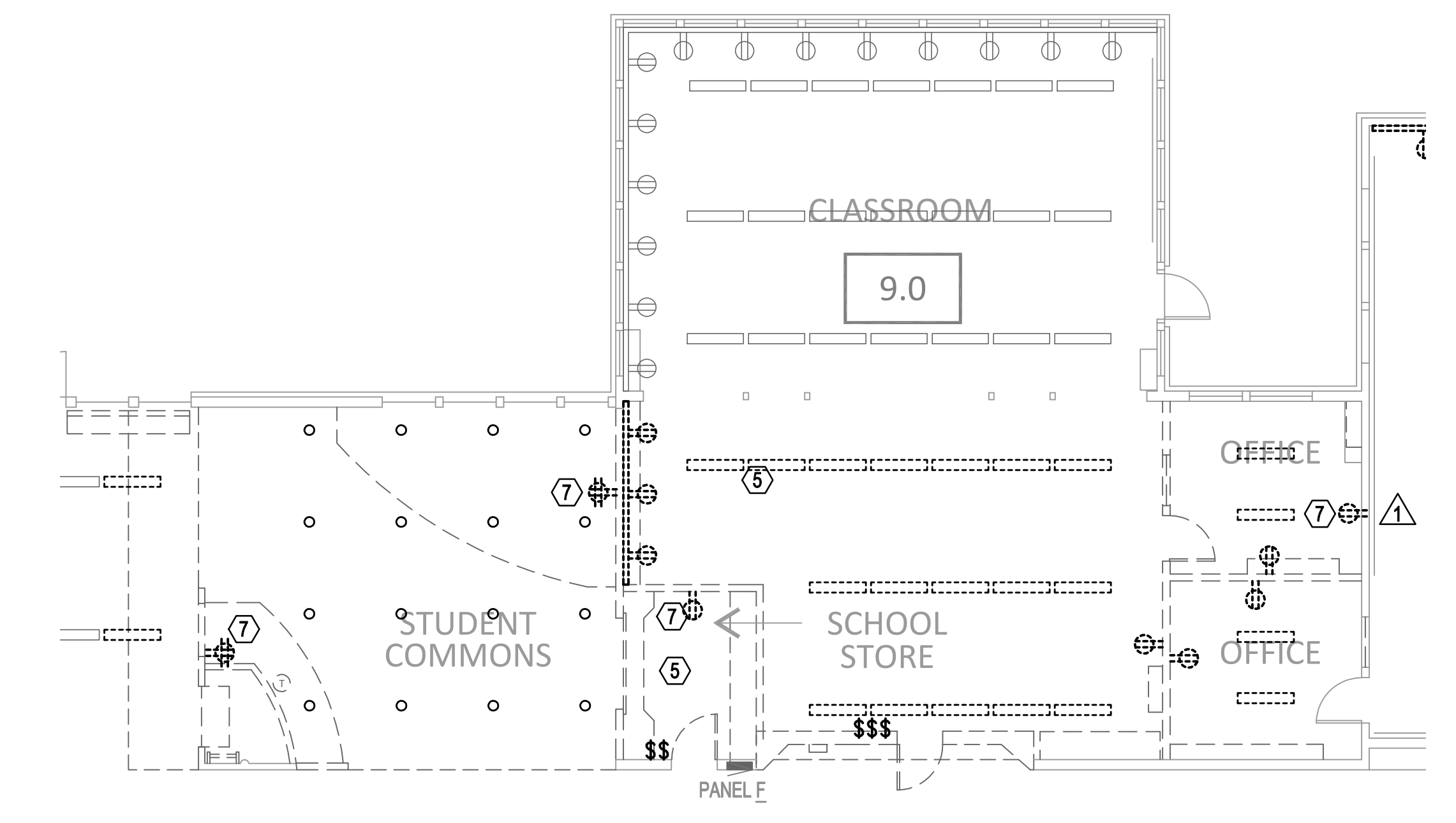
8 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



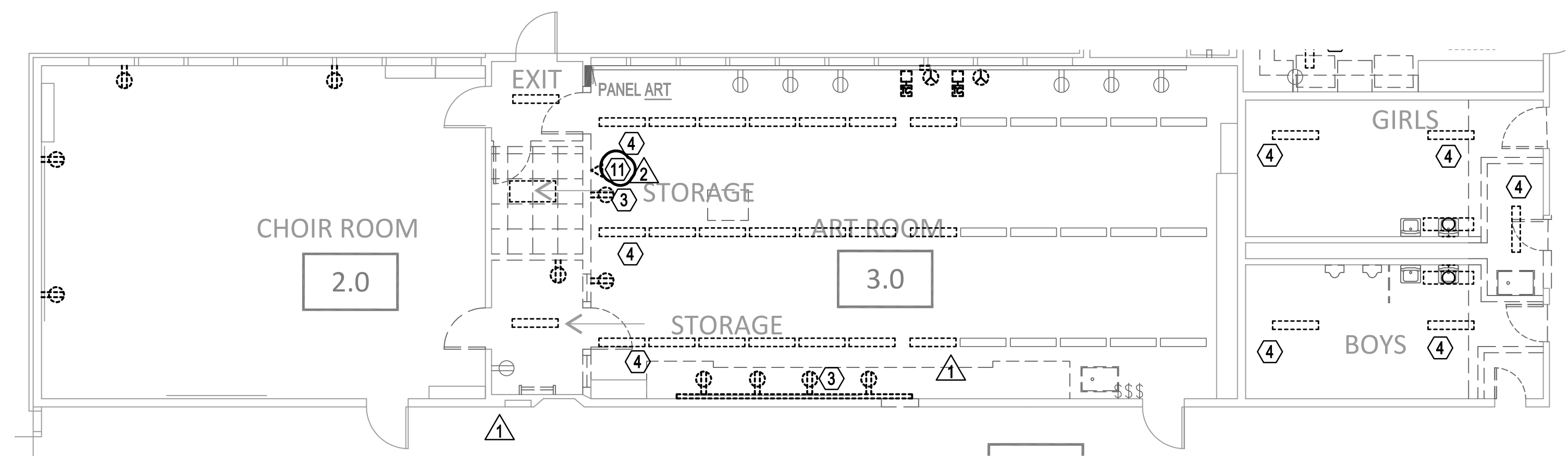
9 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



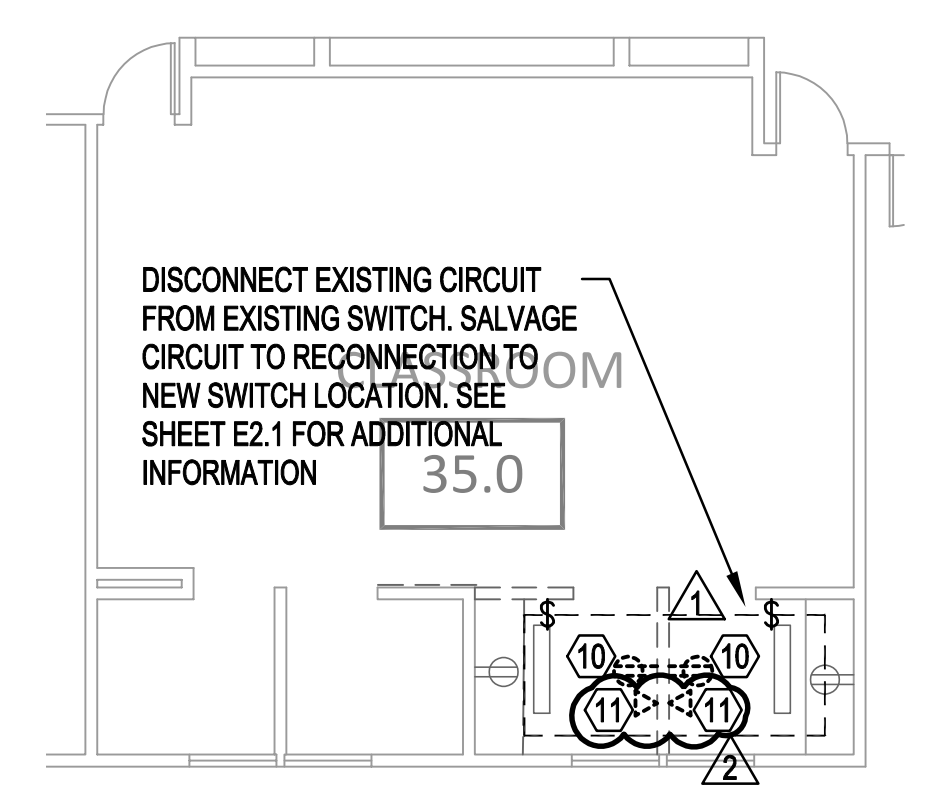
4 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



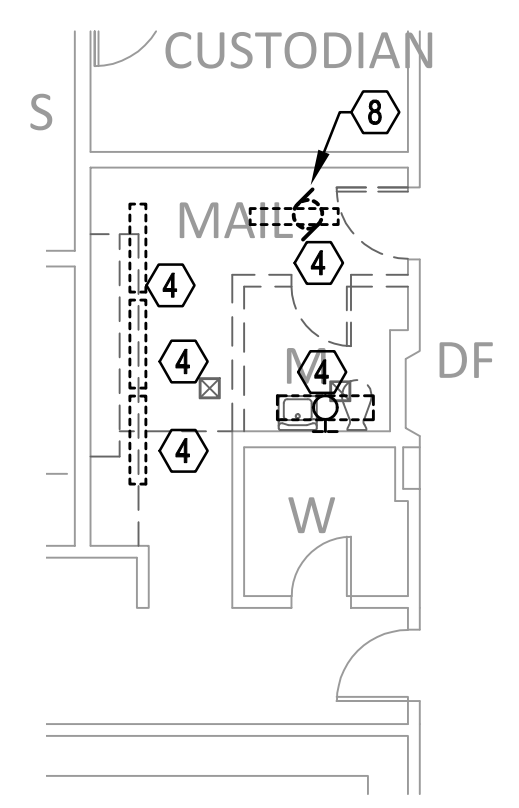
5 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



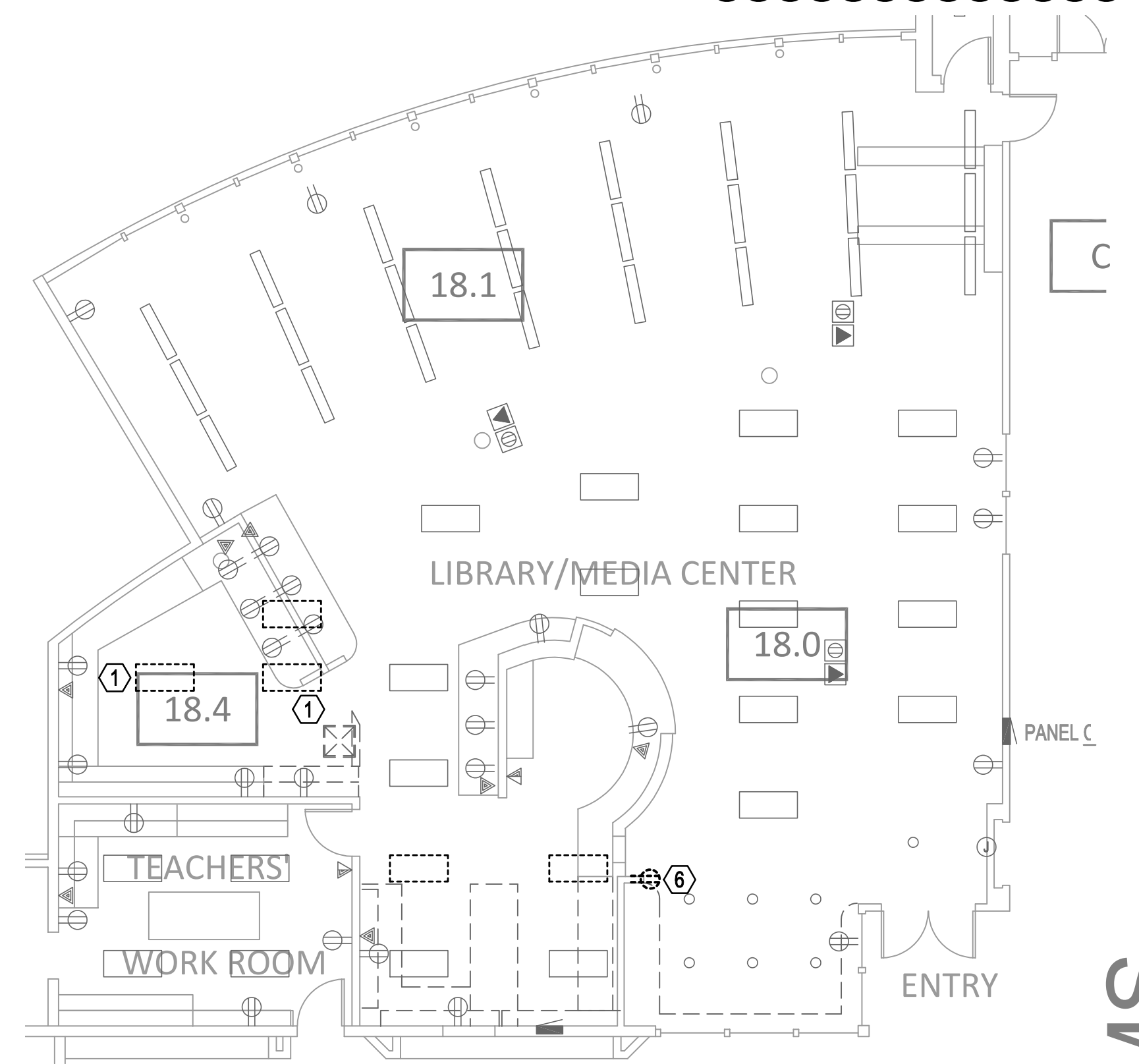
6 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



1 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



2 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"



3 PARTIAL DEMOLITION - ELECTRICAL
 ED.1 1/8" = 1'-0"

- NOTES:**
- SALVAGE FIXTURE AND CIRCUIT FOR RELOCATION DURING NEW CONSTRUCTION PHASE. LOCATE PER E2.4.
 - SALVAGE CIRCUIT AND EXTEND TO NEW RECEPTACLE LOCATION. SEE SHEET E1.1 FOR ADDITIONAL INFORMATION.
 - SALVAGE CIRCUIT AND EXTEND TO NEW RECEPTACLE LOCATION. SEE SHEET E1.2 FOR ADDITIONAL INFORMATION.
 - SALVAGE CIRCUIT AND EXTEND TO NEW FIXTURE LOCATION. SEE SHEET E2.X SERIES FOR ADDITIONAL INFORMATION.
 - SALVAGE FIXTURE AND CIRCUIT FOR RELOCATION DURING NEW CONSTRUCTION PHASE. LOCATE PER E2.3.
 - SALVAGE CIRCUIT AND EXTEND TO NEW RECEPTACLE LOCATION. SEE SHEET E1.4 FOR ADDITIONAL INFORMATION.
 - SALVAGE CIRCUIT AND EXTEND TO NEW RECEPTACLE LOCATION. SEE SHEET E1.3 FOR ADDITIONAL INFORMATION.
 - SALVAGE CIRCUIT AND EXTEND TO NEW EXHAUST FAN LOCATION. SEE SHEET E1.4 FOR ADDITIONAL INFORMATION.
 - WALL DEMOLISHED BY ABATEMENT CONTRACTOR. CONTRACTOR TO COORDINATE EXISTING CIRCUITS TERMINATION LOCATION WITH ABATEMENT CONTRACTOR.
 - SALVAGE CIRCUIT AND EXTEND TO NEW RECEPTACLE LOCATION. SEE SHEET E1.5 FOR ADDITIONAL INFORMATION.
 - SALVAGE CAT6 CABLE AND DATA OUTLET FOR RELOCATION. SEE SHEET E1.5 FOR ADDITIONAL INFORMATION.

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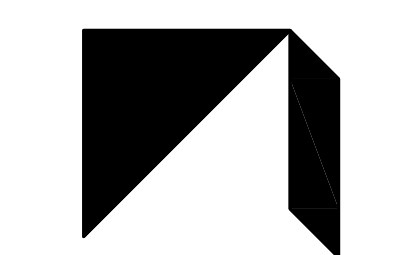
PARTIAL DEMOLITION PLANS - ELECTRICAL

ED.1

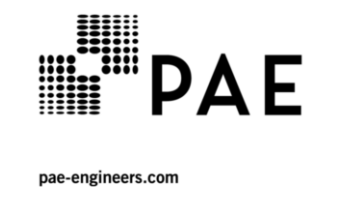
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- NOTES:**
1. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 THROUGH E1.5, PROVIDE 1-1/4" CONDUIT AND WHITE CAT6 CABLING TO MDF ROOM.
 2. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 THROUGH E1.5, PROVIDE 1-1/4" CONDUIT AND WHITE CAT6 CABLING TO IDF ROOM 2.
 3. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 THROUGH E1.5, PROVIDE 1-1/4" CONDUIT AND WHITE CAT6 CABLING TO IDF ROOM 3.
 4. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 THROUGH E1.5, PROVIDE 1-1/4" CONDUIT AND WHITE CAT6 CABLING TO IDF ROOM 4.

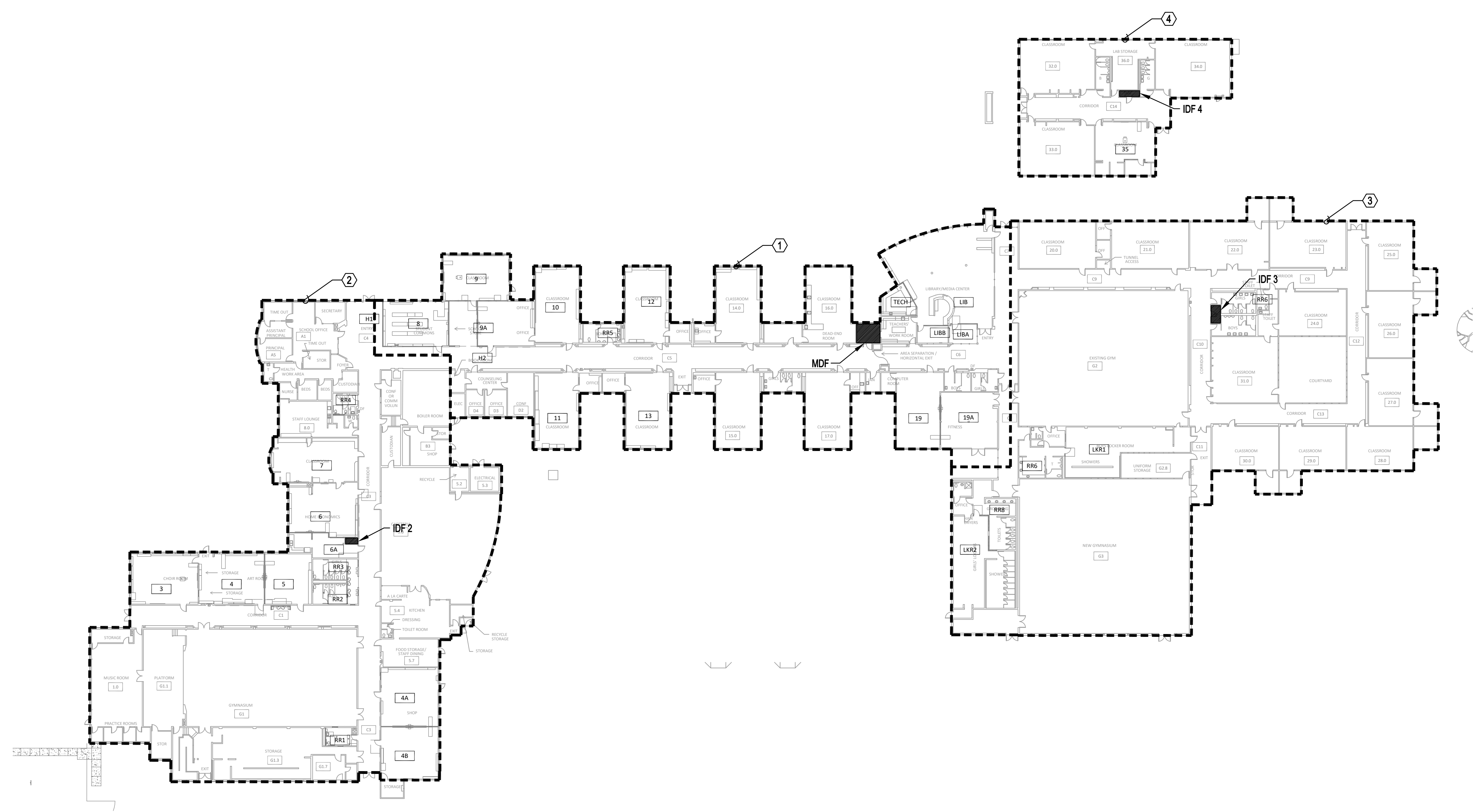


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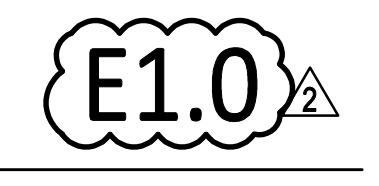
JOB NO: 19189
 ISSUE DATE: 3/3/2020

OVERALL ELECTRICAL PLAN

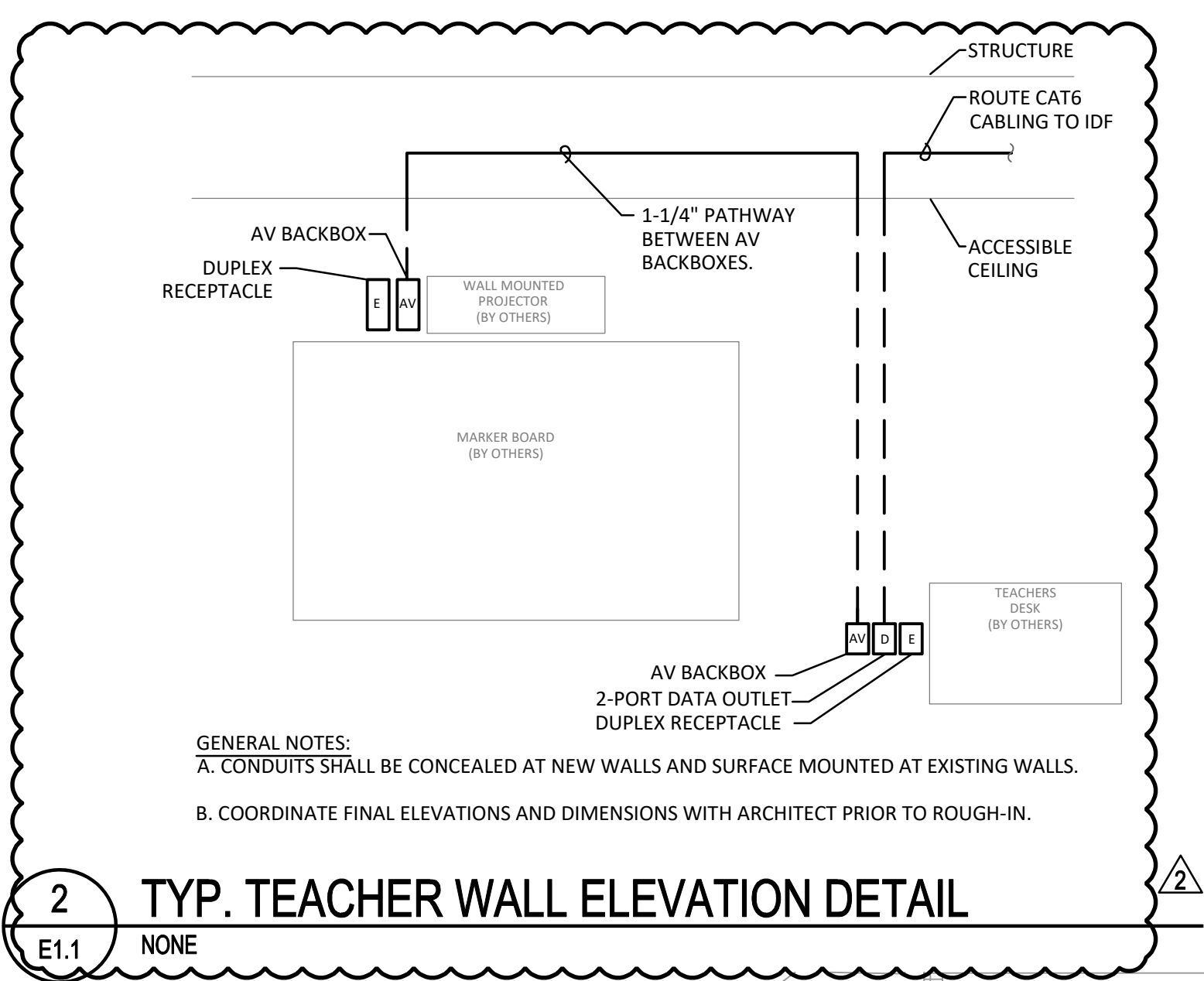
1 OVERALL ELECTRICAL PLAN
 E1.0 1/32" = 1'-0"



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Date: 3/27/20 Time: 10:47am File: \\pae-engineers.com\Projects\2019\19-1866 - Eugene 4J - YG Relocation\01 Production\02 CAD\19-1866 E1.0.dwg User: daniel.wrtola



GENERAL NOTES:

- A. ALL MECHANICAL AND PLUMBING EQUIPMENT SHOWN IS FOR REFERENCE ONLY. REFER TO MECHANICAL AND PLUMBING SHEETS FOR EXACT LOCATIONS OF ALL EQUIPMENT. SEE MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON E0.02 FOR CIRCUITING INFORMATION.
- B. REFERENCE M0.01 FOR MECHANICAL SYMBOLS AND M0.02 FOR MECHANICAL SCHEDULES.
- C. ALL INTERIOR RACEWAY TO BE CONCEALED WHEN LOCATED WITHIN FINISHED SPACES UNLESS OTHERWISE NOTED.
- D. REFER TO ARCHITECTURAL CEILING PLANS, ELEVATIONS, AND FLOOR PLANS FOR ACTUAL LOCATIONS OF ALL CEILING, WALL, AND FLOOR MOUNTED DEVICES AND EQUIPMENT. WHERE INTERIOR ELEVATIONS DIFFER BETWEEN ARCHITECTURAL AND ENGINEERING DRAWINGS, CONTRACTOR TO NOTIFY ENGINEER.

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F. THE FIRE ALARM SYSTEM IS SHOWN FOR GUIDANCE AND IS INTENDED TO BE USED TO PROVIDE INFORMATION FOR A FIRE ALARM DESIGN-BUILD SYSTEM. EQUIPMENT AND DEVICE ARRANGEMENT SHOWN IS TO AID IN ESTABLISHING A BASIS OF DESIGN. CONTRACTOR SHALL BE RESPONSIBLE FOR CREATION OF SHOP DRAWINGS, AND TO PROVIDE FULL DESIGN, PERMITTING, INSTALLATION, TESTING, AND COORDINATION WITH OTHER TRADES. PROVIDE A COMPLETE SYSTEM THAT MEETS CURRENT CODE AND FUNCTIONALITY REQUIREMENTS.

NOTES:

- 1. CONNECT SALVAGED CIRCUIT TO NEW RECEPTACLE.
- 2. MOTOR CONNECTIONS LOCATED IN ATTIC.
- 3. NOT USED.
- 4. COORDINATE ELEVATION WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN.
- 5. PROVIDE BACK-BOX AND CONDUIT PATHWAY FOR PROJECTOR AV CONNECTION. SEE TEACHING WALL ELEVATION ON THIS SHEET FOR ADDITIONAL INFORMATION.

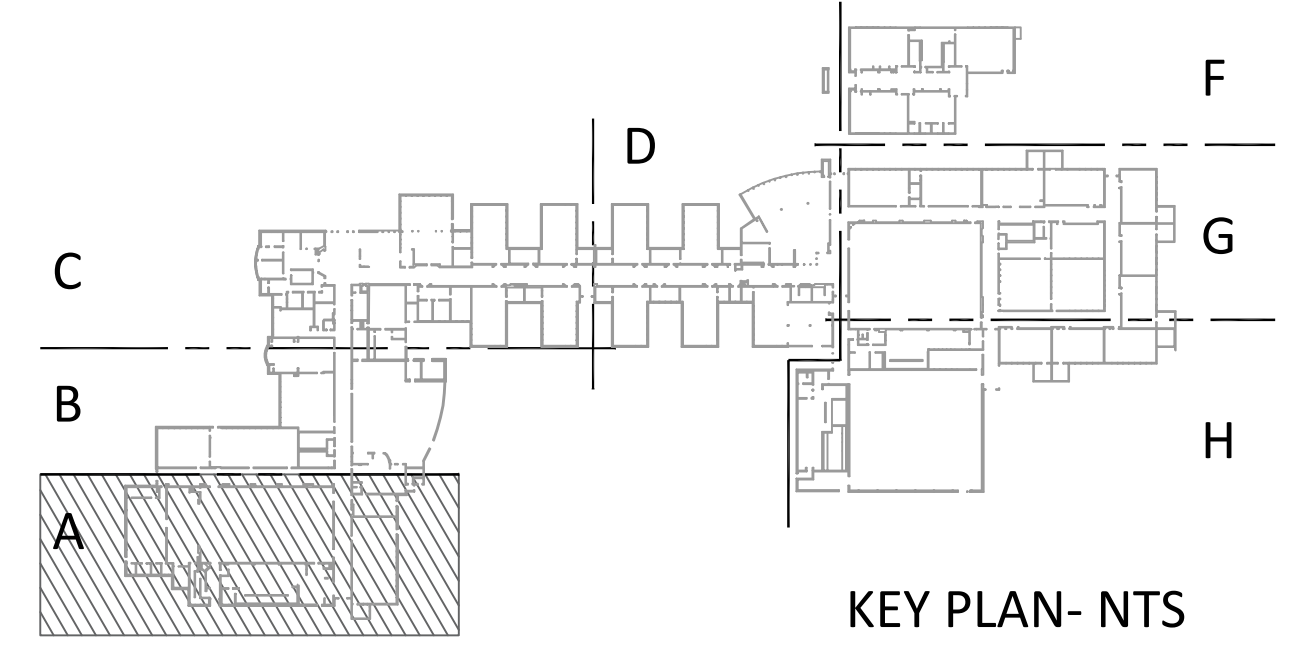
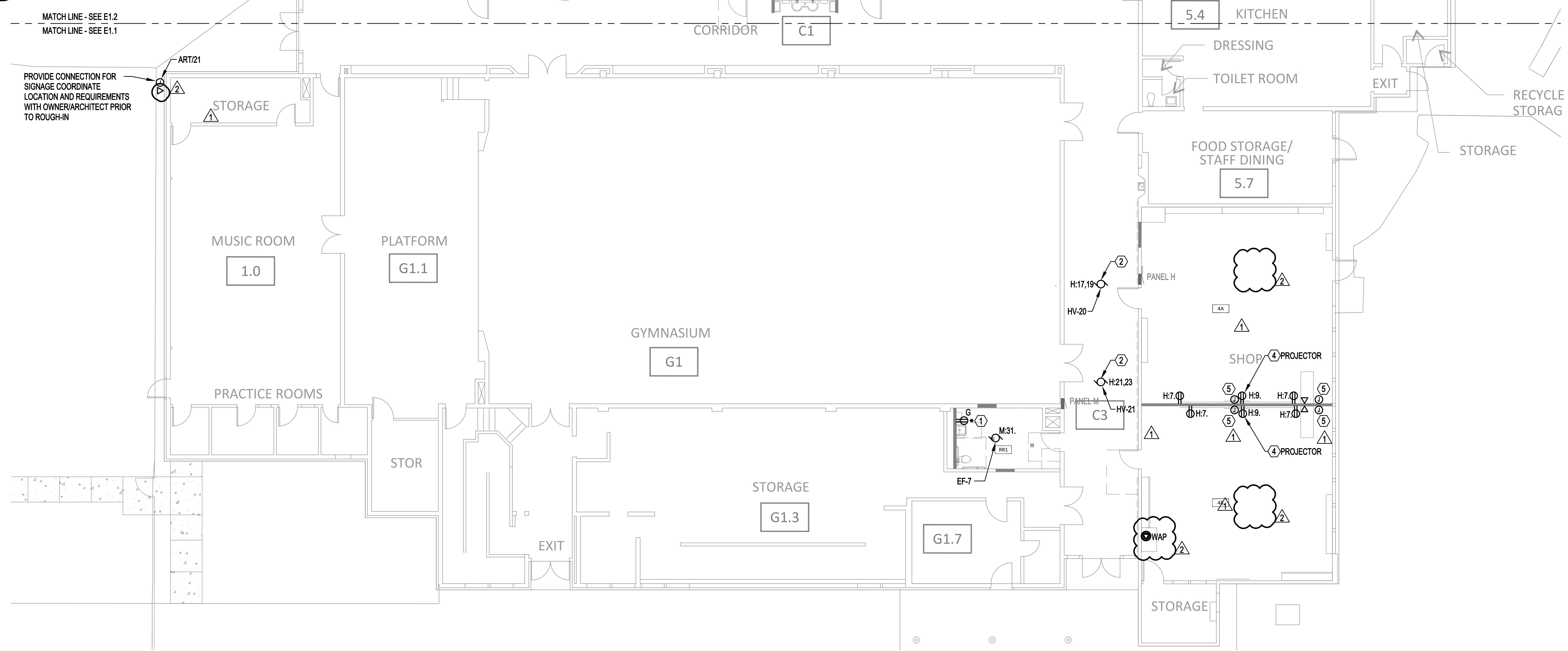
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REGISTERED PROFESSIONAL ENGINEER
ROBERT A. WILSON
EXPIRES 12-31-2020

PAE
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REVISIONS

3/17/2020	ADD. 1
3/27/2020	ADD. 2



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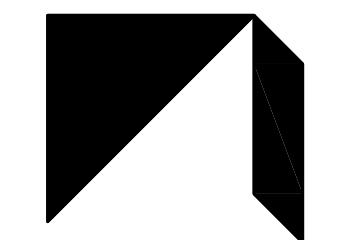
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ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - A

E1.1

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GENERAL NOTES:

- A. ALL MECHANICAL AND PLUMBING EQUIPMENT SHOWN IS FOR REFERENCE ONLY. REFER TO MECHANICAL AND PLUMBING SHEETS FOR EXACT LOCATIONS OF ALL EQUIPMENT. SEE MECHANICAL EQUIPMENT CONNECTION SCHEDULE ON E0.02 FOR CIRCUITING INFORMATION.
- B. REFERENCE M0.01 FOR MECHANICAL SYMBOLS AND M0.02 FOR MECHANICAL SCHEDULES.
- C. ALL INTERIOR RACEWAY TO BE CONCEALED WHEN LOCATED WITHIN FINISHED SPACES UNLESS OTHERWISE NOTED.
- D. REFER TO ARCHITECTURAL CEILING PLANS, ELEVATIONS, AND FLOOR PLANS FOR ACTUAL LOCATIONS OF ALL CEILING, WALL, AND FLOOR MOUNTED DEVICES AND EQUIPMENT. WHERE INTERIOR ELEVATIONS DIFFER BETWEEN ARCHITECTURAL AND ENGINEERING DRAWINGS, CONTRACTOR TO NOTIFY ENGINEER.

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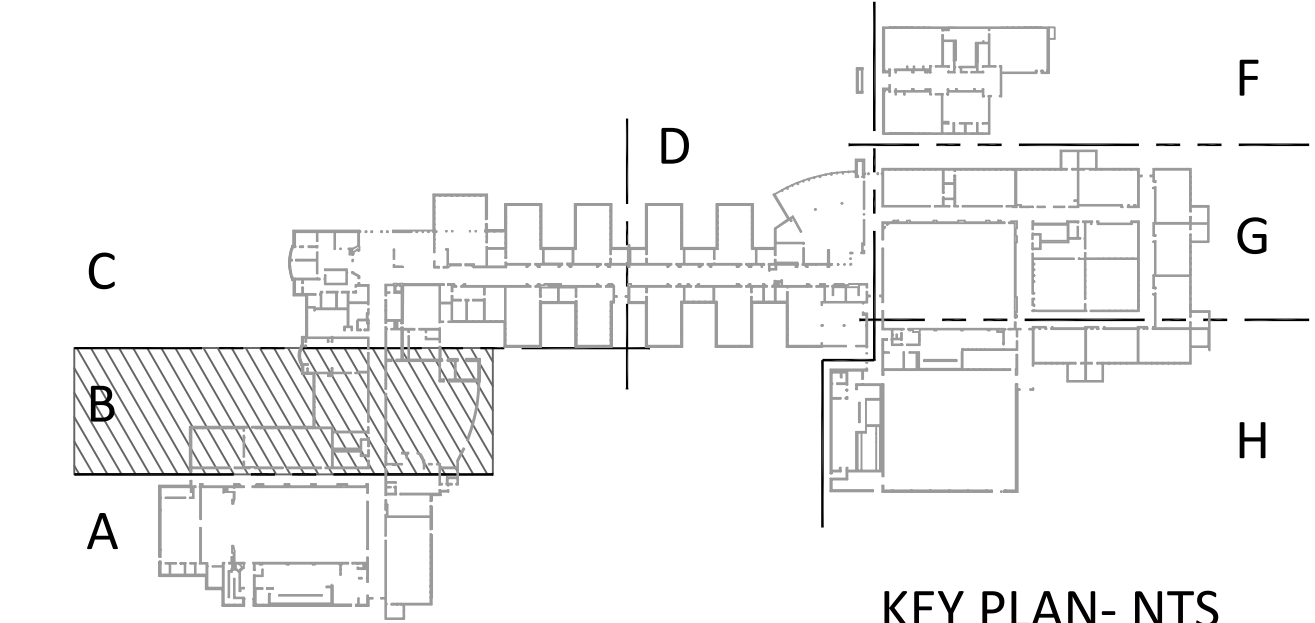
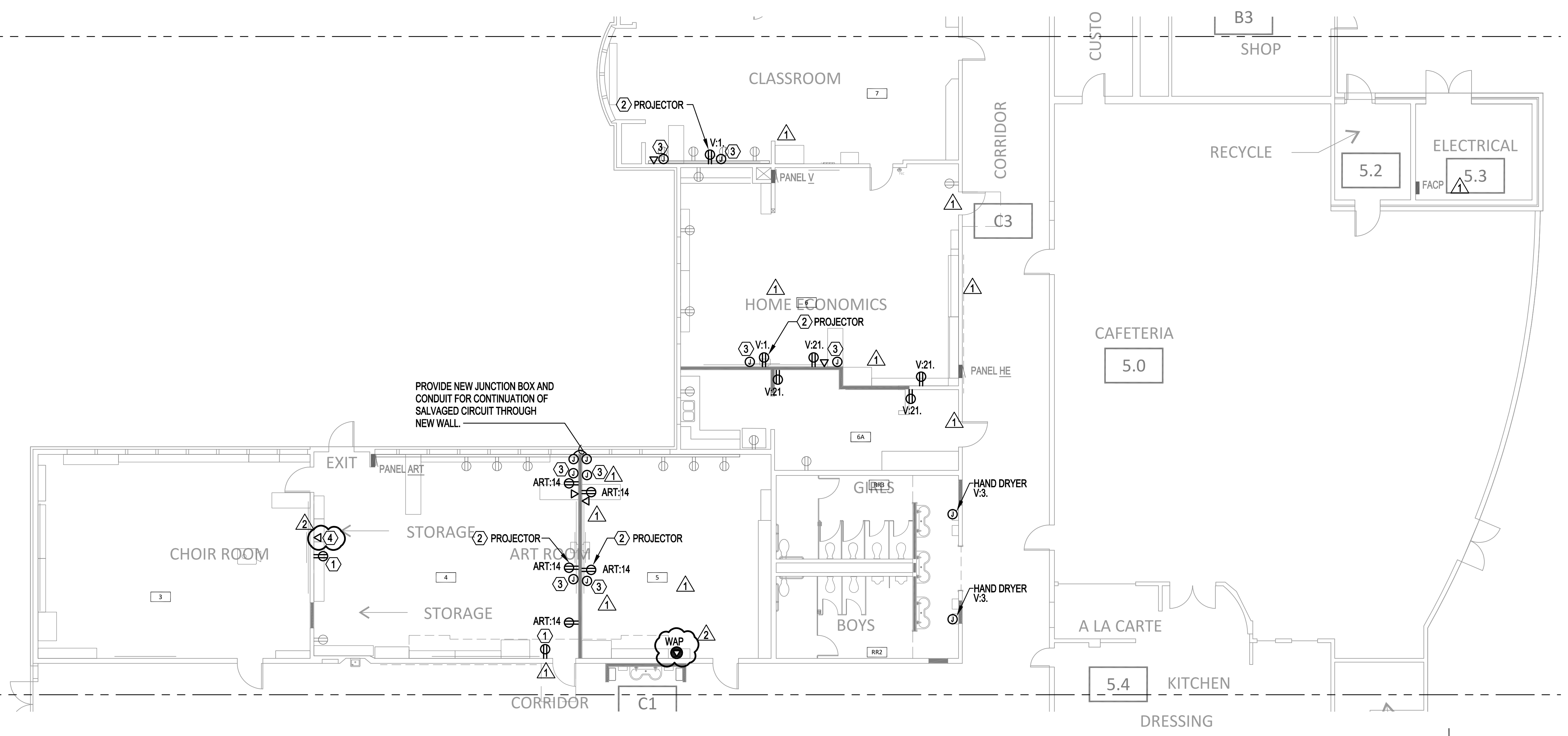
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NOTES:

- 1. CONNECT SALVAGED CIRCUIT TO NEW RECEPTACLE.
- 2. COORDINATE ELEVATION WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN.
- 3. PROVIDE BACK-BOX AND CONDUIT PATHWAY FOR PROJECTOR AV CONNECTION. SEE TEACHING WALL ELEVATION ON SHEET E1.1 FOR ADDITIONAL INFORMATION.
- 4. RELOCATED DATA RECEPTACLES. IT IS ACCEPTABLE TO RE-USE SALVAGED CABLE IF UNDAMAGED.

MATCH LINE - SEE E1.3
 MATCH LINE - SEE E1.2

MATCH LINE - SEE E1.2
 MATCH LINE - SEE E1.1



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 FLOOR PLAN - B

E1.2

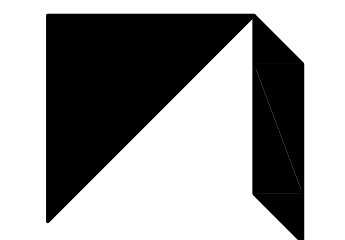
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1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - B
 E1.2 1/8" = 1'-0"





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ELECTRICAL
FLOOR PLAN - C

E1.3

KMS

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GENERAL NOTES:

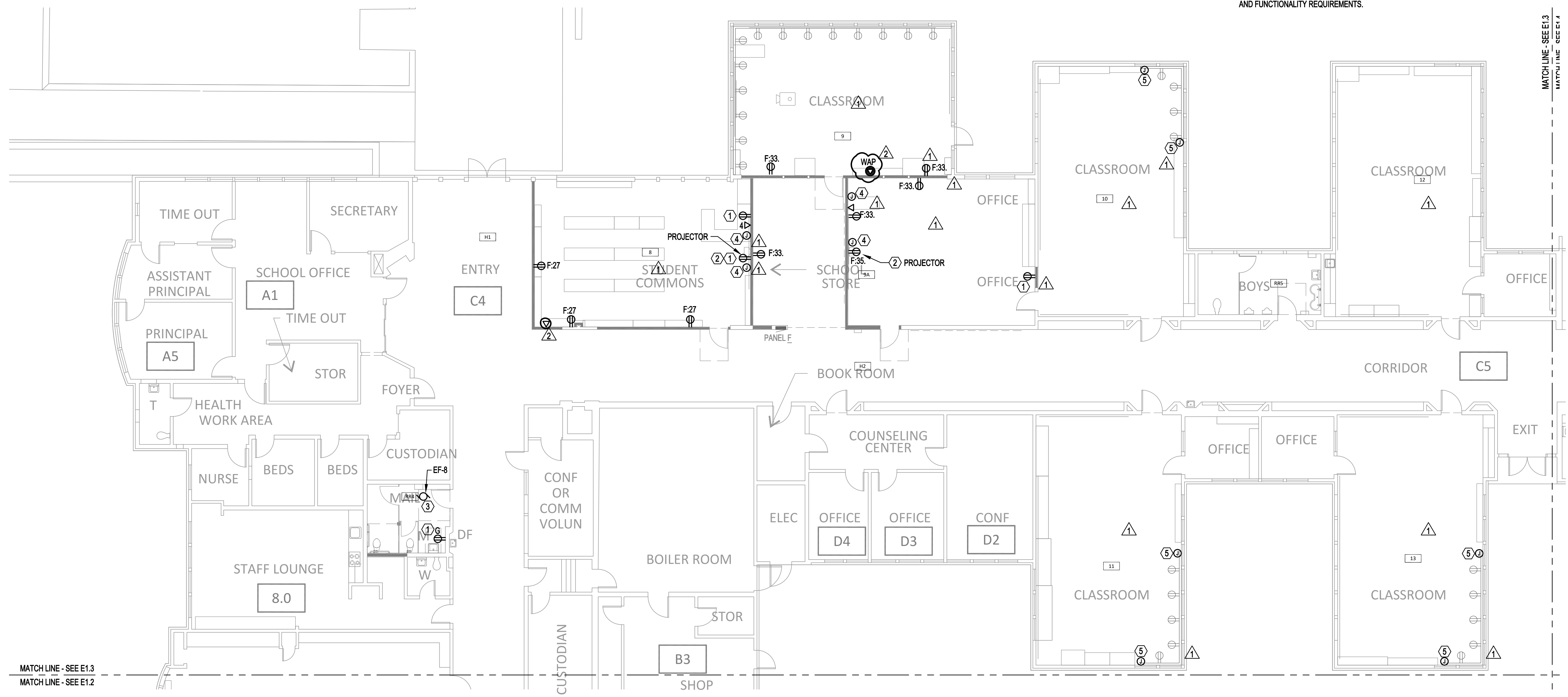
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- B. REFERENCE M0.01 FOR MECHANICAL SYMBOLS AND M0.02 FOR MECHANICAL SCHEDULES.
- C. ALL INTERIOR RACEWAY TO BE CONCEALED WHEN LOCATED WITHIN FINISHED SPACES UNLESS OTHERWISE NOTED.
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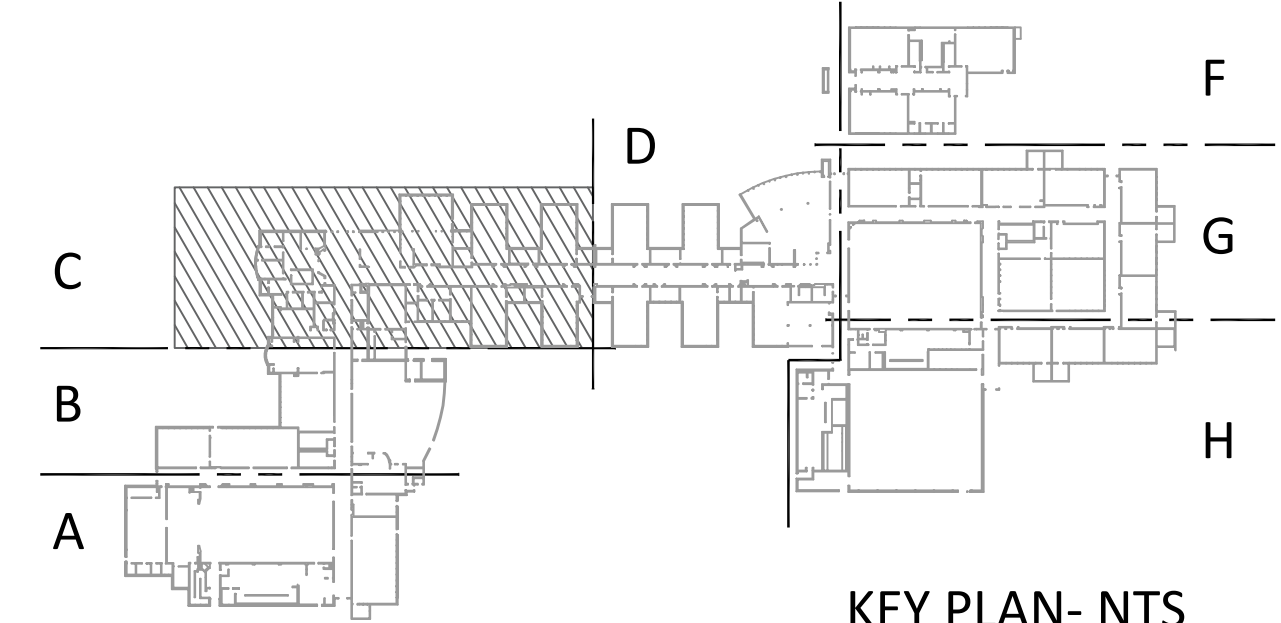
NOTES:

- 1. CONNECT SALVAGED CIRCUIT TO NEW RECEPTACLE.
- 2. COORDINATE ELEVATION WITH ARCHITECT/OWNER PRIOR TO ROUGH-IN.
- 3. CONNECT SALVAGED CIRCUIT TO NEW EXHAUST FAN.
- 4. PROVIDE BACK-BOX AND CONDUIT PATHWAY FOR PROJECTOR AV CONNECTION. SEE TEACHING WALL ELEVATION ON SHEET E1.1 FOR ADDITIONAL INFORMATION.
- 5. PROVIDE SURFACE MOUNTED CONDUIT TO EXTEND SALVAGED CIRCUIT TO NEW JUNCTION BOX FOR RECONNECTION OF EXISTING SURFACE MOUNTED RACEWAY.



MATCH LINE - SEE E1.3
MATCH LINE - SEE E1.2

MATCH LINE - SEE E1.3
MATCH LINE - SEE E1.4

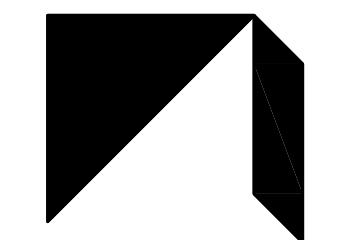


KEY PLAN- NTS

1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - C
E1.3 1/8" = 1'-0"



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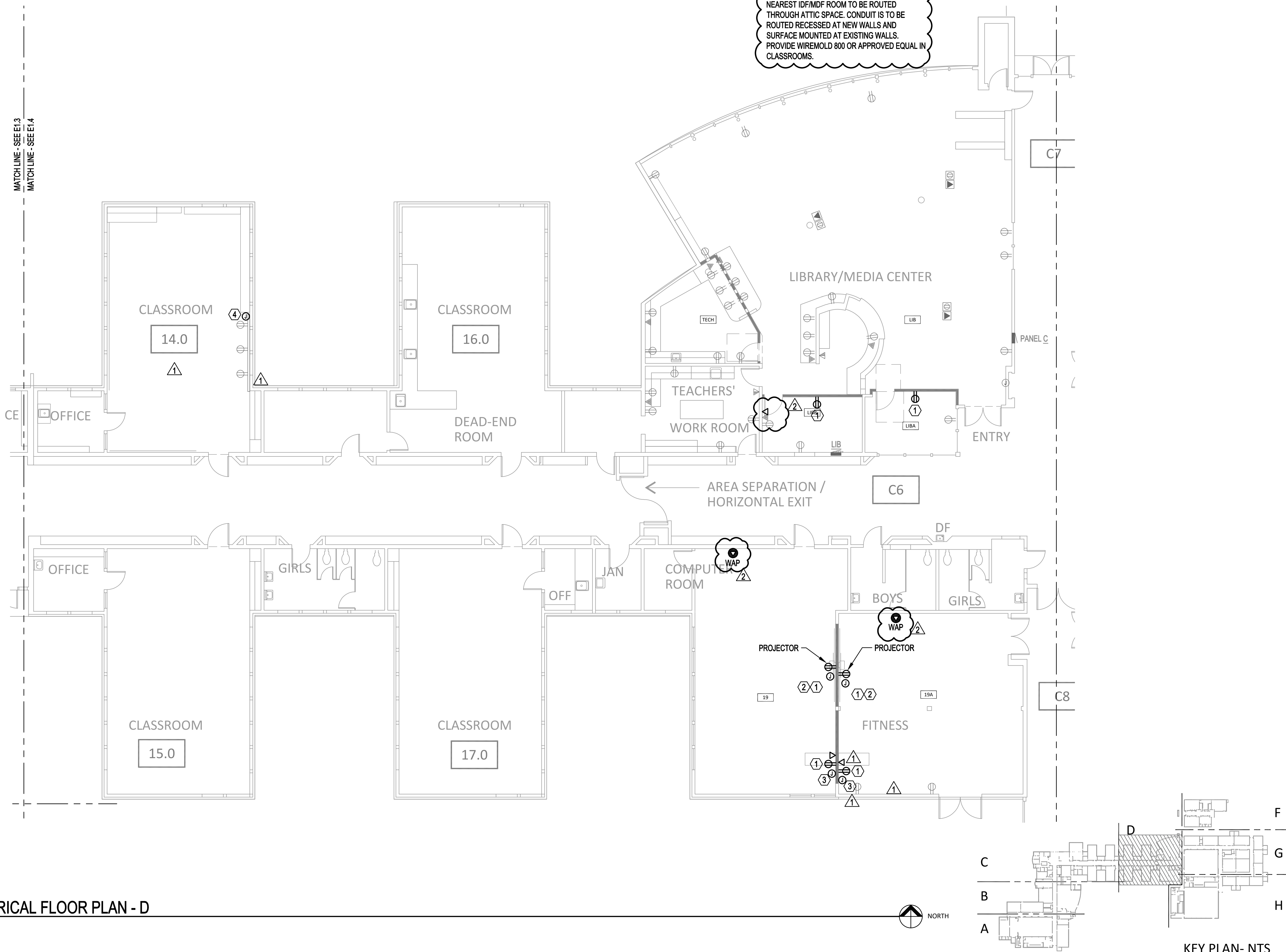
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4. PROVIDE SURFACE MOUNTED CONDUIT TO EXTEND SALVAGED CIRCUIT TO NEW JUNCTION BOX FOR RECONNECTION OF EXISTING SURFACE MOUNTED RACEWAY.



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ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - D

E1.4

KMS

KEY PLAN- NTS

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1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - D
E1.4 1/8" = 1'-0"

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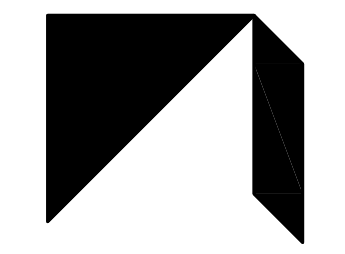
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NOTES:

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2. PROVIDE BACK-BOX AND CONDUIT PATHWAY FOR PROJECTOR AV CONNECTION. SEE TEACHING WALL ELEVATION ON SHEET E1.1 FOR ADDITIONAL INFORMATION.

3. RELOCATED DATA OUTLETS. IT IS ACCEPTABLE TO RE-USE SALVAGED CABLE IF UNDAMAGED.



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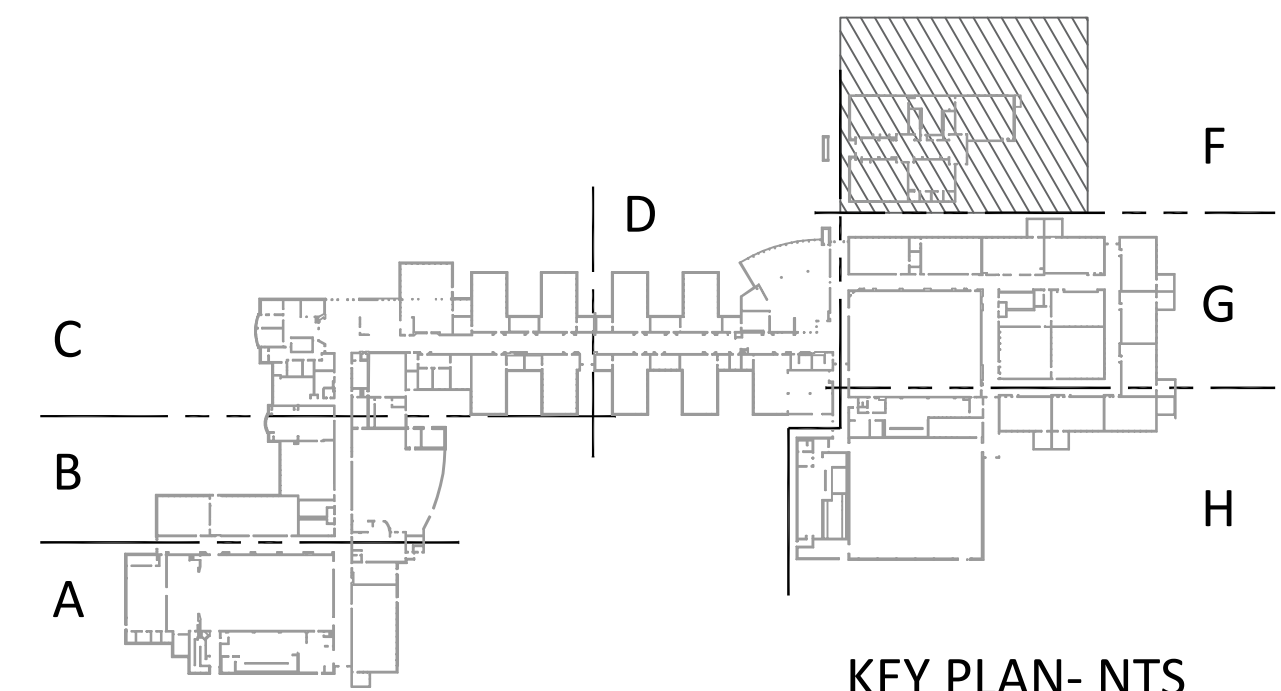
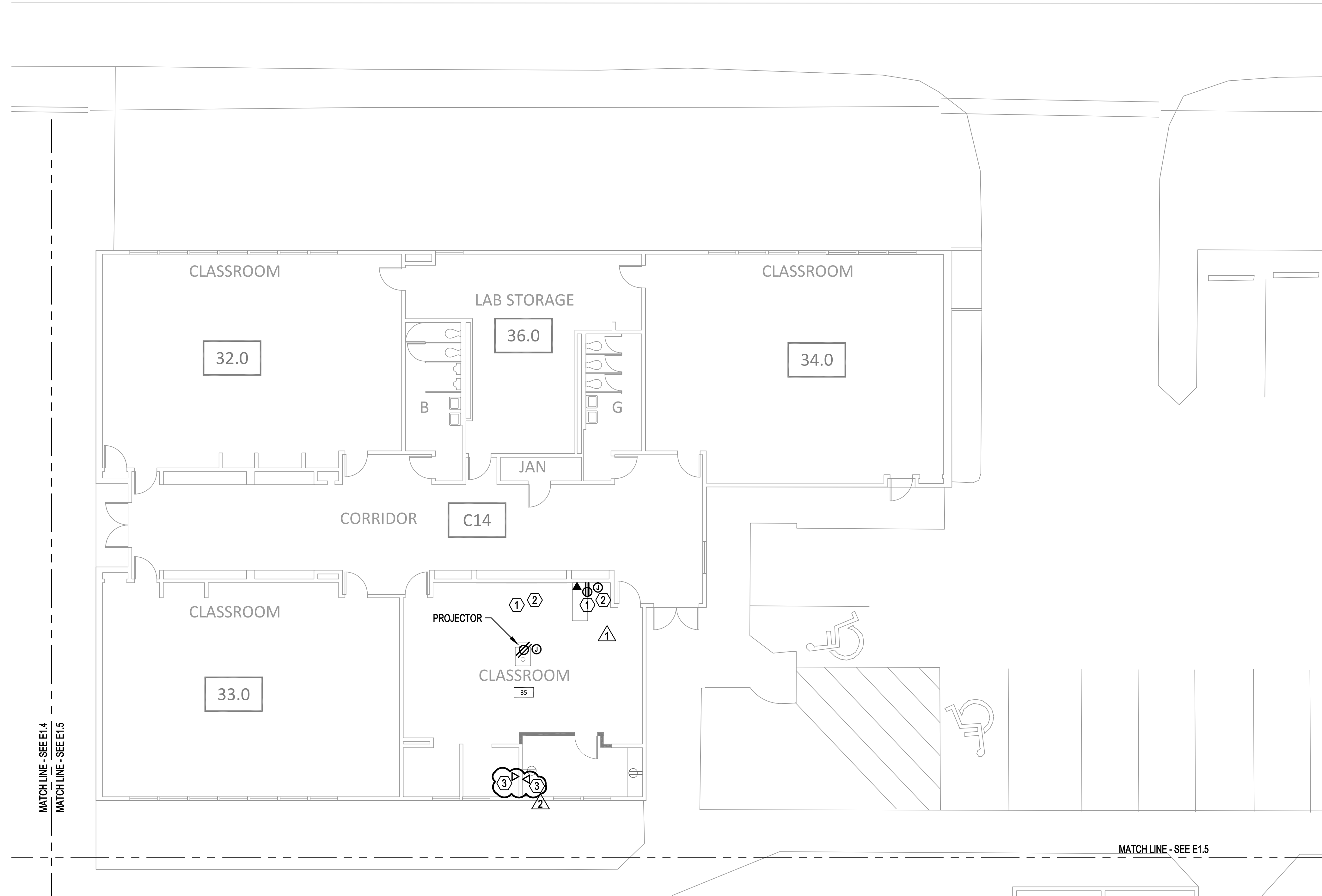
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ENLARGED
PARTIAL
ELECTRICAL
FLOOR PLAN - F

E1.5

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1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN - F
E1.4 1/8" = 1'-0"



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CONSTRUCTION SPECIFICATIONS

EROSION CONTROL

PERFORMANCE REQUIREMENTS

- A. COMPLY WITH ALL REQUIREMENTS OF U.S. ENVIRONMENTAL PROTECTION AGENCY FOR EROSION AND SEDIMENTATION CONTROL, AS SPECIFIED FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), UNDER REQUIREMENTS FOR THE 2012 GENERAL PERMIT FOR DISCHARGES FROM CONSTRUCTION ACTIVITIES.
- B. COMPLY WITH CITY OF EUGENE EROSION PREVENTION PROGRAM'S OUTCOMES SHEET.
- C. MINIMIZE WIND, WATER, AND VEHICULAR EROSION OF SOIL ON PROJECT SITE DUE TO CONSTRUCTION ACTIVITIES FOR THIS PROJECT. IF EROSION OCCURS DUE TO CONSTRUCTION ACTIVITY, RESTORE ERODED AREAS AT NO COST TO OWNER.
- CONTROL MOVEMENT OF SEDIMENT AND SOIL FROM TEMPORARY STOCKPILES OF SOIL. USE PLASTIC SHEETING OVER STOCKPILES DURING WET WEATHER OR THE STOCKPILE IS TO REMAIN IN PLACE FOR OVER 48 HOURS.
 - PREVENT DEVELOPMENT OF RUTS DUE TO EQUIPMENT AND VEHICULAR TRAFFIC BY PROVIDING HAUL ROADS AND CONSTRUCTION ENTRANCES.
 - PREVENT WINDBLOWN SOIL FROM LEAVING THE PROJECT SITE.
 - PREVENT TRACKING OF MUD ONTO PUBLIC ROADS OUTSIDE SITE.
 - PREVENT MUD AND SEDIMENT FROM FLOWING ONTO SIDEWALKS AND PAVEMENTS.
 - PREVENT MUD AND SEDIMENT FROM ENTERING ON-SITE OR OFF-SITE STORM DRAINS THROUGH THE USE OF INLET PROTECTION AND PERIMETER SEDIMENT BARRIERS.

FINAL STABILIZATION

- A. COMPLETELY RESTORE ALL AREAS DISTURBED BY CONSTRUCTION:
- FILL DEPRESSIONS CAUSED BY CONSTRUCTION WITH SATISFACTORY SOIL MATERIAL IN HORIZONTAL LAYERS NOT EXCEEDING A LOOSE DEPTH OF 8 INCHES AND COMPACT EACH LAYER TO A DENSITY EQUAL TO ADJACENT ORIGINAL GROUND.
 - RE-SEED ALL DISTURBED AREAS WITH SEED MIXTURE ACCEPTABLE TO 4J SCHOOL DISTRICT. STABILIZE SEEDED AREAS WITH TACKIFIED MULCH, COMPOST, OR APPROVED EQUAL.

FENCE GATE HARDWARE

HINGES & ACCESSORIES

- A. CAPS: CAST STEEL GALVANIZED; SIZED TO POST DIAMETER; SET SCREW RETAINER.
- B. FITTINGS: SLEEVES, BANDS, CLIPS, RAIL ENDS, TENSION BARS, FASTENERS AND FITTINGS; STEEL.
- C. HINGES: TRUCLOSE SERIES 3, OR APPROVED EQUAL.
- D. HARDWARE FOR SINGLE SWINGING GATES: 180 DEGREE HINGES, 2 FOR GATES UP TO 60 INCHES HIGH, 3 FOR TALLER GATES; ROLO LATCH WITH GRAVITY DROP AND PADLOCK HASP; KEEPER TO HOLD GATE IN FULLY OPEN POSITION.
- E. HARDWARE FOR DOUBLE SWINGING GATES: 180 DEGREE HINGES, 2 FOR GATES UP TO 60 INCHES HIGH, 3 FOR TALLER GATES; DROP BOLT ON INACTIVE LEAF ENGAGING SOCKET STOP SET IN CONCRETE, ACTIVE LEAF LATCHES TO INACTIVE LEAF PREVENTING RAISING OF DROP BOLT, PADLOCK HASP; KEEPERS TO HOLD GATE IN FULLY OPEN POSITION.
- CENTER GATE STOP AND DROP ROD AT DOUBLE GATES. METAL SLEEVE SET IN CONCRETE FOR DROP ROD. PROVIDE CONCRETE CENTER DROP TO FOOTING DEPTH.
- F. HOLD-OPENS: AT EACH GATE, PROVIDE WALL OR POST MOUNTED HASP FOR LOCKING GATE IN THE OPEN POSITION.

EARTH MOVING

SOIL MATERIALS

- A. GENERAL: PROVIDE BORROW SOIL MATERIALS WHEN SUFFICIENT SATISFACTORY SOIL MATERIALS ARE NOT AVAILABLE FROM EXCAVATIONS.
- B. SATISFACTORY SOILS: SOIL CLASSIFICATION GROUPS GW, GP, GM, SW, SP, AND SM ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS; FREE OF ROCK OR GRAVEL LARGER THAN 3 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.
- C. UNSATISFACTORY SOILS: SOIL CLASSIFICATION GROUPS GC, SC, CL, ML, OL, CH, MH, OH, AND PT ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS.
- UNSATISFACTORY SOILS ALSO INCLUDE SATISFACTORY SOILS NOT MAINTAINED WITHIN 2 PERCENT OF OPTIMUM MOISTURE CONTENT AT TIME OF COMPACTION.
- D. BASE COURSE: USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.
- E. ENGINEERED FILL: NATURALLY OR ARTIFICIALLY GRADED MIXTURE OF NATURAL OR CRUSHED GRAVEL, CRUSHED STONE, AND NATURAL OR CRUSHED SAND; ASTM D 2940; WITH AT LEAST 90 PERCENT PASSING A 3-INCH SIEVE AND NOT MORE THAN 12 PERCENT PASSING A NO. 200 SIEVE.
- F. BEDDING COURSE AND PIPE ZONE BACKFILL: USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.
- G. BACKFILL AND FILL:
- SATISFACTORY SOIL MATERIALS
 - INITIAL TRENCH BACKFILL: USE OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION 3/4-INCH-0-INCH BASE AGGREGATE.
- H. ENGINEERED WOOD FIBER FOR SOFTPLAY: PROVIDE GT IMPAX ENGINEERED WOOD FIBER OR APPROVED EQUAL.

ACCESSORIES

- A. DETECTABLE WARNING TAPE: ACID- AND ALKALI-RESISTANT, POLYETHYLENE FILM WARNING TAPE MANUFACTURED FOR MARKING AND IDENTIFYING UNDERGROUND UTILITIES, A MINIMUM OF 6 INCHES WIDE AND 4 MILS THICK, CONTINUOUSLY INSCRIBED WITH A DESCRIPTION OF THE UTILITY, WITH METALLIC CORE ENCASED IN A PROTECTIVE JACKET FOR CORROSION PROTECTION, DETECTABLE BY METAL DETECTOR WHEN TAPE IS BURIED UP TO 30 INCHES DEEP, COLORED TO COMPLY WITH LOCAL PRACTICE OR REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION OR AS FOLLOWS:
- RED: ELECTRIC.
 - YELLOW: GAS, OIL, STEAM, AND DANGEROUS MATERIALS.
 - ORANGE: TELEPHONE AND OTHER COMMUNICATIONS.
 - BLUE: WATER SYSTEMS.
 - GREEN: SEWER SYSTEMS.
- B. TRACER WIRE: 12 AWG MINIMUM SOLID COPPER INSULATED HIGH MOLECULAR WEIGHT POLYETHYLENE (HMW PE) TRACER WIRE OR APPROVED EQUAL. THE TRACER WIRE INSULATION SHALL BE GREEN FOR SEWER PIPE AND BLUE FOR WATERLINES AND BE A MINIMUM OF 45 MIL. THICK. JOINTS OR SPLICES SHALL BE WATERPROOF. THE WIRE SHALL BE RATED FOR 30 VOLT.
- C. DRAINAGE FABRIC: NONWOVEN GEOTEXTILE, SPECIFICALLY MANUFACTURED AS A DRAINAGE GEOTEXTILE; MADE FROM POLYOLEFINS, POLYESTERS, OR POLYAMIDES; AND WITH THE FOLLOWING MINIMUM PROPERTIES DETERMINED ACCORDING TO ASTM D 4759 AND REFERENCED STANDARD TEST METHODS:
- GRAB TENSILE STRENGTH: 110 LBF (490N); ASTM D 4632.
 - TEAR STRENGTH: 40 LBF (178 N); ASTM D 4533.
 - PUNCTURE STRENGTH: 220 LBF (979 N); ASTM D 4833.
 - APPARENT OPENING SIZE: NO. 40 (??MM); ASTM D 4751.
 - PERMATIVITY (MINIMUM): .5 SEC-1; ASTM D 4491.
- E. SEPARATION FABRIC: WOVEN GEOTEXTILE, SPECIFICALLY MANUFACTURED AS A SEPARATION GEOTEXTILE; MADE FROM POLYOLEFINS, POLYESTERS, OR POLYAMIDES; AND WITH THE FOLLOWING MINIMUM PROPERTIES DETERMINED ACCORDING TO ASTM D 4759 AND REFERENCED STANDARD TEST METHODS:
- GRAB TENSILE STRENGTH: 180 LBF (800 N); ASTM D 4632.
 - TEAR STRENGTH: 68 LBF (302 N); ASTM D 4533.
 - PUNCTURE STRENGTH: 371 LBF (1650 N); ASTM D 4833.
 - APPARENT OPENING SIZE: NO. 30; ASTM D 4751.

CONCRETE PAVING

1.1 FORMS

- A. FORM MATERIALS: PLYWOOD, METAL, METAL-FRAMED PLYWOOD, OR OTHER APPROVED PANEL-TYPE MATERIALS TO PROVIDE FULL-DEPTH, CONTINUOUS, STRAIGHT, SMOOTH EXPOSED SURFACES.
- USE FLEXIBLE OR CURVED FORMS FOR CURVES WITH A RADIUS 100 FEET OR LESS.
- B. FORM-RELEASE AGENT: COMMERCIALY FORMULATED FORM-RELEASE AGENT THAT WILL NOT BOND WITH, STAIN, OR ADVERSELY AFFECT CONCRETE SURFACES AND WILL NOT IMPAIR SUBSEQUENT TREATMENTS OF CONCRETE SURFACES.

1.2 CONCRETE MATERIALS

- A. CEMENTITIOUS MATERIAL: USE THE FOLLOWING CEMENTITIOUS MATERIALS, OF SAME TYPE, BRAND, AND SOURCE THROUGHOUT PROJECT:
- PORTLAND CEMENT: ASTM C 150, GRAY PORTLAND CEMENT TYPE I
 - FLY ASH: ASTM C 618, CLASS C.
 - NORMAL-WEIGHT AGGREGATES: ASTM C 33, CLASS 4M, UNIFORMLY GRADED. PROVIDE AGGREGATES FROM A SINGLE SOURCE.
 - MAXIMUM COARSE-AGGREGATE SIZE: 1 INCH NOMINAL.
 - FINE AGGREGATE: FREE OF MATERIALS WITH DELETERIOUS REACTIVITY TO ALKALI IN CEMENT.
 - WATER: POTABLE AND COMPLYING WITH ASTM C 94/C 94M.
 - AIR-ENTRAINING ADMIXTURE: ASTM C 260.
 - CHEMICAL ADMIXTURES: ADMIXTURES CERTIFIED BY MANUFACTURER TO BE COMPATIBLE WITH OTHER ADMIXTURES AND TO CONTAIN NOT MORE THAN 0.1 PERCENT WATER-SOLUBLE CHLORIDE IONS BY MASS OF CEMENTITIOUS MATERIAL.
 - WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE A.
 - WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE D.
 - HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE F.

1.4 CURING MATERIALS

- A. ABSORPTIVE COVER: AASHTO M 182, CLASS 3, BURLAP CLOTH MADE FROM JUTE OR KENAF, WEIGHING APPROXIMATELY 9 OZ./SQ. YD. DRY.
- B. MOISTURE-RETAINING COVER: ASTM C 171, POLYETHYLENE FILM OR WHITE BURLAP-POLYETHYLENE SHEET.
- C. WATER: POTABLE.
- D. EVAPORATION RETARDER: WATERBORNE, MONOMOLECULAR, FILM FORMING, MANUFACTURED FOR APPLICATION TO FRESH CONCRETE.
- E. CLEAR, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND: ASTM C 309, TYPE 1, CLASS B.
- F. WHITE, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND: ASTM C 309, TYPE 2, CLASS B.

1.5 RELATED MATERIALS

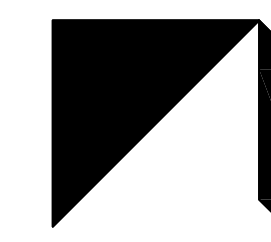
- A. JOINT FILLERS: ASTM D 1751, ASPHALT-SATURATED CELLULOSIC FIBER IN PREFORMED STRIPS.
- C. EPOXY BONDING ADHESIVE: ASTM C 881, TWO-COMPONENT EPOXY RESIN, CAPABLE OF HUMID CURING AND BONDING TO DAMP SURFACES, OF CLASS SUITABLE FOR APPLICATION TEMPERATURE AND OF GRADE TO REQUIREMENTS.

1.6 CONCRETE MIXTURES

- A. PREPARE DESIGN MIXTURES, PROPORTIONED ACCORDING TO ACI 301, WITH THE FOLLOWING PROPERTIES:
- COMPRESSIVE STRENGTH (28 DAYS): 3300 PSI.
 - MAXIMUM WATER-CEMENTITIOUS MATERIALS RATIO AT POINT OF PLACEMENT: 0.50.
 - SLUMP LIMIT: 4 INCHES, PLUS OR MINUS 1 INCH.
 - AIR CONTENT: 4-1/2 PERCENT PLUS OR MINUS 1.5 PERCENT FOR 1-INCH NOMINAL MAXIMUM AGGREGATE SIZE.
- B. CHEMICAL ADMIXTURES: USE ADMIXTURES ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
- 1.7 CONCRETE MIXING
- A. READY-MIXED CONCRETE: MEASURE, BATCH, AND MIX CONCRETE MATERIALS AND CONCRETE ACCORDING TO ASTM C 94/C 94M. FURNISH BATCH CERTIFICATES FOR EACH BATCH DISCHARGED AND USED IN THE WORK.
- WHEN TEMPERATURE IS BETWEEN 85 DEG F AND 90 DEG F, REDUCE MIXING AND DELIVERY TIME FROM 1-1/2 HOURS TO 75 MINUTES; WHEN AIR TEMPERATURE IS ABOVE 90 DEG F, REDUCE MIXING AND DELIVERY TIME TO 60 MINUTES.

1.8 PAVEMENT MARKINGS

- A. PAVEMENT-MARKING PAINT: ALKYD-RESIN TYPE, LEAD AND CHROMATE FREE, READY MIXED, COMPLYING WITH FS TT-P-115, TYPE I OR AASHTO M 248, TYPE N.
- COLOR: AS INDICATED.
- B. PAVEMENT-MARKING PAINT: LATEX, WATERBORNE EMULSION, LEAD AND CHROMATE FREE, READY MIXED, COMPLYING WITH FS TT-P-1952, TYPE II, WITH DRYING TIME OF LESS THAN 45 MINUTES.
- COLOR: AS INDICATED.
- C. PAVEMENT-MARKING PAINT: MPI #97 LATEX TRAFFIC MARKING PAINT.
- COLOR: AS INDICATED.



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REVISIONS

- | | |
|---|---------------|
| 1 | 17 MARCH 2020 |
| 2 | 27 MARCH 2020 |

**NORTH EUGENE HIGH SCHOOL
IMPROVEMENTS
200 SILVER LN, EUGENE, OR 97404
RENOVATIONS**

JOB NO: 19126
ISSUE DATE: 09/13/20

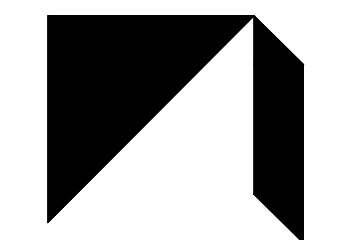
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SPECIFICATIONS

NEHS

2 C1.2

100% CD

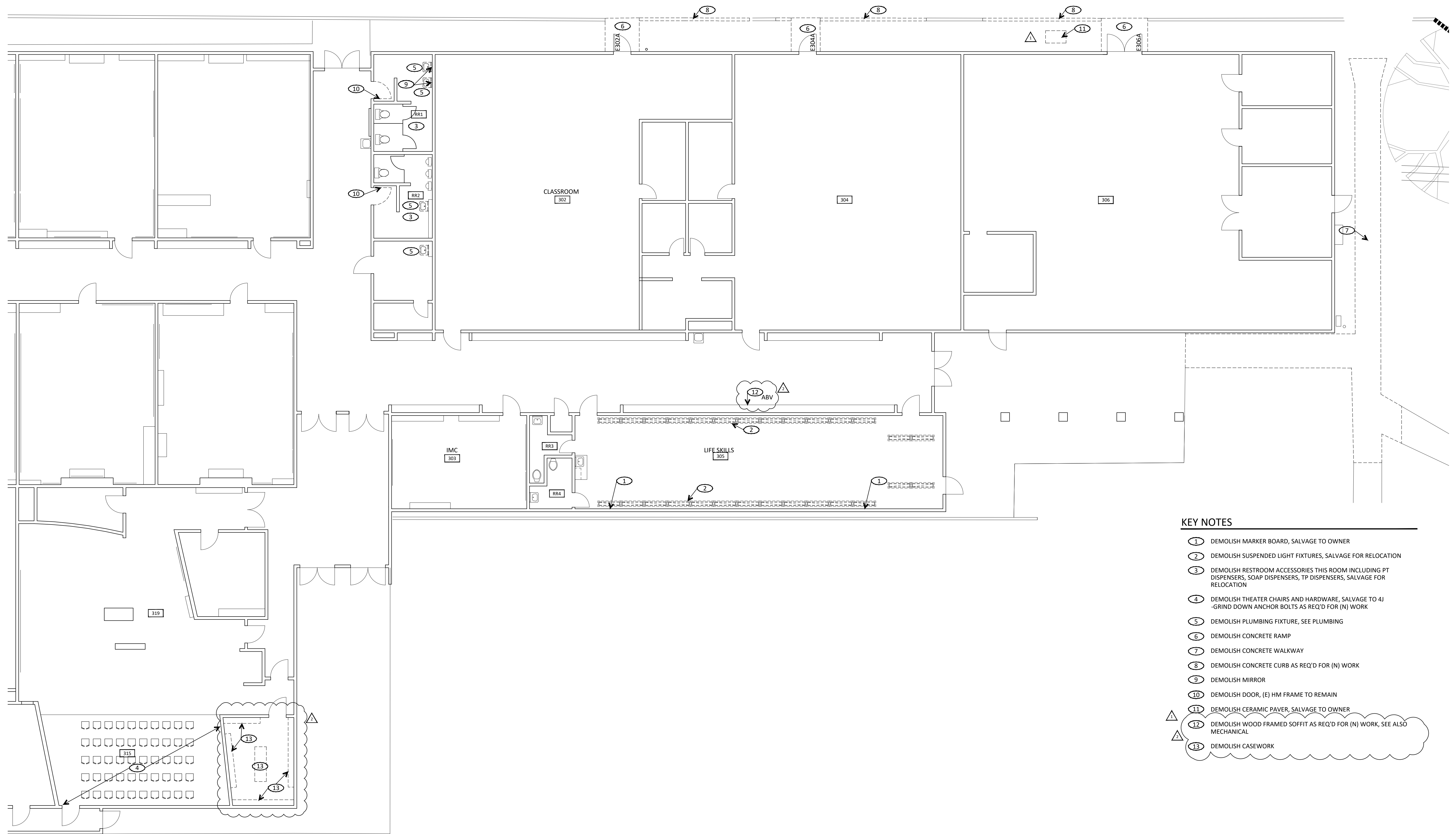
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REVISIONS		
△	3/17/2020	ADD. 1
△	3/24/2020	ADD. 2



KEY NOTES

- ① DEMOLISH MARKER BOARD, SALVAGE TO OWNER
- ② DEMOLISH SUSPENDED LIGHT FIXTURES, SALVAGE FOR RELOCATION
- ③ DEMOLISH RESTROOM ACCESSORIES THIS ROOM INCLUDING PT DISPENSERS, SOAP DISPENSERS, TP DISPENSERS, SALVAGE FOR RELOCATION
- ④ DEMOLISH THEATER CHAIRS AND HARDWARE, SALVAGE TO 4J -GRIND DOWN ANCHOR BOLTS AS REQ'D FOR (N) WORK
- ⑤ DEMOLISH PLUMBING FIXTURE, SEE PLUMBING
- ⑥ DEMOLISH CONCRETE RAMP
- ⑦ DEMOLISH CONCRETE WALKWAY
- ⑧ DEMOLISH CONCRETE CURB AS REQ'D FOR (N) WORK
- ⑨ DEMOLISH MIRROR
- ⑩ DEMOLISH DOOR, (E) HM FRAME TO REMAIN
- ⑪ DEMOLISH CERAMIC PAVER, SALVAGE TO OWNER
- ⑫ DEMOLISH WOOD FRAMED SOFFIT AS REQ'D FOR (N) WORK, SEE ALSO MECHANICAL
- ⑬ DEMOLISH CASEWORK

1 ENLARGED DEMOLITION PLAN
1/8" = 1'-0"



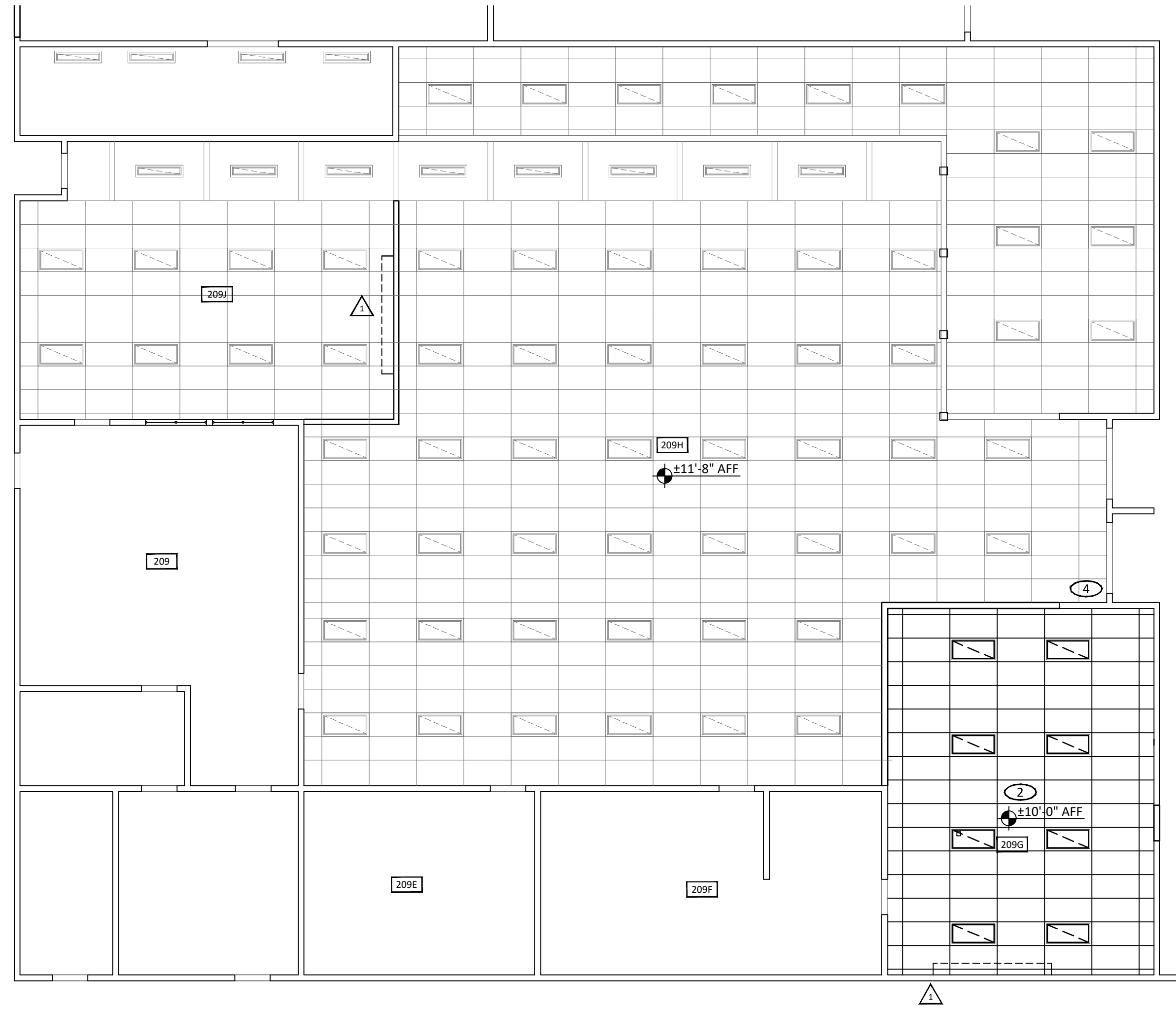
ESD 4J NORTH EUGENE HIGH SCHOOL IMPROVEMENTS
200 SILVER LN, EUGENE OR
RENOVATIONS

JOB NO: 19188
ISSUE DATE: 03 MAR 2020

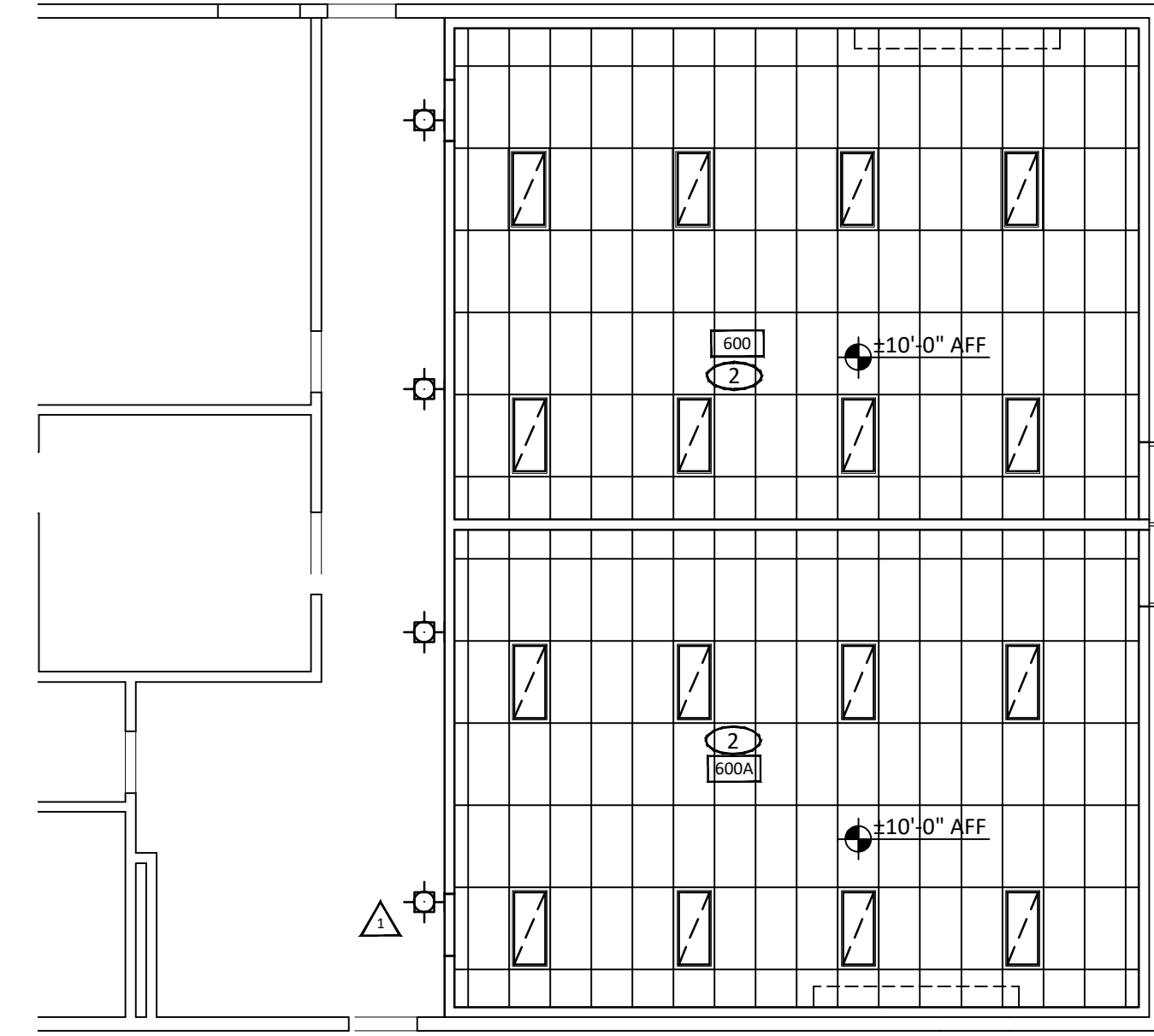
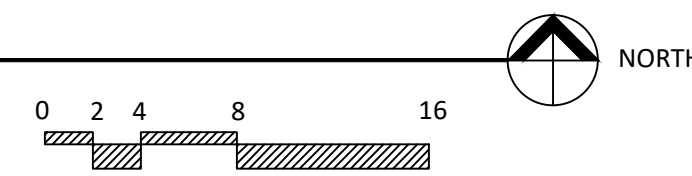
PARTIAL
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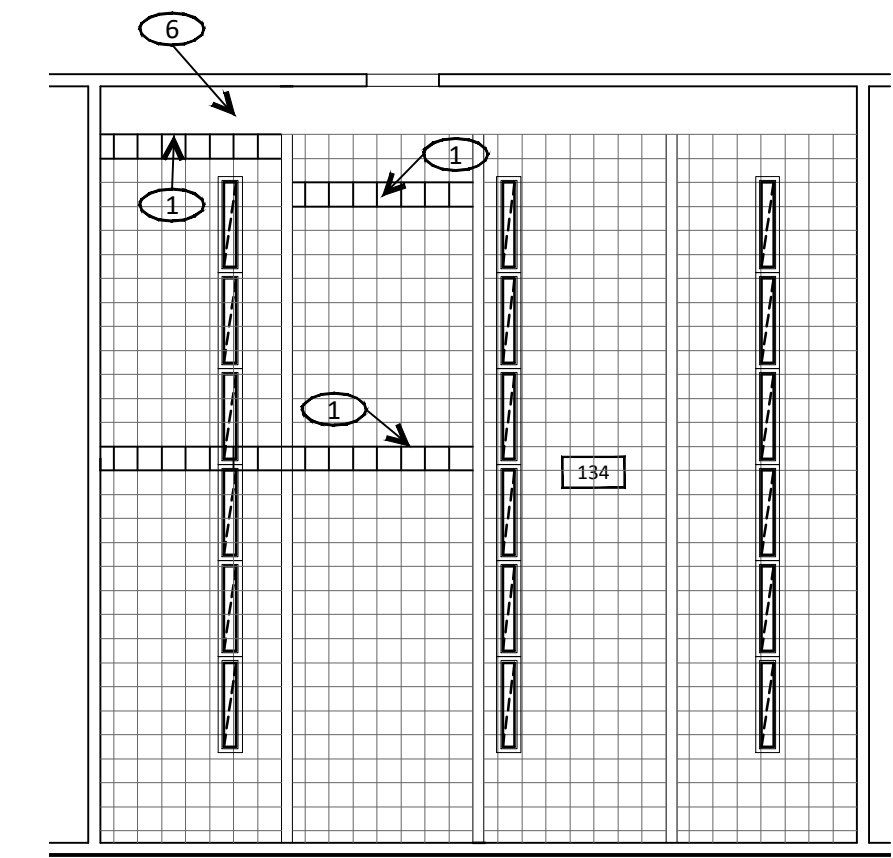
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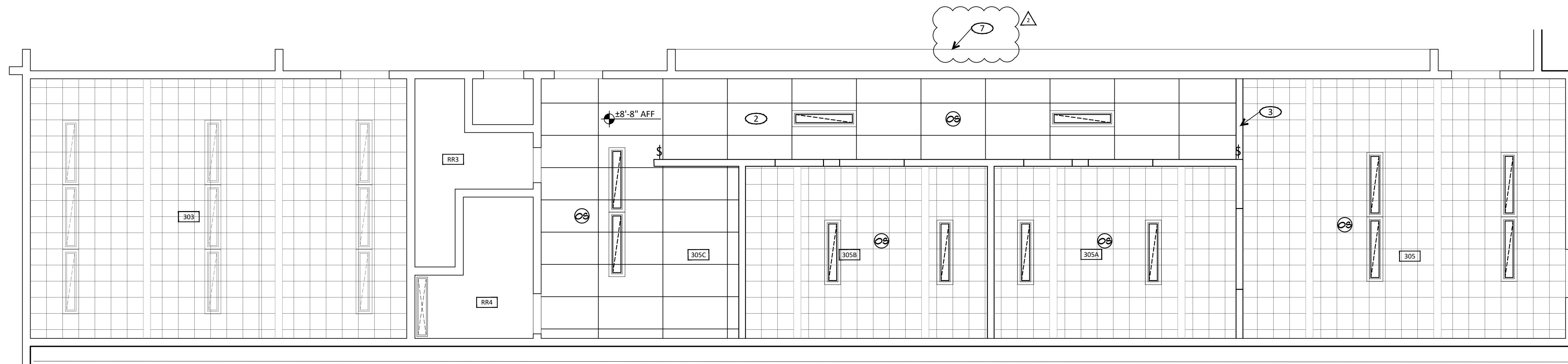
1 LIBRARY ENLARGED FLOORPLAN
1/8" = 1'-0"



2 ROOM 600/A REFLECTED CEILING PLAN
1/8" = 1'-0"



3 ROOM 134 ENLARGED FLOORPLAN
1/8" = 1'-0"



4 ROOMS 303 AND 305 REFLECTED CEILING PLAN
1/4" = 1'-0"



KEY NOTES

- ① PATCH GLUE-ON TILE ASSY WHERE WALL DEMOLISHED, MATCH ADJACENT TILE ASSY
- ② (N) SUSPENDED ACOUSTIC CEILING TILE AND GRID ASSY, SEE A/A310 FOR TYP DETAILS
- △ ③ (N) GYP BD WRAPPED HEADWALL @ 8'-0" AFF
- ④ (R) LIGHTING CONTROLS, SEE ELECT
- ⑤ MATCH ADJACENT CEILING HEIGHT
- △ ⑥ (E) GYP BD SOFFIT TO REMAIN
- ⑦ (N) WD FRAMING AND FINISH WHERE SOFFIT DEMOLISHED FOR (N) WORK, SEE ALSO MECHANICAL



REVISIONS

△	3/17/2020	ADD. 1
△	3/24/2020	ADD. 2

ESD 4J NORTH EUGENE HIGH SCHOOL IMPROVEMENTS
 200 SILVER LN, EUGENE OR
 RENOVATIONS

JOB NO: 19188
ISSUE DATE: 03 MAR 2020

PARTIAL
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A220

NEHS

Date: 3/27/20 Time: 10:26am File: \\pae-engineers.com\Projects\2019\19-1867 - Eugene 4J - Corridor Relocation\01 Production\02 CAD\19-1867 E0.01.dwg User: daniel.wrtala

ABBREVIATIONS			
AFF	ABOVE FINISHED FLOOR	KVAR	KILOVOLT AMPS REACTIVE
A	AMPERE (AMP)	LA	LIGHTNING ARRESTOR
AL	ALUMINUM	LTG	LIGHTING
ARCH	ARCHITECT / ARCHITECTURAL	LV	LOW VOLTAGE
ATS	AUTOMATIC TRANSFER SWITCH	MATV	MASTER ANTENNA TELEVISION
CB	CIRCUIT BREAKER	MCA	MINIMUM CIRCUIT AMPS
C	CONDUIT	MCB	MAIN CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION	MCC	MOTOR CONTROL CENTER
CKT	CIRCUIT	MDP	MAIN DISTRIBUTION PANEL
CLG	CEILING	MECH	MECHANICAL
CT	CURRENT TRANSFORMER	MH	METAL HALIDE
CU	COPPER	MLO	MAIN LUGS ONLY
DN	DOWN	MV	MERCURY VAPOR
EMERG	EMERGENCY	MTS	MANUAL TRANSFER SWITCH
EMT	ELECTRIC METALLIC TUBING	NIC	NOT IN CONTRACT
EP	EXPLOSION PROOF	NL	NIGHT LIGHT CIRCUIT
EPO	EMERGENCY POWER OFF	PA	PUBLIC ADDRESS
EWC	ELECTRIC WATER COOLER	PDZ	PRIMARY DAYLIGHT ZONE
FA	FIRE ALARM	PE	PHOTO ELECTRIC CELL
FLA	FULL LOAD AMPS	PF	POWER FACTOR
FLUOR	FLUORESCENT	PNL	PANELBOARD
FCIC	FURNISHED BY CONTRACTOR INSTALLED BY CONTRACTOR	PVC	POLYVINYL CHLORIDE CONDUIT
FOIC	FURNISHED BY OWNER INSTALLED BY CONTRACTOR	PWR	POWER
FOIO	FURNISHED BY OWNER INSTALLED BY OWNER	SDP	SUB-DISTRIBUTION PANEL
GFP	GROUND FAULT PROTECTION	SDZ	SECONDARY DAYLIGHT ZONE
GFI	GROUND FAULT INTERRUPTER	STR	STARTER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	SV	SOLENOID VALVE
GRC	GALVANIZED RIGID CONDUIT	SW	SWITCH
GRD	GROUND	TD	TIME DELAY
HP	HORSEPOWER	TP	TAMPERPROOF
HPS	HIGH PRESSURE SODIUM	TTB	TELEPHONE TERMINAL BOARD
HV	HIGH VOLTAGE	TTC	TELEPHONE TERMINAL CABINET
HZ	HERTZ	TV	TELEVISION
IG	ISOLATED GROUND	TYP	TYPICAL
INC	INCANDESCENT	UG	UNDERGROUND
JB	JUNCTION BOX	UPS	UNINTERRUPTIBLE POWER SUPPLY
KW	KILOWATT	V	VOLTAGE
KWH	KILOWATT HOUR	VA	VOLT AMPERES
KV	KILOVOLT	VP	VAPOR PROOF
KVA	KILOVOLT AMP	W	WATTS
		WAP	WIRELESS ACCESS POINT
		WP	WEATHER PROOF
		XFMR	TRANSFORMER
		XFSW	TRANSFER SWITCH

LIGHTING	
	CEILING LUMINAIRE: SURFACE, RECESSED
	CEILING LUMINAIRE: PENDANT MOUNTED
	CEILING LUMINAIRE: PENDANT LINEAR
	WALL LUMINAIRE: SURFACE, RECESSED
	WALL WASHER: SURFACE, RECESSED
	TRACK WITH HEADS LOCATED
	FLUORESCENT LUMINAIRE: SURFACE, RECESSED
	FLUORESCENT LUMINAIRE: WALL MOUNTED
	FLUORESCENT LUMINAIRE: BARE LAMP
	POLE LIGHT: LUMINAIRES AS SHOWN
	DESIGNATES LIGHT ON EMERGENCY CIRCUIT
	EXIT LIGHT: CEILING, WALL (ARROWS AS SHOWN)
	BOLLARD
	EMERGENCY BATTERY LIGHT: HEADS AS SHOWN
	WALL SWITCH: 1 POLE, 2 POLE
	WALL SWITCH: 3 WAY, 4 WAY
	WALL SWITCH: KEY LOCK, MOMENTARY
	WALL SWITCH: LOW VOLTAGE, PILOT
	WALL SWITCH: TIMER, MANUAL DIMMER
	DESIGNATES LUMINAIRE TYPE (SEE LUMINAIRE SCHEDULE)
	DESIGNATES NIGHT LIGHT CIRCUIT
	PHOTOELECTRIC CELL: WALL MOUNTED, CEILING MOUNTED
	OCCUPANCY SENSOR: CEILING OR WALL MOUNTED
	"X" DESIGNATES DEVICE TYPE:
	S: IN COMBINATION WITH WALL SWITCH
	U: ULTRASONIC
	R: INFRARED
	UR: DUAL TECHNOLOGY, ULTRASONIC/INFRARED

DESIGNATION SYMBOLS	
	EQUIPMENT DESIGNATOR SEE SCHEDULE.
	DARK LINE WEIGHT INDICATES NEW WORK
	DARK AND DASHED LINE WEIGHT INDICATES DEMO WORK
	LIGHT LINE WEIGHT INDICATES EXISTING TO REMAIN
	NOTE

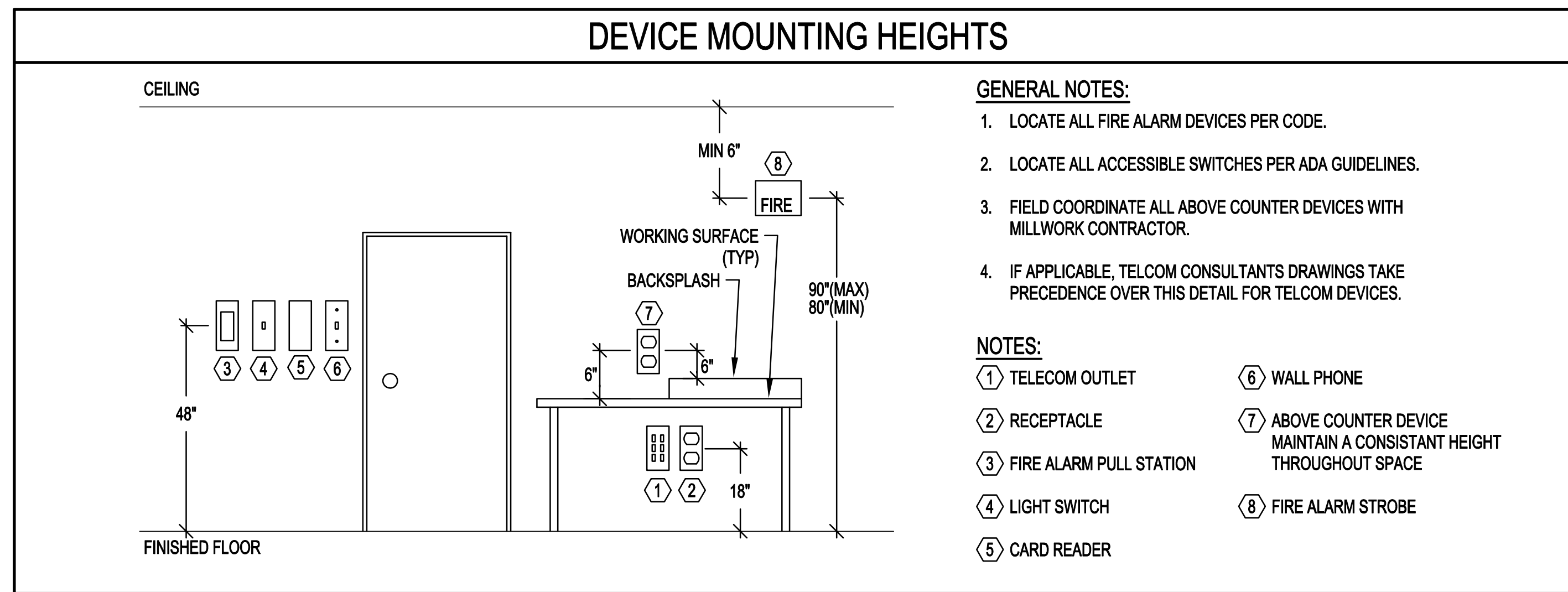
POWER	
	WALL RECEPTACLE: SINGLE, DUPLEX
	WALL RECEPTACLE: EMERGENCY, 4-PLEX
	WALL RECEPTACLE: ISOLATED GROUND
	CEILING RECEPTACLE: DUPLEX
	FIRE RATED FLOOR POKE-THRU
	CONNECTION TO EQUIPMENT PROVIDED BY OTHERS
	DENOTES RECEPTACLE ABOVE COUNTER
	SPECIAL PURPOSE OUTLET AS NOTED, EMERGENCY
	CLOCK HANGER RECEPTACLE
	FLUSH IN-FLOOR OUTLET: DUPLEX, COMBINATION
	PEDESTAL OUTLET: POWER, SIGNAL, COMBINATION
	SURFACE OUTLET STRIP: DIMENSION AS SHOWN
	TELEPOWER POLE, POWER, COMBINATION
	JUNCTION BOX
	DISCONNECT SWITCH: FUSED, NON-FUSED
	MOTOR STARTER: MANUAL, MAGNETIC, COMBINATION
	MOTOR CONNECTION
	CONTACTOR, RELAY, SOLENOID
	PUSH BUTTON STATION
	WIRING CONCEALED IN CEILING OR WALL
	WIRING CONCEALED IN FLOOR OR UNDERGROUND
	INDICATES INSULATED GREEN GROUND WIRE
	HOME RUN DESTINATION SHOWN
	CONDUIT ELL: UP, DN.

TELECOMMUNICATIONS	
	OUTLET TYPE: 2-PORT DATA UNLESS NOTED OTHERWISE
	WIRELESS ACCESS POINT: WALL, CEILING. PROVIDE TWO CABLES PER OUTLET (UON)

EQUIPMENT	
	ELECTRICAL EQUIPMENT
	PANELBOARD: SURFACE, RECESSED
	CABINET: SURFACE, RECESSED
	TRANSFORMER
	GROUND ROD, IN TEST WELL
	GROUND PAD
	EQUIPMENT WITH DERIVED GROUND
	VOLTMETER, AMMETER
	SELECTOR SWITCH: VOLTMETER, AMMETER
	METER: KILOWATT HOUR, POWER FACTOR
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	CABLE TRAY: CENTER SUPPORT, OUTER SUPPORTS

ONE-LINE	
	CIRCUIT BREAKER
	SWITCH, FUSED SWITCH
	BUS
	AUTOMATIC SWITCH
	METER
	PANEL
	FEEDER CALLOUT
	FAULT CURRENT CALLOUT
	GENERATOR

NOTE	
THIS IS A STANDARD LEGEND SHEET, THEREFORE, SOME SYMBOLS MAY APPEAR ON THIS SHEET THAT DO NOT APPEAR ON THE DRAWINGS.	



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3/17/2020	ADD. 1
3/27/2020	ADD. 2

ESD 4J NORTH EUGENE HIGH SCHOOL IMPROVEMENTS
200 SILVER LN, EUGENE, OR 97404
RENOVATIONS

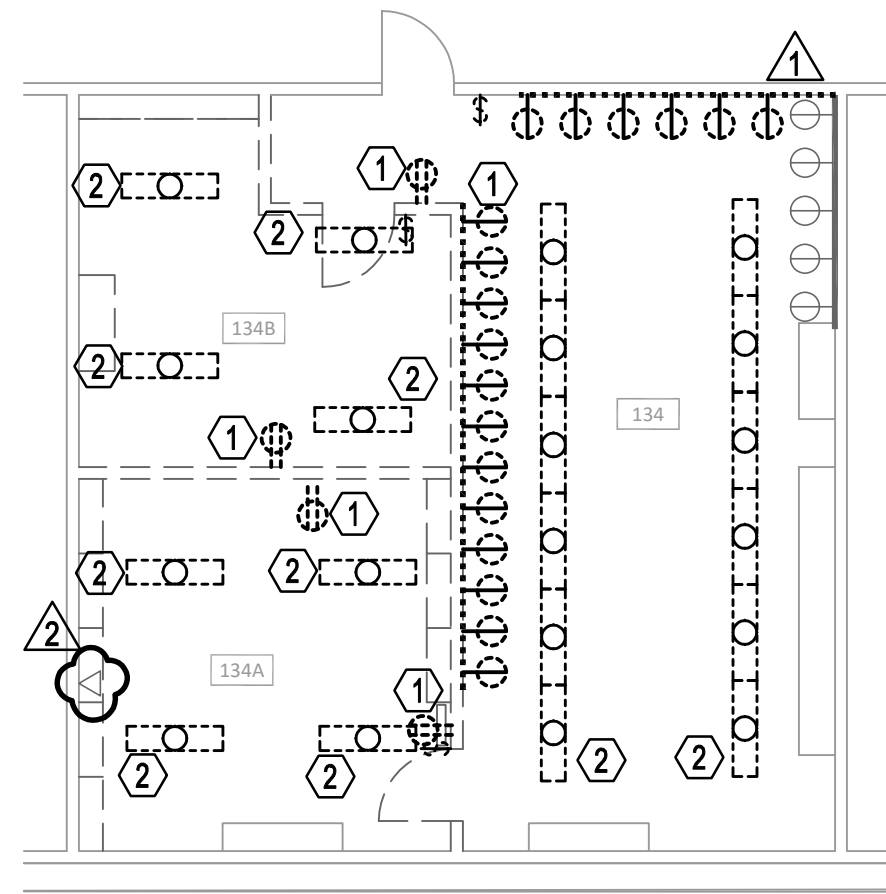
JOB NO: 19188
ISSUE DATE: 3 MAR 2020

SYMBOLS, LEGENDS AND ABBREVIATIONS - ELECTRICAL

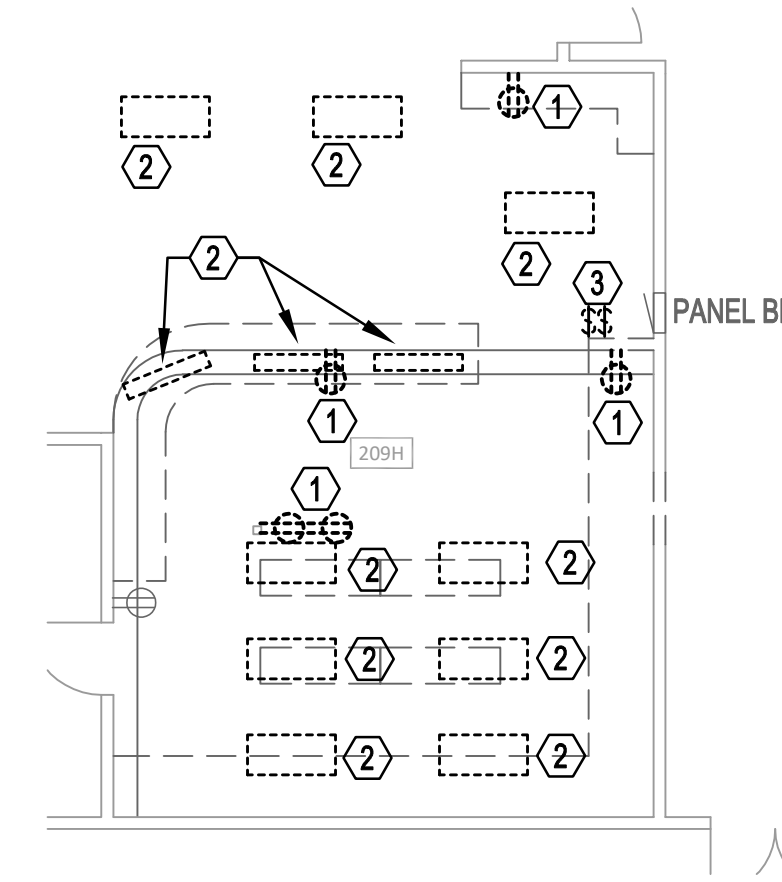
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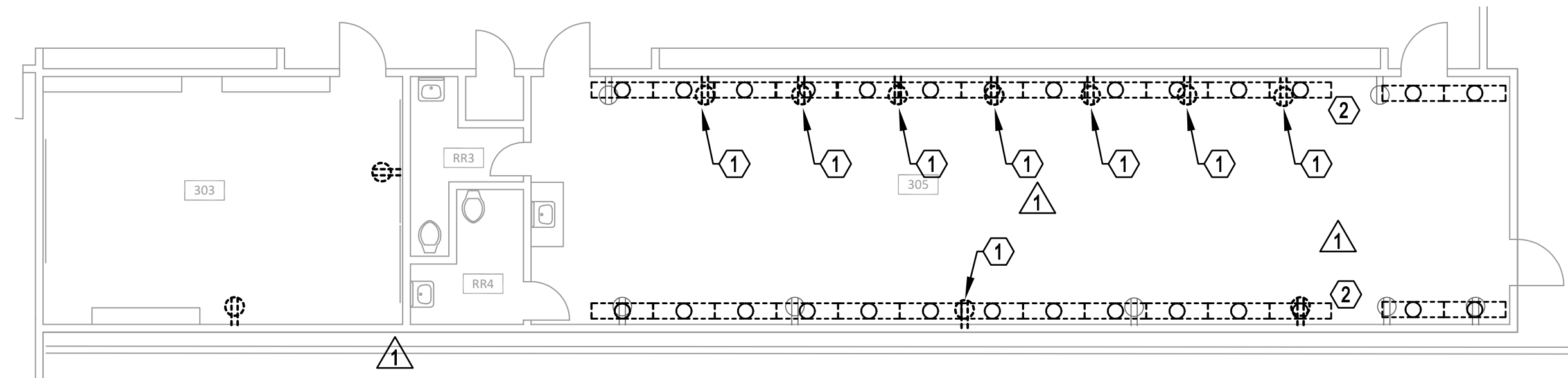
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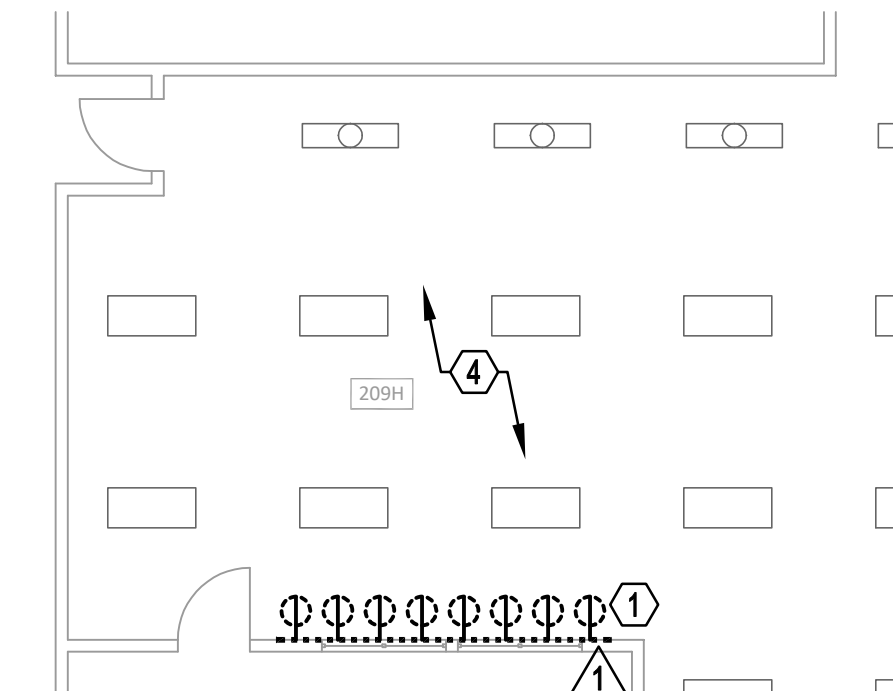
4 PARTIAL DEMOLITION PLAN
ED.1 1/8" = 1'-0" NORTH



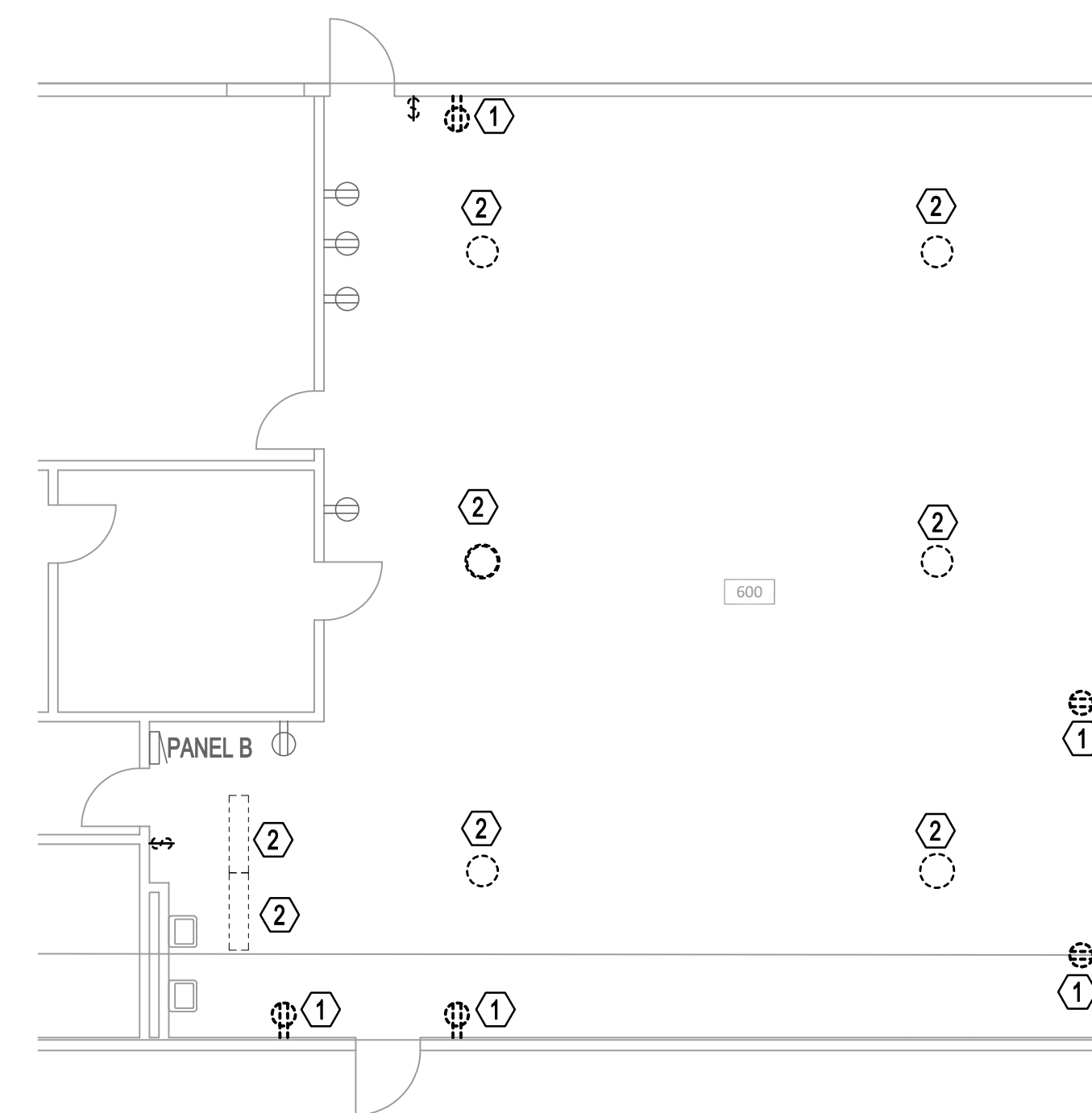
1 PARTIAL DEMOLITION PLAN
ED.1 1/8" = 1'-0" NORTH



5 PARTIAL DEMOLITION PLAN
ED.1 1/8" = 1'-0" NORTH



2 PARTIAL DEMOLITION PLAN
ED.1 1/8" = 1'-0" NORTH



3 PARTIAL DEMOLITION PLAN
ED.1 1/8" = 1'-0" NORTH

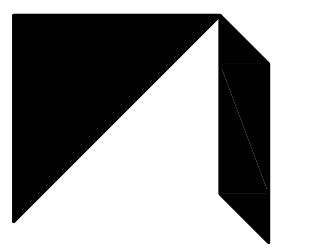
GENERAL NOTES:

A. CAREFULLY REMOVE AND OFFER TO THE OWNER ALL ELECTRICAL EQUIPMENT THAT IS TO BE REMOVED AND IN GOOD WORKING ORDER. REMOVE FROM PROJECT SITE AND PROPERLY DISPOSE ALL EQUIPMENT REJECTED BY THE OWNER.

B. THE LOCATIONS OF ALL EQUIPMENT AND DEVICES MAY NOT BE SHOWN AND THESE PLANS DO NOT SHOW ALL OF THE DEMOLITION CONDITIONS. DEMOLITION INCLUDES THE REMOVAL OF ALL RACEWAY, CONDUCTORS, COMMUNICATION CABLING, LIGHT FIXTURES, DEVICES, ELECTRICAL EQUIPMENT, FIRE ALARM DEVICES, CABLES, HANGERS, AND SUPPORTS THAT ARE MADE OBSOLETE BY THE NEW WORK OR ARE ABANDONED AND NO LONGER IN USE.

NOTES:

1. DEMOLISH RECEPTACLE AND BACKBOX AND REMOVE CONDUIT AND CONDUCTORS TO ABOVE ACCESSIBLE CEILING. SALVAGE CIRCUIT FOR EXTENSION TO NEW RECEPTACLE LOCATION. SEE SHEET E1.1 FOR ADDITIONAL INFORMATION.
2. DEMOLISH FIXTURE AND REMOVE CONDUIT AND CONDUCTORS TO JUNCTION BOX. SALVAGE CIRCUIT FOR EXTENSION TO NEW FIXTURE LOCATION. SEE SHEET E2.1 FOR ADDITIONAL INFORMATION.
3. DEMOLISH SWITCHES AND BACKBOX AND REMOVE CONDUIT AND CONDUCTORS TO ABOVE ACCESSIBLE CEILING. SALVAGE CIRCUIT FOR EXTENSION TO NEW SWITCH LOCATION. SEE SHEET E2.1 FOR ADDITIONAL INFORMATION.
4. NO ELECTRICAL DEMOLITION SCOPE IN THIS AREA.



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△	3/27/2020	ADD. 2

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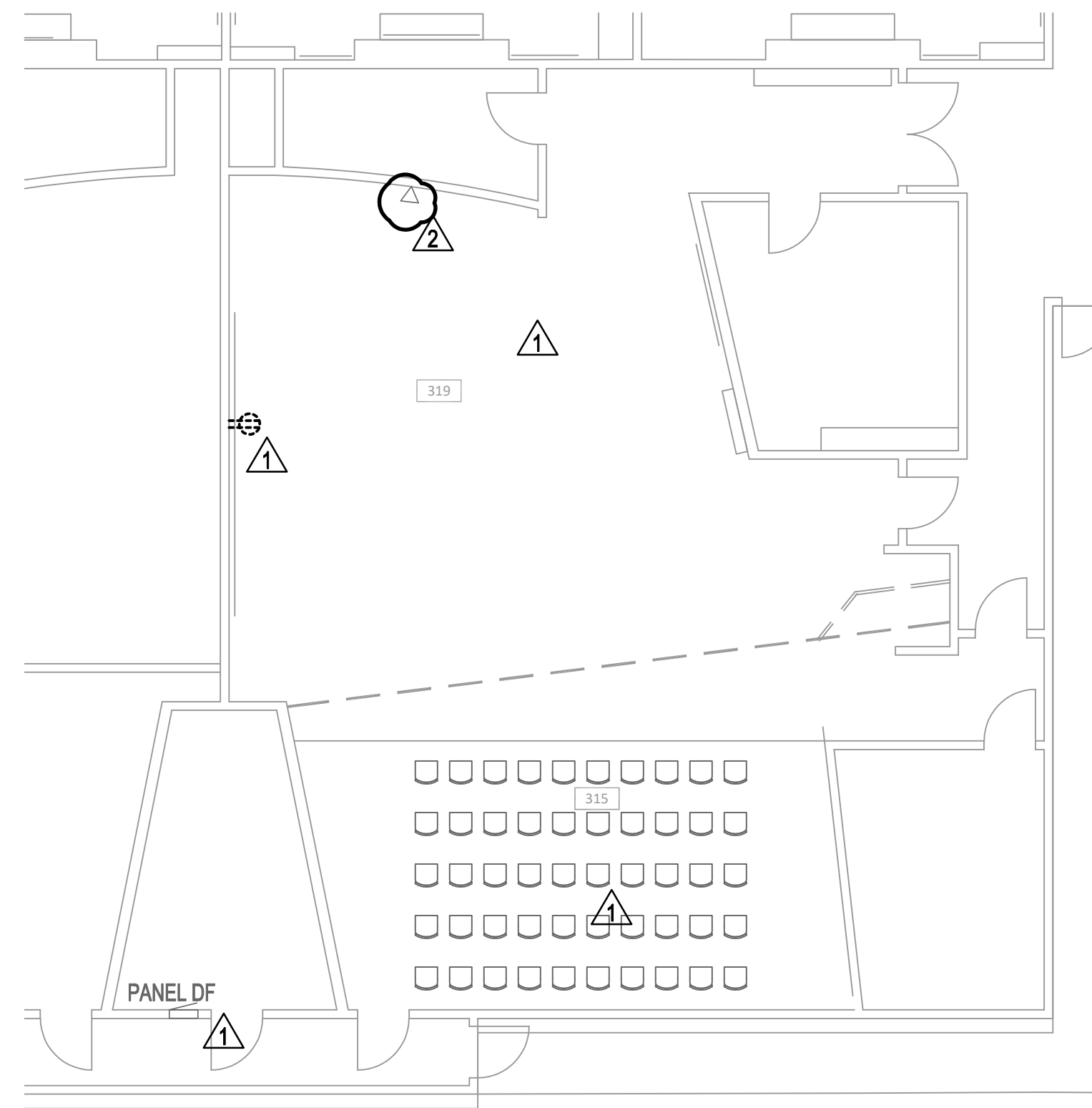
200 SILVER LN, EUGENE, OR 97404
RENOVATIONS

JOB NO: 19188
ISSUE DATE: 3 MAR 2020

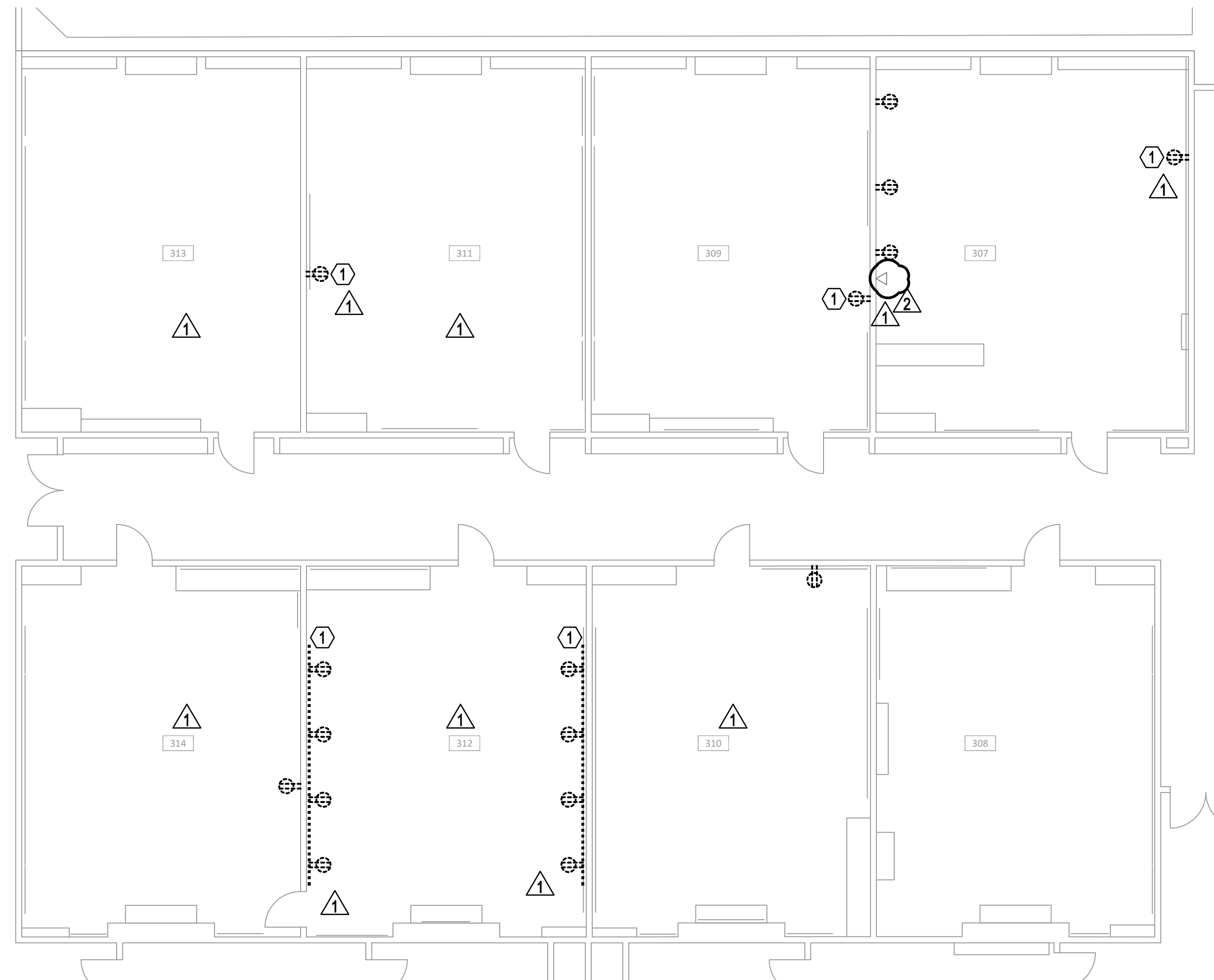
PARTIAL DEMOLITION PLANS

ED.1

NEHS



1 PARTIAL DEMOLITION PLAN
ED.2 1/8" = 1'-0" NORTH



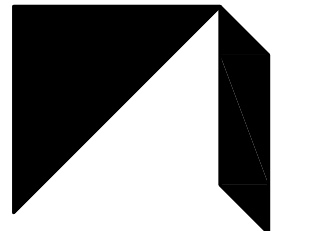
2 PARTIAL DEMOLITION PLAN
ED.2 1/8" = 1'-0" NORTH

GENERAL NOTES:

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NOTES:

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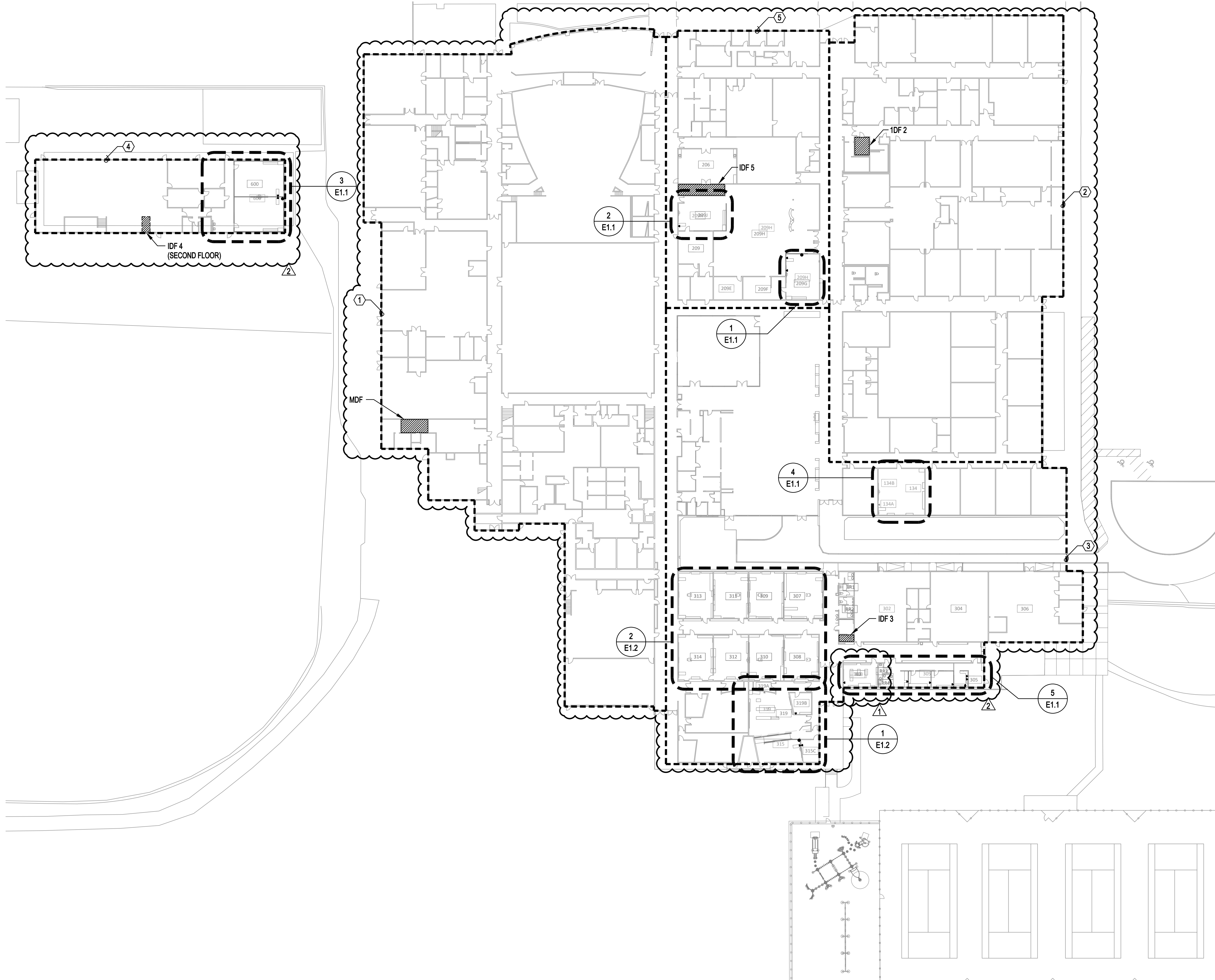
PARTIAL DEMOLITION PLANS

NEHS

ED.2

Date: 3/27/20 Time: 10:23am File: \\pae-engineers.com\Projects\2019\19-1867 - Eugene 4J - Corridor Relocation\01 Production\02 CAD\19-1867 ED.2.dwg User: daniel.wirtala

Date: 3/27/20 Time: 10:26am File: \\pae-engineers.com\Projects\2019\19-1867 - Eugene 4J - Corridor Relocation\01 Production\02 CAD\19-1867 E1.0.dwg User: damian.witoldo



1
E1.0 OVERALL ELECTRICAL PLAN
1/32" = 1'-0"



- NOTES:**
1. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 AND E1.2 PROVIDE 1-1/4" CONDUIT AND WHITE CAT8 CABLING TO MDF ROOM.
 2. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 AND E1.2 PROVIDE 1-1/4" CONDUIT AND WHITE CAT8 CABLING TO IDF ROOM 2.
 3. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 AND E1.2 PROVIDE 1-1/4" CONDUIT AND WHITE CAT8 CABLING TO IDF ROOM 3.
 4. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 AND E1.2 PROVIDE 1-1/4" CONDUIT AND WHITE CAT8 CABLING TO IDF ROOM 4.
 5. FOR DATA OUTLETS SHOWN ON DRAWINGS E1.1 AND E1.2 PROVIDE 1-1/4" CONDUIT AND WHITE CAT8 CABLING TO IDF ROOM 5.

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REVISIONS

△	3/17/2020	ADD. 1
△	3/27/2020	ADD. 2

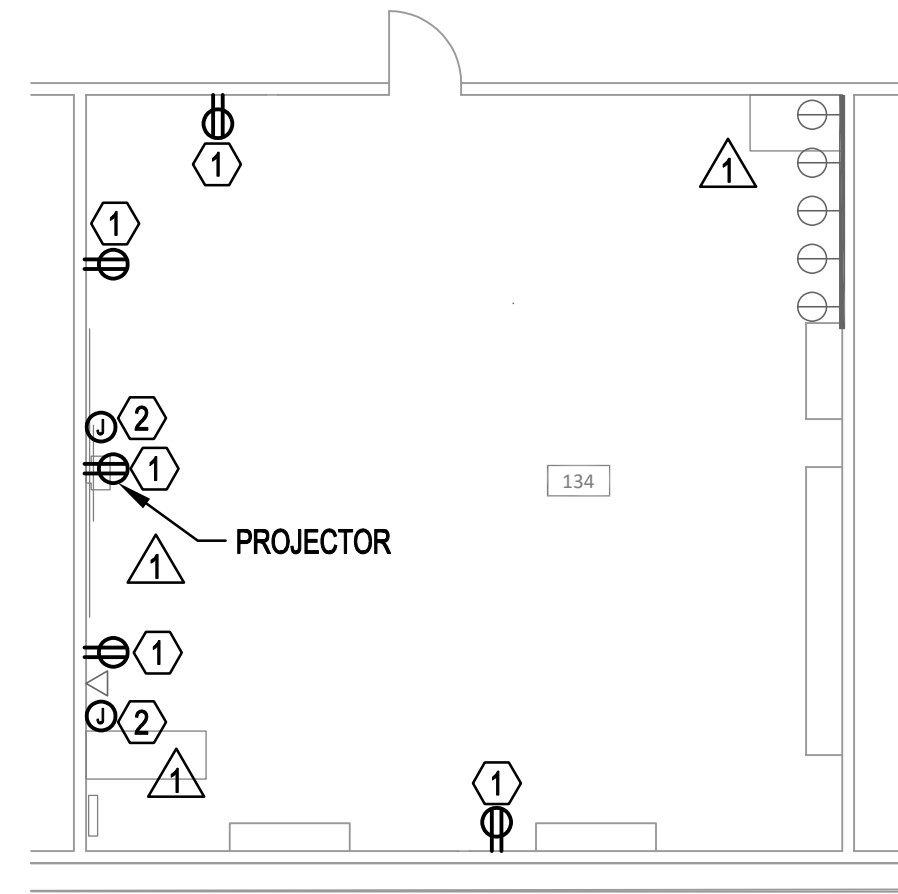
ESD 4J NORTH EUGENE HIGH SCHOOL IMPROVEMENTS
200 SILVER LN, EUGENE, OR 97404
RENOVATIONS

JOB NO: 19188
ISSUE DATE: 3 MAR 2020

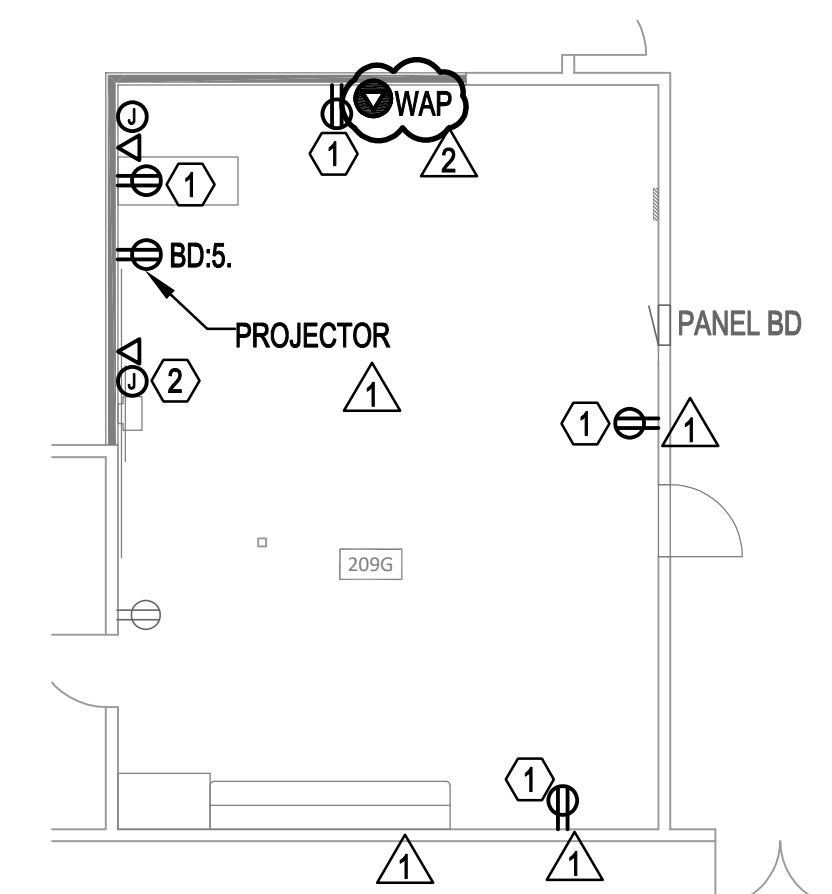
OVERALL ELECTRICAL PLAN

NEHS

E1.0



4 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
E1.1 1/8" = 1'-0" NORTH



1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
E1.1 1/8" = 1'-0" NORTH

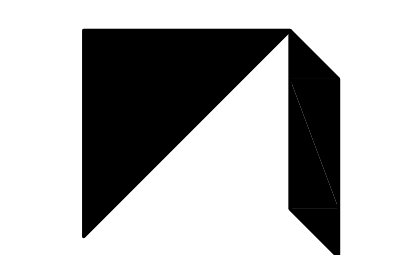
GENERAL NOTES:

A. THE DIV 27 (TELECOMMUNICATION) SCOPE INCLUDES PROVIDING NEW DATA DEVICES AND ASSOCIATED CABLING BACK TO THE EXISTING PATCH PANELS IN THE IDF ROOMS. PROVIDE DEVICE BACKBOX, JACKS, COVERPLATE, CONDUIT, AND CABLING. PATCH CABLES WILL BE PROVIDED BY OWNER. CONDUIT PATHWAYS TO NEAREST IDF/MDF ROOM TO BE ROUTED THROUGH ATTIC SPACE. CONDUIT IS TO BE ROUTED RECESSED AT NEW WALLS AND SURFACE MOUNTED AT EXISTING WALLS. PROVIDE WIREMOLD 800 OR APPROVED EQUAL IN CLASSROOMS AND WIREMOLD 2300 OR APPROVED EQUAL IN CORRIDORS. FILL CAPACITY NOT TO EXCEED 40%.

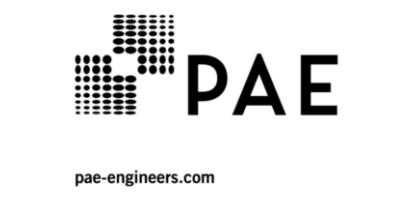
B. THE FIRE ALARM SYSTEM IS SHOWN FOR GUIDANCE AND IS INTENDED TO BE USED TO PROVIDE INFORMATION FOR A FIRE ALARM DESIGN-BUILD SYSTEM. EQUIPMENT AND DEVICE ARRANGEMENT SHOWN IS TO AID IN ESTABLISHING A BASIS OF DESIGN. CONTRACTOR SHALL BE RESPONSIBLE FOR CREATION OF SHOP DRAWINGS, AND TO PROVIDE FULL DESIGN, PERMITTING, INSTALLATION, TESTING, AND COORDINATION WITH OTHER TRADES. PROVIDE A COMPLETE SYSTEM THAT MEETS CURRENT CODE AND FUNCTIONALITY REQUIREMENTS.

NOTES:

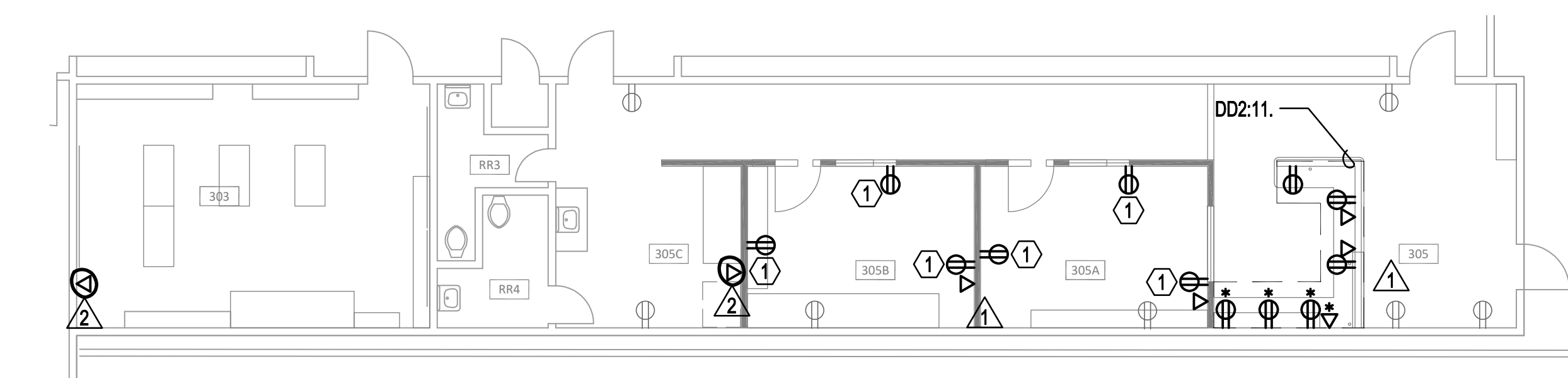
1. CONNECT SALVAGED CIRCUIT TO NEW RECEPTACLE.
2. PROVIDE BACK-BOX AND CONDUIT PATHWAY FOR PROJECTOR AV CONNECTION. SEE TEACHING WALL ELEVATION ON THIS SHEET FOR ADDITIONAL INFORMATION.



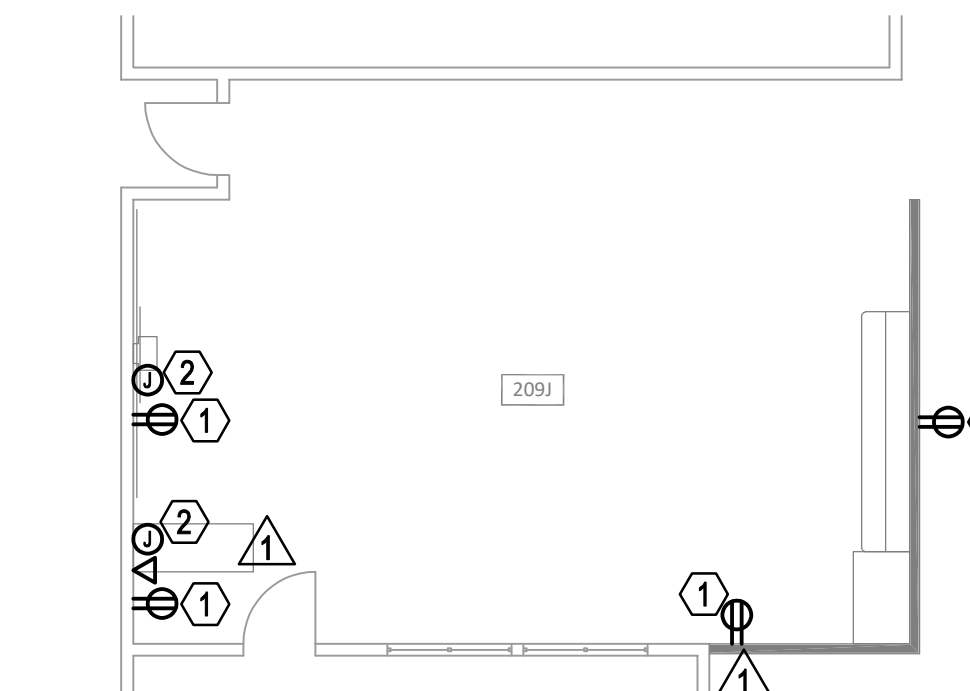
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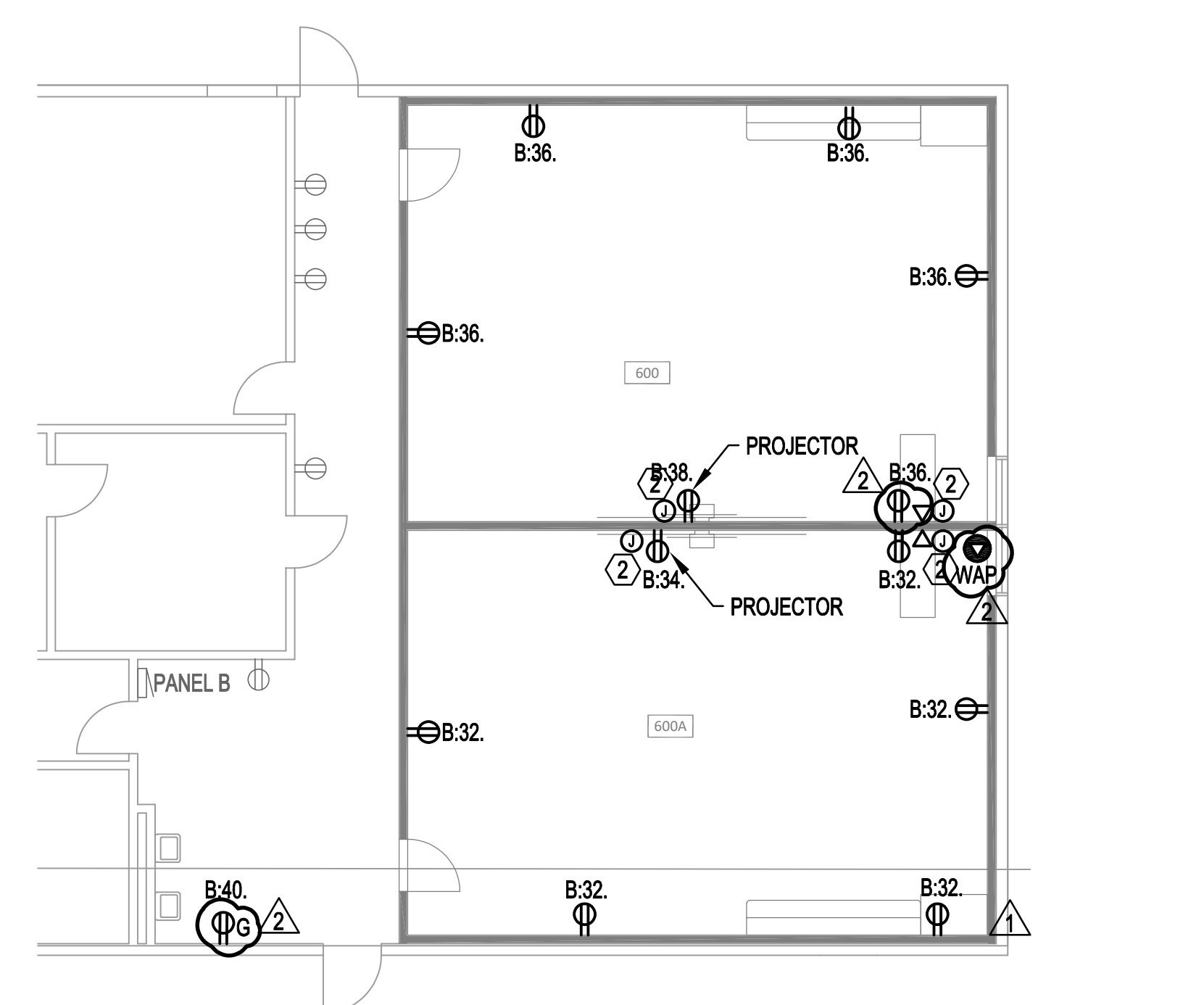
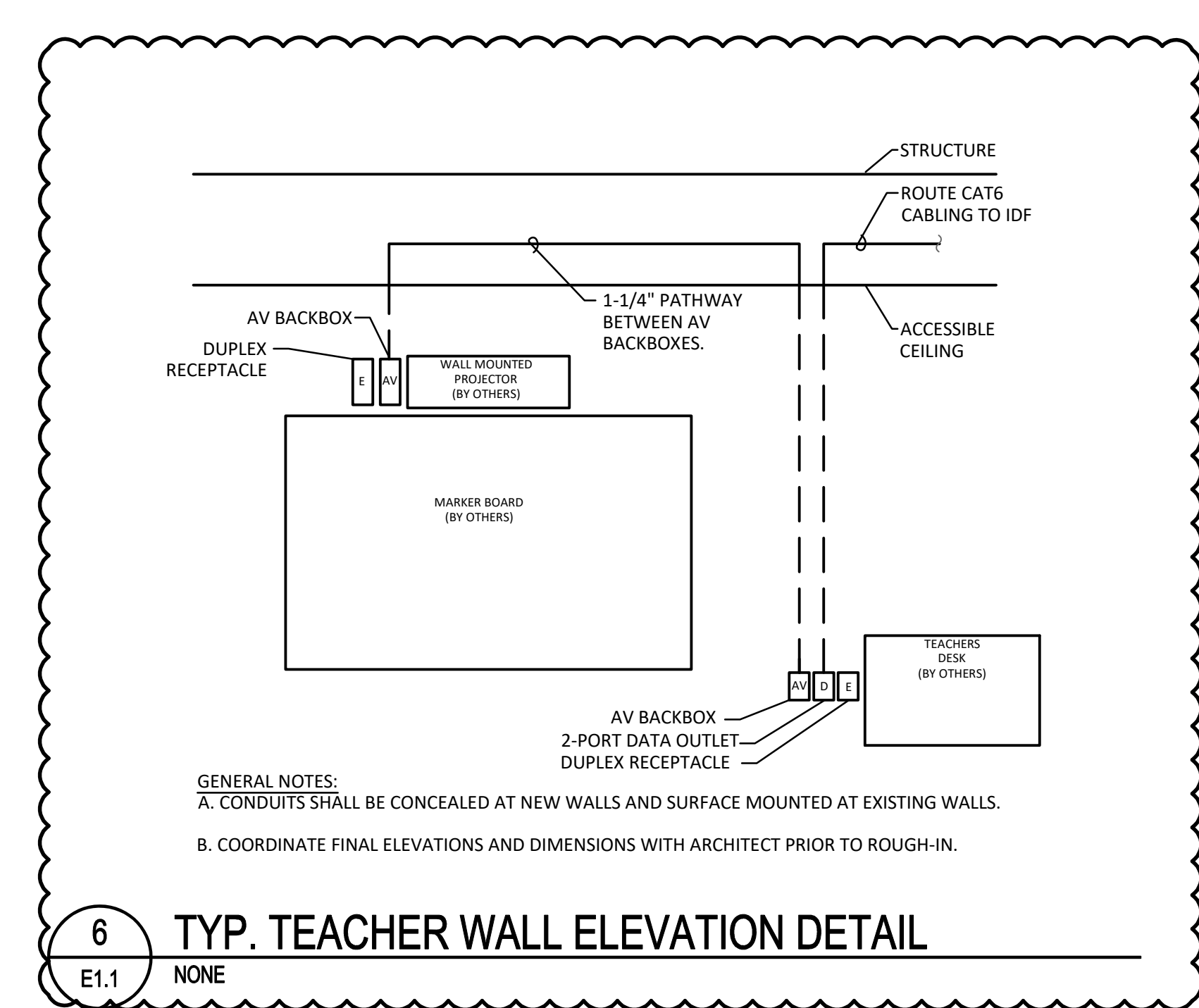
REVISIONS		
△	3/17/2020	ADD. 1
△	3/27/2020	ADD. 2



5 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
E1.1 1/8" = 1'-0" NORTH



2 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
E1.1 1/8" = 1'-0" NORTH



3 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
E1.1 1/8" = 1'-0" NORTH

ESD 4J NORTH EUGENE HIGH SCHOOL IMPROVEMENTS
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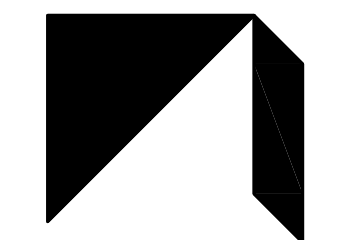
JOB NO: 19188
ISSUE DATE: 3 MAR 2020

ENLARGED PARTIAL ELECTRICAL FLOOR PLAN

E1.1

NEHS

Date: 3/27/20 Time: 10:25am File: \\pae-engineers.com\Projects\2019\19-1867 - Eugene 4J - Corridor Relocation\01 Production\02 CAD\19-1867 E1.1.dwg User: damiel.witala



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03/21/20



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REVISIONS		
△	3/17/2020	ADD. 1
△	3/27/2020	ADD. 2

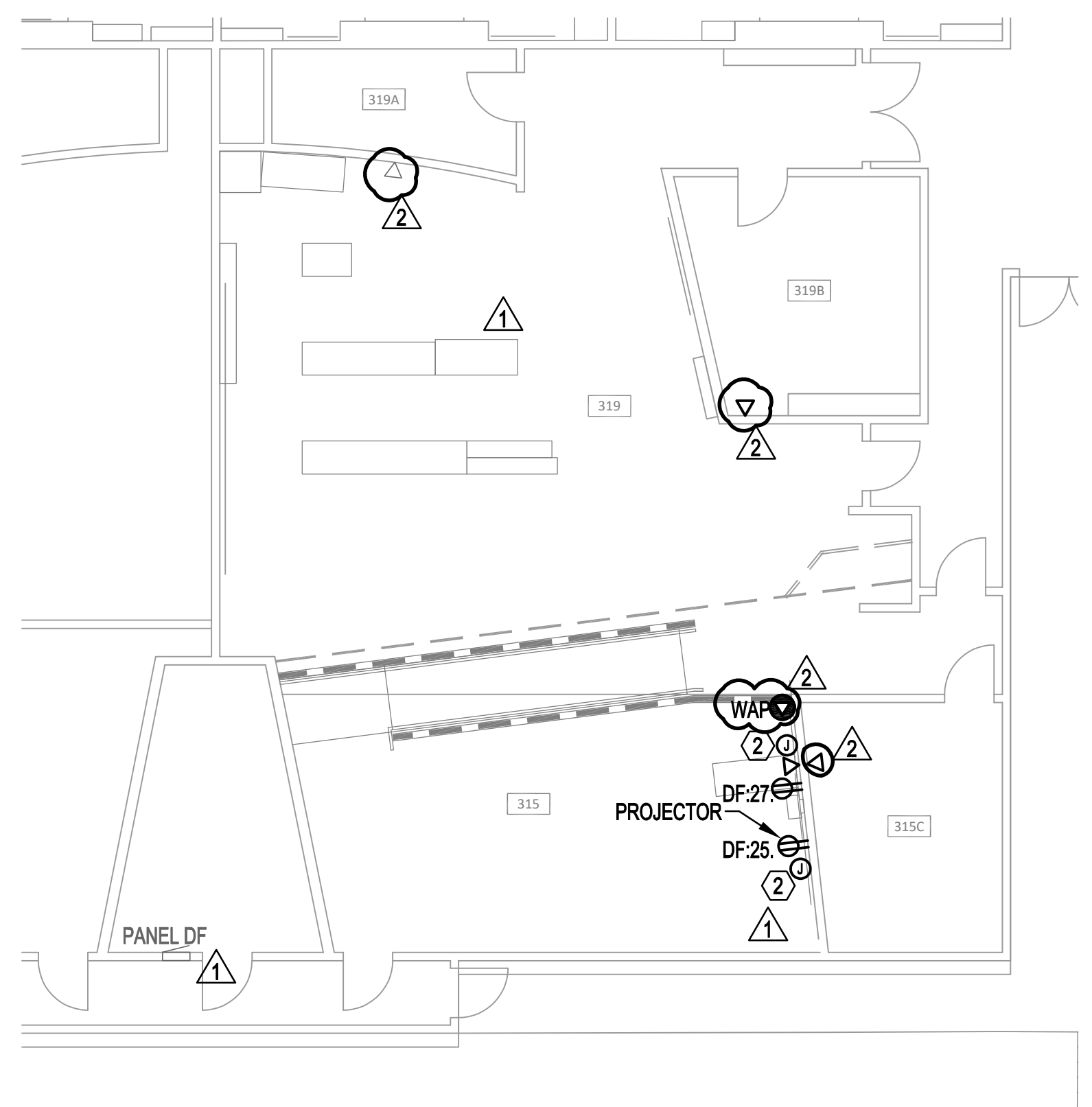
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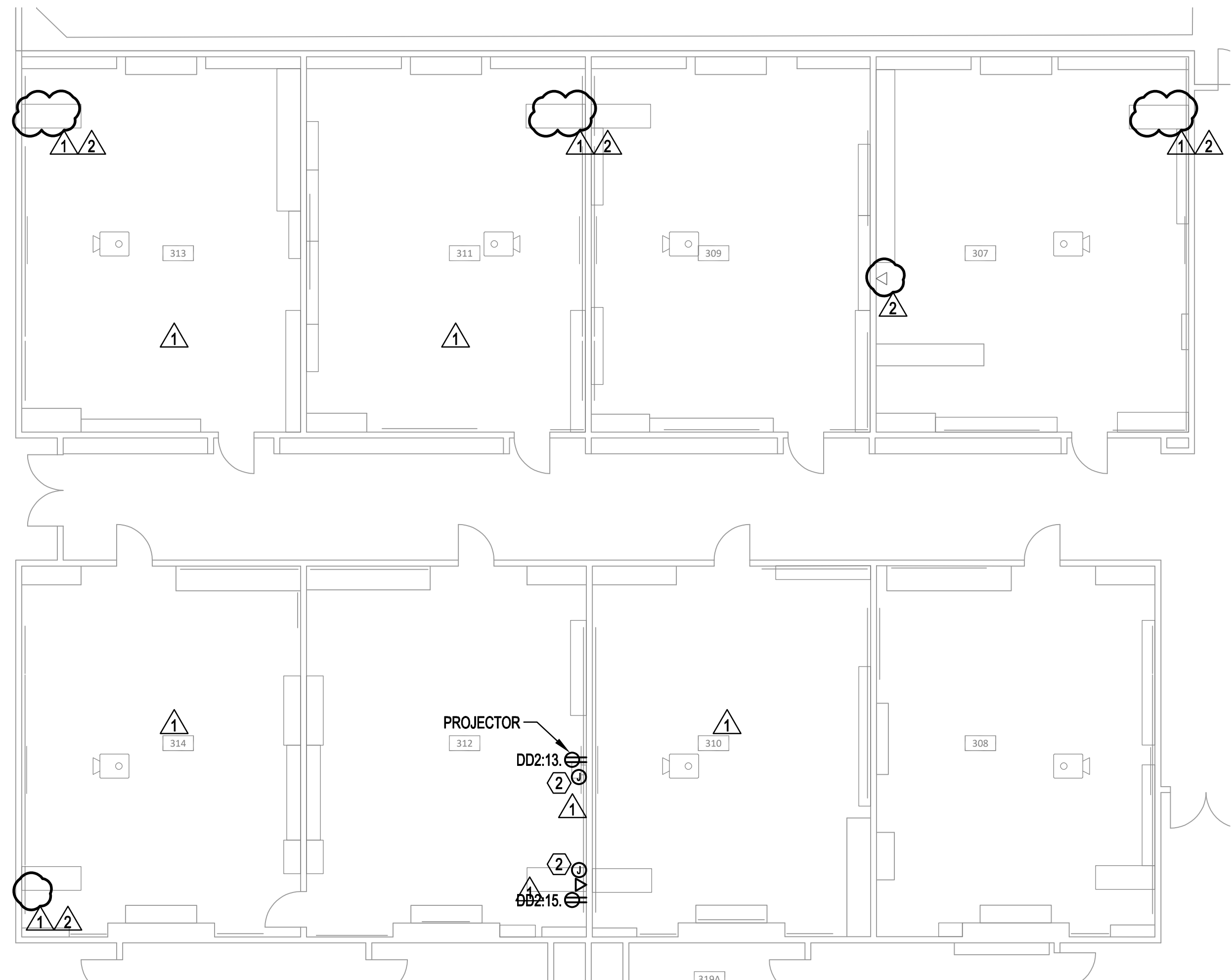
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NOTES:

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1 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
 1/8" = 1'-0" NORTH



2 ENLARGED PARTIAL ELECTRICAL FLOOR PLAN
 1/8" = 1'-0" NORTH

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ENLARGED PARTIAL ELECTRICAL FLOOR PLAN

E1.2

NEHS