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CSP 26-006AL (BP030) – ADDENDUM No.01
Willowridge HS Renovations

FOR

Fort Bend Independent School District
2023 Bond Program

To access the complete Addendum:

https://fortbendisd.bonfirehub.com/portal/

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Houston + Austin + Dallas

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23 October 2025

addendum

PROJECT BP030 Willowridge High School Fine Arts Addition and Renovation, 2023306
PROJECT NO. CSP 26-006AL
ADDENDUM NO. 001
BID PACKAGE ISSUE FOR BID AND PERMIT

NOTICE TO ALL BIDDERS

This Addendum forms a part of and/or modifies the Contract Documents dated **16 September 2025**

LIST OF ITEMS INCLUDED IN ADDENDUM

This Addendum form consists of **204 pages** and all attachments noted herein, including the following.

- Cover Letter **(1 page, 8.5”x11”)**
- Q&A Responses and narrative of changes within the specifications and drawings **(12 pages, 8.5”x11”)**
- Attachment A: Pre-Bid Walk Sign-In Sheet **(2 Pages, 8.5”x11”)**
- Attachment B: Updated Specifications **(11 Spec Sections, 115 pages, 8.5”x11”)**
- Attachment C: Updated Drawings **(74 pages, 30”x42”)**

RESPONSE TO BIDDERS QUESTIONS

Q1 Existing Fire Alarm - It is our understanding that the existing fire alarm systems at Willowridge HS is the Silent Knight 5820 panel, which is now "obsolete" and devices are not available. Would you please provide direction on how you would like for us to proceed with the fire alarm SoW at this campus, due to the fact that this existing FA system is obsolete?
A1 A1 Refer to replaced specifications for direction on fire alarm scope. System will be Honeywell silent knight SK voice evac FACP.

Q2 Specification 28 46 00 -1.1 - Please confirm the full replacement of the Fire Alarm System and devices
A2 A2 Refer to replaced specifications for scope.

Q3 Specification 28 46 00 -2.1 - Please confirm that Siemens Building Technologies is an acceptable Fire Alarm System.
A3 A3 No, per district TDGs, only Honeywell Silent Knight SK.

Q4 Bid Bond Form Request - In regard to the required bid bond of 5%, I see the bonding capacity certification letter form, but I do not see a bid bond form. Will a bid bond form be provided?
A4 There is not a bid bond form. The only required bond form for the bid is the Bonding Capacity Certification letter found in division 00

Q5 Lightweight Fill - Sir, can you ask the Architect if they can provide Specs for the 035216 LWIC, it is not on the Manual
A5 Spec will be provided.

Q6 Black Box Grid Speakers Reference Drawing AV11.10 detail # 1. Please confirm the quantity of pipe grid loudspeakers required. RFI #1, Item #2 – Black Box Grid Speakers Reference Drawing AV11.10 detail # 1. Please confirm the pipe grid is provided and installed by others not the AV

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Contractor. RFI #1, Item #3 – ALS Devices Specification Section 274116 2.10 B ALS Receiver. No quantities are provided for the receivers, ear speakers, headsets or neck loops. Please provide the quantities the AV Contractor is to include. RFI #1, Item #4 – Loose Equipment for Black Box Reference Drawing AV11.10 Loose Equipment for Black Box and Specification Section 274116. The list calls out a Microphone Snake Type 1 quantity of 1. Section 274116 does not appear to have a specific Type 1 microphone snake detailed. Additionally, this same list calls out paging relay cables Type 6 and Type 25. Section 274116 does not appear to have a specific Type 6 or Type 25 paging relay cable specified. Please clarify the microphone snake the AV Contractor is to provide. Also, please clarify the Type 6 and Type 25 paging relay cable to be provided. RFI #1, Item #5 – Loose Equipment for Bank Hall Reference Drawing AV91.21 Loose Equipment for Band Hall and Specification Section 274116. The list details microphone stands Type 1, 2 and 5. No specific Type 1, 2 or 5 microphone stands are specified. Please clarify the microphone stands the AV Contractor is to provide. RFI #1, Item #6 – Existing AV Equipment Specification Section 274116 1.7 B and H states to remove the existing audio-visual system in the Auditorium and the AUX GYM. Please clarify specifically what existing AV equipment is to be removed from the Auditorium and the AUX GYM. Will a lift be required in either space to remove main loudspeakers, projection screens, wire and cable? Emily Emberson Ford AV 405-945-2041 embee@fordav.com

A6 Item #1 Black Box Grid speakers are listed as loose equipment. Reference schedule on AV11.10. Item #2 Pipe grid is provided under 11 61 33. Item #3 Given the size of the rooms and the fact that the transmitter package included 4 receivers with their respective accessories, additional receivers were not required. Item #4 Microphone Snake and paging relay cables are being added to specification for Addendum 001. Item #5 Microphone stands are being added to specifications for Addendum 001. Item #6 – Any Equipment that is required to complete systems as outlines in the drawings and specifications. It is the responsibility of the contractor to determine what is necessary and the means and methods of removal.

Q7 Wireless Media Connectivity Reference Section 274116 1.7 Descriptions & Requirements. The Black Box, Band/Orchestra/Mariachi, Choir and Ensemble/Percussion spaces all describe a wireless media connectivity requirement. Do each of these spaces need to have a Crestron Air Media device? RFI #2, Item #2 – Choir Subwoofer Reference Section 274116 1.7 Descriptions & Requirements item F Choir (4b) Loudspeakers and drawing AV11.21 detail # 2. Item 4b in the specs describes a floor mounted subwoofer for the Choir room. Drawing AV11.21 detail # 2 does not show a subwoofer. There is a line output from the Amplifier to an I/O Panel labeled SUB. Please clarify if a subwoofer is required in the Choir. If a subwoofer is required, please clarify the make and model to be provided. RFI #2, Item #3 – Choir Rack Reference Section 274116 1.7 Descriptions & Requirements item F Choir (6a) Equipment Housing and drawing AV91.21 detail # 7. Item 6a in the specs describes a permanent wall mounted equipment rack for the Choir room. Drawing AV91.21 detail # 7 shows a portable equipment rack. Please clarify the make and model of equipment rack required for the Choir room. RFI #2, Item #4 – Presentation System for Ensemble & Shared Ensemble Reference Section 274116 1.7 Descriptions & Requirements item G 5 a – e and drawings AV2.31 and AV2.33. The floor plan drawings do not detail video projectors or projection screens for the ensemble and shared ensemble rooms. The system description detailed in item G (a-e) details a complete presentation system for both the ensemble and shared ensemble rooms. Please clarify if a complete presentation system is required for the ensemble and shared ensemble rooms. RFI #2, Item #5 – DSP for AUX GYM Reference Section 274116 2.6 B DSP Type 1. The QSC Core 110f is end of life with no stock available. Please confirm if the QSC Core 24F is an acceptable substitution.

A7 Item #1 The wireless media connectivity in question for these rooms refers to the media player supporting Bluetooth. Per 27 41 16, Wireless Presentation system is only required in the Auditorium. Item #2 Subwoofer is kisted as loose equipment. Reference loose equipment schedules. Item #3 Information in specification is being updated for Addendum 001. Item #4

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Percussion is the only space that requires a presentation system. Item #5 Product replacement is being added to specification for Addendum 001.

Q8 We respectfully request approval to substitute the specified Extron equipment with Crestron equivalents as outlined in the attached RFI submittal. The proposed Crestron models provide equal or better performance, full interoperability with existing AV infrastructure, and alignment with the project's standard control platform. It will not affect the price. Please see the Equals below:

Specified Extron Model: DTP3 T 203 (60-1885-52)
Function / Description: 3-input 4K60 transmitter (HDBaseT)
Proposed Crestron Equivalent: DM-TX-4KZ-302-C

Specified Extron Model: DTP T HWP 4K 331 D (60-1421-52
Function / Description: Wall plate HDMI 4K transmitter
Proposed Crestron Equivalent: DM-TX-4KZ-100-C-1G

Specified Extron Model: DTP HDMI 4K 330 Rx (60-1331-13)
Function / Description: HDMI 4K receiver
Proposed Crestron Equivalent: DM-RMC-4KZ-100-C

Specified Extron Model: MLC Plus 100 (60-1469-03)
Function / Description: Wall-mounted media controller
Proposed Crestron Equivalent: MPC3-201

Specified Extron Model: PI 115 (60-1233-02)
Function / Description: Power injector (48V)
Proposed Crestron Equivalent: PWE-4803RU

Specified Extron Model: TLP Pro 725M (60-1563-XX)
Function / Description: 7-inch wall-mounted touch panel
Proposed Crestron Equivalent: TSW-770

A8 Owners technical design guidelines request Extron. Provide as specified.

Q9 Storage Asbestos - Please verify there is no scope in A201 Storage where asbestos has been identified per 00 31 26.

A9 There is scope in the Storage rooms where asbestos has been identified. The room that has the asbestos is labeled as the Copy Room on sheet A4/A2.70. The scope is to remove the casework in that room and include new finishes. Contractor to provide asbestos abatement prior to work being performed.

Q10 ? on Detail D4/A8.10 - Detail D4/A8.10; What is the intended casework or equipment marked by a "?"

A10 The equipment in the elevations are tagged with a question mark. An equipment schedule has been added on sheet A0.70 and tags have been updated. Spec for the Laundry Systems has been added.

Q11 Door Type - There are two doors in room B119 called out as wood doors. The comments on the door schedule call for a STC 48 door. Please confirm the correct door type.

A11 Door should be an S1 wood sound door.

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Q12 Drawing A2.32 - REUPHOLSTER (9) AUDITORIUM CHAIRS - Will an allowance be provided for the 9 chairs in the auditorium? No specification is provided. If so, what allowance value are the bidders to carry for this scope?
A12 There is no allowance value for this. The scope has been modified in the drawings for clarity.

Q13 There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. E2.13 note E33 - Alternate 11B - This alternate is not identified on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A13 The alternative wording has been corrected.

Q14 PACKAGE "B" ALTERNATE BID PROPOSAL FORM 2 - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. E2.15 note E26 - Alternate 9A - This alternate does not match PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A14 The alternative wording has been corrected.

Q15 PACKAGE "B" ALTERNATE BID PROPOSAL FORM 3 - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. E2.13 note E28 - Alternate 10B - This alternate is not identified on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A15 I believe you mean sheet E2.15 tagged note E28. The alternative wording has been corrected.

Q16 PACKAGE "B" ALTERNATE BID PROPOSAL FORM - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. E2.19 note E29 E2.31 note E31 E2.32 note E31 - Alternate 11A & 11B - This alternate is not identified on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A16 Alternate wording has been changed for clarification.

Q17 PACKAGE "B" ALTERNATE BID PROPOSAL FORM 5 - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. E2.36 note E40 - Alternate 4A - This alternate does not match on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A17 Sheet E2.36A with tagged note E40 has been removed from the set.

Q18 PACKAGE "B" ALTERNATE BID PROPOSAL FORM 6 - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. P1.11 & 1.12, note P6 & P7 P2.31 & 2.32 note P27 & P28 - Alternate 1&2 - This alternate does not match on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A18 Reference to #1 and #2 has been removed from these locations.

Q19 PACKAGE "B" ALTERNATE BID PROPOSAL FORM - There is a discrepancy between alternates on the alternate bid form and the alternates called out in the drawings. TR2.36 note 721 This alternate is not identified on PACKAGE "B" ALTERNATE BID PROPOSAL FORM
A19 This scope item should be left as an alternate since it was not part of the original scope. Alternates to be consolidated in a future addendum.

Q20 Light Weight Insulating Concrete (LWIC) - Detail D5 on sheet A5.30 calls for LWIC but there is no spec section. Will a spec section for LWIC be issued?
A20 Spec section to be added.

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MODIFICATIONS TO SPECIFICATIONS

01 23 00 ALTERNATES

1. Added language to Alt No 10 regarding breaker to be added to switchboard.

03 52 16 LIGHTWEIGHT INSULATING CONCRETE:

1. Added new section to cover insulation at roof assembly.

07 52 16 MODIFIED BITUMINOUS MEMBRANE ROOFING

1. Revised section to include lightweight insulating concrete, removed references to torch application, and update information on base sheet and cap sheet where there were conflicts previously.

11 23 26 LAUNDRY SYSTEMS:

1. Added new spec section to cover washing machine and dryer.

11 31 00 RESIDENTIAL APPLIANCES:

1. Added new spec section to cover appliances listed in equipment schedule.

11 61 62 THEATRICAL LIGHTING SYSTEMS

1. 11 61 62 - 2.4, b – removed Mini Relay Panel (ERP)
2. 11 61 62 –2.8, C – Added Emergency Lighting Transfer Switch (ELTS)

23 24 26 WATER-COOLED, ROTARY-SCREW WATER CHILLERS

1. Specification added to the project.

23 64 23 SCROLL WATER CHILLERS

1. Microchannel aluminum condenser coils with e-coating added to the specification

23 64 16 CENTRIFUGAL WATER CHILLERS

1. Remove specification from project manual entirely

27 41 16 INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

1. 1.7, B, 1, a – Added information to limit existing system removal to necessary scope
2. 1.7, E, 5 – Note added to define scope of presentation system
3. 1.7, F, 6 – Updated information for equipment housing to reference portable rack
4. 1.7, G, 5 – Note added to define scope of presentation system
5. 1.7, H, 1 - Added information to limit existing system removal to necessary scope
6. 2.3, P – Item added – Microphone Stands and Mounting Hardware
7. 2.6, B – Second option for DSP product added, as first one is about to be discontinued
8. 2.24, D – Item added – Paging Relay Cable
9. 2.24, E – Item added – Microphone Snake

28 31 11 DIGITAL, ADDRESSABLE, VOICE EVACUATION FIRE-ALARM SYSTEM

1. Fire alarm specification shall be replaced in its entirety with the addendum 1 new specification. See attached.

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MODIFICATIONS TO DRAWINGS

A0.70 - MASTER SCHEDULE

1. Added an equipment schedule that correlates to the equipment tagged in the interior elevations.

A2.31 - LEVEL 1 - FLOOR PLAN - AREA B1

1. Ice machine was missing from the ice room in the band hall. Equipment and tag has been added.

A2.32 - LEVEL 1 - FLOOR PLAN - AREA B2

1. Updated the keynote for the auditorium chairs to clarify the scope

A2.70 - ENLARGED PLANS - ART ROOMS

1. Demo plans updated to reflect existing conditions.

A6.20 - DOOR SCHEDULE, DOOR LEAF, & FRAME TYPE, WINDOW TYPES AND GLAZING SCHEDULE

1. Door types updated for doors B119A and B119B.
2. Door hardware sets updated for B112A, B112B, B119A, B119B, K100B, K102, K107, K108, K114

A6.30 - HARDWARE SCHEDULE

1. 103GW door hardware set added
2. C710MAC door hardware set added
3. S103 door hardware set added

A8.10 - INTERIOR ELEVATIONS

1. Equipment tags with ?'s has been updated to match the equipment schedule.

A8.11 - INTERIOR ELEVATIONS

1. Detail B5 added finishes to the casework tags that had it missing
2. Equipment tags with ?'s has been updated to match the equipment schedule.

M1.14 LEVEL 1 MECHANICAL DEMOLITION PLAN – MECH YARD

1. Added general notes to plan.

M2.14 LEVEL 1 MECHANICAL PLAN – MECH YARD

1. Adjusted piping sizes.
2. Added general notes
3. Added locations for new pump VFDs

M2.15 LEVEL 1 MECHANICAL PLAN – AREA B3

1. Added dryer exhaust duct in scene shop
2. Added notes concerning internal insulation for AHUs and terminal units.

M2.21 LEVEL 2 MECHANICAL PLAN – CENTRAL PLANT

1. Relocated chiller piping connections to new sheet
2. Added replacement of emergency refrigerant monitoring stations

M4.20 FINE ARTS CHW SCHEMATICS

1. Added sheet to project.
2. Added piping schematics for air-cooled chiller work in fine arts addition.

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M4.30 MAIN CHW SCHEMATICS

1. Added sheet to project
2. Added CHW piping schematics for main chiller plant

M5.01 MECHANICAL SCHEDULES

1. Added alternate numbers to pump schedules.

M6.01 MECHANICAL CONTROLS

1. Added sequence of operations and points list.
2. Added sensors to area F AHU.
3. Changed two AHU types to three way control valves instead of two way valves.

M6.02 MECHANICAL CONTROLS

1. Added sequences of operations and points list.

M6.03 MECHANICAL CONTROLS – FINE ARTS CENTRAL PLANT

1. Added sheet to project.
2. Added controls schematics and sequences of operations for chiller scope.

E1.11 ENLARGED SITE DEMOLITION PLAN – FIELD HOUSE

1. Tagged note E41 removed from existing fan at plan north wall as fan is existing to remain.

E1.21 ENLARGED SITE PLAN – FIELD HOUSE

1. Tagged note E61 added to sheet to describe alternate 10 for new DOAS unit at field house.

E2.13 LEVEL 1 ELECTRICAL DEMOLITION PLAN – AREA B1

1. Tagged note for overhead door revised from E23 to E24. Tagged note E23 removed from sheet.
2. Existing duplex revised from demolished to existing to remain. Tagged note E7 added.
3. View #3 renamed to 'ALTERNATE 5', and tagged note E33 modified to match.
4. Light fixtures not in scope region clarified to be existing to remain.
5. Added tagged notes E4, E34, and E37 added for theater area.
6. Removed duplicate duplex in Band Hall B110.
7. Added tagged note E13 to fixture marked for demo.
8. Added tagged note E59 to clarify receptacles to be removed and replaced.
9. Added tagged notes E67 and E68 to existing light switches in Mariachi B116 and Band Hall B110.

E2.14 LEVEL 1 ELECTRICAL DEMOLITION PLAN – AREA B2

1. Existing lights in scene shop clarified to be removed and replaced, tagged note E5 added to sheet. .
2. Tagged note E10 added to sheet to clarify rooms existing to remain.
3. Tagged notes E4, E34, and E37 added to sheet.
4. Existing power locations for lower level seat lighting shown. Tagged note E35 added to sheet.

E2.15 LEVEL 1 ELECTRICAL DEMOLITION PLAN - AREA F & D

1. Tagged notes E26 and E28 modified to update alternate number.
2. Tagged note E8 modified as shown.

E2.17 LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA B2

1. Existing back of house light fixtures on stage revised from cylinder pendants to strip lights for clarity. Tagged note E4 modified as shown.

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E2.17.A LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA B2 - ALTERNATE

1. Tagged note E37 modified to update alternate number.

E2.18 LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA F

1. Tagged note E8 modified as shown.

E2.19 LEVEL 2 ELECTRICAL DEMOLITION PLAN - ART ROOMS & MECH SPACES

1. Tagged note E29 modified to remove alternate verbiage.
2. Existing MSBA and MSBB clarified as existing to remain.
3. Tagged note E67 and E68 added to sheet to clarify locations for switches to be removed and replaced.

E2.21 LEVEL 1 OVERALL PLAN – ELECTRICAL

1. Added proposed routing for feeder to new building.

E2.31 LEVEL 1 POWER FLOOR PLAN – AREA B1

1. Existing duplex in B112 Office revised to remain and recircuited to new panel.
2. Homerun shown for circuit in B115 Percussion.
3. View #3 renamed as 'ALTERNATE 5'. Tagged note E32 removed and replaced with E62. Tagged note E63 added to view to clarify disconnect size. Controls for ACCH-3AT and ACCH-4ALT circuited to panel LP1T.
4. In View #4 tagged note modified for CHWP-3 disconnect to E64. Controls for ACCH-4 circuited to panel LP1T.
5. Change circuit for the chillers.

E2.32 LEVEL 1 POWER FLOOR PLAN – AREA B2

1. Weatherproof duplex added for CU-1 unit on roof and circuited to panel LP1T.
2. Tagged note E54 modified to change Nema type for disconnect from type 1 to 3R for CU-1.
3. Scene shop
    a. Power for washer and dryer revised to 480V/3Ph power as shown and circuited to panel HMB3. Tagged noted E64 and E65 added to sheet for disconnect sizes.
4. Alternate for instantaneous waters heaters added in dressing rooms. Power location added in each dressing room and circuited to panel HMB3. Tagged note E57 added to sheet.

E2.33 LEVEL 1 POWER FLOOR PLAN – AREA B3

1. Panel and circuit number clarified for IWH power in K108 Office.
2. Power relocated in Black Box and Choir with added chase.

E2.36 LEVEL 2 POWER FLOOR PLAN - AREA B2

1. Weatherproof duplex added for CU-2 unit on roof and circuited to panel LP3B.
2. Tagged note E54 modified to change Nema type for disconnect from type 1 to 3R for CU-2.
3. Power location for AHU-BAND UV lights added and circuited to panel LP3B.
4. Added panelboard HD3B to the platform.

E2.36.A LEVEL 2 POWER FLOOR PLAN - AREA B2 - ALTERNATE

1. Sheet removed from set.

E2.38 LEVEL 2 POWER FLOOR PLAN - ART ROOMS & MECH SPACES

1. Existing MSBA and MSBB shown as existing on plan.
2. USB type clarified for USB duplexes in art rooms.

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E3.31 LEVEL 1 LIGHTING FLOOR PLAN – AREA B1

1. Removed unnecessary exit sign in B110 Band Hall.
2. Added occupancy sensors to PR rooms.
3. Light fixture type changed to AF40 in PR rooms.
4. Moved light switch in Mariachi B116 and Band Hall B110 to match existing to be demo switch location. Added tagged note E21 to indicate the new switch location.

E3.32 LEVEL 1 LIGHTING FLOOR PLAN - AREA B2

1. Ten (10) new cylinder pendants over stage removed. Lighting in this area shown on level 2.
2. Blue lights added type SB and circuited to MBP-2.
3. Tagged note E36 added to sheet for alternate seating lighting.
4. Scene Shop
    a. Strip fixtures revised to type F460 and one additional light added in room.
    b. Tagged note E44 added to clarify lighting to be connected to existing lighting circuit in room.
    c. Occupancy sensor added.

E3.33 LEVEL 1 LIGHTING FLOOR PLAN – AREA B3

1. Changed vacancy sensors in Black Box K104 to high bay vacancy sensors.
2. Changed two (2) fixtures in Corridor K100 AF40 fixtures to AF40E.
3. Added exit sign to Corridor K100.
4. Changed D410 in Corridor K100 to D410E.
5. Added Key switch to Corridor K100.
6. Changed F440 in Mech Access M4 to F440E to provide battery backup.
7. Added low voltage switch to storage K103, drama classroom K101, and in black box K104.
8. Adjusted the lighting layout in Mech C3 and removed one light fixture.

E3.34 LEVEL 2 LIGHTING FLOOR PLAN - AREA B2

1. Aisle lights type SL circuited to MBP-2. Tagged note E30 added to sheet.
2. One cylinder pendant moved to be connected to inverter.
3. Two (2) additional F460 strip fixtures added around stage. All locations are shown for reference to be replaced one-for-one.

E3.34.A LEVEL 2 LIGHTING FLOOR PLAN - AREA B2 - ALTERNATE

1. Alternate scope for upper-level seating removed from project. Tagged note E40 removed from sheet.
2. Tagged note E39 modified to update alternate number.
3. One (1) CP6 added to lighting circuit.

E3.35 LEVEL 2 LIGHTING FLOOR PLAN - ART ROOM

1. Tagged not E69 added to sheet to clarify circuiting for new light fixtures in mechanical rooms.

E5.01 PARTIAL ELECTRICAL ONE-LINE – FIELD HOUSE – DEMO AND NEW

1. Alternate 10 for added DOAS unit added to new one-line diagram.

E5.02 PARTIAL ELECTRICAL ONE-LINE – SCHOOL MSBA - DEMO

1. Demolish existing breaker 10 for the temp building.

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E5.06 PARTIAL ELECTRICAL ONE-LINE – SCHOOL MSBA – NEW

1. Added panelboard HD3B to the one-line. We fed a lot of the new panelboard for the addition.

E5.06 PARTIAL ELECTRICAL ONE-LINE – SCHOOL MSBA – NEW ALT

1. ACCH and CHWP tags modified as shown.
2. Added panelboard HD3B to the one-line. We fed a lot of the new panelboard for the addition.

E7.01 LIGHTING SCHEDULES

1. Type SB added to schedule.
2. Basis of design and equals added for type SL.

E7.03 PANEL SCHEDULES

1. LP1T
    a. Circuit previously used for scene shop washer reused for general power weatherproof duplex for CU-1.
    b. Circuit previously used for scene shop dryer removed and revised to (1) 120V/20A spare, and (1) 120V/20A circuit for ACCH-4 controls.
    c. Circuit for alternate air-cooled chillers soon. Breakers to be 120V/20A spares under base bid
2. HM1F: Breakers for FVAV-10s modified from 277V/20A to 277V/30A.

E7.04 PANEL SCHEDULES

1. HMB3
    a. One (1) 480V/15A/3PH and one (1) 480V/50A/3PH breaker added for washer/dryer in scene shop.
    b. Circuit for IWHs in dressing rooms added under alternate. Breakers shall be 120V/20A spares under base bid.
    c. Breaker size FVAV-14 revised from 480V/20A/3PH to 480V/25A/3PH.
    d. Two (2) 277V/20A breakers added for IWH alternate at dressing rooms.
2. HM2F: Breakers for FVAV-10s modified from 277V/20A to 277V/30A.

P1.13 LEVEL 1 & 2 DEMOLITION PLUMBING PLAN - ART ROOMS

1. Added keynote to demo existing sink.

P2.21 LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B1

1. Added sanitary drain lines to serve FS-1 at ice makers.

P2.22 LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B2

1. Increased sanitary line size to accommodate commercial washing machine drain.
2. Added 3” drain line down from trench behind washing machine.

P2.31 LEVEL 1 PLUMBING PLAN - AREA B1

1. Added IMB, FS-1 and to serve ice maker.
2. Added 1/2" CW to connect to ice maker wall box.
3. Added sanitary and vent piping to serve FS-1 at ice maker.
4. Added keynotes.

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Kirksey ARCHITECTURE

P2.32 LEVEL 1 PLUMBING PLAN - AREA B2

1. Revised water line sizes serving fixtures in Scene Shop.
2. Added 2" vent piping.
3. Revised water and drain to serve commercial washing machine.
4. Removed washing machine drain box.
5. Added keynotes.

P5.00 PLUMBING SCHEDULES

1. Revised scheduled water heater to be 50 gal storage.
2. Revised FS-1 to be round type floor sink fixture.
3. Added CDB condensate drain box and IMB ice maker box, to plumbing fixture schedule.

AV0.01 GENERAL NOTES AND LEGENDS

1. VPC removed from Symbol Legend

AV0-90 - AUDIO-VIDEO EQUIPMENT DETAILS

1. Removed two screens from Projection Screen Schedule

AV2-31 - LEVEL 1 FLOOR PLAN - AREA B1

2. Removed PS/VP/BP/MIP and Elevation

AV2-33 - LEVEL 1 FLOOR PLAN - AREA B3

1. Antenna Plates added to Black-Box.
2. Removed PS/BP and MIP

AV2-41 - LEVEL 1 REFLECTED CEILING PLAN - AREA B1

1. Updated layout of ceiling microphone plates and respective keynotes.

AV2-43 - LEVEL 1 REFLECTED CEILING PLAN - AREA B3

1. Updated layout of ceiling microphone plates and respective keynotes.
2. Removed VPC

AV3-10 - ELEVATIONS AND SECTIONS

1. Updated curtain location for screen alignment

AV3-11 – ELEVATIONS

1. Updates in layout of ceiling microphone plates and mounting instructions.
2. Removed Detail 3
3. Removed VP and PS from Detail 2
4. Removed PS Detail 1

AV3-13 – ELEVATIONS

1. Updates in layout of ceiling microphone plates and mounting instructions.

AV3-15 – ELEVATIONS

1. Elevation view reflecting the addition of antenna plates in Black-Box.
2. Removed PS from Detail 3
3. Removed PS and VPC from Detail 4
4. Removed Detail 5

AV11-10 - BLACK-BOX-CLASSROOM AUDIO FUNCTIONAL DIAGRAMS

1. Antenna plates and microphone mount note added to functional diagram.

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Kirksey ARCHITECTURE

AV11-21 - MUSIC ROOMS FUNCTIONAL DIAGRAMS

1. Microphone plates updated in functional diagrams.
2. Removed PS from video functional diagram

AV91-11 - BLACK-BOX-THEATER CLASSROOM DETAILS

1. Updated plate details to reflect the addition of antennas to the Black-box and change in type of connector for paging relay to conform with TDG.

AV91-21 - MUSIC ROOM DETAILS

1. Updated plate details – paging relay connector, and paging relay cables added to loose items list for Choir room.

T2.31 TECHNOLOGY LEVE 1 – FLOOR PLAN – AREA B1

1. PLC B106- added above ceiling wireless access point antenna data drop
2. Percussion B115 - Relocated wireless access point antenna data drop from ceiling to wall

T5.00 TECHNOLOGY TYPICAL LABELING SCHEME

1. Detail 1- removed reference of destination room, clarified panel #
2. Detail 3 – revised detail to show panel termination preferences and type, removed reference to high-pair count backbone copper cable.

TPA2.33 PUBLIC ADDRESS LEVEL 1 – FLOOR PLAN – AREA B3

1. Shared Ensemble K113 – deleted one building intercom volume control.

TS2.33 – SECURITY LEVEL 1 – FLOOR PLAN – AREA B3

2. IDF C4 - Door C4
    a. Added one wall mounted camera
    b. Added one door contact and connection for internal request to exit
    c. Added one card reader
3. Door K100C – relocated wall mounted card reader from south wall to north wall.
4. Door K100B
    a. Added one card reader
    b. Added on door contact and connection to internal request to exit

TS5.00 SECURITY SCHEDULES

1. Updated schedules to reflect revisions noted on Sheet TS2.33

TL2-36 – LEVEL 2 FLOOR PLAN – AREA B2

1. Removed unnecessary Emergency Relay Panel

TL16.01 – THEATRICAL LIGHTING CONTROL RISER

1. Revised emergency lighting plan to utilize an emergency lighting transfer switch without an emergency relay panel

TR2.36 – LEVEL 2 FLOOR PLAN – AREA B2

1. Updated Lineset Schedule, offset location for Lineset #1, #2; and comments on Linesets #5, #8, #11.

END OF ADDENDUM FORM

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DESIGN & CONSTRUCTION

Date: Friday, October 10, 2025 **Project Name: Willowridge High School Renovations** **Project #: BP030**

Pre-Bid Site Walk : Willowridge High School

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(S) – authored by Structural Engineer
(A) – authored by Architect
(MEP) – authored by MEP Engineer
(O) – authored by Owner
(TR) – authored by Theatre Consultant
(T) – authored by Technology

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27 51 00 PUBLIC ADDRESS AND CLOCK SYSTEM (T) ..... 16 SEP 2025

DIVISION 28 — ELECTRONIC SAFETY AND SECURITY
28 00 00 COMMON ELECTRONIC SAFETY AND SECURITY REQUIREMENTS (MEP) ..... 16 SEP 2025
28 05 03 ELECTRONIC SAFETY AND SECURITY SHOP DRAWINGS AND SUBMITTALS (MEP) ..... 16 SEP 2025
28 05 10 SCOPE OF THE ELECTRONIC SAFETY AND SECURITY WORK (MEP) ..... 16 SEP 2025
28 05 37 EMERGENCY RESPONDER RADIO ANTENNA SYSTEM (MEP) ..... 16 SEP 2025
28 13 00 ACCESS CONTROL SYSTEM (T) ..... 16 SEP 2025
28 16 00 INTRUSION DETECTION SYSTEM (T) ..... 16 SEP 2025
28 23 00 VIDEO SURVEILLANCE SYSTEM (T) ..... 16 SEP 2025
28 31 11 DIGITAL ADDRESSABLE VOICE EVACUATION FIRE ALARM SYSTEM (MEP) ..... 23 OCT 2025
28 46 00 FIRE DETECTION AND ALARM (MEP) ..... 16 SEP 2025

DIVISION 31 — EARTHWORK
31 00 00 EARTHWORK UNDER BUILDING PAD (S) ..... 16 SEP 2025
31 22 13 SITE GRADING (C) ..... 16 SEP 2025
31 23 33 TRENCHING AND BACKFILL (C) ..... 16 SEP 2025
31 32 13.19 LIME STABILIZATION (C) ..... 16 SEP 2025
31 32 13.26 LIME FLY ASH OR FLY ASH (C) ..... 16 SEP 2025
31 41 33 TRENCH SAFETY (C) ..... 16 SEP 2025
31 63 29 DRILLED CONCRETE PIERS AND SHAFTS (S) ..... 16 SEP 2025

DIVISION 32 — EXTERIOR IMPROVEMENTS
32 13 13 CONCRETE SITE PAVING (C) ..... 16 SEP 2025
32 17 23.13 PAINTED PAVEMENT MARKINGS (C) ..... 16 SEP 2025
32 31 13 CHAIN LINK FENCES AND GATES (A) ..... 16 SEP 2025
32 92 00 TURF AND GRASSES (C) ..... 16 SEP 2025

DIVISION 33 — UTILITIES
33 10 00 WATER DISTRIBUTION (C) ..... 16 SEP 2025
33 30 00 SANITARY SEWER (C) ..... 16 SEP 2025
33 40 00 STORM DRAINAGE (C) ..... 16 SEP 2025

DIVISION 34 — TRANSPORTATION
NOT USED

DIVISION 35 — WATERWAY AND MARINE
NOT USED

DIVISION 40 — PROCESS INTEGRATION
NOT USED

DIVISION 41 — MATERIAL PROCESSING AND HANDLING EQUIPMENT
NOT USED

DIVISION 42 — PROCESS HEATING, COOLING, AND DRYING EQUIPMENT
NOT USED

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DIVISION 43 — PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT
NOT USED

DIVISION 44 — POLLUTION AND WASTE CONTROL EQUIPMENT
NOT USED

DIVISION 45 — INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT
NOT USED

DIVISION 46 — WATER AND WASTEWATER EQUIPMENT
NOT USED

DIVISION 48 — ELECTRICAL POWER GENERATION
NOT USED

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PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by Proposers and stated on the Proposal Form for certain work defined in the Proposal Requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the total addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum. Pricing for alternates may not be submitted or listed in the form of an allowance amount on the proposal form.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
2. Cost listed for each Alternate includes cost of related coordination, modification or adjustment.

B. Notification: Immediately following award of the Contract, Contractor shall prepare and distribute to each entity or person to be involved in the performance of the Alternate Work, a notification of the status of each Alternate scheduled herein. Indicate which alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates if any.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Contractor shall be responsible for any changes in the Work affected by acceptance of Alternates. Claims for additional costs or time extensions resulting from changes to the Work as a result of the Owner's election of any or all Alternates will only be considered if it is a deferred for later consideration.

E. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (Not Used)

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PART 3 EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No 1: Base Bid Adjustment

B. Alternate No 2: Deviations Request Form: If bidder proposes to use any substitutions or deviations from the base bid, use Alternate No. 2 via the Deviations Form in Document 00 21 13 Instructions to Bidders.

C. Alternate No. 3: Water Cooled Chillers (CH-1 and CH-2):
   1. Base Bid: Provide water cooled chillers as manufactured by Carrier.
   2. Alternate 3A: Provide water cooled chillers as manufactured by JCI
   3. Alternate 3B: Provide water cooled chillers as manufactured by Daikin.

D. Owner to select one of the following six alternates (4A through 5C) during bidding negotiations:
   1. Alternate No. 4: Air Cooled Chiller (ACCH-4):
      a. Alternate 4A: Provide air cooled chiller as manufactured by Carrier.
      b. Alternate 4B: Provide air cooled chiller as manufactured by JCI
      c. Alternate 4C: Provide air cooled chiller as manufactured by Daikin.
   2. Alternate No. 5: Air Cooled Chillers at Auditorium:
      a. Alternate 5A: Replace existing air cooled chiller (ACCH-3E) currently servicing the Auditorium with two new air cooled chillers (ACCH-3ALT and ACCH-4ALT) manufactured by Carrier.
      b. Alternate 5B: Replace existing air cooled chiller (ACCH-3E) currently servicing the Auditorium with two new air cooled chillers (ACCH-3ALT and ACCH-4ALT) as manufactured by JCI.
      c. Alternate 5C: Replace existing air cooled chiller (ACCH-3E) currently servicing the Auditorium with two new air cooled chillers (ACCH-3ALT and ACCH-4ALT) as manufactured by Daikin.

E. Alternate No. 6: Walkway Lighting in Auditorium
   1. Provide new theater walkway lighting in lower level of Auditorium. Remove 56 existing end panels and replace with new Irwin LED beacon light end panels.

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F. Alternate No. 7: New Cloud Ceiling in Auditorium
    1. Remove existing ceiling cloud in Auditorium and replace with new painted gypsum board cloud ceiling system. Add new light fixtures, speakers, and sprinkler head diffusers to accommodate revised layout of new ceiling cloud system. Refer Reflected Ceiling Plans and Electrical Sheets on Drawings.

G. Alternate No. 8: Updated Theater Lobby Finishes
    1. Provide new theater lobby finishes including paint, resilient tile flooring, acoustical ceiling panels, and rubber base. Estimated quantities of each material include:
        a. Flooring: 4,200 square feet.
        b. Resilient Base: 475 square feet.
        c. Paint: 6,000 square feet.
        d. Acoustical Panel Ceilings: 3,700 square feet.
    2. Refer to Specifications, Architect's Master Schedule, Finish Plans, and Reflected Ceiling Plans.

H. Alternate No. 9: Elevator #2
    1. Alternate 9A: Replace passenger elevator #2. Reference Section 14 24 00 "Hydraulic Elevators."
    2. Alternate 9B: Provide passenger elevator #2 modernization in lieu of replacement. Reference Section 14 27 00 "Elevator Renovation."

I. Alternate No. 10: Air Handling Unit at Field House
    1. For increased humidity control in the existing field house, provide roof-mounted Packaged DX Dedicated Outdoor Air Unit to supply outside air to the field house air handling units.
    2. Remove intake fan, IF-1. Locate dedicated outdoor air unit on roof and duct OA into existing OA duct in building. Dedicated outdoor air unit shall be a York model JROA, 8080 CFM outdoor air supply, 763 TMBH/383.9 SMBH, 98 DB/80 WB entering coil, 51.4 DB/51WB leaving coil unit with variable capacity compressors and modulating hot gas reheat.
    3. Coordinate with Electrical for supply of a 460v/3 Phase, 150.2 MCA/175 MFS electrical connection to unit.
    4. **250AF/175AT breaker to be added to new switchboard 'MS#2' to feed unit.**
    5. Coordinate with Structural for steel required to support approximately 8500 lb unit. Unit shall be controlled by packaged controls, and the existing BAS shall schedule the unit on/off.

End of Section 01 23 00

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SECTION 03 52 16 - LIGHTWEIGHT INSULATING CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Cast-in-place cellular foam lightweight insulating concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include mixing and application instructions for each type of lightweight insulating concrete.

B. Shop Drawings: Include plans, sections, and details showing roof slopes, lightweight insulating concrete thicknesses, embedded insulation board, roof penetrations, roof perimeter terminations and curbs, control and expansion joints, and roof drains.

C. Design Mixtures: For each lightweight insulating concrete mix.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.

B. Material Test Reports: For lightweight aggregates, from a qualified testing agency, indicating compliance with requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An Installer who employs and retains, throughout the project, supervisors who are trained and approved by manufacturer.

B. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.

B. Store packaged materials to protect them from elements or physical damage.

C. Do not use cement that shows indications of moisture damage, caking, or other deterioration.

1.7 FIELD CONDITIONS

A. Do not place lightweight insulating concrete unless ambient temperature is at least 40 deg F and rising.
1. When air temperature has fallen or is expected to fall below 40 deg F, heat water to a maximum 120 deg F before mixing so lightweight insulating concrete, at point of placement, reaches a temperature of 50 deg F minimum and 80 deg F maximum.

B. Do not place lightweight insulating concrete during rain or snow or on surfaces covered with standing water, snow, or ice.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide lightweight insulating concrete identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. Thermal Envelope: Design, fabricate and install lightweight concrete system with continuous insulation to provide a minimum uniform thermal envelope.
   1. Provide thickness of insulation required to achieve a minimum effective uniform thermal R-value of 26.
   2. Average R-Value calculations are not acceptable.

2.2 CELLULAR LIGHTWEIGHT INSULATING CONCRETE

A. Produce cellular lightweight insulating concrete with the following minimum physical properties using cementitious materials, air-producing liquid-foaming agents complying with ASTM C 869/C 869M, and the minimum amount of water necessary to produce a workable mix.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Aerix Industries.
      b. Allied Foam Tech Corp.
      c. Celcore Incorporated.
      d. Elastizell Corporation of America.
      e. Siplast.
   1. As-Cast Unit Weight: 40 to 48 lb/cu. ft. at point of placement, when tested according to ASTM C 138/C 138M.
   2. Oven-Dry Unit Weight: 32 to 40 lb/cu. ft., when tested according to ASTM C 495.
   3. Compressive Strength: Minimum 300 psi, when tested according to ASTM C 495.

2.3 MATERIALS

A. Cementitious Material: Portland cement, ASTM C 150/C 150M, Type I/II.

B. Water: Clean, potable.

C. Joint Filler: ASTM C 612, Class 2, glass-fiber type; compressing to one-half thickness under a load of 25 psi.

D. Galvanized Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, 2 by 2 inches, W0.5 by W0.5, fabricated from galvanized-steel wire into flat sheets.

E. Molded-Polystyrene Insulation Board: ASTM C 578, Type I, 0.90-lb/cu. ft. minimum density.
   1. Provide units with manufacturer's standard keying slots or holes of 3 to 4 percent of board's gross surface area.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Carpenter Company.
      b. Cellofoam North America.
      c. Dyplast Products, LLC.
      d. Insulfoam.
      e. ThermaFoam, LLC.

2.4 DESIGN MIXTURES

A. Prepare design mixtures for each type and strength of lightweight insulating concrete by laboratory trial batch method or by field-test data method. For trial batch method, use a qualified independent testing agency for preparing and reporting proposed mixture designs.
   1. Limit use of fly ash to not exceed 25 percent of portland cement by weight.

B. Limit water-soluble chloride ions to the maximum percentage by weight of cement or cementitious material permitted by ACI 301.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Control Joints: Install control joints at perimeter of roof deck and at junctures with vertical surfaces, including curbs, walls, and vents, for full depth of lightweight insulating concrete. Fill control joints with joint filler.
   1. Provide 1-inch- wide control joints for roof dimensions up to 100 feet in length; 1-1/2-inch- wide control joints for roof dimensions exceeding 100 feet.

B. Welded Wire Reinforcement: Place steel welded wire reinforcement with longest dimension perpendicular to steel deck ribs. Cut reinforcement to fit around roof openings and projections. Terminate reinforcement at control joints. Lap sides and ends of reinforcement at least 6 inches.

3.2 MIXING AND PLACING

A. Mix and place lightweight insulating concrete according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.

B. Install insulation board according to lightweight insulating concrete manufacturer's written instructions. Place insulation board in wet, lightweight insulating concrete slurry poured a minimum of 1/8 inch over the structural substrate. Ensure full contact of insulation board with slurry. Stagger joints and tightly butt insulation boards.
   1. Install insulation board in a stair-step configuration with a maximum step-down of 1 inch.

C. Deposit and screed lightweight insulating concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to depths and slopes indicated.

D. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.

E. Begin curing operations immediately after placement, and air cure for not less than three days, according to manufacturer's written instructions.

F. If ambient temperature falls below 32 deg F, protect lightweight insulating concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform field tests and inspections, and prepare test reports.

B. Testing of samples of lightweight insulating concrete obtained according to ASTM C 172, except as modified by ASTM C 495, shall be performed according to the following requirements:
   1. Determine as-cast unit weight during each hour of placement, according to ASTM C 138/C 138M.
   2. Determine oven-dry unit weight and compressive strength according to ASTM C 495. Make a set of at least six molds for each day's placement, but not less than one set of molds for each 5000 sq. ft. of roof area.
   3. Perform additional tests when test results indicate that as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.
      a. Retest cast-in-place lightweight insulating concrete for oven-dry unit weight and compressive strength.

3.4 DEFECTIVE WORK

A. Remove and replace lightweight insulating concrete that fails to comply with requirements.

END OF SECTION

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SECTION 07 52 16 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Styrene-butadiene-styrene (SBS)-modified bituminous membrane “cool roof” roofing.
2. Roof insulation.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

B. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is FM Global approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

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1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.9 FIELD CONDITIONS

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

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
   1. Special warranty includes membrane roofing, base flashings, fasteners, substrate board, and other components of roofing system.
   2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Elevate by Holcim.
   2. Johns Manville.
   3. Siplast, Inc.
   4. Soprema

B. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
   2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

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C. Roofing System Design: Tested by a qualified testing agency to resist uplift pressures as indicated on Drawings.

D. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
1. Fire/Windstorm Classification: Class 1A-90
2. Hail-Resistance Rating: MH.

E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 BASE SHEET MATERIALS

A. SBS-Modified Bitumen Polyester Mat Base Sheet: ASTM D 6164/D 6164M, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric, smooth surfaced, suitable for cold adhesive application method.
1. Thickness: 120 mil minimum.

2.4 CAP SHEET MATERIALS

A. Granule-Surfaced Roofing Cap Sheet: ASTM D 6164/D 6164M, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric, suitable for cold adhesive application method.
1. Granule Color: White.
2. Thickness: 140 mil minimum.

2.5 BASE FLASHING MATERIALS

A. SBS-Modified Bitumen, Smooth-Surfaced Backer Sheet: Matching base sheet, suitable for installation method specified.

B. Liquid Flashing System: Roof membrane manufacturer's standard one- or two-part moisture curing resin with low solvent content, consisting of a primer, flashing cement, and scrim.

~~**2.6 ROOFING SHEET MATERIALS**~~

~~**A. Glass-Fiber Base Ply Sheet: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.**~~

~~**B. Granule-Surfaced Roofing Cap Sheet: ASTM D 6164/D 6164M, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with fibrous glass mat fabric); granule surfaced; suitable for application method specified, and as follows:**~~
~~**1. Granule Color: White.**~~

~~**2.7 BASE FLASHING SHEET MATERIALS**~~

~~**A. Backer Sheet: ASTM D 6164/D 6164M, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with fibrous glass mat fabric); smooth surfaced; suitable for application method specified.**~~

~~**B. Granule-Surfaced Flashing Sheet: ASTM D 6164/D 6164M, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with polyester fabric) ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers) ASTM D 6162, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); granule surfaced; suitable for application method specified, and as follows:**~~
~~**1. Granule Color: Match primary roof color.**~~

2.8 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Asphalt Primer: ASTM D 41/D 41M.

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C. Roofing Asphalt: ASTM D 312, Type III.

D. Roofing Asphalt: ASTM D 6152, SEBS modified.

E. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.

F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

G. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

I. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing.

J. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.9 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.

B. Lightweight Insulating Concrete: Comply with requirements in Section 03 52 16 “Lightweight Insulating Concrete.”

~~**C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.**~~

~~**1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:**~~

~~**a. Atlas Roofing Corporation.**~~
~~**b. Carlisle SynTec Incorporated.**~~
~~**c. Elevate.**~~
~~**d. GAF Materials Corporation.**~~
~~**e. Johns Manville.**~~
~~**f. Rmax, Inc.**~~

~~**D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.**~~

~~**E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.**~~

~~**2.10 INSULATION ACCESSORIES**~~

~~**A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.**~~

~~**B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.**~~

~~**C. Insulation Cant Strips: ASTM C 728, perlite insulation board.**~~

~~**D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick, factory primed.**~~

~~**1. Products: Subject to compliance with requirements, provide one of the following:**~~

~~**a. CertainTeed Corporation; GlasRoc Sheathing Type X.**~~
~~**b. Georgia Pacific Corporation; Dens Deck Prime.**~~
~~**c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.**~~
~~**d. USG Corporation; Securock Glass Mat Roof Board.**~~

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2.11 WALKWAYS

A. Walkway Pads: Reinforced asphaltic composition pads with slip-resisting mineral-granule surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 inch thick, minimum.
   1. Pad Size: Manufacturer's standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
   1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
   2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 00 "Steel Decking."
   4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
   5. Verify that minimum curing period recommended by roofing system manufacturer for lightweight insulating concrete roof decks has passed.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft., and allow primer to dry.

D. Install insulation strips in ribs of acoustical roof decks according to acoustical roof deck manufacturer's written instructions.

3.3 INSTALLATION, GENERAL

A. Comply with roofing system manufacturer's written instructions.

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

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

D. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 07 27 26 "Fluid-Applied Membrane Air Barriers."

~~**E. Asphalt Heating: Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application. Circulate asphalt during heating. Do not raise asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed asphalt manufacturer's recommended temperature limits during asphalt heating. Do not heat asphalt within 25 deg F of flash point. Discard asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.**~~
~~**1. Apply hot roofing asphalt within plus or minus 25 deg F of equiviscous temperature.**~~

~~**F. Asphalt Heating: Heat and apply SEBS-modified roofing asphalt according to roofing system manufacturer's written instructions.**~~

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G. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 INSULATION INSTALLATION

A. Install ~~one lapped base sheet course and mechanically fasten to substrate~~ according to roofing system manufacturer's written instructions.

B. Comply with requirements in Section 03 52 16 “Lightweight Insulating Concrete.”

~~**C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 degrees.**~~

~~**D. Install tapered insulation under area of roofing to conform to slopes indicated.**~~

~~**E. Install insulation with long joints of insulation in a continuous straight line, with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.**~~
~~**1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.**~~

~~**F. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.**~~
~~**1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.**~~

~~**G. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.**~~

~~**H. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.**~~

~~**I. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:**~~
~~**1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft., and allow primer to dry.**~~
~~**2. Set each layer of insulation in a solid mopping of hot roofing asphalt.**~~

~~**J. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.**~~
~~**1. Fasten insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.**~~
~~**2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.**~~

~~**K. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing system manufacturer.**~~
~~**1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.**~~
~~**2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.**~~
~~**3. Apply hot roofing asphalt to underside, and immediately bond cover board to substrate.**~~

3.5 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
1. Install roofing system MBS -2 -I -[T] [M] [L], according to roof assembly identification matrix and roof assembly layout illustrations in NRCA's "The NRCA Roofing and Waterproofing Manual" and to Section requirements.

B. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
1. Deck Type: I (insulated).
2. Adhering Method: L (cold-applied adhesive).

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3. Number of SBS-Modified Asphalt Sheets: One.
4. Surfacing Type: M (mineral-granule-surfaced cap sheet).

C. Start installation of roofing in presence of manufacturer's technical personnel.

D. Where roof slope exceeds 1/2 inch per 12 inches, install roofing membrane sheets parallel with slope.
1. Backnail roofing sheets to nailer strips according to roofing system manufacturer's written instructions.

E. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.6 BASE SHEET INSTALLATION

A. Before installing, unroll base sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature.

B. Loosely lay one course of sheathing paper, lapping edges and ends a minimum of 2 inches and 6 inches, respectively.

C. Installation of Base Sheet:
1. Install base sheet in accordance with roofing membrane manufacturer's written installation instructions, starting at low point of roof.
2. Extend base sheet over and terminate above cants.
3. Install base sheet in a shingle fashion.
4. Adhere base sheet to substrate in a uniform coating of cold-applied adhesive.
5. Self-adhere base sheet to substrate.
6. Install base sheet without wrinkles or rears, and free from air pockets.
7. Laps: Accurately align base sheet, without stretching, and maintain uniform side and end laps.
a. Lap side laps as recommended by roofing membrane manufacturer but not less than 3 inches.
b. Lap end laps as recommended by roofing membrane manufacturer but not less than 12 inches. Stagger end laps not less than 18 inches.
c. Completely bond and seal laps, leaving no voids.
d. Roll laps with a 20 lb roller.
8. Repair tears and voids in laps and lapped seams not completely sealed.
9. Apply pressure to body of base sheet in accordance with roofing membrane manufacturer's written installation instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

3.7 CAP SHEET INSTALLATION

A. Before installing, unroll cap sheet, cut into workable lengths, and allow to lie flat for a time period recommended by roofing membrane manufacturer for the ambient temperature at which cap sheet will be installed.

B. Install cap sheet in accordance with roofing membrane manufacturer's written installation instructions, starting at low point of roof.
1. Extend cap sheet over and terminate above cants.
2. Install cap sheet in a shingle fashion.
3. Adhere cap sheet to bottom layer in a uniform coating of cold-applied adhesive.
4. Self-adhere cap sheet to bottom layer.
5. Install cap sheet without wrinkles or tears, and free from air pockets.
6. Install cap sheet so side and end laps shed water.

C. Laps: Accurately align roof sheets, without stretching, and maintain uniform side and end laps.
1. Lap side laps as recommended by roofing membrane manufacturer but not less than 3 inches.

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2. Lap end laps as recommended by roofing membrane manufacturer but not less than 12 inches. Stagger end laps not less than 18 inches.
3. Completely bond and seal laps, leaving no voids.
4. Roll laps with a 20 lb roller.
5. Repair tears and voids in laps and lapped seams not completely sealed.

D. Apply pressure to body of cap sheet in accordance with roofing membrane manufacturer's written installation instructions, to remove air pockets and result in complete adhesion of cap sheet to substrate.

E. Apply roofing granules of same color as cap sheet to cover exuded bead at laps while bead is hot, to provide a continuous color appearance.

~~**3.8 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION**~~

~~**A. Install modified bituminous roofing cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:**~~
~~**1. Adhere to substrate in cold-applied adhesive.**~~
~~**2. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.**~~

~~**B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.**~~
~~**1. Repair tears and voids in laps and lapped seams not completely sealed.**~~
~~**2. Apply roofing granules to cover exuded bead at laps while bead is hot.**~~

~~**C. Install roofing sheets so side and end laps shed water.**~~

3.9 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer-Sheet Application: Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants in a solid mopping of hot roofing asphalt cold-applied adhesive.
3. Backer-Sheet Application: Adhere backer sheet to substrate in a solid mopping of hot roofing asphalt cold-applied adhesive.
~~**4. Flashing-Sheet Application: Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F. Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer.**~~
5. Flashing-Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
~~**6. Flashing-Sheet Application: Adhere flashing sheet to substrate in asphalt roofing cement at rate required by roofing system manufacturer.**~~
~~**7. Flashing-Sheet Application: Torch apply flashing sheet to substrate.**~~

B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
1. Seal top termination of base flashing.

D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

E. Roof Drains: Set 30-by-30-inch- metal flashing in bed of asphaltic adhesive on completed roofing membrane. Cover metal flashing with roofing cap-sheet stripping, and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
1. Install stripping according to roofing system manufacturer's written instructions.

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3.10 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.
   1. Set walkway pads in cold-applied adhesive.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
   1. Infrared Thermography: Testing agency surveys entire roof area using infrared color thermography in accordance with ASTM C1153.
      a. Perform tests before overlying construction is placed.
      b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing, or by nuclear hydrogen detection testing.
      c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
      d. Testing agency to prepare survey report of initial scan indicating locations of entrapped moisture if any.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

C. Roofing system will be considered defective if it does not pass tests and inspections.
   1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

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

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
   1. Owner: <**Insert name of Owner**>.
   2. Address: <**Insert address**>.
   3. Building Name/Type: <**Insert information**>.
   4. Address: <**Insert address**>.
   5. Area of Work: <**Insert information**>.
   6. Acceptance Date: _____.
   7. Warranty Period: <**Insert time**>.
   8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
   1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

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a. lightning;
b. peak gust wind speed exceeding <**Insert** mph>;
c. fire;
d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. vapor condensation on bottom of roofing; and
g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

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

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.
1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 07 52 16

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SECTION 112326 - LAUNDRY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Commercial Washer-Extractor
2. Drying Tumblers

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

B. Product Schedule: For appliances. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and manufacturer.

B. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each appliance to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Regulatory Requirements: Comply with the following:
1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and Texas Accessibility Standards (TAS).

D. Preinstallation Conference: Conduct conference at Project site.

1.7 WARRANTY

A. Washer Extractor: Full warranty including parts and labor for on-site service
1. Warranty Period: Two years from date of Substantial Completion.

B. Drying Tumbler: Full warranty including parts and labor for on-site service on the product.
1. Warranty Period for Other Components: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
1. Huebsch.
2. Speed Queen.
3. UniMac.

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B. Basis of Design: As indicated on Architect's Equipment Schedule.

2.2 WASHER-EXTRACTOR

A. Washer-Extractor:
1. The 30.6 (W) x 47.2 (H) x 42.3.1 (D) washers should be made of a 304 or equal stainless steel cylinder, tub and cover panels with a dry weight capacity of 40 lbs and a wash cylinder volume of 6.3 cu.ft. minimum.
2. The washer should have six washing speeds. The G-force at highest extract speed is 200G

2.3 DRYING TUMBLER

A. Drying Tumbler:
1. The34.5 (W) x 66.7 (H) x 53.1 (D) dryer has a maximum capacity of up to 55 lbs with a cylinder volume of 17.30 cu.ft.
2. The air outlet diameter shall be 8 inches in diameter with an air flow of 700 cfm.
3. The lint filter shall be self-cleaning, depositing lint to storage area at bottom of tumbler.

B. Provide three ten bushel yellow glosstex laundry carts.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of commercial washer and dryer.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written instructions.

B. Utilities: Comply with plumbing and electrical requirements.

C. Level and adjust for proper operation.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:
1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
2. Operational Test: After installation, start units to confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.

B. An appliance will be considered defective if it does not pass tests and inspections.

3.4 DEMONSTRATION

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

END OF SECTION

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SECTION 11 31 00 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Cooking appliances.
2. Refrigeration appliances.
3. Ice machines.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.

B. Product Schedule: For appliances. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Source Limitations: Obtain each type of residential appliance from single manufacturer.

C. Regulatory Requirements: Comply with the following:
1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and Texas Accessibility Standards (TAS).

E. Preinstallation Conference: Conduct conference at Project site.

1.7 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
1. Warranty Period: One year from date of Substantial Completion.

B. Microwave Oven: Full warranty including parts and labor for on-site service.
1. Warranty Period: One year from date of Substantial Completion.

C. Refrigerator/Freezer, Sealed System: Full warranty including parts and labor for on-site service on the product.
1. Warranty Period for Sealed Refrigeration System: One year from date of Substantial Completion.
2. Warranty Period for Other Components: One year from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 APPLIANCES

A. Refer to Architect's Equipment Schedule.

2.2 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.

C. Examine walls, ceilings, and roofs for suitable conditions where overhead exhaust hoods, downdraft exhaust or microwave ovens with vented exhaust fans will be installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Range Anti-Tip Device: Install at each range according to manufacturer's written instructions.

E. Utilities: Comply with plumbing and electrical requirements.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:
1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
2. Operational Test: After installation, start units to confirm proper operation.

B. An appliance will be considered defective if it does not pass tests and inspections.

3.4 DEMONSTRATION

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

END OF SECTION

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SECTION 11 61 62 – THEATRICAL LIGHTING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provision of the Theatrical Lighting Systems at the Auditorium and Black Box.

1.2 RELATED DOCUMENTS

A. Theatre Lighting Systems Drawings (“TL” Series) and general provisions of the contract including general and supplementary conditions and Division 1 Specification sections apply to this section.
B. Section 11 61 33: Theatrical Rigging Systems, drawings, and documentation.
C. Section 27 41 15: Audio-Visual Systems and Equipment, drawings, and documentation.
D. Division 26: Electrical Work drawings and documentation.

1.3 SECTION INCLUDES

A. Project instructions for the Contractor and System description details.
B. System product descriptions.
C. Project completion instructions for the Contractor.

1.4 RESPONSIBILITY AND RELATED WORK

A. Coordination, supply, installation, shipping, storage, inspection, commissioning, testing, instruction and warranties of the Theatrical Lighting Systems.
B. Plant, materials, equipment, transport and labor necessary to accomplish this and have a complete and fully functioning System.
C. Also includes:
    1. Required licenses and permits including payment of charges and fees.
    2. Verification of dimensions and conditions at the job site.
    3. Provision of submissions.
    4. Installation in accordance with the Contract Documents, Manufacturer's recommendation, and in conformity with applicable codes and authority having jurisdiction.
    5. Extension of electrical service, including ground, to equipment locations.
D. The drawings included with this specification convey general system concepts. Where the plans do not show complete and accurate building details, the Contractor is responsible for making field measurements necessary to establish exact locations, relationships, and load capacities necessary for the installation of these systems.
E. Coordinate the work with the related documents and the scheduled work of other trades.
F. Conduit infrastructure system, including wire for AC Power and grounding for the Theatrical Lighting Systems, are provided as part of the Contract. Coordination between different disciplines is required to achieve a proper conduit system installation and power provisions for Theatrical Lighting Systems. All electrical installation shall be in accordance with Division 26.
G. Supply accessories and minor equipment items needed for a complete and fully operational system, even if not specifically mentioned in these Specifications or on the associated Drawings, without claim for additional payment.
H. Notify the Architect of any discrepancies in part numbers or quantities before bid. Failing to provide such notification requires the Contractor to supply items and quantities according to the intent of the Specifications and associated Drawings without claim for additional payment.
I. Specifications and drawings are complementary. Work called for by one is binding as if called for by both. Any discrepancies between specifications and drawings shall be brought to the attention of the Architect for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of their failure to have brought said discrepancies to the attention of the Architect.
J. Execute all work in accordance with the NEC and all applicable State and Local codes, ordinances, and regulations.
K. If a conflict develops between the Contract Documents and the appropriate codes and is reported to the Architect prior to bid opening, the Architect will prepare the necessary clarification. Where a conflict is reported after contract award, propose a resolution of the conflict and, upon approval, perform work.

1.5 REFERENCES

A. Published specification standards, tests or recommended methods of trade, industry or governmental organizations apply to Work in this section where cited below:
    1. American National Standards Institute (ANSI)
    2. American Society of Testing and Materials (ASTM)

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3. Electronics Industries Association (EIA)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. National Electrical Manufacturer's Association (NEMA)
6. National Electrical Code (NEC)
7. National Fire Protection Association (NFPA)
8. Underwriters Laboratories (UL)
9. Occupational Safety and Health Administration (OSHA)
10. Entertainment Services and Technology Association (ESTA)
11. United States Institute of Theater Technology (USITT)
12. Illuminating Engineering Society (IES)

1.6 DEFINITIONS

A. In addition to Division 1 definitions, the following list of terms as used in this Section shall be defined as:
1. Owner – Fort Bend Independent School District
2. Project – Willowridge High School Renovations and Additions
3. Consultant(s) – WJHW
4. Architect – Kirksey
5. Contractor – The provider of all material, labor, and equipment necessary for the systems described in this Section
6. Furnish/Supply – To purchase, procure, acquire, and deliver complete with all necessary accessories (CWANA)
7. Install – To set in place, join, attach, link, set up or otherwise connect together and test until complete before turning over to the Owner, all parts, item, or equipment supplied by the contractor.
8. Provide – To furnish and install

1.7 DESCRIPTIONS AND REQUIREMENTS

A. Auditorium
1. Provide production lighting control console and accessories.
2. Provide stage edge safety light and controls.
3. Provide new theatrical lighting power distribution system and data network for production lighting and architectural lighting control.
4. Provide new architectural lighting control processor and house lighting panels throughout the venue.
5. Provide new LED production lighting fixtures, cables, and accessories.

B. Black Box
1. Provide new theatrical lighting power distribution system and data network for production lighting and architectural lighting control.
2. Provide new architectural lighting control processor and house lighting panels throughout the venue.
3. Provide production lighting control console and accessories.
4. Provide new LED production lighting fixtures, cables, and accessories.

C. Focus
1. Contractor will hang, focus, and program lights to an Owner directed plot
2. The Owner may elect to generate their own plot. If not, the Consultant will provide this documentation.
3. If the Contractor finds any needed updates or changes before hang begins the Consultant or Owner will update the documents as needed.
4. The Contractor is responsible for tracking and updating all changes to the plot after it has been turned over for installation. These updates and changes may be provided to the Consultant as necessary. However, the Contractor is responsible for these updates and may be provided the plot in an editable format to make the updates.
5. The Consultant produced plot will provide the following information if applicable for each fixture:
   a. Location
   b. Unit number for that location
   c. Type
   d. Area/purpose
   e. Mode
   f. Fixture universe/address
6. As part of turnover documents, the Contractor will be required to ensure the following are provided:
   a. An electronic version of the plot. Provided on a flash drive and preserved by the Contractor for at least the length of the warranty.

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b. A B-sized version of the plot mounted to foamcore-like material.
c. All of the information listed above in number 5 and additionally all circuiting of fixtures.

7. As part of the final observation and testing (3.5) Consultant will verify the focus. The Contractor may elect to complete the focus before the final observation and make any changes noted by the Consultant at this time. If the Contractor elects to have the Consultant direct focus as part of final observation the following shall be provided:
   a. At least (10) days notice
   b. A board operator
   c. At least (2) people to perform the focus
   d. All required lifts and safety equipment
   e. A focus target. Person or figure
   f. Person or system to document any changes that arise as part of the focus

D. Console Programming
1. The Contractor shall create a starting show file for the project. The file will be loaded onto the console, provided to the Owner on a flash drive, and preserved by the Contractor for at least the length of the warranty. The Contractor will provide the starting show file to the Owner, if requested, following the requirements laid out in the warranty portion (1.14) of this specification and shall be considered a service call.
2. Owner may select to add, update, or change any of the information below. These changes may be directed before, during, or after initial training. The Contractor will make any requested changes provided any amount of training time is left in the project as outlined in the instruction of Owner personnel of this specification (3.6).
3. At the Owner's request program any fixture, color, or controllable attribute to provided faders.
4. Ensure all areas outlined in the console programming portion of this specification are covered as part of the instruction of Owner personnel of this specification (3.6).
5. Using the provided plot, the Contractor shall create the following console programming at a minimum, if applicable:
   a. Patching
   b. Patch all fixtures to channel numbers outlined in the plot.
6. Groups
   a. (1) group for every area of the plot.
   b. (1) group for every "row" of front lights
   c. (1) group for every "row" of front lights from the left
   d. (1) group for every "row" of front lights from the right
   e. (1) group for every "row" of top lights
   f. (1) group for every "row" of backlights
   g. (1) group for the cyclorama lights
7. Palettes
   a. Intensity
      1) Provide a 70% intensity for use in creating cues
   b. Color
      1) Provide warm (R02) and cool (R3202 or R60) for ease of selection.
      2) Provide a red (R27), green (R90), and blue (R80) for use on cyclorama fixtures
      3) A warm white. Roughly 3200K
8. Interactive Control Display (Magic Sheet)
   a. Provide an interactive control display to aid in programming and console use
   b. The interactive display shall utilize a combination of standard and user-defined symbols to generate a fixture layout which copies the light plot as closely as reasonably possible.
   c. Selectable fixtures will, at a minimum, indicate the following parameters or palettes and their current states:
      1) Fixture type
      2) Channel
      3) Intensity
      4) Color
      5) Focus
   d. Provide controls for all groups as described above

1.8 QUALITY ASSURANCE

A. Contractor's Qualifications: Firm experienced in the provision of systems similar in complexity to those required for this project; and meet the following:
1. No less than five (5) years of experience with equipment and systems of the specified types.

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2. Experience with at least five (5) comparable scale projects within the last two (2) years.
3. Engage the services of a Manufacturer certified technician.
4. Be a franchised dealer and service facility for the manufacturer's products furnished.
5. Maintain a fully staffed and equipped service facility.
6. At the request of the Architect, demonstrate that:
    a. Adequate plant and equipment are available to complete the work.
    b. Adequate staff with commensurate technical experience is available.

B. Manufacturer's Qualifications:
1. No less than five (5) years continuous experience in the production of specified type of product.
2. Production shall meet applicable NEMA standards.

1.9 SUBMITTALS:

A. Provide submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures section unless otherwise indicated.

B. The submittal information required by the specification is to be presented complete and as submissions noted below. Submittals are a crucial and integral part of the construction process; as such the Owner's consultant will not recommend payment to the Contractor above 25% of the scheduled value of this work until all submittal information has been approved.

C. Submittals must be original work produced by the firm responsible for performing the work defined in this specification. Scanning, photographic copying, materially copying, or any other reproducing the contents of the drawings or specifications contained within the Contract Documents will be marked as unacceptable and not reviewed for any content. No claim shall be made for delay, undue burden, or additional costs for the effort to produce shop drawings, schedules, and equipment lists addressing this specification or the overall project manual.

D. Project Submittal Part 1:
1. Provide for approval not later than thirty (30) days after issuance of Notice to Proceed and prior to commencement of Work:
    a. Section 1: A complete schedule of submittals.
    b. Section 2: A chronological schedule of Work in bar chart form. Revise and resubmit schedule as required to reflect construction progress.

E. Project Submittal Part 2:
1. Provide for approval no later than sixty (60) days after issuance of Notice to Proceed and in accordance with previously submitted submittal schedule.
2. Products:
    a. Section 1: Complete list of products to be incorporated within the Work (Bill of Materials).
    b. Section 2: Manufacturer's data sheets for each product.
        1) Provide original manufacturer's data sheets in order as they appear in the specification.
        2) Data sheets are required for each product in sufficient detail to evaluate product suitability for incorporation within the Work.
        3) Product literature shall include documentation of UL Listing or approved recognition by a Nationally Recognized Testing Laboratory (NRTL).
    c. Section 3: Provide Architect and/or Architect's Consultant with samples of wall plate materials and colors as specified in this section.
    d. Section 4: Submit Safety Data Sheets (SDS) for each potentially hazardous material prior to use. Include information pertaining to the hazardous material with the SDS.
3. Drawings:
    a. Provide computer software generated drawings using standard industry graphic standards. Hand or poorly drawn documents will not be accepted. All drawings shall be created on a computer aided drafting (CAD) system. Electronic files of theatrical lighting contract documents shall not be distributed for use in generating submittal documents with the exception of Architectural backgrounds.
    b. Schematic Drawings.
        1) Provide drawings detailing cabling-riser intent.
        2) Give each component a unique designator and use this designator consistently throughout the project.
        3) Include inter- and intra-component connections and cabling diagram depicting cable types, designators, and color codes.
    c. Installation Drawings.
        1) Provide drawings showing the coordinated locations of all installed equipment. Drawings shall include floorplans and other views as necessary to fully describe the intended finished conditions.

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2) Provide Conduit and Electrical Drawings indicating:
   a) Conduit sizing/routing for each system component,
   b) Locations where power is required along with the location of all junction boxes.
3) Detail Drawings: Provide drawings showing special details depicting methods and means specific to each product, assembly and each product Manufacturer's recommended installation methods and means.

d. Equipment Drawings:
1) Rack and Panel Elevations: Provide a front elevation of all racks and/or panels.
2) Rack and Panel Assembly Details: Provide drawings showing location of equipment in racks with dimensions; wire routing and cabling within housings; AC power outlet and terminal strip locations.
3) Custom Enclosures and Millwork Drawings: Provide full fabrication detail drawings indicating size, material, finish, and openings for equipment.
4) Fabricated Plates and Panels Drawings: Provide complete drawings of custom fabricated plates or panels. Drawings to include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.

e. Schedule Drawings: Provide load schedules noting source and destination of wiring and associated connected load.
f. Labeling Drawing: Provide representative equipment and cabling labeling scheme. Include font sizes and styles, explanation of scheme, and descriptor and designator schedule.
g. General Detail Drawings: Provide detail drawings depicting any unique installation methods specific to each product.
h. Control Screen Templates: Provide layout drawings and/or screenshots for master house lighting stations and similar electronic control surfaces.

4. Any other pertinent data generated which is necessary to provide the Work.

F. Submittal Format:
1. Electronic (PDF) submittal documents are required for review.
2. Provide each submittal with a unique number and each shall be numbered in consecutive order.
3. Submittals shall not be issued with other disciplines.
4. Provide each submittal with a complete table of contents with the following information:
   a. Project Name
   b. Submittal number. In the case of a resubmittal, use the original submittal number immediately followed by the suffix "R" immediately followed by a unique number and shall be numbered in consecutive order.
   c. Date of submission.
   d. Referenced specification Section, Part, Article, Paragraph, and page number or drawing reference as applicable.
5. Follow list by Manufacturer's data sheets, arranged as in Part 2 of this specification. If a data sheet shows more than one product, indicate the model being proposed with an arrow or other appropriate symbol.
6. Drawings executed at an appropriate scale, but not smaller than 1/8" = 1'-0".

G. Resubmission Requirements:
1. Make any requested corrections or change in submittals required. Resubmit for review as directed.
2. Indicate any changes that have been made other than those requested.
3. Approval of Submittals: Each submittal package will be returned with one of the following stamps:
   a. "No Exceptions Taken" proceed with construction; all job site coordination will be at the direction of the General Contractor.
   b. "Make Corrections Noted: No Resubmission Required" submittals have been returned with conditional approval. Corrections, as indicated on the returned drawings and/or specifications, must be made before construction can begin.
   c. "Make Corrections Noted: Submit Only Corrected Pages/Items" submittals have been returned with conditional approval. Corrections, as indicated on the returned drawings and/or specifications, must be made in writing and returned to the consultant before construction can begin.
   d. "REJECTED, Submit Specified Item" a specified item in the submittal has been rejected for the reasons noted. Re-submit in compliance with the specifications.
   e. "REJECTED, Revise and Re-submit" submittal has been rejected for the reasons noted. Re-submit in compliance with the specifications.
   f. "No Review Action Required" all information provided was for information or coordination purposes only. Review is not required.

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4. Any of the above stamps may also carry a “PARTIAL” stamp. This indicates that required information noted in the section above was not provided. Omitted items may be noted as part of the reviewed submittal, but it is the Contractor’s responsibility to verify all required submittal documentation.

1.10 PROJECT RECORD MANUAL

A. Provide electronic copies of the project record documents or as required per the General Conditions of the Project.

B. The Project Record Manual shall be segregated into three separate bindings as follows:
   1. As-Built Record Documents:
      a. Product Data:
         1) List of all products incorporated in the Project inclusive of all substitutions, field changes, or revisions The list shall include Manufacturer’s serial numbers.
         2) Manufacturer's data for each type of product conforming to the scheme above.
         3) Organize and bind the above in specification order.
      b. Record drawings: Final rendition of project drawings enumerated in the Submittal section above. Provide editable computer software generated drawings using standard industry graphic standards. Hand or poorly drawn documents will not be accepted. All drawings shall be created on a computer aided drafting (CAD) system, in both a DWG and PDF file format.
      c. Test Reports: Record findings of systems testing described in Part 3 below.
   2. Operations Manual
      a. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity.
         1) This procedure should describe the operation of all system capabilities.
         2) Assume the intended reader of the manual to be technically experienced but unfamiliar with the components and the facility.
   3. Service & Maintenance Manual:
      a. Provide an original copy of the service manual on every piece of equipment for which the Manufacturer offers a service manual. Arrange manuals in the same order as the operations manual.
      b. Manufacturer’s maintenance and care instructions.
      c. Maintenance Instructions: include maintenance phone number(s) and hours, maintenance schedule, description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
   4. Warranty Manual:
      a. Manufacturer's warranty statements on each product.
      b. Date of substantial completion and ending dates for warranties for each group of products.
      c. Software registration and licenses.
   5. Include any other pertinent data generated during the Project or required for future service.
   6. Appropriately duplicate data within the separate bindings when it will reasonably clarify procedures, e.g., operational data in maintenance binding.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Products shall ship and be stored in their original container to prevent damaging or entrance of foreign matter.

B. Provide protective covering during construction to prevent damaging or entrance of foreign matter.

C. Replace, at no expense to Owner, product damaged during storage, handling, or the course of construction.

1.12 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify Architect in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The Drawings diagrammatically show cabling and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to the Architect for approval, showing how the work may be installed.

1.13 FINAL TESTING AND OBSERVATION

A. Upon completion of installation and initial tests and adjustments specified in Part 3, acceptance testing shall be performed by the Consultant.

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B. The process of acceptance testing the System may necessitate moving and adjusting certain component parts; perform such adjustments without claim for additional payment.

1.14 WARRANTY

A. Warrant labor and product for two (2) years following the date of substantial completion to be free of defects and deficiencies and to conform to the drawings and specifications as to kind, quality, function, and characteristics. Repair or replace defects occurring in labor or product within the Warranty period without charge. Any cost associated with this warranty repair is the responsibility of the Contractor.
B. This warranty is in addition to any specific warranties issued by Manufacturers for greater periods of time.
C. Within the warranty period, answer service calls within twenty-four (24) hours during normal working hours and correct the deficiency within forty-eight (48) hours.
D. During the warranty period, the Manufacturer shall provide a toll-free 24-hour-per-day number for telephone technical support and service request. If callback is required, calls shall be answered within thirty (30) minutes.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Model numbers and manufacturers included in this specification are listed to establish a standard of product function, performance, and quality. Products or manufacturers listed herein are listed in no particular order or preference.
B. Refer to General and Supplementary Conditions and Division 1 Specification Sections for equipment substitution procedure. Substitution of any equipment within this specification shall require review and approval by WJHW.
C. Substitution of specified products with other qualified manufacturers and products will be considered providing:
D. A request for substitution of each specific product must be made in writing by a bidding Contractor not less than ten (10) business days prior to bid for written approval of the Architect.
E. Sufficient data of the products is presented for prior approval including technical data, manufacturer's specifications, samples, and, if requested, results of independent testing laboratory tests.
F. Written permission is obtained for the substitution from the Owner or Owner's Representative.
G. Providing product not specifically specified without prior written approval by the Owner, Architect, and/or Architect's Consultant shall not be accepted.

2.2 GENERAL

A. Products shall be new, free from defects and listed by an NRTL when an applicable NRTL Standard exists. Provide product of a given type from one manufacturer.
B. Provide product of a given type from one manufacturer.
C. Regardless of the length or completeness of the descriptive paragraph herein, provide product complying with the specified manufacturers' published specifications.

2.3 CABLING AND ACCESSORIES

A. All cable shall be compliant with NEC and NRTL listed. Any NRTL listing must be available at the time of bid.
B. All electrical conductors installed under this contract, except where otherwise specified, shall be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper, and meet appropriate ratings (e.g., CMR, CMP, etc.)
C. Cable shall carry appropriate fire rating (e.g., CMR, CMP, OFNR, OFNP, etc.) on jacket of cable.
D. Where cables are routed through cable tray, provide tray rated cable of equal specification.
E. Where cables are run exposed through a return air plenum, provide plenum rated cable of equal specification.
F. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
G. The Belden cables listed below are approved for use on this project and are listed to set the acceptable standard of performance. If field conditions or actual cable pathway requires tray or plenum cable, provide version of cable that meets required rating. Cables from Carol, Liberty, and West Penn are also acceptable provided they meet the performance specifications of the approved listed cables.
H. DMX512 (E-DMX) distribution cable:
    1. Provide 24 AWG four twisted pair data cable.
    2. Pair Color Code Chart:
        a. 1 – White/Blue Stripe and Blue
        b. 2 – White/Orange Stripe and Orange

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c. 3 – White/Green Stripe and Green
d. 4 – White/Brown Stripe and Brown
3. Insulation: Polyolefin
4. Inner/Outer Jacket Material: PVC – Polyvinyl Chloride
5. Nominal Impedance: 100 ohms.
6. Nominal Velocity of Prop.: 72%
7. Capacitance between conductors: 15.0 pF/ft.
8. Acceptable product:
a. Belden 1583A (Category 5E).

I. DMX512 (E-DMX) distribution cable – Stage Electric Drops:
1. Provide extra rugged, flexible control cable (Ethernet) for connection of NET outlets on grid to electric batten distribution.
2. Cable to be four-pair, double shielded, low-capacitance.
3. Conductors: 26 AWG tinned, annealed copper stranded 7 x 0.16.
4. Connector: Provide with EtherCon connector by Neutrik®.
5. Assembly: pairs cabled with Kevlar strength member.
6. Shield: (inner) aluminum/Mylar, 100% coverage (outer) tinned copper braid, 80% coverage.
7. Conductivity: 15ohms per 100 meters @ 20C.
8. Impedance: 100 ± 15 ohms 1-100MHz.
9. Acceptable product:
a. TMB & Associates ProPlex or equivalent.

J. DMX512 Backup Control Signal Distribution Cable:
1. Provide 24 AWG two twisted pair cable.
2. Insulation: Foam polyethylene.
3. Shield: aluminum foil/polyester tape.
4. Capacitance between conductors: 12.5 pF/ft.
5. Acceptable product:
a. Belden 9729

K. Architectural Lighting DMX Cable:
1. Provide 24 AWG two twisted pair cable.
2. Insulation: Foam polyethylene.
3. Shield: aluminum foil/polyester tape.
4. Capacitance between conductors: 12.5 pF/ft.
5. Acceptable product:
a. Belden 9842

L. Preset Station Signal Distribution Cable:
1. Provide 16 AWG single twisted pair cable.
2. Insulation: PVC-polyvinyl chloride.
3. Shield: unshielded.
4. Capacitance between conductors: 33 pF/ft.
5. Acceptable product:
a. Belden 8471

M. Multi-Conductor SO Type Cable:
1. Provide multi-conductor cable with black neoprene jacket.
2. Conductivity: not less than 98%.
3. Conductor: soft drawn annealed stranded copper.
4. Minimum Conductor Temperature: 90° C.
5. Size: No. 12 AWG minimum.
6. No. of Conductors: As required by circuits shown.
7. Acceptable product:
a. Cole Wire & Cable
b. Carol
c. Rome

2.4 POWER DISTRIBUTION

A. Wall-Mounted Motorized Breaker Panels (MBP)
1. General
a. Breaker Panels shall be UL Listed,
b. Breaker Panels shall consist of a main enclosure with 12, 24, or 48 pole breaker subpanels, integral control electronics for low voltage terminations and provision for accessory cards
c. The panel shall be constructed of 16-gauge galvanized steel. All panel components shall be properly treated or finished in fine-textured, scratch resistant paint

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d. The unit shall provide interior cover over the control electronics and accessory cards to allow access only to class 2 wiring and prevent direct access to class 1 line voltage components
e. Circuits as described in schedule
f. Breakers shall provide manual switching control while power is unavailable

2. Each panel shall have a keypad and LCD display for rack configuration, backup, and fault indication.
3. Panels shall employ USITT DMX-512 control format.
4. An Ethernet connection shall provide advanced control of relays over streaming ACN (sACN) and transmit status, control override, and measured energy usage per branch circuit via an internal Web UI or central monitoring interface
5. The panel shall have a UL924-listed contact input for use in Emergency Lighting systems.
6. Electrical
   a. Breaker Panels shall be available to support power input from:
      1) 120/208V three phase 4-wire plus ground
   b. Breaker panels shall support main circuit breaker options:
   c. As required for functional system based on existing electrical service or Division 26 documents
7. Breaker Panel Accessories
   a. A low voltage 0-10V dimming option shall provide up to 24 0-10v control outputs that are linked to relay circuits within the panel. Each output shall support up to 400mA of current sink per output
   b. A contact input option shall provide 24 dry contact inputs to be linked for direct or group relay control, to activate a preset, or to activate a sequence. Controller software shall allow for normally open maintained, normally closed maintained, or momentary toggle
8. Provide with main lug only option.
9. Quantity: As shown in drawings
10. Acceptable Product
    a. Electronic Theatre Controls – Sensor IQ Panel
    b. Lyntec - LCP Series Lighting Control Panelboards
    c. Vari-lite – RigSwitch+ Performance Power Platform

B. Mini Relay Panel (ERP)
1. Provide a small-format DMX controlled relay panel for load circuit distribution as described on the drawings.
2. Mechanical
   ~~a. Panel shall be constructed of 16AWG steel and finished in a black fine-texture powder paint.~~
   ~~b. Panel shall support wall and ceiling Bmounting, including installation in plenum air return spaces.~~
   ~~c. A removable dead front cover shall be mechanically fastened using four screws.~~
   ~~d. An internal safety cover made of 16AWG steel shall prevent access to all line voltage (Class 1) wiring and components without limiting access to low voltage terminations, changing settings during commissioning, or manual control of relays.~~
3. Functionality
   ~~a. Panel shall be available in both (4) and (8) zone configurations with a 20A, fully–rated, relay output and 0-10V dimming output per zone.~~
   ~~b. Panel shall be UL924 LISTED for emergency lighting circuits and shall activate only the selected outputs. Excluded loads shall be shed and not output during emergency conditions~~
   ~~c. Panel shall support onboard configuration without the use of software.~~
   ~~d. Panel shall support a contact input for use in UL 924 Emergency Systems~~
   ~~e. A dry contact input shall provide triggering of an emergency condition~~
   ~~f. A three-position switch shall set the input as Normally Open (NO) Normally Closed (NC), or Off.~~
   ~~g. Panels shall be configurable via ANSI E1.20 Remote Device Management (RDM). RDM parameters shall include: Panels that are not configurable over RDM shall not be acceptable.~~

C. Distribution Wiring Devices
1. General
   a. All power distribution devices overall assembly shall be listed by a nationally recognized test lab.

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b. All dimmed circuit connectors shall be 20A grounded stage pin type. All switched circuits connectors shall be 20A stage pin type. All connector types provided shall be of a single manufacture.
c. All pigtails shall be three-wire type “SOW” rubber jackets cable. All pigtails to be provided with proper strain relief.
d. All power distribution devices shall be fabricated from minimum 18-gauge galvanized steel and finished in black fine-textured powder coat paint unless noted otherwise. Boxes shall be free from burrs, sharp corner, and overhanging edges.
e. Circuits for Raceways and Plugging Boxes shall be labelled with 2” yellow on black Brady numbers. Numbers shall be located so that they are not obscured by cabling. Circuits shall be assigned and labelled per schedules on drawings.
f. Circuits for Wall Boxes and Floor Pockets shall be labelled with 1” yellow on black Brady numbers. Numbers shall be located so that they are not obscured by cabling. Circuits shall be assigned and labelled per schedules on drawings. As a rule, circuits shall number Stage Left to Stage Right, Down stage to Upstage.
g. All power distribution devices shall be provided with appropriate mounting hardware.
h. All multi-conductor cable is to be provided with Kellems-type strain relief grips at each end of the cables with intermediate strain relief as required.
i. Provide connector strips, gridiron junction boxes (GIJB), and associated hardware for over the stage lighting. Coordinate connector strip lengths for electrics with the theatrical rigging equipment. Provide all multi-conductor cables allowing the devices to fly to a low trim as indicated on the TR sheets. The cable is to be provided with necessary cable strain relief grips as part of the cable management system. Provide rugged network control cables to parallel the multi-conductor cable runs. Verify all electrical circuits and label all circuit numbers as specified.

2. Wall Mounted Boxes (WB)
   a. Provide a wall plug-box designed for recessed mounting.
   b. Construction: code gauge steel.
   c. Connectors: female 20 Ampere stage pin connectors surface mounted in the plug-box.
   d. Circuits: number of circuits as specified on drawings.
   e. Labeling: circuits are labeled with yellow letters on black background.
   f. Overall assembly UL listed.
   g. Quantity: As shown in drawings.
   h. Acceptable product:
      1) Altman 450 series
      2) ETC 9200 series
      3) SSRC RM series
3. Pipe Mounted Boxes (PB)
   a. Provide a plug box designed for pipe mounting.
   b. Construction: code gauge steel.
   c. Pigtails: SO type cable. Provide lengths as shown on drawings.
   d. Connectors: female 20A stage-pin connectors on the end of each of the pigtails and flush mounted 20A parallel blade receptacles for convenience circuits.
   e. Circuits: number of circuits as specified on drawings.
   f. Labeling: circuits are labeled with yellow letters on black background.
   g. Overall assembly UL listed.
   h. Quantity: As shown in drawings.
   i. Acceptable product:
      1) Altman 450 series
      2) ETC 9300 series
      3) SSRC PM series
      4) ETC 8500 series
4. Gridiron Junction Boxes (GJB)
   a. Provide a junction box designed to mount to the structure above.
   b. Construction: 16-gauge, cold rolled steel with removable covers.
   c. Size: minimum 18”W X 6”H X 12”D with four mounting holes. Box will be provided to properly to accommodate number of circuits specified on drawings.
   d. Finish: fine-texture, scratch resistant, black-powder coating.
   e. Termination: barriered, screw clamp type terminal strip(s). Terminals to be sized for the circuit, according to the circuit amperage as required.
   f. Grounding: junction box will have grounding lugs.
   g. Up to two (2) GIJBs may be required per stage electric; reference circuit count per drawings.

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h. Overall assembly UL listed.
i. Provide Kellems-type grips for each multi-conductor cable entering the junction box.
j. Acceptable product:
1) Altman GJB series
2) ETC 8700 series
3) SSRC GB series

5. Distribution Raceway (R)
a. Provide a connector strip style connector device designed for mounting to pipe battens. Unit is to have a barrier strip for use in conjunction with control network distribution.
b. Construction: 16-gauge, cold-rolled steel with removable covers.
c. Size: approximately 4”X4” in section, provided in lengths as shown on TR drawings.
d. Finish: fine texture, scratch resistant, black powder coat.
e. Bracket: provide (1) steel hanging bracket for every five (5) feet of strip.
f. Pigtails: SO type cable, 18” in length with Heyco strain relief.
g. Connectors: female 20A stage-pin connectors on the end of each of the pigtails and flush mounted 20A parallel blade receptacles for convenience circuits
h. Circuits: number of circuits as specified on drawings with labels on both sides of connector strip.
i. Termination: circuits terminated at a barrier terminal strip in a terminal box located, as specified on drawings.
j. Overall assembly UL listed.
k. Quantity: As shown in drawings
l. Acceptable product:
1) Altman 450 series
2) ETC 9900 series
3) SSRC BAL series

6. SO Cable Cradles
a. Provide properly sized cable cradles for SO cable service from gridiron junction box to plug-strip connector device.
b. Acceptable product:
1) ETC 8800 Series
2) Altman 512 Series.

7. SO Cable Kellems-type Grips
a. Provide properly sized Kellems-type grips for SO cable service from gridiron junction box to plugstrip connector device.
b. Quantity: As required for the specified number of circuits
c. Acceptable product:
1) Hubbell or equivalent.

2.5 CONTROL EQUIPMENT

A. Control Distribution Rack (CDR)
1. The control distribution rack shall be an EIA compliant 19” wall mount rack.
2. Center section and back pan shall be 16 gauge steel, finished in a black textured powder coat.
3. Rack rails shall be constructed of 11 gauge steel with tapped 10-32 mounting holes in universal EIA spacing.
4. Rack height shall be sized to contain all equipment as shown in the contract documents.
5. Rack shall have an overall depth of 22.3.” Useable depth shall be 20,” extending into the back pan 3.5.”
6. Accessories:
a. Provide a Furman M-8Lx type pull out panel light in the rack.
b. Provide one (1) locking storage drawer and all necessary vent or blank panels.
7. The control distribution rack shall be provided by the Lighting Control System Manufacturer.
8. Quantity and details: As shown on drawings
9. Acceptable product:
a. Mid-Atlantic DWR series

B. UPS Backup Power / Surge Protection
1. Provide a rack mountable UPS backup to support equipment located in the control distribution racks (provide with one (1) spare battery).
2. Output Power Capacity: 1400VA/1050W
3. Input 120V/ Output 120V
4. Interface Port: DB-9 RS-232

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5. Extended runtime model
6. Rack Height: 2 Units
7. Filtering: Full time multi-pole noise - filtering: 0.3% IEEE surge let-through: zero clamping response time: meets UL 1449
8. The UPS shall be provided by the lighting control system manufacturer.
9. Quantity: As shown in drawings.
10. Acceptable product:
    a. APC
    b. Tripp Lite
    c. Middle Atlantic

C. Control Components
1. Ethernet Switches (ESW)
    a. Provide business grade Gigabit PoE+, Layer 2 managed Ethernet switches in the CDR as shown in the TL series documents.
    b. Switch shall include 24 POE+ ports meeting IEEE802.3at standard
    c. Switch shall include port routing via separate VLAN subnets
    d. Switch shall be equipped with LED indicators for power status, port status, bandwidth utilization, collision detection and speed indication.
    e. Switch shall have a built-in web-based management interface to provide easy to use management through a standard browser. Provide with all required software management tools.
    f. Provide rack mount kit and required hardware and cables for stacking.
    g. Each network location shall have a dedicated input point on the network switch. Dedicated input points shall be clearly labeled to identify connected network device at the patch panel. Patching shall not be required.
    h. Ethernet switch shall be tested and approved by Lighting Control System Manufacturer for compatibility with all connected devices.
    i. Quantity: As required by design
2. Network Node/Gateway
    a. Provide rack-mounted DMX Ethernet node/Gateway to generate DMX to devices located at theatrical and house architectural lighting positions
    b. Nodes shall have (4) screw terminal or 5-pin DMX connectors for a total of 4 DMX universes for distribution over the Ethernet system.
    c. DMX Node shall have LEDs for indication of power, network activity, and DMX port configuration.
    d. Each input shall route directly to the Ethernet Switch located in the assigned Dimmer Rooms without the need for patching.
    e. Quantity: As required by design.
    f. Acceptable product:
        1) Pathway rack-mounted gateway
        2) Vari-lite rack-mounted gateway
        3) ETC rack-mounted gateway
3. eDIN Demultiplexer Module:
    a. Provide a rack mounted DMX to 0-10v signal converter for house lighting as required. Reference Division 26 documents.
    b. Each architectural circuit shall have an independent output by the Demultiplexer; there shall be no daisy chain runs between circuits.
    c. Quantity: As required by Design.
    d. Acceptable product:
        1) Pathway Connectivity #1004 Demultiplexer (DMX-to-Analog)
        2) ETC Response 0-10V Gateway

D. Plates and Devices
1. Network Receptacle Station/Gateway (NET)
    a. Provide a remote plug-in station for connection of control console and portable DMX Gateways at control booth and other locations as noted in the drawings.
    b. Station shall be provided with a Neutrik RJ45 jack. Each jack shall be rated for use in harsh commercial conditions.
    c. Station will contain the following components:
        1) RJ 45 jack with punch down block, provide Neutrik EtherCon type receptacle as indicated on drawings.
        2) Station faceplates shall be .80” aluminum, finished in fine texture, scratch-resistant black powder coat.

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3) Station back box will be a minimum of 2.5 inches.
4) Station shall have silk screened graphics white in color.
5) Provide a Lamacoid label that de-notes, using an alpha-numeric labeling convention, the switch location and network port number.

d. These network connections shall also be configured with a back box and mounting hardware for mounting on the FOH lighting galleries or backstage.
e. Each Network jack will route directly to the Ethernet Switch located in the assigned Dimmer Rooms without the need for patching.
f. No daisy chaining between jacks or splicing of Category 5e and above cable is allowed.
g. Quantity: As shown in drawings.
h. Acceptable product:
1) Pathway Network station
2) Vari-lite station
3) SSRC station
4) ETC Network station

2. DMX512 Distribution Box/Network Gateway (NN2):
a. Provide a plug-in box designed for pipe mounting.
b. Node shall provide the quantity of universes, as specified, of DMX512 control for intelligent lighting or other DMX512 addressable devices.
c. Power for the node shall be provided over the Cat6 cable via the network switch. All nodes shall be IEEE 802.3af compliant and UL listed. Power consumption shall not be greater than 3 watts.
d. Ports:
1) DMX Ports shall comply with the requirements of the USITT DMX512.
2) The DMX port shall be software-configurable for either input or output.
3) DMX inputs shall be fully opto-isolated from the node electronics and from each other.
4) DMX outputs shall be earth-ground referenced.
5) DMX Ports shall be capable of withstanding fault voltages of up to 250VAC without damage.
e. Node modules will mount within a standard electrical box or enclosure.
f. Each input shall route directly to the Ethernet Switch located in the assigned Dimmer Rooms without the need for patching.
g. Quantity: As shown in drawings.
h. Acceptable product:
1) Pathway Connectivity Pathport Node
2) Vari-lite Node
3) ETC DMX Node

3. Portable Network Gateways:
a. Provide portable output nodes and input node for pipe mounting at any NET station.
b. Each node shall be equipped with a molded RJ 45 connector on a jacketed cable (see specification for flexible Category 6 cable) for connection to the lighting control network (NET).
c. Node shall provide the quantity of universes, as specified, of DMX512 control for intelligent lighting or other DMX512 addressable devices.
d. Power for the node shall be provided over the Category 6 cable via the network switch. All nodes shall be IEEE 802.3af compliant and UL listed. Power consumption shall not be greater than 3 watts.
e. Ports:
1) DMX Ports shall comply with the requirements of the USITT DMX512.
2) The two DMX ports shall be software-configurable for either input or output.
3) DMX inputs shall be fully opto-isolated from the node electronics and from each other.
4) DMX outputs shall be earth-ground referenced.
5) DMX Ports shall be capable of withstanding fault voltages of up to 250VAC without damage.
f. Double Universe Node shall contain the following components:
1) RJ 45 connector. Connector is to be RJ Lnxx model ENSAM315.
g. Provide C-clamp for pipe mounting.
h. Quantity: (4) Output Nodes and (2) Input Nodes
i. Acceptable product:
1) Pathway Connectivity Pathport Node

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2) Vari-lite Node
3) ETC Portable DMX Node

4. DMX512 Distribution (DMX):
   a. Provide DMX512 distribution for connection to wiring devices in the Classroom and Auditorium.
   b. Modules shall provide one optically isolated DMX512 signal output capable of driving thirty-two (32) receiving devices on a single DMX line.
   c. Provide a wall plugging box designed for surface mounting.
   d. Construction: code gauge steel.
   e. Connectors: Neutrik 5 conductor XLR, flush mounted.
   f. Circuits: located as shown on the drawings.
   g. Labeling: labeled with yellow letters on black background.
   h. Quantity: As shown in drawings.
   i. Acceptable product:
      1) Pathway Connectivity station
      2) Vari-lite station
      3) SSRC station
      4) ETC station
5. Control Receptacle Station (CR#)
   a. Provide a flush-mounted control station for connection of the control console over network.
      1) Provide with DMX receptacles as described on the drawings.
   b. Station will contain receptacle components as described on the drawings.
   c. Station faceplates shall be .80” aluminum, finished in fine texture, scratch resistant black powder coat.
   d. Station Back box will be a minimum of 2.5 inches deep
   e. Station shall have white, silk screened graphics
   f. Provide a Lamacoid label for network jacks that denotes, using alpha-numeric labelling convention, the switch location and network port number.
   g. Each network jack shall route directly to the Ethernet switch without the need for patching.
   h. No daisy-chaining between jacks or splicing on network cabling is allowed.
   i. Quantity: As shown in drawings.
   j. Acceptable product:
      1) Pathway Connectivity station
      2) Vari-lite station
      3) SSRC station
      4) ETC station

2.6 CONTROL CONSOLE AND ACCESSORIES

A. Overview
   1. Use the currently installed control console for direct operation of theatrical fixtures and development of user-presets to be stored for recall via the Architectural Control Sub-system specified in this section.
   2. Provide initial setup as directed as part of the system commissioning process.

B. Black Box Control Console
   1. The lighting control console shall be a microprocessor-based system specifically designed to provide complete control of stage, studio, and entertainment lighting systems.
   2. The system shall also be able to control third party ACN devices directly. The system shall provide control of 1,024 or 6,144 outputs on a maximum of 32,768 control channels.
   3. A maximum of 10,000 cues, 999 cue lists, 1000 groups, 1000 presets, 4 x 1000 palettes (Intensity, Focus, Color and Beam), 1000 effects, 1000 macros and 100 curves may be contained in non-volatile electronic memory and stored to an onboard hard disk or to any USB storage device.
   4. The console may be placed in Tracking or Cue Only mode by the user as a system default and overridden on individual record actions as required.
   5. A Master Playback fader pair and dedicated Grand Master/Blackout shall be provided.
   6. A high-resolution level wheel shall be provided to control intensity for selected channels and scrolling within selected displays. Four page-able high-resolution encoders shall be provided for control of other non-intensity parameters. Non-intensity parameters shall be controllable via the encoders or keypad controls, without need of an external pointing device.
   7. Control and programming features for automated fixtures shall also include: a standard library of fixture profiles, the ability to copy and edit existing profiles and create new profiles, patch displays including channel and output addressing, 16-bit fade resolution, color characterization allowing color mixing and storing in Hue and Saturation or native device values.

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8. The system shall direct user input through on-screen dynamic prompts and integral LEDs on console keys indicating current operating mode. A context sensitive on-line Help feature shall explain and provide an example of the operation of each feature of the system.
9. A row of softkeys shall be provided, which change function based on the selection and context of the console. These softkeys shall be labeled via an adjacent LCD display that shows their current functions at all times. Systems using softkeys with no LCD display shall not be acceptable.
10. Console software upgrades shall be made by the user via a USB port; changing internal components shall not be required.
11. The console operating software shall be loaded into program execution memory from the internal hard drive when the console is powered. In the event of an uncontrolled shutdown, the console shall return to its last output state when power is restored.
12. Console power shall be 95 – 240V AC at 50 or 60Hz, supplied via a detachable power cord.
13. Accessories:
    a. Provide (2) external touchscreens high resolution DVI monitors that will display system information, including playback status, live output and blind values for all record targets.
    b. Provide (1) fully-functioning, detachable alphanumeric keyboard. The keyboard shall allow labeling of channels, cues, presets, groups, palettes, effects, macros, curves and the show. An integral electronic keyboard shall be provided.
    c. Provide with dust cover
    d. Provide with USB mouse
    e. Provide with 25’ network control cable
    f. Provide (1) Littlite with 3-pin XLR connector
    g. Provide (1) USB jump drive, minimum 8gb
14. Quantity: (1)
15. Acceptable product:
    a. Electronic Theater Controls Element 2 with 6,144 channels of control

C. Auditorium Control Console
1. The lighting control console shall be a microprocessor-based system specifically designed to provide complete control of stage, studio, and entertainment lighting systems.
2. The system shall also be able to control third party ACN devices directly. The system shall provide control of 2,048 or 12,288 outputs on a maximum of 32,768 control channels.
3. A maximum of 10,000 cues, 999 cue lists, 1,000 groups, 1,000 presets, 4 x 1,000 palettes (Intensity, Focus, Color and Beam), 1,000 effects, 1,000 macros and 1,000 curves may be contained in non-volatile electronic memory and stored to an onboard hard disk or to any USB storage device.
4. The console may be placed in Tracking or Cue Only mode by the user as a system default and overridden on individual record actions as required.
5. A Master Playback fader pair and dedicated Grand Master/Blackout shall be provided.
6. Twenty user configurable playback faders shall be built into the console for additional preset, palette, submaster and grand master control.
7. Up to six USB fader wings may be connected to the console, for a maximum of 300 submasters and/or 200 playback faders. USB fader wings may be rigidly connected to the main console to provide a "single connected unit" with no external cables required. The wings also may be connected via USB cables and used "on the side."
8. A high-resolution level wheel shall be provided to control intensity for selected channels and scrolling within selected displays. Four page-able high-resolution encoders shall be provided for control of other non-intensity parameters. Non-intensity parameters shall be controllable via the encoders or keypad controls, without need of an external pointing device.
9. Rotary encoders for non-intensity parameters shall be labeled by means of an integral LCD display mounted above or below the encoders on the main console. The display shall show the currently loaded functions of the encoders based on the current selections. Systems using encoders with no LCD labeling shall not be acceptable.
10. Control and programming features for automated fixtures shall also include: a standard library of fixture profiles, the ability to copy and edit existing profiles and create new profiles, patch displays including channel and output addressing, 16-bit fade resolution, color characterization allowing color mixing and storing in Hue and Saturation or native device values.
11. The system shall direct user input through on-screen dynamic prompts and integral LEDs on console keys indicating current operating mode. A context sensitive on-line Help feature shall explain and provide an example of the operation of each feature of the system.
12. A row of softkeys shall be provided, which change function based on the selection and context of the console. These softkeys shall be labeled via an adjacent LCD display that shows their current functions at all times. Systems using softkeys with no LCD display shall not be acceptable.

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13. Console software upgrades shall be made by the user via a USB port; changing internal components shall not be required.
14. The console operating software shall be loaded into program execution memory from the internal hard drive when the console is powered. In the event of an uncontrolled shutdown, the console shall return to its last output state when power is restored.
15. Console power shall be 95 – 240V AC at 50 or 60Hz, supplied via a detachable power cord.
16. Accessories:
    a. Provide (2) external touch screen high resolution DisplayPort (DP) monitors that will display system information, including playback status, live output and blind values for all record targets.
    b. Provide (1) fully-functioning, detachable alphanumeric keyboard. The keyboard shall allow labeling of channels, cues, presets, groups, palettes, effects, macros, curves and the show. An integral electronic keyboard shall be provided.
    c. Provide console client software kit
    d. Provide with dust cover
    e. Provide with USB mouse
    f. Provide with 25’ network cable
    g. Provide (1) Littlite with 3-pin XLR connector
    h. Provide (1) USB jump drive, minimum 8gb
17. Quantity: (1)
18. Acceptable product:
    a. Electronic Theater Controls ION XE 20 with 2,048 channels of control.

D. Auditorium Handheld Remote Focus
1. The portable access unit shall be a wired or wireless remote-control device that allows access to console programming and playback functions.
2. The device shall be an 8-inch tablet with a capacitive multi-touch display.
3. Remote unit shall connect through an RJ45 and wirelessly via a WAP
4. Contractor shall provide WAP that meets District standards for WiFi function and security
5. Contractor shall provide the following accessories:
    a. Charging/cable Adaptor
    b. Hand Strap.
    c. Shoulder Strap
    d. EETI Stylus Pen
    e. Office Dock
    f. VESA Dock
6. Acceptable product:
    a. Electronic Theatre Controls ETCpad

2.7 ARCHITECTURAL CONTROL SYSTEM

A. Processing – Provide either a rack mounted control processor located in the control distribution rack or provide distributed processing at each control station.
1. The processing rack shall receive output data from a lighting control console and/or architectural control stations, process the information it receives and distribute the information to DMX-controlled panels and devices.
2. Processing Racks shall be designed to support the following wire terminations:
    a. AC (single phase)
    b. Echelon link power
    c. 24Vdc
    d. DMX512 In
    e. DMX512 Out
    f. RS232 Serial In/Out
    g. Net3 Unshielded Twisted Pair (UTP) or ST fiber optic
3. Coordinate integration of audio-visual system with contractor and program system as directed by the End User.

B. Configuration – Configure architectural control system screens in conjunction with User prior to commissioning. Base configuration shall accommodate the following basic layouts:
1. Main Navigation
2. User configurable named presets (2 pages to be programmed at training)
3. House light individual control
4. House light presets
5. Work light individual control
6. Work light presets

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7. Blue light individual control
8. Blue light presets

C. Stations - General
1. Master stations shall be located in the control booth, backstage and as noted on the contract documents.
2. Provide preset stations as described below and shown in drawings.
3. All audience exposed switches shall be provided with locking covers and shall be painted a custom color as determined by the architect.

D. Acceptable product:
1. Electronic Theatre Controls Paradigm System with Ern
   a. Provide with Response Snapback
2. Vari-lite Vision.net
3. Interactive Technologies CueServer3 Pro

E. House Lighting Fixture Control
1. Contractor shall be responsible for installation and termination of DMX and/or 0-10v to all architectural house light fixtures. It is the Contractor's responsibility to verify operation on ground before fixtures are permanently installed. Any required DMX and/or 0-10v controlled interface shall be provided by the Contractor including equipment parts, labor and installation of equipment.

F. Control Stations/Receptacles
1. House Light Master Station (HLM)
   a. Provide full color 7" LCD touchscreen master station.
   b. Station shall be wall mounted or rack mounted as shown on drawings
   c. Station finish shall be black in technical areas and color selected by Architect for public spaces.
   d. Station shall be configurable with system software via USB, serial data and Network interface
   e. Station shall have the ability to store multiple configurations with the User being able to select which is active.
   f. Station shall accommodate individual zone control, preset record and selection function.
   g. Station shall be able to lock out preset stations located in the facility.
   h. Master station shall have local control for each work light, house lights, running lights and other settings as required by the Owner.
   i. Quantity: As shown on the drawings.
   j. Acceptable product:
      1) Electronic Theatre Controls – Unison Paradigm touchscreen station
      2) Vari-lite – Vision.net touchscreen station
      3) Interactive Technologies – CueServer3 Pro Insite touchscreen station
2. SMP Rack Panel (SMP)
   a. Provide standard 19" panel to be mounted in SMP rack provided under 27 41 16
   b. Panel shall contain the following:
      1) House Light Master touchscreen station (HLM)
      2) (2) Neutrik RJ-45 network receptacle (NET)
      3) Network labels as required
      4) On/Off switch for Stage Edge Safety Light power supply
   c. Coordinate panel size and material type to match AV components in the SMP rack.
3. Portable House Light Master Station
   a. Provide a portable house light master station as specified above with a clam-type protective cover that also functions as a stand.
   b. Provide with 25' detachable connection cable.
   c. Quantity: (1)
   d. Acceptable product:
      1) Electronic Theatre Controls – Unison Paradigm handheld touchscreen
      2) Vari-lite – Vision.net portable touchscreen station
      3) Interactive Technologies – CueServer3 Pro Insite touchscreen station
4. Push Button Preset Stations (HL2)
   a. Provide two, five and ten push button stations as shown on drawings
   b. Stations shall be mounted within a one-gang back box
   c. Station finish shall be black in technical areas color selected by Architect for public spaces.
   d. Two button stations (HL2) shall be programmed for on/off operation with on button being a fully programmable preset

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e. Five button stations (HL5) shall have four programmable presets plus off. Presets may include house lights, work lights, blue lighting and will be programmed with the User.
f. Quantity: As shown on the drawings.
g. Acceptable product:
1) Electronic Theatre Control Unison Heritage
2) Vari-lite Vision.net
3) Interactive Technologies Ultra Stations

2.8 EMERGENCY LIGHTING EQUIPMENT

A. Emergency DMX Bypass Control (EDB)
1. Provide a bypass means to trigger special-purpose lighting presets and bypass normal lighting controls during emergency or panic situations
2. The Emergency DMX Bypass shall be capable of overriding a single universe of ANSI E1.11–2008, USITT DMX512-A control signals from “Normal” to “Bypass” when a trigger signal is detected.
3. The DMX Emergency Bypass Controller shall poll the bypass trigger input after a power loss and react upon start up.
4. The default or recorded sequence shall be recalled immediately on restart if the trigger is also applied at restart.
5. The Emergency DMX Bypass enclosure shall provide discrete high and low voltage wiring compartments with voltage barrier.
6. The Emergency DMX Bypass shall have a LED indicator visible from the exterior of the enclosure.
7. The Emergency DMX Bypass shall be UL Section 924 Listed for interaction with similarly listed products.
8. Quantity: As shown on drawings.
9. Acceptable product:
a. Electronic Theatre Controls DMX Emergency Bypass Controller
b. Vari-lite DMX Bypass

B. Phase Loss Monitor (PLM)
1. Provide a means to detect the loss of normal power and trigger special-purpose lighting presets.
2. Phase Loss Monitor enclosures shall support 100V to 277V configurations
3. E Phase Loss Monitor enclosures shall be field configurable for single-phase, bi-phase, and three-phase operation without the need for additional components.
4. The Phase Loss Monitor shall be completely pre-wired by the manufacturer. The contractor shall provide input feed and control wiring.
5. All control wire connections shall be terminated via factory provided connectors.
6. The Phase Loss Monitor shall be UL and Section 924 Listed for interaction with similarly listed dimming and switching panels.
7. Quantity: As shown on drawings.
8. Acceptable product:
a. ETC Emergency Bypass Detection Kit
b. Vari-lite Phase Loss Sense Panel

~~C. Emergency Lighting Transfer System (ELTS)~~
~~1. Provide an emergency lighting transfer system that shall switch dimmed and non-dimmed lights to emergency power if normal electricity fails;~~
~~2. The ELTS shall be enclosed in a NEMA-1 rated steel cabinet and shall be UL rated;~~
~~3. The ELTS shall accept fire and auxiliary open circuit signals for activation;~~
~~4. Provide with one (1) remote controlled key switch station located at the stage manager’s rack;~~
~~5. Quantity: As shown on drawings.~~
~~6. Acceptable product:~~
~~a. Electronic Theater Controls Emergency Lighting Transfer Switch~~
~~1) Model No. ELTS2-1-M-3P-6~~

2.9 MISCELLANEOUS

A. Stage Edge Safety Light
1. Lamp: SKL Square Krystal-Lite (waterproofed) on 6" spacing
2. Bulb Type: Red, white at the center
3. Housing: SC Channel; .41" profile, "U" channel for inlayed/surface design - field verify all dimensions.
4. Coordinate installation with Electrical.
5. Transformer: Provide appropriately sized transformer for custom length. Stage edge light to be controlled through the dimming system, provide any DMX interface as needed.

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6. Ensure control interconnectivity to orchestra pit as needed. Stage edge should switch between fixtures based on pit location automatically.
7. Overall assembly is to be UL listed.
8. Quantity: (1) As shown on drawings
9. Acceptable Product:
    a. Vista Light Strip (with SKL lamps)
    b. Future-Light Edge Light
    c. Tivoli Stage Edge

B. LED Stage Electric Work Lights
1. Provide a high output LED work light capable of clamping onto the top batten of the stage electrics.
2. Construction: Heavy duty anodized extruded aluminum housing. All materials shall be corrosion resistant.
3. Rating: 120/240 volts AC/DC operation.
4. Cable: 36” Teflon leads encased in black fiberglass sleeving.
5. Connectors: (1) male parallel blade
6. Yoke: Rigid flat steel with locking dog tilt handle.
7. Finish: All black enamel
8. Provide with yoke and c-clamp hardware
9. Quantity: (8)
10. Acceptable product:
    a. Altman LED Work Light
    b. SSRC LED Work Light, 150W Warm White

C. Rolling Safety Light
1. Provide castered stand with safety caged compact fluorescent 100 watt equivalent lamp.
2. Provide (1) 30’ 12/3 cable terminating in a 20A U-ground connector. Mount cable hanger to stand.
3. Quantity: (1) Custom Safety Light
4. Acceptable product(s):
    a. Altman 526/5-9 with listed accessories

2.10 PORTABLE LIGHTING FIXTURES AND ACCESSORIES

A. Provide and integrate the following equipment into the project.
1. Theatrical Lighting Fixtures
    a. The portable lighting fixtures shall connect and be controlled by the new theatrical lighting control system.
    b. All fixtures shall be listed by UL or an OSHA approved NRTL.
    c. Fixtures shall be constructed of rugged die cast aluminum with high impact knobs and handles unless otherwise noted.
    d. Fixtures shall be provided with a black finish unless otherwise noted.
    e. Fixtures shall have a rugged steel yoke with a positive locking clutch which will allow for a 300º body rotation.
    f. All fixtures shall be provided with color frame, power lead with mating grounded connector, safety cable, and c-clamp.
    g. Fixtures shall be:
        1) Labeled with the Owner’s mark and select numbering/labelling inventory scheme.
        2) Bench-focused, if necessary.
        3) Hung in the Owner’s selected stock plot.
        4) Patched at the console.

B. LED-type fixtures
1. Provide (1) power pass-through and (1) DMX extension cable at 10 ft. length for each LED-type fixture included in the inventory. All cables shall adhere to requirements set for below in Cables and Accessories portion of this specification.
2. All LED-type fixtures shall support ANSI E1.11 DMX512-A and ANSI E1.20 RDM standards.
3. All LEDs used in the product shall be high brightness and proven quality from established and reputable LED manufacturers.
4. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.

C. Fixtures – Type and Quantity
1. Type A1 – High Intensity Color-changing LED Profile
    a. Provide a six (6) color mixing high-intensity LED illuminator with DMX controlled intensity and color;
    b. Unit shall have a shutter assembly with (4) blades mounted in two or more planes. Shutter blades shall be warp and burnout resistant;

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c. Unit shall have two accessory slots, a top-mounted quick release gel frame retainer, and a slot with sliding cover for motorized pattern devices or optional iris.
d. Unit shall have projector-like quality pattern imaging, sharp shutter cuts without halation, and allow for both hard and soft beam edges;
e. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply;
f. Provide power lead with stage pin connector
g. Unit shall support power and DMX in and thru connections.
h. Provide the following quantity of high-definition lens tubes:
    1) (10) 14°;
    2) (12) 19°;
    3) (10) 26°;
i. Quantity: (32)
j. Acceptable product:
    1) ETC Source Four LED Series 2 Lustr (black) complete with EDLT lens tube
    2) VL600 Acclaim PLE+
    3) Chauvet Ovation Reve E-3

2. Type A2– Color-changing LED Profile - Auditorium
    a. Provide an RGBL color mixing high-intensity LED illuminator with DMX controlled intensity and color;
    b. Unit shall have a shutter assembly with (4) blades mounted in two or more planes. Shutter blades shall be warp and burnout resistant;
    c. Unit shall have two accessory slots, a top-mounted quick release gel frame retainer, and a slot with sliding cover for motorized pattern devices or optional iris.
    d. Unit shall have projector-like quality pattern imaging, sharp shutter cuts without halation, and allow for both hard and soft beam edges;
    e. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply;
    f. Provide power lead with stage-pin connector;
    g. Unit shall support power and DMX in and thru connections.
    h. Provide the following quantity of high-definition lens tubes:
        1) (08) 14°;
        2) (08) 19°;
        3) (08) 26°;
        4) (06) 36°;
    i. Quantity: (30)
    j. Acceptable product:
        1) ETC ColorSource Spot V complete with EDLT lens tube
        2) Vari-lite LED PLE

3. Type A3 – Color-changing LED Wash - Auditorium
    a. Provide an RGBL color mixing high-intensity LED illuminator with DMX-controlled intensity and color;
    b. Unit shall have an accessory slot with a top-mounted quick-release gel frame retainer.
    c. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply.
    d. Provide power lead with stage-pin connector;
    e. Unit shall support power and DMX in and thru connections.
    f. Provide (6) barn door assemblies and floor-stand yokes with base.
    g. Quantity (30)
    h. Acceptable product:
        1) ETC ColorSource Fresnel V
        2) Vari-lite Acclaim LED Fresnel
        3) Chauvet Ovation F-915FC

4. Type A4 – LED Cyclorama Fixture - Auditorium
    a. Provide a four (9) color mixing high-intensity LED illuminator with DMX controlled intensity and color;
    b. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply;
    c. Provide power lead with stage-pin connector;
    d. Unit shall support power and DMX in and thru connections;
    e. Provide trunnion with c-clamps hanging bracket mounting for each fixture if manufacturer does not provide yoke-mounting hardware;
    f. Acceptable product and quantity:

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1) Vari-lite CODA LED Cyc (9).
2) Altman Cyc 200 LED RGBA (9);
3) Chauvet Ovation CYC 3 FC (9).

5. Type A5 – LED Follow Spots - Auditorium
   a. Provide a 6000K cool white high-intensity LED illuminator with DMX controlled intensity.
   b. Construction: sheet metal housing with black finish. All materials will be corrosion resistant.
   c. Rating: Long life LED source
   d. High performance quartz condenser optical system.
   e. 100% closing iris with black plate follower in a removable cassette.
   f. Built in flicker free power supply.
   g. "A" size double gobo holder on slide changer.
   h. 6-way boomerang color changer fitted with removable filter frames.
      1) Provide the boomerang loaded with gels selected by Owner. These gels will be provided separately from any allotment of gels within this specification.
   i. Heavy duty adjustable yoke.
   j. Heavy duty stand
   k. Special hanging points at the rear of the unit.
   l. Set of tools and first emergency spare parts.
   m. Quantity: (2)
   n. Acceptable Products:
      1) Robert Juliat –Tristan
      2) Altman AFS-700

6. Type B1 – Color-changing LED Zoom-style Profile – Black Box
   a. Provide an RGBL color mixing high-intensity LED illuminator with DMX-controlled intensity and color;
   b. Unit shall have a shutter assembly with (4) blades mounted in two or more planes. Shutter blades shall be warp and burnout resistant;
   c. Unit shall have two accessory slots, a top-mounted quick-release gel frame retainer, and a slot with a sliding cover for motorized pattern devices or optional iris.
   d. Unit shall have projector-like quality pattern imaging, sharp shutter cuts without halation, and allow for both hard and soft beam edges;
   e. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply;
   f. Provide power lead with stage-pin connector;
   g. Unit shall support power and DMX in and thru connections;
   h. Unit shall utilize an integral 25º -50º adjustable lens assembly;
   i. Quantity: (22)
   j. Acceptable product:
      1) ETC ColorSource Spot jr Deep Blue
      2) Vari-lite Acclaim LED Zoomspot
      3) Chauvet Ovation E2-FC

7. Type B2 – Black Box Color-changing LED Wash – Black Box
   a. Provide an RGBL color mixing high-intensity LED illuminator with DMX controlled intensity and color;
   b. Unit shall have an accessory slot with a top-mounted quick release gel frame retainer.
   c. Unit shall operate at 100V to 240V 50/60 Hz and utilize an internal power supply.
   d. Provide power lead with stage-pin connector;
   e. Unit shall support power and DMX in and thru connections.
   f. Provide one (1) NSP, MFL, and WFL round field lens with each fixture.
   g. Quantity (18)
   h. Acceptable product:
      1) ETC ColorSource PAR Deep Blue
      2) Vari-lite Acclaim LED Fresnel
      3) Chauvet Ovation P-56FC

D. Cables and Accessories
   1. Extension Cables:
      a. Provide extension cables for extending pigtail or wall box circuits to lighting instrument.
      b. Provide cable and connectors which meet or exceed the quality of cables and connectors set forth in this specification.

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c. Provide each cable with Velcro cable tie.
d. Provide extension cable assemblies consisting of 12-gauge, 3 conductor flexible cable and 20A rated male and female grounded stage-pin connectors.
e. Quantity:
    1) Auditorium
        a) (16) @ 10 ft.
        b) (08) @ 25 ft.
    2) Black Box
        a) (08) @ 10 ft.
        b) (08) @ 25 ft.
f. Acceptable Products:
    1) Lex Products PowerFLEX
    2) TMB & Associates ProPower
    3) Or approved equal

2. Adapter Cables
a. Provide adapter cables for extending pigtail or wall box circuits to lighting instrument.
b. Provide cable and connectors which meet or exceed the quality of cables and connectors set forth in this specification.
c. Provide each cable with Velcro cable tie.
d. Provide extension cable assemblies consisting of 12-gauge, 3 conductor flexible cable and 20A rated male Edison connectors and female grounded twist-lock connectors.
e. Quantity:
    1) (6) @ 1ft. with Male Edison and female twist-lock connectors
    2) (6) @ 1ft. with Male twist-lock and female Edison connectors
f. Acceptable Products:
    1) TMB & Associates ProPower
    2) Lex Products PowerFLEX
    3) Or approved equal

3. DMX-512 cable
a. Provide DMX-512 cables for connecting lighting consoles, moving lights, or other DMX controlled accessories to the Network Nodes.
b. Connectors shall be Neutrik 5-pin.
c. Provide 24AWG two twisted pair data cable.
d. Insulation: polyethylene.
e. Nominal Impedance: 100 ohms.
f. Nominal Velocity of Prop.: 78%.
g. Capacitance between conductors: 12.5 pF/ft.
h. Quantity:
    1) Auditorium
        a) (16) @ 10 ft.
        b) (08) @ 25 ft.
    2) Black Box
        a) (08) @ 10 ft.
        b) (08) @ 25 ft.
i. Acceptable Products:
    1) TMB & Associates ProPlex
    2) Lex Products PowerFLEX
    3) Or approved equal

4. Flexible Category 5e Cable/NET Cable:
a. Provide extra rugged, flexible control cable (Ethernet) for connection of NET stations to portable Network Nodes.
b. Cable to be 4-pair, double shielded, low-capacitance.
c. Conductors: 24 AWG tinned, annealed copper stranded 7 x 0.16.
d. Connector: Provide with EtherCon connector by Neutrik
e. Assembly: pairs cabled with Kevlar strength member.
f. Shield: (inner) aluminum/Mylar, 100% coverage (outer) tinned copper braid, 80% coverage.
g. Conductivity: 15ohms per 100 meters @ 20C.
h. Impedance: 100 ±15 ohms 1-100 MHz
i. Quantity:
    1) Auditorium
        a) (4) 3’ Ethernet Cable
        b) (4) 10’ Ethernet Cable

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c) (2) 25' Ethernet Cable
2) Black Box
a) (4) 3' Ethernet Cable
b) (4) 10' Ethernet Cable
c) (2) 25' Ethernet Cable
j. Acceptable Products:
1) TMB & Associates ProPlex
2) Lex Products PowerFLEX
3) Or approved equal

5. XLR DMX Terminator
a. Provide XLR DMX male terminator
b. Connector shall be Neutrik 5-pin.
c. Termination resistance: 120 ohms +/- 1et5her0% between pins 2 and 3
d. Termination power capacity: 2 watts
e. Quantity: (18)
f. Acceptable Product
1) ETC SGE 1507
2) Lex Products DMX5P-TERM

6. Diffusion Medium Sheets
a. Provide standard and high temperature (HT) diffusion medium
b. Provide (24) full size sheets (20"x24") of HT diffusion medium
c. Acceptable product:
1) Rosco Color Filters R119 Light Hamburg Frost
2) Lee Color Filters 253 Hampshire Frost

7. Pattern Templates (Gobos)
a. Provide stainless steel image patterns.
b. Patterns shall be selected by the Owner
c. Quantity:
1) (8) size B
2) (8) size M
d. Acceptable product(s):
1) Rosco Stainless Steel Gobos

8. Pattern Template Holders
a. Provide stainless steel metal pattern holders with plastic pull ring
b. Quantity:
1) (8) size B
2) (8) size M
c. Acceptable product(s):
1) City Theatrical 2160 and 2165 sandwich holders
2) Electronic Theatre Controls 400PH-B and 400PH-M pattern holders

9. Side Arm Extensions
a. Provide side arms for extending the mounting point of theatrical fixtures beyond rigging pipes and handrails.
b. Side arm to consist of:
c. Hanging attachment for connection to 1.5" schedule 40 batten or handrail.
d. Pipe extension of 18"
e. One or more sliding tees for attaching theatrical fixtures to pipe extension
f. Color: black
g. Quantity: (18)
h. Acceptable product:
1) Altman Lighting 509-HD-24-1 Side Arm

10. Tie Line
a. Product will be a cotton line with polyester core
b. The blend will be a diamond braid construction
c. Product will be Black in color
d. Product will be unglazed
e. Product will be 1/8" in diameter
f. Product will be on original spool or reel
g. Provide 600'-0" spool
1) Cut into 24" ties for dressing cable used in repertory plot
2) Furnish the remainder of unused spool to Owner
h. Quantity: (2)

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i. Acceptable product:
1) Rose Brand #4 Tie Line

11. Light Trees:
a. Provide code rated parts to comprise a lighting tree.
b. Pipe and base will be furnished in black finish.
c. Provide six (8) light tree assemblies as follows:
d. Provide a 50lb. base NPT threaded to accept a typical 1-1/2" Schedule 40 pipe.
e. Provide a 10'-6" section of 1-1/2" Schedule 40 pipe (threaded on both ends) with plastic vinyl end cap.
f. Provide total three (3) – 18" sliding tee side arms for each tree.
g. Provide total three (3) – 35 pound sandbags for each tree.
h. Acceptable product:
1) Base: Altman B50.
2) Or approved equal

12. Side Arms:
a. Provide total of eighteen (24) – 18" sliding tee side arms (three) for each light tree.
b. Furnished in black finish.
c. Acceptable product:
1) Altman 18in. Sidearm with One Tee
2) Or approved equal

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate incorporation of the Work specified herein with other project work so as to facilitate a cohesive final product.
B. The installation recommendations contained within the Telecommunications Distribution Methods Manual are mandatory minimum standards and requirements.
C. Mount equipment and enclosures plumb and level.
D. Permanently installed equipment to be firmly and safely held in place.
E. Verify all locations of equipment in all rooms with Owner's Representative, Owner, and Consultant.

3.2 INSTALLATION OF CABLE AND WIRING

A. Verify installation of electrical work for this scope and all associated equipment with the overall Electrical installation. Provide all necessary equipment, including mounting hardware, for complete connection of power system wiring.
B. Verify installation of power and ground wiring to equipment. Power and ground wiring will terminate inside of equipment and/or junction boxes and be hardwired to ground buss and circuit breaker to ensure uninterrupted operation.
C. All control wiring will be executed in adherence to ANSI standards including the following:
1. Isolate cables carrying signals at different levels and separate to restrict interaction.
2. Keep wiring separated into three groups of conduit provided for control circuits, power circuits (up to 50 Amps), and feeder circuits (above 50 Amps).
3. Isolate all wiring, except for safety ground wiring, from conduit ground.
4. Take such precautions as are necessary to prevent and guard against electromagnetic and electrostatic interference in other technical systems (such as sound and communications systems) in the facility. Where possible all devices and wiring will be enclosed in a shielded environment. Take care not to use shields (conduits) and grounds as current carrying return paths for lamp and relay coil commons. All ground references are to be made to the building electrical system ground.
5. Label unused wiring provided for spares or future systems and terminate at screw terminal strips.
6. All joints and connections will be made with resin-core solder or with ratchet jaw crimp type mechanical connectors. Connect all circuits electrically in phase using same wire color code for similar circuits throughout the project.
7. Install cable in a manner to adhere to manufacturer's specifications for maximum cable pulling tension, minimum bend radius, and restrictions.
8. Provide appropriate support at all horizontal-to-vertical transitions in order to keep the weight of the cable from degrading at the point of transition.
9. If a J-hook or trapeze system is used to support cable bundles, all horizontal cables shall be supported at a maximum of 48-inch (1.2 meter) intervals. At no point shall the cables rest on light fixtures, acoustic ceiling grids, panels, conduits, sprinkler pipe, water pipe and/or HVAC system ducting.

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10. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices
11. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, install appropriate carriers to support the cabling.
12. Cables shall be identified by a self-adhesive machine label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606-A. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
13. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
14. Provide splice free wiring and cabling from origination to destination. Cables shall be installed in continuous lengths from origin to destination (no splices). Properly designed transition points, or consolidation points are not considered 'splice' points.
15. Cover edges of cable and wire pass-through holes in chassis, housings, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting.
16. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced prior to final acceptance at no cost to the Owner.

3.3 INSTALLATION OF EQUIPMENT

A. Take appropriate precautions against electrostatic discharge (ESD) when installing electronic equipment.
B. Equipment to be installed in new condition, free of damages, scratches, dents, etc.
C. Provide adequate ventilation in cabinet mounted equipment to maintain operating temperatures within range recommended by Manufacturer.
D. All equipment will be installed in compliance with applicable Local and National Codes and Regulations.
E. Equipment shall be installed in accordance with Manufacturer's requirements.
F. Install lighting fixtures using standard industry practices. All lamps, lenses, and reflectors will be installed free of dirt, dust, and finger smudges. Do not use bare hands when handling conventional tungsten lamps. Ensure that a safety cable is properly applied with each fixture.
G. Install lighting instruments to the standard house hang or repertory plot as directed by Consultant. Contractor shall document location of each type of distribution device and circuiting as part of as-built documents on plot. Provide pdf copy of plot to Consultant and Owner. Provide (2) full size printed copies of plot to Owner.

3.4 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the System ensure the following:
   1. Physical installation is complete.
   2. Products are installed in proper and safe manner according to Manufacturer's requirements.
   3. Dust, debris, solder splatter, etc. is removed.
   4. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
   5. Temporary facilities and utilities have been properly disconnected and removed.
   6. Broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. have been replaced or properly repaired, and debris cleaned up and discarded. The jobsite shall be broom clean.
B. Contractor shall:
   1. Retain the services of a Manufacturer certified technician to check the installation and ensure its proper operation. No part of the Theatrical Lighting System may be energized before this technician has checked and approved the System installation.
   2. Test all lighting load circuits for the following:
      a. Continuity
      b. Nominal voltage
      c. Polarity
      d. Accuracy to the Distribution Schedule as enumerated in the drawings.
   3. Test controls wiring for the following:
      a. Appropriate wire types and quantities
      b. Control wire distance from source
      c. Terminations meet Manufacturer requirements
C. The following identifies some, but not all, of the commissioning tasks of the commissioning team. This list is not intended to be comprehensive and should be considered a general guideline for the Contractor without a defined commissioning process statement:

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1. Program all power distribution panels
2. Setup and program all network control devices
3. Setup and initial programming of control console
4. Setup and initial programming for all architectural control devices
5. Program all emergency lighting control devices

3.5 FINAL OBSERVATION & TESTING

A. Upon completion of installation, initial adjustments, tests and measurements specified in Part 3, and submission and review of the results, a final inspection and test will be observed by the Consultant.

B. Testing will include operation of each major system and any other components deemed necessary. Contractor will assist in this testing and provide all test equipment noted below. Contractor shall provide at least two (2) technicians available for the entire testing period (day and night), to assist in tests, adjustments, and final modifications. Testing process is estimated to take a minimum of one (1) day.

C. Provide the following test gear:
1. Circuit Tester with adapters for all connectors present in the system.
2. Multimeter capable of measurements up to 600V AC/DC, 10A DC, and 2MOhms
3. DMX Tester
4. Industrial Ethernet Tool capable of testing signal continuity and distance from source

D. The following procedures will be performed on each System:
1. Observation of the physical installation including labeling, mounting, and finish of all equipment and components which are a part of the System.
2. Functional testing of all control devices and devices under control within the System.
3. Review of programming and standard settings for all control interface devices.
4. Load circuit verification.
5. Control circuit verification.
6. Other tests on equipment or systems deemed appropriate.

E. The Consultant will provide the Owner with a listing describing any incomplete or otherwise deficient items determined as part of the testing process. Where further adjustment or work becomes evident during testing, the Contractor is to continue work until the System is complete.

3.6 INSTRUCTION OF OWNER PERSONNEL

A. Provide operations and service training on all equipment incorporated in the System.

B. Training shall not be conducted until final observation and testing is completed by the Consultant, unless otherwise directed by the Owner.

C. Provide (12) hours of training. Training time shall be conducted in multiple sessions, with each session not to exceed four hours. Training shall be conducted in accordance with Owner's schedule.
1. Six months after completion of initial training, schedule an additional (4) hours with Owner for review of systems and equipment operation.

D. The major equipment components and subject matter are as follows (advisory percentage of overall time allocated):
1. Power Distribution System (20%)
   a. Basic testing and control
   b. Normal and emergency operations
   c. Programming memory
   d. Software configurations and upgrades
   e. Troubleshooting.
2. Control Console (40%)
   a. Operational training, including offline or remote-access software
   b. Patching and programming
   c. Fixture integration
   d. Peripheral hardware
   e. Applications interface for retrieving information from the control console
   f. Troubleshooting
   g. Upgrades
3. Architectural Controls (20%)
   a. Part of training will be to establish programmed looks for the performance areas with the end-user. The Contractor shall provide all equipment to establish DMX values for preset looks.
   b. Snapshotting preset onto DMX controller
   c. Preset recall operation
   d. Normal operations (e.g., console arbitration, time-clock controlled events, etc.)

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e. Troubleshooting.
4. Theatrical Lighting Fixtures and Accessories (20%)
a. Hang and focus
b. Cabling and circuiting
c. Setup and DMX addressing
d. Troubleshooting

E. Training Schedules
1. Training should be assumed to take place on the project site.
2. Training should be scheduled to be non-overlapping.
3. Actual training schedule shall be by agreement with Owner.
4. In the event that a portion of the training time is occupied in troubleshooting the equipment installation, then the training time shall be extended an equal amount of time.

F. Submit an outline of the course with sample instructional aides for approval thirty (30) days prior to scheduled instruction sessions to architect and architect's consultant.

G. Following discussions with Owner, provide a Training submittal 2-4 weeks prior to first training. Submittal shall:
1. Include a separate page/entry for every training session.
2. Indicate date, time, and approximate length of training session.
3. Indicate person(s) conducting training.
4. Indicate whether training will be video recorded.
5. Intended curriculum and most appropriate attendees (e.g., technician, operations, IT, etc.)
6. Include signature and title lines for:
a. Owner acknowledging and accepting training schedule. Include both an Accepted and Rejected box. An alternate schedule time should be suggested by the Owner in the event the schedule is rejected.
b. Countersigning by trainer indicating that training actually occurred.
c. All persons attending training. Where attendees do not stay for the entire session, this should be noted on the form and initialed by Owner's representative attending training.
d. Owner's representative attending training at the end of the session shall initial that:
1) Training Occurred.
2) Training Materials were provided and left with Owner
3) Training was not interrupted or shortened by equipment or system troubleshooting. If it is, then there should be a line where Owner and Contractor can indicate when make-up training will be provided and how long it should be.
4) Training was generally sufficient for the proposed curriculum.
7. Include Notes section for Owner and Contractor to note any issues during training (areas requiring further development, etc.)

H. Following training occurrence, submit completed training records no later than 5 days following end of training. When training is conducted over a period of weeks, completed training submittals shall be consolidated into a single submittal and submitted every 2 weeks.

3.7 EVENT ATTENDANCE

A. Contractor shall attend the first facility use or event as directed by the Owner.
1. Event Attendance includes the following requirements:
a. Attendance shall begin at the first crew call and conclude when the crew is released. During these events perform such tasks (e.g., assistance with patching, programming, troubleshooting cabling problems, etc.) as requested by User. Tasks shall be strictly assistance, not operation.
b. Event support personnel shall be a technician associated with the original installation and commissioning.
c. In the event that the system is used prior to final acceptance, attendance in support of system usage shall not be construed as acceptance or as event attendance.
2. Coordinate these schedules with the Owner.

END OF SECTION 11 61 62

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SECTION 23 24 26 - WATER-COOLED, ROTARY-SCREW WATER CHILLERS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

A ISO 9001 - Quality Management Systems — Requirements; 2015.

1.2 SYSTEM DESCRIPTION

A Microprocessor controlled water-cooled liquid chiller utilizing screw compressor(s) and electronic expansion valves.

1.3 QUALITY ASSURANCE

A Unit shall be rated in accordance with AHRI Standard 550/590 (U.S.A.), latest edition.

B Unit construction shall comply with ASHRAE 15 Safety Code, NEC, and ASME applicable codes (U.S.A. codes).

C Unit shall be manufactured in a facility registered to ISO 9001:2000 Manufacturing Quality Standard.

D 460-v, 60 Hz units shall be constructed in accordance with UL standards and shall be tested and listed by ETL, as conforming to those standards. Units shall carry the ETL labels.

1.4 DELIVERY, STORAGE, AND HANDLING

A Unit controls shall be capable of withstanding 150 F (65.5 C) storage temperatures in the control compartment.

B Chiller and starter should be stored indoors, protected from construction dirt and moisture. An inspection should be conducted under shipping tarps, bags, or crates to be sure water has not collected during transit. Protective shipping covers should be kept in place until machine is ready for installation. The inside of the protective cover should meet the following criteria:

C Temperature is between 40 F (4.4 C) and 120 F (48.9 C).

D Relative humidity is between 10% and 80% (non-condensing).

1.5 WARRANTY

A Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of chillers that fail in materials or workmanship within specified warranty period. Warranty indicated shall be independent of acceptance of Article 1.10 “FIVE YEAR MAINTENANCE AGREEMENT”.

1. Extended warranties include, but are not limited to, the following:
    a. The manufacturer shall provide a five year parts warranty for the entire compressor assembly. Include coverage for compressor casting, compressor motor, impellers, speed increasing gears, inlet guide vanes, bearings, shafts, motor alignment, gaskets and O-rings, suction elbow and discharge volute. Any refrigerant or at the shaft seal shall be repaired at no cost to the owner. The warranty shall commence at date of substantial completion.
    b. The manufacturer shall provide a five year parts and labor warranty for the complete chiller assembly including structural frame, compressor motor starter, compressor, compressor motor, speed increasing gears, purge (low pressure chillers), condenser and evaporator tube bundles and tubes, control panel, chiller controls and safeties, microprocessor boards, gauges, water boxes, refrigerant relief valves (medium and high pressure chillers), and rupture disks (low pressure chillers). The warranty shall commence at date of substantial completion.
    c. The manufacturer shall provide 5-year replacement refrigerant charge warranty.
2. Warranty Period: Five years from date of Substantial Completion.

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1.6 FIVE YEAR MAINTENANCE AGREEMENT

A The chiller manufacturer shall include a five-year maintenance agreement for each of the chillers, renewable at the owner's discretion for another five (5) years at the conclusion of the first five (5) year maintenance agreement subject to CPI price increases. If renewed by the owner for another five (5) years, the chiller manufacturer shall also include all warranties specified in Paragraph 1.09 above for the second 5-year period. The maintenance agreement shall include a minimum of one two (2) hour inspection per quarter each year for each of the chillers. The cost for all materials, parts, refrigerant, gaskets, O-rings, couplings, etc. for the five-year maintenance agreement shall be borne by the chiller manufacturer.

B Electrical System Check – Operational verification of relays, overload dashpot fluid level, starter contacts, tightening of power wiring, and megohmeter test of compressor motor (s), and overload calibration at each inspection.

C Machine Safety Control Check – Calibration of all unit safety control devices at each inspection.

D Purge Service – Pressurize the purge tank, test the solenoid valves to insure proper sealing, check purge tank sight glass and remove any water if present, lift the purge tank body from the base plate to visually inspect the purge tank coil and all internal parts and clean where necessary, inspect the tank drain valve and line to insure it is free of any debris, replace the tank gasket, and install new filter drier cores, put tank back in place, pressurize, and check for leaks at each inspection.

E Refrigerant Charge Service – The chiller shall be checked for proper refrigerant charge at each of the specified inspections. Refrigerant shall be added as required at no charge to the owner.

F Condenser Tube Service – A condenser heads shall be removed at one end of the chiller. The tubes and tube sheets shall be inspected for fouling and cleaned if required.

G Operator Log – A review of the operator's logs and the operator's experience with recent operation shall be done at each of the specified inspections to address any concerns.

H Unit Log – A log of all temperatures, pressures, amperage, and voltage shall be done at each of the specified inspections.

I The following items shall be done at each of the specified inspections while the chiller is operational:
1. Adjust operating and safety controls as required and record settings.
2. Complete operating log of temperatures, pressures, voltages, and amperages to determine unit-operating efficiency.
3. Check operation of purge system.
4. Check operation of control circuit.
5. Check operation of motor and motor starter.
6. Check customer's log with operator and discuss operation of each chiller in general.
7. An ASHRAE Guideline 3 Report shall be reviewed with the owner at each of the specified inspections by the manufacturer's field supervisor. The report shall be signed by the chiller manufacturer's field supervisor and a given to the owner for his records.
8. Refrigerant Analysis Service - An analysis of the refrigerant shall be performed annually measuring acid, moisture content, and to check for system contamination. The manufacturer's field supervisor shall make a review of the laboratory results and a written report shall be submitted.

J Chiller manufacturer shall provide "base line" eddy current tests for condenser tubes prior to shipment of chillers to jobsite, if chiller manufacture does not provide this test at the factory field perform at delivery of chillers to project site. Chiller manufacturer shall conduct eddy current tests as part of the maintenance agreement every two years and provide owner with a certified report of results, with recommendations. Each eddy current test shall be compared to original "base line" report.

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PART 2 PRODUCTS

2.1 GENERAL

A Factory assembled, single-piece, water-cooled liquid chiller. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (R-513A) and special features required prior to field start-up.

2.2 MANUFACTURERS

A Carrier Coporation

B Daikin McQuay

C York, a brand of Johnson Controls International

2.3 COMPRESSORS(S):

A Semi-hermetic twin-screw compressor(s) with internal muffler and check valve.

B Each compressor shall be equipped with a discharge shutoff valve.

C Sound Barriers:

1. Furnish removable and reusable sound-barrier covers over the compressor housing, hermetic motor, compressor suction and discharge piping, and condenser shell.
2. Provide for repeated installation and removal without use of tape or calk.
3. Inner and outer cover shall consist of a PTFE-impregnated fiberglass cloth enclosing heavy-density, needled fiberglass insulation material with a mass-loaded vinyl acoustic barrier.
4. Covers shall be double sewn and lock stitched with edges folded and sewn so no raw cut edges are exposed.
5. Form covers around control devices, gages, conduit, piping, and supports without degrading sound-barrier performance.
6. Continuously lap all exposed seams at least 2 inches for better sound containment.
7. Permanently label each section of cover to indicate its location, description, size, and number sequence.
8. Randomly place stainless-steel quilting pins to prevent covers from shifting and sagging.

2.4 EVAPORATOR

A Shall be tested and stamped in accordance with ASME Code (U.S.A.) for a refrigerant working-side pressure of 220 psig. Water-side pressure rating shall be 150 psig.

B Shall be mechanically cleanable shell-and-tube type with removable heads.

C Tubes shall be internally enhanced, seamless-copper type, and shall be rolled into tube sheets.

D Shall be equipped with victaulic fluid connections.

E Shell shall be insulated with 3/4-in. (19-mm) closed-cell, polyvinyl chloride foam with a maximum K factor of 0.28. Heads require field insulation.

F Shall have an evaporator drain and vent.

G Shall be equipped with factory-installed thermal dispersion chilled fluid flow switch.

2.5 INSULATION

A Material: Closed-cell, flexible elastomeric, thermal insulation complying with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

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B Thickness: Provide two (2) layers, 3/4 inch each. If the 2nd layer can not be provided at the factory, coordinate installation of additional layer of insulation with insulation contractor at no additional cost to owner.

C Adhesive: As recommended by insulation manufacturer and applied to 100 percent of insulation contact surface. Seal seams and joints.

D Factory-applied insulation over cold surfaces of chiller capable of forming condensation. Components shall include, but not be limited to, evaporator shell and end tube sheets, evaporator water boxes including nozzles, refrigerant suction pipe from evaporator to compressor, cold surfaces of compressor, refrigerant-cooled motor, and auxiliary piping.
1. Before insulating steel surfaces, prepare surfaces for paint, and prime and paint as indicated for other painted components. Do not insulate unpainted steel surfaces.
2. Seal seams and joints to provide a vapor barrier.
3. After adhesive has fully cured, paint exposed surfaces of insulation to match other painted parts.

2.6 CONDENSER

A Shall be tested and stamped in accordance with ASME code (U.S.A.) for a refrigerant working-side pressure of 220 psig. Water-side pressure rating shall be 150 psig.

B Shall be mechanically cleanable shell-and-tube type with removable heads.

C Tubes shall be internally enhanced, seamless-copper type, and shall be rolled into tube sheets.

D Shall be equipped with victaulic water connections.

2.7 REFRIGERATION OCMPONENTS

A Refrigerant circuit components shall include oil separator, high and low side pressure relief devices, discharge and liquid line shutoff valves, filter drier, moisture indicating sight glass, expansion valve, refrigerant economizer, and complete charge of compressor oil. The units shall have a complete operating charge of refrigerant HFC-134a.

2.8 CONTROLS

A Unit controls shall include the following minimum components:
1. Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
2. Separate terminal block for power and controls.
3. Separate 115-v power supply to serve all controllers, relays, and control components.
4. ON/OFF control switch.
5. Replaceable solid-state controllers.
6. Pressure sensors installed to measure suction, oil, economizer, and discharge pressure. Thermistors installed to measure evaporator entering and leaving fluid temperatures.

B Unit controls shall include the following functions:
1. Automatic circuit lead/lag.
2. Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature with temperature set point accuracy to 0.1° F (0.05° C).
3. Limiting the chilled fluid temperature pulldown rate at start-up to an adjustable range of 0.2° F to 2° F (0.1 to 1.1° C) per minute to prevent excessive demand spikes at start-up.
4. Seven-day time schedule.
5. Leaving chilled fluid temperature reset from return fluid.
6. Chilled water and condenser water pump start/stop control.
7. Condenser water block valve control for condenser water temperatures are below manufacture minimums.
8. Chiller control for parallel chiller applications without addition of hardware modules and control panels (requires thermistors).

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9. Single step demand limit control activated by remote contact closure.

2.9 SAFETIES

A Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:
1. Loss of refrigerant charge.
2. Reverse rotation.
3. Low chilled fluid temperature.
4. Motor overtemperature.
5. High pressure.
6. Electrical overload.
7. Loss of phase.
8. Loss of chilled water flow.

2.10 DIAGNOSTICS

A The control panel shall include, as standard, a display:
1. Touch screen display consisting of ¼ VGA LCD (liquid crystal display) with adjustable contrast and backlighting.
2. Display shall allow a user to navigate through menus, select desired options and modify data.

B Features of the display shall include:
1. Display shall be customizable and allow up to 72 data points.
2. Display shall support both local equipment or network made for remote mount.
3. Display shall allow access to configuration, maintenance, service, set point, time schedules, alarm history and status data.
4. Display shall have one button for chiller on/ off.
5. Display shall include three levels of password protection against unauthorized access to configuration and maintenance information, and display set up parameters.
6. Display shall allow for easy connection of a portable hand held technician tool to access information and upload and/or download chiller settings.
7. Display shall be compatible with the Carrier Comfort Network® (CCN) system and provide network alarm acknowledgement or indication and provide capability to fully monitor and control chiller.
8. Display alarms and parameters shall be capable of being displayed in full text.
9. Display shall be capable of displaying the last 50 alarms and will store a snapshot of a minimum of 20 status data parameters for each alarm.
10. Compressor run hours.
11. Compressor number of starts.
12. Compressor current.
13. Time of day:
    a. Display module, in conjunction with the microprocessor, must also be capable of displaying the output (results) of a service test. Service test shall verify operation of every switch, thermistor, and compressor before chiller is started.
    b. Diagnostics shall include the ability to review a list of the 30 most recent alarms with clear language descriptions of the alarm event. Display of alarm codes without the ability for clear language descriptions shall be prohibited.
    c. An alarm history buffer shall allow the user to store no less than 30 alarm events with clear language descriptions, time and date stamp event entry.
    d. The chiller controller shall include multiple connection ports for communicating with the local equipment network and the Carrier Comfort Network (CCN) system.
    e. The control system shall allow software upgrade without the need for new hardware modules.

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2.11 OPERATING CHARACTERISTICS

A Unit shall be capable of starting up with 95 F (35 C) entering fluid temperature to the evaporator.

2.12 ELECTRICAL REQUIREMENTS

A Unit primary electrical power supply shall enter the unit at a single location.

2.13 SPECIAL FEATURES

A Wye-Delta Starter: Unit shall have a factory-installed, wye-delta starter to minimize electrical inrush current.

B Control Power Transformer: Unit shall be supplied with a factory-installed controls transformer that will supply 115-v control circuit power from the main unit power supply.

C Minimum Load Control: Unit shall be equipped with factory-installed, microprocessor-controlled, minimum load control that shall permit unit operation down to 10% of full capacity.

D BACnet Translator Control: Unit shall be supplied with factory or field-installed interface between the chiller and a BACnet Local Area Network (LAN, i.e., MS/ TP EIA-485).

PART 3 EXECUTION

3.1 EXAMINATION

A Examine chillers before installation. Reject chillers that are damaged.

B Examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting chiller performance, maintenance, and operations before equipment installation.
1. Final chiller locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

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

3.2 CHILLER INSTALLATION

A Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases.

B Equipment Mounting:
1. Install chillers on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete."

C Maintain manufacturer's recommended clearances for service and maintenance.

D Install separate devices furnished by manufacturer and not factory installed.

3.3 CONNECTIONS

A Comply with requirements for piping specified in Section 23 21 13 "Hydronic Piping," Section 23 21 16 "Hydronic Piping Specialties," Drawings indicate general arrangement of piping, fittings, and specialties.

B Install piping adjacent to chiller to allow service and maintenance.

C Evaporator Fluid Connections: Connect to evaporator inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to evaporator outlet with shutoff valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, pressure differential sensor for minimum flow control and drain connection with valve. Make connections to chiller with a mechanical coupling.

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D Condenser Fluid Connections: Connect to condenser inlet with shutoff valve, strainer, flexible connector, thermometer, and plugged tee with pressure gage. Connect to condenser outlet with shutoff valve, flexible connector, flow switch, thermometer, plugged tee with shutoff valve and pressure gage, block valve and drain connection with valve. Make connections to chiller with a mechanical coupling.

E Connect each chiller drain connection with a union and drain pipe, and extend pipe, full size of connection, to floor drain. Provide a shutoff valve at each connection.

3.4 STARTUP SERVICE

A Engage a factory-authorized service representative to perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that refrigerant charge is sufficient and chiller has been leak tested.
3. Verify that pumps are installed and functional.
4. Verify that thermometers and gages are installed.
5. Operate chiller for run-in period.
6. Check bearing lubrication and oil levels.
7. For chillers installed indoors, verify that refrigerant pressure relief device is vented outdoors.
8. Verify proper motor rotation.
9. Verify static deflection of vibration isolators, including deflection during chiller startup and shutdown.
10. Verify and record performance of fluid flow and low-temperature interlocks for evaporator and condenser.
11. Verify and record performance of condenser water block valve for condenser water flow control.
12. Verify and record performance of chiller protection devices.
13. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

B Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assembly, installation, and connection.

C Prepare test and inspection startup reports.

3.5 DEMONSTRATION

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

END OF SECTION

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SECTION 23 64 23 - SCROLL WATER CHILLERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Air-cooled scroll water chillers.

1.2 RELATED REQUIREMENTS

A Section 03 30 00 - Cast-in-Place Concrete: Concrete housekeeping pads.

B Section 23 21 13 - Hydronic Piping.

C Section 23 21 14 - Hydronic Specialties.

D Section 25 35 19 - Integrated Automation Control Valves.

E Section 26 05 83 - Wiring Connections.

1.3 REFERENCE STANDARDS

A AHRI 550/590 (I-P) - Performance Rating of Water-Chilling and Heat Pump Water-Heating Packages Using the Vapor Compression Cycle; 2023.

B ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).

C ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks; 2020, with Errata and Amendments (2022).

D ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

E ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.

F NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

G UL 1995 - Heating and Cooling Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A See Section 01 30 00 - Administrative Requirements for submittal procedures.

B Product Data: Provide rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

C Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Indicate equipment, piping and connections, valves, strainers, and thermostatic valves required for complete system.

D Manufacturer's Certificate: Certify that components furnished but not produced by manufacturer meet or exceed manufacturer's requirements.

E Manufacturer's Performance Data: Indicate energy input versus cooling load output from 0 to 100 percent of full load at specified and minimum condenser water temperature for water-cooled chillers and at specified and minimum outdoor air temperature for air-cooled chillers.

F Manufacturer's Instructions: Submit manufacturer's complete installation instructions.

G Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

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1.5 DELIVERY, STORAGE, AND HANDLING

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

B Deliver units to the job site completely assembled and charged with refrigerant and oil by manufacturer.

1.6 WARRANTY

A See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B Manufacturer's Warranty: Provide minimum five year warranty to include coverage for materials and labor for compressor and complete assembly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A Carrier Corporation; _____: www.carrier.com/#sle.

B Daikin Applied Americas, Inc; _____: www.daikinapplied.com/#sle.

C York, a brand of Johnson Controls International, PLC; _____: www.york.com/#sle.

D Substitutions: See Section 01 60 00 - Product Requirements.
1. The chilled water system has been designed based on specific capacities and characteristics of equipment specified in this section and other sections.

2.2 SCROLL-WATER CHILLER PERFORMANCE REQUIREMENTS

A Packaged Air-Cooled Chiller:
1. Refrigerant: R-32
2. Evaporator:
   a. Fouling Factor: 0.00010 sq ft-hr-degrees F/Btu.
3. Packaged Air-Cooled Condenser:

2.3 AIR-COOLED, SCROLL WATER CHILLER

A Factory assembled and tested chiller consisting of compressor(s), compressor motor(s), evaporator, condenser, enclosure, refrigeration circuits(s) and specialties, interconnecting piping, starters, and microprocessor-based controls.
1. Rating: AHRI 550/590 (I-P).
2. Safety: UL 1995 and ASHRAE Std 15.
3. Construction and Testing: ASME BPVC-VIII-1 as applicable for construction type.
4. Enclosures:
   a. Frame: Heavy-gauge steel with hot-dipped galvanized or air-dried paint finish.
   b. Steel Cabinets: Factory apply baked on enamel or baked on powder paint finish.
   c. Perform 500-hour minimum salt spray test in accordance with ASTM B117.

B Hermetic Scroll Compressor:
1. Unit: Fully hermetic type with multiple, direct drive compressors with discharge and suction service valves.
2. Vibration Control: Factory installed internal isolators or field installed external isolators.
3. Oil Lubrication System: Initial oil charge, oil sump, heater, oil level, and sight glass.
4. Capacity Reduction System: Compressor staging with control down to 12 percent of full load without the activation of hot gas bypass.
5. Motor: 3600 or 3500 rpm, suction gas-cooled, with thermal or current overload protection.

C Evaporator:
1. Shell and tube type.
   a. Shell, removable heads and tube support sheets constructed of carbon steel.

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b. Tubes: Mechanically treated copper tubes fixed and aligned into intermediate tube support sheets across the shell to maintain consistent spacing between tubes.
c. Working Pressure Rating, Refrigerant Side: 400 psi minimum.
d. Working Pressure Rating, Water Side: 150 psi minimum.
e. End Connections: Provide with flanged or grooved connections.
f. Cold Surfaces Insulation.
1) Insulation is factory or field installed on shell, connections, and suction piping.
2) 0.75 inches minimum thick, closed cell, expanded polyvinyl chloride, polyurethane, or vinyl nitrate polymer insulation with a maximum K factor of 0.28.
g. Provide factory installed vents and water drain connections on evaporator or piping.
h. Provide factory or field installed fittings for temperature control sensors on evaporator or piping.
i. Freeze Protection for Outdoor Locations: Provide thermostatically controlled electric heater to protect from freezing at ambient temperatures down to minus 20 degrees F.

D Air-Cooled Condenser, Finned-Tube Type:
1. Finned-Tube Type:
a. Mechanically bond aluminum fins to copper tubing and protect with corrosion resistant materials or coatings.
b. Microchannel aluminum with immersion bath-applied chemical treatment coasting
c. Clean, dehydrate and test.
d. Leak Test: 650 psi minimum.
2. Coil Guards: Provide corrosion proof, louvered panels or grilles, factory installed. Protect condenser coil by enclosing with heavy plastic to prevent damage during shipping or rigging.
3. Fans and Motors:
a. Fans: Dynamically balance propeller, shrouded-axial, or airfoil type fans of reinforced polymer or glass fiber reinforced composite corrosion resistant construction equipped with sealed, permanently lubricated ball bearings.
b. Discharge Fan Guards: Corrosion resistant, heavy gauge, steel wire.
c. Discharge Direction: Vertical.
d. Motors: Direct drive, totally enclosed for outdoor use with current overload protection.

E Refrigerant Circuits:
1. Provide multiple independent refrigeration circuits with one or multiple compressor(s) per circuit.
2. Provide liquid line shut-off valve, filter-drier, expansion valve, and refrigerant relief device for each independent circuit.

F Controls Package:
1. Unit Controls: Factory-supplied DDC:
a. Control-panel mounted with required input-output expansions, power supply, fused disconnect, hand switches, knobs, and accessories required to control chiller unit to manufacturer required sequences to meet intended use with listed performance.
b. Factory configured to interface prewired sensors, switches, and safeties with allowance to add up to four chiller valves and flow sensors.
c. Graphic-based touchscreen to include unit operation controls and user filter based interface for faults, alarms, performance, unit diagnostics, and data recording up to 12 months.
d. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135 BACnet MS/TP.
e. External Point Mapping: Provide mapping table for each parameter included in the local visual interface with software-toggle flag to allow reduced mapping of available points.
f. Isolation Valves: Field-installed, 2-position, butterfly type with position tracking; see Section 25 35 19.
2. Prewire, assemble, factory mount, and test operating and safety control system consisting of a digital display or gauges, on-auto-off switch, motor starters, disconnect switches, power and control wiring. Provide controls, monitoring, programmable setpoints, alarms, and BAS as defined below:
a. Automatic Adjustable Operating Controls:

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1) Temperature of chilled water leaving chiller.
2) Chiller system capacity control based on setpoints and system load.
3) Compressor short-cycling prevention.
4) Lead/lag for multiple compressors.
5) Automatic reset on power source failure.
6) Load limiting.

b. Normal Operation Monitoring and Open Coverless Displays:
1) Hours of operation.
2) Suction and discharge refrigerant pressures.
3) Automatic diagnostics.
4) Number of starts.
5) On/off compressor status.
6) Entering and leaving chilled water temperatures.
7) Status of operation.
8) Condenser water entering and leaving temperatures.
9) Weekly purge cycle totalization if applicable.
10) Oil pressure.

c. Setpoints:
1) Leaving chilled water temperature.
2) Date/time.

d. Automatic Chiller Shut-Down Safety Controls and Alarm:
1) Automatic Reset:
(a) Chilled water flow interlock.
(b) Voltage protection; over and under.
(c) Phase reversal protection.
2) Manual Reset:
(a) Evaporator low pressure.
(b) High motor winding temperature.
(c) Low chilled water temperature.
(d) Low chilled water flow.
(e) High condenser refrigerant discharge pressure.
(f) Motor current overload and phase loss.
(g) Low oil flow.
3) Remote Alarm: Activate remote, audible bell upon safety shutdown of chiller.

e. Points for Remote Monitoring and Control:
1) Minimum Data Transmission to BAS:
(a) All system operating conditions.
(b) Capacity control information.
(c) Safety shutdown conditions.
2) Minimum Operating Commands from BAS:
(a) Remote unit start/stop.
(b) Remote chilled water reset.

G Electrical:
1. Compliance: NEMA EN 10250 or UL 1995 as applicable.

PART 3 EXECUTION

3.1 INSTALLATION

A Install in accordance with manufacturer's instructions.

B Align chiller package on steel or concrete foundations.

C Install units on vibration isolators.

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D Connect to electrical service.

E Connect to chilled water piping.

F Arrange piping for easy dismantling to permit tube cleaning and removal.

END OF SECTION

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SECTION 27 41 16 – INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY
- A. Integrated Audio-Video Systems and Equipment as part of the Work.

1.2 RELATED DOCUMENTS
- A. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this section.
- B. Reference the Project Manual for related specification sections.
- C. Reference the Project Drawings for additional information.

1.3 SECTION INCLUDES
- A. Project instructions for the Contractor and System description details
- B. System product description
- C. Project completion instructions for the Contractor

1.4 RESPONSIBILITY
- A. Responsibilities include, but are not limited to, the following items:
  1. Provide materials, equipment, transportation, and labor necessary for a fully working, tested, and calibrated system. Supply accessories and minor equipment items (such as, but not limited to, power strips, adapters, connectors, mounting hardware, etc.) needed for a complete system, even if not specifically mentioned in these Specifications. Notify the Architect of any discrepancies in part numbers or quantities before bid. Failing to provide such notification, supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.
  2. Specifications and drawings are complementary. Work called for by one is binding as if called for by both. Any discrepancies between specifications and drawings shall be brought to the attention of the Architect for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of their failure to have brought said discrepancies to the attention of the Architect.
  3. Execute work in accordance with the National Electrical Code (NEC), the National Electrical Safety Code, the Occupational Safety and Health Act (OSHA), applicable State and Local codes, ordinances, regulations, authority having jurisdiction (AHJ), and manufacturer's recommendations. If a conflict develops between the contract documents and the appropriate codes and is reported to the Architect prior to bid opening, the Architect will prepare the necessary clarification. Where a conflict is reported after contract award, propose a resolution of the conflict and, upon approval, perform Work.
  4. Required licenses, insurance and permits including payment of charges and fees
  5. Verification of dimensions and conditions at the job site.
  6. Coordinate location and installation of equipment with other building elements.
  7. Preparation of submittal information
  8. Pick-up of Owner Furnished Equipment (OFE) and incorporation into project if applicable.
  9. Development and implementation of control system software code and control panel layouts, which will become the property of the Owner
  10. Final tests and adjustments, written report, and documentation
  11. Instruction of operating personnel
  12. Provision of manuals
  13. Maintenance services and warranty.

1.5 REFERENCES
- A. Published specification standards, tests or recommended methods of trade, industry or governmental organizations apply to Work in this section where cited below:
  1. American National Safety Institute (ANSI)
  2. American Society of Testing and Materials (ASTM)
  3. Electronics Industries Association (EIA)
  4. Federal Communications Commission (FCC)
  5. National Electrical Manufacturer's Association (NEMA)
  6. National Electrical Code (NEC)
  7. Underwriters Laboratories (UL)

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8. Occupational Safety and Health Administration (OSHA)
9. Society of Motion Picture and Television Engineers (SMPTE)
10. Building Industry Consulting Service International (BICSI)
11. Davis and Davis, Sound System Engineering (3rd Edition) (SSE), Howard W. Sams, 2006
12. Giddings, Audio System Design and Installation (ASDI), Howard W. Sams, 2013
13. AV Installation Handbook Second Edition: The Best Practices for Quality Audiovisual Systems, Infocomm (AVIH), 2009

1.6 DEFINITIONS

A. In addition to those Definitions of Division1, the following list of terms as used in this specification shall be defined as follows:
1. Furnish - To purchase, procure, acquire, and deliver complete with related accessories.
2. Install – To set in place, join, attach, link, set up or otherwise connect together and test until complete before turning over to the Owner, all parts, items, or equipment supplied by Contractor.
3. Provide – To furnish and install.

1.7 DESCRIPTIONS & REQUIREMENTS

A. The following is intended to further describe the Work and clarify design intent and is not an exhaustive description of the systems.

B. Auditorium
1. Existing System
a. Remove existing audio visual system whenever necessary **to complete scope of this project**.
b. Palletize and turn over to Owner any and all removed equipment.
c. Existing sound system to be reinstalled in same manner and condition, with the exception of items being replaced in this scope.
2. Mixing System
a. Provide a digital mixing system at the main control position for productions.
3. Audio Sources
a. Provide wireless microphone system installed in the front-of-house position.
4. AV Presentation System
a. Provide a motorized projection screen
b. Provide a laser projector
c. Provide a video switch and digital video transport for video paths
d. Provide HDMI input at the Stage Manager’s Rack
e. Provide Wireless Presentation System at Stage Manager Rack
f. Provide Touch Panel Control System at Stage Manager’s Rack
g. Control of the AV presentation system shall be simple and intuitive via touch panel. Provide the following controls
1) Projector power on and off functions with state feedback from projector
2) Video switch source selection with state feedback of video switch
3) Projection screen raise, lower and stop
5. Life Safety
a. Provide a contact closure from the life safety system.
b. System to mute upon contact closure and remain muted during the alarm.
c. System to continue previous operation when alarm has ended.

C. Black Box
1. Audio Sources
a. Provide a wireless microphone system.
b. Provide a rack mounted multi-media player for music playback.
c. Provide wired and wireless media connectivity.
d. Provide cabling and equipment accessories.
2. Mixing System
a. Provide a rack mounted digital mixer.
3. Processing and Amplification
a. Provide DSP amplification for room loudspeakers.
4. Loudspeakers
a. Provide loudspeakers with pipe-clamps for mounting to the pipe grid.
b. Provide cabling connections around the room for loudspeaker connections at the pipe grid and portable equipment rack at the floor.
5. Equipment Housing
a. Provide a portable equipment rack for housing mixer, amplifier, and playback equipment.

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6. Production Intercom
   a. Provide a wireless intercom system.
   b. Provide wireless belt packs and headsets.
   c. System to be housed in separate portable equipment rack.
7. Hearing Assist
   a. Provide a wireless, single channel radio frequency hearing assist system.
   b. System must operate on approved FCC frequencies.
   c. Provide enough portable receivers to meet current ADA standards including:
      1) Ear speakers
      2) Headsets
      3) Inductive coil loops

D. Theater Classroom
1. Audio Sources
   a. Provide a rack mounted multi-media player for music playback.
2. Mixing System
   a. Provide a rack mounted mixer.
3. Loudspeakers
   a. Provide wall mounted speakers at the front of the room.
4. Equipment Housing
   a. Provide a portable equipment rack for housing of rack mounted equipment.
5. Life Safety
   a. Provide a contact closure from the life safety system.
   b. System to mute upon contact closure and remain muted during the alarm.
   c. System to continue previous operation when alarm has ended.

E. Band/Orchestra/Mariachi
1. Audio Sources
   a. Provide microphones for recording.
   b. Provide a rack mounted multi-media recorder.
   c. Provide wired and wireless media connectivity.
   d. Provide cabling and equipment accessories.
2. Mixing System
   a. Provide a rack mounted mixer for control and routing of audio sources.
3. Processing and Amplification
   a. Provide DSP amplification for room loudspeakers.
4. Loudspeakers
   a. Provide wall mounted speakers at the front of the room for music playback.
   b. Provide floor mounted subwoofer.
5. Presentation System (**Band/Orchestra Only)**
   a. Provide a fixed wall-mounted projection screen for Band/Orchestra
   b. Provide a motorized projection screen for Mariachi
   c. Provide a wall-mounted projector.
   d. Provide wired HDMI input with audio at wall plate at teacher workstation
   e. Provide balanced wired audio connection to audio system
   f. Provide button panel style control system with rotary volume control
6. Equipment Housing
   a. Provide a portable equipment rack for housing of rack mounted equipment.
7. Life Safety
   a. Provide a contact closure from the life safety system.
   b. System to mute upon contact closure and remain muted during the alarm.
   c. System to continue previous operation when alarm has ended.

F. Choir
1. Audio Sources
   a. Provide wireless microphone system.
   b. Provide microphones for recording.
   c. Provide a rack mounted multi-media recorder.
   d. Provide wired and wireless media connectivity.
   e. Provide cabling and equipment accessories.
2. Mixing System
   a. Provide a rack mounted mixer for control and routing of audio sources.
3. Processing and Amplification
   a. Provide DSP amplification for room loudspeakers.
4. Loudspeakers

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a. Provide wall mounted speakers at the front of the room for music playback.
b. Provide floor mounted subwoofer.

5. Presentation System
   a. Provide a wall-mounted projection screen.
   b. Provide a wall-mounted projector.
   c. Provide wired HDMI input with audio at wall plate at teacher workstation
   d. Provide balanced wired audio connection to audio system
   e. Provide button panel style control system with rotary volume control
6. Equipment Housing
   a. Provide a **portable** ~~**permanent wall mounted equipment**~~ rack for housing of rack mounted equipment.
   b. ~~**Equipment rack to be located near the director for quick access to operable equipment**~~**.**
7. Life Safety
   a. Provide a contact closure from the life safety system.
   b. System to mute upon contact closure and remain muted during the alarm.
   c. System to continue previous operation when alarm has ended.

G. Ensemble/Shared Ensemble/Percussion
1. Audio Sources
   a. Provide a rack mounted multi-media player for music playback.
   b. Provide wired and wireless media connectivity.
   c. Provide a line input connection at the front of the room for Owner provided metronome.
   d. Provide cabling and equipment accessories.
2. Mixing System
   a. Provide a rack mounted mixer for control and routing of audio sources.
3. Processing and Amplification
   a. Provide DSP amplification for room loudspeakers.
4. Loudspeakers
   a. Provide wall mounted speakers at the front of the room for music playback.
5. Presentation System **(Percussion Only)**
   a. Provide a wall-mounted projection screen.
   b. Provide a wall-mounted projector.
   c. Provide wired HDMI input with audio at wall plate at teacher workstation
   d. Provide balanced wired audio connection to audio system
   e. Provide button panel style control system with rotary volume control
6. Equipment Housing
   a. Provide a portable equipment rack for housing of rack mounted equipment.
7. Life Safety
   a. Provide a contact closure from the life safety system.
   b. System to mute upon contact closure and remain muted during the alarm.
   c. System to continue previous operation when alarm has ended.

H. Aux Gym
1. Existing System
   a. Remove existing audio visual system **whenever necessary to complete the scope of this project**.
   b. Palletize and turn over to Owner any and all removed equipment.
2. Audio Sources
   a. Provide wired microphone connections at either end of the court.
   b. Provide line input connections located in wall plates on either side of the court.
   c. Provide wireless microphone system.
   d. Provide dynamic microphones.
   e. Provide wired and wireless media connectivity.
   f. Provide cabling and equipment accessories.
3. Processing and Amplification
   a. Provide a dedicated DSP to the space.
   b. Provide DSP amplification for room loudspeakers.
4. Loudspeakers
   a. Provide surface mounted loudspeakers distributed over seating area for audio coverage of the spectator seats.
   b. Provide surface mounted loudspeakers distributed over the court for audio coverage of the court.
5. Equipment Housing

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a. Provide a permanent wall mounted equipment rack for housing of rack mounted equipment.
b. Equipment rack to be located in adjacent storage room.

6. Control
   a. Provide a touch panel control system for system operation.
   b. Touch panel to be located behind a protective hinged door.
7. Hearing Assist
   a. Provide a wireless, single channel radio frequency hearing assist system. System must operate on approved FCC frequencies.
   b. Provide a remote mounted antenna to provide coverage of the audience area.
   c. System must operate on approved FCC frequencies.
   d. Provide enough portable receivers to meet current ADA standards including:
      1) Ear speakers
      2) Headsets
      3) Inductive coil loops
8. Life Safety
   a. Provide a contact closure from the life safety system.
   b. System to mute upon contact closure and remain muted during the alarm.
   c. System to continue previous operation when alarm has ended.

1.8 SUBMITTALS

A. Provide submittals in accordance with Conditions of the Contract and Division 1, Submittal Procedures section unless otherwise indicated.

B. Submittals shall contain sufficient information to describe the Work to be performed. Reviewed shop drawings are to be used for final coordination and construction.

C. Shop drawings must be original work produced by the Contractor responsible for performing the work defined in this specification. Scanning, photographic copying, materially copying, or any other reproducing the contents of the drawings or specifications contained within the Contract Documents will be marked as unacceptable and not reviewed for any content. No claim shall be made for delay, undue burden, or additional costs for the effort to produce shop drawings, schedules, and equipment lists addressing this specification or the overall project manual.

D. Supplementary submittal requirements:
   1. Provide the following in one electronic submission for review within thirty days of issuance of Notice to Proceed (NTP) and prior to commencement of Work:
      a. Complete schedule of submittals.
      b. Chronological schedule of Work in bar chart form.
      c. Product Data Sheets:
         1) Provide a complete table of contents with the following information:
         2) Project title.
         3) Submittal number. In the case of a resubmittal, use the original submittal number immediately followed by the suffix “R” immediately followed by a unique number and be numbered in consecutive order.
         4) Date of submission.
         5) Provide a list of and Manufacturer's data sheets on products to be incorporated with the Work. Arrange data sheets in the same order they appear in this specification. Where a data sheet shows more than one product, indicate the model being proposed with an arrow or other appropriate symbol.
         6) Submit manufacturer’s product literature for each type of firestop material to be used. Literature shall include documentation of UL classifications or approved third party testing. Manufacturer’s name and number for each part shall be included. Submit drawings of through penetrations, which include the system to be utilized for the firestopping application. Drawing shall indicate construction of wall or floor assembly; size, number and material of penetrating items; firestop system designation; required F-rating, T-rating and remarks.
         7) Upon Owners and/or Consultant’s request provide (3) three copies of the submittals. Bind submittal in titled three ring D style binders sized for 150 per cent of the material. Maximum size: three-inch spine. Use multiple volumes as required. Separate major grouping with labeled binder tabs.
         8) Submissions that do not follow the format and configuration described above will be returned without review.
      d. Shop Drawings:
         1) Functional Diagrams/Schematics:

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a) Detailed wiring diagrams showing interconnection of components and products, wiring and cabling diagrams depicting cable types and designators, and device designators for each system. Provide connector designations and terminal strip identification, along with color codes for cables connecting to these devices. Give each component a unique designator and use this designator consistently throughout the project.

2) Coordination Drawings:
   a) Prepare and submit a set of coordination drawings showing major elements, components, and devices of the audio and video system in relationship with other building components. Prepare drawings to an accurate scale of 1/8”=1’-0” or larger on suitable sized media.
   b) Prepare floor plans, reflected ceiling plans, elevations, sections, and details to conclusively coordinate and integrate all equipment. Indicate locations where space is limited, and where sequencing and coordination of installations is of importance to the efficient flow of the Work including but not necessarily limited to the following:
      (1) Equipment housings
      (2) Ceiling and wall mounted devices
      (3) Raceways
      (4) Cabling

e. Equipment: Location of equipment within racks, consoles, or on tables, with dimensions; wire routing and cabling within housings; AC power outlet and terminal strip locations.
f. Patch panel(s): Layouts and designation (labeling) strips, including color schemes.
g. Full fabrication details of any custom enclosures and millwork indicating size, material, finish and openings for equipment.
h. Structural rigging and mounting details:
   1) Loudspeaker rigging, suspension, and mounting detail drawings shall be signed and sealed by a professional engineer licensed to practice in the state in which the project is located. The signed and sealed drawings noted above to include the following:
      a) Analysis of all components in the load path and attachment method to building structure for suspended loudspeakers.
      b) Attachment method for mounting brackets at ceilings, walls, or other building features.
      c) Detail the product manufacturer, part numbers, and load capacity of the hardware fittings and materials selected for suspended or mounted loudspeakers.
      d) A copy of the design calculations.
      e) Secondary steel required for attachment to the building structure.
      f) Custom brackets, mounts, suspension grids or trusses, loudspeaker cabinet frames, or loudspeaker brackets.
      g) Loudspeaker brackets or mounts provided by the specific loudspeaker manufacturer being installed that do not include traceability data.
   2) Traceability data and/or ANSI standard compliance data for loudspeaker mounting brackets or rigging provided by the loudspeaker manufacturer.
   3) Risk analysis data as referenced in Part 3.2, F
   4) Stamping Engineer post-installation sign-off as described in Part 3.2, F
   5) Proof of ETCP certification for on-site rigging crew.
i. Projector, loudspeaker, camera mounting details, include hardware types and load capacity.
j. Fabricated Plates and Panels
   1) Provide complete drawings on custom fabricated plates or panels. Drawings shall include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.
k. Labeling
   1) Equipment and cabling labeling scheme. Include font sizes and styles, explanation of scheme, and designator schedule.
l. Schedules
   1) Wiring schedule showing source and destination of wiring and indicating which wiring is in conduit. Junction box schedule showing type of box, size, mounting and location. Include this information with remainder of wiring diagrams.
m. Control System Software

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1) Provide electronic copies of proposed control system user interfaces within sixty (60) days of issuance of Notice to Proceed (NTP).

n. IP Addresses
1) Coordinated with the venue IT Administrator, provide a list of IP addresses, by device, used in the project.

o. Consultant's project documents in electronic format will not be supplied to the Contractor for their use as part of submittals.

p. Detail drawings executed at an appropriate scale, but not smaller than 1/8 inch = 1'–0".

q. Submissions that do not follow the format and configuration described above will be returned without review.

r. Any other pertinent data which is necessary to provide the Work.

2. Control System Software:
a. Provide electronic copies of proposed control system user interfaces within sixty (60) days of issuance of Notice to Proceed (NTP).

E. Resubmission requirements:
1. Make all requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate all changes that have been made other than those requested.

1.9 CONTRACT CLOSE-OUT DOCUMENTS:

A. Provide submittals in accordance with Conditions of the Contract and Division 1, Submittal Procedures section unless otherwise indicated, after substantial completion but prior to final observation:

B. Supplementary submittal requirements:
1. Provide the following in one electronic submission for review.
a. Equipment Manuals:
1) Manufacturer's owner/instruction manual for each type of Product by manufacturer and model or part number unless specified otherwise herein
2) Supply manufacturer's serial numbers for each Product
3) For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item
4) Separately bind list by manufacturer and model or part number of Products incorporated within the Work, arranged in alpha numeric order. When applicable, bind Manufacturer's warranty statements separately.

b. Test Reports: Recorded findings of Commissioning.

c. Signed copy of turn over equipment to Owner including quantity, make and model.

d. Copy of any program or hardware setup files.

e. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity.
1) This procedure should describe the operation of system capabilities.
2) Assume the intended reader of the manual to be technically inexperienced but unfamiliar with the components and the facility.

f. Provide Consultant with copy of Owner training video.

g. Service Information, including service phone number(s) and hours; service schedule; description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.

h. Any other pertinent data generated during the Project or required for future service.

i. Within three (3) weeks of final observation, submit the following in one electronic submission for review. Upon Owners and/or Consultant's request provide (3) three copies of the following:
1) Record drawings: Final rendition of Shop Drawings depicting what is actually incorporated within the Work.
2) Hardcopy full size set of Record drawings.
3) Three (3) compact disc or DVD's containing Record drawings in AutoCAD editable DWG format and Adobe PDF format. Resolution to be sufficient to permit Owner's technicians to be able to clearly read all notes and text on screen.
4) One set of signed proof-of-training documents.

2. Submittal Format:
a. Record Drawings: Drawings executed at an appropriate scale, but not smaller than 1/8 inch = 1'–0".

b. Segregate documents into separate binders containing data relevant to operational, maintenance, and warranty issues. Appropriately duplicate data within the separate

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bindings when it will reasonably clarify procedures, e.g., operational data in maintenance binding.

c. Bind Project Record Manual in titled three ring D style binders sized for 150 per cent of the material. Maximum size: three inch spine. Use multiple volumes as required. Separate major grouping with labeled binder tabs.

C. Resubmission requirements:
1. Make all requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate all changes that have been made other than those requested.

1.10 CUSTOM SOFTWARE

A. Introduction:
1. Proprietary software provided for the Technical Systems shall be subject to this software license between the Contractor and the Owner as an essential element of the system as defined in the system specification and associated documents, drawings and agreement.
2. Contractor shall agree that 3rd party proprietary software provided with the system shall be subject to this agreement.
3. Contractor and Owner agree that this software license is deemed to be part of, and subject to, the terms of the Agreement applicable to both parties; and shall supersede any standard manufacturer or Contractor's standard license agreement.
4. Proprietary software shall be defined to include, but not be limited to, device and system specific software and firmware designed to run on conventional computer based operating platforms as well as all micro-processor based hardware used to program, setup, or operate the system or its components.
5. For sake of this agreement, MS Windows® shall not be considered "proprietary" software, unless a non-public version of Windows® or any of its components are critical to the operation of the system in which case it shall be deemed proprietary.

B. License Grant and Ownership:
1. Contractor hereby grants to Owner a perpetual, non-exclusive, site license to all software for Customer's use in connection with the establishment, use, maintenance and modification of the system implemented by Contractor. Software shall mean executable object code of software programs and the patches, scripts, modifications, enhancements, designs, concepts or other materials that constitute the software programs necessary for the proper function and operation of the system as delivered by the Contractor and accepted by the Owner.
2. Except as expressly set forth in this agreement, Contractor shall at all times own all intellectual property rights in the software. Any and all licenses, product warranties or service contracts provided by third parties in connection with any software, hardware or other software or services provided in the system shall be delivered to Owner for the sole benefit of Owner.
3. Owner may supply to Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by Contractor. All such intellectual property shall remain the exclusive property of Owner and shall not be used by Contractor for any purposes other than those associated with delivery of the system.

C. Copies, Modifications, and Use:
1. Source code shall be available to Owner for a period of not less than 10 years.
2. Owner may make copies of the software for archival purposes and as required for modifications to the system. All copies and distribution of the software shall remain within the direct control of Owner and its representatives.
3. Owner may make modifications to the source code version of the software, if and only if the results of all such modifications are applied solely to the system. In no way does this Software License confer any right for Owner to license, sublicense, sell, or otherwise authorize the use of the software, whether in executable form, source code or otherwise, by any third parties.
4. All express or implied warranties relating to the software shall be deemed null and void in case of any modification to the software made by any party other than Contractor.

D. Warranties and Representations:
1. Contractor represents and warrants to Owner that:
a. It has all necessary rights and authority to execute and deliver this Software License and perform its obligations hereunder and to grant the rights granted under this Software License to Owner;
b. The goods and services provided by contractor under this Software License, including the software and all intellectual property provided hereunder, are original to Contractor or its subcontractors or partners; and

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c. The software, as delivered as part of the system, will not infringe or otherwise violate the rights of any third party, or violate any applicable law, rule or regulation.

2. Contractor further represents and warrants that, throughout the System Warranty Period, the executable object code of software and the system will perform substantially in accordance with the System Specifications and Agreement. If the software fails to perform as specified and accepted all remedies are pursuant to the policies set forth in the Specification and in the Agreement. No warranty of any type or nature is provided for the source code version of the software which is delivered as is.
3. Except as expressly stated in this Agreement, there are no warranties, express or implied, including, but not limited to, the implied warranties of fitness for a particular purpose, of merchantability, or warranty of no infringement of third party intellectual property rights.

1.11 QUALITY ASSURANCE

A. Qualifications: Contractor to be experienced in the provision of systems similar in complexity to those required for this project, and meet the requirements listed below. Provide documentation at the time of bid to support these qualifications:
   1. Form of corporation.
   2. No less than three years' experience with equipment and systems of the specified types.
   3. Experience with at least three comparable scale projects within the last three years.
   4. Be a franchised dealer and service facility for the manufacturer's products furnished.
   5. Maintain a fully staffed and equipped service facility with full-time field technicians.
   6. Have at least one supervisory on-site employee who has completed and has been certified CTS-I by Infocomm.
   7. Supervision of all rigging by an ETCP certified rigger for all work associated with suspension or mounting of overhead equipment.
   8. Adequate plant capacity and equipment to complete the Work.
   9. Adequate staff with commensurate technical experience.
   10. Suitable financial status (i.e., bonding and materials purchase capacity) to meet the obligations of the Work.
   11. Adequate regional service organization to meet warranty response requirements of the Project.
   12. Provide listing with appropriate explanation regarding the status of Contractor's resolved or unresolved legal disputes within the last six calendar years.
   13. Provide listing with appropriate explanation regarding any projects within the last 3 years where the Contractor has failed to meet construction schedules due to Contractor's cause.
   14. Completed current version of the AIA Contractor's Qualification Form.
B. Subcontractors: at the time of bid, the Contractor shall provide a list of structural, electrical, sound, or any other subcontractors intended to do the Work, or are being retained as local service providers throughout the warranty period. Subcontractors shall be appropriately state licensed in their specialty and must provide the same qualification documents as the Contractor.
C. Work: Perform Work in compliance with the applicable standards listed herein and governing codes and regulations of the authorities having jurisdiction and the Contract Documents.
   1. Drawings and specification requirements govern where they exceed Code and Regulation requirements.
   2. Where requirements between governing Codes and Regulations vary, the more restrictive provision applies.
   3. Nothing in the Contract Documents grants authority or permission to disregard or violate any legal requirements.
D. Coordinate exact location and installation of equipment, power, grounding, and raceway requirements with the Architect.

1.12 DELIVERY, STORAGE & HANDLING

A. Ship Products in its original container, to prevent damaging or entrance of foreign matter.
B. Handling and shipping in accordance with Manufacturer's recommendation.
C. Provide protective covering during construction of all installed devices, to prevent damaging or entrance of foreign matter.
D. Replace at no expense to Owner, Products damaged during storage, handling or the course of construction.

1.13 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify Architect in writing of discrepancies, conflicts, or omissions promptly upon discovery.

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B. The Drawings diagrammatically show cabling and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to Architect for approval, showing how the work may be installed.

1.14 WARRANTY

A. Warrant labor and equipment for one year following the date of substantial completion to be free of defects and deficiencies, and to conform to the drawings and specifications as to kind, quality, function, and characteristics. Repair or replace defects occurring in labor or equipment within the Warranty period without charge.
B. This warranty is in addition to any specific warranties issued by manufacturers for greater periods of time.
C. Within the warranty period, answer service calls within twenty four (24) hours during normal working hours and correct the deficiency within forty eight (48) hours.
D. Provide Owner with the name and telephone number of the person to call for service. This information to be part of Project Closeout Documents.
E. Thirty days prior to the end of the warranty period provide a complete checkout of all system components. Repair or replace any defective equipment discovered during the testing. Correct any defects in wiring or other functional problems reported by Owner. Warranty replacement and service of equipment shall not apply to Owner furnished equipment (OFE). Coordinate observation visit with the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Products quantity is as required. If a quantity is given, provide at least the given amount. Some product listed may not be required to fulfill the obligations of the Work.
B. Equipment and materials shall be new and conform to applicable UL or ANSI provisions.
C. Regardless of the length or completeness of the descriptive paragraph herein, provide Products complying with the specified manufacturer's published specifications.
D. Remove or blank out all manufacturers’ names, logos, or other symbols from loudspeakers or other objects placed in view of the public. If logos are removable, remove and repaint to the color of the adjacent surface and reattach.
E. Take care during installation to prevent scratches, dents, chips, etc.

2.2 ACCEPTABLE MANUFACTURERS

A. Model numbers and manufacturers included in this specification are listed as a standard of function, performance, and quality.
B. Refer to General and Supplementary Conditions and Division 1 Specification Sections for equipment substitution procedure.
C. If a specified product has been discontinued by a manufacturer, provide the replacement model (as certified by the manufacturer) at no additional cost.
D. Where required provide manufacturer’s rack mount adapter or one manufactured by Middle Atlantic or Winstead unless specified elsewhere.

2.3 MICROPHONES AND ACCESSORIES

A. Single Wireless Microphone System (WLRS, Type 1)
    1. Not specified.
B. Dual Wireless Microphone System (WRLS, Type 2)
    1. Receiver Type: Digital Wireless System with automatic switching diversity reception with XLR type audio output connectors.
    2. Indicators: LED signal strength meters for battery, RF and audio levels.
    3. Frequency: Coordinate with FCC and local requirements.
    4. Antennas: Rear mount passive antennas for the frequency spectrum chosen.
    5. 1-RU Rack mountable.
    6. Acceptable Product:
        a. Shure ULXD4D Diversity Receiver
C. Triple Wireless Microphone System (WRLS, Type 3)
    1. Not specified
D. Quad Wireless Microphone System (WRLS, Type 4)
    1. Receiver Type: Digital Wireless System with automatic switching diversity reception with XLR type audio output connectors.
    2. Indicators: LED signal strength meters for battery, RF and audio levels.
    3. Frequency: Coordinate with FCC and local requirements.

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4. Antennas: Rear mount passive antennas for the frequency spectrum chosen.
5. 1-RU Rack mountable.
6. Acceptable Product:
    a. Shure ULXD4Q Diversity Receiver

E. Multi-Channel Wireless Microphone System (WRLS, Type 5)
1. Receiver Type: Digital Wireless System with automatic switching diversity/quadversity reception with XLR type audio output connectors.
2. Indicators: LED signal strength meters for battery, RF and audio levels.
3. Frequency: Coordinate with FCC and local requirements.
4. Antennas: Rear mount passive antennas for the frequency spectrum chosen.
5. 1-RU Rack mountable.
6. Provide channel licensing for number of channels as shown in drawings.
7. Acceptable Product:
    a. Shure ANX4

F. Wireless Antenna (ANT-MA)
1. Directional antenna
2. Wide band
3. Provide any additional signal amplification recommended by manufacturer
4. Provide any additional mounting hardware as required
5. Acceptable Product:
    a. Shure UA874US
        1) Shure UA834 (as needed)
        2) Atlas MAC-1 (Coordinate finish with Architect)
        3) Atlas AD19# (Coordinate finish with Architect)

G. Bodypack Wireless Microphone (Type 1)
1. Theatrical headset/lapel mic
2. Acceptable Product:
    a. Shure ULXD1 Bodypack Transmitter
        1) Shure SB900B Lithium Ion Battery
        2) Shure UL4#-MTQG Headset Microphone (coordinate color with Owner)
        3) Shure MX153#/O-TQG (coordinate color with Owner)

H. Bodypack Wireless Microphone (Type 2)
1. Athletic headset/lapel mic
2. Acceptable Product:
    a. Shure ULXD1 Bodypack Transmitter
        1) Shure SB900B Lithium Ion Battery
        2) Shure UL4#-MTQG Headset Microphone (coordinate color with Owner)
        3) Shure SM31FH

I. Handheld Wireless Microphone (Type 1)
1. Beta 87A capsule
2. Acceptable Product:
    a. Shure ULXD2/B87A Handheld Transmitter
        1) Shure SB900B Lithium Ion Battery

J. Wireless Microphone Charge Base (Type 1)
1. 8 Port Wireless Microphone Charging Dock
2. Acceptable Product:
    a. Shure SBC800-US Battery Charger Base

K. Vocal Microphone: (Type 1)
1. Handheld dynamic cardioid pattern
2. Acceptable Product:
    a. Audix OM6
    b. Shure Beta58a
    c. Approved Equivalent

L. Instrument Microphone: (Type 1)
1. Dynamic cardioid pattern
2. Acceptable Product:
    a. Audix D4
    b. Shure Beta57a
    c. Approved Equivalent

M. Instrument Microphone: (Type 2)
1. Condenser cardioid pickup pattern
2. Acceptable Product:

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a. Audix f9
b. Shure SM81
c. Approved Equivalent

N. Suspended Microphone: (Type 1)
1. Phantom powered
2. Acceptable Product:
a. Audix ADX40 with CPSADXC cardioid capsule
b. Shure MX202B/C
c. Approved Equivalent

O. Microphone Switch (MIC SWITCH, Type 1)
1. Push to talk
2. Tabletop
3. Acceptable Product:
a. ProCo SAS2
b. Approved Equivalent

P. Microphone Stands and Mounting Hardware:
1. Acceptable Product:
a. TYPE 1: Round-base floor stands, Black
1) Atlas MS-10CE w / PB11XEB
2) Approved Equivalent
b. TYPE 2: Heavy Duty floor stand, Black
1) Atlas SB11WE
2) Approved Equivalent
c. TYPE 3: Boom Arm Short, Black
1) Atlas PB11XEB
2) Approved Equivalent
d. TYPE 4: Boom Arm Long, Black
1) AtlasPB21XEB
2) Approved Equivalent
e. TYPE 5: Tabletop stand, Black
1) Atlas SMS2B
2) **Approved Equivalent**

2.4 INPUT SOURCES

A. Media Player (MDP, Type 1):
1. Analog and outputs: RCA unbalanced.
2. 1-U Rack Mountable.
3. Bluetooth Receiver
4. USB & Aux input
5. Wireless Remote Control.
6. Acceptable Product:
a. Tascam CD-400U

B. Media Recorder (MDR, Type 1):
1. Analog inputs and outputs: RCA unbalanced, Balanced XLR
2. Digital input and output: S/PDIF, AES/EBU
3. Media Format: SD, USB, CD
4. File Formats: CD, MP3, WAV
5. Stereo Record and Playback
6. Ethernet connectivity
7. 1-U Rack Mountable.
8. Wireless remote control
9. Acceptable Product:
a. Tascam SS-CDR250N

C. Mono DI Box (Type 1):
1. Inputs for unbalanced line sources
2. Inputs shall be via ¼" receptacles
3. Line and mic level outputs
4. Ground lift switch
5. Acceptable Product:
a. Whirlwind DIRECTOR
b. Radial ProDI
c. Approved Equivalent

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D. Stereo DI Box (Type 1):
   1. Inputs for stereo/dual mono unbalanced line sources
   2. Inputs shall be via ¼", RCA, 3.5mm receptacles
   3. Line and mic level outputs
   4. Ground lift switch
   5. Acceptable Product:
      a. Whirlwind DIRECT2
      b. Radial ProAV2
      c. Approved Equivalent

E. Stereo Computer DI Box (Type 1):
   1. Inputs for stereo/dual mono unbalanced line sources
   2. Inputs shall be via ¼", RCA, 3.5mm receptacles
   3. Line and mic level outputs
   4. Ground lift switch
   5. Acceptable Product:
      a. Whirlwind PC-DI
         1) ProCo BPMBMB-3 3.5mm TRS Cable
      b. Radial JPC
         1) ProCo BPMBMB-3 3.5mm TRS Cable
      c. Approved Equivalent

F. Stereo Computer USB DI Box (Type 1)
   1. Inputs shall be via USB receptacle
   2. Mic level outputs
   3. Acceptable Product:
   4. Whirlwind PC-USB
      a. Radial USB-Pro
      b. Approved Equivalent

G. Line Input (LI, Type 1)
   1. Decora mounted
   2. Stereo RCA jacks
   3. Stereo 3.5mm jack
   4. Balanced stereo outputs
   5. Acceptable Product:
      a. RDL DS-CIJ3D

H. Bluetooth Receiver (BTRX, BTIO, Type 1)
   1. Input: Bluetooth
   2. Output: balanced analog audio.
   3. Provides long distance distribution of Bluetooth audio using Cat6 cable.
   4. Powered from receiver in rack.
   5. Does not support automatically pairing.
   6. Customizable Bluetooth name.
   7. Coordinate finish with Architect
   8. Acceptable Product to Include:
      a. RDL BT1A (BTRX)
      b. RDL TX-TPR2A (BTIO)

I. Bluetooth Receiver (BTRX, Type 2)
   1. Input: Bluetooth & Line level
   2. Output: Dante
   3. Provides long distance distribution of Bluetooth audio using Cat6 cable.
   4. Powered from receiver in rack.
   5. Does not support automatically pairing.
   6. Customizable Bluetooth name.
   7. Coordinate finish with Architect
   8. Acceptable Product:
      a. Q-Sys unD6IO-BT

2.5 MIXERS

A. Reinforcement Console (MIXER, Type 1):
   1. Digital audio mixing surface
   2. Customizable motorized faders
   3. Touch screen LCD
   4. Local Analog and Digital IO

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5. Digital Audio Network compatibility
6. Expansion Card Slots
7. Set virtual inputs/output labels to match connector labeling
8. Acceptable Product:
    a. Allen & Heath C3500

B. Stage Rack I/O (MIX IO, Type 1):
1. Analog and Digital I/O
2. 44.1kHz, 48kHz, 88.2kHz, 96kHz sampling
3. Digital Audio Network compatibility
4. Expandable IO
5. Recessed Rack Mounted
6. Acceptable Product:
    a. Allen & Heath CDM series
        1) Allen & Heath Dante 64x64

C. Portable I/O Expander (MIX IO, Type 2)
1. Portable digital audio expander.
2. 16 balanced inputs
3. 8 balanced outputs
4. Acceptable Product:
    a. Allen & Heath DX168

D. Mixer (MIXER, Type 2):
1. 16 input digital rackmount mixer
2. 8 outputs
3. 32 channels
4. USB audio input/output.
5. Rack Mountable.
6. Acceptable Product:
    a. Allen & Heath Qu-5
        1) Allen & Heath Qu-5 rackmount kit

E. Mixer (MIXER, Type 3)
1. 2 mic/5 stereo line inputs with alt. inputs
2. 3 stereo zone outputs
3. Rack Mountable.
4. Acceptable product:
    a. Tascam MZ-223

F. Mixer (MIXER, Type 4):
1. Dante connectivity
2. 16 input digital rackmount mixer
3. 8 outputs
4. 32 channels
5. USB audio input/output.
6. Rack Mountable.
7. Acceptable Product:
    a. Allen & Heath Qu-5D
        1) Allen & Heath Qu-5 rackmount kit

2.6 DIGITAL SIGNAL PROCESSORS

A. Digital Signal Processing System (DSP)
1. Provide independent DSP processing for each system as detailed on the AV drawings.
2. The DSP system and control software shall be operational 30 days prior to the first use of the installed system.
3. Function: Provide all signal processing and control required for the system(s). Devices required include, but are not limited to; mixer, matrix router, crossover, high and low pass filters, delay, compression, 6-band parametric equalizer, limiter, ducker, signal delay, and external control.
4. Unit to be configured with a minimum quantity of inputs and outputs as shown within the AV drawings, including control port requirements.
5. Signal flow and routing to be fully user configurable.
6. Unit to permit hardwire connection of external switches for recalling presets.
7. Unit to permit remote networked control via dedicated devices.
8. Access to external user-adjustable controls shall be restricted.
9. Manufacturer Software:
    a. Provide 12 months of on-site software upgrades from date of final acceptance.

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10. DSP Software Setup:
    a. Provide site specific configuration and programming for the DSP software.
    b. Coordinate user interface, software functionality, and menu screens with Architect's Consultant. Reference submittal requirements.
    c. Provide ongoing software upgrades and maintenance for 12 months from date of final acceptance.
    d. Reference Part 3.4 System Programing in this specification for additional programming details.
11. Where DSP and Amplifiers are used in the same system, use processing and amplification products of the same platform.

B. Digital Signal Processor (DSP, Type 1)
1. Acceptable Product:
    a. QSC Q-Sys Core 110f
        1) QSC QIO-GP8x8 (DSP-GPIO)
    b. QSC Q-Sys Core 24F

C. Digital Signal Processor Input/Output Expander (DSP IO, Type 1)
1. Acceptable Product:
    a. QSC QIO-ML4i
    b. QSC QIO ML2x2
    c. QSC QIO L4o

2.7 POWER AMPLIFIERS

A. General:
1. Two, Four, or Eight channel power amplifier with the EIA standard RS-490 power rating at 1% THD into 70-volt constant voltage load or 8-ohm load as applicable.
2. Provide protection of circuit components in the event of input over-drive, output overload, or short circuits.
3. Frequency response: ±1 dB, 20 Hz to 20 kHz with less than 1 per cent THD at rated output.
4. Input impedance: 10k ohm balanced.
5. Output regulation: 2 dB from no load to full load conditions.
6. Noise generation: at least 85 dB below rated output with input shorted.

B. Acceptable products:
1. Type 1:
    a. LEA CONNECT 35xD
2. Type 2:
    a. QSC CX-Q 4K series
    b. LEA CONNECT 70xD

2.8 LOUDSPEAKERS

A. Speaker (Type 1)
1. Type: Surface mounted loudspeaker
2. Configuration: 12-inch coaxial two-way loudspeaker
3. Frequency Range: 55 Hz – 20 kHz
4. Power: 600W @ 8 ohms
5. Coverage: 90-degree conical
6. Acceptable Product:
    a. Renkus-Heinz CX121M
        1) Renkus-Heinz UBKT/CT121M

B. Speaker (Type 2)
1. Type: Surface mounted loudspeaker
2. Configuration: 12-inch two-way loudspeaker
3. Frequency Range: 60 Hz – 20 kHz
4. Power: 600W @ 8 ohms
5. Coverage: 90 x 40-degree
6. Acceptable Product:
    a. Renkus-Heinz CX121
        1) Renkus-Heinz UBRKT/CT121

C. Speaker (Type 3)
1. Type: Full-range 2-way loudspeaker
2. Configuration: 12-inch driver with 1-inch compression driver
3. Frequency Response: 82Hz – 18kHz
4. Power: 350 @ 8 ohms

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5. Coverage: 90 x 60 degrees
6. Acceptable Product:
    a. Electro-Voice EV EKX-12
        1) EKX-TCA pipe clamp/mount bracket
        2) Black Safety Cable

D. Speaker (Type 4)
1. Type: Floor-mounted subwoofer
2. Configuration: 12-inch LF driver
3. Frequency range: 40Hz – 120Hz
4. Power: 300W @ 8 Ohms
5. Acceptable Product:
    a. Renkus-Heinz C112S

E. Speaker (Type 5)
1. Type: High output loudspeaker
2. Configuration: 12-inch two-way
3. Frequency Range: 65 Hz – 20 kHz
4. Power: 600W @ 8 ohms
5. Coverage: 90 x 60 degree
6. Acceptable Product:
    a. ElectroVoice EVF-1122S/96
        1) ElectroVoice EVF-UB
    b. EAW MK2396i
        1) EAW UBKT

2.9 LOUDSPEAKER HARDWARE AND SUPPORT STRUCTURE

A. All rigging truss modules, slings and hardware to meet a minimum of one of the following standards.
1. ASME B30.26
2. ASME B30.9
3. OSHA 1910.184
4. OSHA 1926.251
5. UL 1480 31.3

B. Custom Loudspeaker Rigging
1. For indoor practice field speaker cluster.
2. Provide rigging drawings in accordance with Part 1 of this specification.
3. Coordinate all rigging attachments with structure.
4. Acceptable Manufacturer
    a. Polar Focus
    b. Adaptive Technologies

C. Shoulder Type Machinery Eye Bolts:
1. Forged Steel - Quenched and Tempered.
2. Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
3. Product to meet or exceed all the requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements.
4. Select size of product based working load limits required.
5. Acceptable Product:
    a. Crosby Group S-279 / M-279 Series

D. Forged Eye Nuts:
1. Forged Steel - Quenched and Tempered.
2. Tapped with standard UNC class 2 threads after galvanizing.
3. Product to meet or exceed all the requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements.
4. Select size of product based working load limits required.
5. Acceptable Product:
    a. Crosby Group G-400 Series

E. Anchor Shackles:
1. Forged - Quenched and Tempered, with alloy pin.
2. Working Load Limit permanently shown on every shackle.
3. Hot Dip galvanized or Self-Colored.
4. Product to meet the performance requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class1.
5. Select size of product based working load limits required.
6. Provide all screw pin type shackles with mouse wire.

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7. Acceptable Product:
    a. Crosby Group G-213 / S-213 Series Round Pin
    b. Crosby Group G-209 / S-209 Series Screw Pin

F. Turnbuckles:
1. Acceptable turnbuckle assembly combinations include: Eye and Eye, Jaw and Jaw, Jaw and Eye.
2. End fittings are Quenched and Tempered, bodies heat treated by normalizing.
3. Hot Dip galvanized.
4. Product to meet or exceed all the requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements.
5. Product to meet the performance requirements of Federal Specifications FF-T-791b, Type 1 Form 1 - CLASS 4, and ASTM F-1145.
6. Select size of product based working load limits required.
7. All end fittings to be moused to the body with mousing cable.
8. Acceptable Product:
    a. Crosby Group HG-226 Series, Eye and Eye
    b. Crosby Group HG-227 Series, Jaw and Eye
    c. Crosby Group HG-228 Series, Jaw and Jaw

G. Wire Rope:
1. Strands: 7 x 19 Utility Cable.
2. Type: Galvanized.
3. Select size of product based working load limits required.
4. Acceptable Manufacturer:
    a. Wire Rope Corporation of America (WRCA)

H. Wire Rope Thimble:
1. Product to meet the performance requirements of Federal Specification FF-T-276b Type II.
2. Hot Dip galvanized.
3. Select size of product based wire rope size required for suspended load.
4. Acceptable Product:
    a. Crosby Group G-411 Series

I. Wire Rope Sleeves:
1. Type: Copper Duplex.
2. Select size of product based wire rope size required for suspended load.
3. Acceptable Product:
    a. Wire Rope Corporation of America (WRCA) SW-740 Series

2.10 ASSISTIVE LISTENING

A. ALS Transmitter (ALT, Type 1):
1. Configuration: Single-channel.
2. Frequency: 216 MHz.
3. Audio Input: Balanced, mic or line level, 3-pin XLR.
4. Provide power supply.
5. Provide 1-RU rack mount bracket.
6. Remote mounted antenna (ANT-HA)
7. Acceptable Product:
    a. Listen Technologies LS-71-216
        1) Listen Technologies LA-124 for device/panel mounted antennas
    b. William Sound FM-558 Pro
        1) William Sound ANT 034 for device/panel mounted antennas

B. ALS Receiver (Type 1):
1. Configuration: Single channel.
2. Frequency: 216 MHz.
3. Frequency agile to adjust various systems.
4. Receivers to be frequency adjustable for use in all venues.
5. Include an individual price for owner to purchase additional receivers.
6. Acceptable Product:
    a. Listen LR-4200-216 Receiver
        1) Listen LA-401 Ear Speaker
        2) Listen LA-402 Headset
        3) Listen LA-430 Neck Loop
    b. William Sound FM-R38
        1) William Sound EAR 022
        2) William Sound HED 024

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3) William Sound NKL 001

2.11 PRODUCTION INTERCOM

A. Wireless Intercom Base (ICW, Type 1)
1. 2 channel
2. Rack mountable
3. 2-wire and 4-wire compatible
4. 2.4GHz frequency
5. Acceptable Product:
a. Clear Com BS210

B. Wireless Intercom Belt Unit (Type 1)
1. Acceptable Product:
a. Clear Com BP210
1) Clear Com CC-15-MD4 (mini DIN connector)
2) Clear Com BAT41 Battery

C. Wireless Intercom Charge Base (Type 1)
1. Acceptable Product:
a. Clear Com AC40A

2.12 PROJECTION SCREENS

A. Large Electric Projection Screen (PS, Type 1)
1. General: Provide manufacturer's standard units consisting of screen and other components as required for a complete installation.
2. Provide rigging and mounting hardware as required.
3. Comply with the following requirements for the viewing surface:
a. Tab tensioned screen
b. HD Progressive 1.3 surface material
c. 16:10 aspect ratio
d. Provide custom black drop
e. Screen size: Reference Projection Screen Schedule in AV drawings
4. Acceptable Product:
a. Da-Lite Tensioned Professional Electrol – Custom

B. Fixed Projection Screen (PS, Type 2)
1. General: Provide manufacturer's standard units consisting of screen and other components as required for a complete installation.
2. Provide rigging and mounting hardware as required.
3. Comply with the following requirements for the viewing surface:
a. HD Progressive 1.3 surface material
b. 16:10 aspect ratio
c. Screen size: Reference Projection Screen Schedule in AV drawings
4. Acceptable Product:
a. Da-Lite Da-Snap

C. Electric Projection Screen (PS, Type 3)
1. General: Provide manufacturer's standard units consisting of screen and other components as required for a complete installation.
2. Provide rigging and mounting hardware as required.
3. Comply with the following requirements for the viewing surface:
a. Tab tensioned screen
b. HD Progressive 1.3 surface material
c. 16:10 aspect ratio
d. Screen size: Reference Projection Screen Schedule in AV drawings
4. Acceptable Product:
a. Da-Lite Tensioned Cosmopolitan Series

2.13 VIDEO PROJECTORS

A. Video Projector (PROJ, Type 1)
1. 3 LCD laser light source
2. Brightness 16,000 ANSI lumens
3. Native resolution 1920x1200
4. Control Communication RS-232C
5. Field verify throw distance to determine the appropriate required lens
6. Coordinate color with architect

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7. Acceptable Product to include:
    a. Epson EB-PU2216 w/Chief VCTU, WMA2S, CMS003

B. Video Projector (PROJ, Type 2)
1. 3 LCD laser light source
2. Brightness 13,000 ANSI lumens
3. Native resolution 1920x1200
4. Control Communication RS-232C
5. Field verify throw distance to determine the appropriate required lens
6. Coordinate color with architect
7. Acceptable Product to include:
    a. Epson EB-PU2213 w/Chief VCTU

2.14 AV SOURCES

A. Wireless Presentation System (WPS, Type 1)
1. Wirelessly present content from laptops, smartphones, and tablet devices via built in Wi-Fi network capabilities or via an external Wi-Fi wireless network.
2. Present content from desktop or laptop computers via Miracast® screen mirroring technology or present content from Android™ and iOS® mobile devices with the AirMedia app.
3. Simultaneous display from up to 4 devices
4. HDMI output
5. Acceptable Product to include:
    a. Crestron Airmedia Receiver 3200-WF
    b. PW-2414WU

2.15 AUDIO ACCESSOIRES

A. Audio Amplifier (AUD, Type 1)
1. Convert Stereo IHF Levels to Stereo PRO
2. Independently Adjustable Gain
3. Acceptable Product to include:
    a. RDL ST-UBA2
    b. PS-24AS

2.16 VIDEO SWITCHERS

A. Video Switcher (VSW, Type 1)
1. Two HDMI Inputs
2. One DTP3 twisted pair output on RJ-45
3. Auto-switching between inputs
4. Supports 4K/60
5. HDCP 2.3 compliant
6. Acceptable Product:
    a. Extron DTP3 T 203 (60-1885-52)

2.17 TRANSMITTERS/RECEIVERS

A. DTP Transmitter (DTP-TX, Type 1)
1. Long Distance DTP Transmitter for HDMI - Decorator-Style Wallplate
2. Converts HDMI to CAT5e/6.
3. Transmits video with embedded audio, bidirectional RS-232 and IR, and Ethernet up to 330 feet (100 meters) over a shielded CATx cable
4. Supports video resolutions up to 4K
5. HDCP 2.3 compliant
6. Coordinate color with Architect
7. Acceptable Product:
    a. Extron DTP T HWP 4K 331 D (60-1421-52)
    b. Extron DTP T HWP 4K 331 D (60-1421-53)

B. DTP Receiver (DTP-RX, Type 1)
1. Long Distance DTP Receiver for HDMI
2. Converts CAT5e/6 to HDMI
3. Receives video with embedded audio, bidirectional RS-232 and IR, and Ethernet up to 330 feet (100 meters) over a shielded CATx cable
4. Supports video resolutions up to 4K
5. HDCP 2.3 compliant

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6. Acceptable Product:
    a. Extron DTP HDMI 4K 330 Rx (60-1331-13)

2.18 USER INTERFACES

A. Button Panel (BP, Type 1)
1. Fully configurable using Global Configurator Plus or Global Configurator Professional
2. Two bidirectional RS-232 ports
3. Two relays for controlling room functions
4. Acceptable Product to Include:
    a. Extron MLC Plus 100 (60-1469-03)
    b. Extron PI 115 60-1233-02 (POE Type 1)

B. Touch Panel (TP, Type 1)
1. Screen size: 7-inch diagonal
2. Capacitive touch surface
3. Resolution: 1024 x 600
4. PoE powered
5. Coordinate color with architect
6. Include Extron RM 5 (70-1137-02) when rack mounted
7. Acceptable Product to Include:
    a. Extron TLP Pro 725M (60-1563-XX)
    b. Extron PI 115 60-1233-02 (POE Type 1)
    c. Extron TLCA 1 (60-1748-10)
    d. Extron TLP Control Processor Upgrade (79-2577-01)

C. Touch Panel (TP, Type 2)
1. Screen size: 11.6-inch diagonal
2. Capacitive touch surface
3. Resolution: 1920 x 1200
4. PoE powered
5. Acceptable Product:
    a. QSC TSC-101w-G3

2.19 AV NETWORK HARDWARE

A. Network Switch (AVSW, Type 1)
1. Managed
2. Gigabit switch
3. PoE+
4. Streaming compatible
5. Acceptable Product:
    a. Netgear M4250 Series
    b. Pakedge SX Series
    c. Luxul AMS Series
    d. QSC NS Gen-2 Series
    e. Approved Equivalent

2.20 POWER SYSTEMS

A. Power Sequencing
1. Power Sequencing system to be operated via low voltage button contact closures from either push buttons located on panels local to the event space or via a contact closure from a relative control system (DSP, Control Processor, etc.)
2. Devices to be sequenced “ON” in order of audio signal flow. Devices and equipment to be shut down in reverse order from “ON” sequence. Example “ON” order starting with:
    a. Source devices. (Media Players, Pre-amplifiers, etc.)
    b. Processing devices (DSP, Mixers, Video Switchers, etc.)
    c. Output devices (Amplifiers, Powered Speakers, etc.)
3. Devices not to be sequenced and to remain on for status and monitoring purposes to include but not limited to:
    a. Network switches and components.
    b. Equipment housing ventilation systems.
    c. Control system equipment responsible for providing control of Remote Power Sequencing system.

B. Power Sequencer (SEQ, Type 1)
1. 6 step sequencing

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2. Low voltage contact closure
3. Configurable step delay
4. Acceptable Product:
    a. Middle Atlantic USC-6R

C. Power Sequencer (SEQ, Type 2)
1. Low voltage-controlled power sequencer
2. Rack mounted
3. 6 controlled outlets
4. 1 unswitched outlet
5. Acceptable Product:
    a. Middle Atlantic PDS-620R

D. Rack Power Distribution (RPD, Type 1)
1. Modular raceway power system.
2. Rack mountable vertical distribution.
3. Low voltage contact closures.
4. Coordinate wiring of high voltage components with electrical contractor.
5. Provide additional raceways if circuit count exceeds maximum raceway length
6. Coordinate wiring of high voltage components.
7. Acceptable Product:
    a. Middle Atlantic MPR-#A
        1) Middle Atlantic RLM-20A (Switched Module, as needed)
        2) Middle Atlantic RLM-30A (Switched Module, as needed)
        3) Middle Atlantic M-20A (Un-switched Module, as needed)

E. Rack Power Distribution (RPD, Type 2)
1. Rack mountable vertical distribution.
2. Used for additional outlets where needed.
3. Size strip to number of required outlets.
4. Acceptable Product:
    a. Middle Atlantic PDT Series
    b. Middle Atlantic PD Slim Series

F. Switched Power Distribution (SW POWER, Type 1)
1. Low voltage-controlled power distribution
2. Rack mounted
3. 3 controlled duplexes
4. 1 unswitched duplex
5. Acceptable Product:
    a. Middle Atlantic PDC-915R-6

G. Power Protection with Lights (POWER/LIGHT):
1. 20 Amp power system.
2. Eight switched AC outlets.
3. Acceptable Product:
    a. Furman Sound PL-PRO C
    b. Approved Equivalent

H. Rackmount Uninterruptible Power Supply (UPS)
1. Provide UPS systems to maintain power to all networking and processing equipment, including digital audio mixer systems and recording equipment.
2. UPS’s shall be on-line style with sufficient battery reserve to operate for 15 minutes. Size each UPS unit for 25% additional capacity.
3. Rack mountable.
4. Acceptable Product:
    a. Middle Atlantic Select Series UPS
    b. APC Smart-UPS

I. Free Standing Uninterruptible Power Supply
1. Provide UPS systems to maintain power to all networking and processing equipment, including control room equipment.
2. UPS’s shall be on-line style with sufficient battery reserve to operate for 15 minutes. Size each UPS unit for 25% additional capacity.
3. Free Standing
4. Acceptable Product:
    a. APC Back UPS PRO Series
    b. Approved Equivalent

J. Power Supplies:

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1. As required.

2.21 EQUIPMENT HOUSING AND ACCESSORIES

A. General
   1. Refer to drawings for equipment rack sizes and additional notes.

B. Portable Equipment Rack (Type 1)
   1. Size: 8RU front with 12RU Top
   2. Tapped 10-32 rack rails
   3. Acceptable Product:
      a. SKB 1SKB19-R1208

C. Portable Equipment Rack (Type 2)
   1. Rolling rack
   2. 8RU
   3. Acceptable Product:
      a. SKB 8U rSeries Rolling Rack

D. Rack Blanks (BLANK)
   1. Flanged, aluminum panel.
   2. Anodized finish.
   3. Acceptable product:
      a. Middle Atlantic BL series

E. Rack Vents (VENT)
   1. Flanged, aluminum panel.
   2. Anodized finish.
   3. Acceptable product:
      a. Atlantic VTP series

F. Cable Management
   1. Brush grommet panel
   2. Acceptable Product:
      a. Middle Atlantic BR series

G. Rack Drawers (DRAWER)
   1. Blank anodized finish
   2. Acceptable product:
      a. Middle Atlantic D series

H. Rack Mounted Sliding Shelf (SLIDE OUT SHELF)
   1. Finish: Black
   2. 1-RU rack mountable sizes.
   3. Acceptable product to include:
      a. Middle Atlantic SS

I. Equipment Rack Screws:
   1. Install rack mounted equipment with black 10-32 star post security screws with flat nylon washers.
   2. Quantity as required.
   3. Provide one spare bit located in a clear plastic bag attached to the inside of each equipment rack in plain view.
   4. Acceptable Product:
      a. Middle Atlantic HTX

2.22 PLATES AND PANELS

A. General
   1. Provide plates and panels and as described in Drawings. Engrave as shown on Drawings. Other Plates and Panels may be required to satisfy the requirements of the Work.
   2. Custom panels shall be 1/8-inch thick aluminum, standard EIA sizes, brushed, anodized finish unless otherwise noted. Brush in direction of aluminum grain only.
   3. Plate finish shall be coordinated with the Owner. Plastic plates are not acceptable.
   4. Panel, plate and label engraving shall be 1/8-inch block sans serif characters unless noted otherwise. On dark panels or pushbuttons, letters shall be white; on stainless steel or brushed natural aluminum pushbuttons, letters shall be black.

B. Custom and/or Engraved Panels:
   1. Custom panels constructed of 1/8 inch brushed aluminum
   2. Coordinate finishes with Architect
   3. Acceptable Manufacturers:
      a. EMG
      b. RCI Custom

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c. ProCo
d. Radial Engineering

2.23 CONNECTORS

A. XLR Panel mount Connectors
1. Provide panel mount XLR connectors with unified metal shell.
2. RF-Protector connectors.
3. Shell Color: Black.
4. Contacts: Silver.
5. Terminations: Solder.
6. Acceptable Product:
a. Male Connectors: Neutrik NC*MD-L-1-BAG Series
b. Female Connectors: Neutrik NC*FD-L-1-BAG Series

B. XLR Cable Connectors
1. Provide XLR cable connectors with die cast shell.
2. No-screw type assembly.
3. Chuck-type strain relief.
4. Shell Color: Black.
5. Contacts: Silver.
6. Terminations: Solder.
7. Acceptable Product:
a. Male Connectors: Neutrik NC*MX-BAG Series
b. Female Connectors: Neutrik NC*FX-BAG Series

C. Speaker Connectors
1. Provide 4 or 8 conductor connector
2. Shell Color: Black
3. Terminations: Solder or tab
4. Acceptable Product:
a. Neutrik NL4MPXX
b. Neutrik NL8MPRXX

D. BNC Cable Connectors
1. Provide cable mount BNC connectors.
2. Contacts: Brass or copper.
3. Terminations: Crimp.
4. Acceptable Product:
a. Kings
b. Amp
c. Amphenol
d. Canare
e. Liberty

E. HDMI Connectors
1. Provide panel mount HDMI feedthrough connectors
2. HDMI 2.0 compliant
3. Acceptable Product:
a. Neutrik NAHDMI-W

F. Ethercon Panel Connectors
1. Provide panel mount Ethercon CAT6 connectors
2. Metal housing
3. Shielded
4. Acceptable Product:
a. Neutrik NE8FDP-B

2.24 LOOSE CABLES

A. Microphone/Instrument Cables:
1. Cable properties:
a. Quad 24 gauge stranded with braided shield, flexible hard service jacket.
b. Color: Black
c. Each cable to be provided with a Velcro style tie wrap.
1) Minimum 5/8” width
2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-inch diameter.
3) Standard of performance:

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a) Rip-Tie CABLEWRAP

2. Microphone Cable:
   a. Type 06 – 6 foot, with Gray collar on connector
   b. Type 25 – 25 foot, with Blue collar on connector
   c. Type 50 – 50 foot, with Green collar on connector
   d. Type 100 – 100 foot, with Red collar on connector
3. Instrument Cable
   a. Type 06 - 6 foot, 1/4-1/4
   b. Type 10 – 10 foot, 1/4-1/4
4. Acceptable cable:
   a. Whirlwind MKQ series
   b. Canare StarQuad
   c. ProCo AmeriQuad

B. Intercom Cables:
1. Cable properties:
2. Quad 24 gauge stranded with braided shield, flexible hard service jacket.
3. Color: Black
   a. Each cable to be provided with a Velcro style tie wrap.
   b. Minimum 5/8” width
   c. Length appropriate to wrap minimum 1.5 times around a cable loop of 14-inch diameter.
   d. Standard of performance:
      1) Rip-Tie CABLEWRAP
4. Intercom Cable:
   a. Type 06 – 6 foot, with Gray collar on connector
   b. Type 25 – 25 foot, with Blue collar on connector
   c. Type 50 – 50 foot, with Green collar on connector
   d. Type 100 – 100 foot, with Red collar on connector
5. Acceptable cable:
   a. Whirlwind MKQ series
   b. Canare StarQuad
   c. ProCo AmeriQuad

C. Speaker Cables:
1. Cable properties:
   a. Color: Black,
   b. Connector: NL4 to NL4 or NL8 to NL8
   c. Wire: 12 gauge stranded, SJ jacket.
   d. Each cable to be provided with a Velcro style tie wrap.
      1) Minimum 1” width
      2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-18 inch diameter.
      3) Standard of performance:
         a) Rip-Tie CABLEWRAP
2. Speaker Cable:
   a. Type 06 – 6 foot, with Gray collar on connector
   b. Type 25 – 25 foot, with Blue collar on connector
   c. Type 50 – 50 foot, with Green collar on connector
   d. Type 100 – 100 foot, with Red collar on connector
3. Acceptable cable:
   a. Whirlwind NL series
   b. Approved Equivalent

D. Paging Relay Cable:
1. Cable Properties:
a. Connector: NL2 to NL2
b. Wire: 16 gauge
2. Paging Relay Cable:
a. Type 06 – 6 foot
b. Type 25 – 25 foot
3. Acceptable cable:
a. Whirlwind NL series
b. Rapco Horizon
c. Approved Equivalent

E. Microphone Snake (Type 1):

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1. 6 Channel
2. Male to Female XLR connectors
3. Acceptable Product:
a. WhirlwindUSA MS-6-0-NR-075
b. Approved Equivalent

F. Ethernet Audio Cables:
1. Cable properties:
a. Color: Black
b. Neutrik Ethercon Connector
c. Rugged Tactical Jacket
d. Each cable to be provided with a Velcro style tie wrap.
1) Minimum 5/8” width
2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-inch diameter.
3) Standard of performance:
a) Rip-Tie CABLEWRAP
2. Ethernet Audio Cable:
a. Type 06 – 6 foot, with Gray collar on connector
b. Type 25 – 25 foot, with Blue collar on connector
c. Type 50 – 55 foot, with Green collar on connector
d. Type 100 – 100 foot, with Red collar on connector
3. Acceptable cable:
a. ProCo DuraCat
b. Approved Equivalent

G. Power Extension Cables:
1. Cable properties:
a. Color: Black
b. 12-gauge, 3 conductor, stranded, flexible hard service jacket.
c. Each cable to be provided with a Velcro style tie wrap.
1) Minimum 1” width
2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-18 inch diameter.
3) Standard of performance:
a) Rip-Tie CABLEWRAP
2. Power Extension Cable:
a. Type 12 – 12 foot,
b. Type 25 – 25 foot,
c. Type 50 – 50 foot,
d. Type 100 – 100 foot
3. Acceptable cable:
a. ProCo E-Cords series
b. Approved Equivalent

2.25 CABLES & WIRING

A. General
1. All electrical conductors installed under this contract, except where otherwise specified, shall be soft drawn annealed stranded copper having a conductivity of not less than 98% of pure copper, and meet appropriate ratings (e.g. CMR, CMP, etc.)
2. Cable shall carry appropriate fire rating (e.g. CMR, CMP, OFNR, OFNP, etc.) on jacket of cable.
3. Where cables are routed through cable tray, provide tray rated cable of equal specification.
4. Where speaker cables are run exposed through a return air plenum, provide plenum rated cable of equal specification.
5. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
6. The Belden cables listed below are approved for use on this project and are listed to set the acceptable standard of performance. If field conditions or actual cable pathway requires tray or plenum cable, provide version of cable that meets required rating. Cables from West Penn, Windy City Wire, Liberty, Commscope and Gepco are also acceptable provided they meet the performance specifications of the approved listed cables.

B. Microphone/Line Level Wire
1. Provide shielded 22 AWG cable.
2. Cable to be PVC jacketed.
3. Jacket color: black.

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4. Acceptable Product:
    a. Belden 9451

C. Production Intercom Wire
1. 18 AWG shielded
2. Cable capacitance to be less than 17 pF/ft
3. Acceptable Product:
    a. Belden 6340FT
    b. Belden 9207

D. Speaker Level Wire
1. For applications less than 300W and/or 300 feet
2. Provide 16 AWG cable.
3. Cable to be CL3R or CL2P rated.
4. Jacket color: gray.
5. Acceptable Product:
    a. Belden 5200UE

E. Speaker Level Wire
1. For applications less than 600W and/or 600 feet
2. Provide 14 AWG cable.
3. Cable to be CL3R or CL2P rated.
4. Jacket color: gray.
5. Acceptable Product:
    a. Belden 5100UE

F. Speaker Level Wire
1. For applications less than 2400W and/or 1000 feet
2. Provide 12 AWG cable.
3. Cable to be CL3R or CL2P rated.
4. Jacket color: gray.
5. Acceptable Product:
    a. Belden 5000UE

G. Speaker Level Wire
1. For applications more than 2400W and/or 1000 feet
2. Provide 10 AWG cable.
3. Cable to be CL3R or CL2P rated.
4. Acceptable Product:
    a. Belden 5T00UP

H. Category Cable
1. 23-gauge solid cable
2. Category 6+ Enhanced
3. 4 pair, UTP
4. Acceptable Product
    a. Belden 2412F

I. Shielded Twisted Pair Cable
1. 24-AWG solid copper cable inside an overall braid and foil shield
2. Meets performance requirements set by HDBaseT Alliance
3. Meets or exceeds manufactures requirements for video transport device

J. Relay/Control Level Wire
1. Provide unshielded 22 AWG cable.
2. Cable to be CMR or CMP rated.
3. Provide number of conductors where required.
4. Acceptable Product:
    a. Belden Cable

K. Wireless /Assisted Listening Antenna Cable
1. For applications less than 100 feet
2. 16-gauge, stranded center conductor
3. RG8/X
4. 95% braided shield
5. Acceptable Product:
    a. Belden 9258

L. Wireless /Assisted Listening Antenna Cable
1. For applications between 100 and 400 feet
2. 10-gauge, stranded center conductor
3. RG8/U

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4. 90% braided shield
5. Acceptable Product:
   a. Belden 9913

M. HDMI Cable
1. Provide pre-molded cables in lengths as required
2. Acceptable Product:
   a. Crestron® Certified HDMI® Interface Cable
   b. Extron Ultra Series HDMI Cable
   c. Comprehensive Microflex Pro AV/IT 18Gbps

2.26 MISCELLANEOUS

A. Cable Tray
1. Refer to AV drawings for size and lengths
2. Width: 18-inches
3. Powder coated steel
4. Follow manufacturers recommendation for ladder support
5. Acceptable Product:
   a. Middle Atlantic CL series
      1) Provide Middle Atlantic mounting hardware and connectors

B. Relay (RLY, Type 1):
1. Acceptable Product:
   a. RDL ST-LCR1

C. Headphones (Type 1):
1. Acceptable Product:
   a. Sony MDR-7506
   b. Shure SRH440
   c. Approved Equivalent

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate incorporation of the Work specified herein with other project work so as to facilitate a cohesive final Products.

B. The installation recommendations contained within ASDI and Telecommunications Distribution Methods Manual are mandatory minimum standards and requirements.

C. Mount equipment and enclosures plumb and level.

D. Permanently installed equipment to be firmly and safely held in place. Design equipment supports to support loads imposed with a safety factor of at least five. Seismic bracing shall be installed on appropriate equipment where local codes require such installation.

E. Verify all locations of equipment in all rooms with Owner's Representative, Owner, and Consultant.

3.2 INSTALLATION

A. Installation of cable and wiring
1. Cabling and Wiring:
   a. Install cable in a manner to adhere to manufacturer's specifications for maximum cable pulling tension, minimum bend radius, and restrictions.
   b. Provide appropriate support at all horizontal-to-vertical transitions in order to keep the weight of the cable from degrading at the point of transition.
   c. If a J-hook or trapeze system is used to support cable bundles, all horizontal cables shall be supported at a maximum of 48-inch (1.2 meter) intervals. At no point shall the cables rest on light fixtures, acoustic ceiling grids, panels, conduits, sprinkler pipe, water pipe and/or HVAC system ducting.
   d. Horizontal distribution cables shall be bundled in groups of no more than 50 cables when being supported by J-Hook or trapeze systems. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance. An exception to this rule is when cable is installed in cable tray systems.
   e. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices

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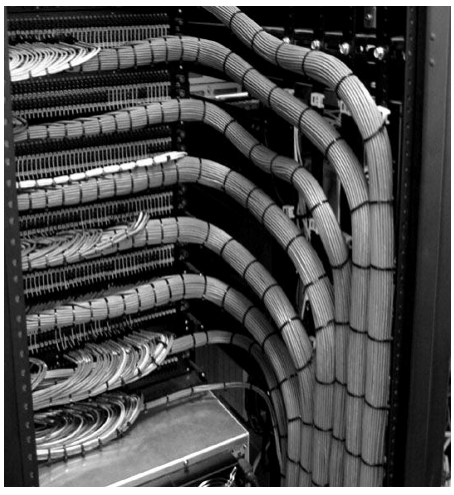
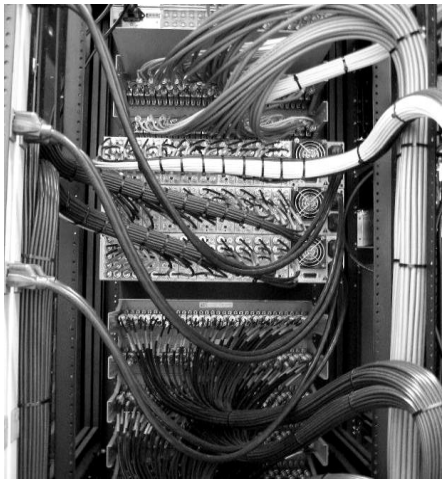
f. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, install appropriate carriers to support the cabling.
g. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced prior to final acceptance at no cost to the Owner.
h. Cables shall be identified by a self-adhesive machine label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606-A. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
i. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
j. Provide splice free wiring and cabling from origination to destination. Cables shall be installed in continuous lengths from origin to destination (no splices). Properly designed transition points, or consolidation points are not considered ‘splice’ points.
k. Make joints and connections with rosin-core 60/40 solder or with mechanical connectors specifically intended for the type and class of cable being used. Where spade lugs are used, crimp properly with ratchet type tool.
l. Take precaution to prevent and guard against electromagnetic and electrostatic hum. For line-level audio signal, float cable shield at one end. Shield not connected to be folded back over cable jacket and covered with heat-shrink tubing. Do not cut off unused shield.
m. Isolate cables and wires of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation in any amplifier section. Keep wiring separated into groups for microphone level circuits, line level circuits, loudspeaker circuits, and power circuits.
n. Connect cable to active components through XLR connections whenever multiple formats are available. Make connections to speaker transformers with properly sized closed end connectors crimped with factory approved ratchet type tool. Wire nut or "Scotchlock" connectors are not acceptable. Do not wrap audio cable splices or connections with adhesive backed tape.
o. Cover edges of cable and wire pass-through holes in chassis, housings, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting.
p. Execute wiring in strict adherence to:
    1) Phillip Giddings. Audio System Design and Installation. Indianapolis: Howard W. Sams & Co., 1990.
    2) Don Davis and Carolyn Davis. Appendix II, Recommended Wiring Practices. Sound System Engineering, 2nd Edition. Indianapolis: Howard W. Sams & Co., 1989.
    3) AV Installation Handbook Second Edition: The Best Practices for Quality Audiovisual Systems, Infocomm, 2009

2. Equipment Housing Cabling and Wiring:
    a. Lace, tie, or harness wire or cable as required herein, and in accordance with accepted professional practice. Dress, lace or harness all wire or cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Install cable and wire neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Reference photos below for standard of quality.





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b. Provide adequate service loops so that equipment mounted on rack slides may be pulled fully out, to their locked position without straining cable.
c. Neatly bundle excess AC power cable from housing mounted equipment with plastic cable ties.
d. Provide plastic cable ties or Velcro straps to bundle cabling and wiring. Electrical tape and adhesive backed cable tie anchors are not acceptable.
e. Install with connections completely visible and labeled.
f. Provide termination resistors, if required, of 5 per cent tolerance; fully visible and not concealed.

B. Installation of connectors, plates & panels:
1. Install panel mounted connectors rigidly attached to panels, plumb and level.
2. Custom rack panels shall be 1/8 inch thick aluminum, standard EIA sizes, brushed black anodized finish (brushed in direction of aluminum grain only), unless otherwise noted.
3. Custom connector plates (speaker, microphone, etc.) are typically stainless steel, unless otherwise noted or specified. However, verify plate finish with Architect.
4. Install XLR type connectors in accordance with IEC-268 standard, with a wiring scheme of pin 2 hot (high), pin 3 (low), and pin 1 screen (shield).
5. Other Plates and Panels may be required to satisfy the requirements of the Work.

C. Installation power and grounding:
1. Coordinate final connection of power and ground wiring to housings.
2. Hardwire power wiring directly to internal AC receptacles to ensure uninterrupted operation.
3. Provide 3-conductor, isolated ground, 120 VAC outlets as required within each housing. Provide a minimum of two spare outlets in each rack.
4. Provide a copper ground buss top to bottom in each housing, insulated from the housing. Ground equipment chassis not having a three wire power cord to these busses using 6/32 nuts, bolts and lock-washers with No. 12 wire. Connect green ground wire from each AC outlet in housing to this buss bar.
5. Replace manufacturers supplied 18 gauge IEC power cords with UL listed 18 gauge pre-molded 6”, 12”, 18”, or 24”. Use minimum length required. No looped or cable tied IEC power cords will be permitted within the equipment rack.
6. Replace manufacturers supplied 14 gauge IEC power cords with UL listed 14 gauge pre-molded 18” or 36” for all equipment IEC capable. Use minimum length required and minimize looped or cable tied IEC power cords present in the equipment rack.

D. Installation of electronic equipment:
1. Take appropriate precautions against electrostatic discharge (ESD). Establish a personal ground before handling electronic equipment through the use of a grounded wrist wrap and/or an anti-static floor pad.
2. Take appropriate precautions to protect the equipment from damage during installation. Equipment to be installed free of damages, scratches, dents, etc.
3. Mount trim potentiometers, custom circuit cards, relays, and transformers (except large 70V units) in shielded enclosures, and mark their function and connections with engraved lamicoid labels.
4. Mount equipment plumb and level, firmly and safely held in place.

E. Installation of equipment housing:
1. Mount equipment in racks and consoles and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Owner in writing that racks will be fabricated on site and the reasons for the change.
2. Secure rack mounted devices utilizing all available fastener mounting positions on device.
3. Provide rear support for housing mounted equipment greater than 15 inches deep.
4. Provide blank panels to fill unused panel space within the equipment housing.
5. If Key door locks are required, key each housing type alike.
6. Looking at the rack from the rear, locate AC power and speaker wiring on the left; line level audio, video, and RF wiring on the right.
7. Provide shaft locks or security covers on non-user operated equipment having front panel controls. These panels are to be installed at the conclusion of testing.
8. If forced air active thermal management is used, provide ventilation blocking material on the front, sides, and rear of the equipment rack as needed. Reference Middle Atlantic Products “Controlling the Temperature Inside Equipment Racks”.
9. Panels or equipment mounted on the rear rack rails shall not block access to any front mounted components.
10. If equipment rack is not equipped with casters, provide two inch high wood base to isolate equipment rack from floor. Wood base should be capable of supporting the load.

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F. Installation of loudspeakers:
   1. The Contractor is responsible for final design and engineering of loudspeaker rigging, attachments, brackets, and hoisting.
   2. Loudspeakers shall be mounted at the operating position in a safe, secure, and permanent manner.
   3. Provide custom rigging as needed. In addition to the ANSI standards below, custom rigging shall be built to include compliance with the following American Welding Society standards:
      a. AWS-D1.1/D1.1M:2020
      b. AWS-D1.2/D1.2M:2014
   4. Loudspeaker manufacturer supplied mounting brackets or rigging shall be built to the applicable ANSI standards listed below, with testing and/or traceability data provided as part of shop drawings submittal.
   5. Suspension and Mounting:
      a. Static and dynamic equipment loads shall be suspended or mounted in compliance with the following ANSI/ESTA standards, using the latest available versions of the standards:
         1) ANSI E1.4-2-2021 Statically Suspended Rigging Systems
         2) ANSI E1.56-2018 Rigging Support Points
         3) ANSI E1.6-1-2021 Powered Hoist Systems
         4) ANSI E1.8-2012 Loudspeaker Enclosures Intended for Overhead Suspension
      b. Rigging, mounting, and support systems for overhead suspended loudspeakers shall be reviewed and certified by a registered Professional Engineer (PE), in the employ of the Contractor, licensed to practice in the State in which the project is located. Documentation shall be included as a submittal item. Once the systems are installed, the PE shall physically inspect, at the Contractor's cost, the methods and means used to verify compliance with the original design.
   6. General Guidelines:
      a. Reference Project structural documents.
      b. Site and/or special inspections may be required if requested by the Owner.
      c. Paint loudspeakers, supports, and related hardware color as directed by the Owner.
      d. The aiming direction of all loudspeakers shall be adjustable by no less than ±5 degrees horizontally and vertically.
      e. Loudspeakers are to be oriented parallel to their mounting surface unless otherwise noted.
      f. Provide a safety cable connected to a secondary location for each loudspeaker.
      g. All loudspeakers located in ceiling tiles shall be located in the center of the tile unless noted otherwise.
      h. Paint loudspeakers to match surroundings. Confirm color selection with the Architect during the submittal phase.
      i. Exterior loudspeaker cabinets shall be constructed of materials designed for permanent outdoor exposure conditions with a minimum IP 54 rating, and a minimum expected 10-year life span. Exterior and interior surfaces of the cabinets shall be protected from the effects of water, moisture, and humidity. The exterior surface shall also be protected from the effects of ultraviolet radiation to prevent fading and color change. The cabinets shall be shaped and oriented in a manner that minimizes the possibility of water pooling on any cabinet surface. Associated hardware shall be inherently non-corrosive, performing to the standards of 304 Stainless Steel or higher.

G. Installation of projectors:
   1. Confirm distance of specified projection lens before mounting projector.
   2. Projectors shall be mounted plumb and level at the operating position in a safe, secure and permanent manner.
   3. All hardware required to locate the mount and projector at the required location shall be provided.
   4. Projectors shall be mounted using tamper proof secure hardware.
   5. Contractor may be required to adjust projection screen and lift upper and lower limit switches for projection screens and lifts specified elsewhere and not installed as part of this Contract.

H. Installation of flat panel monitors:
   1. Confirm location before mounting.
   2. Monitors shall be mounted plumb and level at the operating position in a safe, secure and permanent manner.
   3. All hardware required to locate the mount and monitor at the required position shall be provided.
   4. Locate monitor on the center line of the room unless noted otherwise.

I. Loose Equipment
   1. Provide loose equipment as indicated on drawings.
   2. Unpackage and assemble items.

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3. Place items in designated storage or refer to Owner for direction on final location and storage of loose equipment.

3.3 FIRESTOP

A. A fire-stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Fire-stop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire-stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire-stopped.

C. Fire-stop systems shall be reviewed by a Professional Engineer (PE) licensed to practice in the State in which the project is located. Stamped drawings showing the fire stop systems shall be included as a submittal item. Once the systems are installed, the engineer of record for the firestop system shall physically inspect the methods and means used to verify compliance with the original design.

D. A drawing showing the proposed fire-stop system, stamped/embossed by the PE shall be provided to the Owner's Technical Representative prior to installing the fire-stop system(s).

E. All fire-stop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for observation by the local authorities prior to cable system acceptance.

3.4 CONTROL SYSTEM PROGRAMMING

A. Aux Gym
   1. Low voltage controls by control system
      a. Power Sequencing
         1) Power Up: Triggered by control system via touch panel STANDBY Control system to begin System Power Up Sequence. Sequence to be timed to trigger sequencing systems in accordance with the sequence specified in Power Sequencing Systems in this specification. During Sequence, Control System to flash the STANDBY button on touch panel until sequence is complete. Upon completion, Control System to indicate that the system is powered on and ready via solid color on STANDY button on touch panel.
         2) Power Down: Triggered by control system via touch panel SYSTEM OFF, Control system to begin System Power Down Sequence. Sequence to be timed to trigger sequencing systems in accordance with the sequence specified in Power Sequencing Systems in this specification. During Sequence, Control System to flash the SYSTEM OFF button on the touch panel until sequence is complete. Upon completion, Control System to indicate that the system is powered off by solid color on SYSTEM OFF button on touch panel.
   2. DSP functions triggered by AV Control System touch panel.
      a. STANDBY: Audio DSP preset to mute all output capability of the system.
      b. EVENT: This preset to change Audio DSP Source Matrix to route the outputs of the portable cart connections to the main loudspeakers. All outputs of the DSP to be unmuted.
         1) COURT MUTE: Provide mute button for loudspeakers providing coverage of the court.
         2) Volume controls: Provide volume controls for sources shown in DSP diagram.
         3) Mute controls: Provide mute buttons for sources shown in DSP diagram.
   3. Low voltage controls for DSP
      a. PAGE: Triggered by the paging and/or fire alarm system, this preset to change the Source Matrix to source the paging/fire alarm system audio feed to the main loudspeakers. System to remain in this state until the trigger has been released.

B. Transport Control
   1. Provide standard Stop, Play, Pause, Fast Forward and Rewind for each playback device and menu control for DVD players. Buttons should be arranged in a conventional fashion that will be familiar to the normal user.
   2. The selected control function should be displayed by showing the appropriate button "pressed". It should remain this way until another function is selected.
   3. For devices that will go into a standby mode after a period of time, the control system shall sense this mode and restore normal operating mode once a transport function has been selected. This may require the use of current sensors to determine the state of the unit. No direct user action should be required at the playback device to restore the normal operating mode.

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C. Screen/Shade Control
   1. In addition to up-down functions, provide a Stop function to allow the movement to be halted. Once movement has been stopped, the up or down buttons should resume travel in the selected direction.
   2. Control system shall not prevent screen/shade wall controls from being used as well.
   3. Touch panel controls should be readily accessible to the user to permit direct control of shades or screen with having to navigate through multiple control pages.

D. Room Combining
   1. Combining of adjacent areas shall be done through a graphical representation of the physical areas to be combined. Use of a floor plan metaphor is recommended with the graphic oriented correctly with respect to control panel location.
   2. Use buttons or other appropriate objects placed along the common wall to enable the combining function.
   3. When spaces are combined, the graphic appearance of those areas shall change to reflect this configuration. Once an area is separated from a combination, the color of its area should revert to the normal room color.
   4. Common control functions between combined rooms shall be linked, allowing control of the combined area from any one of the touch panels. Examples of common functions include:
      a. Background music selection,
      b. Background music volume
      c. Background music muting
      d. Lighting preset recall
      e. Master volume (not individual channel volume)
   5. When combining adjacent rooms, the control system shall force the common functions to a predetermined default configuration so all rooms have the same configuration.
   6. To avoid unintentional changes, a control panel will not be able to operate a function in a remote location without also operating that same function in the room where the panel is located.

E. Level Control
   1. Objects requiring level adjustment such as volume or tone controls shall be through Up/Down buttons with a graphical representation of the actual level.
   2. Increment of level change to be adjusted for reasonable range without the need to push the Up or Down buttons needlessly.

F. Volume Mute
   1. Where the ability to mute the sound is needed, the button shall use the label “Vol On” and “VOL OFF” instead of Mute and Unmute. When in a “VOL OFF” mode, pushing the “VOL UP” button shall restore the sound and bring the system out of the muted mode.
   2. VOL ON/OFF buttons shall change color to indicate the status of the button.

G. Standard Colors
   1. Control functions shall be color coded to add clarity and show relationships between different groups of controls.
   2. The color Red shall be reserved to indicate a fault or abnormal condition.
   3. Green may be used to indicate normal operation, but may be used for standard control colors as well.
   4. Similar controls should maintain the same color scheme across all control pages.
   5. When a function is selected, the graphical depiction of that button should appear to be pressed and its color change to a darker shade of the regular button color.
   6. Color schemes used for background and foreground objects should be selected to be complimentary and provide a consistent theme throughout the control pages.

H. Minimum Button Size and Placement
   1. Minimum visual size of a button is 3/8” wide by 1/4” high.
   2. Spacing between buttons should be no less than 1/16”.
   3. Where buttons are immediately adjacent, the active selection area of the button should be reduced to 80% of the visual area of the button.

I. Button Actions
   1. When a function on a control page is selected, that button or visual object associated with that function should change to reflect what has been chosen.
   2. For functions that are momentary selections (i.e., VOL UP), the change of state is visible for as long as the button is being pressed.
   3. For function that are maintained selections (i.e., PLAY), the change of state remains visible until another function is selected and resets the previous function.

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4. The state change of a button or visible object should depict real-world objects as much as possible including the appearance of the button be pressed inward, change in shade of the original color, but not a change in hue.

J. Labels
1. Use of simple words or titles are preferred to indicate functionality, navigation and system status.
2. Use of stylish symbols should be avoided unless their identity is commonly recognized by the general public. Standard symbols for transport functions are acceptable.
3. Labels should be presented in a clear, sans serif type face that will remain legible on lower resolution touch panels.
4. Where physical buttons are present along the side of a touch panel, these buttons should be engraved and filled with a contrasting color.

K. Power On/Off
1. For panels requiring an ON/OFF control, these functions should be linked through current sensors or other methods for the control system to detect the power on condition of the component being controlled.
2. Powering off a system should not interfere with the ability of a projector to complete its cool down cycle.

L. Look & Feel
1. Control pages should utilize a clean, elegant but stylish appearance.
2. Use a common graphical template across all control pages for a consistent look.
3. The touch screen layout should utilize graphical elements such as drop shadows, gradient fills and transparency to provide a pleasing overall appearance.
4. Utilize graphical representations of floor plans to convey location information.
5. Include company logos, icons or watermarks to portray the corporate identity.
6. Provide clear navigation tools for moving between control pages.
7. Each sub-page should have a “BACK” button to return to the previous page. This button should appear in the same location on each page.
8. Provide a “HELP” button or icon on each user page to provide clear, non-technical instructions on how to use the functions available to regular users.

M. Security
1. Provide password access to control pages not intended to be accessed by the general public.
2. Unless otherwise noted, provide a minimum of three levels of access
   a. General User
   b. Non-Technical Employee
   c. AV Technician
3. Segregate the control functions to only allow authorized individuals access to more sophisticated control pages.
4. Provide a timeout feature to automatically return the control panel back to the default opening screen after 30 seconds of inactivity. After this reset, passwords must be reentered to return to a previous control page.

N. Presets
1. For systems that have different operating modes or configurations, provide the ability to store and recall preset combinations of system settings.
2. Provide a “Preset” page that permits a minimum of five presets to be recalled. Each button to include a label describing the function or configuration associated with that button.
3. Provide the ability for new presets to be stored over previous settings. New preset to be able to change the label to reflect the new or revised configuration.
4. When a preset has been recalled, the control page should indicate the active configuration.

3.5 LABELING OF EQUIPMENT

A. Provide each terminal strip with a unique descriptor and a numerical designator for each terminal. Show terminal strip descriptor and designator on system schematic drawing.

B. Provide logical and legible cable and wiring label permanently affixed for easy identification.
1. Labels on cables to be adhesive strip type covered with clear heat-shrink tubing. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style.
2. Wiring designator to be an alpha-numeric code unique for each cable. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings.
3. Locate the cable designator at the origination and destination of each circuit within 3 inches of the point of termination or connection. Provide cable designator on circuits with intermediate splice points with an additional suffix to indicate each segment.

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3.6 ENGRAVING

A. Text font: 1/8 inch block sans serif characters unless noted otherwise.
B. On dark materials, provide white characters; on stainless steel or brushed natural aluminum plates, or light-colored materials, provide black characters.
C. Provide at least two lines of text with first line listing the general device name, e.g., amplifier. Second line to include schematic reference of the device, e.g., AMP-1.
D. Equipment label: black with white characters except where indicated.

3.7 COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:
   1. All products are installed in proper and safe manner according to manufacturer's instructions.
   2. Insulation and shrink tubing are present were required.
   3. Dust, debris, solder splatter, etc. is removed.
   4. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
   5. Labeling has been provided.
   6. Temporary facilities and utilities have been properly disconnected, removed and disposed of off-site.
   7. Products are neat, clean and unmarred and parts securely attached.
   8. Broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. have been replaced or properly repaired, and debris cleaned up and discarded.
B. Prior to energizing the System verify and perform the following tests and adjustments in compliance with applicable EIA standards.
   1. Electronic devices are properly grounded.
   2. Test each AC power receptacle with a circuit checker for proper hot, neutral and ground connections.
   3. Verify each individual component is operating properly.
   4. Verify each individual component's performance meets the manufacturer's published performance for this unit.
   5. Measure and record the DC resistance between the technical ground in any equipment rack or console and the main building ground. Resistance should be 0.15 ohms or less.
C. Speaker Circuit Verification Test
   1. Measure the impedance of each speaker line leaving the equipment racks.
   2. For constant voltage systems measure the impedance at 100 (or 250) Hz, 1 KHz and 8 (or 10) KHz of each line leaving the equipment rack with the line disconnected from the driving source. For band limited devices, use a frequency appropriate for the operating range of the transducer.
   3. When documenting the results of these tests, include the calculated impedance based on number of units on a line and the size and distance of the run. Correct any field readings that differ more than 20% from the calculated impedance.
   4. Include the results of the tests in the Project Record Manual.
D. Speaker Polarity Verification Test
   1. Use an electronic polarity checker, TEF-20, SYSID, SIM II, Smaart, or other similar device to test each loudspeaker. All speakers should have the same relative polarity.
   2. Follow manufacturer's recommendations in conducting the tests.
   3. Include the results of the tests in the Project Record Manual.
E. Audio Signal Paths
   1. Verify operation from each source device through all switching, amplification and distribution devices.
F. System Gain Adjustment
   1. Adjust each active device to have proper gain structure from the mixer output to the input of the amplifier.
   2. With all amplifiers turned off, connect a sine wave or pink noise generator to the input of the mixer. Using an RMS AC voltmeter with a dB scale, adjust the mixer to an output between -10 and 0 dBu. Once the level has been established, it should remain unchanged throughout the test. All equalizers should be set flat for this test.
   3. Follow the signal flow from the mixer to each subsequent component. Measure the input level and output level of each device at the point of connection to the device. The input level reading should differ no more than 0.25 dB from the level recorded for the preceding device. Diagnose and correct the wiring or equipment when any readings exceed this range.
   4. Adjust the output of each component to achieve the proper output level.
   5. Record the output levels of each device in the Project Record Manual.
G. Signal Delay Adjustment

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1. Adjust the delay to each subsystem to ensure proper synchronization between the main speakers and delayed speakers.
2. Using a TEF 20, SYSID, Smaart, SIM II, or other acceptable time based measurement system, measure the arrival time of the distant signal and then measure the arrival of the local signal.
3. Based on the arrival times measured, adjust the delay applied to the local speakers to synchronize them with the distant speakers. Repeat the test to verify the delay has been set to within 1 ms of the arrival of the distant signal. Once the precise delay time has been determined, provide an additional 10 ms of Haas effect delay to maintain directional orientation toward the original sound source.
4. Continue to test and adjust each separate subsystem with a dedicated delay channel.
5. Provide hard-copy printout of each delay adjustment showing first the arrival times with no delay set and then the result after the delay has been adjusted. Record the settings of each delay in the Project Record Manual.

H. Remote Input Verification Test
1. Using a microphone or portable signal generator, connect to each microphone/line level receptacle throughout the facility.
2. Verify that the receptacle under test appears at the correct input and is operating properly.
3. In a similar manner, check all remote tielines and media related lines for correct wiring and labeling.

I. System Equalization
1. Using a RTA, TEF 20, SYSID, or SMAART, equalize all loudspeaker systems to provide a suitable frequency response as follows:
   a. Speech Reinforcement Systems: flat response from 125 Hz to 2.5 KHz, with 2 dB roll off above.
   b. Program Reproduction Systems: flat response from 65 Hz to 8 KHz, with 2 dB roll off above.
2. Verify system gain and amplifier levels.
3. Provide program levels of at least 85 dB and speech reinforcement levels of at least 70 dB in the seating area without objectionable distortion, buzzes, or rattles.
4. Provide hard copy printouts of the spectral response with the test data.

J. RFI and Parasitic Oscillation
1. With systems operating check to ensure that all systems are free from spurious oscillation and radio frequency interference in the absence of audio signal.

K. Buzzes, Rattles and other Distortions
1. Adjust the system for normal operating level in the space. Apply a slow sine wave sweep from 60 Hz to 3 KHz and listen carefully for buzzes, rattles and other objectionable distortions.
2. Correct the cause of the defect. If the cause is not from the system. Bring the cause to the attention of the GC, indicating cause and suggestive corrective actions.

L. Video Systems Test
1. Projected images and screen must be plumb with respect to ceiling line.

M. Video System Tests. Verify performance of all video equipment, components and systems, as specified herein.
1. Video (signal):
   a. S/N (peak to RMS), unweighted DC to 4.2 MHz: 55 dB minimum.
   b. Crosstalk, unweighted DC to 4.2 MHz: 45 dB minimum.
   c. Frequency Response: Within plus to minus 0.5 dB to 4.2 MHz.
   d. Line and Field Tilt: 2% maximum.
   e. Differential Gain: 2% maximum.
   f. Differential Phase: 2 degrees maximum.
   g. Frequency Response: DC to 4.2 MHz within plus or minus 0.5 dB.

N. Video Signal Paths
1. Verify operation from each source device through all switching, amplification and distribution devices.

O. Video Test Report shall include the following:
1. Test Failures and Notices
   a. Sink Device EDID Test – Open items or failures shall not be accepted.
   b. Cable Length Test – Open items or failures shall not be accepted.
   c. HDCP KSV Limitations – Limitations shall not be accepted.
   d. Cable Limitations - Limitations shall not be accepted.
   e. EDID Limitations - Limitations shall not be accepted.
   f. Cable Length Limits exceeded – Failing cables shall not be accepted.
2. Device Model Number, Serial Number, and Firmware Version for main chassis and each input and output card.

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3. Device Model Number, Serial Number, and Firmware Version for connected transmitter and receiver devices.
4. EDID – Input Resolution and 3D support status for each input.
5. EDID – Supported Output Resolution and 3D support status for devices connected to each output.
6. EDID – Supported Audio formats for each input.
7. EDID – Supported Audio formats for devices connected to each output.

P. Control Systems
1. Verify operational functions of the control system and all interfaced devices.
2. Verify operational functionality of any wireless user devices.

3.8 CAT5E/CAT6 CABLE CERTIFICATION

A. General Field Test Requirements
1. All CAT5E/CAT6 cabling links installed as part of this scope shall be tested for the following, in accordance with the field test specifications defines in ANSI/TIA-568-C.2 “Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard.” This document will be referred to as the “Category 5e Standard”:
   a. Wire Map
   b. Length
   c. Insertion Loss
   d. NEXT loss
   e. PS NEXT Loss
   f. ACR-F Loss
   g. PS ACR-F Loss
   h. Return Loss
   i. Propagation Loss
   j. Delay Skew
2. The installed twisted-pair horizontal links shall be tested from terminated end point to terminated end point for compliance with the “Permanent Link” performance specification as defined in the Category 5e Standard.
3. One hundred percent of the installed cabling links must pass the requirements of the Category 5e standard mentioned above and as further detailed in Section B below. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section C below.
4. The test equipment (tester) shall comply with the accuracy requirements for level IIe field testers as defined in ANSI/TIA-1152. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 2 of ANSI/TIA-1152 (Table 2 in this TIA document also specifies the accuracy requirements for the channel configuration).
5. The RJ45 test plug shall fall within the values specified in ANSI/TIA-568-C Annex C for NEXT, FEXT and Return Loss.
6. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
7. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
8. The Pass or Fail condition of the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any Fail result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass.
9. A Pass or Fail result for each parameter is determined by comparing the measured values with the specifies test limits for that parameter.

B. Performance Test Parameters
1. The test parameters are defined by the Category 5e Standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test, all measurements (at each frequency in the range from 1 MHz through 100 MHz) must meet or exceed the limit value determined in the above mentioned standard.

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2. Wire Map - Shall report Pass if the wiring of each wire-pair from end to end is determined to be correct.
3. Length – The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP. The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.
4. Insertion Loss (Attenuation) – Insertion Loss is a measure of signal loss in the permanent link or channel. The term “Attenuation” has been used to designate “Insertion Loss.” Insertion Loss shall be tested from 1 MHz through 100 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk Ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results of the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which the worst case value occurs, and the test limit value at this frequency.
5. NEXT Loss – Pair-to-pair near end crosstalk loss (abbreviated as NEXT loss) shall be tested for each wire pair combination from each end of the link (a total of 12 pair combinations).This parameter is to be measured from 1 through 100 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT loss measurements shall not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

   Table 1 – Maximum frequency step size as defined in ANSI/TIA-1152

Frequency Range (MHz)	Maximum Step size (MHz)
1 - 31.25	0.15
31.26 - 100	0.25

6. PS NEXT Loss – Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PS NEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 100 MHz and the step size may not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Maximum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS next. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
7. ACR-F Loss, pair to pair – Attenuation Crosstalk Ratio Far-end is calculated from the pair-to-pair FEXT Loss. It shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ACR-F Loss that must be evaluated and reported in the test results. ACR-F measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ACR-F is to be measured 1 through 100 MHz and the maximum step size for FEXT loss measurements shall not exceed the maximum step size defined as the standard as in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst value for ACR-F. There wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
8. PS ACR-F Loss – Power Sum Attenuation Crosstalk Ratio Far-end is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs of the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
9. Return Loss – Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to

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be measured from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst value of Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

10. Propagation Delay – Propagation delay is the time required for the signal to travel from one of the links to the other. This measurement is to be performed for each of the four wire pairs. Minimum test results documentation (summary results): Identify the wire pair with the worst propagation delay. The report shall include the propagation delay value measured as well as the test limit value.
11. Delay Skew – [as defined in the Category 5e Standard; Section 6.2.19] This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.

C. Test Result Documentation
1. The test results/measurements shall be transferred into a Windows based database utility that allows for the maintenance, inspection, and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., “as saved in the tester” at the end of each test and that these results cannot be modified at a later time.
2. The database for the completed job shall be stored and delivered on CD-ROM or DVD including the software tools required to view, inspect, and print any selection of test reports.
3. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information:
    a. The identification of the link in accordance with the naming convention defined in the overall system documentation.
    b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number.
    c. The date and time the test results were saved in the memory of the tester.
4. General information to be provided in the electronic data base with the test results information for each link:
    a. The identification of the customer site as specified by the end-user.
    b. The identification of the link in accordance with the naming convention defined in the overall system documentation.
    c. The overall Pass/Fail evaluation of the link-under-test
    d. The name of the test limit selected to execute the stored test results
    e. The cable type and value of NVP used for length calculations
    f. The date and time the test results were saved in the memory of the tester
    g. The brand name, model, and serial number of the tester.
    h. The identification of the tester interface
    i. The revision of the tester software and the revision of the test limits database in the tester
    j. The test results information must contain information on each of the required test parameters that are listed in Section B and as further detailed below under paragraph C5.
5. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
6. The detailed test results data to be provided in the electronic database must contain the following information:
    a. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m330 and test limit value.
    b. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
    c. Delay Skew: Identify the pair with the largest value for delay skew, the value measured in nanoseconds (ns) and the test limit value.
    d. Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair.
    e. Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link.

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f. NEXT, ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link.
g. PS NEXT and PS ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link.

3.9 FINAL OBSERVATION & TESTING

A. Upon completion of installation, initial adjustments, tests and measurements specified in Part 3, and submission and review of the results, a final observation and test will be performed by the Owner or Owner's representative no earlier than two weeks after receipt of the written results.
B. Provide a minimum of one (1) person for observation and testing familiar with aspects of the System to assist the Owner.
C. The process of testing the System may necessitate moving and adjusting certain components.
D. Testing includes operation of each major system and any other components deemed necessary. Perform tests and provide required test equipment, tools and material required to make any necessary repairs, corrections, or adjustments.
E. The following procedures will be performed on each System:
1. Observation of the methods and means employed to incorporate the System within the facility.
2. Verification of proper operation, from controlling devices to controlled devices.
3. Verification of proper adjustment, balance, and alignment of equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and appropriately record these settings within the Record Documents.
4. Other tests on equipment or systems deemed appropriate.
F. In the event the need for further adjustment or work becomes evident during testing, the Contractor is to continue their work until the System is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications and any extension of the observation and testing period is required, the Contractor shall pay for additional time and expenses of the Owner at the standard rate in effect at that time.

3.10 TEST EQUIPMENT

A. Thirty days prior to start of testing, provide a list to the Owner of test equipment make, model numbers and calibration dates that will be used.
B. The following equipment shall be available on site for the entire test period through final system testing.
1. Sound Level Meter : ANSI S1.4-1971 Type S1A with digital or analog display. Meter to provide ranges of 40 to 120 dBA.
2. Pink Noise Source - Equal energy per octave bandwidth 20 Hz to 20,000 Hz, ±1 dB (long-term average) at 0 dBm output. Stability: ±2 dB per day.
3. Dual-trace oscilloscope - 100 MHz bandwidth, 1 mV/cm sensitivity.
4. Impedance Meter - Capable of testing audio lines at three frequencies, minimum, between 250 Hz and 5k Hz. Measurement Range: 1 ohm to 100 kohms.
5. Audio Oscillator: bandwidth 20 Hz to 20k Hz ±.5 dB at 0 dBm output. Output to be balanced. Oscillator to include adjustable output level over the range from –30 dBu to +10 dBu.
6. Multimeter - Measurement range, DC to 20k Hz, 100 mV to 300 V, 10 ma to 10 A, dB.
7. NTSC Test generator
8. Real time analyzer with LED or CRT display. The unit shall meet the filter requirements of ANSI S1.11 Class III for one third octave filters.
9. Video (analog) test generator capable of generating signal up to 1920 x 1200 with audio.
10. Video (digital) test generator capable of generating signal up to 1920 x 1200 with audio.
11. Ladders and scaffolding necessary to inspect elevated equipment, junction boxes, etc.
C. Provide three portable VHF or UHF business band radios for use during acceptance testing with transmission range sufficient to cover entire project. Include rechargeable batteries and recharger along with holster for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance.

3.11 INSTRUCTION OF OWNER PERSONNEL

A. Provide instruction to Owner designated personnel focusing on the use, operation and maintenance of the systems, scheduled as a minimum of two separate sessions, by an instructor fully knowledgeable and qualified in system operation. The System Reference Manuals should be complete and on site at the time of this instruction. Coordinate schedule of demonstration with Owner's Representative.
1. Auditorium
a. 4 hours of instruction.
2. Aux Gym
a. 4 hours of instruction.

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3. Music Rooms
   a. 5 hours of instruction (Orchestra, Band, Mariachi and Choir).
   b. 2 hours of instruction (Ensemble, Shared Ensemble and Percussion).
4. Black-Box
   a. 6 hours of instruction.
5. Theater Classroom
   a. 2 hours of instruction.

B. Video record all training sessions and compile a training video to be provided to the Owner on digitally.
C. Provide sign in sheet to document the attendee's presence.
D. If Contractor is not properly equipped to conduct Owner training on particular equipment, arrange for factory representatives of the equipment to be present to provide training at no additional cost to the Owner.

3.12 CLEANUP AND REPAIR

A. Upon completion of the work, remove refuse and rubbish from and about the premises. Leave areas and equipment clean and in an operational state. Repair any damage caused to the premises by the installation of systems at no cost to the Owner.

END OF SECTION 27 41 16

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SECTION 283111 - DIGITAL, ADDRESSABLE, VOICE EVACUATION FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-alarm control unit.
   2. Manual fire-alarm boxes.
   3. System smoke detectors.
   4. Duct smoke detectors.
   5. Notification appliances.
   6. Device guards.
   7. Magnetic door holders.
   8. Remote annunciator.

B. This section includes extensions and modifications of the existing fire alarm system, including installation of a new addressable fire-alarm control panel with voice evacuation capabilities in the building.

C. Related Sections include the following:
   1. Division 26 Section "Raceways and Boxes for Electrical Systems" for raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 DEFINITIONS

A. EMT: Electrical Metallic Tubing.
B. FACP: Fire Alarm Control Panel.
C. HLI: High Level Interface.
D. NICET: National Institute for Certification in Engineering Technologies.
E. PC: Personal computer.

1.3 SYSTEM DESCRIPTION

A. Noncoded, UL-certified addressable system, with multiplexed signal transmission and speaker/strobe evacuation, dedicated to fire-alarm service only.
B. Automatic sensitivity control of certain smoke detectors.
C. All components provided shall be listed for use with the selected system.
D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.4 ACTION SUBMITTALS

A. Submit product data and shop drawings in accordance with Division 01 and Division 28 Section “Electronic Safety and Security Shop Drawings and Submittals” for products specified under PART 2 - PRODUCTS.
B. Specification Compliance Certification: Submit a Specification Compliance Certification in accordance with Division 28 Section “Electronic Safety and Security Shop Drawings and Submittals”.
C. Product Data: For each type of product, including furnished options and accessories.
   1. Include construction details, material descriptions, dimensions, profiles, and finishes.
   2. Include rated capacities, operating characteristics, and electrical characteristics.
D. Shop Drawings: For fire-alarm system.
   1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   2. Include plans, elevations, sections, details, and attachments to other work.
   3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
   4. Detail assembly and support requirements.
   5. Include voltage drop calculations for notification-appliance circuits.
   6. Include battery-size calculations.
   7. Include input/output matrix.
   8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
   9. Include performance parameters and installation details for each detector.
   10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

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11. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    b. Show field wiring required for HVAC unit shutdown on alarm.
    c. Locate detectors according to manufacturer's written recommendations.
12. Include voice/alarm signaling-service equipment console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
13. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

E. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
    a. Trained and certified by manufacturer in fire-alarm system design.
    b. NICET-certified, fire-alarm technician; Level III minimum.
    c. Licensed or certified by authorities having jurisdiction.

F. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Field quality-control reports.
C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
    a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
    b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
    d. Riser diagram.
    e. Device addresses.
    f. Record copy of site-specific software.
    g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
        1) Equipment tested.
        2) Frequency of testing of installed components.
        3) Frequency of inspection of installed components.
        4) Requirements and recommendations related to results of maintenance.
        5) Manufacturer's user training manuals.
    h. Manufacturer's required maintenance related to system warranty requirements.
    i. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

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1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Lamps for Remote Indicating Lamp Units: Quantity equal to 5 percent of amount installed, but no fewer than one unit.
   2. Lamps for Strobe Units: Quantity equal to 5 percent of amount installed, but no fewer than one unit.
   3. Smoke Detectors, Fire Detectors: Quantity equal to 5 percent of amount of each type installed, but no fewer than one unit of each type.
   4. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.
   5. Keys and Tools: One extra set for access to locked or tamper proofed components.
   6. Audible and Visual Notification Appliances: One of each type installed.
   7. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.
D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
E. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.9 PROJECT CONDITIONS

A. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.
B. Coordinate the Work of this section with the Work of other sections, including sprinkler systems, elevators, HVAC systems, and security/door locking systems.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
   1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
   2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Silent Knight SK-Series by Honeywell.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
   1. Manual stations.
   2. Smoke detectors.
   3. Duct smoke detectors.
   4. Automatic sprinkler system water flow.
B. Fire-alarm signal shall initiate the following actions:
   1. Identify alarm and specific initiating device addressable point at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
   2. Sound a distinctive evacuation signal throughout the entire building where specific initiating device is in alarm.
   3. Simultaneously active all flashing visual alarm assemblies associated with audible indicators.
   4. Unlock electric door locks in designated egress paths.
   5. Release fire and smoke doors held open by magnetic door holders.

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6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode. Shut down HVAC equipment rated 2000 cfm or greater that circulate air on the alarm floor.
7. Activate an automatic telephone dialer and alarm contact closure for use with approved central station monitoring service. Owner provides NFPA 71 central station connection and maintains that service.
8. Record events in the system memory.
9. Indicate device in alarm on the graphic annunciator.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.
2. Alert and Action signals of air-sampling detector system.
3. Independent fire-detection and -suppression systems.
4. User disabling of zones or individual devices.
5. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.
10. Voice signal amplifier failure.

E. System Supervisory Signal Actions:
1. Initiate notification appliances.
2. Identify specific device addressable point initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
3. After a time, delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
4. Transmit system status to building management system.
5. Display system status on graphic annunciator.

2.3 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
b. Include a real-time clock for time annotation of events on the event recorder and printer.
c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
d. The FACP shall be listed for connection to a central-station signaling system service.
e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, three line(s) of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class A.

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2. Pathway Survivability: Level 1.
3. Each Signaling Line Circuit (SLC) and Notification Appliance Circuit (NAC): Limited to only 80 percent of its total capacity during initial installation.
4. Serial Interfaces:
   a. One dedicated RS 485 port for central-station operation using point ID DACT.
   b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
   c. One RS 232 port for PC configuration.
   d. One RS 232 port for voice evacuation interface.

D. Smoke-Alarm Verification:
1. Provide UL-Listed alarm verification feature.
2. Alarm verification shall be per addressable, open area smoke detector. Alarm verification shall be field programmable on an individual detector basis.
3. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
4. Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector as prescribed by UL 864.
5. The system shall reset the alarmed zone/device within the UL prescribed window of 60 seconds maximum. If the alarm condition does not confirm with 60 seconds of the reset signal, the programmed alarm outputs shall be canceled and the system returned to the normal mode.
6. If the alarm condition re-occurs within the designated verification cycle or a non-verified device or zone activates, the programmed events listed above shall immediately occur for the confirmed alarm condition.
7. Sound general alarm if the alarm is verified.
8. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.

E. Notification-Appliance Circuit:
1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72, followed by pre-recorded message determined by event and this scenario repeating or other message as approved by local authority until system is reset.
2. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.

G. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

H. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

I. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of fire-alarm control unit.
1. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
   a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
   b. Programmable tone and message sequence selection.
   c. Standard digitally recorded messages for "Evacuation" and "All Clear."
      1) Fire evacuation and relocation.
      2) Intruder or hostile person sighted within or around the building grounds.
      3) Directions to occupants to take cover within building.
      4) Emergency weather conditions appropriate for local area.
      5) All clear.
   d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.
2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

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J. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.
   1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
   1. Batteries: Sealed lead calcium.
   2. Sufficient capacity to provide power for entire system upon loss of normal AC power for a period of 24 hours with 15 minutes of alarm signaling at end of this 24-hour period, as required by NFPA 72, Local Systems.

L. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
   1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with attached addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   2. Station Reset: Key- or wrench-operated switch.
   3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

2.5 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:
   1. Comply with UL 268; operating at 24-V dc, nominal.
   2. Detectors shall be two-wire type.
   3. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
   4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   5. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
   6. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
      a. Multiple levels of detection sensitivity for each sensor.
      b. Sensitivity levels based on time of day.

B. Photoelectric Smoke Detectors:
   1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
   2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
      a. Primary status.
      b. Device type.
      c. Present average value.
      d. Present sensitivity selected.
      e. Sensor range (normal, dirty, etc.).

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
   1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
   2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
      a. Primary status.
      b. Device type.
      c. Present average value.

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d. Present sensitivity selected.
e. Sensor range (normal, dirty, etc.).

3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.6 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters on the lens.
1. Rated Light Output:
a. 15/30/75/110 cd, selectable in the field.
2. Mounting: Ceiling mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, white.

C. Voice/Tone Notification Appliances:
1. Comply with UL 1480.
2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
3. High-Range Units: Rated 2 to 15 W.
4. Low-Range Units: Rated 1 to 2 W.
5. Mounting: Flush or surface mounted and bidirectional.
6. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.7 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnets: Require no more than 3 W to develop 25-lbf holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: 24-V ac or dc.
4. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

2.8 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Flush cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.9 DEVICE GUARDS

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
1. Factory fabricated and furnished by device manufacturer.
2. Finish: Paint of color to match the protected device.

B. Provide STI Stopper II Cover with integral sounder on all manual pull stations.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
   1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

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

3.2 EXISTING FIRE ALARM SYSTEM UPGRADE

A. Furnish and install new fire alarm control panel to replace the existing panel in the Willowridge High School facility.
   1. Program new panel to perform all control and supervisory functions of the existing system.
   2. New panel shall implement EVACS notification capability per current building code and AHJ requirements.

B. Provide new cabling, amplifiers, power supplies, etc. as needed to implement EVACS notification capability per current building code and AHJ requirements.

C. Coordinate disposal of existing fire alarm control unit with Owner.

3.3 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
   1. Devices placed in service before all other trades have completed cleanup shall be replaced.
   2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.

C. Manual Fire-Alarm Boxes:
   1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.
   2. Mount manual fire-alarm box on a background of a contrasting color.
   3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.
   4. Provide Stopper II covers with integral sounders on all manual stations except the manual station installed directly adjacent to the fire alarm control panel.

D. Smoke- or Heat-Detector Spacing:
   1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
   2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
   3. Smooth ceiling spacing shall not exceed 30 feet.
   4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A in NFPA 72.
   5. HVAC: Locate detectors not closer than 36 inches from air-supply diffuser or return-air opening.
   6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.

E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches long shall be supported at both ends.
   1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.

G. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

H. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

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I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling. Install all devices at the same height unless otherwise indicated.
J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.4 DELIVERY, STORAGE, AND HANDLING
A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
C. Handling: Protect materials from damage during handling and installation.

3.5 PATHWAYS
A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.
1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.
B. Pathways shall be installed in EMT.
C. Exposed EMT shall be painted red enamel.

3.6 CONNECTIONS
A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
1. Smoke dampers in air ducts of designated HVAC duct systems.
2. Magnetically held-open doors.
3. Electronically locked doors and access gates.
4. Alarm-initiating connection to elevator recall system and components.
5. Supervisory connections at valve supervisory switches.
6. Supervisory connections at elevator shunt-trip breaker.
7. Data communication circuits for connection to building management system.

3.7 IDENTIFICATION
A. Install framed instructions in a location visible from fire-alarm control unit.
B. All junction boxes including the cover are to be painted red in color for identification purposes.
C. All control panels and sub panels shall clearly indicate electrical breaker location, including room number, panel name, and breaker number.
D. Provide self-adhesive, color-coded, identification marker on ceiling grid directly below any device requiring an IP-connection or service above the ceiling. Ceiling marker to be Seton L12723 or equivalent. Fire alarm related devices should utilize a red identification marker on the ceiling grid.
E. Identify each initiating device or signaling appliance with loop and circuit number. Use clear self-adhesive label with black lettering on face or mounting base of device.

3.8 GROUNDING
A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.9 FIELD QUALITY CONTROL
A. Field tests shall be witnessed by authorities having jurisdiction.
B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
1. Visual Inspection: Conduct visual inspection prior to testing.
a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

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b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.10 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.11 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

D. Installer shall provide a backup copy of the installed program database on USB drive upon completion of the project. They shall also provide the current version for the panel provided.

3.12 DEMONSTRATION

A. Engage a factory-authorized service representative to train a minimum of two (2) Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system. Training shall be five (5) days and be held at factory or factory-authorized service center. Include travel and accommodations costs for Owner’s maintenance personnel.

END OF SECTION 283111

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DIVISION 04 MASONRY

04 20 00 UNIT MASONRY

BRK-1	Manufacturer	Cloud Ceramics/ Kansas Brick & Tile
	Color / Texture	Coronado / Velour
	Size	King Size
	Pattern	Running Bond
	Grade	SW
	Type	FBX
BRK-1B	Manufacturer	Cloud Ceramics/ Kansas Brick & Tile
D	Color / Texture	Coronado / Velour
	Size	King Size
	Pattern	Stack Bond
	Grade	SW
	Type	FBX
BRK-2	Manufacturer	Kansas Brick & Tile
	Color / Texture	Mocha / Velour
	Size	King Size
	Pattern	Running Bond
	Grade	SW
	Type	FBX
BRK-2B	Manufacturer	Kansas Brick & Tile
	Color / Texture	Mocha / Velour
	Size	King Size
	Pattern	Stack Bond
	Grade	SW
	Type	FBX

DIVISION 06 WOOD AND COMPOSITES

06 41 16 PLASTIC LAMINATE-FACED ARCHITECTURAL CABINETS

PL-1	Manufacturer	Wilsonart
	Product Name/No.	Premium Laminate
C	Color	Magnolia
	Texture	Leno Weave Finish
	Comments	Millwork

DIVISION 07 THERMAL

07 21 29 SPRAY-APPLIED INSULATION

ACC-1	Manufacturer	International Cellulose Corporation
	Product	K-13
	Color	Black
	Thickness	2"

07 42 13.13 FORMED METAL WALL PANELS

MWP-1	Manufacturer	Dizal
	Product	6F Plank
	Panel Width (Inches)	6"
	Panel Depth (Inches)	.41 mm
	Panel Thickness (Guage)	1.6 mm
	Finish	Hickory Natural

074243 ALUMINUM COMPOSITE PANEL

ACM-1	Manufacturer	Alpolic
	Product	FR
	Finish	AUB Blue

B 07 72 00 ROOF ACCESSORIES (Roof Hatch)

HATCH-1	Description	Roof Hatch
	Manufacturer	Babcock-Davis
	Product	BRHTA36X36S1T
	Size	36"x36"
	Material	As specified

07 95 00 EXPANSION CONTROL

EJ-F1	Description	Floor-to-Floor
	Manufacturer	Construction Specialties
	Product	GFPS-200
	Finish	Gasket Color: Gray
EJ-W4	Description	Fire Rated Wall-to-Wall (Corner)
	Manufacturer	Construction Specialties
	Product	FWFC-200M w/ Fire Barrier
	Finish	Gasket Color: Gray

DIVISION 08 OPENINGS

08 31 13 ACCESS DOORS

AD-1	Description	Non-Rated: Access Door in Gypsum Board Ceiling
	Manufacturer	Acudoor
A	Model / Type	(GFRG-S) Glass Fiber Reinforced Gypsum
	Size	[12x12] [24x24]
	Rating	non rated
	Finish	Match adjacent ceiling
	Remarks	
AD-2	Description	Non-Rated: Access Door in Wall (Flangeless, Flush)
	Manufacturer	Acudoor
	Model / Type	DW-5058 Drywall
	Size	varies, coordinate
	Rating	non rated
	Finish	[Painted] [Stainless Steel]
	Lock	[Standard cam lock] [cylinder lock with key]
	Remarks	

08 80 00 GLAZING

GL-1	Description	Vision Glass
	Manufacturer	Guardian Industries Corp
	Product	SNX 62/27 SuperNeutral Low-E
	outside glass	1/4" Ultra Clear
	surface #2	SuperNeutral Low-E
	insulated space	1/2" air space
	surface #3	
	inside glass	1/4" Ultra Clear
	Transmittance (VLT)	64
	U-Value (Winter)	0.29
	U-Value (Summer)	0.27
	SHGC	0.27
GL-2	Description	Vision Security Glass
	Manufacturer	Guardian Industries Corp
	Product	SNX 62/27 SuperNeutral Low-E
	outside glass	1/4" Clear
	surface #2	SuperNeutral Low-E
	insulated space	1/2" air space
	surface #3	.090" PVB
	inside glass	3/16" Clear
	Transmittance (VLT)	64
	U-Value (Winter)	0.29
	U-Value (Summer)	0.27
	SHGC	0.23
GL-3	Description	Interior Glazing Security / Safety Glass
	Outside glass	1/4" annealed
	Laminate	.090" PVB
	Inside glass	1/4" annealed
	Manufacturer	TBD
	Product	TBD
GL-4	Description	Acoustical Glazing (Tempered)
	Thickness	1/2"
	Remarks	3/8" clear sealant joints between panels

08 91 19 FIXED LOUVER

LVR-1	Manufacturer	Ruskin
	Product	EME520DD
	Louver Depth	5 inches
	Free Area	0.47
	Screen	Bird Screen
	Blank-off Panels	Not Required
	Color	

08 14 16 FLUSH WOOD DOORS

WD-1	Type	PLAM faced door
	Manufacturer	Wilsonart
	Color	
	Texture	
	Remarks	Veneer Pattern and color to match existing doors
WD-2	Type	PLAM faced door
	Manufacturer	Wilsonart
	Color	Black
	Texture	Matte
	Remarks	Black Box Theatre Doors; only on Black Box side

DIVISION 09 FINISHES

09 24 00 CEMENT PLASTERING

CP-1	Description	Exterior Portland Cement Plasterwork (Stucco)
	Texture	
	Color	TBD

09 30 00 TILING (CERAMIC, STONE, QUARRY, GLASS)

TILE-1	Type	Porcelain Tile
	Manufacturer	Dal-Tile
	Color	Electric Moss VL79
	Size	12x24
	Finish	Matte
	Thickness	5/16"
	Jointing Pattern	Vertical Running Bond
	Joint Width	
	Grout Color	TBD
	Remarks	Provide sealant joint at all inside corners on wall tile, NO EXCEPTIONS, regardless of substrate (masonry or drywall). Provide sealant between wall/floor tile and door frames, do not install grout in these locations. Allow for movement of dissimilar materials.

09 30 00 TILING ACCESSORIES

TS-1	Manufacturer	Schluter
	Product	Quadec
	Finish	

09 51 13 ACOUSTICAL PANEL CEILING

APC-1	Manufacturer	Armstrong World Industries
	Panel Name, Item No.	School Zone Fine Fissured No. 1713
	Panel Size	2x2
	Susp. Syst. Name, Size	Armstrong World Industries 15/16" exposed T, no concealed spline, always white
	Remarks	
APC-2	Manufacturer	Armstrong World Industries
	Panel Name, Item No.	Fine Fissured Humiguard with BioBlock
	Panel Size	2x2
	Susp. Syst. Name, Size	Armstrong World Industries 15/16" exposed T, no concealed spline, always white
	Remarks	Min. NRC .90

09 61 16 CONCRETE FLOOR SEALER

CFS-1	Manufacturer	Dayton Superior
	Product	Day-Chem Sure Hard (J-17)
	Strip Curing Compound	Citrus Peel (J-48)
	Color	Clear

09 64 10 WOOD STAGE FLOORING

WDF-1	Manufacturer	
	Product	Masonite
	Species and Grade	Sierra Pine Medite
	Thickness	1/4"
	Width	4'
	Lengths	8'
	Stain color	Black
	Interior Finish Classification	Class A Fire-Rated A-C plywood
	Remarks	Black Box Floor, 2" Slab Depression RE: Structure

09 65 13 RESILIENT BASE AND ACCESSORIES

RBA-1	Description	Base
	Manufacturer	Tarkett
	Product	Traditional Wall Base 167
	Color	Fudge
	Size	4"
	Style / Profile	Cove
	Material Type	TS - Rubber,thermoset
	Interior Finish Classification	Class A

09 65 19 RESILIENT TILE FLOORING

LVT-1	Description	Vinyl Tile
	Manufacturer	Tarkett
	Product	PCCA Create Emphasis
	Color	11513 Purpose
	Thickness	32 mil
	Size	18x18
	Interior Finish Classification	Class I
LVT-2	Description	Vinyl Tile
	Manufacturer	Tarkett
	Product	Contour Abstract
	Color	Color Beam Juniper C101
	Thickness	32 mil
	Size	18x18
	Interior Finish Classification	Class I
LVT-3	Description	Vinyl Tile
	Manufacturer	Mohawk Group
	Product	Chromascope C0159
	Color	910 Winter Mood
	Thickness	2.5 mm
	Size	12x24
	Interior Finish Classification	Class I
LVT-4	Description	Vinyl Tile
	Manufacturer	Mohawk Group
	Product	Chromascope C0159
	Color	940 Jack Rabbit
	Thickness	2.5 mm
	Size	12x24
	Interior Finish Classification	Class I

09 68 13 CARPET TILE

CPT-1	Manufacturer	Tarkett
	Pattern	Assertive Action
	Color	Chromium 26201
	Size	24x24
	Installation Pattern	Vertical Ashlar
	Interior Finish Classification	Class I
CPT-2	Manufacturer	Tarkett
	Pattern	Maelstrom
	Color	Blue Spirit 71602
	Size	24x24
	Installation Pattern	Vertical Ashlar
	Interior Finish Classification	Class I
	Remarks	

09 84 00 SOUND ABSORBING WALL UNITS

AWP-1	Panel Manuf.	Sound Concepts
	Type	CS 1 - Acoustical Wall Panels
	Color	Anchorage 2335 - Asteroid
	NRC	0.95
	Interior Finish Classification	Class A
AWP-2	Panel Manuf.	Sound Concepts
	Type	CS 1 - Acoustical Wall Panels
	Color	Anchorage 2335 - Midnight
	NRC	0.95
	Interior Finish Classification	Class A
AWP-3	Panel Manuf.	Sound Concepts
	Type	CS 1 - Acoustical Wall Panels
	Color	Anchorage 2335 - Cobalt
	NRC	0.95
	Interior Finish Classification	Class A

09 84 36 SOUND ABSORBING CEILING UNITS

SCU-1	Panel Manuf.	Wenger Ceiling Diffuser Panels
	Thickness	6" Thick
	Type	Lay in for standard grid ceiling
	Color	TBD
	Panel Size	4x4
	Location	Music Rooms
	Interior Finish Classification	Class A

09 91 00 PAINT

***Refer to specifications for paint type to be used for each substrate type.**

General Note: All gypsum walls to be level 4 finish unless noted otherwise in schedule below.

PT-1	Manufacture/Color No.	Sherwin Williams - SW 9541
	Color	White Snow
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	All Gypboard locations U.N.O
PT-2	Manufacture/Color No.	Sherwin Williams - SW 7004
	Color	Amazing Gray
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	Accent Color
PT-3	Manufacture/Color No.	Sherwin Williams - SW 9177
	Color	Salty Dog
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	Accent Color
PT-4	Manufacture/Color No.	Sherwin Williams - SW 6994
	Color	Greenblack
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	Black Box and Theater
PT-5	Manufacture/Color No.	Sherwin Williams - SW 7045
	Color	Intellectual Gray
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	Accent Color
PT-6	Manufacture/Color No.	Sherwin Williams - SW 7043
	Color	Worldly Gray
	Sheen	Semi-gloss
	Gypsum Level	Level 4
	Remarks	Accent Color

DIVISION 10 SPECIALTIES

10 11 00 VISUAL DISPLAY UNIT

VDU-1	Type	Porcelain-Enamel Markerboard
	Manufacturer	Claridge
	Product / Model No.	
	Fastening Method	concealed 'Z' clip mounting brackets
	Finish / Color	low gloss white
	Accessories	
	Remarks	Refer to interior elevations for size
VDU-2	Type	Tack Board
	Manufacturer	Claridge
	Product / Model No.	
	Fastening Method	concealed 'Z' clip mounting brackets
	Finish / Color	Fabric-backed vinyl surface/TBD
	Remarks	1/4-inch cork laminated over 1/4-inch hardboard in an extruded aluminum frame. Refer to interior elevations for size, magnetic

10 14 00 SIGNAGE AND GRAPHICS

*Refer to Signage and Graphics (SG) Drawings

G-WC-1	Type	Graphic Wall Covering
	Manufacturer	
	Product / Model No.	Product name
	Finish / Color	Satin white

10 22 38 OPERABLE PANEL PARTITIONS

OP-1	Manufacturer	Modernfold
	Product / Model No.	Acousti-Seal Encore Operable Partition
	Height	Refer for RCP for ceiling height
	Panels	Dual Paired Panel - 10 Panels
	STC Rating	56
	Operation	Manual
	Finish 1	Marker Board
	Finish 2	Marker Board
	Frame Finish	Clear anodized aluminum finish
	Seals	Top and Bottom Seals
	Location	Drama Classroom 419/433 Black Box
	Notes	Partition wall to extend to back of pocket when in closed position.

10 26 00 WALL AND DOOR PROTECTION

WP-1	Description	Crash Rail
	Manufacturer	Construction Specialties
	Product / Model No.	SCR-40
	Finish 1	1586 Naval Blue
	End Cap/Corners	Acrovyn End Cap 24I001xxx
	Size	4"
	Thickness	30.2 mm
	Mount	Bumper

10 28 00 TOILET, SHOWER AND CUSTODIAL ACCESSORIES

TA-1 TOILET PAPER

TA-1.2	Description	Toilet Tissue Dipenser-Surfaced Mounted
	Remarks	OFCI

TA-8 SOAP DISPENSER

TA-8.2	Description	Soap Dispenser - Wall Mounted
	Remarks	OFCI

10 44 13 FIRE PROTECTION CABINET

FEC-1	Description	Fire Extinguisher Cabinet
	Manufacturer	JL Industries
	Series	Embassy- Stainless Steel
	Model No.	5634V10
	Trim Style	Trimless Recessed
	Door Style	Solid with Handle
	Cabinet Material	Stainless Steel
	Cabinet Construction	Refer to specifications
	Fire Extinguisher	Refer to Life Safety Plans and 104416
	Fire Extinguisher Type	FE-1
	Remarks	Provide Magnetic catch

10 44 16 FIRE EXTINGUISHERS

FE-1	Description	Multi-Purpose Chemical (Class A,B,C Fires)
	Manufacturer	JL Industries
	Model No.	Cosmic 10E
	U/L Rating	4A-80BC

DIVISION 12 FURNISHINGS

12 21 13 HORIZONTAL LOUVER BLINDS

HLB-1	Description	Horizontal Louver Blinds
	Manufacturer	Levolor
	Size	1"
	Blind Color	TBD

12 24 13 ROLLER SHADES

RS-1	Description	Roller Shade
	Manufacturer	Draper, Inc.
	Shade Material	TBD
	Openness Factor	3% openness
	Rollers	One
	Operation	Motorized
	Interior Finish Classification	Class A
	Location	At clerestory windows
RS-2	Description	Roller Shade
	Manufacturer	Draper, Inc.
	Shade Material	TBD
	Openness Factor	3% openness
	Rollers	One
	Operation	Manual
	Interior Finish Classification	Class A
	Location	at exterior windows

12 36 23.13 PLASTIC LAMINATE-CLAD COUNTERTOPS

PL-2	Manufacturer	Wilsonart
	Product Name/No.	Standard Laminate
	Color	Slate Grey D91-60
	Texture	Matte Finish
	Comments	Millwork Countertop
PL-3	Manufacturer	Wilsonart
	Product Name/No.	Chemsurf
	Color	Graphite 10657
	Texture	Matte Finish
	Comments	Artroom Counter

F

EQUIPMENT SCHEDULE

ID	DESCRIPTION	MANUFACTURER	PRODUCT	FINISH	PROVIDED BY	INSTALL BY	NOTES
EA-1	Under Counter Refrigerator	Summit	24" Wide Built-In All-Refrigerator, ADA Compliant, ALS5	Stainless Steel	Contractor	Contractor	Verify Refrigerator will fit under counter
EA-2	Printer				Owner	Owner	
EA-3	Microwave				Owner	Contractor	
EA-4	Washer Extractor	Unimac	Cabinet Hardmount, UCT040QN	Stainless Steel	Contractor	Contractor	Electric, microprocessor control
EA-5	Front Load Dryer - Electric	Unimac	Single dryer, UT065	Stainless Steel	Contractor	Contractor	208/240 3-phase, 55lb capacity timer
EA-6	Freestanding ice machine	Manitowac	Ice Cube Machine, IT0450	Stainless Steel	Contractor	Contractor	

A

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D

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REGISTERED ARCHITECT — JOHN L. SERAFY — STATE OF TEXAS — 24625

23 OCTOBER 2025

C

	DATE	ISSUE
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

B

FORT BEND 2025 BOND — INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

MASTER SCHEDULE

SHEET NUMBER

A0.70

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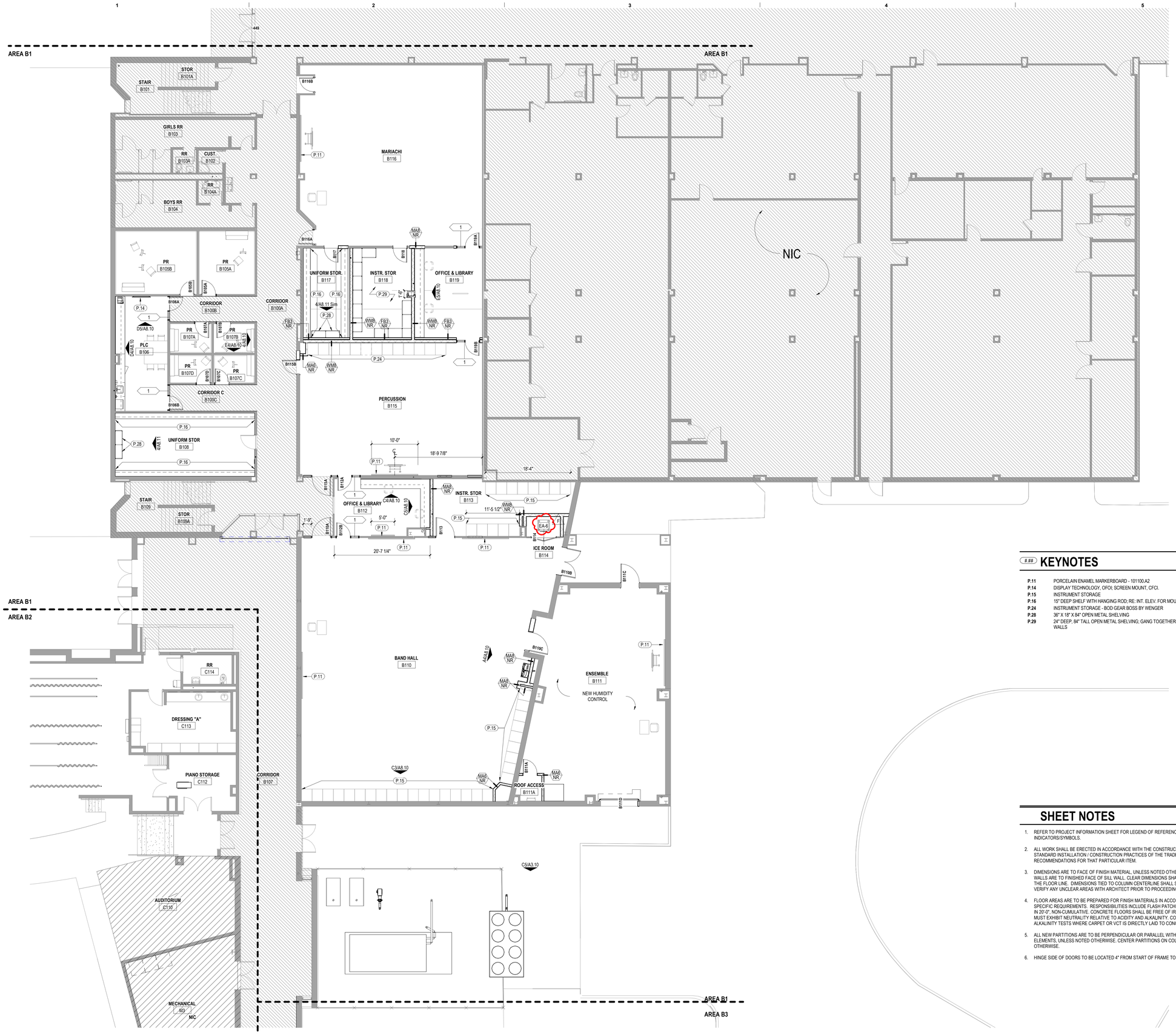

1/8" = 1'-0"

LEVEL 1 FLOOR PLAN- AREA B1 | B5

KEYNOTES

P.11	PORCELAIN ENAMEL MARKERBOARD - 101100.A2
P.14	DISPLAY TECHNOLOGY, OFOI; SCREEN MOUNT, CFCI.
P.15	INSTRUMENT STORAGE
P.16	15" DEEP SHELF WITH HANGING ROD; RE: INT. ELEV. FOR MOUNTING HEIGHTS
P.24	INSTRUMENT STORAGE - BOD GEAR BOSS BY WENGER
P.28	36" X 18" X 84" OPEN METAL SHELVING
P.29	24" DEEP, 84" TALL OPEN METAL SHELVING; GANG TOGETHER AND AFFIX TO WALLS

SHEET NOTES

1. REFER TO PROJECT INFORMATION SHEET FOR LEGEND OF REFERENCE SYMBOLS AND OTHER GRAPHIC INDICATORS/SYMBOLS.
2. ALL WORK SHALL BE ERECTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MAINTAIN STANDARD INSTALLATION / CONSTRUCTION PRACTICES OF THE TRADE AND MANUFACTURER'S RECOMMENDATIONS FOR THAT PARTICULAR ITEM.
3. DIMENSIONS ARE TO FACE OF FINISH MATERIAL, UNLESS NOTED OTHERWISE. DIMENSIONS TO EXTERIOR WALLS ARE TO FINISHED FACE OF SILL WALL. CLEAR DIMENSIONS SHALL NOT VARY AND ARE MEASURED AT THE FLOOR LINE. DIMENSIONS TIED TO COLUMN CENTERLINE SHALL SET FINISHED CLEAR DIMENSIONS. VERIFY ANY UNCLEAR AREAS WITH ARCHITECT PRIOR TO PROCEEDING.
4. FLOOR AREAS ARE TO BE PREPARED FOR FINISH MATERIALS IN ACCORDANCE WITH MANUFACTURER'S SPECIFIC REQUIREMENTS. RESPONSIBILITIES INCLUDE FLASH PATCHING TO LEVEL AND SMOOTH FLOOR TO 1" IN 20'-0", NON-CUMULATIVE. CONCRETE FLOORS SHALL BE FREE OF IRREGULARITIES IN THE SURFACE AND MUST EXHIBIT NEUTRALITY RELATIVE TO ACIDITY AND ALKALINITY. CONTRACTOR TO CONDUCT MOISTURE AND ALKALINITY TESTS WHERE CARPET OR VCT IS DIRECTLY LAID TO CONCRETE SLAB.
5. ALL NEW PARTITIONS ARE TO BE PERPENDICULAR OR PARALLEL WITH CORE OR EXTERIOR WINDOW WALL ELEMENTS, UNLESS NOTED OTHERWISE. CENTER PARTITIONS ON COLUMNS OR MULLIONS, UNLESS NOTED OTHERWISE.
6. HINGE SIDE OF DOORS TO BE LOCATED 4" FROM START OF FRAME TO NEAREST PERPENDICULAR PARTITION.

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REGISTERED ARCHITECT JOEY L. SEIDEL 24625 STATE OF TEXAS

23 OCTOBER 2025

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
F	10/23/2025	ADDENDUM 001

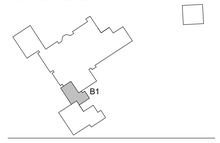
FORT BEND 2025 BOND INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE
LEVEL 1 - FLOOR PLAN - AREA B1

SHEET NUMBER
A2.31

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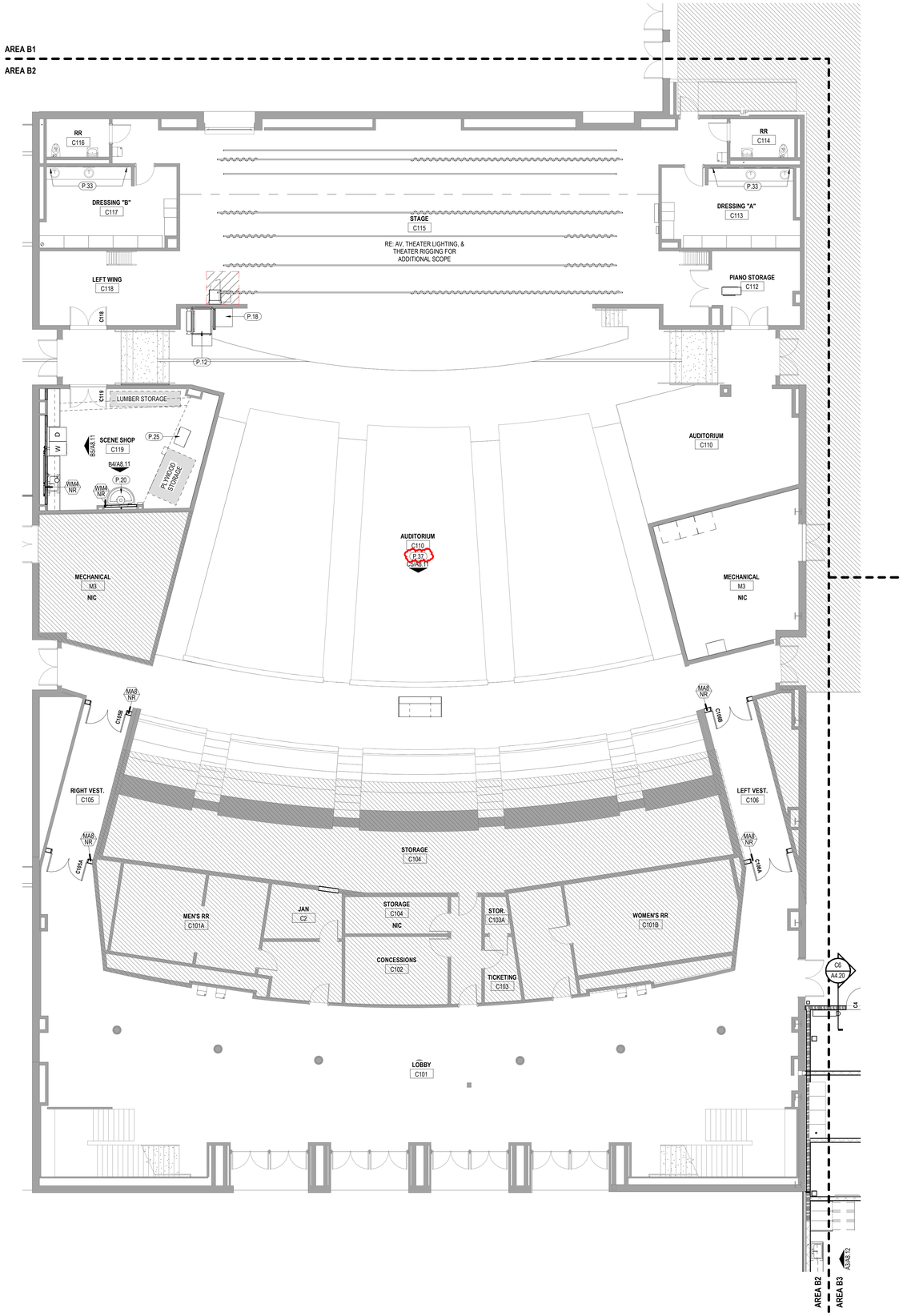

KEYNOTES

P.12	WHEELCHAIR LIFT - 144200
P.18	INFILL STAGE. MATCH EXISTING STAGE FINISHES.
P.20	TROUGH SINK
P.25	FLAMMABLE CABINET
F P.33	REPLACE EXISTING INCANDESCENT LIGHTING AT DRESSING ROOM MIRRORS
P.37	REPLACE FABRIC COVERS FOR 9 AUDITORIUM SEATS- VIF WHETHER THEY ARE BACK OR SEATS AND THE WIDTHS- FABRIC TO MATCH EXISTING - ABSECON MILLS SHIRE CORDON BLEU

SHEET NOTES

1. REFER TO PROJECT INFORMATION SHEET FOR LEGEND OF REFERENCE SYMBOLS AND OTHER GRAPHIC INDICATORS/SYMBOLS.
2. ALL WORK SHALL BE ERECTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MAINTAIN STANDARD INSTALLATION / CONSTRUCTION PRACTICES OF THE TRADE AND MANUFACTURER'S RECOMMENDATIONS FOR THAT PARTICULAR ITEM.
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5. ALL NEW PARTITIONS ARE TO BE PERPENDICULAR OR PARALLEL WITH CORE OR EXTERIOR WINDOW WALL ELEMENTS, UNLESS NOTED OTHERWISE. CENTER PARTITIONS ON COLUMNS OR MULLIONS, UNLESS NOTED OTHERWISE.
6. HINGE SIDE OF DOORS TO BE LOCATED 4" FROM START OF FRAME TO NEAREST PERPENDICULAR PARTITION.

1/8" = 1'-0"

LEVEL 1 FLOOR PLAN - AREA B2 | A4

Kirksey
ARCHITECTURE
Houston + Austin + Dallas
6909 Portwest Drive
Houston Texas 77024
713 850 9600
kirksey.com

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REGISTERED ARCHITECT
JOHN L. SERPA
STATE OF TEXAS
24625

23 OCTOBER 2025

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
F	10/23/2025	ADDENDUM 001

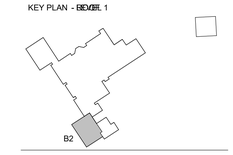
FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE
LEVEL 1 - FLOOR PLAN - AREA B2

SHEET NUMBER
A2.32

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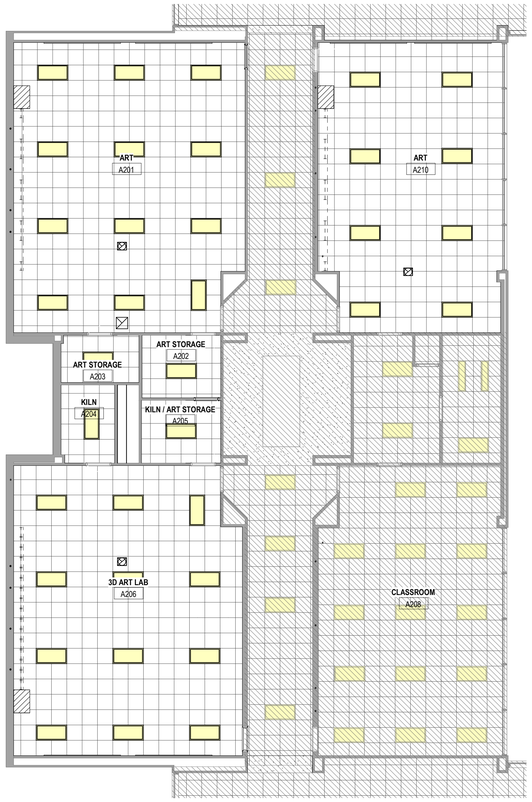
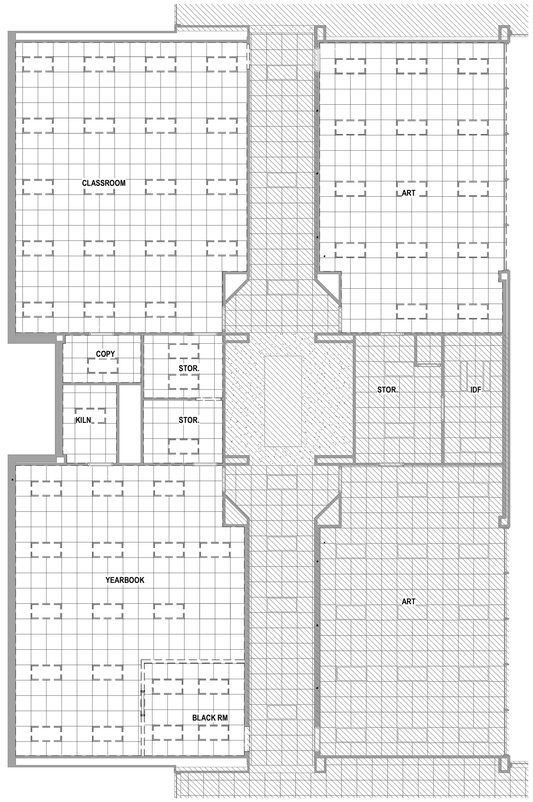
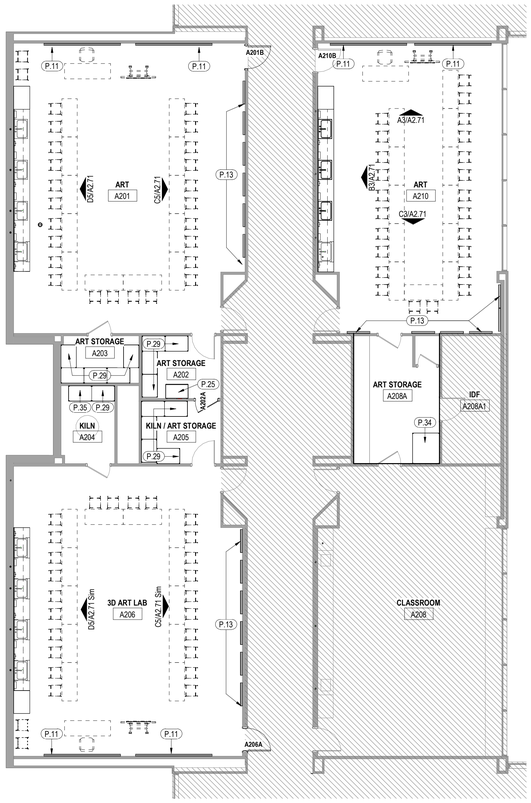


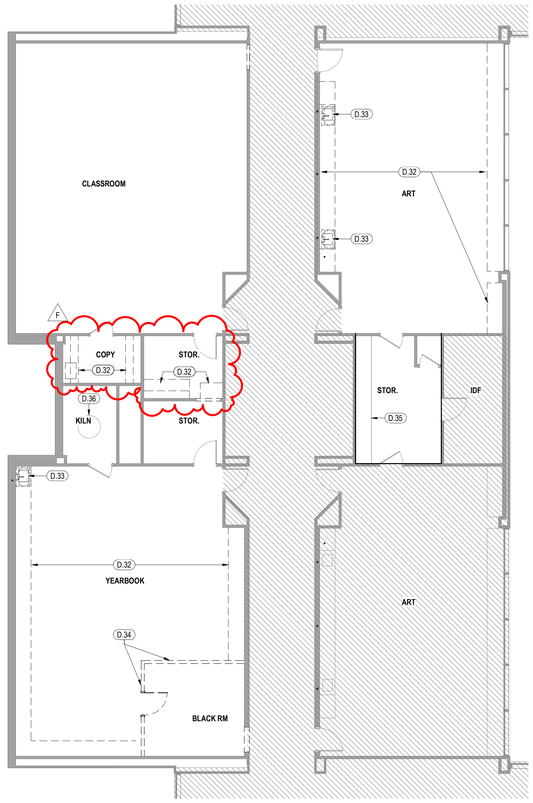
1/8" = 1'-0" ENLARGED RCP - ART ROOMS | C2



1/8" = 1'-0" ENLARGED DEMO RCP - ART ROOMS | C4



1/8" = 1'-0" ENLARGED PLANS - ART ROOMS | A2



1/8" = 1'-0" ENLARGED DEMO PLAN - ART ROOMS | A4

KEYNOTES

D.32	DEMO EXISTING CASEWORK IN ITS ENTIRETY
D.33	DEMO EXISTING SINK RE: PLUMBING
D.34	DEMO EXISTING DARK ROOM
D.35	EXISTING MILLWORK TO REMAIN
D.36	EXISTING KILN TO REMAIN
P.11	PORCELAIN ENAMEL MARKERBOARD - 101100.A2
P.13	DISPLAY CLIP FOR POSTER BOARDS; TACKLESS
P.25	FLAMMABLE CABINET
P.29	24" DEEP, 84" TALL OPEN METAL SHELVING; GANG TOGETHER AND AFFIX TO WALLS
P.34	POSTER BOARD STORAGE CABINET; 42" X 48" X 48"
P.35	DRYING RACK FOR CERAMIC PRODUCTS

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

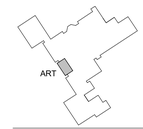
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

ENLARGED PLANS - ART ROOMS

SHEET NUMBER

A2.70

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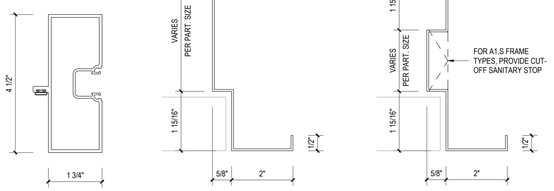
DOOR SCHEDULE

	DOOR				NO. OF	FRAME			DETAILS							
NO.	TYPE	FINISH	WIDTH	HEIGHT	LEAVES	TYPE	FINISH	ELEVATION	HEAD RE:	JAMB RE:	SILL RE:	HDWR. NO	FIRE RATING	TO ROOM: NUMBER	KEYING	COMMENTS
A201B	B4.1		3' - 0"	7' - 0"	1	A1						553		A201		NEW DOOR IN EXISTING WALL
A202A	A1		3' - 0"	7' - 0"	1	A1						503		A205		NEW DOOR IN EXISTING WALL
A206A	B4.1		3' - 0"	7' - 0"	1	A1						553		A206		NEW DOOR IN EXISTING WALL
B105A	S2		3' - 0"	7' - 0"	1	A1						S503		B105A		NEW STC 52 DOOR IN EXISTING WALL
B105B	S2		3' - 0"	7' - 0"	1	A1						S503		B105B		NEW STC 52 DOOR IN EXISTING WALL
B106A	B1		3' - 0"	7' - 0"		A1		1				553		B100B		NEW DOOR IN EXISTING WALL
B106B	B1		3' - 0"	7' - 0"		A1		1				553		B100C		NEW DOOR IN EXISTING WALL
B107A	S2		3' - 0"	7' - 0"	1	A1						S503		B107A		NEW STC 52 DOOR IN EXISTING WALL
B107B	S2		3' - 0"	7' - 0"	1	A1						S503		B107B		NEW STC 52 DOOR IN EXISTING WALL
B107C	S2		3' - 0"	7' - 0"	1	A1						S503		B107C		NEW STC 52 DOOR IN EXISTING WALL
B107D	S2		3' - 0"	7' - 0"	1	A1						S503		B107D		NEW STC 52 DOOR IN EXISTING WALL
B110A	S2		4' - 0"	7' - 10"	1	A1						S701		B100A		STC 52 DOOR/GLAZING CONSTRUCTION
B110B	B1	PT-#	6' - 0"	8' - 0"	2	B1	PT-#									CARD READER, DOOR POSITION SENSOR
B110C	S2		4' - 0"	7' - 10"	1	A1						S503		B111		STC 52 DOOR/GLAZING CONSTRUCTION
B110D			15' - 0"	10' - 0"										B107		
B111A	A1	PT-#	3' - 0"	7' - 0"	1	A1	PT-#					203		B111		
B111C	A1		4' - 0"	7' - 10"	1	A1						C715		EXTERIOR		NEW DOOR IN EXISTING WALL, CARD READER, DOOR POSTITION SENSOR
B111D			8' - 0"	8' - 0"								001		EXTERIOR		OVERHEAD DOOR; PROVIDE GATE CONTACTS
B112A	S1		3' - 0"	7' - 10"		A1		1				S103		B112		STC 48 DOOR/GLAZING CONSTRUCTION
B112B	S1		3' - 0"	7' - 10"		A1		1				S103		B112		STC 48 DOOR/GLAZING CONSTRUCTION
B113	B1		4' - 0"	7' - 10"	1	A1						203W		B113		
B114	B1		5' - 4"	7' - 10"	2	A1						212S		B110		
B115A	S2		4' - 0"	7' - 10"	1	A1						S553		B115		STC 52 DOOR/GLAZING CONSTRUCTION
B115B	S2		3' - 0"	7' - 10"	1	A1						S553		B115		STC 52 DOOR/GLAZING CONSTRUCTION
B116A	S2		3' - 0"	7' - 10"	1	A1						S701		B116		STC 52 DOOR/GLAZING CONSTRUCTION
B116B	S2		3' - 0"	7' - 10"	1	A1						S701		B116		STC 52 DOOR/GLAZING CONSTRUCTION
B117	B1		3' - 0"	7' - 0"	1	A1						203S		B117		
B118	B4	F	3' - 0"	7' - 0"	1	A1						203S		B118		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
B119A	S1		3' - 0"	7' - 10"		A1		1				S103		B116		STC 48 DOOR/GLAZING CONSTRUCTION
B119B	S1		3' - 0"	7' - 10"		A1		1				S103		B115		STC 48 DOOR/GLAZING CONSTRUCTION
B119E			3' - 0"	1' - 0 19/32"								003				ROOF HATCH, DOOR POSITION SENSOR
C4	A1		3' - 0"	8' - 0"	1	A1						C201	90 MIN	C4		CARD READER, DOOR POSITION SENSOR
C105A	A1		6' - 0"	7' - 0"	2	A1						710MGC		C105		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C105B	A1		6' - 0"	7' - 0"	2	A1						800VG		C110		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C106A	A1		6' - 0"	7' - 0"	2	A1						710MGC		C106		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C106B	A1		6' - 0"	7' - 0"	2	A1						800VG		C110		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C201A	A1		3' - 0"	7' - 0"	1	A1						711G		C201		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C201B	A1		3' - 0"	7' - 0"	1	A1						711G		C201		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C201C	A1		3' - 0"	7' - 0"	1	A1						711G		C201		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
C201D	A1		3' - 0"	7' - 0"	1	A1						711G		C201		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
K100A	M		8' - 0"	8' - 0"								710RHM	90 MIN	K100		
K100B	F1		6' - 0"	7' - 10"	2	F1						C710MAC		K100B		
K100C	F1		6' - 1"	7' - 10 1/4"		F1						C710MAC		EXTERIOR		CARD READER, DOOR POSITION SENSOR
K101A	S2		3' - 0"	7' - 10"	1	A1						S701		K101		STC 52 DOOR/GLAZING CONSTRUCTION
K101B	S1		4' - 0"	7' - 0"	1	A1						S203		K104		STC 48 DOOR CONSTRUCTION
K102	B1		3' - 0"	7' - 10"		A1		1				103GW		K102		SOLID CORE DOOR WITH FRAME/FLOOR SEALS; MIN STC 35 GLAZING
K103A	B1		4' - 0"	7' - 0"	1	A1						203GW		K103		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
K103B	B1		4' - 0"	7' - 0"	1	A1						203GW		K104		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
K104A	S1		4' - 0"	7' - 0"	1	A1						S701		K104		STC 52 DOOR CONSTRUCTION
K104B	A1		4' - 0"	7' - 10"	1	A1						C715		EXTERIOR		CARD READER, DOOR POSITION SENSOR
K104C			10' - 0"	10' - 0"								001		K104		OVERHEAD DOOR; PROVIDE GATE CONTACTS
K105A	S2		4' - 0"	7' - 10"	1	A1						S701		K105		STC 52 DOOR/GLAZING CONSTRUCTION
K105B	A1		3' - 6"	7' - 10"	1	A1						C715		K105		CARD READER, DOOR POSITION SENSOR
K106	B4		4' - 0"	7' - 10"	1	A1						203FW		K106		
K107	S2		4' - 0"	7' - 10"	1	A1						S203		K105		STC 52 DOOR/GLAZING CONSTRUCTION
K108	B1		3' - 0"	7' - 10"		A1		1				103GW		K108		SOLID CORE DOOR WITH FRAME/FLOOR SEALS; MIN STC 35 GLAZING
K110	S2		3' - 0"	7' - 10"	1	A1						S503		K110		STC 52 DOOR/GLAZING CONSTRUCTION
K111	S2		3' - 0"	7' - 10"	1	A1						S503		K100		STC 52 DOOR/GLAZING CONSTRUCTION
K112A	S2		4' - 0"	7' - 10"	1	A1						S701		K100		STC 52 DOOR/GLAZING CONSTRUCTION
K112B	A1		6' - 0"	7' - 10"		A1		B				C714M		EXTERIOR		CARD READER, DOOR POSITION SENSOR
K113	B1		3' - 0"	7' - 0"	1	A1						203G		K113		SOLID CORE DOOR WITH FRAME/FLOOR SEALS
K113A	S2		4' - 0"	7' - 0"	1	A1						S503		K105		STC 52 DOOR/GLAZING CONSTRUCTION
K113B	S2		4' - 0"	7' - 0"	1	A1						S503		K112		STC 52 DOOR/GLAZING CONSTRUCTION
K114	B1		3' - 0"	7' - 10"		A1		1				103GW		K112		SOLID CORE DOOR WITH FRAME/FLOOR SEALS; MIN STC 35 GLAZING
K115	B1		4' - 0"	7' - 0"	1	A1						203W		K115		
M4	A1		3' - 0"	7' - 0"	1	A1						201C	90 MIN	M4		
M4A			3' - 0"	1' - 0 19/32"								003				ROOF HATCH, DOOR POSITION SENSOR

EXISITNG DOOR SCHEDULE

	DOOR				NO. OF	FRAME			DETAILS							
NO.	TYPE	FINISH	WIDTH	HEIGHT	LEAVES	TYPE	FINISH	ELEVATION	HEAD RE:	JAMB RE:	SILL RE:	HDWR. NO	FIRE RATING	TO ROOM: NUMBER	KEYING	COMMENTS
A210B	B4.1		3' - 0"	7' - 0"	1	A1						553X				EXISITNG DOOR; 180 DEGREE HINGES
C118	B1	PT-#	6' - 0"	11' - 10 1/2"	2	B1	PT-#					212X		77		EXISITNG DOOR; RECEIVE NEW LOCKS
C119	B1	PT-#	6' - 0"	9' - 10 1/2"	2	B1	PT-#					212X		84		EXISITNG DOOR; RECEIVE NEW LOCKS

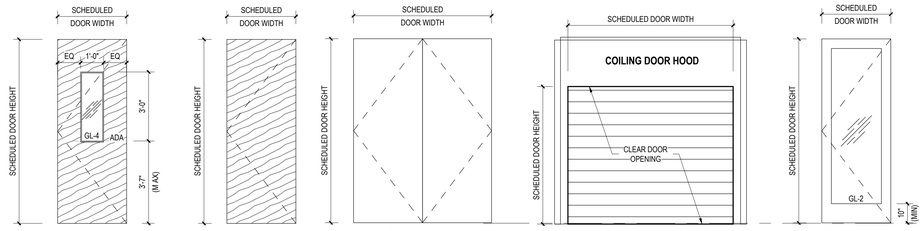


F1 08 41 16
STOREFRONT ALUMINUM FRAME EXTERIOR

A3 08 11 13
HOLLOW METAL FRAME SINGLE RABBET

A1 08 11 13
HOLLOW METAL FRAME EQUAL RABBET

6" = 1'-0" FRAME TYPES | C3



S2 08 34 73
WOOD SOUND CONTROL DOOR
RE: COMMENTS IN DOOR SCHEDULE FOR ACOUSTICAL REQUIREMENTS. VENEER TO MATCH EXISTING DOORS

S1 08 34 73
WOOD SOUND CONTROL DOOR
RE: COMMENTS IN DOOR SCHEDULE FOR ACOUSTICAL REQUIREMENTS. VENEER TO MATCH EXISTING DOORS

M 08 17 13
INTEGRATED METAL DOOR (DOUBLE EGRESS HOLD OPEN 90°

T1 08 33 23
OVERHEAD COILING DOOR

F1
08 41 13 EXTERIOR ALUM. DOOR (WIDE STILE)

B4.1 08 14 16
FLUSH WOOD DOOR WITH LITE

B4 08 14 16
FLUSH WOOD DOOR WITH LITE
RE: COMMENTS IN DOOR SCHEDULE FOR ACOUSTICAL REQUIREMENTS. VENEER TO MATCH EXISTING DOORS

B1 08 14 16
FLUSH WOOD DOOR

A1 08 11 13
HOLLOW METAL DOOR

3/8" = 1'-0" DOOR TYPES | A4

SDI 250.8 (TABLE 5)

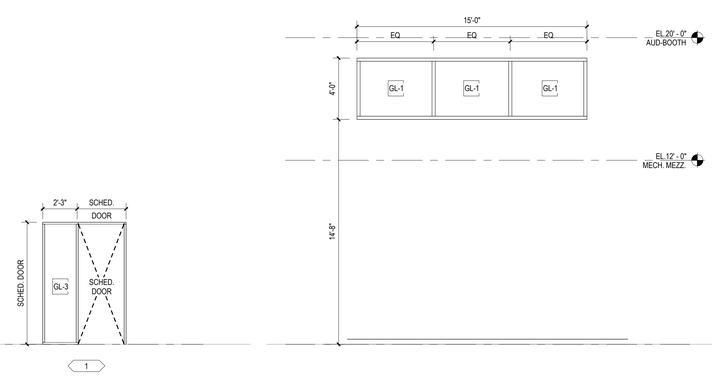
* HARDWARE MOUNTING HEIGHTS GUIDELINES		
LOCKS, LATCHES, ROLLER LATCHES & DOUBLE HANDLE SETS		**38" - 42"** CENTERLINE OF LOCK STRIKE FROM BOTTOM OF FRAME
RIM & MORTISE PANIC DEVICES		
COMBINATION PUSH BAR		CENTERLINE OF **42"** FROM BOTTOM OF FRAME
PULL PLATES		CENTERLINE OF GRIP @ **42"** FROM BOTTOM OF FRAME
HOSPITAL ARM PULL		CENTERLINE OF LOWER BASE IS **45"** FROM BOTTOM OF FRAME WITH GRIP OPEN AT BOTTOM
PUSH PLATES		CENTERLINE OF **45"** FROM BOTTOM OF FRAME
CYLINDRICAL & MORTISE DEADLOCKS		**48"** TO CENTERLINE OF STRIKE FROM BOTTOM OF FRAME, U.O.N.
HINGES	TOP	UP TO 11 3/4" FROM RABBET SECTION OF FRAME TO CENTERLINE OF HINGE
	BOTTOM	UP TO 13" FROM BOTTOM OF FRAME TO CENTERLINE OF HINGE
	INTERMEDIATE	EQUALLY SPACED BETWEEN TOP & BOTTOM HINGES

*** DOOR AND HARDWARE NOTES**

HARDWARE LOCATION ON DOOR TO BE CONTINGENT UPON THE FOLLOWING:

- FINAL LOCATION OF ALL HARDWARE SHALL BE CONTIGENT UPON LOCAL CODES.
- G.C. TO COORDINATE HARDWARE WITH DOOR LITES OR ANY OTHER SPECIAL REQUIREMENTS TO AVOID CONFLICT.
- G.C. TO COORDINATE DOOR AND DOOR HARDWARE WITH MANUFACTURER'S REQUIREMENTS

1/2" = 1'-0" DOOR HARDWARE MOUNTING HTS | A5



1/4" = 1'-0" INTERIOR WINDOW TYPES | 7

1/4" = 1'-0" EXTERIOR WINDOW TYPES | 4

Kirksey ARCHITECTURE
Houston + Austin + Dallas
6909 Portwest Drive
Houston Texas 77024
713 850 9600
kirksey.com

These drawings have been prepared as one coordinated set of drawings and are complimentary. What is required by one drawing is required by all of the drawings, even if a detail or component part is not identified on every sheet. Any user's reliance on a single or select few sheet(s) of the drawings without consideration for the information included in the entire set of drawings will be at the user's sole risk and shall not form the basis for a request for additional compensation or time.

REGISTERED ARCHITECT Jody L. Sorge 24625 STATE OF TEXAS

23 OCTOBER 2025

	DATE	ISSUE
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
DOOR SCHEDULE, DOOR LEAF, & FRAME TYPE, WINDOW TYPES AND GLAZING SCHEDULE

SHEET NUMBER
A6.20

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10/23/2025 10:38:27 AM Autodesk Docs://2023306 Willowridge High School/ARCH_Willowridge High School_2024.rvt

Docusign Envelope ID: 5555E922-9585-442E-BF8B-057333D2EAE3

Hardware Group No. 001 - OH DOOR

PROVIDE EACH RU DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R QTY REQD	626	SCH
1	EA	SFIC MORT CYLINDER	80-132 W/KEYED CONST. CORE QTY/TYPE REQD	626	SCH
	EA	NOTE	REMAINDER OF HARDWARE BY DOOR MFR.		

-COORDINATE HARDWARE WITH DOOR MFR.

Hardware Group No. 003 - ROOF HATCH

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
	EA	ALL HW BY OTHERS			B/O
	EA	DOOR CONTACT	BY SECURITY CONTRACTOR		B/O

Hardware Group No. 103GW - SGL OFFICE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
4	EA	HINGE	5BB1 5 X 4.5	652	IVE
1	EA	OFFICE/ENTRY LOCK	L9050HD 17A L583-363	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	DOOR BOTTOM	369AA/3551AA-Z49 (WD/MD AS REQ)	AA	ZER

Hardware Group No. 201C - SGL STORAGE CLOSER

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT	689	LCN
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 203 - SGL STORAGE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
4	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 203G - SGL STORAGE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	DOOR BOTTOM	369AA/3551AA-Z49 (WD/MD AS REQ)	AA	ZER

Hardware Group No. 203GW - SGL STORAGE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	DOOR BOTTOM	369AA/3551AA-Z49 (WD/MD AS REQ)	AA	ZER

Hardware Group No. 203S - SGL STORAGE OH STOP

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	OH STOP	900S SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 203SGW - SGL STORAGE OH STOP

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	OH STOP	900S SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	DOOR BOTTOM	369AA/3551AA-Z49 (WD/MD AS REQ)	AA	ZER

Hardware Group No. 203TW - SGL STORAGE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
4	EA	HINGE	5BB1 5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS408/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 203W - SGL STORAGE

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
4	EA	HINGE	5BB1 5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS408/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE	BK	ZER

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
			SILENCERS @ NON-RATED DOORS)		

Hardware Group No. 212S - PAIR STORAGE OH STOP

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
8	EA	HINGE	5BB1HW 4.5 X 4.5 NRP QTY/SIZE REQD	652	IVE
2	EA	SURFACE BOLT	SB360 12" T	604	IVE
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
2	EA	OH STOP	900S SERIES X SIZE & MOUNTING AS REQ	630	GLY
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER
1	EA	OVERLAPPING ASTRAGAL	383AA-DOOR HEIGHT	AA	ZER

Hardware Group No. 212X - PAIR STORAGE - REPLACE LOCKSET ONLY

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
	EA	BALANCE HARDWARE	EXISTING DOOR/FRAME		B/O
	EA	EXISTING TO REMAIN	REUSED		

HARDWARE SET IS A GUIDELINE.
GENERAL CONTRACTOR/HW SUPPLIER FIELD-VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTAL/ORDERING. PROVIDE/REPLACE ALL PRODUCTS/COMPONENTS NECESSARY FOR COMPLETE, FUNCTIONING COMPLIANT OPENING. ADVISE ARCHITECT OF ANY INCOMPATIBILITY REGARDING DOOR/FRAME/HARDWARE. GC AND HARDWARE SUPPLIER TO REVIEW ALL OPENINGS/HARDWARE SETS WITH OWNER/ARCHITECT AT LATER DATE TO DETERMINE EXACT REQUIREMENTS.
IN SUBMITTAL PROVIDE NAME, COMPANY AND DATE OF FIELD VERIFICATION. REPLACE ANY EXISTING MECHANICAL/ELECTRICAL HARDWARE THAT DOES NOT OPERATE PROPERLY. PROVIDE FILLER/COVER PLATES/BONDO/ETC WHERE REQUIRED.

Hardware Group No. 503 - SGL CLASSROOM LOCK

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 QTY/SIZE REQD	652	IVE
1	EA	CLASSROOM LOCK	L9070HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 553 - SGL STORAGE LOCK (CLASSROOM)

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP QTY/SIZE REQD	652	IVE
1	EA	CLASSROOM SECURITY	L9071HD 17A	626	SCH
2	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

Hardware Group No. 553X - SGL STORAGE LOCK (CLASSROOM)

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP QTY/SIZE REQD	652	IVE
1	EA	CLASSROOM SECURITY	L9071HD 17A	626	SCH
2	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

REVIEW EXISTING HINGE/HANGING DEVICE AND COORDINATE FOR 180-DEGREE SWING.
HARDWARE SET IS A GUIDELINE.
GENERAL CONTRACTOR/HW SUPPLIER FIELD-VERIFY EXISTING CONDITIONS PRIOR TO SUBMITTAL/ORDERING. PROVIDE/REPLACE ALL PRODUCTS/COMPONENTS NECESSARY FOR COMPLETE, FUNCTIONING COMPLIANT OPENING. ADVISE ARCHITECT OF ANY INCOMPATIBILITY REGARDING DOOR/FRAME/HARDWARE. GC AND HARDWARE SUPPLIER TO REVIEW ALL OPENINGS/HARDWARE SETS WITH OWNER/ARCHITECT AT LATER DATE TO DETERMINE EXACT REQUIREMENTS.
IN SUBMITTAL PROVIDE NAME, COMPANY AND DATE OF FIELD VERIFICATION. REPLACE ANY EXISTING MECHANICAL/ELECTRICAL HARDWARE THAT DOES NOT OPERATE PROPERLY. PROVIDE FILLER/COVER PLATES/BONDO/ETC WHERE REQUIRED.

Hardware Group No. 710MGC - PAIR PANIC DEV

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
2	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
1	EA	REMOVABLE MULLION	KR4954-STAB-MT54	689	VON
2	EA	PANIC HARDWARE	CD-99-EO-SNB	626	VON
4	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
3	EA	SFIC MORT CYLINDER	80-132 W/KEYED CONST. CORE	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	DOOR PULL	VR910 DT SNB	630	IVE
1	EA	DOOR PULL	VR910 NL SNB	630	IVE
2	EA	SURFACE CLOSER	4040XP-SCUSH-SNB	689	LCN
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A-DOOR WIDTH	A	ZER
1	EA	THRESHOLD	545A-FRAME WIDTH	A	ZER

Hardware Group No. 711G - SGL EXIT DEV ACOUSTIC SEAL / NON-STC RATED

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
1	EA	PANIC HARDWARE	CD-99-EO-SNB	626	VON
2	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	SFIC MORT CYLINDER	80-132 W/KEYED CONST. CORE	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	DOOR PULL	VR910 NL SNB	630	IVE
1	EA	SURFACE CLOSER	4040XP-RW/PA/EDA-TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS WHERE APPLICABLE	630	IVE
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
1	EA	DOOR SWEEP	39A-DOOR WIDTH	A	ZER
1	EA	SADDLE THRESHOLD	545-V3-FRAME WIDTH	A	ZER

Hardware Group No. 720DRHW - D=DOUBLE EGRESS / MAGNETIC HOLD-OPEN

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
2	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
2	EA	FIRE EXIT HARDWARE	9947-EO-F-LBR (WDC @ WD) LENGTH & HEIGHT AS REQ	626	VON
2	EA	SURFACE CLOSER	4040XP-RW/PA/EDA-TBSRT	689	LCN

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
2	EA	FIRE/LIFE WALL MAG	SEM7800 SERIES AS REQUIRED	689	LCN
1	EA	GASKETING	488S PSA H & J	BK	ZER
1	EA	OVERLAPPING ASTRAGAL	383AA/383FSAA AS REQ (OMIT WHERE SUPPLIED BY DOOR MFR)	AA	ZER

DOORS TO RELEASE UPON FIRE ALARM ACTIVATION

Hardware Group No. 800VG - PAIR PANIC DEV

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
2	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
2	EA	DUMMY PUSH BAR	330	626	VON
2	EA	DOOR PULL	VR910 DT SNB	630	IVE
2	EA	SURFACE CLOSER	4040XP-SCUSH-SNB	689	LCN
1	EA	MEETING STILE	328AA (2 PCS - 1 SET) HEIGHT AS REQUIRED	AA	ZER
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	JAMB SEAL	870AA-S (2PCS JAMB HEIGHT)	AA	ZER
2	EA	DOOR SWEEP	39A-DOOR WIDTH	A	ZER
1	EA	THRESHOLD	545A-FRAME WIDTH	A	ZER

Hardware Group No. C201 - SGL LOCK - ACCESS CONTROLLED (WHERE NOTED AND IDF/MDF)

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
4	EA	HINGE	5BB1 4.5 X 4.5 NRP QTY/SIZE REQD	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	EU MORTISE LOCK	L9092HDEU 17A CON 12/24 VDC	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	SURFACE CLOSER	4040XP-RW/PA/EDA-TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER
1	EA	VARIABLE LENGTH WIRE HARNESS	CON-XXP LENGTH AS REQ		SCH
1	EA	WIRING HARNESS (6")	CON-6W (FOR CONNECTION TO FIELD WIRING)		SCH
	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O
	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		B/O
	EA	DOOR CONTACT	BY SECURITY CONTRACTOR		B/O

Hardware Group No. C710MAC - PAIR EXIT DEV (ALUM) INCLUD VEST ACCESS CONTROLLED

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
1	EA	CONT. HINGE	112XY EPT HEIGHT AS REQ	628	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED MULLION	KR4954-STAB-MT54	689	VON
1	EA	PANIC HARDWARE	CD-99-EO-SNB	626	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO-CON-SNB 24 VDC	626	VON
3	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
2	EA	SFIC MORT CYLINDER	80-132 W/KEYED CONST. CORE	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	DOOR PULL	VR910 NL	630	IVE
2	EA	SURFACE CLOSER	4040XP-SCUSH-SNB	689	LCN
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
	SET	SEAL	PERIMETER SEAL BY FRAME MFR.		
	SET	ASTRAGAL	MEETING STILE SEAL BY DOOR MFR.		
1	EA	VARIABLE LENGTH WIRE HARNESS	CON-XXP LENGTH AS REQ		SCH
1	EA	WIRING HARNESS (6")	CON-6W (FOR CONNECTION TO FIELD WIRING)		SCH
	EA	BALANCE HARDWARE	BY DOOR MFG		B/O
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O
1	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		B/O
2	EA	DOOR CONTACT	BY SECURITY CONTRACTOR		B/O

Hardware Group No. C714M - PAIR EXIT DEV EXTERIOR (HM) ACCESS CONTROLLED

PROVIDE EACH PR DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	CONT. HINGE	700-HEIGHT REQD	630	IVE
1	EA	CONT. HINGE	700 EPT-HEIGHT REQD	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED MULLION	KR4954-STAB-MT54	689	VON
1	EA	PANIC HARDWARE	CD-99-EO-SNB	626	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO-CON-SNB 24 VDC	626	VON
3	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
2	EA	SFIC MORT CYLINDER	80-132 W/KEYED CONST. CORE	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	DOOR PULL	VR910 DT	630	IVE
1	EA	DOOR PULL	VR910 NL	630	IVE
2	EA	SURFACE CLOSER	4040XP-SCUSH-SNB	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS WHERE APPLICABLE	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	JAMB SEAL	328AA-2PC-JAMB HEIGHT	AA	ZER
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
2	EA	DOOR SWEEP	39A-DOOR WIDTH	A	ZER
1	EA	THRESHOLD	655A-EV3-FRAME WIDTH (OR AS DETAILED)	A	ZER
1	EA	VARIABLE LENGTH WIRE HARNESS	CON-XXP LENGTH AS REQ		SCH
1	EA	WIRING HARNESS (6")	CON-6W (FOR CONNECTION TO FIELD WIRING)		SCH
	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O
	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		B/O
	EA	DOOR CONTACT	BY SECURITY CONTRACTOR		B/O

Hardware Group No. C715 - SGL EXIT DEV EXTERIOR (HM) ACCESS CONTROLLED

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
1	EA	CONT. HINGE	700 EPT-HEIGHT REQD	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO-CON-SNB 24 VDC	626	VON
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	DOOR PULL	VR910 NL	630	IVE
1	EA	SURFACE CLOSER	4040XP-SCUSH-SNB	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS WHERE APPLICABLE	630	IVE
1	EA	RAIN DRIP	142A DW + 4"	AA	ZER
1	EA	JAMB SEAL	328AA-2PC-JAMB HEIGHT	AA	ZER
1	EA	HEADER SEAL	429AA-1PC-HEADER WIDTH	AA	ZER
1	EA	DOOR SWEEP	39A-DOOR WIDTH	A	ZER
1	EA	THRESHOLD	655A-EV3-FRAME WIDTH (OR AS DETAILED)	A	ZER
1	EA	VARIABLE LENGTH WIRE HARNESS	CON-XXP LENGTH AS REQ		SCH
1	EA	WIRING HARNESS (6")	CON-6W (FOR CONNECTION TO FIELD WIRING)		SCH
	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O
	EA	CREDENTIAL READER	BY SECURITY CONTRACTOR		B/O
	EA	DOOR CONTACT	BY SECURITY CONTRACTOR		B/O

BASIS OF DESIGN HARDWARE SET
-ALL HARDWARE SPECIFIED MUST BE APPROVED/COORDINATED WITH THE STC DOOR MFR. PRIOR TO ORDERING DOORS, FRAMES AND HARDWARE.
-A STANDARD STC UNIT IS SUPPLIED WITH NECESSARY HINGES, PERIMETER GASKETING AND RETAINER, DOOR BOTTOM, LOOSE STOPS, STOP OFFSET HARDWARE BRACKETS AND ALL REQUIRED FASTENERS.
-CLOSERS WITH EDA OR CUSH (RIGID TYPE ARMS) NOT ALLOWED WITH CAM-LIFT HINGES.

Hardware Group No. S553 - S=STC DOOR - BASIS OF DESIGN HARDWARE SET FOR OTHER MFR I.E.. KREIGER OR OVERLY

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
	EA	HINGE/PIVOTS	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	CLASSROOM SECURITY	L9071HD 17A	626	SCH
2	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
	EA	BALANCE OF HARDWARE	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	STRIKE & CLOSER MOUNTING BRACKETS	328SPB/870SPB/770SPB (AS REQD)		ZER

BASIS OF DESIGN HARDWARE SET
-ALL HARDWARE SPECIFIED MUST BE APPROVED/COORDINATED WITH THE STC DOOR MFR. PRIOR TO ORDERING DOORS, FRAMES AND HARDWARE.
-A STANDARD STC UNIT IS SUPPLIED WITH NECESSARY HINGES, PERIMETER GASKETING AND RETAINER, DOOR BOTTOM, LOOSE STOPS, STOP OFFSET HARDWARE BRACKETS AND ALL REQUIRED FASTENERS.
-CLOSERS WITH EDA OR CUSH (RIGID TYPE ARMS) NOT ALLOWED WITH CAM-LIFT HINGES.

Hardware Group No. S701 - S=STC DOOR - BASIS OF DESIGN HARDWARE SET FOR OTHER MFR I.E.. KREIGER OR OVERLY

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
	EA	HINGE/PIVOTS	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	PANIC HARDWARE	99-L-17-SNB	626	VON
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	SFIC RIM CYLINDER	80-159 W/KEYED CONST. CORE	626	SCH
1	EA	SURFACE CLOSER	4040XP-TBSRT-MOUNTING/ARM/BRKT A REQD	689	LCN
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
	EA	BALANCE OF HARDWARE	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	STRIKE & CLOSER MOUNTING BRACKETS	328SPB/870SPB/770SPB (AS REQD)		ZER

BASIS OF DESIGN HARDWARE SET
-ALL HARDWARE SPECIFIED MUST BE APPROVED/COORDINATED WITH THE STC DOOR MFR. PRIOR TO ORDERING DOORS, FRAMES AND HARDWARE.
-A STANDARD STC UNIT IS SUPPLIED WITH NECESSARY HINGES, PERIMETER GASKETING AND RETAINER, DOOR BOTTOM, LOOSE STOPS, STOP OFFSET HARDWARE BRACKETS AND ALL REQUIRED FASTENERS.
-CLOSERS WITH EDA OR CUSH (RIGID TYPE ARMS) NOT ALLOWED WITH CAM-LIFT HINGES.

Hardware Group No. S103 - S=STC DOOR - BASIS OF DESIGN HARDWARE SET FOR OTHER MFR I.E.. KREIGER OR OVERLY

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
	EA	HINGE/PIVOTS	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	OFFICE/ENTRY LOCK	L9050HD 17A 09-544	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
	EA	BALANCE OF HARDWARE	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	STRIKE & CLOSER MOUNTING BRACKETS	328SPB/870SPB/770SPB (AS REQD)		ZER

BASIS OF DESIGN HARDWARE SET
-ALL HARDWARE SPECIFIED MUST BE APPROVED/COORDINATED WITH THE STC DOOR MFR. PRIOR TO ORDERING DOORS, FRAMES AND HARDWARE.
-A STANDARD STC UNIT IS SUPPLIED WITH NECESSARY HINGES, PERIMETER GASKETING AND RETAINER, DOOR BOTTOM, LOOSE STOPS, STOP OFFSET HARDWARE BRACKETS AND ALL REQUIRED FASTENERS.
-CLOSERS WITH EDA OR CUSH (RIGID TYPE ARMS) NOT ALLOWED WITH CAM-LIFT HINGES.

Hardware Group No. S203 - S=STC DOOR - BASIS OF DESIGN HARDWARE SET FOR OTHER MFR I.E.. KREIGER OR OVERLY

PROVIDE EACH SGL DOOR(S) WITH THE FOLLOWING:

QT		DESCRIPTION	CATALOG NUMBER	FINIS H	MFR
	EA	HINGE/PIVOTS	PROVIDED BY SOUND DOOR MFG		B/O
1	EA	STOREROOM LOCK	L9080HD 17A	626	SCH
1	EA	SFIC EVEREST PERM CORE	80-037 CKC EV29 R	626	SCH
1	EA	DOOR STOP (TYPE REQD)	WS406/WS407CCV/FS436/OH STOP - AS REQD	626	IVE
	EA	BALANCE OF HARDWARE	PROVIDED BY SOUND DOOR MFG		B/O
1

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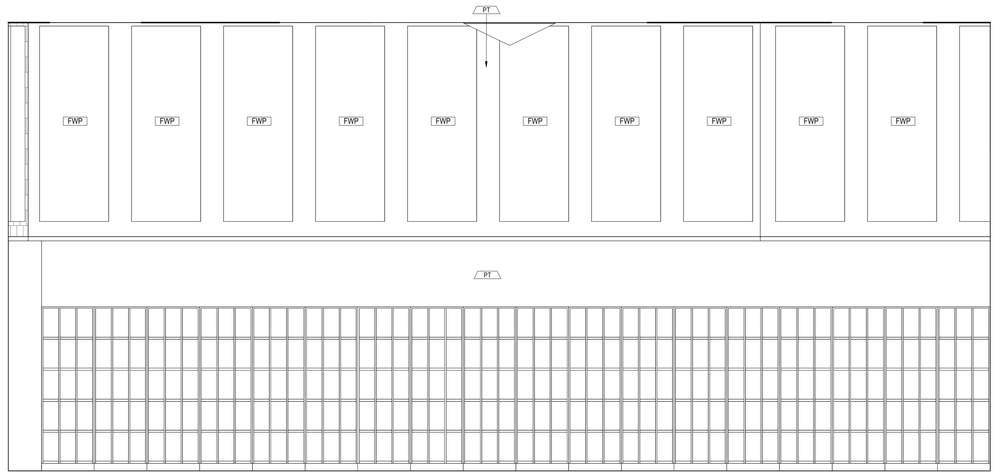
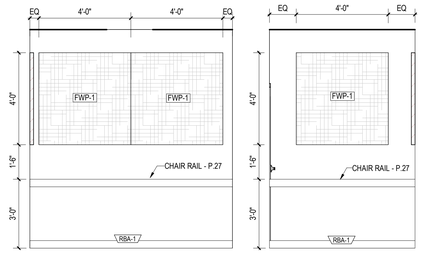
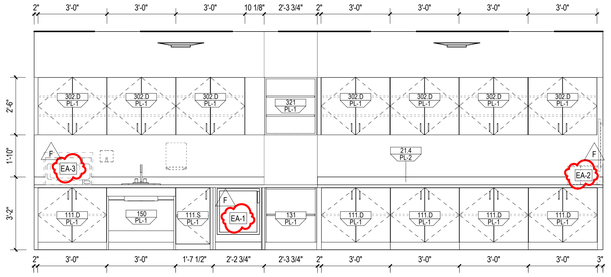


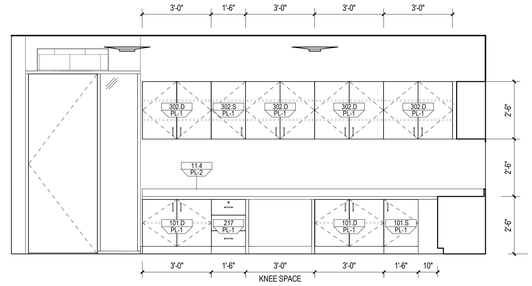
3/8" = 1'-0" BAND HALL B110 S | C3



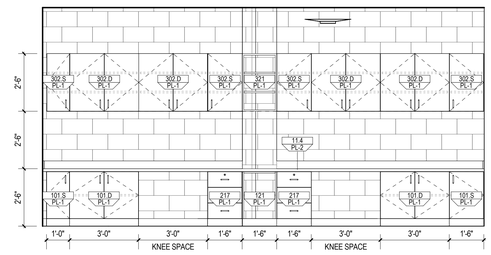
3/8" = 1'-0" PRACTICE ROOM B107B E & S | E4



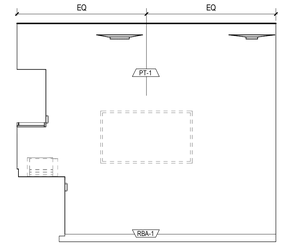
3/8" = 1'-0" PLC B106 W | D4



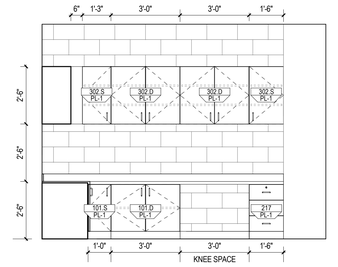
3/8" = 1'-0" BAND OFFICE & LIBRARY B112 N | C4



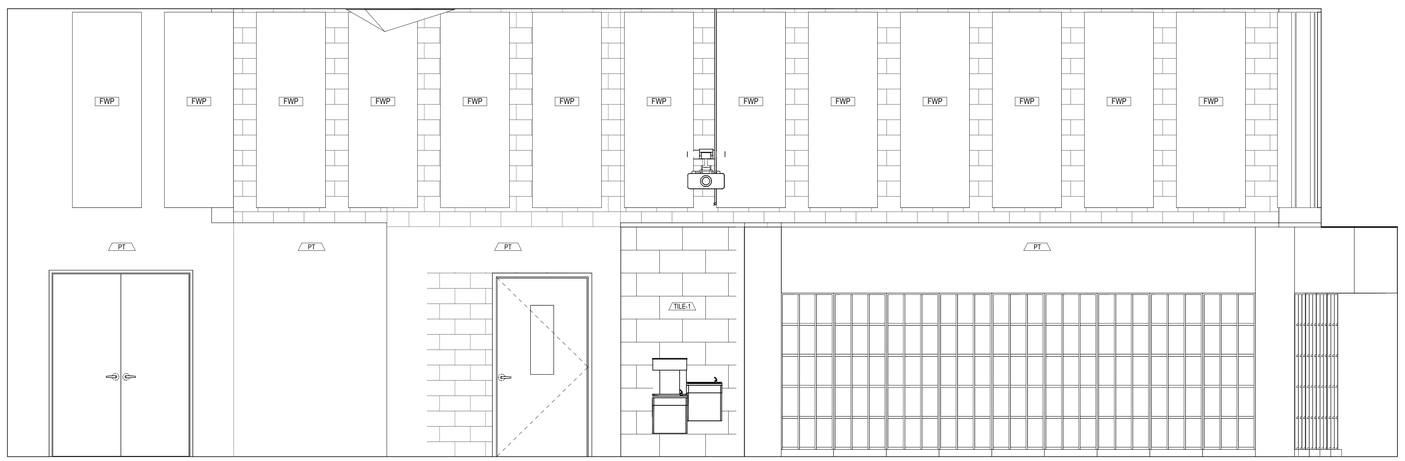
3/8" = 1'-0" MARIACHI OFFICE & LIBRARY B119 W | E5



3/8" = 1'-0" PLC 106 N | D5



3/8" = 1'-0" BAND OFFICE & LIBRARY B112 W | C5



3/8" = 1'-0" BAND HALL B110 E | A4

SHEET NOTES

1. PROVIDE CONTROL JOINTS AT ALL OPENINGS (DOORS, WINDOWS, AND CASED IN DRYWALL PARTITIONS.

Kirksey ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

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REGISTERED ARCHITECT JOHN L. SERPA 24625 STATE OF TEXAS

23 OCTOBER 2025

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
F	10/23/2025	ADDENDUM 001

FORT BEND 2024 BOND INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

INTERIOR ELEVATIONS

SHEET NUMBER

A8.10

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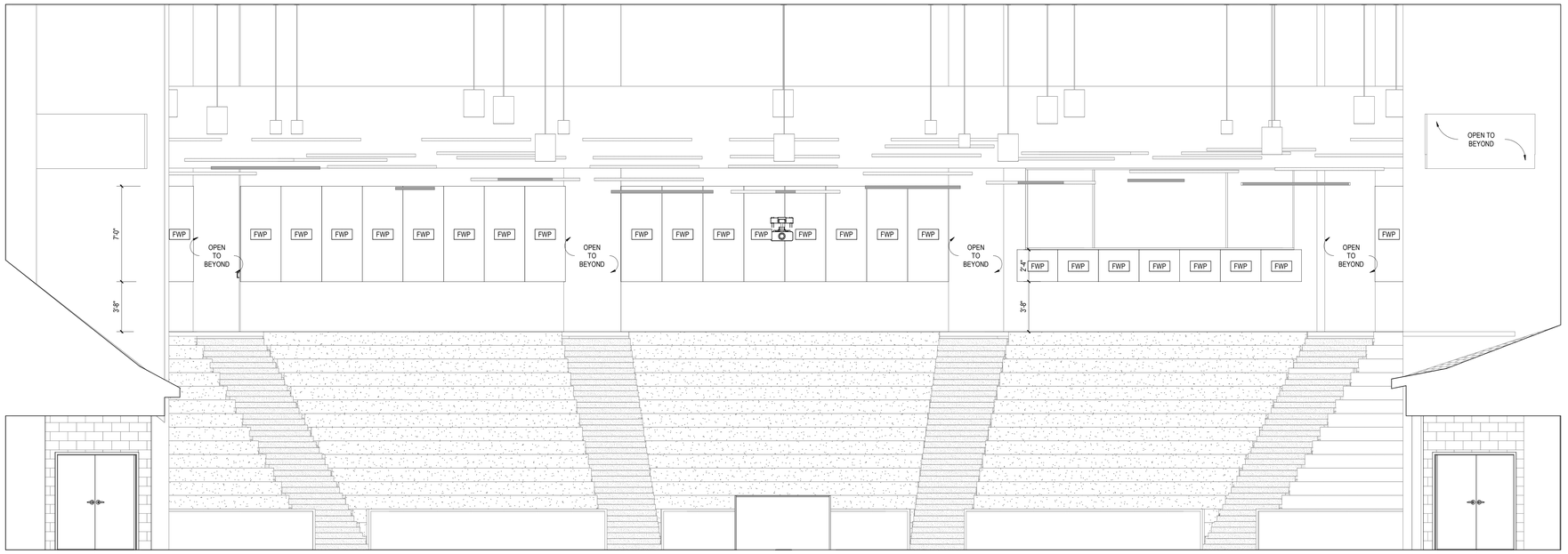
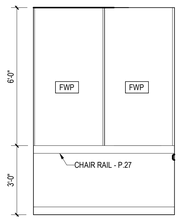
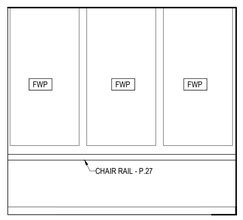


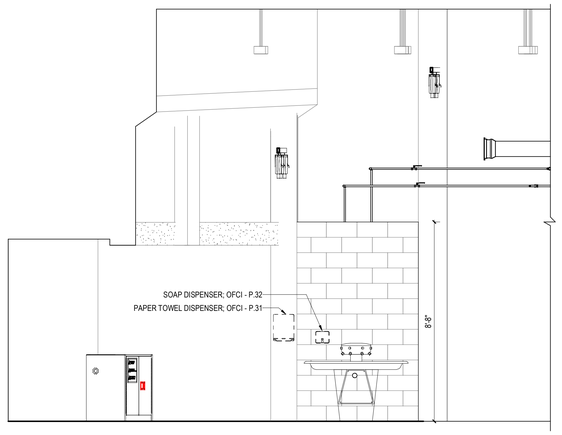
1/4" = 1'-0" AUDITORIUM UPPER TIER C110 S | C5



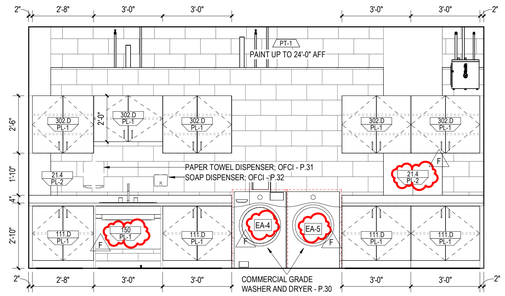
3/8" = 1'-0" TYP. P.R. E | B2



3/8" = 1'-0" TYP. PRACTICE ROOM S | B3



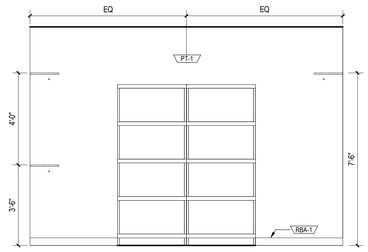
3/8" = 1'-0" SCENE SHOP C119 S | B4



3/8" = 1'-0" SCENE SHOP C119 W | B5

SHEET NOTES

1. PROVIDE CONTROL JOINTS AT ALL OPENINGS (DOORS, WINDOWS, AND CASED IN DRYWALL PARTITIONS.



3/8" = 1'-0" BAND UNIFORM STOR. B108 W | 4

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REGISTERED ARCHITECT JOHN L. SERPA 24625 STATE OF TEXAS

23 OCTOBER 2025

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023 2028

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
INTERIOR ELEVATIONS

SHEET NUMBER
A8.11

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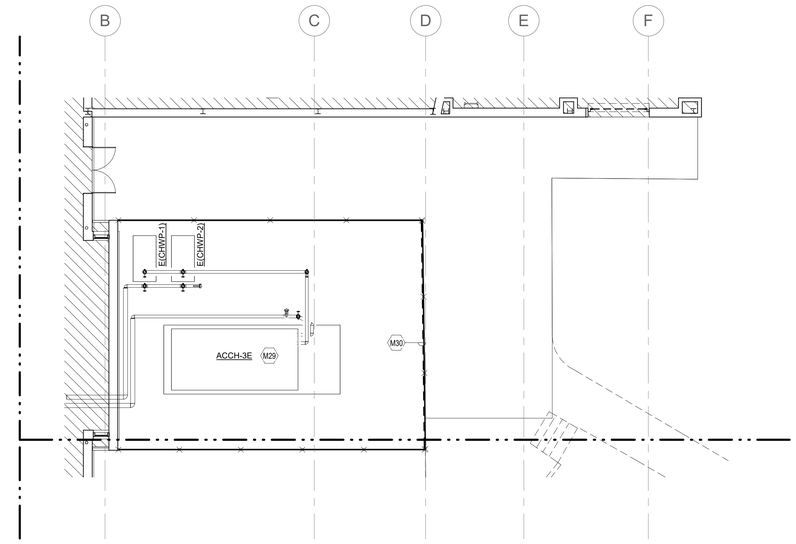
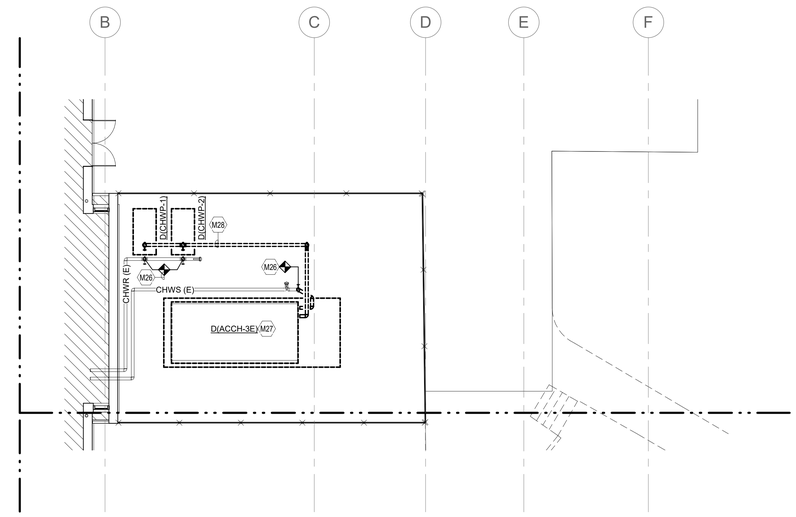
GENERAL NOTES:
- REFER TO SHEET M4.20 FOR CHW PLANT SCHEMATICS
- REFER TO SHEET M6.03 FOR CHW PLANT CONTROLS SCOPE AND INFORMATION

TAGGED NOTES

##	
M26	DEMO CHILLED WATER PIPING BELOW VERTICAL CONTROL VALVE BACK TO EQUIPMENT.
M27	DEMO EXISTING AIR COOLED CHILLER AND ASSOCIATED CONCRETE PAD.
M28	DEMO CHILLED WATER PUMPS AND ALL CHILLED WATER PIPING BETWEEN PUMPS AND EXISTING AIR COOLED CHILLER.
M29	ALL EXISTING PIPING AND EQUIPMENT TO REMAIN.
M30	DEMO BACK FENCE TO BE EXTENDED.



1 LEVEL 1 MECHANICAL YARD DEMO PLAN - AREA B3
1/8" = 1'-0"



2 LEVEL 1 MECHANICAL YARD DEMO PLAN ALTERNATE - AREA B3
1/8" = 1'-0"

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STATE OF TEXAS
RICHARD LOPEZ
105316
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.09.16

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1

SHEET TITLE

LEVEL 1 MECHANICAL DEMOLITION PLAN - MECH YARD

SHEET NUMBER

M1.14

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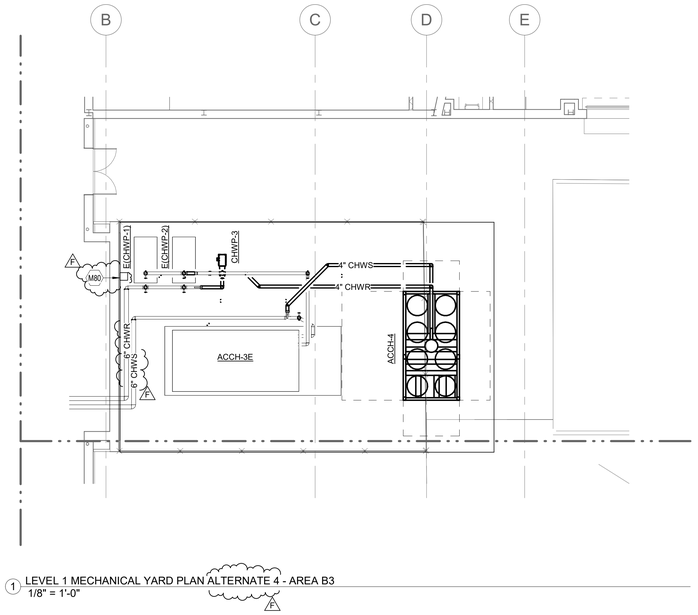
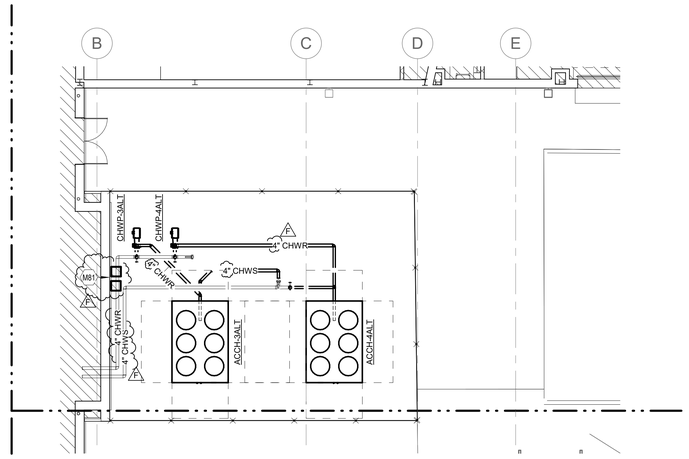
GENERAL NOTES:
- REFER TO SHEET M4.20 FOR CHW PLANT SCHEMATICS
- REFER TO SHEET M6.03 FOR CHW PLANT CONTROLS SCOPE AND INFORMATION

TAGGED NOTES

##	
M80	FURNISH AND INSTALL VFD FOR PUMP CHWP-3. PUMP SHALL BE LOCATED IN NEMA 3R ENCLOSURE.
M81	FURNISH AND INSTALL VFD'S FOR PUMPS CHWP-3ALT AND CHWP-4ALT IN NEMA 3R ENCLOSURES.



1 LEVEL 1 MECHANICAL YARD PLAN ALTERNATE 4 - AREA B3
1/8" = 1'-0"



2 LEVEL 1 MECHANICAL YARD PLAN ALTERNATE 5 - AREA B3
1/8" = 1'-0"

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713 850 9600
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STATE OF TEXAS
RICHARD LOPEZ
105316
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.09.16

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

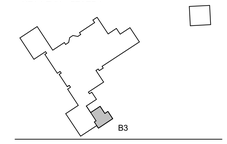
FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE
LEVEL 1 MECHANICAL PLAN - MECH YARD

SHEET NUMBER
M2.14

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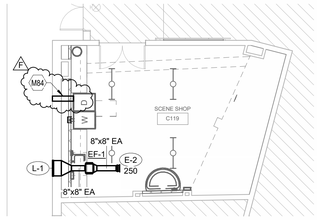
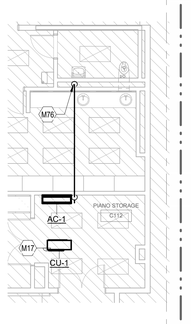
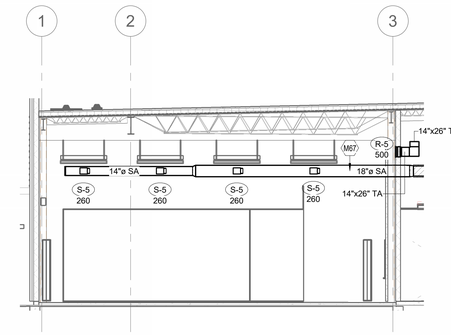


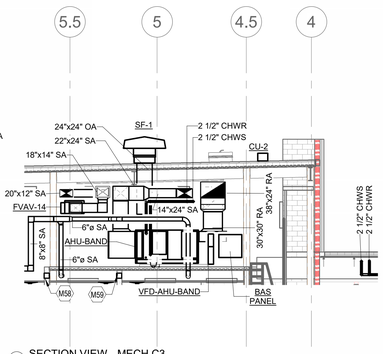
3 ENLARGED MECHANICAL PLAN - SCENE SHOP - AREA B2
1/8" = 1'-0"



4 ENLARGED MECHANICAL PLAN - PIANO STORAGE - AREA B2
1/8" = 1'-0"

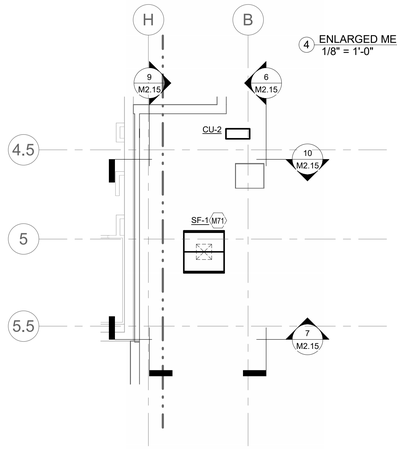


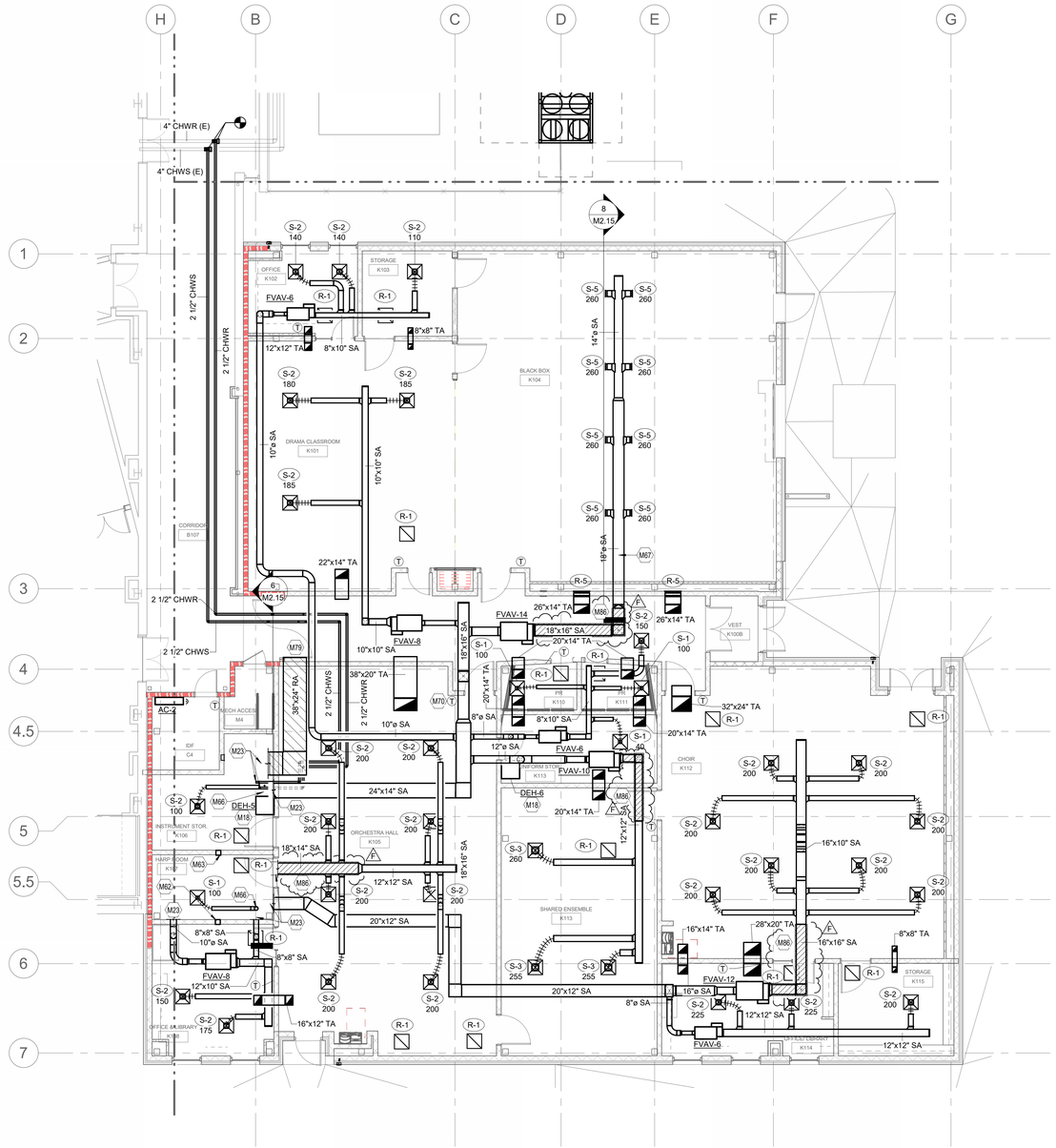
8 SECTION VIEW - BLACK BOX - AREA B3
1/8" = 1'-0"



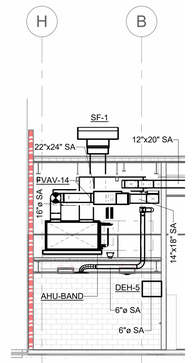
6 SECTION VIEW - MECH C3
1/8" = 1'-0"

TAGGED NOTES	##
M17	CU-1 TO BE MOUNTED ON ROOF.
M18	PROVIDE DEHUMIDIFIER DESERT AIRE HPR120 OR EQUAL. TO BE INSTALLED ON WALL BELOW CEILING WITH WALL MOUNTING BRACKET. ROUTE CONDENSATE TO CONDENSATE WALL BOX PROVIDED ON PLUMBING SHEETS.
M23	REFER TO 2/M2.15 FOR DUCTWORK CONTINUATION.
M58	CUT IN TRANSFER AIR PATHS ABOVE CEILING BETWEEN PLENUMS. FIELD VERIFY THAT THESE TRANSFER PATHS DO NOT ALREADY EXIST.
M59	UP TO EXISTING TO REMAIN GRAVITY VENTILATOR ON ROOF.
M62	PROVIDE 10"X10" WALL OPENING ABOVE CEILING FOR AIR TRANSFER.
M63	PROVIDE 8"X8" WALL OPENING ABOVE CEILING FOR AIR TRANSFER.
M64	REFER TO 1/M2.15 FOR DUCTWORK CONTINUATION.
M66	SUPPLY DUCTWORK ROUTED DOWN FROM MECHANICAL ROOM ABOVE. REFER TO 2/M.15 FOR DUCTWORK CONTINUATION.
M67	EXPOSED DUCTWORK SHALL BE DOUBLE WALL ROUND DUCT WITH PAIN GRIP FINISH. PAINT COLOR TO BE BLACK. PROVIDE ESCUCHEON PLATE AT WALL PENETRATION.
M69	24"X24" OA DUCTWORK ROUTED DOWN FROM ROOF MOUNTED SUPPLY FAN.
M70	NEW THERMOSTAT TO SERVE FVAV-14 LOCATED IN MECH C3.
M71	NEW ROOF MOUNTED SUPPLY FAN. ROUTE DUCTWORK DOWN TO MECH C3. REFER TO PLANS FOR MORE INFORMATION.
M72	PROVIDE MANUAL DAMPER AS SHOWN ON PLANS.
M76	ROUTE CONDENSATE DOWN IN WALL AND SPILL TO LAVATORY P-TRAP VIA TAIL-PECE WYE. COORDINATE WITH PLUMBING.
M79	INTERALLY LINE HATCHED RA DUCTWORK WITH 2 INCH ACOUSTICAL LINER. REFER TO 1/M2.15 & 2/M2.15 FOR FULL DUCTWORK ROUTED WITH HATCHED LINE.
M84	FURNISH AND INSTALL 8" DRYER VENT FROM THE BACK OF THE DRYER OUT TO THE EXTERIOR WALL. PROVIDE EXTERIOR DRYER VENT HOUSING ON EXTERIOR WALL AND PAINT TO MATCH EXTERIOR BRICK. SEAL WALL WATER TIGHT. VERIFY VENT SIZE WITH MANUFACTURER.
M85	INTERNALLY LINE ALL SUPPLY AIR WITHIN MECH C3 ROOM WITH 2" OF INSULATION.
M86	INTERNALLY INSULATED SA DUCT DOWNSTREAM OF TERMINAL UNIT SHOWN HATCHED WITH 2" OF FIBERGLASS INSULATION.

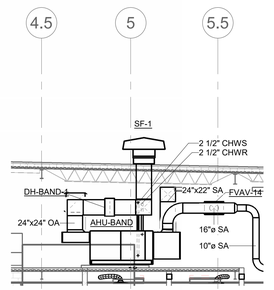




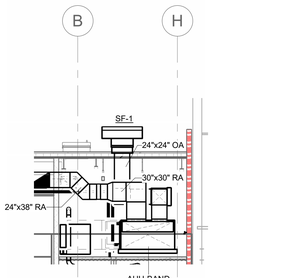
1 LEVEL 1 AIR DISTRIBUTION PLAN - AREA B3
1/8" = 1'-0"



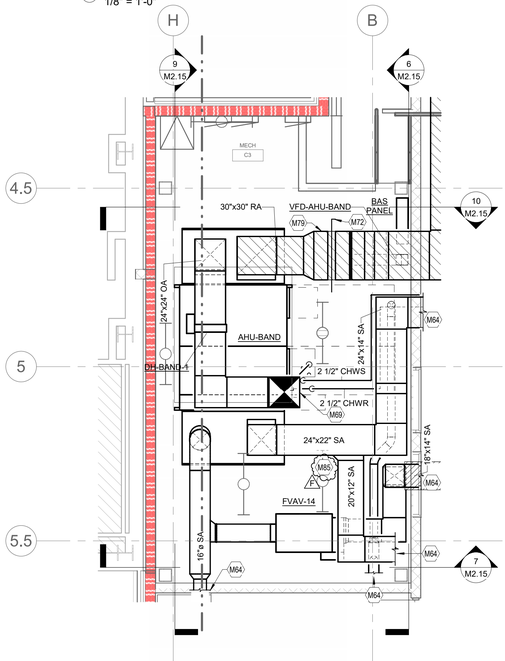
7 SECTION VIEW - MECH C3 - 2
1/8" = 1'-0"



9 SECTION VIEW - MECH C3 - 3
1/8" = 1'-0"



10 SECTION VIEW - MECH C3 - 4
1/8" = 1'-0"



2 ENLARGED MECHANICAL VIEW - MECH C3 - AREA B3
1/4" = 1'-0"

5 PARTIAL ROOF PLAN - MECH C3 - AREA B3
1/8" = 1'-0"

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ARCHITECTURE

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CMTA F-8627
2025.09.16

△	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
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E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1

SHEET TITLE

LEVEL 1 MECHANICAL PLAN - AREA B3

SHEET NUMBER

M2.15

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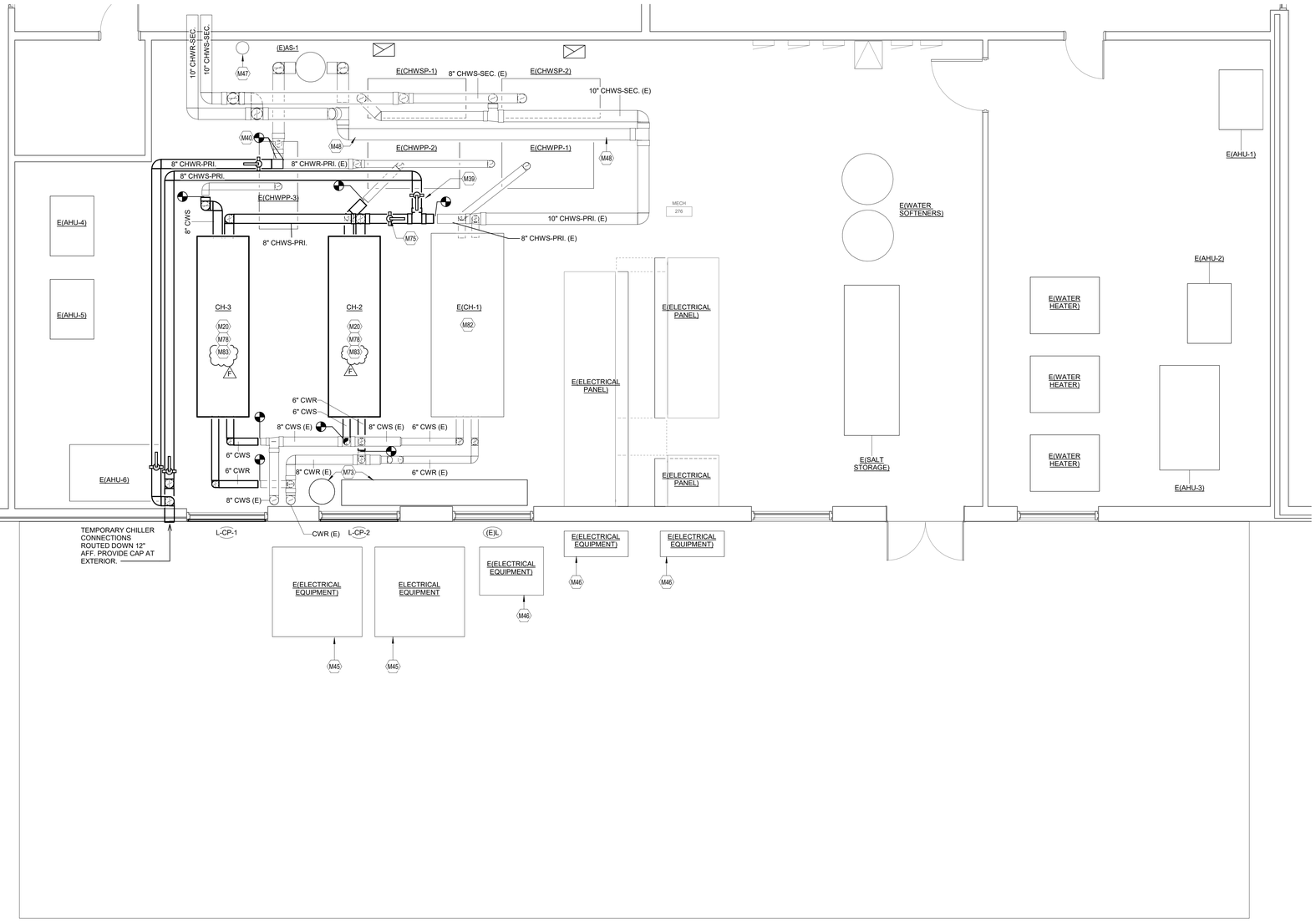

1 LEVEL 2 AIR DISTRIBUTION PLAN - CENTRAL PLANT
1/4" = 1'-0"

TAGGED NOTES ##

M20	INSTALL NEW CHILLER THROUGH EXISTING LOUVER OPENING ON 2ND FLOOR. CONTRACTOR TO COORDINATE WITH ELECTRICAL EQUIPMENT ON GROUND WHEN REMOVING AND ADDING CHILLERS.
M39	NEW CONNECTION POINT FOR TEMP CHILLER SUPPLY. FREEZE PIPE AND INSTALL NEW ISOLATION VALVE AS SHOWN.
M40	NEW CONNECTION POINT FOR TEMP CHILLER RETURN. FREEZE PIPE AND INSTALL NEW ISOLATION VALVE AS SHOWN.
M45	EXISITNG GROUND LEVEL ELECTRICAL EQUIPMENT EXISTING TO REMAIN. CHILLER AND RIGGING WILL NEED TO COME THROUGH LOUVER AND OUT OVER EQUIPMENT. CONTRACTOR TO PLAN FOR NECESSARY EQUIPMENT.
M46	EXISITNG UPPER LEVEL ELECTRICAL EQUIPMENT TO REMAIN. CONTRACTOR TO ENSURE THAT NO ELECTRICAL EQUIPMENT IS DAMAGED DURING REMOVAL OR INSTALLATION OF NEW CHILLERS.
M47	EXISITNG POT FEEDER TO REMAIN.
M48	EXISITNG BYPASS PIPING TO REMAIN.
M73	NEW CONDENSER WATER TREATMENT SYSTEM TO BE INSTALLED AFTER NEW CHILLERS HAVE BEEN MOVED IN AND INSTALLED IN FULL.
M75	NEW PERMANENT CHWS-PRI. PIPING. FREEZE PIPE AND INSTALL NEW ISOLATION VALVE AS SHOWN.
M78	INSTALL NEW CONCRETE PADS WITH VIBRATION ISOLATORS FOR NEW CHILLERS. VIBRATION ISOLATORS TO BE MASON INDUSTRIES MODEL SLR-3-136 (MINIMUM 3" DEFLECTION), QTY (4).
M82	REPLACE EXISTING EMERGENCY REFRIGERANT MONITORING SYSTEM FOR EXISTING TO REMAIN CHILLER, CH-3. TIE MONITORING SYSTEM INTO THE OPERATION OF THE EXISTING PURGE EXHAUST FAN. FIELD VERIFY REFRIGERANT TYPE FOR EXISTING CHILLER.
M83	PROVIDE NEW EMERGENCY REFRIGERANT MONITORING SYSTEM FOR TWO NEW CHILLERS. TIE THE MONITORING SYSTEM INTO THE OPERATION OF THE EXISTING PURGE EXHAUST. VERIFY SELECTED CHILLER REFRIGERANT TYPE.

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RICHARD LOPEZ
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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

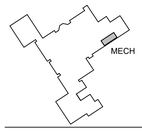
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 MECHANICAL PLAN - CENTRAL PLANT

SHEET NUMBER

M2.21

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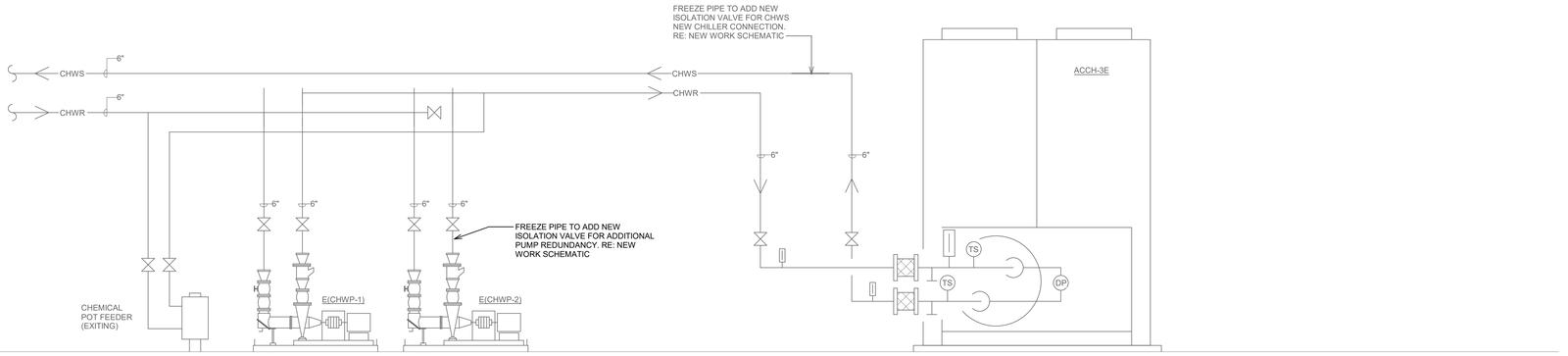
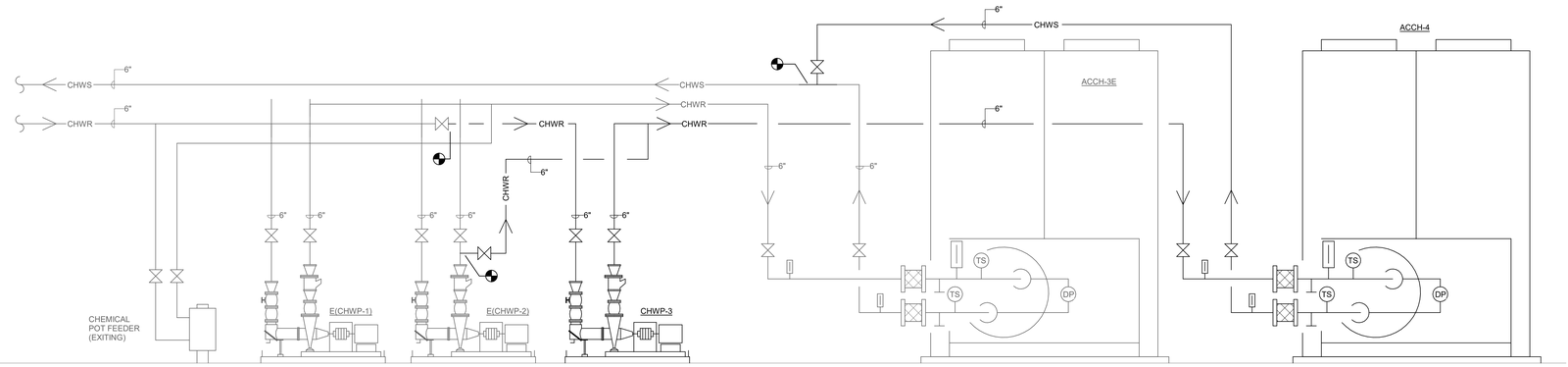


FINE ARTS CHILLED WATER SCHEMATIC - DEMO - ALTERNATE 4

NTS



FINE ARTS CHILLED WATER SCHEMATIC - NEW WORK - ALTERNATE 4

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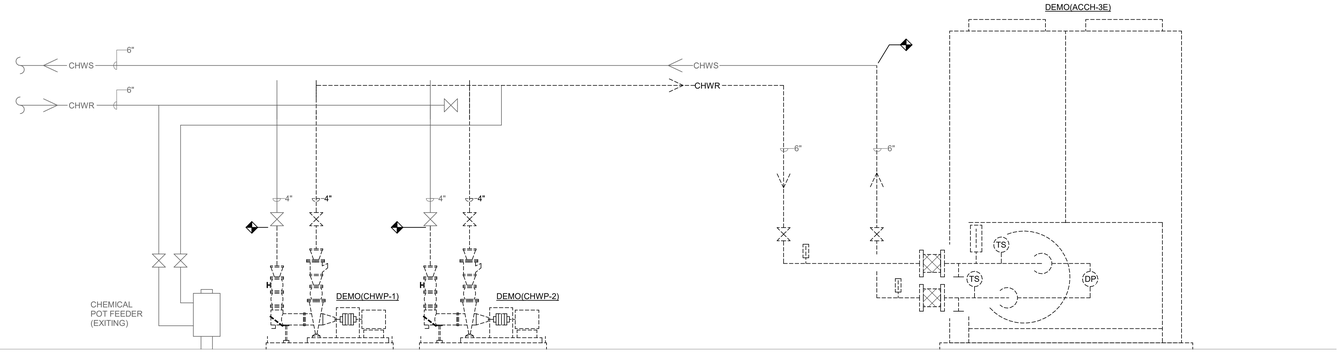

FINE ARTS CHILLED WATER PIPING SCHEMATIC - DEMO - ALTERNATE 5

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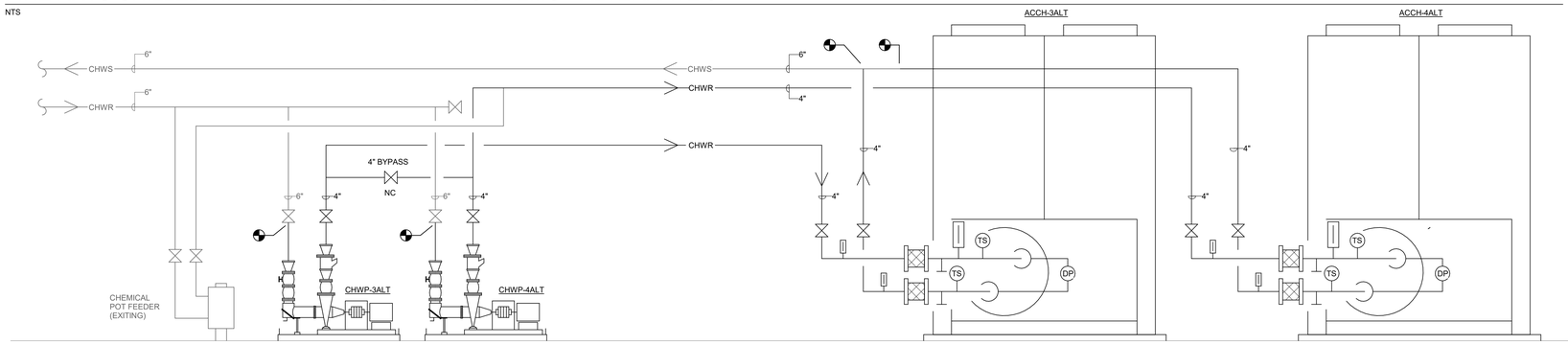

FINE ARTS CHILLED WATER PIPING SCHEMATIC - NEW - ALTERNATE 5

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

FINE ARTS CHW SCHEMATICS

SHEET NUMBER

M4.20 A

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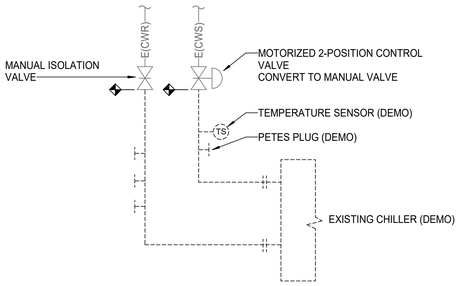
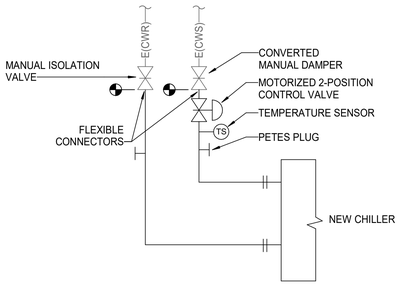
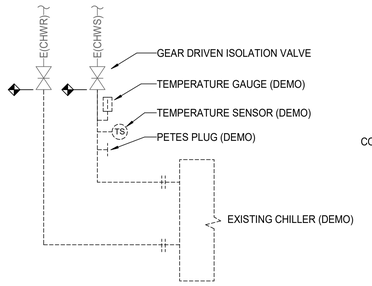


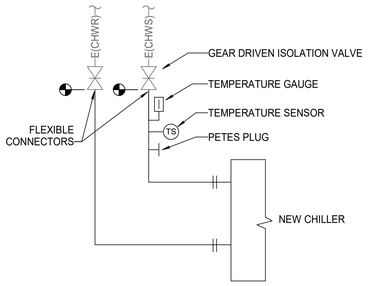
CHILLERS CONDENSER WATER PIPING CONNECTION - DEMO



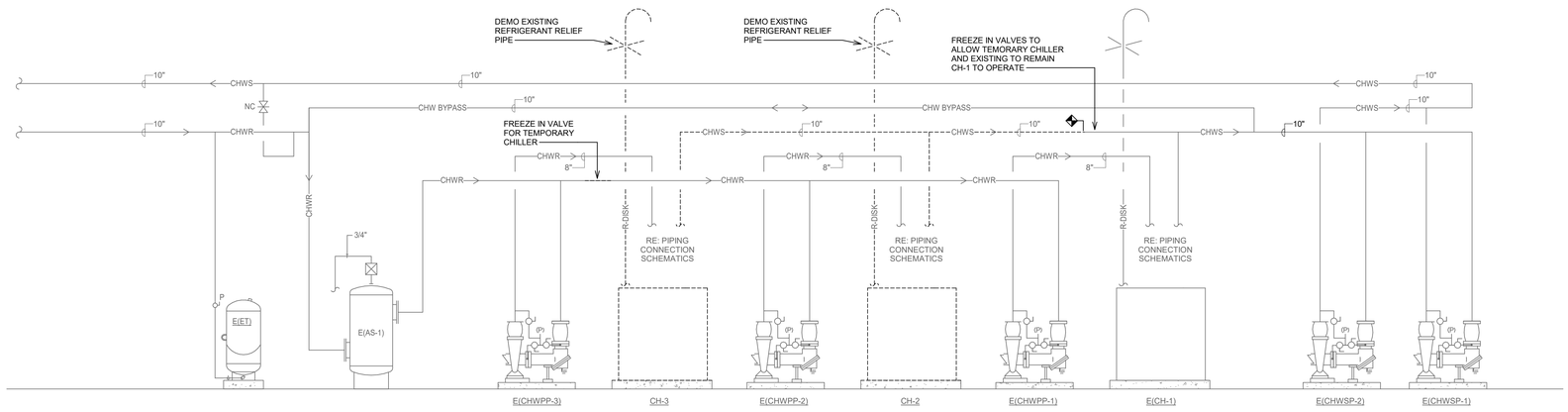
CHILLERS CONDENSER WATER PIPING CONNECTION - NEW



CHILLERS CHILLED WATER PIPING CONNECTION - DEMO

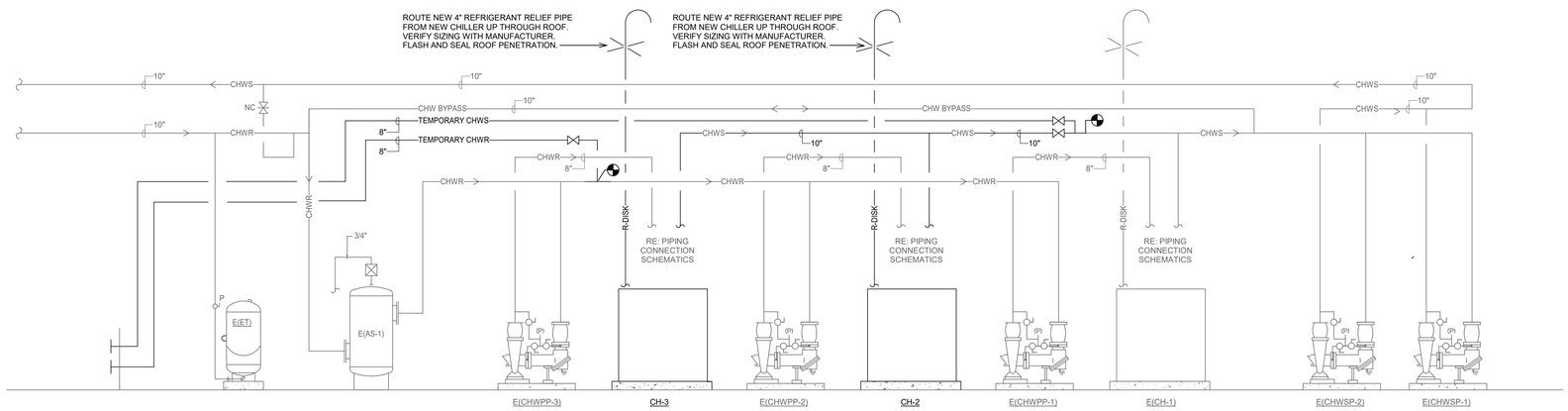


CHILLERS CHILLED WATER PIPING CONNECTION - NEW



MAIN BUILDING CHILLED WATER PIPING SCHEMATIC- DEMO

NTS



MAIN BUILDING CHILLED WATER PIPING SCHEMATIC- NEW

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PROJECT NAME

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PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

MAIN CHW SCHEMATICS

SHEET NUMBER

M4.30

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FINE ARTS CHW PLANT - PUMP SCHEDULE - ALTERNATE 4

MARK	MFG	MODEL	TYPE	AREA SERVED	GPM	FOH	ELECTRICAL				IMPELLER DIA. (INCH)	PUMP EFF	ISOLATION VALVES?	SUCTION DIFFUSER
							MOTOR HP	BHP	VFD	VOLT/PH/HZ				
CHWP-3	GRUNDFOS	NBS 020-095-4P	BASEMOUNTED END SUCTION	ACCH-2	200	65	7.5	4.31	Yes	480/3/60	8.35	76.1	YES	YES

REMARKS:
1. FURNISH AND INSTALL REMOTE MOUNTED MOUNTED IN EXTERIOR-RATED NEMA 3R ENCLOSURE FOR ALL PUMPS.
2. FURNISH AND INSTALL PUMPS ON 6" TALL HOUSEKEEPING PAD.

FINE ARTS CHW PLANT - PUMP SCHEDULE - ALTERNATE 5

MARK	MFG	MODEL	TYPE	AREA SERVED	GPM	FOH	ELECTRICAL				IMPELLER DIA. (INCH)	PUMP EFF	ISOLATION VALVES ?	SUCTION DIFFUSER
							MOTOR HP	BHP	VFD	VOLT/PH/HZ				
CHWP-3ALT	GRUNDFOS	NBS 015-090-4P	BASEMOUNTED END SUCTION	ACCH-1ALT	85.5	65	3	2.3	Yes	480/3/60	8.15	61.2	YES	YES
CHWP-4ALT	GRUNDFOS	NBS 015-090-4P	BASEMOUNTED END SUCTION	ACCH-2ALT	85.5	65	3	2.3	Yes	480/3/60	8.15	61.2	YES	YES

REMARKS:
1. FURNISH AND INSTALL REMOTE MOUNTED MOUNTED IN EXTERIOR-RATED NEMA 3R ENCLOSURE FOR ALL PUMPS.
2. FURNISH AND INSTALL PUMPS ON 6" TALL HOUSEKEEPING PAD.

FINE ARTS CHW PLANT - AIR COOLED CHILLER SCHEDULE - ALTERNATE 4

MARK	GENERAL				EFFICIENCIES		TOTAL COOLING CAPACITY (TONS) / INPUT POWER (KW)	EWT/LWT (°F)	GPM/WPD	MIN/MAX FLOW RATE (GPM)	AMBIENT TEMP (°F)	SOUND POWER LEVELS FULL	ELECTRICAL		
	MFG	MODEL	TYPE	REFRIGERANT	EER	IPLV							MCA	MOCP	VOLT/PH/HZ
ACCH-4	DAIKEN	AGZ008F	AIR-COOLED SCROLL COMPRESSOR CHILLER	R32	8.801	16.79	133/181.5	58/42	199.1/4.2	192/528	105	94	352	400	460/3/60

REMARKS:
1. CONTRACTOR SHALL COORDINATE CHOSEN CHILLERS' DIMENSIONS WITH EXISTING AND PROPOSED EXPANDED CENTRAL PLANT.
2. IF A STRAINER IS REQUIRED FOR WARRANTY PURPOSES ON THE CHILLER INLET, THE CONTRACTOR SHALL PROVIDE THE COST FOR PROVISION AND INSTALLATION OF THE STRAINER AS PART OF THE CONTRACT.
3. CHILLERS SHALL BE LOCATED ON A 6" TALL HOUSEKEEPING PAD THAT EXTENDS 6" PAST THE CHILLER ON ALL SIDES.
4. PROVIDE CHILLER WITH EMERGENCY FREEZE-PROOF HEATERS AND COORDINATE ELECTRICAL PROVISION WITH THE CONTRACTOR.
5. CHILLERS SHALL BE SINGLE POINT POWER.
6. PROVIDE SCCR = 65 KAIC.
7. PROVIDE WITH FACTORY DISCONNECT.
8. PROVIDE WITH CONDENSER COIL LOUVERS AND BASE FRAME GRILLES.
9. PROVIDE WITH 120V GFCI OUTLET.
10. PROVIDE WITH BAS COMMUNICATION CARD AND LCD DISPLAY.
11. PROVIDE ELECTROFIN COATED CONDENSER COILS
12. PROVIDE LIQUID, DISCHARGE, AND SUCTION SHUT-OFF VALVES.
13. PROVIDE PHASE AND UNDER/OVER VOLTAGE PROTECTION WITH LED.

FINE ARTS CHW PLANT - AIR COOLED CHILLER SCHEDULE - ALTERNATE 5

MARK	GENERAL				EFFICIENCIES		TOTAL COOLING CAPACITY (TONS) / INPUT POWER (KW)	EWT/LWT (°F)	GPM/WPD	MIN/MAX FLOW RATE (GPM)	AMBIENT TEMP (°F)	SOUND POWER LEVELS FULL	ELECTRICAL		
	MFG	MODEL	TYPE	REFRIGERANT	EER	IPLV							MCA	MOCP	VOLT/PH/HZ
ACCH-3ALT	DAIKEN	AGZ006F	AIR-COOLED SCROLL COMPRESSOR CHILLER	R32	9.213	17.23	85.5/111.5	58/42	128/4.6	108/360	105	91	232	300	460/3/60
ACCH-4ALT	DAIKEN	AGZ006F	AIR-COOLED SCROLL COMPRESSOR CHILLER	R32	9.213	17.23	85.5/111.5	58/42	128/4.6	108/360	105	91	232	300	460/3/60

REMARKS:
1. CONTRACTOR SHALL COORDINATE CHOSEN CHILLERS' DIMENSIONS WITH EXISTING AND PROPOSED EXPANDED CENTRAL PLANT.
2. IF A STRAINER IS REQUIRED FOR WARRANTY PURPOSES ON THE CHILLER INLET, THE CONTRACTOR SHALL PROVIDE THE COST FOR PROVISION AND INSTALLATION OF THE STRAINER AS PART OF THE CONTRACT.
3. CHILLERS SHALL BE LOCATED ON A 6" TALL HOUSEKEEPING PAD THAT EXTENDS 6" PAST THE CHILLER ON ALL SIDES.
4. PROVIDE CHILLER WITH EMERGENCY FREEZE-PROOF HEATERS AND COORDINATE ELECTRICAL PROVISION WITH THE CONTRACTOR.
5. CHILLERS SHALL BE SINGLE POINT POWER.
6. PROVIDE SCCR = 65 KAIC.
7. PROVIDE WITH FACTORY DISCONNECT.
8. PROVIDE WITH CONDENSER COIL LOUVERS AND BASE FRAME GRILLES.
9. PROVIDE WITH 120V GFCI OUTLET.
10. PROVIDE WITH BAS COMMUNICATION CARD AND LCD DISPLAY.
11. PROVIDE ELECTROFIN COATED CONDENSER COILS
12. PROVIDE LIQUID, DISCHARGE, AND SUCTION SHUT-OFF VALVES.
13. PROVIDE PHASE AND UNDER/OVER VOLTAGE PROTECTION WITH LED.

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STATE OF TEXAS
RICHARD LOPEZ
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.09.16

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
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E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
MECHANICAL SCHEDULES

SHEET NUMBER
M5.01

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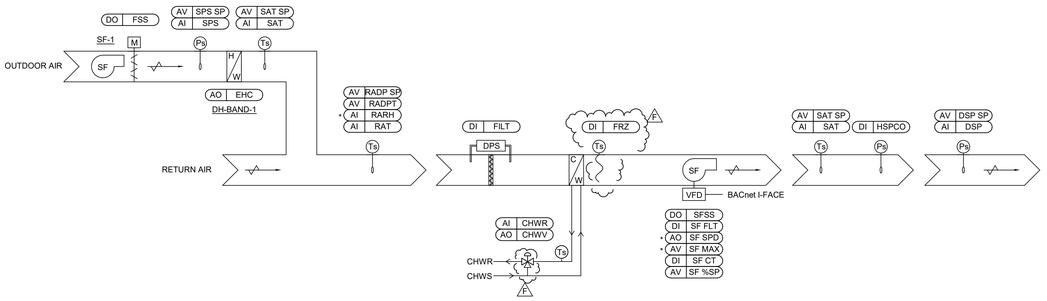
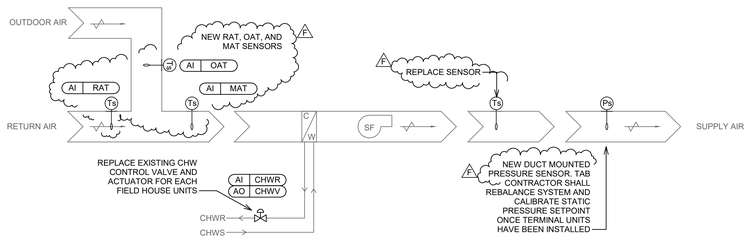
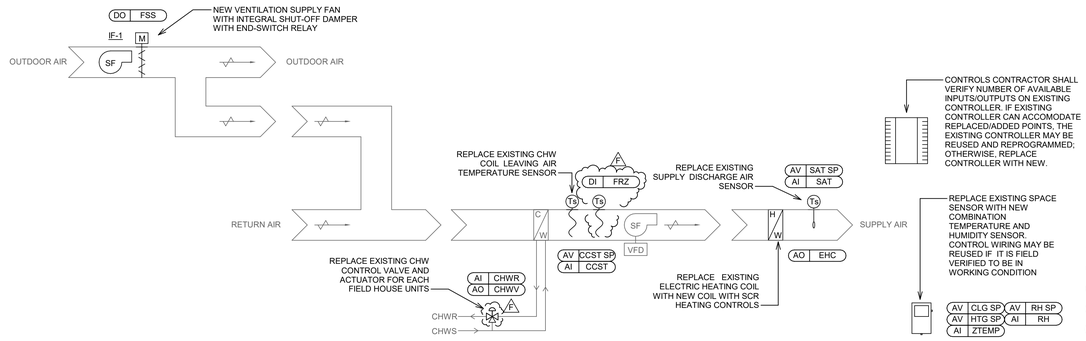


NEW VAV AIR HANDLING UNIT - FINE ARTS ADDITION



EXISTING VAV AIR HANDLING UNIT - AREA F



EXISTING FIELD HOUSE SINGLE ZONE CONSTANT VOLUME AHU'S WITH ELECTRIC REHEAT COIL

POINT TYPES:

AV: ANALOG VIRTUAL
AO: ANALOG OUTPUT
AI: ANALOG INPUT
DV: DIGITAL VIRTUAL
DO: DIGITAL OUTPUT
DI: DIGITAL INPUT
NA: CONTROL INTEGRAL TO EQUIPMENT AND DOES NOT REQUIRE BAS POINT

*POINTS NOTED WITH AN * ARE NOT REQUIRED TO BE DISPLAYED GRAPHICALLY ON THE FRONT END

POINT NAMES:

AHU R: AHU RUN COMMAND
BCO: BOILER CARBON MONOXIDE SENSOR
BDP P#: BOILER PLANT DIFFERENTIAL PRESSURE SENSOR. HARDWIRE POINT BACK TO HEATING HOT WATER PUMP CONTROLLER.
BPBPV: HEATING HOT WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). THIS POINT MUST BE HARDWIRED BACK TO THE BOILER PLANT CONTROLLER.
BPC: BOILER PLANT CAPACITY (CALCULATED)
BRT B#: B-# BOILER RETURN WATER TEMP
BRT P: HEATING HOT WATER PLANT RETURN TEMP
BST B: HEATING HOT WATER PLANT SUPPLY TEMP FOR BOILER STAGING CONTROL
BST P: HEATING HOT WATER PLANT SUPPLY TEMP
BST B#: B-# BOILER SUPPLY WATER TEMP
CCST: COOLING COIL SUPPLY TEMP
CCST SP: COOLING COIL SUPPLY TEMP SETPOINT
CDL C#: CHILLER ACCH-# DEMAND LIMIT
CDP C#: CHILLER DIFFERENTIAL PRESSURE SENSOR
CDP P#: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SENSOR (TOTAL OF 2). HARDWIRE POINT BACK TO CHILLER PLANT UNITARY CONTROLLER.
CDP SP: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SETPOINT
CFL C#: CHILLER FAILURE ALARM
CHP SS: CHILLED WATER PLANT START/STOP
CHWR: CHILLED WATER RETURN TEMP
CHWV: CHILLED WATER VALVE POSITION (CALCULATED % OPEN)
CLG SP: COOLING DRY BULB TEMP SETPOINT
CLP C#: CHILLER CURRENT OUTPUT
CO2 SP: CO2 SETPOINT, CALCULATED AS [CO2 SP] = [OA CO2] + 500 PPM
CPBPV: CHILLED WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). HARDWIRE THIS POINT BACK TO THE CHILLED PLANT CONTROL PANEL (LOCATED REMOTELY)
CPT: CHILLED WATER PLANT TOTAL TONNAGE
CRT C#: ACCH-# RETURN CHILLED WATER TEMP
CRT P: CHILLED WATER PLANT RETURN WATER TEMP
CSR P: CHILLED WATER PLANT SUPPLY WATER TEMP
CSS C#: CHILLER ACCH-# START/STOP
CST C#: ACCH-# SUPPLY CHILLED WATER TEMP
CVEP: CONSTANT VOLUME EXHAUST DUCT PRESSURE
CVEP SP: CONSTANT VOLUME EXHAUST DUCT PRESSURE SETPOINT
DP C#: ACCH-# CHILLER DIFFERENTIAL PRESSURE
DSP: DUCT STATIC PRESSURE
DSP SP: DUCT STATIC PRESSURE SETPOINT
EADPT: EXHAUST AIR DEW POINT TEMP
EARH: EXHAUST AIR RELATIVE HUMIDITY
EAT: EXHAUST AIR DRY BULB TEMP
EFSS: EXHAUST FAN START/STOP
EF FLT: EXHAUST FAN FAULT
EF MAX: EXHAUST FAN MAX SPEED AS SET BY TAB
EF SPD: EXHAUST FAN SPEED
EF %SP: EXHAUST FAN SPEED AS % OF MAX, CALCULATED AS [EF %SP] = [EF SPD] / [EF MAX]
EF CT: EXHAUST FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
EHC: ELECTRIC HEATING COIL SCR OUTPUT
EWBD: ENERGY RECOVERY WHEEL BYPASS DAMPER POSITION (OPEN/CLOSED)
EWET: ENERGY RECOVERY WHEEL DISCHARGE EXHAUST AIR DRY BULB TEMP
EWOT: ENERGY RECOVERY WHEEL DISCHARGE OUTDOOR AIR DRY BULB TEMP
EW FLT: ENERGY RECOVERY WHEEL FAULT
EW SPD: ENERGY RECOVERY WHEEL FAN SPEED
EWSS: ENERGY RECOVERY WHEEL START/STOP
FBD: FACE AND BYPASS DAMPER POSITION (CALCULATED % OPEN FACE)
FILT: DIRTY FILTER STATUS
FLW C#: ACCH-# CHILLER FLOW
FLW B#: B-# BOILER FLOW
FLW BP: HEATING HOT WATER PLANT SUPPLY FLOW
FLW CP: CHILLED WATER PLANT SUPPLY FLOW
FRZ: FREEZE STAT
F SS: HVLS FAN START/STOP
F SPD: HVLS FAN SPEED
GEAD: GENERAL EXHAUST AIR MODULATING DAMPER POSITION (CALCULATED % CLOSED)
HCST: HEATING COIL SUPPLY TEMP
HTA: HIGH TEMPERATURE ALARM
HTG SP: HEATING DRY BULB SUPPLY TEMP
HWP SS: HEATING HOT WATER BOILER PLANT START/STOP
HWR: HOT WATER RETURN TEMP
HWV: HOT WATER VALVE POSITION (CALCULATED % OPEN)
ID: ISOLATION DAMPER (DAMPER AND CONTROL ARE INTEGRAL TO FAN)
ELC: EXTERIOR LIGHTING CONTROLS ON/OFF
ELD#: ELECTRIC METER MSB-# DEMAND (KW)
ELDT: TOTAL ELECTRIC METER DEMAND (KW)
EMC#: ELECTRIC METER MSD-# CONSUMPTION (KWH)
EMCT: TOTAL ELECTRIC METER CONSUMPTION (KWH)
KHA: KITCHEN HOOD ANSUL SYSTEM ACTIVATION
KHET#: KITCHEN HOOD EXHAUST TOTAL (TYPICALLY 0-10 VDC). # REPRESENTS HOOD NUMBER.
KHL: KITCHEN HOOD EXHAUST SYSTEM ON LIGHT SIGNAL
KHS: KITCHEN HOOD EXHAUST SYSTEM SWEEP-OFF
MAT: MIXED AIR TEMPERATURE
HSPCO: HIGH DUCT STATIC PRESSURE CUT-OFF
OA CO2: OUTDOOR AIR CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
OAT: DRY BULB OUTDOOR AIR TEMP
PF BP#: HWP-# PUMP START/STOP
PF CP#: CHWP-# PUMP START/STOP
PFL BP#: HWP-# PUMP FAILURE ALARM
PFL CP#: CHWP-# PUMP FAILURE ALARM
PFS BP#: HWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFS CP#: CHWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFZ#: HARDWIRED CHILLER PUMP START FROM CHILLER
PHCT: PREHEAT COIL DISCHARGE TEMP
PHCT SP: PREHEAT COIL DISCHARGE TEMP SETPOINT
PIS: STAND-BY PUMP TEMPORARY IDENTITY (CHWP-1A, CHWP-1B, CHWP-S)
PS BP#: HWP-# PUMP SPEED
P MB#: HWP-# MAX PUMP SPEED
PS %B#: HWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %B#] = [PS BP#] / [P MB#]
PS C#: CHWP-# PUMP SPEED
P MC#: CWP-# MAX PUMP SPEED
PS %C#: CWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %C#] = [PS CP#] / [P MC#]
PSS BP: HEATING HOT WATER PLANT PUMPING SYSTEM START/STOP (FROM BOILER CONTROL PANEL)
RADPT: DEW POINT RETURN AIR TEMP
RADP SP: RETURN AIR DEW POINT SETPOINT
RARH: RETURN AIR RELATIVE HUMIDITY
RAT: DRY BULB RETURN AIR TEMP
RH: RELATIVE HUMIDITY
RH SP: RELATIVE HUMIDITY SETPOINT
RPSS: RECIRCULATION PUMP START/STOP
SAT SP: DRY BULB SUPPLY AIR TEMP SETPOINT
SAT: DRY BULB SUPPLY AIR TEMP
SD: DUCT SMOKE DETECTOR
SEAD: SHUT-OFF EXHAUST AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
SF MAX: MAX SUPPLY FAN SPEED (CONFIRM WITH TAB MAX SPEED SETTINGS)
SFSS: SUPPLY FAN START/STOP
SF FLT: SUPPLY FAN FAULT
SF SPD: SUPPLY FAN SPEED
SF %SP: SUPPLY FAN % SPEED OF MAX, CALCULATED BY [SF%SP] = [SF SPD/SFMAX]
SF CT: SUPPLY FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
SOAD: SHUT-OFF OUTDOOR AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
TUD: TERMINAL UNIT PRIMARY AIR VALVE POSITION (CALCULATED, % OPEN)
TUF: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW
TUF SP: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW SETPOINT
TUFSS: TERMINAL UNIT FAN START/STOP
TUP: TERMINAL UNIT PRIMARY AIR VALVE DIFFERENTIAL PRESSURE
UV: UV LIGHT STATUS
VES#: MANUAL ISOLATION VALVE WITH END SWITCH MONITORED BY BAS.
ZCO2: ZONE CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
ZTEMP: DRY BULB ZONE TEMPERATURE

SENSOR TYPES:

DUCT PROBE SENSOR OR INSERTION FLOW METER
ACTUATED CONTROL DAMPER
INSERTION THERMOWELL PIPE SENSOR
SERPENTINED ACROSS COIL SENSOR

SEQUENCE OF OPERATION:

- GENERAL:
  1. AIR HANDLING UNIT IS NEW.
  2. AHU CONSISTS OF THE FOLLOWING:
     A. CHILLED WATER COIL WITH 3-WAY CONTROL VALVE
     B. SA FAN WITH VFD CONTROLLED BY DUCT STATIC PRESSURE
     C. OUTDOOR AIR SUPPLY AIR FAN AND ASSOCIATED ELECTRIC DUCT HEATER
- SA FAN:
  1. PROVIDE CT ON EACH SA FAN MOTOR FOR STATUS.
  2. THE SUPPLY AIR FAN SHALL BE CONTROLLED THROUGH A VARIABLE FREQUENCY DRIVE (VFD)
  3. FURNISH AND INSTALL DUCT MOUNTED PRESSURE SENSOR APPROXIMATELY 2/3 WAY DOWN THE SUPPLY AIR DUCT MAIN.
  4. DIFFERENTIAL PRESSURE OPTIMIZATION SHALL BE ACCOMPLISHED BY POLLING ALL VAV BOX DAMPER POSITIONS ON A 5-MINUTE BASIS (ADJ) AND RESETTING THE DP SETPOINT SO THAT A MINIMUM OF 10% OF THE TERMINAL BOXES ARE 90% OPEN.
- SUPPLY AIR TEMPERATURE CONTROL
  1. AVERAGE SPACE TEMPERATURE: EACH TERMINAL BOX SPACE TEMPERATURE SHALL BE POLLED AT 5-MINUTE INTERVALS TO DETERMINE THE AVERAGE DIFFERENCE BETWEEN SPACE TEMPERATURE AND SPACE TEMPERATURE SETPOINT.
  2. RETURN AIR DEWPOINT [RADPT]: PROVIDE DEWPOINT SENSOR LOCATED IN RA DUCT UPSTREAM OF UNITS OA CONNECTION. THE UNIT'S INITIAL DEW POINT SETPOINT SHALL BE SET TO 55 DEG F (ADJ).
  3. DISCHARGE TEMPERATURE SETPOINT:
     A. THE DISCHARGE TEMPERATURE SETPOINT [SAT SP], WHEN THE RETURN AIR DEW POINT [RA DPT] IS AT OR BELOW SETPOINT, SHALL BE BASED ON THE AVERAGE SPACE TEMPERATURE AS INDICATED BELOW:
        a. AVERAGE SPACE TEMP 1 DEG F OR MORE ABOVE SETPOINT: [SAT SP] = 55 DEG F (ADJ)
        b. AVERAGE SPACE TEMP 1 DEG F OR MORE BELOW SETPOINT: [SAT SP] = 62 DEG F (ADJ)
        c. AVERAGE SPACE TEMP IN BETWEEN DEADBAND: VARY LINEARLY
     B. THE DISCHARGE TEMPERATURE SETPOINT [SAT SP], WHEN THE RETURN AIR DEW POINT [RA DPT] IS ABOVE SETPOINT, SHALL BE AS FOLLOWS:
        a. [RA DPT] > [RADP SP] AND [RA DPT] > [RADP SP] + 1.5 DEG F: [SAT SP] = 55 DEG F (ADJ)
        b. [RA DPT] BETWEEN SETPOINT AND [RADP SP] + 1.5 DEG F = VARY LINEARLY BETWEEN SETPOINT NOTED IN 3.A ABOVE AND B.A
  4. VENTILATION FAN:
     A. WHEN THE AHU IS IN OCCUPIED MODE, THE SUPPLY FAN, SF-1 SHALL BE ON AND SHALL CONTROL TO A CONSTANT DISCHARGE STATIC PRESSURE.
     B. OA DUCT HEATER: THE OA DUCT HEATER SHALL MODULATE TO MAINTAIN A DISCHARGE TEMPERATURE OF 40 DEG F.
  5. FREEZE PROTECTION
     A. IN THE EVENT THAT THE LOW LIMITE FREEZE STAT ON THE DISCHARGE OF THE CHILLED WATER COIL DROPS BELOW 40 DEG F, THE AHU SA FAN SHALL BE DISABLED, THE SF-1 FAN SHALL BE DISABLED AND ITS DAMPER SHUT, AND THE CHW CONTROL VALVE SHALL OPEN.
  6. DISPLAY POINTS: DISPLAY GRAPHICS AND POINTS AS INDICATED IN THIS SCHEMATIC
  7. TRENDS:
     A. TREND 1:
        a. FAN SPEED
        b. DUCT STATIC PRESSURE
        c. AVERAGE POSITION OF TERMINAL BOX AIR VALVES
        d. AVERAGE SPACE TEMPERATURE SETPOINT DIFFERENCE
        e. DISCHARGE AIR TEMPERATURE
        f. DISCHARGE AIR TEMPERATURE SETPOINT
        g. RETURN AIR DEW POINT TEMPERATURE

SEQUENCE OF OPERATION:

- GENERAL:
  1. AIR HANDLING UNIT IS EXISTING TO REMAIN.
  2. UNIT SENSORS/CONTROL VALVES ARE TO BE REPLACED/ADDED AS INDICATED.
  3. EXISTING CONTROL POINTS INTEGRATED INTO UNIT SHALL REMAIN IN UNIT AND ON FRONT END.
- SEQUENCE OF OPERATION FOR AIR HANDLING UNIT SHALL MATCH THE NEW VAV AIR HANDLING UNIT - FINE ARTS ADDITION SHOWN ABOVE.

SEQUENCE OF OPERATION:

- GENERAL:
  1. THIS SYSTEM CONSISTS OF CHILLED WATER AIR HANDLING UNITS WITH THREE WAY CHILLED WATER CONTROL VALVES, A SUPPLY FAN, AND A DUCT-MOUNTED ELECTRIC HEATING COIL
  2. OUTDOOR AIR IS INTRODUCED TO THE AIR HANDLING UNITS VIA AN EXISTING INTAKE HOOD WITH NEW SUPPLY FAN, IF-1, TO FORCE VENTILATION INTO THE RETURN OF THE AIR HANDLING UNITS.
  3. THE EXISTING AIR HANDLING UNITS ARE TO REMAIN; HOWEVER, SENSORS AND SPECIFIC PORTIONS OF THE UNITS ARE BEING REPLACED PER THE SCHEMATIC SHOWN.
  4. MODES:
     A. OCCUPIED MODE:
        a. THE AIR HANDLING UNITS SHALL OPERATE TO MAINTAIN SPACE DRY BULB TEMPERATURE AND HUMIDITY LEVELS.
        b. IF-1 SUPPLY MAN SHALL BE ON WHEN THE BUILDING IS OCCUPIED.
     B. UNOCCUPIED MODE:
        a. IN UNOCCUPIED MODE THE AIR HANDLINGS SHALL OPERATE TO MAINTAIN UNOCCUPIED SETPOINTS; HOWEVER, THE VENTILATION AIR (IF-1) SHALL BE TURNED OFF.
  5. SUPPLY FAN CONTROL
     A. THE UNIT SUPPLY FAN SHALL OPERATE AT A CONSTANT VOLUME/SPEED WHEN THE UNIT. THE UNIT FAN SHALL BE ON WHEN IN OCCUPIED MODE.
  6. CHILLED WATER CONTROL VALVE: THE CHILLED WATER VALVE AND ELECTRIC HEATING COIL SHALL MODULATE BASED ON SPACE TEMPERATURE. A 2 DEG F (ADJ) DEADBAND SHALL BE UTILIZED TO CONTROL TO A SPECIFIC DISCHARGE AIR TEMPERATURE
     A. CHILLED WATER COIL CONTROL VALVE:
        a. SPACE TEMP 1 DEG F BELOW SETPOINT: DICHARGE AIR [SAT] AT 62 DEG F (ADJ)
        b. SPACE TEMP 1 DEG F ABOVE SETPOINT: DICHARGE AIR [SAT] AT 55 DEG F (ADJ)
        c. SPACE TEMP BETWEEN LIMITS: VARY LINEARLY BETWEEN DISCHARGE SETPOINTS.
     B. ELECTRIC HEATING REHEAT COIL
        a. SPACE TEMP 1 DEG F BELOW SETPOINT: DICHARGE AIR [SAT] AT 85 DEG F (ADJ)
        b. SPACE TEMP 1 DEG F ABOVE SETPOINT: DICHARGE AIR [SAT] AT 72 DEG F (ADJ)
        c. SPACE TEMP BETWEEN LIMITS: VARY LINEARLY BETWEEN DISCHARGE SETPOINTS.
     C. WHEN SPACE TEMPERATURES ARE BETWEEN THE COOLING AND HEATING DEADBAND RANGE, BOTH THE CHILLED WATER COIL VALVE AND ELECTRIC HEATING COIL SHALL BE CLOSED/OFF.
     D. DEHUMIDIFICATION MODE: NOTE THAT THE CHW COIL TEMPERATURES NOTED BELOW DO OVERRIDE THE DISCHARGE AIR TEMPERATURES NOTED ABOVE IN 6.A.
        a. THE UNIT SHALL ENTER DEHUMIFICATION MODE IF THE SPACE HUMIDITY [RH] RISES ABOVE 55% RH SETPOINT (ADJ)
        b. IF SPACE RELATIVE HUMIDITY [RH] >= 55% AND SPACE RELATIVE HUMIDITY [RH] < 57% RH (ADJ):
           - THE CHILLED WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN A MAX CHW COIL TEMPERATURE OF 55 DEG F(ADJ)
        c. IF SPACE RELATIVE HUMIDITY [RH] >= 57%:
           - THE CHILLED WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN A MAX CHW COIL TEMPERATURE OF 53 DEG F(ADJ)
        d. REHEAT SHALL OCCUR IN DEHUMIDIFICATION MODETO SATISFY THE REQUIREMENTS IN 6.B
  7. VENTILATION FAN, IF-1:
     A. WHEN THE BUILDING IS IN OCCUPIED MODE, IF-1 SHALL OPERATE. PROVIDE RELAY FROM FAN TO FAN'S MOTORIZED DAMPER TO AUTOMATICALLY OPEN DAMPER PRIOR TO FAN BEING ENERGIZED.
  8. FREEZE PROTECTION:
     A. IN THE EVENT OF THE AIR HANDLING LOW LIMITE FREEZE STAP [FRZ] BEING TRIPPED, THE UNIT SUPPLY FAN SHALL DEACTIVATE, IF-1 SHALL DEACTIVATE AND ITS DAMPER SHALL CLOSE, AND THE CHW COIL CONTROL VALVE SHALL FULLY OPEN TO FLOW WATER THROUGH THE COIL.
  9. GRAPHICAL DISPLAY: DISPLAY ALL POINTS INDICATED ON THIS SCHEMATIC IN ADDITION TO ANY EXISTING POINTS ALREADY ON THE FRONT END.
  10. TRENDS:
      A. TREND #1:
         a. SPACE TEMP
         b. SPACE HUMIDITY
         c. CHW COIL DISCHARGE AIR TEMP
         d. UNIT DISCHARGE AIR TEMO [SAT]

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
MECHANICAL CONTROLS

SHEET NUMBER
M6.01

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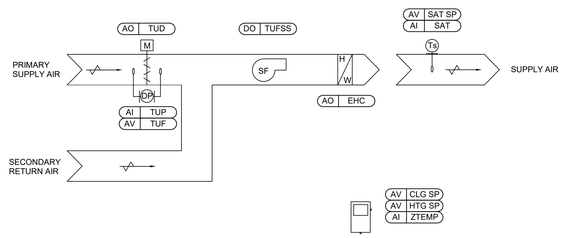
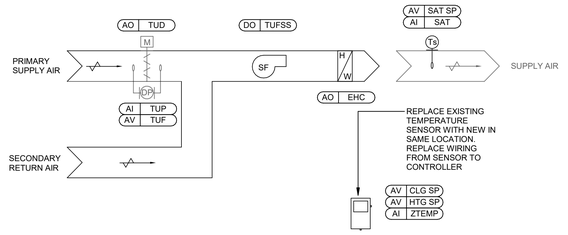
MAIN BUILDING CENTRAL PLANT SCOPE OF WORK

- EXISTING CHILLERS, CH-2 AND CH-3, ARE BEING REPLACED IN THIS PROJECT. THE GRAPHICAL FRONT-END ON THE PLANT IS TO REMAIN. THE SEQUENCING OF THE CHILLERS IS TO REMAIN WITH THE NEW CHILLERS REPLACING THE EXISTING CHILLERS.
- INTEGRATE CHILLER CONTROL PANEL INTO FRONT END VIA BACNET CONNECTION
- HARDWIRE THE FOLLOWING POINTS TO THE CHILLER FROM THE BAS:
  1. CHILLER(S) START/STOP
  2. CHILLERS(S) FAILURE
  3. CHILLER(S) STATUS
- REPLACE THE FOLLOWING EXISTING SENSORS WITH NEW:
  1. CHWS TEMP TO THE BUILDING
  2. CHWR TEMP FROM THE BUILDING
  3. FLOW METER IN CHWS TO THE BUILDING. REPLACE WITH INSERTION ONICON F-3500 OR EQUAL.
  4. CHWS TEMP TO EXISTING CHILLER, CH-1
  5. CWS TEMP FROM EXISTING CHILLER, CH-1
- PROVIDE NEW SENSORS/POINTS FOR REPLACED CHILLERS:
  1. CHWS TEMP TO NEW CHILLERS, (CH-2 AND CH-3)
  2. CWS TEMP FROM NEW CHILLERS, (CH-2 AND CH-3)
  3. CW ISOLATION VALVE FOR NEW CHILLERS (CH-2 AND CH-3)
  4. EMERGENCY REFRIGERANT MONITORING SYSTEMS

MAIN BUILDING CENTRAL PLANT



SERIES FAN POWERED TERMINAL UNIT CONTROLS - NEW FINE ARTS ADDITION



SERIES FAN POWERED TERMINAL UNIT CONTROLS - AREA F

SEQUENCE OF OPERATION

- OCCUPANCY:
  1. WHEN THE BUILDING IS OCCUPIED, THE TERMINAL UNIT SUPPLY FANS SHALL OPERATE, EVEN IF THE AHU SA FAN IS OFF.
- SPACE TEMPERATURE CONTROL:
  1. THE SUPPLY FAN SHALL BE BALANCED TO THE CONNECTED GRILLE TOTAL ON THE DRAWINGS.
  2. WHEN COOLING IS REQUIRED, THE VALVE SHALL MODULATE BETWEEN ITS MINUMUM (30% OPEN) AND MAXIMUM (CONNECTED AIRFLOW TOTAL) SETTING AS REQUIRED TO MAINTAIN SPACE TEMPERATURE.
  3. IF THE SPACE TEMPERATURE DROPS TO 1 DEG OR MORE BELOW THE ROOM HEATING SETPOINT, THE ELECTRIC HEATING COIL SHALL ENGAGE TO MAINTAIN THE FOLLOWING DICHARGE AIR TEMPERATURE (NOTE, THE AIR VALVE SHOULD BE AT 30% AT THIS TIME):
     A. SPACE TEMPERATURE 1 DEG ABOVE SPACE HEATING SETPONT: DISCHARGE AIR TEMP: 68 DEG F
     B. SPACE TEMPERATURE 1 DEG BELOW SPACE HEATING SETPOINT: DISCHARGE AIR TEMP: 85 DEG F
  4. DISPLAY POINTS: DISPLAY POINTS INDICATED IN THIS SCHEMATIC.
  5. TRENDS:
     A. SPACE TEMPERATURE SETPOINT
     B. SPACE TEMPERATURE
     C. AIRFLOW TOTAL
     D. AIR DAMPER POSITIONAS PERCENT OPEN
     E. DISCHARGE TMPERATURE
     F. PERCENT FULL LOAD HEATING

SEQUENCE OF OPERATION

- OCCUPANCY:
  1. WHEN THE BUILDING IS OCCUPIED, THE TERMINAL UNIT SUPPLY FANS SHALL OPERATE, EVEN IF THE AHU SA FAN IS OFF.
- SPACE TEMPERATURE CONTROL:
  1. THE SUPPLY FAN SHALL BE BALANCED TO THE CONNECTED GRILLE TOTAL ON THE DRAWINGS.
  2. WHEN COOLING IS REQUIRED, THE VALVE SHALL MODULATE BETWEEN ITS MINUMUM (30% OPEN) AND MAXIMUM (CONNECTED AIRFLOW TOTAL) SETTING AS REQUIRED TO MAINTAIN SPACE TEMPERATURE.
  3. IF THE SPACE TEMPERATURE DROPS TO 1 DEG OR MORE BELOW THE ROOM HEATING SETPOINT, THE ELECTRIC HEATING COIL SHALL ENGAGE TO MAINTAIN THE FOLLOWING DICHARGE AIR TEMPERATURE (NOTE, THE AIR VALVE SHOULD BE AT 30% AT THIS TIME):
     A. SPACE TEMPERATURE 1 DEG ABOVE SPACE HEATING SETPONT: DISCHARGE AIR TEMP: 68 DEG F
     B. SPACE TEMPERATURE 1 DEG BELOW SPACE HEATING SETPOINT: DISCHARGE AIR TEMP: 85 DEG F
  4. DISPLAY POINTS: DISPLAY POINTS INDICATED IN THIS SCHEMATIC.
  5. TRENDS:
     A. SPACE TEMPERATURE SETPOINT
     B. SPACE TEMPERATURE
     C. AIRFLOW TOTAL
     D. AIR DAMPER POSITIONAS PERCENT OPEN
     E. DISCHARGE TMPERATURE
     F. PERCENT FULL LOAD HEATING

POINT TYPES:

AV: ANALOG VIRTUAL
AO: ANALOG OUTPUT
AI: ANALOG INPUT
DV: DIGITAL VIRTUAL
DO: DIGITAL OUTPUT
DI: DIGITAL INPUT
NA: CONTROL INTEGRAL TO EQUIPMENT AND DOES NOT REQUIRE BAS POINT

*POINTS NOTED WITH AN * ARE NOT REQUIRED TO BE DISPLAYED GRAPHICALLY ON THE FRONT END

POINT NAMES:

AHU R: AHU RUN COMMAND
BCO: BOILER CARBON MONOXIDE SENSOR
BDP P#: BOILER PLANT DIFFERENTIAL PRESSURE SENSOR. HARDWIRE POINT BACK TO HEATING HOT WATER PUMP CONTROLLER.
BPBPV: HEATING HOT WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). THIS POINT MUST BE HARDWIRED BACK TO THE BOILER PLANT CONTROLLER.
BPC: BOILER PLANT CAPACITY (CALCULATED)
BRT B#: B-# BOILER RETURN WATER TEMP
BRT P: HEATING HOT WATER PLANT RETURN TEMP
BST B: HEATING HOT WATER PLANT SUPPLY TEMP FOR BOILER STAGING CONTROL
BST P: HEATING HOT WATER PLANT SUPPLY TEMP
BST B#: B-# BOILER SUPPLY WATER TEMP
CCST: COOLING COIL SUPPLY TEMP
CCST SP: COOLING COIL SUPPLY TEMP SETPOINT
CDL C#: CHILLER ACCH-# DEMAND LIMIT
CDP C#: CHILLER DIFFERENTIAL PRESSURE SENSOR
CDP P#: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SENSOR (TOTAL OF 2). HARDWIRE POINT BACK TO CHILLER PLANT UNITARY CONTROLLER.
CDP SP: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SETPOINT
CFL C#: CHILLER FAILURE ALARM
CHP SS: CHILLED WATER PLANT START/STOP
CHWR: CHILLED WATER RETURN TEMP
CHWV: CHILLED WATER VALVE POSITION (CALCULATED % OPEN)
CLG SP: COOLING DRY BULB TEMP SETPOINT
CLP C#: CHILLER CURRENT OUTPUT
CO2 SP: CO2 SETPOINT, CALCULATED AS [CO2 SP] = [OA CO2] + 500 PPM
CPBPV: CHILLED WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). HARDWIRE THIS POINT BACK TO THE CHILLED PLANT CONTROL PANEL (LOCATED REMOTELY)
CPT: CHILLED WATER PLANT TOTAL TONNAGE
CRT C#: ACCH-# RETURN CHILLED WATER TEMP
CRT P: CHILLED WATER PLANT RETURN WATER TEMP
CSR P: CHILLED WATER PLANT SUPPLY WATER TEMP
CSS C#: CHILLER ACCH-# START/STOP
CST C#: ACCH-# SUPPLY CHILLED WATER TEMP
CVEP: CONSTANT VOLUME EXHAUST DUCT PRESSURE
CVEP SP: CONSTANT VOLUME EXHAUST DUCT PRESSURE SETPOINT
DP C#: ACCH-# CHILLER DIFFERENTIAL PRESSURE
DSP: DUCT STATIC PRESSURE
DSP SP: DUCT STATIC PRESSURE SETPOINT
EADPT: EXHAUST AIR DEW POINT TEMP
EARH: EXHAUST AIR RELATIVE HUMIDITY
EAT: EXHAUST AIR DRY BULB TEMP
EFSS: EXHAUST FAN START/STOP
EF FLT: EXHAUST FAN FAULT
EF MAX: EXHAUST FAN MAX SPEED AS SET BY TAB
EF SPD: EXHAUST FAN SPEED
EF %SP: EXHAUST FAN SPEED AS % OF MAX, CALCULATED AS [EF %SP] = [EF SPD] / [EF MAX]
EF CT: EXHAUST FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
EHC: ELECTRIC HEATING COIL SCR OUTPUT
EWBD: ENERGY RECOVERY WHEEL BYPASS DAMPER POSITION (OPEN/CLOSED)
EWET: ENERGY RECOVERY WHEEL DISCHARGE EXHAUST AIR DRY BULB TEMP
EWOT: ENERGY RECOVERY WHEEL DISCHARGE OUTDOOR AIR DRY BULB TEMP
EW FLT: ENERGY RECOVERY WHEEL FAULT
EW SPD: ENERGY RECOVERY WHEEL FAN SPEED
EWSS: ENERGY RECOVERY WHEEL START/STOP
FBD: FACE AND BYPASS DAMPER POSITION (CALCULATED % OPEN FACE)
FILT: DIRTY FILTER STATUS
FLW C#: ACCH-# CHILLER FLOW
FLW B#: B-# BOILER FLOW
FLW BP: HEATING HOT WATER PLANT SUPPLY FLOW
FLW CP: CHILLED WATER PLANT SUPPLY FLOW
FRZ: FREEZE STAT
F SS: HVLS FAN START/STOP
F SPD: HVLS FAN SPEED
GEAD: GENERAL EXHAUST AIR MODULATING DAMPER POSITION (CALCULATED % CLOSED)
HCST: HEATING COIL SUPPLY TEMP
HTA: HIGH TEMPERATURE ALARM
HTG SP: HEATING DRY BULB SUPPLY TEMP
HWP SS: HEATING HOT WATER BOILER PLANT START/STOP
HWR: HOT WATER RETURN TEMP
HWV: HOT WATER VALVE POSITION (CALCULATED % OPEN)
ID: ISOLATION DAMPER (DAMPER AND CONTROL ARE INTEGRAL TO FAN)
ELC: EXTERIOR LIGHTING CONTROLS ON/OFF
ELD#: ELECTRIC METER MSB-# DEMAND (KW)
ELDT: TOTAL ELECTRIC METER DEMAND (KW)
EMC#: ELECTRIC METER MSD-# CONSUMPTION (KWH)
EMCT: TOTAL ELECTRIC METER CONSUMPTION (KWH)
KHA: KITCHEN HOOD ANSUL SYSTEM ACTIVATION
KHET#: KITCHEN HOOD EXHAUST TOTAL (TYPICALLY 0-10 VDC). # REPRESENTS HOOD NUMBER.
KHL: KITCHEN HOOD EXHAUST SYSTEM ON LIGHT SIGNAL
KHS: KITCHEN HOOD EXHAUST SYSTEM SWEEP-OFF
MAT: MIXED AIR TEMPERATURE
HSPCO: HIGH DUCT STATIC PRESSURE CUT-OFF
OA CO2: OUTDOOR AIR CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
OAT: DRY BULB OUTDOOR AIR TEMP
PF BP#: HWP-# PUMP START/STOP
PF CP#: CHWP-# PUMP START/STOP
PFL BP#: HWP-# PUMP FAILURE ALARM
PFL CP#: CHWP-# PUMP FAILURE ALARM
PFS BP#: HWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFS CP#: CHWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFZ#: HARDWIRED CHILLER PUMP START FROM CHILLER
PHCT: PREHEAT COIL DISCHARGE TEMP
PHCT SP: PREHEAT COIL DISCHARGE TEMP SETPOINT
PIS: STAND-BY PUMP TEMPORARY IDENTITY (CHWP-1A, CHWP-1B, CHWP-S)
PS BP#: HWP-# PUMP SPEED
P MB#: HWP-# MAX PUMP SPEED
PS %B#: HWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %B#] = [PS BP#] / [P MB#]
PS C#: CHWP-# PUMP SPEED
P MC#: CWP-# MAX PUMP SPEED
PS %C#: CWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %C#] = [PS CP#] / [P MC#]
PSS BP: HEATING HOT WATER PLANT PUMPING SYSTEM START/STOP (FROM BOILER CONTROL PANEL)
RADPT: DEW POINT RETURN AIR TEMP
RADP SP: RETURN AIR DEW POINT SETPOINT
RARH: RETURN AIR RELATIVE HUMIDITY
RAT: DRY BULB RETURN AIR TEMP
RH: RELATIVE HUMIDITY
RH SP: RELATIVE HUMIDITY SETPOINT
RPSS: RECIRCULATION PUMP START/STOP
SAT SP: DRY BULB SUPPLY AIR TEMP SETPOINT
SAT: DRY BULB SUPPLY AIR TEMP
SD: DUCT SMOKE DETECTOR
SEAD: SHUT-OFF EXHAUST AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
SF MAX: MAX SUPPLY FAN SPEED (CONFIRM WITH TAB MAX SPEED SETTINGS)
SFSS: SUPPLY FAN START/STOP
SF FLT: SUPPLY FAN FAULT
SF SPD: SUPPLY FAN SPEED
SF %SP: SUPPLY FAN % SPEED OF MAX, CALCULATED BY [SF%SP] = [SF SPD/SFMAX]
SF CT: SUPPLY FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
SOAD: SHUT-OFF OUTDOOR AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
TUD: TERMINAL UNIT PRIMARY AIR VALVE POSITION (CALCULATED, % OPEN)
TUF: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW
TUF SP: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW SETPOINT
TUFSS: TERMINAL UNIT FAN START/STOP
TUP: TERMINAL UNIT PRIMARY AIR VALVE DIFFERENTIAL PRESSURE
UV: UV LIGHT STATUS
VES#: MANUAL ISOLATION VALVE WITH END SWITCH MONITORED BY BAS.
ZCO2: ZONE CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
ZTEMP: DRY BULB ZONE TEMPERATURE

SENSOR TYPES:

DUCT PROBE SENSOR OR INSERTION FLOW METER
ACTUATED CONTROL DAMPER
INSERTION THERMOWELL PIPE SENSOR
SERPENTINED ACROSS COIL SENSOR

Kirksey ARCHITECTURE
Houston + Austin + Dallas
6909 Portwest Drive
Houston Texas 77024
713 850 9600
kirksey.com

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RICHARD LOPEZ
105316
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.09.16

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
MECHANICAL CONTROLS

SHEET NUMBER
M6.02

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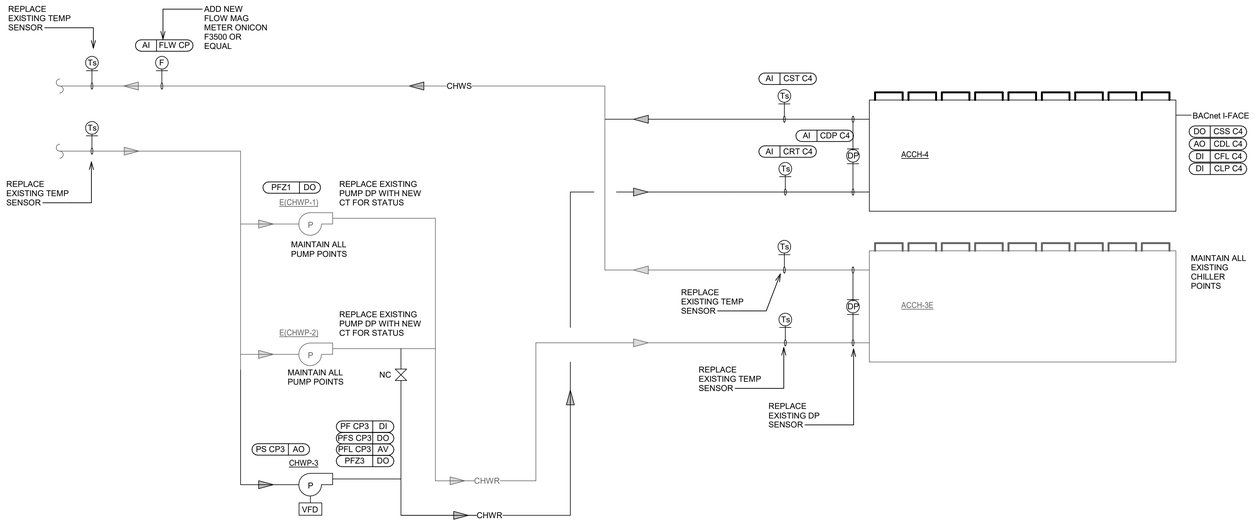
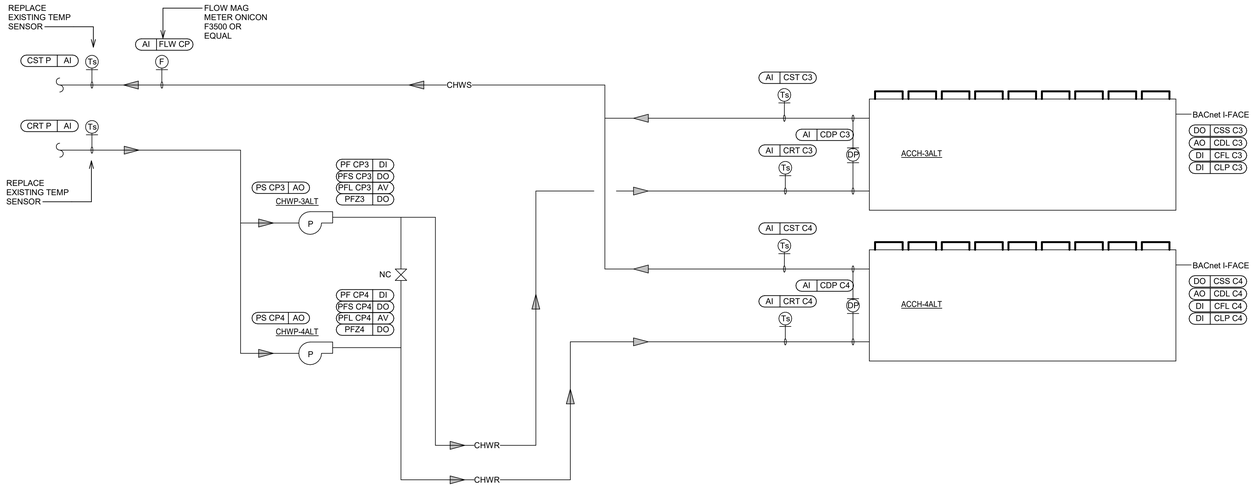


SEQUENCE OF OPERATION:

2. GENERAL: THE CHILLED WATER CONTROLS SYSTEM IS EXISTING. A SECOND CHILLER AND ITS PUMP ARE BEING ADDED TO THE SYSTEM
3. CHILLER SEQUENCING: THE CHILLED WATER SYSTEM SHALL BE STARTED/STOPPED THROUGH THE BAS. BELOW IS THE ADDED CONTROL SEQUENCE FOR STAGING THE CHILLERS
   1. AUTOMATIC:
      A. CHILLERS SHALL OPERATE PER THE BUILDING'S OCCUPANCY SCHEDULE.
      B. STAGING OF CHILLERS IS AUTOMATED.
      C. CHILLERS SHALL OPERATED ON A LEAD/LAG SEQUENCE WITH LEAD CHILLER ROTATING ON A WEEKLY BASIS (ADJ)
      D. DISCHARGE WATER TEMPERATURE FROM THE CHILLER SHALL BE MAINTAINED AT 42 DEG F (ADJ) THROUGH THE CHILLER'S FACTORY CONTROLS.
      E. IN THE EVENT THAT CHILLED WATER SUPPLY TEMPERATURE TO THE BUILDING [CST P] RISES TO 44 DEG F (ADJ), THE LAG CHILLER SHALL OPERATE.
      F. THE LAG CHILLER SHALL BE DEACTIVATED WHEN CHILLED WATER TEMPERATURES FROM THE BUILDING [CRT P] FALL TO 49 DEG F (ADJ)
4. PUMP SEQUENCING:
   1. WHENEVER A CHILLER IS ACTIVATED, ITS ASSOCIATED CHILLED WATER PUMP SHALL BE ACTIVATED.
      A. E(CHWP-1) INTERLOCKED WITH ACCH-3E
      B. CHWP-3 INTERLOCKED WITH ACCH-4
      C. A MANUAL BYPASS EXISTS BETWEEN THE TWO PUMPS. TO USE THIS BYPASS, THE BYPASS MUST BE MANUALLY OPENED AND THE PUMPS MUST BE PUT INTO OPERATION MANUALLY.
      D. PUMPS SHALL OPERATED AT A CONSTANT VOLUME WHEN IN OPERATION.
5. FREEZE:
   1. HARDWIRE EACH CHILLER'S PUMP FROM THE CHILLER CONTROL PANEL TO TURN ON WHEN THE CHILLER GOES INTO FREEZE PROTECTION MODE.
6. GRAPHIC DISPLAY:
   1. DISPLAY ALL GRAPHICS AND POINTS AS INDICATED ABOVE IN THE CONTROL SCHEMATIC.
7. DIAGNOSTIC TREND LOGS: PROVIDE TRENDING PER THE FOLLOWING:
   1. TREND #1:
      A. CHWS TEMPS FROM EACH CHILLER
      B. CHWS TEMP TO THE BUILDING
      C. CHWR TEMP FROM THE BUILDING
      D. PUMPS STATUSES
      E. CHILLER STATUSES

FINE ARTS CHILLED WATER PLANT - ALTERNATE #4



SEQUENCE OF OPERATION:

- GENERAL: THE CHILLED WATER SYSTEM SHALL CONSIST OF (2) NEW AIR COOLED CHILLERS AND (2) NEW CONSTANT VOLUME CHILLED WATER PUMPS
  1. OCCUPIED MODE:
     A. IN SCHOOL: THE CHILLED WATER SYSTEM SHAL BE IN OPERATION WHENEVER AIR HANDLING EQUIPMENT IS OPERATIONAL AND CALLING FOR COOLING.
     B. SUMMER: THE CHILLED WATER SYSTEM SHALL BE IN OPERATION WHENEVER AIR HANDLING EQUIPMENT IS OPERATION AND AT LEAST (2) ZONES ARE ABOVE SETPOINT.
  2. UNOCCUPIED MODE: OFF
  3. MORNING COOL-DOWN CALL: THE CHILLED WATER SYSTEM SHALL OPERATING DURING MORNING COOL DOWN.
  4. MORNING WARM-UP CALL: THE CHILLED WATER SYSTEM SHALL BE OFF.
- CHILLER SEQUENCING: THE CHILLED WATER SYSTEM SHALL BE STARTED/STOPPED THROUGH THE BAS. THERE SHALL BE THREE MODES OF OPERATION:
  1. OFF: ALL CHILLERS AND PUMPS SHALL BE OFF
  2. MANUAL: THE CHILLERS AND PUMPS SHALL BE STARTED MANUALLY
  3. AUTOMATIC:
     A. CHILLERS SHALL OPERATE PER THE BUILDING'S OCCUPANCY SCHEDULE.
     B. STAGING OF CHILLERS IS AUTOMATED.
     C. CHILLERS SHALL OPERATED ON A LEAD/LAG SEQUENCE WITH LEAD CHILLER ROTATING ON A WEEKLY BASIS (ADJ)
     D. DISCHARGE WATER TEMPERATURE FROM THE CHILLER SHALL BE MAINTAINED AT 42 DEG F (ADJ) THROUGH THE CHILLER'S FACTORY CONTROLS.
     E. IN THE EVENT THAT CHILLED WATER SUPPLY TEMPERATURE TO THE BUILDING [CST P] RISES TO 44 DEG F (ADJ), THE LAG CHILLER SHALL OPERATE.
     F. THE LAG CHILLER SHALL BE DEACTIVATED WHEN CHILLED WATER TEMPERATURES FROM THE BUILDING [CRT P] FALL TO 49 DEG F (ADJ)
- PUMP SEQUENCING:
  1. WHENEVER A CHILLER IS ACTIVATED, ITS ASSOCIATED CHILLED WATER PUMP SHALL BE ACTIVATED.
     A. CHWP-3ALT INTERLOCKED WITH ACCH-3ALT
     B. CHWP-4ALT INTERLOCKED WITH ACCH-4ALT
     C. A MANUAL BYPASS EXISTS BETWEEN THE TWO PUMPS. TO USE THIS BYPASS, THE BYPASS MUST BE MANUALLY OPENED AND THE PUMPS MUST BE PUT INTO OPERATION MANUALLY.
     D. PUMPS SHALL OPERATED AT A CONSTANT VOLUME WHEN IN OPERATION.
- FREEZE:
  1. HARDWIRE EACH CHILLER'S PUMP FROM THE CHILLER CONTROL PANEL TO TURN ON WHEN THE CHILLER GOES INTO FREEZE PROTECTION MODE.
- GRAPHIC DISPLAY:
  1. DISPLAY ALL GRAPHICS AND POINTS AS INDICATED ABOVE IN THE CONTROL SCHEMATIC.
- DIAGNOSTIC TREND LOGS: PROVIDE TRENDING PER THE FOLLOWING:
  1. TREND #1:
     A. CHWS TEMPS FROM EACH CHILLER
     B. CHWS TEMP TO THE BUILDING
     C. CHWR TEMP FROM THE BUILDING
     D. PUMPS STATUSES
     E. CHILLER STATUSES

FINE ARTS CHILLED WATER PLANT - ALTERNATE #5

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POINT TYPES:

AV: ANALOG VIRTUAL
AO: ANALOG OUTPUT
AI: ANALOG INPUT
DV: DIGITAL VIRTUAL
DO: DIGITAL OUTPUT
DI: DIGITAL INPUT
NA: CONTROL INTEGRAL TO EQUIPMENT AND DOES NOT REQUIRE BAS POINT

*POINTS NOTED WITH AN * ARE NOT REQUIRED TO BE DISPLAYED GRAPHICALLY ON THE FRONT END

POINT NAMES:

AHU R: AHU RUN COMMAND
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BDP P#: BOILER PLANT DIFFERENTIAL PRESSURE SENSOR. HARDWIRE POINT BACK TO HEATING HOT WATER PUMP CONTROLLER.
BPBPV: HEATING HOT WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). THIS POINT MUST BE HARDWIRED BACK TO THE BOILER PLANT CONTROLLER.
BPC: BOILER PLANT CAPACITY (CALCULATED)
BRT B#: B-# BOILER RETURN WATER TEMP
BRT P: HEATING HOT WATER PLANT RETURN TEMP
BST B: HEATING HOT WATER PLANT SUPPLY TEMP FOR BOILER STAGING CONTROL
BST P: HEATING HOT WATER PLANT SUPPLY TEMP
BST B#: B-# BOILER SUPPLY WATER TEMP
CCST: COOLING COIL SUPPLY TEMP
CCST SP: COOLING COIL SUPPLY TEMP SETPOINT
CDL C#: CHILLER ACCH-# DEMAND LIMIT
CDP C#: CHILLER DIFFERENTIAL PRESSURE SENSOR
CDP P#: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SENSOR (TOTAL OF 2). HARDWIRE POINT BACK TO CHILLER PLANT UNITARY CONTROLLER.
CDP SP: CHILLED WATER PLANT DIFFERENTIAL PRESSURE SETPOINT
CFL C#: CHILLER FAILURE ALARM
CHP SS: CHILLED WATER PLANT START/STOP
CHWR: CHILLED WATER RETURN TEMP
CHWV: CHILLED WATER VALVE POSITION (CALCULATED % OPEN)
CLG SP: COOLING DRY BULB TEMP SETPOINT
CLP C#: CHILLER CURRENT OUTPUT
CO2 SP: CO2 SETPOINT, CALCULATED AS [CO2 SP] = [OA CO2] + 500 PPM
CPBPV: CHILLED WATER PLANT BYPASS VALVE POSITION (CALCULATED, % OPEN). HARDWIRE THIS POINT BACK TO THE CHILLED PLANT CONTROL PANEL (LOCATED REMOTELY)
CPT: CHILLED WATER PLANT TOTAL TONNAGE
CRT C#: ACCH-# RETURN CHILLED WATER TEMP
CRT P: CHILLED WATER PLANT RETURN WATER TEMP
CSR P: CHILLED WATER PLANT SUPPLY WATER TEMP
CSS C#: CHILLER ACCH-# START/STOP
CST C#: ACCH-# SUPPLY CHILLED WATER TEMP
CVEP: CONSTANT VOLUME EXHAUST DUCT PRESSURE
CVEP SP: CONSTANT VOLUME EXHAUST DUCT PRESSURE SETPOINT
DP C#: ACCH-# CHILLER DIFFERENTIAL PRESSURE
DSP: DUCT STATIC PRESSURE
DSP SP: DUCT STATIC PRESSURE SETPOINT
EADPT: EXHAUST AIR DEW POINT TEMP
EARH: EXHAUST AIR RELATIVE HUMIDITY
EAT: EXHAUST AIR DRY BULB TEMP
EFSS: EXHAUST FAN START/STOP
EF FLT: EXHAUST FAN FAULT
EF MAX: EXHAUST FAN MAX SPEED AS SET BY TAB
EF SPD: EXHAUST FAN SPEED
EF %SP: EXHAUST FAN SPEED AS % OF MAX, CALCULATED AS [EF %SP] = [EF SPD] / [EF MAX]
EF CT: EXHAUST FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
EHC: ELECTRIC HEATING COIL SCR OUTPUT
EWBD: ENERGY RECOVERY WHEEL BYPASS DAMPER POSITION (OPEN/CLOSED)
EWET: ENERGY RECOVERY WHEEL DISCHARGE EXHAUST AIR DRY BULB TEMP
EWOT: ENERGY RECOVERY WHEEL DISCHARGE OUTDOOR AIR DRY BULB TEMP
EW FLT: ENERGY RECOVERY WHEEL FAULT
EW SPD: ENERGY RECOVERY WHEEL FAN SPEED
EWSS: ENERGY RECOVERY WHEEL START/STOP
FBD: FACE AND BYPASS DAMPER POSITION (CALCULATED % OPEN FACE)
FILT: DIRTY FILTER STATUS
FLW C#: ACCH-# CHILLER FLOW
FLW B#: B-# BOILER FLOW
FLW BP: HEATING HOT WATER PLANT SUPPLY FLOW
FLW CP: CHILLED WATER PLANT SUPPLY FLOW
FRZ: FREEZE STAT
F SS: HVLS FAN START/STOP
F SPD: HVLS FAN SPEED
GEAD: GENERAL EXHAUST AIR MODULATING DAMPER POSITION (CALCULATED % CLOSED)
HCST: HEATING COIL SUPPLY TEMP
HTA: HIGH TEMPERATURE ALARM
HTG SP: HEATING DRY BULB SUPPLY TEMP
HWP SS: HEATING HOT WATER BOILER PLANT START/STOP
HWR: HOT WATER RETURN TEMP
HWV: HOT WATER VALVE POSITION (CALCULATED % OPEN)
ID: ISOLATION DAMPER (DAMPER AND CONTROL ARE INTEGRAL TO FAN)
ELC: EXTERIOR LIGHTING CONTROLS ON/OFF
ELD#: ELECTRIC METER MSB-# DEMAND (KW)
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OA CO2: OUTDOOR AIR CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
OAT: DRY BULB OUTDOOR AIR TEMP
PF BP#: HWP-# PUMP START/STOP
PF CP#: CHWP-# PUMP START/STOP
PFL BP#: HWP-# PUMP FAILURE ALARM
PFL CP#: CHWP-# PUMP FAILURE ALARM
PFS BP#: HWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFS CP#: CHWP-# PUMP STATUS VIA CURRENT TRANSDUCER (CT)
PFZ#: HARDWIRED CHILLER PUMP START FROM CHILLER
PHCT: PREHEAT COIL DISCHARGE TEMP
PHCT SP: PREHEAT COIL DISCHARGE TEMP SETPOINT
PIS: STAND-BY PUMP TEMPORARY IDENTITY (CHWP-1A, CHWP-1B, CHWP-S)
PS BP#: HWP-# PUMP SPEED
P MB#: HWP-# MAX PUMP SPEED
PS %B#: HWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %B#] = [PS B#] / [P MB#]
PS CP#: CHWP-# PUMP SPEED
P MC#: CWP-# MAX PUMP SPEED
PS %C#: CWP-# PUMP SPEED AS PERCENT OF MAX, CALCULATED AS [PS %C#] = [PS CP#] / [P MC#]
PSS BP: HEATING HOT WATER PLANT PUMPING SYSTEM START/STOP (FROM BOILER CONTROL PANEL)
RADPT: DEW POINT RETURN AIR TEMP
RADP SP: RETURN AIR DEW POINT SETPOINT
RARH: RETURN AIR RELATIVE HUMIDITY
RAT: DRY BULB RETURN AIR TEMP
RH: RELATIVE HUMIDITY
RH SP: RELATIVE HUMIDITY SETPOINT
RPSS: RECIRCULATION PUMP START/STOP
SAT SP: DRY BULB SUPPLY AIR TEMP SETPOINT
SAT: DRY BULB SUPPLY AIR TEMP
SD: DUCT SMOKE DETECTOR
SEAD: SHUT-OFF EXHAUST AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
SF MAX: MAX SUPPLY FAN SPEED (CONFIRM WITH TAB MAX SPEED SETTINGS)
SFSS: SUPPLY FAN START/STOP
SF FLT: SUPPLY FAN FAULT
SF SPD: SUPPLY FAN SPEED
SF %SP: SUPPLY FAN % SPEED OF MAX, CALCULATED BY [SF%SP] = [SF SPD/SFMAX]
SF CT: SUPPLY FAN STATUS, 1 PER FAN (VIA CT INSTALLED ON FAN)
SOAD: SHUT-OFF OUTDOOR AIR CONTROL DAMPER POSITION (OPEN/CLOSED)
TUD: TERMINAL UNIT PRIMARY AIR VALVE POSITION (CALCULATED, % OPEN)
TUF: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW
TUF SP: TERMINAL UNIT PRIMARY AIR VALVE AIRFLOW SETPOINT
TUFSS: TERMINAL UNIT FAN START/STOP
TUP: TERMINAL UNIT PRIMARY AIR VALVE DIFFERENTIAL PRESSURE
UV: UV LIGHT STATUS
VES#: MANUAL ISOLATION VALVE WITH END SWITCH MONITORED BY BAS.
ZCO2: ZONE CO2, OBTAINED FROM FACILITIES MONITORING SYSTEM
ZTEMP: DRY BULB ZONE TEMPERATURE

SENSOR TYPES:

- DUCT PROBE SENSOR OR INSERTION FLOW METER
- ACTUATED CONTROL DAMPER
- INSERTION THERMOWELL PIPE SENSOR
- SERPENTINED ACROSS COIL SENSOR

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STATE OF TEXAS
RICHARD LOPEZ
#85336
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.09.16

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
MECHANICAL CONTROLS - FINE ARTS CENTRAL PLANT

SHEET NUMBER
M6.03
F

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TAGGED NOTES	##
E2	EXISTING HEATERS TO BE REMOVED AND REPLACED. EXISTING CIRCUITS SHALL REMAIN AND BE REUSED FOR NEW HEATERS.
E41	EXISTING POWER FOR EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING LIGHTING CIRCUIT.
E55	EXISTING PANELS AND ASSOCIATED TRANSFORMER SHALL BE REMOVED AND REPLACED. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
E56	EXISTING SWITCHBOARD AT FIELD HOUSE SHALL BE REMOVED AND REPLACED. REFER TO ONE-LINE DIAGRAM ON SHEET E5.01 FOR MORE INFORMATION.

1 ENLARGED SITE DEMOLITION PLAN - FIELD HOUSE
1/8" = 1'-0"

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STATE OF TEXAS
GEORGE JAMES OEHRLE
REGISTERED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

△	DATE	ISSUE
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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

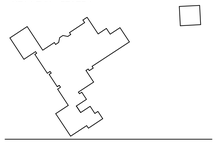
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

ENLARGED SITE DEMOLITION PLAN - FIELD HOUSE

SHEET NUMBER

E1.11

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1 ENLARGED SITE PLAN - FIELD HOUSE
1/8" = 1'-0"

GENERAL NOTES (SITE):

GENERAL

A. DO NOT SCALE FROM MECHANICAL AND ELECTRICAL DRAWINGS. FIELD VERIFY REQUIRED DIMENSIONS AND COORDINATE WITH CIVIL DRAWINGS AND SURVEYS.

B. REFER ALSO TO ALL OTHER PLANS AND THE SPECIFICATION, BUT ESPECIALLY TO:
- THE SITE SURVEY
- THE ARCHITECTURAL SITE PLAN
- THE SITE GRADING PLAN
- THE PLANTING PLAN (WHERE AVAILABLE)
- FOUNDATION PLAN(S)
- APPROPRIATE MECHANICAL & ELECTRICAL FLOOR PLANS FOR SERVICE CONTINUATIONS
- OTHER SITE UTILITY PLANS

WHERE THERE ARE CONFLICTS AMONG THESE PLANS AND/OR RELATED SPECIFICATIONS, ADVISE THESE ENGINEERS AT LEAST TEN DAYS PRIOR TO SUBMISSION OF BIDS.

C. ALL FEES AND ANY OTHER COSTS TO UTILITY COMPANIES, MUNICIPALITIES, INSPECTORS, REVIEWING AGENCIES, ETC. ARE TO BE INCLUDED AS A PART OF THIS CONTRACT.

D. ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL AT MINIMUM COMPLY WITH FEDERAL, STATE, COUNTY, AND LOCAL CODES, RULES, REGULATIONS, AND REQUIREMENTS. IN CASE OF CONFLICTS OR DISCREPANCIES AMONG CODE REQUIREMENTS OR BETWEEN ANY CODE REQUIREMENT AND THIS DESIGN, THE MOST STRINGENT SHALL APPLY.

E. WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL FEDERAL, STATE, AND/OR LOCAL RULES, REGULATIONS, STANDARDS, AND SAFETY REQUIREMENTS, INCLUDING 811 / "B-U-D".

F. UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE MUNICIPALITY AND/OR UTILITY COMPANY STANDARDS. IN ALL CASES, THE MOST STRINGENT REQUIREMENT SHALL APPLY. IF ANY VARIATION OCCURS, CONSULT THE ENGINEER.

G. CONTRACTOR SHALL CONTACT ENGINEER FOR INSPECTION OF TRENCHES PRIOR TO COVERING OF WORK. PROVIDE PHOTOS UPON REQUEST.

H. CONTRACTOR SHALL CUT AND PATCH ALL PAVEMENT, CURBING, ETC. AS REQUIRED FOR WORK. CONTRACTOR SHALL REPAIR ALL LANDSCAPING THAT IS DAMAGED FOR WORK. FINISH GRADE, SEED AND STRAW ALL DISTURBED GREEN SPACES. ALL PATCH AND REPAIR WORK SHALL BE IN ACCORDANCE WITH BOTH CIVIL AND LANDSCAPE DRAWINGS AND SPECIFICATIONS.

EXISTING CONDITIONS

I. LOCATIONS, DEPTHS, MATERIAL TYPES, ELEVATIONS, ETC. OF ALL APPURTENANCES, LINES, BUILDINGS, ETC. INDICATED ON THESE DRAWINGS WERE TAKEN FROM VARIOUS SOURCES, ARE DIAGRAMMATIC ONLY AND ARE SUBJECT TO SUBSTANTIAL VARIATION FROM EXISTING CONDITIONS; ACTUAL UTILITIES LOCATIONS MAY VARY. CONSEQUENTLY ALL CONTRACTORS SHALL EXERCISE CARE IN THE COURSE OF THEIR WORK SO AS TO ENSURE THAT THEY DO NOT INTERRUPT ANY EXISTING SERVICE. FOR SAFETY PURPOSES, PAY PARTICULAR ATTENTION TO THIS PRECAUTION RELATIVE TO NATURAL GAS AND ELECTRICAL LINES.

J. CONTRACTOR SHALL VISIT THE SITE AND FIELD VERIFY THE ROUTING OF ALL UTILITIES PRIOR TO SUBMISSION OF BIDS. SUBMISSION OF A BID PROPOSAL INDICATES THAT THE CONTRACTOR IS FULLY AWARE OF ALL OBSTRUCTIONS AND WILL INSTALL ALL OF THE NEW UTILITIES WITHOUT REQUESTS FOR ANY ADDITIONAL CHANGES.

K. WHEN INTERRUPTION OF AN EXISTING UTILITY OR SERVICE IS PLANNED OR OCCURS ACCIDENTALLY, THE CONTRACTOR(S) SHALL WORK CONTINUOUSLY AS NEEDED TO RESTORE SAME, PROVIDING PREMIUM TIME AS NEEDED AT NO INCREASE IN THE CONTRACT PRICE.

L. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY EXCAVATION WORK REQUIRED TO LOCATE UNDERGROUND UTILITIES. THE CONTRACTOR IS ALSO REQUIRED TO NOTIFY ANY OTHER AFFECTED UTILITY OWNERS PRIOR TO DIGGING. IN THE EVENT OF ACCIDENTAL INTERRUPTION OF SERVICE, CONTRACTOR WILL IMMEDIATELY NOTIFY THE OTHER UTILITY OWNERS.

TECHNICAL REQUIREMENTS

M. PROVIDE LONG-RADIUS SWEEPING ELBOWS FOR UNDERGROUND CONDUIT BENDS. WHERE SERVING A UTILITY OWNED TRANSFORMER, THE UTILITY STANDARDS SHALL TAKE PRECEDENCE.

N. PROVIDE GALVANIZED RIGID CONDUIT FOR EXTERIOR UNDERGROUND TRANSITIONS TO ABOVE GRADE; EXTEND CONDUIT A MINIMUM OF 6" ABOVE GRADE.

O. PROVIDE PULL BOXES PER DETAILS AND SPECIFICATIONS. IF ADDITIONAL PULL BOXES ARE NEEDED, COORDINATE LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.

TAGGED NOTES (#)

E61 ALTERNATE 10: IN LIEU OF NEW INTAKE FAN IF-1, NEW DOAS ROOF MOUNTED UNIT SHALL BE ADDED AND FED FROM NEW SWITCHBOARD MS#2. REFER TO ONE-LINE DIAGRAM ON SHEET E5.01 FOR MORE INFORMATION.

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STATE OF TEXAS
GEORGE JAMIE VEHRT
103744
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

	DATE	ISSUE
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B	03/21/2025	100% DESIGN DEVELOPMENT
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FORT BEND 2020 BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

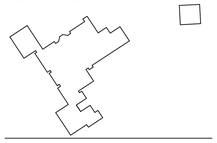
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

ENLARGED SITE PLAN - FIELD HOUSE

SHEET NUMBER

E1.21

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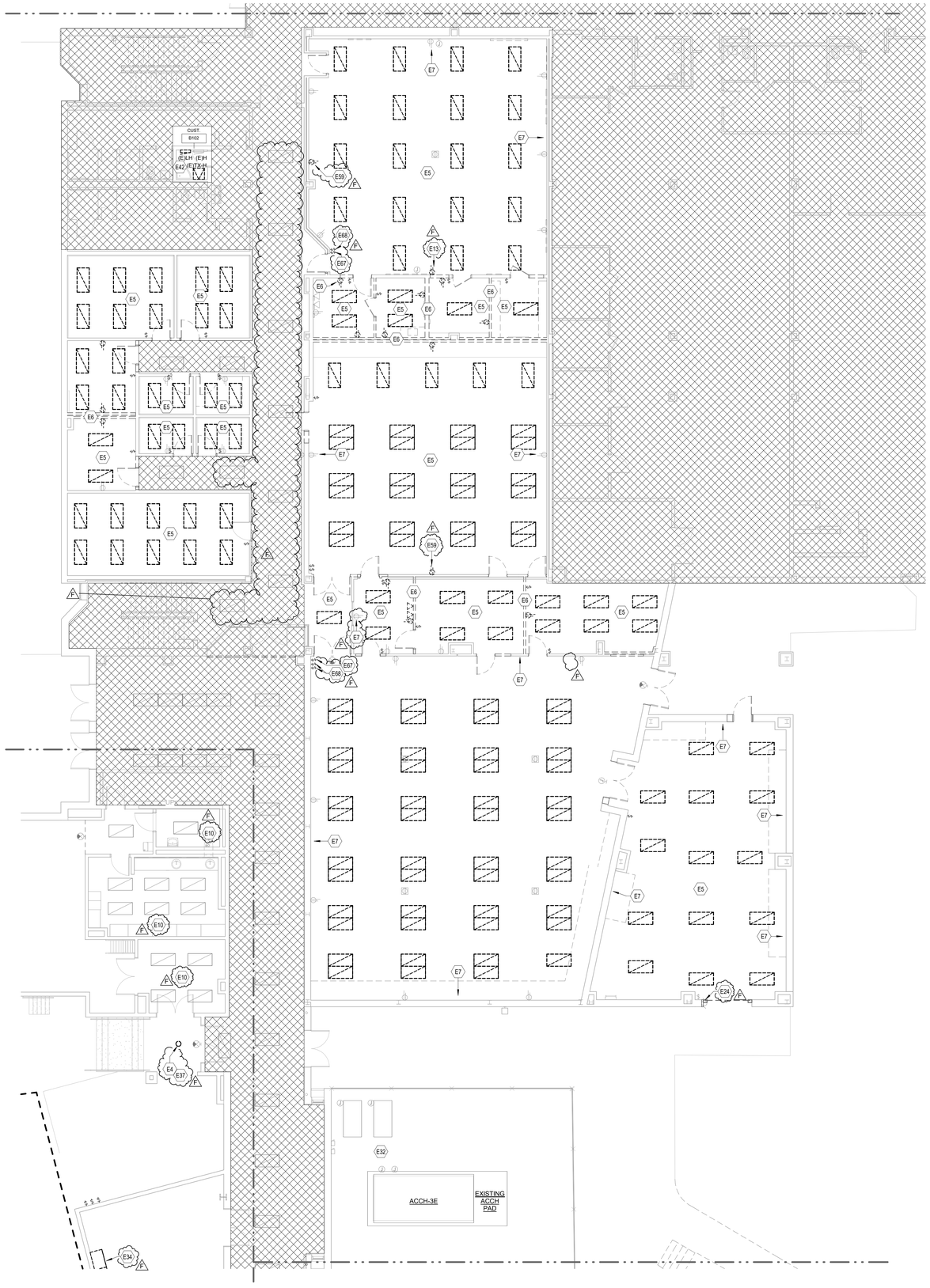
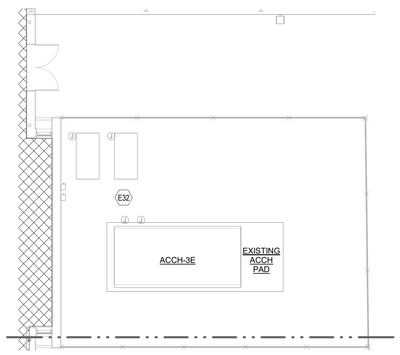
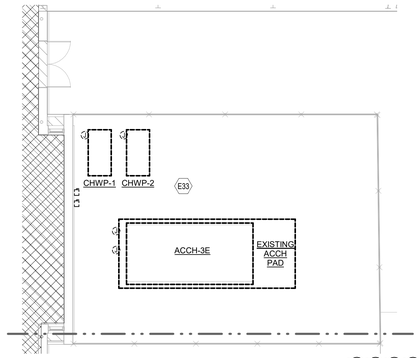


1 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN - AREA B1
1/8" = 1'-0"



2 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN - MECH YARD
1/8" = 1'-0"



3 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN -MECH YARD -ALTERNATE 5
1/8" = 1'-0"

TAGGED NOTES

E4	ALL THEATRICAL AND BACK OF HOUSE LIGHTING IN THE AUDITORIUM SHALL BE REMOVED AND REPLACED ONE-FOR-ONE. LIGHT FIXTURE LOCATIONS SHOWN ON PLAN FOR REFERENCE. FIELD VERIFY EXACT LOCATIONS.
E5	ALL EXISTING LIGHTING AND LIGHTING CONTROLS IN THIS ROOM SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING LIGHTING CIRCUIT.
E6	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING CIRCUIT.
E7	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL REMAIN.
E10	ALL EXISTING ELECTRICAL DEVICES IN THIS ROOM SHALL REMAIN.
E13	EXISTING DUPLEX ON THIS WALL SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING CIRCUIT.
E24	EXISTING OVERHEAD COILING DOOR TO BE REMOVED AND REPLACED. EXISTING POWER SHALL REMAIN AND BE RECIRCUITED TO NEW PANEL.
E32	EXISTING POWER FOR ALL MECHANICAL UNITS SHALL REMAIN.
E33	ALTERNATE 5: EXISTING CHILLER TO BE REMOVED AND REPLACED WITH TWO (2) CHILLERS. EXISTING PUMPS TO BE REMOVED AND REPLACED. EXISTING CIRCUITS SHALL BE REUSED FOR NEW PUMPS.
E34	EXISTING DISTRIBUTION BOARD 'DPB' TO BE REMOVED AND REPLACED. REFER TO ONE-LINE DIAGRAM ON SHEET 'E5.02' FOR MORE INFORMATION.
E37	ALTERNATE 7: EXISTING THEATRICAL LIGHTING SHALL BE REMOVED AND REPLACED WITH REVISED LAYOUT.
E42	EXISTING PANEL 'LH' AND ASSOCIATED TRANSFORMER 'TX-H' SHALL BE REMOVED AND REPLACED. REFER TO ONE-LINE DIAGRAM ON SHEET 'E5.04' FOR MORE INFORMATION.
E59	EXISTING RECEPTACLE SHALL BE REMOVED AND REPLACED.
E67	EXISTING LIGHT SWITCH SHALL BE REMOVED AND REPLACED.
E68	EXISTING LIGHT SWITCH SHALL BE REMOVED AND REPLACED WITH BLANK COVER.

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2025.10.23

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FORT BEND 2025 BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

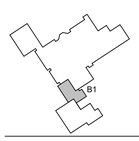
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 ELECTRICAL DEMOLITION PLAN - AREA B1

SHEET NUMBER

E2.13

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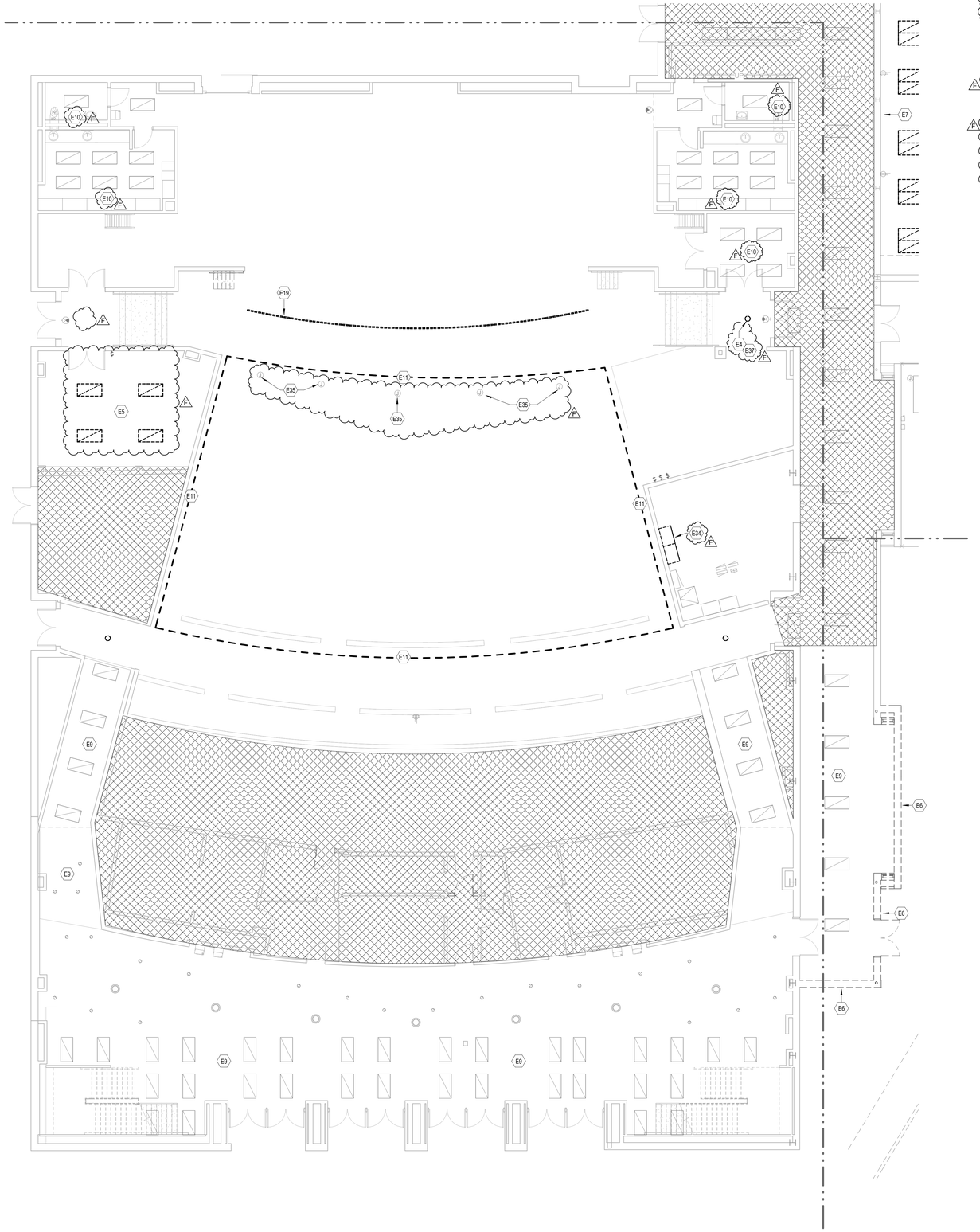

1 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN - AREA B2
1/8" = 1'-0"

TAGGED NOTES ##

E4	ALL THEATRICAL AND BACK OF HOUSE LIGHTING IN THE AUDITORIUM SHALL BE REMOVED AND REPLACED ONE-FOR-ONE. LIGHT FIXTURE LOCATIONS SHOWN ON PLAN FOR REFERENCE, FIELD VERIFY EXACT LOCATIONS.
E5	ALL EXISTING LIGHTING AND LIGHTING CONTROLS IN THIS ROOM SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING LIGHTING CIRCUIT.
E6	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING CIRCUIT.
E7	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL REMAIN.
E9	ALL EXISTING LIGHTING AND LIGHTING CONTROLS IN THIS ROOM SHALL REMAIN.
E10	ALL EXISTING ELECTRICAL DEVICES IN THIS ROOM SHALL REMAIN.
E11	EXISTING POWER FOR WALKWAY LIGHTING ON LOWER LEVEL SEATING SHALL REMAIN. EXISTING WALKWAY LIGHT FIXTURES SHALL BE RETROFITTED.
E19	EXISTING STAGE EDGE LIGHT SHALL BE REMOVED AND REPLACED.
E34	EXISTING DISTRIBUTION BOARD 'DPB' TO BE REMOVED AND REPLACED. REFER TO ONE-LINE DIAGRAM ON SHEET 'E5.02' FOR MORE INFORMATION.
E35	ALTERNATE 6: EXISTING WALKWAY LIGHTING ON LOWER-LEVEL SEATING TO BE REMOVED AND REPLACED WITH SEATING WITH INTEGRAL LIGHTING. EXISTING CIRCUITS SHALL BE REUSED FOR NEW LIGHTING.
E37	ALTERNATE 7: EXISTING THEATRICAL LIGHTING SHALL BE REMOVED AND REPLACED WITH REVISED LAYOUT.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023

PROJECT NAME

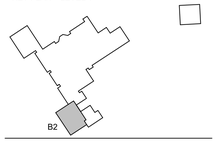
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 ELECTRICAL DEMOLITION PLAN - AREA B2

SHEET NUMBER

E2.14

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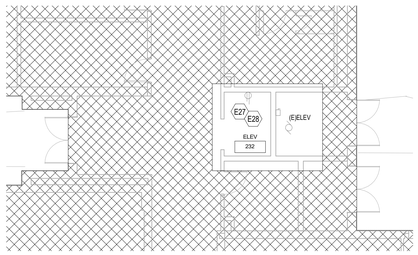

2 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN - AREA D
1/8" = 1'-0"

1 LEVEL 1 ELECTRICAL DEMOLITION FLOOR PLAN - AREA F
1/8" = 1'-0"

TAGGED NOTES (A) (##)

E8 (A)	ALL EXISTING ELECTRICAL DEVICES AND EQUIPMENT IN THIS ROOM SHALL REMAIN.
E25 (A)	EXISTING ELEVATOR TO BE REMOVED AND REPLACED. EXISTING ELECTRICAL EQUIPMENT AND CIRCUITING SHALL BE REUSED FOR NEW ELEVATOR.
E26 (A)	ALTERNATE 9B: EXISTING ELEVATOR TO REMAIN AND BE MODERNIZED. EXISTING POWER SHALL REMAIN.
E27	EXISTING POWER FOR ELEVATOR TO REMAIN.
E28 (A)	ALTERNATE 9A: EXISTING ELEVATOR TO BE REMOVED AND REPLACED. EXISTING ELECTRICAL EQUIPMENT AND CIRCUITING SHALL BE REUSED FOR NEW ELEVATOR.

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STATE OF TEXAS
REGINALD JAMES DEHRIT
CMTA F-8627
REGISTERED PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2024

PROJECT NAME

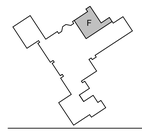
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 ELECTRICAL DEMOLITION PLAN - AREA F & D

SHEET NUMBER

E2.15

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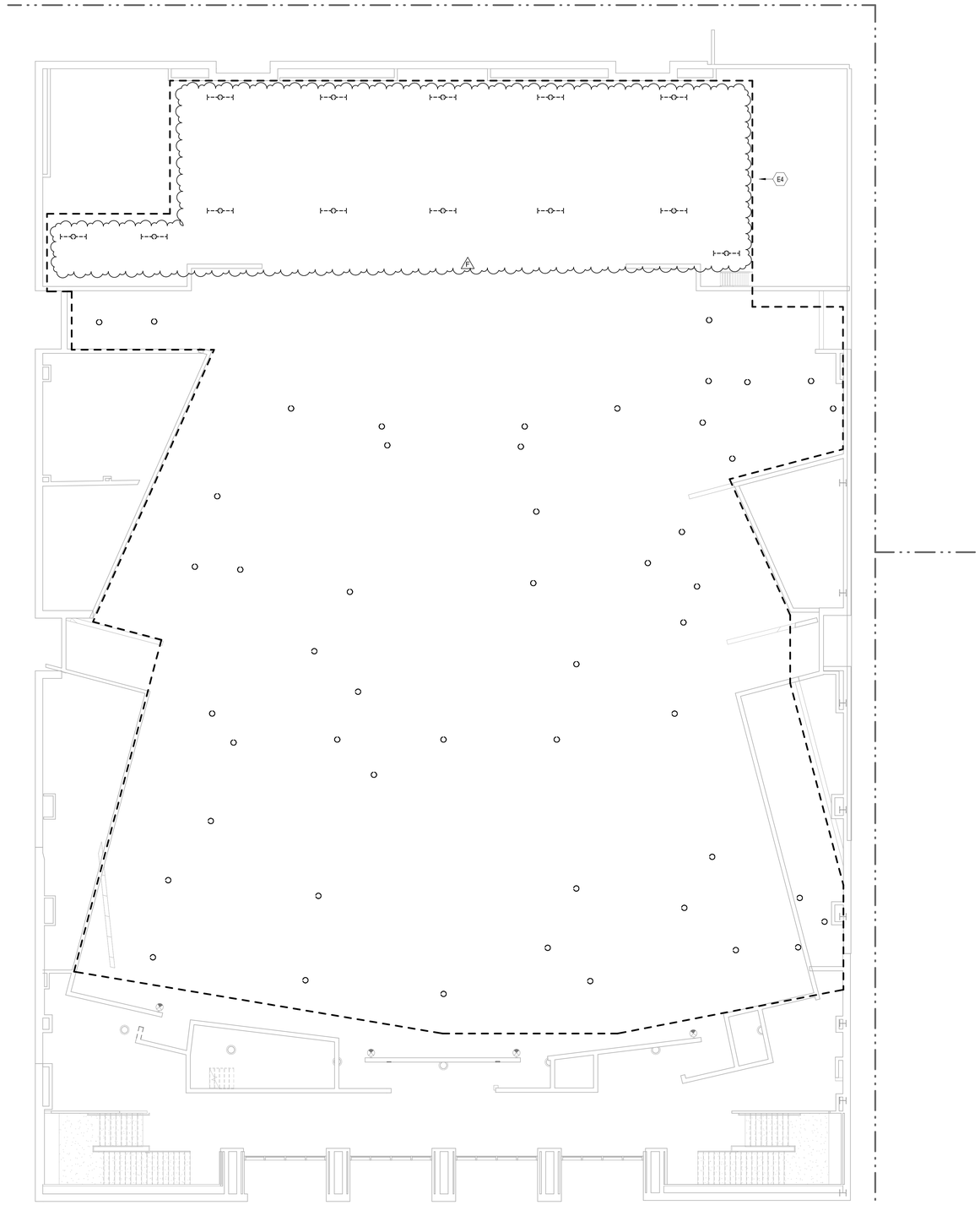
TAGGED NOTES

E4	ALL THEATRICAL AND BACK OF HOUSE LIGHTING IN THE AUDITORIUM SHALL BE REMOVED AND REPLACED ONE-FOR-ONE. LIGHT FIXTURE LOCATIONS SHOWN ON PLAN FOR REFERENCE. FIELD VERIFY EXACT LOCATIONS.



1 LEVEL 2 ELECTRICAL DEMOLITION FLOOR PLAN - AREA B2
1/8" = 1'-0"

Kirksey
ARCHITECTURE

Houston + Austin + Dallas

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Houston Texas 77024
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CMTA F-8627
2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

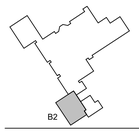
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA B2

SHEET NUMBER

E2.17

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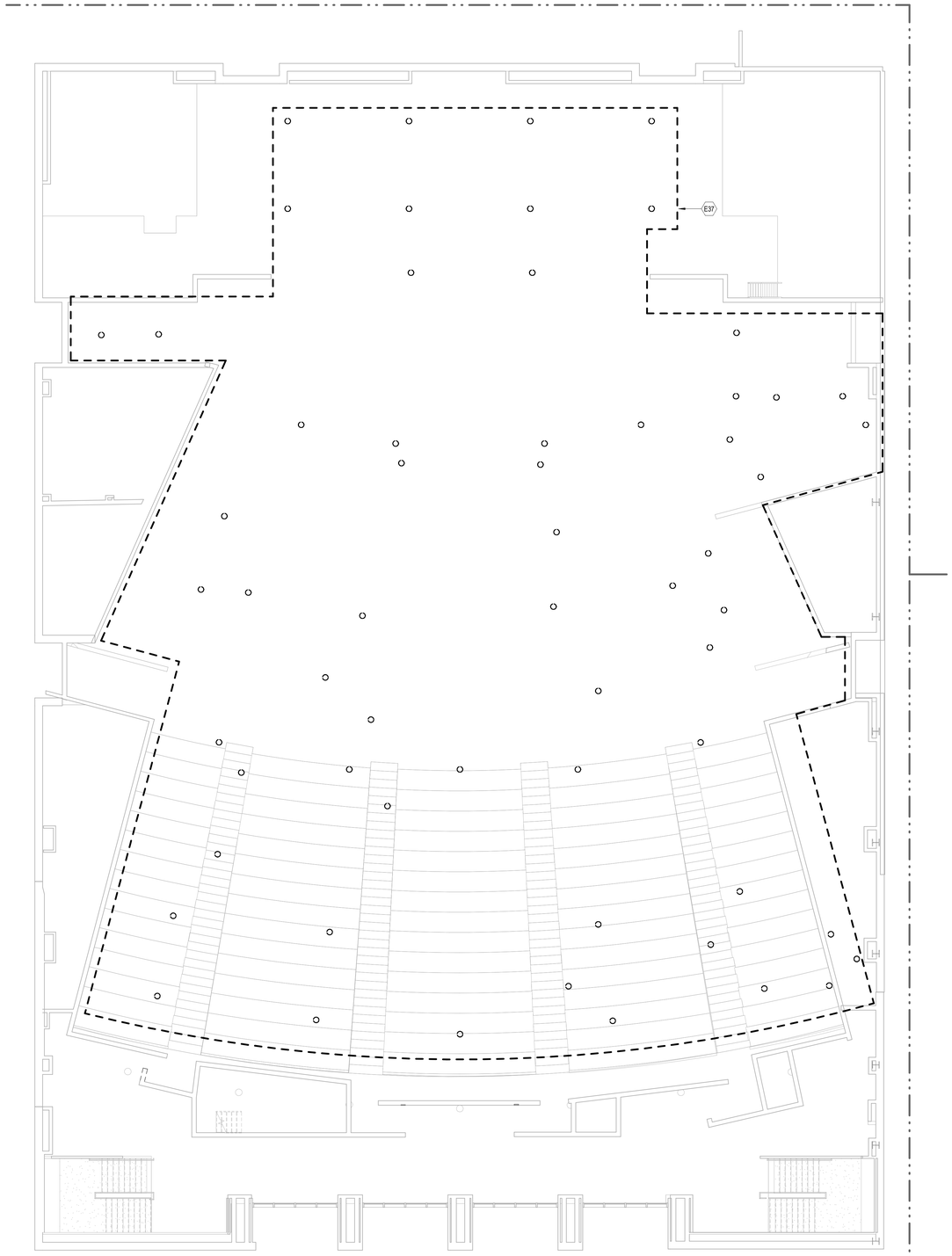
Docusign Envelope ID: 5555E922-9585-442E-BF8B-057333D2EAE3

TAGGED NOTES /F

E37 ALTERNATE 2 EXISTING THEATRICAL LIGHTING SHALL BE REMOVED AND REPLACED WITH REVISED LAYOUT.



1 LEVEL 2 ELECTRICAL DEMOLITION FLOOR PLAN - AREA B2 - ALTERNATE
1/8" = 1'-0"

Kirksey
ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

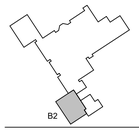
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA B2 - ALTERNATE

SHEET NUMBER

E2.17.A

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Docusign Envelope ID: 5555E922-9585-442E-BF8B-057333D2EAE3

TAGGED NOTES

E8 \ ALL EXISTING ELECTRICAL DEVICES AND EQUIPMENT IN THIS ROOM SHALL REMAIN.

1 LEVEL 2 ELECTRICAL DEMOLITION FLOOR PLAN - AREA F
1/8" = 1'-0"

Kirksey ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

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STATE OF TEXAS
REGINA JAMIE OEHRTZ
CMTA F-8627
REGISTERED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

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A	12/04/2024	100% SCHEMATIC DESIGN
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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

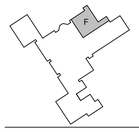
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 ELECTRICAL DEMOLITION PLAN - AREA F

SHEET NUMBER

E2.18

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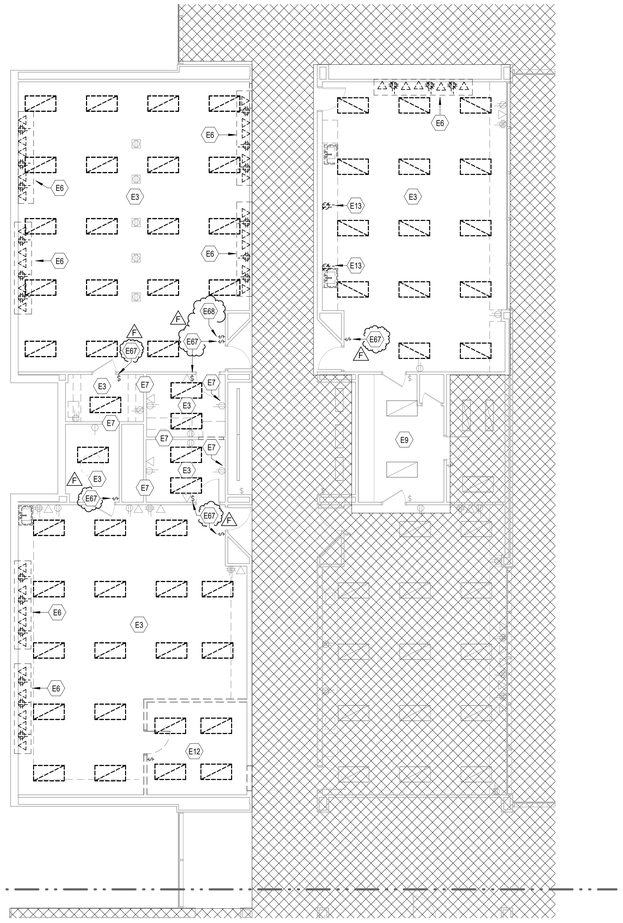
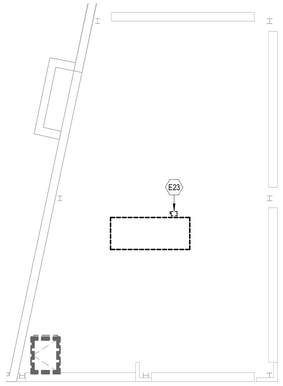
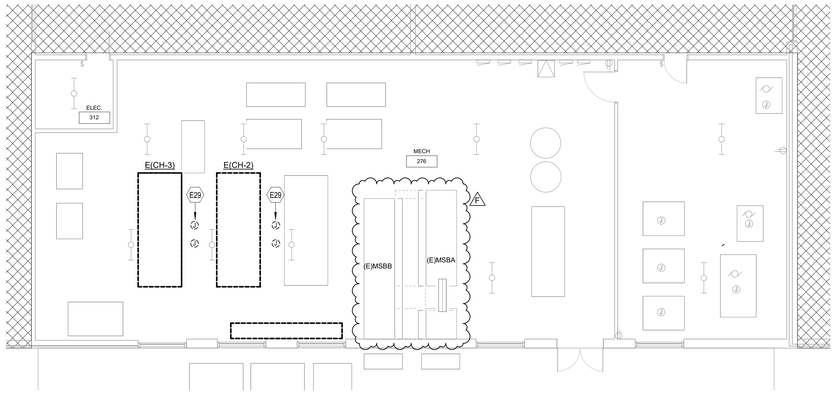
TAGGED NOTES	##
E3	ALL EXISTING LIGHTING AND LIGHTING CONTROLS IN THIS ROOM SHALL BE REMOVED. EXISTING LIGHTING CIRCUIT(S) SHALL BE REUSED FOR NEW LIGHTING.
E6	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING CIRCUIT.
E7	ALL EXISTING ELECTRICAL DEVICES ON THIS WALL SHALL REMAIN.
E9	ALL EXISTING LIGHTING AND LIGHTING CONTROLS IN THIS ROOM SHALL REMAIN.
E12	ALL ELECTRICAL DEVICES IN THIS ROOM SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING LIGHTING CIRCUIT.
E13	EXISTING DUPLEX ON THIS WALL SHALL BE REMOVED. REMOVE ASSOCIATED CONDUIT AND WIRING BACK TO LAST FIXTURE OR JUNCTION BOX IN SERIES. EXTEND CIRCUIT AS REQUIRED TO KEEP CONTINUITY OF EXISTING CIRCUIT.
E23	EXISTING ROOF TOP UNIT TO BE REMOVED AND REPLACED. EXISTING POWER FOR UNIT SHALL BE REMOVED. EXISTING CIRCUIT SHALL BE REUSED FOR NEW MECHANICAL UNIT.
E29	EXISTING CHILLERS SHALL BE REMOVED AND REPLACED. EXISTING CIRCUITING SHALL BE REUSED FOR NEW CHILLER.
E67	EXISTING LIGHT SWITCH SHALL BE REMOVED AND REPLACED.
E68	EXISTING LIGHT SWITCH SHALL BE REMOVED AND REPLACED WITH BLANK COVER.



2 LEVEL 2 ELECTRICAL DEMOLITION FLOOR PLAN - ART ROOMS
1/8" = 1'-0"



3 ROOF ELECTRICAL DEMOLITION PLAN - B1 ROOF
1/8" = 1'-0"



1 LEVEL 2 ELECTRICAL DEMOLITION FLOOR PLAN - MECH
1/8" = 1'-0"

Kirksey
ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

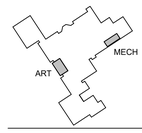
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 ELECTRICAL DEMOLITION PLAN - ART ROOMS & MECH SPACES

SHEET NUMBER

E2.19

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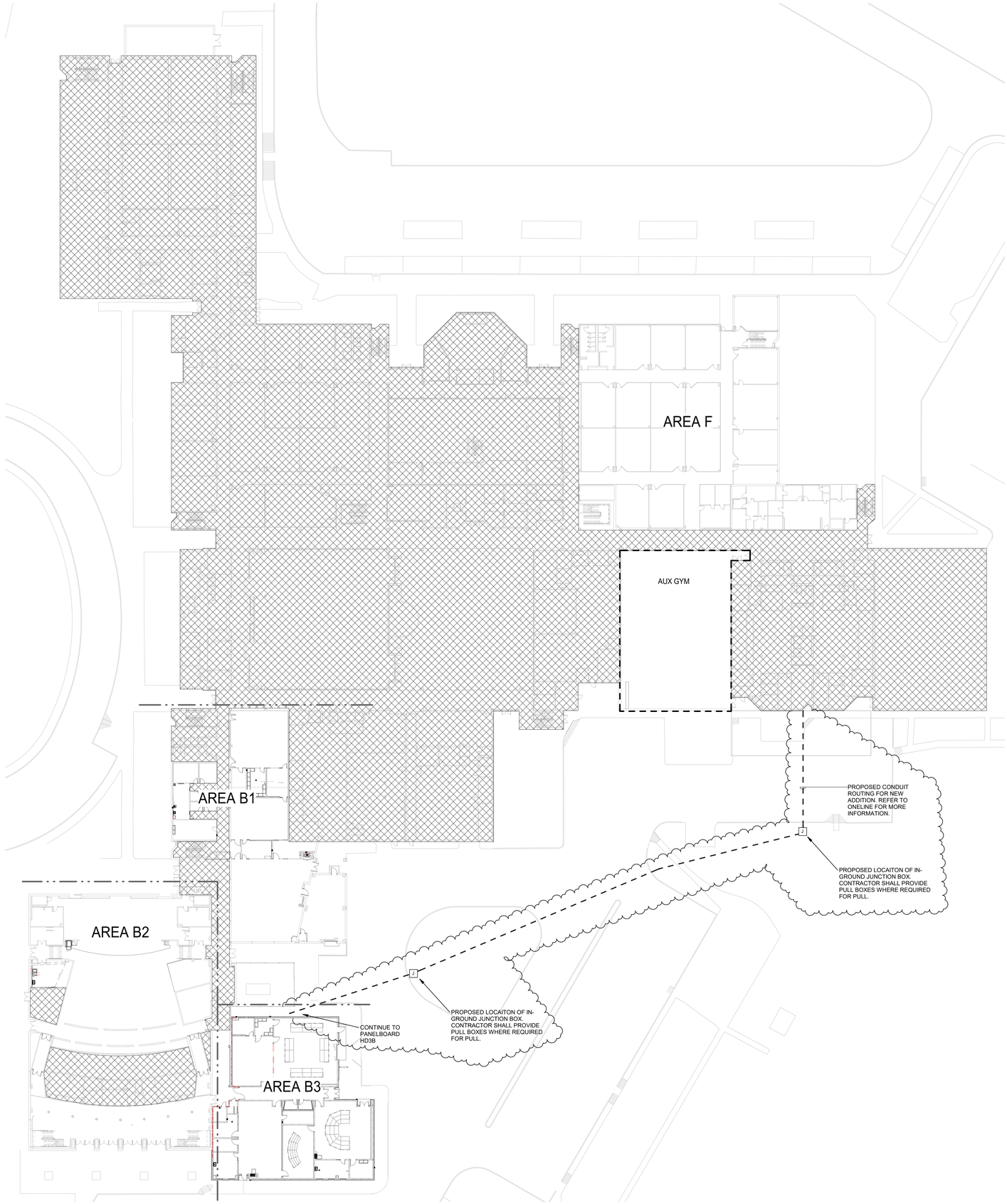

1 LEVEL 1 OVERALL ELECTRICAL PLAN
1" = 30'-0"

TAGGED NOTES ##

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STATE OF TEXAS
GEORGE JAMES VEHRT
REGISTERED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1

SHEET TITLE
LEVEL 1 OVERALL PLAN - ELECTRICAL

SHEET NUMBER
E2.21

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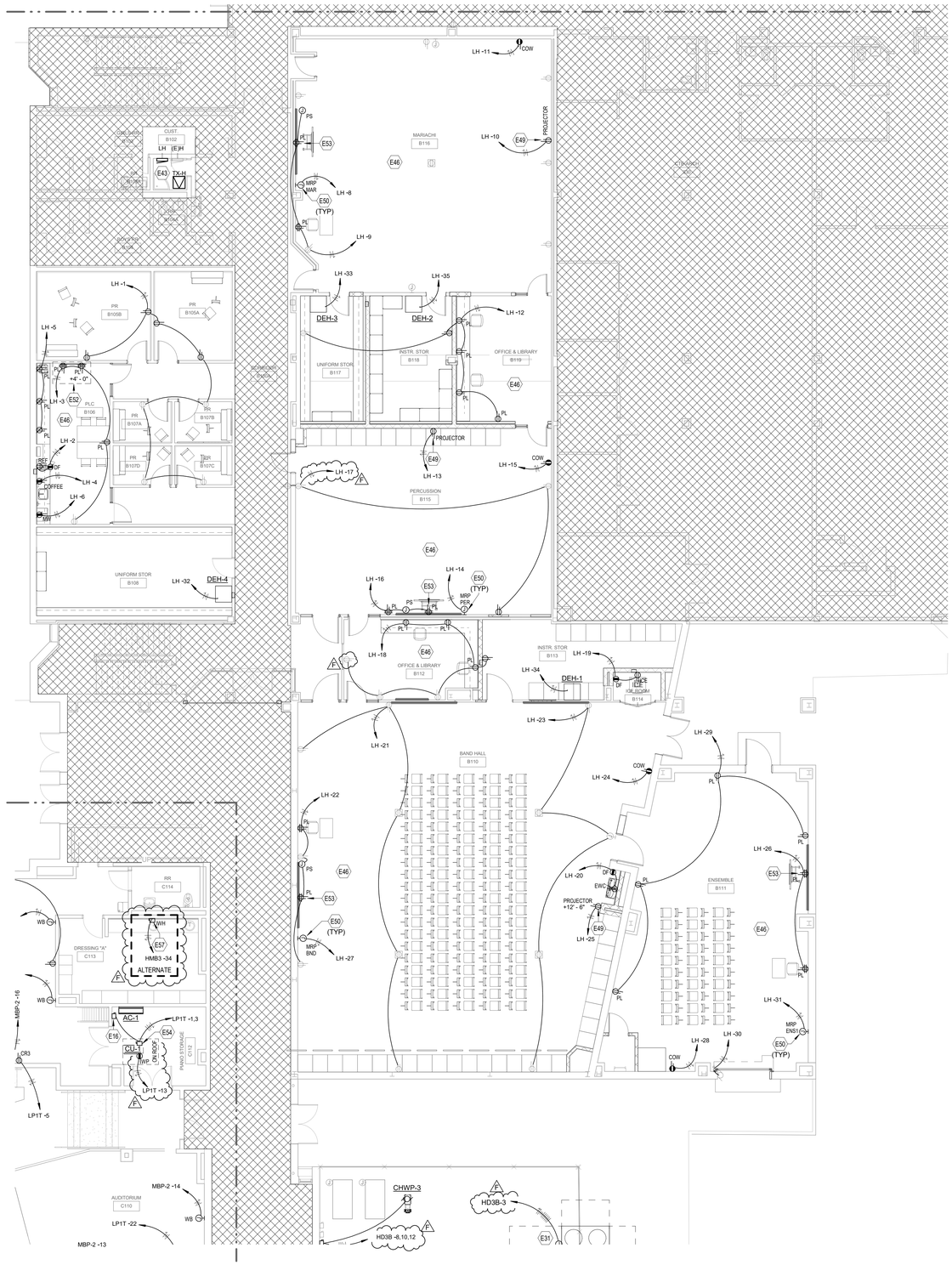
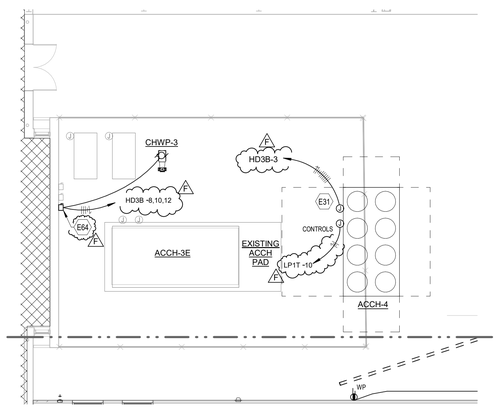
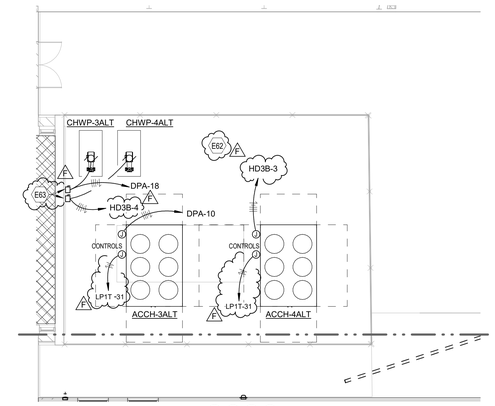


1 LEVEL 1 - POWER FLOOR PLAN - AREA B1
1/8" = 1'-0"



2 LEVEL 1 - POWER FLOOR PLAN - MECH YARD
1/8" = 1'-0"



3 LEVEL 1 - POWER FLOOR PLAN - ALTERNATE 5 - MECH YARD
1/8" = 1'-0"

GENERAL NOTES (POWER):

A. REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.

B. CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING.

C. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER NEC 310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER NEC 300.17 AND ANNEX C.

D. MULTIWIRE BRANCH CIRCUITS AS DEFINED IN NEC 100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.

E. IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING ON OUTSIDE OF COVER PLATE. MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.

F. RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).

G. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

TAGGED NOTES (##)

E16	PROVIDE 250V/30A/NF/2P/NEMA-1 HEAVY DUTY DISCONNECT SWITCH FOR AC UNIT. MOUNT ADJACENT TO UNIT.
E31	ADDITIONAL CHILLER AND ASSOCIATED PUMP ADDED FOR FINE ARTS ADDITION. NEW CHILLER SHALL BE CONNECTED TO EXISTING SWITCHBOARD 'MSBB'. NEW PUMP SHALL BE CIRCUITED TO NEAREST MECHANICAL PANEL.
E43	EXISTING PANEL 'LH' AND ASSOCIATED TRANSFORMER 'TX-H' SHALL BE REMOVED AND REPLACED. NEW TRANSFORMER SHALL BE SUSPENDED. REFER TO ONE-LINE DIAGRAM ON SHEET 'E5.04' FOR MORE INFORMATION.
E46	AT LEAST 50% OF ALL NEW RECEPTACLES IN ENCLOSED OFFICES, CONFERENCE ROOMS, AND BREAKROOMS SHALL BE PLUG-LOAD CONTROLLED CONTROLLED BY ROOM CONTROLLER WITHIN ASSOCIATED ROOM, U.O.N. PLUG-LOAD CONTROLLED RECEPTACLES ARE DENOTED WITH 'PL'.
E49	POWER FOR PROJECTOR SHALL BE RECESSED IN WALL BOX. REFER TO AV DETAIL ON SHEET 'AV0.90' AND AV SECTIONS FOR EXACT LOCATION AND MORE INFORMATION.
E50	PROVIDE ISOLATED GROUNDS FOR AV EQUIPMENT POWER. TYPICAL FOR ALL AV EQUIPMENT LOCATIONS.
E52	REFER TO TECHNOLOGY ELEVATION ON SHEET 'T4.02' FOR EXACT POWER LOCATIONS FOR INTERACTIVE DISPLAY.
E53	REFER TO TECHNOLOGY ELEVATION ON SHEET 'T4.02' FOR EXACT POWER LOCATIONS FOR CLASSROOM WALL.
E54	PROVIDE 250V/30A/NF/2P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E57	PROVIDE 600V/30A/NF/1P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E62	ALTERNATE 5: TWO (2) NEW AIR COOLED CHILLERS AND ASSOCIATED PUMPS ADDED TO REPLACE EXISTING CHILLER AND CIRCUITED TO EXISTING SWITCHBOARD 'DPA'. REFER TO SHEET E5.06 FOR MORE INFORMATION.
E63	ALTERNATE 5: PROVIDE 600V/30A/NF/3P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E64	PROVIDE 600V/30A/NF/3P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.

Kirksey ARCHITECTURE

Houston + Austin + Dallas

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Houston Texas 77024

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

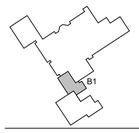
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 POWER FLOOR PLAN - AREA B1

SHEET NUMBER

E2.31

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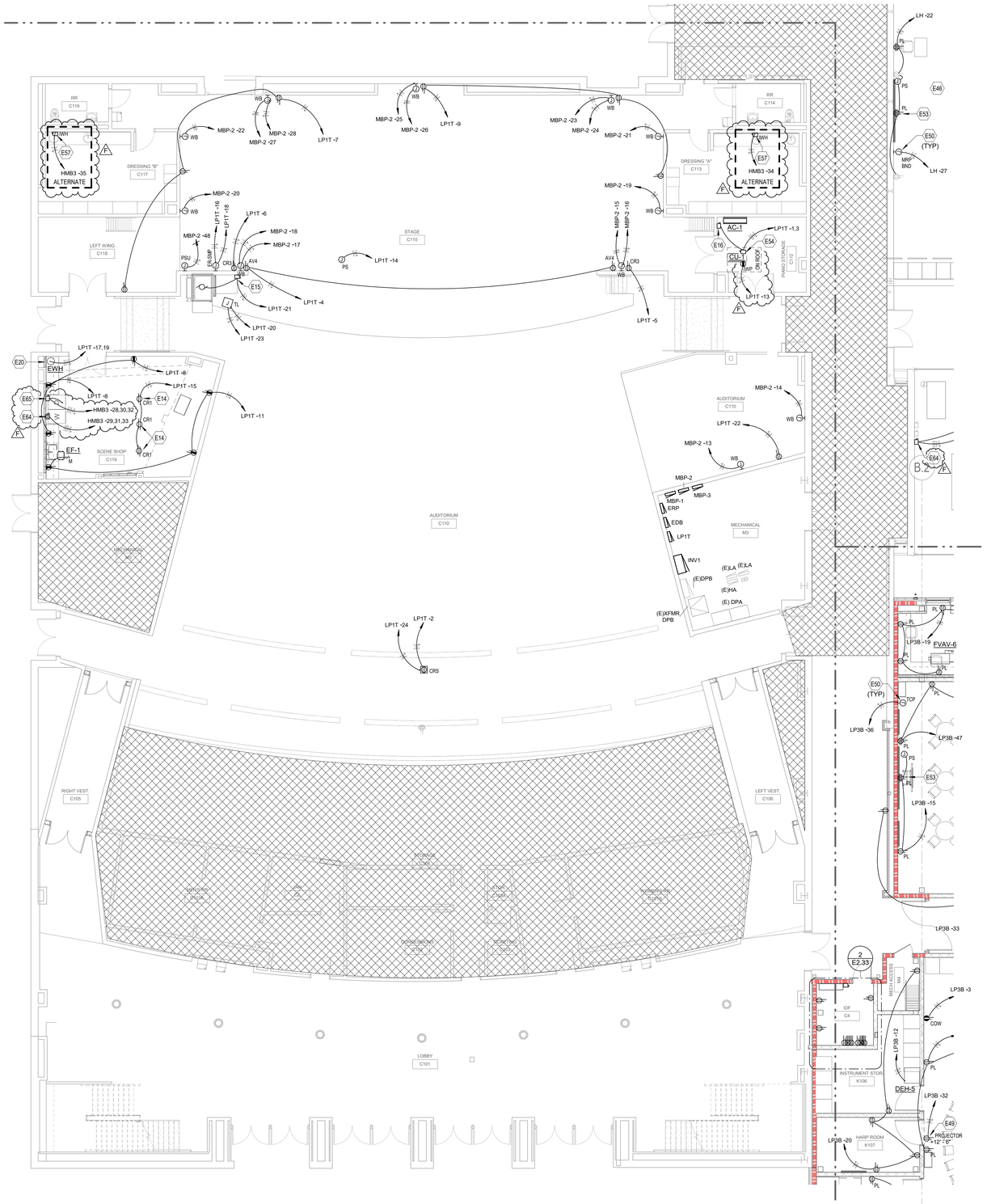

1 LEVEL 1 - POWER FLOOR PLAN - AREA B2
1/8" = 1'-0"

GENERAL NOTES (POWER):

A. REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.

B. CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING.

C. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER NEC 310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER NEC 300.17 AND ANNEX C.

D. MULTIWIRE BRANCH CIRCUITS AS DEFINED IN NEC 100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.

E. IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING ON OUTSIDE OF COVER PLATE. MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.

F. RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).

G. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

TAGGED NOTES

E14	PROVIDE RETRACTABLE CORD REEL, HUBBEL # HBLC25163C OR APPROVED EQUAL, WITH GFCI DUPLEX.
E15	PROVIDE 250V/30A/NF/3P/NEMA-1 HEAVY DUTY DISCONNECT SWITCH FOR LIFT STATION.
E16	PROVIDE 250V/30A/NF/2P/NEMA-1 HEAVY DUTY DISCONNECT SWITCH FOR AC UNIT. MOUNT ADJACENT TO UNIT.
E20	PROVIDE 250V/30A/NF/3P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH FOR WATER HEATER.
E46	AT LEAST 50% OF ALL NEW RECEPTACLES IN ENCLOSED OFFICES, CONFERENCE ROOMS, AND BREAKROOMS SHALL BE PLUG-LOAD CONTROLLED CONTROLLED BY ROOM CONTROLLER WITHIN ASSOCIATED ROOM, U.O.N. PLUG-LOAD CONTROLLED RECEPTACLES ARE DENOTED WITH 'PL'.
E49	POWER FOR PROJECTOR SHALL BE RECESSED IN WALL BOX. REFER TO AV DETAIL ON SHEET 'AV0.00' AND AV SECTIONS FOR EXACT LOCATION AND MORE INFORMATION.
E50	PROVIDE ISOLATED GROUNDS FOR AV EQUIPMENT POWER. TYPICAL FOR ALL AV EQUIPMENT LOCATIONS.
E53	REFER TO TECHNOLOGY ELEVATION ON SHEET 'T4.02' FOR EXACT POWER LOCATIONS FOR CLASSROOM WALL.
E54	PROVIDE 250V/30A/NF/2P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E57	PROVIDE 600V/30A/NF/1P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E64	PROVIDE 600V/30A/NF/3P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.
E65	PROVIDE 600V/60A/NF/3P/NEMA-4X HEAVY DUTY DISCONNECT SWITCH.

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713 850 9600
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CMTA F-8627
2025.10.23

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F	10/23/2025	ADDENDUM 001

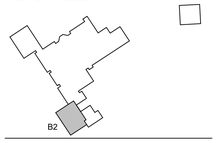
FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE
LEVEL 1 POWER FLOOR PLAN - AREA B2

SHEET NUMBER
E2.32

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GENERAL NOTES (POWER):

A. REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.

B. CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING.

C. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER NEC 310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER NEC 300.17 AND ANNEX C.

D. MULTIWIRE BRANCH CIRCUITS AS DEFINED IN NEC 100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.

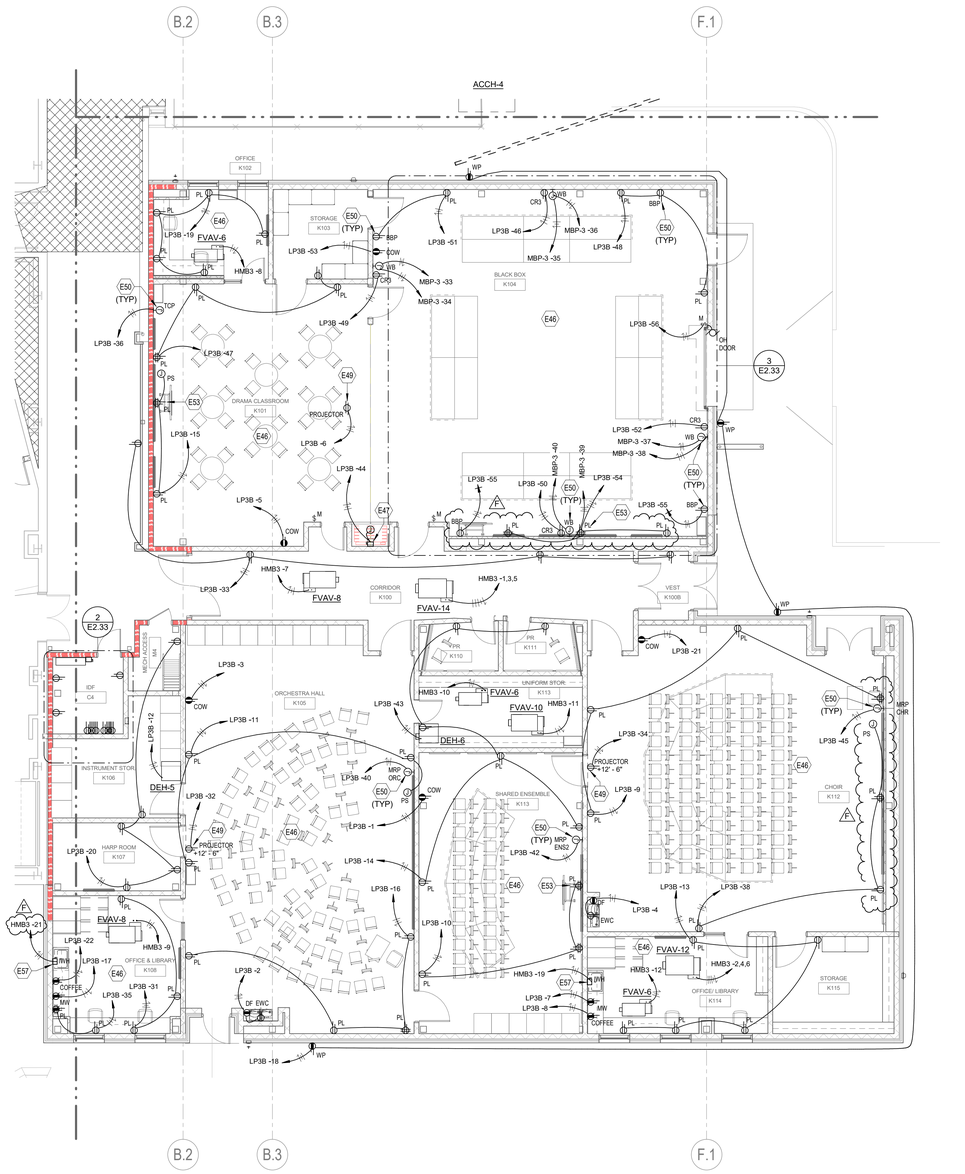
E. IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING ON OUTSIDE OF COVER PLATE. MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.

F. RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).

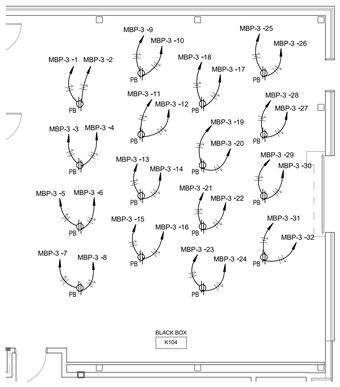
G. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

TAGGED NOTES (##)

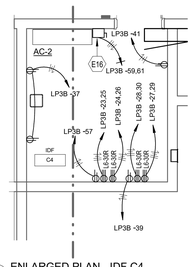
E16	PROVIDE 250V/30A/NF/2P/NEMA-1 HEAVY DUTY DISCONNECT SWITCH FOR AC UNIT. MOUNT ADJACENT TO UNIT.
E46	AT LEAST 50% OF ALL NEW RECEPTACLES IN ENCLOSED OFFICES, CONFERENCE ROOMS, AND BREAKROOMS SHALL BE PLUG-LOAD CONTROLLED CONTROLLED BY ROOM CONTROLLER WITHIN ASSOCIATED ROOM, U.O.N. PLUG-LOAD CONTROLLED RECEPTACLES ARE DENOTED WITH 'PL'.
E47	PROVIDE 250V/60A/NF/1P/NEMA-1 HEAVY DUTY DISCONNECT SWITCH FOR MOTORIZED PARTITION. COORDINATE EXACT LOCATION WITH MANUFACTURER PRIOR TO INSTALLATION.
E49	POWER FOR PROJECTOR SHALL BE RECESSED IN WALL BOX. REFER TO AV DETAIL ON SHEET 'AV0.90' AND AV SECTIONS FOR EXACT LOCATION AND MORE INFORMATION.
E50	PROVIDE ISOLATED GROUNDS FOR AV EQUIPMENT POWER. TYPICAL FOR ALL AV EQUIPMENT LOCATIONS.
E53	REFER TO TECHNOLOGY ELEVATION ON SHEET 'T4.02' FOR EXACT POWER LOCATIONS FOR CLASSROOM WALL.
E57	PROVIDE 600V/30A/NF/1P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.



1 LEVEL 1 - POWER FLOOR PLAN - AREA B3
1/8" = 1'-0"



3 K104 BLACK BOX PIPE GRID
1/8" = 1'-0"



2 ENLARGED PLAN - IDF C4
1/4" = 1'-0"

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STATE OF TEXAS
GEORGE JAMES EHRIT
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

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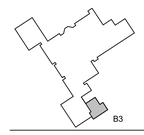
FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE
LEVEL 1 POWER FLOOR PLAN - AREA B3

SHEET NUMBER
E2.33

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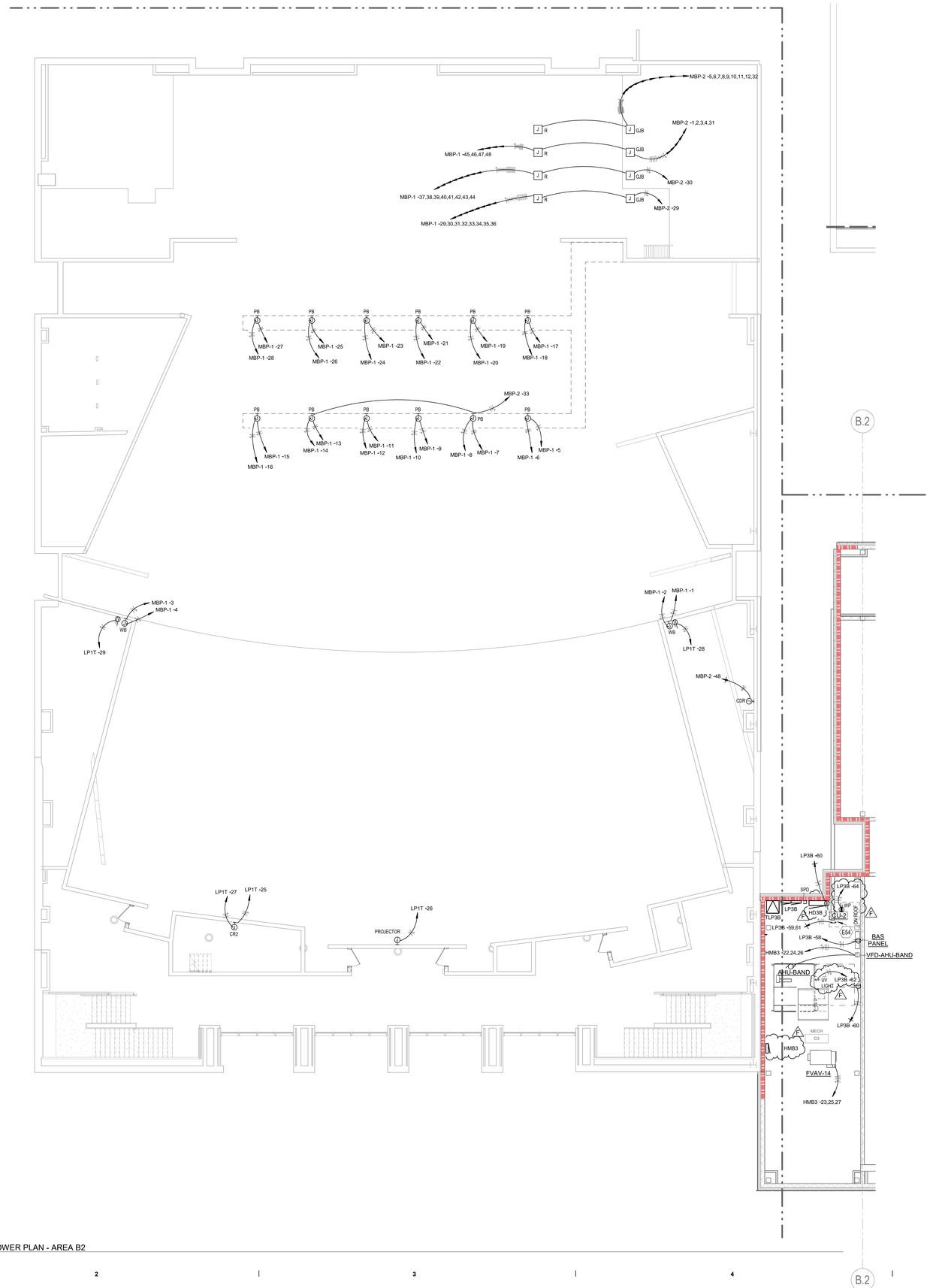

1 LEVEL 2 POWER PLAN - AREA B2
1/8" = 1'-0"

GENERAL NOTES (POWER):

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F. RECEPTACLES THAT ARE CONTROLLED BY AN AUTOMATIC MEANS SUCH AS OCCUPANCY SENSOR OR ENERGY MANAGEMENT SYSTEM SHALL BE MARKED IN ACCORDANCE WITH NEC 406.3(E).

G. LOCATIONS OF ELECTRICAL CONNECTIONS AND LOCAL DISCONNECTS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC. NOTIFY OTHER TRADES OF REQUIRED CLEARANCE AREAS TO AVOID ROUTING OF OTHER SYSTEMS IN THESE AREAS. DO NOT INSTALL ELECTRICAL EQUIPMENT OVER EQUIPMENT NAMEPLATES OR ACCESS PANELS OR THROUGH ACCESS/MAINTENANCE CLEARANCES OF EQUIPMENT BY OTHER TRADES.

TAGGED NOTES (△ / ##)

E54	PROVIDE 250V/30A/NF/2P/NEMA-3R HEAVY DUTY DISCONNECT SWITCH.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

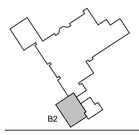
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 POWER FLOOR PLAN - AREA B2

SHEET NUMBER

E2.36

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GENERAL NOTES (POWER):

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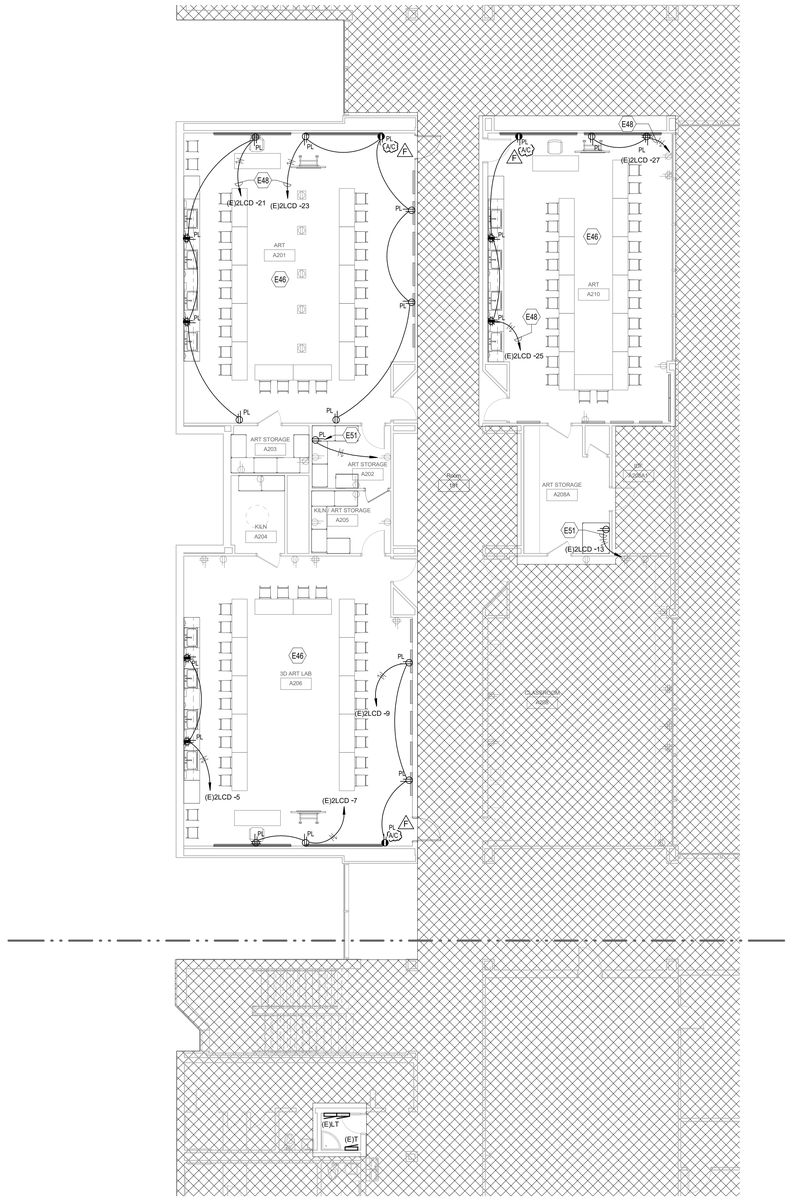
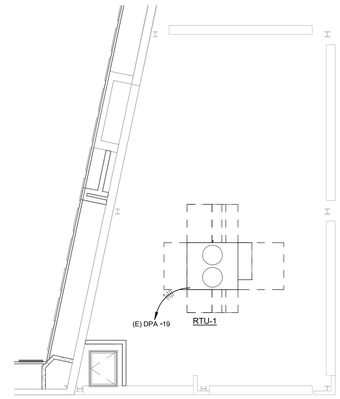
TAGGED NOTES

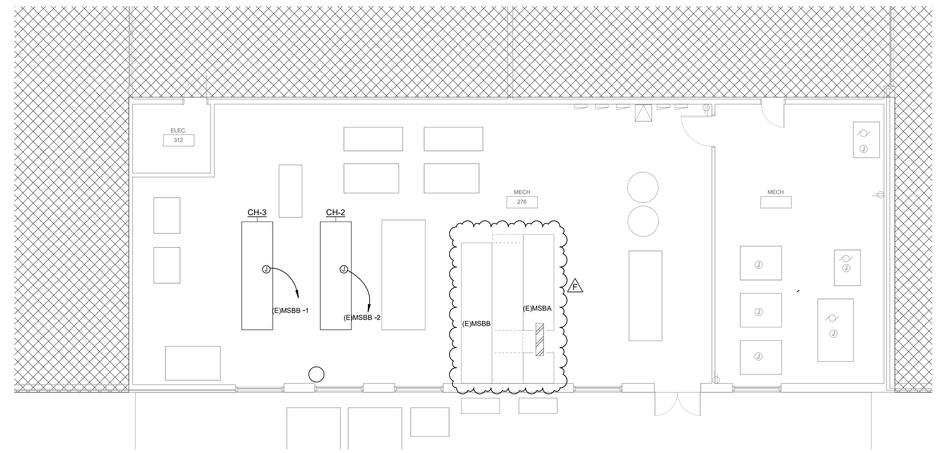
E46	AT LEAST 50% OF ALL NEW RECEPTACLES IN ENCLOSED OFFICES, CONFERENCE ROOMS, AND BREAKROOMS SHALL BE PLUG-LOAD CONTROLLED CONTROLLED BY ROOM CONTROLLER WITHIN ASSOCIATED ROOM, U.O.N. PLUG-LOAD CONTROLLED RECEPTACLES ARE DENOTED WITH 'PL'.
E48	EXISTING CIRCUITS SHALL BE REUSED FOR NEW RECEPTACLES IN THIS AREA.
E51	NEW RECEPTACLE SHALL BE CONNECTED TO EXISTING CIRCUIT.



2 LEVEL 2 POWER PLAN - ART ROOMS
1/8" = 1'-0"



3 ROOF POWER PLAN - B1 ROOF
1/8" = 1'-0"



1 LEVEL 2 POWER PLAN - MECH
1/8" = 1'-0"

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2024

PROJECT NAME

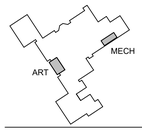
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 POWER FLOOR PLAN - ART ROOMS & MECH SPACES

SHEET NUMBER

E2.38

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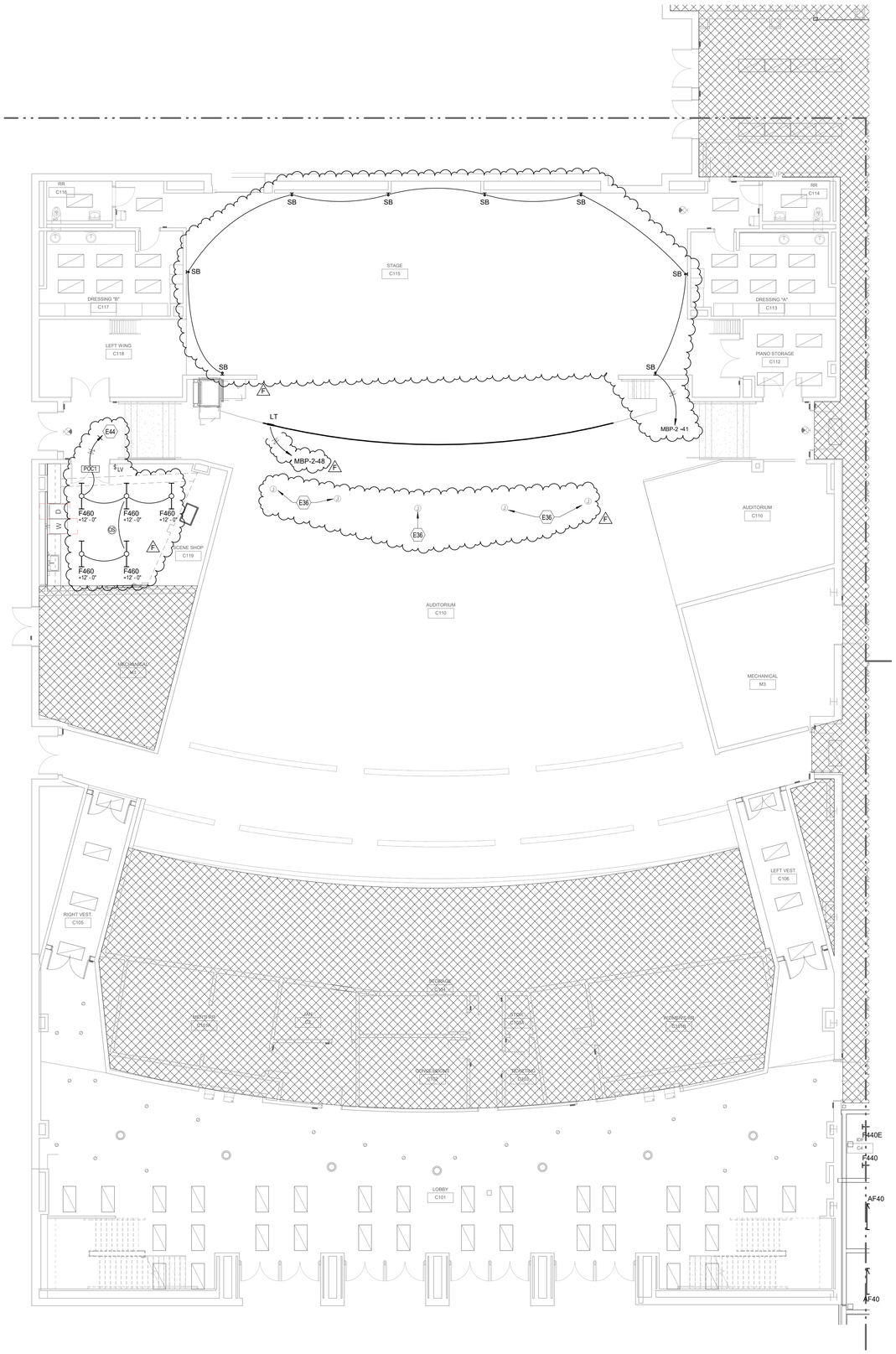

1 LEVEL 1 LIGHTING FLOOR PLAN - AREA B2
1/8" = 1'-0"

GENERAL NOTES (LIGHTING):

A. REFER TO THE ARCHITECT'S REFLECTED CEILING PLANS, ELEVATIONS, AND CASEWORK DETAILS FOR EXACT LOCATIONS OF ALL WALL AND CEILING MOUNTED ELECTRICAL DEVICES.

B. CONTRACTOR SHALL FOLLOW BRANCH CIRCUITING LAY-OUT, AS INDICATED ON THE FLOOR PLANS, WITH A MAXIMUM OF THREE (3) BRANCH CIRCUITS PER HOMERUN. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH A DEDICATED NEUTRAL CONDUCTOR. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING.

C. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER N.E.C. #310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER N.E.C. #300.17 AND ANNEX C.

D. MULTIWIRE BRANCH CIRCUITS AS DEFINED IN N.E.C #100 / 210.4 (CIRCUITS SHARING A COMMON NEUTRAL CONDUCTOR) SHALL NOT BE PERMITTED.

E. IDENTIFY THE PANEL AND CIRCUIT NUMBER FOR ALL RECEPTACLES, SWITCHES, ETC. IN AREA OF CONSTRUCTION. PROVIDE CLEAR ADHESIVE LABELS WITH BLACK LETTERING ON OUTSIDE OF COVER PLATE. ALSO, MARK INSIDES OF ALL DEVICE BOXES WITH PANEL AND CIRCUIT NUMBER.

F. LOCATE CHAIN-HUNG INDUSTRIAL FIXTURES IN MECHANICAL ROOMS TO AVOID DUCTWORK AND PIPING, TO MAXIMIZE AVAILABLE LIGHT. SPACE AROUND EQUIPMENT, AIR HANDLERS, ETC. TO PROVIDE ADEQUATE LIGHTING TO ALL AREAS OF ROOM. PROVIDE ADDITIONAL FIXTURES OF SAME TYPE AS NEEDED TO FULFILL THIS REQUIREMENT.

G. LOCATE EXIT SIGNS FOR MAXIMUM VIEWING AREA TO IDENTIFY EGRESS PATHS AS INDICATED ON PLANS. COORDINATE LOCATIONS SUCH THAT ARCHITECTURAL FEATURES OR EQUIPMENT FROM OTHER TRADES DO NOT OBSTRUCT VIEW.

H. PROVIDE UNSWITCHED CONDUCTOR FOR ALL LIGHTING CIRCUITS SERVING EMERGENCY LIGHTING, WHETHER OR NOT INDICATED BY TICK MARKS. WHERE EXIT SIGNS, EMERGENCY BATTERY PACKS, OR EMERGENCY CONTROL RELAYS ARE PROVIDED, CONNECT TO UNSWITCHED LINE(S) PER MANUFACTURER INSTRUCTIONS.

I. ALL LIGHTING FIXTURE OPTICS SHALL BE HANDLED WITH COTTON GLOVES DURING INSTALLATION AND LAMPING TO AVOID FINGERPRINTS OR DIRT DEPOSITS. IT IS PREFERRED THAT FIXTURES BE SHIPPED AND INSTALLED WITH CLEAR PLASTIC BAGS TO PROTECT OPTICS. AT CLOSE OF PROJECT, AND AFTER CONSTRUCTION AIR FILTERS ARE CHANGED, REMOVE BAGS. ANY OPTICS SHOWING DIRT OR FINGER PRINTS SHALL BE CLEANED WITH SOLVENT RECOMMENDED BY THE MANUFACTURER, OR REPLACED AS NECESSARY IN ORDER TO TURN OVER TO THE OWNER NEW FIXTURES AT OCCUPANCY.

J. RECESSED LUMINAIRES SHALL BE SECURED SUCH THAT THE FORCE REQUIRED INSERTING LAMPS, TRIMS, LENSES, LOUVERS, OR DOOR FRAMES DOES NOT SHIFT HOUSING. ALL TRIMS SHALL BE COMPLETELY FLUSH WITH FINISHED CEILINGS AT COMPLETION OF CONSTRUCTION.

TAGGED NOTES

#	
E36	ALTERNATE 6: EXISTING CIRCUITS FOR WALKWAY LIGHTING SHALL BE EXTENDED TO INTEGRAL LIGHTS AT LOWER-LEVEL SEATING.
E44	EXISTING LIGHTING CIRCUIT SHALL BE REUSED FOR NEW LIGHTING IN THIS AREA.

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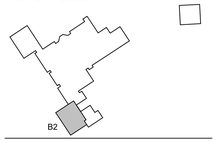
KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 LIGHTING FLOOR PLAN - AREA B2

SHEET NUMBER

E3.32

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C. IF ADDITIONAL CONDUCTORS ARE RUN IN THE SAME CONDUIT WITH THOSE INDICATED, CONTRACTOR SHALL DERATE ALL CURRENT CARRYING CONDUCTORS PER N.E.C. #310.15(B)(3), AND UPSIZE CONDUIT AS REQUIRED PER N.E.C. #300.17 AND ANNEX C.

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F. LOCATE CHAIN-HUNG INDUSTRIAL FIXTURES IN MECHANICAL ROOMS TO AVOID DUCTWORK AND PIPING, TO MAXIMIZE AVAILABLE LIGHT. SPACE AROUND EQUIPMENT, AIR HANDLERS, ETC. TO PROVIDE ADEQUATE LIGHTING TO ALL AREAS OF ROOM. PROVIDE ADDITIONAL FIXTURES OF SAME TYPE AS NEEDED TO FULFILL THIS REQUIREMENT.

G. LOCATE EXIT SIGNS FOR MAXIMUM VIEWING AREA TO IDENTIFY EGRESS PATHS AS INDICATED ON PLANS. COORDINATE LOCATIONS SUCH THAT ARCHITECTURAL FEATURES OR EQUIPMENT FROM OTHER TRADES DO NOT OBSTRUCT VIEW.

H. PROVIDE UNSWITCHED CONDUCTOR FOR ALL LIGHTING CIRCUITS SERVING EMERGENCY LIGHTING, WHETHER OR NOT INDICATED BY TICK MARKS. WHERE EXIT SIGNS, EMERGENCY BATTERY PACKS, OR EMERGENCY CONTROL RELAYS ARE PROVIDED, CONNECT TO UNSWITCHED LINE(S) PER MANUFACTURER INSTRUCTIONS.

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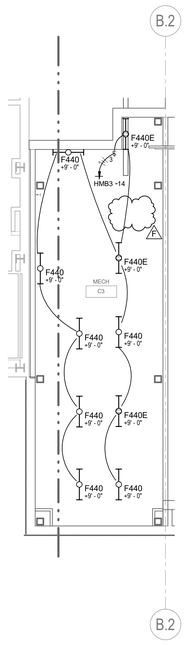
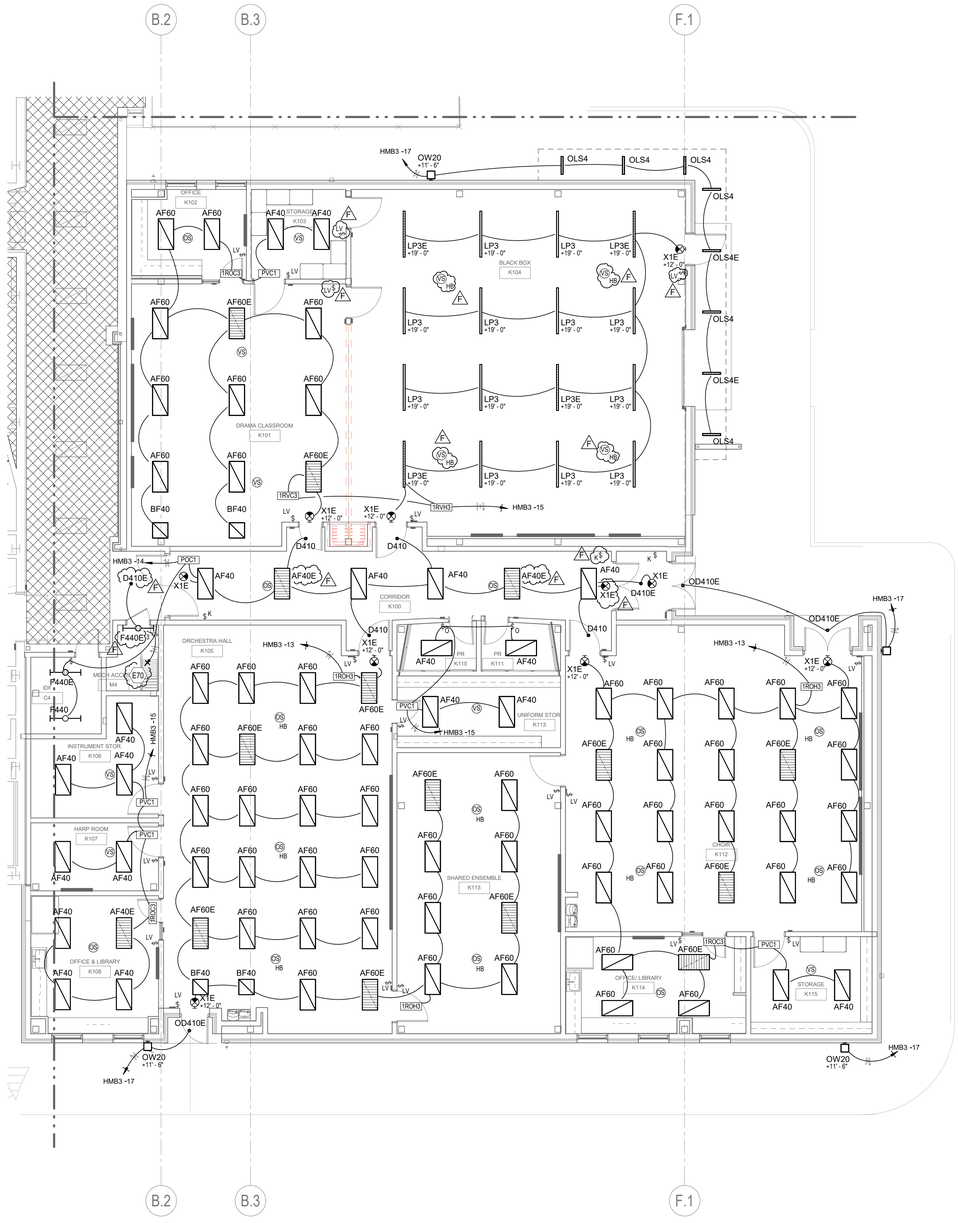
TAGGED NOTES (#)

E70 LIGHTING CIRCUIT TO CONTINUE TO SECOND FLOOR MECHANICAL ROOM.



2 LEVEL 2 - LIGHTING PLAN - MECH C3
1/8" = 1'-0"



1 LEVEL 1 LIGHTING FLOOR PLAN - AREA B3
1/8" = 1'-0"

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2025

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1

SHEET TITLE

LEVEL 1 LIGHTING FLOOR PLAN - AREA B3

SHEET NUMBER

E3.33

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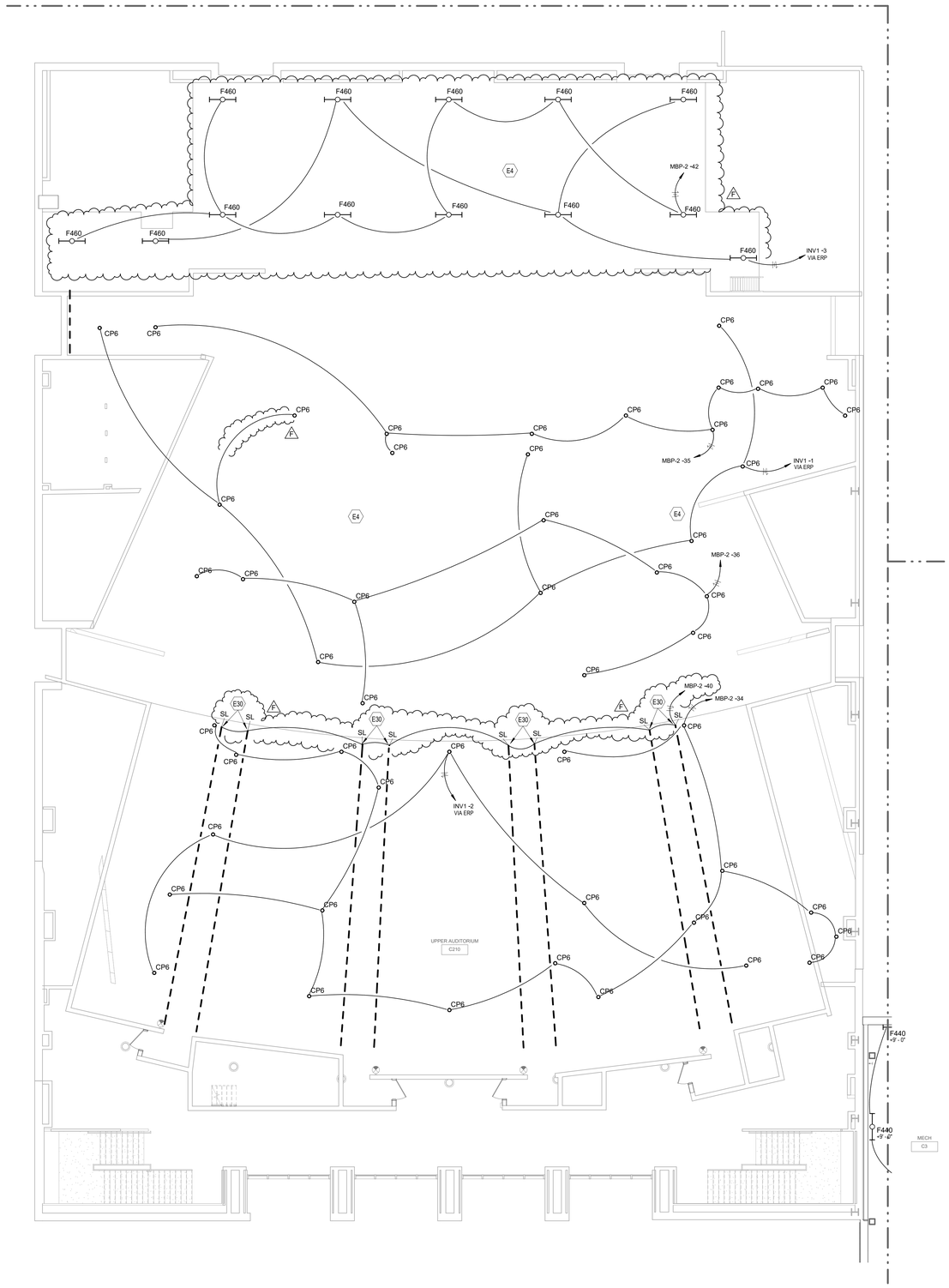

1 LEVEL 2 - LIGHTING PLAN - AREA B2
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TAGGED NOTES (##)

E4	ALL THEATRICAL AND BACK OF HOUSE LIGHTING IN THE AUDITORIUM SHALL BE REMOVED AND REPLACED ONE-FOR-ONE. LIGHT FIXTURE LOCATIONS SHOWN ON PLAN FOR REFERENCE. FIELD VERIFY EXACT LOCATIONS.
E30	PROVIDE NEW AISLE LIGHTING TYPE 'SL' FOR UPPER LEVEL SEATING. FIELD VERIFY EXACT LOCATIONS AND LENGTH REQUIRED.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023 2027

PROJECT NAME

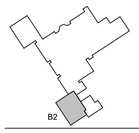
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 LIGHTING FLOOR PLAN - AREA B2

SHEET NUMBER

E3.34

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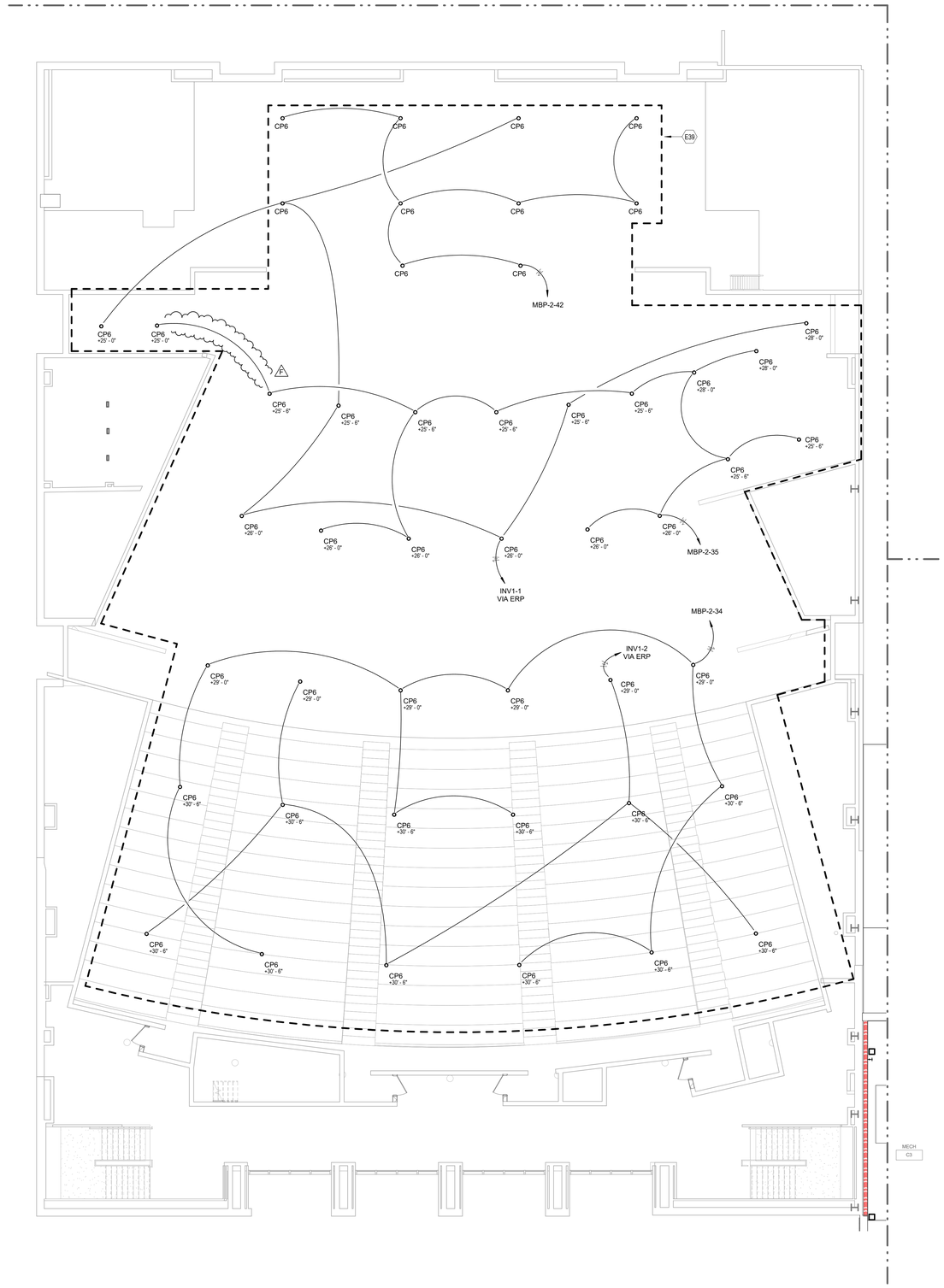

1 LEVEL 2 - LIGHTING PLAN - AREA B2 - ALTERNATE
1/8" = 1'-0"

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TAGGED NOTES	(##)
E39 ALTERNATE 7 NEW THEATRICAL LIGHTING SHALL BE CONNECTED TO EXISTING LIGHTING CIRCUITS.	

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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

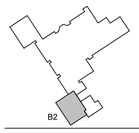
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 LIGHTING FLOOR PLAN - AREA B2 - ALTERNATE

SHEET NUMBER

E3.34.A

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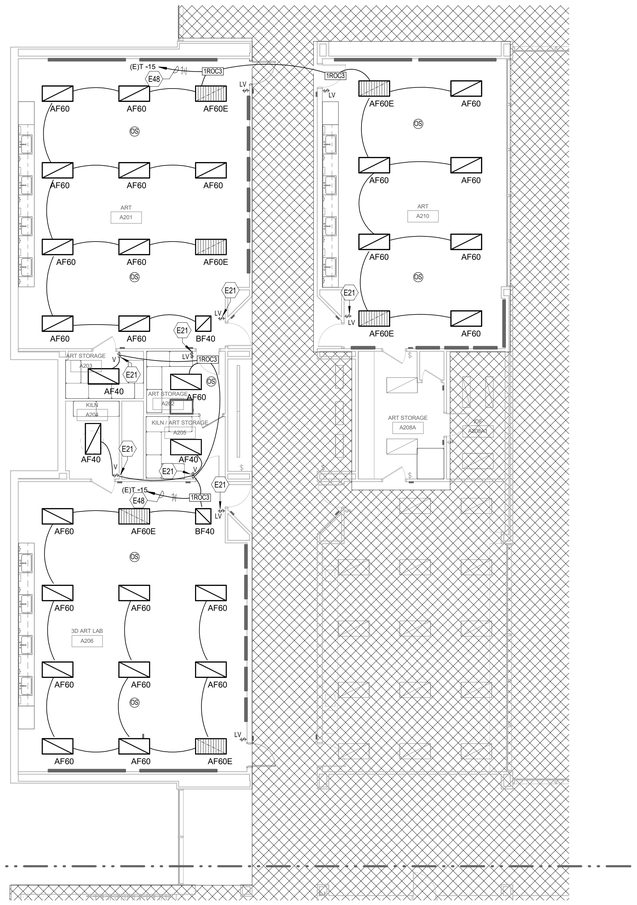
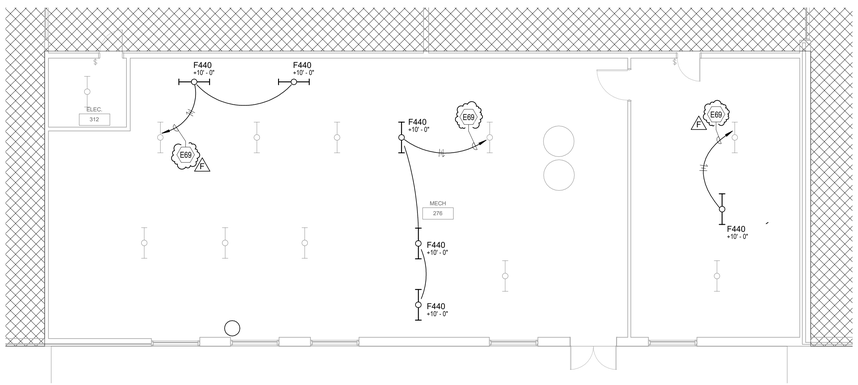


1 LEVEL 2 - LIGHTING PLAN - ART ROOMS
1/8" = 1'-0"



2 LEVEL 2 - LIGHTING PLAN - MECH
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TAGGED NOTES	#
E21	NEW LIGHT SWITCH SHALL BE LOCATED AT EXISTING SWITCH LOCATION.
E48	EXISTING CIRCUITS SHALL BE REUSED FOR NEW RECEPTACLES IN THIS AREA.
E69	NEW LIGHT FIXTURES SHALL BE CONNECTED AND CONTROLLED WITH EXISTING LIGHT FIXTURES IN ROOM.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2024

PROJECT NAME

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PROJECT ADDRESS

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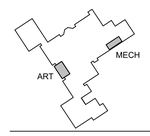
KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 LIGHTING FLOOR PLAN - ART ROOM

SHEET NUMBER

E3.35

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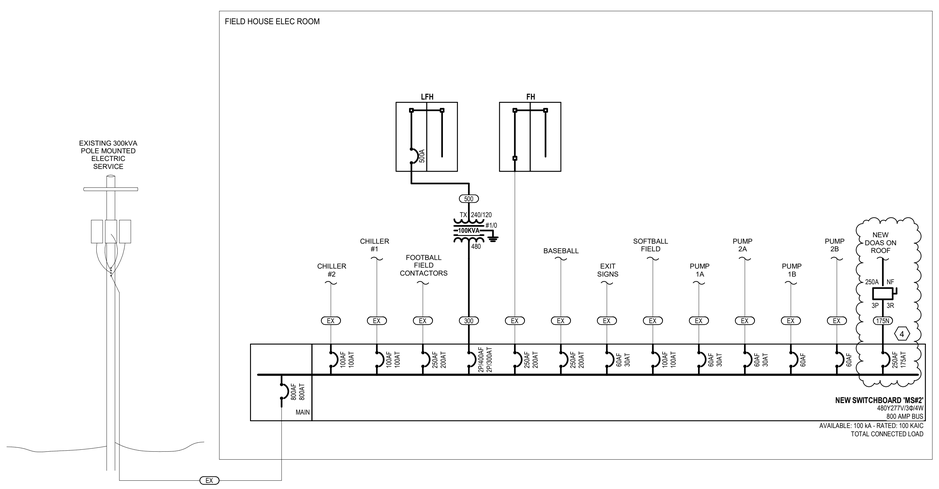
COPPER FEEDER SCHEDULE

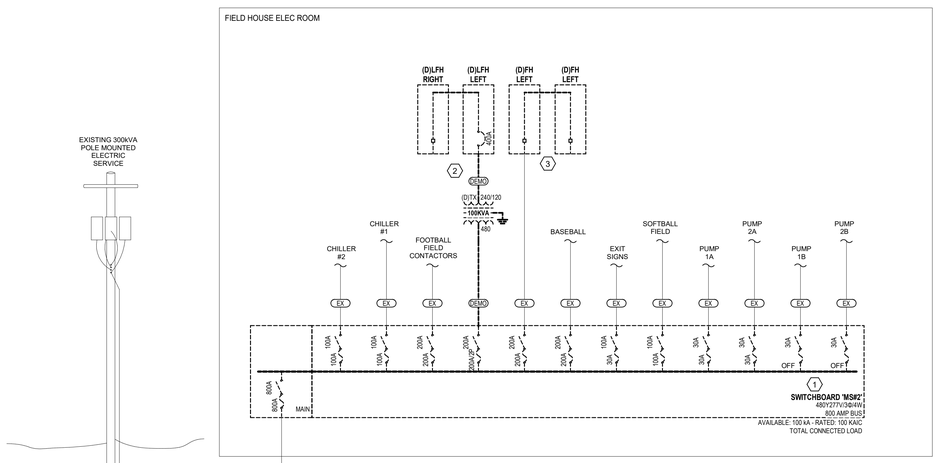
TAG	OCPD SETTING	1LINE FEEDER PARALLEL RUNS	PHASE CONDUCTORS	NEUTRAL	EQUIP. GROUND	CONDUIT SIZE	REMARKS
15N	15A	-	3#12	1#12 N	1#12 G	3/4" C	
20N	20A	-	3#12	1#12 N	1#12 G	3/4" C	
25NU	25A	-	3#10	1#10 N	1#10 G	1" C	NOTE 3
50	50A	-	3#6		1#10 G	1" C	
60N	60A	-	3#4	1#4 N	1#10 G	1-1/4" C	
70N	70A	-	3#4	1#4 N	1#8 G	1-1/4" C	
100N	100A	-	3#1	1#1 N	1#8 G	1-1/2" C	
100NT	100A	-	3#1	1#1 N	1#6 G	1-1/2" C	NOTE 6
150N	150A	-	3#1/0	1#1/0	1#6 G	2" C	
150NT	150A	-	3#2/0	1#2/0	1#4 G	2" C	NOTE 6
175N	175A	-	3#2/0	1#2/0 N	1#6 G	2" C	
200N	200A	-	3#3/0	1#3/0 N	1#6 G	2" C	
250NU	250A	-	3#250KCM	1#250KCM N	1#4 G	2-1/2" C	NOTE 3
300	300A	-	3#350KCM		1#4 G	2-1/2" C	
300N	300A	-	3#350KCM	1#350KCM N	1#4 G	2-1/2" C	
400N	400A	2 SETS	3#3/0	1#3/0 N	1#3 G	2" C	
400NU	400A	2 SETS	3#3/0	1#3/0 N	1#3 G	2" C	NOTE 3
500	500A	2 SETS	3#250KCM		1#2 G	2-1/2" C	
500NT	500A	2 SETS	3#250KCM	1#250KCM N	1#2 G	2-1/2" C	NOTE 6
600NU	600A	2 SETS	3#350KCM	1#350KCM N	1#1 G	4" C	NOTE 3

TAGGED NOTES:

1. EXISTING SWITCHBOARD SHALL BE REMOVED AND REPLACED. EXISTING LOADS SHALL BE RECONNECTED TO NEW BOARD.
2. EXISTING PANELS AND ASSOCIATED TRANSFORMER SHALL BE DEMOLISHED BACK TO SOURCE AND REPLACED.
3. EXISTING PANELS SHALL BE REMOVED AND REPLACED. EXISTING FEED SHALL BE EXTENDED AS NEEDED TO NEW PANEL.
4. ALTERNATE 1D: PROVIDE NEW BREAKER TO FEED ROOF-MOUNTED DOAS UNIT. F



2 PARTIAL ELECTRICAL ONE-LINE - FIELD HOUSE - NEW
NTS



1 PARTIAL ELECTRICAL ONE-LINE - FIELD HOUSE - DEMO
NTS

Kirksey ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

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STATE OF TEXAS — GEORGE JAMES EHRIT — 124727 — REGISTERED PROFESSIONAL ENGINEER

CMTA F-8627
2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2020

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

PARTIAL ELECTRICAL ONE-LINE - FIELD HOUSE - DEMO AND NEW

SHEET NUMBER

E5.01

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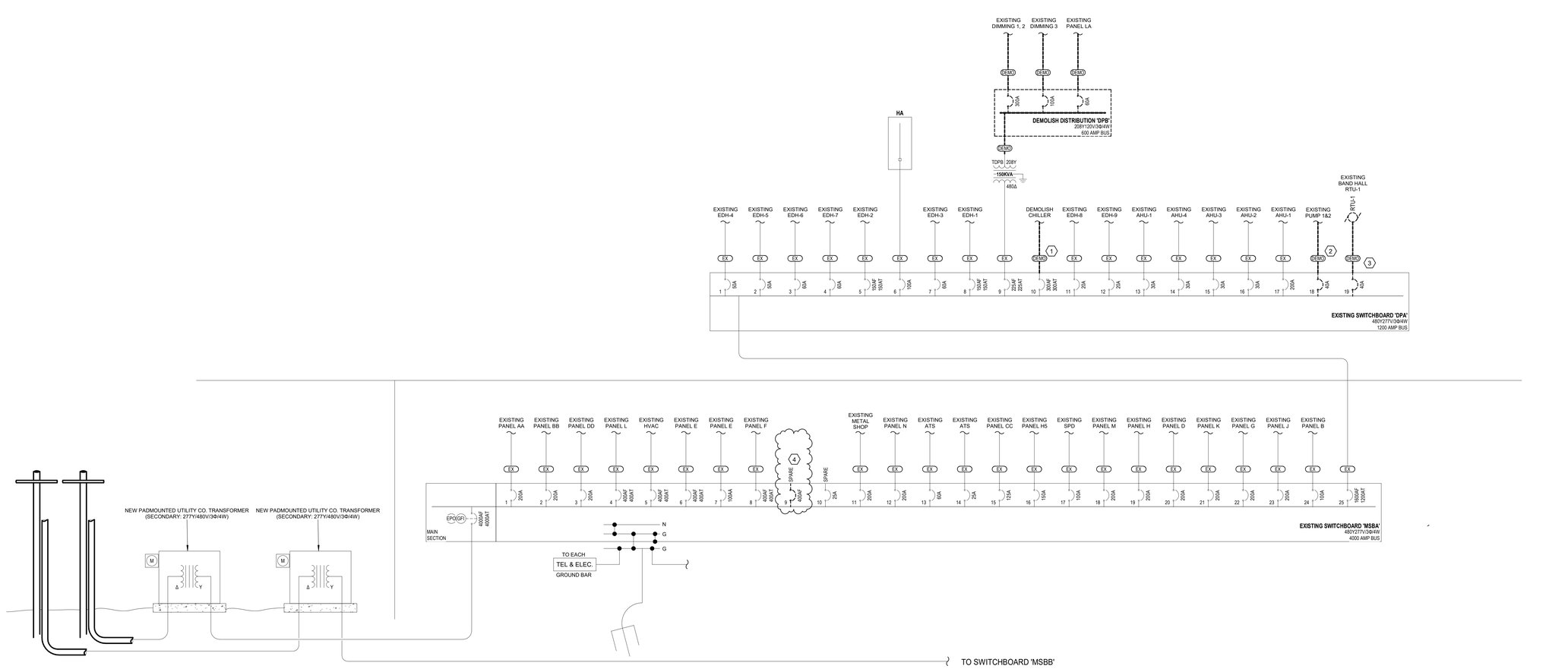

1 ELECTRICAL ONE-LINE DIAGRAM - NEW WORK
1/8" = 1'-0"

TAGGED NOTES:

1. EXISTING CHILLER FEEDER AND CONNECTION SHALL BE DEMOLISH IN ALTERNATE. BREAKER SHALL BE RE-USED FOR NEW CHILLER.
2. EXISTING PUMPS FEEDER AND CONNECTION SHALL BE DEMOLISH IN ALTERNATE. EXISTING BREAKER SHALL BE DEMOLISH FOR NEW PUMPS.
3. EXISTING RTU-1 SHALL BE DEMOLISH.
4. EXISTING SPARE BREAKER SHALL BE DEMOLISH. REFER TO NEW ONE-LINE FOR MORE INFORMATION.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2020 2024

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

PARTIAL ELECTRICAL ONE-LINE - SCHOOL MSBA - DEMO

SHEET NUMBER

E5.02

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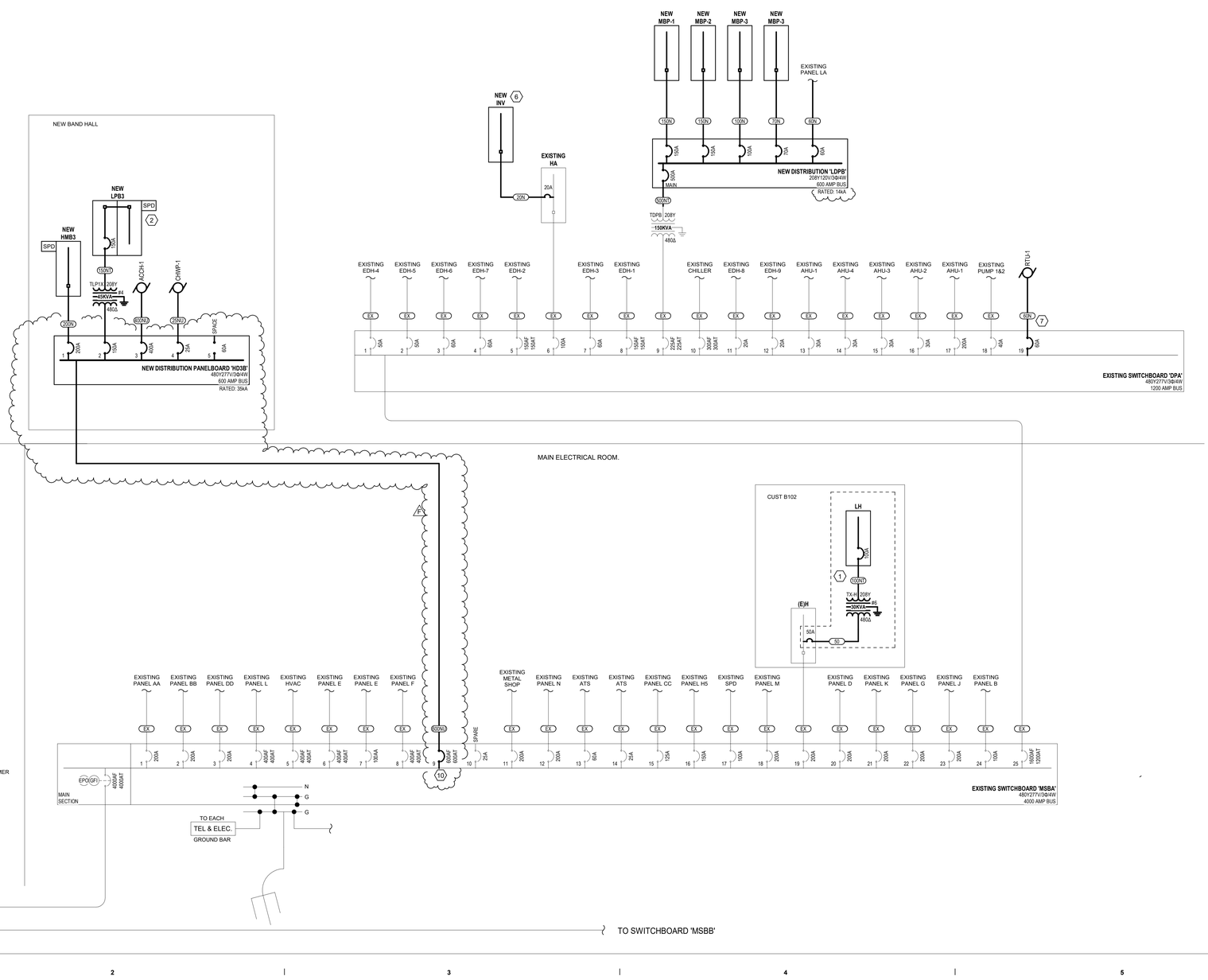
COPPER FEEDER SCHEDULE

TAG	OCPD SETTING	1LINE FEEDER PARALLEL RUNS	PHASE CONDUCTORS	NEUTRAL	EQUIP. GROUND	CONDUIT SIZE	REMARKS
15N	15A	-	3#12	1#12 N	1#12 G	3/4" C	
20N	20A	-	3#12	1#12 N	1#12 G	3/4" C	
25NU	25A	-	3#10	1#10 N	1#10 G	1" C	NOTE 3
50	50A	-	3#6		1#10 G	1" C	
60N	60A	-	3#4	1#4 N	1#10 G	1-1/4" C	
70N	70A	-	3#4	1#4 N	1#8 G	1-1/4" C	
100N	100A	-	3#1	1#1 N	1#8 G	1-1/2" C	
100NT	100A	-	3#1	1#1 N	1#6 G	1-1/2" C	NOTE 6
150N	150A	-	3#1/0	1#1/0	1#6 G	2" C	
150NT	150A	-	3#2/0	1#2/0	1#4 G	2" C	NOTE 6
175N	175A	-	3#2/0	1#2/0 N	1#6 G	2" C	
200N	200A	-	3#3/0	1#3/0 N	1#6 G	2" C	
250NU	250A	-	3#250KCM	1#250KCM N	1#4 G	2-1/2" C	NOTE 3
300	300A	-	3#350KCM		1#4 G	2-1/2" C	
300N	300A	-	3#350KCM	1#350KCM N	1#4 G	2-1/2" C	
400N	400A	2 SETS	3#3/0	1#3/0 N	1#3 G	2" C	
400NU	400A	2 SETS	3#3/0	1#3/0 N	1#3 G	2" C	NOTE 3
500	500A	2 SETS	3#250KCM		1#2 G	2-1/2" C	
500NT	500A	2 SETS	3#250KCM	1#250KCM N	1#2 G	2-1/2" C	NOTE 6
600NU	600A	2 SETS	3#350KCM	1#350KCM N	1#1 G	4" C	NOTE 3

TAGGED NOTES:

1. EXISTING PANEL 'LH' AND ASSOCIATED TRANSFORMER 'TX-H' SHALL BE REMOVED AND REPLACED. THREE (3) SPACES SHALL BE REMOVED AND REPLACED WITH NEW 480V/50A/3P BREAKER AT EXISTING PANEL 'H' TO SERVE NEW TRANSFORMER.
2. SURGE PROTECTION DEVICE (SPD) TYPE C UNIT FOR PANELABOARDS AS SPECIFIED (DIVISION 26). MOUNT UNIT TO SIDE OF PANELBOARD WITH A MAXIMUM 3' WIRE LEAD LENGTH.
3. PROVIDE NEW 480V/200A/3P BREAKER AT EXISTING DISTRIBUTION BOARD TO SERVE NEW BAND HALL.
4. PROVIDE ELECTRONIC TRIP BREAKERS.
5. PROVIDE THERMAL MAGNETIC CIRCUIT BREAKERS.
6. BATTERY INVERTER SHALL BE 5KVA EMERGI-LITE #6-FTE-5-SG-90-D-25-X OR APPROVED EQUAL.
7. NEW BREAKER FOR NEW RTU-1 ON THE BAND ROOF. REFER TO PLANS FOR MORE INFORMATION.
8. NEW BREAKER SHALL BE PROVIDED IN PLACE OF EXISTING SPARE FOR NEW BAND HALL.



1 ELECTRICAL ONE-LINE DIAGRAM - NEW WORK BASE BID
1/8" = 1'-0"

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023 2027

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
PARTIAL ELECTRICAL ONE-LINE - SCHOOL MSBA - NEW

SHEET NUMBER
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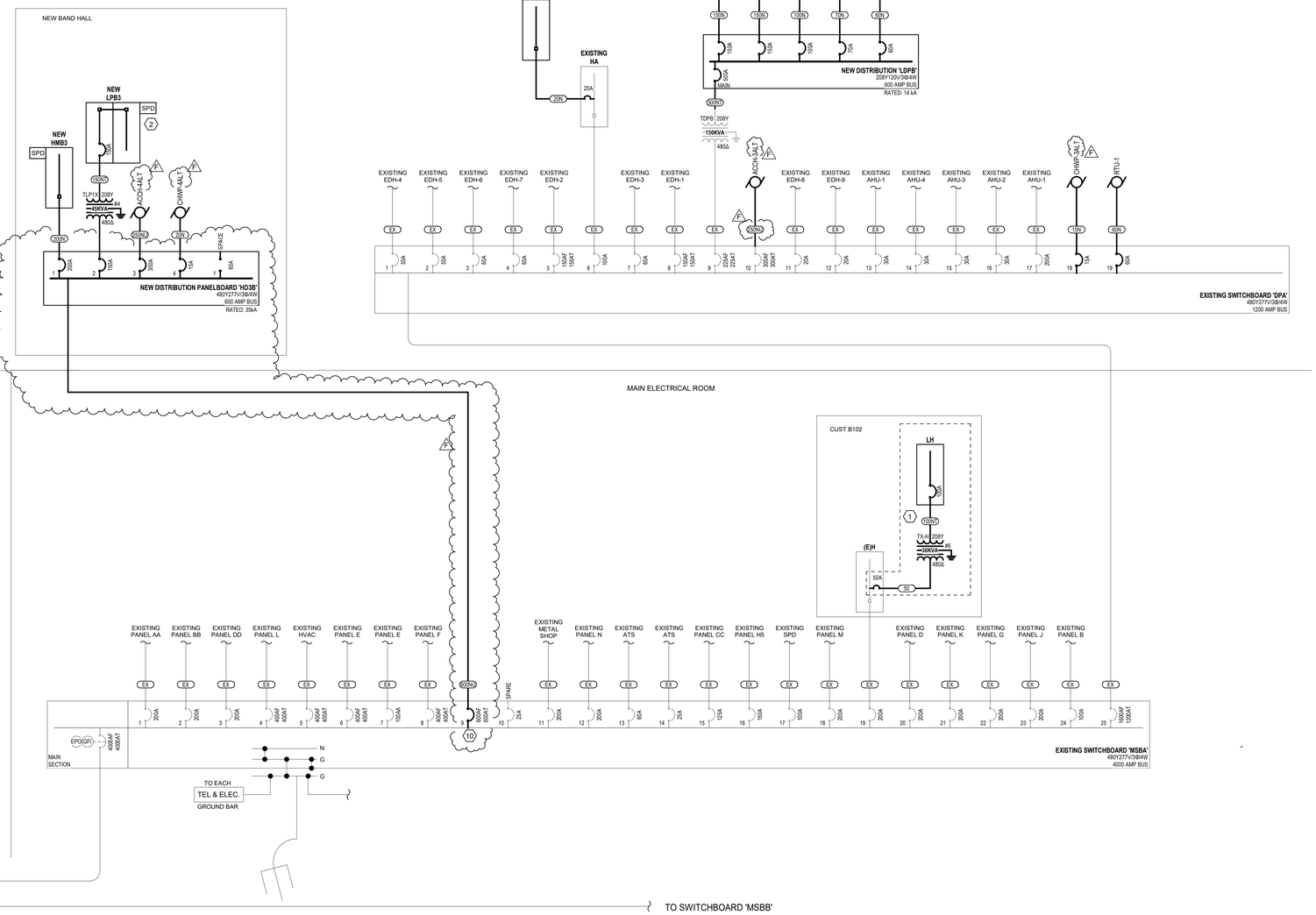

1 ELECTRICAL ONE-LINE DIAGRAM - NEW WORK BASE BID
1/8" = 1'-0"

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STATE OF TEXAS GEORGE JAMES EHRIT 119111 REGISTERED PROFESSIONAL ENGINEER

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2020

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

PARTIAL ELECTRICAL ONE-LINE - SCHOOL MSBA - NEW ALT

SHEET NUMBER

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LIGHTING CONTROL SCHEDULES - LINE VOLTAGE SWITCHES

TYPE	DESCRIPTION	SEQUENCE OF OPERATION	SWITCH	REMARKS
O	LINE VOLTAGE, WALL MOUNT, DUAL TECHNOLOGY OCCUPANCY SENSOR	1. AUTO "ON" AT 100% 2. AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.)	SWITCH: 1. Lutron #MS-B102-O-WH 2. Greengate #ONW-D-1001-MV 3. nLight #nWSX-PDT-LV 4. Sensor Switch #WSXA-PDT-XX	
V	LINE VOLTAGE, WALL MOUNT, DUAL TECHNOLOGY VACANCY SENSOR	1. MANUAL "ON" AT 100% 2. AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.)	SWITCH: 1. Lutron #MS-B102-V-WH 2. Greengate #VNW-D-1001-MV 3. nLight #nWSX-PDT-LV 4. Sensor Switch #WSXA-PDT-XX	

LIGHTING CONTROL SCHEDULES - POWER PACKS

TYPE	DESCRIPTION	SEQUENCE OF OPERATION	CONTROLLER	SENSOR	SWITCH	REMARKS
POC1	SINGLE ZONE POWER PACK WITH CEILING-MOUNTED OCCUPANCY SENSING	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" (WHERE INDICATED ON DRAWINGS) 2. OCCUPANCY SENSOR - AUTO "ON" AT 100% 3. OCCUPANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.)	POWER PACK: 1. Lutron #PP-DV 2. Greengate #SP20-RD4 3. nLight #nPP16-EFP	SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE MOMENTARY SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTR-CS-1 2. Greengate #GMDS 3. nLight #nPODM-XX	
PVC1	SINGLE ZONE POWER PACK WITH CEILING-MOUNTED VACANCY SENSING	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" 2. VACANCY SENSOR - MANUAL "ON" AT 100% 3. VACANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.)	POWER PACK: 1. Lutron #PP-DV-M 2. Greengate #SP20-RD4 3. nLight #nPP16-EFP-SA	SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE MOMENTARY SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTR-CS-1 2. Greengate #GMDS 3. nLight #nPODM-XX	

LIGHTING CONTROL SCHEDULES - ROOM CONTROLLERS

TYPE	DESCRIPTION	SEQUENCE OF OPERATION	CONTROLLER	SENSOR	SWITCH	REMARKS
1ROC3	SINGLE ZONE ROOM CONTROLLER WITH CEILING-MOUNTED OCCUPANCY SENSING AND MANUAL DIMMING. PLUG LOAD CONTROL.	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" 2. OCCUPANCY SENSOR - AUTO "ON" AT 50% 3. PLUG LOADS SHALL BE "ON" WITH LIGHTING 4. MANUAL 0-10V DIMMING FROM 10%-100% 5. OCCUPANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.), PLUG LOAD	ROOM CONTROLLER: 1. Lutron #PP-DV (2) 2. Greengate #RC3D-PL 3. nLight #nPP16-D-EFP-PA (2)	SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE DIM SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTSTV-WH 2. Greengate #RC-3TLB 3. nLight #NPODMA-DX-XX	
1ROH3	SINGLE ZONE ROOM CONTROLLER WITH CEILING-MOUNTED HIGH-BAY OCCUPANCY SENSING AND MANUAL DIMMING. PLUG LOAD CONTROL.	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" 2. HIGH-BAY OCCUPANCY SENSOR - AUTO "ON" AT 50% 3. PLUG LOADS SHALL BE "ON" WITH LIGHTING 4. MANUAL 0-10V DIMMING FROM 10%-100% 5. HIGH-BAY OCCUPANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.), PLUG LOAD	ROOM CONTROLLER: 1. Lutron #PP-DV (2) 2. Greengate #RC3D-PL 3. nLight #nPP16-D-EFP-PA (2)	HIGH-BAY SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE DIM SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTSTV-WH 2. Greengate #RC-3TLB 3. nLight #NPODMA-DX-XX	
1RVC3	SINGLE ZONE ROOM CONTROLLER WITH CEILING-MOUNTED VACANCY SENSING, MANUAL DIMMING, AND PLUG LOAD CONTROL.	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" 2. VACANCY SENSOR - MANUAL "ON" AT 100% 3. MANUAL 0-10V DIMMING FROM 10%-100% 4. VACANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.)	ROOM CONTROLLER: 1. Lutron #PP-DV (2) 2. Greengate #RC3D-PL 3. nLight #nPP16-D-EFP-PA (2)	SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE DIM SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTSTV-WH 2. Greengate #RC-3TLB 3. nLight #NPODMA-DX-XX	
1RVH3	SINGLE ZONE ROOM CONTROLLER WITH CEILING-MOUNTED HIGH-BAY VACANCY SENSING, MANUAL DIMMING, AND PLUG LOAD CONTROL.	1. LOW-VOLTAGE MOMENTARY SWITCH WILL TURN LIGHTS "ON/OFF" 2. VACANCY SENSOR - MANUAL "ON" AT 100% 3. MANUAL 0-10V DIMMING FROM 10%-100% 4. VACANCY SENSOR - AUTO "OFF" AFTER 20 MINUTE DELAY (ADJ.	ROOM CONTROLLER: 1. Lutron #PP-DV (2) 2. Greengate #RC3D-PL 3. nLight #nPP16-D-EFP-PA (2)	HIGH-BAY SENSOR (QUANTITY AS REQUIRED BY MANUFACTURER): 1. Lutron #LOS-CDT-2000-WH 2. Greengate #OAC-DT-1000-R 3. nLight #nCM-PDT-10	LOW-VOLTAGE DIM SWITCH (QUANTITY AS SHOWN): 1. Lutron #NTSTV-WH 2. Greengate #RC-3TLB 3. nLight #NPODMA-DX-XX	

LIGHT FIXTURE SCHEDULE - INTERIOR

TYPE	DESCRIPTION	BASIS OF DESIGN	EQUAL MANFACTURERS	MOUNTING	LAMPS / CCT	MINIMUM LUMENS	MAXIMUM WATTAGE	VOLTAGE	REMARKS
AF40	2'X4' FLAT PANEL, MEDIUM LUMEN LEVEL.	METALUX #24CGTX-40-L840-CD	LITHONIA LIGHTING #CPX-2X4-4000LM-80CRI-40K-SWL-MIN10-ZT-MVOLT DAY-BRITE #2FPZ43L840-4-DS-UNV-DIM COLUMBIA LIGHTING #NBT24-40L042G-SF-ED1U	RECESSED	LED 4000K	4000	36	277	
AF40E	2'X4' FLAT PANEL, MEDIUM LUMEN LEVEL WITH INTEGRAL BATTERY BACKUP.	METALUX #24CGTX-40-EL14W-L840-CD	LITHONIA LIGHTING #CPX-2X4-4000LM-80CRI-40K-SWL-MIN10-ZT-MVOLT-E10W DAY-BRITE #2FPZ43L840-4-DS-UNV-DIM-EM10 COLUMBIA LIGHTING #NBT24-40L042G-SF-ED1U-ELL14	RECESSED	LED 4000K	4000	36	277	
AF60	2'X4' FLAT PANEL, HIGH LUMEN LEVEL.	METALUX #24CGTX-65-L840-CD	LITHONIA LIGHTING #CPX-2X4-6000LM-80CRI-40K-SWL-MIN10-ZT-MVOLT DAY-BRITE #2FPZ60L840-4-DS-UNV-DIM COLUMBIA LIGHTING #NBT24-40L070G-SF-ED1U	RECESSED	LED 4000K	6000	54	277	
AF60E	2'X4' FLAT PANEL, HIGH LUMEN LEVEL WITH INTEGRAL BATTERY BACKUP.	METALUX #24CGTX-65-EL14W-L840-CD	LITHONIA LIGHTING #CPX-2X4-6000LM-80CRI-40K-SWL-MIN10-ZT-MVOLT-E10W DAY-BRITE #2FPZ60L840-4-DS-UNV-DIM-EM10 COLUMBIA LIGHTING #NBT24-40L70G-SF-ED1U-ELL14	RECESSED	LED 4000K	6000	53	277	
BF40	2'X2' FLAT PANEL, MEDIUM LUMEN LEVEL.	METALUX #22CGTX-45-L840-CD	LITHONIA LIGHTING #CPX-2X2-4000LM-80CRI-40K-SWL-MIN10-ZT-MVOLT DAY-BRITE #2FPZ45L840-2-DS-UNV-DIM COLUMBIA LIGHTING #NBT22-40L044G-SF-ED1U	RECESSED	LED 4000K	4000	43	277	
CP6	6" ROUND CYLINDER PENDANT WITH WIDE DISTRIBUTION, DMX DRIVER, AND STEM MOUNT.	PORTFOLIO #LER6D60DMXMB-EC6DR6059659040-6LBLI-P836MB-DMX-SPX	GOTHAM #IV06CYL-PC-D-60LM-40K-80CRI-WD-MIN10-MVOLT-DMX-L7-JBX-CAN-SX-P-AR-LSS-XXX LIGHTOLIER #C6PDL6094WDMXUCLB-CASK36BKX PRESCOLITE #LTC-6RD-PCC-60L40K8-WD-DMX-SSXX	PENDANT	LED 4000K	6000	67	120	
D410	4" RECESSED ROUND DOWNLIGHT WITH WIDE DISTRIBUTION AND SEMI-SPECULAR FINISH.	PORTFOLIO #LD4C109040D010-W0L1	GOTHAM #IV04-D-10LM-40K-80CRI-WD-MIN10-MVOLT-ZT-P-XX-LSS-F LIGHTOLIER #4RN-C4L10940WZ10U-C4RDLCL PRESCOLITE #LTR-4RD-H-SL-10L-DM1-LTR-4RD-T-SL40K8WD-SS-XX	RECESSED	LED 4000K	900	11	277	
D410E	4" RECESSED ROUND DOWNLIGHT WITH WIDE DISTRIBUTION, SEMI-SPECULAR FINISH AND INTEGRAL BATTERY BACKUP.	PORTFOLIO #LD4C109040D010EM-W0L1	GOTHAM #IV04-D-10LM-40K-80CRI-WD-MIN10-MVOLT-ZT-E7W-P-XX-LSS-F LIGHTOLIER #4RNEM6-C4L10940WZ10U-C4RDLCL PRESCOLITE #LTR-4RD-H-SL-10L-DM1-LTR-EM-4RD-T-SL40K8WD-SS-XX	RECESSED	LED 4000K	900	11	277	
F440	4' STRIP WITH SEMI-FROSTED LENS AND NARROW DISTRIBUTION. PROVIDE FIXTURE WITH CHAIN HANGER KIT.	METALUX #4SNLED-LD5-41SL-LN-UNV-L840-CD-1-AYC-CHAIN/SET	LITHONIA #ZL1D-L48-SMR-3000LM-FST-MVOLT-40K-80CRI-WH-HC36 COLUMBIA LIGHTING #MPS4-40ML-CN-EDU-CSHC DAY-BRITE #FSS440L840-UNV-DIM-FKR-126	SUSPENDED	LED 4000K	4000	31	277	
F440E	4' STRIP WITH SEMI-FROSTED LENS AND NARROW DISTRIBUTION. PROVIDE FIXTURE WITH CHAIN HANGER KIT AND INTEGRAL BATTERY BACKUP.	METALUX #4SNLED-LD5-41SL-LN-UNV-EL14W-L840-CD-1-AYC-CHAIN/SET	LITHONIA #ZL1D-L48-SMR-4000LM-FST-MVOLT-40K-80CRI-WH-HC36-E10W COLUMBIA LIGHTING #MPS4-40ML-CN-EDU-CSHC-ELL14 DAY-BRITE #FSS440L840-UNV-DIM+FKR-126-EMLED	SUSPENDED	LED 4000K	4000	31	277	
F460	4' STRIP WITH SEMI-FROSTED LENS, NARROW DISTRIBUTION AND BLACK FINISH. PROVIDE FIXTURE WITH CHAIN HANGER KIT.	METALUX #4SNLED-LD5-61SL-LN-UNV-L840-CD-1-BLK-AYC-CHAIN/SET	LITHONIA #ZL1D-L48-SMR-7000LM-FST-MVOLT-40K-80CRI-MB-HC36 COLUMBIA LIGHTING #MPS4-60ML-CN-EDU-CSHC-MB DAY-BRITE #FSS470L840-UNV-DIM-FKR-126-BK	SUSPENDED	LED 4000K	6000	59	120	
LP3	3"X6' DIRECT LINEAR PENDANT FIXTURE WITH STEM MOUNT AND BLACK FINISH.	NEORAY #S123DP-C1165D840-S8-JB-6F0-1-U-DD-F-B	AXIS LIGHTING #TB3DLED-1100-80-40-SO-6'-BLK-UNV-DP-1-SASL LITECONTROL #3L-P-D-6'-06-SOF-C5-40K9-D110-D01-1C-UNV-FA1 PRUDENTIAL #PR03-LIN-FLSH-LED4-HO-6-XXX-SAL-NU-SC-RSC-X3-DM01	SUSPENDED	LED 4000K	1100LM/FT	64	277	
LP3E	3"X6' DIRECT LINEAR PENDANT FIXTURE WITH STEM MOUNT, BLACK FINISH, AND INTEGRAL BATTERY BACKUP.	NEORAY #S123DP-C1165D840-S8-JB-6F0-1B2-U-DD-F-B	AXIS LIGHTING #TB3DLED-1100-80-40-SO-6'-BLK-UNV-DP-1-E(1)-SASL LITECONTROL #3L-P-D-6'-06-SOF-C5-40K9-D110-D01-1C-UNV-FA1-EF PRUDENTIAL #PR03-LIN-FLSH-LED4-HO-6-XXX-SAL-NU-SC-RSC-X3-DM01-EMHE	SUSPENDED	LED 4000K	1100LM/FT	64	277	
LT	STAGE EDGE TAPE LIGHT.	ACCLAIM LIGHTING #F2B-226-XAXN-ALD-400-24-C2	APPROVED EQUALS	RECESSED	LED 4000K	100LM/FT	4	120	
SB	STAGE BLUE LIGHT PATHWAY FIXTURE. (F)	BRUCK #138021-BLACK-BLU-VC	SIGNIFY #PHDSBKBLU LUMEX #SL650-BLUE-120-277-BLACK PRIMA #8910-HL-BK-120-LED-B	WALL	LED BLUE	5	1	120	
SL	THEATRICAL AISLE LIGHTING FOR UPPER LEVEL WALKWAYS. FIELD VERIFY EXACT LENGTHS REQUIRED.	TIVOLI #SATT-CC-30-04-C-X-ADUL-80-1-5-12D	PRIMUS LIGHTING #PL-CC-8-W30K-X OR APPROVED EQUALS	SURFACE	LED 3000K		1	120	
U2	2' UNDERCAB LIGHTING.	FAIL-SAFE #UCL-1-LD2-LD4-40-89BW-EDC1-UNV	KENALL #AUCLED-I-XX-1140K-24-277 PRIMUS #FC7-L-4K-DO-UNV-SW277-X-2' APPROVED EQUAL	SURFACE	LED 4000K	500	17	277	
X1E	UNIVERSAL MOUNT EXIT SIGN WITH INTEGRAL BATTERY BACKUP.	SURE-LITES #LPX7	LITHONIA LIGHTING #LQM-S-W-3-R-120/277-M6-ELN CHLORIDE #VERWEM COMPASS #CER		LED		2	277	

PROVIDE A 10 WARRANTY. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

LIGHT FIXTURE SCHEDULE - EXTERIOR

TYPE	DESCRIPTION	BASIS OF DESIGN	EQUAL MANFACTURERS	MOUNTING	LAMPS / CCT	MINIMUM LUMENS	MAXIMUM WATTAGE	VOLTAGE	REMARKS
OD410E	EXTERIOR 4" RECESSED ROUND DOWNLIGHT WITH WIDE DISTRIBUTION, SEMI-SPECULAR FINISH AND INTEGRAL BATTERY BACKUP.	PORTFOLIO #LD4C109040D010EM-W0L1	GOTHAM #IV04-D-10LM-40K-80CRI-WD-MIN10-MVOLT-ZT-E7W-P-XX-LSS-F LIGHTOLIER #4RNEM6-C4L10940WZ10U-C4RDLCL PRESCOLITE #LTR-4RD-H-SL-10L-DM1-LTR-EM-4RD-T-SL40K8WD-SS-XX	RECESSED	LED 4000K	1000	11	277	FIXTURE SHALL HAVE INTEGRAL BATTERY BACKUP.
OLS4	EXTERIOR LINEAR SURFACE FIXTURE. REFER TO LIGHTING PLANS FOR REQUIRED LINEAR LENGTH.	NULITE #RXT-R-D-FF-03-L-40-UNV-D-1-X	AXIS LIGHTING #EX4S-400-80-40-SO-X-UNV-DP-1-S PRUDENTIAL #WETBPRO3-LIN-FLSH-LED4-LO-X-SAL-SC-UNV-SUR-DM01 LITECONTROL #3W-S-D-X'-XX-SOFW-C1-40K9-D030-D01-1C-UNV	SURFACE	LED 4000K	300LM/FT	30	277	
OLS4E	EXTERIOR LINEAR SURFACE FIXTURE WITH INTEGRAL BATTERY BACKUP. REFER TO LIGHTING PLANS FOR REQUIRED LINEAR LENGTH.	NULITE #RXT-R-D-FF-03-L-40-UNV-D-1B10-X	AXIS LIGHTING #EX4S-400-80-40-SO-X-UNV-DP-1-S-EX PRUDENTIAL #WETBPRO3-LIN-FLSH-LED4-LO-X-SAL-SC-UNV-SUR-DM01-EMC LITECONTROL #3W-S-D-X'-XX-SOFW-C1-40K9-D030-D01-1C-UNV-EF	SURFACE	LED 4000K	300LM/FT	30	277	FIXTURE SHALL HAVE INTEGRAL BATTERY BACKUP.
OW20	EXTERIOR LOW-PROFILE WALL MOUNT.	LUMARK #AXCS3A-XX	LITHONIA LIGHTING #WPX1-LED-P2-40K-MVOLT-XXX BEACON #RWL1-48L-20-4K7-3-UNV-XXX OR APPROVED EQUAL	WALL	LED 4000K	2000	23	277	
OW20E	EXTERIOR LOW-PROFILE WALL MOUNT WITH INTEGRAL BATTERY BACKUP.	LUMARK #AXCS3A-XX-CBP	LITHONIA LIGHTING #WPX1-LED-P2-40K-MVOLT-E4WH-XXX BEACON #RWL1-48L-20-4K7-3-UNV-XXX-EH OR APPROVED EQUAL	WALL	LED 4000K	2000	23	277	FIXTURE SHALL HAVE INTEGRAL BATTERY BACKUP.

PROVIDE A 10 WARRANTY. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

Kirksey ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

These drawings have been prepared as one coordinated set of drawings and are complimentary. What is required by one drawing is required by all of the drawings, even if a detail or component part is not identified on every sheet. Any user's reliance on a single or select few sheet(s) of the drawings without consideration for the information included in the entire set of drawings will be at the user's sole risk and shall not form the basis for a request for additional compensation or time.

STATE OF TEXAS — REGINALD JAMES GEHRT — 124117 — LICENSED PROFESSIONAL ENGINEER

CMTA F-8627

2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT — 2023 BOND

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

LIGHTING SCHEDULES

SHEET NUMBER

E7.01

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MOTORIZED BRANCH CIRCUIT BREAKERS, LINTECH OR APPROVED MODEL. REFER TO THEATRICAL DRAWINGS FOR MORE INFORMATION.

PANELBOARD AND WIRING SCHEDULE

PANEL: MBP-1 | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 208Y/120V,3P,4W | **SPD:** Yes | **PANEL INTERRUPTING RATING:**
AMPERES: 150 A | **MOUNTING:** SURFACE | **LOCATION:** MECHANICAL M3 | **SUPPLY FROM:** (E)DPB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
WB AD201				20	1	1	0.2	0.2		2	1	20				WB AD201
WB AD202				20	1	3		0.5	0.5	4	1	20				WB AD202
PB AD203				20	1	5			0.5	0.5	6	1	20				PB AD203
PB AD204				20	1	7	0.5	0.5		8	1	20				PB AD204
PB AD205				20	1	9		0.5	0.5	10	1	20				PB AD205
PB AD206				20	1	11			0.5	0.5	12	1	20				PB AD206
PB AD207				20	1	13	0.5	0.5		14	1	20				PB AD207
PB AD208				20	1	15		0.5	0.5	16	1	20				PB AD208
PB AD209				20	1	17			0.5	0.5	18	1	20				PB AD209
PB AD210				20	1	19	0.5	0.5		20	1	20				PB AD210
PB AD211				20	1	21		0.5	0.5	22	1	20				PB AD211
PB AD212				20	1	23			0.5	0.5	24	1	20				PB AD212
PB AD213				20	1	25	0.5	0.5		26	1	20				PB AD213
PB AD214				20	1	27		0.5	0.5	28	1	20				PB AD214
R AD301				20	1	29			0.5	0.5	30	1	20				R AD301
R AD301				20	1	31	0.5	0.5		32	1	20				R AD301
R AD301				20	1	33		0.5	0.5	34	1	20				R AD301
R AD301				20	1	35			0.5	0.2	36	1	20				R AD301
R AD303				20	1	37	0.5	0.5		38	1	20				R AD303
R AD303				20	1	39		0.5	0.5	40	1	20				R AD303
R AD303				20	1	41			0.5	0.5	42	1	20				R AD303
R AD303				20	1	43	0.5	0.2		44	1	20				R AD303
R AD305				20	1	45		0.5	0.5	46	1	20				R AD305
R AD305				20	1	47			0.5	0.2	48	1	20				R AD305
							TOTAL LOAD (kVA): 7.7 kVA	8.0 kVA	7.4 kVA							
							TOTAL CURRENT (A): 64 A	67 A	61 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	23040 VA	100.00%	23040 VA	TOTAL CONNECTED LOAD:	23040 VA
				TOTAL ESTIMATED DEMAND:	23040 VA
				TOTAL CONNECTED CURRENT:	64 A
				TOTAL ESTIMATED DEMAND CURRENT:	64 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: MBP-2 | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 208Y/120V,3P,4W | **SPD:** No | **PANEL INTERRUPTING RATING:**
AMPERES: 150 A | **MOUNTING:** SURFACE | **LOCATION:** MECHANICAL M3 | **SUPPLY FROM:** (E)DPB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
GJB AD306				20	1	1	0.2	0.2		2	1	20				GJB AD306
GJB AD306				20	1	3		0.2	0.2	4	1	20				GJB AD306
GJB AD308				20	1	5			0.2	0.2	6	1	20				GJB AD308
GJB AD308				20	1	7	0.2	0.2		8	1	20				GJB AD308
GJB AD308				20	1	9		0.2	0.2	10	1	20				GJB AD308
GJB AD308				20	1	11			0.2	0.2	12	1	20				GJB AD308
WB AD101				20	1	13	0.5	0.5		14	1	20				WB AD102
WB AD103				20	1	15		0.5	0.5	16	1	20				WB AD103
WB AD104				20	1	17			0.5	0.5	18	1	20				WB AD104
WB AD105				20	1	19	0.5	0.5		20	1	20				WB AD106
WB AD107				20	1	21		0.5	0.5	22	1	20				WB AD108
WB AD109				20	1	23			0.5	0.5	24	1	20				WB AD109
WB AD110				20	1	25	0.5	0.5		26	1	20				WB AD110
WB AD111				20	1	27		0.5	0.5	28	1	20				WB AD111
GJB AD302				20	1	29			0.2	0.2	30	1	20				GJB AD304
GJB AD306				20	1	31	0.2	0.2		32	1	20				GJB AD308
PB AD204/AD207				20	1	33		1.0	1.1	34	1	20				UPPER DECK HOUSE LTG
HOUSE LTG				20	1	35			0.7	0.6	36	1	20				LOWER DECK HOUSE LTG
SPARE	--	--	--	20	1	37	0.0	0.0		38	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	39		0.0	0.0	40	1	20				UPPER DECK AISLE LGT
C115 STAGE BLUE LTS				20	1	41			0.0	0.5	42	1	20				STAGE TASK LTG
						43		0.0		44	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	45		0.0	0.0	46	1	20	--	--	--	SPARE
						47				48	1	20				PSU STAGE EDGE LIGHT/CDR
							TOTAL LOAD (kVA): 4.1 kVA	5.9 kVA	5.8 kVA							
							TOTAL CURRENT (A): 34 A	51 A	51 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	12880 VA	100.00%	12880 VA	TOTAL CONNECTED LOAD:	15780 VA
LTNG	2900 VA	125.00%	3625 VA	TOTAL ESTIMATED DEMAND:	16505 VA
				TOTAL CONNECTED CURRENT:	44 A
				TOTAL ESTIMATED DEMAND CURRENT:	46 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: MBP-3 | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 208Y/120V,3P,4W | **SPD:** No | **PANEL INTERRUPTING RATING:**
AMPERES: 100 A | **MOUNTING:** SURFACE | **LOCATION:** MECHANICAL M3 | **SUPPLY FROM:** (E)DPB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
PB BD201				20	1	1	0.2	0.2		2	1	20				PB BD201
PB BD202				20	1	3		0.2	0.2	4	1	20				PB BD202
PB BD203				20	1	5			0.2	0.2	6	1	20				PB BD203
PB BD204				20	1	7	0.2	0.2		8	1	20				PB BD204
PB BD205				20	1	9		0.2	0.2	10	1	20				PB BD205
PB BD206				20	1	11			0.2	0.2	12	1	20				PB BD206
PB BD207				20	1	13	0.2	0.2		14	1	20				PB BD207
PB BD208				20	1	15		0.2	0.2	16	1	20				PB BD208
PB BD209				20	1	17			0.2	0.2	18	1	20				PB BD209
PB BD210				20	1	19	0.2	0.2		20	1	20				PB BD210
PB BD211				20	1	21		0.2	0.2	22	1	20				PB BD211
PB BD212				20	1	23			0.2	0.2	24	1	20				PB BD212
PB BD213				20	1	25	0.2	0.2		26	1	20				PB BD213
PB BD214				20	1	27		0.2	0.2	28	1	20				PB BD214
PB BD215				20	1	29			0.2	0.2	30	1	20				PB BD215
PB BD216				20	1	31	0.2	0.2		32	1	20				PB BD216
WB BD101				20	1	33		0.5	0.5	34	1	20				WB BD101
WB BD102				20	1	35			0.5	0.5	36	1	20				WB BD102
WB BD103				20	1	37	0.5	0.5		38	1	20				WB BD103
WB BD104				20	1	39		0.5	0.5	40	1	20				WB BD104
SPARE	--	--	--	20	1	41			0.0	0.0	42	1	20	--	--	SPARE
SPARE	--	--	--	20	1	43	0.0	0.0		44	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	45		0.0	0.0	46	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	47			0.0	0.0	48	1	20	--	--	SPARE
							TOTAL LOAD (kVA): 3.2 kVA	3.8 kVA	2.8 kVA							
							TOTAL CURRENT (A): 27 A	32 A	23 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	6880 VA	100.00%	6880 VA	TOTAL CONNECTED LOAD:	9760 VA
REC	2880 VA	100.00%	2880 VA	TOTAL ESTIMATED DEMAND:	9760 VA
				TOTAL CONNECTED CURRENT:	27 A
				TOTAL ESTIMATED DEMAND CURRENT:	27 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: (E)H | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 480Y/277V,3P,4W | **SPD:** | **PANEL INTERRUPTING RATING:**
AMPERES: 200 A | **MOUNTING:** SURFACE | **LOCATION:** CUST. B102 | **SUPPLY FROM:**

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
(E) SPARE	--	--	--	30	2	1	0.0	0.0		2	1	20	--	--	--	(E) LOAD
						3			0.0	0.0	4	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	5				0.0	0.0	6	1	20	--	--	--	(E) LOAD
MARIACHI/STOR LTG				20	1	7	3.6	2.4				8	1	20				BAND HALL/ENSEMBLE LTG
(E) LOAD	--	--	--	20	1	9			0.0	0.0								
(E) LOAD	--	--	--	20	1	11					0.0	0.0	10	1	20	--	--	--
(E) LOAD	--	--	--	20	1	13	0.0	0.0					12	1	20	--	--	--
(E) LOAD	--	--	--	20	1	15			0.0	0.1			14	1	20	--	--	--
(E) LOAD	--	--	--	20	1	17					0.0	0.0	16	1	20			(E)OUTDOOR LTG/NEW BAND EXT
(E) LOAD	--	--	--	20	1	19	0.0	--					18	1	20	--	--	--
(E) LOAD	--	--	--	20	1	21			0.0	--			20	1	--	--	--	(E) SPACE
(E) LOAD	--	--	--	20	1	23					0.0	--	22	1	--	--	--	(E) SPACE
(E) LOAD	--	--	--	20	1	25	0.0	9.7					24	1	--	--	--	(E) SPACE
(E) LOAD	--	--	--	20	1	27			0.0	11.7			26					
(E) LOAD	--	--	--	20	1	29					0.0	11.8	28	3	50	*	*	*
							TOTAL LOAD (kVA): 15.6 kVA	11.9 kVA	11.8 kVA	30								TX-H
							TOTAL CURRENT (A): 56 A	43 A	43 A									

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	7600 VA	100.00%	7600 VA	TOTAL CONNECTED LOAD:	39242 VA
LTNG	6062 VA	125.00%	7578 VA	TOTAL ESTIMATED DEMAND:	36568 VA
REC	18380 VA	77.20%	14190 VA	TOTAL CONNECTED CURRENT:	47 A
HEAT	7200 VA	100.00%	7200 VA	TOTAL ESTIMATED DEMAND CURRENT:	44 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.
*REFER TO ONE-LINE DIAGRAM.

PANELBOARD AND WIRING SCHEDULE

PANEL: LH | **MAINS TYPE:** 100A MCB | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 208Y/120V,3P,4W | **SPD:** No | **PANEL INTERRUPTING RATING:**
AMPERES: 150 A | **MOUNTING:** SURFACE | **LOCATION:** CUST. B102 | **SUPPLY FROM:** TX-H

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
B107A-B107C/B105A/B PR				20	1	1	1.4	0.7		2	1	20				B106 PLC REFRIG
B106 PLC- 3 DUPLEX				20	1	3		1.1	0.5	4	1	20				B106 PLC COFFEE
B106 PLC COUNTER				20	1	5			0.5	1.0	6	1	20				B106 PLC MW
MARIACHI FB/DUPLEXES				20	1	7	1.8	0.5		8	1	20				MRP MAR RACK
MARIACHI TEACHING WALL				20	1	9		1.2	0.2	10	1	20				MARIACHI PROJECTOR
MARIACHI COW				20	1	11			0.5	1.4	12	1	20				B117-B119 OFFICE/STOR
B115 PERC PROJECTOR				20	1	13	0.2	0.5		14	1	20				B115 PERC MRP RACK
B115 PERC COW				20	1	15		0.5	1.0	16	1	20				B115 PERC TEACHING WALL
B115 PERC 4 DUPLEXES				20	1	17			0.7	1.8	18	1	20				B112 OFFICE/B113 STOR
B114 ICE RM				20	1	19	0.4	0.7				20	1	20				B110 DRINKING FOUNTAIN
B110 BAND HALL 2 FB				20	1	21		1.3	1.4			22	1	20				B110 BAND HALL TEACHING WALL
B110 BAND HALL 2 FB/DUPLEXES				20	1	23			1.6	0.5	24	1	20				B110 BAND HALL COW	
B110 PROJECTOR				20	1	25	0.5	0.7		26	1	20				B111 ENSEMBLE TEACHING WALL	
B110 BAND HALL RACK				20	1	27		0.5	0.5			28	1	20				B111 ENSEMBLE COW
B111 ENSEMBLE 4 DUPLEXES				20	1	29			0.9	1.0	30	1	20				B111 ENSEMBLE 4 OH DOOR	
B111 ENSEMBLE MRP ENS				20	1	31	0.5	1.8				32	1	20				HEAT UNIFORM STOR B108
B117 DEH-4				20	1	33		1.8	1.8			34	1	20				B113 DEH-2
B118 DEH-3				20	1	35			1.8	0.0	36	1	20	--	--	--	SPARE	
SPARE	--	--	--	20	1	37	0.0	0.0				38	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	39		0.0	0.0			40	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	41			0.0	0.0	42	1	20	--	--	--	SPARE	
							TOTAL LOAD (kVA): 9.7 kVA	11.7 kVA	11.8 kVA							
							TOTAL CURRENT (A): 81 A	100 A	101 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	7600 VA	100.00%	7600 VA	TOTAL CONNECTED LOAD:	33180 VA
REC	18380 VA	77.20%	14190 VA	TOTAL ESTIMATED DEMAND:	28990 VA
HEAT	7200 VA	100.00%	7200 VA	TOTAL CONNECTED CURRENT:	92 A
				TOTAL ESTIMATED DEMAND CURRENT:	80 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: LP1T | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 208Y/120V,3P,4W | **SPD:** No | **PANEL INTERRUPTING RATING:**
AMPERES: 100 A | **MOUNTING:** SURFACE | **LOCATION:** MECHANICAL M3 | **SUPPLY FROM:** (E)DPB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
C112 CU-1/AC-2				20	2	1	1.3	0.4		2	1	20				C110 AUDITORIUM CRS
						3			1.3	0.4	4	1	20				C115 STAGE AV4
C115 STAGE CR3				20	1	5				0.2	0.2	6	1	20				C115 STAGE CR3
C115 STAGE CONVENIENCE				20	1	7	0.5	0.5				8	1	20				C119 SCENE SHOP CONVENIENCE
C115 STAGE CONVENIENCE				20	1	9			0.5	0.5								
C119 SCENE SHOP CONVENIENCE				20	1	11					0.6	0.0	10	1	20	--	--	--
CU-1 REC ON ROOF				20	1	13	0.2	0.5					12	1	20	--	--	--
C119 SCENE SHOP REC				20	1	15			1.1	0.5			14	1	20			C115 STAGE PROJECTOR SCREEN
C119 SCENE SHOP EWH				20	2	17							16	1	20			ER-SMP
						19	1.5	0.5			1.5	0.5	18	1	20			ER-SMP
STAGE LIFT STATION				20	1	21			1.0	0.2			20	1	20			TL FLOORBOX
TL FLOORBOX				20	1	23					0.5	0.5	22	1	20			AUDIT PROJECTOR
CR2 AUDIT				20	1	25	0.5	0.5					24	1	20			C110 AUDITORIUM CRS
CR2 AUDIT				20	1	27			0.5	0.2			26	1	20			AUDIT PROJECTOR
AUDIT L2 DUPLEX				20	1	29					0.2	0.0	28	1	20			AUDIT L2 DUPLEX
ACCH-3/LT CONTROLS*				20	1	31	0.5	0.0					30	1	20	--	--	--
SPARE	--	--	--	20	1	33			0.0	0.0			32	1	20	--	--	--
SPARE	--	--	--	20	1	35					0.0	--	34	1	--	--	--	SPARE
SPACE				--	1	37	--	--					36	1	--	--	--	SPARE
SPACE	--	--	--	--	1	39			--	--			38	1	--	--	--	SPACE
SPACE	--	--	--	--	1	41					--	--	40	1	--	--	--	SPACE
							TOTAL LOAD (kVA): 7.0 kVA	6.2 kVA	4.1 kVA							
							TOTAL CURRENT (A): 61 A	54 A	34 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	7580 VA	100.00%	7580 VA	TOTAL CONNECTED LOAD:	17252 VA
Motor	2712 VA	100.00%	2712 VA	TOTAL ESTIMATED DEMAND:	17252 VA
REC	3960 VA	100.00%	3960 VA	TOTAL CONNECTED CURRENT:	48 A
HEAT	3000 VA	100.00%	3000 VA	TOTAL ESTIMATED DEMAND CURRENT:	48 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.
*BREAKER TO BE SPARE UNDER BASE BID. (F)

PANELBOARD AND WIRING SCHEDULE

PANEL: HM1F | **MAINS TYPE:** MLO | **AVAILABLE FAULT CURRENT:**
VOLTAGE: 480Y/277V,3P,4W | **SPD:** No | **PANEL INTERRUPTING RATING:**
AMPERES: 200 A | **MOUNTING:** SURFACE | **LOCATION:** MECH. M15 | **SUPPLY FROM:** (E)MSBB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
F120 FVAV-12				20 (F)	3	1	2.9	2.9		2						
						3		2.9	2.9	4	3	20 (F)				F122 FVAV-12
						5			2.9	2.9	6					
F110 FVAV-10	10	10		30	1	7	5.7	5.7				8	1	30	10	10	F121 FVAV-10
F111 FVAV-10	10	10		30	1	9		5.7	5.7			10	1	30	10	10	F123 FVAV-10
F112 FVAV-10	10	10		30	1	11			5.7	5.7		12	1	30	10	10	F124 FVAV-10
F113 FVAV-10	10	10		30	1	13	5.7	5.7				14	1	30	10	10	F125 FVAV-10
F114 FVAV-10	10	10		30	1	15		5.7	5.7			16	1	30	10	10	F126 FVAV-10
F115 FVAV-10	10	10		30	1	17			5.7	5.7		18	1	30	10	10	F127 FVAV-10
F117 FVAV-10	10	10		30	1	19	5.7	5.7				20	1	30	10	10	F128 FVAV-10
F119 FVAV-10	10	10		30	1	21		5.7	5.7			22	1	30	10	10	F129 FVAV-10
TX				20	2	23			1.4	0.0		24	1	20	--	--	SPARE
						25	1.4	0.0				26	1	20	--	--	SPARE
SPACE	--	--	--	--	1	27		--	0.0			28	1	20	--	--	SPARE
SPACE	--	--	--	--	1	29			--	--		30	1	--	--	--	SPACE
SPACE	--	--	--	--	1	31	--	--				32	1	--	--	--	SPACE
SPACE	--	--	--	--	1	33		--	--			34	1	--	--	--	SPACE
SPACE	--	--	--	--	1	35			--	--		36	1	--	--	--	SPACE
SPACE	--	--	--	--	1	37	--	--				38	1	--	--	--	SPACE
SPACE	--	--	--	--	1	39		--	--			40	1	--	--	--	SPACE
SPACE	--	--	--	--	1	41			--	--		42	1	--	--	--	SPACE
							TOTAL LOAD (kVA): 41.3 kVA	39.8 kVA	29.9 kVA							
							TOTAL CURRENT (A): 155 A	149 A	108 A							

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS	
EQUIP	2880 VA	100.00%	2880 VA	TOTAL CONNECTED LOAD:	111050 VA
Motor	28570 VA	100.00%	28570 VA	TOTAL ESTIMATED DEMAND:	111050 VA
HEAT	79600 VA	100.00%	79600 VA	TOTAL CONNECTED CURRENT:	134 A
				TOTAL ESTIMATED DEMAND CURRENT:	134 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

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STATE OF TEXAS — REGINALD JAMES GEHRT — 127 — REGISTERED PROFESSIONAL ENGINEER
CMTA F-8627
2025.10.23

△	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND 2025 BOND — INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
PANEL SCHEDULES

SHEET NUMBER
E7.03

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PANELBOARD AND WIRING SCHEDULE

PANEL: **HMB3** | VOLTAGE: 480Y/277V,3P,4W | AMPERES: 225 A
MAINS TYPE: MLO | SPD: No | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: 22 kA (F) | LOCATION: MECH C3 | SUPPLY FROM: HD3B (F)

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
						1	2.2	2.9		2						
K100 CORR FVAV-14 (A)	10	10		25	3	3		2.2	2.9	4	3	20				K114 OFFICE/LIBRARY FVAV-12
						5			2.2	2.9	6						
K100 CORR FVAV-8				20	1	7	4.6	2.7		8	1	20				K102 OFFICE FVAV-6
K108 OFFICE & LIBRARY FVAV-8				20	1	9		4.6	2.7	10	1	20				K113 UNIFORM STOR FVAV-6
K113 UNIFORM STOR FVAV-10	10	10	(A)	30	1	11			5.7	12	1	20				K114 OFFICE/LIBRARY FVAV-6
K105/K112-115 LTNG				20	1	13	3.1	0.7		14	1	20				K100 CORR LTNG
K103-104/106-108/110/111 LTNG				20	1	15			2.2	--	16	1	--	--	--	SPACE
EXTERIOR LTNG				20	1	17				0.4	--	18	1	--	--	--	SPACE
K114 OFFICE IWH				20	1	19	4.1	--				20	1	--	--	--	SPACE
K108 OFFICE IWH				20	1	21		4.1	5.8			22					
						23			2.2	5.8	24	3	45		10	10	AHU-BAND
MECH C3 FVAV-14	10	10		25	3	25	2.2	5.8				26					
						27		2.2	9.6			28					
						29			1.9	9.6	30	3	50	1	10	6	C119 SCENE SHOP DRYER
C119 SCENE SHOP WASHER				15	3	31	1.9	9.6				32					
						33		1.9	4.1			34	1	20			C118 DRESSING A IWH**
C117 DRESSING B IWH**				20	1	35			4.1	0.0	36	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	37	0.0	0.0				38	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	39			0.0	0.0		40	1	20	--	--	--	SPARE
SPARE (F)	--	--	--	20	1	41					0.0	--	42	1	--	--	--	SPACE (F)
							TOTAL LOAD (kVA):		39.7 kVA		42.3 kVA		37.4 kVA			
							TOTAL CURRENT (A):		145 A		154 A		135 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
EQUIP	16588 VA	100.00%	16588 VA	TOTAL CONNECTED LOAD: 119453 VA
LTNG	6333 VA	125.00%	7917 VA	TOTAL ESTIMATED DEMAND: 121036 VA
Motor	31832 VA	100.00%	31832 VA	TOTAL CONNECTED CURRENT: 144 A
HEAT	64700 VA	100.00%	64700 VA	TOTAL ESTIMATED DEMAND CURRENT: 146 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.
*REFER TO ONE-LINE DIAGRAM. **BREAKER SHALL BE SPARE UNDER BASE BID.

PANELBOARD AND WIRING SCHEDULE

PANEL: **HM2F** | VOLTAGE: 480Y/277V,3P,4W | AMPERES: 300 A
MAINS TYPE: MLO | SPD: No | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: | LOCATION: MECH M3 | SUPPLY FROM: (E)MSBB

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
						1	2.9	3.6		2						
F205 FVAV-12				20	3	3		2.9	3.6	4	3	25		10	10	F220 FVAV-14
						5			2.9	3.6	6					
						7	2.9	2.9		8						
F206 FVAV-12				20	3	9		2.9	2.9	10	3	20				F221 FVAV-12
						11			2.9	2.9	12					
						13	2.9	2.9		14						
F207 FVAV-12				20	3	15		2.9	2.9	16	3	20				F222 FVAV-12
						17			2.9	2.9	18					
						19	2.9	2.9		20						
F208 FVAV-12				20	3	21		2.9	2.9	22	3	20				F223 FVAV-12
						23			2.9	2.9	24					
						25	2.9	2.9		26						
F209 FVAV-12				20	3	27		2.9	2.9	28	3	20				F224 FVAV-12
						29			2.9	2.9	30					
						31	2.9	2.9		32						
F210 FVAV-12				20	3	33		2.9	2.9	34	3	20				F225 FVAV-12
			(A)			35			2.9	2.9	36					
F212 FVAV-10	10	10		30	1	37	5.7	2.9		38						
F214 FVAV-10	10	10		30	1	39			5.7	2.9	40	3	20			F226 FVAV-12
F217 FVAV-10	10	10		30	1	41					5.7	2.9	42			
F216 FVAV-10	10	10		30	1	43	5.7	2.9		44						
F217 FVAV-10	10	10		30	1	45			5.7	2.9	46	3	20			F227 FVAV-12
F218 FVAV-10	10	10		30	1	47					5.7	2.9	48			
SPARE	--	--	--	20	1	49	0.0	0.0		50	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	51			0.0	0.0	52	1	20	--	--	--	SPARE
SPARE	--	--	--	20	1	53				0.0	0.0	54	1	20	--	--	--	SPARE
SPACE	--	--	--	--	1	55	--	--				56	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	57			--	--		58	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	59					--	--	60	1	--	--	--	SPACE
							TOTAL LOAD (kVA):		52.1 kVA		52.1 kVA		52.1 kVA			
							TOTAL CURRENT (A):		188 A		188 A		188 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
Motor	31744 VA	100.00%	31744 VA	TOTAL CONNECTED LOAD: 156444 VA
HEAT	124700 VA	100.00%	124700 VA	TOTAL ESTIMATED DEMAND: 156444 VA
				TOTAL CONNECTED CURRENT: 188 A
				TOTAL ESTIMATED DEMAND CURRENT: 188 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: **(E)2LCD** | VOLTAGE: 208Y/120V,3P,4W | AMPERES: 225 A
MAINS TYPE: | SPD: | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: | LOCATION: | SUPPLY FROM:

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
(E) A206 CR REC	--	--	--	20	1	1	0.0	0.0		2	1	20	--	--	--	(E) B206 CR REC
(E) A206 CR REC	--	--	--	20	1	3			0.0	0.0	4	1	20	--	--	--	(E) B206 CR REC
A206 3D ART LAB REC				20	1	5				0.4	0.0	6	1	20	--	--	--	(E) B206 CR REC
A206 3D ART LAB REC				20	1	7	0.5	0.0				8	1	20	--	--	--	(E) B204 CR REC
A206 3D ART LAB REC				20	1	9			0.5	0.0		10	1	20	--	--	--	(E) B203 CR REC
(E) A208 CR REC	--	--	--	20	1	11					0.0	0.0	12	1	20	--	--	--	(E) B203 CR REC
A208A CR/STOR REC				20	1	13	0.4	0.0					14	1	20	--	--	--	(E) B203 CR REC
(E) A201 CR REC	--	--	--	20	1	15			0.0	0.0			16	1	20	--	--	--	(E) B203 CR REC
(E) A201 CR REC	--	--	--	20	1	17					0.0	0.0	18	1	20	--	--	--	(E) B203 CR REC
(E) A201 CR REC	--	--	--	20	1	19	0.0	0.0					20	1	20	--	--	--	(E) B203 CR REC
A201 ART CR REC				20	1	21			0.9	0.0			22	1	20	--	--	--	(E) B203 CR REC
A201 ART CR REC				20	1	23					0.9	0.0	24	1	20	--	--	--	(E) B203 CR REC
A210 ART CR REC				20	1	25	0.5	0.0					26	1	20	--	--	--	(E) SPARE
A210 ART CR REC				20	1	27			0.5	0.0			28	1	20	--	--	--	(E) SPARE
(E) SPARE	--	--	--	20	1	29					0.0	0.0	30	1	20	--	--	--	(E) SPARE
(E) SPACE	--	--	--	--	1	31	--	--					32	1	--	--	--	--	(E) SPACE
(E) SPACE	--	--	--	--	1	33			--	--			34	1	--	--	--	--	(E) SPACE
(E) SPACE	--	--	--	--	1	35					--	--	36	1	--	--	--	--	(E) SPACE
(E) SPACE	--	--	--	--	1	37	--	--					38	1	--	--	--	--	(E) SPACE
(E) SPACE	--	--	--	--	1	39			--	--			40	1	--	--	--	--	(E) SPACE
(E) SPACE	--	--	--	--	1	41					--	--	42	1	--	--	--	--	(E) SPACE
							TOTAL LOAD (kVA):		1.4 kVA		2.0 kVA		1.3 kVA			
							TOTAL CURRENT (A):		12 A		17 A		11 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
REC	4680 VA	100.00%	4680 VA	TOTAL CONNECTED LOAD: 4680 VA
				TOTAL ESTIMATED DEMAND: 4680 VA
				TOTAL CONNECTED CURRENT: 13 A
				TOTAL ESTIMATED DEMAND CURRENT: 13 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: **(E)T** | VOLTAGE: 480Y/277V,3P,4W | AMPERES: 225 A
MAINS TYPE: | SPD: | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: | LOCATION: | SUPPLY FROM:

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
(E) AREA C LTNG	--	--	--	20	1	1	0.0	0.0		2	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	3			0.0	0.0	4	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	5				0.0	0.0	6	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	7	0.0	0.0				8	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	9			0.0	0.0		10	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	11					0.0	0.0	12	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	13	0.0	0.0					14	1	20	--	--	--	(E) PARKING LOT FLOOD
LTNG ART CLASSROOMS				20	1	15		2.1	0.0				16	1	20	--	--	--	(N) SPARE
(N) SPARE	--	--	--	20	1	17				0.0	0.0	18	1	20	--	--	--	(N) SPARE
(N) SPARE	--	--	--	20	1	19	0.0	0.0				20	1	20	--	--	--	(N) SPARE
(E) AREA C LTNG	--	--	--	20	1	21			0.0	0.0		22	1	20	--	--	--	(E) AREA C LTNG
(E) AREA C LTNG	--	--	--	20	1	23					0.0	0.0	24						
(E) SPARE	--	--	--	20	1	25	0.0	0.0					26	3	20	--	--	--	(E) DUMBWAITER
(E) SPARE	--	--	--	20	1	27			0.0	0.0			28						
							TOTAL LOAD (kVA):		0.0 kVA		2.1 kVA		0.0 kVA			
							TOTAL CURRENT (A):		0 A		8 A		0 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
LTNG	2090 VA	125.00%	2613 VA	TOTAL CONNECTED LOAD: 2090 VA
				TOTAL ESTIMATED DEMAND: 2613 VA
				TOTAL CONNECTED CURRENT: 3 A
				TOTAL ESTIMATED DEMAND CURRENT: 3 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: **(E)LT** | VOLTAGE: 208Y/120V,3P,4W | AMPERES: 225 A
MAINS TYPE: | SPD: | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: | LOCATION: | SUPPLY FROM:

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
						1	0.0	0.0		2						
(E) LOAD	--	--	--	20	2	3		0.0	0.0	4	2	20	--	--	--	(E) LOAD
						5			0.0	0.0	6					
(E) LOAD	--	--	--	20	2	7	0.0	0.0		8	2	20	--	--	--	(E) LOAD
						9		0.0	0.0	10						
(E) LOAD	--	--	--	20	2	11			0.0	0.0	12	2	20	--	--	--	(E) LOAD
						13	0.0	0.0		14						
(E) LOAD	--	--	--	20	2	15		0.0	0.0	16	2	20	--	--	--	(E) LOAD
						17			0.0	0.0	18					
(E) LOAD	--	--	--	20	2	19	0.0	0.0		20	1	20	--	--	--	(E) LOAD
(E) SPACE	--	--	--	--	1	21		--	--	22	1	--	--	--	--	(E) SPACE
(E) LOAD	--	--	--	20	1	23			0.0	0.0	24	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	25	0.0	0.0		26	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	27		0.0	0.0	28	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	29			0.0	0.0	30	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	31	0.0	0.0		32	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	33			0.0	0.0	34	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	35				0.0	0.0	36	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	37	0.0	0.0				38	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	39			0.0	0.0		40	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	41					0.0	0.0	42	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	43	0.0	0.0					44	1	20	--	--	--	(E) LOAD
(E) LOAD	--	--	--	20	1	45			0.0	0.0			46	1	20	--	--	--	(E) LOAD
A202 ART STOR REC				20	1	47					0.4	0.0	48	1	20	--	--	--	(E) LOAD
							TOTAL LOAD (kVA):		0.0 kVA		0.0 kVA		0.4 kVA			
							TOTAL CURRENT (A):		0 A		0 A		3 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
REC	360 VA	100.00%	360 VA	TOTAL CONNECTED LOAD: 360 VA
				TOTAL ESTIMATED DEMAND: 360 VA
				TOTAL CONNECTED CURRENT: 1 A
				TOTAL ESTIMATED DEMAND CURRENT: 1 A

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: **LP3B** | VOLTAGE: 208Y/120V,3P,4W | AMPERES: 225 A
MAINS TYPE: 150A MCB | SPD: Yes | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: 10 kA (F) | LOCATION: MECH C3 | SUPPLY FROM: TLP3B

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
K113 SHARED ENSEMBLE COW				20	1	1	0.5	0.2		2	1	20				K105 ORCHESTRA HALL WF
K105 ORCHESTRA HALL COW				20	1	3			0.5	0.2	4	1	20				K112 CHOIR WF
K101 DRAMA CR COW				20	1	5					0.5	0.2	6	1	20				K101 DRAMA CR PROJECTOR
K114 OFFICE/LIBRARY MW				20	1	7	1.0	0.5					8	1	20				K114 OFFICE/LIBRARY COFFEE
K112 CHOIR REC				20	1	9			0.9	0.7			10	1	20				K113 SHARED ENSEMBLE REC
K105 ORCHESTRA HALL REC				20	1	11					0.8	1.8	12	1	20				K106 DEH-6
K114 OFFICE/LIBRARY REC				20	1	13	1.3	1.1					14	1	20				K113 SHARED ENS/PR REC
K101/103 DRAMA CR/STOR REC				20	1	15			0.8	1.1			16	1	20				K105 ORCHESTRA HALL REC
K108 OFFICE & LIBRARY MW				20	1	17					1.0	0.7	18	1	20				EXTERIOR DUPLEXES
K102 OFFICE REC				20	1	19	1.1	0.9					20	1	20				K106/107 INSTR. STOR/HARP RM..
K112 CHOIR COW				20	1	21			0.5	0.5			22	1	20				K108 OFFICE & LIBRARY COFFEE
C4 IDF L6-30R	10	10		30	2	23					1.0	1.0	24						
						25	1.0	1.0					26	2	30		10	10	C4 IDF L6-30R
C4 IDF L6-30R	10	10		30	2	27			1.0	1.0			28						
						29					1.0	1.0	30	2	30		10	10	C4 IDF L6-30R
K108 OFFICE & LIBRARY REC				20	1	31	0.7	0.2					32	1	20				K105 ORCHESTRA HALL...
K100/K100B CORR DUPLEXES				20	1	33			0.7	0.2			34	1	20				K112 CHOIR PROJECTOR
K108 OFFICE & LIBRARY REC				20	1	35					0.5	0.5	36	1	20				K101 DRAMA TCP AV
C4 IDF REC				20	1	37	0.4	1.0					38	1	20				K112 CHOIR TEACH..
C4 IDF REC				20	1	39			0.2	0.2			40	1	20				K105 ORCHESTRA AV RACK
C4 IDF REC				20	1	41					0.2	0.2	42	1	20				K113 SHARED ENSEMBLE AV...
K105 DEH-7				20	1	43	1.8	1.7					44	1	35		10	10	K101 DRAMA PARTITION
K112 CHOIR MRP CHR				20	1	45			0.2	0.2			46	1	20				K104 BB CR3
K101 DRAMA CR DUPLEXES				20	1	47					1.1	0.5	48	1	20				K104 BB BBP/2 DUPLEX
K104 BB CR3 WEST WALL				20	1	49	0.2	0.2					50	1	20				K104 BB CR3 SOUTH WALL
K104 BB BBP/1 DUPLEX				20	1	51			0.4	0.2			52	1	20				K104 BB CR3 EAST WALL
K104 BB COW				20	1	53					0.5	0.7	54	1	20				K104 BB BBP/TEACH WALL
K104 BB BBP/QUAD				20	1	55	0.4	1.0					56	1	20				K104 OH DOOR
C4 IDF REC				20	1	57			0.2	0.2			58	1	20				BAS PANEL
CU-2/AC-2		10	10	25	2	59					1.7	0.4	60	1	20				MECH C3 DUPLEXES
						61	1.7	1.0					62	1	20				AHU-BAND UV LIGHT
SPARE	--	--	--	20	1	63			0.0	0.2			64	1	20				CU-2 DUPLEX ON ROOF (F)
SPARE	--	--	--	20	1	65					0.0	0.0	66	1	20				SPARE
SPARE	--	--	--	20	1	67	0.0	0.0					68	1	20	--	--	--	SPARE
SPACE	--	--	--	--	1	69			--	0.0			70	1	20	--	--	--	SPARE
SPACE	--	--	--	--	1	71					--	--	72	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	73	--	--					74	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	75			--	--			76	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	77					--	--	78	1	--	--	--	--	SPACE
SPACE	--	--	--	--	1	79	--	0.0					80						
SPACE	--	--	--	--	1	81			--	0.0			82	3	30	1	8	8	SPD
SPACE	--	--	--	--	1	83					--	0.0	84						
							TOTAL LOAD (kVA):		18.6 kVA		9.9 kVA		15.3 kVA			
							TOTAL CURRENT (A):		162 A		83 A		134 A			

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
EQUIP	13940 VA	100.00%	13940 VA	TOTAL CONNECTED LOAD: 43868 VA
LTNG	1000 VA	125.00%	1250 VA	TOTAL ESTIMATED DEMAND: 38958 VA
Motor	5008 VA	100.00%	5008 VA	TOTAL CONNECTED CURRENT: 122 A
REC	20320 VA	74.61%	15160 VA	TOTAL ESTIMATED DEMAND CURRENT: 108 A
HEAT	3600 VA	100.00%	3600 VA	

NOTES: WHERE NOT LISTED, WIRE AND CONDUIT SHALL BE BE MINIMUM PER SPECIFICATIONS. SPARE BREAKERS TO BE 20A/1P.

PANELBOARD AND WIRING SCHEDULE

PANEL: **(E)HA** | VOLTAGE: 480Y/277V,3P,4W | AMPERES: 100 A
MAINS TYPE: MLO | SPD: Yes | MOUNTING: SURFACE
AVAILABLE FAULT CURRENT: | PANEL INTERRUPTING RATING: | LOCATION: MECHANICAL M3 | SUPPLY FROM: (E) DPA

CIRCUIT DESCRIPTION	WIRE	GND	C	OCP	P	CKT	A	B	C	CKT	P	OCP	C	GND	WIRE	CIRCUIT DESCRIPTION
(E)LTG	--	--	--	20	1	1	0.0	0.0		2	1	20	--	--	--	(E)LTG LOBBY
(E)LTG	--	--	--	20	1	3			0.0	0.0	4	1	20	--	--	--	(E)LTG LOBBY
(E)LTG	--	--	--	20	1	5					0.0	0.0	6	1	20	--	--	--	(E)LTG STOR
(E)LTG	--	--	--	20	1	7	0.0	0.0					8	1	20	--	--	--	(E)LTG RESTRM/CONS
(E)LTG	--	--	--	20	1	9			0.0	0.0			10	1	20	--	--	--	(E)LTG CORRIDOR
(E)HIDS AUDITORIUM	--	--	--	20	1	11					0.0	0.0	12						
(E)HIDS AUDITORIUM	--	--	--	20	1	13	0.0	0.0					14	3	15	--	--	--	(E)SF1
(E)HIDS AUDITORIUM	--	--	--	20	1	15			0.0	0.0			16						
(E)LTG	--	--	--	20	1	17					0.0	0.0	18						
(E)SOUTH WALL PACKS	--	--	--	20	1	19	0.0	0.0					20	3	20	--	--	--	(E)SF2
(E)SOUTH WALL PACKS	--	--	--	20	1	21			0.0	0.0			22						
(E)EM INVERTER	--	--	--	20	1	23					0.0	0.0	24						
(E)SPARE	--	--	--	20	1	25	0.0	0.0					26	3	15	--	--	--	(E)AIR COMPRESSOR
(E)SPARE	--	--	--	20	1	27			0.0	0.0			28						
(E)SPARE	--	--	--	20	1	29					0.0	0.0	30						
						31	0.0	0.0					32	3	15	--	--	--	(E)HW-1
(E)MCC	--	--	--	30	3	33			0.0	0.0			34						
						35					0.0	--	36

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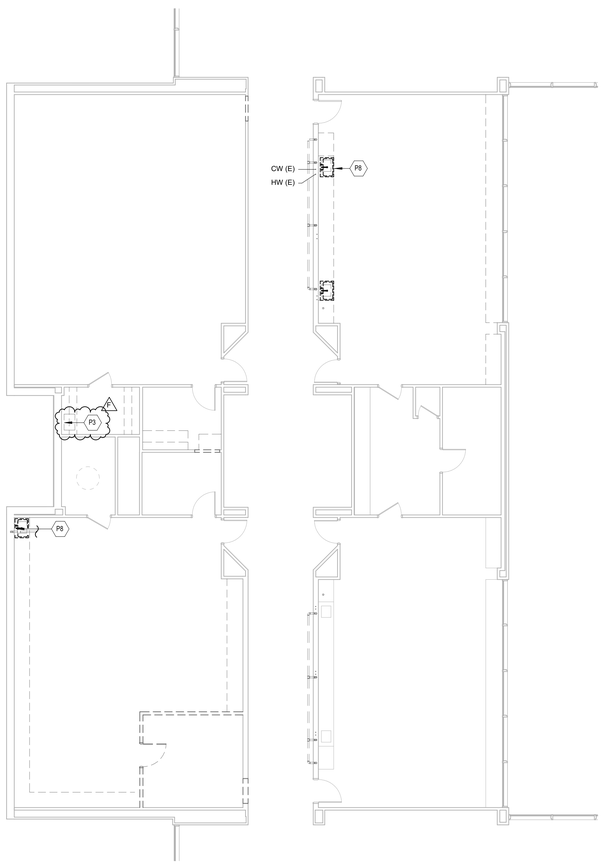
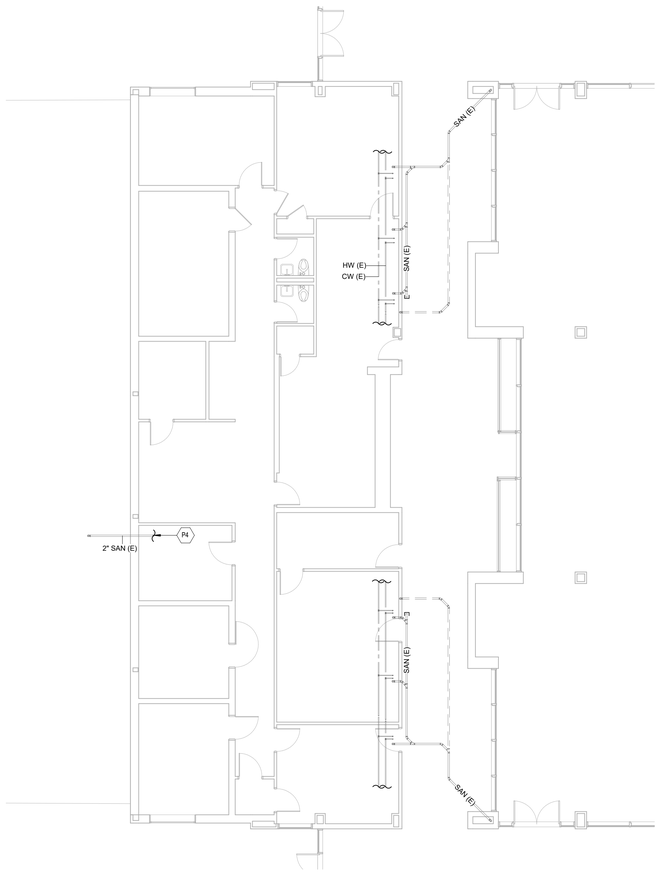
TAGGED NOTES	##
P3	EXISTING SINK AND ALL ASSOICATED PLUMBING IS TO BE DEMOED AND REMOVED FROM WALL. SANITARY IS TO BE CAPPED BELOW SLAB. WATER CAPPED ABOVE CEILING. EXISTING VENT ROUTED UP TO SECOND FLOOR IS TO REMAIN AND CAPPED IN PREPARATION OF NEW FIXTURE CONNECTION.
P4	EXISTING SANITARY SERVING FIXTURES ON SECOND FLOOR IS TO BE CAPPED ABOVE CEILING IN PREPARATION OF RELOCATIONS SANITARY LINE ROUTED BELOW SLAB.
P8	DEMO EXISTING SINK AND DISCONNECT ALL ASSOCIATED PIPING. EXISTING PLUMBING IN WALL IS TO REMAIN IN PREPERATION FOR NEW SINK INSTALLATION.



2 LEVEL 2 PLUMBING DEMOLITION PLAN - ART ROOMS
1/8" = 1'-0"



1 LEVEL 1 PLUMBING DEMOLITION PLAN - ART ROOMS
1/8" = 1'-0"

Kirksey
ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

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STATE OF TEXAS
RICHARD VOTZ
LICENSED
PROFESSIONAL ENGINEER

CMTA F-8627

2025.10.23

△	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT 2025 BOND

PROJECT NAME

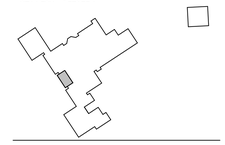
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 & 2 DEMOLITION PLUMBING PLAN - ART ROOMS

SHEET NUMBER

P1.13

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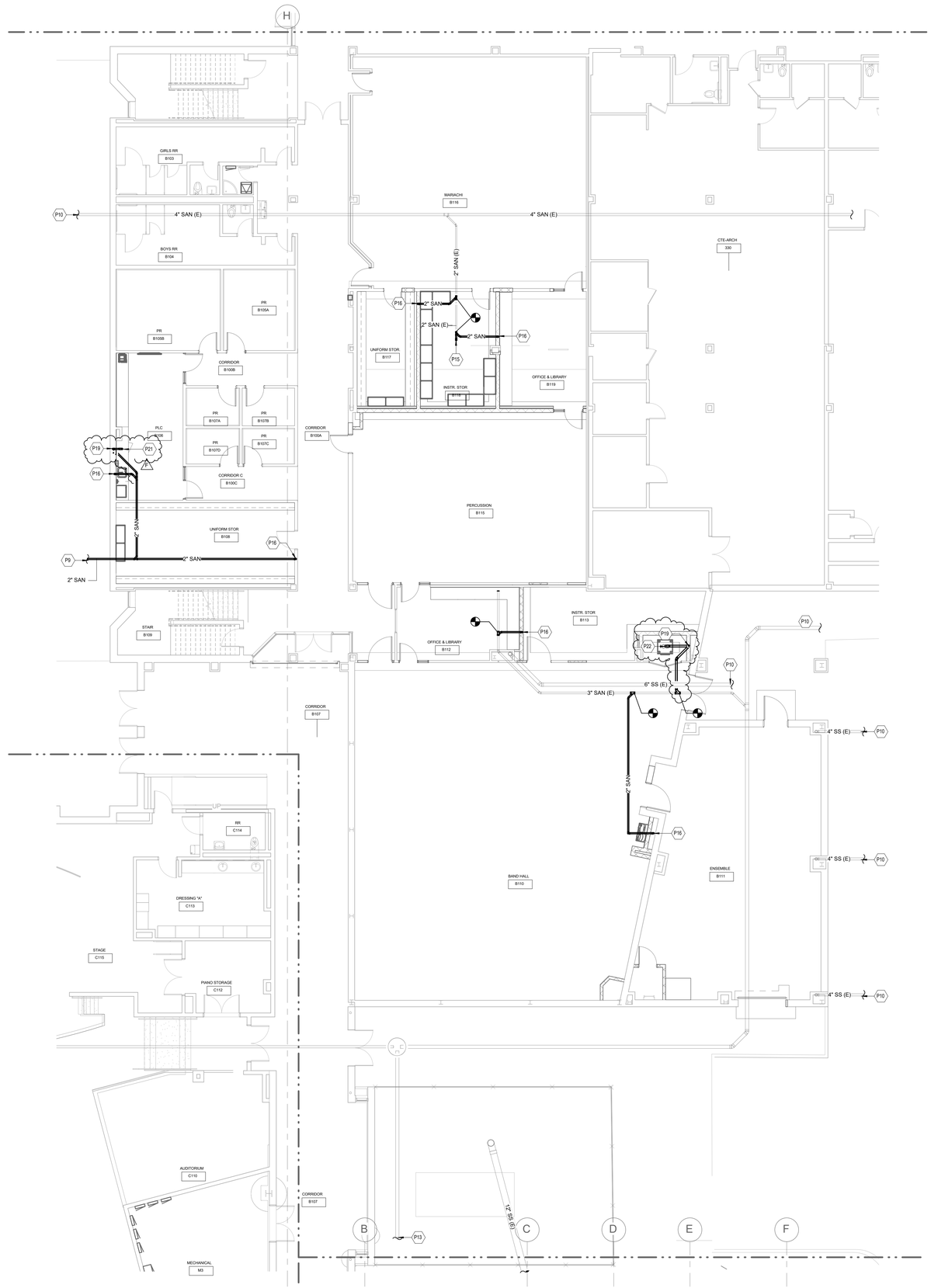

1 LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B1
1/8" = 1'-0"

TAGGED NOTES

P9	NEW PIPING ROUTED OUT TO SITE TO CONNECT TO CIVIL. REFER TO CIVIL FOR NEW CONNECTIONS AND CONTINUATION.
P10	EXISTING PIPING OUT TO SITE. EXISTING SHOWN FOR REFERENCE. REFER TO CIVIL PLANS FOR CONTINUATION AND EXISTING SITE CONDITIONS.
P13	FIELD VERIFY EXISTING SANITARY LINE SIZE. LOCATION AND ROUTE PRIOR TO CONSTRUCTION. IF EXISTING LINE IS ROUTED BELOW NEW BUILDING FOOTPRINT, IT WILL NEED TO BE REROUTED BY PLUMBING AND RECONNECTED TO CIVIL. EXISTING ROUTE IS TO BE COORDINATED WITH ENGINEER AND CIVIL ENGINEER TO CONFIRM IF DEMO AND REROUTE IS REQUIRED.
P15	SANITARY DOWN FROM CLEANOUT ABOVE.
P16	2" SANITARY DOWN FROM FIXTURE(S) ABOVE.
P19	2" VENT UP.
P21	2" TRAPPED DOWN FROM DRAIN ABOVE.
P22	3" TRAPPED DOWN FROM DRAIN ABOVE.

Kirksey ARCHITECTURE

Houston + Austin + Dallas

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STATE OF TEXAS
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2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

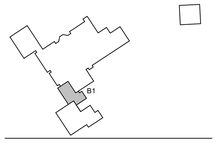
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B1

SHEET NUMBER

P2.21

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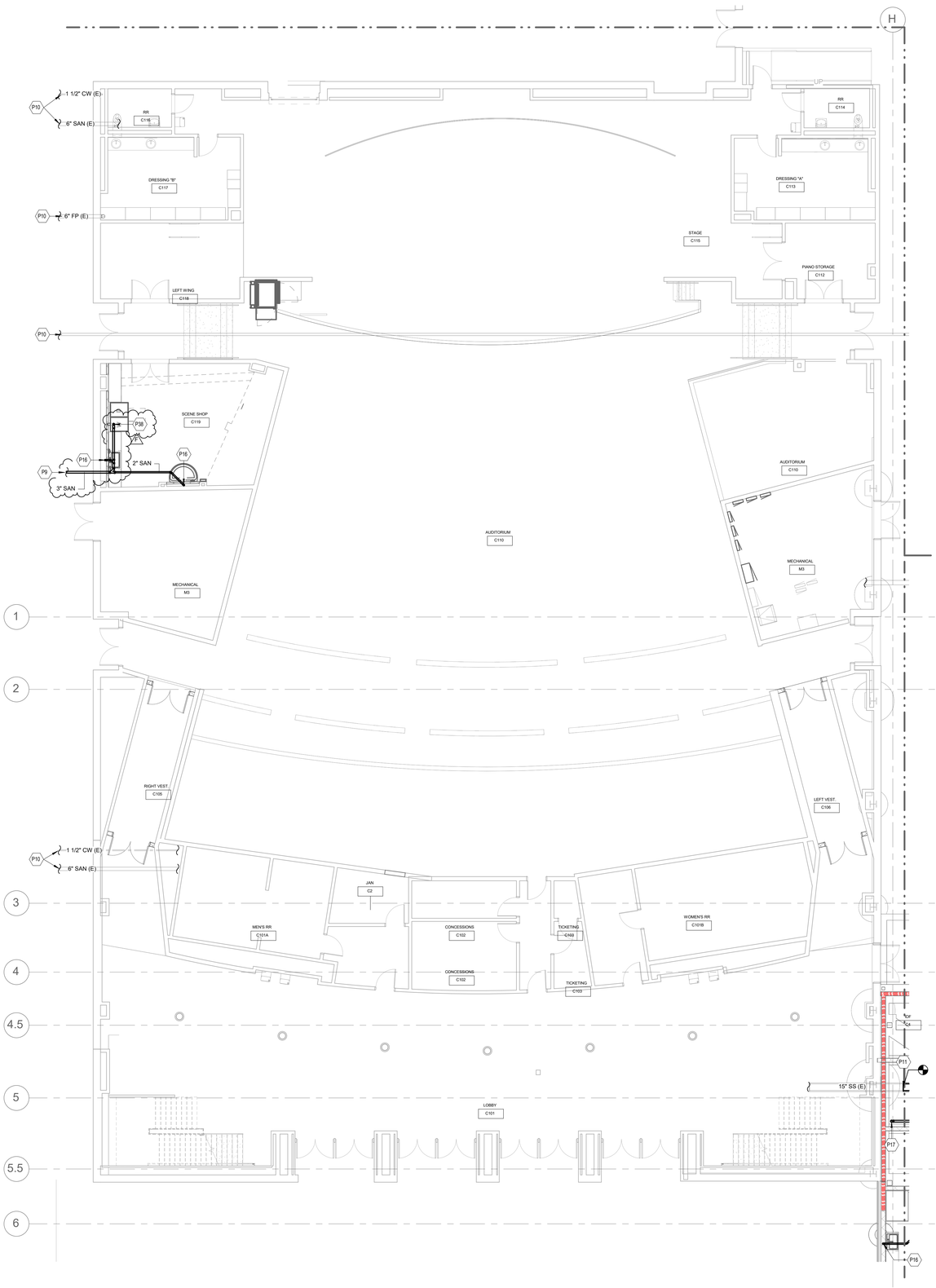
TAGGED NOTES	##
P9	NEW PIPING ROUTED OUT TO SITE TO CONNECT TO CIVIL. REFER TO CIVIL FOR NEW CONNECTIONS AND CONTINUATION.
P10	EXISTING PIPING OUT TO SITE. EXISTING SHOWN FOR REFERENCE. REFER TO CIVIL PLANS FOR CONTINUATION AND EXISTING SITE CONDITIONS.
P11	CONNECT TO EXISTING (CAPPED DURING DEMO) IN APPROXIMATE LOCATION. FIELD VERIFY EXACT LOCATION, ELEVATION AND SIZE OF EXISTING PRIOR TO CONSTRUCTION.
P16	2" SANITARY DOWN FROM FIXTURE(S) ABOVE.
P17	3" SANITARY DOWN FROM FIXTURE(S) ABOVE.
P38	TRAPPED DOWN FROM DRAIN ABOVE. DRAIN LINE DOWN FROM WASHING MACHINE TRENCH DRAIN.



1 LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B2
1/8" = 1'-0"

Kirksey ARCHITECTURE

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6909 Portwest Drive

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STATE OF TEXAS
RICHARD WEITZ
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CMTA F-8627

2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

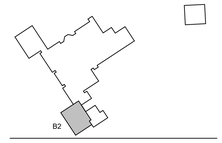
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 BELOW SLAB PLUMBING PLAN - AREA B2

SHEET NUMBER

P2.22

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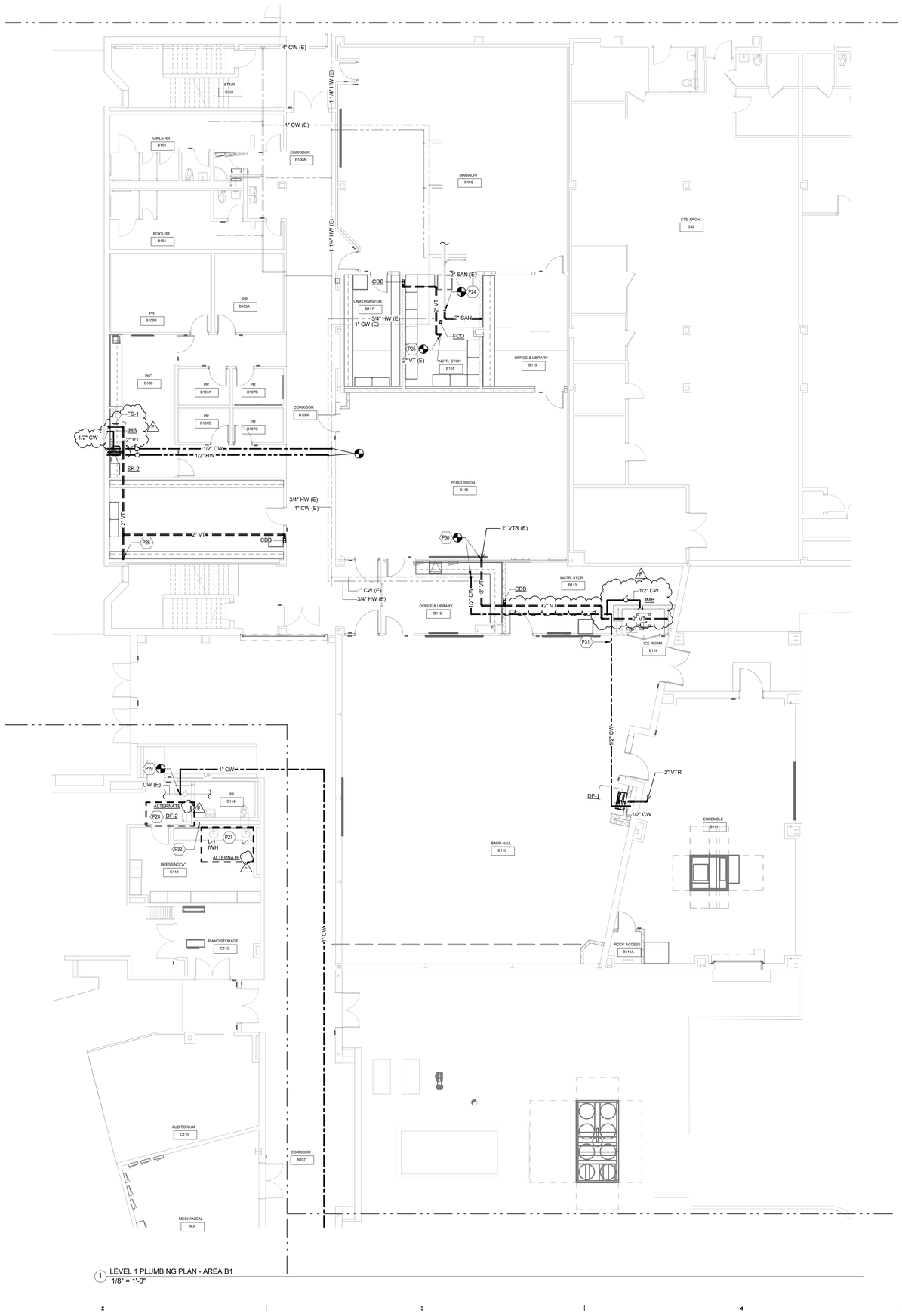

1 LEVEL 1 PLUMBING PLAN - AREA B1
1/8" = 1'-0"

TAGGED NOTES

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P24	EXISTING SANITARY RE-ROUTED DOWN TO BELOW SLAB.
P25	NEW VENT PIPING TO CONNECT TO EXISTING VTR.
P26	2" VENT ROUTED UP THROUGH WALL ON FLOOR ABOVE. VENT IS TO BE ROUTED UP AND VENT THROUGH ROOF.
P27	ALTERNATE - CONNECT NEW SINK TO EXISTING PIPING CAPPED DURING DEMO. CONNECTED NEW POINT OF USE WATER HEATER TO SINKS ARE REQUIRED PER MANUFACTURERS RECOMMENDATIONS.
P28	ALTERNATE - CONNECT NEW DRINKING FOUNTAIN TO EXISTING PIPING CAPPED DURING DEMO.
P29	CONNECT TO EXISTING CW PIPING OF 1" OR GREATER. CONNECTION IS TO BE PRIOR TO THE SHUT-OFF VALVE SERVING RESTROOM OR OTHER FIXTURES IN THIS AREA. FIELD VERIFY EXACT SIZE, LOCATION AND ROUTE OF EXITING CW PRIOR TO CONSTRUCTION. CONNECTION LOCATION AND ROUTE ARE TO BE MODIFIED AS REQUIRED.
P30	CONNECT NEW TO EXISTING OF SAME SIZE OR GREATER, IN APPROXIMATE LOCATION. FIELD VERIFY EXACT LOCATION AND SIZE PRIOR TO CONSTRUCTION.
P31	PIPING ROUTED UP AND OVER HIGH CEILING AREA. COORDINATE WITH ARCHITECTUAL CEILING HEIGHTS.
P32	MECHANICAL CONDENSATE DRAIN LINE IS TO BE ROUTED DOWN INTO CHASE THEN THROUGH WALL TO CONNECT TO LAVATORY DRAIN LINE VIA WYE BRANCH TAIL PIECE. FIELD COORDINATE EXACT LOCATIONS OF EXISTING LAV DRAIN LINE AND MODIFY AS REQUIRED. REFER MECHANICAL DRAWINGS AND COORINDATE WITH MECHANICAL CONTRACTOR.

Kirksey ARCHITECTURE

Houston + Austin + Dallas

6909 Portwest Drive

Houston Texas 77024

713 850 9600

kirksey.com

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CMTA F-8627

2025.10.23

	DATE	ISSUE
A	12/04/2024	100% SCHEMATIC DESIGN
B	03/21/2025	100% DESIGN DEVELOPMENT
C	06/06/2025	50% CONSTRUCTION DOCUMENTS
D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND 2023 BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

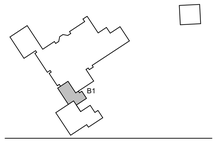
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 PLUMBING PLAN - AREA B1

SHEET NUMBER

P2.31

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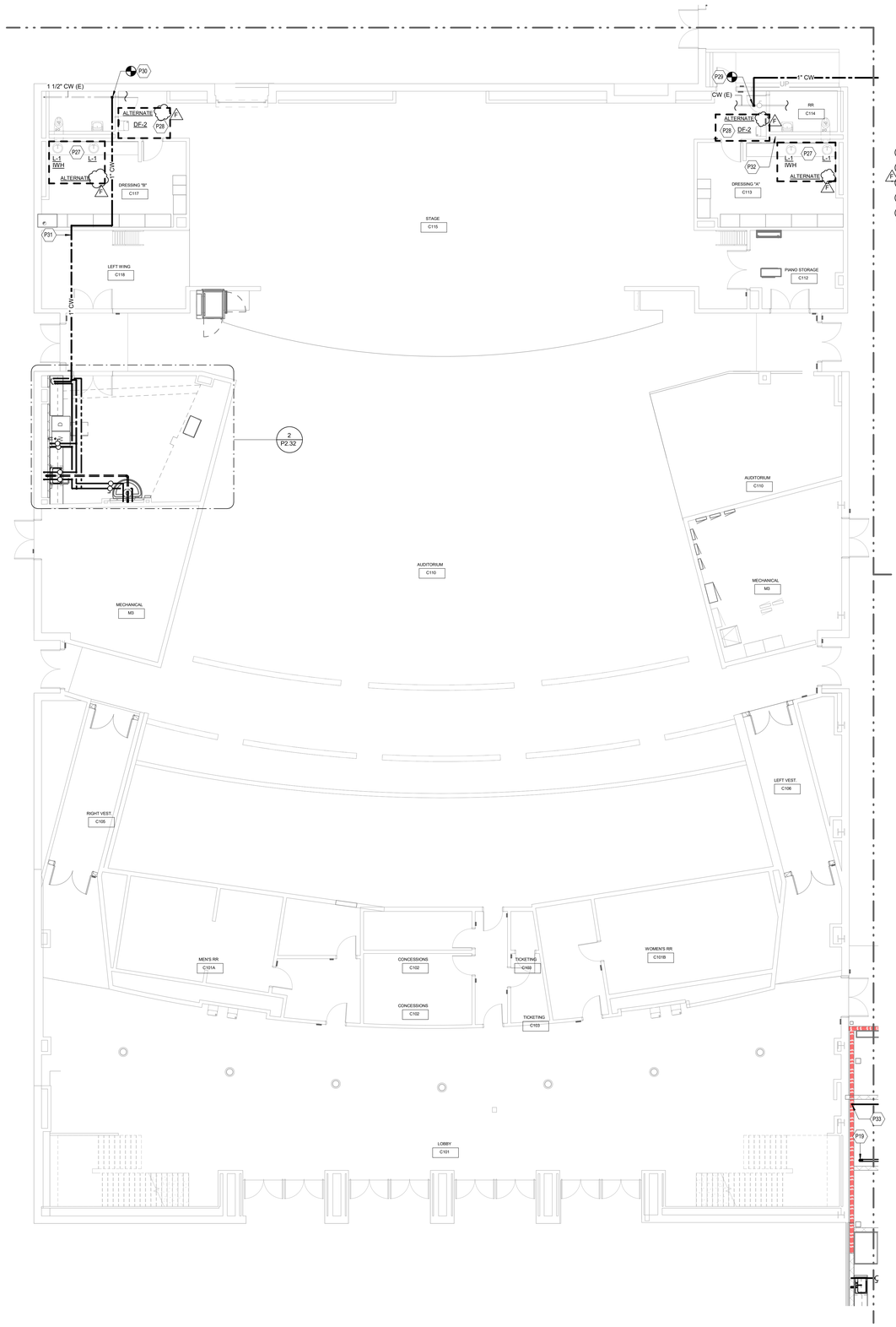
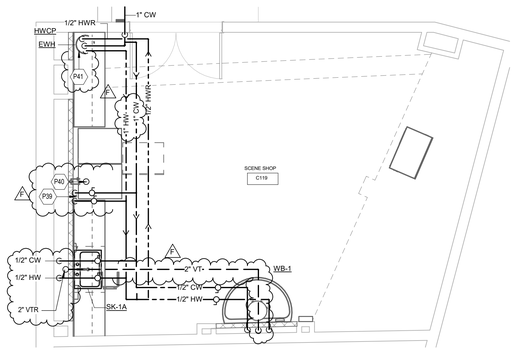


1 LEVEL 1 PLUMBING PLAN - AREA B2
1/8" = 1'-0"



2 PLUMBING PLAN - SCENE SHOP C119
1/4" = 1'-0"

TAGGED NOTES

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P19	2" VENT UP.
P27	ALTERNATE - CONNECT NEW SINK TO EXISTING PIPING CAPPED DURING DEMO. CONNECTED NEW POINT OF USE WATER HEATER TO SINKS ARE REQUIRED PER MANUFACTURERS RECOMMENDATIONS.
P28	ALTERNATE - CONNECT NEW DRINKING FOUNTAIN TO EXISTING PIPING CAPPED DURING DEMO.
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P33	CW PIPING TO KITCHEN ROOM ABOVE.
P39	3/4" HW AND CW ROUTED DOWN TO SERVE COMMERCIAL WASHING MACHINE. INSTALL AND CONNECT PER MANUFACTURERS RECOMMENDATIONS.
P40	3" DRAIN LINE FROM WASHING MACHINE IS TO DISCHARGE INTO TRENCH BEHIND MACHINE. INSTALL DRAIN AND DRAIN LINES PER MANUFACTURERS RECOMMENDATIONS.
P41	WATER HEATER INSTALLED SUSPENDED ABOVE CASEWORK. PROVIDE ADEQUATE STRUCTURAL SUPPORT FOR SUSPENDED WATER HEATER.

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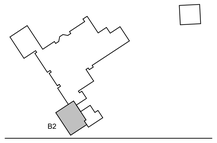

SHEET TITLE

LEVEL 1 PLUMBING PLAN - AREA B2

SHEET NUMBER

P2.32

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PUMP SCHEDULE

TAG	DESCRIPTION	MANUFACTURER & MODEL NO.	LOCATION	TYPE	GPM	DESIGN HEAD FT.	SHUT OFF HD. FT.	BHP	HP	RPM	ELECTRICAL			REMARKS
											VOLTS	PH	Hz	
HWCP	DOMESTIC CIRCULATING PUMP	GRUNDFOS MAGNA 3-32-60	xx	INLINE	4	10	-	1/20	1/12	2,950	115	1	60	PUMP TO BE STAINLESS STEEL TO MEET THE LOW THE LOW LEAD REQUIREMENTS. RE-CIRCULATING PUMPS SHALL BE CONTROLLED BY THE BUILDING'S AUTOMATED SYSTEM. PUMPS TO BE SET TO TURN OFF DURING NON OPERATIONAL HOURS.

WATER HEATER SCHEDULE

TAG	DESCRIPTION	MANUFACTURER & MODEL NO.	LOCATION	INPUT (CFH)	CAPACITY (GAL)	RECOVERY GPH AT 80° F. RISE	TYPE GAS/KW	ELECTRICAL			REMARKS
								VOLTS	PH	Hz	
EWH-1	ELECTRIC WATER HEATER	A.O. SMITH DEN-52 F	SCENE SHOP - MOUNTED ABOVE CABINETRY F	-	50 GALLON F	15 GALLONS	ELECTRIC 3 KW	208	1	60	DUAL 3.0 KW ELEMENTS, WIRED FOR NON SIMULTANEOUS OPERATION AND COMPLETE WITH TEMPERATURE AND PRESSURE RELIEF VALVE. SET TEMPERATURE TO MAINTAIN 140 DEGREES. WESSELS NO.T-x x GALLON NON-ASME DIAPHRAGM TYPE PRE-CHARGED THERMAL EXPANSION TANK.

DOMESTIC HOT WATER HEATING NOTES:

1. PROVIDE THERMAL EXPANSION TANK IN PIPING AS REQUIRED BY LOCAL ENERGY CODES.
2. RECOVERY RATE IS BASED ON 80° DEGREE FAHRENHEIT TEMPERATURE RISE
3. HEAT TRAPS SHALL BE INSTALLED ON ALL NON-CIRCULATING WATER HEATERS PER THE 2021 IECC (INTERNATIONAL ENERGY CONSERVATION CODE) . PROVIDE AND INSTALL HEAT TRAPS IN THE INLET AND OUTLET PIPING OF THE WATER HEATER(S).
4. WATER HEATING PIPING SHALL BE INSULATED PER 2021 IECC (INTERNATIONAL ENERGY CONSERVATION CODE) .
5. HOT WATER SYSTEMS THAT CIRCULATE HOT WATER SHALL HAVE AND AUTOMATIC CONTROL (AUTOMATIC TIME CLOCK) THAT IS CAPABLE OF TURNING THE PUMP OFF DURING THE PERIODS OF NON USE.
6. CONTROLS WILL SHUT-OFF OPERATION OF CIRCULATING PUMP BETWEEN WATER HEATER AND STORAGE TANKS WITHIN 5 MINUTES AFTER END OF HEATING CYCLE.

PIPING MATERIAL SCHEDULE

1. SANITARY SOIL, WASTE AND VENT BURIED:
   PVC PIPE SCHEDULE 40, DWV WITH SOLVENT WELD JOINTS.
   FOR PIPING REPAIRS USE ANACO-HUSKY "CR 7000", 316 SS CORROSION RESISTANT COUPLINGS.
2. SANITARY SOIL, WASTE AND VENT ABOVE FLOOR SLAB ON GRADE:
   NO-HUB CAST IRON PIPE AND FITTINGS WITH HUSKY "HD-2000", SERIES NO-HUB COUPLINGS
3. STORM PIPING BURIED:
   PVC PIPE SCHEDULE 40, DWV WITH SOLVENT WELD JOINTS.
   FOR PIPING REPAIRS USE ANACO-HUSKY "CR 7000", 316 SS CORROSION RESISTANT COUPLINGS.
4. STORM PIPING ABOVE FLOOR SLAB ON GRADE:
   NO-HUB CAST IRON PIPE AND FITTINGS WITH HUSKY "HD-2000", SERIES NO-HUB COUPLINGS
5. DOMESTIC WATER BELOW SLAB ON GRADE:
   UPANOR PEX-a PIPE TUBING FOR 2" AND SMALLER JOINED WITH LEAD-FREE BRASS OR ENGINEERED POLMER (EP) FITTINGS MANUFACTURED BY THE PIPE MANUFACTURER. UTILIZING COLD-EXPANSION PEX-a REINFORCING RINGS MADE OF THE SAME MATERIAL AS PIPE. FITTINGS SHALL BE THIRD PARTY CERTIFIED TO NSF-14, AND ASTM-F 1960 AND SHALL COMPLY TO ASTM-F876 AND ASTM-F877, TRANSITION FITTINGS TO BE PEX TO PRESS ON-PIECE LEAD FREE BRASS FITTING WITH ON ASME B16.51 COPPER PRESS END AND ONE ASTM F 1960 COLD-EXPANSION END, WITH PEX-a REINFORCING COLD EXPANSION RING.
   2-1/2" AND LARGER TYPE "K" COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS.
   ALL PIPING TO BE PROTECTED INSIDE A PVC SLEEVE.
6. DOMESTIC WATER ABOVE FLOOR SLAB ON GRADE:
   UPANOR PEX-a PIPE TUBING FOR 3" AND SMALLER JOINED WITH LEAD-FREE BRASS OR ENGINEERED POLMER (EP) FITTINGS MANUFACTURED BY THE PIPE MANUFACTURER. UTILIZING COLD-EXPANSION PEX-a REINFORCING RINGS MADE OF THE SAME MATERIAL AS PIPE. FITTINGS SHALL BE THIRD PARTY CERTIFIED TO NSF-14, AND ASTM-F 1960 AND SHALL COMPLY TO ASTM-F876 AND ASTM-F877. TRANSITION FITTINGS TO BE PEX TO PRESS ON-PIECE LEAD FREE BRASS FITTING WITH ON ASME B16.51 COPPER PRESS END AND ONE ASTM F 1960 COLD-EXPANSION END, WITH PEX-a REINFORCING COLD EXPANSION RING.
   4" AND LARGER TYPE "L" COPPER TUBING TO BE ROLLED GROOVED ENDS AND JOINED WITH VICTAULIC DOMESTIC MANUFACTURER COPPER FITTINGS WITH GROOVED ENDS.
   REFER TO SHEET P-604 FOR SUPPORT INSTALLATON DETAILS.
7. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

PLUMBING FIXTURE SCHEDULE

SYMBOL	DESCRIPTION	SIZE OF CONNECTION					REMARKS
		TRAP	SAN	VT	CW	HW	
SK-1	SINK - SINGLE COMPARTMENT	1 1/2"	2"	2"	1/2"	1/2"	JUST SL-1921-A-GR, SINGLE COMPARTMENT STAINLESS STEEL SINK, 19" X 21" X 7.5" DEEP, 18 GAUGE, TYPE 304 STAINLESS STEEL WITH 3-HOLE FAUCET PUNCHING AT REAR, LOCATE DRAIN AT CENTER REAR ZURN NO. Z831C4-XL-17F WIDESPREAD GOOSENECK FAUCET WITH 8" SPOUT, 1.5 GPM AERATOR, 4" VR COLOR CODED WRIST BLADES, CERAMIC DISC CARTRIDGE, WITH CHROME FINISH. JUST NO. J-35 (QUANTITY-1) STRAINER WITH 1 1/2" TAILPIECE. MCGUIRE NO. 8912 1-1/2" ADJUSTABLE SEMI-CAST CHROME-PLATED BRASS P-TRAP WITH TUBING WASTE TO WALL AND CHROME-PLATED CAST WALL FLANGE WITH SET SCREW. MCGUIRE NO. LF2165LK (QUANTITY-2) LOOSE KEY ANGLE STOPS WITH SUPPLIES. PROVIDE TMV-1 MIXING VALVE.
SK-1A	SINK - SINGLE COMPARTMENT	1 1/2"	2"	2"	1/2"	1/2"	JUST SL-1921-A-GR, SINGLE COMPARTMENT STAINLESS STEEL SINK, 19" X 21" X 5" DEEP, 18 GAUGE, TYPE 304 STAINLESS STEEL WITH 3-HOLE FAUCET PUNCHING AT REAR, LOCATE DRAIN AT CENTER REAR ZURN NO. Z831C4-XL-17F WIDESPREAD GOOSENECK FAUCET WITH 8" SPOUT, 1.5 GPM AERATOR, 4" VR COLOR CODED WRIST BLADES, CERAMIC DISC CARTRIDGE, WITH CHROME FINISH. JUST NO. J-35 (QUANTITY-1) STRAINER WITH 1 1/2" TAILPIECE. MCGUIRE NO. 8912 1-1/2" ADJUSTABLE SEMI-CAST CHROME-PLATED BRASS P-TRAP WITH TUBING WASTE TO WALL AND CHROME-PLATED CAST WALL FLANGE WITH SET SCREW. MCGUIRE NO. LF2165LK (QUANTITY-2) LOOSE KEY ANGLE STOPS WITH SUPPLIES. PROVIDE TMV-1 MIXING VALVE. TRAP WRAP KIT...***
SI	SOLIDS INTERCEPTOR	1 1/2"	2"	2"			ZURN Z1180 POINT OF USE SOLIDS INTERCEPTOR
DF-1	DRINKING FOUNTAIN	1 1/2"	2"	2"	1/2"	-	ELKAY NO. EMABFTL BI-LEVEL, STAINLESS STEEL CONSTRUCTION DRINKING FOUNTAIN WITH FLEXIBLE GUARD BUBBLER, WATER FILTER AND LEAD FILTER OPTIONS. DRINKING FOUNTAIN TO BE REFRIGERATED WITH 115V/1/60 POWER. DRINKING FOUNTAIN TO BE PROVIDED WITH EZH20 BOTTLE FILLING STATION. MCGUIRE NO. HST02 STOP VALVE FOR COLD WATER SUPPLY.
DF-2 ALTERNATE	SINGLE STATION DRINKING FOUNTAIN	1 1/2"	2"	2"	1/2"	-	ELKAY NO. XX, STAINLESS STEEL CONSTRUCTION DRINKING FOUNTAIN WITH FLEXIBLE GUARD BUBBLER, WATER FILTER AND LEAD FILTER OPTIONS. DRINKING FOUNTAIN TO BE REFRIGERATED WITH 115V/1/60 POWER. DRINKING FOUNTAIN TO BE PROVIDED WITH EZH20 BOTTLE FILLING STATION. MCGUIRE NO. HST02 STOP VALVE FOR COLD WATER SUPPLY.
IWH	INSTA WATER HEATER	-	-	-	1/2"	1/2"	EEMAX LAVADVANTAGE NO. SPEX4277T ML - TANKLESS WATER HEATER, MULTIPLE LAVATORY WITH FACTORY SET 110 F MAX TEMP. 0.2 GPM TURN ON, 80 DEGREE RISE AT 0.35 GPM FLOW. VOLTS 277/SINGLE PHASE/4.1 KW.
IMB	ICE MAKER BOX LOCATION(S): REFRIGERATORS, ICE MACHINES	-	-	-	1/2"	-	GUY GRAY NO. BIM875AB, 20 GAUGE HOT-DIPPED GALVANIZED STEEL WALL BOX, 1/2" FIP INLET, 1/4" OD OUTLET, COMPRESSION LOW LEAD ANGLE VALVE.
CDB	CONDENSATE DRAIN BOX	1-1/2"	2"	2"	-	-	BLC NO. BLC-CDB/TG-01, 8X10 STAINLESS STEEL CONDENSATE DRAIN BOX WITH TRAP GAURD AND LOUVERED DOOR, COVER AND LABEL. INSTALL PER MANUFACTURERS RECOMENDATIONS.

PLUMBING DRAINS SPECIFICATION / CONNECTION SCHEDULE

SYMBOL	DESCRIPTION	SIZE OF CONNECTION					REMARKS
		TRAP	SS	SV	CW	HW	
FND	FLOOR DRAIN WITH FUNNEL						WADE NO. 1100-WW-85-A6 FLOOR DRAIN WITH 6" ROUND STAINLESS STEEL GRATE AND CLAMP, INTERGRAL FUNNEL TOP ASSEMBLY PLUG TRAP PRIMER CONNECTION IF NOT USED.
FS-1	FLOOR SINK						WADE NO. 9010 8" ROUND FLOOR SINK WITH 6" DEEP SUMP, HALF GRATE, AND ALUMINUM DOME BOTTOM STRAINER. A
RD	ROOF DRAIN	-	-	-	-	-	WADE NO. 3000-42 15" DIAMETER ROOF DRAIN, DURA-COATED CAST IRON BODY WITH COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD AND LOW SILHOUETTE CAST IRON DOME PROVIDE EXTENSION, ROOF SUMP RECEIVER, AND UNDERDECK CLAMP AS REQUIRED FOR ROOF CONSTRUCTION
OD	OVERFLOW ROOF DRAIN	-	-	-	-	-	WADE NO. 3000-42-D 15" DIAMETER ROOF DRAIN, DURA-COATED CAST IRON BODY WITH COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD AND LOW SILHOUETTE CAST IRON DOME PROVIDE EXTENSION, ROOF SUMP RECEIVER, 2" HIGH EXTERNAL WATER DAM, AND UNDERDECK CLAMP AS REQUIRED FOR ROOF CONSTRUCTION.
ODN	DOWNSPOUT NOZZEL	-	-	-	-	-	WADE NO. 3940-1-[166], DOWN SPOUT NOZZLE. ALL NICKEL BODY WITH DECORATIVE FACE OF WALL FLANGE AND OUTLET NOZZLE. [WITH REMOVABLE STAINLESS STEEL SCREEN]
OTG	ODOR TRAP GUARD LOCATION: ALL DRAINS U.N.O.	-	-	-	-	-	PROSET TRAP GUARD, VERIFY AND PROVIDE THE PROPER TRAP GUARD FOR EACH DRAIN.
FCO	FLOOR CLEANOUT						WADE NO. 6000-1, ADJUSTABLE FLOOR CLEANOUTS, POLISHED NICKEL BRONZE TOP. DURA-COATED C.I. BODY WITH GAS AND WATER TIGHT ABS THREADED PLUG AND ROUND SCORIATED TOP. PROVIDE A CARPET MARKER AS REQUIRED. PROVIDE A ROUND TOP RECESSED FOR 1/8" TILE AS REQUIRED. PROVIDE A ROUND TOP RECESSED FOR 1-1/4" TERRAZZO AS REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND COORDINATE FINISHES WHERE CLEANOUTS ARE INSTALLED PER ARCHITECTURAL DRAWINGS.
ECO	EXTERIOR CLEANOUT						WADE NO. 6000-12, ADJUSTABLE FLOOR CLEANOUT, DURA-COATED C.I. BODY WITH GAS AND WATER TIGHT THREADED PLUG AND ROUND SCORIATED TOP.
WCO	WALL CLEANOUT						WADE NO. 8560-75-NH, CAST IRON CLEANOUT FERRULE WITH COUNTERSUNK BRONZE PLUG. WADE NO. 8340 ROUND WALL CLEANOUT ACCESS COVER WITH CENTER SCREW.
FPWH	FREEZE PROOF WALL HYDRANT LOCATION: EXTERIOR	-	-	-	3/4"	-	WADE NO. 8701 NON FREEZE WALL HYDRANT, VANDAL RESISTANT WITH VACUUM BREAKER WITH 3/4" MALE HOSE CONNECTION AND NEOPRENE PLUNGER. HEAVY DUTY BRASS CASING, 360 DEGREE SWIVEL, HEAVY DUTY CHROME PLATED BRONZE HEAD CASTING ENCASED IN A BOX WITH HINGED COVER.
HB-1	HOSE BIBB LOCATION: RESTOOMS	-	-	-	3/4"	-	WADE NO. 8708 ENCASED WALL HYDRANT. WITH LOOSE KEY HANDLE, POLISHED CHROME FINISH, VACUUM BREAKER AND ALL BRASS CONSTRUCTION. HOSE BIBB TO BE INSTALLED AT RESTROOM UNDER LAVATORY FOR WASHDOWN.
RH-1	ROOF HYDRANT	-	-	-	3/4"	-	HOEPTNER NO.2131R FREEZE FLOW ROOF HYDRANT, 3/4" FIP INLET, 3/4" HOSE THREAD OUTLET. ROOF HYDRANT SHALL NOT REQUIRE A DRAIN LINE FOR FROST PROTECTION. HYDRANT SHALL DRAIN INTO AN INTEGRAL STAINLESS STEEL CANISTER.

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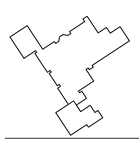

SHEET TITLE
PLUMBING SCHEDULES

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P5.00

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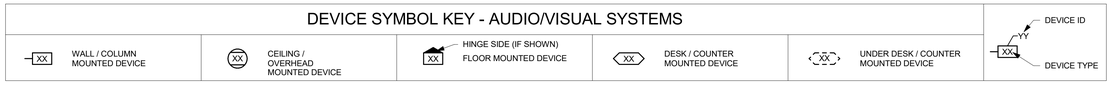
DEVICE SYMBOL KEY - AUDIO/VISUAL SYSTEMS



SYMBOL LEGEND - AUDIO/VISUAL SYSTEMS

SIZES, DIMENSIONS AND NOTES DESCRIBE TYPICAL REQUIREMENTS. IF APPLICABLE, VARIATIONS AND/OR ADDITIONAL REQUIREMENTS WILL BE NOTED ON THE DRAWINGS.
UNLESS NOTED OTHERWISE, MOUNTING HEIGHTS ARE TO CENTER OF ROUGH-IN BOX.

TYPE	DEVICE	ROUGH-IN BOX (H"xW"xD")	DEVICE COVER SIZE	MOUNTING HEIGHT			DEVICE NOTES	CONDUIT NOTES
				WALL/COLUMN	CEILING/OVERHEAD	FLOOR		
ACP	GYM CONTROL PANEL	TYPE C (12"x12"x6")	ALDF1212W	4'-0" TO TOP OF BOX; REF DETAIL	--	--	REF DETAILS IN AV11 SERIES	REF PLANS
ANT	ANTENNA PLATE	TYPE 2	2-GANG	REF ELEVATIONS	--	--	--	REF PLANS
AV4	AV PLATE	TYPE 4	4-GANG	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
BBP	BLACK BOX PANEL	TYPE A (6"x6"x4")	REF LEGEND NOTE 3	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
BP	BUTTON PANEL	TYPE 2	2-GANG	BUILDING SWITCH HEIGHT	--	--	--	REF PLANS
JBR	JUNCTION BOX - RACK	TYPE A (12"x12"x4")	--	REF ELEVATIONS/DETAILS	--	--	--	REF PLANS
JBS	JUNCTION BOX - SPEAKER	REF LEGEND NOTE 1	--	REF ELEVATIONS/DETAILS	REF PLANS	--	--	REF PLANS
M1	MICROPHONE PLATE	TYPE 1	1-GANG	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
M2	MICROPHONE PLATE	TYPE 2	2-GANG	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
MIP	MULTIMEDIA INPUT PLATE	TYPE 2	1-GANG	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
MIX*	MIX FLOOR BOX - EXISTING	EXISTING	10" x 10"	--	--	FLUSH MOUNTED TO FLOOR	--	--
MRP	MUSIC ROOM PANEL	TYPE A (6"x6"x4")	REF LEGEND NOTE 3	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
PS	PROJECTION SCREEN	TYPE 1	1-GANG	REF ELEVATIONS/DETAILS	FLUSH IN CEILING	--	--	REF PLANS AND DETAILS
S2	SPEAKER PLATE	TYPE 2	2-GANG	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
TCP	THEATER CLASSROOM PANEL	TYPE A (6"x6"x4")	REF LEGEND NOTE 3	BUILDING OUTLET HEIGHT	--	--	--	REF PLANS
VP	VIDEO PROJECTOR LOCATION (WALL)	REF DEVICE NOTE	--	REF ELEVATIONS/DETAILS	--	--	PROVIDE CHEIF PAC525FC COORDINATE COLOR WITH ARCHITECT	REF PLANS AND DETAILS

LEGEND NOTES - AUDIO/VIDEO SYSTEMS

1 PROVIDE HOFFMAN PAINTED STEEL TYPE 1 SCREW COVER PULL BOX NO LESS THAN 12" W X 12" H X 4" D UNLESS NOTED OTHERWISE. SIZE JUNCTION BOX TO NUMBER AND SIZE OF CONDUIT. PROVIDE 3/4" VOID FREE AC PLYWOOD WITH TWO COATS FIRE RETARDANT WHITE PAINT ON BACK WALL OF JUNCTION BOX FROM SIDEWALL TO SIDEWALL. A SINGLE WIRING TROUGH WILL NOT BE ACCEPTABLE AS A REPLACEMENT TO/FOR INDIVIDUAL JUNCTION BOXES.

2 CRITICAL DIMENSIONS ARE NOTED IN DOCUMENTATION. FOR ANY DIMENSION THAT IS NOT PROVIDED, FIELD COORDINATE FINAL LOCATION.

3 FIELD COORDINATE PLATE/PANEL COVER SIZE BASED ON MOUNTING CONDITIONS. SURFACE MOUNTED ROUGH-IN PLATE/PANEL SHOULD NOT EXTEND BEYOND THE ROUGH-IN BOX.

DEVICE SYMBOL KEY - SPEAKER SYSTEMS

SYMBOL LEGEND - SPEAKER SYSTEMS

SIZES, DIMENSIONS AND NOTES DESCRIBE TYPICAL REQUIREMENTS. IF APPLICABLE, VARIATIONS AND/OR ADDITIONAL REQUIREMENTS WILL BE NOTED ON THE DRAWINGS.
UNLESS NOTED OTHERWISE, MOUNTING HEIGHTS ARE TO CENTER OF ROUGH-IN BOX.

TYPE	DEVICE	ROUGH-IN BOX (H"xW"xD")	DEVICE COVER SIZE	MOUNTING HEIGHT			DEVICE NOTES	CONDUIT NOTES
				WALL/COLUMN	CEILING/OVERHEAD	FLOOR		
1	SPEAKER	TYPE 2	--	REF PLANS/ELEVATIONS	--	--	--	REF PLANS
2	SPEAKER	TYPE 2	--	REF PLANS/ELEVATIONS	--	--	--	REF PLANS
4	SPEAKER	TYPE 2	--	--	--	--	--	REF PLANS
5	SPEAKER	TYPE 2	--	--	REF PLANS/ELEVATIONS	--	--	REF PLANS

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

GENERAL NOTES AND LEGENDS

SHEET NUMBER

AV0.01

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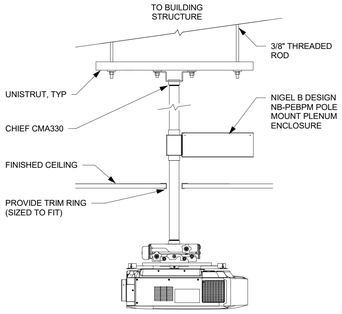
AV PROJECTION SCREEN SCHEDULE

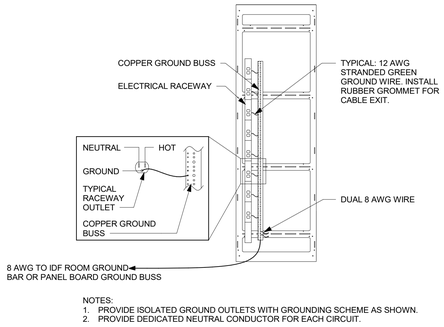
SCREEN ID	IMAGE WIDTH	IMAGE HEIGHT	ASPECT RATIO	SCREEN TYPE	HEIGHT TO BOTTOM OF IMAGE
PS-AUD	240"	150"	1.6	1	78"
PS-BND	110"	69"	1.6	2	REFERENCE ELEVATIONS
PS-CHR	110"	69"	1.6	2	REFERENCE ELEVATIONS
PS-ORC	110"	69"	1.6	2	REFERENCE ELEVATIONS
PS-PERC	110"	69"	1.6	2	REFERENCE ELEVATIONS

AV RACK SCHEDULE

RACK DESIGNATOR	ROOM	RACK STYLE	TYPE #	RACK MOUNTING HEIGHT (AFF TO BOTTOM OF RACK)	JBR MOUNTING HEIGHT (AFF TO CENTER OF JBR)		DETAIL (SEE BELOW)	NOMINAL SIZE (RU)	NOMINAL DEPTH	OPTIONS	NOTES
					WALL RACK	FLOOR RACK					
ER-FOH (EXISTING)	EXISTING RACK	ROLLTOP	--				--	12	39"		EXISTING
ER-GYM	GYM STORAGE	WALL MOUNTED	1	2' - 2"	4' - 0"		1/AV0.90	21	26"		NEW
ER-SMP (EXISTING)	EXISTING RACK	WALL MOUNTED	--	0' - 8 1/2"	4' - 0"		1/AV0.90	41	28"		EXISTING

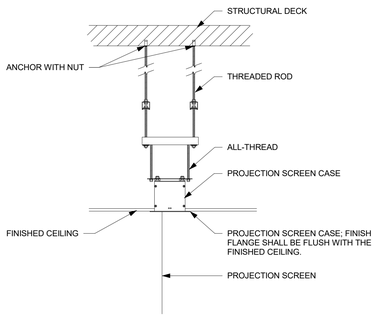


1" = 1'-0" PROJECTOR CEILING MOUNTED DETAIL | 3

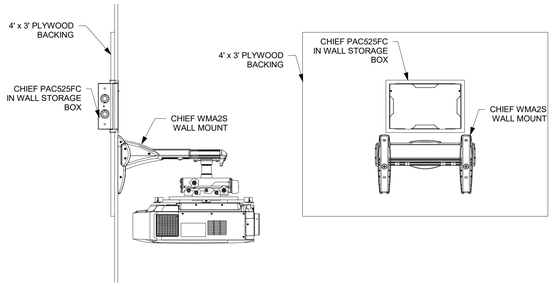


NOTES:
1. PROVIDE ISOLATED GROUND OUTLETS WITH GROUNDING SCHEME AS SHOWN.
2. PROVIDE DEDICATED NEUTRAL CONDUCTOR FOR EACH CIRCUIT.

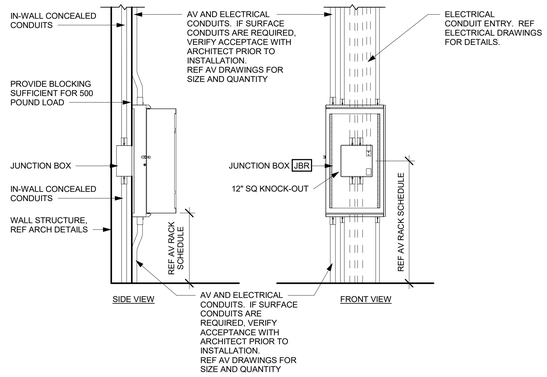
1/2" = 1'-0" RACK GROUND BAR DETAIL | 5



1" = 1'-0" PROJECTION SCREEN MOUNTING DETAIL | 2



1" = 1'-0" PROJECTOR MOUNTING DETAIL | 4



1/2" = 1'-0" WALL MOUNTED RACK DETAIL | 1

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WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

AUDIO-VIDEO EQUIPMENT DETAILS

SHEET NUMBER

AV0.90

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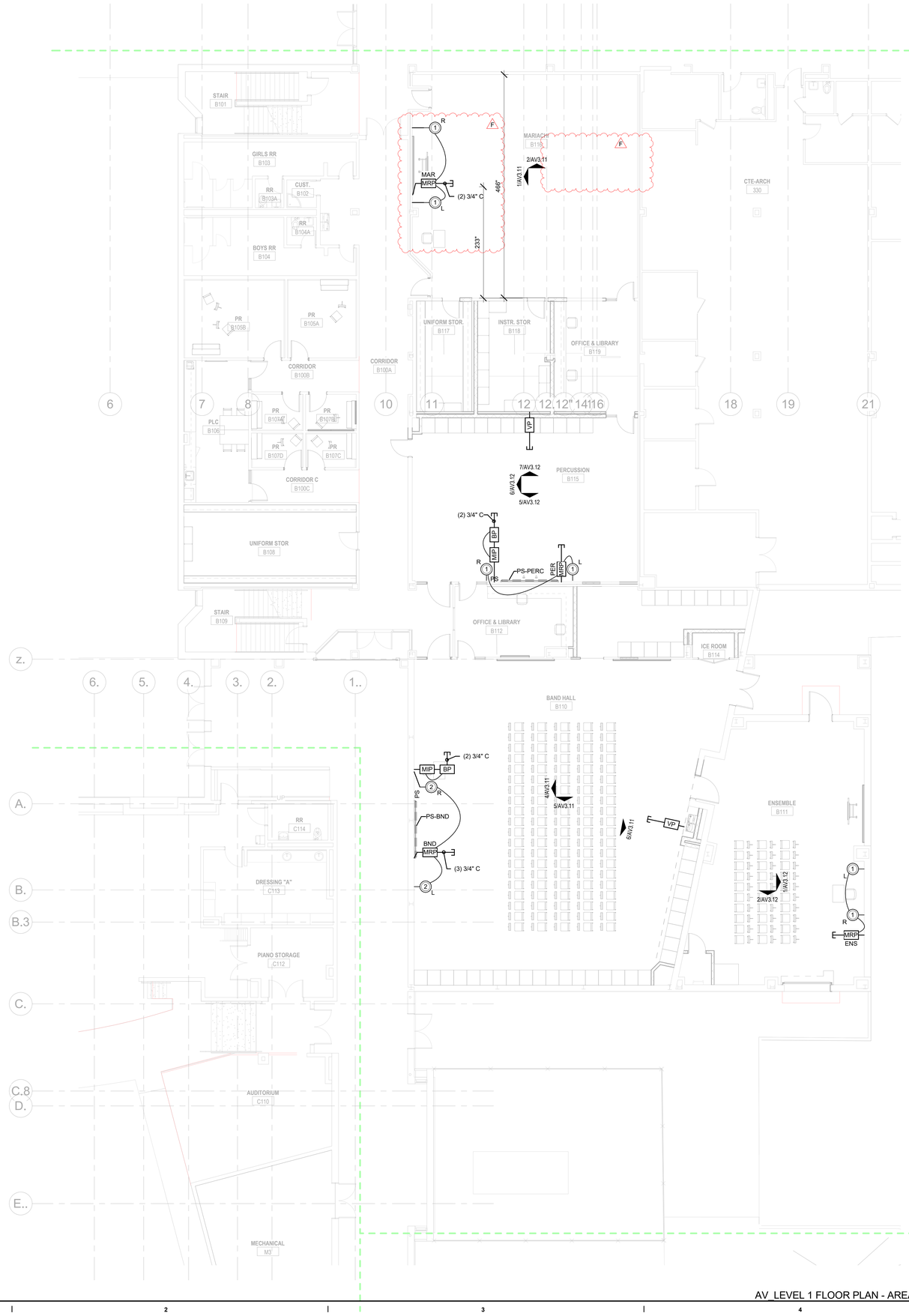

1/8" = 1'-0"

AV_LEVEL 1 FLOOR PLAN - AREA B1 | A4

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PROJECT NAME

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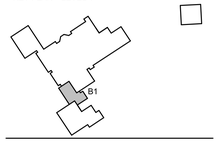
PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 FLOOR PLAN - AREA B1

SHEET NUMBER

AV2.31

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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

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PROJECT ADDRESS

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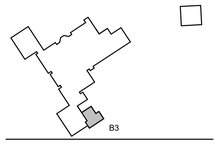
KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 FLOOR PLAN - AREA B3

SHEET NUMBER

AV2.33

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1/8" = 1'-0"

AV_LEVEL 1 FLOOR PLAN - AREA B3 | A4

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KEYNOTES

##	
202	FIELD COORDINATE PLATE POSITION WITH TO ALIGN SUSPENDED MICROPHONE LAYOUT WITH BAND PLACEMENT

F

1/8" = 1'-0"

AV_LEVEL 1 REFLECTED CEILING PLAN - AREA B1 | A4

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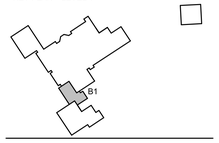
PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 REFLECTED CEILING PLAN - AREA B1

SHEET NUMBER

AV2.41

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KEYNOTES

205	FIELD COORDINATE PLATE POSITION AND SUSPENDED MICROPHONE ELEVATION TO ALIGN MICROPHONE LAYOUT WITH OWNER FURNISHED RISERS
206	FIELD COORDINATE PLATE POSITION TO ALIGN SUSPENDED MICROPHONE LAYOUT WITH ORCHESTRA PLACEMENT

F

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PROJECT ADDRESS

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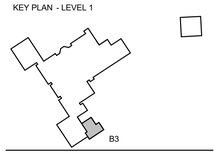
KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 1



SHEET TITLE

LEVEL 1 REFLECTED CEILING PLAN - AREA B3

SHEET NUMBER

AV2.43

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1/8" = 1'-0"

AV_LEVEL 1 REFLECTED CEILING PLAN - AREA B3 | A4

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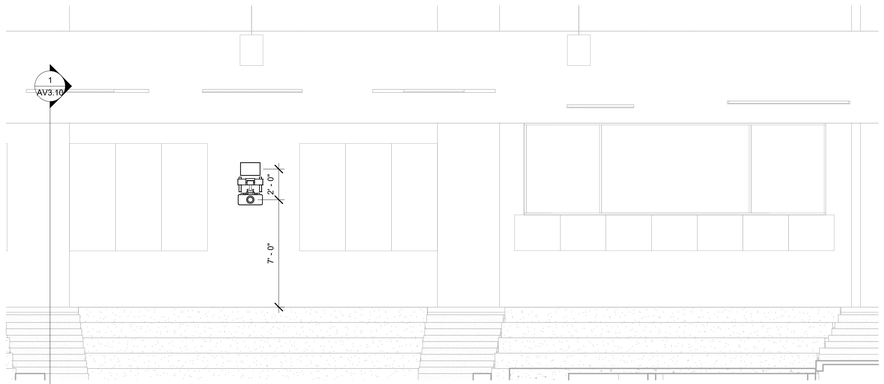
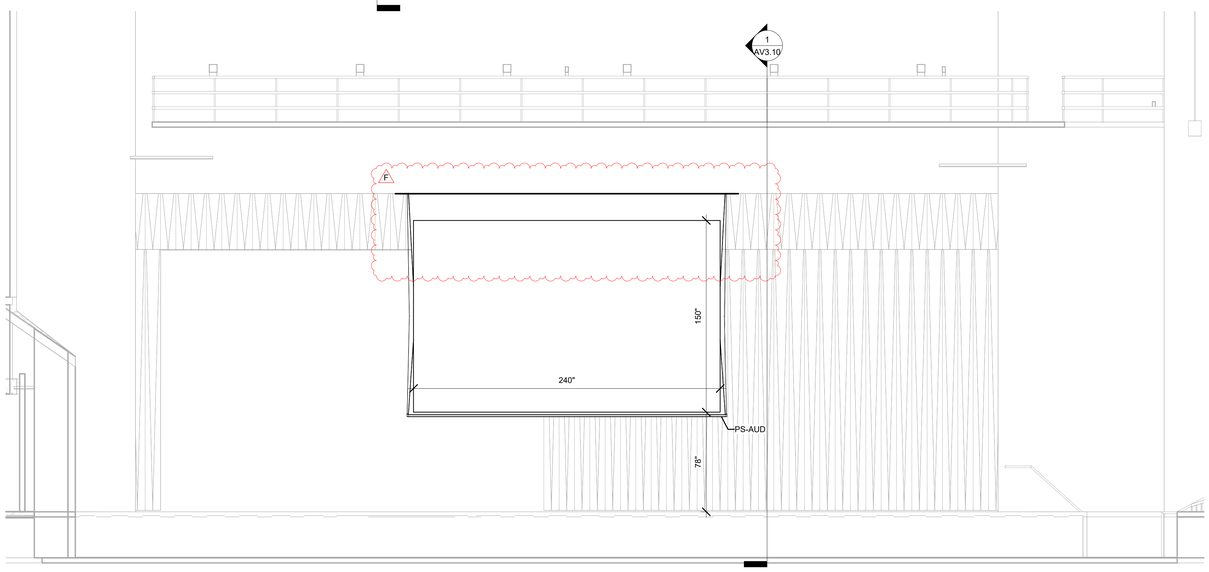
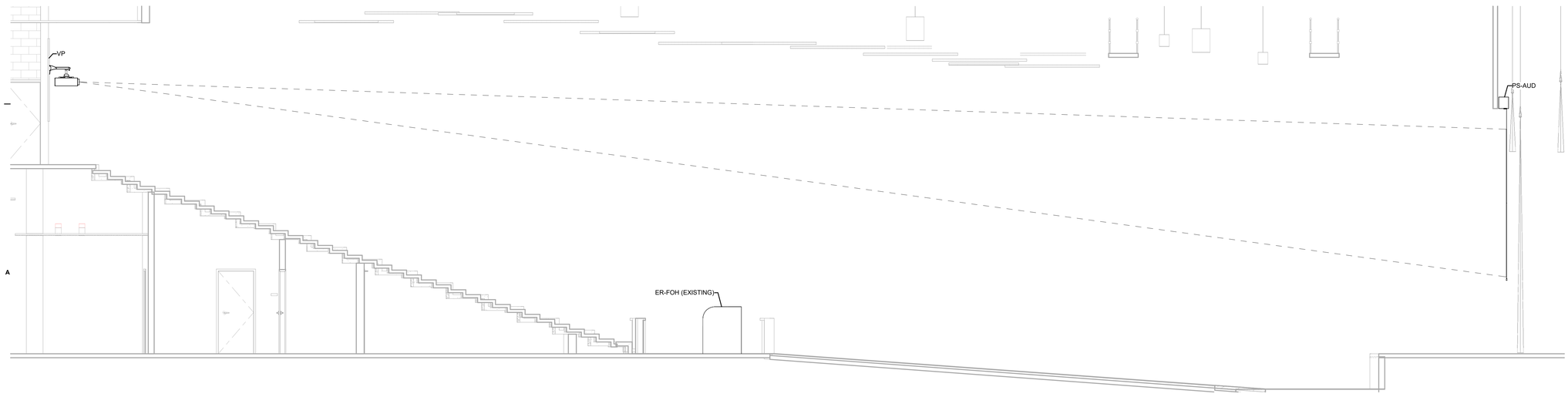


1/4" = 1'-0" AUDITORIUM C110 REAR ELEVATION | 3



1/4" = 1'-0" AUDITORIUM C110 FRONT ELEVATION | 2



1/4" = 1'-0" AUDITORIUM C110 SECTION | 1

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PROJECT NAME
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PROJECT ADDRESS
16301 Chimney Rock Rd,
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KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
ELEVATIONS AND SECTIONS

SHEET NUMBER
AV3.10

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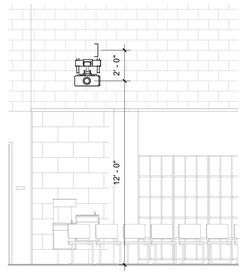
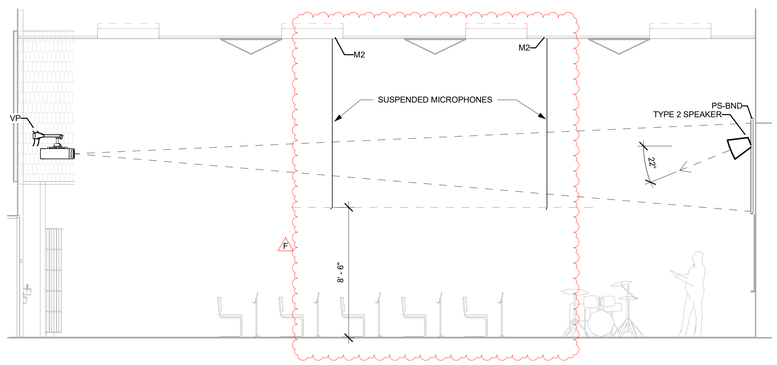
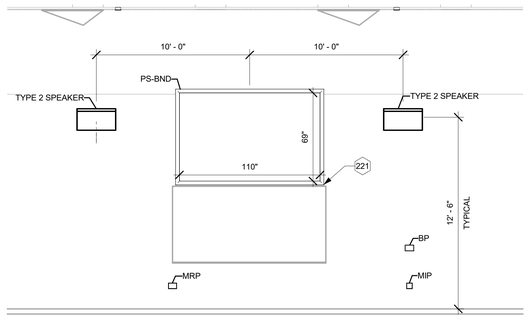


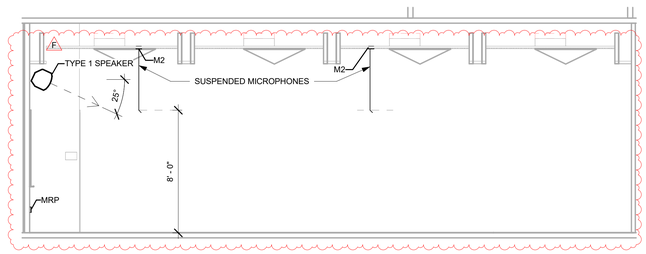
1/4" = 1'-0" BAND HALL B110 REAR ELEVATION | 6



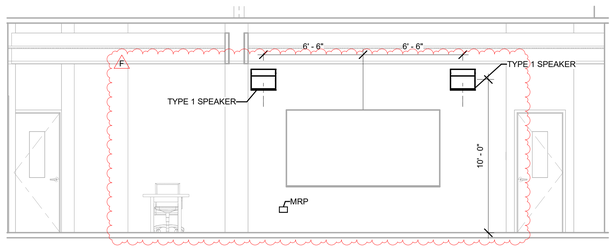
1/4" = 1'-0" BAND HALL B110 SIDE ELEVATION | 5



1/4" = 1'-0" BAND HALL B110 FRONT ELEVATION | 4



1/4" = 1'-0" MARIACHI B116 SIDE ELEVATION | 2



1/4" = 1'-0" MARIACHI B116 FRONT ELEVATION | 1

KEYNOTES

221	MOUNT DIRECTLY ABOVE THE CENTER OF THE MARKER BOARD THE EDGES OF THE BOARD AND SCREEN SHALL TOUCH.

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D	08/20/2025	90% CONSTRUCTION DOCUMENTS
E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023 2027

PROJECT NAME

WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

ELEVATIONS

SHEET NUMBER

AV3.11

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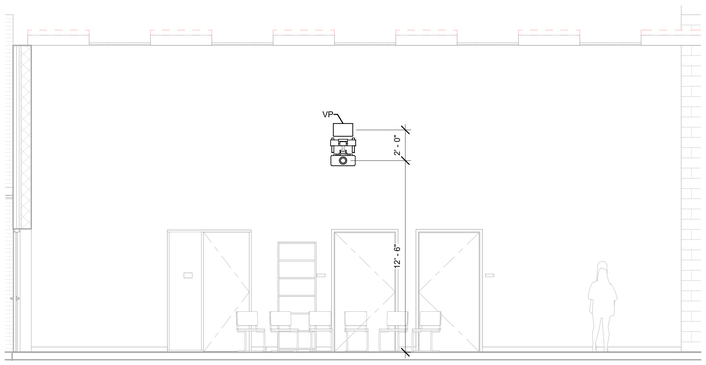
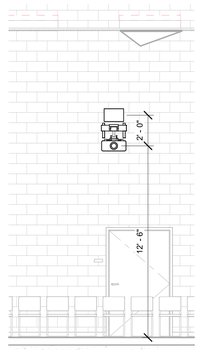


1/4" = 1'-0" ORCHESTRA K105 REAR ELEVATION | 6



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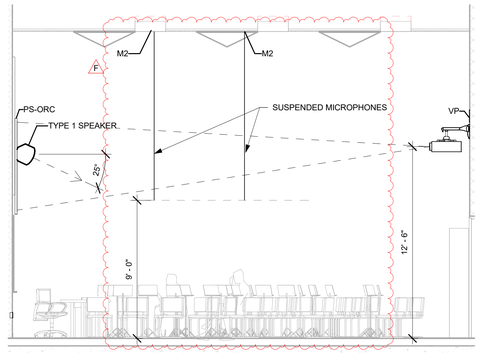
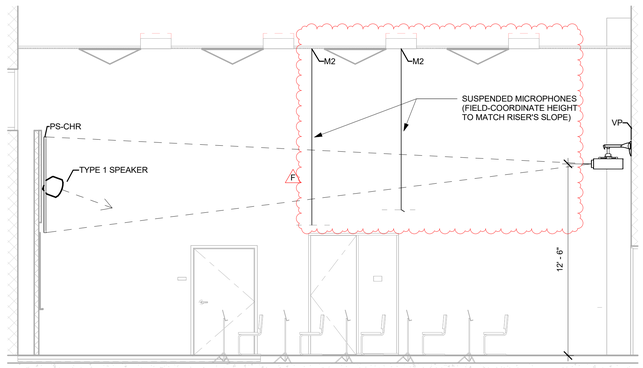
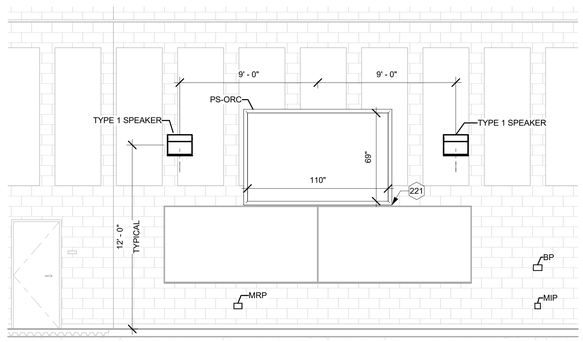


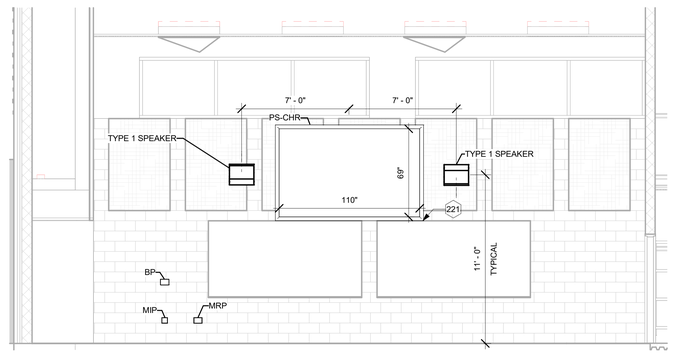
1/4" = 1'-0" ORCHESTRA K105 SIDE ELEVATION | 5



1/4" = 1'-0" CHOIR K112 SIDE ELEVATION | 2



1/4" = 1'-0" ORCHESTRA K105 FRONT ELEVATION | 4



1/4" = 1'-0" CHOIR K112 FRONT ELEVATION | 1

KEYNOTES

221	MOUNT DIRECTLY ABOVE THE CENTER OF THE MARKER BOARD THE EDGES OF THE BOARD AND SCREEN SHALL TOUCH.

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND 2023

PROJECT NAME

WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd, Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

ELEVATIONS

SHEET NUMBER

AV3.13

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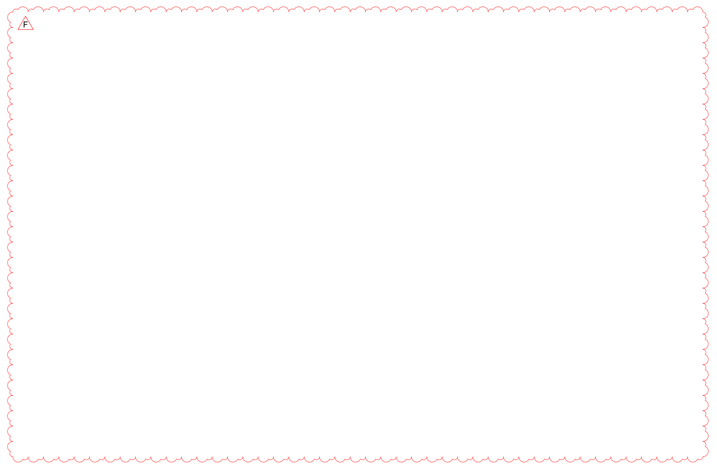
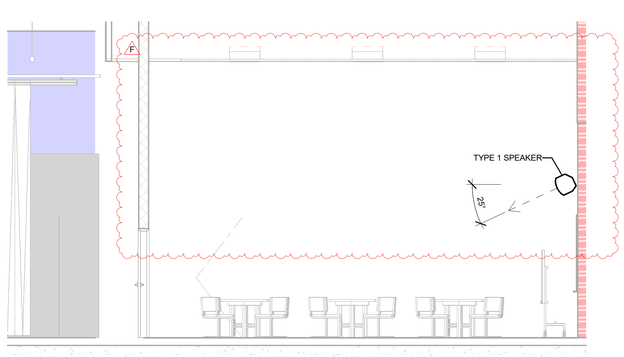
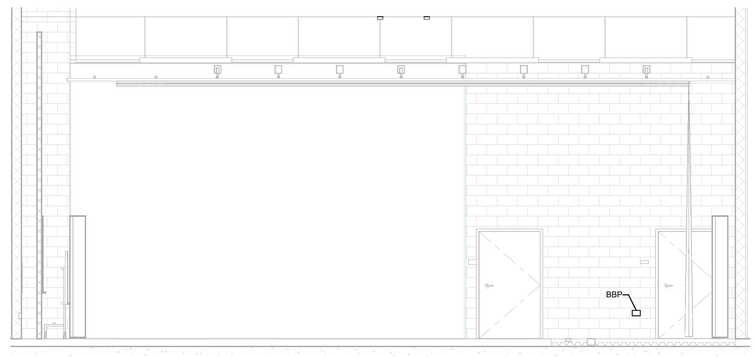
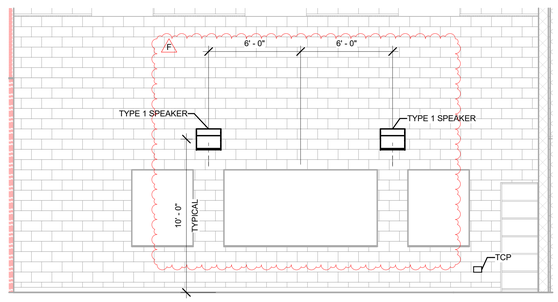




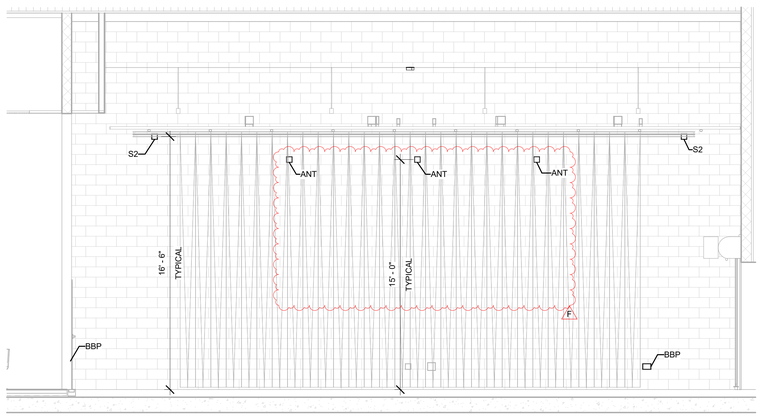
1/4" = 1'-0" DRAMA CLASSROOM K101 SIDE ELEVATION 4



1/4" = 1'-0" BLACK-BOX WEST ELEVATION 2



1/4" = 1'-0" DRAMA CLASSROOM K101 FRONT ELEVATION 3



1/4" = 1'-0" BLACK-BOX NORTH ELEVATION 1

KEYNOTES

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
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KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

ELEVATIONS

SHEET NUMBER

AV3.15

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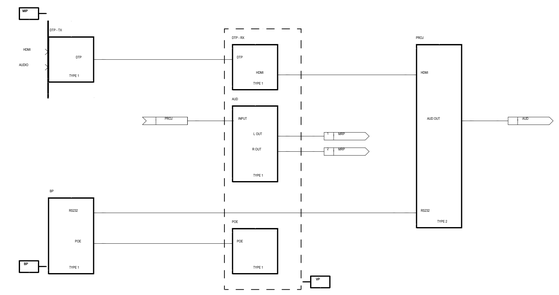
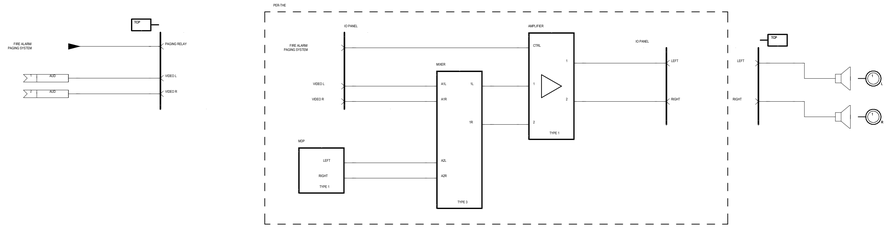
LOOSE EQUIPMENT - INTERCOM (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
10	WIRELESS INTERCOM BELT UNIT	1	--
5	WIRELESS INTERCOM CHARGE BASE	1	--
1	PORTABLE EQUIPMENT RACK	2	PER-INT
2	MICROPHONE CABLE	6	--
2	MICROPHONE CABLE	25	--
4	INTERCOM CABLE	10	--
4	INTERCOM CABLE	25	--

LOOSE EQUIPMENT - BLACK BOX AUDIO SYSTEM (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
4	BODYPACK WIRELESS MICROPHONE	1	--
4	HANDHELD WIRELESS MICROPHONE	1	--
1	WIRELESS MICROPHONE CHARGE BASE	1	--
4	VOCAL MICROPHONE	1	--
4	MICROPHONE STAND AND MOUNTING	1	--
4	MICROPHONE STAND AND MOUNTING	5	--
2	MONO DI BOX	1	--
1	STEREO DI BOX	1	--
1	STEREO COMPUTER DI BOX	1	--
1	STEREO COMPUTER USB DI BOX	1	--
1	PORTABLE EQUIPMENT RACK	1	PER-BB
6	SPEAKER	3	--
4	MICROPHONE CABLE	6	--
4	MICROPHONE CABLE	25	--
2	MICROPHONE CABLE	50	--
2	INSTRUMENT CABLE	06	--
1	MICROPHONE SNAKE	1	--
4	SPEAKER CABLE	06	--
4	SPEAKER CABLE	25	--
4	SPEAKER CABLE	50	--
1	SPEAKER CABLE	25	NL8
1	PAGING RELAY CABLE	6	--
1	PAGING RELAY CABLE	25	--
1	HEADPHONES	1	--

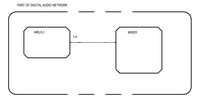
LOOSE EQUIPMENT - THEATER CLASSROOM AUDIO SYSTEM (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
2	VOCAL MICROPHONE	1	--
2	MICROPHONE STAND AND MOUNTING	1	--
2	MICROPHONE STAND AND MOUNTING	5	--
1	STEREO DI BOX	1	--
1	PORTABLE EQUIPMENT RACK	1	PER-THE
4	MICROPHONE CABLE	6	--
4	MICROPHONE CABLE	25	--
2	SPEAKER CABLE	06	--
2	SPEAKER CABLE	25	--
1	PAGING RELAY CABLE	6	--
1	PAGING RELAY CABLE	25	--
1	HEADPHONES	1	--



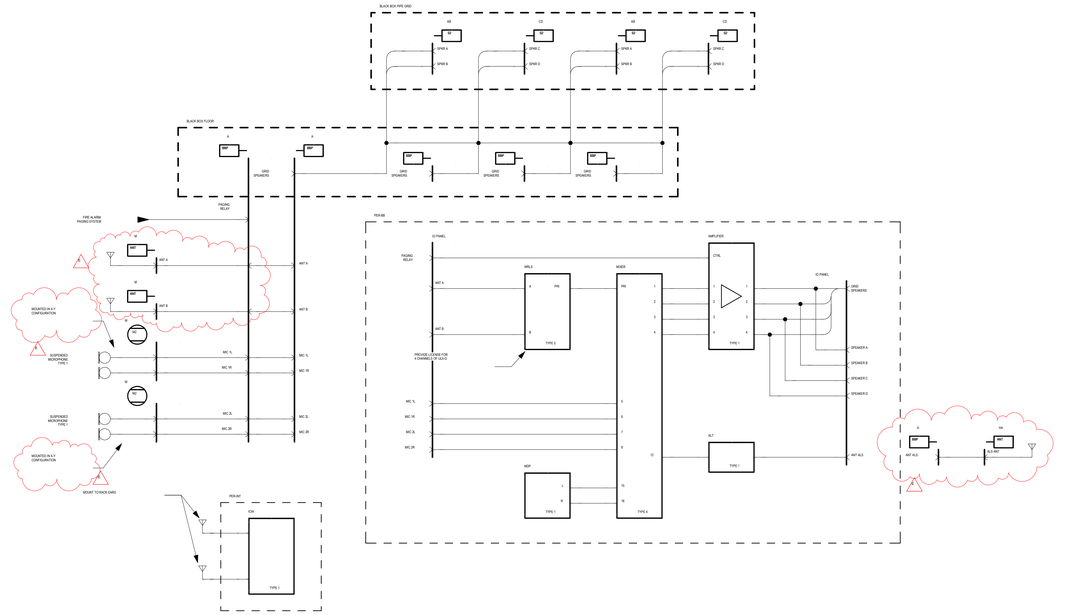
1 TYPICAL CLASSROOM VIDEO FUNCTIONAL DIAGRAM
1/2" = 1'-0"



2 THEATER CLASSROOM AUDIO FUNCTIONAL DIAGRAM
1/2" = 1'-0"



4 PART OF DIGITAL AUDIO NETWORK - BLACK-BOX
1/2" = 1'-0"



3 BLACK-BOX AUDIO FUNCTIONAL DIAGRAM
1/2" = 1'-0"

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PROJECT NAME

WILLOWRIDGE HIGH SCHOOL
FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd.
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

BLACK-BOX/CLASSROOM AUDIO FUNCTIONAL DIAGRAMS

SHEET NUMBER

AV11.10

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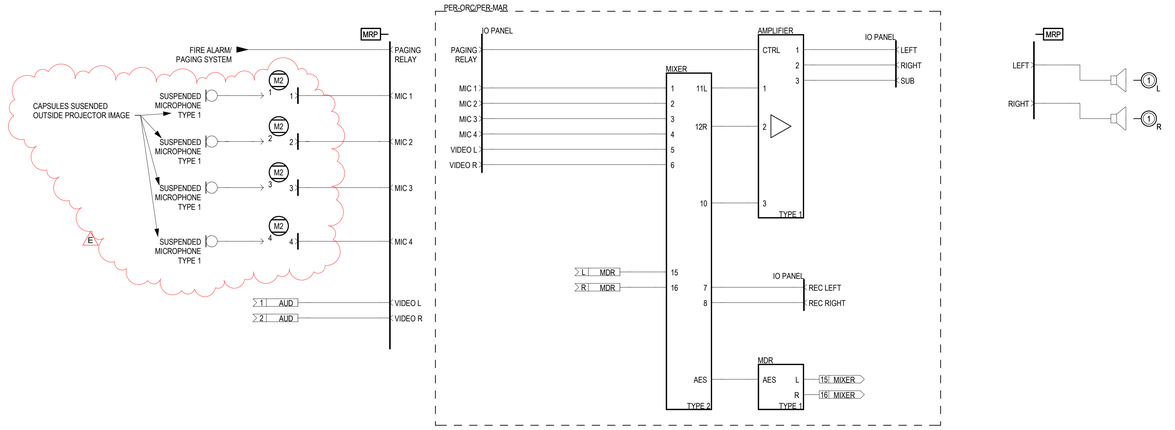
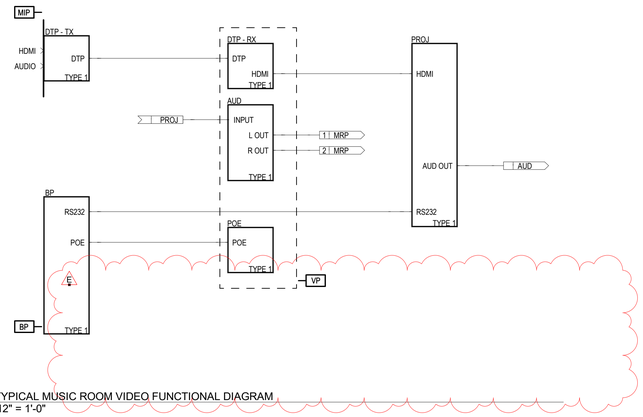
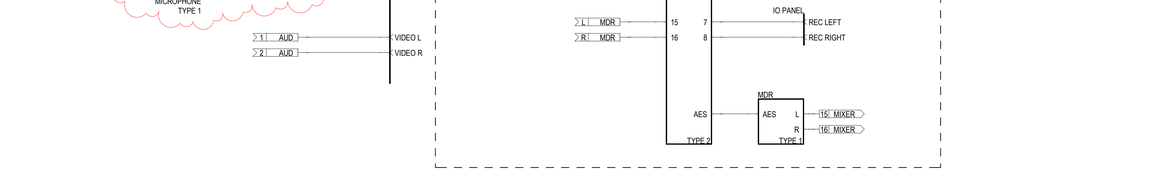


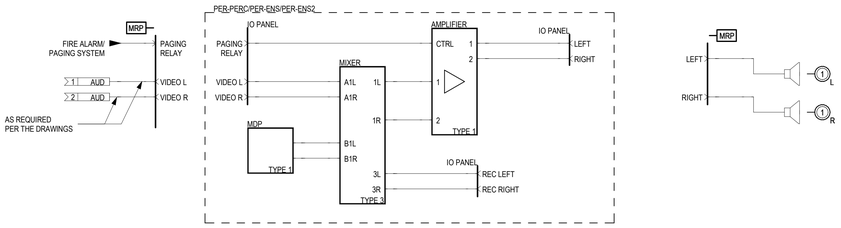
3 ORCHESTRA HALL/MARIACHI AUDIO FUNCTIONAL DIAGRAM
12" = 1'-0"



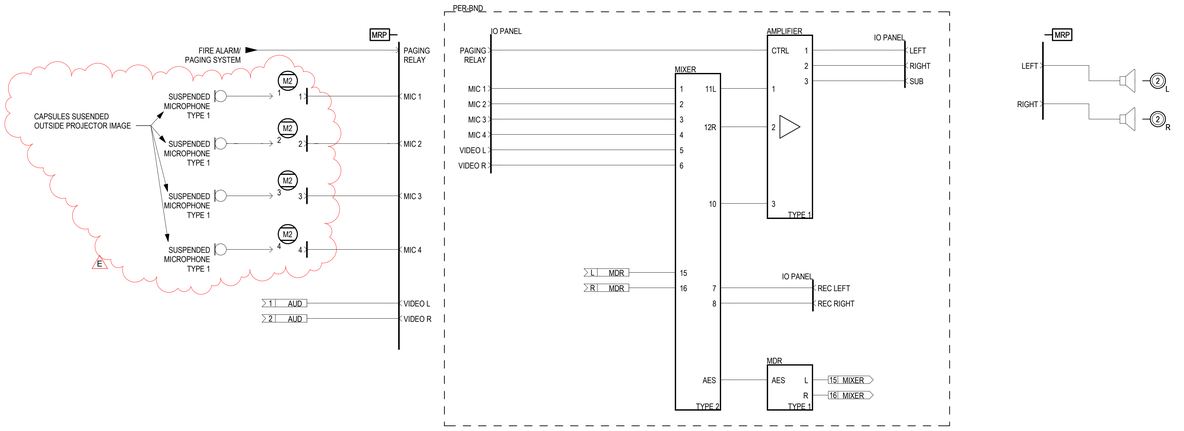
5 TYPICAL MUSIC ROOM VIDEO FUNCTIONAL DIAGRAM
12" = 1'-0"



2 CHOIR AUDIO FUNCTIONAL DIAGRAM
12" = 1'-0"



4 PERCUSSION/ENSEMBLE/SHARED ENSEMBLE AUDIO FUNCTIONAL DIAGRAM
12" = 1'-0"



1 BAND HALL AUDIO FUNCTIONAL DIAGRAM
12" = 1'-0"

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ARCHITECTURE

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FINE ARTS ADDITION AND
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PROJECT ADDRESS

16301 Chimney Rock Rd,
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KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

MUSIC ROOMS FUNCTIONAL
DIAGRAMS

SHEET NUMBER

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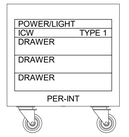
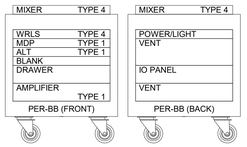
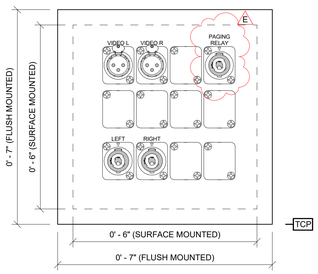


5 PER-INT RACK ELEVATION
1" = 1'-0"

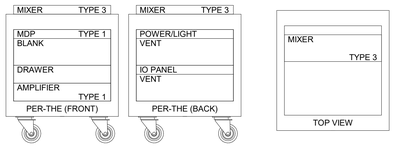


4 PER-BB RACK ELEVATIONS
1" = 1'-0"

8 THEATER CLASSROOM IO PANEL
6" = 1'-0"

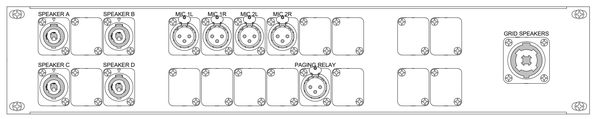


7 TCP PLATE DETAILS
6" = 1'-0"

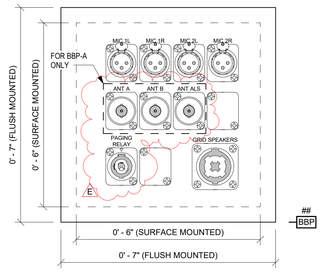


6 PER-THE RACK ELEVATIONS
1" = 1'-0"

3 BLACK-BOX CEILING MICROPHONE PLATE DETAIL
6" = 1'-0"



2 BLACK-BOX IO PANEL
6" = 1'-0"



1 BBP PLATE DETAILS
6" = 1'-0"

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PROJECT NAME

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PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

BLACK-BOX/THEATER CLASSROOM DETAILS

SHEET NUMBER

AV91.11

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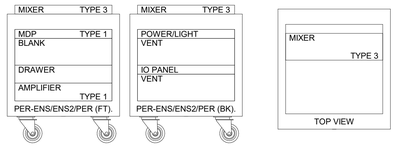
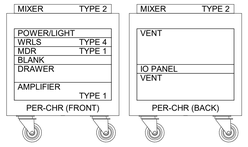
LOOSE EQUIPMENT - TYPICAL OF BAND HALL, MARIACHI, ORCHESTRA HALL (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
1	VOCAL MICROPHONE	1	--
2	INSTRUMENT MICROPHONE	2	--
2	MICROPHONE STAND AND MOUNTING	1	--
2	MICROPHONE STAND AND MOUNTING	2	--
2	MICROPHONE STAND AND MOUNTING	5	--
1	STEREO DI BOX	1	--
1	PORTABLE EQUIPMENT RACK	1	PER-###
1	SPEAKER	4	--
5	MICROPHONE CABLE	06	--
6	MICROPHONE CABLE	25	--
2	MICROPHONE CABLE	50	--
4	SPEAKER CABLE	6	--
3	SPEAKER CABLE	25	--
1	PAGING RELAY CABLE	6	--
1	PAGING RELAY CABLE	25	--
1	HEADPHONES	1	--

LOOSE EQUIPMENT - TYPICAL OF ENSEMBLE, SHARED ENSEMBLE, PERCUSSION (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
1	VOCAL MICROPHONE	1	--
2	INSTRUMENT MICROPHONE	2	--
2	MICROPHONE STAND AND MOUNTING	1	--
2	MICROPHONE STAND AND MOUNTING	2	--
2	MICROPHONE STAND AND MOUNTING	5	--
1	STEREO DI BOX	1	--
1	PORTABLE EQUIPMENT RACK	1	PER-###
4	MICROPHONE CABLE	06	--
5	MICROPHONE CABLE	25	--
2	MICROPHONE CABLE	50	--
4	SPEAKER CABLE	6	--
3	SPEAKER CABLE	25	--
1	PAGING RELAY CABLE	6	--
1	PAGING RELAY CABLE	25	--
1	HEADPHONES	1	--

LOOSE EQUIPMENT - CHOIR (REFERENCE SPECIFICATION 27 41 16)			
QUANTITY	DESCRIPTION	TYPE	NOTES
4	BODYPACK WIRELESS MICROPHONE	1	--
4	HANDHELD WIRELESS MICROPHONE	1	--
1	WIRELESS MICROPHONE CHARGE BASE	1	--
1	VOCAL MICROPHONE	1	--
2	INSTRUMENT MICROPHONE	2	--
2	MICROPHONE STAND AND MOUNTING	1	--
2	MICROPHONE STAND AND MOUNTING	2	--
2	MICROPHONE STAND AND MOUNTING	5	--
1	STEREO DI BOX	1	--
1	PORTABLE EQUIPMENT RACK	1	PER-CHR
1	SPEAKER	4	--
5	MICROPHONE CABLE	06	--
6	MICROPHONE CABLE	25	--
2	MICROPHONE CABLE	50	--
4	SPEAKER CABLE	6	--
3	SPEAKER CABLE	25	--
1	PAGING RELAY CABLE	6	--
1	PAGING RELAY CABLE	25	--
1	HEADPHONES	1	--



8 PER-ENS/ENS2/PER RACK ELEVATIONS
1" = 1'-0"



7 PER-CHR RACK ELEVATIONS
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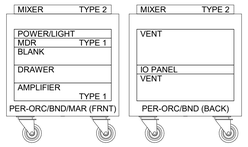
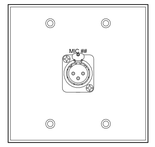
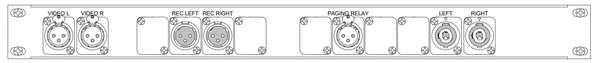


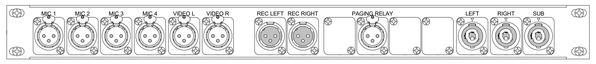
6 PER-ORC/BND/MAR RACK ELEVATIONS
1" = 1'-0"



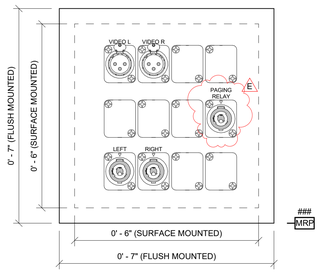
5 CEILING MICROPHONE PLATE DETAIL
6" = 1'-0"
NOTE: REFERENCE FUNCTIONALS FOR CONNECTOR LABELING.



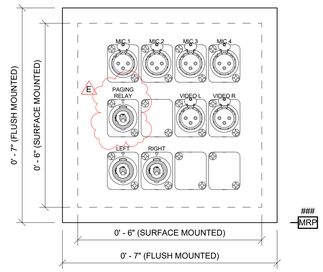
4 MUSIC ROOM IO PANEL (TYPICAL OF PER-PERC/PER-ENS/PER-ENS2)
6" = 1'-0"



3 MUSIC ROOM IO PANEL (TYPICAL OF PER-BND/PER-CHR/PER-ORCH/PER-MAR)
6" = 1'-0"



2 MRP PLATE DETAILS (TYPICAL FOR MRP-ENS/MRP-ENS2/MRP-PER)
6" = 1'-0"



1 MRP PLATE DETAILS (TYPICAL FOR MRP-BND/MRP-ORC/MRP-MAR/MRP-CHR)
6" = 1'-0"

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△	DATE	ISSUE
C	08/20/2025	90% CONSTRUCTION DOCUMENTS
D	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

PROJECT NAME
WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
MUSIC ROOM DETAILS

SHEET NUMBER
AV91.21

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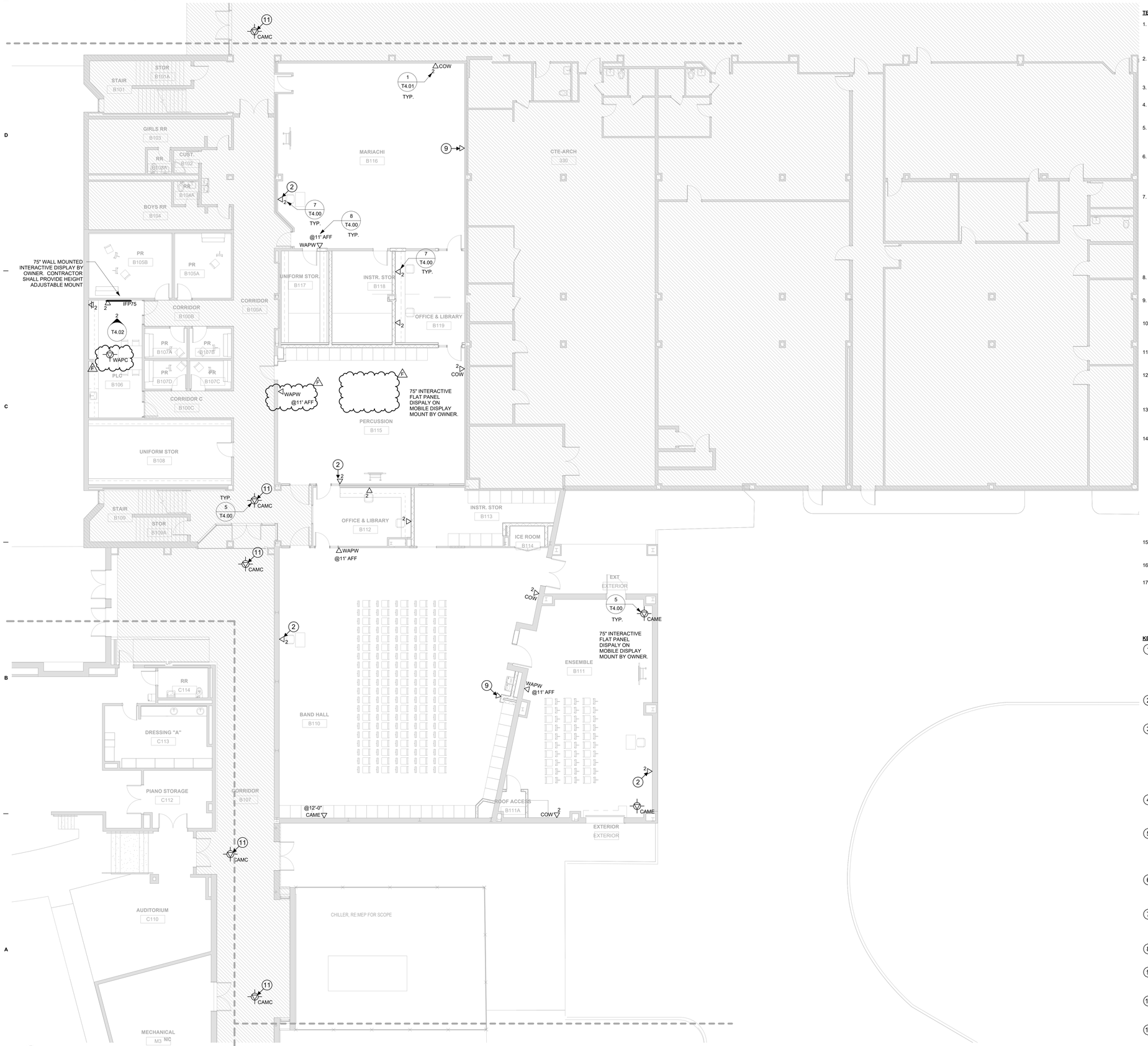

1 T2.31 TECHNOLOGY LEVEL 1 - FLOOR PLAN - AREA B1
1/8" = 1'-0"

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TECHNOLOGY FLOOR PLANS GENERAL NOTES:

1. THE TECHNOLOGY REGION / WIRING BOUNDARIES ARE IDENTIFIED ON THE OVERALL SHEETS ONLY AND NOT ON THE ENLARGED SHEETS. CONTRACTOR SHALL REFER TO THE OVERALL SHEETS FOR ALL TECHNOLOGY REGIONS/WIRING BOUNDARIES.
2. ALL CONDUIT PATHWAYS, ROUGH-INS, BACKBOXES, FLOOR BOXES, CONDUIT SLEEVES, ETC. INDICATED ON THE TECHNOLOGY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
3. ALL POWER INDICATED ON THE TECHNOLOGY DRAWINGS IS TO BE PROVIDED AND INSTALLED BY DIVISION 26.
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING BACK TO THE ORIGINAL RATING.
5. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR TECHNOLOGY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS.
6. TECHNOLOGY CABLING SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VIDEO, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC.
7. UNLESS NOTED OTHERWISE, ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING (AN OPEN CEILING OR CLOUD TYPE CEILING IS NOT CONSIDERED AN ACCESSIBLE CEILING) IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF A MAIN CORRIDOR OR NEAREST MDF/IDF. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF / IDF ROOM TO MINIMIZE THE CABLE LENGTH ENSURING CABLE LENGTH DOES NOT EXCEED 275 FEET.
8. UNLESS NOTED OTHERWISE ALL CONDUITS SHALL BE HOMERUN FROM THE DEVICE LOCATION AND NO DAISY CHAINING OF DEVICES/ ROUGH-INS SHALL BE ALLOWED.
9. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS.
10. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES.
11. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.
12. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.
13. EQUIPMENT NOT RELATED TO THE SUPPORT OF THE TELECOMMUNICATIONS ROOM (E.G., PIPING, DUCTWORK, PNEUMATIC TUBING) SHALL NOT BE INSTALLED IN, PASS THROUGH, OR ENTER THE TELECOMMUNICATIONS ROOM.
14. ALL CONDUITS FOR TECHNOLOGY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE A LAY-IN TYPE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE A LAY- IN TYPE CEILING TO PREVENT THE CABLES FROM BEING EXPOSED, THE CONDUIT SHALL ROUTE TO THE NEAREST LAY-IN TYPE CEILING OFF A MAIN CORRIDOR OR NEAREST MDF/IDF. THE CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE MAIN CORRIDOR OR NEAREST MDF/IDF TO MINIMIZE THE CABLE LENGTH ENSURING THE CABLE LENGTH DOES NOT EXCEED 275 FEET. CONDUIT, CONNECTIONS, J-BOXES, SUSPENSION, ANCHORAGES, AND OTHER CONDUIT COMPONENTS EXPOSED TO VIEW IN PUBLIC SPACES SHALL BE ROUTED AND INSTALLED CAREFULLY TO MINIMIZE VISUAL IMPACT AND SHALL BE FULLY PAINTED TO MATCH UNLESS NOTED OTHERWISE.
15. CONDUIT(S) INSTALLED IN-SLAB OR UNDER-SLAB TO FLOOR BOXES, POKE-THURS, AND TO WORKAREA OUTLETS, ETC. SHALL BE INSTALLED WITH WET RATED CABLE(S).
16. NO GRID WIRE SHALL BE UTILIZED FOR SUPPORTS ONLY USE SOLID SUPPORTS (CLIPS, ALL-THREAD, ANCHORS, ETC.).
17. WIRE BASKET TRAY SHALL HAVE A 6" CLEARANCE FROM CEILING TILE TO THE BOTTOM OF BASKET TRAY, 12" CLEARANCE FROM THE TOP OF THE BASKET TRAY TO HVAC UNITS, HVAC DUCTS, HEATING DUCTS, AND HEATING EQUIPMENT, ETC., AND 12" CLEARANCE FROM THE SIDE OF THE BASKET TRAY TO HVAC UNITS, HVAC DUCTS, HEATING DUCTS, AND HEATING EQUIPMENT, ETC. WIRE BASKET TRAY SHALL BE PROPERLY GROUNDED AND BONDED AS PER INDUSTRY STANDARDS (BY DIV. 26).

KEYED NOTES:

1. APPROXIMATE ROUTE CONDUIT SHALL TAKE TO A LAY-IN TYPE CEILING. THE CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO THE WALLS AND IN THE MOST DIRECT MANNER POSSIBLE TO THE NEAREST LAY-IN TYPE CEILING OFF A MAIN CORRIDOR TO MINIMIZE THE CABLE LENGTH, ENSURING THE CABLE LENGTH DOES NOT EXCEED 275 FEET. (BY DIV 26)
2. INSTRUCTOR'S DATA OUTLET SHALL BE INSTALLED 4-FEET FROM ADJACENT WALL OR ANY OBSTRUCTION (COLUMN FURR-OUT, CASEWORK, ETC.) GREATER THAN 16". ADJACENT POWER RECEPTACLE REQUIRED.
3. DATA CABLE WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON A J-HOOK ABOVE ACCESSIBLE CEILING FOR CONTRACTOR PROVIDED / CONTRACTOR INSTALLED WALL MOUNTED MONITOR WHERE THERE IS AN ACCESSIBLE CEILING. CONTRACTOR SHALL PLACE A BLUE ADHESIVE DOT AND A LABEL MIRRORING THE LABEL ON THE SURFACE MOUNTED BOX ON THE CEILING GRID DIRECTLY BELOW THE OUTLET LOCATION FOR FUTURE IDENTIFICATION OF THE OUTLET LOCATION. REFER TO AUDIO | VISUAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS. (BY DIV. 27)
4. DATA CABLE FOR MECHANICAL/ELECTRICAL CONTROLS. REFER TO MECHANICAL / ELECTRICAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS. (BY DIV. 27/26)
5. DATA CABLE FOR HVAC UNIT CONTROL PANEL. DATA CABLE TERMINATED INSIDE THE VERTIV BOX/PANEL. VERTIV BOX/PANEL SHOULD BE RIGHT ABOVE HVAC UNIT, DIV. 27 CONTACTOR TO COORDINATE WITH HVAC CONTACTOR. REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS. (BY DIV. 27/26)
6. DATA CABLES FOR CONTRACTOR PROVIDED / CONTRACTOR INSTALLED ACCESS CONTROL SECURITY PANEL. REFER TO SECURITY DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH- IN REQUIREMENTS. (BY DIV. 27/26)
7. DATA CABLES FOR CONTRACTOR PROVIDED / CONTRACTOR INSTALLED INTRUSION DETECTION SYSTEM SECURITY PANEL. REFER TO SECURITY DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS. (BY DIV. 27/26)
8. DATA CABLES FOR AV EQUIPMENT RACK. REFER TO AUDIO | VISUAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS.
9. DATA CABLES FOR AV EQUIPMENT WALL RACK. PROVIDE OUTLET AND TERMINATE CABLE WITHIN RACK. REFER TO AUDIO | VISUAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS.
10. DATA CABLE FOR AV WALL PLATE. TERMINATE CABLE WITHIN AV WALLPLATE REFER TO AUDIO | VISUAL DRAWINGS FOR EXACT LOCATION AND CONDUIT ROUGH-IN REQUIREMENTS.
11. EXISTING DEVICE TO REMAIN

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Jason Gonzalez Jr
BICSI ID # 364970
EXPIRES 12-31-25
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E	09/16/2025	ISSUE FOR BID AND PERMIT
F	10/23/2025	ADDENDUM 001

FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
TECHNOLOGY LEVEL 1 - FLOOR PLAN - AREA B1

SHEET NUMBER
T2.31

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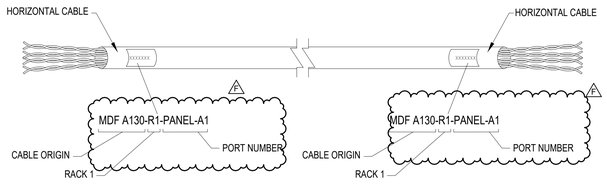

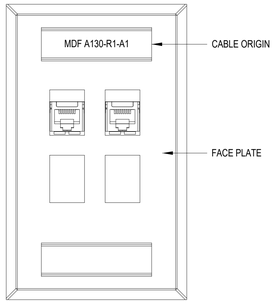

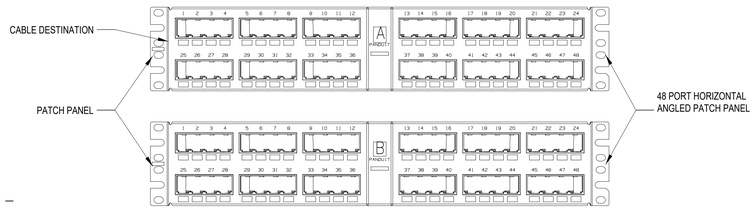

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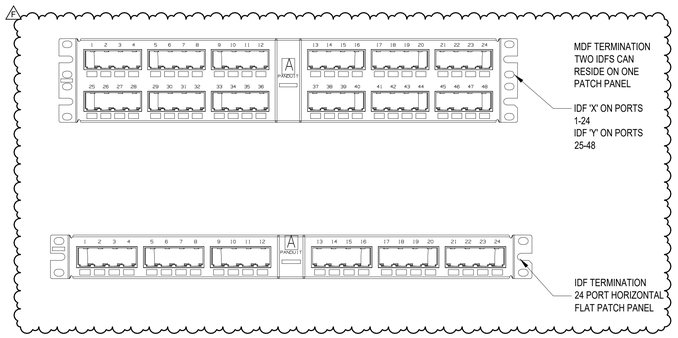

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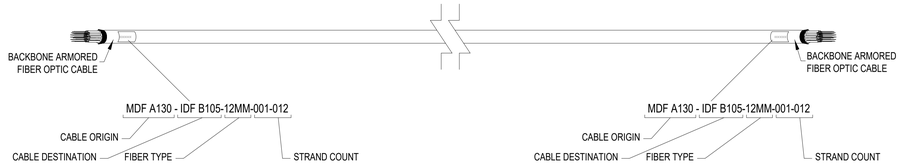

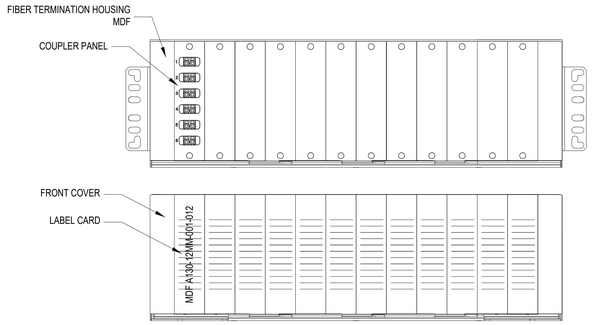

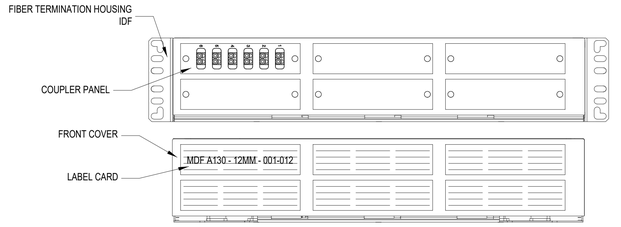

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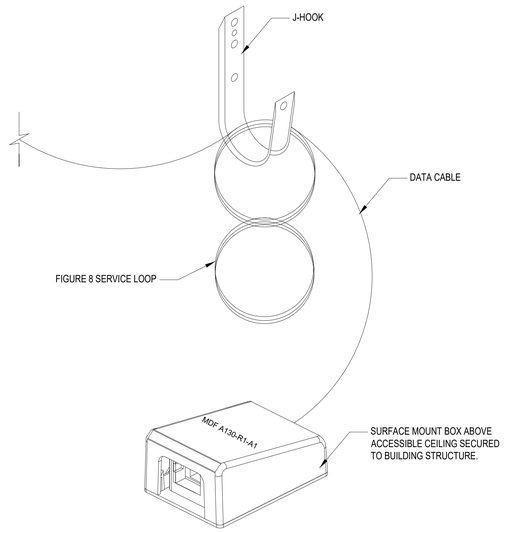

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F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

TECHNOLOGY TYPICAL LABELING SCHEME

SHEET NUMBER

T5.00

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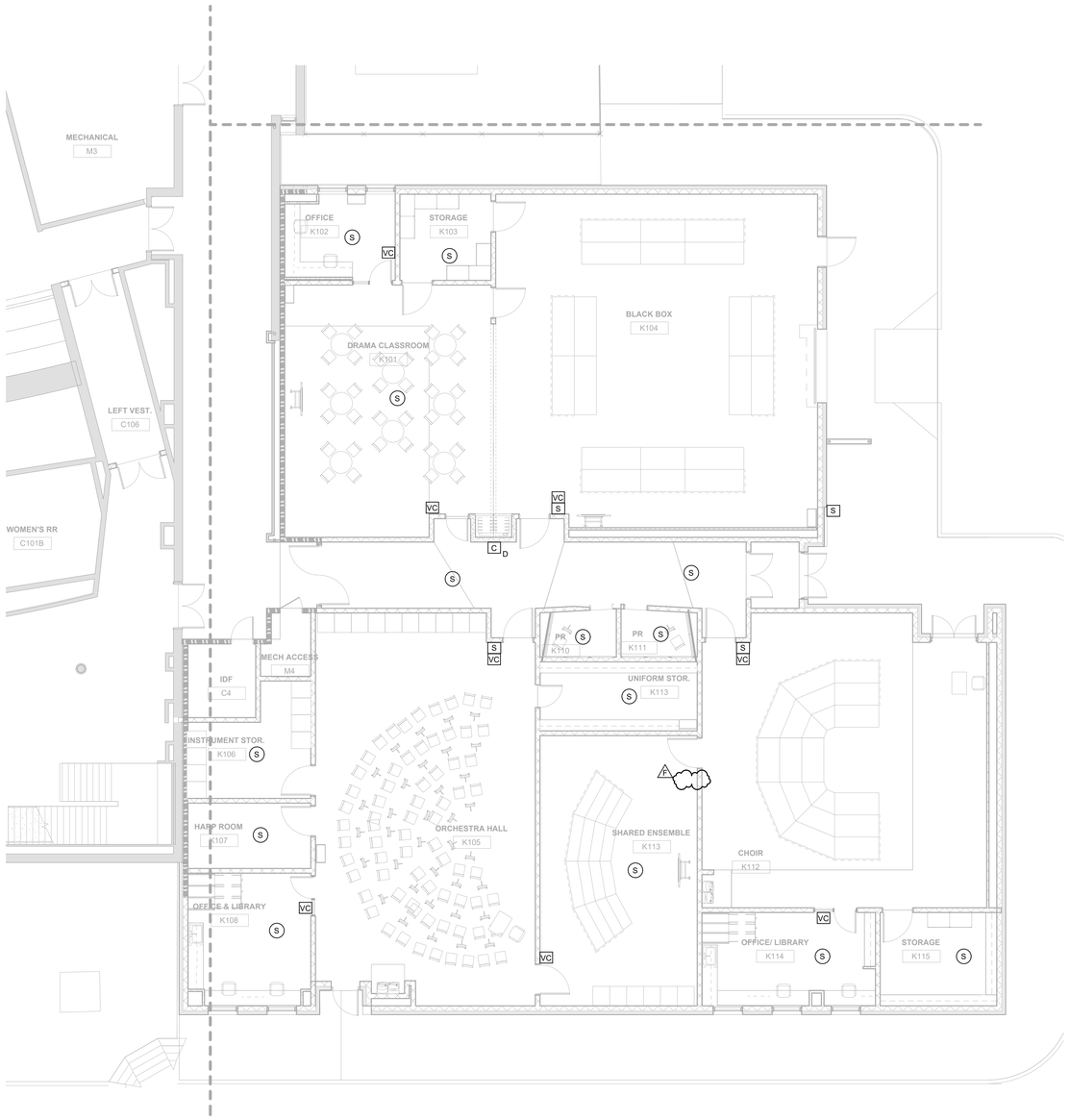

1 PUBLIC ADDRESS LEVEL 1 - FLOOR PLAN - AREA B3
TPA2.33 1/8" = 1'-0"

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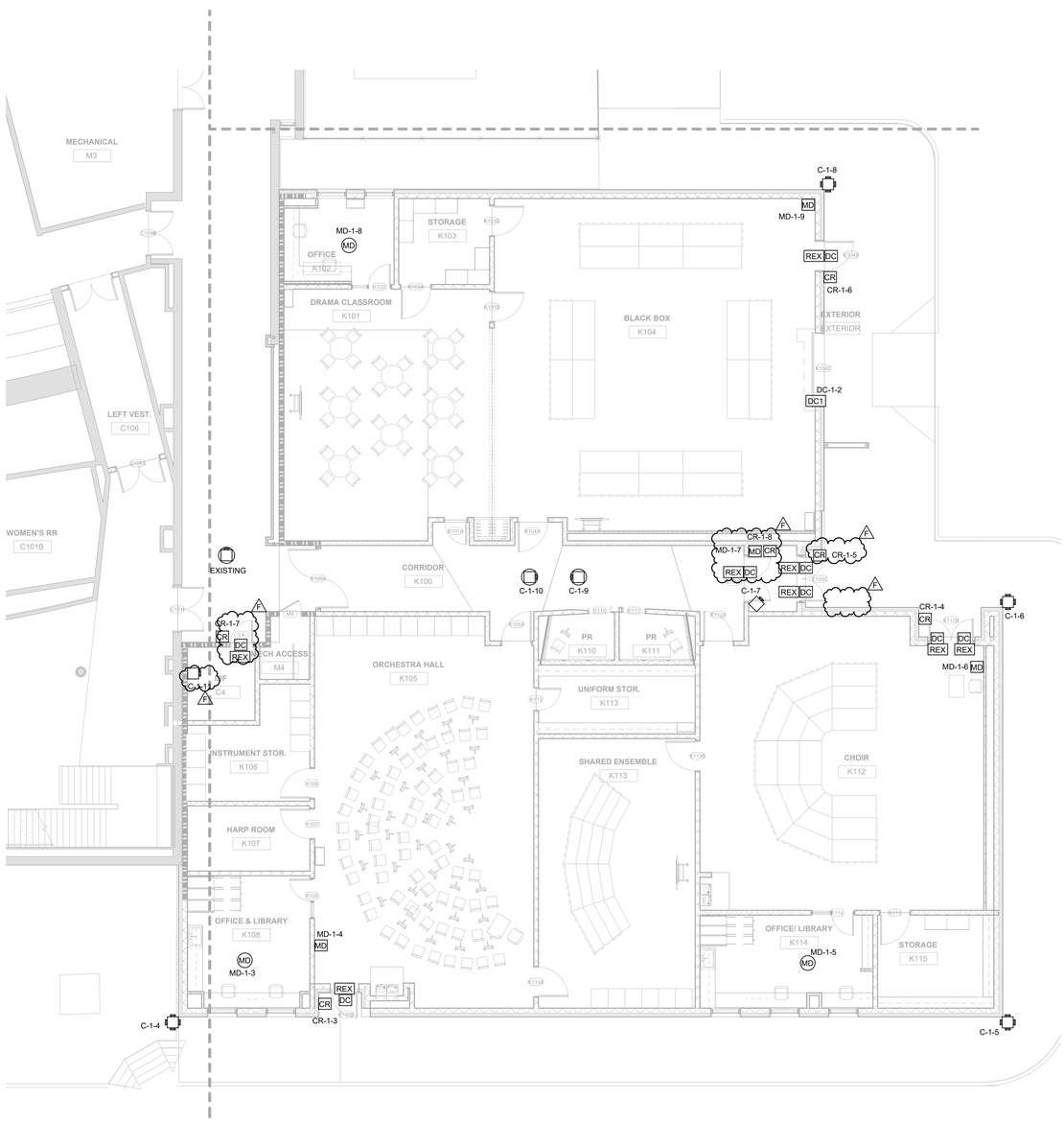

1 TS2.33 SECURITY LEVEL 1 - FLOOR PLAN - AREA B3
1/8" = 1'-0"

SECURITY FLOOR PLANS GENERAL NOTES:

1. ALL SECURITY INSTALLATIONS SHALL COMPLY WITH LOCAL CODES AND PERMITTING REQUIREMENTS FOR LOW-VOLTAGE, CCTV, AND ACCESS CONTROL SYSTEMS. CONTRACTOR SHALL VERIFY AND OBTAIN ALL REQUIRED PERMITS PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL PROVIDE AND INSTALL ALL REQUIRED BOXES, CONDUIT, CABLING, SUPPORTS, TERMINATIONS, AND ACCESSORIES FOR A COMPLETE AND CODE-COMPLIANT SECURITY SYSTEM, WHETHER OR NOT EACH ITEM IS SPECIFICALLY SHOWN.
3. ALL CONDUIT PATHWAYS, ROUGH-INS, SLEEVES, AND ASSOCIATED INFRASTRUCTURE SHOWN ON SECURITY DRAWINGS SHALL BE INSTALLED BY DIVISION 26 (ELECTRICAL).
4. ALL POWER TO SECURITY DEVICES, PANELS, AND EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY DIVISION 26 (ELECTRICAL) UNLESS OTHERWISE NOTED.
5. SECURITY DATA NETWORK CABLING, FIBER CONNECTIVITY, AND ASSOCIATED EQUIPMENT SHALL BE PROVIDED AND INSTALLED BY DIVISION 27 (COMMUNICATIONS). REFER TO T-SERIES DRAWINGS FOR ROUTING AND REQUIREMENTS.
6. ELECTRIFIED DOOR HARDWARE INDICATED ON SECURITY DRAWINGS SHALL BE PROVIDED AND INSTALLED BY DIVISION 8. REFER TO DOOR HARDWARE SCHEDULES FOR MODEL TYPES, POWER TRANSFER DEVICES, AND CONTROL INTERFACE REQUIREMENTS.
7. VEHICLE GATE EQUIPMENT AND OPERATORS SHALL BE PROVIDED AND INSTALLED BY DIVISION 11. COORDINATE ALL SECURITY-RELATED RELAY CABLING AND TERMINATIONS IN THE FIELD.
8. ELEVATOR SECURITY INTERFACES, INCLUDING CARD READER FLOOR ACCESS, HALL CALL CONTROL, AND CAMERAS, SHALL BE COORDINATED WITH THE ELEVATOR VENDOR. TRAVEL CABLES AND ASSOCIATED TERMINATIONS SHALL BE PROVIDED AND INSTALLED BY THE ELEVATOR CONTRACTOR. REFER TO ELEVATOR SHOP DRAWINGS AND SPECIFICATIONS FOR INTERFACE REQUIREMENTS.
9. WHERE SYSTEMS INTERFACE WITH EMERGENCY SERVICES (E.G., GATES, EGRESS HARDWARE, OR INTERCOMS), COORDINATION WITH THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) IS REQUIRED PRIOR TO COMMISSIONING.
10. WHERE INTEGRATION WITH BUILDING SYSTEMS IS REQUIRED (E.G., BMS, ELEVATOR RECALL, INTERCOM, OR FIRE ALARM), COORDINATION SHALL BE PERFORMED WITH THE RESPECTIVE SYSTEM VENDORS PRIOR TO ROUGH-IN.
11. SECURITY EQUIPMENT SHALL BE POWERED FROM DEDICATED CIRCUITS UNLESS OTHERWISE NOTED. COORDINATE PANEL LOCATIONS, BREAKER REQUIREMENTS, AND UPS BACKUP (IF REQUIRED) WITH DIVISION 26.
12. ALL SECURITY SYSTEM COMPONENTS SHALL BE PROPERLY GROUNDED AND BONDED PER MANUFACTURER REQUIREMENTS AND APPLICABLE ELECTRICAL CODES.
13. CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTES WITH ARCHITECTURAL, CIVIL, ELECTRICAL, AND LANDSCAPE DRAWINGS PRIOR TO INSTALLATION OR TRENCHING.
14. ALL PENETRATIONS THROUGH FIRE-RATED WALLS OR STRUCTURES FOR SECURITY CABLING SHALL BE SEALED TO RESTORE ORIGINAL FIRE-RESISTANCE RATINGS.
15. PENETRATIONS THROUGH NON-RATED WALLS SHALL BE SEALED TO REDUCE ACOUSTIC TRANSMISSION BETWEEN SPACES.
16. ALL WALL AND FLOOR PENETRATIONS SHALL BE SEALED TO PREVENT WATER INTRUSION INTO INTERIOR OR CONDITIONED SPACES.
17. CONTRACTOR SHALL RESTORE ALL SURFACES (E.G., WALLS, PAVEMENT, LANDSCAPING) AFFECTED BY SECURITY INSTALLATION TO ORIGINAL OR BETTER CONDITION.
18. ALL SECURITY DEVICE LOCATIONS SHOWN ARE DIAGRAMMATIC AND NOT TO SCALE. FINAL PLACEMENT SHALL BE COORDINATED WITH THE ARCHITECT OR SECURITY DESIGN CONSULTANT PRIOR TO ROUGH-IN.
19. COORDINATE ALL EXTERIOR CAMERA LOCATIONS WITH LANDSCAPING AND ADJACENT BUILDING ELEMENTS. ENSURE CLEAR FIELDS OF VIEW FREE FROM OBSTRUCTIONS SUCH AS TREES, DOWNSPOUTS, OR SIGNAGE.
20. DEVICE MOUNTING HEIGHTS, INCLUDING ACCESS CONTROL AND INTERCOMS, SHALL COMPLY WITH ADA ACCESSIBILITY STANDARDS AND APPLICABLE LOCAL AND STATE CODES.
21. VERIFY EXACT MOUNTING CONDITIONS IN THE FIELD AND COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS WITH STRUCTURE, FINISHES, OR UTILITIES.
22. ALL INSTALLED SYSTEMS AND COMPONENTS SHALL BE TESTED FOR FULL FUNCTIONALITY, INTEGRATION, AND COMPLIANCE WITH SPECIFICATIONS PRIOR TO FINAL TURNOVER.
23. CONTRACTOR SHALL COORDINATE FINAL TERMINATIONS, PROGRAMMING, AND SYSTEM COMMISSIONING WITH THE SECURITY VENDOR OR INTEGRATOR. SYSTEM FUNCTIONALITY SHALL BE DEMONSTRATED AND ACCEPTED BY THE OWNER PER WRITTEN SPECIFICATIONS.
24. CONTRACTOR SHALL REFER TO T-SERIES TECHNOLOGY OR STRUCTURED CABLING DRAWINGS FOR DEVICE DATA NETWORK CABLING, RISER INFORMATION, AND ADDITIONAL SYSTEM-SPECIFIC REQUIREMENTS.
25. CONTRACTOR SHALL SUBMIT PRODUCT DATA SHEETS, SHOP DRAWINGS, AND DEVICE CUT SHEETS FOR ALL SECURITY EQUIPMENT FOR REVIEW AND APPROVAL PRIOR TO ORDERING.
26. UPON COMPLETION, PROVIDE RECORD DRAWINGS (AS-BUILTS), INCLUDING CONDUIT ROUTING, DEVICE LOCATIONS, CABLE IDS, AND PANEL TERMINATIONS. LABEL ALL DEVICES IN THE FIELD TO MATCH RECORD DOCUMENTS.
27. CONTRACTOR SHALL NOTIFY THE SECURITY CONSULTANT AND/OR ARCHITECT OF ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS PRIOR TO INSTALLATION. UNAUTHORIZED SUBSTITUTIONS OR RELOCATIONS MAY BE SUBJECT TO REMOVAL AND CORRECTION AT THE CONTRACTOR`S EXPENSE.

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REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER
Bicsi
Jason Gonzalez Jr
BICSI ID # 364970
EXPIRES 12-31-25
RCDD

09-16-2025

	DATE	ISSUE
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F	10/23/2025	ADDENDUM 001

FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME
FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS
16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE
SECURITY LEVEL 1 - FLOOR PLAN - AREA B3

SHEET NUMBER
TS2.33

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FBISD WILLOWRIDGE HS
ACCESS CONTROL SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	DEVICE MOUNTING	ASSOCIATED DOOR NUMBER	ASSOCIATED DOOR TYPE	DEVICE HEIGHT (TO CENTER)	TERMINATION POINT	NOTES
CR-1-1	CARD READER	WALL	B110B	DOUBLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-2	CARD READER	WALL	B111C	SINGLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-3	CARD READER	WALL	K105B	SINGLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-4	CARD READER	WALL	K112B	DOUBLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-5	CARD READER	WALL	K100C	DOUBLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-6	CARD READER	WALL	K104B	SINGLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-7	CARD READER	WALL	C4	SINGLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	
CR-1-8	CARD READER	WALL	K100B	SINGLE	48-INCHES A.F.F.	CONFIRM WITH OWNER	

FBISD WILLOWRIDGE HS
INTRUSION DETECTION SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	DEVICE MOUNTING	DEVICE HEIGHT (TO CENTER)	TERMINATION POINT	ZONE / AREA	NOTES
MD-1-1	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-2	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-3	MOTION DETECTOR - 360°	CEILING	SEE TYPICAL DETAIL	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-4	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-5	MOTION DETECTOR - 360°	CEILING	SEE TYPICAL DETAIL	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-6	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-7	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-8	MOTION DETECTOR - 360°	CEILING	SEE TYPICAL DETAIL	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
MD-1-9	MOTION DETECTOR	WALL	96-INCHES A.F.F.	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
DC-1-1	OVERHEAD DOOR CONTACT	FLOOR	SEE TYPICAL DETAIL	CONFIRM WITH OWNER	CONFIRM WITH OWNER	
DC-1-2	OVERHEAD DOOR CONTACT	FLOOR	SEE TYPICAL DETAIL	CONFIRM WITH OWNER	CONFIRM WITH OWNER	

FBISD WILLOWRIDGE HS
VIDEO SURVEILLANCE SYSTEM DEVICE SCHEDULE

DEVICE NUMBER	DEVICE TYPE	DEVICE RATING (INTERIOR / EXTERIOR)	DEVICE MOUNTING	DEVICE HEIGHT (TO CENTER)	NOTES
C-1-1	SINGLE LENS DOME	EXTERIOR	WALL	9-FEET A.F.F.	
C-1-2	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-3	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-4	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-5	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-6	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-7	SINGLE LENS DOME	EXTERIOR	WALL	9-FEET A.F.F.	
C-1-8	360° MULTI-DIRECTIONAL LENS	EXTERIOR	WALL	12-FEET A.F.F.	
C-1-9	SINGLE LENS DOME	INTERIOR	CEILING	SEE TYPICAL DETAIL	
C-1-10	SINGLE LENS DOME	INTERIOR	CEILING	SEE TYPICAL DETAIL	
C-1-11	SINGLE LENS DOME	INTERIOR	WALL	6-INCHES BELOW LADDER RACK	MUST FACE IDF ENTRACE

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FORT BEND INDEPENDENT SCHOOL DISTRICT BOND

PROJECT NAME

FBISD BP030 WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

SECURITY SCHEDULES

SHEET NUMBER

TS5.00

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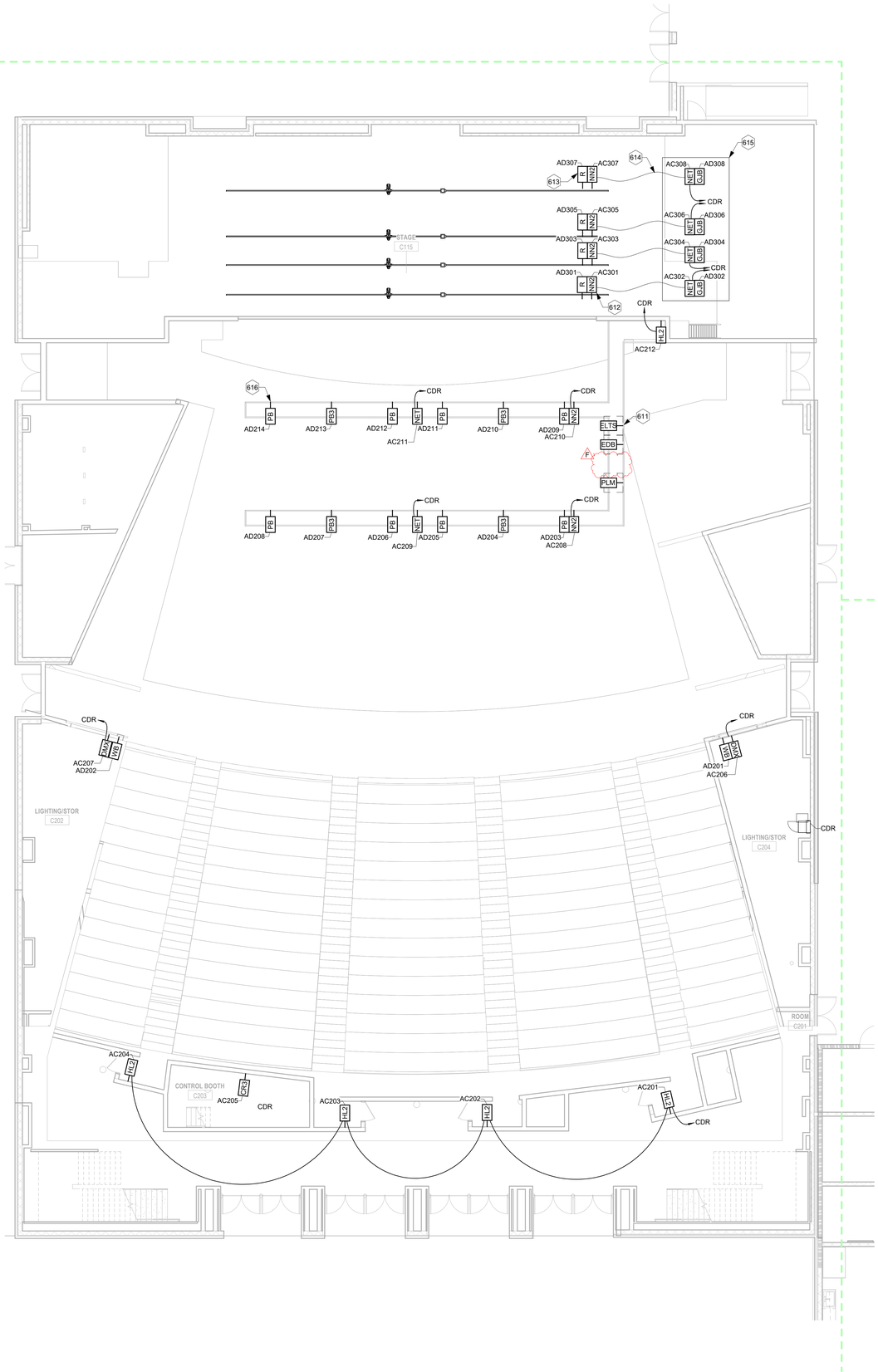

KEYNOTES

611	PROVIDE REMOTE-CONTROL ELTS KEYSWITCH IN SMP WITHIN AV RACK; COORD WITH ELEC AND AV
612	2-PORT DMX GATEWAY WITHIN RACEWAY
613	RACEWAY, SO CABLES, AND CABLE CRADLES FOR STAGE ELECTRICS. TYPICAL OF ALL R DEVICES.
614	VIA INTEGRATED CABLE MANAGMANET, TYP.
615	DEVICES MOUNTED TO STRUCTURE ABOVE
616	FIELD VERIFY EXISTING CONDUIT; CLEAN AND RE-USE IF IN GOOD CONDITION. TYP. OF ALL CATWALK DEVICES

1/8" = 1'-0"

TL_LEVEL 2 FLOOR PLAN - AREA B2 | A4

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FORT BEND 2022 BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

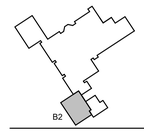
WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 FLOOR PLAN - AREA B2

SHEET NUMBER

TL2.36

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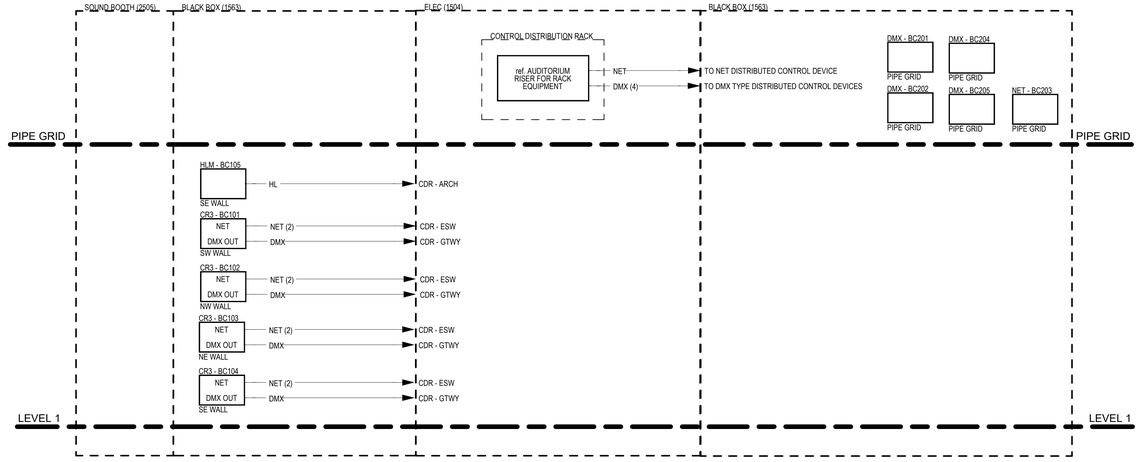
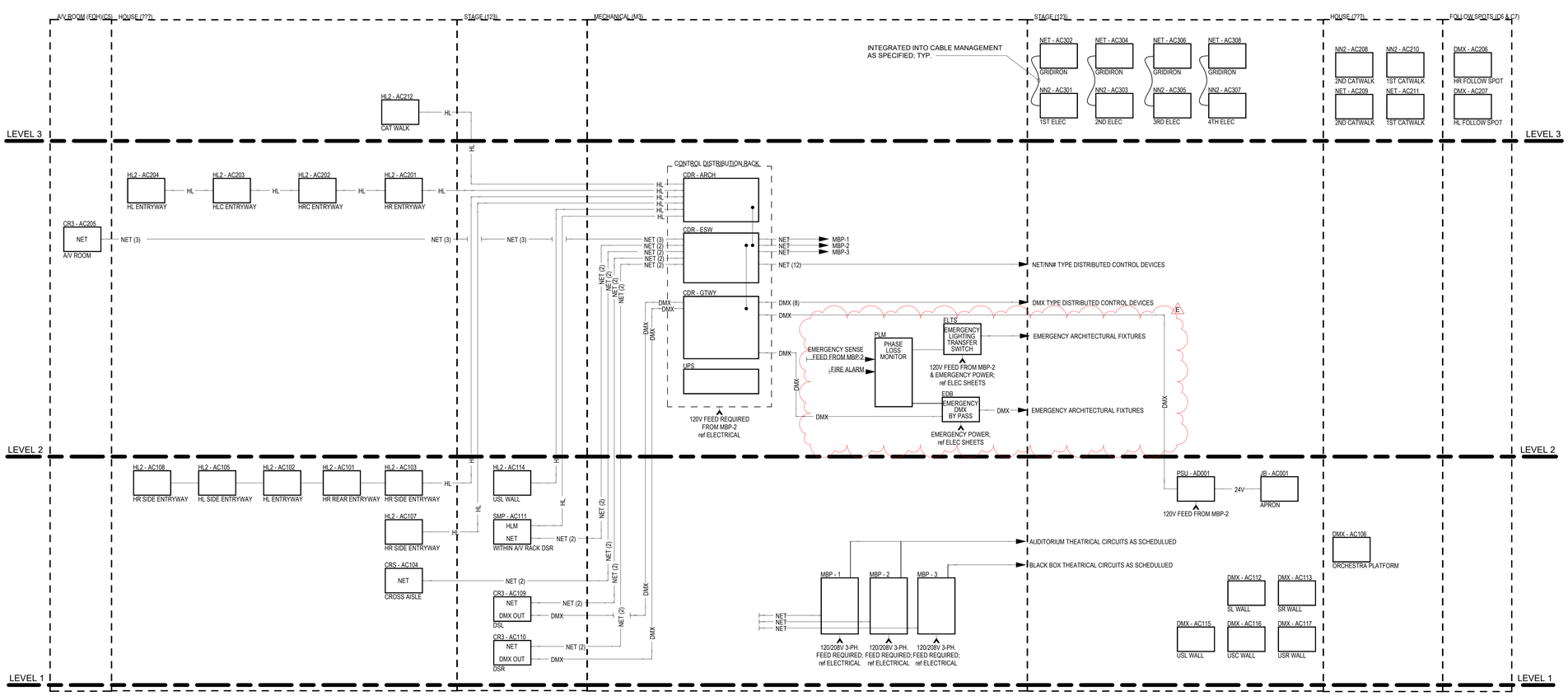


2 BLACK BOX LIGHTING CONTROL RISER DIAGRAM
12" = 1'-0"

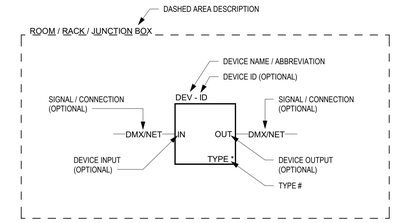


1 AUDITORIUM LIGHTING CONTROL RISER DIAGRAM
12" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE INSTALLATION SO THAT LOADS ARE PROPERLY LANDED INSIDE DIMMER RACK TO ACHIEVE PROPER FUNCTION OF THE ETHERNET LIGHING NETWORK.
2. ALL HOUSELIGHT / WORKLIGHT WIRING CONFIGURATION SHOULD BE CERTIFIED WITH LIGHTING CONTROL EQUIPMENT MANUFACTURER.
3. PROVIDE UPS BACKUP FOR DMX DISTRIBUTION, ARCHITECTURAL LIGHTING CONTROL PROCESSOR AND LIGHTING CONTROL CONSOLES.
4. WORKLIGHT, HOUSELIGHT, SEATLIGHT, STEPLIGHT, AND SAFETY LIGHT LOADS SHALL BE COORDINATED - SEE HOUSELIGHT LIGHTING CIRCUIT SCHEDULE FOR DETAILS AND CIRCUIT LOCATION.
5. COORDINATE POSSIBLE TRANSFORMER AND BALLAST REQUIREMENTS AND LOCATIONS FOR HOUSELIGHT, SEATLIGHT, STEP LIGHT AND SAFETY LIGHT LOADS.
6. TERMINATE ALL FIVE PINS OF EACH DMX INPUT AND OUTPUT.
7. PROVIDE PROPER AMOUNTS OF CABLE SLACK AFTER TERMINATION FOR FUTURE UPGRADE OF LIGHTING SYSTEM.
8. COORDINATE EMERGENCY LIGHTING CIRCUITING.

DEVICE SIGNAL FLOW DETAIL



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PROJECT NAME

WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN

SHEET TITLE

THEATRICAL LIGHTING CONTROL RISER

SHEET NUMBER

TL16.01

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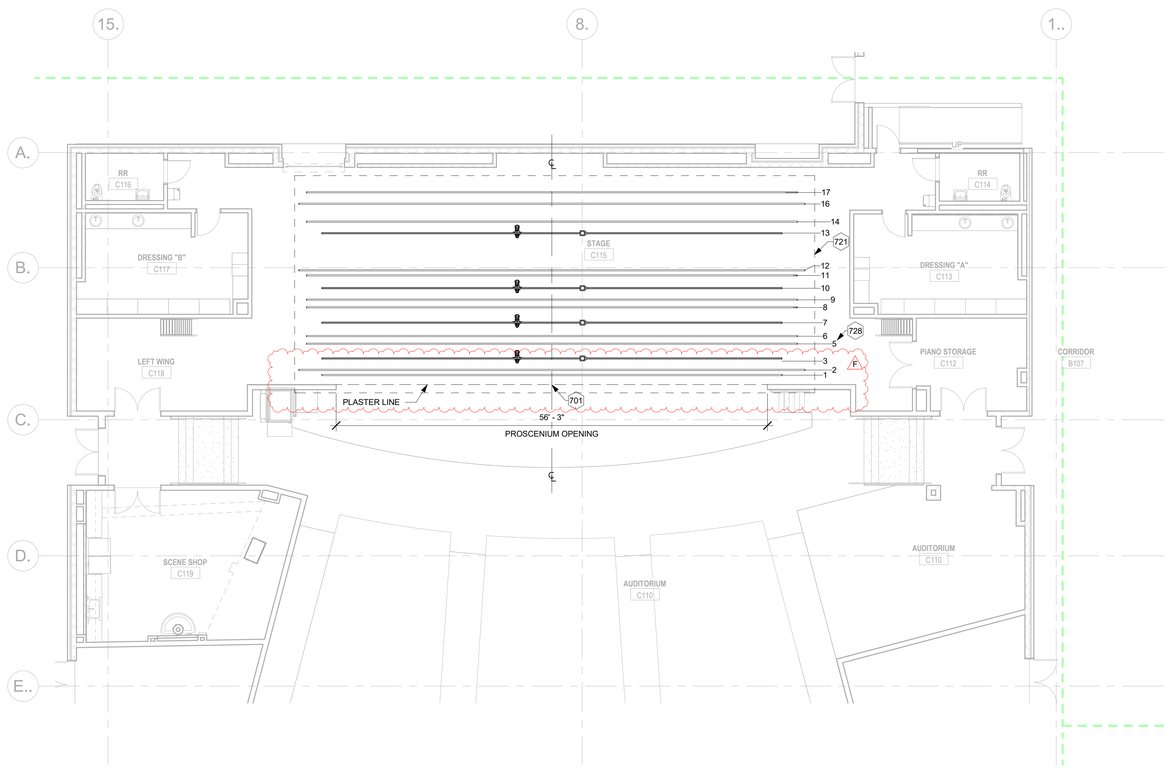
LINESET SCHEDULE - DIMENSIONS FROM DATUM								
Lineset ID	Description	Offset	Capacity	Batten Length	BASE/ALTERNATIVE	Class	Hoist Mount	Comments
1	VALANCE	1' - 2"	500	60' - 0"	BASE	DEAD HUNG	--	INSPECT AND REUSE EXISTING BATTEN & HARDWARE
2	MAIN DRAPE	1' - 10"	1000	66' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE NEW BI-PARTING TRAVELER TRACK WITH 3'-0" CL OVERLAP; PULL ON SL
3	1st ELECTRIC	3' - 4"	2000	60' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATE: VIF EXISTING MOUNTING CONDITIONS; PROVIDE WITH EXISTING DOUBLE BATTEN AND CABLE MANAGEMENT; PROVIDE NEW HOIST/CONTROLS, ref. SPECIFICATION
5	BORDER	5' - 3"	500	64' - 0"	BASE	DEAD HUNG	--	INSPECT AND REUSE EXISTING BATTEN & HARDWARE; BOTTOM OF BORDER SHALL BE 17'-0" AFF
6	LEGS	6' - 3"	500	64' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE WITH NEW 12'-0" LONG WALK-ALONG TRACK AT EACH END OF BATTEN
7	2nd ELECTRIC	8' - 0"	2000	60' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATE: VIF EXISTING MOUNTING CONDITIONS; PROVIDE WITH EXISTING DOUBLE BATTEN AND CABLE MANAGEMENT; PROVIDE NEW HOIST/CONTROLS, ref. SPECIFICATION
8	BORDER	10' - 0"	500	64' - 0"	BASE	DEAD HUNG	--	INSPECT AND REUSE EXISTING BATTEN & HARDWARE; BOTTOM OF BORDER SHALL BE 17'-0" AFF
9	LEGS	11' - 0"	500	64' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE WITH NEW 12'-0" LONG WALK-ALONG TRACK AT EACH END OF BATTEN
10	3rd ELECTRIC	12' - 6"	2000	60' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATE: VIF EXISTING MOUNTING CONDITIONS; PROVIDE WITH EXISTING DOUBLE BATTEN AND CABLE MANAGEMENT; PROVIDE NEW HOIST/CONTROLS, ref. SPECIFICATION
11	BORDER	14' - 2"	500	64' - 0"	BASE	DEAD HUNG	--	INSPECT AND REUSE EXISTING BATTEN & HARDWARE; BOTTOM OF BORDER SHALL BE 17'-0" AFF
12	MID-STAGE TRAVELER	14' - 10"	1000	66' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE NEW BI-PARTING TRAVELER TRACK WITH 3'-0" CL OVERLAP; PULL ON SL
13	4th ELECTRIC	19' - 8"	2000	60' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATE: VIF EXISTING MOUNTING CONDITIONS; PROVIDE WITH EXISTING DOUBLE BATTEN AND CABLE MANAGEMENT; PROVIDE NEW HOIST/CONTROLS, ref. SPECIFICATION
14	LEGS	21' - 2"	500	64' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE WITH NEW 12'-0" LONG WALK-ALONG TRACK AT EACH END OF BATTEN
15	UTILITY	22' - 0"	1200	64' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATIVE: INSPECT AND REUSE EXISTING BATTEN; NEW HOIST & CONTROLS; ref SPECIFICATION
16	UPSTAGE TRAVELER	23' - 6"	1000	66' - 0"	BASE	DEAD HUNG	--	PROVIDE NEW BATTEN; PROVIDE NEW BI-PARTING TRAVELER TRACK WITH 3'-0" CL OVERLAP; PULL ON SL
17	CYCLORAMA	25' - 0"	1200	64' - 0"	ALTERNATIVE	HOIST	STRUCTURE	ALTERNATIVE: INSPECT AND REUSE EXISTING BATTEN; NEW HOIST & CONTROLS; ref SPECIFICATION



1/8" = 1'-0"

TR_LEVEL 2 FLOOR PLAN - AREA B2. | 1

KEYNOTES

701	DATUM ORIGIN: THE DATUM FOR THEATRICAL RIGGING IS DEFINED AS: (1) THE STAGE CENTER-LINE. (2) THE REAR/ BACKSTAGE FINISH WALL OF THE PROSCENIUM ARCH [I.E. PLASTER-LINE]. (3) THE FINISH ELEVATION OF THE STAGE FLOOR
721	ALTERNATE: REMOVE AND DISPOSE OF ALL STAGE HOISTS AND CONTROLS, PROVIDE (6) NEW STAGE HOISTS AND CONTROLS AS SCHEDULED AND SPECIFIED
728	LINESET ID, TYP.

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FORT BEND BOND
INDEPENDENT SCHOOL DISTRICT

PROJECT NAME

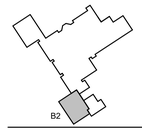
WILLOWRIDGE HIGH SCHOOL FINE ARTS ADDITION AND RENOVATION

PROJECT ADDRESS

16301 Chimney Rock Rd,
Houston, TX 77053

KIRKSEY PROJECT NO. 2023306

KEY PLAN - LEVEL 2



SHEET TITLE

LEVEL 2 FLOOR PLAN - AREA B2

SHEET NUMBER

TR2.36

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10/15/2025 9:23:21 AM
Autodesk Docs://2023306 Willowridge High School/AV_Willowridge High School_2024.rvt

Certificate Of Completion

Envelope Id: 5555E922-9585-442E-BF8B-057333D2EAE3
Status: Completed
Subject: Please DocuSign: 20251023 CSP 26-006AL - BP030 Willowridge HS Renovations - Addendum No.01
Source Envelope:
Document Pages: 204
Signatures: 5
Certificate Pages: 3
Initials: 0
AutoNav: Enabled
EnvelopeId Stamping: Enabled
Time Zone: (UTC-08:00) Pacific Time (US & Canada)

Envelope Originator:
Christine Manrique
16431 Lexington Blvd
Sugar Land, TX 77479
christine.manrique@fortbendisd.gov
IP Address: 161.51.248.19

Record Tracking

Status: Original
10/23/2025 1:05:12 PM
Holder: Christine Manrique
christine.manrique@fortbendisd.gov
Location: DocuSign

Signer Events	Signature	Timestamp
Nancy Lane nancy.lane@fortbendisd.gov Security Level: Email, Account Authentication (None)	Signed by: Nancy Lane F77F1A85ABE744F... Signature Adoption: Pre-selected Style Using IP Address: 161.51.248.19	Sent: 10/23/2025 1:21:31 PM Viewed: 10/23/2025 1:22:13 PM Signed: 10/23/2025 1:22:18 PM
Electronic Record and Signature Disclosure: Not Offered via Docusign		
Ryan Kiefer ryan.kiefer@fortbendisd.gov Security Level: Email, Account Authentication (None)	Signed by: Ryan Kiefer 1F973D1CC91A41D... Signature Adoption: Pre-selected Style Using IP Address: 161.51.248.19	Sent: 10/23/2025 1:22:32 PM Viewed: 10/23/2025 1:32:29 PM Signed: 10/23/2025 1:32:37 PM
Electronic Record and Signature Disclosure: Not Offered via Docusign		
Brenda Garcia brenda.garcia@fortbendisd.gov Security Level: Email, Account Authentication (None)	Signed by: Brenda Garcia F7F6BD96D7C742E... Signature Adoption: Pre-selected Style Using IP Address: 2601:2c7:c080:1370:9184:37f2:a83d:d247 Signed using mobile	Sent: 10/23/2025 1:32:52 PM Viewed: 10/23/2025 1:33:30 PM Signed: 10/23/2025 1:33:42 PM
Electronic Record and Signature Disclosure: Not Offered via Docusign		
Daniel Bankhead daniel.bankhead@fortbendisd.gov Exec. Dir. Security Level: Email, Account Authentication (None)	Signed by: Daniel Bankhead AABFCACAF7E9453... Signature Adoption: Pre-selected Style Using IP Address: 161.51.248.19	Sent: 10/23/2025 1:33:55 PM Viewed: 10/23/2025 2:10:12 PM Signed: 10/23/2025 2:10:20 PM
Electronic Record and Signature Disclosure: Not Offered via Docusign		

Signer Events	Signature	Timestamp
Kathleen Booker Kathleen.Booker@fortbendisd.gov Security Level: Email, Account Authentication (None)	Signed by: Kathleen Booker 1E40D8AADA6A4FB... Signature Adoption: Pre-selected Style Using IP Address: 161.51.248.96	Sent: 10/23/2025 2:10:34 PM Viewed: 10/23/2025 2:13:55 PM Signed: 10/23/2025 2:14:13 PM
Electronic Record and Signature Disclosure: Not Offered via Docusign		
In Person Signer Events	**Signature**	**Timestamp**
Editor Delivery Events	**Status**	**Timestamp**
Agent Delivery Events	**Status**	**Timestamp**
Intermediary Delivery Events	**Status**	**Timestamp**
Certified Delivery Events	**Status**	**Timestamp**
Carbon Copy Events	**Status**	**Timestamp**
Ekaette Etim cn_ekaette.etim@fortbendisd.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 10/23/2025 1:21:32 PM Viewed: 10/23/2025 1:45:24 PM
Jane Thompson cn_jane.thompson@fortbendisd.gov Executive Assistant to Daniel Bankhead Fort Bend ISD Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 10/23/2025 1:33:55 PM
Doris Emeka Onyenwe doris.emekaonyenwe@fortbendisd.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 10/23/2025 2:10:32 PM
Antoinette Lewis Antoinette.Lewis1@fortbendisd.gov Security Level: Email, Account Authentication (None) **Electronic Record and Signature Disclosure:** Not Offered via Docusign	COPIED	Sent: 10/23/2025 2:10:34 PM Viewed: 10/23/2025 5:24:49 PM
Witness Events	**Signature**	**Timestamp**
Notary Events	**Signature**	**Timestamp**

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	10/23/2025 1:21:32 PM
Envelope Updated	Security Checked	10/23/2025 1:41:10 PM
Envelope Updated	Security Checked	10/23/2025 1:41:10 PM

Envelope Summary Events	Status	Timestamps
Envelope Updated	Security Checked	10/23/2025 1:41:10 PM
Envelope Updated	Security Checked	10/23/2025 1:41:10 PM
Certified Delivered	Security Checked	10/23/2025 2:13:55 PM
Signing Complete	Security Checked	10/23/2025 2:14:13 PM
Completed	Security Checked	10/23/2025 2:14:13 PM

Payment Events	Status	Timestamps