A D D E N D U M N O. 2

SEPTEMBER 4, 2025

TIMBERWOOD MIDDLE SCHOOL IMPROVEMENTS

HUMBLE, TEXAS

BRW Project No.: 223005.00
Humble ISD No.: CSP# 2026-03

The Construction Documents for the above referenced project, dated **JUNE 13, 2025** shall be amended as follows:

CLARIFICATIONS

2.01: Existing T-buildings are part of the overall school/campus. Where whole systems are called to be replaced or upgraded for the overall school, the scope of work shall also apply to the existing T-buildings.

SPECIFICATIONS

* Where entire specification section is replaced in this addendum, a black vertical bar has been added on the right side of each page where portions of the replaced specification have been modified.

2.02: SECTION 00 00 10 TABLE OF CONTENTS

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.02: SECTION 00 52 13.10 A101-2017 STANDARD FORM OF AGREEMENT

A. Amend specification section as follows.

1. Add as part of section 4.3 Allowances:

a. Architectural Graphics Allowance: $50,000.00

b. Landscape Irrigation Allowance: $80,000.00

2.04: SECTION 01 21 00 ALLOWANCES

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Add Section 3.03 B “Allowance No. 2: Architectural Graphics Allowance: Include an allowance of $50,000.00 for architectural graphics. Any signage and graphics currently noted elsewhere in the contract documents shall be part of the base scope and are not a part of this allowance.”
2. Add Section 3.03 C “Allowance No. 3: Landscape Irrigation: Include an allowance of $80,000.00 for landscape irrigation.”

2.05: SECTION 08 45 23 INSULATED TRANSLUCENT SKYLIGHT SYSTEM

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.06: SECTION 08 63 00 ISULATED STRUCTURAL SKYLIGHT SYSTEM

A. Remove section dated JUNE 13, 2025, in its entirety.

2.07: SECTION 09 68 00 CARPETING

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.08: SECTION 09 84 13 ACOUSTIC WALL PANELS

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.09: SECTION 10 73 16 PREFABRICATED ALUMINUM CANOPIES

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.10: SECTION 11 66 00 ATHLETIC EQUIPMENT

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.11: SECTION 11 66 43 SCOREBOARDS

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.12: SECTION 11 66 53 GYMNASIUM DIVIDER

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.13: SECTION 12 35 83 SPECIALTY CASEWORK

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.14: SECTION 23 09 33 BUILDING MANAGEMENT AND CONTROL SYSTEM (GENERAL)

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Amend Section 3.11, A, 4 , to read “A system differential pressure sensor shall modulate the hot water pump variable frequency drives to maintain system differential pressure.”
2. Amend title to section 3.15 to read “FAN COIL UNITS (CHFCU-1 through CHFCU-5)”
3. Amend title to section 3.18 to read “SINGLE ZONE AIR HANDLING UNITS CONTROL W/ VARIABLE FREQUENCY DRIVE (AHU-1, AHU-2. AHU-3, CHFCU-6)”
4. Amend title to section 3.21 to read “OUTSIDE AIR VARIABLE VOLUME TERMINAL UNITS (OAVAV-)”
5. Amend title to section 3.22 to read “KITCHEN EXHUAST AND SUPPLY AIR SYSTEM (KEF-1 THROUGH KEF-5, RMUA-1, VAV-K1 THROUGH VAV-K5)”

2.15: SECTION 23 09 34 COORDINATION OF BMCS

A. Remove section dated JUNE 13, 2025, in its entirety.

2.16: SECTION 23 65 27 AIR COOLED ROTARY SCOLL CHILLER

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.17: 2.06 SECTION 23 82 19 FAN COIL UNITS

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.18: SECTION 26 05 12 ELECTRICAL SHOP AND COORDINATION DRAWINGS

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Add section 3.3, J, 22. “2-Hour fire rated cable”

2.19: 2.08 SECTION 26 05 19 CONDUCTORS AND CONNECTORS

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.20: 2.09 SECTION 26 09 44 LIGHTING CONTROLS

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Remove section 2.1, A, 4. “Douglas Lighting Controls”

2.21: 2.10 SECTION 26 32 16 DUAL PURPOSE MANUAL TRANSFER SWITCHES

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.22: SECTION 27 41 16.10 AUDIO AND VIDEO DISTRIBUTION FOR INSTRUCTIONAL SPACES.

A. Remove section dated JUNE 13, 2025, in its entirety.

2.23: SECTION 27 41 16.20 AUDIO AND VIDEO DISTRIBUTION FOR SPECIAL VENUES.

A. Replace entire section date JUNE 13, 2025 with section dated SEPTEMBER 4, 2025, attached hereto.

2.24: SECTION 27 50 00 BUILDING INTERCOMMUNICATIONS SYSTEM (EXPAND EXISTING)

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Remove section 1.2, C and D.

2.25: SECTION 28 15 00 INTRUSION DETECTION

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Add section 1.1 E. “Expand existing system.”

2.26: SECTION 28 46 00 FIRE DETECTION AND ALARM SYSTEM

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Add section 1.1 C. “Replace existing system in its entirety. Replace all detection, indicating, monitoring and control devices. Replace all wiring. Existing system shall remain fully functional and monitored until new system is accepted by the AHJ and owner. Existing system shall be demo’d in its entirety after the new system is accepted. Cable shall be removed from ceilings and walls, from source. Boxes where devices were removed from shall be blanked off and/or patched and painted.”
2. Remove Section 2.1, A
3. Remove Section 2.1, C
4. Add section 2.2, X “Fire Alarm Communicator provided and installed by contractor”

5. Add Section 2.2, X, 1. "Teleguard TG-7FS, 5G LTE-M Cellular Communicator."
    a. Renumber subsequent sections as a result of added section X.

2.27: SECTION 31 31 16 TERMITE CONTROL

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.28: SECTION 32 12 16 ASPHALTIC CONCRETE PAVEMENT

A. Section dated SEPTEMBER 4, 2025, attached hereto, is entirely new and hereby made part of this addendum.

2.29: SECTION 32 18 23 SYNTHETIC TRACK SURFACING SYSTEM

A. Amend specification section dated JUNE 13, 2025, as follows.

1. Amend section 2.02, A to read:

2.02 PERFORMANCA STANDARDS

A. The BSS 1000 synthetic track surfacing system shall exhibit the following minimum performance standards as required by IAAF:

1.	Thickness:	13mm (average, minimum 10mm)
2.	Force Reduction	35-50%
3.	Vertical Deformation:	0.6mm-1.8mm
4.	Coefficient of Friction:	≥ 0.5 (47 TRRL Scale)
5.	Tensile Strength:	≥ 0.5 Mpa
6.	Elongation:	≥ 40%

DRAWINGS

2.30: DRAWING A2.3 ROOF PLAN

A. Amend drawing dated JUNE 13, 2025, as follows.

2. Amend keyed note 0860.02 to read "New pyramid skylight 4'-0" x 4'-0"
3. Amend keyed note 0860.03 to read "New pyramid skylight 6'-0" x 6'-0"

2.31: DRAWING A4.1 DOOR SCHEDULE & DETAILS

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added sign detail, 13.

2.32: DRAWING A7.1B FINISH PLAN – AREA B

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added shelving elevation 3 for shelving at uniform storage 721.
2. Added keyed notes for musical instrument storage at band 403.
3. Updated acoustic ceiling tile AC5, acoustic wall panels, and carpet types in the finish legend.

2.33: DRAWING A7.1G FINISH PLAN – AREA G

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added shelving at uniform storage 721

2.34: DRAWING M2.4 MECHANICAL FLOOR PLAN – AREA D

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added 12x10 return air grill path with fire damper near Computer Lab 702

2.35: DRAWING E3.6 ELECTRICAL POWER FLOOR PLAN – AREA G

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added quad receptacle, conduit and associated wiring for new AV Rack located in Weight Room 128.

2.36: DRAWING E6.1 ELECTRICAL PANEL SCHEDULE

A. Amend drawing dated JUNE 13, 2025, as follows.

1. In branch panel LG, replace 20A spare CKT 35 with 20A #12 AWG for new AV Rack.

2.37: DRAWING T2.1 TECHNOLOGY FLOOR PLAN – AREA A

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Indicated location of existing local sound system head end.

2.38: DRAWING T2.6 TECHNOLOGY FLOOR PLAN – AREA G

A. Replace entire DRAWING date JUNE 13, 2025 with section dated AUGUST 27, 2025, attached hereto.

1. Added technology, intercom and AV design for Weight Room 128.

END OF ADDENDUM NO. 2 *

SECTION 00 00 10 – TABLE OF CONTENTS

END OF SECTION 00 00 10

SECTION 08 45 23 - INSULATED TRANSLUCENT SKYLIGHT SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:

1. Flat insulated, translucent sandwich panels
2. Aluminum clamptite installation system
3. Aluminum flashing attached to skylights

1.02 SUBMITTALS

A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.

B. Submit shop drawings. Include plans, elevations, and details.

C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.

1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
    a. Sandwich panels: 7" x 12" units
    b. Factory finished aluminum: 3" long sections

D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.

1. Reports required (if applicable) are:
    a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
    b. Burn Extent (ASTM D 635)
    c. Color Difference (ASTM D 2244)
    d. Impact Strength (UL 972)
    e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
    f. Bond Shear Strength (ASTM D 1002)
    g. Beam Bending Strength (ASTM E 72)
    h. Insulation U-Factor (NFRC 100)
    i. NFRC System U-Factor Certification (NFRC 700)

j. NFRC Visible Light Transmittance (NFRC 202)

k. Solar Heat Gain Coefficient (NFRC or Calculations)

l. Air Leakage (ASTM E 283)

m. Structural Performance (ASTM E 330)

n. Water Penetration (ASTM E 331)

o. Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)

p. Fall Through Resistance (ASTM E 661)

q. Class A Roof Covering Burning Brand (UL 790)

1.03 CLOSEOUT SUBMITTALS

A. Provide field maintenance manual to include in project maintenance manuals.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.

2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.

3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.05 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.

1. When requested, include span analysis data.

2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.

3. Structural Loads. Provide skylight system capable of handling the following loads:

a. Live Load (PSF): as indicated on the structural drawings.

b. Wind Load (PSF): as indicated on the structural drawings.

B. Deflection Limits:

1. Unit Skylight: Limited to L/60 of clear span for each assembly component.

C. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.

B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.07 WARRANTY

A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within one year from the date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

B. Kalwall Corporation, locally distributed by Griesenbeck Architectural Products, 832-841-2074, dustin@griesenbeck.com

C. Structures Unlimited, Inc., 800-225-3895, info@structuresunlimitedinc.com

D. Kingspan

2.02 PANEL COMPONENTS

A. Face Sheets:

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.

a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.

b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.

2. Interior face sheets:

a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 450 when tested in accordance with UL 723.

b. Burn extent by ASTM D 635 shall be no greater than 1".

3. Exterior face sheets:

a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 5 years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.

b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.

4. Appearance:

a. Exterior face sheet: Smooth, .070" thick and White in color.

b. Interior face sheet: Smooth, .045" thick and White in color.

c. Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

B. Grid Core:

1. Aluminum I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".

C. Laminate Adhesive:

1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".

2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.

3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:

a. 50% Relative Humidity at 68° F: 540 PSI

b. 182° F: 100 PSI

c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI

d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.03 PANEL CONSTRUCTION

A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.

1. Thickness: 2-3/4 inches

2. Grid Core Insulation: Fill panel cores with fiberglass batt
3. Panel U-factor by NFRC certified laboratory: 2-3/4” aluminum grid 0.29
4. Visible Light Transmittance (VLT):
    a. Visible LT (NFRC 202) by NFRC certified laboratory: 16%
5. Solar heat gain coefficient 0.22
6. Grid pattern as viewed: Nominal size 12” x 24”; pattern Shoji

B. Standard panels shall deflect no more than 1.9” at 30 PSF in 10’-0” span without a supporting frame by ASTM E 72.

C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
1. Absence of flame penetration through the wall assembly at any time.
2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.

D. Skylight System:
1. Skylight system shall pass Class A Roof Burning Brand Test by UL 790.

E. Skylight System shall meet the fall through requirements of OSHA 1910.21 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.

2.04 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

A. Aluminum clamptite installation system - Unit Skylight:
1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.

B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clamptite installation system at the factory under controlled conditions.

C. Fasteners: 300 series stainless steel screws for aluminum clamptite installation system, excluding final fasteners to the building.

D. Finish:
1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's standards**.**

PART 3 - EXECUTION

3.01 EXAMINATION

A. Installer shall examine substrates, supporting structure, and installation conditions.

B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.

2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.03 INSTALLATION

A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.

1. Anchor component parts securely in place by permanent mechanical attachment system.

2. Accommodate thermal and mechanical movements.

3. Seal aluminum clamptite installation system as shown on the manufacturer’s fabrication drawings and suggested installation instructions.

B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.04 FIELD QUALITY CONTROL (Unit Skylights)

A. Water Test: Installer to test a representative section of installed materials according to procedures in AAMA 501.2.

B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.05 CLEANING

A. Clean the panel system, interior and exterior, immediately after installation.

B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

SECTION 09 68 00 – CARPETING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this SectionGeneral Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Perform all work required to complete the Carpeting indicated by the Contract Documents and all work that can be reasonably inferred to be included. Furnish all supplementary items necessary for its proper installation.

B. Walk-Off Carpet at entryways indicated in the drawing.

C. District Standard:
   1. Walk-off mat: at all exterior entrances (minimum 10 feet x width of corridor).

D. Related Sections include the following:
   1. Division 9 Section “Resilient Flooring”
   2. Division 9 Section "Resilient Base and Accessories”

A. Preinstallation Conference: Conduct conference at Project site
   1. Review methods and procedures related to carpet installation including, but not limited to, the following:
      a. Review delivery, storage, and handling procedures.
      b. Review ambient conditions and ventilation procedures.
      c. Review subfloor preparation procedures.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written data on physical characteristics and durability.
   2. Include manufacturer's written installation recommendations for each type of substrate.

B. Submit Manufacturer's Product Safety Data Sheets for each product.

C. TX-CHPS Documentation Submittals:
   1. MW 3.1: Product data and certification letter indicating total percentage of total recycled content and percentage of post-consumer recycled content for products having recycled content.
   2. EQ 7.0 and 7.1: Laboratory test reports for the following products and systems installed inside the weatherproofing system indicating that they meet the testing and product requirements of the California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Emissions from Indoor Sources Using Environmental Chambers, Version 1.1 (2010). The school classroom shall be used as the exposure modeling scenario for evaluating the acceptability of VOC emissions as described in the Standard Method, Tables 4-2 and 4-3. For wet applied products, additional content criteria are specified.

a. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.

D. Sustainable Design Submittals:
1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

E. Shop Drawings: Furnish plan for each area to receive carpet, showing the following:
1. Columns, doorways, enclosing walls or partitions, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Seam locations, types, and methods.
4. Type of subfloor.
5. Type of installation.
6. Pattern type, repeat size, location, direction, and starting point.
7. Pile direction.
8. Types, colors, and locations of insets and borders.
9. Types, colors, and locations of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.
11. Type of carpet cushionSamples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedulesCarpet: 12-inch- (300-mm-) square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
3. Carpet Cushion: 6-inch- (150-mm-) square Sample as applicable.
4. Carpet Seam: 6-inch (150-mm) SampleSamples for Initial Selection: For each type of product.
1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

H. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: 18 inch x 18 inch sample of each type carpet specified and full color range available.
2. 6 inch long sample of each type exposed edge.
3. 18 inch long sample of each accessory item.
4. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet and carpet cushion, for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

2. Precautions for cleaning materials and methods that could be detrimental to carpet and carpet cushion.

1.07 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.08 QUALITY ASSURANCE

A. Installer Qualifications:
   1. The Contractor shall be experienced in the supervision of carpet installation, with at least five (5) years experience in this type of work. The actual work shall be done by qualified and experienced mechanics working under his supervision or under the supervision of an experienced workroom supervisor who has also been doing this type of work for five years.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.10 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet and carpet cushion until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period and per the adhesive manufacturer's recommended levels.

C. Do not install carpet and carpet cushion over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

D. Field Measurements: Written dimensions shall take precedence over scaled plan sizes. All dimensions are approximate and the Contractor shall be responsible for verifying all dimensions and conditions in the field prior to installation**WARRANTY**

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
   1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
   2. Failures include, but are not limited to, the following:
      a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
      b. Loss of tuft bind strength.
      c. Excess static discharge**.**
      d. Delamination.
   3. Warranty Period: **10** years from date of Substantial Completion.

B. Special Warranty for Carpet Cushion: Manufacturer agrees to repair or replace components of carpet cushion installation that fail in materials or workmanship within specified warranty period.

1. Warranty includes removal and replacement of carpet and accessories required by replacement of carpet cushion.
2. Warranty does not include deterioration or failure of carpet cushion due to unusual traffic, failure of substrate, vandalism, or abuse.
3. Failure includes, but is not limited to, permanent indentation or compression.

PART 2 - PRODUCTS

2.01 . MATERIALS

C. Basis of Design: Kinetex, J+J Flooring.

D. Woven construction of Antron fiber, 4 ply yarn, 7 rows per inch minimum, with a combination of rows and pitch to achieve 1320 loops per square inch minimum, minimum face weight of 24 oz. per square yard, minimum total weight of 56 oz. per square yard, yarn dyed, with static control below 3.5 K.V., Class I, flammability meeting NFPA-253 and ASTM-E648 (.45 watts/cm2), smoke density meeting NFPA-258 - 450 or less, 12' wide rolls. Allow for two colors of carpeting from manufacturer's standard range to be selected by Architect.

E. Pad: “Tred-Mor" #1562-2 Sponge rubber commercial carpet cushion as manufactured by Sponge Cushion, Inc.

F. Adhesive: Waterproof type recommended in writing by carpet manufacturer to suit this application and expected service.

G. Edge Strips: Rubber butting gauge shall be Johnsonite's #EG-XX-H or as required for material height, in color to match base, or approved equal.

H. Carpet Reducer: Rubber reducer #CRS-XX of height equal required for material heights and other accessories as made by Johnsonite or approved equal. Colors as selected by the Architect from manufacturer's standards.

I. Carpet Tile Adapter: Rubber tile adapter equal to Johnsonite's #CTA-XX-A or as required for material height, of color as selected by Architect manufacturer's standards.

J. Attic Stock: Provide 10% attic stock for replacement.

K. Manufacturers: Subject to compliance with requirements, **provide products by one of the following**:
1. J+J Flooring.
2. Johnsonite: A Tarkett Company Powerbond.

AA. Performance Characteristics:Class I, flammability meeting NFPA-253 and ASTM-E648 (.45 watts/cm2), smoke density meeting NFPA-258 - 450 or less.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. The carpet manufacturer's recommended procedures for installation shall be closely followed. Particular attention is to be paid to recommendations for application of floor covering adhesive, seam cement and cross joining.

B. Carpet edgings shall be neatly trimmed for tight fit along walls, cut and fit evenly around all projections and into trim strips. Fit closely and evenly to, in and through doorways, terminating carpet under doors. Finished installation shall be smooth and free of ripples and puckers.

C. Carpet binder bar shall be supplied and installed as required at doorways and other openings adjoining hard surface materials. Secure with nails appropriate for substrate.

D. All carpet shall be laid in the same direction, unless specifically shown otherwise.

E. Lay carpet with absolute minimum number of seams. Do no use small carpet strips.

F. All cross joins necessary due to layout of areas shall be at the absolute minimum and shall be indicated on shop drawings.

G. Cross joins necessary due to length of rolls received shall be placed in the cutting to avoid occurrence at conspicuous locations, near doors or at pivot points, and must be approved prior to seaming.

H. Adhesive shall be applied to both edges of the carpet at a cross join. These edges shall be brought together to insure direct contact of the adjoining edges after application of the adhesive.

I. Spots and smears of floor covering adhesive and seam cement shall be removed immediately.

J. Perform initial vacuum cleaning of entire carpet installation areas and leave in perfect condition.

3.02 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.

B. Examine carpet for type, color, pattern, and potential defects.Do not proceed with any work until such defects are entirely corrected. The Contractor shall carefully check all dimensions and other conditions in the facilities and shall be responsible for proper fitting of carpet in areas designated.

D. Before installation, remove all debris and job soiling with a vacuum cleaner and damp mop. Install tackless strip in accordance with manufacturer's directions.The application or installation of carpet by the carpet contractor shall be an indication of his acceptance of the subfloor.

F. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

3.03 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive, carpet, and carpet cushion manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.04 INSTALLATION

A. Comply with the Carpet and Rug Institute's CRI 104 and carpet manufacturer's written installation instructions for the following:
   1. Direct-glue-down installation.

B. Comply direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position with carpet manufacturer's written instructions and Shop Drawings for seam locations and
   1. Carpet shall be installed in the largest possible pieces. The use of small pieces and scraps will not be accepted.
   2. Check carpet before beginning installations and ensure there is no visible variation between dye lots.
   3. Seams are to be kept to an absolute minimum. Seams shall receive a coating of edge sealer applied to base and side of pile yard, securing breadth and end to end. Seams installed so that they are practically invisible upon completion. Use adhesives applied in 6 inch bands at all cross (butt) seams and around perimeter of all areas. All woven selvages are to be trimmed to insure good side seams.
   4. All edges shall be free from fraying. On all finished edges of carpet where it abuts an adjacent floor at the same or different level, finishing strips must be applied as specified. Finishing edges shall be mechanically fastened to substrate.
   5. Edge mouldings shall be mitered at corners and mechanically fastened to substrate at 12 inch O.C. minimum. Do not fasten through carpet. Tap downs shall be installed without denting.
   6. Entire carpet installation shall be unwrinkled, without twist, laid tight and flat to subfloor, well adhered, and present a uniform appearance. Ensure monolithic color, pattern and texture match within any one area.

C. Install borders with mitered corner seams.

D. Do not bridge building expansion joints with carpet.

E. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

F. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking deviceCarpet step-off saddle and reducer strips shall be supplied and installed at doorways, where carpeting abuts dissimilar floor surfaces, and as required.

I. Do not place heavy objects such as furniture on carpeted surfaces for minimum of 24 hours or until adhesive has set.

J. Any carpet which wrinkles or loosens at seams within one year from date of installation shall be corrected at no cost to the Owner.

3.05 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:
   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
   2. Remove yarns that protrude from carpet surface.
   3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with the Carpet and Rug Institute's CRI 104Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet cushion and adhesive manufacturers.

D. Replace damaged materials, and soiled material that can not be adequately cleaned to remove evidence of soiling using methods approved by Manufacturer.

E. All carpet shall be vacuumed and left protected in a manner ready for occupancy.

END OF SECTION 09 68 00

SECTION 09 84 13 - ACOUSTIC WALL PANELS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. General Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Section Includes:

B. Furnish all labor, materials, tools, equipment and services necessary for and incidental to fabricate and install the acoustical wall panel work as shown on the drawings, or as specifiedherein, including but is not necessarily limited to the following:
   1. . Fabric-wrapped sound-absorbing wall panels.
   2. Fabric-wrapped sound-diffusing wall panels.
   3. Quadratic sound-diffusing wall panels.
   4. Surface-applied felt fabric.
   5. Cementitious wood fiber wall panels.
   6. Fabric-wrapped sound-absorbing wall panels.
   7. Fabric-wrapped sound-diffusing wall panels.

C. Related Sections include the following:
   1. Division 09 Section: Gypsum Board
   2. Division 09 Section: Wallcovering
   3. Division 09 Section: Painting

1.03 ACTION SUBMITTALS

A. Product Data: For each type of fabric facing, panel edge, core material, and mounting indicated.

B. Shop Drawings: Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge and core materials.
   1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.

C. Samples for Initial Selection: For each type of acoustical wall panel manufacturer's full range.

D. Samples: For the following products, prepared on Samples of size indicated below:
   1. Fabric: Full-width by approximately 36-inch long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
   2. Panel Edge: 12-inch- long Sample(s) showing each edge profile, corner, and finish.
   3. Core Material: 12-inch- square Sample at corner.
   4. Mounting Devices: Full-size Samples.

1.04 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Electrical outlets, switches, and thermostats.
   2. Items penetrating or covered by acoustical wall panels including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Alarms.
      e. Sprinklers.
      f. Access panels.

B. Product Certificates: For each type of acoustical wall panel, from manufacturer.

C. Warranty: Submit sample of Special Warranty.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance Data: For acoustical wall panels to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.

1.06 QUALITY ASSURANCE

A. Fire Rating:
   1. All system materials are to satisfy the standards and methods below:

Fabrics	ASTM E84, Class A or Class 1 for Flamespread and Smoke Generated.
Cores	ASTM E84, Class A or Class 1 for Flamespread and Smoke Generated.
Mounting	ASTM E84, Class A or Class 1 for Flamespread and Smoke Generated.

   2. Fire rating shall be for a complete assembly including mounting devices, core, and fabric. Test panels shall duplicate actual job conditions.

B. Install Qualifications: Installation shall be performed by a firm with a minimum of 3 years experience in the installation of the specified wall panels and authorized to install the approved product.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protect system materials from excessive moisture in shipment, storage, and handling. Store in a dry place with adequate ventilation. Do not store panels beneath other materials as creasing may result.

B. Installer's representative shall conduct receipt inspection of goods.
   1. Fabric that is flawed by the inclusion of excessive misweaves, poor color match with goods specified, water damage, inadequate continuous drops without seaming, or other conditions unacceptable to the Architect, shall be rejected.

1.08 PROJECT CONDITIONS

A. All other finishes in the space shall be completed to the extent necessary to prevent later damage to the wall system.

B. Temperature and humidity shall be stable at values near those indicated for final occupancy.

1.09 WARRANTY

A. Manufacturer's standard three (3) year limited warranty.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of acoustical wall panels that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Acoustical performance.
      b. Fabric sagging, distorting, or releasing from panel edge.
      c. Warping of core.

PART 2 - PRODUCTS

2.01 ITEMS

A. **AW1 & AC5-** Wall Panel and ceiling system. Sound-Absorbing Linear Ceiling and Wall scape Panel: 9mm 60% polyester felt tile to attach to acoustical ceiling gird. Size as indicated in Drawings. Color: As indicated in the drawings. Include manufacture edge caps matching surface color. Ceiling Grid type 1. Mounting: Provide fasteners as required for complete installation. Coordinate panel system with lighting as required.

B. **AW2-** Wall Panel: Fabric wrapped on all four sides, bevel edged 3" panel in sizes as shown on drawings with a noise coefficient of up to 1.00 shall be Tectum Inc.'s "Fabri-Tough Decor Panels". Fabric shall be in color as selected by Architect from Manufacturer's full range. Size as indicated in Drawings. Mounting: Provide fasteners as required for complete installation.

C. **AW3** -Wall Panel: Woven fabric over 3/4" mineral fiberboard shall be Armstrong's Soundsoak woven finish with "Donegal Tweed" fabric in color as selected by Architect from Manufacturer's full range. Size as indicated in Drawings. Mounting: Provide fasteners as required for complete installation.

D. Moldings: J-molding in standard color as selected by Architect.

E. Mounting: Provide fasteners as required for complete installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions under which the work is to be performed. Notify the General Contractor of any unsatisfactory conditions. Do not proceed until the conditions are satisfactory.

B. Field measure the substrate to be treated.

C. Examine fabric, fabricated units, substrates, areas, and conditions, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PROTECTION

A. Protect treatments from damage and soiling during shipping and installation until Owner's acceptance.

3.03 INSTALLATION

A. Fasten spline mounting devices to the gypsum board substrate as per manufacturer's instructions.

B. Concealed mounting system shall be plumb and straight and in proper alignment. Mounting devices shall not be visible through the panel joint when installed.

C. Fabric surfaces shall be free of wrinkles and the weave shall be plumb, straight and properly aligned horizontally and vertically.

3.04 CLEANING AND PROTECTION

A. Clean exposed panel surfaces as recommended by fabric manufacturer. Remove dust and other foreign materials according to manufacturer's written instructions. Remove and replace fabric if cleaning in place or offsite is unsuccessful.

B. Installing subcontractor and General Contractor shall coordinate to ensure that completed installation will not be damaged by later work.

C. Protection: Protect surfaces from damage and soiling until project substantial completion.

D. Replacement: At no additional cost, replace damaged materials and materials that cannot be cleaned to satisfaction of Owner.

SECTION 10 73 16 - PREFABRICATED ALUMINUM CANOPIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, shall apply to work specified in this Section.

B. General Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Work in this section shall include design, fabrication, and installation of complete, mechanically fastened, extruded aluminum protective cover system. All work shall be in complete accordance with the drawings and this specification.
   1. Canopy located at new exterior entrance between practice gym 131 and large ensemble 404.

B. Related Sections:
   1. Division 05 Section: "Structural Steel", for steel brackets and supports at and inside building walls.
   2. Division 07 Section: "Sheet Metal Flashing and Trim".
   3. Division 07 Section: "Joint Sealants".
   4. Division 26 Section: "Electrical", for coordination of routing of conduit and installation of electrical devices at canopies.

1.03 REFERENCES

A. The Aluminum Associate - Aluminum Design Manual 2010.

B. American Welding Society - AWS D1.2/D1.2M: 2008.

1.04 SUBMITTALS

A. Furnish complete shop drawings bearing the seal of a registered engineer showing the required live and wind loads of the project. Shop Drawings shall clearly illustrate all details, including, but not limited to: Plan views, drainage locations and details, building wall condition details, flashing details, canopy component sizing and thickness, fastener sizing, large scale assembly details, and finishes by component. General Contractor to verify all dimensions and elevations prior to submittal to Architect. Submittal shall be checked by manufacturer prior to fabrication. The site-specific shop drawings and calculations shall bear the seal of a Structural Engineer licensed to work in the state of the project site.

B. Submit samples for finish and color selections. Provide two samples of specified finish: minimum size: 2-1/2” x 4”.

C. Submit manufacturer’s brochure and product data.

1.05 QUALITY ASSURANCE

A. Canopy Manufacturer shall have a minimum of 10-years experience in designing and installing aluminum canopy systems.

B. Installation shall be performed by aluminum canopy manufacturer to ensure a single source responsibility for the work.

1.06 ENGINEERING REQUIREMENTS

A. Canopy shall be designed to comply with local building codes and the following, whichever is most stringent:
   1. Canopies shall be capable of withstanding a 20-psf live load, & 110-mph ASD wind loads, or as required by state and local building codes having jurisdiction. Structure shall be capable of sustaining hail, and support being walked on by maintenance personnel.
   2. Canopy fascias designed of adequate thickness to prevent oil canning.

1.07 WARRANTY

A. Provide manufacturer's 1-year Warranty against defects in material and workmanship, and 1-year Warranty on field installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Basis of Design Manufacturer: Design is based on the products of AVAdeck. Subject to compliance with requirements, Prefabricated Aluminum Canopies by one of the following:
   1. AVAdek, 12130 Galveston Road, Building 1, Webster, Texas 77598, 713-944-0988.
   2. InPro Fabrication, Fort Worth, TX 76115, 817-926-2803.
   3. Peachtree Protective Covers, Inc., 1477 Rosedale Drive, Hiram, GA 30141, 800-341-3325.

2.02 MATERIALS

A. All components shall be 6061, 6063, or 6005 Alloy extruded aluminum. All components shall be sized as required to meet engineering requirements of the project, sizes and depth indicated in Drawings, and as follows, whichever is greatest except that canopy member depths shall not exceed depths shown in Drawings unless specifically approved by Architect:
   1. Overhead Supports: 1.9" x .120" wall, extruded aluminum round tube.
   2. Fascia / Beams: Minimum .125" wall, extruded aluminum 8" face. Other beams shall not be deeper or control overall canopy depth.
      a. Perimeter Trim Profile: Manufacturer's standard flat profile.
   3. Wall mounted canopy Truss Rods: Equally sized throughout, minimum size as determined by Manufacturer for loading conditions.
   4. Deck: Standard decking of required size as determined by manufacturer; deck thickness shall be at least .080" thick.

B. Drainage
   1. Drainage trim rings through bottom of canopy: Where indicated in Drawings, water shall drain through equal sized round trim rings extending down through canopy fascia beams, located at the corners of canopies as indicated in Drawings.
      a. Water to free-fall to paved surface.

C. Fasteners, Connections and Fittings: All components provided by canopy Manufacturer.
   1. All bolts, nuts, washers, and screws used in joining the members shall be stainless steel.
   2. Where exposed fasteners are not avoidable, visible fasteners or components must be finished to match surrounding surfaces.
   3. Component Accessories: Shall be of similar materials as specified for prime components.
   4. Flashing: Minimum .040, color to match canopy system fascia.

D. Finish: Finish and color selection of each component shall be Manufacturer's coating process; custom color fascia is to be determined. Final color may be different at each school. Decking color is to match structural decking roof overhang (white) above canopy.
   1. AAMA 607.5 Kynar 500 Fluoropolymer Based Painted 2 Coat

2.03 FABRICATION

A. Beams shall be heliarc welded.

B. Decking:
   1. Decking shall be an extruded aluminum component with an interlocking and self-flashing design to provide structural integrity for the completed assembly.
   2. Decking shall be mechanically fastened in the field.
   3. The canopy deck is to have welded end closures at the deck terminations.
   4. Fabricate decking sections at light fixtures with cap detail as shown in Drawings that will conceal conduits and shield electrical devices from rainwater.
   5. Decking and roof surface shall slope to permit draining to drain openings at the corners of the canopy furthest from the building.

C. Concealed Drainage:
   1. Water shall drain from canopy surface into an integral gutter system and directed through drainage trim rings at designated locations in canopies. Water shall drain freely onto pavement below from the sides of the canopy perpendicular via appropriately-sized downspout openings with protruding lip to direct water away from the edge of the canopy, such that water does not pour over the main path of travel beneath the canopy.

D. Flashing shall be prefinished .040 aluminum fabricated to prevent leakage between canopy and adjacent structures.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate installation requirements with the work of other trades, including but not necessarily limited to the following:
   1. Structural elements supporting or partially supporting prefabricated metal canopies. Coordinate exact size and locations of mounting plates and attachments provided by other trades as required, prior to preparation of shop drawings for such supports and for the canopy system.
   2. Coordination with routing of electrical work, including supports and attachment details, to ensure waterproof installation, with conduit hidden from view to the maximum extent possible. Install conduit as work progresses. See Electrical Routing article
   3. Coordination with work of other trades where adjacent or attaching to canopy.
   4. Wash down of masonry, and other work in the vicinity that could damage canopy finishes after installation, should be complete prior to canopy installation.

B. Examine conditions and preparations for installation made by other trades, prior to installation. Inform general contractor of any deficiencies. Do not proceed to installation until deficiencies are corrected; beginning installation constitutes acceptance of substrates / conditions.

3.02 INSTALLATION

A. Install canopy in accordance with manufacturer’s recommendations and instructions.

B. Erect canopy after adjacent concrete and masonry work is complete and washed down.

C. Install beams straight and true.

D. Install rain caps over draining sections of deck.

E. Install flashing as required.

F. Prevent damage or scratching during installation.

3.03 ELECTRICAL ROUTING

A. General: Electrical conduits and penetrations through roof deck shall be concealed in finished canopy construction and detailed for weathertight construction as specified herein.

B. Conduit routing and electrical connections:
   1. Route electrical conduits from the building concealed behind / through canopy framing members at wall connections.
   2. Route conduits through non-draining "dry beams" or G-shape sections to each section of metal decking with electrical device connections.
      a. Depending on canopy design, conduits typically need to be installed in dry beams prior to installation of canopy deck.
   3. Route conduit from dry beam up to above deck section and run to each electrical connection location.
      a. Where electrical device covers will conceal the electrical box, the box may be attached from below deck, screwed through deck from below. Seal around each screw penetration above deck with silicone sealant. Use waterproof connection for conduit penetration through deck to box.
      b. Where electrical boxes will not be concealed by electrical device housing, paint boxes to match deck color.
   4. After conduit and electrical boxes are in place, canopy installer to install metal deck caps over deck sections containing electrical conduit; and install flashing / waterproof cover over dry beams as applicable.

3.04 CLEANING AND PROTECTION

A. Strip protective coatings or coverings from aluminum at time as indicated by Manufacturer; do not allow to melt to metal surfaces. Clean all parts prior to substantial completion. Repair to new condition to replace any materials damaged during installation.

B. Take precautions to prevent damage to canopy and finishes during and after installation.

C. Thoroughly clean canopy after installation.

END OF SECTION 10 73 16

SECTION 11 66 00 - ATHLETIC EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. General Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Section Includes:
1. Basketball backstops.
2. Volleyball inserts, standards, and equipment.
3. Wall padding.
4. Ballet Bars.
5. Wall Storage Hooks.
6. Interior Scoreboards.

B. Related Sections include the following:
1. Division 01 - Owner Provided, Contractor Installed items.
2. Division 04 Section - Unit Masonry Assemblies.
3. Division 09 Section - Wood Gym Flooring, for coordination with equipment installed in flooring, and court striping.
4. Division 09 Section - Painting.
5. Mechanical and Fire Sprinkler, for coordination of ductwork and sprinkler pipes shop drawings with folding basketball backstop.
6. Electrical, for coordination of electrical requirements for operable backstops, and for coordination with other trades to ensure that no devices are located in conflict with wall pads.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Submit manufacturer's product literature, shop drawings, and installation instructions.

B. Shop Drawings: For gymnasium equipment. Include plans, elevations, sections, details, and attachments to and coordination with other work.
1. Submit dimensioned court striping plan, coordinate with other equipment, for approval by Architect.

C. Samples for Initial Selection: For wall pad and backboard protection color selection.

D. Closeout Submittals: Maintenance data and replacement parts sourcing contact information.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of gymnasium equipment from a single manufacturer as complete units, including necessary mounting hardware and accessories.

1.05 GUARANTEE

A. The entire installation will be Guaranteed against faulty materials, workmanship and operation for a period of one year from the date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by Porter Athletic Equipment Company or a comparable product by one of the following:
1. Nevco
2. AALCO Manufacturing.
3. Draper Inc.
4. Performance Sports Systems.
5. Sports Imports.

2.02 BASKETBALL BACKSTOPS

A. Overhead-Supported Operable Basketball Backstops, located as indicated in Drawings:
1. 6 "Y" Frame Single Drop No. 949 with Center-Strut as manufactured by Porter Athletic, Inc. (Electric)
   a. Folding Type: Provide manufacturer's standard assembly for forward-folding, front-braced backboard, with hardware and fittings to permit folding.
   b. Goal Height Adjuster: Adjustable from 8 to 10 feet with gear-drive mechanism, locking in any position within adjustment range, with visible height scale attached to side of framing.
   c. Backboard Safety Device: Designed to limit free fall if support cable, support chain, pulleys, fittings, winch, or related components fail.
   d. Backboard Electric Operator: Provide operating machine of size and capacity recommended by manufacturer for equipment specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, and remote controls. Coordinate wiring requirements and electrical characteristics with building electrical system.
      1) Key switch: Coordinate with other trades and run conduit inside walls or CMU block. Confirm exact locations for key switches with Architect.
2. 6 Basketball Backboards: Model No. 00208000 rectangular glass backboard as manufactured by Porter Athletic, Inc. with safety pads.
   a. Backboards: 72 inches by 42 inches by 1/2" thick fully tempered glass with unitized steel frame.
   b. Regulation Perimeter Striping and Target Area Markings: Official white.
   c. Warranty: Limited lifetime warranty against structural defects when installed on Porter Center-Strut support systems.
   d. Backboard Safety Pads: Designed for backboard thickness indicated and extending continuously along bottom and up sides of backboard and over goal mounting and backboard supports as per manufacturer's standard design.
      1) Bolt-On style
      2) Color: As selected by Architect from manufacturer's full range.

B. 6 Basketball Goals: Complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring. Each unit complete with white nylon cord, 12-loop-mesh net, sized to fit rim diameter.
1. Double-Rim Basket Ring: Fabricated with 2 rims.
2. Type: Movable, breakaway design with manufacturer's standard breakaway mechanism and rebound characteristics identical to those of fixed, non-movable ring.
3. Finish: Official orange powder coated.

2.03 VOLLEYBALL EQUIPMENT

A. Floor Insert: Solid-brass floor plate; and steel pipe sleeve, concealed by floor plate, with capped bottom end, sized with ID to fit post standards, not less than 9 inches long to securely anchor pipe sleeve in structural floor; with anchors designed for securing floor insert to floor substrate indicated; size to match uprights. Model KA25 as manufactured by Sports Imports, or approved equal.
   1. Floor Plate: Lockable hinged access cover, designed to be flush with adjacent flooring. Provide two tool(s) for unlocking access covers.

B. Uprights:
   1. Material: Extruded Anodized aluminum.
   2. Size: 3 1/2 inch diameter, to work with provided sleeves.
   3. Dual reinforced ribs.
   4. Adjustable net height.
   5. Tensioning winch located at easy reach height.
   6. Basis of Design: 01991-000 Powr-Rib® II 3" Uprights with Powr-Winch® manufactured by Porter Athletic Equipment: www.porter-ath.com.

C. Miscellaneous Equipment: Basis of design equipment based on Porter Athletic model numbers referenced.
   1. Transport carrier: 00956-000. One unit to hold one set of standards, net and one Judge's Stand.
   2. Judge's Stand with protective pad: 00999-000/00993-000.
   3. Volleyball Net Model 02295-640 net with dowels.
   4. Protective Pads: 00839-000.
   5. Net Antennae: 02296-100 for each upright.
   6. WR10 Wall mounted holder for Volleyball Poles with spring-loaded levers by sports imports
   7. Sports Imports Wall mounted 2 volleyball net storage wall bolts on hooks.

2.04 WALL PADDING

A. Fire-Retardant Wall Padding: SafPad as manufactured by Porter Athletic, Inc., or approved equal:
   1. Shock Absorption: ASTM F 2440, meet minimum standard.
      a. Maximum Drop Height: 4 feet.
      b. gmax: 181.
   2. HIC: 499.
   3. Meets NFPA 286.
   4. Meets 2003 IBC Section 803.2.1.
   5. Cover Material: Designated as flame resistant in accordance with NFPA 701.
   6. Wall Pad Dimensions: 6'-0" high, behind basketball backstops, 6'-0" high at each side of inside corners of the gymnasium, at locations as indicated in Drawings.
   7. Nailing Margin: 1-inch nailing margin top and bottom for securing panels to wall.
   8. Foam: 2-inch thick, flame-retardant, polychloroprene latex foam.
   9. Interior Foam: Bonded to 7/16-inch plywood to minimize warping.
   10. Entire Face of Panel, Including Nailing Margins: Upholstered in 14-ounce, fire-retardant, high-tensile, vinyl-coated polyester fabric material with leather-like embossed finish.
   11. Cover Material Tear Strength: 100 psi.
   12. Cover Material Properties: Mildew resistant, rot resistant, with infection-combating fungicide.
   13. Fold and securely staple cover to backside of OSB or plywood backing.
   14. Fabric Covering Color: Color to be determined by Architect from manufacturer's full range for color.

2.05 MISCELLANEOUS EQUIPMENT

A. Free standing 8'-0" long ballet bar, equal to model **Boss Barre Pro**, as manufactured by Boss Ballet Barres, balletbarresonline.com, 1-(888) 301-6403.

B. Stability Ball Storage Racks: Stability Ball Wall Storage Rack, as manufactured by Power Systems Inc., 1-800-321-6975, www.power-systems.com.

C. Equipment Storage Hooks: 6" deep red vinyl coated U-Shaped "ladder hooks", by Stanley, National Mfg, or equal. Mount exposed 2x4, stained hardwood blocking to match millwork to wall. Fasten blocking rails at 2'-0" maximum on center with lag bolts to blocking in stud wall construction, or to masonry walls with expansion anchors. Pre-drill and mount to hooks in blocking rails at 16" and staggered at 8" spacing in two horizontal rows at 3'-6" and 6'-0" above floor level. Mount hooks in straight lines, and square to rails and walls. Refer to Drawings for locations.

PART 3 - EXECUTION

3.01 COORDINATION

A. General Contractor shall coordinate equipment provided under this Section with other equipment and systems as necessary to avoid conflicts, prior to fabrication or installation of the components of other systems, including but not limited to:

1. Conflicts of MEP and other systems with equipment components, including the path of travel of moving and operable parts. Coordinate operable athletic equipment, with other systems as part of preparation of their shop drawings.
2. Installation of equipment in or to other materials, including but not limited to blocking required at walls, and installation of floor sleeves or other equipment into flooring system.
3. Any system that might otherwise be installed in conflict with room divider curtain.
4. Any electrical or other devices, signage, or other equipment to be mounted on walls, that might otherwise be located in conflict with wall pads.
5. In the event of discovery of an apparent conflict, notify Architect.

B. Electrical Connections: Connect automatic operators to building electrical system.

1. Coordinate all conduit for all wiring to be run as high as possible at exposed ceiling areas, with vertical conduit run inside walls or CMU block unless specifically indicated otherwise.

3.02 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Complete equipment field assembly, where required.

1. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.
2. Permanently Placed Gymnasium Equipment and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
3. Connections: Connect automatic operators to building electrical system.

B. Backstops and volleyball standards secured to structure with all necessary support pipes and brackets necessary for attachment provided by this Contractor. Install in accordance with reviewed shop drawings and to suit floor marking layout. Backstops and volleyball standards centered on court lines and in proper alignment with foul marking lines. Install level, plumb and true to line, properly secured and attached to suit use conditions.

C. Install wall padding where indicated on drawings and in accordance with manufacturer's recommendations.

3.03 ADJUSTING

A. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.04 CLEANING

A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

B. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.05 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 11 66 00

SECTION 11 66 43 - SCOREBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. General Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Section Includes:
   1. Single-sided interior LED scoreboards.

B. Related Sections include the following:
   1. Division 06 Section "Rough Carpentry".
   2. Division 09 Sections Athletic Flooring
   3. Division 11 Section Athletic Equipment
   4. Division 11 Section Gymnasium Equipment
   5. Division 11 Section Gymnasium Dividers
   6. Division 26 Electrical Sections.

1.03 REFERENCES

A. Standard for Electric Signs, UL 48

B. Standard for CSA C22.2 #207

C. Federal Communications Commission Regulation Part 15

D. National Electric Code

1.04 SUBMITTALS

A. Product data: Submit manufacturer’s product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.

B. Shop drawings:
   1. Submit product attachment drawings.
   2. Submit electrical and signal drawings.
   3. Submit shop drawings indicating equipment locations, color renderings and copy layouts.

C. Maintenance data: Submit manufacturer’s installation, operation, and maintenance manuals.

D. Samples: Submit selection and verification samples for finishes, colors, and textures of each type, color, and pattern of resilient flooring and accessories required, showing full range of color and pattern variations.

1.05 QUALITY ASSURANCE

A. Confirm all specifications with the factory prior to order.

B. Single Source Responsibility: Single manufacturer shall provide all components required to install the products specified in this section.

C. Manufacturers Qualifications: Manufacturers must have five years of experience in the manufacturing of scoreboards and message displays of the type specified.

D. Installer Qualifications: Factory-trained and experienced in the proper installation of scoreboards and message displays.

E. Welders: AWS certified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Physical inspection of items required at time of delivery; any shipping damages must be reported at delivery prior to storage.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not install scoring equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.

B. Field Measurements: Coordinate scoreboard location and height with the customer. Verify dimensions by field measurements.

C. Supply weight and mounting method to verify that building structure is capable of supporting the scoreboard’s weight in addition to the auxiliary equipment.

1.08 WARRANTY

A. Provide 5 years of no cost parts exchange including standard shipping on electronics parts and radios due to manufacturing defects.

B. Provide toll-free service coordination.

C. Provide technical online and phone support during business hours.

D. One Year Extended Service for on-site labor coverage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: The design for Gymnasium scoreboard is based on Daktronics Model BB-2155. Subject to compliance with requirements, provide the named products or approved equal by another one of the following.
   1. Substitutions must be approved by the Owner.

B. Subject to compliance with requirements, other manufacturers who may offer comparable products include, but are not necessarily limited to the following:
   1. Nevco
   2. Electro-Mech
   3. Fair Play
   4. Spectrum

2.02 INTERIOR BASKETBALL, VOLLEYBALL AND WRESTLING SCOREBOARD

A. Daktronics BB-2155 single-sided basketball scoreboard displays period time to 99:59, HOME and GUEST scores to 199, PERIOD to nine, team FLS (fouls) to 19, PLYR (player) number to 99, player FOUL to nine, T.O.L. (time outs left) to nine and indicates possession and bonus. During the last minute of the period, scoreboard displays time to 1/10 of a second. Electronic captions automatically change when volleyball and wrestling modes are selected. Scoreboard can also score any sport requiring a clock, score and period function.
   1. General information
      a. Dimensions: 6'-0" (1.83 m) high, 10'-0" (3.05 m) wide, 0'-6" (152 mm) deep
      b. Base weight: 275 lb (125 kg) – options may increase weight
      c. Base power requirement: 270 W – options may increase wattage
      d. Color: provide over 150 colors to choose from
   2. Construction
      a. All-aluminum construction
      b. Scoreboard back, face, and perimeter: 0.063" (1.60 mm) thick
      c. Cabinet withstands high-velocity impact from air-filled sports balls without the need for protective screens
   3. Digits & Indicators
      a. LED digit technology.
      b. PanaView® (PV) – discrete LEDs protrude through the scoreboard face.
      c. LED color to be selected by Architect.
      d. Clock and score digits: 13" (330 mm) high
      e. PERIOD, FLS, PLYR/FOUL and T.O.L. digits: 10" (254 mm) high
      f. Bonus indicators: 4" (102 mm) high
      g. Possession arrows: 3" (76 mm) high
      h. Seven bar segments per digit
   4. Vinyl Captions
      a. Applied directly to scoreboard face
      b. HOME and GUEST captions: 6" (152 mm) high
      c. PERIOD and T.O.L. captions: 4" (102 mm) high
      d. Color: To be selected by Architect.
   5. Electronic Captions
      a. FLS and PLYR/FOUL captions: 6" (152 mm) high
      b. Color: amber LEDs
   6. Horn
      a. Vibrating horn mounted inside the scoreboard cabinet behind the face
      b. Sounds automatically when period clock counts down to zero
      c. Sounds manually as directed by operator
   7. Power Cord
      a. Cord is 11' (3.35 m) long
      b. Cord plugs into a standard grounded outlet
   8. Accessory Equipment
      a. Vinyl striping applied around the clock and scoreboard face
      b. Custom team name caption in place of HOME
      c. Double bonus indicators in place of single bonus indicators
      d. Two 17" (432 mm) high, 21" (533 mm) wide aluminum panels in upper corners with vinyl logo/sponsor decoration
      e. Hinged metal mesh protective screen – painted to match scoreboard

2.03 SCORING CONSOLE

A. Console equal to All Sport® 5000 controller

B. Scores multiple sports using changeable keyboard inserts

C. Controls multiple scoreboards, stats display and shot clocks, including other All Sport 5000 controlled displays currently owned by customer

D. Recalls clock, score, and period information if power is lost

E. Console capable of automatically calculating and displaying DOWN & TO GO for each play

F. Runs Time of Day and Segment Timer modes

G. Console includes:
   1. Rugged aluminum enclosure to house electronics
   2. Sealed membrane water-resistant keyboard
   3. 32-character backlit LCD to verify entries and recall information currently displayed
   4. Power cord that plugs into a standard grounded outlet; 6 watts max
   5. Control cable to connect to the control receptacle junction box (wired system only)
   6. Hand-held switch for main clock start/stop and horn
   7. Soft-sided carrying case

H. Accessory Equipment
   1. 2.4 GHz spread spectrum radio system with frequency hopping technology and 64 non-interfering channels; system includes a transmitter installed inside the console and a receiver installed inside the scoreboard(s)
   2. Hard carrying case
   3. Battery pack

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that mounting surface is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings.

B. Verify support structure foundation concrete has cured adequately according to specifications.

3.02 INSTALLATION

A. Follow manufacturer's current application requirements for installation under conditions specific to the project.

B. Power conduit, cables and outlet boxes to be provided and installed by the electrical contractor. Signal raceways, conduit and boxes to be provided by the electrical contractor. Electrical contractor is also responsible for any required wire and terminators between each scoreboard and control location.

C. Mount scoreboards and interior displays to wall in location detailed and in accordance with manufacturer's instructions. Unit to be plumb and level.

D. Install scoreboards and exterior displays to beams in location detailed and in accordance with manufacturer's instructions. Verify unit is plumb and level.

E. Install scoreboard where power cord is not visible and behind the unit itself. Contractor to verify all electrical installations allow for proper installation and to verify in field.

3.03 INSTALLATION - CONTROL CENTER

A. Provide boxes, cover plates and jacks as required to meet control specification requirements. Control cables to control panels shall be concealed.

B. Test the operation of the scoreboard, controller and all control jacks; leave control unit in carrying case and other loose items with owner's designated representative.

C. Conduct operator training on the scoreboard/controller operation.

3.04 FIELD QUALITY CONTROL

A. Provide set-up and testing of results/statistics/timing system including portable cabling and software installation.

B. Perform maintenance training during installation.

C. Perform operator training.

D. Installation supervision by manufacturer’s representative.

E. Perform final systems testing and commissioning of equipment.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 11 66 43

SECTION 11 66 53 - GYMNASIUM DIVIDER

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Top-roll divider systems.
   2. Electric operators.
   3. Divider curtains.
   4. Divider system accessories.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

B. Submit Manufacturer's Product Safety Data Sheets for each product.

C. Shop Drawings: For gymnasium dividers.
   1. Include plans showing alignment of curtains in relation to sport-court layout and overhead structural supports.
   2. Include elevations, sections, details, and attachments to other work.
   3. Include system clearances, stacking requirements, and limits for fitting into adjacent construction.
   4. Include point loads and locations for attachment of gymnasium dividers to structure.
   5. Include diagrams for power, signal, and control wiring.

D. Samples for Initial Selection: For each type of gymnasium divider curtain fabric.

E. Samples for Verification: For divider curtain fabrics, not less than 12 inches square of mesh and of solid fabric.

1.05 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans with divider-curtain layouts, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
   1. Structural members to which divider-curtain systems will be attached.
   2. Suspended ceiling components, if any.
   3. Items supported from building structure, including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Sprinklers.
      e. Smoke detectors.
      f. Acoustical treatments or panels.

g. Access panels.

B. Qualification Data: For Installer.

C. Product Certificates: For each type of gymnasium divider.

D. Sample Warranty: For special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For gymnasium dividers to include in operation and maintenance manuals.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.08 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of gymnasium dividers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Faulty operation of gymnasium dividers.
      b. Tearing or deterioration of fabric, seams, or other materials beyond normal use.
   2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 TOP-ROLL DIVIDER SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AALCO Manufacturing.
   2. ADP Lemco.
   3. Arizona Courtlines, Inc.
   4. Draper Inc.
   5. IPI by Bison.
   6. Jaypro Sports, LLC.
   7. Performance Sports Systems.
   8. Spalding Equipment.

B. Source Limitations: Obtain from single source from single manufacturer.

C. Divider-Curtain System: Electrically operated, top-roll drive pipe, and as follows:
   1. Outer Edge Hems: Double turned and welded.
   2. Supports and Fittings: Corrosion-resistant steel clamps and hangers.
   3. Drive Pipe: 3-1/8-inch nominal diameter, fabricated from steel, aluminum, or PVC pipe or tubing, with a minimum number of joints as necessary for required lengths. Steel shall be galvanized or shop primed and shop finished with black paint.
   4. Curtain Battens: 1-1/2-inch nominal diameter, fabricated from steel pipe or tubing, with a minimum number of joints as necessary for required lengths. Provide galvanized steel or shop prime and shop finish with black paint.

2.02 ELECTRIC OPERATORS

A. Provide factory-assembled electric operation system of size and capacity recommended in writing and provided by gymnasium divider manufacturer for gymnasium dividers specified,

with electric motors and factory-prewired motor controls, control devices, and accessories required for proper operation.

1. Include wiring from control stations to motors and between synchronizer and dual motors for long curtains. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

B. Electrical Components, Devices, and Accessories: Listed and labeled according to NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Motor Electrical Characteristics:
   1. Horsepower: 3/4 hp.
   2. Voltage: 115 V ac, single phase, 60 hertz.

D. Limit Switches: Adjustable switches at each divider curtain, interlocked with motor controls and set to automatically stop divider curtain at fully extended and fully retracted positions.

E. Control System:
   1. Key-Switch Operation: NEMA ICS 6, Type 1 enclosure, momentary-contact, three-position switch-operated control with up, down, and off functions.
      a. Group Key-Switch Control: One switch per curtain.
      b. Switches: Single key switch incorporated into faceplate with multiple switch cutouts **as** indicated on Drawings. Install in line with other switches indicated on Drawings to be used for motorized basketball goals.
      c. Keys: Provide two keys per station.

2.03 DIVIDER CURTAINS

A. Upper Curtain, Mesh: Woven mesh of polyester yarn coated with vinyl, weighing not less than 9 oz./sq. yd.
   1. Mesh Color: As selected by Architect from full range of industry colors and color densities.

B. Lower Curtain, Solid: Woven polyester fabric coated with vinyl, 22 oz./sq. yd, 8-ft height above floor.
   1. Fabric Color(s): As selected by Architect from full range of industry colors and color densities.

C. Hems: Folded and electronically welded.

D. Seams: Electronically welded.

E. Overall Curtain Height: As indicated on Drawings and field-verified by Contractor.

F. Bottom of Curtain: Approximately 1 inch above finished floor.

G. Divider-Curtain Flame-Resistance Rating: Passes NFPA 701 Test 2.

2.04 DIVIDER SYSTEM ACCESSORIES

A. Safety Lock: Locks drive system when speed exceeds manufacturer's recommended speed.Audible Motion Alarm: Provide alarm with intermittent warning tone when curtain is raised or lowered.

2.05 SUPPORT MATERIALS AND FASTENERS

A. Support Chain and Fittings: For chains used for overhead lifting, provide Grade 80, heat-treated alloy-steel chains, according to ASTM A391/A391M, with commercial-quality, hot-dip galvanized steel connectors and hangers.

B. General-Purpose Chain: For chains not used for overhead lifting, provide carbon steel chain, according to ASTM A413/A413M, Grade 30 proof coil chain or higher grade recommended by gymnasium divider manufacturer. Provide coating type, chain size, number, and installation method according to manufacturer's written instructions.

C. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for alignment of mounting substrates, installation tolerances, operational clearances, and other conditions affecting performance of the Work.
   1. Verify critical dimensions.
   2. Examine supporting structure.
   3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements are clearly marked. Locate reinforcements and mark locations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions.

B. Install gymnasium dividers after other finishing operations, including painting, have been completed unless otherwise indicated.

C. Install gymnasium dividers level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated; in proper relation to adjacent construction; and aligned with sport-court layout.
   1. Verify clearances for movable components of gymnasium dividers throughout entire range of operation and for access to operating components.

D. Electric Operators Installation: Connect electric operators to building electrical system.

3.03 ADJUSTING

A. Adjust movable components of gymnasium dividers to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, uneven tension, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range; and lubricate as recommended in writing by manufacturer.

B. Limit Switch Adjustment: Set and adjust upper and lower limit controls.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium dividers.

END OF SECTION 11 66 53

SECTION 12 35 83 – SPECIALTY CASEWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Specialty Casework Including the Following:

1. Musical instrument storage casework.
2. Metal shelving systems.

1.02 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI A208.1 - Particleboard.

B. ASTM International (ASTM):

1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
3. ASTM E 795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

C. Audio Engineering Society (AES):

1. AES-4id - AES information document for room acoustics and sound reinforcement systems -- Characterization and measurement of surface scattering uniformity.

D. Builders Hardware Manufacturers Association (BHMA):

1. ANSI/BHMA A156.9 - Cabinet Hardware.

E. GREENGUARD Environmental Institute (GEI):

1. GREENGUARD certified low emitting products.

F. International Electrotechnical Commission (IEC)

1. Requirements for listing and labeling of products.

G. National Electrical Manufacturers Association (NEMA):

1. NEMA LD 3 - High Pressure Decorative Laminates.

H. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code (NEC).

I. Underwriters' Laboratories, Inc. (UL) and Underwriters' Laboratories of Canada (ULC):

1. Requirements for listing and labeling of products.

J. U.S. Department of Commerce, National Institute of Standards and Technology (NIST):

1. DOC PS 1 - U.S. Product Standard for Construction and Industrial Plywood.

K. California Air Resources Board (CARB).

L. California 93120 - Formaldehyde Emissions Phase I.

1.03 SUBMITTALS

A. Product Data: Manufacturer's data sheets, installation instructions, and maintenance recommendations.

B. Shop Drawings: Prepared by manufacturer. Include elevations showing casework components, details of each condition of installation, and types and locations of hardware and fasteners. Show fabrication and installation details. Include plans, elevations, sections, details, and attachments to other Work.

C. Samples: For each color and finish for each exposed casework component.

D. Operation and Maintenance Data.

E. Warranty: Submit sample meeting warranty requirements of this Section.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 years experience in manufacture of similar products in use in similar environments.

B. Obtain music education casework through one source from a single approved manufacturer.

C. Electrical Components: Listed and labeled per NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle casework in accordance with manufacturer's recommendations. Ship to jobsite only after roughing-in, painting work, and other related finish work has been completed and installation areas are ready to accept casework and recommended temperature and humidity levels will be maintained during the remainder of construction.

1.06 COORDINATION

A. Coordinate installation of blocking and supports in frame wall assemblies under work of other sections where required for anchoring casework.

1.07 WARRANTY

A. Special Warranty: Manufacturer's written warranty indicating manufacturer's intent to repair or replace components of music education storage casework that fail in materials or workmanship within 10 years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:

1. Fracturing or breaking of casework components including doors, panels, shelves, or hardware resulting from normal wear and tear and normal use other than vandalism.

2. Delamination or other failures of glue bond of components.

3. Warping of casework components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.

4. Failure of operating hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. DESIGN BASIS: Wenger Corporation, JR Clancy and GearBoss, which is located at: 555 Park Dr.; Owatonna, MN 55060; Toll Free Tel: 800-4WENGER (493-6437); Tel: 507-455-4100; Fax: 507-455-4258; Email:request info (info@wengercorp.com); Web:https://www.wengercorp.com|http://www.jrclancy.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time period allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements for acoustical performance.

b. Samples of each type of product specified, including but not limited to the following:
1) Door and casework panels.

2) Grille doors.

3) Hinges with through-bolting hardware.

4) Latches with through-bolting hardware.

c. Project references: minimum of 5 installations not less than 5 years old, with owner contact information.

d. List of successful installations of similar products available for evaluation by Architect.

e. Sample warranty.

2. Approved manufacturers shall meet separate requirements of Submittals.

2.02 MATERIALS

A. Materials Meeting Sustainable Design Requirements:

1. No Added Urea Formaldehyde Products: Provide music education storage casework made with composite products and adhesives with no urea formaldehyde added.

2. FSC Certified Wood Products: Provide music education storage casework made with wood from certified sources. Also available in Moisture Resistant, Class 1 Fire rated and Plywood cores.

B. Particleboard: ANSI A208.1, minimum 43 lb/cu. ft. (689 kg/cu. m) density, composite products and adhesives, with no urea formaldehyde added.

C. Fire Rated Particle Board: ANSI A208.1, minimum 45 lb/cu. ft. (720 kg/cu. m) density ASTM E-84 class 1.

D. Plywood: APA standards PS1-98 section 5.7.4 or 5.7.1 or ANSI /HPVA HP-1-2004 Panel provide with HDF skins to prevent grain telegraphing.

E. Particleboard Thermoset Panels: Particleboard finished with thermally-fused polyester surfacing on both sides meeting performance properties of NEMA LD 3 for VGS grade, edge-banded, including the following:

1. Surface Abrasion Resistance: Taber Wheel, 400 cycles, for solid colors.

F. Particleboard Thermoset Panels: Particleboard panel with no formaldehyde added 3/4 inch (19 mm) thick finished with thermally-fused polyester surfacing on both sides meeting performance requirements of NEMA LD 3 for VGS grade, edge-banded, including the following:

1. Surface Abrasion Resistance: Taber Wheel, 400 cycles, for solid colors.

G. Polyethylene Shelves: High-density, one-piece, blow-molded or polyethylene, with radiused front edge, for abuse-resistant shelves. Same color throughout will not show scratches.

H. PVC Edge Banding: Radiused PVC extrusions, 1/8 inch (3 mm) thick.

2.03 MUSICAL INSTRUMENT STORAGE CASEWORK

A. Basis of Design: AcoustiCabinets as manufactured by Wenger Corporation. Modular instrument storage casework with integral bases, adjustable levelers, and through-bolted fastening, enabling owner reconfiguration of unit layout.

1. Acoustically enhanced instrument storage casework finished with interior lining of sound-absorbent material providing sound absorption and noise reduction properties.

2. Sound Absorption Average: Minimum SAA of 0.80, based upon sound absorption coefficient for twelve one-third octave bands from 200 to 2500 Hz, inclusive, with a minimum Noise Reduction Coefficient (NRC) of 0.75, per ASTM C 423 and ASTM E 795.

3. Acoustical Performance: Comply with manufacturer's published sound absorption data.

4. Wave grille doors in 5/16 inch (24 mm) and 1/4 inch (6.4 mm) diameter designed to reduce vibration.

5. Adjustable shelf system integrated into cabinet walls allowing shelf placement at increments common to musical instruments. No loose parts or tools required. Shelf system to include a latch to prevent unintended shelf movement.

B. Storage Casework Component Load Capacities:

1. Storage Casework Wire-Grille Door Hinge: Each weld capable of resisting 400 lbf (1779 N) pull test without visible damage or permanent deformation.

2. Storage Casework Full Grille Door Hinge= Full length door capable of supporting 315 lbs (143 kg). Through open and close cycle without permanent damage.

3. Robe and Uniform Storage Casework Garment Hanger Rods: Capable of supporting

vertical load applied uniformly along width of unit of 200 lbf (890 N).

C. Robe and uniform storage casework with integral bases, adjustable levelers, and through-bolted fastening, enabling owner reconfiguration of unit layout.

D. Side Panels and Divider Panels: Particleboard thermoset panel with no urea formaldehyde added, 3/4 inch (19 mm) thick. Side panels machined to accept unit-to-unit through-bolting.

E. Grille Doors: Bright basic steel wire, 5/16 and 3/16 inch (7.9 and 4.8 mm) diameter, or 5/16 and 1/4 inch (7.9 and 6.3 mm) diameter for AcoustiCabinets, with full 360 degree welds at T-joints.

1. Provide for instrument storage casework.

2. Provide for casework indicated.

F. Panel Edge Banding: 3 mm thick, heat-bonded, with radiused and profiled edges and corners.

G. Shelving: Sized with adequate gap between shelving and casework side panels to allow air movement inside casework.

1. Up to 27 inches (686 mm) wide: Removable molded polyethylene shelf, with impact-resistant, radiused front edge, mounted to cabinet wall with self-locking clip.

2. Over 27 inches (686 mm) wide: For large instrument casework: Removable formed polyethylene shelf, ribbed, with high-impact-resistant, radiused front edge, supported by steel tube frame.

3. Tubular steel supports are included for shelves over 19 inches (483 mm) wide.

4. Corner cabinet revolving shelving: 0.053 inch (1.3 mm) min. thickness steel sheet bolted to revolving steel center post, with radiused hardboard deflector panel.

H. Casework Panel Color: As selected by Architect from manufacturer's standard colors.

I. Filler Panels and Closure: 3/4 inch (19 mm) thick particleboard thermoset panels with no urea formaldehyde in Oyster color. Provide the following, cut to fit field conditions, where indicated:

1. Wall filler between cabinet side and wall.

2. Top filler between cabinet top and wall.

3. Top of cabinet closure panel between cabinet and finished ceiling or soffits.

4. Finished back panel for exposed cabinet backs.

J. Butt Hinges: 2-3/4 inches (70 mm), 5-knuckle steel hinges made from 0.090 inch (2.29 mm) thick metal, ANSI/BHMA A156.9, Grade 1, with powder-coated finish, through-bolted to door and side panels and welded to grille door frames. Provide 2 hinges on compartment doors, and 4 hinges on full-height doors.

K. Slide Latch: 0.105 inch (2.67 mm) min. thickness steel, with padlock eye, powder-coat finish, through-bolted to panel door and side panel and welded to grille door frames. Latches securely without padlock. Provide with clear plastic label holder for use with standard size

labels; number system available for user to print. Padlocks furnished by Owner.

L. Panel Connectors: 1/4- 20 by 1.77 inch (45 mm) panel connectors, with steel thread inserts, powder coated to match panels.

M. Cabinet Levelers: Leveling glides with 3/8 inch (9.5 mm) diameter threaded steel rod in steel corner brackets, minimum two each per cabinet side, accessible from within unit, and concealed in completed installation.

N. Carcass joinery includes lag screws powder coated to match substrate.

O. Back panel 7/32 inch (5.6 mm) reinforced with 3/4 inch (19 mm) stretcher panels held in a dado groove and lag screwed in place.

P. Fasteners: Manufacturer-recommended fasteners as required for casework substrate and project performance requirements, consisting of one or more of the following:

1. Sheet Metal Screws: SAE J78, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
2. Wood Screws: ASME B18.6.1.
3. Expansion Anchors in Concrete and Concrete Masonry Units: Carbon-steel, zinc plated.
4. Hardware supplied to anchor the cabinets to the wall and to adjacent casework

Q. Finish: Steel Sheet, Steel Wire, and Exposed Fasteners. Urethane-based electrostatic powder coating, color as indicated. Refer to Drawings.

2.04 METAL SHELVING SYSTEMS

A. GearBoss Metal Shelving Systems, Shelf Starter Bay, Shelf Add-On Bay, and Shelves by Wenger Corporation: Cantilever-type modular metal storage shelving system comprised of the following components:

1. Structural Performance:
   a. Allowable Load Rating: 1000 lb. (373 kg) per 4 by 8-foot (1219 by 2438-mm) bay.
   b. Load-Carrying Capacity per 48 inch (1219 mm) Shelf: 250 lb. (113 kg).
2. Shelf Unit Uprights: Steel tube, metallic-coated, 2-inch (50.8 mm) square, 0.109-inch (2.76 mm) thick, with perforations on all four sides at 1 inch (25 mm) on center.
3. Horizontal Stringer: Formed sheet steel, metallic-coated, 0.075-inch (1.9-mm) thick.
4. Shelf Cross Tubes: 14 gauge steel tube, metallic-coated, 5/8-inch (22-mm) square.
5. Shelf Brackets: Formed steel, 0.015-inch (0.38-mm) thick.
6. Laminate-Clad Wood Panels: Core material and thickness indicated, finished with thermally-fused anti-microbial polyester surfacing on both sides.
7. Unit Width: 48 inch (1219 mm) center-to-center unless otherwise indicated.
8. Unit Height: 96 inches (2438 mm).
9. Shelves can be adjusted in 1 inch (25 mm) increment without tools.

B. Metal Shelving Materials:

1. Aluminum Extruded Bars, Profiles, and Tubes: ASTM B221.
2. Sheet Steel: Cold-rolled, ASTM A1008, commercial steel, type B.
3. Steel Tube: ASTM A501, hot-formed steel tubing.
4. Steel Wire: ASTM C510, cold drawn steel wire
5. Particleboard: To ANSI A208.1, minimum 43 lb/cu. ft. (689 kg/cu. m) density.
6. Plywood: APA standards PS1-98 section 5.7.4 or 5.7.1 or ANSI /HPVA HP-1-2004 Panel provide with HDF skins to prevent grain telegraphing.
7. Steel Tube: ASTM A500, cold-formed steel tubing.
8. Laminate Finish: Composite, of thickness indicated, finished with thermally-fused anti-microbial polyester surfacing on both sides, meeting performance properties of NEMA LD3 for VGS grade, with heat bonded, radiused, 3 mm thick extruded PVC edge banding.
    a. Surface Abrasion Resistance: Taber Wheel, 400 cycles, for solid colors.
9. PVC Edge Banding: LMA EDG-1, radiused PVC extrusions, 3 mm thick, heat-bonded.
10. Anchors and Fasteners:
    a. Factory Provided: Material, type, and size recommended by manufacturer for secure anchorage to substrate.
    b. Field Installed: Manufacturer-recommended fasteners furnished by Contractor as required for locker substrate and project requirements.

C. Metal Shelving Fabrication:

1. Fabricate components square, and rigid. Make exposed metal safe to touch and free of sharp ends or burrs.
2. Form frames, panels, doors, and accessories from one-piece, or one rigid assembly, unless specifically shown on Shop Drawings.
3. Factory preassemble metal components by welding all joints, and connections; with no bolts, nuts, screws, or rivets used in assembly, except as required for knock down shipping and attachment to mounting surfaces.

D. Metal Shelving Accessories:

1. Shelf Depth: 17.5 inches (444 mm) with 2 cross tubes.
2. Cantilevered Shelf: Steel tube and bracket, with aluminum extrusion nosing, mill finish unless otherwise indicated.
3. Garment Hanger: Steel round tube mounts underneath shelf; powder-coat finish, black. Quantity of garment bars as indicated on Drawings.

E. Metal Shelving Finishes: Manufacturer's standard finish, color as selected by Architect from

manufacturer's standard colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine casework installation areas for compliance with requirements for installation tolerances, location of blocking and other anchoring reinforcements, and other existing conditions affecting installation and performance of casework. Proceed with casework installation upon correction of unsatisfactory conditions.

3.02 CASEWORK INSTALLATION

A. Install plumb, level, and true; using integral levelers. Install in accordance with manufacturer's recommendations and approved submittals.

B. Install hardware uniformly and precisely. Set hinges snug and flat. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

C. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind and close with uniform reveals.

D. Metal Shelving Requirements:

1. Anchor uprights to walls using anchors of type, size, and spacing recommended by manufacturer.
2. Install shelves in each unit.
3. Erect cantilever adjustable uprights to substrate with a maximum tolerance from vertical of 1/4 inch (6 mm).
4. Adjust metal shelving so connectors and other components engage accurately and securely. Verify modular components fit easily into alternate locations without force or use of tools.

3.03 CLEANING AND PROTECTING

A. Repair or replace defective work as directed by Architect upon inspection.

B. Clean casework surfaces. Touch up, refinish, or replace damaged components in a manner acceptable to Architect.

C. Turn over operation and maintenance instructions to Owner.

END OF SECTION 12 35 83

SECTION 23 65 27 - AIR-COOLED ROTARY SCROLL CHILLER

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Furnish and Install a packaged, electric-driven, air-cooled, water chilling unit with multiple scroll compressors complete with controls.

1.2 RELATED WORK

A. Division 23 - Mechanical
   1. Chilled Water Piping
   2. Insulation
   3. Building Management Control System
   4. Vibration Isolation
   5. Electrical Provisions of Mechanical Work

1.3 REFERENCES

A. ANSI/ARI 550/590 - Water Chilling Packages using the Vapor Compression Cycle.

B. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.

C. ANSI/ASHRAE 90A - Energy Conservation in New Building Design.

D. ANSI/ASME SEC 8 - Boiler and Pressure Vessel Code

E. ANSI/NEMA MG 1 - Motors and Generators.

F. ANSI/UL 465 - Central Cooling Air Conditioners.

G. ANSI/AFBMA 9-1978 - Load Ratings and Fatigue Life for Ball Bearings. Bearings must have life of not less than 200,000 hours.

H. ANSI/NFPA Standard 70 - National Electrical Code (NEC)

I. ASTM B117 - Standard Method of Salt Spray (Fog) Testing

J. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

K. ASTM A525 - Zinc (Hot-Dip Galvanized) Coatings on Sheet Steel Products

L. ASTM D1654 - Evaluation of Painted or Coated Specimens, Subjected to Corrosive Environments.

1.3 PERFORMANCE

A. Provide performance as scheduled on drawings. Provide factory run test to ensure proper

chiller operation. Provide certified documentation to Owner in Closeout Documents.

1.4 WARRANTY

A. The Chiller manufacturer shall provide a full machine parts, labor, and refrigerant warranty and maintenance service agreement for a period of five (5) years from substantial completion.
   1. The warranty shall include, but not be limited to the compressor assemblies including motor, condensers, fans, variable frequency drives, controls, evaporator, condenser, refrigeration system and all other auxiliary components and accessories as well as refrigerant and oils in systems.
   2. In the event of failure, provide new or factory authorized rebuilt parts. Shop or job site rebuilt parts are not acceptable.
   3. On all manufacturers warranties the chiller manufacturer shall provide a factory certificate listing as a minimum chiller model, serial, and warranty information as specified above. Each chiller tag shall be provided with an individual and unique warranty certificate. Manufacturer's representative warranty letters are not acceptable as an alternative to the original manufacturer's certificates.
   4. The chiller manufacturer authorized service agency is required to perform any and all warranty service. Contractor warranty service is not authorized. Warranty work shall be performed with District Representative present.

1.5 SUBMITTALS

A. Submit manufacturer's certified computer generated performance and capacity data in accordance with specification requirements.

B. Submit the following information:
   1. Manufacturer's installation instructions.
   2. Minimum Circuit Ampacity.
   3. Maximum Overcurrent Protection size.
   4. Maximum conductor / Terminal Lug size.
   5. Minimum flow thru evaporator.
   6. Electrical interlocks.

C. Submit recommended clearance dimensions for air flow and service.

D. Submit coordination drawings as specified.
   1. Give consideration to adjacent structures as they affect air flow patterns.

E. Submit internal wiring diagram of Control Center.

F. Submit sequence of operation in narrative form.

G. Submit a letter stating chiller being proposed meets the efficiency requirements of Centerpoint Energy's Score Program listed in Centerpoint Energy's Design Guide: HVAC Recommendations document.

H. Mark-up a copy of the specifications, indicating in the margin of each paragraph, the following: COMPLY, DO NOT COMPLY, NOT APPLICABLE.

1.6 STORAGE/HANDLING/SHIPPING

A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

B. Protect units from physical damage. Factory coil shipping covers shall be kept in place until installation.

C. Unit controls shall be capable of withstanding 203°F (95°C) storage temperatures in the control compartment for an indefinite period of time.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Carrier

2.2 COMPRESSORS

A. Provide a minimum of two independently circuited hermetic rotary scroll type compressors with the following:
   1. Direct drive, 3600 rpm, suction gas-cooled hermetic motor.
   2. Rubber isolation pads.
   3. Crankcase heaters.
   4. Oil sight glass.
   5. Load and unload solenoid valves.
   6. Discharge oil separator.
   7. Hot gas bypass for compressor unloading.
   8. Centrifugal oil pump.
   9. Oil charging valve.

B. Provide capacity modulation from 100% to 25% via compressor cycling.
   1. Control to be based upon leaving chilled water.
   2. To avoid excessive compressor cycling while maintaining leaving chilled water temperature at desired temperature +/- differential, compressor cycling set points to be separated by a minimum 20% capacity dead band.

C. Unit shall be equipped with factory installed Ultra-Low Sound Compressor Sound Reduction enclosure the encases each compressor. The sound reduction enclosure shall meet or exceed maximum A-weighted sound pressure level rating of 70dBA at 30’ from the condenser coil side of chiller per AHRI. Complete sound attenuation package shall be provided regardless if scheduled dBA is met without.

2.3 CONDENSER COILS

A. Coils shall be one of the following:
   1. Coil shall be microchannel design and shall have a series of flat tubes containing multiple, parallel flow microchannel layered between the refrigerant manifolds. Tubes shall be 9153 aluminum alloy. Tubes made of 3102 alloy or other alloys of lower corrosion resistance shall not be accepted. Long Life Alloy Microchannel shall pass 4500hr salt spray rating uncoated.
   2. The condenser coils shall consist of 0.375 inch seamless copper tubes mechanically bonded into plate-type fins. The fins shall have full drawn collars to completely cover the tubes.

B. Protect all vertical or angled coil sections from hail or physical damage with corrosion resistant louvered hail guard including chiller ends, factory installed to cover compressor and condenser sections.

C. Field adjustable head pressure based fan cycling controls for each circuit capable of maintaining minimum head pressure down to 20°F unless noted otherwise.

D. Protect condenser coils during shipping.

E. Provide condenser coils coated with corrosion resistant epoxy utilizing a dip and bake. Coating shall be flexible and uniformly bonded to all condenser coil surfaces.

2.4 FANS AND MOTORS

A. Direct drive ultra-quiet nine blade fans propeller type fans.
   1. Vertical discharge with sound reduction without performance reduction.
   2. Protect fan blades with a heavy-gauge wire guard.
   3. Statically and dynamically balanced.
   4. Sound reduction engineered heavy-duty molded plastic blades designed to reduce airflow turbulence.

B. Motors with built in thermal overload protection
   1. Permanently lubricated ball bearings.
   2. Weatherproof (TEAO or TEFC) motors.
   3. Variable frequency drive on each condenser fan circuit.

2.5 COOLER/EVAPORATOR

A. Provide a tube-in-shell direct expansion cooler for the evaporator.
   1. Tube-in-shell direct expansion cooler
      a. Copper tube and steel shell construction
      b. 300 psig water side working pressure
      c. ASME coded 225 psig refrigerant side working pressure
      d. Fully independent refrigerant circuit for each compressor.
      e. Serviceable construction including removable heads and field

replaceable tubes.

f. Drain and vent connection.

g. Inlet strainer.

B. Protect cooler and heat exchanger with ambient controlled heater cable and minimum 1-1/2" thick flexible elastomeric rubber closed cell insulation. Heater cable to protect evaporator to -20°F (-29°C). Heater cable shall be wrapped helically around the shell under the insulation.

C. Protect insulation and equipment from abrasion by unit enclosure.

D. After completion of successful start-up, installing contractor shall seal all openings.

E. Provide water drain connection, vent and fittings for factory installed leaving water temperature control and low temperature cutout sensors.

F. All water connections to Evaporator shall be provide with factory flanged connections.

2.6 CASING/ENCLOSURES

A. House components in minimum 12 gauge galvanized steel frame and mounted on welded structural steel base. Hot-dip galvanized steel frame coating shall be Underwriters Laboratories Inc. (UL) recognized as G90-U, UL guide number DTHW2.

B. Unit panels, and control panels shall be 14 gauge, finished with a baked on powder paint. Control panel doors shall have door stays. Paint system shall meet the requirements for outdoor equipment of Federal Government Agencies.

C. Mount starters and disconnects in weatherproof panel provided with full opening access doors. Provide lockable disconnect operating handle external to panel and clearly visible from outside of unit indicating if power is on or off.

D. Casings fabricated from steel that do not have a Zinc coating conforming to ASTM A 123 or ASTM A525 shall be treated for the prevention of corrosion with a factory coating or paint system. The coating or paint system shall withstand 672 hours in a salt-spray fog test in accordance with ASTM B 117. Each specimen shall have a standard scribe mark as defined in ASTM D 1654. Upon completion of exposure, the coating or paint system shall be evaluated and rated in accordance with procedures A and B of ASTM D 1654. The rating of failure at the scribe mark shall be not less than six (average creepage not greater than 1/8"). The rating of the unscribed area shall not be less than ten (no failure). Thickness of coating or paint system on the actual equipment shall be identical to that on the test specimens with respect to materials, conditions of application, and dry-film thickness.

E. Coated wire mesh to limit access beneath the condenser coils, cooler, and compressor section area.

F. Convenience outlet (GFIC) at control panel connected to 120-vac circuit provided for heat

tracing on cooler.

G. A control power transformer shall be factory installed to provide unit control power.

2.7 REFRIGERANT CIRCUIT

A. All units shall have a separate independent refrigerant circuit for each compressor. Twenty & 30 Ton single circuit; 40, 50 & 60 Tons, dual individual refrigerant circuits.

B. Provide for each refrigerant circuit:
1. Liquid line isolation valve.
2. Filter dryer (replaceable core type).
3. Liquid line sight glass and moisture indicator.
4. Electronic or thermal expansion valve sized for maximum operating pressure. Expansion valves with less than five years of proven field operation are not acceptable.
5. Charging valve.
6. Discharge and oil line check valves.
7. Compressor suction and discharge service valves.
8. Relief valve.
9. Full operating charge of refrigerant and oil.
10. Unit factory leak tested at 200 psig.

2.8 CONTROL PANEL

A. The Control Center.
1. NEMA 3R weatherproof cabinet with hinged lockable outer door.
2. Control system.
3. Solid-state compressor three phase motor protection.
4. Single point field power connection points.
5. Control interlock terminals.
6. Fan motor and control circuit fuses.
7. Individual contactors for each fan motor.
8. Unit power terminal blocks for connection to remove disconnect switch.
9. Power supply terminals for evaporator heater circuit.
10. Dead front panels over line voltage.
11. Control power / circuit transformer.
12. Provide incoming power terminals, sized to accept the feeder conductors.
13. Chiller run and alarm status relay cards.

B. Microprocessor control system.
1. Stage unit based on leaving water temperature control.
2. Oil differential pressure setpoints.
3. Motor protection.
4. High pressure alarm.
5. Loss of refrigerant alarm.
6. Loss of water flow alarm.

7. Freeze protection alarm.
8. Low refrigerant pressure alarm.
9. Auto start/stop switch.
10. Chilled water setpoint adjustment.
11. Anti-recycle timer.
12. Compressor run status.
13. Password protection.
14. Low water temperature safety (freeze protection).
15. Automatic pump down cycle.
16. Limit supply water temperature pull down on start up to 1° per minute.
17. Automatic lead-lag sequence change of compressors.
18. Unload the compressors if the return water is too high.
19. Compressor starts with the controlled cylinders unloaded.
20. Reset of the chilled water temperature.
21. Indicate status of safeties.
22. Non-volatile memory (EPROM) with setpoints retained with battery backup.
23. Automatic high pressure unloader to unload compressor at pressures above 375 psig.
24. Auto restart after power failure.
25. Alarm Relay
26. Percent of Running Load Amperage
25. BacNET interface

C. Display the following information with 16 key keypad with two line x 40 character clear English Display for outdoor viewing.
1. Supply and Return water temperature.
2. Low water temperature cutout setting.
3. Low ambient temperature cutout setting.
4. Outdoor air temperature.
5. English and Metric data.
6. Suction pressure cutout setting.
7. Each system suction pressure.
8. Each system discharge pressure.
9. Each system oil pressure.
10. Percent of full load motor current.
11. Liquid control range. (2.0 - 20°F above setpoint).
12. Liquid pulldown rate sensitivity adjustment.
13. Anti-recycle timer status for each compressor.
12. Compressor starts & operating run hours.
13. Safety shutdown shall be date and time stamped.
14. Compressor run status.
15. History and alarm diagnostic memory display.

D. All control functions and information shall be available at the unit control panel or via RS 232 cable and phone modem to personal computer.

E. Chiller shall include a relay board with dry contacts for alarms to notify a Building Automation System of certain events or statues of the chiller.

F. Chiller shall include input for leaving chilled water temperature setpoint based upon a 2-10VDS or 4-20mA signal from a Building Automation System.

G. Chiller shall include input for chiller current limit setpoint based upon a 2-10VDC or 4-20mA signal from a Building Automation System.

H. Chiller shall be provided with High SCCR device to allow chiller to tolerate a 65 kA short circuit current for a brief period of time while protecting downstream components.

PART 3 – EXECUTION

3.1 INSTALLATION

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

B. Where the chiller unit is mounted on a grade, a concrete pad shall be provided that is a minimum of 4" high and extends 6" all around the chiller.

C. Align chiller package on steel or concrete foundations.

D. Locate away from overhead restrictions. Maintain side clearances according to manufacturer's recommendations and maintain overhead clearance to allow full elimination of hot air discharge.

E. Install units on vibration isolation pads.

F. Arrange piping for easy dismantling to permit tube cleaning, removing and or repair.

G. Level chiller.

H. Provide flexible elastomeric rubber closed cell insulation to prevent condensation from occurring at cooler and suction piping. After completion of successful start-up, installing contractor shall seal all openings in insulation and apply a protective aluminum sheetmetal jacket over insulation.

I. Provide a flexible pipe connection at both the chiller inlet and outlet.

3.2 CHILLER MANUFACTURER START-UP/ FIELD SERVICES

A. Provide the services of a factory trained service technician employed full time by the chiller manufacturer to start-up the system. Technicians, as required, shall be factory trained and experienced in the work they perform. (Contractor startup is unacceptable.)

B. The technicians shall utilize comprehensive report forms to document results. Sample forms shall be submitted for review prior to commencing work.

C. Upon completion of the work, the report forms shall be signed by the technicians and their supervisor and included in the final report and Owner's manual.

D. Submit four copies of the final report to the Architect/Engineer for approval within 10 working days of start-up.

E. Follow the manufacturer's start-up procedures.
   1. Verify interlocks.
   2. Test and verify operation of safety controls.
   3. Calibrate controls.
   4. Verify microprocessor based control operation.
   5. Test, calibrate, and set the chilled water temperature controls.
   6. Verify chilled water temperature reset sequence.
   7. Verify operation of the integrated control panel.

F. Measure and record the following data:
   1. Chilled water entering/leaving temperature.
   2. Chilled water flow through the chiller.
   3. Suction pressure/condensing pressure.
   4. Suction pressure/unloading steps.
   5. Air entering/leaving condenser; dry bulb temperature.
   6. Outdoor ambient; dry bulb.
   7. Motor nameplate voltage; phase and full load amperes.
   8. Heater coil in starter (as applicable)
      a. Rating in amperes.
      b. Manufacturer's recommendation.
   9. Power reading (voltage and amperes of legs at motor terminals).

G. Test and calibrate the operation of the electronic ground current sensing devices.

H. If the system has been shipped with a holding charge, provide the following:
   1. Leak test.
   2. Refrigerant pressure test.
   3. Evacuate, dehydrate and charge.

I. Verify that accessories are installed and performing the specified functions. Insert certification in Owner's manual.

J. Instruct the Owner's operating personnel. Provide Owner with 8 hours of training prior to substantial completion.

K. Do not operate the equipment for any reason until the factory start-up service has been completed.

L. Provide a print-out from the unit micro-computer control system showing the correct operation of all system controls and components.

M. Provide minimum 24 hour history log displaying accuracy of temperature control system in 15 minute intervals and documented number of compressor cycles during the 24 hour period.

3.3 IDENTIFICATION

A. Furnish each unit with a durable, deep etched, .025" thick, factory installed aluminum identification plate, permanently mounted with the following information:
   1. Unit identification as indicated on Contract Drawings.
   2. Serial Number.
   3. Model Number.
   4. Capacity (Tons)
   5. Unit power supply: Volts / PH / Amps.
   6. Sales Order #.
   7. Date unit manufactured.

END OF SECTION 23 65 27

SECTION 23 82 19 - FAN COIL UNITS

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Floor mounted decorative cabinet fan/coil units, horizontal fan/coil units for concealed installation and horizontal exposed ceiling mounted fan/coil units with decorative cabinet.

1.2 RELATED WORK

A. Division 23 Mechanical
   1. Air Balance
   2. Controls
   3. Electrical Provisions of Mechanical Work
   4. Ductwork
   5. Air filtration

1.3 REFERENCES

A. ANSI/AHRI 410 - force circulation air cooling and air heating coils

B. National Electrical Code

1.4 SUBMITTALS

A. Submit manufacturer's dimensioned product data sheets.
   1. Show location of filter access doors.

B. Submit fan performance curve for each unit:
   1. Plot fan volume against static pressure, horsepower and efficiency.
   2. Show point of rating based on static requirements of the system.

C. Submit the fan performance plot at each motor speed position with consideration for the reduced internal static.

D. Submit a chart of specific sound power level at each octave band center frequency.

E. Submit manufacturer's certified heating and cooling coil capacity data.

F. Submit filter manufacturer's product data sheets and capacity information.

G. Submit manufacturer's data on housing insulation material.

1.5 CAPACITY

A. Refer to equipment schedule.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Carrier

B. JCI

C. Trane

2.2 COMPONENTS

A. Fan section

B. V-belt drive assembly, or,

C. Multi-speed direct connected motor

D. Filter section

E. Coil section

F. Insulated sheet metal cabinet with removable panels for access to the interior

G. Motor and drive inside the cabinet

2.3 FAN SECTION

A. Locate the motor and drive assembly inside the cabinet.

B. Size each v-belt drive for 50% overload.
   1. Adjustable pitch motor pulley
   2. Provide built-in motor protection
   3. Belt adjustment means

C. Provide multi-speed direct connected fan motor with built-in motor protection.
   1. Three-speed windings
   2. Factory wired to a junction box with provisions for motor speed change, mounted on the box
   3. Resiliently mounted

D. Select the fan motor so that the brake horsepower required to deliver the design air quantity at the system static pressure will not exceed the motor nameplate amperage rating.

E. Supply Fans:
   1. Double width, double inlet, forward curve blade
   2. Statically and dynamically balanced

3. Tested after being installed in the fan section
4. Selected for the design air quantities and static pressure of the system
5. Mounted on a common shaft if multiple wheels

F. Select fan to operate at or near its maximum efficiency point when handling the required air quantity and static pressure.

G. Fan Bearings:
1. Permanently lubricated
2. Self-aligning

2.4 DECORATIVE HOUSING AND PLENUM

A. Where units are exposed to view in occupied spaces and where scheduled, construct cabinets of cold rolled steel, bonderized and coated with baked enamel finish.

B. Access panels shall have position locking fasteners for easy removal.
1. Plated screws with captive nuts
2. Hinged if too large for one man operation

2.5 UNIT HOUSING

A. All cabinet walls and access doors shall be fabricated of double wall, impact resistant, rigid polyurethane foam panels.

B. Unit insulation shall have a minimum thermal resistance R-value of 6.25. Foam insulation shall have a density of 2 pounds/cubic foot and shall be tested in accordance with ASTM D-1929 for a minimum flash ignition temperature of 610°F.

C. Unit construction shall be double wall with G90 galvanized steel on both sides and a thermal break. Double wall construction with a thermal break prevents moisture accumulation on the insulation, provides a cleanable interior, prevents heat transfer through the panel and prevents exterior condensation on the panel.

D. Unit shall be designed to reduce air leakage and infiltration through the cabinet. Sealing shall be included between panels and between access doors and openings to reduce air leakage. Refrigerant piping and electrical conduit through cabinet panels shall include sealing to reduce air leakage.

E. Access to filters, cooling coil, reheat coil, heaters, supply fans and electrical and controls components shall be through hinged access doors. Stainless steel hinges shall be included on the doors.

F. Access doors shall be flush mounted to cabinetry, with stainless steel removable hinges and quarter-turn, zinc cast handles.

G. Condensation on the exterior of the unit is not approved.

H. Insulation, vapor barriers, facings and adhesives shall have:

1. Flame spread not higher than 25.
2. Smoke developed rating not higher than 50.

2.6 CONDENSATE DRAIN PANS

A. IAQ style drain pans shall be provided under all coils.
1. Pitch to drain connection
2. Fabricated from 16 gauge 304 stainless steel
3. Triple pitched for complete drainage with no standing water
4. Insulated to prevent condensation
5. Welded corners
6. Stainless drain connection

2.7 COILS

A. Reference Schedule and Specification Section 23 82 16.

2.8 FILTER SECTION

A. Locate behind access doors.
1. Construct with substantial hinges
2. Neoprene gaskets
3. Permanent quick-release latching devices

B. Arranged to accommodate the 1" thick filters as specified.
1. Single section filter

C. Provide full length tracks to support the filter.

PART 3 – EXECUTION

3.1 SPARE PARTS

A. Provide the following spare parts and material to the Owner for use after the warranty period.
1. One spare fan motor for each size of fan motor on the project
2. One spare set of filters or filter media for each fan coil unit on the project

3.2 ELECTRICAL REQUIREMENTS

A. Bring electrical connections to a common junction box.

3.3 STORAGE

A. Storage and shipping in accordance with manufacturer's recommendations.

3.4 INSTALLATION

A. Install unit so motor connections and filters are accessible.

END OF SECTION 23 82 19

SECTION 26 05 19 - CONDUCTORS AND CONNECTORS – 600 VOLT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide electrical conductors, wire and connector work as shown, and specified.

B. Types: The types of conductors and connectors required for the project include the following:
   1. 600V building conductors
   2. 600V building conductor connectors
   3. 600V 2-hour fire rated power cable

C. Application: The applications for conductors and connectors required on the project are as follows:
   1. Power distribution circuitry
   2. Lighting branch circuitry
   3. Appliance, receptacle, and equipment branch circuitry
   4. Motor branch circuitry
   5. Control wiring
   6. Line voltage

D. Refer to other specific specification sections for voice, video, data, alarm and instrumentation cables.

1.2 QUALITY ASSURANCE

A. UL Label: Conductors and connectors shall be UL labeled.

1.3 REFERENCES

A. Refer to other specific specification sections regarding specialized wiring and connections.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CONNECTORS

A. General: Except as indicated, provide conductors and connectors of manufacturer's standard materials, as indicated by published product information, designed and constructed as instructed by the manufacturer, and as required for the installation.

B. Conductors: Provide factory-fabricated conductors of the size, rating, material, and type as indicated for each use. Conductors shall be soft or annealed copper wires meeting, before stranding, the requirements of ASTM B 3, Standard Specification for Soft or Annealed Copper Wire for Electrical Purposes, latest edition.
   1. Conductors for control wiring sized #14 AWG through #10 AWG shall be

stranded.

2. Conductors for power and lighting shall be stranded. Stranding shall be Class B meeting the requirements of ASTM B 8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, or Soft.

C. Insulation for standard building conductors: Insulation shall meet or exceed the requirements of UL 83, Standard for Thermoplastic Insulated Wires.
   1. All wiring inside lighting fixtures shall be temperature rated per NEC.
   2. Insulation for copper conductors shall be UL Type THHN/THWN, 90 degrees C.

D. Insulation for 2-hour fire rated power cables: Insulation shall meet or exceed the requirements of UL 2196 Fire Test for Electrical Circuit Protection Systems, and UL 44, Standards for Fire Resistive Cable. Conductor ampacity shall be based on 75C. Combination UL Type insulation types are permissible where the required UL Type is part of the combination UL listing.
   1. Conductors installed underground: Insulation for underground fire rated conductors shall be wet location, UL Type RHW 75 degrees C, or UL RHW-2 90 degrees C.
   2. Conductors installed above ground: Insulation for above ground fire rated conductors shall be UL Type RHH 90C or RHW 75C or UL RHW-2 90C.
   3. Electrical Circuit Protective Systems (FHIT) – System 27 of the UL Fire Resistance Directory

E. Cable Lubricant: Fire resistant, nonflammable, water-based type for standard building conductors. Provide cable lubricants for fire rated cables as recommended by the cable manufacturer.

2.2 COLOR CODES FOR CONDUCTORS FOR BRANCH CIRCUITS AND FEEDERS

A. Color coding for conductors as required by NEC 210.5. Color coding for phase and voltage shall be as required by local codes and local standards. Where such standards do not exist, color coding shall be as follows:

Color Code Table	**USE CONTINUOUS COLOR CODED INSULATION THROUGHOUT**					
System/ Phase	**A**	**B**	**C**	**N**	**G**	**IG**
120/208 3 Ph	Black	Red	Blue	White	Green	Green/Yellow Stripe
120/240 3 Ph	Black	Orange	Blue	White	Green	Green/Yellow Stripe
120/240 1 Ph	Black	N/A	Blue			
277/480	Brown	Purple	Yellow	Gray	Green	Green/Yellow Stripe

Notes to Color Code Table:

1. 120/208, 120/240, and 277/480 Volt Systems shall be routed in separate raceways.
2. Switched legs of phase conductors for lighting and appliance branch circuits shall be of the same color as described above throughout the entire circuit.
3. Conductors shall be the same color from breaker to device or outlet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install electrical conductors and connectors as shown, in accordance with the manufacturer's written instructions, the requirements of NEC, the NECA Standard of Installation, and industry practices.

B. Coordination: Coordinate conductor installation work with electrical raceway and equipment installation work, as necessary for interface.

C. Conductors:
1. Provide a grounded (neutral) conductor for each branch circuit. Do not share grounded (neutral) conductors.
2. No more than six phase conductors shall be installed in a single raceway. Any combination of phase conductors and grounded (neutral) conductors in any raceway shall not exceed nine.
3. When any combination of four or more phase and grounded (neutral) conductors are installed in a raceway, the minimum size for all conductors including equipment ground conductor shall be #10 AWG, and they shall be de-rated accordingly.
4. When more than four (4) conductors are size #10 AWG, they shall be installed in a one-inch conduit.
5. Pull conductors together when more than one is being installed in a raceway. Whenever possible, pull conductors into their respective conduits by hand. Use pulling lubricant when necessary.
6. Before any conductor is pulled into any conduit, thoroughly swab the conduit to remove foreign material and to permit the wire to be pulled into a clean, dry conduit.
7. Run feeders their entire length in continuous section without joints or splices.
8. No wire smaller than #12 AWG shall be permitted for any lighting or power circuit. No wire smaller than #14 AWG shall be used for any control circuit, unless shown otherwise.
9. Provide the same size wire form the panelboard to last outlet on circuit. For 20 amp branch circuits operating at 150V or less, provide #10 AWG wire when the first outlet is over 75-feet from the panelboard. For branch circuits operating at 150 to 600 volts, provide #10 AWG wire when the first outlet is over 150-feet from the panelboard.
10. Branch circuit voltage drop shall not exceed 3% of rated voltage.
11. No tap or splice shall be made in any conductor except in outlet boxes, pull boxes, junction boxes, splice boxes, or other accessible locations. Make taps and splices using an approved compression connector. Insulate taps and splices

equal to the adjoining conductor. Make splices or taps only on conductors that are a component part of a single circuit, protected by approved methods. Taps or splices in feed through branch circuits for connection to light switches or receptacles shall be made by pigtail connection to the device.

12. Support conductors in vertical raceways, as required by the NEC.
13. Do not permit conductors entering or leaving a junction or pull box to deflect to create pressure on the conductor insulation.
14. Make joints in branch circuits only where circuits divide. These shall consist of one through circuit to which the branch from the circuit shall be spliced.
15. Make connections in conductors up to a maximum of one #6 AWG wire with two #8 AWG wires using twist-on pressure connectors of required size.
16. Make connections in conductors or combinations of conductors larger than specified using cable fittings of type and size required for specific duty.
17. After a splice is made, insulate entire assembly with UL-approved insulating tape to a value equivalent to the adjacent insulation.
18. Make splices and connections in control circuit conductors using UL-approved solderless crimp connectors.
19. All conduits shall be installed with an insulated grounding conductor per NEC 250.122. Where green conductor insulation is not available, the ground conductor shall be identified with green phasing tape at all accessible locations.
20. Neatly train and lace wiring inside boxes, equipment and panelboards. Provide tie-straps around conductors with their shared neutral conductor where there are more than two neutral conductors in a conduit.
21. Clean conductor surfaces before installing lugs and connectors.
22. Make splices, taps and terminations to carry full ampacity of conductors with no perceptible temperature rise.
23. Provide stranded conductors connected with pressure type connectors / compression fittings and terminal lugs UL listed for the type of conductor used (AL-CU) and correctly sized to the diameter of the bare conductors.
24. Run mains and feeders their entire length in continuous pieces without splices or joints.
25. Color code conductors.
26. Do not install a pull string in conduits containing conductors.
27. Conductors shall be the same color from load side of overcurrent protection device to outlet or utilization equipment.
28. Spare conductors shall not be installed in any conduit, gutter, raceway, panel or enclosure unless noted otherwise.

D. Two-hour fire rated cable:

1. Two-hour fire rated power cable shall be installed per manufacturer's installation instructions in compliance with UL Fire Resistance Directory, Electrical Circuit Protective Systems (FHIT), and System 27.
2. Two-hour fire rated power cable shall be installed in rigid steel EMT or rigid steel galvanized conduit (RGC) with steel fittings. Provide fire rated sealant to the end of the raceway to prevent gases from migrating from the fire rated cable into the equipment.
3. Provide two-hour rated cable where conduit or cables enters or passes through the building envelope at areas or rooms that are not two-hour rated equipment

rooms for the following:
a. Fire Pump feeders.
b. Emergency Feeders (Life Safety) as defined by NFPA Article 700.
c. Legally required level one standby systems as defined by NFPA 110 and NFPA Article 701. These systems include but are not limited to those used to aid firefighting and rescue operations, smoke removal systems, and elevators designated for ADA and/or fire rescue operations.

4. Alternate two hour rated feeder conductor sizes may be substituted for the required conductor ampacity, voltage drop, or equipment lug terminations based on two-hour fire rated conductor standard size availability or provided equipment manufacturer's cable terminations. Substituted conductor ampacity shall meet or exceed the specified cable ampacity and exceed the required equipment minimum circuit ampacity. Provide substitutions and the required conduit sets and sizes as required for the substitutions at no additional cost to the Owner.

E. Identification: Label each phase conductor in each junction box with corresponding circuit number, using self-adhesive wire markers.

F. Splices and Joints:
1. In accordance with UL 486A, C, D, E, and NEC.
2. Aboveground Circuits (No. 10 AWG and smaller):
   a. Connectors: Solderless, screw-on, reusable pressure cable type, rated 600 V, 220˚ F, with integral insulation, approved for copper and aluminum conductors.
   b. The integral insulator shall have a skirt to completely cover the stripped wires.
   c. The number, size, and combination of conductors, as listed on the manufacturers' packaging, shall be strictly followed.

G. Aboveground Circuits (No. 8 AWG and larger):
1. Connectors shall be indent, hex screw, or bolt clamp type of high conductivity and corrosion resistant material, listed for use with copper and aluminum conductors.
2. Provide field-installed compression connectors for cable sizes 250 kcmil and larger with not less than two clamping elements or compression indents per wire.
3. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Splice and joint insulation level shall be not less than the insulation level of the conductors being joined.
4. Plastic electrical insulating tape: Per ASTM D2304, flame-retardant, cold and weather resistant.

H. Underground Branch Circuits and Feeders:
1. Submersible connectors in accordance with UL 486D, rated 600 V, 190˚F, with integral insulation.

3.2 TESTING

A. Pre-Energization Check: Before energizing, check cable and conductors for circuit continuity and short circuits. Correct malfunctions.

B. Service Entrance and Feeder Insulation Resistance Test: Each main service entrance conductor and each feeder conductor shall have its insulation resistance tested after the installation is complete except for connection at its source and point of termination. Testing shall be performed by qualified technicians who have been trained in testing procedures and in the use of all test equipment.

1. Make tests using a Biddle Megger or equivalent test instrument at a voltage of not less than 1000 VDC; measure resistance from conductor to conductor, conductor to neutral (if present) and from conductor to ground. Insulation resistance shall not be less than the following:

Wire Size (AWG)	Insulation Resistance (Ohms)
#8	250 K
#6 through #2	100 K
#1 through #4/0	50 K
Larger than #4/0	25 K

2. Conductors that do not meet or exceed the insulation resistance values listed above shall be removed, replaced, and retested.

C. Submittals: Contractor shall furnish instruments and personnel required for tests. Submit 4 copies of certified test results to Architect for review. Test reports shall include conductor tested, date and time of test, relative humidity, temperature, and weather conditions.

D. Voltage and Current Values: The voltage and current in each conductor shall be measured and recorded after connections have been made and the conductor is under load.

SAMPLE DC HIGH VOLTAGE CABLE TEST REPORT
(Specification Paragraph 3.2, C)

Date_____

Contract and Work Location: ___
Contract (Project) No.: _
Circuit Identification: __
(Dwg., Title, Number and Ckt. Number)

Test Equipment: _____
(Make, Model, Serial No., Etc.)
Applied Test Voltage _____
Normal Oper. Voltage _____
Cable Installation: New _____ Used _____
(Date) (No. Years)
Cable Size _____AWG
Cable Length _____Ft.
Cable Material _____Cu _____Al
Temperature _____ Humidity _____

TEST DATA - RESISTANCE IN KILO OHMS

CONDUCTOR PER PHASE	A-N	B-N	C-N	A-G	B-G	C-G	A-B	B-C	A-C

END OF SECTION 26 05 19

SECTION 26 32 16 - DUAL PURPOSE MANUAL TRANSFER SWITCHES WITH INTEGRATED LOAD BANK AND GENERATOR QUICK CONNECTS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install manual transfer switches with 4-poles, amperage, voltage, and withstand current ratings as shown on the plans or as required. Each manual transfer shall consist of a 3-position center off mechanically held power transfer switch unit and a mechanical operating mechanism to provide complete manual operation. Each manual transfer switch shall include integrated load bank and generator quick disconnects. All manual transfer switches and mechanical operating mechanism shall be the product of the same manufacturer.

1.2 RELATED DOCUMENTS

A. The Conditions of the Contract and applicable requirements of Division 1 and Section 26 05 00 govern this Section.

1.3 Acceptable Manufacturers

A. Basis of design: ASCO Series 300.

B. Alternate manufactures:
   1. Trystar
   2. PSI Power and Controls

1.4 Codes and Standards

The manual transfer switches and accessories shall conform to the requirements of:

A. UL 1008 Listed for Optional Standby Transfer Switches (Manual Transfer Switches)

B. UL 891 Switch Boards

C. CSA C22.2 No.178 –1978

D. EC 60947-6-1 Low – Voltage Switchgear and Controller

E. PA 70 - National Electrical Code

F. FPA 99 – Essential Electrical Systems for Health Care Facilities

G. EEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

H. UL 508 Industrial Control Equipment

I. NEC Article 700

J. International Standards Organization ISO 9001

K. RoHs compliant (Restriction of Hazardous Substances)

L. Seismic qualification – International Building Code & OSHPD to SDS level of 2.5

1.5 QUALITY ASSURANCE

A. NEC and NFPA Compliance: Comply with applicable portions of the NEC (NFPA 70) including, but not limited to, emergency and standby power generation systems.

B. IEEE Compliance: Comply with applicable Institute of Electrical and Electronics Engineers, Inc. (IEEE) standards pertaining to generator construction.

C. Supplier: All equipment provided shall be supplied by an authorized distributor of the manufacturer who has been continuously engaged in the distribution of industrial grade Power System products for a minimum of 10-years. The supplier shall provide initial start-up services, conduct field acceptance testing, and warranty service. The supplier is to be authorized to perform warranty service on all products provided.

1.6 SUBMITTALS

A. Submittal drawings and information on the manual transfer switches including installation drawings, wiring diagrams, dimensions, weights, etc. shall be provided. Full descriptive information on accessory items shall be furnished. Indicate:
   1. Detailed dimensions for equipment footprint, front, rear, and side elevations.
   2. Conduit entrance locations and requirements and restrictions.
   3. Enclosure material, finish, and NEMA classification type.
   4. Nameplate legends.
   6. Metering and control wiring details.
   7. Electrical characteristics including voltage, ampacity, overcurrent device frame size and trip ratings, withstand ratings, and time current curves of all overcurrent devices and components.

B. Submit manufacturers' "Installation, Start-Up and Service" instructions, recommended conductors, overcurrent protection, and electrical interlocks.

C. Submit recommended clearance dimensions.

D. Submit sequence of operation in narrative form.

E. Instruction Data and Drawings: Commercial type operating instructions shall be

provided consisting of operating and maintenance manuals, parts books, dimensional drawings, and wiring diagrams.

1.7 WARRANTY

A. Provide one-year parts and labor warranty from date of substantial completion.

PART 2 - PRODUCTS

2.1 Mechanically Held Transfer Switch

A. The manual transfer switch unit shall be manually operated and mechanically held. The switch shall be mechanically interlocked to ensure only one of three possible positions, Source 1, Source 2, or Center Off. Fused disconnect type switches shall not be acceptable.

B. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

C. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented blow-on construction for high withstand current capability and be protected by separate arcing contacts.

D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors.

E. Transfer switch designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching, or transfer between two active power sources are not acceptable.

F. Neutral conductors shall be switched to electrically isolate the permanent generator from the temporary generator. The manual transfer switch shall be provided with fully- rated neutral transfer contacts.

G. The manual transfer switch shall be tested in accordance with UL 1008 for transfer switches. Switch ratings of 260 Amperes and less shall have endurance rating of 6000 cycles, 400 Ampere shall have endurance rating of 4000 cycles, and 600 – 3000 Amperes shall have endurance rating of 3000 cycles.

2.2 MANUAL OPERATIONS PROVISIONS

A. The manual transfer switch shall be arranged for manually actuated manual operation.

B. The manual transfer shall be actuated via a mechanical operating mechanism.

C. The manual operating handle shall be capable of external operation without opening

the enclosure door.

D. It shall have the same contact to contact speed as would be for automatic operation.

E. There shall be three positions for manual operation:
   1. Connected to Source 1 (preferred)
   2. Connected to Source 2 (alternate)
   3. Connected to center off (disconnected position)

F. Switch position when connected to Source 1, or Source 2 shall be pad – lockable.

2.3 ENCLOSURE

A. Manual transfer switches located outdoors shall be furnished in a NEMA type 3RX type 316 stainless steel enclosure. Manual transfer switches located indoors shall be NEMA 3R.

B. Enclosures shall be wall mounted or free-standing floor or pad mounted.

C. NEMA 3R enclosures shall be code gauge steel as per UL 50 with ANSI #61 powder coat finish.

D. 3RX enclosures shall be 316 stainless steel.

E. Provide strip heater with thermostat for Type 3R and 3RX enclosure requirements.

2.4 MECHANICAL AND ELECTRICAL PERFORMANCE

A. Mechanical position indicators (yellow) visible to the operator shall be included for Source 1 (preferred), Source 2, (alternate), and Center Off (disconnected).

B. Auxiliary position indicating contacts, rated 10 amps, 250 Vac shall be provided consisting of one closed when the manual transfer switch is connected to Source 1 (preferred), and one contact closed when the manual transfer switch is connected to Source 2 (alternate).

C. A form A contact shall be provided to indicate switch is in the Center Off (disconnected) position.

D. Auto Start Destination Toggle Switch shall be provided to allow for the user to select which generator the ATS will start when the engine start signal is sent from the building automatic transfer switch.

G. The Dual-Purpose Manual Transfer Switch integrated quick connects shall provide a connecting means for connecting a portable generator or a load bank.

H. Generator quick connects:
   1. For 400A and below models, there shall be one (1) row of up to five (5) single pole connections.
   2. For 600A - 800A models, there shall be two (2) rows of up to five (5) single pole connections.
   3. For 1000A-1200A models, there shall be three (3) rows of up to 5 single pole connections.
   4. For 1600A models, there shall be four (4) rows of up to 5 single pole connections.
   5. For 2000A models, there shall be five (5) rows of up to 5 single pole connections.
   6. For 2500A models, there shall be seven (7) rows of up to 5 single pole connections.
   7. For 3000A models, there shall be eight (8) rows of up to 5 single pole connections.

I. Neutral connections are not required for Load Bank connections:
   1. For 400A and below models, there shall be one (1) row of up to four (4) series single pole connections.
   2. For 600A - 800A models, there shall be two (2) rows of up to four (4) single pole connections.
   3. For 1000A-1200A models, there shall be three (3) rows of up to four (4) single pole connections.
   4. For 1600A models, there shall be three (3) rows of up to 4 single pole connections.
   5. For 2000A models, there shall be five (5) rows of up to 4 single pole connections.
   6. For 2500A models, there shall be seven (7) rows of up to 4 single pole connections.
   7. For 3000A models, there shall be eight (8) rows of up to 4 single pole connections.

J. All electrical quick connectors shall be 16 Series cam type single pole connectors; color coded as per local industry standard practice:
   1. 240V and below: phase 1 = black, phase 2 = red or orange for hi-leg, phase 3 = blue (if required).
   2. 480V: phase 1 = brown, phase 2 = purple or orange, phase 3 = yellow.
   3. Ground shall always be green.
   4. Neutral shall always be white.
   5. A minimum of 25% phase ampacity shall be provided for ground connections for portable generator and load bank connections.

2.5 ACCESSORIES

A. Enclosure Heater(s): A 125-watt enclosure heater with transformer and thermostat

(adjustable from 30° to 140 degrees F) shall be provided for outdoor installations where type 3R or 3RX, enclosures are specified. (This feature shall be equal to ASCO accessory 44G and shall be capable of being added to existing switches). Thermostat shall be set to 40-degrees F.

B. Surge Suppression – A SPD with a surge current rating of 65kA shall be provided with individually matched fused metal oxide varistors (MOVs). It shall include LED status indication of normal operation, under voltage, power loss, phase loss or component failure. Shall include form C dry contacts for external alarm or monitoring. The unit shall be enclosed in a Noryl housing rated NEMA 4, 12, and 4X. Shall comply with UL 1449 latest edition. (This feature shall be equal to ASCO accessory 73).

D. Power Meter - ASCO 5210 Power Meter Connected to Load Side (135L)

E. Accessory 171EP Base Package Bundle – Two form C contacts shall be connected to a terminal block that operate when Source 1 and Source 2 voltage is present at manual transfer switch terminals. The following indicators shall be provided:
1. Load Connected to Source 1 (Green).
2. Load Connected to Source 2 (Red).
3. Source 1 Available (Green).
4. Source 2 Available (Red).
5. Load Disconnect (Yellow)
6. Phase Rotation Monitor
7. Maintained Engine Start Switch and Common Alarm LED/Contact

2.6 WITHSTAND AND CLOSING RATINGS

A. The Manual Transfer Switch shall be rated to close on and withstand the available RMS symmetrical short circuit current at the terminals with the type of overcurrent protection shown on the plans.
1. Source 1 WCR ratings @ 480v shall be as follows when used with specific circuit breakers or current limiting fuses:

MTDQ Size	Source 1 Withstand & Closing Rating MCCB	Source 1 W/CLF
150A - 600A	50,000A	200,000A
800A - 1200A	50,000A	200,000A
1600A - 2000A	65,000A	200,000A
2500A - 3000A	100,000A	200,000A

2. Source 2 WCR ratings @ 600V shall be as follows when used with any molded case circuit breaker:

MTDQ Size	Source 2 Withstand & Closing Rating MCCB at Source Wired to Quick Connects
105A - 600A	22,000A

800A - 1200A	22,000A
1600A - 2000A	65,000A
2600A - 3000A	100,000A

2.7 TESTS AND CERTIFICATION

A. The manual transfer switch shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure compliance with the specification requirements.

B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

C. The manual transfer switch manufacturer shall be certified to ISO 9001: 2008 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001: 2008.

2.8 SERVICE REPRESENTATION

A. The manual transfer switch manufacturer shall maintain a national service organization of company- employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

B. The manufacturer shall maintain records of switch shipments, by serial number, for a minimum of 20 years.

C. For ease of maintenance, the manual transfer switch nameplate shall include drawing numbers and serviceable part numbers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install manual transfer switches where shown, in accordance with the equipment manufacturer's written instructions and recognized industry practices to ensure that the transfer switch complies with the specified requirements and serve the intended purposes. Provide and install complete operating instructions in a Plexiglas enclosure for each type of transfer switch inside the enclosure.

B. Standard: Comply with NEMA standards, requirements of the NEC, and applicable

portions of NECA Standard of Installation pertaining to installation of manual transfer switches.

C. Concrete Pad: Install free-standing floor or pad mounted manual transfer switches on a reinforced concrete pad. The pad shall extend 6" beyond the manual transfer switch base, unless shown otherwise. Furnish the exact position of any block outs, mounting bolts, and the dimensions and location of the manual transfer switch pad in a timely manner so as to prevent delay of the concrete work. Refer to Section 26 05 00 for housekeeping pads and Division 3 for Concrete Work.

D. Provide circuits, conductors, and raceways as required for manual transfer switch options and accessories as required or specified. Provide separate dedicated circuits from the emergency branch circuit panel board to the manual transfer switch when required for indicated options or accessories

3.2 GROUNDING

A. Ground the manual transfer switch to the building grounding system and provide a driven ground electrode at the manual transfer switch location or bond to the building grounding system ground rod(s) if in close proximity.

3.3 TESTING

A. Notify Owner's Commissioning Authority (CxA) prior to performing any tests so the CxA may witness tests at his/her discretion. Refer to Section 26 01 00 Commissioning of Electrical Systems. Testing shall be witnessed by owner and Engineer.

B. Coordinate testing of manual transfer switch with the testing of the permanent generator source and associated automatic transfer switches, including the generator load bank test.

C. Contractor shall furnish all instruments, load banks, and personnel required for test. Submit 4 copies of certified test results to Architect/Engineer for review. Test reports shall include date and time of test, relative humidity, temperature, and weather conditions.

D. Pre-energization checks: Before energizing, check for continuous of circuits and for short circuits.

E. Provide thermal infrared scan of the manual transfer switch under full load as directed and witnessed by Owner. Correct any deficiencies causing abnormal heating and repeat the scan. Provide digital video documentation with deficiencies corrected for comparison to future test. Make corrections as needed as soon as possible as directed by the Owner. Repeat the scan at the 11-month prior to close out and make corrections prior to close-out.

F. Submittals: Furnish instruments and personnel required for tests. Submit 4 copies of certified test results to the Architect for review. Test reports shall include switchboard tested, date and time of test, relative humidity, temperature, and weather conditions.

3.5 TRAINING

A. Provide four hours training, one hour each for four persons, four separate days. Coordinate with the Owner for manual transfer switch training which may coincide with any other related or required generator or automatic transfer switch training.

END OF SECTION 26 32 16

SECTION 27 41 16.20 – AUDIO AND VIDEO DISTRIBUTION SYSTEMS FOR SPECIAL VENUES

PART 1 – GENERAL

1.1 RELATED WORK

A. The following sections shall associate with this specification as applicable.
   1. General Conditions
   2. Supplementary Conditions
   3. Division 1
   4. Division 26 in its entirety.
   5. Division 27 in its entirety.
   6. Division 28 in its entirety.

1.2 DESCRIPTION

A. Summary of Work:
   1. Provide all equipment specified well as all miscellaneous parts and materials required for the proper, complete, and functional Video and/or Sound Distribution System at the following Venues:
      a. BAND 403
      b. PRACTICE GYM 131
      c. DANCE 129
      d. WEIGHT ROOM 128
   2. All applicable equipment shall bear the UL label.
   3. Governing Codes and Conflicts: If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes, regulations, and manufacturer installation requirements.
   4. Locate equipment to accommodate millwork, fixtures, marker boards and other room equipment at no additional cost to the owner.
   5. Plenum rated cable may be used as an option at the contractor's discretion. Wherever cabling is run exposed, conduit shall be used to cover and protect wiring.
   6. These documents are conceptual in nature. It shall be the responsibility of the approved installer to furnish a complete and functional system, including the items shown on the drawings, in the specifications, and items not designated in either. The installer's shop drawings and product data submittals shall represent a complete system and documents accepted do not relieve the installer from being required to provide any materials, equipment, or labor to furnish a complete and functional system as recognized by the Project's Technology Consultant and the Owner.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:
   1. The contractor providing and installing the integrated audiovisual systems and associated infrastructure shall be an authorized dealer of the specified projector manufacturer and be capable of providing the manufacturer's maximum available product warranty.
   2. All individuals installing the audio-video system must be employees of the authorized dealer and at least 75% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.
   3. The proposing contractor and the installing contractor must be the same company. No subcontractor to the proposing audio-video contractor will be allowed for any portion of the audio-video scope of work.
   4. The System Installer shall meet all applicable regulations of the State and Department of Labor insofar as they apply to this type of system. The bidder shall be a firm normally employed in the audio-video industry and shall provide a reference list of ten (10) projects of equivalent size or larger and contact names confirming successful completion of projection system installations.
   5. The bidder shall have an authorized service center, within 75-miles of the project's location, for the brand of equipment that is submitted for bid. The Owner, Architect, and Consultant reserves the right to perform an onsite inspection as they deem necessary.
   6. The bidder must produce a letter from the manufacturer guaranteeing the delivery of all the equipment outlined in the specification herein.
   7. The bidder shall have a full-time local service personnel capable of servicing the projector system described herein.

B. Pre-Construction Meeting:
   1. The successful Contractor shall attend a mandatory pre-construction meeting with individuals deemed necessary by the Owner's representative prior to the start of the work.
   2. The contractor shall provide a mockup of the complete integrated audiovisual system solution for each of the typical spaces below before implanting the installation in multiple like rooms. Mockup shall include all products listed in part 2 of this specification. Coordinate with G.C., Architect, Consultant, and Owner for scheduling and location of mockup.
   3. All proposing contractors must have ability to demonstrate a/v system being proposed and provide owner with completely installed system to evaluate performance and operation.

C. Acceptance: The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

D. Warranty:
   1. The selected system installer shall be factory authorized service center and shall provide an end-to-end performance warranty of not less than one (1) year. The proposer shall provide current certification documentation. The performance

warranty shall be issued by the manufacturer and shall warrant that video projection system projectors have been tested to the district's approval. This end-to-end warranty shall cover the labor associated with removing/reinstalling any associated hardware or equipment as well as the replacement of all defective equipment or hardware.

2. The bidder shall also submit with the materials mentioned in section 1.5 submittals of this specification a written explanation outlining the terms and conditions of product warranty of all parts and service of the integrated a/v solutions.

1.4 REGULATORY REQUIREMENTS

A. Standards: All work shall be performed in accordance with the latest revisions of the following standards and codes:
   1. Latest Local Codes and Amendments
   2. National Electrical Code, current version

B. Other References:
   1. TIA/EIA-568-A Commercial Building Telecommunications Wiring Standard
   2. EIA/TIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces.
   3. TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
   4. TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
   5. EIA/TIA 455-A Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
   6. TIA/EIA TSB 67 Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
   7. TIA/EIA TSB 72 Centralized Optical Fiber Cabling Guidelines
   8. ISO/IEC 1180 Generic Cabling Standard
   9. EN 50173 Generic Cabling Standards for Customer Premises
   10. ANSI/EIA/TIA 526-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plan.

C. Governing Codes and Conflicts: If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes and regulations.

1.5 ABBREVIATIONS

A. The following abbreviations are used in this document:
   1. AV-*# Audiovisual input station / Presentation Station (Reference drawing legend) CMP Ceiling Mounted Projector LCD or LED Flat panel screen/monitor

1.6 SUBMITTALS

A. Project Initiation: Within fourteen (14) days of Notice to Proceed, the projection system installer shall furnish the following in a single consolidated submittal:
   1. Permits: The Contractor shall obtain all required permits and provide copies to the Owner/Architect/Engineer.
   2. Product Literature: Complete manufacturer's product literature for all, speakers, amplifiers, cable, cross-connect blocks, cable supports, cable labels, outlet devices, and other products to be used in the installation. In addition, whenever substitutions for recommended products are made, samples (when requested by the Owner/Designer) and the manufacturer's supporting documentation demonstrating compatibility with other related products shall be included.
   3. Construction Schedule: A time-scaled Construction Schedule, using PERT/CPM, indicating general project deadlines and specific dates relating to the installation of the cable distribution system.
   4. Testing: Proposed Contractor test result forms, and a list of instrumentation to be used for systems testing.
   5. The contractor shall provide a letter from the manufacturer stating that the dealer is an authorized service center.
   6. The resume and contact information of the full-time service personnel responsible for the installed projection system.
   7. Specification Compliance: A letter shall be provided stating, by section and subsection, that the installer complies with the ENTIRE specification section. If the installer intends to deviate from any portion of the specifications, a detailed explanation of reason in which the installer would like to deviate shall be provided in addition to the specification compliance letter. No deviations shall be acceptable until they have been accepted by the project's technology consultant.
   8. Certifications: The contractor shall submit all of the following certifications and the certifications must contain dates which are valid from the date of proposal and not expirer any sooner than 12 months after substantial completion of the project.
      a. AMX authorized dealer certification
      b. Installer training certification
         1) Provide specification with line by line acknowledgement of compliance.

B. Shop Drawings: Submit the following items, for Owner review and approval, within twenty-eight (28) days of notice to proceed:
   1. Proposed wiring and connectivity diagram of the proposed projection system including all faceplates and sound reinforcing equipment
   2. In addition to the wiring/connectivity diagram, the submitted drawings shall indicate the following, even if the following is expected to be provided by the project's electrical or general contractor:
      a. Location of wall penetrations (all penetrations shall be sleeved and contain protective bushings at both ends)
      b. Location of sleeved wall pass-thru
      c. Size of sleeve at each location installed
      d. Quantity of cable passing through each sleeve

e. Location of drops in each room (quantity or labeling of drops are not required in the submittal plans. Labeling shall be provided in the closeout plans and quantities shall be as per the contract documents, addendums, and issued changes. Each drop shall be labeled for the type of outlet that it is)

f. Conduit routing, size, quantity, and stub-up locations for all floor mounted outlets.

3. Drawing Compliance: A letter shall be provided stating that the installer complies with the ENTIRE project drawing, including all general, keyed, and notes to contractor. If the installer intends to deviate from any portion of the specifications, a detailed explanation of reason in which the installer would like to deviate shall be provided in addition to the specification compliance letter. NO DEVIATIONS SHALL BE ACCEPTABLE UNTIL THEY HAVE BEEN ACCEPTED BY THE PROJECT'S TECHNOLOGY CONSULTANT.

C. Project Completion: As a condition for project acceptance, the Contractor shall submit the following for review and approval:

1. Samples: Complete manufacturer's product literature and samples (if requested) for all pre-approved substitutions to the recommended products made during the course of the Project.
2. Inspection and Test Reports: During the course of the project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied, and the work performed conform to Contract requirements. The contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.
3. Operating and Maintenance Instructions: Operating and maintenance instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction and shall be provided to the Owner for their use on disc or USB drive with the project name and description (2 copies).
4. Provide schematic line diagram of system components as deployed in each installation.

PART 2 – PRODUCTS

2.1 GENERAL

All products listed in this section shall be provided and installed by the contractor unless otherwise noted below. The following list is not intended to be a complete list of required equipment or cables as the project is to be Turnkey and may require equipment beyond the depth of this list. It is the contractor's responsibility to ensure that they are providing a complete and functional system with their proposal

A. Installation: The cabling shall be installed per requirements of the manufacturer and the Project Documents utilizing materials meeting all applicable TIA/EIA standards. The Contractor is responsible for providing all incidental and/or miscellaneous hardware not explicitly specified below as required for a complete and operational system.

B. Materials: Materials shall be as listed or shall be approved equivalent products of other manufacturers meeting the intent and quality level of the TIA/EIA specifications. All approved equivalent products will be published by addendum ten days prior to proposal for Architect / Engineer to review.

C. Testing: All installed cabling shall be tested 100% good after installation by the Contractor.

D. Ratings: All products shall be new and brought to the job site in the original manufacturer's packaging. Electrical components (including innerduct) shall bear the Underwriter's Laboratories label. All communications cable shall bear flammability testing ratings as follows:

CM Communications Cable
CMP Plenum Rated Communications Cable
CMR Riser-Rated Communications Cable

E. Initial Cable Inspection: The Contractor shall inspect all cable prior to installation to verify that it is identified properly on the reel identification label, that it is of the proper gauge, containing the correct number of pairs, etc. Note any buckling of the jacket that would indicate possible problems. Damaged cable or any other components failing to meet specifications shall not be used in the installation.

F. Cable Lubricants: Lubricants specifically designed for installing communications cable may be used to reduce pulling tension as necessary when pulling cable into conduit.

1. Approved Products
   a. Twisted-pair cable: Dyna-Blue
      American Polywater

G. Fire Wall Sealant: Any penetration through firewalls (including those in sleeves) will be resealed with an Underwriter Laboratories (UL) approved sealant.

1. Approved Products
   a. 3M or
   b. Pre-approved equal

2.2 BAND 403 – AUDIO DISTRIBUTION

A. Contractor to provide and install a complete video and audio distribution system in compliance with the equipment specified in the table below and associated drawings. Installation shall turnkey, including programming, testing, and training.

MFR	PRODUCT NUMBER	DESCRIPTION
STRONG	Strong-SR-FS-SYSTEM-DC21U	Foundation Rack System with DC Fans
FURMAN	Furman M-8x2	15A Standard Power Conditioner, 9 outlets, 1 RU, 6ft cord
ALESIS	Multimix 10 Wireless	10 Channel Mixer with Bluetooth
Tascam	CD-400U	CD/SD/USB Player with Bluetooth receiver and AM/FM Tuner

MFR	PRODUCT NUMBER	DESCRIPTION
QSC	QSC-GXD8	Light weight class-d professional power amplifier with DSP, 2 channels, 800 watts/ch at 8 ohm
Gator	Gator-GRW-DRW2	Rack drawer, 14.2” deep, lockable, 2U
Gator	Gator-GRW-DRW4	Rack drawer, 14.2” deep, lockable, 4U
QSC	QSC-E112	12” 2- Way, externally powered, live sound reinforcement loudspeaker – only available in block
QSC	QSC-E12-Yoke	Powder coated steel yoke for mounting the E12 or E112 horizontally or vertically - black
Roland	R-RCC-3-TRXM	Black Series 3ft interconnect cable ¼” TRS-XLR(male)
Roland	R-RCC-3-TRXF	Black Series 3ft interconnect cable ¼” TRS-XLR(female)
Roland	R-RCC-10-3535	Black series 10ft interconnect cable, 3.5mm TRS –3.5mm TRS, Balanced
Shure	Shure KSM1237/SL Stereo	Two KSM137, two foam windscreens, A27M Stereo Microphone Adapter, carrying case.
Atlas	Atlas-AD-12BE	Surface mount male mic flange 5/8”-#27 thread ebony finish
Atlas	Atlas-AD-19B	Extension Tube 45 degree angle tube; 5/8” #27 thread chrome
Hosa	MCL-150	Microphone cable, Hosa XLR3F to XLR3M, 50ft.
Denon	Denon-DN-900R	Network SD/USB Audio Recorder with Dante 2x2 interface
Mackie	Thump212	12” 1400W powered loudspeaker. Speaker at back of band hall. Transmit from the front mixer to this speaker wirelessly. Requires power.
OnStage	SS7322B	Adjustable Wal Mount Speaker Bracket, for mounting on flat surfaces. Angle Adj:30-90 degrees. Fits 1-3/8” cabinet inserts, black finish
Mackie	T100	Steel Loudspeaker Tripod
Alto	Stealth Wireless MK2	Stereo wireless kit for active speakers

2.3 PRACTICE GYM 131 AND DANCE 129 – AUDIO DISTRIBUTION

A. Contractor to provide and install a complete audio and video distribution system in compliance with the equipment specified in the table below and associated drawings. Installation shall turnkey, including programming, testing, and training. Gym and Dance shall have the same head end location. Each space shall be independent and have its own DSP, AMP, speakers microphones, audio inputs, etc.

MFR	PRODUCT NUMBER	DESCRIPTION
AtlasIED	324-15	Wall mount rack
AtlasIED	ECS-3	Power sequencer/conditioner
AtlasIED	AP-GNL18	Goosneck Lamp
AtlasIED	SD 3-14	Storage drawer
BSS	Blu-100	DSP
BSS	Blu-8v2BLK	Wall controller for Blu-100
Shure	QLXD 124/85	Wireless mic kit x4
Shure	UA844+SWB	Wires antenna combiner
Shure	UA8100	100' remote antenna cables x2
Shure	UA8	½ wave antenna
Shure	UA834WB	Active antenna amplifier
Denon	DN-350UI	Internet radio media plater
Denon	DN-300C MKII	CD/Media Player
Proco	iRack	Rack mounted ipod input plate
	WP1004	Single gang microphone jack
JBL	328/CT	2-Way co-axial speakers with backbox and grille
JBL	312CS	High-Output 12 in. In-Ceiling Subwoofer Loudspeaker with backbox and grille (DANCE only)
ElectroVoice	EKX15P	Powered speaker (gym only)
ElectroVoice	TSP 1	Tripod stands (2) with carry bag (gym only)
	P222CS	22ga/2 conductor shielded wite
	P142C	12ga/2 conductor wire

2.4 WEIGHT ROOM 128 – AUDIO DISTRIBUTION

A. Contractor to provide and install a complete audio distribution system in compliance with the equipment specified in the table below and associated drawings. Installation shall turnkey, including programming, testing, and training. Weight room local sound system shall integrate with existing locker room sound system.

MFR	PRODUCT NUMBER	DESCRIPTION
JBL	Control 45C/T	2-way 5.25" Coaxial Ceiling Loudspeaker
Crown	DCI 2|1250N	2 CH @ 1250 W/CH amplifier with BLU link
BSS	EC-4BV	Ethernet Controller with 4 Buttons and Volume Control
Octasound	RABX2	Aux/Bluetooth Mixer Interface
Atlas Sound	300 series	Wall mount rack with 2 spare keys. Provide size to accommodate all equipment, plus an additional 25% for future growth.

2.5 AUDIO AND VIDEO COMPONENTS AND EQUIPMENT - ALL VENUES

A. Custom Plates
   1. Liberty Panel Crafters, Proco, or RCI are approved manufacturers.
   2. Provide custom plates as indicated on the drawings.

B. Equipment Rack: Provide and install equipment rack at locations designated on the contract drawings. Equipment rack shall consist of the following:
   1. Enclosure:
      a. Atlas Sound 300 Series wall mount rack with 6 spare keys. (1 per venue). Provide size to accommodate all equipment, plus an additional 25% for future growth.
   2. Additional Accessories:
      a. Middle Atlantic D3 (3) space rack drawer (1 per venue)
      b. Juice Goose JG 8LED Power Distribution Center with LED Lighting (1 per venue)
      c. Juice Goose CQ 1520 Sequenced Power Control System (1 per venue)
      d. Provide any additional hardware or lacing strips to make a complete installation
      e. Provide blank panels necessary to enclose rack completely.

C. Miscellaneous Equipment
   1. Provide the following equipment for each venue, unless noted otherwise. (excluding the Advanced Culinary Lab, Weight Room, and Wrestling Room)
      a. (2) Shure SM58S-LC Microphones, per venue
      b. (1) 25’ Microphone cable, per venue
      c. (1) 50’ Microphone cable, per venue
      d. (2) Atlas MS20E Mic Stand, per venue
      e. (1) Atlas TL34-15E Boom Stand, per venue

D. Assistive Listening
   1. Provide a remote antenna. Adjust DSP for “hard knee” compression on assisted listening output. Test and use equalization for maximum sound quality.
      a. Listen LT-800-072-01 – Assisted Listening RF Transmitter
      b. Listen LA-326 Universal Rack Mounting Kit
      c. Listen LR-500-072-P1 Advanced Intelligent DSP RF Receiver
      d. Listen LA-430 Intelligent Ear Phone/Neck Loop Lanyard
      e. Listen LA-380-01 Intelligent 12-Unit Charging/Carrying Case
      f. Provide quantities needed to fulfill the quantities stipulated in the Receivers for Assistive Listening Systems Table.
      *if part numbers are obsolete update with manufacture recommended replacement

RECEIVERS FOR ASSISTIVE LISTENING SYSTEMS TABLE

Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of Required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats	2
201 to 500	2, plus 1 per 25 seats over 50 seats	1 per 4 receivers
501 to 1000	20, plus 1 per 33 seats over 500 seats	1 per 4 receivers
1001 to 2000	35, plus 1 per 50 seats over 1000 seats	1 per 4 receivers
2001 and over	55, plus 1 per 100 seats over 2000 seats	1 per 4 receivers

E. Programming shall be coordinated with the Owner and Project's Consultant. Programming shall include, but not be limited to the following:
   1. AV Control Panel Configuration
   2. Audio routing from any source location through the DSP
   3. Projector and screen control via the Audio / Video Control panel
   4. Device resolution and over/under-scanning settings
   5. Incorporation of any Owner furnished source equipment (maximum of 2)

2.6 DISPLAY AND PROJECTOR MOUNTING HARDWARE

A. Wall Mounted Monitors: Provide the following at each wall mounted flat screen display location on the entire project
   1. Universal Articulating Wall Mount: Peerless Product No. PLAV70-UNLP
   2. Provide Triple Stud Wall Plate for each, stud-wall, wall mounted solution: Peerless Product No. WSP(716 or 724). Coordinate exact model with stud-wall construction. Coordinate desired finish color with architect and owner at each location.

B. Provide the following mounting hardware at each Ceiling Mounted Projector location (if not associated with a projector lift).
   1. One (1) 2'x2' Above Suspended Ceiling Storage Box with Column Drop, Chief Product No. CMS492C
   2. One (1) Adjustable Extension Colum, Chief Product No. CMS####*
      a. Height adjustment in 1" increments
      b. 1.5" NPT, threaded on both ends
      c. '####' to be replaced with a numeric value depicting the minimum and maximum adjustment capabilities. The center setting shall be equivalent to the height at the top of the projection surface but shall not exceed a maximum extension capability of 5'.
      d. '*' to be replaced with a 'W' if required in white.
   3. One (1) Universal projector mount with keyed locking, Chief Product No. RPM#U*
      a. '#' shall be replaced with an alphabetical character that shall depict the product version

b. '*' to be replaced with an alphabetical character depicting the mount color.

4. All product finish colors shall be coordinated with the architect. Color should match the color of the mounted device and the finish of the surface it is mounted to.

C. Projector Lift
1. 350 lb. Maximum Lift Capacity
2. 15' to 17' extension capacity
3. Provide the following optional accessories:
   a. Environmental Airspace Housing
   b. Ceiling Closure Panel, white in color
   c. Universal-Style Projector Mounting Bracket
4. Approved Manufacture:
   a. Draper
5. Coordinate installation location with screen and required throw distance.
6. Provide one (1) projector lift at each of the following locations:
   a. Gymnasium

2.7 AUDIO VISUAL PATCH CABLES

A. Provide and install the following Patch Cables
1. Provide the following at each AV Input Outlet:
   a. One (1) 10' HDMI Patch Cable, C2G Product No. 56784
   b. One (1) 10' 3.5MM Stereo Audio Cable, C2G Product No. 22602
   c. One (1) 10' USB(A)-to-USB(B) Cable, C2G Product No. 54175

2. Provide the following at each AV Output Outlet:
   a. One (1) 6' HDMI Patch Cable, C2G Product No. 56783
   b. One (1) 6' 3.5MM Stereo Audio Cable, C2G Product No. 22601
   c. One (1) 6' USB(A)-to-USB(B) Cable, C2G Product No. 54174

2.8 CABLE ROUTING/PATHWAY

A. Cable Support System: All audio-video cabling shall be installed and supported using an approved J-Hook cable support system at 4'-0" intervals unless installed in conduit. Do not exceed manufacture recommendation for the quantity of cables supported in an individual support.

B. All cable bundles shall be grouped together using plenum rated Velcro for the entire run above and below the ceilings.

PART 3 – EXECUTION

3.1 GENERAL

A. Contractor is required to properly mount integrated A/V solutions and connect all ceiling video / audio cables to projector component inputs.

B. Contractor is required to thoroughly test and verify operation of all A/V inputs and video modes prior to project completion.

C. Contractor is required to focus and adjust projector to properly project image on viewing surface (screen or multimedia board depending on location).

D. Contractor shall provide owner with written verification test process and results once all projectors have been installed, tested, and placed in final condition.

E. Damage: The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, over tightened bindings, loosely twisted and over-twisted pairs at terminals and cable sheath removed too far (over 1-1/2 inches).

F. The Contractor shall replace any damaged ceiling tiles that are broken during cable installation.

G. Clean Up: All clean up activity related to work performed will be the responsibility of the Contractor and must be completed daily before leaving the facility.

3.2 DOCUMENTATION

A. Contractor shall provide owner with detailed serial number listing and associated graphical room number designation equipment was installed. Contractor shall use actual graphical package room numbers not architectural plan numbers from construction set.

3.3 STATION WIRING INSTALLATION

A. General: All cable must be handled with care during installation so as not to change performance specifications. Factory twists of each individual pair must be maintained up to the connection points at both ends of all category 6 cable. There shall never be more than one and one-quarter inch of unsheathed enhanced Category6 UTP cable at either the wiring USB Transmitter or Receiver.

B. Exposed Cable: All cabling shall be installed inside walls or ceiling spaces whenever possible. Exposed station cable will only be run where indicated on the Drawings. Additional exposed cable runs will require Owner approval and will only be allowed when no other options exist.

C. Placement: All cabling and associated hardware shall be placed so as to make efficient use of available space. All cabling and associated hardware shall be placed so as not to impair the Owner’s efficient use of their full capacity.

D. Cable Routes:
   1. All cabling placed in ceiling areas must be in conduit, cable tray or an approved J-Hook cable support. Cable supports shall be permanently anchored to building structure or substrates. Provide attachment hardware and anchors designed for the structure to which attached and that are suitably sized to carry the weight of the cables to be supported. Do not route cable through webbing of structural steel. Cabling must be supported in dedicated supports intended to support cabling as described in this section. Contractor shall adhere to the manufacturer’s suggested fill ratio for each size cable support installed.

2. Attaching cable to pipes or other mechanical items is not permitted. Communications cable shall be rerouted so as to provide a minimum of 18 inches spacing from light fixtures, sources of heat, power feeder conduits and EMI sources. Cabling shall not be attached to ceiling. Grid support wires. Cable runs shall be routed down the corridors; parallel or perpendicular to building structure. Multiple cables to be bundled together at and between each cable support installed.
3. Contractor shall be responsible for coordinating with other trades on the project so that the installed cable pathway does not interfere with the installation of other systems to insure that mechanical ducts, pipes, conduits, or any other above ceiling systems are not putting unnecessary stress on any portion of the install audio-video cabling.

3.4 STATION HARDWARE

A. Flush mounted components: all component shall be inserted to a flush mounted faceplate unless designated otherwise.

B. Placement: Where possible, the AV input outlets shall be located so that its centerline is 18 inches above floor level or 12 inches above permanent bench surfaces. Outlets shall not be mounted on temporary, movable, or removable surfaces, doors, or access hatches. The CMP outlet shall route directly to the rear of the projector and does not require any type of faceplates.

3.5 PROGRAMMING

A. Programming shall be coordinated with the Owner and Project's Consultant. Programming shall include, but not be limited to the following:
1. AV Control Panel Configuration
2. Audio routing from any source location through the DSP
3. Projector and screen control via the Audio / Video Control panel
4. Device resolution and over/under-scanning settings
5. Incorporation of any Owner furnished source equipment (maximum of 3)

3.6 FINAL TESTING REQUIREMENTS

A. Notification: The Owner and Engineer shall be notified one week prior to any testing so that the testing may be witnessed.

B. Inspection: Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms and timetable for all copper and fiber optic cabling.

C. Procedures: Trained personnel shall perform all testing. Acceptance of the test procedures discussed below is predicated on the Contractor's use of the recommended products and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors. Testing procedures shall consist of, but not me limited to the following:

1. Input locations to be tested utilizing multiple types of source equipment. Equipment to include:
    a. Personal Computer (laptop)
    b. Apple iMac
    c. Apple Mac Mini
    d. Google Chromebook
    e. Additional devices may be required at the time of testing
    f. contractor to provide devices on a single cart, to roll between inputs during testing.
2. Routing of video, from any source, to each projector and display simultaneously and independently.
3. Routing of audio, from any source, to each audio channel simultaneously and independently.
4. Control of the entire system from each installed A/V Control Panel
5. Additional test requirements may be required at the Owner and/or Consultant's request.

3.7 OWNER TRAINING AND DEMO

A. A/V integrator shall provide demonstration of all integrated a/v solutions to owner's staff that have any stake with the operation and maintenance of the a/v solutions. Integrator shall produce sign in sheets for record of who was trained and when. Copies of sign in sheets shall be submitted with close out paperwork. Coordinate training dates with owner at project completion.

B. Integrator shall provide factory training for owner's operations and maintenance personnel for each major component of the systems listed in the A/V solutions outlined in part 2 of these specifications. Training shall be a minimum of 4 hrs. per person. Re-training of staff shall be available, at no cost to the owner, to a maximum of 3 on-site training sessions up to 1 year from the date of project competition.

C. All training is to be recorded via video recording and a copy of the recorded video shall be provided to the owner upon completion. All video recording equipment, for the recording of training, shall be provided by the integrator.

END OF SECTION 27 41 16.20

SECTION 31 31 16 – TERMITE CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

B. General Coordination Procedures, (Reference Specification Section 01 31 00) General Contractor shall coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work that depend on each other for proper installation, connection, and operation.

1.02 SUMMARY

A. Section Includes: Furnish and install a chemical barrier to afford the structure protection from termites and other common ground insects.
   1. Soil treatment for termite control at gymnasium addition.

B. Related Sections include the following:
   1. Division 01, Section "Temporary Facilities and Controls", for pest control requirements during and at conclusion of construction period.
   2. Division 03, Section "Cast-In-Place Concrete”
   3. Division 06, Section "Rough Carpentry", for wood preservative treatment by pressure process.

1.03 QUALITY ASSURANCE

A. Comply with all applicable regulatory and environmental requirements.

B. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.
   1. Any chemicals toxic to animals and plant life should be applied with caution by an experienced person who is licensed in accordance with the regulatory agency of the State.

C. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

D. Preinstallation Conference: Conduct conference at Project site.

1.04 SUBMITTALS

A. Action Submittals: Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
   2. Include the EPA-Registered Label for termiticide products.

B. Informational Submittals:
   1. Qualification Data: For qualified Applicator.
   2. Product Certificates: For each type of termite control product.
   3. Sample Warranties.

C. Closeout Submittals: Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and inclusion in O&M Manuals. Include the following:
   1. Date and time of application.

2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.06 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that project has been registered with Manufacturer to meet the required Warranty criteria, provide termite control work for the duration of the Warranty, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite activity or damage is discovered during warranty period, the Applicator shall re-treat soil and repair or replace damage caused by termite infestation.
   1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SOIL TREATMENT

A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
   1. Products: Subject to compliance with requirements, provide the following, or other approved equal:
      a. Control Solutions Inc., Dominion 2L.
      b. Any “equal” products shall be approved in writing by Humble ISD Pest Control for use.
   2. Pest Control Contractors: Subject to compliance with requirements, acceptable Applicators include but are not necessarily limited to:
      a. Terminix
      b. Orkin
      c. Myers
      d. Metrogard
   3. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

B. Materials shall be used, provided:
   1. They are determined to meet five (5) year test conducted by the U.S. Forest Service, or the U.S. Department of Agriculture.
   2. Evidence is provided indicating any toxic effects to humans, plants, or animal life.
   3. Allowed by governing laws and/or ordinances.

PART 3 - EXECUTION

3.01 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

B. Include both pre-construction and post-construction subterranean termite control treatment.

3.02 APPLYING SOIL TREATMENT

A. Prior to application of treatment, the Contractor shall notify the Structural Pest Control Board as required by law. The Contractor shall also notify the Owner prior to the application of treatment.

B. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

C. Proceed with application only after unsatisfactory conditions have been corrected. If Applicator determines there are non-permissive weather conditions or other unsatisfactory conditions present that preclude the treatment from being properly applied, the Contractor shall inform the Owner of such delay.

D. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
   1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

E. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
   1. Slabs-on-Grade and Basement Slabs: Treat underground-supported slab construction, including footings, and building slabs. Treat soil materials before concrete footings and slabs are placed.
   2. Adjacent Slabs: Attached porches, mow strips, entrance platforms, sidewalks leading to primary slab, and similar slab structures shall be treated.
   3. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
   4. Masonry: Treat voids at masonry that rest on footings below grade.
   5. Penetrations: At expansion joints, cold joints, construction joints, control joints, exposed cracks, and areas where slabs will be penetrated.

F. Avoid disturbance of treated soil after application. Keep traffic off treated areas until completely dry.

G. Post warning signs in areas of application.

H. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

I. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

J. After Application is Complete: Contractor shall collect from the Applicator and immediately submit, via email, the following items to the Humble ISD Program/Project Manager and Pest Control Department as soon as application of treatment is complete:
   1. Supporting treatment diagrams.
   2. Photographs.
   3. Other relevant information from the treatment application.

END OF SECTION 31 31 16

SECTION 32 12 16 - ASPHALTIC CONCRETE PAVEMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Surface courses of compacted mixture of coarse and fine aggregates and asphaltic material.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.3 REFERENCES

A. ASTM C 33 - Standard Specification for Concrete Aggregates.

B. ASTM C 131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

C. ASTM C 136 - Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

D. TxDOT Tex-126-E - Molding, Testing, and Evaluation of Bituminous Black Base Material.

E. TxDOT Tex-106-E - Method of Calculating the Plasticity Index of Soils.

F. TxDOT Tex-203-F - Sand Equivalent Test.

G. TxDOT Tex-204-F - Design of Bituminous Mixtures.

H. TxDOT Tex-207-F - Determination of Density of Compacted Bituminous Mixtures.

I. TxDOT Tex-208-F - Test for Stabilometer Value of Bituminous Mixtures.

J. TxDOT Tex-217-F - Determination of Deleterious Material and Decantation Test for Coarse Aggregates.

K. TxDOT Tex-227-F - Theoretical Maximum Specific Gravity of Bituminous Mixtures.

1.4 SUBMITTALS

A. Submittals shall conform to requirements of COH Construction Project Division 1 Specifications.

B. Submit certificates that asphaltic materials and aggregates meet requirements of Article 2.1, Materials, of this Section.

C. Submit proposed design mix and test data for each type and strength of surface course in Work.

D. Submit manufacturer's description and characteristics of mixing plant for approval.

E. Submit manufacturer's description and characteristics of spreading and finishing machine for approval.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Coarse Aggregate

1. Gravel or crushed stone, or combination thereof, that is retained on No. 10 sieve, uniform in quality throughout and free from dirt, organic or other injurious matter occurring either free or as coating on aggregate. Aggregate shall conform to ASTM C 33 except for gradation. Furnish rock or gravel with Los Angeles abrasion loss not to exceed 40 percent by weight when tested in accordance with ASTM C 131.

B. Fine Aggregate

1. Sand or stone screenings or combination of both passing No. 10 sieve. Aggregate shall conform to ASTM C 33 except for gradation. Use sand composed of sound, durable stone particles free from loams or other injurious foreign matter. Furnish screenings of same or similar material as specified for coarse aggregate. Plasticity index of that part of fine aggregate passing No. 40 sieve shall be not more than 6 when tested by Tex-106-E. Sand equivalent shall have a minimum value of 45 when tested by Tex-203-F.

C. Composite Aggregate: Conform to following limits when graded in accordance with ASTM C 136.

GRADATION OF COMPOSITE AGGREGATE	
Sieve Size	Percent Passing
1/2"	100
3/8"	85 to 100
#4	50 to 70
#10	32 to 42
#40	11 to 26
#80	4 to 14
#200	1 to 6*
*2 to 8 when Test Method Tex-200-F, Part II (Washed Sieve Analysis) is used.	

D. Asphaltic Material: Moisture-free homogeneous material which will not foam when heated to 347 degrees F, meeting following requirements:

VISCOSITY GRADE				
TEST	AC-10		AC-20	
	Min.	Max.	Min.	Max.
Viscosity, 140E F stokes	1000	± 200	2000	± 400
Viscosity, 275E F stokes	1.9	-	2.5	-
Penetration, 77E F, 100 g, 5 sec.	85	-	55	-
Flash Point, C.O.C., F.	450	-	450	-
Solubility in trichloroethylene, percent	99.0	-	99.0	-
Tests on residues from thin film oven tests:				
Viscosity, 140E F stokes	-	3000	-	6000
Ductility, 77E F, 5 cms per min., cms	70	-	50	-
Spot tests	Negative for all grades			

1. Material shall not be cracked.

2. Engineer will designate grade of asphalt to use after design tests have been made. Use only one grade of asphalt after grade is determined by test design for project.

2.2 EQUIPMENT

A. Mixing Plant: Weight-batching or drum mix plant with capacity for producing continuously mixtures meeting specifications. Plant shall have satisfactory conveyors, power units, aggregate handling equipment, hot aggregate screens and bins, and dust collectors. Provide equipment to supply materials adequately in accordance with rated capacity of plant and produce finished material within specified tolerances. Following equipment is essential:

1. Cold aggregate bins and proportioning device.

2. Dryer.

3. Screens.

4. Aggregate weight box and batching scales.

5. Mixer.

6. Asphalt storage and heating devices.

7. Asphalt measuring devices.

8. Truck scales.

B. Bins: Separate aggregate into minimum of four bins to produce consistently uniform grading and asphalt content in completed mix.

2.3 MIXES

A. Employ a certified testing laboratory to prepare design mixes. Test in accordance with Tex-126-E or Tex-204-F and Tex-208-F.

B. Density and Stability Requirements:

Percent Density		Percent	HVEEM Stability Percent
Min.	Max.	Optimum	Not Less Than
94.5	97.5	96	35

C. Proportions for Asphaltic Material: Provide 4 to 8 percent of mixture by weight. Aggregate by weight shall not contain more than 1.0 percent by weight of fine dust, clay-like particles, or silt when tested in accordance with Tex-217-F, Part II.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify compacted base course is ready to support imposed loads.

B. Verify lines and grades are correct.

3.2 PREPARATION

A. Prime Coat: Do not apply a tack coat until primed base has cured to satisfaction of Engineer.

B. Tack Coat: Where the mixture will adhere to the surface on which it is to be placed without use of a tack coat, tack coat may be eliminated if approved by Engineer.

C. Prepare subgrade in advance of asphaltic concrete paving operation.

3.3 PLACEMENT

A. Do not place asphaltic mixture when air temperature is below 50 degrees F and falling. Mixture may be placed when air temperature taken in shade and away from artificial heat is above 40 degrees F and rising.

B. Haul prepared and heated asphaltic concrete mixture to the project in tight vehicles previously cleaned of foreign material. Mixture shall be at temperature between 250 degrees F and 325 degrees F when laid.

C. Spread material into place with approved mechanical spreading and finishing machine of screening or tamping type. Use track-mounted finish machine to place base course directly on earth subgrade.

D. Surface Course Material: Surface course 2 inches or less in thickness may be spread in one lift. Spread lifts in such manner that, when compacted, finished course will be smooth, of uniform density, and will be to section, line and grade as shown. Place construction joints on surface courses to coincide with lane lines or as directed by Engineer.

E. Place courses as nearly continuously as possible. Pass roller over unprotected ends of freshly laid mixture only when mixture has cooled. When work is resumed, cut back laid material to produce slightly beveled edge for full thickness of course. Remove old material which has been cut away and lay new mix against fresh cut.

F. When new asphalt is laid against existing or old asphalt, existing or old asphalt shall be saw cut full depth to provide straight smooth joint.

G. In restricted areas where use of paver is impractical, spread and finish asphalt by mechanical compactor. Use wood or steel forms, rigidly supported to assure correct grade and cross section. Carefully place materials to avoid segregation of mix. Do not broadcast material. Remove any lumps that do not break down readily. Place asphalt courses in same sequence as if placed by machine.

3.4 COMPACTION

A. Begin rolling while pavement is still hot and as soon as it will bear roller without undue displacement or hair cracking. Keep wheels properly moistened with water to prevent adhesion of surface mixture. Do not use excessive water.

B. Compress surface thoroughly and uniformly, first with power-driven, 3-wheel, or tandem rollers weighing from 8 to 10 tons. Obtain subsequent compression by starting at side and rolling longitudinally toward center of pavement, overlapping on successive trips by at least one-half width of rear wheels. Make alternate trips slightly different in length. Continue rolling until no further compression can be obtained and rolling marks are eliminated. Complete rolling before mixture temperature drops below 175 degrees F.

C. Use tandem roller for final rolling. Double coverage with approved pneumatic roller on asphaltic concrete surface is acceptable after flat wheel and tandem rolling has been completed.

D. Along walls, curbs, headers and similar structures, and in locations not accessible to rollers, compact mixture thoroughly with lightly oiled tamps.

E. Compact binder course and surface course to density not less than 93 percent of the maximum possible density of voidless mixture composed of same materials in like proportions.

3.5 TOLERANCES

A. Furnish templates for checking surface in finished sections. Maximum deflection of templates, when supported at center, shall not exceed 1/8 inch.

B. Completed surface, when tested with 10-foot straightedge laid parallel to center line of pavement, shall show no deviation in excess of 1/8 inch in 10 feet. Correct any surface not meeting this requirement.

3.6 FIELD QUALITY CONTROL

A. Testing will be performed under provisions of applicable TSUS Construction Project Division 01 Specifications

B. Minimum of one core will be taken at random locations per 1000 feet per lane of roadway or 500 square yards of base to determine in-place depth and density.

C. In-place density will be determined in accordance with Tex-207-F and Tex-227-F from cores or sections. Other methods of determining in-place density, which correlate satisfactorily with results obtained from roadway specimens, may be used when approved by Engineer.

D. Contractor may, at his own expense, request three additional cores in vicinity of cores indicating nonconforming in-place depths. In-place depth at these locations shall be average depth of four cores.

E. Fill cores and density test sections with new compacted asphaltic concrete.

3.7 NONCONFORMING PAVEMENT

A. Recompact pavement sections not meeting specified densities or replace them with new asphaltic concrete material. Replace with new material sections of surface course pavement not meeting surface test requirements or having unacceptable surface texture. Patch asphalt pavement sections in accordance with procedures established by Asphalt Institute.

B. Remove and replace areas of asphalt found deficient in thickness by more than 10 percent. Use new asphaltic base of thickness shown on Drawings.

C. Replace nonconforming pavement sections.

3.8 UNIT PRICE ADJUSTMENT

A. Unit price adjustments shall be made for in-place depth determined by cores as follows:

1. Adjusted Unit Price shall be ratio of average thickness as determined by cores to thickness bid upon, times unit price bid.

2. Adjustment shall apply to lower limit of 90 percent and upper limit of 105 percent of unit price.

3. Average depth below 90 percent may be rejected by Engineer.

3.9 PROTECTION

A. Do not open pavement to traffic until 12 hours after completion of rolling, or as shown on Drawings.

B. Maintain asphaltic concrete pavement in good condition until completion of Work.

C. Repair defects immediately by replacing asphaltic concrete pavement to full depth.

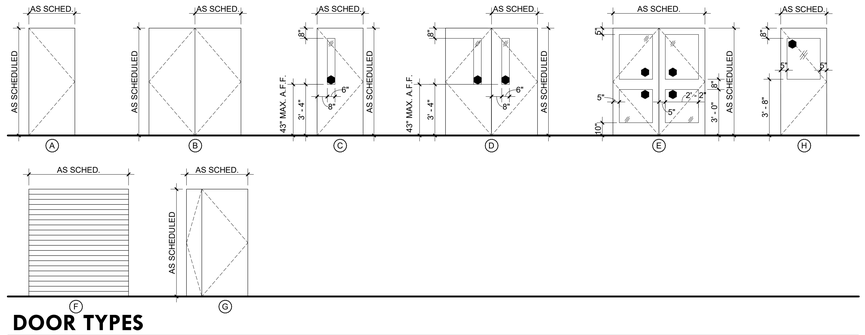
END OF SECTION 32 12 16

DOOR SCHEDULE

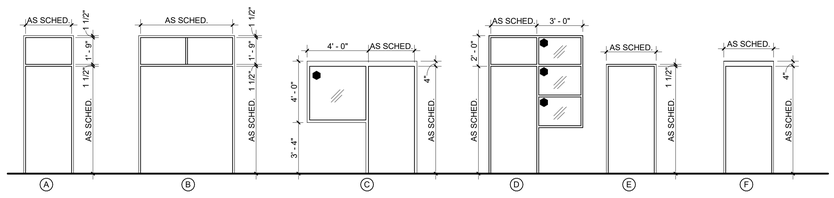
DOOR NUMBER	DOOR SIZE	TYPE	MTL.	FIRE RATING	FRAME TYPE	FRAME MTL.	DETAILS SILL	DETAILS JAMB	DETAILS HEAD	HDWR. SET	REMARKS
001A	6' - 0" X 7' - 0" X 2 1/4"	E	GL			AL	7/A4.1	4/A4.1	7/A4.1	1.0	PANIC BARS, CLOSERS, CARD READER
001B	3' - 6" X 7' - 0" X 1 3/4"	B	HM	90 MIN.	E	HM		10/A3.6	1/A4.1	4.0	FIRE RATED 2 HR. MIN. ; PANIC BARS, MAGNETIC HOLD-OPENS, CLOSERS
001C	3' - 6" X 7' - 0" X 1 3/4"	B	HM	90 MIN.	E	HM		10/A3.6	1/A4.1	4.0	FIRE RATED 2 HR. MIN. ; PANIC BARS, MAGNETIC HOLD-OPENS, CLOSERS
001D	6' - 0" X 7' - 0" X 2 1/4"	E	GL			AL	7/A4.1	4/A4.1	7/A4.1		PANIC BARS, CLOSERS, CARD READER
101A	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		CLOSER, MAIN DOOR TO CTE
101B	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		
102B	2' - 11" X 7' - 0" X	FFF	HM					4/A4.1	7/A4.1		
128	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1	3.0	
129	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		
129B	3' - 0" X 7' - 0" X 1 3/4"	A	WD		A	HM		12/A4.1	16/A4.1		
130A	6' - 0" X 7' - 0" X 1 3/4"	B	WD		B	HM		12/A4.1	16/A4.1		
130B	3' - 0" X 7' - 0" X 1 3/4"	A	HM		E	HM					CARD READER
130B	4' - 0" X 8' - 0" X 1 3/4"	XX									
130C	8' - 0" X 9' - 0" X 1/2"	F	HM		E	HM		9/A4.1	11/A4.1		ROLL UP MANUAL DOOR EXTERIOR
131A	6' - 0" X 7' - 0" X 1 3/4"	N	WD		B	HM		12/A4.1	16/A4.1		PANIC HARDWARE, CLOSER
131B	6' - 0" X 7' - 0" X 1 3/4"	N	WD		B	HM		12/A4.1	16/A4.1		PANIC HARDWARE, CLOSER
131C	6' - 0" X 7' - 0" X 1 3/4"	N	WD		F	HM					PANIC BARS, CLOSERS, CARD READER
403A	3' - 6" X 7' - 0" X 1 3/4"	H	WD/GL		A	HM		12/A4.1	16/A4.1		PR WITH VISION LIGHT, ACOUSTIC DOOR NEEDED
403B	3' - 6" X 7' - 0" X 1 3/4"	H	WD/GL		A	HM		12/A4.1	16/A4.1		PR WITH VISION LIGHT, ACOUSTIC DOOR NEEDED
403C	3' - 6" X 7' - 0" X 1 3/4"	H	WD/GL		A	HM		12/A4.1	16/A4.1		BAND DOOR, ACOUSTIC DOOR NEEDED
403D	3' - 6" X 7' - 0" X 1 3/4"	H	WD/GL		A	HM		12/A4.1	16/A4.1		
403E	3' - 6" X 7' - 0" X 1 3/4"	H	WD/GL		C	HM		12/A4.1	16/A4.1		BAND WITH VISION LITE AND WINDOW, ACOUSTIC DOOR NEEDED
403F	3' - 6" X 7' - 0" X 1 3/4"	G	WD		A	HM		12/A4.1	1/A4.1		FIRE RATED 2 HR. MIN. BAND DOOR, ACOUSTIC DOOR NEEDED
403F	2' - 0" X 7' - 0" X 1 3/4"	G	WD		A	HM		12/A4.1	1/A4.1		FIRE RATED 2 HR. MIN. 1FT OPERABLE PANEL ACOUSTIC DOOR NEEDED
403G	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		
404A	3' - 0" X 7' - 0" X 1 3/4"	YY			A			12/A4.1	16/A4.1		
404B	3' - 6" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	1/A4.1		FIRE RATED 2 HR. MIN. BAND DOOR, ACOUSTIC DOOR NEEDED
628A	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		D	HM		12/A4.1	16/A4.1		
628B	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		
628C	3' - 0" X 7' - 0" X 1 3/4"	C	WD/GL		A	HM		12/A4.1	16/A4.1		
825B	3' - 0" X 7' - 0" X 2"	E	WD								

KEYNOTES

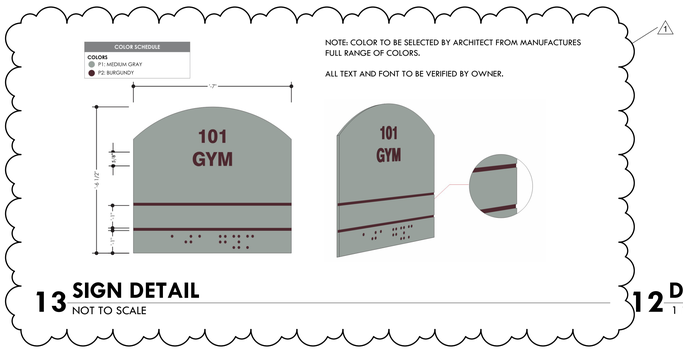
0220.75	EXISING STRUCTURE
0320.02	STEEL REINFORCING
0360.03	FILL WITH GROUT
0405.01	FLASHING END DAM
0405.02	MORTAR NET
0420.01	ADJUSTABLE MASONRY WALL TIES AT 16" O.C.E.W.
0420.02	CONCRETE MASONRY UNIT HORIZONTAL REINFORCING
0420.13	6" CONCRETE MASONRY UNITS
0420.14	8" CONCRETE MASONRY UNITS
0420.20	BULLNOSE CMU
0420.27	KING SIZE BRICK
0420.29	INVERTED BOND BEAM WITH FIELD GROUND EDGE RADIUS
0510.08	STEEL BENT PLATE (RE: STRUCTURAL)
0540.06	2" COLD-FORMED METAL FURRING CHANNEL
0540.07	2" VERTICAL COLD-FORMED METAL FURRING CHANNELS AT 16" O.C. HORIZONTALLY
0550.02	3" X 3" X 1/4" STEEL ANGLE
0610.05	1/2" EXTERIOR GRADE PLYWOOD
0720.05	2" CONTINUOUS MINERAL WOOL INSULATION
0725.04	FLUID-APPLIED MEMBRANE AIR BARRIER SYSTEM
0740.02	PREFINISHED METAL WALL PANEL SYSTEM
0740.05	Z-CLOSURE
0760.40	TERMINATION BAR AND PREFINISHED FLASHING CAP
0790.01	SEALANT WITH BACKER ROD AS REQUIRED
0790.02	CAULKING
0810.01	ALUMINUM DOOR FRAME
0810.02	HOLLOW METAL FRAME
0810.04	HOLLOW METAL DOOR AND FRAME
0810.05	JAMB ANCHOR (3 PER JAMB)
0810.06	HOLLOW METAL DOOR
0830.14	OVERHEAD COILING DOOR
0830.15	OVERHEAD COILING DOOR HOUSING
0830.18	DOOR TRACK
0840.01	ALUMINUM STOREFRONT
0840.02	ALUMINUM STOREFRONT DOOR
0870.11	DRIP CAP
3210.14	CONCRETE PAVING (RE: CIVIL)



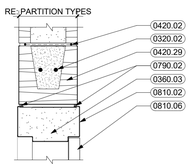
DOOR TYPES



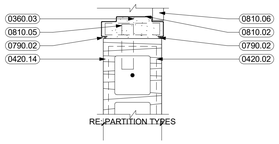
FRAME TYPES



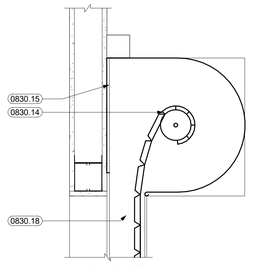
13 SIGN DETAIL
NOT TO SCALE



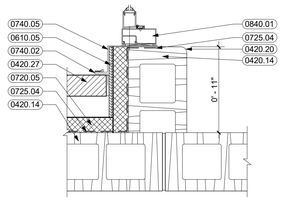
12 DOOR HEAD DETAIL
1 1/2" = 1'-0"



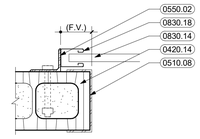
11 DOOR JAMB DETAIL
1 1/2" = 1'-0"



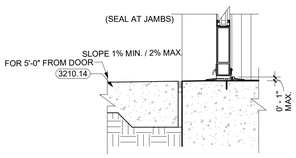
10 HEAD DETAIL
1 1/2" = 1'-0"



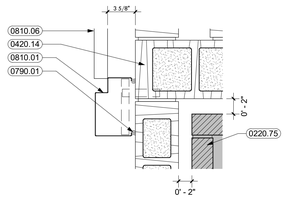
9 JAMB DETAIL
1 1/2" = 1'-0"



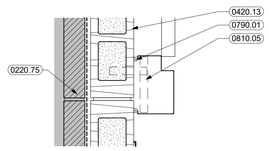
8 JAMB DETAIL
1 1/2" = 1'-0"



7 SILL DETAIL
1 1/2" = 1'-0"



6 SECTION DETAIL
1 1/2" = 1'-0"



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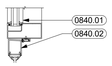
1 1/2" = 1'-0"



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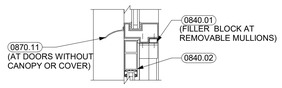
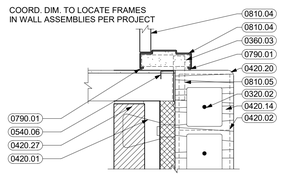
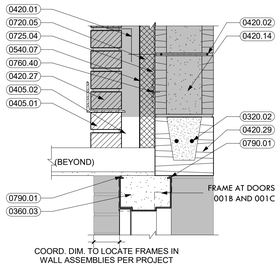
1 1/2" = 1'-0"



3 HEAD DETAIL
1 1/2" = 1'-0"



2 JAMB DETAIL
1 1/2" = 1'-0"



1 HEAD DETAIL
1 1/2" = 1'-0"

BROWN REYNOLDS WATFORD ARCHITECTS
4301 MAGNOLIA COVE DRIVE
SUITE 250 BUILDING A
HUMBLE, TEXAS 77345
281.301.3800
WWW.BRWARCH.COM

DATE FEBRUARY 23, 2024
DRAWN BY JTL
CHECKED BY MD, JSC
BRW PROJECT NUMBER 223005.00

HUMBLE ISD
TIMBERWOOD MIDDLE SCHOOL
RENOVATIONS

NO.	REVISION	DATE
1	ISSUED FOR CSP	06/13/2025
	ADDENDUM 2	9/4/2025

A4.1

DOOR SCHEDULE & DETAILS

KEYNOTES

1010.23	ROOM NUMBER SIGN
1010.49	BUILDING ENTRANCE IDENTIFICATION SIGN. RE: G1.7 FOR NUMBER SEQUENCE
1235.02	MUSICAL INSTRUMENT STORAGE CASEWORK
1235.03	MUSICAL INSTRUMENT STORAGE CASEWORK FILLER AND COSURE PANEL
1250.14	INSTRUMENT STORAGE CABNIETS WITH INTERIOR ACOUSTIC PANELING. DESIGN BASIS: WENGER ULTRASTORE ACOUSTICABINETS.

FINISH LEGEND

ROOM NAME 101A | CP1 RB1 P1 AC1 — ROOM NAME DESIGNATION & NUMBER — CEILING FINISH / WALL FINISH / BASE FINISH / FLOOR FINISH — ROOM NAME 101A | AC1 P1 RB1 CP1

DESCRIPTION

AC - ACOUSTICAL CEILING TILE
- **AC1:** 24" X 24" (NEW TILE AND GRID)
- **AC2:** 24" X 24" (NEW TILE, EXISTING GRID)
- **AC3:** VINYL COATED CEILING TILE
- **AC4:** FLOATING CLOUDS (AT WEIGHT/ DANCE) 24"X24" NEW TILE AND GRID
- **AC5:** TURF, LINEAR
  COLOR: D02 SILVER TEAK AND 15 MELOT
  PATTERN: VERTICAL LAYOUT SLAT PANELS
  COORDINAT ACS AND AWP1 AS BOTH ARE PART OF THE SAME SYSTEM
- **AC6:** INCREASED NRC ACOUSTIC TILE 24"X24" NEW TILE AND GRID

AWP - ACOUSTICAL WALL PANELS
- **AWP1:** AT BAND & ENSEMBLE
  TURF, LINEAR CEILING AND WALL SCAPE
  COLOR: D02 SILVER TEAK AND 15 MELOT
  PATTERN: L5 PANEL VERTICAL LAYOUT SLAT PANELS
  *CAPPED BLADES AT EDGE PANELS.
- **AWP2:** AT GYM. TECTUM FINALE PB. CUSTOM COLOR TO BE SELECTED BY ARCHITECT.
- **AWP3:** AT BAND/ ENSEMBLE. TECTUM. COLOR: 15 MELOT

C - CARPET
- **C1:** ENTRY WAY CARPET (WALKOFF) TARKETT ABRASIVE ACTION II POWERBOND
  COLOR: 19100 CHARCOAL
- **C2:** CARPET (AT BAND/ENSEMBLE) KINETEX, J+J FLOORING
  COLOR & PATTERN: TO BE SELECTED BY ARCHITECT.

CT - CERAMIC TILE
- **CT1:** CERAMIC TILE (FIELD)
- **CT2:** CERAMIC TILE (ACCENT)
- **CT3:** TILE FLOOR/ BASE (AT CULINARY)

EX - EXISTING FINISH TO REMAIN

GB1: GLAZED BLOCK STARTER COLOR, MATCH EXISTING SCHOOL START BLOCK

M - MISC. METALS
- **M1:** PAINT
  EXPOSED STRUCTURAL STEEL AND HOLLOW METAL DOORS AND FRAMES
  SW:TO BE SELECTED BY ARCHITECT
  FINISH: SEMI GLOSS
  * OVERHEAD STEEL SHALL BE PAINTED TO MATCH SCHEDULED CEILING FINISH AT THE BAND (403) AND LARGE ENSEMBLE (404).

P - PAINT
- **P1:** CEILING, WALL
- **P2:** WALL, ACCENT
- **P3:** WALL (PRIMARY SCHOOL COLOR)

PL - PLASTIC LAMINATE
- **PL4:** PLASTIC LAMINATE (MILLWORK)
- **PL5:** PLASTIC LAMINATE (COUNTERS)
- **PL6:** PLASTIC LAMINATE (DOORS)

PC - POLISHED CONCRETE
- **PC1:** POLISHED CONCRETE

RB - RESILIENT BASE
- **RB1:** RESILIENT BASE

RF - RUBBER FLOORING
- **RF1:** RUBBER FLOORING (WEIGHT ROOM)

SC: SEALED CONCRETE
CLEAR CONCRETE SEALER

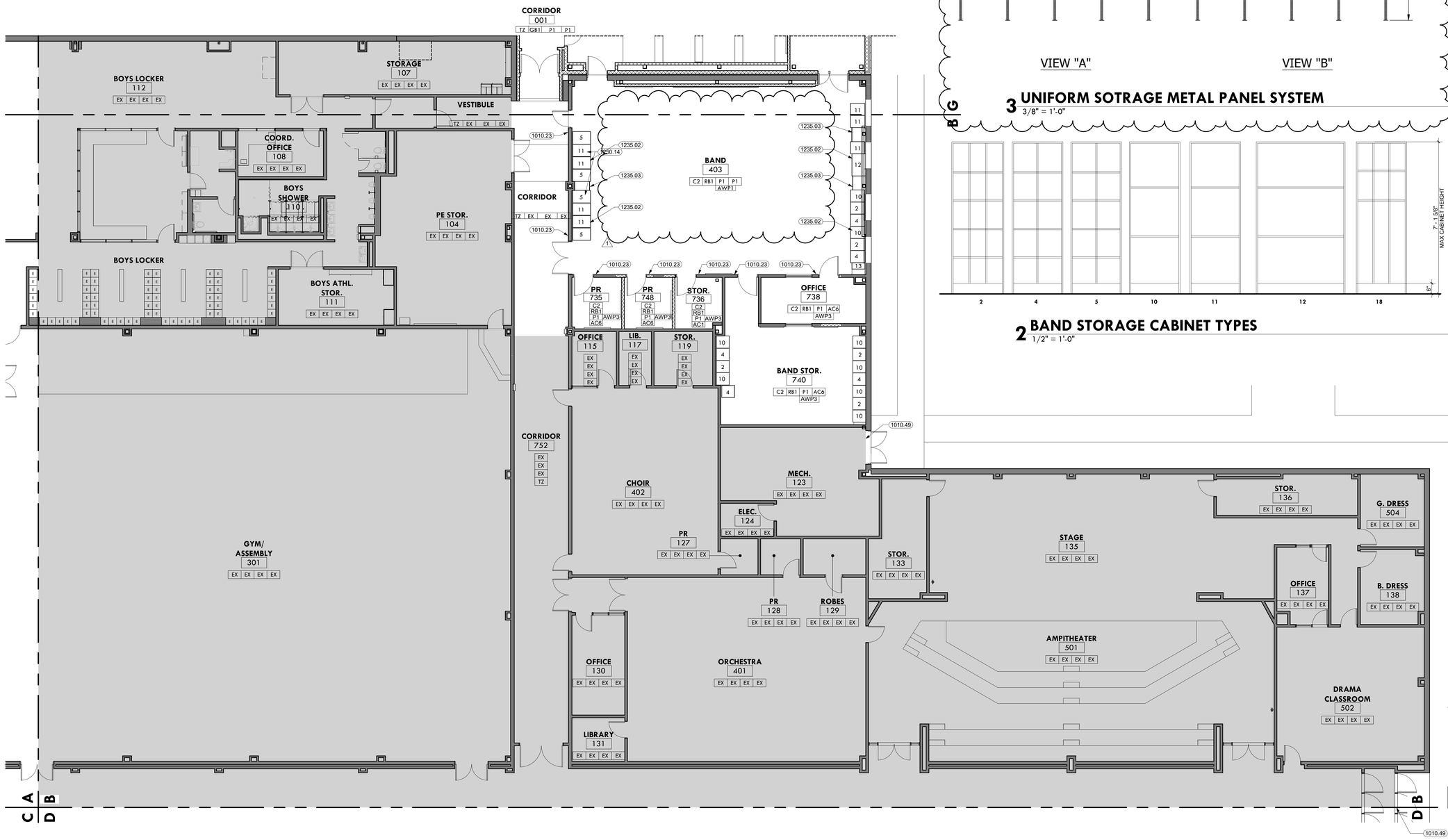
TC: THEATRICAL CURTAIN
COLOR: WHITE

TS - TRANSITION STRIP
- **TS1:** SEE FLOOR TRANSITION DETAIL
- **TS2:** METAL TRANSITION STRIP
- **TS3:** METAL TRANSITION STRIP

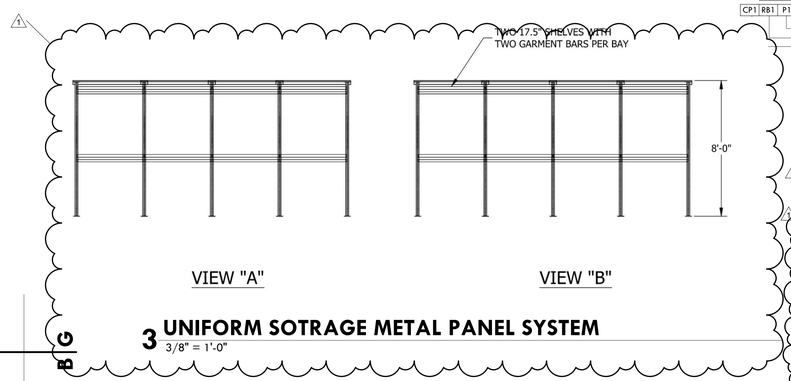
TZ - TERRAZZO FLOORING
- **TZ1:** MATCH EXISTING (MAIN)
- **TZ2:** MATCH EXISTING (ACCENT)
- **VB:** VENTED BASE (AT WOOD FLOOR)

WF - WOOD FLOORING
- **WF1:** SPORTS (GYM)
- **WF2:** (DANCE)

NOTES:
1. GYPSUM BOARD CEILINGS ARE TO BE FINISH P1, U.N.O.
2. PROVIDE FLOOR LEVELING COMPOUND UNDER FINISH FLOORING AS REQUIRED
3. PROVIDE CONTROL JOINTS AT CONCRETE SLAB AS REQUIRED AND AT LOCATIONS SHOWN ON FINISH PLAN.
4. PROVIDE EPOXY PAINT AT ALL INTERIOR PAINTED CMU.
5. REMOVE AND REINSTALL CEILING TILE AND GRID THROUGHOUT THE SCHOOL AS NECESSARY TO RUN NEW INFRASTRUCTURE ABOVE CEILINGS.
6. ENSURE ALL INTERIOR WALLS AND CEILING FINISHES MEET OR EXCEED A CLASS C FLAME SPREAD INDEX AT CORRIDORS, EXIT ENCLOSURES, EXIT PASSAGEWAYS, ROOMS AND ENCLOSED SPACES.



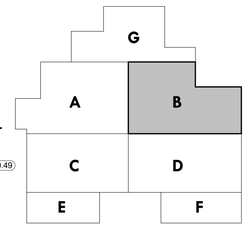
1 FINISH PLAN - AREA B
1/8" = 1'-0"



3 UNIFORM SOTRAGE METAL PANEL SYSTEM
3/8" = 1'-0"

2 BAND STORAGE CABINET TYPES
1/2" = 1'-0"

KEY PLAN



PLAN NORTH / TRUE NORTH

BROWN REYNOLDS WATFORD ARCHITECTS
4501 MAGNOLIA COVE DRIVE
SUITE 250 BUILDING 6
MISSOURI CITY, TEXAS 77345
281.301.1300
WWW.BRWARCH.COM

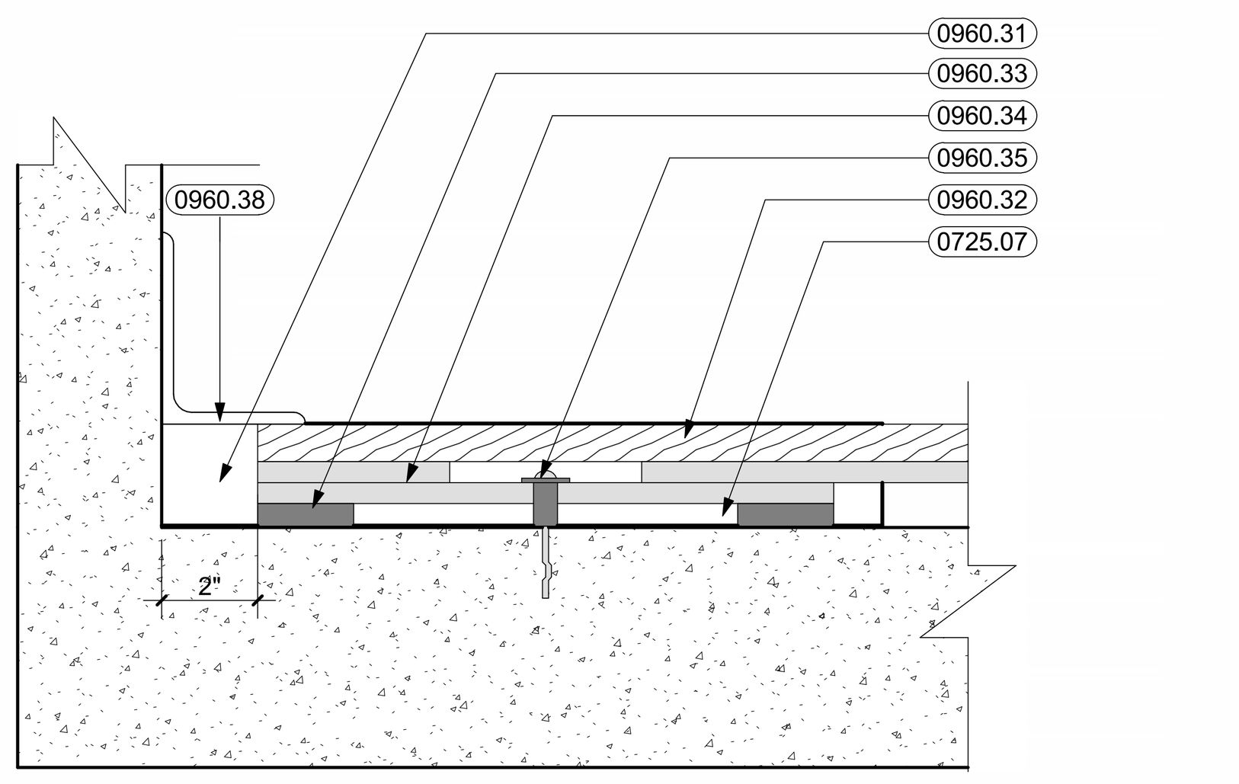
DATE: FEBRUARY 23, 2024
DRAWN BY: JTL
CHECKED BY: MD, JSC
BRW PROJECT NUMBER: 223005.00

HUMBLE ISD
TIMBERWOOD MIDDLE SCHOOL
RENOVATIONS

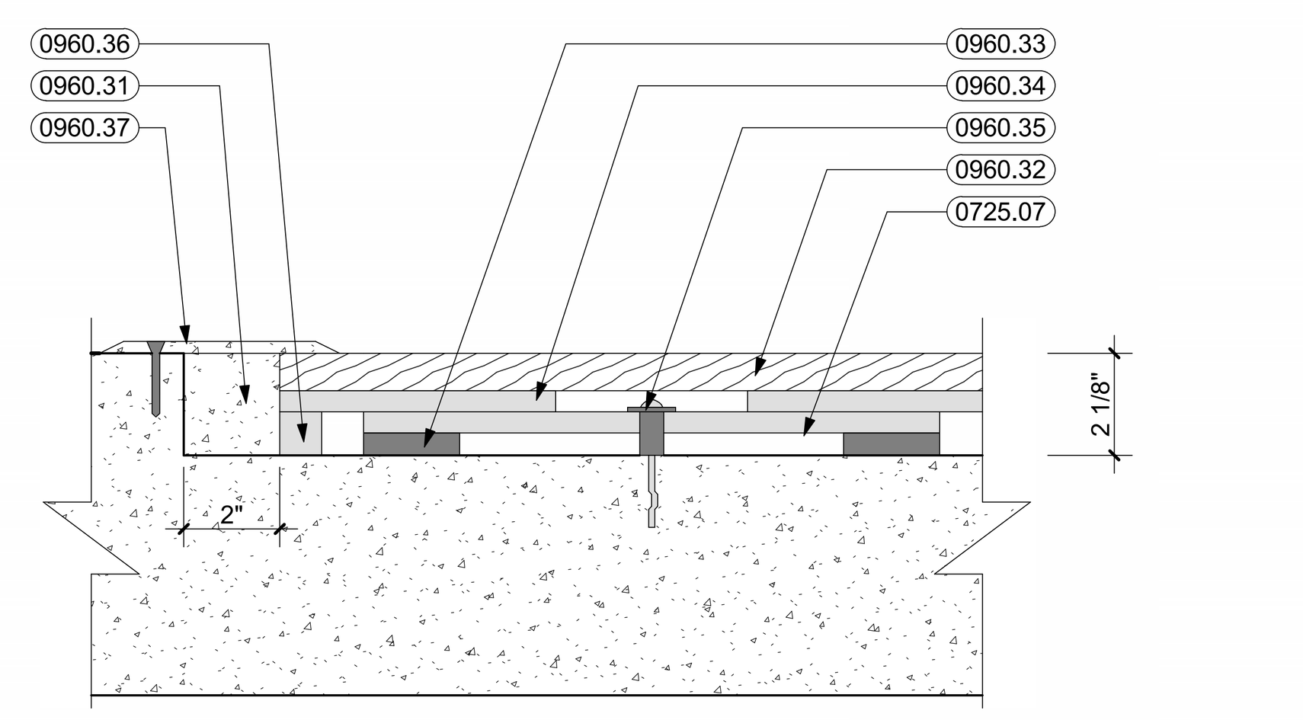
NO.	REVISION	DATE
1	ISSUED FOR CSP ADDENDUM 2	06/13/2025 9/4/2025

A7.1B

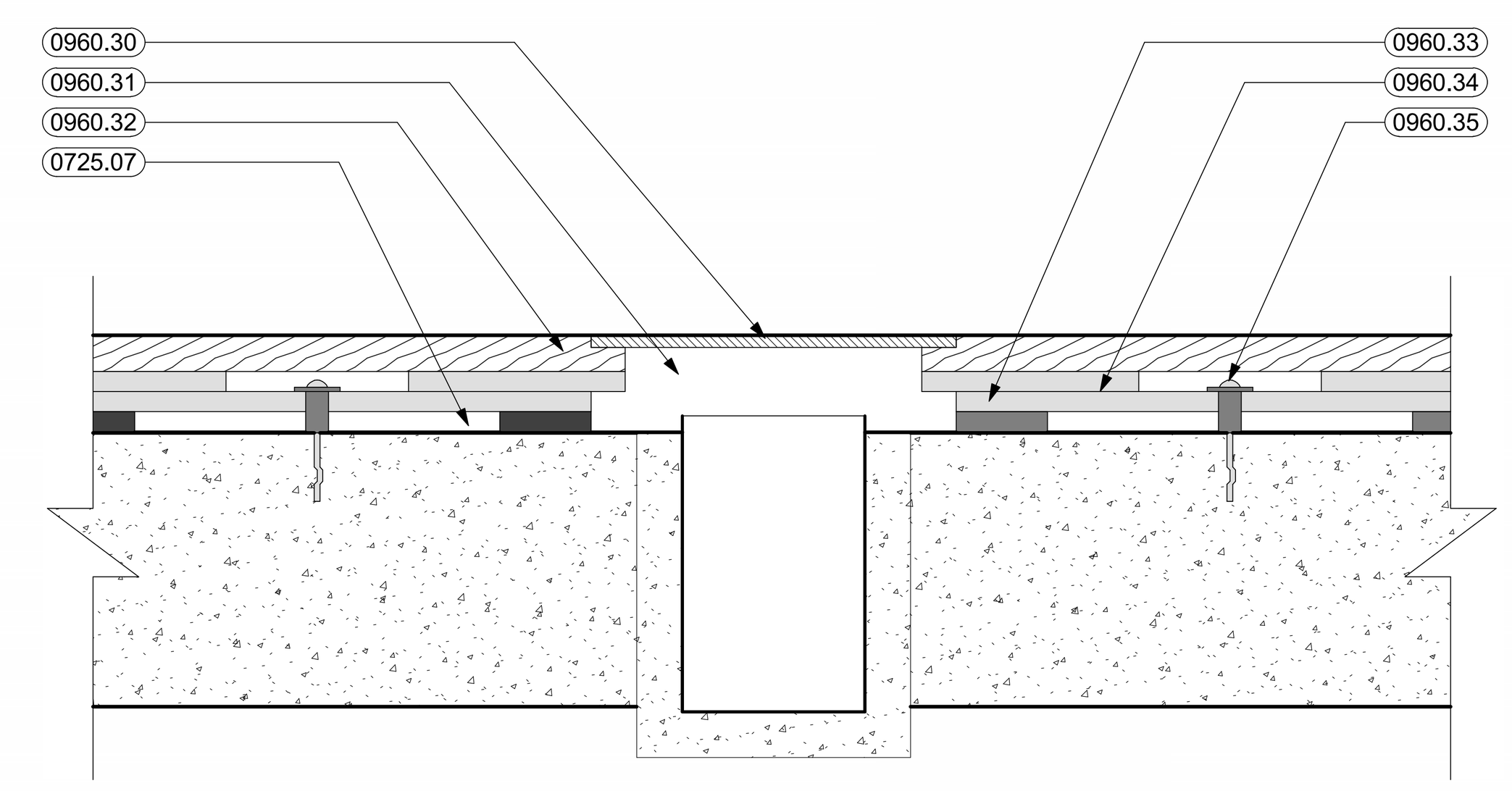
FINISH PLAN - AREA B



5 WALL BASE
3" = 1'-0"



4 DOOR TRANSITION
3" = 1'-0"



3 VOLLEYBALL ANCHOR SYSTEM
3" = 1'-0"

KEYNOTES

0725.07	6 MIL VAPOR BARRIER
0960.28	2" WIDE PAINTED GAME LINE STRIPE.
0960.29	2'-0" WIDE PAINTED GAME LINE PERIMITER.
0960.30	INSERT PLATE
0960.31	1.5"- 2" EXPANSION VOID
0960.32	25/32" MAPLE FLOORING
0960.33	7/16" RESILIENT PAD
0960.34	ECLIPSE SUBFLOOR PANEL
0960.35	ANCHOR AND SLEEVE
0960.36	SOLID STOP BLOCK
0960.37	1/4" THRESHOLD PLATE
0960.38	3"X 4" VENTED COVE BASE
1010.23	ROOM NUMBER SIGN
1010.49	BUILDING ENTRANCE IDENTIFICATION SIGN. RE: G1.7 FOR NUMBER SEQUENCE
1235.01	METAL SHELVING SYSTEM
2650.10	WALL-MOUNTED EXIT SIGN

FINISH LEGEND

ROOM NAME
101A
CP1 | RB1 | P1 | AC1

ROOM NAME DESIGNATION & NUMBER
CEILING FINISH
WALL FINISH
BASE FINISH
FLOOR FINISH

ROOM NAME
101A
AC1
P1
RB1
CP1

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SC: **SEALED CONCRETE**
CLEAR CONCRETE SEALER

TC: **THEATRICAL CURTAIN**
COLOR: WHITE

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WF - WOOD FLOORING
WF1: SPORTS (GYM)
WF2: (DANCE)

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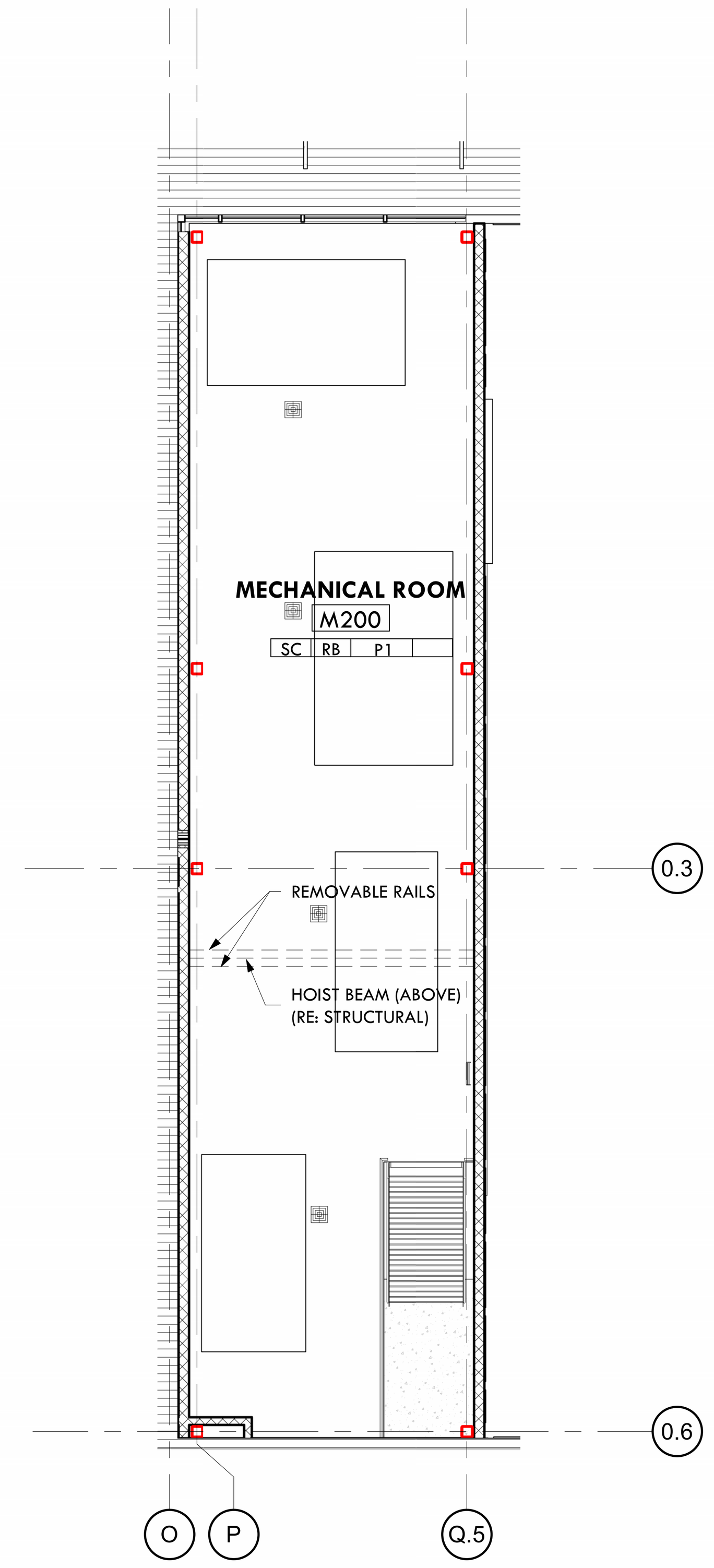
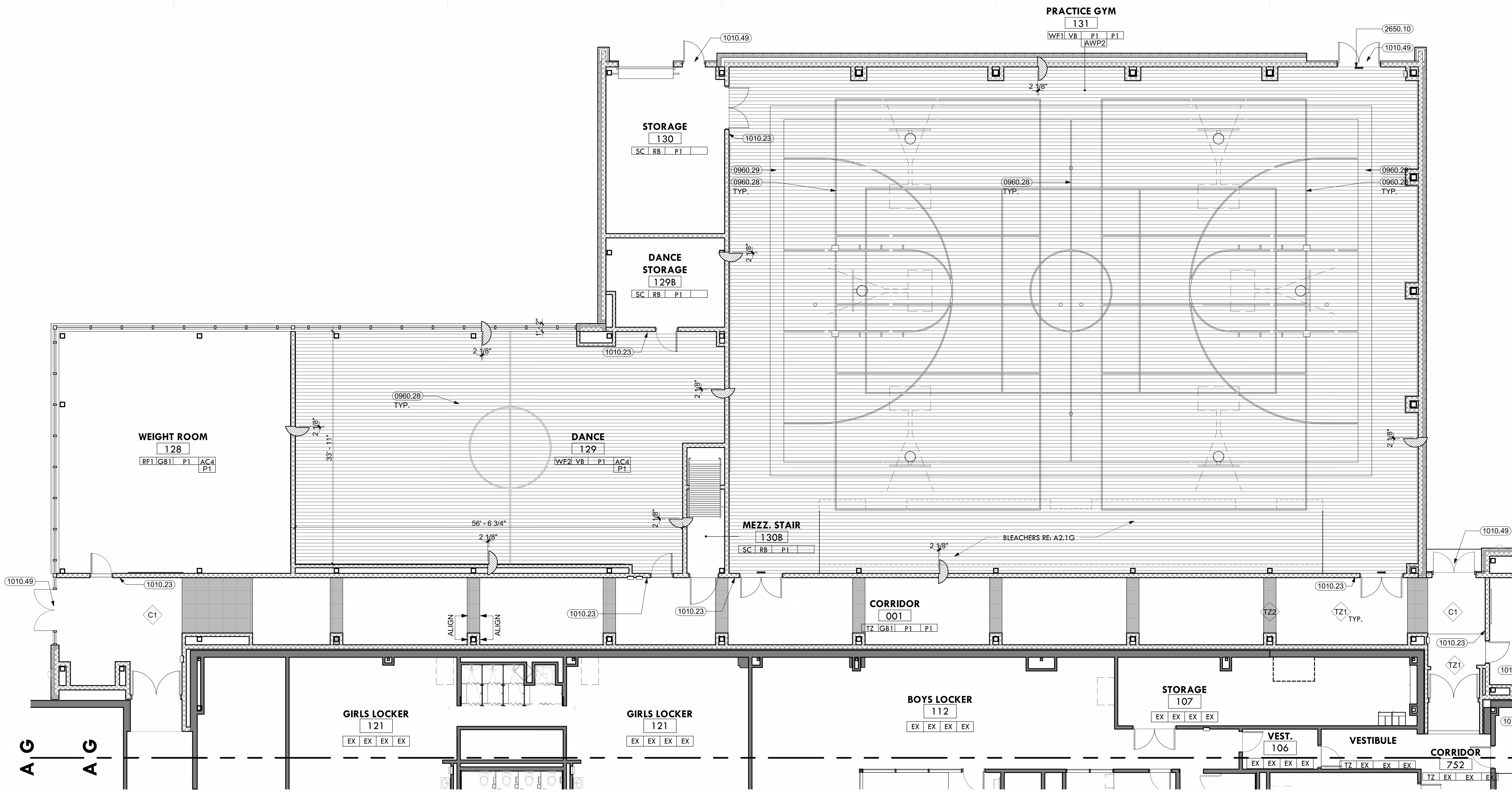
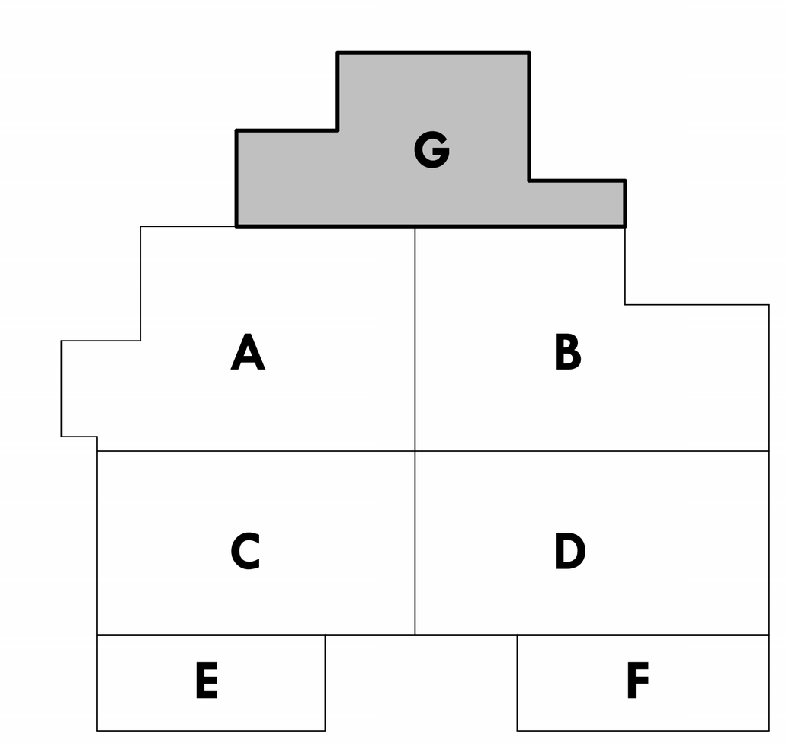


2 SECOND FLOOR FINISH PLAN
1/8" = 1'-0"



1 FINISH PLAN - AREA G
1/8" = 1'-0"

KEY PLAN



BROWN REYNOLDS WATFORD ARCHITECTS
4501 MAGNOLIA COVE DRIVE
SUITE 250 BUILDING 6
HOUSTON, TEXAS 77345
281-361-1800
WWW.BRWARCH.COM
BRW

DATE	FEBRUARY 23, 2024
DRAWN BY	JTL
CHECKED BY	MD, JSC
BRW PROJECT NUMBER	223005.00

HUMBLE ISD
TIMBERWOOD MIDDLE SCHOOL RENOVATIONS

NO.	REVISION	DATE
1	ISSUED FOR CSP	06/13/2025
	ADDENDUM 2	9/4/2025

A7.1G

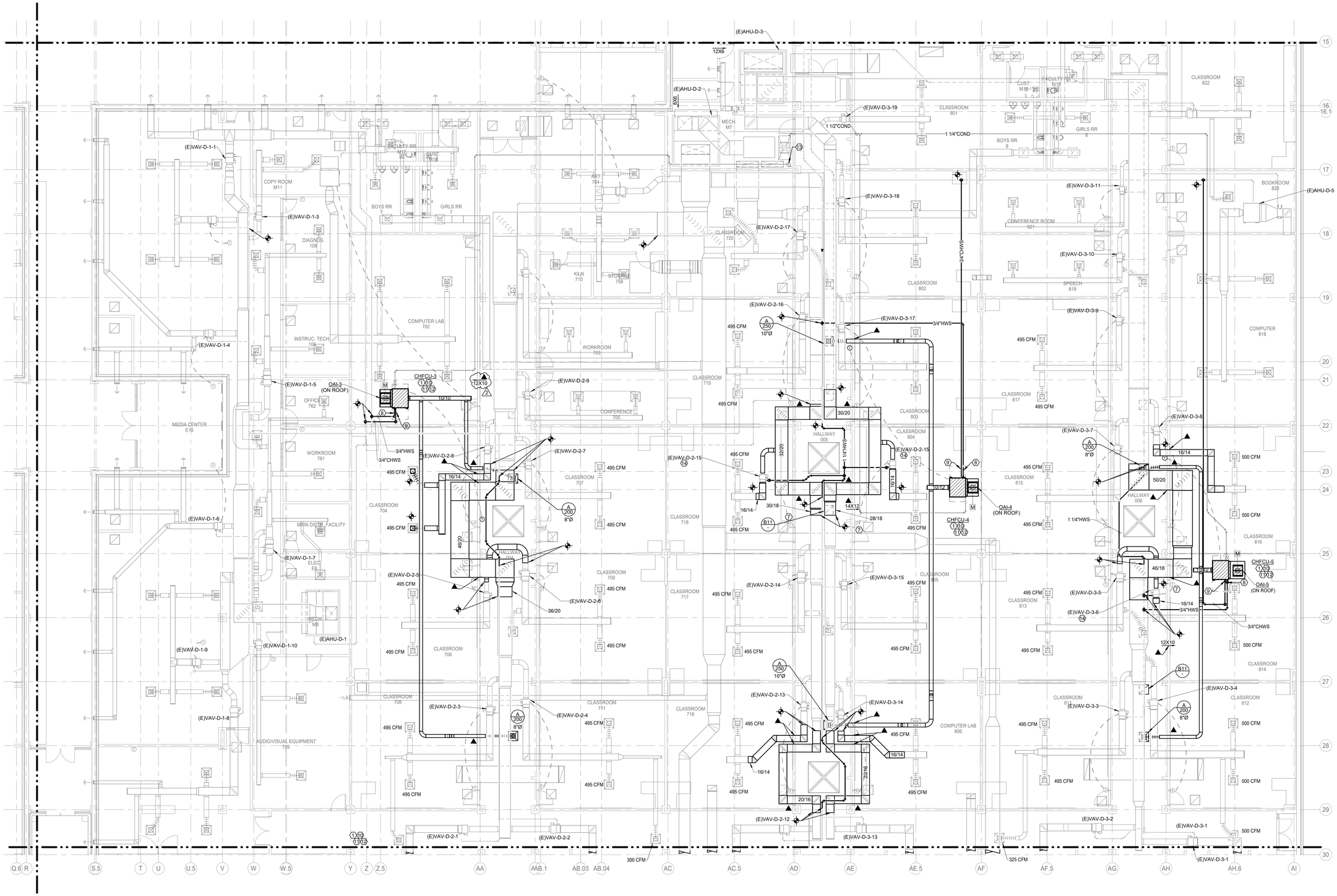
FINISH PLAN - AREA G

MECHANICAL GENERAL NOTES:

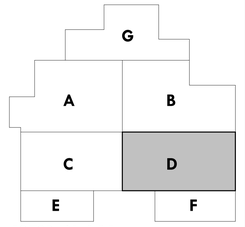
1. COORDINATE IN THE FIELD THE EXACT LOCATION OF MECHANICAL EQUIPMENT WITH CONTRACTOR AND ALL TRADES.
2. SENSORS SHALL BE MOUNTED AT +48" AFF (ABOVE FINISHED FLOOR). UNLESS OTHERWISE NOTED.
3. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
4. THESE CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY REFLECT ACTUAL DIMENSIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD-VERIFY ALL DIMENSIONS AND COORDINATE PLACEMENT OF ALL EQUIPMENT AND ROUTING OF ALL PIPING AND/OR HVAC SYSTEMS.

MECHANICAL KEYED NOTES

1. PROVIDE FULL SIZE PLENUM AT RETURN AIR INLET FOR CHFCU AS SHOWN.
2. PROVIDE ISOLATION VALVE.
3. BALANCE EXISTING TERMINAL BOX TO 990 CFM.
4. BALANCE EXISTING TERMINAL BOX TO 380 CFM.
5. BALANCE EXISTING TERMINAL BOX TO 960 CFM.
6. BALANCE EXISTING TERMINAL BOX TO 400 CFM.
7. EXTEND EXISTING CONTROL WIRES FROM TEMPERATURE SENSOR TO MAKE FINAL CONNECTION.
8. ROUTE HOT WATER SUPPLY AND RETURN PIPING TO EXISTING MAIN PIPING. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPE SYSTEM, SIZE, AND EXACT LOCATION.
9. ROUTE CHILLED SUPPLY AND RETURN PIPING TO EXISTING MAIN PIPING. CONTRACTOR SHALL FIELD VERIFY EXISTING PIPE SYSTEM, SIZE, AND EXACT LOCATION.
10. VERIFY SERVICE CLEARANCES FOR AIR FILTER, FAN SHAFT AND COIL REMOVAL WITH EQUIPMENT MANUFACTURER. COORDINATE WITH ALL TRADES NOT TO OBSTRUCT.
11. ROUTE FULL SIZE CONDENSATE DRAIN PIPING TO FLOOR SINK (SEE PLUMBING DRAWING FOR EXACT LOCATION). INSTALL CONDENSATE TRAP AS RECOMMENDED PER MANUFACTURER.
12. REFER TO DETAILS FOR CHFCU COIL PIPING.
13. ROUTE CONDENSATE PIPE AT SIZE INDICATED TO FLOOR SINK PIECE. REFER TO PLUMBING DRAWINGS.
14. NEW LOCATION OF EXISTING TERMINAL BOX. EXTEND WIRING TO TEMPERATURE SENSOR AS REQUIRED.



1 **MECHANICAL FLOOR PLAN - AREA D**
Scale: 1/8" = 1'-0"



KEY PLAN

ISSUED FOR BID

Salas O'Brien
salasobrien.com 281-664-1900
Houston
10930 W. Sam Houston Pkwy North, Suite 900
Houston, TX 77064
Registration: F-4111
Project No: 2023-02125-00

BRADLEY KALMANS
80219
LICENSED
PROFESSIONAL ENGINEER
08.27.2025

BROWN REYNOLDS WATFORD ARCHITECTS
4301 MAGNOLIA COVE DRIVE
SUITE 250 BUILDING 4
MCKINNEY, TEXAS 75071
281.361.3800
WWW.BRWARCH.COM

DATE JUNE 13, 2025
DRAWN BY AA
CHECKED BY SH
BRW PROJECT NUMBER 223005.00

HUMBLE ISD
TIMBERWOOD MIDDLE SCHOOL
RENOVATIONS

NO.	REVISION	DATE
1	Issue For Bid	06.13.2025
2	Addendum #2	08.27.2025

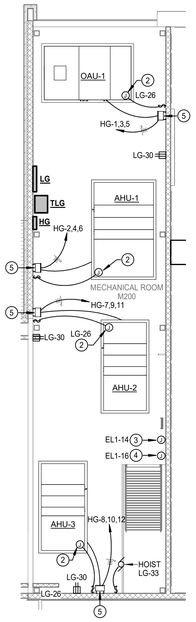
M2.4
MECHANICAL FLOOR PLAN - AREA D

ELECTRICAL GENERAL NOTES:

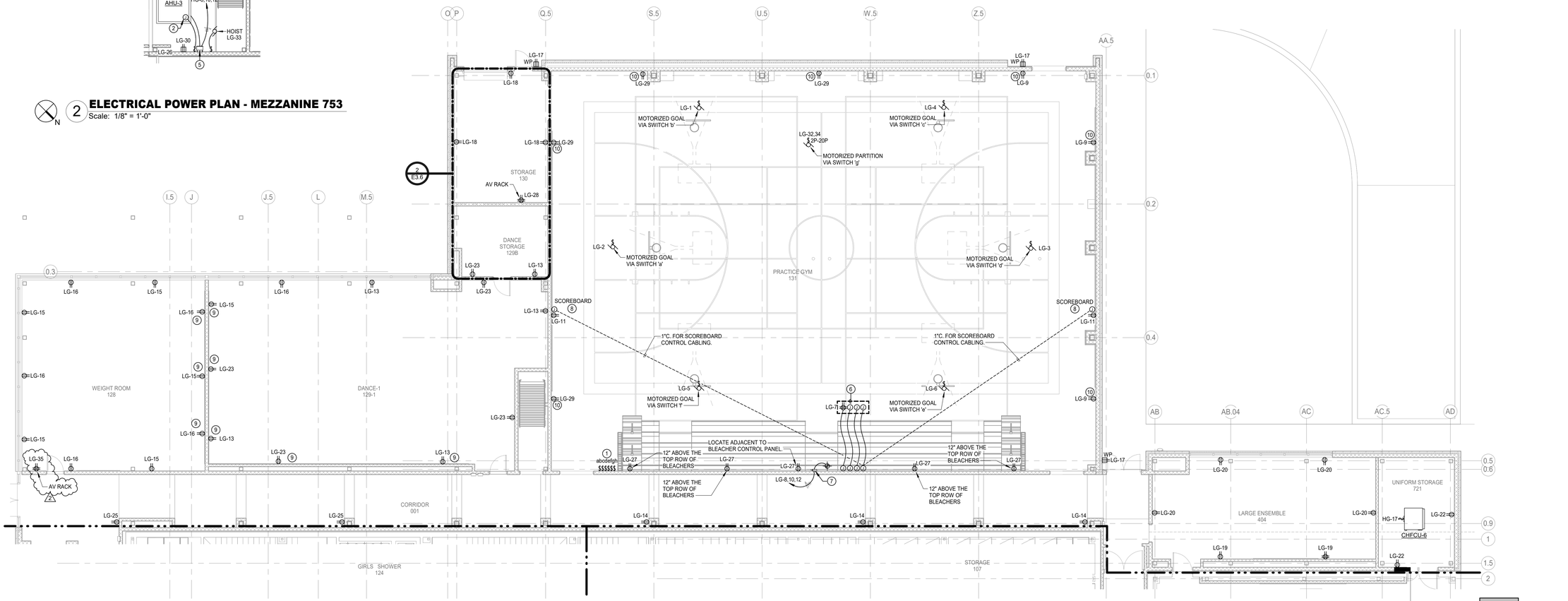
1. UNLESS NOTED OTHERWISE, ALL EXISTING ELECTRICAL SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, SHALL REMAIN.
2. REFER TO TECHNOLOGY SERIES (T-SERIES) DRAWINGS FOR ADDITIONAL WORK REQUIRED BY DIVISION 26.
3. ALL 15 AND 20 AMPERES, 125 AND 250 VOLT NON-LOCKING TYPE RECEPTACLES IN AREA SPECIFIED IN 406.12(1) THROUGH (7) SHALL BE LISTED AS TAMPER-RESISTANT TYPE RECEPTACLES.

ELECTRICAL KEYED NOTES:

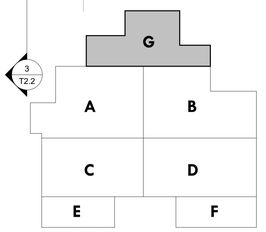
1. KEYED SWITCH LOCATION FOR BASKETBALL GOALS, DIVIDING PARTITION & BLEACHERS. PROVIDE LABEL WITH FUNCTION FOR EACH SWITCH. LOCATE SWITCHES IN RECESSED HINGED BOX WITH LOCKABLE COVER. COORDINATE KEYING AND FINAL LOCATION OF SWITCHES WITH OWNER PRIOR TO ROUGH-IN. (SWITCHES a,b,c,d,e,f,g,h,i,j,k,l,p)
2. PROVIDE JUNCTION BOX FOR CONNECTION OF AIR PURIFICATION SYSTEM. COORDINATE EXACT LOCATION AND MAKE FINAL CONNECTION.
3. PROVIDE JUNCTION BOX AT +54" AFF FOR CONNECTION OF FIRE ALARM BOOSTER PANEL. VERIFY FINAL CONNECTION WITH FIRE ALARM SHOP DRAWINGS AND MAKE FINAL CONNECTION.
4. PROVIDE JUNCTION BOX AT +54" AFF FOR CONNECTION OF BMCS PANEL. VERIFY FINAL LOCATION WITH BMCS SHOP DRAWINGS AND MAKE FINAL CONNECTION.
5. VARIABLE FREQUENCY DRIVE MOTOR CONTROLLER, FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26.
6. PROPOSED SCORER'S TABLE LOCATION. MOUNT MICROPHONE, DATA, POWER, ETC. IN BASEPLATE OF BOTTOM BLEACHER. VERIFY EXACT LOCATION WITH ARCHITECT/OWNER. REFER TO DETAIL FOR ADDITIONAL INFORMATION.
7. PROVIDE 30A/3P/NF DISCONNECT FOR CONNECTION OF BLEACHER CONTROL/CONTACTOR PANEL. INSTALL PER MANUFACUTER RECOMENDATIONS AND MAKE ALL FINAL CONNECTIONS TO BLEACHER CONTROL PANEL.
8. POWER AND CONTROL DEVICES FOR SCOREBOARD. COORDINATE EXACT LOCATION OF SCOREBOARD WITH ARCHITECT PRIOR TO ROUGH-IN. REFER TO DETAIL FOR MORE INFORMATION.
9. COORDINATE INSTALLATION OF RECEPTACLE IN MIRROR WITH ARCHITECT/VENDOR AND PROVIDE WITH MATCHING MIRROR COVERPLATE.
10. COORDINATE INSTALLATION OF RECEPTACLE WHEN LOCATED WITHIN GYM WALL PADDING WITH ARCHITECT/VENDOR.



2 **ELECTRICAL POWER PLAN - MEZZANINE 753**
Scale: 1/8" = 1'-0"



1 **ELECTRICAL POWER FLOOR PLAN - AREA G**
Scale: 1/8" = 1'-0"



KEY PLAN

ISSUED FOR BID

Salas O'Brien
salasobrien.com 281-664-1900
Houston
10930 W. Sam Houston Pkwy North, Suite 900
Houston, TX 77064
Registration: F-4111
Project No: 2023-02125-00

BRADLEY KALMANS
80219
LICENSED
PROFESSIONAL ENGINEER
08.27.2025

BROWN REYNOLDS WATFORD ARCHITECTS
4301 MAGNOLIA COVE DRIVE
SUITE 250 BUILDING 4
HOUSTON, TEXAS 77345
281.361.3800
WWW.BRWARCH.COM

HUMBLE ISD
TIMBERWOOD MIDDLE SCHOOL
RENOVATIONS

DATE	JUNE 13, 2025
DRAWN BY	DES
CHECKED BY	JZ
BRW PROJECT NUMBER	223005.00

NO.	REVISION	DATE
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2	Addendum #2	08.27.2025

E3.6

ELECTRICAL POWER FLOOR PLAN - AREA G AND MEZZANINE

FIRE ALARM

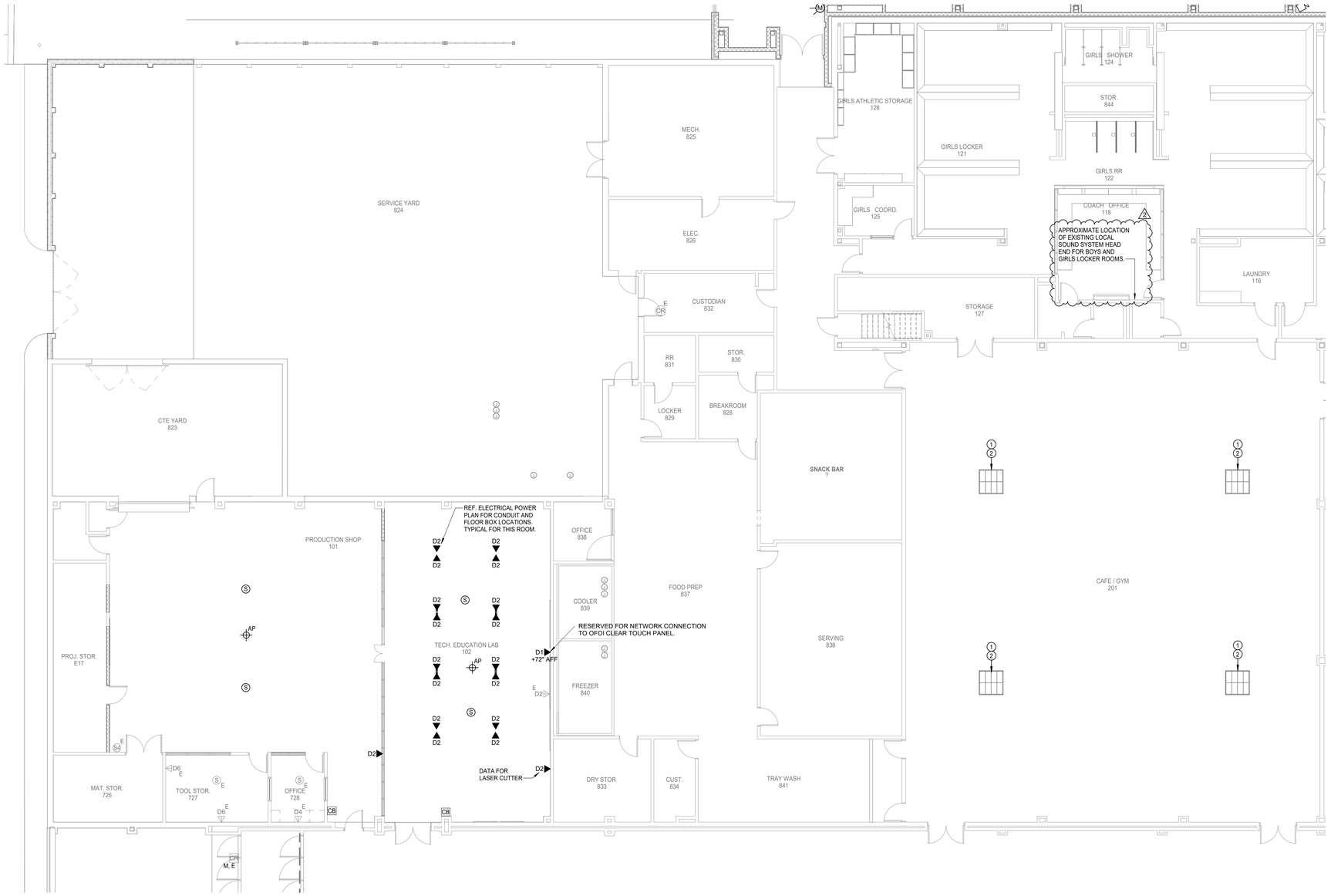
A	FIRE ALARM SYSTEM IS A PERFORMANCE BASED PER SPECIFICATIONS 28 46 00. CONTRACTOR TO REFERENCE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
B	A LICENSED FIRE ALARM PLANNING SUPERINTENDENT CERTIFIED TO A MINIMUM LEVEL 3, IN THE SUBFIELD OF FIRE ALARM SYSTEMS THROUGH THE NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES (NICET), SHALL PROVIDE PLANS AND CALCULATIONS FOR A MANUAL AND AUTOMATIC FIRE DETECTION AND ALARM SYSTEM TO COMPLY WITH THE BUILDING SPACE LAYOUT, BUILDING OCCUPANCY, CURRENT NFPA 72, LOCAL AND STATE CODE REQUIREMENTS, AND THE FIRE ALARM AND DETECTION SYSTEM SPECIFICATIONS.

TECHNOLOGY PLAN GENERAL NOTES

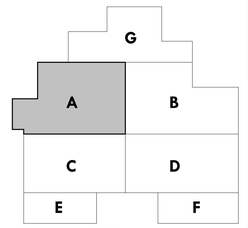
A	COORDINATE ALL FINAL MOUNTING HEIGHTS, FOR WALL MOUNTED DEVICES, PRIOR TO ROUGH-IN. COORDINATE WITH ARCHITECT, OWNER AND ENGINEER.
B	COORDINATE ALL CEILING DEVICE LOCATIONS WITH ARCHITECTURAL DRAWINGS AND INTERIOR DESIGN CONSULTANT(IF APPLICABLE) PRIOR TO ROUGH-IN.
C	REFERENCE TECHNOLOGY SITE PLAN, COMPOSITE PLAN, NOTES & LEGENDS AND DETAILS FOR ADDITIONAL INFORMATION AND DEVICE/OUTLET LOCATIONS.
D	CONTRACTOR TO COORDINATE INTERCOM SPEAKER MOUNTING TYPES WITH ARCHITECTURAL CEILING PLANS PRIOR TO FINAL SPEAKER SELECTION. COORDINATE WITH ENGINEER ON ANY DISCREPANCIES.
E	CONTRACTOR TO COORDINATE ALL DROP LOCATIONS WITH FURNITURE. COORDINATE WITH ARCHITECT AND OWNER FOR MORE INFORMATION.

TECHNOLOGY PLAN KEYED NOTES

1	CONTRACTOR TO ADJUST LOCATIONS OF EXISTING DEVICES THAT ARE LOCATED WHERE NEW SKY LIGHTS WILL BE INSTALLED. TYPICAL FOR ALL SHOWN.
2	ALL DIVISION 27 AND 28 EXISTING CABLING THAT IS IN THE AREA OF SKY LIGHT INSTALLATION SHALL BE PROTECTD AND ADJUSTED AS NEEDED. TYPICAL FOR ALL SHOWN.



1 **TECHNOLOGY FLOOR PLAN - AREA A**
Scale: 1/8" = 1'-0"



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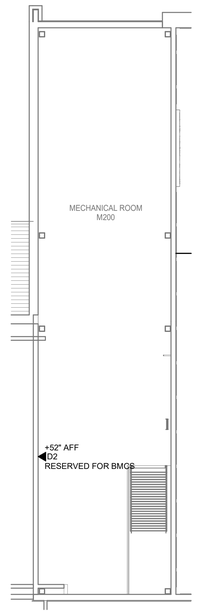
T2.1
TECHNOLOGY FLOOR PLAN - AREA A



N 2 **TECHNOLOGY ENLARGED FLOOR PLAN - MEZZANINE 753**
Scale: 1/8" = 1'-0"

ACCESS CONTROL NOTES

A	ALL NEW EXTERIOR DOUBLE DOORS SHALL HAVE DOOR HARDWARE WITH INTERNAL REQUEST TO EXIT ON BOTH INACTIVE AND ACTIVE LEAFS.
B	ALL NEW EXTERIOR SINGLE DOORS SHALL HAVE DOOR HARDWARE WITH INTERNAL REQUEST TO EXIT.

TECHNOLOGY PLAN GENERAL NOTES

A	COORDINATE ALL FINAL MOUNTING HEIGHTS, FOR WALL MOUNTED DEVICES, PRIOR TO ROUGH-IN. COORDINATE WITH ARCHITECT, OWNER AND ENGINEER.
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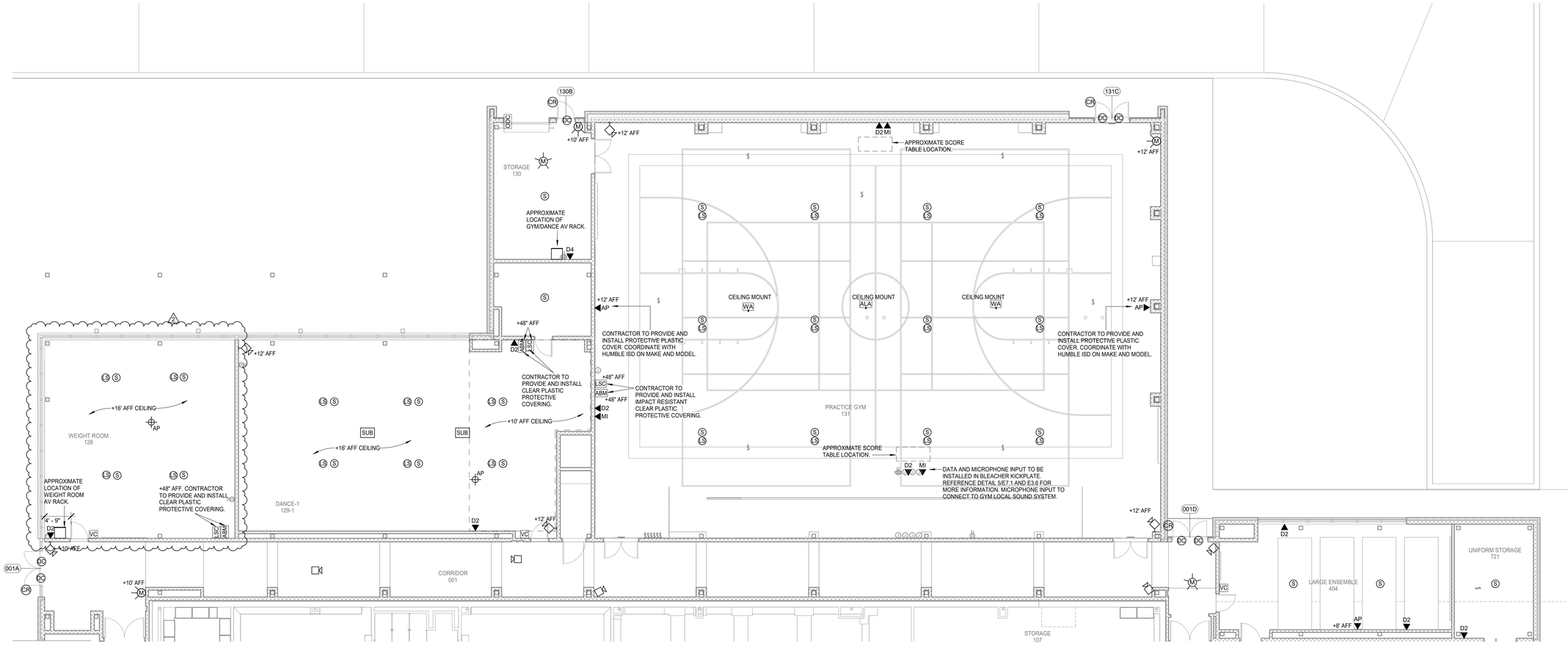

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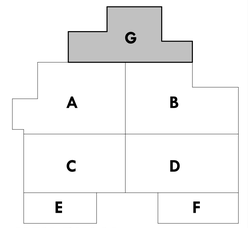

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