



FREEDOM HIGH SCHOOL AUXILIARY GYM

Addendum 01

5/17/2021

DSA File Number: 7-H4
DSA Application Number: 01-119278
PTN: 61721-78

Owner:
Liberty Union High School District
20 Oak Street
Brentwood, CA 94513

Architect:
Quattrocchi Kwok Architects
636 Fifth Street
Santa Rosa, California 95404
P: 707.576.0829
F: 707.576.0295

Architect's Project No.: 1869.00



Date: 05/17/2021

To: Prospective Bidders

The following changes, modifications and additions to Project Manual and Drawings described below are made a part thereof and are subject to all of the requirements thereof as if originally specified. The Bidder must acknowledge receipt of the Addendum in the space provided on the Bid Form; failure to do so may subject the Bidder to disqualification.

Table of Contents - Addendum 01

This Addendum consists of 9 pages and the attachments as listed below dated May 14th, 2021.

Deleted Text is shown in ~~strikeout type~~.

Added Text is shown ***bold italicized type***.

ATTACHMENTS:

Project Manual

01 1100 - Attached Logistics plan ADD01 01.01
08 4313 - ALUMINUM ENTRANCES and STOREFRONTS
08 7100 - DOOR HARDWARE
11 6623 - GYMNASIUM EQUIPMENT
26 2700 - BASIC ELECTRICAL METHODS AND MATERIALS

ADD Drawings (8.5 inch by 11 inch & 11 inch by 17 inch):

ADD01 01.01 Logistic Plan

Drawings: (24 inch by 36 inch)

ADD01 - E-5.2 - SINGLE LINE DIAGRAMS - SIGNAL
ADD01 - E-7.2 - DETAILS
ADD01 - FE-0.1 - FIRE ALARM EQUIPMENT LIST, NOTES & DETAILS
ADD01 - FE-5.1 - FIRE ALARM RISER DIAGRAM

Project Record

None

End of Table of Contents

A. CHANGES TO PREVIOUS ADDENDA

None

B. CHANGES TO THE BIDDING AND CONTRACT REQUIREMENTS

None

C. CHANGES/ ADDITIONS TO THE SPECIFICATIONS

Item No. 1. 01

Section 01 1100 SUMMARY OF WORK

Add Article 1.07.Q CONTRACTOR'S USE OF PREMISES as follows:

Q. The contractor's access to the site shall follow the attached Logistics plan ADD01-01.01

Item No. 1. 02

Section 01 6000 PRODUCT REQUIREMENTS

Revise Article 3.02 LIMITATIONS ON SUBSTITUTIONS SUBMITTED AFTER THE AWARD OF THE CONTRACT as follows:

- B. Architect may consider requests for substitutions of specified equipment and/or materials only when requests are received by Architect within ~~twenty-one (21)~~ ten (10) days prior to the date of bid, in conformance with Public Contract Code Section 3400. Do not request substitutions for products designated as "District Standards".

Item No. 1. 03

The following document denoted Addendum 01 supersedes and replaces previously published document.

Section - 08 7100 – DOOR HARDWARE

Section - 11 6623 – GYMNASIUM EQUIPMENT

Section - 26 2700 – BASIC ELECTRICAL METHODS AND MATERIALS

Revise Table of Contents accordingly.

Item No. 1. 04

The following documents denoted Addendum 01 is added to the project manual.

Section 08 4313 – ALUMINUM ENTRANCES and STOREFRONTS

Revise Table of Contents accordingly.

Item No. 1. 05

Section 09 2513 - TILE CARPETING

Revise Article 2.02 MANUFACTURER as follows:

D. Acceptable Alternate:

1. Dryvit CCP with TAFS (Textured Acrylic Finishes).
2. *Sto Powerwall Finish*

Item No. 1. 06

Specification Section 22 0000 PLUMBING

Correct first sentence of article 1.10.A as follows.

All plumbing systems shall be installed by a ~~C-36 Plumbing~~ Contractor *licensed appropriate for the work in this Section.*

Item No. 1. 07

Specification Section 27 4116 AV SYSTEMS

Correct article 1.09.C as follows.

- C. ~~Specialty~~ Subcontractors shall have at time of bid *installation* and continuously maintain throughout the project and warranty period a ~~low voltage Specialty~~ Contractor's license appropriate for the work in this Section.

D. CHANGES/ ADDITIONS TO THE DRAWINGS

Item No. 1. 08

The following drawings dated May 14, 2021 denoted **Addendum 01** supersede and replace previous drawings with the same titles:

ADD01 - E-5.2 - SINGLE LINE DIAGRAMS - SIGNAL

ADD01 - E-7.2 - DETAILS

ADD01 - FE-0.1 - FIRE ALARM EQUIPMENT LIST, NOTES & DETAILS

ADD01 - FE-5.1 - FIRE ALARM RISER DIAGRAM

E. BIDDERS QUESTIONS

Item No. 1. 09

Q: I was reviewing the electrical section of the specs and I wanted to check with you just to make sure, but I noticed that in the Electrical Division that the Section 26 2700-Basic Electrical Materials & Methods is missing. Where that section should be is a repeat of Section 26 0500 Basic Electrical Requirements.

A Replace the duplicated section 26 0500 with the attached 26 2700 - BASIC METHODS AND MATERIALS.

Item No. 1. 10

Q: There are several mentions throughout the spec book that bidders are required to use the provided 'Substitution Request Form' at the time of the bid. Please advise where in the spec book bidders can find it

A Refer to section 01 6000. Form is at the end of the section.

Item No. 1. 11

Q: Please confirm that the epoxy vapor seal and topping per 072633 is to be applied to all slab areas, including under the wood flooring

A Yes, apply at all slabs

Item No. 1. 12

Q: Please confirm that the densifier per 033511 is to be applied only to exposed concrete slab areas

A Confirmed

Item No. 1. 13

Q: Does metal decking, 053000, require acoustical insulation?

A Yes, per drawings 5/S-M1.4

Item No. 1. 14

Q: Drawings show ceiling suspended front braced backstops for all six backstops yet the Spec calls out Porter's Model 917 backstops which are rear braced. Based on the Drawings there seems to be insufficient space for rear braced backstops. Please confirm Bid Drawings should be followed and front braced, ceiling suspended backstops are required for all six backstops.

A According to Porter's website the 917 is front folding. Design intent is for a front folding backstop. Please provide front folding

Item No. 1. 15

Q: Spec section 11 6623 at 2.12B11 notes specially shaped padding – wall corners. Drawings do not show any wall pads at wall corners. Are these required? If so, please confirm locations

A Provide at corners of Hallway 102

Item No. 1. 16

Q: Spec 11 6623 at Part 2.11 notes floor mounted equipment and references Volleyball nets and posts. Floor mounted equipment is for portable systems yet at 2.11B spec notes Floor Sleeves for posts, therefore a non-portable system. Floor plans also show sleeves for posts. Please confirm Drawings should be followed and floor sleeves are required?

A Specification is correct. Volleyball post (moveable) go into the floor mounted sleeves with a lid. Please, provide all equipment noted in the specification

Item No. 1. 17

Q: On the plans, (A-M5.1) there is a note – XP3 – match existing Freedom Purple. Are the doors and door frames to be Prefinished the same color? Also, is the fixed Storefront (Type W01) to be the same color?

A They are to be the same color. Pre-finished Storefront.

Item No. 1. 18

Q: Could you please let me know the approximate start date for the roofing portion of the project please?

- A Subcontractors must contact the bidding general contractors for sequence and scheduling of subcontractor trades.

Item No. 1. 19

Q: Can you please confirm if "Fire Protection" subcontractors, (license classification C16) need to be pre-qualified with the district?

- A The only subcontractors that require District Prequalification prior to bid include HVAC, Plumbing, Fire Sprinkler, and Electrical subcontractors. The HVAC, Plumbing, Fire Sprinkler, and Electrical subcontractors that are District Prequalified to bid this project are listed on the Prequalification List dated January 1, 2021 that was issued in Bid Clarification 01 as a part of the Mandatory Pre-Bid Conference Agenda

Item No. 1. 20

Q: When is the RFI deadline? I don't see any mention of it on the ITB

- A To be considered, all such requests must be received no later than seven (7) working days prior to the bid opening." The Instruction to Bidders says "Pre-bid clarification request shall be filed a minimum of ten (10) days prior to bid opening.

Item No. 1. 21

Q: The Telescoping Bleacher scope of work lists a competitor. Seems I need to submit a substitution request but Spec Section 01 6000 states this needs to be 21 days prior to bid date. We are beyond this. Substitution requests are heavy work and time consuming - I don't wish to do this if it is not going to be accepted but at the same time, I didn't even have a bid invite 21 days prior to bid date! Am I simply too late?

- A Provide all information as noted on the form in Section 01 6000. Since the bleachers have been approved by DSA, the sub-contractor will be responsible for all cost associated with getting the proposed substitute bleachers approved by DSA.

Item No. 1. 22

Q: Is there an logistics plan from the District that shows the access to the site and contractor lay down area.

- A See the attached Project record for the logistics plan ADD01 01.01

Item No. 1. 23

Q: Numbered Sheet Notes: 15-16 Show IDF-M to Provide specified Wall mount IDF w/ misc. parts. However, on Sheet E1.1, this location seems to be labeled as IDF-G.

- A IDF was mislabeled on E-1.1 and E-5.2. Please consider the sole new IDF for the project, located in Elec 109, as "IDF-M". See ADD01 E-1.1 and ADD01 E-5.2

Item No. 1. 24

Q: Diagrams all label IDF as IDF-G. no mention of IDF -M. also all specification for IDF rack call out as Eaton or equal. Is the CPI part number specified on sheet E-M3.1 acceptable?

A IDF was mislabeled on E-1.1 and E-5.2. Please consider the sole new IDF for the project, located in Elec 109, as "IDF-M". See ADD01 E-1.1

Spec section 27 0000, 2.01(D) lists ESW, Leviton, Homaco, Chatsworth or equal as acceptable. The part number shown in note 15 on sheet ADD01 E-3.1 is acceptable.

Item No. 1. 25

Q: Are we to assume all Data/Voice/PA/Cameras require Cat6 Cable and all WAPS requires Cat6A cable?

A District prefers that all cable for data, voice and clock-speaker be Cat6A. Cable for security cameras is to be installed by others. Please see revised drawings, where cable for cameras has been removed from the drawings.

Item No. 1. 26

Q: Specs state all voice jack to be white, all data jacks to be blue. Is it acceptable for all cable to be blue?

A Delineation between voice and data cable is not required. All cabling and jacks for those uses may be blue.

Item No. 1. 27

Q: Please specify cable/jack colors for WAPS, Cameras, PA/Speakers etc.

A WAPs = White jacks and patch cords, blue cable
Clock/speaker = Orange jacks and patch cords, blue cable
Cameras = Provided by others.

Item No. 1. 28

Q: CLOCK / SPEAKER SYSTEM RISER DIAGRAM States the following:1. ALL CLOCK/SPEAKER DEVICES SHALL BE IP, AND ARE OWNER FURNISHED, CONTRACTOR INSTALLED ('OFCI').
2. PROVIDE ALL REQUIRED PROGRAMMING MODIFICATIONS TO THE EXISTING PA AND CLOCK SYSTEM TO ACCOMMODATE THESE ADDITIONS. PRIOR TO BID, VERIFY THAT THE EXISTING PROGRAM FILES FOR THIS SITE ARE AVAILABLE. INCLUDE IN THE BID ALL COSTS REQUIRED TO RECREATE ANY MISSING OR DEFECTIVE FILES.

1. Can you confirm that program files will be available?
2. What is the existing system and what parts will be provided

A 1. The district will provide all programming for the clock/speaker system, in addition to the devices and back boxes (contractor installed).
2. The existing system is Cisco Informacast. All parts and programming by the district.

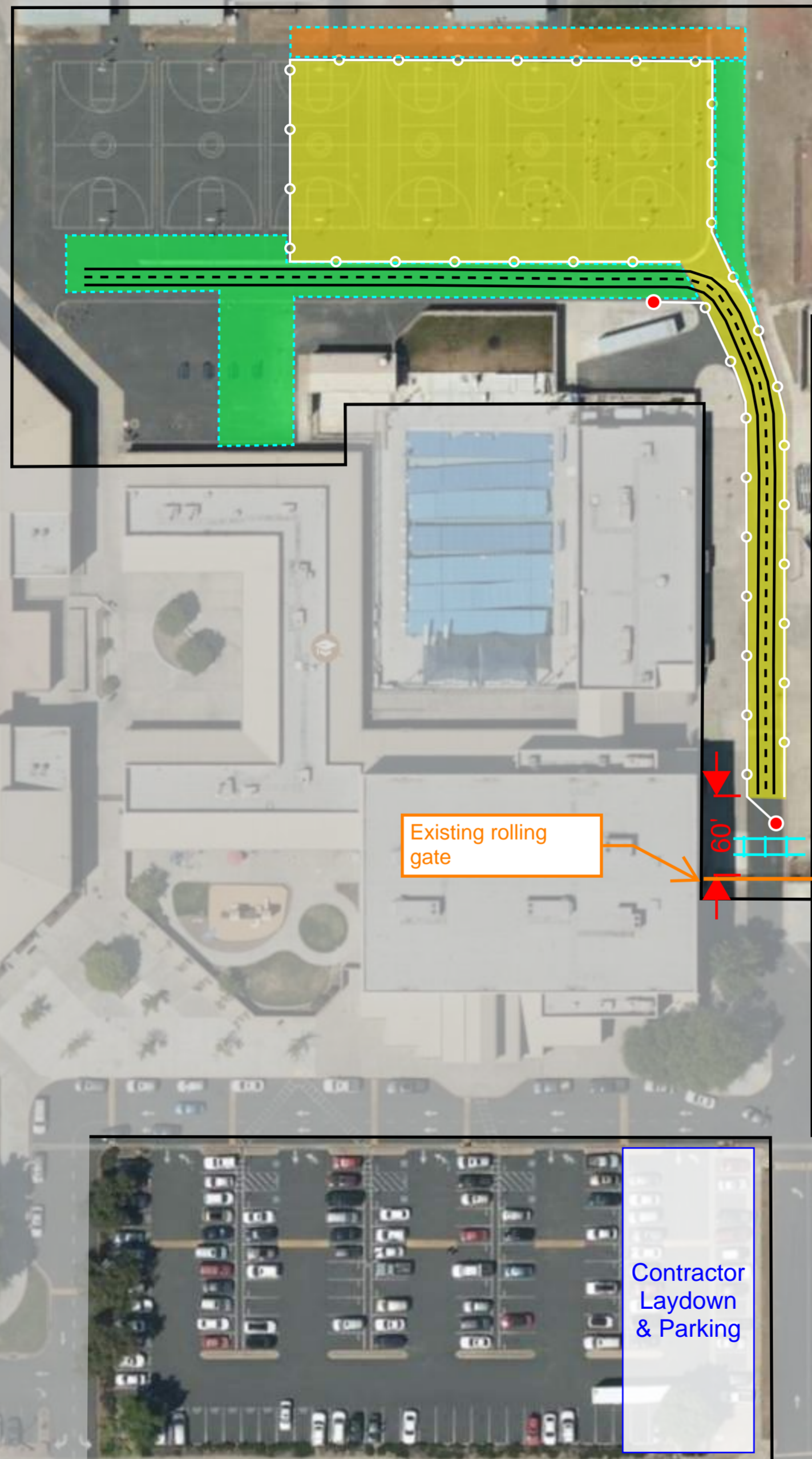
Item No. 1. 29

Q: Is there a functional AV line drawing for the Auxiliary Gymnasium?








A AV-M6.1 is the functional diagram,

END OF ADDENDUM

Freedom High School - New Auxiliary Gymnasium



LEGEND

-  At perimeter of project site, Contractor to provide temporary 6 foot chain link fencing with green fabric. At EVA Roadway, Contractor to provide temporary 6 foot chain link fencing without fabric to within 60 feet of existing rolling gate.
 -  Work in this area to be performed while students/staff are off-site. (summer, school breaks, after-hours, weekends, etc) Trench plates to be used in order to maintain use of EVA road.
 -  Must maintain ADA path of travel for student walkway. Work in this area to be performed while students/staff are off-site. (summer, school breaks, after-hours, weekends, etc)
 -  20' Wide Emergency Vehicle Road - must be maintained throughout duration of construction. No storage of materials in EVA roadway.
 -  Contractor Laydown & Parking Area - Contractor to provide temporary 6 foot chain link fencing at perimeter of Contractor laydown/parking area.
 -  Student Crossing
 -  Gate within temporary fencing

LOGISTIC PLAN

ADD01 01.01

ADDENDUM 01
SECTION 08 4313

ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Perimeter sealant.
- D. Section also includes Contractor's responsibility to assume role of "Responsible Party" for NFRC label testing and inspection "Certified Project Option", to obtain Fenestration Acceptance Requirements certification required for occupancy permit. Refer to California Energy Code Section 110.6.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Restrictions.
- B. Section 07 2500 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
- C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- D. Section 08 5113 - Aluminum Windows.
- E. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.
- F. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; Federal Register, July 26, 1991; updated 2010.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- C. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- D. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2014.
- E. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- F. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.
- G. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- H. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- I. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- J. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

- K. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- L. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- M. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- N. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- O. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- P. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- Q. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- R. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2010).
- S. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- T. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- U. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, "CAL-Green", current edition.
- V. California Energy Code "Building Energy Efficiency Standards", 2013.
- W. California Energy Code "Reference Nonresidential Appendix NA7", 2013.
- X. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code, with California Amendments, current edition.
- Y. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- Z. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting two weeks before starting work of this section; require attendance by all affected installers.
 - 1. Meet at Project site with Installer, installer of each component of associated work, installers of substrate construction to receive this work, installers of other work that must precede or follow storefront work (including mechanical work if any), Architect/Owner, storefront system manufacturer's representative, and other representatives directly

concerned with performance of the Work, including (where applicable) Owner's insurers, test agencies, and governing authorities. Objectives to include:

- a. Review preparation and installation procedures and coordinating and scheduling required with related work.
- b. Review methods and procedures related to storefront and glazing work.
- c. Review structural loading limitations of new storefront.
- d. Review storefront systems requirements (drawings, specifications, and other contract documents).
- e. Review required submittals, both completed and yet to be completed, including deferred approvals, if any.
- f. Review and finalize construction schedule related to storefront work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- g. Review required inspection, testing, certifying, and material usage accounting procedures.
- h. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including provision of temporary enclosure of partially completed or occupied spaces.
- i. Record discussion of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
- j. Review notification procedures for weather or non-working days.

1.05 SUBMITTALS

- A. See Section 01 3300 - Submittals, for submittal procedures.
- B. Provide submittals coordinated with submittals for related sections referenced in this Section for simultaneous review.
- C. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. VOC Submittals:
 1. Product Data - VOC Limits: For adhesives sealants, fillers and primers, documentation including printed statement of VOC contents, demonstrate compliance with limits specified in Section 01 6116.
- E. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 1. Shop drawings shall include project-specific integrations to surrounding cladding and waterproofing components, including items specified in other sections.
 2. Provide installation instructions and isometric details indicating how system components will be installed and sealed watertight.
- F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- G. Samples: Submit two samples 12x12 inches in size illustrating finished aluminum surface, glass, glazing materials.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

- I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and testing agency.
- B. Certificate of Acceptance: Refer to California Energy Code Section 110.6.
 - 1. Submit Certificate of Acceptance certifying that the fenestration product meets the required acceptance requirements, completed, signed and submitted to the enforcement agency, with copies to Owner and Architect.
- C. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- D. Welding certificates.
- E. Preconstruction Test Reports: For sealant.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements. For each system provide test reports with shop drawings
- G. Source quality-control reports.
 - 1. Field quality-control reports.
- H. NFRC 100 Label Certificate: Submit proof of testing of site-built assembly and compliance with NFRC 100. Manufacturer certificates or factory tests are not acceptable for this requirement.
- I. Warranties: Sample of special warranties.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- D. NFRC Compliance: Completed site-built assembly shall conform to NFRC 100 requirements and be tested and labeled in accordance with that standard.
- E. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- F. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- G. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating glazed aluminum curtain-wall systems correspond to established dimensions.
- C. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. See Section 01 7000 - Contract Closeout, for additional warranty requirements.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components.
- C. Correct defective Work within a five year period after Date of Substantial Completion.
- D. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 DESIGN REQUIREMENTS

- A. VOC Limits for adhesives sealants, fillers, coatings and primers. Comply with limits specified in Section 01 6116.
- B. Assume role of "Responsible Party" for NFRC label testing and inspection "Certified Project Option". Make all arrangements necessary to perform required testing of site-built assembly and obtain NFRC label as described in NFRC 100.5.6. Contractor is responsible to obtain, including payment of all required fees, a label certificate for the site built fenestration system

meeting requirements of California Energy Code 2013 Section 10-111(a)2 as described in California Energy Code Section 110.6.

- C. Thermally Broken: All components, including doors, to be thermally broken with continuous resilient elastomeric extrusions.
- D. Weather Resistance:
 - 1. Design shall provide waterproofing and an air-vapor retarder that is continuous at all penetrations, transitions, and other conditions. System shall integrate with the building's waterproofing and air-vapor-retarder system to provide a weathertight transition. System shall not allow the movement of the interior or exterior air to flow vertically within the assembly. Methods employed to prevent internal air movement shall not restrict water flow channels or prevent thermal movement of the frames.
 - 2. Water penetration into the system is acceptable only if all of the following conditions are satisfied; any other water penetration is considered water leakage and is unacceptable:
 - a. Water is immediately contained and drained to the exterior.
 - b. There is no wetting of a surface that could be damaged by moisture or that would be visible to building occupants.
 - c. There would be no staining or other damage to completed building or its furnishings.
 - d. This definition of water leakage governs over the other definitions that may appear in referenced documents.
 - 3. Provide internal gutters and weep systems to collect and drain water leakage and condensation to the exterior at the sill of each opening. Glazing assemblies shall have on isolated gutter cavity at each glass perimeter so the leakage is confined to and wept from the opening of origin. Glazing assemblies shall have continuous spliced gutters at mullions splices, with sealed and caps at termination conditions. Systems shall not direct water to contact edges of insulating glass units. Prevent water infiltration at weeps. Coordinate gutter and weep systems with other sections.
- E. Sound Transmission Class (STC): Rated for not less than 30 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.
 - 1. Locations per Drawings, coordinate with Section 08 8000 for IGU selection, values as scheduled or as shown on Drawings:

2.02 MANUFACTURERS

- A. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer, same as that specified in Section 08 4413 for Glazed Aluminum Curtain Walls.
- B. Aluminum-Framed Storefront and Doors:
 - 1. EFCO Corporation; Series 433 Thermal TripleSet Storefront, www.efcocorp.com.
 - 2. Kawneer North America; Trifab® VersaGlaze 451T: www.kawneer.com/#sle.
 - 3. Oldcastle BuildingEnvelope; Series 3000-6000 Thermal Multiplane: www.oldcastlebe.com/#sle.
 - 4. Wausau Window and Wall Systems; 14000-14650 Series: www.wausauwindow.com.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.03 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Glazing Position: Back-Set.
 - 2. Water Leakage Test Pressure Differential: 10 lbf/sq ft.
 - 3. Air Infiltration Test Pressure Differential: 6.24 psf.
 - 4. Finish: Superior performing organic coatings.

- a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 11. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
- B. Performance Requirements:
1. Structural Loads:
 - a. Wind Loads: As indicated on the Drawings.
 - b. Seismic Loads: As indicated on the Drawings.
 - c. Other Design Loads: As indicated on Drawings.
 2. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Deflection Normal to Glazing Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans more than 13 feet 6 inches (4.1 m).
 - b. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch (3.2 mm).
 - 1) Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.
 - c. At safety loads of 150 percent of design load for metal members supporting glass, residual deflection of framing members shall not exceed 1/1000th of span.
 - d. Accommodate a minimum 1/2 in. live load deflection or greater, as determined by the Structural Engineer of Record, as well as anticipated thermal expansion and elastic shortening of the building. Contractor's Engineer shall be responsible for all necessary project data and ensure that design complies with the Structural Engineer of Record live and dead load deflection criteria.
 3. Water Penetration Resistance: No uncontrolled water as described in paragraph "Weather Resistance" above, when tested in accordance with ASTM E331 at pressure differential of 10 lbf/sq ft.
 4. Water Penetration under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested

- according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 9.0 lbf/sq. ft. (433 Pa).
5. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
 6. Thermally Broken: All components, including doors, to be thermally broken with continuous resilient elastomeric extrusions.
 7. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
 8. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at specified differential pressure of 6.24 lbf/sq. ft. across assembly in accordance with ASTM E283.
 9. Failure defined to include any of the following:
 - a. Deflection exceeding specified limits.
 - b. Water penetration, including condensation, in excess of that specified in this section.
 - c. Thermal stresses transferring to building structure.
 - d. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
 - e. Noise or vibration created by wind and by thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant failure.
 - h. Failure of operating units.

2.04 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
 1. Glazing Stops: Flush.
 2. Cross-Section: As indicated on drawings.
- B. Infill Panels: Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
 1. Finish: Same as storefront.
- C. Sun Screens: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
 1. Configuration: As indicated on drawings.
 2. Louver Type: Bar.
 3. Sun Screen Angle: As indicated on Drawings. If not shown, request from Architect.
 4. Design Criteria: Design and fabricate to resist the same loads as storefront system as well as the following loads without failure, damage, or permanent deflection:
 - a. Loads as indicated on Structural Drawings.
 - b. Thermal Movement: Plus/minus 1/8 inch, maximum.
 5. Sizes: As indicated on drawings.

2.05 GLAZING

- A. Glazing: As specified in Division 08 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
 - 1. VOC Limits, for adhesives sealants, fillers and primers. Comply with limits specified in Section 01 6116.
 - 2. Weatherseal Sealant: If structural sealant is not the weatherseal sealant, provide ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
 - a. Color: As selected by Architect.

2.06 ENTRANCE DOOR SYSTEMS

- A. Stile-and-Rail Type Entrance Doors for manual-swing operation: Provide storefront manufacturer's heavy duty type complying with all of the following:
 - 1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds.
 - 2. Glazing: Fabricate doors to facilitate replacement of glass or aluminum panels, without disassembly of stiles and rails. Provide beveled, snap-on, extruded-aluminum stops and preformed gaskets with exterior stops anchored for non-removal.
 - 3. Equip each door leaf with an adjusting mechanism located in the top rail near the lock stile, which provides for minor clearance adjustments after installation.
 - 4. Door Construction: Minimum 2 inch overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - 5. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
 - 6. Door Design: Wide stile; 5-inch (127-mm) nominal width.
 - a. Stile and Rail dimensions as indicated.
 - b. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
- B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

2.07 VENTING WINDOWS

- A. Aluminum Windows: Manufacturer's standard units, complying with AAMA/WDMA/CSA 101/IS.2/A440, with self-flashing mounting fins, and as follows:
 - 1. AA 900 ISO WEB. Compatible with storefront perimeter frame.
 - 2. Window Type: As indicated on Drawings.
 - 3. Minimum Performance Class: Match criteria specified for Storefront.
 - 4. Minimum Performance Grade: Match criteria specified for Storefront..
 - 5. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch (1.63-mm) thickness at any location for main frame and sash members.
 - a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
 - 6. Mullions: Between adjacent windows where occurring, fabricated of extruded aluminum matching finish of window units.

7. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
 - a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch (3.26 mm) thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.
8. Hardware: Manufacturer's standard; of stainless steel, or bronze; including the following:
 - a. Cam-action sweep sash lock and keeper at meeting rails.
 - b. Pole-operated, cam-action locking device on meeting rail where rail is more than 72 inches (1830 mm) above floor.
 - c. Operator Pole: Provide one pole for each room having window operators more than 72 inches (1830 mm) above floor.
 - d. Steel or bronze operating arms.
 - e. Concealed lock operable with hex key at locations indicated in drawings to be lockable.
 - f. Opening Limiters: Window manufacturer standard type of materials matching locks. Limit opening to 4 inches maximum horizontal extension where operable windows are adjacent to a path of travel.
9. Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric; complying with AAMA 701/702.

2.08 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M). 6063 alloy, T5 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Fasteners: Stainless steel.
- D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.
 1. Break shapes as indicated, as recommended by manufacturer, and as required to fully enclosed and seal system.
- E. Concealed Flashings: Stainless steel, 26 gage, 0.0187 inch minimum thickness.
- F. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- G. Sealant for Setting Thresholds: Non-curing butyl type.
- H. Concealed Flashings: 0.018 inch thick stainless steel, dead soft, as selected by manufacturer for compatibility with other components.
- I. Perimeter Sealant: Silicone, as specified in Section 07 9005.
- J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- K. Glazing Accessories: As specified in Section 08 8000.
- L. Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25, zinc oxide, alkyd, linseed oil primer.
- M. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.
- N. Protective Backing Paint: Bituminous type, emulsified asphalt, ASTM D1187.

2.09 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
 - 1. Manufacturers:
 - a. PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
 - b. Sherwin-Williams Company; SHER-NAR 5000: oem.sherwin-williams.com/#sle.
 - c. Valspar; Fluropon: www.valsparcoilextrusion.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Color(s) as selected by Architect from:
 - 1. Manufacturer's full range of standard colors.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.10 HARDWARE

- A. Other Door Hardware: As specified in Section 08 7100.

2.11 FABRICATION

- A. General: Fabricate aluminum entrance and storefront components to designs, sizes and thickness indicated, and to comply with specified standards. Sizes and profile requirements are indicated on the drawings.
- B. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site. Disassemble components only where necessary for shipment and installation.
 - 1. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
 - 2. Do not drill and tap for surface-mounted hardware items until time of installation at Project site.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members. Fabricate curved members to true shapes as shown on drawings, segmented or faceted curves are not acceptable. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, while enabling installation and dynamic movement of perimeter seal.

- E. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- F. Prepare components to receive anchor devices. Fabricate anchors.
- G. Welding: Comply with AWS recommendations. Grind exposed welds smooth to remove weld spatter and welding oxides. Restore mechanical finish.
 - 1. Welding behind finished surfaces shall be performed to minimize distortion and discoloration on the finished surface.
- H. Reinforcing: Install reinforcing as required for hardware, performance requirements, sag resistance and rigidity.
- I. Dissimilar Metals: Separate dissimilar metals and concealed metal surfaces that will be in contact with cementitious materials with bituminous paint, suitable sealant, elastomeric tape, or gasket between the surfaces. Do not use coatings containing lead.
- J. Reinforce components internally for door hardware and door operators.
- K. Reinforce framing members for imposed loads.
- L. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
- M. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.12 OPERABLE UNIT FABRICATION

- A. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
 - 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- B. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- C. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- D. Operable Window Frames: Reinforce as required to support loads imposed by window operation and for installing window hardware.
 - 1. Provide compression weather stripping at fixed stops.
- E. Operable Windows: Reinforce as required for installing hardware.
 - 1. At pairs of windows, provide sliding-type weather stripping retained in adjustable strip .

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify, with installer present, dimensions, tolerances, and method of attachment with other work.

- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
 - 1. Do not install damaged components.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill and perimeter flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- H. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- I. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K. Set thresholds in bed of sealant and secure.
- L. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.
- M. Install perimeter sealant in accordance with Section 07 9005.
- N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 OPERABLE UNITS

- A. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation, weathertight enclosure and tight fit at weather stripping.
 - 1. Opening Limiters: Adjust to limit opening to 4 inches maximum horizontal extension.
- B. Entrance Doors: Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.04 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.05 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as directed by Architect.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as directed by Architect.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
 - 3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 6.20 psf.
 - a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
 - 4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.20 psf.
 - a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft.
- D. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- F. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections. Should failure occur, Contractor shall test one additional area for each failed location.
- G. Prepare test and inspection reports.
- H. Fenestration Acceptance Requirements: Refer to California Energy Code Section 110.6.
 - 1. Before an occupancy permit is granted, site-built fenestration products in other than low-rise residential buildings shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified in the Reference Nonresidential Appendix NA7 to ensure that site-built fenestration meet Standards requirements, including a matching label certificate for product(s) installed and be readily accessible at the project location.
 - 2. Contractor is responsible to prepare and obtain a Certificate of Acceptance certifying that the fenestration product meets the acceptance requirements, completed, signed and submitted to the enforcement agency, including payment of all fees, with copies to Owner and Architect.

3.06 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.
- B. Verify opening limiters prevent extension of operable units more than 4 inches horizontal from the face of the window frame.
- C. Provide window operating poles in each room having operable hardware more than 72 inches (1830 mm) above floor.

3.07 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
 - 1. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
 - 2. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.
- B. Remove excess sealant by method acceptable to sealant manufacturer and which will not damage pre-finished aluminum surfaces.

3.08 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Touch-up minor damage to factory applied finish, no exposed unfinished aluminum allowed in finish work; replace components that cannot be satisfactorily repaired.

END OF SECTION

ADDENDUM 01
SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. All door hardware required to complete the work as indicated on the drawings and as specified herein.
- B. Related Sections/Work Specified Elsewhere
 - 1. Section 08 1113 – Hollow Metal Doors and Frames
 - 2. Section 08 4313 – Aluminum Entrances and Storefronts
 - 3. Section 10 1400 - Signage

1.02 REFERENCES

- A. CBC - California Building Code – (Title 24, Part 2, California Code of Regulations (CCR)
- B. ADAAG – Americans with Disabilities Act Accessibility Guidelines
- C. NFPA 80 – Standard for Fire Doors and Other Opening Protectives - National Fire Protection Association
- D. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies - National Fire Protection Association
- E. ANSI A156.1 through A156.20 – American National Standards Institute hardware standards as applicable
- F. U.L. – Underwriters Laboratories, Inc.
- G. BHMA – Builders Hardware Manufacturers Association
- H. DHI – Door and Hardware Institute – “Keying Systems and Nomenclature” and mounting heights/locations procedures and standards

1.03 SUBMITTALS

- A. Submit in accordance with Section 01 3300.
- B. Hardware Schedule
 - 1. Within 30 days following Notice of Award, submit a complete Schedule of Hardware to Architect for review. Schedule criteria:
 - a. Prepare in Door and Hardware Institute (DHI) vertical format only. Horizontal schedules will be rejected.
 - b. Include index of doors, listing door number, page and heading number for each door listed.
 - c. Include a legend of abbreviations, symbols, finishes and manufacturers.
 - d. Schedule each hardware item with quantity, type, manufacturer's model number,

- size/handing as applicable, screws/fasteners, finish, manufacturer's name and any additional information required for proper installation/operation.
 - e. List hardware for each door in groups, referencing the same group numbers and numerical group sequence as specified in 3.06 HARDWARE SCHEDULE.
 - f. Include in each hardware group/heading, the door number/location, door and frame types, material, size, thickness, fire rating and any additional door and frame information required for proper installation/operation of hardware.
- C. Review and approval of the Hardware Schedule by Architect does not absolve Contractor of responsibility for missing and/or incorrect items.
- D. When requested, provide the District/Architect, copies of purchase orders showing the dates hardware orders were placed with the factories.
- E. Product Data: Include catalog cut sheets on each type of hardware scheduled to include pictures/drawings, specifications and/or data sheets.
- F. Samples
- 1. Provide physical samples of hardware as requested by Architect.
 - 2. Samples will be returned upon request.
 - 3. Contractor is responsible for cost of samples.
- G. Keying Schedule
- 1. Prior to submission of the 08 7100 Door Hardware submittal, the Contractor to have a keying conference with the District to determine the specific key/keying requirements of the project for inclusion in the Keying Schedule and submittal. Conference to confirm/establish:
 - a. Schlage Everest keyway.
 - b. Specific keying for each cylinder.
 - 2. Refer to 2.04 KEYING for additional items to be confirmed/established for inclusion in the Keying Schedule and submittal.
 - 3. Pursuant to the keying conference, Contractor shall submit a final Keying Schedule to the District for approval.
- H. Operations and Maintenance Data
- 1. At contract closeout, provide District with 2 copies of an "Owners Operation and Maintenance Manual". The manual to consist of a hard cover, three-ring binder with the manual's title and project name listed on the outside, front cover. The manual to include:
 - a. Maintenance data for each item of hardware.
 - b. Manufacturer's installation instructions for each hardware item.
 - c. Name, address and phone number of the local representative for each product manufacturer.
 - d. Parts list for each product.
 - e. Copy of final hardware schedule to include all items listed in 1.03 SUBMITTALS, B. and E.
 - f. Manufacturer's warranty for each product.

1.04 QUALITY ASSURANCE/REGULATORY REQUIREMENTS

- A. Substitutions
- 1. Provide manufacturers of products listed in 2.01 MANUFACTURERS.
 - 2. Substitution requests to be made only in writing and no later than 10 days prior to bid

opening.

3. Substitutions will not be allowed after the bid.

B. Supplier Qualifications

1. Hardware supplier to be a recognized finish hardware supplier, regularly engaged in contracting work, who has been furnishing projects of this size and scope in the project's vicinity for a period of not less than 5 years.
2. The firm must have warehousing facilities and a sufficient staff to accommodate a project of this size and scope.
3. The supplier must have in his employ a certified Architectural Hardware Consultant (AHC) who is available at reasonable times during the course of the project for consultation with District, Architect and Contractor.
4. The supplier must be an authorized factory distributor of the key system specified.

C. Installer Qualifications

1. Hardware installer must have at least 2 years' experience in installing all types of finish hardware with specific experience in hardware installation on a project of this type and scope.

D. Fire Rated Doors and Frames

1. Provide hardware for fire rated doors and frames in compliance with positive pressure standard NFPA 252 or UL 10C, current edition of NFPA 80 and local building/fire code requirements. Provide only hardware that has been fire tested and positive pressure listed by Underwriters Laboratories (UL) or Warnock Hersey International (WHI) for types and sizes of doors specified and complies with "Fire Door Assembly" codes and requirements of door and frame labels.
2. Provide manufacturer's certificate of compliance or other documentation for each hardware item required to comply with positive pressure standard NFPA 252 or UL 10C.
3. Where emergency exit devices are required on fire rated doors, provide UL or WHI label on exit devices indicating "Fire Exit Hardware".
4. Install closing (self-closing or automatic closing) device on every fire door bearing fire labels.

E. Exit Doors

1. Doors shall be operable from the inside with "non-grasping" trim that does not require the use of a key or any special knowledge.

1.05 DELIVERY, STORAGE AND HANDLING

A. Marking and Packaging

1. Package each hardware item individually in manufacturer's original box/package.
2. Mark all packages with respective door, room, hardware heading and hardware set number.

B. Delivery

1. Deliver all hardware to jobsite unless otherwise directed by Contractor or specified herein.

C. Storage

1. Store all hardware in a dry, secured, enclosed area that is not subject to any corrosive elements that could damage the operation or appearance of the product.

1.06 COORDINATION

- A. Templates
 - 1. Distribute door hardware templates for doors, frames and other work specified to be factory prepared for hardware installation.
 - 2. Review shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware with requirements specified herein.

1.07 WARRANTY

- A. Product Warranties
 - 1. Butt Hinges: Lifetime
 - 2. Continuous Hinges: Lifetime
 - 3. Locksets: 7 years
 - 4. Exit Devices: 10 years
 - 5. Surface Closers: 30 years
 - 6. Remaining hardware warranted for a minimum period of 2 years. The manufacturer's specific product warranty, if greater than 2 years, shall take precedence.
- B. Manufacturer's product warranty to commence from date of substantial completion. The manufacturer is responsible for re-installation of defective product during the warranty period.

1.08 MAINTENANCE

- A. Tools and Instructions
 - 1. Provide District at contract closeout, any specialized tools and maintenance instructions required for Owner's adjustment, maintenance, removal and replacement of door hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide hardware from listed manufacturers. To match existing District / Campus design, function and security / keying system, provide only the specified manufacturer of scheduled hardware where "Matches Existing" is listed. Refer to 1.04, A. for substitutions.

<u>HARDWARE ITEM</u>	<u>SPECIFIED MANUFACTURER</u>	<u>APPROVED EQUALS</u>
Hinges - Butts	HAG Hager	Mckinney, PBB, Stanley, Bommer, Ives or approved equal
Continuous Hinges	SEL Select	Matches Existing
Locksets, Cylinders	SCH Schlage	Matches Existing
Exit Devices, Removeable Mullions	VON Von Duprin	Matches Existing
Closers	LCN	Matches Existing
Protective Plates, Stops, Flush Bolts, Misc.	ROC Rockwood	Burns, Trimco, Ives, Glynn-Johnson or approved equal
Overhead Stops and Holders	ABH Architectural Builders Hardware	Glynn-Johnson or

Thresholds, Sweeps, Seals

PEM Pemko

approved equal
Zero, Reese, National
Guard or approved equal

2.02 MATERIALS

A. Screws and Fasteners

1. Install all hardware only with screws and fasteners furnished with hardware.
2. Where a specific type of hardware is packaged by the manufacturer with "screws and fasteners by others", install hardware with manufacturer's recommended type(s).
3. Finish to match hardware.

B. Hinges (butts)

1. Unless otherwise specified, furnish full mortise, template type butts with non-rising loose pins.
2. Furnish Hager as specified or approved equal as listed in 2.01, A. Provide:
 - a. 4.5 x 4.5 size for doors up to 3'0" wide.
 - b. 5 x 4.5 size for doors 3'1" and wider.
 - c. Three hinges for doors less than 7'6" tall and four hinges for doors 7'6" tall and greater.
 - d. Exterior, out-swinging door hinges in non-ferrous material with stainless steel, Non Removable Pin (NRP).
 - e. Interior hinges in wrought steel, polished and plated to match specified finish of other hardware. NRP at all out-swinging doors with keyed locksets.
 - f. Hinges of sufficient width, where required to clear frame and trim, to allow door to open 180 degrees.

C. Continuous Hinges

1. Furnish Select geared type as specified.

D. Locks

1. Except where otherwise specified, furnish all locksets, latchsets, cylinders and component parts by Schlage as specified. Provide:
 - a. Lock series and trim/design as specified.
 - b. Locksets and cylinders with Everest cylinders in keyway as directed by the District.
 - 1). Locksets: Provide with conventional/standard cylinders.
 - 2). Mortise and rim cylinders: Provide with interchangeable cores (IC).
 - c. Box strikes as required by frame types with sufficient length lip to prevent latchbolt from damaging trim.

E. Exit Devices/Panic Hardware

1. Conform to ANSI A156.3 Grade 1 Standard.
2. Comply with CBC 309.4 Operation: The force required to activate operable parts...push bar force required to retract latch...shall be 5 pounds maximum.
3. Panic Hardware shall not be provided with "Night Latch" (NL) function for any accessible doors or gates unless the following conditions are met:
 - a. It is dogged during the time the facility is open.
 - b. Such dogging operation is performed only by employees as their job function (non-public use).
4. Furnish Von Duprin as specified.

F. Closers

1. Comply with CBC opening force requirements.
 - a. Interior non-rated doors – 5 lbs.
 - b. Exterior doors – 5 lbs.
 - c. Fire doors to have minimum opening force allowable by the appropriate authority having jurisdiction, not to exceed 15 lbs.
 2. Surface Closers
 - a. Conform to ANSI A156.4 Grade 1 Standard. Furnish LCN as specified. Provide:
 - 1). Non-handed type that allows 180-degree door opening.
 - 2). Drop plates, back plates, brackets, mortise shoes, spacer blocks and long arms as required.
 - 3). Parallel arm closers with heavy-duty arm (EDA).
 - 4). Multi-size, power adjustable type with independent latch speed, sweep speed and back check cushioning valve controls.
- G. Protective Plates
1. Furnish Rockwood kick plates as specified or approved equal listed in 2.01, A. Provide:
 - a. .050 thick.
 - b. Beveled 4 edges.
 - c. Sizes specified.
- H. Stops and Holders
1. Furnish Rockwood as specified or approved equal listed in 2.01, A.
 2. Where conditions will not allow installation of wall or floor stops as specified in 3.02 INSTALLATION, furnish overhead stop ABH 9000 series.
- I. Thresholds, Sweeps and Seals
1. Furnish Pemko as specified or approved equal listed in 2.01, A.
 2. Provide per plan details and as specified in 3.06 HARDWARE SCHEDULE.
 3. Thresholds shall not exceed ½" in height with a slope no greater than 1:2.
 - a. Furnish with appropriate screws and anchors for floor material.
- J. Silencers
1. For frames without seals, provide push-in type silencers. Self-adhesive type is not allowed. Provide:
 - a. Pairs of doors: 2 each
 - b. Single doors: 3 each
- K. Miscellaneous Hardware
1. Provide remaining hardware items as specified in 3.06 HARDWARE SCHEDULE. The manufacturers and model numbers listed establish design, function and quality requirements.

2.03 FINISHES

- A. Provide finishes specified in 3.06 HARDWARE SCHEDULE. BHMA finish designation indicates base metal as well as finish.

2.04 KEYING

2.04 KEYING

- A. Refer to 1.03, G. Keying Schedule for requirements for preparation of specific keying

schedule.

- B. Factory key all locksets and cylinders:
 - 1. Master key/grand master and/or higher level key as required
 - 2. Construction master key
- C. Furnish the following keys and related items:
 - 1. 2 blanks and 2 change per keyed different lock
 - 2. 4 each keyed alike set
 - 3. 5 masters each MK set
 - 4. 2 grand masters and/or higher level keys as required
 - 5. 10 construction masters for each type of construction core
 - 6. 2 control
 - 7. 2 split
 - 8. 1 bitting list
- D. Stamp all key bows with "DO NOT DUPLICATE" and with any other inscription as directed by the District/Architect.
- E. Tag all permanent keys with door and hardware heading numbers and deliver to District.

2.05 KEY CONTROL

- A. Key Cabinet
 - 1. Provide MMF Industries STEELMASTER Dupli-Key model or approved equal products listed in 2.01, A.
 - 2. Furnish with key lock and all accessories.
 - 3. Cabinet size to accommodate 125 percent of total number of locks and cylinders.
 - 4. Deliver cabinet to District prior to building occupancy.
 - 5. The District is responsible for installation and hanging of keys on hooks.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors, frames and related items for defects or other conditions that would prevent the proper installation and operation of specified hardware. Do not proceed with hardware installation until deficiencies are corrected.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions.
- B. Surface Closers
 - 1. Install inside rooms, in stairwells and inside vestibules. Do not mount closers in corridors except at exterior doors that open off a corridor.
 - 2. Install with sex nuts and bolts.
 - 3. Template for maximum degree of opening:
 - a. Parallel arm: 180 degrees
 - b. Regular arm: Maximum degree listed by manufacturer
 - 1). Where adjacent wall, obstruction or closer stop type arm will not permit maximum degree of opening, install closers to allow the maximum degree of

opening allowed by the stop arm or before door contacts wall or obstruction. In no instance are closers to be templated for less than 90 degree opening.

4. Adjust closers per 2.02, F. and comply with closer sweep requirements so that from an open position of 90 degrees, the time required to move door to a position 12 degrees from the latch is 5 seconds minimum.

C. Exit Devices

1. Install with sex nuts and bolts.

D. Locksets and Cylinders

1. Install per manufacturer's instructions.
2. At end of project:
 - 1). Remove construction insert in conventional/standard cylinders.
 - 2). Remove construction cores and install permanent cores in IC cylinders.

E. Kick Plates

1. Install plates on push side of door unless otherwise specified.
2. Install only with screws furnished.
3. Align centered between door edges and with bottom edge flush with door bottom.
4. Plates are to fit flat against the face of the door without any modification to the plate.
5. Replace plates of incorrect size that encroach on glass area, hang below door bottom or extend beyond door edges.

F. Stops

1. Floor Stops:
 - a. Install in a position that permits maximum door swing but does not exceed 4" from wall.
 - b. Furnish stops of proper height to engage door.
 - c. Position to contact the door at a point 6 inches from the latch edge, but no further than 1/3 the door width as measured from the latch edge.
2. Wall Stops:
 - a. Fasten to solid blocking/backing.
 - b. Install at height that will engage operating trim/levers.

G. Thresholds

1. Set in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants".
2. Secure to concrete with flat head machine screws and expansion anchors.

H. Seals

1. As required, notch jamb seals around hardware items (closer arms, strikes, etc.).

I. Fasten miscellaneous wall-mounted hardware to solid blocking/backing.

J. Unless otherwise specified, all hardware mounting heights shall be per drawings, CBC and/or Door and Hardware Institute (DHI) mounting location standards. Operating/opening hardware shall be installed between 34" minimum and maximum 44" centerline above finished floor.

3.03 FIELD QUALITY CONTROL

- A. After hardware installation has been completed, Architect, District's representative and/or

Section 08 7100 - Door Hardware

project inspector shall:

1. Visually inspect installed hardware to determine compliance with the approved hardware and keying schedules.
2. Cycle doors to determine proper operation of hardware.

3.04 ADJUSTING AND CLEANING

- A. At the end of project, clean and make final adjustments to all hardware. Where hardware is found defective, repair or replace as directed.
- B. Adjust and maintain door and gate closers per 11B-404.2.8.1, so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.

3.05 PROTECTION

- A. Provide proper care and protection for all hardware items and finishes until completion of project.

3.06 HARDWARE SCHEDULE

- A. The following is a schedule of hardware to be furnished for this work. The listed material to conform throughout with the requirements of the foregoing specification.

HW-1

Each pair to have

2	Continuous Hinges	SL11HD	628	SEL
1	Exit Device	CDSI-AX99NL	626	VON
1	Exit Device	CDSI-AX99DT	626	VON
1	Removeable Mullion	KR4954 x 154	689	VON
1	Storage Mount	MT5428		VON
3	IC Mortise Cylinders	Model/part required	626	SCH
1	IC Rim Cylinder	Model/part required	626	SCH
2	Closers/Stops/Holders	4040XP SHCUSH	689	LCN
1	Threshold	Per detail		PEM
2	Sweeps	29326CNB		PEM
1	Set Seals	319CN		PEM
1	Astragal	By door mfr.		

Note: Refer to 2.02 MATERIALS, E. Exit Devices/Panic Hardware for "Night Latch" (NL) conditions.

HW-2

Each door to have

	Hinges	BB1168	652	HAG
1	Exit Device	CDSI-AX99NL	626	VON
1	IC Mortise Cylinder	Model/part required	626	SCH
1	IC Rim Cylinder	Model/part required	626	SCH

1	Closer/Holder	4040XP HCUSH	689	LCN
1	Kick Plate	K1050 10" x 2" LDW	630	ROC
1	Floor Stop	481	626	ROC

Note: Refer to 2.02 MATERIALS, E. Exit Devices/Panic Hardware for "Night Latch" (NL) conditions.

HW-3

Each door to have

	Hinges	BB1168	652	HAG
1	Lockset	ND95PD RHO	626	SCH
1	Floor Stop	481	626	ROC

HW-4

Each door to have

	Hinges	BB1168	652	HAG
1	Lockset	ND95PD RHO	626	SCH
1	Kick Plate	K1050 10" x 2" LDW	630	ROC
1	Floor Stop	481	626	ROC

HW-5

Each door to have

	Hinges	BB1168	652	HAG
1	Privacy Indicator "Occupied" Lockset	LV9456P 06A x L283-722 x ADA Thumbturn 09-509 x L583-363 x standard cylinder	626	SCH
1	Closer	4040XP REG	689	LCN
1	Kick Plate	K1050 10" x 2" LDW	630	ROC
1	Floor Stop	481	626	ROC
1	Set Seals	S88GR	Gray	PEM

HW-6

Each door to have

	Hinges	BB1199	630	HAG
1	Lockset	ND95PD RHO	626	SCH
1	Closer/Stop/Holder	4040XP SHCUSH	689	LCN
1	Threshold	Per detail		PEM
1	Sweep	29326CNB		PEM
1	Set Seals	319CN		PEM

HW-7

Each pair to have

	Hinges	BB1168	652	HAG
2	Flush Bolts	555	626	ROC

1	Dust Proof Strike	570	626	ROC
1	Lockset	ND95PD RHO	626	SCH
2	Kick Plates	K1050 10" x 1 ½" LDW	630	ROC
2	Overhead Stops & Holders	9000 series x template 110 degree	630	ABH
1	Welded Steel Astragal	By door mfr./supplier		

END OF SECTION

ADDENDUM 01
SECTION 11 6623
GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Basketball backboards, goals, hoops, nets, and support framing, electrically operated.
- B. Volleyball Equipment.
- C. Badminton Equipment
- D. Scoreboards, electrically operated.
- E. Gymnasium Divider Curtains, electrically operated.
- F. Floor anchors for tensioned elements.
- G. Floor sleeves for net and goal posts.
- H. Wall mounted protection pads.
- I. Gym divider curtains.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete floor slab to receive floor sleeves and anchors.
- C. Section 05 1200 - Structural Steel Framing: Structural members supporting basketball systems.
- D. Section 06 1000 - Rough Carpentry: Wall Framing and blocking for equipment attachment.
- E. Pertinent sections specifying floor finishes.
- F. Pertinent sections specifying electrical connections and control conduits/raceways.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- C. California Code of Regulations, Title 24, Part 2, California Building Code (CBC), International Building Code.
- D. California Code of Regulations, Title 24, Part 11, California Green Building Standards Code, "CAL-Green".
- E. Manufacturer's recommendations and installation instructions.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFSHSA Court and Field Diagram Guide, National Federation of State High School Associations; 2006.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- B. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection.

1.05 SUBMITTALS

- A. Section 01 3300 - Submittals, for submittal procedures.
- B. Division of the State Architect Deferred Approval Submittal Requirements:
 - 1. This section specifies work that is a Division of the State Architect deferred approval item. All Engineering calculations and Shop Drawings require review and approval by the Division of the State Architect prior to fabrication or installation. Deferred Approval review provisions of Section 01 3300 apply to the submittals of this section.
 - 2. Submit items for deferred approval complete with all structural calculations, test data and information as specified or as subsequently required by the reviewing agency, including engineering stamps and signatures as required. Architect shall submit to DSA only following Architect/Engineer review.
 - a. The Architect will not approve deferred approval submittals until they are approved by DSA.
 - 3. No work or fabrication shall begin until DSA approved submittals are distributed to the Contractor.
 - 4. Contractor is notified that significant lead time is required for deferred approval review by DSA and shall schedule submittals accordingly. No extension of Contract Time will be allowed for delays incurred by deferred approval review.
 - a. The Architect is not responsible for DSA delays in deferred approval review.
 - 5. Submit Certification of Compliance and all other documentation as required by Division of the State Architect.
 - 6. Make all changes and revisions required by Division of State Architect to obtain approval at no additional costs or extension of time.
- C. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
 - 1. Electrical characteristics and connection locations.
 - 2. Fire rating certifications.
 - 3. Structural steel welder certifications.
 - 4. Manufacturer's installation instructions.
- D. CAL-GREEN Submittals:
 - 1. Product Data - VOC Limits: For adhesives, sealants, fillers, primers and coatings, documentation including printed statement of VOC contents, comply with limits specified in related section.
 - 2. Composite Wood Formaldehyde Limits: Provide certification that all products meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates as specified in related section.
 - 3. Product Data - Low/No-VOC Paints and Coatings. Provide certification that all primers and coatings meet VOC emission limits specified in related section. List manufacturer, brand, application, type (flat or non-flat), number of gallon, and the VOC emissions in grams/liter. Include MSDS and product data sheet indicating VOC limits for each product provided.
- E. Design Data: Indicate Applicable sport associations standards.

- F. Shop Drawings: Indicate Complete layout and installation drawings for all equipment. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Show all details and fully define anchoring systems; show all insert locations fully dimensioned.
 - 2. Show all details of attachment into actual floor and wall conditions used on this project.
 - 3. All anchorage drawing details shall bear original stamp and signature of California licensed Structural Engineer responsible for preparation of the Structural Engineering Calculations.
- G. Samples: Submit samples of wall pad coverings in manufacturer's available range of colors, textures, and graphics.
 - 1. Submit two color cards, 8.5 x 11 inch in size, illustrating product color selections.
 - 2. Available curtain fabrics.
- H. Certificates: Certify that products of this section meet or exceed specified requirements.
 - 1. Structural Engineering Calculations: Submit for all components and assemblies; signed and stamped by a California licensed Structural Engineer.
 - 2. Proof of qualifications for manufacturer and installer: Submit DSA approval file and application numbers for at least 3 previous projects.
- I. Manufacturer's Instructions: Indicate specific installation requirements.
- J. Operating and maintenance data, for each operating equipment item.
- K. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Attachment details and all required supporting information and calculations must be submitted to DSA, through the Architect, for approval prior to installation of athletic equipment.
 - 2. Backstops are a DSA deferred approval item. Review and approval by the Division of the State Architect of engineering calculations and shop drawings before fabrication.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
 - 1. Recognized and approved by the California State Division of the State Architect as a manufacturer of athletic equipment systems.
 - 2. Aware of all DSA requirements for fabrication and installation of athletic equipment systems.
 - 3. Have successfully prepared a Deferred Approval submittal to DSA on a minimum of five occasions.
- C. Installer Qualifications: Company specializing in performing work of the type specified and approved by manufacturer.
- D. Design backstop support structure under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in California.
- E. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.
- D. Sequence installation of equipment to avoid traffic over finish floor materials.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. VOC Limits for adhesives, sealants, fillers, primers and coatings . Comply with limits specified in related section.
- B. Composite Wood products must meet current CARB Airborne Toxic Control Measure (ATCM) for Composite Wood Formaldehyde Limits by Mandatory Compliance Dates as specified in related Section.

2.02 MANUFACTURERS - GENERAL

- A. For convenience in identifying products, manufacturer's proprietary names or catalog numbers may be indicated. Unless modified by Specifications or notation on Drawings, manufacturer's complete product catalog description for indicated product name or number shall constitute requirements for each product. Products shall incorporate all features set forth in the manufacturer's catalog description for the standard item, except for such modifications thereto as may be indicated in the Contract Documents.
- B. Use of proprietary names, catalog numbers, and specific requirements set forth in the Contract Documents, are not intended to preclude use of other manufacturer's product or procedure which may be equal thereto, subject to requirements for substitutions specified in Section 01600, but are given to establish standard of design and quality for materials, construction and workmanship.
- C. General: Whenever a particular product, material, trade name and/or manufacturer's name is specified, it is the minimum standard of quality required.
 - 1. Product names specified in this section form the basis of the contract documents and are from manufacturers represented locally by Southwest Interiors, 26115 Table Meadow Road, Auburn, CA 95602.
 - 2. Area Representative: Bob Walters, 530-269-2855.
- D. Substitutions: See Section 01 6000 - Product Requirements.
 - 1. Contractor will not be allowed to substitute products or manufacturers after the bid opening date except as otherwise provided in Section 01 6000. Failure to comply with this requirement is grounds for disqualification of substitution.
 - 2. Requests for substitution of proposed alternate systems must meet or exceed the following specified characteristics; must be made in writing prior to bid date; and be approved in writing via addenda by the Architect prior to the bid date, all in strict accordance with Section 0 16000.

3. Documentation of Substitutions: Substituted products and/or systems will only be considered if the proposed substitute is requested timely; fully documented as being equivalent or superior in quality to the specified system as described in these specifications; without exception. Additionally, all manufacturer and installer/fabricator guidelines must be met as specified.
 - a. All performance requirements listed must be met and submitted as well as all items listed in the QUALITY ASSURANCE Article.
 - b. Submit complete product and test data as specified under SUBMITTALS Article for each proposed substitution.

2.03 MANUFACTURERS

- A. Gymnasium Equipment:
 1. Porter Athletic Equipment Company; ____: www.porterathletic.com/#sle.
 2. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GENERAL REQUIREMENTS

- A. See drawings for sizes and locations, unless noted otherwise.
- B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
 1. National Federation of State High School Associations (NFHS) sports rules.
- C. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.
- D. Hardware: Heavy duty steel hardware, as recommended by manufacturer.
- E. Electrical Wiring and Components: Comply with NFPA 70; provide UL-listed equipment.
- F. Structural Steel Fabrications: Welded in accordance with AWS D1.1/D1.1M, using certified welders.

2.05 BASKETBALL COMPONENTS

- A. Backboards: Tempered glass, rectangular shaped.
 1. Frame: Brushed aluminum edge, steel mounting.
 2. Provide conversion frame, mountable on both assemblies designed for fan shaped backboards and assemblies designed for rectangular backboards.
 3. Dimensions: 42 inches high by 72 inches wide
 4. Thickness: 0.5 inches.
 5. Markings: Painted.
 6. Provide safety padding for bottom edge of backboard.
 7. Provide mounting kit.
 8. Color: Manufacturer's standard.
 9. Product: 00208-000 manufactured by Porter.
- B. Goals: Steel rim, mounted to backboard, with attached nylon net; complete with mounting hardware.
 1. Net Attachment Device: Tube-tie.
 2. Breakaway mechanism, adjustable.
 3. Finish: Powder coat orange.
 4. Product: Porter "Ultra-Flex" model No. 00245-500.
- C. Winch: Worm gear type, designed to hold backstop in any positions when raising or lowering, Model 0070x.

1. Motor: Size as recommended by manufacturer, electric operation, thermally protected,
 2. Limit Switch: Precisely limit up and down operation of the winch.
 3. Wall Switch: Dual keyed, flush mounted, momentary key which cannot be instantly reversed. Gang switch installation for multiple backstops.
 4. Manual Operation: Include provisions for manual operation of winch in event of failure.
- D. Controls: Remote touch pad operation, Porter E2500.
- E. Backstop control center; Wall mounted, key pad, power-touch, 2.5 simultaneous operation gymnasium control center, Porter Model 02500-000.

2.06 BASKETBALL BACKSTOP AND GOAL ASSEMBLIES

- A. Main Court Backstop: Ceiling suspended, forward fold, Model 917, with off set weight stabilizing system, adjustable hangers, all welded construction, 10 gage mast stem and center strut design..
1. Backstop Safety Lock: All backstops, inertia-sensitive lock with 2 inch nylon belt, 6000 pound breaking strength, withstanding 1000 pound free-falling load; "Saf-Strap" Model 10797-100."Safe-Strap" Automatic inertial locking mechanism to lock backstop in position in case of winch failure, provide complete with "Retractor-Reel".
 2. Backboard: Glass, fully tempered, 1/2-inch thickness, within a steel frame; rectangular shape, Model No. 00204-000; 72 inch by 42 inch.
 3. Backboard Safety Padding, 00326-000 bolt-on type compatible with specified backboard, minimum 8 year warranty.
 4. Electric winch operation.
- B. Cross Court Backstop: Ceiling Suspended, forward fold, rear braced, Model 917, with off set weight stabilizing system, adjustable hangers, all welded construction, 10 gage mast stem and center strut design.
1. Backstop Safety Lock: All backstops, inertia-sensitive lock with 2 inch nylon belt, 6000 pound breaking strength, withstanding 1000 pound free-falling load; "Saf-Strap" Model 10797-100."Safe-Strap" Automatic inertial locking mechanism to lock backstop in position in case of winch failure, provide complete with "Retractor-Reel".
 2. Backboard: Glass, fully tempered, 1/2-inch thickness, within a steel frame; rectangular shape, Model No. 00204-000; 72 inch by 42 inch.
 3. Backboard Safety Padding, 00326-000 bolt-on type compatible with specified backboard, minimum 8 year warranty.
 4. []
- C. Winch: Worm gear type, designed to hold backstop in any positions when raising or lowering, Model 0070x.
1. Motor: Size as recommended by manufacturer, electric operation, thermally protected,
 2. Limit Switch: Precisely limit up and down operation of the winch.
 3. Manual Operation: Include provisions for manual operation of winch in event of failure.
- D. Controls: Remote touch pad operation, Porter E2500.
- E. Backstop control center; Wall mounted, key pad, power-touch, 2.5 simultaneous operation gymnasium control center, Porter Model 02500-000.

2.07 SCOREBOARDS AND SHOT TIMERS

- A. Gymnasium Interior Scoreboard(s): Fair-Play Model BB-3600-4
1. "Panaview" design with 13 inch high seven-bar segment-per-digit LED lighting. 9 feet x 5 feet x 4 inches deep.

2. Aluminum Panel construction, colors selected by Architect from 250 available options at no additional cost.
 3. Captions: Vinyl lettering, "HOME" and GUEST 6 inches high, all others 4 inch. Provide "Home Team Name" in lieu of "HOME".
 4. Control Console, wireless, Fair-Play Scoreboards, Model MP72, aluminum case, sealed-membrane water-resistant keyboard, capable of controlling compatible keyboards through game-specific inserts. Provide with inserts for Basketball, Volleyball, and Wrestling.
 - a. Console-to-Wall Control Cable: Shielded, one-pair, 24 AWG, minimum 20 feet long, with compatible connectors.
 - b. Junction Box: Manufacturers standard wall box suitable for concealed mounting as indicated, with mounted connector sockets.
 - c. Carrying Case: Standard type.
 5. Control Cable: Manufacturer's recommended type, connecting scoreboards to console junction box(es).
 6. Horn: Vibrating type, mounted behind scoreboard face, automatic sounding on end of period, manually by operator and as controlled by segment timer.
 - a. Visual Horn Indicator: Manufacturer's standard type, Model VHI 150.
 7. Custom school mascot panel.
 8. Segment Timer: Sound horn automatically at end of user-defined time period for use in practices.
- B. Shot Timer: Fair-Play Scoreboards, Model ST-1411-4.
1. "Panaview" design with 13 inch high seven-bar segment-per-digit LED lighting.
 2. Aluminum panel construction, color selected by Architect matching scoreboard.
 3. Interlock with Scoreboard to tie Shot Clock timer with game clock stop.
- C. Manufacturers:
1. Fair-Play Scoreboards, Des Moines, IA, www.fairplay.com
 2. Daktronics, Inc., Brookings, SD, www.daktronics.com.
 3. Nevco Scoreboard Company, Greenville, IL, www.nevcoscoreboards.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.

2.08 GYMNASIUM DIVIDER CURTAIN

- A. Curtain: Approved by California State Fire Marshal. Size as noted on Drawings. Porter Model 600 series for configuration specified.
1. Operation: Roll-Up.
 2. Fabric Section: Continuous 22 ounce reinforced vinyl-coated polyester fabric with horizontal heat welded seams and anti-microbial treatment, meeting standards of California State Fire Marshal and conforming to UL-214 and NFPA-701. All seams fully welded. Color as selected by Architect from manufacturer's standards, minimum of twelve choices.
 - a. Fabric Height: 8'-0" above finish floor.
 3. Mesh Section: Vinyl coated polyester mesh, 45 to 50 percent open, with PVC coating, white color. Provide from top of fabric to ceiling height.
- B. Suspension Assembly:
1. Steel tubes top and bottom. Bottom tube designed to enable curtain to be rolled up compactly and wrinkle-free around the tube.
 2. Entire curtain assembly suspended from hoistbelt.

- C. Motor : Manufacturer's standard 115 v., single phase reversible, geared motor provided as part of Curtain Assembly. Horsepower capacity as recommended by manufacturer for curtain size and type indicated.
- D. Limit Switch: Precisely limit up and down operation of the winch.
- E. Controls: Wall mounted, key pad, power-touch, 2.5 simultaneous operation gymnasium control center, Porter Model 02500-000.
- F. Manufacturers:
 - 1. Porter Athletic Equipment Company, Broadview, IL; www.porter-ath.com is specified.
 - 2. Substitutions: See Section 01600 - Product Requirements.

2.09 VOLLEYBALLEQUIPMENT AND ACCESSORIES

- A. Upright Poles: Powder coated steel, 3-1/2 inch outside diameter. Net height settings adjustable by sliding collar and spring loaded pin.
 - 1. Porter Model 1952.
 - 2. Game Standard Inserts: Steel sleeve with swiveling non-removable floor plate, brass finish, vandal-resistant key. Model and dimensions recommended by manufacturer to suit upright poles and finish flooring types indicated.
 - 3. Manual Winch: drumless, with nylon tension strap, placed on upright at net height.
- B. Pads: Upright pole safety pads, standard configuration; color as selected by Architect from manufacturer's standards; Porter Model No. 839-1XX.
- C. Net: Black No. 36 nylon cord, 4 inch square, top cable nylon coated to prevent fraying. Tension straps and dowels in end pockets to assist net tension. Size to match court layout(s) indicated, Model 02295-640 "Powr-Line" Net.
 - 1. Net Antennas and Boundary Markers: International quality, positive locking, securing to net hems. Manufacturer's standard type.
- D. Storage cart: Manufacturer's recommended best-quality model to accommodate specified products for relocation and efficient storage, sized to fit 36 inch door opening.

2.10 BADMINTON EQUIPMENT AND ACCESSORIES

- A. Upright Poles - Permanent: Powder coated steel, 2-3/8 inch outside diameter, Model 764.
 - 1. Furnish with brass color swivel floor plate and sleeve. Oversized, for floating wood floor.
 - 2. Manual Winch: drumless, with nylon tension strap, placed on upright at net height.
- B. Net: Black 1/4 inch diameter braided polypropylene rope and top cable, 3/4 inch squares with tension straps and dowels in end pockets to assist net tension. Size to match court layout(s) indicated, Model 2236.
- C. Game Standard Inserts: Steel sleeve with brass color swivel floor plate, model and dimensions recommended by manufacturer to suit upright poles and finish flooring types indicated. Porter Model 00770-xxx.
- D. Storage cart: Manufacturer's recommended best-quality model to accommodate specified products for relocation and efficient storage, sized to fit 36 inch door opening.

2.11 FLOOR-MOUNTED EQUIPMENT

- A. Volley Ball Nets and Posts: One court system of adjustable posts, net, and tensioning winch meeting requirements for FIVB, USA Volleyball, NCAA and NFHS competition requirements.

1. Posts: 3-1/2 inch O.D. schedule 80 aluminum tube with 1 inch height adjustments between 42 and 96 inches.
 2. Net: 4 inch square #36 nylon cord with vinyl coated polyester hem, double stitched around the perimeter.
 3. Tensioning Winch: Manual crank heavy duty, self-locking worm gear mechanism.
- B. Floor Sleeves for Posts: Metal sleeve, with latch cover, cast into concrete subfloor to hold poles for nets and goals; installed flush with finish floor surface.
1. Latch Cover: Brass, round; tamper resistant lock with key.
 2. Sleeve: Aluminum.
 3. Depth of Sleeve: 9 inches from floor surface to bottom, including latch cover.

2.12 WALL PADDING

- A. Wall Padding: Foam filling bonded to backing board, wrapped in covering; each panel fabricated in one piece. Porter Model 00340 series "FR-SAFPAD".
1. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84 as a complete panel.
 2. Listed as fire-retardant by California State Fire Marshal per method 5903. Entire Pad Assembly Class A fire certification.
 3. Covering: Vinyl-coated polyester fabric, mildew and rot resistant; stapled to back of board.
 - a. Color: As selected from manufacturer's standard range. Minimum fifteen choices.
 - b. Texture: Embossed leather-look.
 - c. Custom Graphics: To be supplied by Owner.
 - d. Fabric Weight: 14 oz/sq yd.
 4. Foam: Open cell polychloroprene (Neoprene) 5.5 pcf nominal density.
 5. Foam Thickness: 1-1/2 inches.
 6. Backing Board: Plywood.
 - a. Thickness: 1/2 inch.
 - b. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84.
 7. Panel dimensions and extents: Width and extents as indicated, six feet height.
 8. Mounting: Removable; Z-clips fixed to wall and to padding.
 9. Molded Vinyl Wall Pad Inserts: Porter Models 341 and 342.
- B. Specially Shaped Padding: Same construction as standard padding; custom fabricate to fit irregularly shaped members, areas, and protrusions in gymnasium as indicated; provide padding for:
1. Wall corners.

2.13 ACCESSORIES

- A. Mounting Hardware: Vandal-proof screws, bolts, anchors, stainless steel at exterior exposure, size and type recommended by manufacturer to suit applications and resist applied loads.
- B. Accessories and materials as recommended by Manufacturer and as required for complete installation as indicated.

2.14 MIXES

- A. Concrete: Type specified in Section 03300..

2.15 FACTORY FINISHING

- A. Finish all steel parts with baked-on enamel.
- B. Provide nine color options for backstop frame and pipes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation, and notify Architect in writing of unsatisfactory or detrimental conditions.
- C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.

3.02 INSTALLATION

- A. Install in accordance with Contract Documents and manufacturer's instructions.
- B. Install goals and inserts in precise location required for alignment with game lines.
- C. Coordinate installation of inserts and anchors that must be built in to flooring or subflooring.
- D. Install equipment rigid, straight, plumb, and level.
- E. Secure equipment with manufacturer's recommended anchoring devices.
- F. Set floor plates flush with finished flooring.
- G. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering. Provide hemmed cut-out openings to accommodate required penetrations for electrical or other services.
- H. Separate dissimilar metals to prevent electrolytic corrosion.

3.03 ADJUSTING

- A. Verify proper placement of equipment.
- B. Verify proper placement of equipment anchors and sleeves, and use actual movable equipment to be anchored if available.
- C. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration; lubricate equipment as recommended by manufacturer.

3.04 CLEANING

- A. Remove masking or protective covering from finished surfaces.
- B. Clean equipment in accordance with manufacturer's recommendations.
- C. Do not permit traffic over unprotected floor surface.

3.05 STARTING AND DEMONSTRATION

- A. Provide manufacturer's field representative to prepare and start equipment.
- B. Adjust for proper operation within manufacturer's published tolerances.
- C. Demonstrate proper operation of equipment to Owner 's designated representative.

3.06 SCHEDULES

- A. Volleyball Net Systems: 3 complete sets
- B. Badminton Net Systems: 6 complete sets
- C. Volleyball Storage Carts: 1 carts
- D. Badminton Storage Carts: 1 carts

END OF SECTION

ADDENDUM 01
SECTION 26 2700

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work included in this Section: All materials, labor, equipment, services, and incidentals necessary to install the electrical work as shown on the drawings and as specified hereinafter, including but not limited to the work listed below:
 - 1. Raceways, feeders, branch circuit wiring, wiring devices, safety switches and connections to all equipment requiring electric service.
- B. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.
- C. All work shall comply with Section 26 05 00.

1.02 RELATED WORK

- A. Division 09 - Finishes
- B. Division 23 - Motors and Mechanical Equipment Installation

1.03 SUBMITTALS

- A. Comply with the provisions of Section 26 05 00.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Refer to Section 26 05 00, Basic Electrical Requirements, Part 2 - Products.
- B. List of Equipment Manufacturers:

Conduit and Conduit Fittings

Allied Tube and Conduit, Wester Tube and Conduit, LTV Steel Tubular, National Electric Products, AFC, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, Killark Electric Manufacturing Company, Raco, VAW Aluminum Company, Bridgeport, Steel City, Thomas & Betts, Carlon, O.Z. Gedney, Appleton, Regal.

Wire and Cable (600V)

American Wire Company, General Wire and Cable Corporation, Okonite Company, Rome Cable Corporation, Cerrowire, American Insulated Wire, AFC Cable Systems, Essex, Simplex Wire and Cable Company, Southwire.

Solderless Lugs and Grounding Connections

Burndy Engineering Company Inc, O.Z. Gedney Company Inc, Penn Union Electric Corporation, Thomas and Betts Company Inc.

Pull Boxes, Gutters, Special Cabinets

Square D Company, Columbia Electric Manufacturing Company, General Electric Company, Westinghouse Electric Corporation, Circle Awalt.

Outlet Boxes

Appleton Electric Company, Killark Electric Manufacturing Company, Lew Electric Fittings Company, National Electric Products Corporation, Raco, Steel City Electric Company, Carlon, Bowers.

Wiring Devices

Leviton, Arrow-Hart, Cooper, Hubbell, Lutron, Bryant.

Conduit Racks, Hangers

General Electric Company, Killark Electric Manufacturing Company, Caddy, National Electric Products Corporation, Republic Steel Corporation, Rome Cable Corporation, United States Steel Corporation, VAW Aluminum Company, Superstrut, B-Line.

Safety Switches (Disconnect and Fusible)

Square D Company, Cutler Hammer Inc, General Electric Company, Westinghouse Electric Corporation.

Fuses

Bussman Manufacturing Company, Chase-Shawmut Company.

Firestopping

3M, Nelson.

2.02 MATERIALS

A. Grounding:

1. Provide and install grounding system as noted on the Drawings.
2. Grounding electrode conductor: bare stranded copper type, #4/0 minimum.
3. Install ground wires in rigid conduit.
4. All grounding electrode conductor connections "thermite" or "cad-weld" welded.
5. Use approved pressure type solderless connector or use fusion welding for all connections to and bonding of grounding electrode system. All connections shall be visible, readily accessible for testing purposes. Grounding electrode conductor between the grounding electrode and service equipment: Minimum #4/0.
6. Furnish and install solid copper 3/4" x 10'-0" ground rod(s). Where multiple ground rods are shown, install a minimum of 20'-0" apart. Install ground rods in accessible boxes with covers. Furnish and install 2-#4/0 bare copper cables between multiple ground rods and main switchboard ground bus.
7. Terminate grounding conduits at equipment with ground bushing, with ground wire connected through bushing.
8. Provide No. 12 stranded (green) THHN conductor from outlet box to ground screw of every receptacle.
9. Ground all isolated sections of metallic raceways.
10. Provide #12 minimum stranded (green) THHN conductor sized per NEC, or as noted, connected continuously throughout branch circuit for all circuits, bonded to panel ground bus, and to all electrical devices and equipment enclosures.
11. Grounding electrode installed as follows:
 - a. Place #4/0 bare copper cable in foundation trench; tensioned, supported in such a manner that it cannot be less than two (2) inches from bottom or side of concrete

26 2700 - BASIC ELECTRICAL MATERIALS AND

when foundation concrete is poured; not less than one hundred feet of conductor. Embed in foundation with a loop at approximate center, brought out at top of foundation adjacent to building service equipment for connection to service equipment and for bonding to other parts of the grounding system.

- b. Use approved pressure type solderless connector or use fusion welding for all connections to grounding electrode. Connection visible, readily accessible for testing purposes. Grounding electrode conductor between the grounding electrode and service equipment: Minimum #4/0.
- c. Connect grounding electrode system to metallic water service entry metallic cold water pipe (if available) with nonferrous clamp and bare copper cable (sized as required) in conduit. Connection shall be accessible for inspection.
- d. Connect grounding electrode system to building steel as noted on Drawings. Use exothermic weld, connection shall be accessible for inspection.
- e. After installation, test system using the three-point fall of potential method only. Record results and submit to Architect for approval. If resistance to ground exceeds three ohms, install an additional ground rod, bonded and interconnected to the grounding electrode system.

B. Panelboards:

1. Surface or flush mounted, with branch circuits as shown on drawings.
2. Enclosures: code gauge galvanized sheet steel with welded full flange end pieces, stretcher- leveled steel trim, backpan and door.
3. Bussing of copper with silver-plated contact surfaces.
4. Provide a 200% rated neutral bus for panels supplied with 200% rated feeders (incoming or outgoing). Refer to single line riser diagram for feeder ratings.
5. Trims on surface-mounted cabinets secured with nickel-plated screws with cup washers, bottom of all trims to have lugs for resting on cabinet flange.
6. Panels shall be 20 inches minimum in width, provided with approved gutter space, barriers and adjustable supports. Doors mounted with concealed hinges provided with combination spring latch and lock. Doors and trims and surface mounted cabinets primed and finished with one coat baked on gray enamel. All visible panel enclosures and covers in finished (occupied) areas shall be painted to match adjacent wall finish.
7. Breakers on same phase to be aligned horizontally. Each panel provided with 5-handle locks.
8. Each branch circuit of panelboards to have a permanently fixed number with one word directory, mounted under celluloid on inside of cabinet door, showing circuit numbers and typewritten description of outlets controlled by breakers. Color code mains and each breaker terminal, same as conductor insulation.
9. Each panel shall be equipped with a copper ground bus.
10. All panels shall be fully bussed to accept future circuit breakers.
11. Panel board submittals shall include diagrams of the circuit breaker arrangements in the panels. Arrange circuit breakers in panels exactly as shown on the panel schedules in the construction documents.

C. Circuit Breakers:

1. General: Circuit breakers shall be molded case rated for 480 or 240 volts, multiple or single pole and amperage rating as shown on the drawings, bolt on, manually operated with "de-ion" arc chutes.
2. Main circuit breaker shall be rated to interrupt the available short circuit current 42,000 amps RMS.
3. Distribution circuit breakers shall be rated for the amps interrupting capacity noted on the drawings or U.L. series rated with the main circuit breaker.

4. Branch circuit breakers shall be rated for the amps interrupting capacity or U.L. series rated with the distribution and main circuit breakers, General Electric type THQB or equal, minimum 10,000 A.I.C for 120/208 volt; type TEY or equal, minimum 14,000 A.I.C for 277/480 volt.
 5. Where mechanical equipment is U.L. listed for overcurrent protection with fuses or HACR type circuit breakers, provide fuses where a fused switch is shown. Where the overcurrent protection is a circuit breaker provide HACR, (HACR means Heating, Air-Conditioning and Refrigeration) type.
 6. Provide switch rated type "SWD" circuit breakers where the circuit breaker is going to be used as a switching device in a panelboard.
- D. Dry-Type Transformers:
1. Ventilated type.
 2. Dry-type general distribution transformers shall meet the California Title 24 requirements for energy efficiency standards and DOE 10 - CFR, Part 431 (2016) for energy efficient transformers.
 3. Transformer shall be 3 phase, 60 Hertz. Primary winding shall be Delta connected and secondary winding shall be Wye connected. The temperature rise at rated voltage and full load shall not exceed 150 degrees C with a 220 degrees C U.L. Component Recognized Insulation System. The windings shall be Aluminum or Copper.
 4. The higher voltage winding shall have quantity (6) 2.5% taps - (2) FCAN and (4) FCBN. Set secondary voltage for 120/208V.
 5. Transformer terminals shall be front connected for ease of installation and maintenance.
 6. Where the transformers are installed outdoors provide weatherproof drip cover, rodent screen and a NEMA 3R rating of the enclosure.
- E. Raceways: Only the raceways specified below shall be utilized on this project. Substitutions shall be pre-approved in writing. All bare conduit ends (stub-ups or stub-outs) shall be provided with bushed ends or manufactured insulated throat connectors:
1. Rigid Type - hot dip galvanized or sherardized steel, use on all exterior locations, below grade or in concrete slab, and to 18" on either side of structural expansion joints in floor slabs, with completely watertight, threaded fittings throughout. Compression fittings are not acceptable.
 - a. All rigid steel conduit couplings and elbows in soil or concrete or under membrane to be ½ lap wrapped with Scotch #50 tape and threaded ends coated with T&B #S.C.40 rust inhibitor prior to installation of couplings.
 - b. ½ lap wrap all rigid steel conduit stub-ups from slab or grade to 6" above finished grade level with Scotch #50 tape.
 2. In lieu of rigid steel conduit for power and control raceways and branch circuit conduits in soil or concrete slabs, "Schedule 40" PVC with Schedule 80 PVC conduit elbows and stub-ups may be used with code size (minimum No. 12) ground wire. A "stub-up" is considered to terminate 6" above the finished surface.
 - a. Schedule 80 PVC conduit shall be used in all concrete footings or foundations and to 18" of either side of footings or foundation walls.
 - b. Schedule 80 PVC conduit shall be used in all concrete masonry unit (CMU) walls or columns.
 - c. All conduit runs in concrete floor slabs (where allowed) shall be installed to comply with all applicable UBC and structural codes to maintain the structural integrity of the floor slab. Where conflicts occur, alternate routing shall be provided at no additional cost to the Owner.
 - d. Where schedule 80 PVC is coupled to schedule 40 or other raceways with differing interior dimensions, each end shall be reamed with a reaming tool to reduce the edge profile for protection of the passing conductors during the pull.

3. Intermediate metal conduit may be used in all exposed interior locations, except that electrical metallic tubing may be used in some locations as noted below. Utilize steel compression type fittings for all exposed conduit runs, unless otherwise noted. Cast fittings are unacceptable.
4. Electrical metallic tubing shall be used exposed in interior electrical and mechanical rooms, in interior unfinished spaces, and in interior concealed and furred spaces, made up with steel watertight or steel set screw type fittings and couplings. EMT shall not be used in under-building crawl spaces or other areas subject to moisture. Set screws shall have hardened points. Cast fittings are unacceptable.
5. Surface mounted rectangular steel raceways and boxes; use for all surface mounted installations, unless otherwise noted (all catalog numbers listed are Wiremold - equals allowed) - color Ivory, unless otherwise noted;
 - a. #V500 for branch power runs on ceilings and walls (used with V500 series straps, elbows, connectors and V5000 series low profile boxes and covers).
 - b. #2000 or 2400 low profile for larger power run requirements on ceiling or walls (used with V2000 series straps, elbows, connectors and low profile boxes and covers).
 - c. #2400D for dual service power and tel/data run requirements (used with divided V2400 boxes and covers).
6. Surface mounted rectangular non-metallic dual service raceways; Wiremold #5400 (Ivory) or equal with all required compatible activation covers, bezels, inserts, and blank plates for a complete installation. Refer to drawings for outlet quantities in raceway and feed points. All raceway fed flush from rear with horizontal j-boxes, unless otherwise noted.
7. Use flexible conduit for all motor, transformer and recessed fixture connections, minimum ½"; "Seal tite" type used outdoors and in all wet locations, provide with code size (minimum No. 12) bare ground wire in all flexible conduit.
8. All conduit cuts (factory or field cut) shall be perfectly square to the length of the conduit and cut ends shall be reamed with a reaming tool to provide a smooth edge to the passing conductors and to remove all burs and scrapes. Use of a hand file is not acceptable.
9. All electrical raceways shall be installed concealed, unless otherwise noted. Cut and patch to facilitate such installation to match adjacent and original finish. All exposed conduits, where required, shall be installed parallel to building members.
10. All emergency source circuits shall be installed in separate raceways (from normal power), per 2014 NEC 700.10(B), or the applicable code at the time of permitting.
11. Where existing conditions preclude the installation of EMT in existing walls to remain, provide and install cut-in type boxes and "fish" flexible MC or flex conduit and wire through existing walls to remain, unless shown otherwise on plans.
12. Fasten conduits securely to boxes with locknuts and bushings to provide good electrical continuity.
13. Provide chrome escutcheon plates at all exposed wall, ceiling and floor conduit penetrations.
14. Support individual suspended conduits with heavy malleable strap or rod hangers; supports for ½ inch or ¾ inch conduit placed on maximum 7-foot centers; maximum 10-foot centers on conduits 1 inch or larger.
15. Support multiple conduit runs from Kindorf B907 channels with C-105 and C-106 straps.
16. Conduit bends - long radius.
17. Flash conduits through roof, using approved roof jack; coordinate with General Contractor.
18. To facilitate pulling of feeder conductors, install junction boxes as shown or required.
19. All empty conduits on the project shall be provided with a nylon pull rope to allow pulling of future conductors intended for the specific raceway. Provide plastic wire-tie style nameplate tags on each end of pull rope with printed identification of conduit use

- and the location of the opposite end of the rope. Pull ropes for telephone and cable tv service conduits shall meet the respective utility company requirements.
20. Where conduits pass through structural expansion joints in floor slab, rigid galvanized conduit shall be used 18" on either side of joint, complete with Appleton expansion couplings and bonding jumpers, or equal. All above grade expansion joint crossings shall also utilize expansion joint couplings or flex conduit transitions as required for each particular installation. Installed condition shall allow for a minimum deflection of raceway and wire (in any direction) equal to the structural expansion joint dimension (building to building). No solid conduits shall be allowed to cross expansion joints without proper provisions for building and seismic movement.
 21. Minimum cover of conduits in ground outside of building - 36 inches, unless otherwise noted.
 22. Provide and install exterior wall conduit seals and cable seals in the locations listed below. Coordinate installation and scheduling with other trades:
 - a. Conduit seals through exterior wall or slab (below grade): O.Z. Gedney series "FSK" in new cast in concrete locations, series "CSM" in cored locations.
 - b. Conduit seals through exterior wall or slab (above grade): O.Z. Gedney series "CSMI."
 - c. Cable seals at first interior conduit termination after entry through exterior wall or slab: O.Z. Gedney series "CSBI." Coordinate quantity of conductors at each location.
- F. Outlet Boxes and Junction Boxes. Verify all backbox requirements with devices to be installed prior to rough-in.
1. One piece steel knockout type drawn boxes, unless otherwise noted, sized as required for conditions at each outlet or as noted.
 2. Flush-mounted boxes equipped with galvanized steel raised covers for device mounting flush with finished surface. Provide extension rings as required on all acoustical or additional wall treatment areas to bring top of cover flush with finished surface (coordinate with architectural drawings). Devices shall be capable of being tightly mounted to boxes without distorting or bending device or mounting hardware.
 3. Boxes for fixture outlets: 4-inch octagon or larger as required, or as noted.
 4. Switch and receptacle outlets - not smaller than 4-inch-square in furred walls, with raised cover for single device; ganged where required.
 5. Outlet and switch boxes for wet locations, cast aluminum FS or FD type with cast aluminum gasketed spring lid cover. Weatherproof "Bell" type boxes are not acceptable.
 6. All connectors from conduit to junction or outlet boxes shall have insulated throats. Connectors shall be manufactured with insulated throats as integral part. Insertable insulated throats are unacceptable.
 7. Outlet boxes for cable TV, telephone, 4" square or larger as required or noted, multi-ganged for telephone, data, and other services where indicated on the drawings.
 8. Conduit Bodies: Malleable iron type, with lubricated spring steel clips over edge of conduit body, O-Z/Gedney type EW, or equal.
 9. Pull boxes: All site pull boxes shall be flush in-ground concrete, with engraved covers identifying service use (i.e. electrical, communications, etc.). Boxes shall be Nema 250, Type 6, outside flanged, with recessed cover for flush mounting, by Christy or equal, with required depth to provide box and conduit depths shown or required.
 - a. Provide concrete covers for all boxes in planted or paved areas (up to available concrete cover size).
 - b. Provide galvanized steel covers for all larger boxes (when concrete is not available), or in traffic areas. No cast iron covers.

- c. Provide bolted covers and slab bottoms (with grouted perimeter) or vault type boxes for all electrical distribution and signal system pull boxes used for site distribution, to prevent rodent entry. No collar type boxes with dirt or gravel bottoms
 - d. Provide drain hole at bottom of all vault type boxes, with loose aggregate base below, for proper drainage.
 - e. All covers to be completely flush with finished adjacent surfaces.
 - f. Provide galvanized steel H20 rated covers and installation of box rated for H20 in all traffic areas.
 - g. Provide pullboxes per utility company specifications for all electrical primary and secondary services and for cable TV and telephone service runs. Verify exact size and type prior to order with each utility company.
- G. Wire and Cable (line voltage and signal systems):
1. 600-volt class where used for or run with line voltage power wiring, insulation color coded, minimum No. 12 awg for power branch circuits, No. 14 for power control circuits, and wiring size and type as directed by signal system manufacturer for each signal system.
 2. All conductors shall be copper.
 3. Size and insulation type:
 - a. Standard locations: #12 to #1 AWG: THWN for wet locations and THHN for dry locations. #1/0 through #4/0 AWG: XHHW (55 Mils). 250MCM and larger: XHHW (65 Mils). All wire sizes used shall be based on a 75 degree insulation rating, unless specifically used with 90 degree rated breakers and devices.
 - b. All wiring (power and signal) installed underground between buildings, or in wet or damp locations, shall be outside listed and rated for wet locations.
 - c. High temperature and non-standard locations: Provide wire type and insulation category suitable for area of use as defined in NEC table 310-13.
 4. Conductors No. 8 and larger and as otherwise noted on drawings shall be stranded. Conductors No. 10 and smaller shall be solid.
 5. Provide signal system wiring for each system to meet the system manufacturers requirements and recommendations for each device or equipment type. Signal wiring systems shall be provided with shielding and/or insulation type and cable quantities as directed by the manufacturer, and meet all NEC requirements for locations used.
 6. Install all wiring branch circuits and feeders (low voltage and line voltage) in conduit unless noted otherwise in the drawings. Contractor shall mandrel all feeders and pass a "sock" (or utilize other suitable means) through each raceway prior to pull to remove all water and construction debris. All raceways shall be completely clear of any obstructions or debris and all cut ends shall be reamed, prior to pull. Utilize pulling compound on all runs to insure minimum friction and pulling tension.
 7. Megger test all feeders prior to energizing. See section 26 08 00 for additional information.
 8. Approximately balance branch circuits about the neutral conductors in panels.
 9. Connections to devices from "thru-feed" branch circuit conductors to be made with pigtails, with no interruption of the branch circuit conductors.
 10. Neutral conductor identified by white outer braid, with different tracers of "EZ" numbering tags used where more than one neutral conductor is contained in a single raceway.
 11. Neatly arrange and "marlin" wires in panels and distribution panelboards with "T and B Ty-rap" or approved equal plastic type strapping.
 12. All wire and cable shall bear the Underwriters' Label, brought to the job in unbroken packages; wire color-coded as follows:

Voltage	Phasing	A	B	C	N
120/208	3PH4W	Black	Red	Blue	White

26 2700 - BASIC ELECTRICAL MATERIALS AND

2083PH	3W	Black	Red	Blue	--
277/480	3PH4W	Brown	Orange	Yellow	White
4803PH	3W	Brown	Orange	Yellow	--

13. The equipment grounding conductor shall be insulated copper; where it is insulated, the insulation shall be colored green.
 14. Label each wire of each electrical system in each pull box, junction box, outlet box, terminal cabinet, and panelboard in which it appears with "EZ" numbering tags indicating the connected circuit numbers.
 15. Provide permanently affixed adhesive labels with machine printed lettering (min. 1/8" high) at junction boxes serving fixtures that are supplied by (2) electrical sources (i.e. normal and emergency lighting). Label to read "CAUTION - This light fixture is powered by (2) separate sources. The normal power source breaker and the emergency power source breaker must be turned off before servicing this light fixture."
 16. Install feeder cables in one continuous section unless splices are approved by Architect. Exercise care in pulling to avoid damage or disarrangement of conductors, using approved grips. No cable shall be bent to smaller radius than the spool on which it was delivered from the manufacturer. Color code feeder cables at terminals. Provide identifying linen tags in each pullbox.
- H. Switches: Model numbers are Hubbell, color to be selected by architect, unless otherwise noted. All switches to utilize screw terminals for wire connections - no plug-in terminations:
1. Single Pole - No. HBL1221
 2. Two Pole - No. HBL1222
 3. Three Way - No. HBL1223
 4. Keyed, - No. HBL1221L
 5. Motor Rated Double Pole (30A) - Hubbell No. 7832
 6. Motor Rated Three Pole (30A) - Hubbell No. 7810.
 7. Low voltage Data line switches - Refer to lighting control system (for compatability)
- I. Receptacles: Mounting straps and contacts shall be one piece design, constructed of minimum .050" solid brass. Base shall be high strength, heat resistant, glass reinforced nylon. Device shall accept up to #10 wire, side or back wired with screw terminals - no plug-in terminations. Hubbell, Leviton, Pass & Seymore, or equal. Color to be selected by architect, unless otherwise noted. Numbers listed below are Hubbell:
1. 15A 3PG 125 volt duplex - No. HBL5262
 2. 20A 3PG 125 volt duplex - No. HBL5362
 3. 20A 3PG 125 volt ground fault interrupter receptacle; GFI receptacles shall conform to the 2006 UL requirements to a) interrupt power to the unit in the event of internal failure, or b) provide an audible or visual indication of internal failure of the GFI; No. GF20 or equal. Through wiring to down stream GFI designated receptacles is not acceptable.
 4. 15A 3PG 125 volt half controlled duplex receptacle - No. BR15C1(color), with premanent "controlled" marking, factory applied.
 5. 20A 3PG 125 volt half controlled duplex receptacle - No. BR20C1(color), with premanent "controlled" marking, factory applied.
 6. 15A 3PG 125 volt full controlled duplex receptacle - No. BR15C2(color), with premanent "controlled" marking, factory applied.
 7. 20A 3PG 125 volt full controlled duplex receptacle - No. BR20C2(color), with premanent "controlled" marking, factory applied.
 8. GFI Module (blank face), no indicator light, 20A - No. GFBF20 or equal.
 9. All receptacles located in exterior or wet locations shall be corrosion resistant with UV stabalized body.
- J. Plates: Leviton, or equal, except as noted:

1. The color of all faceplates shall match the color of the devices installed under/in the faceplate, except as specifically noted otherwise.
 2. For flush outlet boxes, for switches, and receptacles: nylon, color to be selected by architect, unless otherwise noted.
 3. Plates for surface-mounted outlets: galvanized steel unless otherwise noted.
 4. Weatherproof duplex receptacle plates for exterior locations with ground fault interrupter receptacles in type FS or FD boxes – Hubbell #WPFS26 or compatible equal. Verify cover compatibility with box type and device installed.
 5. Weatherproof "in-use" cover, vertical or horizontal mount, for exterior with GFCI receptacles. Die-cast metal alloy, TayMac MX series or equal with openings to match installed devices.
 6. Locking plates for duplex receptacles where noted; Pass & Seymour #WP26-L (non weather proof).
 7. Locking plates for duplex exterior GFCI receptacles (or in wet or damp locations); Heavy duty cast aluminum flush cover with locking latch and key, Pass & Seymour #4600 with appropriate mounting plate for type of device installed. Coordinate backbox requirements and finished wall trim-out with wall installer prior to rough-in to insure an adequate and neat trim appearance upon completion.
 8. Plates for flush telephone / data boxes: white nylon or as otherwise directed - provide and install at each telephone / data outlet plate to match duplex power outlet plate, for jack installation by others. Where the power and telephone / data outlet boxes are shared the plate shall be continuous in multi-gang locations. See drawings.
- K. Equipment Disconnects: All disconnects shall be located to allow proper code required clearance in each area. Locations shown on drawings are diagrammatic only. The contractor shall coordinate exact locations in the field (with other trades) prior to rough-in to insure proper clearances.
1. Motor Disconnect Switches and Safety Switches: General Electric Company Heavy Duty Type "THD", cover interlocked with operating handle so that cover cannot be opened with switch in closed position and switch cannot be closed with cover in open position. 240V or 480V rating, single or multi-pole as required or as noted on drawings, in Nema 1 enclosure indoors or Nema 3R enclosure outdoors unless otherwise noted. Provide dual element motor circuit fuses sized as recommended by equipment manufacturer (for final equipment actually installed).
 2. Code required disconnects: Provide a local disconnect in addition to the branch circuit protection device for all equipment as required by code (whether shown or not). Disconnects shall consist of a motor rated switch (or disconnect) for all motor loads less than 3/4HP or other suitable disconnect sized to match branch circuit conductors and load current of equipment, with number of poles as required.
- L. Lugs and Connectors: Thomas and Betts "lock-tite", for No. 4 and larger wire; 3M "Scotchlock" fixed spring screw-on type wire connectors with insulator for No. 6 and smaller wire.
1. All splices shall be made up with screw-on type connectors - no plug-in or push-in style connectors acceptable. Wires shall be solidly twisted together with electricians pliers before screw-on connector is installed to ensure a proper connection in the event of wire nut failure. No exceptions.
 2. Connectors listed or labeled for "no wire twisting required" are not an acceptable substitute for actual wire twisting.
 3. Utilize porcelain type connectors in all high temperature environments (above 105 degrees Celsius).
- M. Splice Insulation: "Scotch" electrical tape with vinyl plastic backing or rubber tape with protective friction tape for interior work.

1. Splices in electrical cables of 600 volt insulation class in underground system duct shall be made only in accessible locations such as pullboxes, light pole handholes, etc., using a compression connector on the conductor and by insulating and waterproofing (for exterior and underground locations) by one of the following methods:
 - a. Cast type splice insulation shall be provided by means of a molded casting process employing a thermosetting epoxy resin insulating material which shall be applied by a gravity poured method or by a pressure injected method. The component materials of the resin insulation shall be in a packaged form ready for convenient mixing after removing from the package. Do not allow the cables to be removed until after the splicing material has completely set.
 - b. Gravity poured method shall employ materials and equipment contained in an approved commercial splicing kit which includes a mold suitable for the cables to be applied. When the mold is in place around the joined conductors, the resin mix shall be prepared and poured into the mold. Do not allow cables to be moved until after the splicing materials have completely set.
- N. Identification: Refer to Section 26 05 00.
- O. Firestopping: as manufactured by 3M Fire Protection Products or equal.
 1. Fire-rated and smoke barrier construction: Maintain barrier and structural floor fire and smoke resistance ratings including resistance to cold smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and sound vibration absorption, and at other construction gaps.
 2. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that it conforms to the construction type, penetration type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall penetrations. Systems or devices must be asbestos free.

PART 3 - EXECUTION

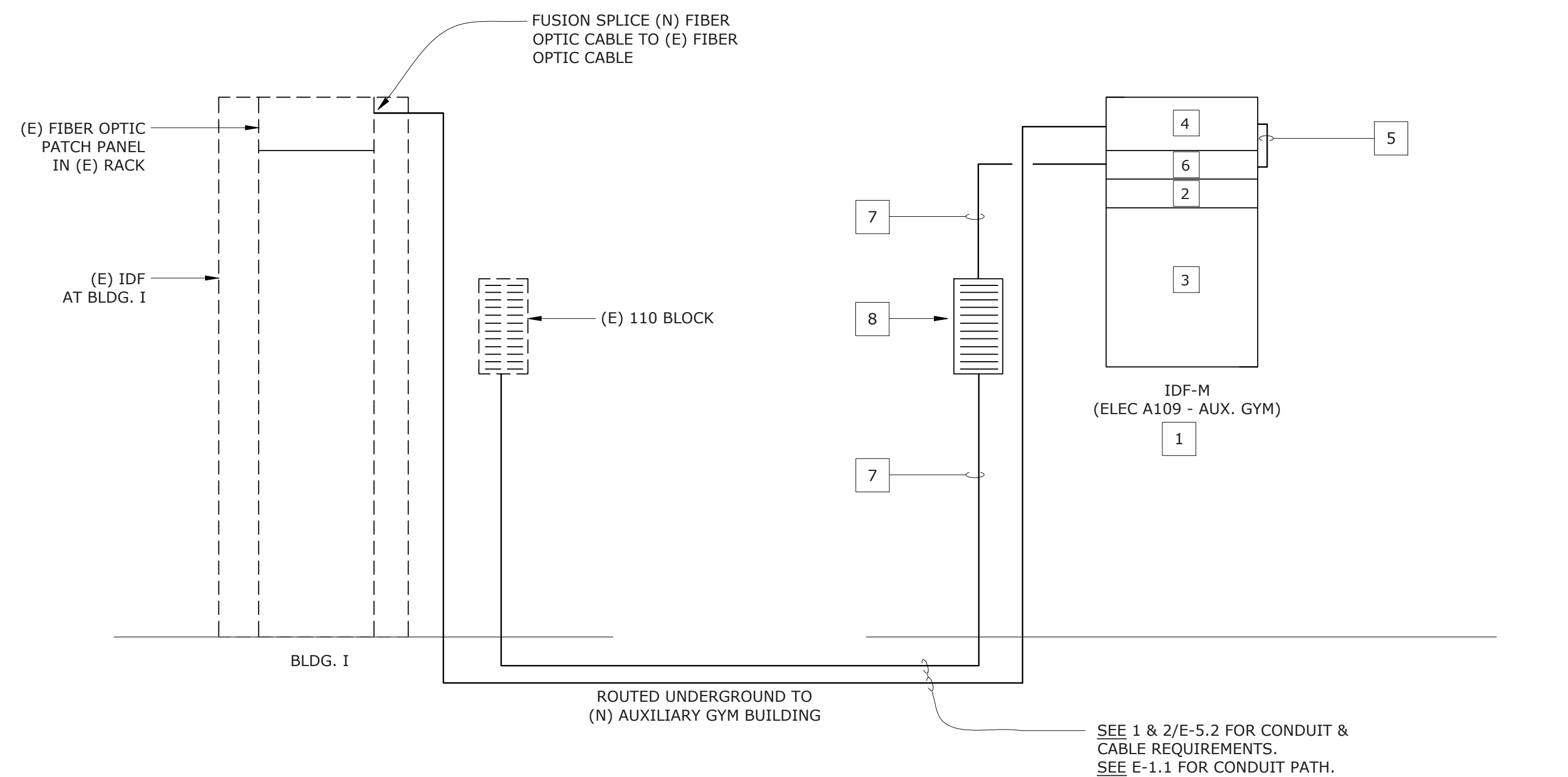
3.01 REFER TO BASIC ELECTRICAL REQUIREMENTS - SECTION 26 05 00 FOR WORK UNDER THIS SECTION.

3.02 TESTS

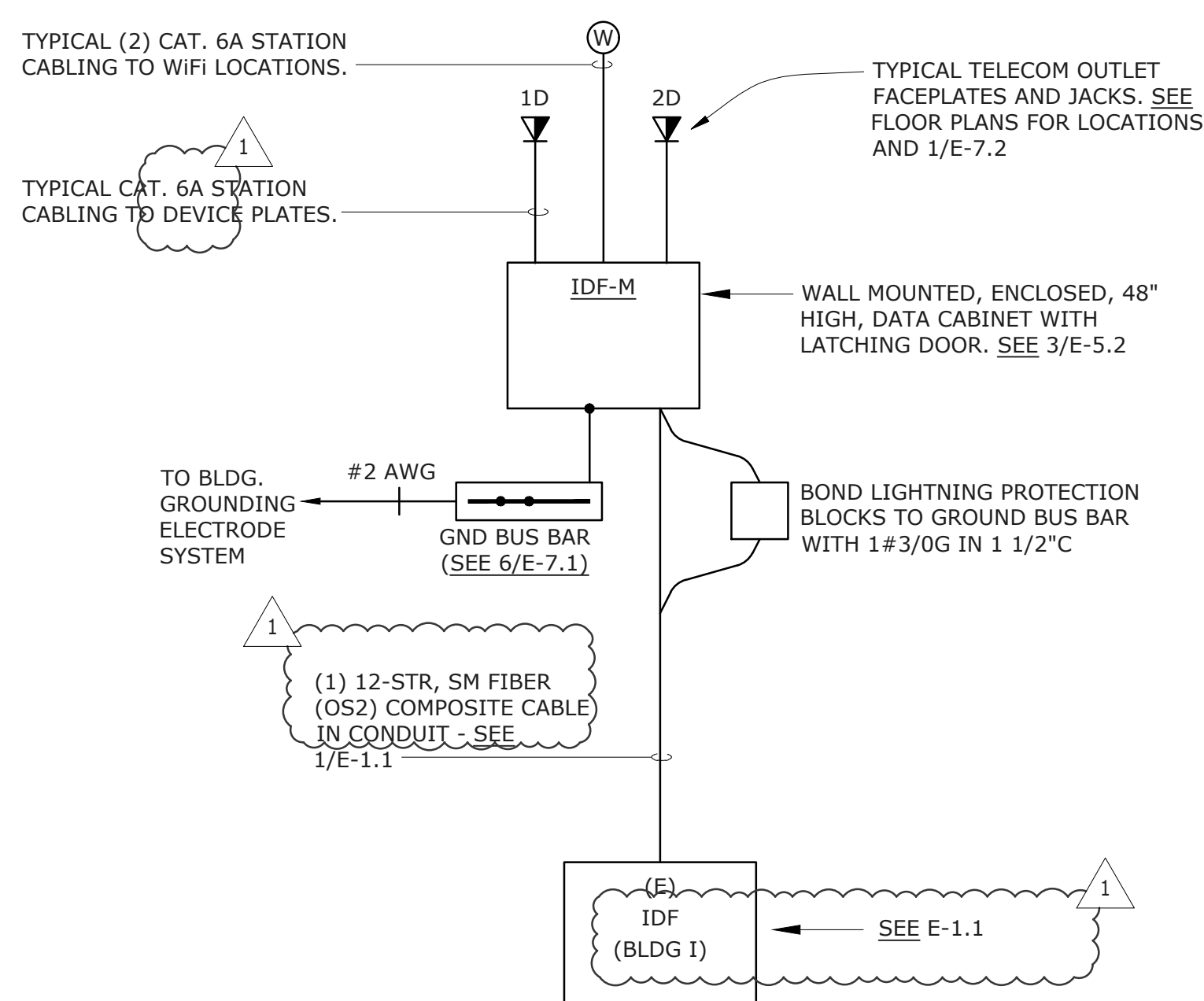
- A. Testing and Inspection: See Section 26 08 00 - Testing.

END OF SECTION

DATA EQUIPMENT LIST		
1	WALL MOUNTED, ENCLOSED, 48" HIGH, DATA CABINET WITH LATCHING DOOR	SEE SPECIFICATIONS
2	WIRE MANAGEMENT	SEE SPECIFICATIONS
3	ACTIVE DISTRICT NETWORK EQUIPMENT	BY NETWORK INTEGRATOR OR OWNER
4	FIBER OPTIC PATCH PANEL	SEE SPECIFICATIONS
5	CATEGORY 6A MODULAR PATCH CORDS	SEE SPECIFICATIONS
6	CATEGORY 6A PATCH PANEL	48-PORT MODULAR TO 110 - SEE SPECIFICATIONS
7	25-PAIR FEEDER CABLE WITH FEMALE AMP END/ PIGTAIL TO 110 BLOCKS	CABLE EXCHANGE #253-X90-50F
8	110 BLOCK FOR COPPER PAIR TERMINATIONS	SEE SPECIFICATIONS



TYPICAL TELECOM CABINET ELEVATIONS



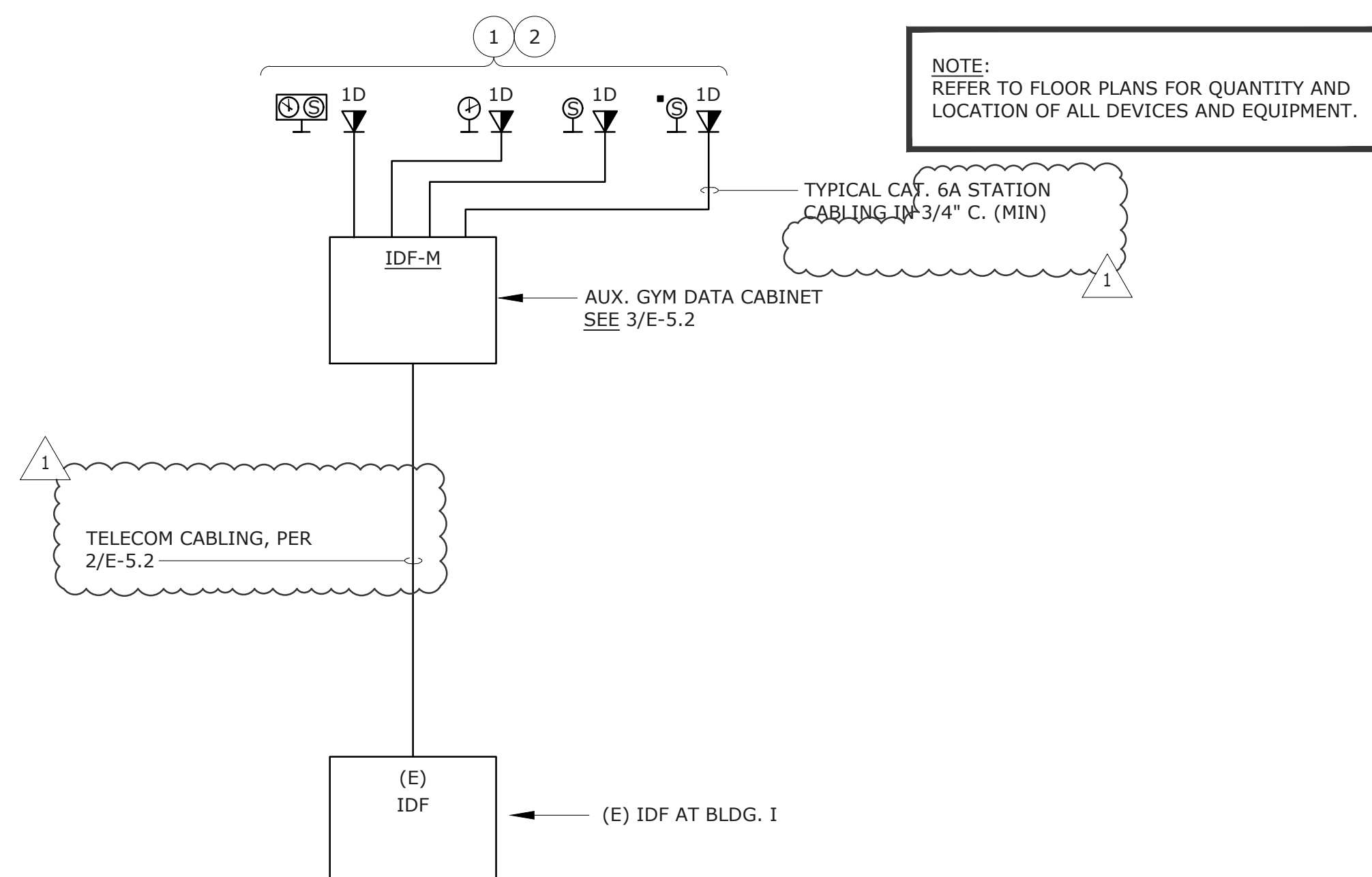
IP TELEPHONE AND DATA SYSTEM RISER DIAGRAM

GENERAL CLOCK/SPEAKER NOTES

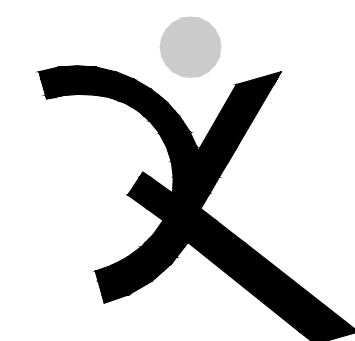
1. ALL CLOCK/SPEAKER DEVICES SHALL BE IP. ALL BACKBOXES AND DEVICES ARE OWNER FURNISHED, CONTRACTOR INSTALLED ('OFCT'). ALL CABLING AND JACKS BY CONTRACTOR.
2. ALL SYSTEM PROGRAMMING MODIFICATIONS TO THE EXISTING PA AND CLOCK SYSTEM TO ACCOMMODATE THESE ADDITIONS WILL BE PROVIDED BY THE DISTRICT.
3. THE EXISTING SYSTEM IS A CISCO INFORMACAST SYSTEM.

SIGNAL SYSTEM NUMBERED NOTES

- 1 TELECOM CABLEING TO BE FULLY TERMINATED ON JACKS AND LOCATED AT A CONCEALED LOCATION FOR CABLE PATCHING TO CLOCK/SPEAKER DEVICE. PROVIDE QUANTITIES AS SHOWN ON THE FLOOR PLANS AND DIAGRAMS. COORDINATE EXACT LOCATION AND REQUIREMENTS PRIOR TO ROUGH-IN.
- 2 DATA JACK SYMBOLS NOT SHOWN ON FLOOR PLANS FOR CLOCK/SPEAKER DEVICES, ONLY THE CLOCK/SPEAKER SYMBOL. CONTRACTOR SHALL PROVIDE AND INSTALL ALL JACKS, PER THE REQUIREMENTS OF NUMBERED NOTE 1, IN QUANTITIES AS SHOWN ON THE FLOOR PLANS AND DIAGRAMS.



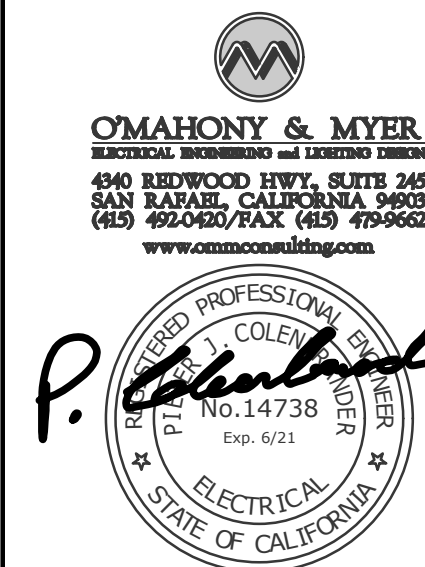
CLOCK / SPEAKER SYSTEM RISER DIAGRAM



**QUATTROCCHI KWOK
ARCHITECTS**

Main Office:
636 Fifth Street, Santa Rosa, CA 95404

East Bay:
55 Harrison Street, Suite 525
Oakland, CA 94607
(707) 576-0829



**FREEDOM
HIGH SCHOOL**

NEW AUXILIARY GYMNASIUM

1050 NEROLY RD,
OAKLEY, CA 94561

LIBERTY UNION
HIGH SCHOOL
DISTRICT[illegible]

DSA APP NO. 01-119278

ARCH PROJECT NO: 1869.00

DRAWN BY: LN,TV,JW,OOM

DRAWING SCALE: AS NOTED

PTN: 61721-78 FILE NO: 7-H4

CONSTRUCTION DOC.

MAY 5, 2021

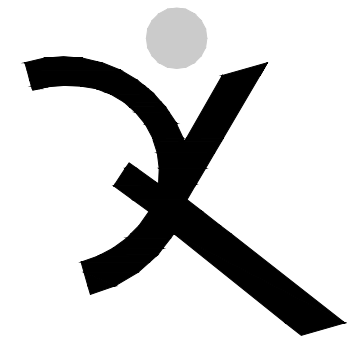
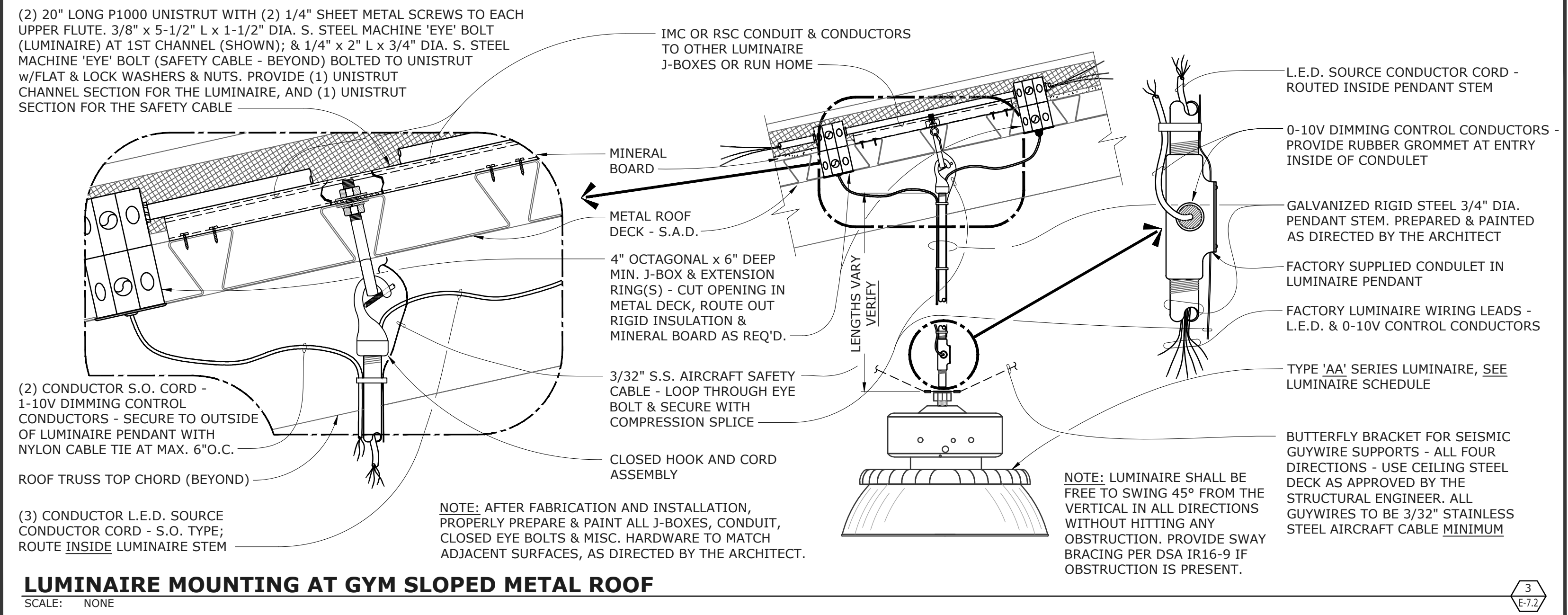
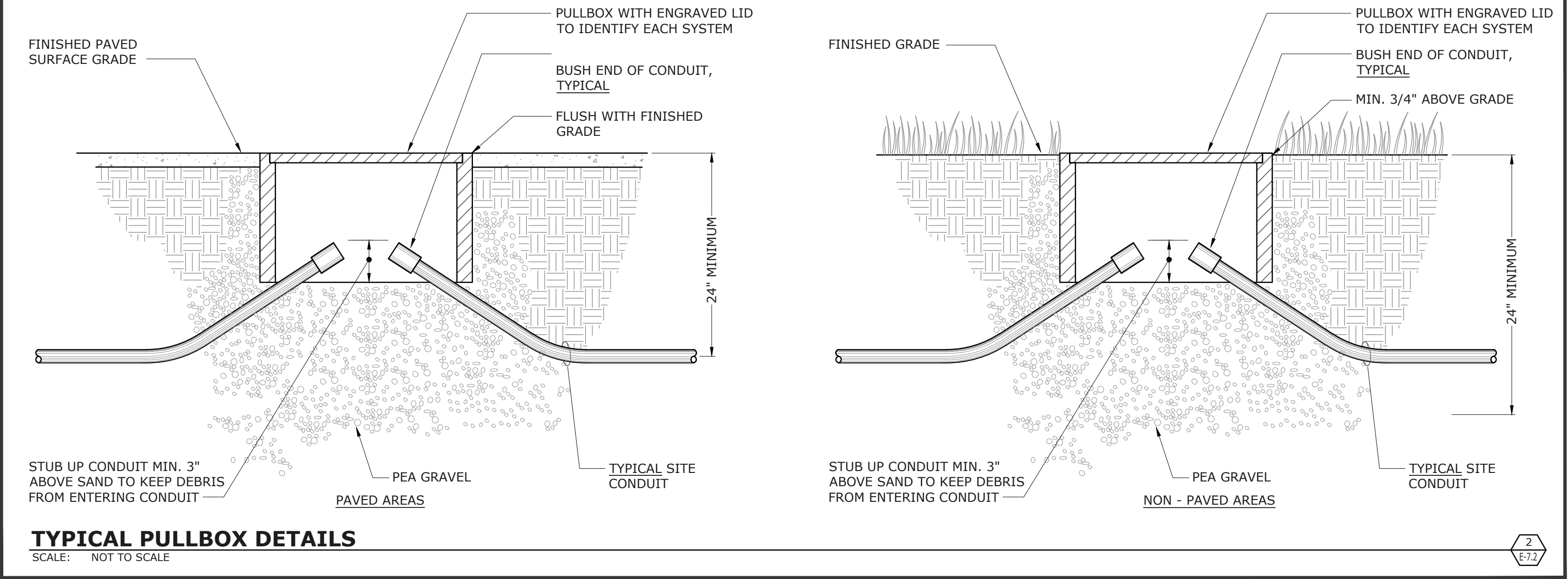
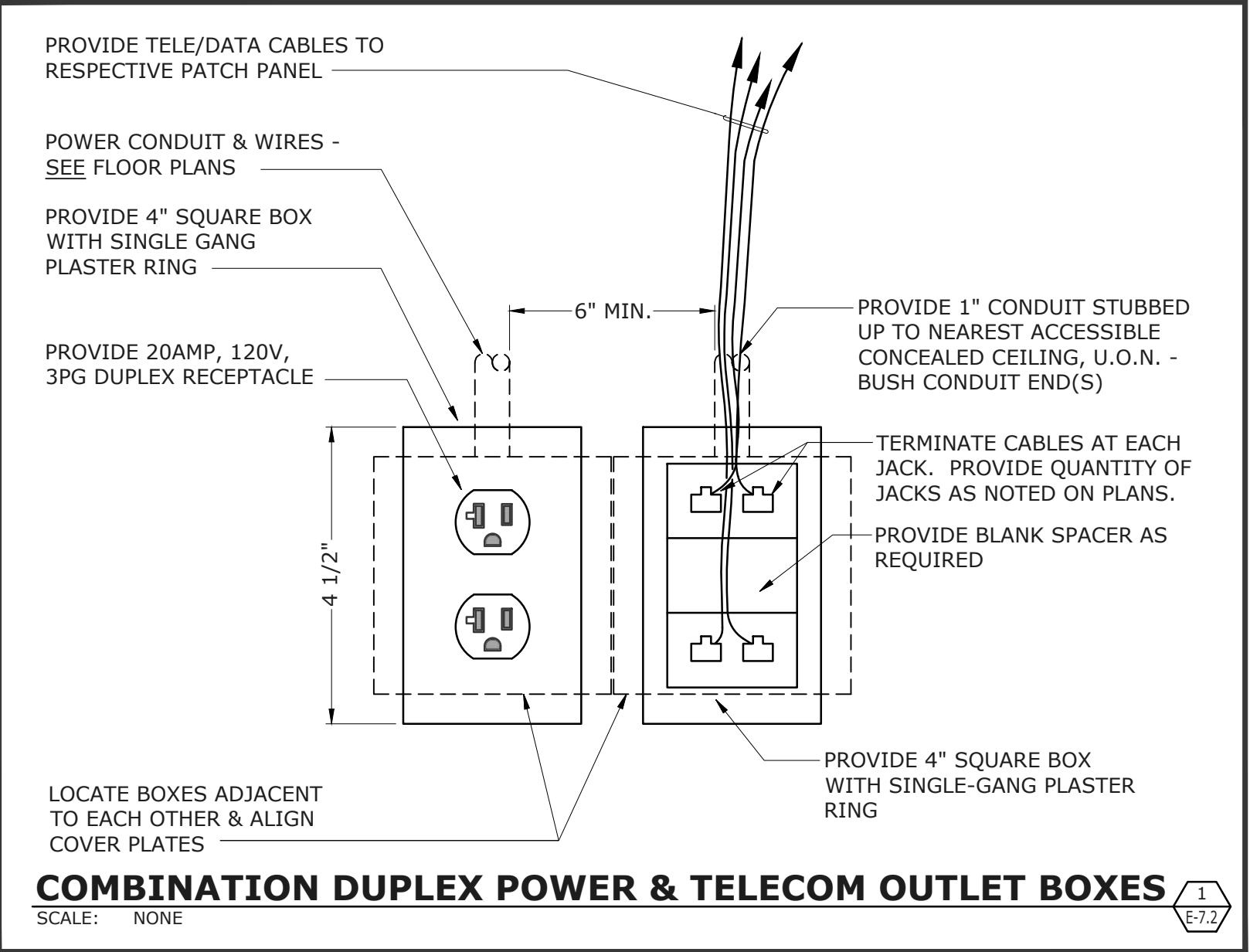
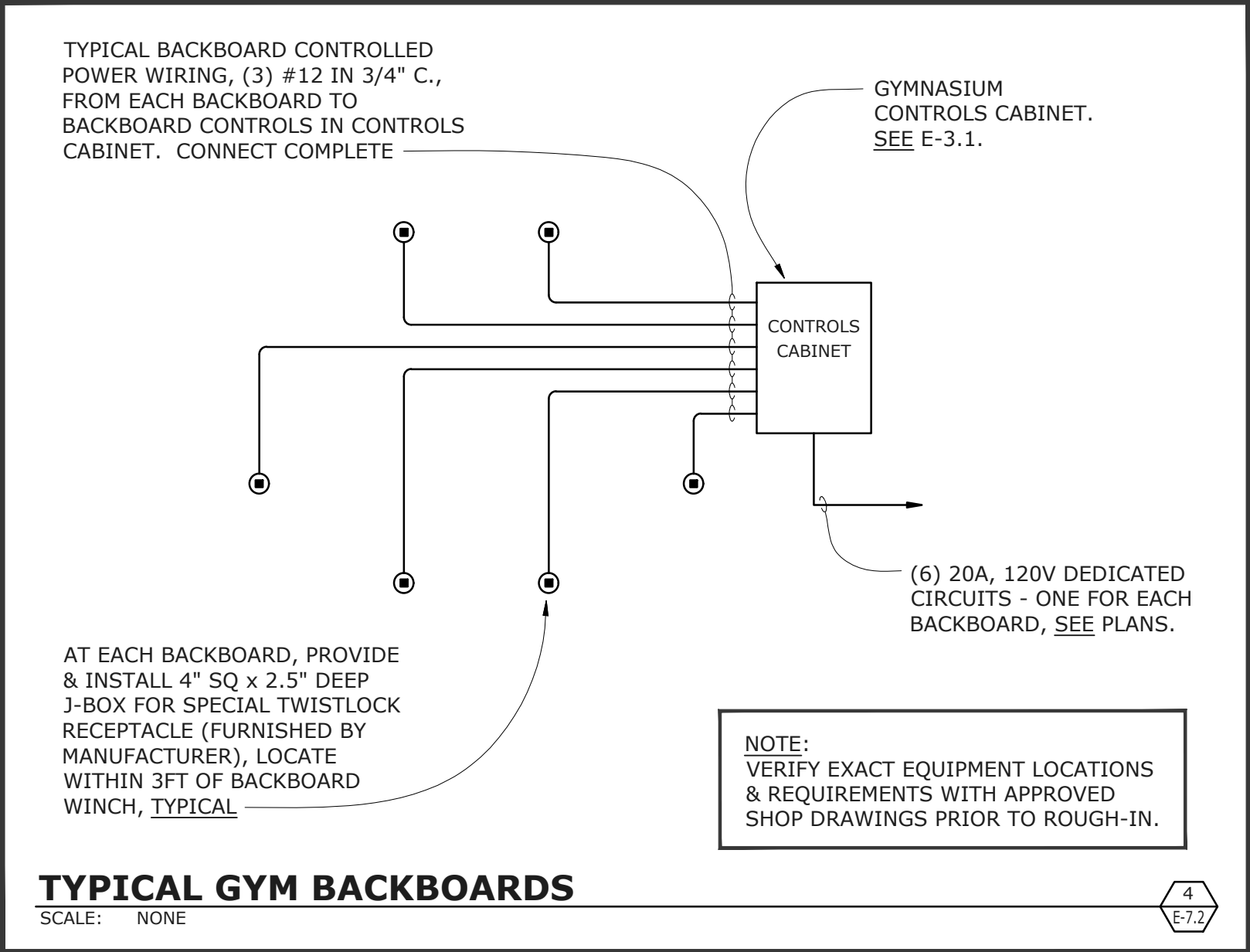
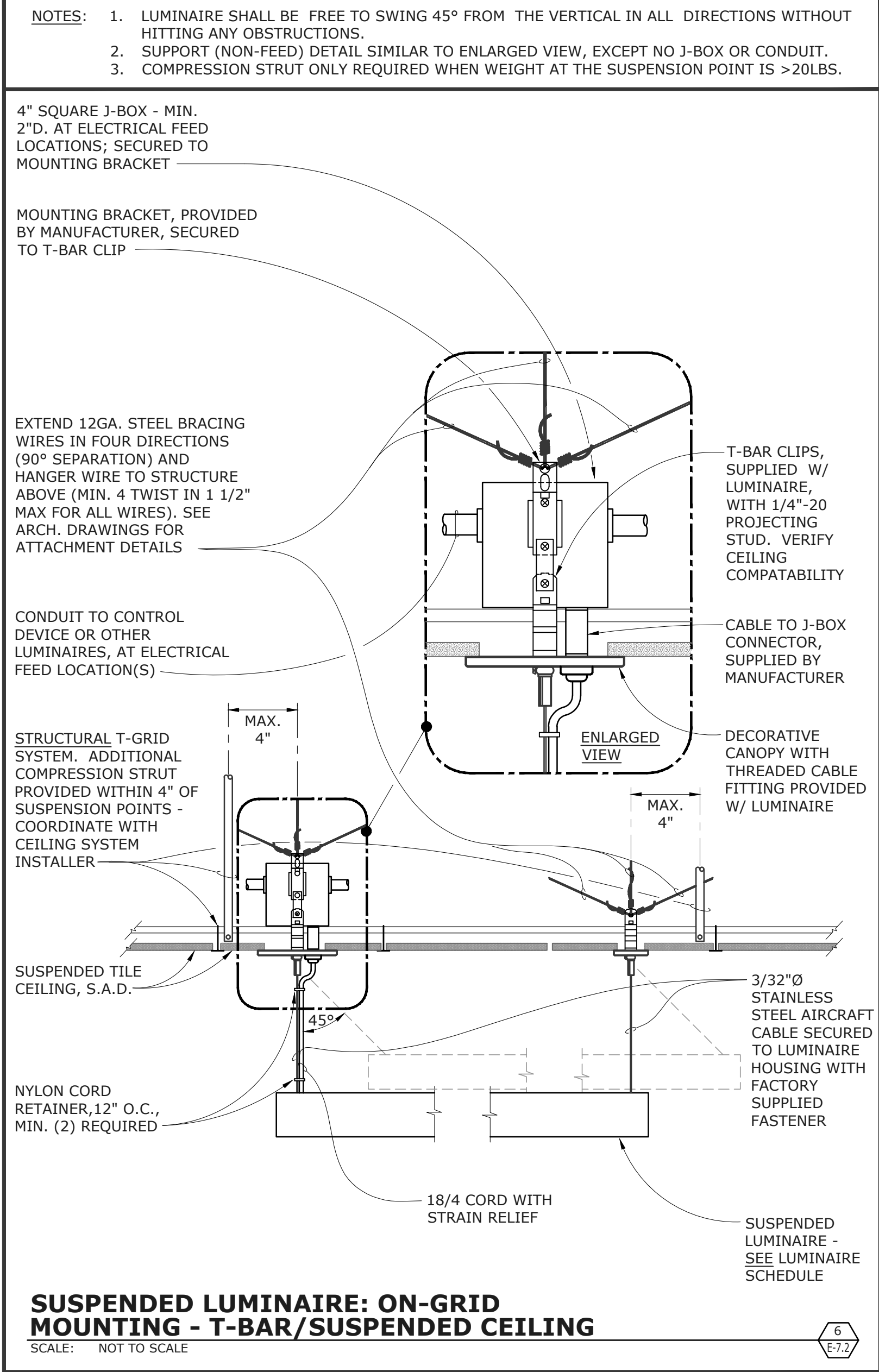
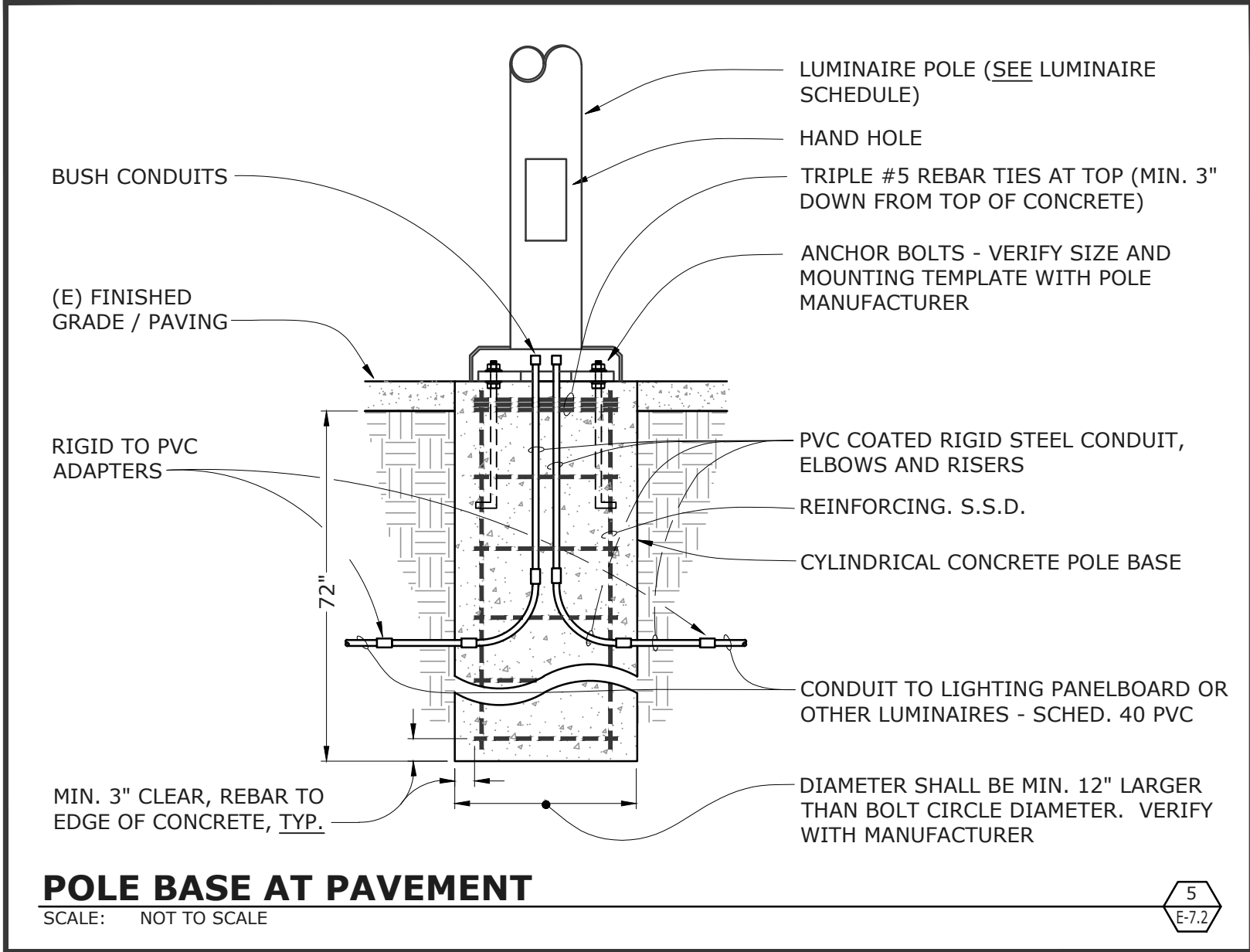
SHEET TITLE

SINGLE LINE DIAGRAMS - SIGNAL

SHEET NUMBER

ADDENDUM 01

E-5.2



QUATTROCCHI KWOK ARCHITECTS
Main Office:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525
Oakland, CA 94607
(707) 576-0829



O'MAHONY & MYER
ELECTRICAL, MECHANICAL AND PLUMBING CONSULTANTS
490 REDWOOD HWY., SUITE 245
SAN RAFAEL, CALIFORNIA 94903
(415) 492-0800 / FAX (415) 492-0666
www.ommconsulting.com
P. O'Mahony
REGISTERED PROFESSIONAL ELECTRICAL ENGINEER
No. 14738
Exp. 6/31
ELECTRICAL ENGINEER
STATE OF CALIFORNIA

FREEDOM HIGH SCHOOL

NEW AUXILIARY GYMNASIUM

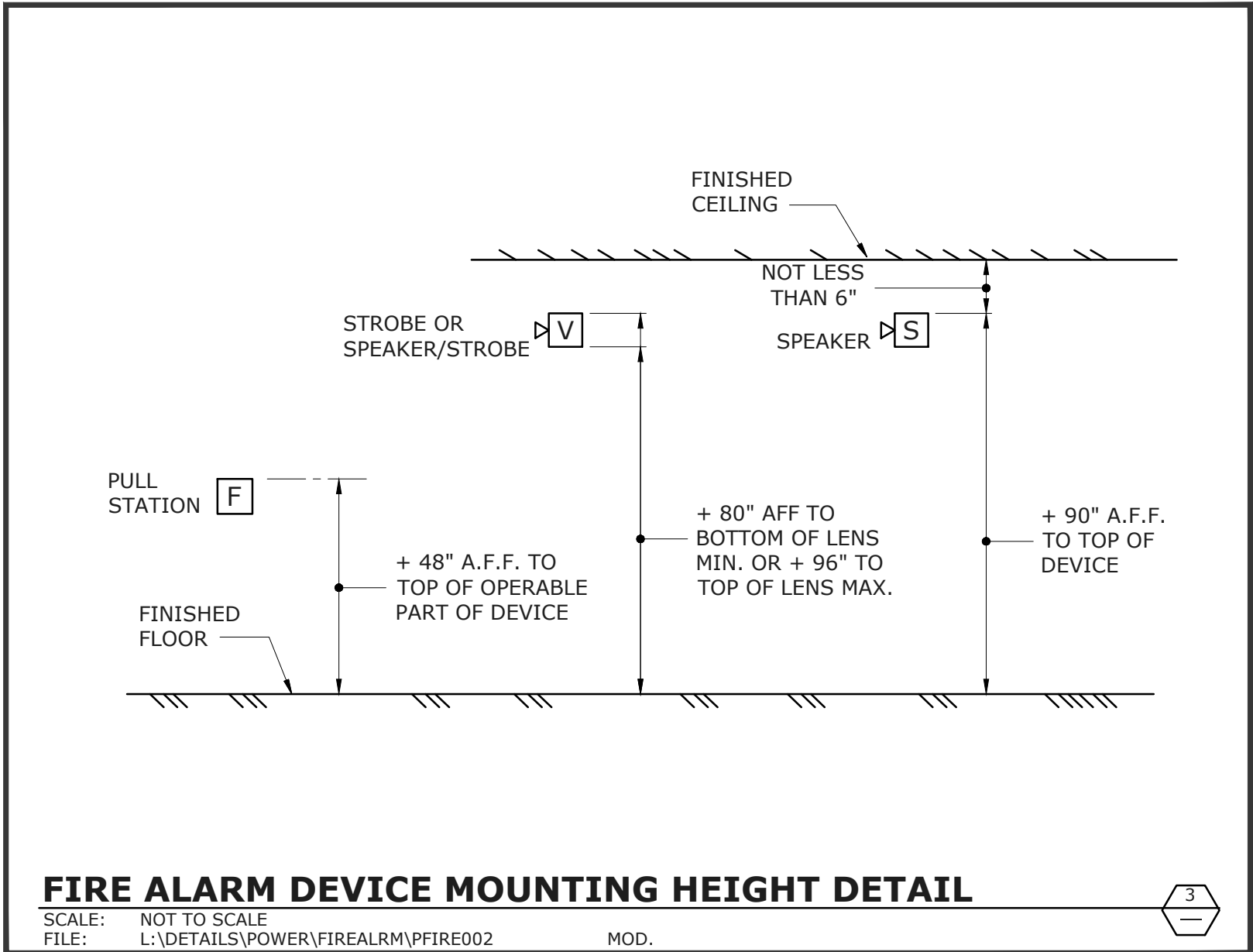
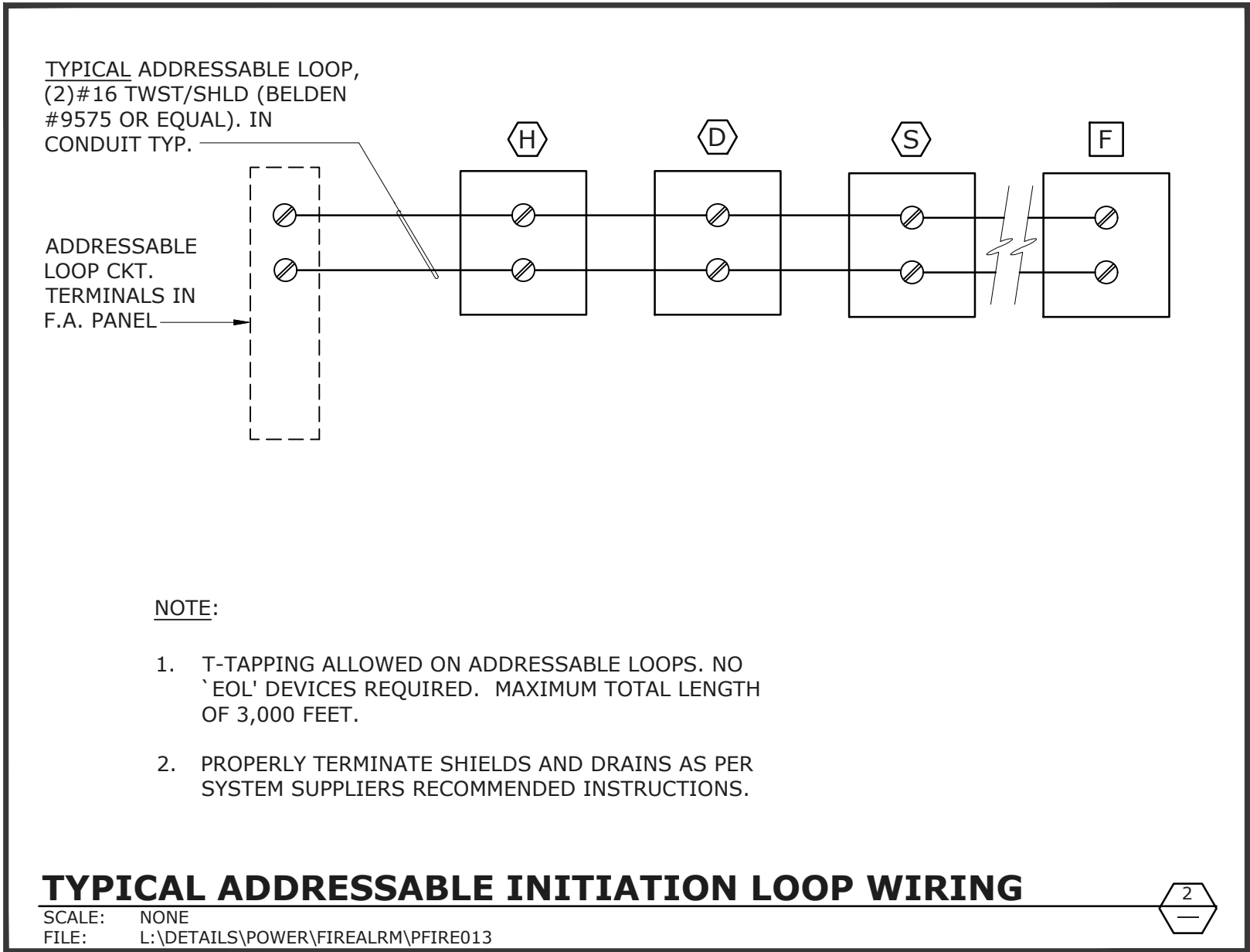
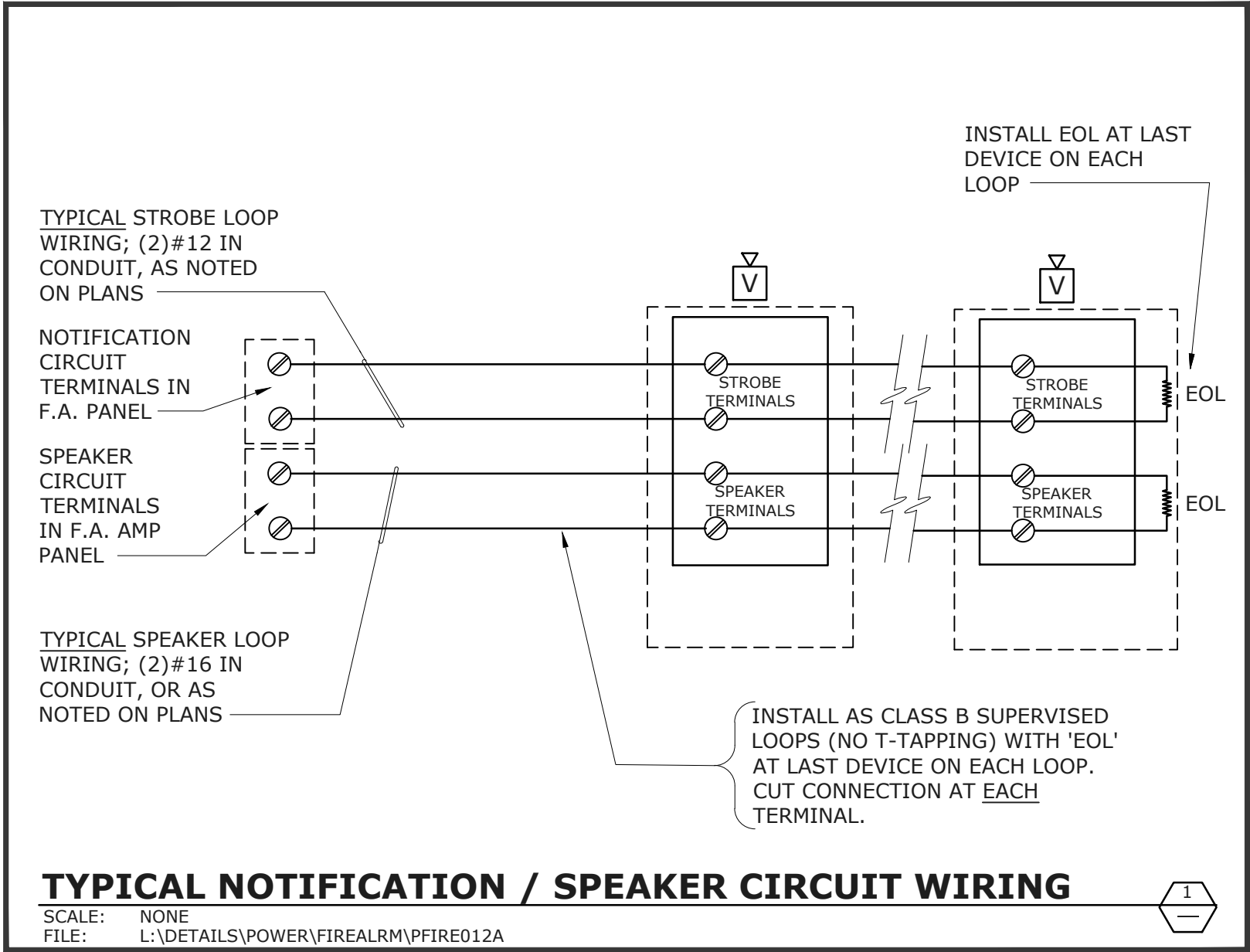
1050 NEROLY RD,
OAKLEY, CA 94561

LIBERTY UNION HIGH SCHOOL DISTRICT

REVISIONS		
△	05-12-21	ADDENDUM 1
DSA APP NO. 01-119278		
ARCH PROJECT NO:	1869.00	
DRAWN BY:	LN,TV,JVL,DOM	
DRAWING SCALE:	AS NOTED	
PTN: 61721-78	FILE NO: 7-H4	
CONSTRUCTION DOC.		
MAY 5, 2021		
SHEET TITLE		

DETAILS

SHEET TITLE
ADDENDUM 01
ADDENDUM 01
E-7.2



FIRE ALARM WIRING LEGEND		
TAG	DESCRIPTION	CABLING
A	INITIATION CIRCUIT	(2) #16 TWISTED/UNSHIELDED
B	STROBE NOTIFICATION CIRCUIT(S)	(2) #12 THHN/THWN
C	SPEAKER NOTIFICATION CIRCUIT(S)	(2) #16 TWISTED/SHIELDED
D	SPEAKER NOTIFICATION CIRCUIT - SITE DIST.	(2) #14 TWISTED/SHIELDED
E	TRANSPONDER NETWORKING	(2) #16 TWISTED/SHIELDED + (2) #14 THHN/THWN
F	BEAM DET. CONTROL WIRING	(1) #14 2-CORE SHIELDED CABLE
G	CONSTANT 24V SUPPLY	(2) #14 THHN/THWN
NOTE: CONTRACTOR SHALL VERIFY EXACT CABLE/WIRE TYPES WITH SYSTEM MANUFACTURER PRIOR TO ROUGH-IN.		

- ### GENERAL FIRE ALARM NOTES
- FINAL FIRE ALARM TEST SHALL BE MADE WITH THE DSA INSPECTOR OF RECORD (IOR). LOCAL FIRE AUTHORITY SHALL BE NOTIFIED OF DATE AND TIME OF FINAL ALARM TESTING AND SHALL ASSIST/WITNESS SUCH TESTING WHEN ABLE. DSA/ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF (48) HOURS PRIOR TO THE FINAL INSPECTION AND/OR TESTING.
 - FIRE ALARM CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2. MONITORING SHALL BE TESTED AND VERIFIED AS SENDING THE CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT AND/OR PROVISIONS.
 - UNDERGROUND AND EXTERIOR CONDUITS SHALL HAVE WATERTIGHT FITTINGS.
 - FIRE ALARM DEVICE MOUNTING HEIGHTS:

PULL STATION: 48" TO TOP OF OPERATOR ABOVE FINISHED FLOOR.

HORN INTERIOR: 90" MIN. TO TOP OF DEVICE ABOVE FINISHED FLOOR, OR 100" MAX TO TOP OF DEVICE, BUT NOT LESS THAN 6" FROM CEILING.

WALL MOUNTED STROBE OR HORN/STROBE: BETWEEN 80" TO BOTTOM OF DEVICE LENS TO +96" TO TOP OF DEVICE LENS ABOVE FINISH FLOOR, BUT NOT LESS THAN 6" FROM CEILING.
 - AUDIBLE FIRE ALARM SYSTEM LEVEL SHALL BE AT LEAST 15dBA ABOVE THE AVERAGE AMBIENT SOUND LEVEL IN ALL OCCUPIABLE AREAS, OR 5 dBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, MEASURED AT 5 FEET ABOVE THE FLOOR. AUDIBLE SIGNALS SHALL NOT BE LESS THAN 75dBA AT 10 FEET, OR MORE THAN 110dBA AT THE MINIMUM HEARING DISTANCE.
 - AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL THREE DISTINCTIVE FIRE ALARM SOUND PER NFPA 72.
 - APPLICABLE CODES:
 - CBC 2019; CEC 2016; CMC 2016; CFC 2016.
 - STATE FIRE MARSHAL TITLE 19, PUBLIC SAFETY.
 - NFPA 72, 2016 EDITION W/CA AMENDMENTS, FIRE ALARM CODE.
 - STROBES SHALL FLASH AT A RATE NOT EXCEEDING TWO FLASHES PER SECOND, AND NOT LESS THAN ONE FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELA. VISUAL DEVICES WITHIN 55 FEET OF EACH OTHER SHALL BE SYNCHRONIZED.
 - FIRE ALARM CONTRACTOR SHALL PROVIDE A COPY OF NFPA 72 SYSTEM RECORD OF COMPLETION, SYSTEM RECORD OF INSPECTION AND TESTING, AND THE "EMERGENCY COMMUNICATIONS SUPPLEMENTARY RECORD OF COMPLETION", TO THE INSPECTOR OF RECORD IOR/DSA, SCHOOL DISTRICT, ARCHITECT AND LOCAL FIRE AUTHORITY.
 - POWER SERVICE TO THE FACP, REMOTE POWER SUPPLIES, AND CENTRAL STATION AUTO DIALER SHALL BE ON A DEDICATED BRANCH CIRCUIT WITH A RED MARKING AND IDENTIFIED AS "FIRE ALARM CIRCUIT CONTROL".
 - INSTALL ALL WIRING IN CONDUIT, MIN. 3/4" CONDUIT. ALL FIRE ALARM SYSTEM WIRING SHALL BE FPL (FIRE POWER LIMITED) OR FPLP (FIRE POWER LIMITED PLENUM RATED) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
 - CONDUIT AND WIRING SHALL BE PER MANUFACTURERS REQUIREMENTS.
 - ALL FIRE ALARM COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS SPECIFICATIONS. NO SINGLE DEVICES/EQPT. SHALL EXCEED 20LBS. WITHOUT SPECIAL MOUNTING DETAILS.
 - INSTALLATION OF SYSTEM SHALL NOT BE STARTED UNTIL COMPLETE SET OF CONSTRUCTION DOCUMENTS (WITH DEVICE TYPES AND LISTINGS) HAVE BEEN REVIEWED AND APPROVED BY DSA.
 - A STAMPED SET OF APPROVED PLANS SHALL BE ON THE JOB SITE AT ALL TIMES AND SHALL BE USED FOR INSTALLATION.
 - ANY DISCREPANCIES BETWEEN THE CONTRACT DOCUMENTS AND CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND ARCHITECT/ENGINEER OF RECORD.
 - THE CONTRACTOR SHALL INSTALL AND ADJUST ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
 - SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1 FOOT FROM FIRE SPRINKLER HEADS OR 3 FEET FROM ANY SUPPLY DIFFUSER. IN AREAS OF CONSTRUCTION OR POSSIBLE DAMAGE /CONTAMINATION, INSTALLED DEVICES SHALL BE COVERED UNTIL AREA IS READY TO BE TURNED OVER TO THE OWNER.
 - PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE ALARM DEVICE. DO NOT SPLICE WIRE. THERE MUST BE AT LEAST 6" OF WIRE LEAD FROM THE BOX TO THE DEVICE. ALL BOXES TO BE SIZED PER CEC FOR PROPER VOLUME WITH INSTALLED WIRING AND DEVICES.
 - SUPERVISING STATION: AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72, AS AMENDED BY CFC CHAPTER 80. THE SUPERVISION STATION SHALL BE LISTED AS EITHER UJFX OR UJJS BY UNDERWRITERS LABORATORY OR SHALL MEET THE REQUIREMENTS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011.
 - A DOCUMENTATION CABINET SHALL BE INSTALLED ADJACENT TO THE FACP IN THE MAIN ELECTRICAL ROOM (NFPA 72, 7.7.2.1). SPACE AGE ELECTRONICS INC, ACERBOX FAD SERIES (#SSU0685 OR EQUAL).
 - ALL RECORD DOCUMENTATION SHALL BE STORED IN THE DOCUMENTATION CABINET (NFPA 72, 7.7.2.3): PROVIDE NAMEPLATE "FIRE ALARM SYSTEM RECORD DOCUMENTS" (NFPA 72, 7.7.2.5).
 - FIRE ALARM MANUAL PULLSTATIONS SHALL MEET THE CALIFORNIA ACCESSIBILITY REQUIREMENTS OUTLINED IN THE CBC ("CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST. THE FORCE TO ACTIVATE THE CONTROLS SHALL BE NO GREATER THAN 5 POUNDS OF FORCE". REFER TO DSA ACCESSIBILITY STAFF FOR QUESTIONS OR CLARIFICATION.)

FIRE ALARM EQUIPMENT LIST					
SYMBOL	DESCRIPTION	MANUFACTURER & MODEL NUMBER	CSFM LISTING NUMBER	STANDBY CURRENT	ALARM CURRENT
FAEVP	(E) FIRE ALARM VOICE EVAC CONTROL PANEL WITH DIGITAL AUDIO CONTROLLER, AMPLIFIER & MICROPHONE	SIMPLEX 4100ES	7165-0026:0251	373mA 200mA	470mA 250mA
FAEP	FIRE ALARM MINIPLEX TRANSPONDER	SIMPLEX 4100-9600	7165-0026:0251	87mA	87mA
M	ADDRESSABLE MONITOR MODULE W/ EOLR	SIMPLEX 4090-9001	7300-0026:0223	-	5.10mA
R	ADDRESSABLE RELAY MODULE	SIMPLEX 4090-9002	7300-0026:0223	-	-
S	ADDRESSABLE PHOTOELECTRIC SMOKE DETECTOR	SIMPLEX 4098-9714	7272-0026:0218	0.40mA	1mA
CB	ADDRESSABLE CARBON MONOXIDE DETECTOR BASE	SIMPLEX 4098-9771	7300-0026:0330	1mA	17mA
-	DETECTOR BASE	SIMPLEX 4098-9792	7300-0026:0217	-	-
B	PROJECTED BEAM DETECTOR TRANSMITTER/RECEIVER WITH ADDRESSABLE SYSTEM CONTROLLER	SIMPLEX 4098-9019	7260-1508:0104	8.50mA	8.50mA
B	PROJECTED BEAM SMOKE DETECTOR - REFLECTOR	(UNIT INCLUDED WITH TRANSMITTER/RECEIVER)	-	-	-
SP	VISUAL STROBE, WALL MOUNT, SELECTABLE CANDELA UL 1971 PUBLIC MODE NOTIFICATION	SIMPLEX 4906-9103	7125-0026:0316 15cd 30cd 75cd 110cd	- 0mA 0mA 0mA 0mA	- 53mA 84mA 165mA 224mA
VS	COMBINATION VISUAL STROBE AND SPEAKER, WALL MOUNT, SELECTABLE CANDELA UL 1971 PUBLIC MODE NOTIFICATION, VISUAL DEVICE	SIMPLEX 4906-9153 (1/2 WATT TAP)	7320-0026:0247 STROBE CKT: 15cd STROBE CKT: 30cd STROBE CKT: 75cd STROBE CKT: 110cd	- 0mA 0mA 0mA 0mA	- 53mA 84mA 165mA 224mA
SS	EXTERIOR AUDIBLE SPEAKER WITH WEATHER-PROOF BACKBOX	WHEELLOCK #ET-1010R (1W TAP)	7320-0785:0105	0mA	7mA

NOTE:
DETECTOR SUBSCRIPTS:
"c" - DETECTOR IN ACCESSIBLE CEILING SPACE
"p" - DETECTOR WITHIN 38° OF PEAK

- ### FIRE ALARM SYSTEM DESCRIPTION
- THE FIRE ALARM SYSTEM SHALL BE AN AUTOMATIC ADDRESSABLE SYSTEM WITH STYLE 4, CLASS B WIRING FOR NAC'S AND SLC'S TO MATCH EXISTING.
 - CIRCUIT PATHWAY SURVIVABILITY SHALL BE LEVEL 1.
 - PROVIDE AND INSTALL NEW EQUIPMENT, DEVICES AND REQUIRED MODULES FULLY COMPATIBLE WITH (E) FACP AND PROVIDE CONNECTIONS COMPLETE FOR A FULLY FUNCTIONING NETWORKED FIRE ALARM SYSTEM.
 - THE NEW FIRE ALARM SYSTEM INCLUDES EMERGENCY VOICE / ALARM COMMUNICATION REQUIREMENTS.
 - THE NAME OF THE SPECIFIC PERSON RESPONSIBLE FOR THE SYSTEM DESIGN IS "CHRIS LIPPINCOTT" (OMAHONY & MYER).
 - SYSTEM INSTALLATION SHALL BE BY A LICENSED ELECTRICAL OR FIRE ALARM CONTRACTOR WITH A CALIFORNIA C-10 LICENSE, REGULARLY ENGAGED IN THE INSTALLATION AND COMMISSIONING OF FIRE ALARM SYSTEMS TO NFPA 72 STANDARDS. INSTALLING CONTRACTOR'S NAME AND CONTACT INFORMATION SHALL BE LISTED IN THE NFPA CLOSE OUT DOCUMENTATION AT COMPLETION OF PROJECT.

- ### FIRE ALARM SCOPE OF WORK
- TERMINATE EACH NOTIFICATION LOOP TO THE FAEP OR RAMP AS SHOWN ON PLANS AND RISER DIAGRAM.
 - TERMINATE EACH INITIATION LOOP AT THE FAEP AS SHOWN ON PLANS AND RISER DIAGRAM.
 - IDENTIFY FIRE ALARM CIRCUITS AT TERMINAL AND JUNCTION LOCATIONS TO PREVENT INTERFERENCE WITH THE FIRE ALARM SYSTEM WHEN OTHER ADJACENT SYSTEMS ARE BEING TESTED OR SERVICED.
 - PROVIDE A COMPLETE NETWORK FIRE ALARM SYSTEM, INCLUDING REMOTE POWER SUPPLY TERMINAL CABINETS, EXPANDER PANELS, OUTLETS, DEVICES AND WIRING FOR THE FACILITY AS SHOWN.
 - FINAL SYSTEM PROGRAMMING SHALL BE DONE BASED ON ACTUAL PHYSICAL ROOM NAMES AND NUMBERS USED AT THE SITE (IF DIFFERENT FROM THE ROOM NAMES OR NUMBERS SHOWN ON THE APPROVED PLANS).

- ### SEQUENCE OF OPERATION
- MANUAL PULL STATION - WHEN A PULL STATION IS PULLED, IT SHALL ANNUNCIATE AN ALARM AT THE FACP. ALARM SHALL ACTIVATE ALL AUDIO AND VISUAL DEVICES THROUGHOUT THE CAMPUS.
 - SMOKE AND HEAT DETECTORS - WHEN A SMOKE OR HEAT DETECTOR IS ACTIVATED, IT SHALL ANNUNCIATE AN ALARM AT THE FACP. ALARM SHALL ACTIVATE ALL AUDIO AND VISUAL DEVICES THROUGHOUT THE CAMPUS.
 - ANY BUILDING POWER FAILURE- IF THE BUILDING LOSES POWER, THE FAILURE SHALL SHOW UP AS A TROUBLE SIGNAL ON THE FACP. THE SYSTEM SHALL STAY ACTIVE ON BATTERY BACK-UP POWER IN ACCORDANCE WITH THE STATE FIRE CODE.
 - SYSTEM SHALL INDICATE TROUBLE ALARMS FOR ALL SYSTEM FAULTS (i.e. GROUND FAULTS, SHORTS, OPEN CIRCUITS, BATTERY DISCONNECT, ETC.).
 - FIRE SPRINKLER SYSTEM - WHEN A FLOW SWITCH IS ACTIVATED, IT SHALL ANNUNCIATE AN ALARM AT THE MAIN FACP. ALARM SHALL ACTIVATE ALL AUDIO AND VISUAL DEVICES THROUGHOUT THE CAMPUS. WHEN TAMPER SWITCH IS ACTIVATED, IT SHALL ANNUNCIATE A SUPERVISORY ALARM AT THE MAIN FACP.
 - UPON ALARM CONDITION, AUTO DIALER TO NOTIFY THE SUPERVISING STATION, AND AUTHORIZED SCHOOL PERSONNEL TO NOTIFY THE FIRE DEPARTMENT AND INITIATE EVACUATION OF STUDENTS AND FACULTY AS PER THE SCHOOL'S EVACUATION PLAN.
 - UPON TROUBLE CONDITION, AUTO DIALER TO NOTIFY THE SUPERVISING STATION, AND AUTHORIZED SCHOOL PERSONNEL TO NOTIFY AUTHORIZED TECHNICIAN TO CORRECT THE TROUBLE CONDITION.
 - UPON CO DETECTION, IT SHALL ANNUNCIATE AN ALARM AT THE FACP AND REMOTE ANNUNCIATOR ONLY AND SHALL ACTIVATE THE CO DETECTOR SOUNDER BASE WITH TEMPORAL 4 FORM IN THE CLASSROOM. SCHOOL PERSONNEL TO NOTIFY THE OCCUPANTS, IMMEDIATELY AND INITIATE EVACUATION OF STUDENTS & FACULTY.

QUATTROCCHI KWOK ARCHITECTS
Main Office:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525
Oakland, CA 94607
(707) 576-0829

OMAHONY & MYER
ELECTRICAL ENGINEERING AND CONSULTING, INC.
490 REDWOOD HWY, SUITE 245
SAN RAFAEL, CALIFORNIA 94903
(415) 492-0807 / FAX (415) 494-0668
www.omahonyandmyer.com

FREEDOM HIGH SCHOOL

NEW AUXILIARY GYMNASIUM

1050 NEROLY RD,
OAKLEY, CA 94561

LIBERTY UNION HIGH SCHOOL DISTRICT

REVISIONS

△	05-12-21	ADDENDUM 1

DSA APP NO. 01-119278

ARCH PROJECT NO: 1869.00

DRAWN BY: LN.TV,JVLLOOM

DRAWING SCALE: AS NOTED

PTN: 61721-78 FILE NO: 7-H4

CONSTRUCTION DOC.

MAY 5, 2021

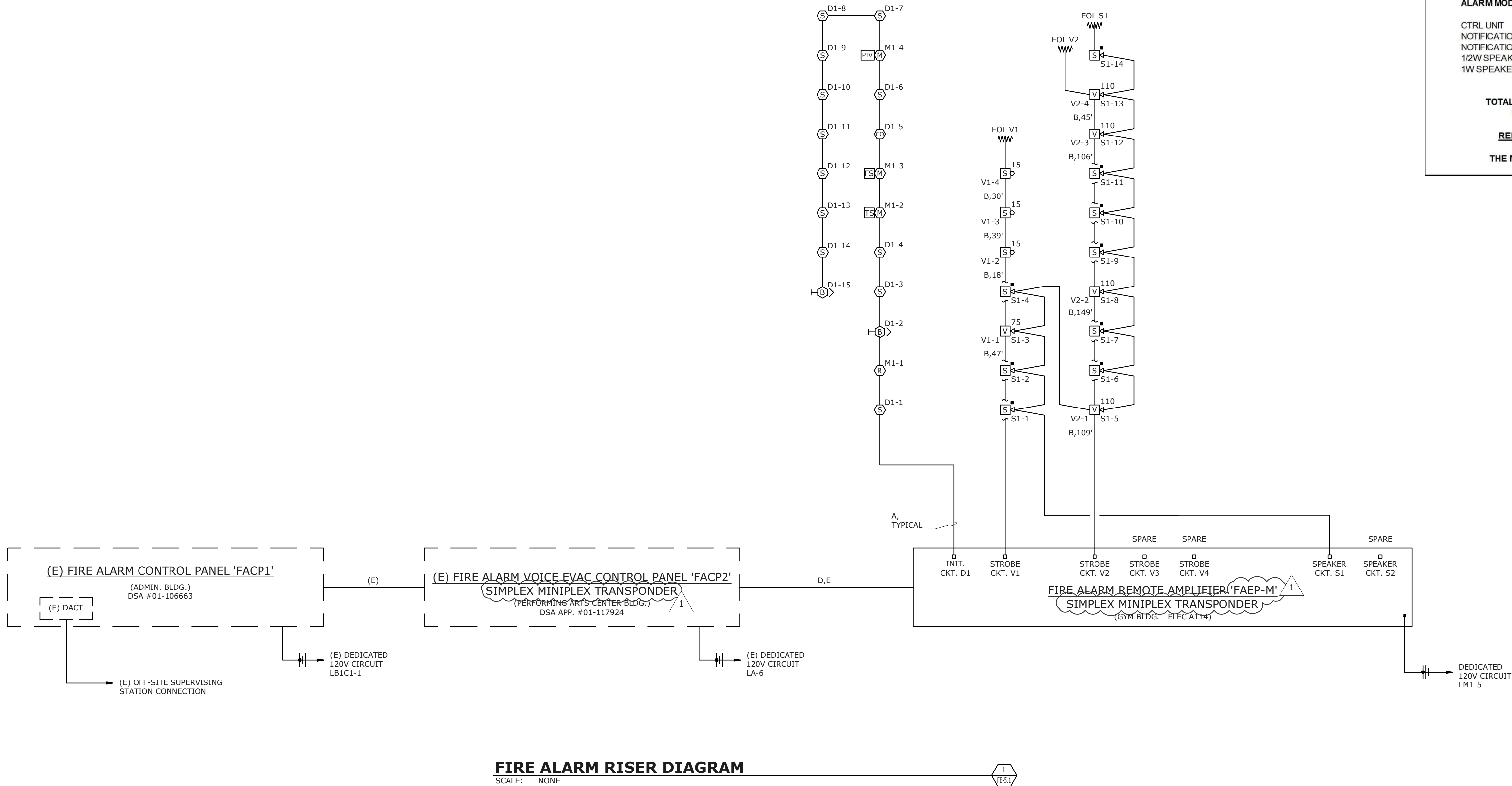
SHEET TITLE

FIRE ALARM EQUIPMENT LIST, NOTES & DETAILS

SHEET NUMBER

ADDENDUM 01

FE-0.1



VOLTAGE DROP CALCULATIONS

FIRE ALARM EXPANDER PANEL 'RAMP-G'

SIGNAL CIRCUIT:	V1				
TOTAL CKT CURRENT =	0.329 A				
MAX VOLT-DROP =	0.46%				
SYSTEM VOLTAGE =	20.4 V				
Device Address-->	V1-1	V1-2	V1-3	V1-4	
Type of Device -->	75spstr	15str	15str	15str	eol
Current of Device (Amp) -->	0.165	0.053	0.053	0.053	0.005
Size of Wire (AWG) -->	#12	#12	#12	#12	#12
Distance to each Device (Ft) -->	47	18	39	30	5
Current Total (Amp) -->	0.329	0.164	0.111	0.058	0.005
Device Volt-drop -->	0.29%	0.35%	0.43%	0.46%	0.46%
Device Volt -->	20.3	20.3	20.3	20.3	20.3

SIGNAL CIRCUIT:	V2				
TOTAL CKT CURRENT =	0.901 A				
MAX VOLT-DROP =	4.87%				
SYSTEM VOLTAGE =	20.4 V				
Device Address-->	V2-1	V2-2	V2-3	V2-4	
Type of Device -->	110spstr	110spstr	110spstr	110spstr	eol
Current of Device (Amp) -->	0.224	0.224	0.224	0.224	0.005
Size of Wire (AWG) -->	#12	#12	#12	#12	#12
Distance to each Device (Ft) -->	109	149	106	45	5
Current Total (Amp) -->	0.901	0.677	0.453	0.229	0.005
Device Volt-drop -->	1.86%	3.77%	4.68%	4.87%	4.87%
Device Volt -->	20.0	19.6	19.4	19.4	19.4

BATTERY CALCULATIONS: FIRE ALARM VOICE EVAC PANEL 'FACP2'

STANDBY MODE	EA (A)	QTY	CURRENT
(E) CONTROL UNIT/LOADS	0.573	2	1.146
(E) ANNUNCIATOR	0.087	1	0.087
(E) DETECTORS, MODULES & REMOTE MIC	0.080	1	0.080
DETECTOR	0.0004	13	0.005
CO DETECTOR	0.0010	1	0.001
TOTAL STANDBY CURRENT =	1.319 A		
REQUIRED (24 HOURS) =	31.655 AH		

ALARM MODE	EA (A)	QTY	CURRENT
(E) CONTROL UNIT/LOADS	0.720	2	1.440
(E) ANNUNCIATOR	0.087	1	0.087
(E) DETECTORS, MODULES & REMOTE MIC	0.006	1	0.006
DETECTOR	0.001	0	0.000
CO DETECTOR	0.017	0	0.000
MODULES	0.032	8	0.256
1/2W SPEAKERS	0.064	1	0.064
DETECTORS	0.006	13	0.078
CO DETECTOR	0.017	1	0.017
MODULES	0.005	4	0.020
TOTAL ALARM CURRENT =	1.968 A		
REQUIRED (15 MIN) =	0.492 AH		

TOTAL POWER REQUIRED WITH 120%
BATTERY DERATING FACTOR = 38.576 AH

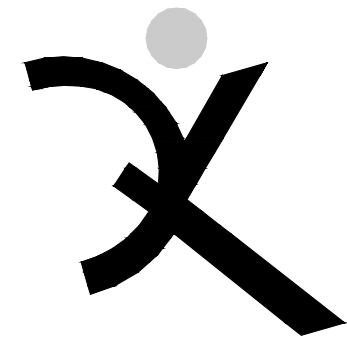
PROVIDE TWO 12V, 55AH BATTERIES
MOUNTED IN SEPARATE ENCLOSURE
BATTERIES SHALL BE MARKED WITH
THE MONTH AND YEAR OF THEIR MANUFACTURE

BATTERY CALCULATIONS: FIRE ALARM EXTENDER PANEL 'RAMP-G'

STANDBY MODE	EA (A)	QTY	CURRENT
CTRL UNIT	0.087	1	0.087
TOTAL STANDBY CURRENT =	0.087 A		
REQUIRED (24 HOURS) =	2.088 AH		

ALARM MODE	EA (A)	QTY	CURRENT
CTRL UNIT	0.087	1	0.087
NOTIFICATION CKT V1	0.329	1	0.329
NOTIFICATION CKT V2	0.901	1	0.901
1/2W SPEAKERS	0.032	5	0.160
1W SPEAKERS	0.064	9	0.576
TOTAL POWER REQUIRED WITH 120% BATTERY DERATING FACTOR =	2.506 AH		

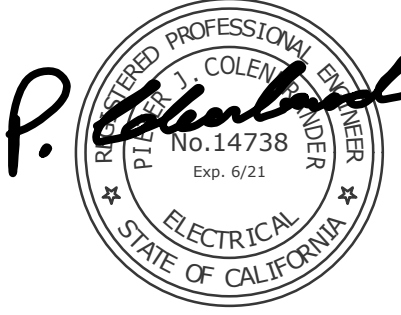
REPLACE (E) WITH TWO 12V, 9AH BATTERIES
BATTERIES SHALL BE MARKED WITH
THE MONTH AND YEAR OF THEIR MANUFACTURE



QUATTROCCHI KWOK
ARCHITECTS
Main Office:
636 Fifth Street, Santa Rosa, CA 95404
East Bay:
55 Harrison Street, Suite 525
Oakland, CA 94607
(707) 576-0829



O'MAHONY & MYER
ELECTRICAL, MECHANICAL AND PLUMBING CONSULTANTS
490 REDWOOD HWY., SUITE 245
SAN RAFAEL, CALIFORNIA 94903
(415) 492-0800 / FAX (415) 492-0666
www.ommahonysite.com



**FREEDOM
HIGH SCHOOL**

**NEW AUXILIARY
GYMNASIUM**

1050 NEROLY RD,
OAKLEY, CA 94561

**LIBERTY UNION
HIGH SCHOOL
DISTRICT**

REVISIONS

Δ	05-12-21	ADDENDUM 1

DSA APP NO. 01-119278

ARCH PROJECT NO. 1869.00

DRAWN BY: LN,TV,JW,OOM

DRAWING SCALE: AS NOTED

PTN: 61721-78 FILE NO: 7-H4

CONSTRUCTION DOC.

MAY 5, 2021

SHEET TITLE

**FIRE ALARM
RISER
DIAGRAM**

SHEET NUMBER

ADDENDUM 01

FE-5.1