Newkirk Novak Construction Partners
11200 West 79th Street
Lenexa, KS 66214
913.312.9535

Liberty School District – Storm Shelter Additions
Addendum No: 004
Description Narrative
September 29, 2023

This Addendum is issued to all registered plan holders pursuant to the Instructions to Bidders and Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

A. CONSTRUCTION MANAGER'S FRONT END MANUAL

Bid date has changed to October 10th. 3pm.
Answers to bidder questions.

B. OTHER

NA

C. SPECIFICATIONS

1. Please reference the attached Addendum No. 004 issued by Hollis + Miller dated September 29, 2023, for updates to Specifications

D. DRAWINGS

1. Please reference the attached Addendum No. 004 issued by Hollis + Miller dated September 29, 2023, for updates to Drawings

Please direct any questions regarding the information in this addenda and the project to Newkirk Novak Construction Partners.

Construction Manager: Newkirk Novak Construction Partners

Liberty School District - Storm Shelter Additions

Architect: Hollis+Miller

Date: 9/29/2023

Question Issued By:	#	Discipline	Scope of Work	Date	Drawing / Detail #	Building	Question	Response	Answered By	Date Answered
Image Flooring	1	Arch	Flooring	9/21/2023			Sub Request for Athletic Flooring - OmniSport Active	Yes	HMA	9/26/2023
Progressive Electronics	2	MEP	AV	9/21/2023		Epic	There is not AV Drawings. Please confrim no scope existis at Epic.	For Epic the AV scope is shown in the electrical plans (Re:E201A and E304). (AV design by S&B for EPIC, AV design by Avant for DMS and SVMS.)	S&B	
Royal Construction	3	Arch	Wall Panels	9/21/2023	F1 & N1/A121A - DMS	All	Request to change details on any Plam or Wood wall panles that are on Z-Clips to have a plywood backer ilo sheetrock.	Sheetrock to remain. This provides the options and does not limit owner in the future if the Plam is removed	HMA	9/26/2023
Royal Construction	4	Arch	Wall Panels	9/21/2023	A1 & G1/A621, A1 & G1/A622	DMS, SVMS	A complete section through the PLAM and AP3 wall panels would be helpful. We need to see how the WP1 panels will attach and how they will align with the AP3 panels.	Will be updated in upcoming addendum.	HMA	9/28/2023
Royal Construction	5	Arch	Wall Panels	9/21/2023	J4/A121A	Epic	Assuming that the PL21 panels return on the back side and extend to the ceiling (see below). Please clarify.	Correct.	HMA	9/25/2023
Royal Construction	6	Arch	Wall Panels	9/21/2023	A7, A12, D7, D12/A621	Epic	The room number is mis-labeled (should be “A103”).	Will be updated in upcoming addendum.	HMA	9/25/2023
Royal Construction	7	Arch	Wall Panels	9/21/2023	L1 & L9/A621, E7 & L7/A622	Epic	The room number is mis-labeled (should be “A111”).	Will be updated in upcoming addendum.	HMA	9/25/2023
Royal Construction	8	Arch	Wall Panels	9/21/2023	A9/A661	Epic	Should Plam Finish be PL21 or PL1?	PL21 is correct. Will be updated in upcoming addendum.	HMA	9/25/2023
Royal Construction	9	Arch	Wall Panels	9/21/2023	A9 & J13/A661	Epic	A plywood backer would be preferred behind PLAM panels. Also, there are no references to Fry-Reglet channels on the corners, which is different than the other schools. Please clarify.	Fry-reglet corners to be added in upcoming addendum.	HMA	9/25/2023
Royal Construction	10	Arch	Wall Panels	9/21/2023	A621	Epic	Please identify the finish type for PL21 Fusion Maple.	#60 Matte	HMA	9/25/2023
KC Mechanical	11	MEP	Plumbing	9/21/2023	Spec	All	Please advise if Sch. 40 PVC DWV pipe and fitting is acceptable for underground waste and vent. Spec section 221316 currently does not allow it.	It will be allowed, spec section 221316 will be updated in upcoming addendum.	S&B	9/28/2023
KC Mechanical	12	MEP	Plumbing	9/21/2023	Spec	All	Spec section (221316) Sanitary Waste and Vent Piping specifies heavy duty no-hub couplings for aboveground systems. Spec section (221413) Storm Drainage Piping specifies standard no-hub couplings for aboveground systems. This is opposite of what we typically see. Please advise this is correct.	Sanitary waste and vent piping will be updated to standard; Storm drainage piping will be updated to heavy-duty. Spec sections will be updated in upcoming addendum.	S&B	9/28/2023
Byers Glass	13	Arch	Glazing	9/21/2023		DMS	Please clarify if Doors D-A100a AND D-A100b should actually be labeled as aluminum framing and also should be part of frame 1?	Correct. Doors D-A100a AND D-A100b are part of Frame Type 1. Correct they are aluminum frame. Will be updated in upcoming addendum.	HMA	9/22/2023
Byers Glass	14	Arch	Glazing	9/21/2023		DMS	Please clarify if Door D-A101a should be labeled as part of Frame 3 instead of Frame 2	Correct. Doors D-A101a are part of Frame Type 3. Will be updated in upcoming addendum.	HMA	9/23/2023
Mid America Precast	16	Arch / Structural	Structure	9/22/2023		DMS / SVMS	Due to the size of the panels, the weights have become an issue with transportation. Is there anyway we could change the dimensions of the double t’s and load bearing walls (north and south sides) walls? This would allow the weight of the panels to reduce which should eliminate the transportation issue. We suggest a 8’4 size instead of the 10’ shown on the plans.	Precast double T size and locations need to remain as is to the original design due to multiple penetrations and strategic coordination during design to support the athletic and fine arts functions in the space. Precast wall panels can be reduced in size per manufacture recommendation as long as, double T size remains as is per the original design and accommodate design intent, provide cost assessment for additional joint and steel connection to precast vs. keeping panels as is, all open sizes and locations need to remain as is per the construction drawings. It is highly advised for precast wall panels to remain 10' to the original design.	BDC/HMA	9/26/2023
Mid America Precast	17	Arch / Structural	Structure	9/22/2023		All	In the precast spec (034100, 2.1 (B, 4.a)) it states that “ at no point shall the thickness of the precast panel wythe be less than 4 inches thick”. The precast plans show an exterior 3” wythe. Please clarify.	3" is acceptable	BDC	9/25/2023
BurnsBoys	18	Arch	Operable Partitions	9/25/2023		Epic	Sub Request for Operable Panel Partitions - Moderco	Yes	HMA	9/26/2023
Coreslab Structures	19	Arch / Structural	Structure	9/25/2023		All	Please confirm Load Bearing Wall width can match TT Width layout per Precast Manufactuer.	See response for Questions 16	BDC/HMA	9/26/2023
Delta	21	Arch	Roofing	9/25/2023		Epic	075423 Thermoplastic Polyolefin (TPO) Roofing. No VSH Requirement listed. Does the owner want a VSH option on the TPO? Does the architect want a vapor barrier on the concrete deck and metal decks on the TPO options?	Provide as indicated in the SPECS		
Delta	22	Arch	Roofing	9/25/2023		All	Please confirm roofing types by location.	Refer to ROOF TYPES on A141, for all three schools	HMA	9/26/2023
Progressive Electronics	23	MEP	Fire Alarm	9/25/2023		All	Could you please provide the model number of the main fire alarm control panel at each school? The specs mention Notifier and Edwards as acceptable manufacturers but doesn’t give any detail about the existing systems.	Existing fire alarm CP at each school is the following; South Valley: Simplex 4010 Discovery: Edwards iO series EPIC: Notifier AFP-200	S&B	9/27/2023
KC Mechanical	24	MEP	Plumbing	9/25/2023		Epic	Please confirm the water closets (WC-1 & WC-2) on EPiC Elementary are intended to be wall hung fixtures per the schedule. The riser diagram and plan view piping schematic show these being plumbed like floor mount fixtures.	Water closets shall be wall hung per the plumbing fixture schedule. The plans and riser diagram will be updated accordingly.	S&B	9/27/2023
ADP Lemco Inc	25	Arch	Gym Equipment	9/25/2023		All	Sub Request for Gym Equipment and Divider Curtain	No		

Newkirk Novak Construction	26	Arch	Skin	9/25/2023		Epic	Please confrim removal of brick at Epic Classroom around CIP Walls is acceptable. Provide revised details if accepted.	Removal of brick at cast in place walls is acceptable. Details and elevations of revision to be documented in an addendum.	HMA	9/26/2023
Mid America Precast	27	Structural	Slab Elevations	9/25/2023		SVMS	On page S100 in the South Valley Middle School plans, on the east side of the foundation plan, it appears the wall changes and had a step in the foundation. It shows T/Slab (El. 99') directly to the north of the S202/5 note. Can you verify this is supposed to read t/slab or is it supposed to read t/ftg like the wall is up until that point on the north?	Yes, this callout refers to T/FTG.	BDC	9/28/2023
DH Pace	30	Arch	Doors, Frames, Hardware	9/26/2023		Epic	E-A114a is listed as Door Type A2. A2 is not specified. Please advise what type of door should be provided for this opening.	Door type A3	HMA	9/26/2023
DH Pace	31	Arch	Doors, Frames, Hardware	9/26/2023		Epic	E-A115 Door Type on Epic is missing. It is just listed as A. Please advise what door type this should be.	Door type A1	HMA	9/26/2023
Cornell Roofing	38	Arch	Roofing	9/26/2023		All	Is TPO to be an alternate at all buildings? If so what alternate.	TPO is not an alternate. TPO is only on EPiC.	HMA	9/26/2023
KC Structural Steel	40	Arch	Roof Access	9/26/2023		All	Spec 055000 2.9A&B point to a prefabricated aluminum ships ladder and a shop fabricated steel ladder. Can you confirm if this is the intent? Or if both are desired to be aluminum.	Specification is correct		
Questec	41	Structural / MEP	ICC500 Requirements	9/26/2023		Epic	While going through the architectural drawing I noticed that in both middle school drawing sets on sheet S100 "General notes" section 10 "Precast Concrete Members" note G states information regarding ICC500. However, epic elementary has no mention of ICC500. To properly meet ICC500 we would need to use wall shrouds and offset vents when going through the storm shelter structure. I want to confirm that these storm shelters on all buildings (elementary school included) are ICC500 and will require proper shrouding materials on plumbing penetrations throughout the shelter.	Confirmed, ICC-500 requirements apply to all three schools (including EPiC Elementary). General note 10.G will be added to EPiC elementary drawings for clarity.	BDC	9/28/2023

hollis + miller architects

we design the future®

ADDENDUM NO. 04

Issued: 09/29/2023

Project: 23018 - Discovery Middle School, 800 Midjay Drive, Liberty, Missouri 64068
23019 - South Valley Middle School, 1000 Midjay Drive, Liberty, Missouri 64068
23020 - EPiC Elementary School, 650 Conister Street, Liberty, Missouri 64068

Owner: Liberty Public Schools
8 Victory Lane
Liberty, MO 64068

Bidding Documents Issued: 08.31.2023

This Addendum includes these 6 pages and the following attachments:

Supplemental Information:

Refer to Newkirk Novak Construction Partners Description Narrative.

Project Manual:

Reissued Section 000105 "Certifications Page" consisting of 2 pages.
Reissued Section 000110 "Table of Contents" consisting of 6 pages.
Reissued Section 075216 "Modified Bituminous Membrane Roofing" consisting of 14 pages.
Reissued Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" consisting of 14 pages.
Reissued Section 116143 "Stage Curtains" consisting of 4 pages.
Refer to Bob D. Campbel & Co., Structure Addendum No. 4 narrative.
Refer to Smith & Boucher, MEP Addendum No. 4 narrative.
Refer to Peerbolte Theatrical Addendum 4 narrative.

Drawings:

23018 – Discovery Middle School
Revised architectural sheets A101A, A121A, A141, A501, A622, A661, A662

Refer to Bob D. Campbell, Structure Addendum No. 4
Refer to Smith & Boucher, MEP Addendum No. 4
Refer to Peerbolte Creative, Theater Addendum No. 4

23019 – South Valley Middle School
Revised architectural sheets A101A, A121A, A141, A363, A621, A661, A662

Refer to Bob D. Campbell, Structure Addendum No. 4
Refer to Smith & Boucher, MEP Addendum No. 4
Refer to Peerbolte Creative, Theater Addendum No. 4

23020 – EPiC Elementary School
Revised architectural sheets G000, AS101, A101A, A121A, A201, A331, A332, A361, A363, A422, A501, A621, A622, A661, and A681.

Refer to Bob D. Campbell, Structure Addendum No. 4
Refer to Smith & Boucher, MEP Addendum No. 4
Refer to Peerbolte Creative, Theater Addendum No. 4

PROJECT MANUAL REVISIONS

A1 SECTION 000005 – CERTIFICATIONS PAGE

A1.1 REPLACE existing Section 000005 “Certifications Page” with the attached revised Section 000005 “Certifications Page”, dated September 29, 2023.

A2 **SECTION 000110 - TABLE OF CONTENTS**

A2.1 REPLACE existing Section 000110 “Table of Contents” with the attached revised Section 000110 “Table of Contents”, dated September 29, 2023.

A3 SECTION 075216 - MODIFIED BITUMINOUS MEMBRANE ROOFING

A3.1 REPLACE existing Section 075216 “Modified Bituminous Membrane Roofing” with the attached revised Section 075216 dated September 29, 2023.

A4 SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A4.1 REPLACE existing Section 075423 “Thermoplastic Polyolefin (TPO) Roofing” with the attached revised Section 075423 dated September 29, 2023.

A5 SECTION 116143 – STAGE CURTAINS

A5.1 REPLACE existing Section 116143 “Stage Curtains” dated September 2023 with the attached revised Section 116143 “Stage Curtains,” dated September 29, 2023.

M1 REFERENCE ATTACHED MEP ADDENDUM NO. 4

E1 REFERENCE ATTACHED MEP ADDENDUM NO. 4

P1 REFERENCE ATTACHED MEP ADDENDUM NO. 4

S1 REFERENCE ATTACHED STRUCUTRAL ADDENDUM NO. 4

TH1 REFERENCE ATTACHED THEATER ADDENDUM NO. 4

we design the future®

DRAWINGS REVISIONS – 23018 Discovery Middle School

A6 GENERAL – ARCHITECTURAL SHEETS

A6.1 REMOVED room name and verbiage throughout the Architectural Sheets as occurs, as follows: STAGE. REPLACED room name with PLATFORM.

A7 SHEET A101A – REFLECTED CEILING PLAN - LEVEL 1 - AREA A

A7.1 REVISE plan note at bleachers, per sheet A101A.

A8 SHEET A121A – REFLECTED CEILING PLAN - LEVEL 1 - AREA A

A8.1 REMOVE plan note referencing roof vents. REVISED and ADDED AP2 (098436.A01 – SOUND-ABSORBING CEILING PANELS) at Platform A108, per sheet A121A.

A9 SHEET A141 – ROOF PLAN

A9.1 REMOVE keynote 077200.A04, Smoke Vents, and a portion of the walkway pads (075216.A16) in PLAN A1/A141.

A9.2 REMOVED keynote 035216.A02 SUBRATE BOARD. REPLACED keynote with 075216.25 COVERBOARD in ROOF TYPES.

A9.3 REMOVED keynote 035216.A04 INSULATION. REPLACED keynote with 075216.20 ROOF INSULATION in ROOF TYPES.

A10 SHEET A501 – DOOR SCHEDULE, DOOR TYPES, FRAME TYPES & DETAILS

A10.1 REVISE Frame Types for doors D-A100a,D-A100b, and D-A101a in DOOR SCHEDULE.

A11 SHEET A622 – INTERIOR ELEVATIONS

A11.1 ADDED section L5 in ELEVATION A1, per sheet A622. Section at plastic laminate and AP3 panel.

A12 SHEET A661– INTERIOR DETAIL

A12.1 REVISED detail N12, per sheet A661.

A13 SHEET A662 – INTERIOR DETAIL

A13.1 REVISED drawing note in TYPE A, B, & C SECTION in panel detail in detail A10, per sheet A662.

A13.2 ADDED detail L5, per sheet A662.

S1 REFERENCE ATTACHED STRUCUTRAL ADDENDUM NO. 4

M2 REFERENCE ATTACHED MEP ADDENDUM NO. 4

E2 REFERENCE ATTACHED MEP ADDENDUM NO. 4

P2 REFERENCE ATTACHED MEP ADDENDUM NO. 4

AV1 GENERAL – AV SHEETS

AV1.1 REMOVED room name and verbiage throughout the AV Sheets as occurs, as follows: STAGE. REPLACED room name and verbiage with PLATFORM.

TH2 REFERENCE ATTACHED THEATER ADDENDUM NO. 4

DRAWINGS REVISIONS – 23019 South Valley Middle School

A14 GENERAL – ARCHITECTURAL SHEETS

A14.1 REMOVED room name and verbiage throughout the Architectural Sheets as occurs, as follows: STAGE. REPLACED room name with PLATFORM.

A15 SHEET A101A – REFLECTED CEILING PLAN - LEVEL 1 - AREA A

A15.1 REVISE plan note at bleachers, per sheet A101A.

A16 SHEET A121A – REFLECTED CEILING PLAN - LEVEL 1 - AREA A

A16.1 REMOVE plan note referencing roof vents. REVISED and ADDED AP2 (098436.A01 – SOUND-ABSORBING CEILING PANELS) at Platform A108, per sheet A121A.

A17 SHEET A141 – ROOF PLAN

A17.1 REMOVE keynote 077200.A04, Smoke Vents, and a portion of the walkway pads (075216.A16) in PLAN A1/A141.

A17.2 REMOVED keynote 035216.A02 SUBRATE BOARD. REPLACED keynote with 075216.25 COVERBOARD in ROOF TYPES.

A17.3 REMOVED keynote 035216.A04 INSULATION. REPLACED keynote with 075216.20 ROOF INSULATION in ROOF TYPES.

A18 SHEET A363 – EXTERIOR DETAILS

A18.1 REVISED detail L1, per sheet A363.

A19 SHEET A622 – INTERIOR ELEVATIONS

A19.1 ADDED section L5/A662 in ELEVATION A1/A622 at plastic laminate and AP3 panel.

A20 SHEET A662 – INTERIOR DETAIL

A20.1 REVISED drawing note in TYPE A, B, & C SECTION in panel detail in detail A10, per sheet A662.

A20.2 ADDED section N7, per sheet A662.

S1 REFERENCE ATTACHED STRUCUTRAL ADDENDUM NO. 4

M3 EFERENCE ATTACHED MEP ADDENDUM NO. 4

E3 REFERENCE ATTACHED MEP ADDENDUM NO. 4

P3 REFERENCE ATTACHED MEP ADDENDUM NO. 4

AV2 GENERAL – AV SHEETS

AV2.1 REMOVED room name and verbiage throughout the AV Sheets as occurs, as follows: STAGE. REPLACED room name and verbiage with PLATFORM.

TH3 REFERENCE ATTACHED THEATER ADDENDUM NO. 4

we design the future®

DRAWINGS REVISIONS – 23020 EPiC Elementary School

A13 SHEET G000 – COVER SHEET

A13.1 REPLACE sheet G000 with attached sheet G000 dated 09/29/2023.

A13.2 ADDED sheet TH100 to drawing index.

A14 SHEET AS101 – ARCHITECTURAL SITE PLAN

A14.1 REPLACE sheet AS101 with attached sheet AS101 dated 09/29/2023.

A14.2 REMOVED subdrainage connection at NW corner of storm shelter.

A15 SHEET A101A – FLOOR PLAN – LEVEL 1 – AREA A

A15.1 REPLACE sheet A101A with attached sheet A101A dated 09/29/2023.

A15.2 REVISED wall types and dimensions at A103 Art.

A16 SHEET A121A – REFLECTED CEILING PLAN – LEVEL 1 – AREA A

A16.1 REPLACE sheet A121A with attached sheet A121A dated 09/29/2023.

A16.2 ADDED TR2 to detail J4.

A16.3 ADDED enlarged plan callout E1/A121B to A114 Music.

A17 SHEET A201 – EXTERIOR ELEVATIONS

A17.1 REPLACE sheet A201 with attached sheet A201 dated 09/29/2023.

A17.2 REVISED elevations A1, F1, and F9.

A18 SHEET A331 – WALL SECTIONS

A18.1 REPLACE sheet A331 with attached sheet A331 dated 09/29/2023.

A18.2 ADDED section A14/A331.

A18.3 REVISED sections A8 and A11 to remove face brick and replace with metal panel and cast in place concrete with form liner.

A19 SHEET A332 – WALL SECTIONS

A19.1 REPLACE sheet A332 with attached sheet A332 dated 09/29/2023.

A19.2 REMOVED subdrainage and ADDED geofoam on sections A4, A9, and A13.

A20 SHEET A361 – EXTERIOR DETAILS

A20.1 REPLACE sheet A361 with attached sheet A361 dated 09/29/2023.

A20.2 REVISED detail J1.

A21 SHEET A363 – EXTERIOR DETAILS

A21.1 REPLACE sheet A363 with attached sheet A363 dated 09/29/2023.

A21.2 REVISED detail K1 and K7.

A22 SHEET A422 – ENLARGED PLANS & DETAILS

A22.1 REPLACE sheet A422 with attached sheet A422 dated 09/29/2023.

A22.2 ADDED wall types to A7.

A23 SHEET A501 – DOOR TYPES & FRAME TYPES

A23.1 REPLACE sheet A501 with attached sheet A501 dated 09/29/2023.

A23.2 REVISED openings E-A108, E-A114a and EA115.

A24 SHEET A621 – INTERIOR ELEVATIONS

A24.1 REPLACE sheet A621 with attached sheet A621 dated 09/29/2023.

A24.2 REVISED room numbers on elevation A7, A12, D7, D12, L1, and L9.

A25 SHEET A622 – INTERIOR ELEVATIONS

A25.1 REPLACE sheet A622 with attached sheet A622 dated 09/29/2023.

A25.2 REVISED room numbers on elevation A1, A7, A12, E1, E7, and L7.

A26 SHEET A661 – INTERIOR DETAILS

A26.1 REPLACE sheet A661 with attached sheet A661 dated 09/29/2023.

A26.2 ADDED TR2 to details A9 and J13.

A26.3 REVISED PL1 to PL21 on detail A9.

A27 SHEET A681 – MATERIAL FINISH LEGEND

A27.1 REPLACE sheet A681 with attached sheet A681 dated 09/29/2023.

A27.2 REVISED material F21.

S1 REFERENCE ATTACHED STRUCUTRAL ADDENDUM NO. 4

M4 REFERENCE ATTACHED MEP ADDENDUM NO. 4

E4 REFERENCE ATTACHED MEP ADDENDUM NO. 4

P4 REFERENCE ATTACHED MEP ADDENDUM NO. 4

TH4 REFERENCE ATTACHED THEATER ADDENDUM NO. 4

END OF ADDENDUM NO. 04

SECTION 000105 - CERTIFICATIONS PAGE

ARCHITECT

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 1 SECTIONS:	011000, 012100, 012200, 012300, 012500, 013100, 013200, 013233, 014000, 014200, 014529, 016000, 017419, 017700, 017823, 017839, 017900.
DIVISION 2 SECTION:	024119.
DIVISION 4 SECTION:	042000.
DIVISION 5 SECTIONS:	055000, 055100, 055213.
DIVISION 6 SECTIONS:	061000, 061600, 064023.
DIVISION 7 SECTIONS:	071326, 071416, 072100, 072726, 074213, 074243, 074400, 074800, **075216**, **075423**, 076200, 077200, 078100, 078413, 078446, 079200, 079500.
DIVISION 8 SECTIONS:	081113, 081416, 084113, 087100, 088000.
DIVISION 9 SECTIONS:	092116, 092900, 093000, 095113, 096466, 096513, 096566, 096723, 096813, 097723, 097253, 098433, 098436, 099113, 099123, 099600, 099723.
DIVISION 10 SECTIONS:	101100, 101400, 101423, 102113, 102238,102600, 102800, 104300, 104413, 104416.
DIVISION 11 SECTIONS:	116143, ~~**116623**~~, 116653.
DIVISION 12 SECTIONS:	122413, 123200, 123666, 126600.
DIVISION 34 SECTION:	334600.

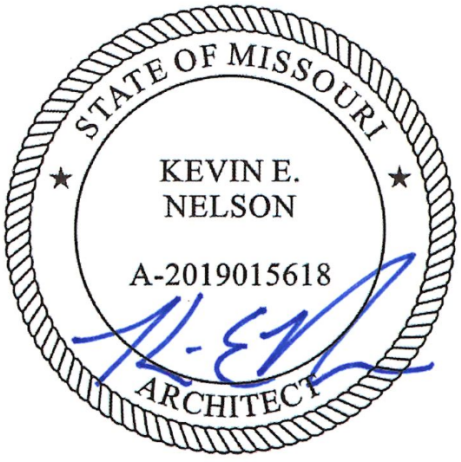
I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.

KEVIN E. NELSON

ARCHITECT

SEPTEMBER 29, 2023

DATE



SEPTEMBER 29, 2023

SECTION 000105 - CERTIFICATIONS PAGE

STRUCTURAL ENGINEER

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 1 SECTIONS:	
DIVISION 2 SECTIONS:	
DIVISION 3 SECTIONS:	033000, **034100**
DIVISION 4 SECTIONS:	
DIVISION 5 SECTIONS:	051200, 052100, 053100, 054000
DIVISION 6 SECTIONS:	
DIVISION 7 SECTIONS:	
DIVISION 8 SECTIONS:	
DIVISION 9 SECTIONS:	
DIVISION 10 SECTIONS:	
DIVISION 11 SECTIONS:	
DIVISION 12 SECTIONS:	
DIVISION 13 SECTIONS:	
DIVISION 14 SECTIONS:	
DIVISION 31 SECTIONS:	
DIVISION 32 SECTIONS:	
DIVISION 33 SECTIONS:	

I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.

RYAN M. HAGEDORN _____ 9/29/2023 _____

ENGINEER DATE

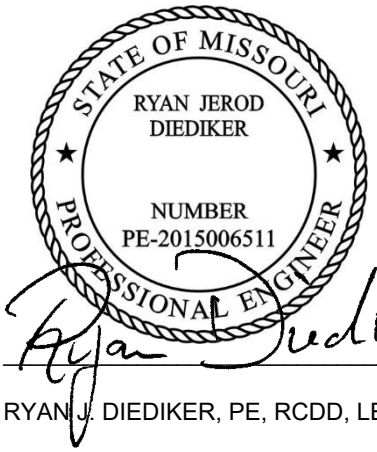
SECTION 000105 - CERTIFICATIONS PAGE-MEP

MEP ENGINEER

I HEREBY, PURSUANT TO RSMO 327.411, STATE THAT THE SPECIFICATIONS INTENDED TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO SPECIFICATIONS LISTED BELOW:

DIVISION 21 SECTIONS:	210500, 211200, 211313
DIVISION 22 SECTIONS:	220500, 220513, 220516, 220517, 220518, 220519, 220523, 220529, 220553, 220719, 221116, 221119, 221123, 221316, 221319, 221413, 221423, 223300, 224000, 224700
DIVISION 23 SECTIONS:	230500, 230513, 230525, 230548, 230553, 230593, 230713, 230719, 230900, 231123, 232300, 233113, 233300, 233416, 233713, 237416.11, 237416.13, 238126, 238239
DIVISION 26 SECTIONS:	260500, 260519, 260523, 260526, 260529, 260533, 260553, 260923, 260943, 262200, 262416, 262726, 262813, 262816, 263323, 264113, 265119, 265219, 265619
DIVISION 27 SECTIONS:	270000, 270500, 270526, 270536, 275116, 275145
DIVISION 28 SECTIONS	280500, 280513, 283111

I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER SPECIFICATIONS, DRAWINGS, ESTIMATES, REPORTS, OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF THE ARCHITECTURAL OR ENGINEERING PROJECT OR SURVEY.



09.28.2023

RYAN J. DIEDIKER, PE, RCDD, LEED AP DATE

DOCUMENT 000110 – TABLE OF CONTENTS

Revisions	Date
ADD01	09.14.2023
ADD02	09.22.2023
ADD04	**06.29.2023**

Project Name: Liberty School District Renovations
Project No. & Locations:
23018- Discovery Middle School
800 Midjay Drive, Liberty, Missouri 64068
23019- South Valley Middle School
1000 Midjay Drive, Liberty, Missouri 64068
23020- EPiC Elementary School
650 Conistor Street, Liberty, Missouri 64068

END OF TABLE OF CONTENTS

BOB D. CAMPBELL & CO.
Structural Engineers Since 1957
4338 Belleview Ave. 816.531.4144
Kansas City, MO 64111 www.bdc-engrs.com

Liberty Public Schools
Addendum 04 – 09/29/23 – Structural Narrative

SPECIFICATIONS:

000105 – Certifications Page
1. Add section 034100

033000 – Cast-In-Place Concrete
1. Add section 1.01-B: inclusion of foam void fill (geofoam)
2. Add section 1.03-A-2-m: Foam void fill (geofoam) installation
3. Add section 2.18: Foam Void Fill (Geofoam)
4. Add section 2.19: Fabricating Foam Void Fill (Geofoam)
5. Add section 3.21: Foam Void Fill (Geofoam) Installation

034100 – Precast Structural Concrete
1. Revise section 2.1-B-4-a: 4” minimum thickness changed to 3” minimum thickness

EPiC ELEMENTARY SCHOOL DRAWINGS:

S001 – GENERAL NOTES
1. Add noted 10.G

S100 – FOUNDATION PLAN
1. Revised footing size, layout, and step locations on west side of addition at art room

S201 – FOUNDATION SECTIONS
1. Revised section 1 to reflect geofoam backfill in place of soil backfill, eliminating below grade temporary bracing requirements.
2. Revised section 2 to include retaining wall design
3. Revised section 9 to include retaining wall design

S202 – FOUNDATION SECTIONS
1. Revised sections 1, 2, 3, and 5 to reflect geofoam backfill in place of soil backfill, eliminating below grade temporary bracing requirements.

S203 – FOUNDATION SECTIONS
1. Revised sections 1 and 2 to reflect geofoam backfill in place of soil backfill, eliminating below grade temporary bracing requirements.

SOUTH VALLEY MIDDLE SCHOOL DRAWINGS:

S102 – ROOF FRAMING PLAN
1. Removed roof vents openings in the precast double-tees

DISCOVERY MIDDLE SCHOOL DRAWINGS:

S102 – ROOF FRAMING PLAN
1. Removed roof vent openings in the precast double tees

ADDENUM No. 4

Liberty Discovery Middle School Storm Shelter Addition
Smith & Boucher Project No. 2314702

Liberty South Valley Middle School Storm Shelter Addition
Smith & Boucher Project No. 2314703

Liberty Epic Elementary School Lighting Storm Shelter Addition
Smith & Boucher Project No. 2314704

09/29/2023

To Documents Titled:
See titles above.
08/31/2023

Architect-of-Record:
Hollis and Miller
1828 Walnut Street Suite 922
Kansas City, MO 64108

The Contract Documents for the above referenced project and the Work covered thereby are modified as described herein.

SPECIFICATIONS

1. 221316 – Sanitary Waste and Vent Piping
    a. Add 1.2 Definitions.
    b. Add 1.4.A Product Data and 1.4.B Shop Drawings.
    c. Add 1.5.C and 1.5.D Quality Assurance
    d. Revise and add Part 2 – Products
    e. Revise 3.1.C to standard.
    f. Add 3.1.D Underground, soil, waste, and vent piping.
    g. Add 3.2.J, 3.2.K, and 3.2.L.
    h. Revise and add 3.3 Joint Construction.
2. 221413 – Storm Drainage Piping
    a. Revise 3.2.B to heavy-duty.

DISCOVERY MIDDLE SCHOOL DRAWINGS

1. Sheet M101A – HVAC Plan – Level 1 & Mezzanine – Area A
    a. Remove plan note 15.
    b. Remove the room name “Stage” and replace with “Platform”.

SOUTH VALLEY MIDDLE SCHOOL DRAWINGS

1. Sheet M101A – HVAC Plan – Level 1 & Mezzanine – Area A
    a. Remove plan note 15.
    b. Remove the room name “Stage” and replace with “Platform”.

EPIC ELEMENTARY SCHOOL DRAWINGS

2. Sheet P100A – Underslab Plumbing Plan – Level 1 – Area A
    a. Water closets are wall-hung. Removed pipe through slab at water closet bowl and revised plan note 1 leader lines.
3. Sheet P301- Plumbing Riser Diagrams
    a. Revised water closets WC-1 and WC-2 to be wall-hung on Waste & Vent Riser Diagram – Area A and Waste & Vent Riser Diagram – Area B.
4. Sheet E302- Electrical Schedules and Details
    a. Revised lighting controls narrative for Stage lighting to be networked and available for control via app or browser control.

Attachments

- See specification and drawing list above.

END OF MEP ITEMS FOR ADDENDUM NO. 4

Make the following changes to Specification 116133

Item 1 - 116133, 2.3 **DELETE** paragraphs C and D in their entirety and **REPLACE** with the following:

C. Flame Retardant: All synthetic fabrics utilized for the curtains hereafter specified shall be inherently flame retardant to conform to all applicable building and safety codes. The specified synthetic velours shall be inherently flame retardant to the extent that the curtain will withstand cleanings without being affected. Prior to final approval, the Rigging Contractor shall provide two original signed and notarized, flameproofing certificates stating the process used, the method of Flame Retardant utilized, the fabric, the color and the yardage. All certificates shall be originated by the firm having done the flameproofing and not by the Theatrical Rigging Contractor.

D. Materials provided:
1. Forestage (Grand Drapery, Grand Valance), Color to be selected by Architect shall be manufactured using one of the following fabrics, or approved equal.
   a. 62" Da Vinci Velvet Plus synthetic velour, 21 ounces per linear yard as manufactured by Dazian.
   b. Fred Krieger Fabric: Prism synthetic velour, 22 ounces per linear yard, 62” wide.
   c. Rose Brand: Encore synthetic velour, 22 ounces per linear yard, 64” wide.
2. Masking Curtains, Color: Black.
   a. 62" Milano Velvet Plus synthetic velour, 16 ounces per linear yard as manufactured by Dazian.
   b. Fred Krieger Fabric: Prism synthetic velour, 14 ounces per linear yard, 62” wide.
   c. Rose Brand: Encore synthetic velour, 15 ounces per linear yard, 64” wide.
3. Stage Curtain Bags
   a. 68” canvas, 15 ounce per linear yard as manufactured by Rose Brand.
   b. 64” Ranger, 16 ounces per linear yard as manufactured by KM Fabric, Inc.
4. Curtain tracks and hardware,
   a. Automatic Devices Company, Model 280 Silent Steel
   b. H&H Specialties, 400 Series Heavy-Duty Straight Track
   c. Hall Stage, T70 Curtain track

Item 2 - 116133 2.3 paragraph M, 1. **DELETE** reference to Prestige velour and **REPLACE** with Encore velour. **DELETE** Reference to 50% and **REPLACE** with 75%.

Item 3 - 116133 2.3 paragraph M, 2. **DELETE** reference to Prestige velour and **REPLACE** with Encore velour. **DELETE** Reference to 50% and **REPLACE** with 75%.

Item 4 - 116133 2.3 paragraph M, 3. **DELETE** reference to Plateau velour and REPLACE with Encore velour. **DELETE** reference to track lengths of 33'5" and 34’8” with a total track span of 66'3". And **REPLAC**E with 30'2" and 30’4” with a total track span of 58'2".

Item 5 - 116133 2.3 paragraph M, 4. **DELETE** reference to Plateau velour and **REPLACE** with Encore velour.

Item 6 - 116133 2.3 paragraph M, 5. **DELETE** in its entirety and **REPLACE** with the following:

5. Provide Five (5) pair, Ten (10) sections total, masking legs. Finish each section 10'0" wide x 23'0" high, 50% fullness, Encore velour, color black.
   a. With each pair of legs, Provide Two (2) ADC 280 Tracks, ten sections total.
      1) Five (5) sections shall be 12’4” in length.
      2) Five (5) sections shall be 12’6” in length.
      3) The tracks shall be provided with all necessary hardware for endless line one way operation and an adjustable 5” floor pulley. Install at locations 3, 6, 9, 14 and 17 on the drawings.

Item 7 - 116133 2.3 paragraph M, 6. **DELETE** in its entirety and **REPLACE** with the following;

6. Provide One (1) masking borders, One (1) section total. Finish with 50% fullness, Encore velour, color black. Finish 47''4" wide x 5'0" high, tied to batten. Install at location 4 on the drawings.

Item 8 - 116133 2.3 paragraph M, 7. **DELETE** reference to Plateau velour and **REPLACE** with Encore velour.

Make the following changing to the drawings:

Item 9 - **Delete** Discovery TH100 and TH101 and replace with attached Discovery TH100 and TH101

Item 10 - **Delete** South Valley TH100 and TH101 and replace with attached South Valley TH100 and TH101.

Item 11 - In all theatrical drawings and specification; TH002, TH003, TH100, TH101, TH102, TH110, TH111, TH112, TH130 and 116100, 116133, 265500. **DELETE** reference to Stage and **REPLACE** with Platform.

The addendum contains the following changes to the theatrical documents

1. Sheet TH100 for EPiC Elementary **ADDED**.

2. Specification 116143 is **DELETED** and **REPLACED** in its entirety.

WARRENSBURG, MISSOURI
109 E Pine, PO Box 754
Warrensburg, MO. 64093-0754
660-429-1383
www.peerbolte.com
FAX 660-429-3666
PO Box 571
Cedar Falls, IA 50613-0027
319-296-5927

SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes cast-in-place concrete (033000.A01), including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Footings and trench footings (grade beams).
   2. Foundation walls and stem walls.
   3. Slabs-on-grade.
   4. Concrete toppings.
   5. Light pole bases.

B. **This section also includes the following:**
   1. **Providing foam void fill (geofoam) blocks to form and support concrete stairs, risers, ramps, and platforms, and provide lightweight backfill.**

C. Related Requirements:
   1. Section 012200 “Unit Prices” for unit prices relating to work of this Section.
   2. Section 012300 “Alternates” for alternates effecting work of this Section.
   3. Section 099123 “Interior Painting” for colored (painted) concrete finish.
   4. Section 316329 "Drilled Concrete Piers and Shafts" for drilled concrete piers and shafts.
   5. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.02 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/CM Ratio: The ratio by weight of water to cementitious materials.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Architect and Engineer.
      b. Contractor's superintendent.
      c. Independent testing agency responsible for concrete design mixtures.
      d. Owner’s testing agency.
      e. Ready-mix concrete manufacturer.
      f. Concrete Subcontractor.
      g. Flatwork technicians.
      h. Manufacturer’s representative for waterproofing admixture.
      i. Flooring manufacturers.
   2. Review special inspection and testing and inspecting agency procedures for the following:
      a. Field quality control.
      b. Concrete finishes and finishing.
      c. Cold- and hot-weather concreting procedures.
      d. Curing procedures.
      e. Construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers.
      f. Forms and form removal limitations.
      g. Vapor-retarder installation.
      h. Anchor rod and anchorage device installation tolerances.
      i. Steel reinforcement installation.
      j. Perimeter insulation installation.
      k. Concrete repair procedures.
      l. Concrete protection.
      m. **Foam void fill (geofoam) installation.**

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mixing water to be withheld for later addition at Project site.
      a. Batch delivery tickets shall indicate batch weights as well as amount of available water to add on each delivery ticket.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Jointing Layout: Submit floor plans indicating proposed layout and locations for joints required to construct the structure, including but not limited to the following:
   1. Location of expansion joints.
   2. Location of construction and control joints. Locations are subject to approval of the Architect.

E. Samples: For each of the following materials:
   1. Form-facing panels.
   2. Form ties.
   3. Chamfers and rustications.
   4. Vapor retarder.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer and testing agency.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Steel reinforcement and accessories.

D. Material Test Reports: For the following, from a qualified testing agency indicating compliance with requirements:
   1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
   1. Include details of decorative formwork matching design shown on drawings.

F. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.06 QUALITY ASSURANCE

A. General:
   1. The following contractors will not be considered by Blue Valley School District projects due to past performance issues: Midland Concrete of Topeka Kansas, Freeman Concrete and Heartland Contractors.
   2. The following material suppliers will not be considered on Blue Valley School District projects due to past performance issues: Kincaid.

3. Contractor shall be responsible for providing exposed finishes completely free of graffiti, scratches and other man-made marks made after wet cement has been placed. Marked surfaces shall be removed and replaced at no additional cost to the Owner.

B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

D. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

G. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

H. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
1. Waterproofing (capillary break) admixture manufacturer will test new concrete slabs for permeability.

1.07 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Protect foam plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.09 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.01 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301.
   2. ACI 117.
   3. ACI 318.
   4. ACI 360.

2.02 FORM-FACING MATERIALS

A. Form-Facing Panels for As-Cast Finishes: Exterior-grade plywood panels, nonabsorptive, that will provide continuous, true, and smooth architectural concrete surfaces, medium-density overlay, Class 1, or better, mill-applied release agent and edge sealed, complying with DOC PS 1.

B. Smooth-Formed Finished Concrete (033000.A16): Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
      a. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
   2. Metal, or other approved panel materials.

C. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum; nonstaining; in longest practicable lengths.

G. Rustication Strips (033000.A05): Metal, dressed wood, or rigid plastic, or with sides beveled and back kerfed; nonstaining; fabricated to configurations indicated, in longest practicable lengths.
   1. Chamfer strips shall be 3/4 by 3/4 inch, minimum.

H. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2.03 STEEL REINFORCEMENT

A. Reinforcing Bars (033000.A06): ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

C. Deformed-Steel Wire: ASTM A 1064/A 1064M.

D. Plain-Steel Welded-Wire Reinforcement (033000.A09): ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

2.04 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
   2. Slab–on-grade supports: Provide supports specifically designed for bearing on soil.
   3. Where legs of wire bar supports contact forms, use CRSI Class 1, gray, plastic-protected bar supports.
   4. Concrete blocks, bricks and plastic chair supports are not allowed per Owner.

2.05 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:
   1. Portland Cement: ASTM C 150/C 150M, Type I or Type III, gray.
   2. Blended Hydraulic Cement: ASTM C595/C595M, Type IL, portland-limestone cement.
   3. Fly Ash: ASTM C 618, Class C.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
   1. Maximum Coarse-Aggregate Size:
      a. 1-inch nominal for slabs on grade and foundations.
      b. 3/4-inch nominal for topping slabs.
      c. 3/4-inch nominal for all other locations.

D. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

E. Air-Entraining Admixture: ASTM C 260/C 260M.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   3. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

H. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

I. Water: ASTM C 94/C 94M and potable.

2.06 WATERSTOPS

A. Non-Swelling, Pre-formed Waterstops (033000.A13): Manufactured rectangular pre-formed joint sealant strip for watertight bond to fresh and cured concrete surfaces. Material shall be a self-sealing adhesive compound with a square or rectangular cross-section. Waterstop shall bond to cured concrete surfaces and shall fuse with fresh concrete. Resistance to hydrostatic head shall not be less than 60 feet of water (non-moving joints).

B. Flexible Rubber Waterstops (033000.A13): CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
   1. Profile: Flat dumbbell with or without center bulb.
   2. Dimensions: 6 inches by 3/8 inch thick; nontapered.

2.07 VAPOR RETARDERS (033000.A14)

A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum perm rating of 0.01 US perms, a minimum puncture resistance of 2260 grams and a minimum tensile strength of 57 lbf/in. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   1. Stego Industries, LLC.; Stego Wrap Vapor Barrier 15 mil.
      a. No substitutions will be allowed as directed by the Owner.

2.08 GRANULAR DRAINAGE/ CAPILLARY BREAK MATERIAL

A. Granular Drainage Fill (033000.A15): Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.09 PERIMETER INSULATION

A. Foam-Plastic Board Insulation (072100.A01): Provide one of the following:
   1. Provide extruded-polystyrene board insulation complying with ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
      a. Type IV, 25 psi.
   2. Provide molded polystyrene board insulation complying with ASTM C 578.
      a. Type IX, 25 psi.
      b. Basis-of-Design Product: ACH Foam Technologies; “Foam-Control Plus+ 250”.

2.10 LIQUID FLOOR TREATMENTS (033000.A21)

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces, while improving slip resistance.
   1. Basis-of-Design Products: Subject to compliance with requirements, provide Prosoco, Inc.; “Consolideck LS" or comparable product meeting specified performance requirements, submitted to and accepted by Architect prior to bidding.
      a. Description: Clear premium sealer, hardener and densifier. This penetrating lithium silicate treatment reacts with the concrete to produce insoluble calcium silicate hydrate within the concrete pores. The treated surfaces resist damage from water and surface abrasion. The increased surface hardness reduces dusting and simplifies maintenance.
      b. Performance Criteria:
         1) Form: Clear, colorless, odorless liquid.
         2) Specific Gravity: 1.10.
         3) pH: 11.0.
         4) Weight per Gallon: 9.2 pounds.
         5) Active Content: 14.5 percent.
         6) Total Solids: 14.5 percent.
         7) Flash Point: Not applicable.
         8) Freeze Point: 32 degrees Fahrenheit (0 degrees Celsius)
         9) Shelf Life: 2 years in unopened, factory-sealed container
         10) VOC Content: 0 grams per Liter. Complies with all known national, state and district AIM VOC regulations.

2. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.11 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Construction Chemicals - Building Systems; Confilm.
      b. Conspec by Dayton Superior; Aquafilm.
      c. Dayton Superior Corporation; Sure Film (J-74).
      d. Euclid Chemical Company (The), an RPM company; Eucobar.
      e. L&M Construction Chemicals, Inc.; E-CON.
      f. Meadows, W. R., Inc.; EVAPRE.
      g. SpecChem, LLC; Spec Film
      h. Unitex; PRO-FILM.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
   1. For areas to receive decorative polished concrete, use membrane forming curing compound.

C. Clear, Waterborne, Membrane-Forming Curing Compound (Exterior Slabs Only): ASTM C 309, Type 1, Class B, dissipating.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Construction Chemicals - Building Systems; Kure 200.
      b. Conspec by Dayton Superior; W.B. Resin Cure.
      c. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
      d. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
      e. L&M Construction Chemicals, Inc.; L&M Cure R.
      f. Meadows, W. R., Inc.; 1100-CLEAR.
      g. SpecChem, LLC; Spec Rez Clear.
   2. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
   3. For use in areas with exterior concrete flatwork not indicated within Civil Drawings.

2.12 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips (033000.A22): ASTM D 1751, asphalt-saturated cellulosic fiber or W. R. Meadows; “Deck-O-Foam”. Thickness for expansion joint filler strip shall be ½ inch, unless otherwise indicated.
   1. For isolation joint filler strips, provide 30# asphalt saturated felt.

B. Semi-rigid Joint Filler (033000.A23): Two-component, semi-rigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 85 to 95 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
   1. Types I and II, nonload bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.022-inch-thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.13 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
   1. Basis of Design: Subject to compliance with requirements, Provide “Ultraplan 1 Plus” by MAPEI or a comparable product with the following characteristics .
   2. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   3. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   4. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
   5. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.14 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Use fly ash, as needed to reduce the total amount of portland cement, which would otherwise be used, by not more than 15 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 15 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 to 0.30 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
   4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.15 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings and Grade Beams: Proportion normal-weight concrete mixture as indicated on the structural drawings.

B. Foundation Walls and Stem Walls: Proportion normal-weight concrete mixture as indicated on the structural drawings.

C. Slabs-on-Grade (Exterior stoop slabs and stairs): Proportion normal-weight concrete mixture as indicated on the structural drawings.

D. Slabs-on-Grade (Interior): Proportion normal-weight concrete mixture as indicated on the structural drawings.

E. Concrete Toppings: Proportion normal-weight concrete mixture as indicated on the structural drawings.

2.16 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.17 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
   1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
   2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
   3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

2.18 **FOAM VOID FILL (GEOFOAM)**

A. **General: Provide Geofoam blocks that have been factory fabricated to fit project dimensions; eliminating field cutting and site generated waste.**

B. **Rigid Cellular Polystyrene Geofoam Blocks (033000.A04): Molded blocks of cellular polystyrene comply with manufacturer's requirements, ASTM D6817 for Type EPS22, and the following:**
   1. **Minimum density: 0.90 pounds per cubic foot (and as indicated on drawings)**
   2. **Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.**
   3. **Compressive Resistance: at 1 percent deformation shall be 7.3 psi.**
   4. **Water Absorption: Not greater than 4 percent.**
   5. **Blocks shall contain no CFC's, HCFC's, HFC's, or formaldehyde.**

C. **Geofoam Accessories:**
   1. **Gripper Plates: Manufacturer's standard galvanized barbed plates for installation between Geofoam layers.**

2.19 **FABRICATING FOAM VOID FILL (GEOFOAM)**

A. **Fabricate Geofoam blocks, square, and true to dimension.**

B. **Factory cut individual blocks for delivery to site and installation without the need for subsequent field cutting.**
   1. **Collect cut-off waste at factory for recycling as post-industrial content. Do not require field fabrication and disposal of Geofoam in the field.**

C. **Marking and Identification: Individual Geofoam blocks shall be marked as follows:**
   1. **Room number identification.**
   2. **Layer I.D. letter and part number identification.**

PART 3 EXECUTION

3.01 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

1. Form recessed slabs as indicated.

C. Utilize sides of trenches for forms whenever possible. Where sides of trenches cannot be used; design, erect, support and maintain formwork to support vertical, lateral, static and dynamic loads that might be applied until such loads can be supported by concrete structure.

D. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.

E. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
   1. Class A, 1/8 inch for smooth-formed finished surfaces.
      a. Fins shall be ground smooth with adjacent concrete surface.
   2. Class C, 1/2 inch for rough-formed finished surfaces.

F. Construct forms tight enough to prevent loss of concrete mortar.

G. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   1. Kerf wood rustications, keyways, reglets, recesses, and the like, for easy removal.
   2. Do not use rust-stained steel form-facing material.
   3. For concrete exposed-to-view on the building interior, seal form joints and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
   4. Construct forms tight enough to prevent loss of concrete mortar.

H. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

I. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

J. Chamfer exterior corners and edges of permanently exposed concrete.

K. Ease edges of tread-to-riser transitions of concrete riser platforms of seating to dimension as indicated on the drawings.

L. Form openings, chases, offsets, sinkages, keyways, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

M. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

N. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

O. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
   1. Coat contact surfaces of wood rustications and chamfer strips with sealer before placing reinforcement, anchoring devices, and embedded items.

3.02 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.03 PERIMETER INSULATION

A. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

B. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
   1. If not otherwise indicated, extend insulation a minimum of 36 inches below exterior grade line.

3.04 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
   3. Do not cut or puncture vapor retarder.
   4. Schedule form removal to maintain surface appearance that matches approved field sample panels and mockups.
   5. Cut off and grind glass-fiber-reinforced plastic form ties flush with surface of concrete.

B. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of 28-day design compressive strength. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.05 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
   1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.06 GRANULAR DRAINAGE FILL

A. Granular Drainage/Capillary Break Fill Course: Cover vapor retarder with not less than indicated depth of granular drainage fill material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 1/2 inch.
   1. Compaction Requirements: Compact to within 95 percent maximum density in accordance with ASTM C 698, Standard Proctor compaction, at workable moisture content.
   2. At trenches through existing slabs on grade, provide at additional granular drainage fill/capillary break material to achieve a thickness of not less than 4 inches.
   3. Refer to Section 313200 “Subsoil Stabilization” for additional requirements regarding granular drainage fill.

3.07 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders for Slabs on Grade: Following leveling and tamping of granular drainage fill course for building slabs on grade, place vapor retarder sheet with longest dimension parallel with direction of pour. Place,

protect, and repair sheet vapor retarder according to ASTM E 1643, manufacturer's written instructions and as follows:

1. Lap joints 6 inches and seal with manufacturers' recommended tape.
2. Lap vapor retarder over and seal to footings, foundation, strip footings, grade beam and any edge of slab that terminates at existing building conditions, as occurs.
3. Seal pipe penetrations with pipe boot made from vapor retarder material, seal with pressure sensitive tape and vapor retarder manufacturer's recommended mastic.
4. Repair punctures and tears with patches of vapor retarder material, lapping 6 inches on all sides and sealing with pressure sensitive tape.

B. Sheet Vapor Retarders at Trenches in Existing Slabs on Grade: At trenches through existing slabs on grade, place vapor retarder over granular drainage fill/capillary break material and bring up tight to sides of opening to receive concrete. Extend vapor retarder up sides 2 inches and seal with asphaltic mastic. Lap joints 6 inches and seal with vapor retarder manufacturer's recommended mastic or pressure sensitive tape. Repair tears and punctures with patches of vapor retarder material lapping 6 inches on all sides of puncture/tear and seal with mastic of pressure sensitive tape. Seal all penetrations.

3.08 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
   1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.09 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   5. Space vertical joints in walls at 100 feet maximum. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
   6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
   8. At Load Transfer Joints: Provide one of the following:
      a. 2 by 4 inch continuous keyway.
      b. One #4 by 12 inch long smooth dowel.
      c. Diamond dowel system.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
    a. Where joints are not specifically indicated, space joints at 15 feet on center (area not to exceed 225 sq ft.). For polished concrete, space joints at 10 feet on center (area not to exceed 100 sq ft.).
    b. Begin saw cutting of joint no later than 12 hours after finishing.
2. Gymnasium Floor Slabs: Do not provide contraction joints in slabs-on-grade indicated to receive athletic flooring under Section 096566 and 096766.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.10 WATERSTOP INSTALLATION

A. Flexible Rubber Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.11 CONCRETE PLACEMENT

A. General Contractor shall notify Owner's Representative at least 24 hours in advance for mandatory review of the following:
1. Specification-mandated inspections of rebar placement or specialized formwork, prior to pouring concrete.
2. Code-required special inspections of rebar placement or specialized formwork, prior to pouring concrete.
3. Rebar tie-ins of exterior flatwork to all doors or other openings, or exterior stoops.

B. Failure of the General Contractor to secure inspection and approval for any of the above conditions prior to pouring concrete is grounds for Owner to require installed material be removed for inspection and reinstalled at Contractor’s expense.

C. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

D. Do not add water to concrete during delivery, at Project site, or during placement unless water was withheld at batch plant, amount withheld was documented in writing and adding withheld water is acceptable to Architect.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).
    a. Refer to ACI 303.1 for areas to receive architectural concrete finishes.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
    a. Do not permit vibrators to contact forms.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Concrete slab repairs at trenches shall be flush with adjacent concrete surface.
6. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

H. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

I. Contractor is responsible for all rinse water runoff.

3.12 FINISHING FORMED SURFACES

A. General - Architectural Concrete Finish: Match Architect's design reference sample, identified and described as indicated, to satisfaction of Architect.

B. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.

C. Smooth-Formed Finish (033000.A16): As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. For concrete exposed to view on the interior of the building, fins and other projections shall be removed flush with adjacent surface of concrete.
2. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

D. Rubbed Finish (033000.A17): Apply the following to smooth-formed-finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
a. Apply to concrete surfaces exposed to public view on vertical surfaces of sides of ramps, at sides of stairs and at lightpole bases.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.13 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, and built-up or membrane roofing.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, resilient and fluid-applied athletic flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system. Do not burnish concrete.
   2. Gymnasium Floor: Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
   3. Finish slab repairs at trenches to be flush with adjacent concrete surfaces.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish (033000.A18): Apply a broom finish to traffic surfaces of exterior concrete platforms, steps, ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.14 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:
   1. Coordinate sizes and locations of concrete bases with actual equipment provided.
   2. Construct concrete bases 4 inches high unless otherwise indicated, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
   3. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
   4. Minimum Compressive Strength: 4000 psi at 28 days.
   5. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
   6. For supported equipment, install anchor bolts that extend through concrete base and anchor into structural concrete substrate.
   7. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   8. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.15 CONCRETE PROTECTING AND CURING

A. General:
   1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.
   2. Contractor shall be responsible for providing exposed finishes completely free of graffiti, scratches, and other man-made marks made after wet concrete has been placed. Marked surfaces shall be removed and replaced at no additional cost to Owner.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply

according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, as follows:
   1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
      a. Use moisture-retaining covers to cure concrete slab surfaces to receive all types of floor coverings.
      b. Use moisture-retaining covers to cure concrete slab surfaces to receive penetrating liquid floor treatments, sealed concrete floor treatments and decorative polished concrete floor treatment.
   2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
      a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

3.16 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than 28 days' old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.17 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least four month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.
   1. Where control/contraction joints extend to the exterior of the building, beyond aluminum storefront, curtain wall and similar framing, completely fill joints with semi-rigid joint filler from exterior to inside face of framing. Exposed joint shall be completely filled and made water-tight.
   2. Where control/contraction joints occur in floors indicated to receive penetrating sealed concrete finish.

3.18 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
   7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.19 FIELD QUALITY CONTROL

A. Special Inspections and Testing: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
   1. Waterproofing (capillary break) admixture manufacturer shall test new concrete slabs for permeability.

C. Inspections:
   1. Steel reinforcement placement.
   2. Steel reinforcement welding.
   3. Headed bolts and studs.
   4. Verification of use of required design mixture.
   5. Concrete placement, including conveying and depositing.

6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.
8. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete;one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31/C 31M.
      a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
      b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
      a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
   7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
   8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
   9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
   10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
   11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
   12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.20 PROTECTION OF FLOOR TREATMENTS

A. Protect floor treatments from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by floor treatments installer.

3.21 **FOAM VOID FILL (GEOFOAM) INSTALLATION**

A. **Geofoam Installation: Install blocks in layers at locations indicated on shop drawings. Hold dimensions on shop drawings and Architect's plans. Blocks shall incorporate positive mechanical connection of foam block layers.**
   1. **Place gripper plates between each layer of Geofoam in quantities as noted on shop drawings.**

END OF SECTION 033000

SECTION 075216 - MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the modified bituminous sheet roofing system (075216.A01) including but not limited to, the following:
   1. Modified bituminous field ply/plies (smooth and granulated).
   2. Modified bituminous 2-ply base flashing.
   3. Roof insulation, tapered roof insulation, and cover board.
   4. Roof cant strips and tapered edge strips.
   5. Lead flashing at roof drains and plumbing vents.
   6. Liquid flashing.
   7. Walkway protection boards.
   8. Base Sheet.
   9. Vented Base Sheet **(for areas with Concrete Deck).**
   10. All accessories and fasteners needed to complete the roofing systems indicated.

B. Related Requirements:
   1. Section 053100 “Steel Decking” for steel decking requirements and installation.
   2. Section 061000 “Rough Carpentry” for wood framing, blocking, and nailers associated with roofing.
   3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
   4. Division 22 for mechanical roof drain systems.
   5. Division 23 for mechanical equipment and accessory curbs.

1.2 SYSTEM DESCRIPTIONS

A. Modified Bitumen Roofing System over Metal Decking: Roofing system shall consist of base layer of insulation, mechanically fastened to metal decking; second layer of insulation shall be set in low-rise foam adhesive; a cover board set in low rise foam adhesive; a modified bitumen smooth surfaced membrane adhered with manufacturer’s cold adhesive; a modified bitumen surfacing ply (cap sheet) with factory-applied mineral surfacing. Surfacing ply shall be adhered with manufacturer’s cold adhesive. Provide all related accessories for a complete and watertight roofing system. All laps in APP systems shall be hot-air welded.

B. Modified Bitumen Roofing System over Precast Structural Concrete: Roofing system shall consist of base layer of insulation set in low-rise foam adhesive to precast decking; additional layers of insulation shall be set in low-rise foam adhesive; **a 1/2 inch thick cover board set in low rise foam adhesive;** a modified bitumen smooth surfaced membrane adhered with manufacturer's cold adhesive; a surfacing ply (polyester cap sheet) shall be either a dual-reinforced (glass fiber mat and polyester mat) or a single reinforced (polyester mat) modified bitumen ply with factory-applied mineral surfacing. Surfacing ply shall be adhered with manufacturer's cold adhesive. Provide all related accessories for a complete and watertight roofing system. All laps in system shall be hot-air welded. **Provide vented base sheet as required per manufacturer.**

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer’s technical product data, installation instructions and recommendations for each type of roofing product/component required. Include data and certified test reports substantiating that materials comply with requirements.
   1. Submit Factory Mutual and Underwriter’s Laboratory material and systems approvals.
      a. For insulation and roof system component fasteners, include copy of FM Approvals RoofNav listing.
   2. Submit Underwriter’s Laboratory material and systems approvals.
   3. Submittals shall be reviewed and accepted by roofing membrane manufacturer’s technical representative with a submittal cover letter stating all products for the roof assembly including roofing membrane, base flashing, roof insulation, adhesives and fasteners are acceptable.

B. Shop Drawings: Indicate dimensions, general construction, specific modifications, component connections, details at adjoining construction and roof top accessories, anchorage methods, hardware and installation

procedures; plus the following specific requirements:

1. Indicate base flashing and membrane terminations and, details for perimeter, penetrations, field fabricate curbs and tie-in flashing details.
2. Indicate insulation fasteners, sheet layout and fastening pattern to comply with performance requirements specified. If insulation and cover board is adhered with low rise foam adhesive, indicated adhesive ribbons patterns to comply with performance requirements specified.
3. Indicate layout and thicknesses for tapered insulation and crickets.
4. Indicate details for perimeter, penetrations, and field fabricate curbs and tie-in flashing details as approved by roof membrane manufacturer and in accordance with performance requirements specified for wind uplift classification specified.
5. Shop drawing shall show sequence of placement of roofing system, set-up locations of equipment and traffic patterns. Installation sequence shall be arranged so traffic across finished roofing system is minimized.
6. Shop drawings shall be reviewed and accepted by roofing membrane manufacturer’s technical representative. A shop drawing cover letter shall be submitted by the roofing membrane manufacturer’s technical representative stating all products for the roof assembly including roofing membrane, base flashing and roof insulation are acceptable.
    a. Shop drawings for Section 076200 “Sheet Metal Flashing and Trim” shall be reviewed concurrently with shop drawings for Section 075216 “Modified Bituminous Membrane Roofing.”

C. Samples: Submit two sets of samples indicating manufacturer’s full range of standard colors for mineral surfaced cap sheet.

D. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.

E. Roof Assembly Certification Letters: Manufacturer of primary roof system components shall submit letter certifying that the roofing system will achieve specified warranty, that roofing system components are acceptable and will meet performance requirements specified.

1.4 INFORMATIONAL SUBMITTALS

A. Certifications: Submit written copy of warranty applications.

B. Manufacturer Certificates:
1. Performance Requirement Certificate: Signed by roof membrane manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
    a. Submit evidence of complying with performance requirements.
2. Manufacturer's Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Field Test Reports:
1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

1.5 CLOSEOUT SUBMITTALS

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

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide primary roofing products including modified bitumen field and surfacing membranes, base sheet, modified bitumen flashing and bitumen/adhesive, successfully produced by a manufacturer, which has produced that type of product for not less than 5 years. Provide secondary products recommended by primary manufacturer.
1. Manufacturer shall be UL listed for roofing system identical to that used for this Project.

2. Manufacturer shall be listed in SPRI's Directory of Roof Assemblies for roofing system identical to that used for this Project.

B. Installer Qualifications: The Roofing Contractor shall perform the work of this Section; and shall be a firm with not less than seven (7) years of successful experience in installation of modified bitumen roofing systems similar to those required for this project. Roofing Contractor shall be licensed by, trained by or otherwise approved in writing by the manufacturer of primary roof materials. The Contractor must be a member of NRCA or one its affiliates.
   1. Roofing Contractor must have successfully completed 2 projects of comparable scale within the past two years using the specified system.
   2. Installer shall have an EMR (Experience Modification Ratio) rating of 0.90 or less.
   3. Installer Certification: Obtain written certification from manufacturer of roofing system certifying that Installer is approved by manufacturer for installation of specified roofing system. Provide copy of certification to Architect prior to award of roofing work.
   4. Installer must be approved by roofing system manufacturer to offer specified manufacturer's warranty.
   5. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman who is on jobsite during times that roofing work is in progress and who is experienced in installation of roofing system similar to the type and scope required for this Project.
   6. All roofing shall be installed by employees of the installer; contract labor is not allowed.

C. Pre-application Roofing Conference: Approximately two weeks prior to scheduled commencement of modified bitumen roofing installation and associated work, the Contractor shall conduct a meeting at Project site with Roofing Contractor, roofing membrane manufacturer's technical representative, Installer of each component of associated work, installer of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work), Architect if requested, roofing system manufacturer's technical representative third party inspection agency representative, and other representatives directly concerned with performance of the work. Contractor to record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
   1. Tour representative areas of roof substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades. Identify and record items to be corrected prior to commencement of work of this Section.
   2. Review roofing systems requirements (drawings, specifications and other contract documents).
   3. Review required submittals (all required submittals shall be completed prior to pre-application roofing conference).
   4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
   5. Review required inspection, testing, certifying and material usage accounting procedures.
   6. Review weather and forecasted weather conditions, and procedures for copying with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement.)
   7. Review temporary protection requirements for roofing system during and after installation.
   8. Review governing regulations and requirements for insurance and certificates.
   9. Roofing work will not be allowed to commence until submittals (or other language) phase has been completed.

D. Insurance Certification: Assist the Owner in preparation and submittal of roof installation certification as may be necessary with fire and extended coverage insurance on roofing and associated work.

E. UL Listing: Provide modified bitumen roofing materials which have been tested for application and slopes indicated and are listed by Underwriter's Laboratories, Inc. (UL) for Class A external fire exposure.
   1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.
   2. Provide roof insulation approved in writing by roof system manufacturer as acceptable substrate for this project.
   3. Provide roofing system that can be installed to comply with UL 790 requirements specified for resistance to external fire.

F. Product/Material Qualifications:
   1. Components of the roofing system shall be manufactured or approved by the roofing system manufacturer to comply with guaranty and construction class requirements.
   2. Fastener corrosion resistance shall be in accordance with FM Standard 4470.

G. Independent Third-Party Services: May be used for roof moisture and ES-1 coping and/or edge metal flashing surveys as described in the warranty section. Third party services shall be provided copies of roof plan for

moisture survey and approved shop drawings for coping and/or edge metal (ES-1 standards) for sheet metal surveys. Third party services shall attend the roofing pre-installation conference if they are to perform the roof moisture or coping and metal edge surveys.

1.7 FIELD QUALITY CONTROL

A. Field Audits: Roof membrane manufacturer's technical representative shall perform in progress site audits and review completed contractor's quality control forms, prepare and submit reports to roofing contractor and owner's representative. Site audits include first day of construction and a site audit for every two weeks of construction.

B. Quality Control Form:
   1. Contractor to complete daily quality control form provided by the roofing membrane manufacturer which is included in the documents. Contractor is to note on provided roof plan areas of daily construction. Completed forms are to be submitted with warranty completion notice.

C. Final Roof Inspection: As a part of the roofing membrane manufacturer's standard warranty, arrange for roof membrane manufacturer's technical representative.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. 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.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle modified bitumen membrane and roofing system components in accordance with roofing system manufacturer's written instructions. Store and handle components in a manner which will ensure that there is no possibility of significant moisture pickup. Unless protected from weather or other moisture sources do not leave unused membrane on the roof overnight or when roofing work is not in progress. Store modified bitumen sheets and other materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.
   1. Cover all materials with breathable tarpaulins. Secure tarpaulins such that weather events cannot displace them after installation.
   2. Remove roofing components from job site that show indications of moisture damage and replace with undamaged materials/components.

B. Where heavy loads are placed up on or transported over decking, or where materials are repeatedly landed, provide temporary planking or plywood to distribute imposed loads.

C. 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.

1.9 PROJECT CONDITIONS

A. Weather Condition Limitation: Proceed with roofing work only when existing and forecasted weather conditions will permit in conjunction with manufacturer's recommendation and guaranty requirements.

B. Project Phasing: All roof insulation, cover board, edge strips, flashing, and field ply(s) shall be installed in a timely manner to allow for all other work by other trades to be completed on the roof prior to application of the surface ply and associated final layer flashing and stripping.

C. Protect roofing system as specified hereinafter.

1.10 WARRANTY

A. Installer's Special Project Warranty: Submit two (2) executed copies of the most current version of the MRCA "Roofing Contractor Materials and Workmanship Warranty", for a period of two (2) years, covering work of this Section including roof membrane, composition flashing, roof insulation, fasteners, walkway pads, and roofing

accessories, all stated on face of Warranty, signed and counter signed by Installer (Roofer) and Contractor.

B. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's "Full Systems – No Dollar Limit" material and workmanship warranty. Submission shall include a written a description of specified services as noted below and shall be endorsed by the Manufacturer's Technical Director. Warranty shall be from the existing decking up, including roofing system, and flashing endorsement signed by authorized representative of roofing system manufacture, on form which was published with product literature as of date of contract documents, for the following period of time:
   1. Twenty (20) years after date of substantial completion. This warranty shall include the following:
      a. Membrane roofing, base flashings, roof insulation, fasteners, cover boards, and other components of membrane roofing system.
      b. Liquid flashing system at roofing system penetrations.
   2. Two-year re-inspection of the modified bitumen system.

C. Additional Warranty Services: The following services must be provided by the roofing membrane manufacturer's technical representative:
   1. Roofing submittals shall be reviewed and accepted by roofing membrane manufacturer.
   2. Roofing shop drawings shall be reviewed and accepted by roofing membrane manufacturer.
   3. Pre-installation Conference: Roofing membrane manufacturer's technical representative shall attend the roofing pre-installation conference and document participation.
   4. Project Start up Audit: Roofing membrane manufacturer's technical representative shall conduct and document a project start up audit, typically the first or second day of roof construction.
   5. Interim Audit: Roofing membrane manufacturer's technical representative shall conduct an interim audit, typically one for every two weeks of construction.
   6. Quality Control Form: Contractor to complete daily quality control form provided by the roofing membrane manufacturer which is included in the documents. Contractor is to note on provided roof plan areas of daily construction. Completed forms are to be submitted with warranty completion notice.

D. Roof Management Warranty: The following services must be provided by the roofing membrane manufacturer's technical department:
   1. Annual inspections for five (5) years.
   2. Manufacturer must maintain digital and/ or hard copies of all warranties issued for the duration of the warranty.

PART 2 PRODUCTS

2.1 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.

C. Wind Uplift Resistance: Design and install roofing system to resist the wind uplift pressures set forth on Structural Drawings when tested according to FM Approvals 4474, UL 580, or UL 1897.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
   1. Fire/Windstorm Classification:
      a. Class A Fire Rating 1A-90.
      b. Class A Fire Rating NC-90.
   2. Hail-Resistance Rating: FM 1-34 VSH.

E. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A, for application and roof slopes indicated; testing by a qualified testing agency.
   1. Identify products with appropriate markings of applicable testing agency.

G. Fire-Resistance Ratings: For roof over gymnasium, comply with fire-resistance-rated assembly designs indicated. Unless otherwise indicated, comply with UL Design No. P915 for a 2-hour assembly rating.
   1. Identify products with appropriate markings of applicable testing agency.

H. Impact Resistance: Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470 ASTM D3746 or CGSB 37-GP 56M to meet the following impact resistance:
   1. Meet FM-VSH (Very Severe Hail), ASTM D3746 or CGSB #&-GP 56M.

2.2 MANUFACTURERS

A. General: Subject to compliance with specified requirements, provide roofing system from one of the manufacturers listed below. Additional manufacturers may be considered when submitted to and accepted by Architect prior to bidding. All manufacturers must meet all specified requirements, regardless of inclusion within the list below.
   1. Garland (SBS)
   2. Johns Manville (APP)
   3. Performance Roofing Systems (APP)
   4. Soprema (SBS)
   5. Tremco (SBS)

2.3 BASE-SHEET MATERIALS

A. Vented Base Sheet (075216.A05) : ASTM 4897, Type II, venting, non-perforated, heavyweight, asphalt-impregnated and –coated, glass-fiber base sheet with coarse granular surfacing or embossed venting channels on bottom surface.
   1. Basis of Design Products: Subject to compliance with requirements and acceptance by manufacturer of primary roofing materials, provide one of the following:
      a. Garland.
      b. Johns Manville; "Ventsulation" Vented Base Sheet.
      c. Performance Roofing Systems: PRS Vented Base Sheet.
      d. Soprema.
      e. Tremco.
      f. Comparable product submitted to and accepted by Architect and roofing material manufacturer prior to bidding.

B. Adhesives: Single-component, moisture cured, silyl-terminated polyether (STPE), membrane adhesive.
   1. Basis-of-Design Product: Provide Colply EF Adhesive by Soprema.

2.4 VAPOR RETARDER

A. Self-Adhered Sheet Vapor Barrier (075216.A16): ASTM D1970/D1970M, polyethylene film laminated to layer of rubberized asphalt adhesive: cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor retarder manufacturer.
   1. Manufacturers and Products: Subject to compliance with requirements, provide one of the following or a comparable product submitted to and accepted by Architect with the following product characteristics:
      a. "SOPRAVAP'R" by Soprema.
      b. "JM Vapor Barrier SA" by Johns Manville.
      c. “Derbistick SA” by Performance Roof Systems.
      d. "ExoAir 110 by Tremco.
   2. Product Characteristics:
      a. Membrane Thickness: Not less than 31 mils.

b. Tear Resistance: 95 MD and 103 XMD per ASTM D5147.
c. Static Puncture Resistance: Not less than 90 lbf per ASTM D5602.
d. Lap Adhesion: not less than 68 lbf/ft per ASTM D1876.
e. Water Absorption: 0.1 percent per ASTM D5147.
f. Water Vapor Permeance: 0.03 perms per E96.
g. Provide 12 inch wide strips of self-adhering air barrier/vapor retarder at all joints and gaps between precast double-tees and between double-tees and adjacent structure.

3. Accessories: Provide pressure sensitive tape, lap adhesive, primer and related accessories neccessary for complete and proper installation that are recommended by vapor barrier manufacturer to suit conditions involved.

2.5 ROOF INSULATION

A. General: If one of the approved roof insulation systems is provided that alters the system thickness from that specified, Contractor is responsible for any additional cost to add additional courses of cut brick or changes in wood blocking, flashing gravel, guards, etc.
1. Provide preformed roof insulation boards manufactured or approved by roof membrane manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated, and approved for use in roof assemblies specified.

B. Insulation Products: Acceptable products must be approved by the roofing system manufacturer.
1. UL approved insulation meeting requirements specified for fire resistance.
2. FM approved insulation meeting wind uplift resistance requirements specified.
3. ASCE 7-16 for wind uplift resistance requirements specified.

C. Polyisocyanurate Board Insulation (075423.A20): ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
1. Provide insulation in at least two layers, with the first layer 1-1/2 inches thick.
2. Mechanically fastened first layer to deck to meet wind uplift requirements specified. All subsequent layers shall be installed with adhesive to meet wind uplift requirements.
a. Note: At areas where vapor retarder occurs, adhere first layer of insulation in lieu of mechanically fastening.
3. Total thickness of insulation shall not be less than 5-1/2 inches. Thickness at roof drains shall be 1-1/2 inches, minimum.
4. First layer of insulation shall provide a minimum aged R-value of 8.6 (for 1-1/2 inch thickness).
5. Second layer of insulation shall be 4.0 inches thick and provide a minimum aged R-value of 23.6.
6. Total aged R-value for roof insulation shall not be less than R-30.

2.6 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing system.

B. Cover Board (075216.A25):
1. Basis of Design Product: Subject to compliance with requirements, provide one of the following:
a. Georgia Pacific; DensDeck StormX Prime Roof Board.
b. Comparable products from other manufacturers meeting specified requirements for VSH requirements.
2. Product Characteristics:
a. Description: Glass-mat gypsum roof board compliant with ASTM C1177, Type "X".
b. Thickness: 5/8 inch, minimum or minimum thickness to obtain a VSH approval with a tested assembly.

C. Insulation Fasteners (steel deck areas only): Basis-of-Design: Derbigum Perlock standard mechanical fasteners for roofing system which has been tested for the required pull-out strength where applicable and compatible with deck type and roofing products used. Roofing Contractor is responsible for testing that may be required to substantiate required fastening methods or procedures.
1. Fasteners shall meet requirements of FM 4470 for corrosion resistance.
2. Fastener Plates for Insulation: Provide 3 inch diameter, galvalume coated steel plates as recommended by roofing system manufacturer.
3. Fastener length shall be adequate to penetrate load bearing surface of steel deck 3/4 inch.

D. Low Rise Foam Adhesive : Manufacturer recommended dual-component low rise urethane adhesive (asbestos free).
   1. Basis of Design Product: Provide "Duotack 365" by Soprema.
   2. VOC Emissions: 245 grams per liter, maximum, per ASTM D 3960-92
   3. Flash Point (COC): 105 degrees F, minimum , per ASTM D 92
   4. Solids Content: 77.5 percent, minimum, by weight per ASTM D 4479
   5. Density: 9.5 pounds/gallon, minimum, at 77 degrees F per ASTM D 70

2.7 MODIFIED BITUMEN ROOFING COMPONENTS

A. General Note :
   1. Total Membrane Thickness shall be defined as the combined thickness of the field ply (base sheet) and surface ply (cap sheet), excluding adhesive layers.
   2. Total Membrane Thickness shall be not less than 300 mils without prior acceptance by Architect, prior to bidding, using the form and guidelines contained in Section 012500 “Substitution Procedures” and Substitution Request Form. The following basis of design thicknesses shall be provided in the absence of written documentation from the Architect.
      a. Field Ply (Base Sheet) Basis of Design Thickness: 120 mils.
      b. Surface Ply (Cap Sheet) Basis of Design Thickness: 180 mils, minimum.
   3. Roof Areas within UL-listed assemblies shall be fabricated and installed per the listed requirements of the UL-listing indicated on the Drawings.
   4. Surface Ply (Cap Sheet) shall be Class A rated per ASTM E 108 and UL 790.

B. Field Ply (Base Sheet) – Provide a smooth-surfaced reinforced modified bituminous membrane from one of the listed manufacturers that will meet the criteria for one of the following standards:
   1. ASTM D6509 – APP modified bituminous membrane with fiberglass reinforcement.
   2. ASTM D6163, Grade S – SBS modified bituminous membrane with fiberglass reinforcement.
   3. ASTM D6164, Grade S – SBS modified bituminous membrane with polyester reinforcement.

C. Surface Ply (Cap Sheet) – Provide a fire retardant, mineral granule-surfaced, reinforced modified bituminous membrane from one of the listed manufacturers that will meet the criteria for one of the following standards:
   1. ASTM D6222, Grade G – APP modified bituminous membrane with polyester reinforcement.
   2. ASTM D6223, Grade G – APP modified bituminous membrane with polyester and fiberglass reinforcement.
   3. ASTM D6162, Grade G – SBS modified bituminous membrane with polyester and fiberglass reinforcement.
   4. ASTM D6163, Grade G – SBS modified bituminous membrane with fiberglass reinforcement.
   5. ASTM D6164, Grade G – SBS modified bituminous membrane with polyester reinforcement.

D. Cold-Applied Adhesive – Provide manufacturer’s recommended cold-applied adhesive for field membrane and base flashing applications to be asphalt-based, asbestos-free and VOC compliant, cold-applied adhesive specially formulated for compatibility and use with modified bituminous membrane roofing and flashing. Cold-applied adhesive shall have the following properties:
   1. VOC Emissions: 180 grams per liter, maximum per ASTM D 3960-92.
   2. Flash Point (COC): 110 degrees F, minimum per ASTM D 92.
   3. Solids Content: 80 percent, minimum by weight per ASTM D4479.
   4. Asphalt Content: 50 percent, minimum per ASTM D4479.
   5. Density: 9.0 lb./gallon at 77 degrees F, per ASTM D 70.
   6. Viscosity: 30,000 cps at 77 degrees F, per ASTM D2196.

E. Modified Bitumen Base Flashing (075216.A10): Provide 2-ply base flashing of same field ply and surfacing ply as specified for field of roof, unless otherwise recommended by roofing system manufacturer. For APP membranes, both plies shall be adhered with manufacturer’s cold-applied adhesive with heat-welded seams or by heat welding.
   1. Granule Material: Mineral.
   2. Granule Color: Match surfacing ply color.

F. Modified Bitumen Vertical Wall Flashing (075213.A11): Provide 2-ply base flashing of same field ply and same surfacing ply (cap sheet) as specified for field of roof. For APP membranes, both plies shall be adhered with manufacturer’s cold-applied adhesive with heat-welded seams or by heat welding.
   1. Granule Material: Mineral.
   2. Granule Color: As selected by Architect from manufacturer's full range.

G. Vertical Sheet Flashing EPDM (075216.A12): Provide an adhered, EPDM membrane complying with ASTM D 4637, Type I, non-reinforced; including all adhesives, sealants and accessories for proper and watertight installation.
   1. Thickness: 60 mils min, nominal.
   2. Exposed Face Color: White.
   3. Contractor shall use roofing system manufacturer's seam tape required by to achieve specified guaranty/warranty. EPDM membrane shall have seam tape factory-applied when required by roofing system manufacturer.

2.8 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Roof Cant Strips (075216.A22) and Preformed Edge Strips (075216.A24): Asphalt impregnated organic fiber insulation units, factory molded to form 3-1/2" x 3-1/2" x 45 degree cant strips and 1-5/8" x 18" tapered edge strips to receive roofing ply sheet courses and lift edges above main roofing surface.
   1. Wood cant strips and Nailer Strips (075126.A23): Provide wood cant strips, 2" in nominal thickness, where indicated and as required by roofing system manufacturer.
   2. Locations of nailable wood cant strips shall be determined by roofing system manufacturer's written recommendations. For manufacturers without written recommendations, refer to NRCA's Roofing Manual for industry standard practice and minimum requirements.

B. Asphalt Flashing Cement: Manufacturer's recommended asbestos-free cement, complying with ASTM D 4586.

C. Asphalt Primer: Comply with ASTM D 41.

D. Vertical Sheet Flashing EPDM (075216.A12): ASTM D 4637, Type II, uniform, flexible EPDM sheet.
   1. Thickness: 60 mils min, nominal.
   2. Exposed Face Color: Black.
   3. Contractor shall use roofing system manufacturer's seam tape required by to achieve specified guaranty/warranty. EPDM membrane shall have seam tape factory-applied when required by roofing system manufacturer

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer (these fasteners are used to fasten roofing material to substrate; not to be confused with roof insulation fasteners).

F. Lead Flashing Sheet (drains): 30" by 30" square, 4 pound per square foot.

G. Lead Flashing Sheet (plumbing vents): 30" by 30" square, 4 pound per square foot.

H. Walkway Protection Boards (075216.A41): Mineral-surfaced bituminous membrane manufactured specifically for hot bituminous application on modified bitumen roofing as a protection course for foot traffic.
   1. Granule Material: Mineral.
   2. Granule Color: As selected by Architect from manufacturer's full range.

I. Liquid-Applied Flashing (075216.A44): Provide a catalyzed acrylic resin specialty flashing system, consisting of liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared and/or primed substrate. Flashing system shall consist of a primer, basecoat and topcoat, combined with a non-woven polyester fleece. Use of specialty liquid flashing system shall be specifically approved in advance by the membrane manufacturer for each application.
   1. Subject to compliance with requirements, provide liquid flashing from one of the following as acceptable to manufacturer of primary roofing materials:
      a. Garland; PMMA liquid flashing.
      b. Tremco; PMMA liquid flashing.
      c. Johns Manville (JM); PMMA flashing resin.
      d. Performance Roof Systems; "DerbiFlash RS 230" liquid flashing.

J. Set on Accessories: Where small roof accessories are set on modified bitumen roofing membrane, roofing cement, and sealants.

PART 3 EXECUTION

3.1 INSPECTION OF SUBSTRATE

A. Roofing Contractor shall examine substrate surfaces to receive modified bitumen roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to the Architect.

B. Examine surfaces for adequate anchorage, foreign materials, moisture and other conditions which would adversely affect roofing application and performance.

C. Examine substrate to ensure roof openings, curbs, pipes sleeves, ducts or vents through roof are solidly set and cant strips and reglets are in place.

D. Examine precast concrete roofing substrates to ensure sealant work between precast units has been completed.

E. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation.
   3. Verify that surface plane flatness and fastening of steel roof deck complies with industry standards.

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

G. Prepare written documentation of conditions which could be detrimental to completion or performance of specified Work before commencing such Work. Work shall not start until defects have been corrected.

H. Photograph interior and exterior equipment and surrounding areas and after completion of construction which may be misconstrued as damage related to demolition operations. File photographs with owner’s representative.

I. 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. 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.

D. Provide temporary barricades and other forms of protection for Owner’s personnel and public from injury due to demolition work.
   1. Protect from damage, existing finish work that is to remain in place and becomes exposed during demolition operations.
   2. Protect against any material or debris dropping into the building, dropping into roof drains and damaging new roof membrane.

3.3 INSTALLATION, GENERAL

A. Cooperate with inspection and test agencies engaged or required to perform services in connection with modified bitumen roofing system installation.

B. Protect other work from spillage of modified bitumen roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Protect lawn areas, building walls and windows and building equipment. Replace/restore other work damaged by installation of roofing system work.

C. Coordinate flow of work, equipment, materials and personnel to eliminate traffic across completed new roofing systems. Provide plywood walkways for the movement of personnel, equipment and materials.

D. Insurance/Code Compliance: Install modified bitumen roofing system and insulations for (and test where required to show) compliance with governing regulations and roofing system performance requirements specified.

E. Cutoffs: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Provide temporary tie off one ply of modified bitumen membrane set in cold adhesive; remove at beginning of next day's work.

F. Roof surfaces shall be thoroughly dry before application of roofing.

G. Roofing Manufacturer's Inspection: Inspection of roofing shall be made by a responsible representative of the roofing manufacturer during application and after completion.

H. When application of roofing is begun, total roof system shall be completed before end of day and before wet by elements (with exception of cap sheet). Install staggered water cut-off at completion of each day's work and remove upon resumption of work.
   1. Precautions shall be taken to protect membrane from punctures, refer to Article 2.4 of this Section.

I. Prior to application of roof insulation, seal all joints between precast roof panels and between precast panels and adjacent construction with self-adhering vapor barrier.

J. Prior to application of roof insulation, provide EPDM membrane strip flashing at all joints between precast roof panels. Adhere strip flashing continuously over joint overlapping and adhering to at least 4 inches on each side.

3.4 BASE-SHEET INSTALLATION

A. Install lapped base-sheet course (Cementitious Wood Fiber Deck and Gypsum Deck), extending sheet over and terminating beyond cants. Attach base sheet as follows:
   1. Mechanically fasten to substrate. On 4 inch lap, fasten 12 inches on center; field of sheet, fasten two rows 18 inches on center.

B. Install a vented base sheet (Gypsum Concrete Deck) in accordance with roofing system manufacturer's written instructions and recommendations to suit conditions involved.
   1. Extend vented base sheet a minimum of 6 inches above top edge of cant strip. Modified bitumen base sheet shall be extended 4 inches above cant strip (as noted below), leaving 2 inches of vented base sheet exposed behind flashing for venting.

3.5 INSULATION AND COVER BOARD INSTALLATION

A. General: Comply with insulation manufacturer's instructions and recommendation for the handling, installation, and bonding or anchorage of insulation to each different type of substrate. Roof insulation and cover board shall be dry when installed and shall be protected from weather. All materials that become wet shall be removed before the end of the day.
   1. Steel Deck Installation: Secure first layer of insulation to metal deck areas indicated on plans using corrosive resistant mechanical fasteners specifically designed and sized for attachment of specified board type insulation to deck type shown. Run long joints of insulation in continuous straight line, perpendicular to roof slope with ends joints staggered at least 12" between rows.
      a. Secure insulation over entire field area of roofing, including corners and perimeters, at spacing as required by FM for Windstorm Resistance Classification specified and per applicable requirements of FM Loss Prevention Data Sheet 1-28.
         1) Mechanically fasten first layer.
      b. Set prefabricated tapered insulation in low-rise foam adhesive and offset joints 12" each way from preceding insulation layer and to provide positive drainage to all exterior gutters and roof drains. Provide saddles at crickets as needed to insure there is no ponded water.
         1) Insulation board gaps shall not exceed 1/4". Where joints exceed 1/4", add baseboard to gap.

2) No more insulation shall be applied than can be covered with required membrane specification on the same day.

2. Concrete Deck Installation: Adhere first layer of insulation to concrete deck areas indicated on plans using manufacturer's recommended adhesive specifically designed and sized for attachment of specified board type insulation to substrate indicated. Run long joints of insulation in continuous straight line, perpendicular to roof slope with ends joints staggered at least 12" between rows.
   a. Secure insulation over entire field area of roofing, including corners and perimeters, at spacing as required by FM for Windstorm Resistance Classification specified and per applicable requirements of FM Loss Prevention Data Sheet 1-28.
   b. Set prefabricated tapered insulation in low-rise foam adhesive and offset joints 12" each way from preceding insulation layer and to provide positive drainage to all exterior gutters and roof drains. Provide saddles at crickets as needed to insure there is no ponded water.
      1) Insulation board gaps shall not exceed 1/4". Where joints exceed 1/4", add baseboard to gap.
      2) No more insulation shall be applied than can be covered with required membrane specification on the same day.
3. Cover boards: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows and stagger joints a minimum of 6" from preceding insulation layer. Loosely butt cover boards together. Adhere cover boards in low rise foam adhesive over entire field area of roofing, including corners and perimeters, at spacing as required by FM for Windstorm Resistance Classification specified and per applicable requirements of FM Loss Prevention Data Sheet 1-28.
4. Roof cant strips and tapered edge strips shall be provided at junctures of modified bitumen membrane with vertical surface, unless otherwise indicated. Roof cant strips and edge strips must be set in mastic.
5. Wood cant strips shall be mechanically fastened to supporting structure with hot-dip galvanized or stainless steel fasteners.

3.6 ROOFING MEMBRANE INSTALLATION

A. General: Install in strict accordance with roofing manufacturer's written specifications and recommended details to achieve Guaranty specified.

B. Multiple-Ply, Modified Bituminous Membrane: Install 2 plies of modified bituminous membrane, consisting of one (1) field ply and one (1) surfacing ply, starting at low point of roofing system (for DDL installation, add one additional field ply). Extend field ply to 2" (nominal) above top edge of cant strip and extend surfacing ply 4" (nominal) above top edge of cant strip; terminate in accordance with requirements to manufacturer of primary roofing materials. For DDL, the second field plies shall be heat welded. Set both plies of membrane in asphalt based cold adhesive.
   1. Nail edges of roofing membrane to exterior side of wood blocking at perimeter edges of roof prior to installing metal gravel stops/fascia. Space nails at minimum of 4" on center.
   2. Shingle in direction to shed water.
   3. Accurately align sheets, without stretching, and maintain uniform side and end laps. Stagger end laps a minimum of 18 inches or as required by manufacturer, no header sheets (belly bands) allowed for surface ply. Completely bond and seal laps, leaving no voids.
      a. Repair tears and voids in laps and lapped seams not completely sealed.
   4. Side and end laps shall be heat welded or hot-air welded.
      a. For DDL, side laps shall be a minimum of 4" and end laps shall be a minimum of 6".

C. Vertical Flashing (075216.A10): Install vertical base flashing in accordance with the roofing system manufacturer's written instructions and current published details. Install multiple ply flashing consisting of one ply of APP modified bitumen field ply and one ply of modified bitumen surfacing ply at cant strips, other sloping and vertical surfaces. Flashing shall extend a minimum of 8" above roof surface and 6" onto roof surface. Install modified bitumen surface ply portion of vertical flashing system after installing surface membrane.
   1. Heat weld all seams and laps.
   2. Fasten top of base flashing membranes every 8 inches. Three course the top of base flashing and over the fasteners; layer of asphalt mastic, fabric, and second layer of asphalt mastic.

D. Vertical Flashing (EPDM) (075216.A11): Fully adhere EPDM vertical wall flashing in accordance with the roofing system manufacturer's written instructions and current published details.

E. Horizontal Flashing (metal edge): Install modified bitumen surfacing ply using specified adhesive (no heat welding permitted). Install 12 inches of stripping ply prior to fastening metal edge. Install surfacing membrane over primed metal flanges. Surfacing membrane shall serve as strip in ply for horizontal details if approved by roofing system manufacturer.

3.7 MISCELLANEOUS INSTALLATION REQUIREMENTS

A. Set on Accessories: Where small roof accessories are set on modified bitumen roofing membrane, prime top surface of metal flange, set metal flange in a bed of manufacturer's recommended roofing cement and seal penetration of membrane. The metal flanges that are required to be fastened with a patter of 3" on-center (O.C.) Staggered using angular or ring shank nails. Use surfacing ply as strip in membrane.

B. Install liquid flashing and fleece reinforcement for roof penetrations according to roofing system manufacture's written instructions.

C. Roof Drains: Install drain sump using tapered edge strip. Set 30-by-30-inch square lead flashing in bed of roofing-manufacturer-approved asphaltic adhesive on completed roofing membrane. Prime surface of lead flashing. Cover lead flashing with roofing membrane 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. Install stripping according to roofing system manufacturer's written instructions.

D. Lead Flashing Sheet (plumbing vents): Set 30 by 30 inch square lead flashing in a bed of roofing manufacturer approved asphaltic adhesive on completed membrane. Prime surface of lead flashing. Cover lead flange with roofing membrane cap sheet and extend 4 inches beyond edge of lead flashing onto field of roof membrane. Bend top of lead flashing down into the penetration a minimum of two inches.

E. Roof Pipe Supports: Beneath pipe supports, provide a sacrificial piece of field membrane (cap sheet) permanently adhered to field membrane.

F. Walkway Strips: Install walkway cap sheet strips over roofing membrane using same application method as used for roofing membrane cap sheet.
   1. Install walkway products according to manufacturer's written instructions.
      a. Install flexible walkways at the following locations:
         1) Perimeter of each rooftop unit.
         2) Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
         3) Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
         4) Top and bottom of each roof access ladder.
         5) Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
         6) Locations indicated on Drawings.
         7) As required by roof membrane manufacturer's warranty requirements.
      b. Provide 6-inch clearance between adjoining pads.
      c. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 PROTECTION OF ROOFING

A. Upon completion of roofing work (including associated work), Installer shall advise Contractor of recommended procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction work will in no way affect or endanger roofing (at Contractor's option), Installer shall make a final inspection of roofing and prepare a written report (to Contractor with copy to Owner) describing nature and extent of deterioration or damage found in the work.
   1. Plan work so traffic over new roofing system is kept to a minimum. Where traffic must continue over new roofing system, provide protection for the finished roof.

B. Installer shall repair or replace (as required) deteriorated or defective work found at time of final inspection. Installer shall be engaged by Contractor to repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection. Repair or replace the roofing and associated work to a condition free of damage and deterioration at time of substantial completion.

C. Existing items, structures or areas damaged during course of construction work shall be restored/repaired to a condition equal or better than it was prior to commencement of work.

3.9 CLEANING

A. As work progresses and prior to completion of roofing membrane installation, clean off cold-applied adhesive, asphalt and other asphalt-based mastic spills to prevent discoloration of roofing membrane as recommended by roofing system manufacturer.

B. Clean off footprints tracked onto roofing membrane surface as recommended by roofing system manufacturer.

C. For general cleaning prior to Substantial Completion, power wash as recommended by roofing system manufacturer. Clean all roof areas prior to turning Project over to Owner.

D. Remove all debris and extra materials from roof surface and the project site.

E. Contractor shall be responsible for the cost of roofing system cleanup and, damage to any property and equipment as a result of a leak during roof system installation. If the cleanup is not performed or contracted for immediately, the District (Owner) will perform or contract the cleanup at the Contractor's expense.

END OF SECTION 075216

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Adhered TPO membrane roofing system (075423.A01).
2. Vented Base Sheet (for areas with Concrete Deck) (075423.A05).
3. Roof insulation (075423.A20) and tapered roof insulation (075423.A21).
4. Coverboard (075423.A25).
5. Walkways (075423.A41).
6. Liquid Flashing (075423.A44).
7. All accessories and fasteners needed to complete the roofing systems indicated.

B. Related Sections:
1. Section 012100 "Allowances" for allowances related to work of this Section.
2. Section 012200 “Unit Prices” for unit prices effecting the work of this Section.
3. Section 012300 “Alternates” for those alternates effecting work of this Section.
4. Section 034100 "Precast Strucutral Concrete" for precast decking.
5. Section 053100 “Steel Decking” for steel decking requirements and installation.
6. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
7. Section 072500 "Weather Barriers" for installation requiremens involving weather barriers.
8. Section 072726 "Fluid Applied Air Barriers" for installation requirements involving fluid applied air barriers.
9. Section 076200 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings and roof expansion joints.
10. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
11. Division 22 for roof drains.
12. Division 23 for mechanical equipment and accessory curbs.

C. Products Installed but not Furnished in this Section:
1. Acoustical insulation strips and mesh spacers for metal acoustical roof deck, refer to Section 053100.

1.2 DEFINITIONS

A. TPO: Thermoplastic polyolefin.

B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roofing Systems" for definitions of terms related to roofing work in this Section.

1.3 SYSTEM DESCRIPTIONS

A. Adhered TPO Roofing System (at Steel Decks). Roofing system shall consist of the following components as specified within this Section and related Sections. Components are described in assembly from bottom up to top application.
1. A base layer of polyisocyanurate roof insulation, mechanically fastened to deck.
2. Subsequent layer(s) of polyisocyanurate insulation adhered to initial layer of roof insulation.
3. Cover board, adhered to roof insulation.
4. TPO Roofing Membrane, adhered to coverboard.

B. Adhered TPO Roofing System (at Precast Deck). Roofing system shall consist of the following components as specified within this Section and related Sections. Components are described in assembly from bottom up to top application.
1. Polyisocyanurate roof insulation adhered to precast double t's.
2. Subsequent layer(s) of polyisocyanurate insulation adhered to initial layer of roof insulation.
3. Cover board, adhered to roof insulation.
4. TPO Roofing Membrane, adhered to coverboard.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site approximately two weeks prior to scheduled commencement roofing installation. Conference shall be conducted concurrently with preinstallation conference for sheet metal flashing and trim.
   1. Meet with Owner, Architect, Construction Manager, 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. Record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review roofing systems requirements (drawings, specifications and other contract documents).
   4. Review required submittals, both completed and yet to be completed.
   5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   6. Tour representative areas of roof substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades. Identify and record items to be corrected prior to commencement of work of this Section.
      a. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   7. Review structural loading limitations of roof deck during and after roofing.
   8. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
   9. Review governing regulations and requirements for insurance and certificates if applicable.
   10. Review temporary protection requirements for roofing system during and after installation.
   11. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: Manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required.
   1. Include data and certified test reports substantiating that materials comply with requirements.
      a. Submit Underwriter’s Laboratory material and systems approvals.
   2. For insulation and roof system component fasteners, include copy of FM Approvals RoofNav listing.
   3. Submittals shall be reviewed and accepted by roofing membrane manufacturer’s technical representative with a submittal cover letter stating all products for the roof assembly including roofing membrane, base flashing, and roof insulation are acceptable.

B. Shop Drawings: For roofing system. Include plans, sections, details, and attachments to other work. Indicate dimensions, general construction, specific modifications, component connections, details at adjoining construction and roof top accessories, anchorage methods, hardware and installation procedures; plus the following specific requirements:
   1. Indicate base flashing and membrane terminations and, details for perimeter, penetrations, field fabricate curbs and tie-in flashing details.
   2. Indicate layout and thicknesses for insulation.
   3. Indicate layout, slopes and thicknesses for tapered insulation and crickets.
   4. Roof plan showing orientation of each type of roof deck and orientation of membrane roofing and fastening spacings.
   5. Insulation sheet layout and fastening patterns for corner, perimeter, and field-of-roof locations to comply with performance requirements specified. If insulation and cover board is adhered with low rise foam adhesive, indicate adhesive ribbons patterns.
   6. Shop drawings shall be reviewed and accepted by roofing membrane manufacturer’s technical representative. A shop drawing cover letter shall be submitted by the roofing membrane manufacturer’s technical representative stating all products for the roof assembly including roofing membrane, base flashing and roof insulation are acceptable.
      a. Shop drawings for Section 076200 “Sheet Metal Flashing and Trim” shall be reviewed concurrently with shop drawings for this Section.

C. Samples for Verification: For the following products:
   1. Roof membrane and flashing, of color required.

2. Walkway pads or rolls, of color required.

D. Wind Uplift Resistance Submittal: For roofing system indicating compliance with wind uplift performance requirements.

E. Roof Assembly Certification Letters: Manufacturer of primary roof system components shall submit letter certifying that the roofing system will achieve specified warranty, that roofing system components are acceptable and will meet performance requirements specified.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and manufacturer.

B. Manufacturer Certificates:
1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
a. Submit evidence of compliance with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Certification of Installer:
1. Submit written certification from manufacturer of primary roofing materials that roofing contractor is capable of providing warranty for specified duration.

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

E. Field Test Reports:
1. Concrete internal relative humidity test reports.

F. Field quality-control reports.

G. Sample Warranties: Sample of manufacturer's special warranty applications.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is listed in SPRI's Directory of Roof Assemblies approved for membrane roofing system identical to that specified for this Project.

B. Installer Qualifications: The Roofing Contractor shall perform the work of this Section; and shall be a firm with not less than seven (7) years of successful experience in installation of TPO roofing systems similar to those required for this project.
1. Roofing Contractor shall be 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.
2. Contractor must be a member of NRCA or one of its affiliates.
3. Roofing Contractor must have successfully completed 4 projects of comparable scale within the past two years using the specified system.
4. Installer Certification: Obtain written certification from manufacturer of roofing system certifying that Installer is approved by manufacturer for installation of specified roofing system. Provide copy of certification to Architect prior to award of roofing work.
5. Installer’s Field Supervision: Require Installer to maintain a full-time supervisor/foreman who is on jobsite during times that roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this Project.
6. All roofing shall be installed by employees of the installer; contract labor is not allowed.

C. Pre-application Roofing Conference: Approximately two weeks prior to scheduled commencement of modified bitumen roofing installation and associated work, the Contractor shall conduct a meeting at Project site with Roofing Contractor, roofing membrane manufacturer's technical representative, Installer of each component of associated work, installer of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work), Architect if requested, roofing system manufacturer's technical representative third party inspection agency representative, and other representatives directly concerned with performance of the work. Contractor to record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
   1. Tour representative areas of roof substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades. Identify and record items to be corrected prior to commencement of work of this Section.
   2. Review roofing systems requirements (drawings, specifications and other contract documents).
   3. Review required submittals (all required submittals shall be completed prior to pre-application roofing conference).
   4. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
   5. Review required inspection, testing, certifying and material usage accounting procedures.
   6. Review weather and forecasted weather conditions, and procedures for copying with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement.)
   7. Review temporary protection requirements for roofing system during and after installation.
   8. Review governing regulations and requirements for insurance and certificates.
   9. Roofing work will not be allowed to commence until submittals (or other language) phase has been completed.

D. Insurance Certification: Assist the Owner in preparation and submittal of roof installation certification as may be necessary with fire and extended coverage insurance on roofing and associated work.

E. UL Listing: Provide TPO roofing system materials which have been tested for application and slopes indicated and are listed by Underwriter's Laboratories, Inc. (UL) for external fire exposure class specified.
   1. Provide roof covering materials bearing Classification Marking (UL) on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.
   2. Provide roof insulation approved in writing by roof system manufacturer as acceptable substrate for this project.
   3. Provide roofing system that can be installed to comply with UL 790 requirements specified for resistance to external fire.

F. Product/Material Qualifications:
   1. Components of the roofing system shall be manufactured or approved by the roofing system manufacturer to comply with warranty and construction class requirements.
   2. Fastener corrosion resistance shall be in accordance with FM Standard 4470.

G. Third Party Inspection: The Owner may employ a "Third Party Inspector" to observe the work of this Section. Presence of this Inspector is for Owner's interest and any information or assistance furnished by the Inspector shall not relieve the Roofing Contractor of responsibilities for the work. Contractor shall provide reasonable notification (not less than 48 hours) whenever work is being done to arrange for Inspector's observations.

1.9 FIELD QUALITY CONTROL

A. Field Audits: Roof membrane manufacturer's technical representative shall perform in progress site audits and review completed contractor's quality control forms, prepare and submit reports to roofing contractor and owner's representative. Site audits include first day of construction and a site audit for every two weeks of construction.

B. Quality Control Form:
   1. Contractor to complete daily quality control form provided by the roofing membrane manufacturer which is included in the documents. Contractor is to note on provided roof plan areas of daily construction. Completed forms are to be submitted with warranty completion notice.

C. Final Roof Inspection: As a part of the roofing membrane manufacturer's standard warranty, arrange for roof membrane manufacturer's technical representative.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. 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.

1.10 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. Where heavy loads are placed upon or transported over decking and where materials are repeatedly landed, provide temporary planking or plywood to distribute imposed loads.

E. Comply with fire and safety regulations.

1.11 PROJECT 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.

B. Protect installed roofing system from damage.

1.12 WARRANTY

A. Installer's Special Project Warranty: Submit two (2) executed copies of MRCA Roofing Contractor Materials and Workmanship Warranty; current Form, for a period of two (2) years, covering work of this Section including roof membrane, composition flashing, roof insulation, fasteners, walkway pads and roofing accessories, all stated on face of Warranty, signed and counter signed by Installer (Roofer) and Contractor.

B. Manufacturer’s Warranty: Submit executed copy of roofing manufacturer’s “Full Systems – No Dollar Limit” material and workmanship warranty. Submission shall include a written a description of specified services as noted below and shall be endorsed by the Manufacturer’s Technical Director. Warranty shall be from the decking up, including roofing system, and metal flashing endorsement signed by authorized representative of roofing system manufacture, on form which was published with product literature as of date of contract documents, for the following period of time:
   1. Twenty (20) years, "No Dollar Limit" from date of Substantial Completion.This warranty shall include the following:
      a. Membrane roofing, base flashings, roof insulation, fasteners, cover boards, and other components of membrane roofing system.
      b. Liquid flashing for strip in flashing and pourable sealer pockets and other applications.
   2. Manufacturer shall provide the warranty inspection of the roofing system.
   3. Manufacturer shall provide a two-year re-inspection of the roofing system at no cost to the Owner.

C. Existing Warranted Roofs: At locations where the existing roof is currently under warranty, all work performed shall be verified by all parties involved in the original warranty and coordinated so that work performed will preserve existing warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain components including roof insulation for membrane roofing system or approved by membrane roofing manufacturer. Secondary components shall be from a manufacturer approved by membrane roofing manufacturer.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Carlisle SynTec Incorporated.
   2. Elevate (formerly Firestone Building Products).
   3. Johns Manville.
   4. Soprema.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane 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. Membrane 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: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design and install roofing system to resist the wind uplift pressures set forth on Structural Drawings when tested according to FM Approvals 4474, UL 580, or UL 1897.

D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.

E. Solar Reflectance Index: Not less than 80 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

F. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

G. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.76 and an emissivity of not less than 0.90 when tested according to CRRC-1.

H. 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.

I. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.
   1. Underwriter’s Laboratories, Inc. (UL); roof covering shall meet external fire exposure Class A material rating.

J. **FM Approvals Listing and Performance: Project is not insured by FM Global, however materials and components shall meet FM "approvals" requirements. Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.**
   1. **Fire/Windstorm Classification: Class 1-90.**
   2. **Hail Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 VSH (very severe hail).**

2.3 TPO MEMBRANE ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
   1. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
   2. Thickness: 60 mils, minimum.
   3. Exposed Face Color: As selected by Architect from manufacturer's standard options.

B. ~~Fabric-Backed Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible fabric-backed TPO sheet.~~
   1. ~~Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.~~
   2. ~~Thickness: 60 mils, with 55 mil fabric backing. Total thickness of 115 mils, minimum.~~
   3. ~~Exposed Face Color: As selected by Architect from manufacturer's standard options.~~

2.4 AUXILIARY MEMBRANE ROOFING MATERIALS

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

B. Base/Sheet Flashing(075423.A10): As recommended by roof membrane manufacturer.

C. Vertical Wall Flashing (075423.A11): Match roof ply.

D. Sheet Flashing (075423.A14): Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

E. Prefabricated Pipe Flashings (075423.A14): As recommended by roof membrane manufacturer.

F. Slip Sheet: Same as field membrane. Provide beneath each splash block. Cut to extend 2 inches past both sides and both ends of splash block.

G. Liquid Flashing (075423.A44): Manufacturer's standard reinforced liquid flashing system, same color as sheet membrane.

H. Bonding Adhesive: Manufacturer's standard.

I. Metal Termination Bars (075423.A40): Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

J. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to TPO roofing manufacturer.

K. Premanufactured Pourable Sealer Pockets (075423.A45): A pre-fabricated interlocking pourable sealer pocket system filled with fast setting, solvent free, multi-use waterproof sealer. Prefabricated pockets connect with tongue and groove joints and are composed of high strength, flexible polyurethane elastomer. Pieces join together to create pockets of varying sizes.
   1. Basis-of-Design product: "Lockin' Pocket Interlocking Pitch Pocket System" by Weather-Tite
   2. Product Characteristics:
      a. Pocket and Sealer Color: Black.
      b. Height: 4 inches tall above field of roof.
      c. Warranty: Not less than 24 months.
   3. Prepare Substrates and install pourable sealer pockets in accordance with manufacturer's written instructions to accommodate substrates involved.

L. Miscellaneous Accessories: Provide pourable sealer pockets, pourable sealer, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories as indicated and as necessary for a complete, proper and watertight roofing system.

1. Provide flashing accessories of same color as roofing membrane when possible.
2. Provide all pre-manufactured accessories as required by roofing system manufacturer to achieve warranty/guarantee specified.

2.5 BASE SHEET MATERIALS

A. Base Sheet Fastener: 1.4-inch twin lock fastener.

B. Vented Base Sheet (Concrete Deck) (075419.A05): ASTM 4897, Type II, venting, non-perforated, heavyweight, asphalt-impregnated and –coated, glass-fiber base sheet with coarse granular surfacing or embossed venting channels on bottom surface.

2.6 ROOF INSULATION

A. General: If one of the approved roof insulation systems is provided that alters the system thickness from that specified, Contractor is responsible for any additional cost to add additional courses of cut brick or changes in wood blocking, flashing, gravel, guards, etc.
   1. Provide preformed roof insulation boards manufactured or approved by roof membrane manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated, and approved for use in roof assemblies specified.

B. Insulation Products: Acceptable products must be approved by the roofing system manufacturer.
   1. Approved insulation meeting requirements specified for Class A for fire resistance.
   2. Approved insulation meeting wind uplift resistance requirements specified.

C. Polyisocyanurate Board Insulation (075423.A20): ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
   1. Provide insulation in at least two layers, with the first layer 1-1/2 inches thick.
   2. Mechanically fastened first layer to deck to meet wind uplift requirements specified. All subsequent layers shall be installed with adhesive to meet wind uplift requirements.
      a. Note: At areas where vapor retarder occurs, adhere first layer of insulation in lieu of mechanically fastening.
   3. Total thickness of insulation shall not be less than 5-1/2 inches. Thickness at roof drains shall be 1-1/2 inches, minimum.
   4. First layer of insulation shall provide a minimum aged R-value of 8.6 (for 1-1/2 inch thickness).
   5. Second layer of insulation shall be 4.0 inches thick and provide a minimum aged R-value of 23.6.
   6. Total aged R-value for roof insulation shall not be less than R-30.

D. Tapered Polyisocyanurate Insulation (075423.A21): Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, and ½ inch per 12 inches at crickets and saddles, 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.

2.7 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

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

C. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Cover Board (075423.A25): ASTM C 1177/C 1177M, Type X, glass-mat, water-resistant gypsum substrate, 5/8 inch thick, factory primed. Coverboard shall be listed by roofing manufacturer for hail resistance rating specified.
   1. Basis-of-Design Product: Provide “Dens-Deck StormX Prime” as manufactured by G-P Gypsum corporation.

2.8 ASPHALT MATERIALS

A. Asphalt Primer: ASTM D 41.

2.9 WALKWAYS

A. Flexible Walkways (075423.A41): Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick and acceptable to roofing system manufacturer.
   1. Size: Approximately 39 by 60 inches.
   2. Color: Light Gray or as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
   4. Where concrete and precast concrete decks occur, perform the following:
      a. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
      b. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F 2170.
         1) Test Frequency: One test probe per each 500 sq. ft., or portion thereof, of roof deck, with no fewer than three test probes.
         2) Submit test reports within 24 hours of performing tests.
      c. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
      d. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
      e. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.

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. 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.

D. Provide temporary barricades and other forms of protection for Owner’s personnel and public from injury due to demolition work.
   1. Protect from damage, existing finish work that is to remain in place and becomes exposed during demolition operations.
   2. Protect against any material or debris dropping into the building or damaging new roof membrane.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions and to meet performance requirements specified.

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. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 072726 "Fluid-Applied Air Barrier Coatings."

D. Cooperate with inspection and test agencies engaged or required to perform services in connection with roofing system installation.

E. Protect other work from spillage of roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Protect lawn areas, building walls and windows and building equipment. Replace/restore other work damaged by installation of roofing system work.

F. Cutoffs: At end of each day's roofing installation, protect exposed edge of incomplete work, including insulation. 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. Provide temporary tie off and remove tie-off at beginning work on adjoining roofing.

G. Coordinate flow of work, equipment, materials and personnel to eliminate traffic across completed new roofing systems. Provide plywood walkways for the movement of personnel, equipment and materials.

H. Roof surfaces shall be thoroughly dry before application of roofing.

I. Install roofing and auxiliary materials to tie into existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

J. Roofing Manufacturer's Inspection: Inspection of roofing shall be made by a responsible representative of the roofing manufacturer during application and after completion.

K. When application of roofing is begun, total roof system shall be completed before end of day and before wet by elements. Install water cut-off at completion of each day’s work and remove upon resumption of work. Precautions shall be taken to protect membrane from punctures.

3.4 BASE SHEET INSTALLATION

A. Install a vented base sheet (Concrete Deck) in accordance with roofing system manufacturer’s written instructions and recommendations to suit conditions involved.
   1. Extend vented base sheet a minimum of 6 inches above top edge of cant strip. Modified bitumen base sheet shall be extended 4 inches above cant strip (as noted below), leaving 2 inches of vented base sheet exposed behind flashing for venting.

3.5 INSULATION INSTALLATION

A. ~~Installation of Acoustical Insulation and Mesh Spacers for Acoustical Roof Deck:~~
   1. ~~Prior to placement of acoustical insulation strips and mesh spacers, clean perforated pan of acoustical deck of all debris, grease, oil, water and other foreign matter.~~
      a. ~~Acoustical insulation strips shall be dry before installation of overlying roof materials.~~
   2. ~~Place mesh spacers in the perforated pan area of the acoustical deck between the dovetail shaped ribs. Spacers shall be butted together to form continuous runs.~~
   3. ~~Place strips of acoustical insulation over mesh spacers in pans between ribs. Tightly butt insulation together to form continuous runs.~~

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation and as follows:

1. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
2. Install tapered insulation under area of roofing to conform to slopes indicated.
3. Install insulation under area of roofing to achieve required thickness.
4. At concrete decks and decks where vapor retarder is specified, adhere first layer of insulation in place.

C. Installation Over Metal Decking:
   1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows and with long joints continuous at right angle to flutes of decking.
      a. Locate end joints over crests of decking.
      b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
      c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
      d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
         1) Trim insulation so that water flow is unrestricted.
      e. Fill gaps exceeding 1/4 inch with insulation.
      f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      g. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
         1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
         2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
   2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
      a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
      b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
      c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
      d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
      e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
      f. Trim surface of insulation where necessary and at roof drains so completed surface is flush and does not restrict flow of water.
      g. Create insulation sumps at through-gravelstop scuppers, as indicated.
      h. Fill gaps exceeding 1/4 inch with insulation.
      i. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      j. Adhere each layer of insulation to substrate using low-rise foam adhesive to meet wind uplift performance requirements specified and as follows:
         1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

D. Installation Over Concrete Decks:
   1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.
      a. Make joints between adjacent insulation boards not more than 1/4 inch in width.
      b. Internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
         1) Trim insulation so that water flow is unrestricted.
      c. Fill gaps exceeding 1/4 inch with insulation.
      d. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      e. Adhere each layer of insulation to substrate using low-rise foam adhesive to meet wind uplift performance requirements specified and as follows:
         1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
   2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
      a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
      b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
      c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
    1) Trim insulation so that water flow is unrestricted.
f. Fill gaps exceeding 1/4 inch with insulation.
g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
h. Adhere each layer of insulation to substrate using adhesive according to meet wind uplift performance requirements specified and as follows:
    1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

A. 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.
    1. Loosely butt cover boards together.
    2. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    3. At internal roof drains, conform to slope of drain sump.
        a. Trim cover board so that water flow is unrestricted.
    4. Cut and fit cover board tight to nailers, projections, and penetrations.
    5. Adhere cover board to substrate using adhesive to meet wind uplift performance requirements specified and as follows:
        a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

B. Exposed Insulation Fasteners: Following installation of roofing system above the multi-use room and gymnasiums, trim all mechanical fasteners exposed on underside of metal roof deck. Trim fasteners with wire or bolt cutters, do not break off. Leave a minimum of 3/4" and a maximum of 7/8" exposed while still maintaining pullout resistance to achieve wind uplift resistance specified.
    1. The decks in the multi-use room and gymnasium are the acoustical decks. Fasteners shall be located within the ribs and not at the pans, therefore, eliminating the need to trim fasteners. However, should any fasteners penetrate the pans, they shall be trimmed to leave 3/4" to 7/8" of the fastener penetrating through the deck to maintain FM pullout resistance.

3.7 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
    1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
    2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
    3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

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

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
   1. Install flexible walkways at the following locations:
      a. Perimeter of each rooftop unit.
      b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
      c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
      d. Top and bottom of each roof access ladder.
      e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
      f. Locations indicated on Drawings.
      g. As required by roof membrane manufacturer's warranty requirements.
   2. Provide 6-inch clearance between adjoining pads.
   3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.

B. Owner will engage a qualified testing agency to perform the following tests:
   1. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C 1153.
      a. Perform tests before overlying construction is placed.
      b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
      c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
         1) Cost of retesting is Contractor's responsibility.
      d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.

C. Project Startup Inspection: Arrange and coordinate for roofing system manufacturer’s technical personnel to inspect project on the first or second day of roof construction.

D. Interim Roof Inspections: Arrange and coordinate for roofing system manufacturer’s technical personnel to inspect project once per every two weeks of roof construction, minimum.

E. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
   1. Notify Architect 72 hours in advance of final roof inspection.

F. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

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

3.11 PROTECTING AND CLEANING

A. Clean all roof areas prior to turning Project over to Owner.

B. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will 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.

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

END OF SECTION 075423 075423

SECTION 116143 - STAGE CURTAINS

PART 1 - GENERAL

1.1 REQUIREMENTS

A. As set forth in the headings of Division 0 and Division 1, General Conditions and General Requirements shall apply to this branch of the Work.

1.2 SUMMARY

A. This section includes the fabrication, furnishing, delivery and installation of the following stage equipment:
   1. Acceptable Manufacturers
   2. Dead Hung Stage Rigging
   3. Stage Curtains and Tracks

1.3 SUBMITTALS

A. Comply with the requirements of Liberty School District and submit listed action submittals in accordance with contract conditions.

B. Product Data: Submit manufacturer's material specifications with quantities on bill of materials and installation instructions. Include instruction for handling, storage, protection, and maintenance.

C. Shop Drawings: Show system layouts, electrical requirements, construction methods, material types and thicknesses, hardware and fittings.

D. Submittals: Show equipment, and complete bill of materials. Cut sheets will not be considered submittals and will be returned unread.

E. Samples: If requested, submit samples of any equipment, hardware, fabric or finishes.

1.4 QUALITY ASSURANCE

A. Theatrical Rigging Contractor: All items of work included in this specification shall be furnished and installed by experienced stage technicians in the employ of a single contractor so that there will be no division of responsibility for the proper operation of the equipment after installation.
   1. Each Theatrical Contractor must furnish a written listing of at least five installations that are equal to or surpass the scope of this project and that have been installed within the last five years.

B. The contractor shall employ an Entertainment Technician Certification Program (ETCP) Certified Theatre Rigger. The Certified Theatre Rigger shall be either the project manager or site foreman and be responsible for the overall project including the layout, inspection and training.
   1. A copy of the Certified Theatre Rigger’s credentials shall be included with the bid documents.

1.5 DELIVERY, STORAGE AND HANDLING

A. Coordinate storage of all equipment, hardware, and accessories with owner to assure that storage does not inhibit the work of other contractors.

B. The Theatrical Contractor shall be responsible for the handling of all equipment, hardware and accessories, including unloading and transport to the designated storage area.

C. Deliver all hardware components and equipment and their accessories to the job site no sooner than two weeks prior to their installation in order to limit possible damage to the equipment while being stored.
   1. Deliver materials in manufacturer’s original undamaged containers with identification labels intact.
   2. Remove packaging materials from site and dispose of at appropriate recycling facilities

D. Deliver curtains to the job site no sooner than two days prior to installation to prevent damage while being stored.

1.6 SCOPE

A. The theatre rigging contractor will be responsible for installing all of the new theatrical rigging and curtain equipment outlined in this specification. All dimensions must be field-verified by the theatrical rigging contractor. Field

conditions which may not be covered in the specifications, shall determine actual equipment needs. The intention of the specification and drawings is to furnish and safely install new equipment and components that conform to building conditions and the intent of the bid documents. Install unistrut where needed to support all new rigging.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. It is the intention of this specification to provide a fully functioning dead hung stage rigging system. Actual equipment and components must reflect building conditions and approved shop drawings. All dimensions must be field-verified by the theatrical rigging contractor. Conditions detailed in the drawings, which may not be covered in the specifications, shall determine actual equipment needs.

B. The curtain track equipment shall be manufactured by one of the following:
1. Automatic Devices Company
2. Tru-Roll- Theatrical Rigging & Hardware

E. Requests for substitution of other components shall include pertinent performance data; charts and drawings showing in what respect the system will function in accordance with the specifications. This information shall be mandatory as a basis for determining the intent in meeting the full requirements of the specification including time schedule.

F. If required by the Owner, provide working samples of substitute equipment, including all necessary accessories, to be delivered as requested for the examination by the Consultant. Handling, shipping, delivery or removal of the samples shall be at the cost of the manufacturer. Substitutions will be accepted only by written addendum prior to the bid date.

G. It shall be understood that the cost of any additions or revisions required by the use of substitute equipment shall be the responsibility of the bidder making the substitution

2.2 DEAD HUNG STAGE RIGGING

A. Provide dead hung tracks. Refer to “TH” drawings for reference.
1. Provide Two (2) dead hung tracks:
a. Provide and install lightweight framing (Unistrut or similar) to overhead structure as needed to support new dead hung tracks.

B. Fabricate, deliver and install in accordance with the following specification schedules.

C. Properly adjust and trim all sets as indicated on “TH” drawings and the Rigging Schedule.

D. All dead hung tracks will be hung with ¼" 7 X 19 galvanized aircraft cable or 3/16 " proof coil chain. Hanging points will be a maximum of 10' 0" on center. All cable termination points shall be finished with ¼" thimbles and a copper nicropress sleeve. On the pipe end of the cable a 30" trim chain fabricated from 3/16" proof coil chain. Swage one end of the chain into the cable eye, wrap around batten 1 ½ times and secure back to the eye of the cable using a 1/4" trade size Screw Pin Shackle (with safety wire), leaving approximately 4" of chain for adjustment. The rigging may only be attached to the support steel overhead. Provide all hardware as required to attach to or wrap around the overhead supports. Any materials required to bridle or span between structural members is the responsibility of the theatrical rigging contractor. Properly adjust and trim all sets, tracks, and curtains.

E. All cables, fittings, sleeves and clips shall conform to the wire rope manufacturer's recommendations as to size, number and method of installation.
1. Provide a “Go-No Go Gauge” that conforms to the Compression tool at time of commissioning for consultant use.

F. Remove all debris from the site. Leave floors broom clean

2.3 STAGE CURTAINS AND TRACKS

A. Fabricate, deliver and install stage draperies, curtains and tracks in accordance with the following specification schedules. Refer to “TH” drawings for reference.

B. Properly adjust and trim all sets, tracks, draperies and curtains.

C. Flame Retardant: All synthetic fabrics utilized for the curtains hereafter specified shall be inherently flame retardant to conform to all applicable building and safety codes. The specified synthetic velours shall be inherently flame retardant to the extent that the curtain will withstand cleanings without being affected. Prior to final approval, the Rigging Contractor shall provide two original signed and notarized, flameproofing certificates stating the process used, the method of Flame Retardant utilized, the fabric, the color and the yardage. All certificates shall be originated by the firm having done the flameproofing and not by the Theatrical Rigging Contractor.

D. Materials provided:
   1. Forestage (Grand Drapery, Grand Valance), Color to be selected by Architect shall be manufactured using one of the following fabrics, or approved equal.
      a. 62" Da Vinci Velvet Plus synthetic velour, 21 ounces per linear yard as manufactured by Dazian.
      b. Fred Krieger Fabric: Prism synthetic velour, 22 ounces per linear yard, 62” wide.
      c. Rose Brand: Encore synthetic velour, 22 ounces per linear yard, 64” wide.
      d. Approved equal.
   2. Masking Curtains, Color: Black.
      a. 62" Milano Velvet Plus synthetic velour, 16 ounces per linear yard as manufactured by Dazian.
      b. Fred Krieger Fabric: Prism synthetic velour, 14 ounces per linear yard, 62” wide.
      c. Rose Brand: Encore synthetic velour, 15 ounces per linear yard, 64” wide.
      d. Approved equal.
   3. Curtain tracks and hardware,
      a. Automatic Devices Company,
      b. Tru-Roll,

E. Fabrication of all panels shall be a single piece for the entire height of the curtain. No splicing of fabric to achieve a desired length will be acceptable.

F. The tread shall be the Tex 40 spun polyester for the synthetic fabric curtains and shall be the color of the fabric on which it is used, both in the needle and in the bobbin. The thread shall not be lighter than #16 in size.

G. Bad stitching, missed stitching, puckered seams, hems, etc., shall not be acceptable. All seams shall be sewn in straight and even lines.

H. Forestage Grand Drapery shall be fabricated with 50% sewn in fullness with box pleats every 12" on center. The top shall have 3" poly webbing double stitched to the back. It shall have #3 brass grommets at the center of each pleat, placed 1" from the top. A CCF-2 fastener shall be used at every grommet to attach curtain to the track. The sides shall be finished with a 1' 0" turned back hem. The bottom shall finish with a 6" hem, weighted with #8 plated jack chain the entire length.

I. Masking curtains shall be fabricated to finish with 25% sewn in fullness with box pleats, 12" on center. The top shall have 3" poly webbing double stitched to the back. It shall have #3 brass grommets at the center of each pleat, placed 1" from the top. The sides shall finish with a 3" turned back hem. The bottom shall finish with a 4" hem which shall contain #8 plated jack chain the entire length of the curtain.

J. Provide the following Curtains and Track Schedule:

   1. Provide One (1), Forestage (Grand) Drapery finished in One (1) section total. Finish One (1) section 27'0" wide x 14'4" high, 50% fullness, Encore velour, color to be determined by the Architect. Installed on ADC #114 curtain track, 34’4” in length. Provide all the necessary hardware for one-way draw and an adjustable 5” floor pulley. Install at location as shown on the TH 100 drawings.
   2. Provide Three (3) masking legs. Finish each section 10'0" wide x 14'4" high, 25% fullness, Encore velour, color black. Provide and install on ADC #114 with three (3) 90 degree 48” radius and one (1) 180 degree 18” radius. Complete with all necessary hardware for walk along operation. Track length is 65’3” as indicated on TH 100 drawing.
   3. Provide Four (4) masking legs. Finish each section 6'0" wide x 14'4" high, 25% fullness, Encore velour, color black. Complete with all necessary hardware for walk along operation. Install on walk along track as describe above.

Q. Upon completion of the installation, clean the fabric of all dust, lint and loose threads. Adjust for proper fit and operation.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspect the areas and conditions where theatrical equipment will be installed. Notify the architect of any conditions that would adversely affect the installation or subsequent utilization of the equipment. Do not proceed with the installation until unsatisfactory conditions are corrected.
   1. Coordinate work and work schedule with related work in other sections. Provide items to be installed by others in sufficient time to prevent delays.

3.2 GENERAL INSTALLATION

A. Install all theatrical equipment, hardware and accessories at locations indicated in the drawings utilizing qualified stage technicians.
   1. Provide all tools, accessories, connecting and attaching devices as required for a complete and properly functioning installation.

B. Install equipment true, plumb and securely anchor in place in accordance with the manufacture's recommendations.

C. Properly test and demonstrate all curtain equipment after installation for the owner’s representative.
   1. Furnish three sets of closeout documents in both printed and electronic (PDF) format. The document should include but not limited to; system layouts, maintenance procedures, operation, and tutorials.
   2. Training and maintenance for the rigging and curtain systems shall be provided by the rigging contractor; training not to exceed one hour.

D. The curtain systems, tracks and rigging shall be guaranteed against defects in material and workmanship for two years from date of substantial completion. The warranty shall be on a factory exchange or repair basis. No equipment having a shorter warranty will be considered and all equipment provided shall be covered by this warranty. The Theatrical Rigging Contractor shall assume all responsibility for workmanship of the installation. Unspecified length warranty will not be acceptable.

3.3 CLEANUP

A. Upon completion of installation, remove all debris from the site.

B. Leave work areas broom clean and ready for use.

END OF SECTION 116143

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following soil and waste, sanitary drainage and vent piping inside the building:
   1. Pipe, tube, and fittings.
   2. Special pipe fittings.

1.2 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. EPDM: Ethylene-propylene-diene terpolymer rubber.

C. LLDPE: Linear, low-density polyethylene plastic.

D. NBR: Acrylonitrile-butadiene rubber.

E. PE: Polyethylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. TPE: Thermoplastic elastomer.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
   1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.4 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Shop Drawings:
   1. Sovent Drainage System: Include plans, elevations, sections, and details.

C. Field quality-control inspection and test reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; and "NSF-drain" for plastic drain piping.

C. Cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and shall be listed by NSF International.

D. CISPI Hubless Couplings (CISPI 310) shall be marked with NSF International.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service class; manufactured by AB&I, Charolotte, or Tyler.

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301. manufactured by AB&I, Charolotte, or Tyler.

B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
   1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) ANACO.
         2) Mission Rubber Co.
         3) Tyler Pipe; Soil Pipe Div.
         4) Pre-approved equal.
   2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) ANACO/Husky SD 4000.
         2) Clamp-All Corp.-125.
         3) Pre-approved equal.
   3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) MG Piping Products Co.
         2) Pre-approved equal.

2.5 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
   1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.

B. Solvent Cement and Adhesive Primer:
   1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 SPECIAL PIPE FITTINGS

A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Dallas Specialty & Mfg. Co.
      b. Fernco, Inc.
      c. Logan Clay Products Company (The).
      d. Mission Rubber Co.
      e. NDS, Inc.
      f. Plastic Oddities, Inc.
      g. Pre-approved equal.

2. Sleeve Materials:
   a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
   b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

B. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. EBAA Iron Sales, Inc.
      b. Romac Industries, Inc.
      c. Star Pipe Products; Star Fittings Div.
      d. Pre-approved equal.

C. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. SIGMA Corp.
      b. Pre-approved equal.

2.7 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Description: ASTM A 674 or AWWA C105, high-density, crosslaminated PE film of 0.004-inch or LLDPE film of 0.008-inch minimum thickness.

B. Form: Sheet or tube.

C. Color: Black or natural.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.

B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

C. Aboveground, soil, waste, and vent piping shall be the following:
   1. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.

D. Underground, soil, waste, and vent piping NPS 15 and smaller shall be the following:
   1. Extra-Heavy class, cast-iron soil piping; gaskets; and gasketed joints.
   2. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
   3. Dissimilar Pipe-Material Couplings: Flexible, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

3.2 PIPING INSTALLATION

A. Basic piping installation requirements are specified in Section "Basic Mechanical Materials and Methods."

B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Section "Basic Mechanical Materials and Methods."

D. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Section "Basic Mechanical Materials and Methods."

E. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

F. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

G. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

H. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
   1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
   2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
   3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

I. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

J. Install ABS soil and waste drainage and vent piping according to ASTM D 2661.

K. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

L. Install underground ABS and PVC soil and waste drainage piping according to ASTM D 2321.

M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

F. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

G. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.4 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Section "Mechanical Vibration and Seismic Controls."

B. Pipe hangers and supports are specified in Section "Hangers and Supports." Install the following:
   1. Vertical Piping: MSS Type 8 or Type 42, clamps.
   2. Individual, Straight, Horizontal Piping Runs: According to the following:
      a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
      b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
      c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
   3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
   4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Section "Hangers and Supports."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
   2. NPS 3: 60 inches with 1/2-inch rod.
   3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
   4. NPS 6: 60 inches with 3/4-inch rod.
   5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Connect soil and waste piping to existing sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

B. Connect drainage and vent piping to the following:
   1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section "Plumbing Fixtures."
   2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
   3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Section "Plumbing Specialties."
   4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.6 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
   1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
   2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction.
   1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
   2. Prepare reports for tests and required corrective action.

3.7 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221316

SECTION 221413 - STORM DRAINAGE PIPING

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. This Section includes the following storm drainage piping inside the building:
   1. Pipe, tube, and fittings.
   2. Special pipe fittings.
   3. Encasement for underground metal piping.

B. Related Sections include the following:
   1. Division 22 Section "Sump Pumps."

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. LLDPE: Linear, low-density polyethylene plastic.

C. PE: Polyethylene plastic.

D. PVC: Polyvinyl chloride plastic.

E. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working-pressure, unless otherwise indicated:
   1. Storm Drainage Piping: 10-foot head of water.
   2. Storm Drainage, Force-Main Piping: 150 psig.

1.5 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. LEED Submittal:
   1. Product Data for Credit EQ 4.1: For solvent cements and adhesive primers, including printed statement of VOC content.

C. Shop Drawings:
   1. Controlled-Flow Storm Drainage System: Include calculations, plans, and details.

D. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service class.

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301; manufactured by AB&I, Charlotte or Tyler.

B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
   1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) ANACO.
         2) Mission Rubber Co.
         3) Tyler Pipe; Soil Pipe Div.
         4) Pre-approved equal.
   2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) ANACO/Husky SD 4000.
         2) Clamp-All Corp.-125.
         3) Pre-approved equal.
   3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
      a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         1) MG Piping Products Co.
         2) Pre-approved equal.

2.5 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight or Schedule 40, galvanized. Include ends matching joining method.

B. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.

C. Pressure Fittings:
   1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
   2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
   3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
   4. Cast-Iron Flanges: ASME B16.1, Class 125.
   5. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.

D. Grooved-Joint Systems:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Anvil International.
b. Star Pipe Products; Star Fittings Div.
c. Victaulic Co. of America.
d. Ward Manufacturing, Inc.
e. Pre-approved equal.

2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, galvanized, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, galvanized, ductile-iron casting; with dimensions matching steel pipe.
3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.6 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
1. Copper Drainage Fittings: ASME B16.23, cast-copper or ASME B16.29, wrought-copper, solder-joint fittings.

B. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.
1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

C. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.
1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.

2.7 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. Solvent Cement and Adhesive Primer:
1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 SPECIAL PIPE FITTINGS

A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Dallas Specialty & Mfg. Co.
b. Fernco, Inc.
c. Logan Clay Products Company (The).
d. Mission Rubber Co.
e. NDS, Inc.
f. Plastic Oddities, Inc.
g. Pre-approved equal.
2. Sleeve Materials:
a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

B. Expansion Joints: Two or three-piece, ductile-iron assembly consisting of telescoping sleeve(s) with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Select and assemble components for expansion indicated. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. EBAA Iron Sales, Inc.
b. Romac Industries, Inc.
c. Star Pipe Products; Star Fittings Div.

d. Pre-approved equal.

C. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. SIGMA Corp.
b. Pre-approved equal.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground storm drainage piping shall be the following:
1. Hubless cast-iron soil pipe and fittings; heavy-duty, shielded, stainless-steel couplings; and coupled joints.

C. Underground storm drainage piping NPS 6 and smaller shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
3. Dissimilar Pipe-Material Couplings: Flexible, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

D. Aboveground storm drainage force mains NPS 1-1/2 and NPS 2 shall be any of the following:
1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
2. Steel pipe, pressure fittings, and threaded joints.

E. Aboveground storm drainage force mains NPS 2-1/2 and NPS 6 shall be any of the following:
1. Steel pipe, pressure fittings, and threaded joints.
2. Grooved-end steel pipe, grooved-joint system fittings and couplings, and grooved joints.

3.3 PIPING INSTALLATION

A. Storm sewer and drainage piping outside the building are specified in Division 33 Section "Storm Utility Drainage Piping."

B. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."

C. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers. Cleanouts are specified in Division 22 Section "Storm Drainage Piping Specialties."

D. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.

E. Install underground, steel, force-main piping. Install encasement on piping according to ASTM A 674 or AWWA C105.

F. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

G. Install wall-penetration fitting system at each service pipe penetration through foundation wall. Make installation watertight.

H. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

I. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

J. Lay buried building storm drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

K. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:
   1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
   2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

L. Install force mains at elevations indicated.

M. Install engineered controlled-flow storm drainage piping in locations indicated.

N. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

O. Install PVC storm drainage piping according to ASTM D 2665.

P. Install underground ABS and PVC storm drainage piping according to ASTM D 2321.

Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

C. Hub-and-Spigot, Cast-Iron Soil Piping Calked Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

D. Hubless Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

F. Grooved Joints: Cut groove ends of pipe and assemble grooved ends of pipes, grooved-end fittings, and grooved-end-piping couplings according to AWWA C606.

G. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 VALVE INSTALLATION

A. General valve installation requirements are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

B. Shutoff Valves: Install shutoff valve on each sump pump discharge.
   1. Install gate or full-port ball valve for piping NPS 2 and smaller.
   2. Install gate valve for piping NPS 2-1/2 and larger.

C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sump pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves. Use normally closed type, unless otherwise indicated.
2. Install backwater valves in accessible locations.
3. Backwater valve are specified in Division 22 Section "Storm Drainage Piping Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
   1. Vertical Piping: MSS Type 8 or Type 42, clamps.
   2. Individual, Straight, Horizontal Piping Runs: According to the following:
      a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
      b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
      c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
   3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
   4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
   2. NPS 3: 60 inches with 1/2-inch rod.
   3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
   4. NPS 6: 60 inches with 3/4-inch rod.
   5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
   6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/4: 84 inches with 3/8-inch rod.
   2. NPS 1-1/2: 108 inches with 3/8-inch rod.
   3. NPS 2: 10 feet with 3/8-inch rod.
   4. NPS 2-1/2: 11 feet with 1/2-inch rod.
   5. NPS 3: 12 feet with 1/2-inch rod.
   6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
   7. NPS 6: 12 feet with 3/4-inch rod.
   8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

H. Install supports for vertical steel piping every 15 feet.

I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1-1/4: 72 inches with 3/8-inch rod.
   2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
   3. NPS 2-1/2: 108 inches with 1/2-inch rod.
   4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
   5. NPS 6: 10 feet with 5/8-inch rod.
   6. NPS 8: 10 feet with 3/4-inch rod.

J. Install supports for vertical copper tubing every 10 feet.

K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

D. Connect force-main piping to the following:
   1. Storm Sewer: To exterior force main or storm manhole.
   2. Sump Pumps: To sump pump discharge.

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
   1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
   2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
   1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
   2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
   3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
   4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
   5. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
   1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
   2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
   3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
   4. Prepare reports for tests and required corrective action.

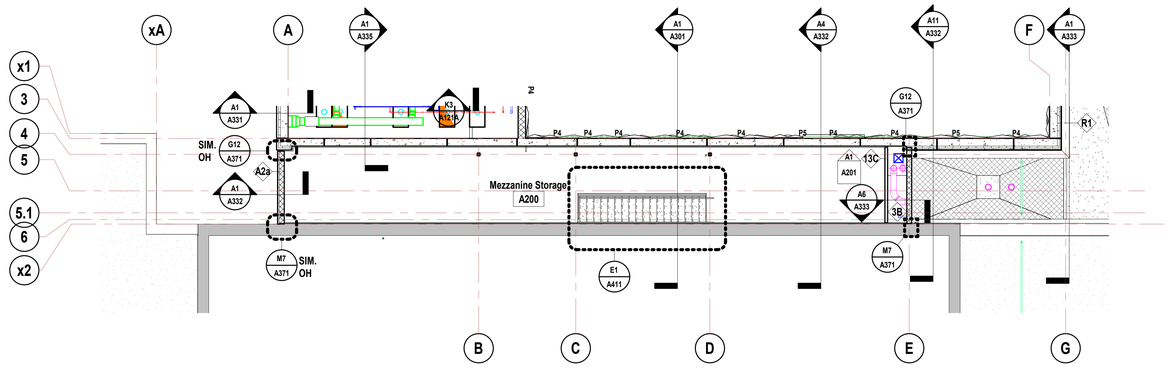
3.9 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

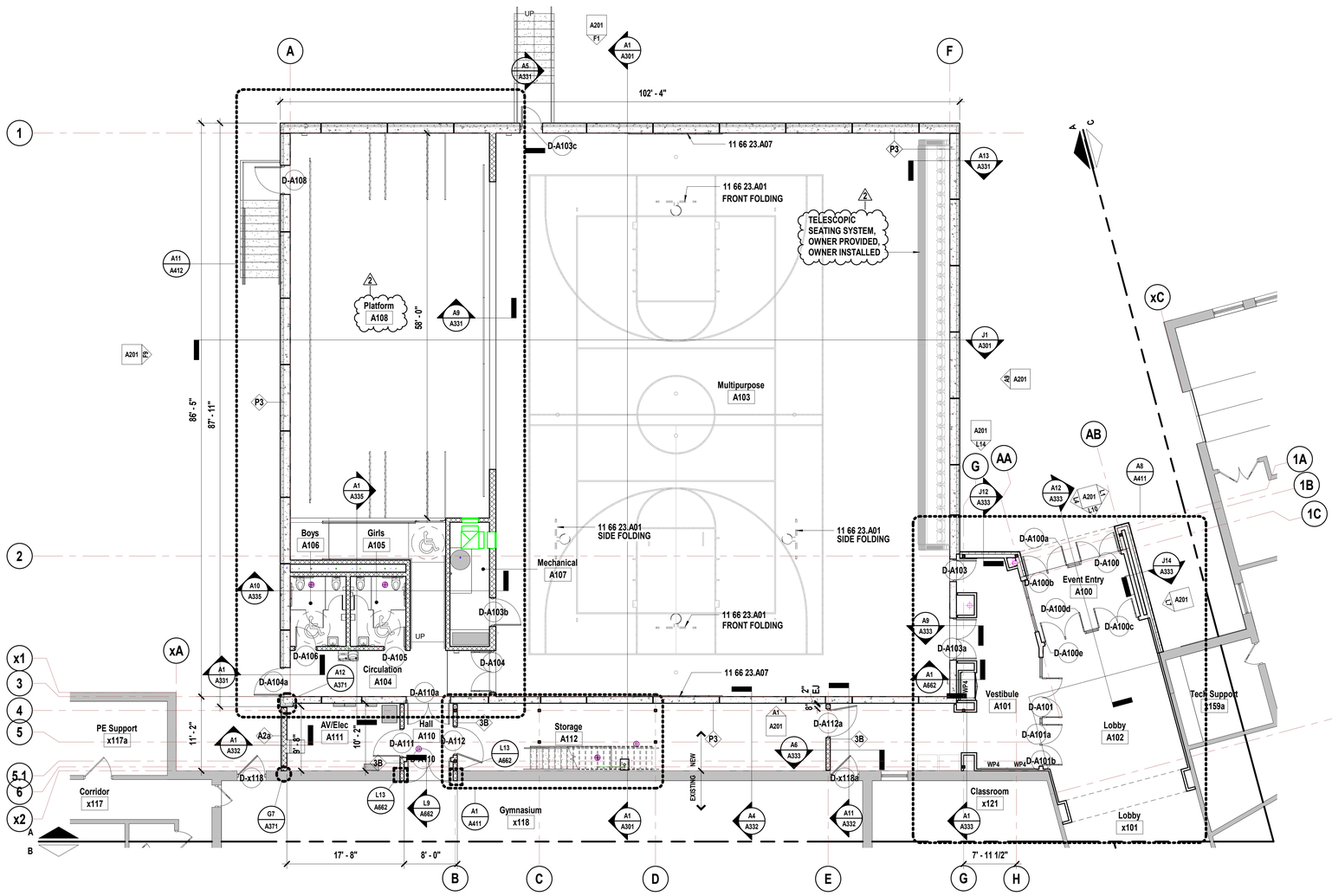
B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 221413



N1 | Scale 1/8" = 1'-0" | Floor Plan - Mezzanine Level- Area A



A1 | Scale 1/8" = 1'-0" | Floor Plan - Level 1 - Area A

8' 4' 0' 8'

PROJECT NORTH TRUE NORTH

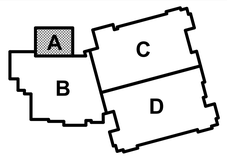
SHEET KEYNOTE LEGEND

11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS
11 66 23.A07	WALL SAFETY PADS

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. DO NOT SCALE THIS DRAWING
3. INTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   - A. TO FACE OF STUD
   - B. TO FACE OF MASONRY UNIT
   - C. TO FACE OF DOOR AND WINDOW ROUGH OPENINGS
4. EXTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   - A. TO FACE OF STUD
   - B. TO FACE OF MASONRY UNIT
   - C. TO FACE OF PRECAST
5. COORDINATE LOCATIONS WHERE BACKING IS REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, WALL HUNG ACCESSORIES AND TECHNOLOGY
6. COORDINATE FINISHES TO REMAIN WITH DEMOLITION SHEET

KEY PLAN



hollis+miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/29/2023

KEVIN E. NELSON
A-2019015618
ARCHITECT
STATE OF MISSOURI

SEPTEMBER 29, 2023

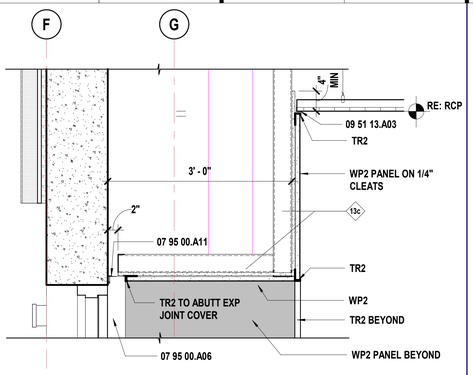
Kevin E. Nelson
A-2019015618

JOB NO: 23018
DRAWN BY: LB
CHECKED BY: JB
DATE: 08.31.2023

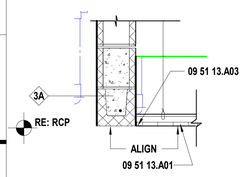
A101A

FLOOR PLAN - LEVEL 1 - AREA A

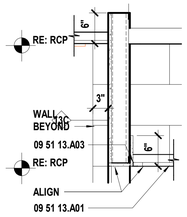
9/29/2023 1:58:31 PM



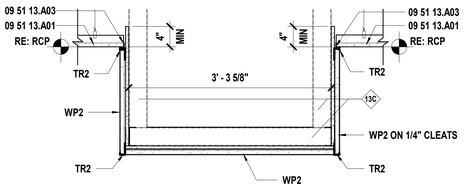
N1 | Scale 1" = 1'-0" | Ceiling Detail - Multipurpose Entry



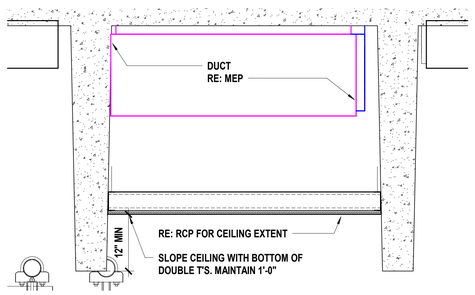
K1 | Scale 1" = 1'-0" | Ceiling Detail - Circulation Ramp



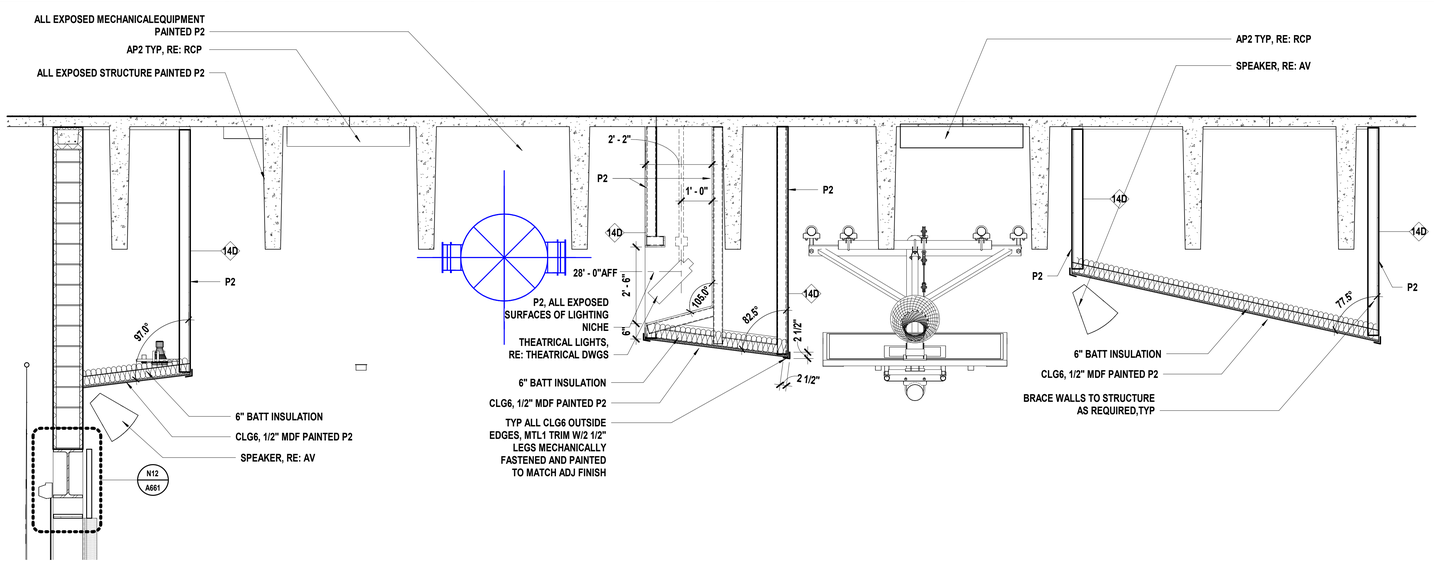
K3 | Scale 1" = 1'-0" | Ceiling Detail - High/Low Ceiling



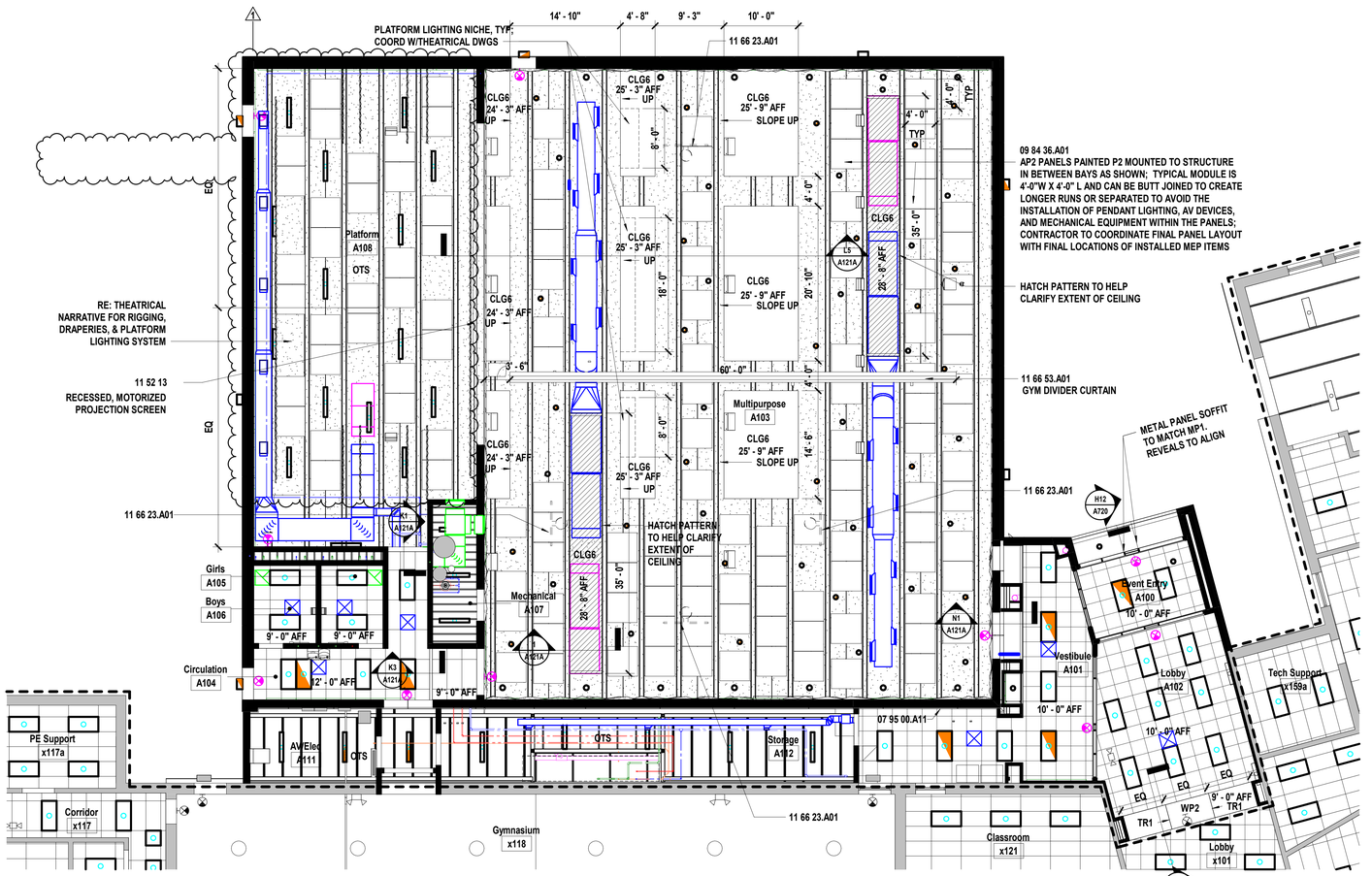
F1 | Scale 1" = 1'-0" | Ceiling Detail - Lobby A102



1 | Scale 1" = 1'-0" | Ceiling Detail -



L5 | Scale 1/2" = 1'-0" | Ceiling Detail - CLG6 @ Stage Lights



A5 | Scale 1/8" = 1'-0" | Reflected Ceiling Plan - Level 1 - Area A

SHEET KEYNOTE LEGEND

07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
07 95 00.A11	CEILING-TO-WALL JOINT SYSTEM
09 51 13.A01	ACOUSTICAL CEILING PANELS
09 51 13.A03	EDGE MOLDINGS AND TRIM
09 84 36.A01	SOUND-ABSORBING CEILING PANELS
11 52 13	PROJECTION SCREENS
11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS
11 66 53.A01	GYMNASIUM DIVIDER CURTAIN ASSEMBLY

SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH
CLG1	Ceiling	White
CLG2	Ceiling	White
CLG3	Ceiling	White
CLG4	Ceiling	White
CLG5	Ceiling	White
CLG6	Ceiling	P2
HP1	High Performance Coating	SW 7011 Natural Choice
HP2	High Performance Coating	SW 6076 Cyberspace
HP3	High Performance Coating	SW 9170 Acier
MTL1	Metal Trim Piece	P2
P1	Paint	SW 7011 Natural Choice
P2	Paint	SW 7076 Cyberspace
P3	Paint	SW 9170 Acier
P4	Paint	SW 6966 Blueblood
P5	Paint	SW 6524 Commodore
P6	Paint	SW 7018 Dovetail
P7	Paint	SW 6967 Frank Blue
P8	Paint	SW 6811 Honorable Blue
TR1	Millwork Trim	
TR2	Millwork Trim	

SHEET NOTES

ALTERNATE NO.1 SCOPE WITHIN BOUNDARY LINE

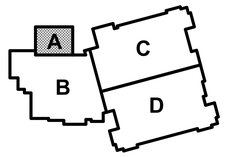
ALTERNATE NO.1
ALL EXISTING ROOMS TO RECEIVE NEW ACOUSTICAL CEILING TILE (ACT) TO REPLACE EXISTING. EXISTING GRIDS TO REMAIN.

1. CLASSROOMS, STORAGE ROOMS, OFFICES, LOCKER ROOMS, SUPPORT SPACES TO RECEIVE **CLG1** (24x48) OR **CLG2** (24x24) TO MATCH EXISTING GRID SIZE

2. LOBBIES, RECEPTION, PUBLIC CIRCULATION, CLASSROOM CORRIDORS, VESTIBULES, MEDIA CENTER, & COMMONS TO RECIEVE **CLG3**

3. KITCHEN, CAFETERIA, RESTROOMS, SHOWERS & OTHER WET SPACES TO RECEIVE **CLG4** (24x48) OR **CLG5** (24x24) TO MATCH EXISTING GRID SIZE

KEY PLAN



hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023

Kevin E. Nelson
A-2019015618

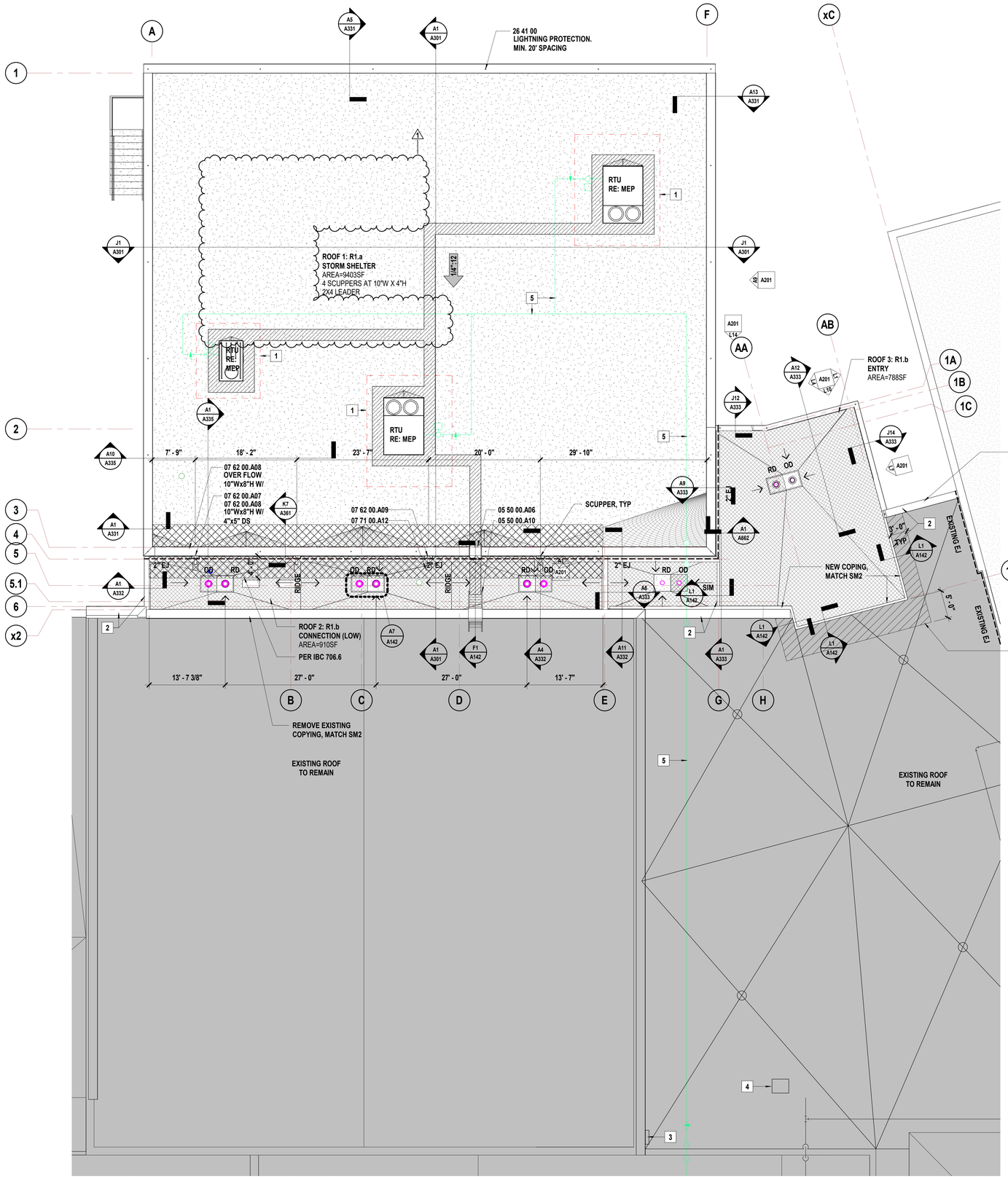
JOB NO: 23018
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

A121A

REFLECTED CEILING PLAN - LEVEL 1 - AREA A

Please consider the environment before printing this.

9/29/2023 1:58:42 PM



ROOF TYPE LEGEND

R1.a MOD BIT W/ 5.2" INSULATION
- 07 52 16.A01 W/ VENTED BASE SHEET
- 07 52 16.A25
- 07 52 16.A20
- PRE-CAST T RE: STRUCTURAL

R1.b MOD BIT TAPERED INSULATION
- 07 52 16.A01
- 07 52 16.A25
- 07 52 16.A20
- METAL DECK RE: STRUCTURAL

SHEET KEYNOTE LEGEND

05 50 00.A06	METAL LADDER
05 50 00.A10	SHIP'S LADDER WITH PLATFORM RETURN
07 52 16.A01	MODIFIED BITUMINOUS ROOFING SYSTEM
07 52 16.A20	ROOF INSULATION
07 52 16.A25	COVERBOARD
07 62 00.A07	DOWNSPOUTS
07 62 00.A08	SCUPPERS
07 62 00.A09	CONDUCTOR HEADS
07 71 00.A12	SPLASH PANS
26 41 00	

ROOF PLAN LEGEND

- SLOPED STRUCTURE RE: STRUCTURAL FOR ROOF BEARING HEIGHTS/SLOPE
- SLOPE PROVIDED BY TAPERED INSULATION OVER FLAT STRUCTURE @ SLOPE INDICATED (1/4" / 12")
- TAPERED INSULATION CRICKET
- ROOF MEMBRANE 07 52 16.A01
- WALKWAY PADS 07 52 16.A16
- EXISTING ROOF AREA
- BUILDING EXPANSION JOINTS PATH. REFER TO SPECIFIC DETAILS FOR MORE INFORMATION

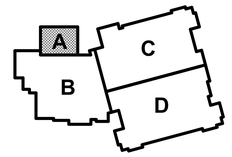
SHEET NOTES

1. REFER TO PLUMBING DRAWINGS FOR ROOF DRAIN DETAILS
2. REFER TO MECHANICAL DRAWINGS FOR ROOF MOUNTED EQUIPMENT AND CURBS
3. REFER TO PLUMBING DRAWINGS FOR EXPOSED GAS PIPING AND SUPPORTS

KEYNOTES

1. UNIT MOUNTED SCREEN. MFR TO PROVIDE FULL COLOR RANGE IN SUBMITAL. FINAL COLOR TO BE SELECTED BY ARCHITECT
   RE: MEP FOR MORE INFORMATION
2. NEW T.O.W. TO ALIGN WITH EXISTING T.O.W. COPING TO MATCH. SM2
3. EXISTING ROOF LADDER TO EXISTING GYM ROOF TO REMAIN
4. EXISTING ROOF ACCESS TO REMAIN
5. GAS LINE, RE: MEP

KEY PLAN



hollis+miller architects
"we design the future"
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

CONSTRUCTION DOCUMENTS

Discovery Middle School Storm Shelter Addition

Liberty Public Schools

800 Midjay Dr, Liberty, MO 64068

REVISIONS:

#	Description	Date
1	Addendum 04	09/29/2023

SEPTEMBER 29, 2023

Kevin E. Nelson
A-2019015618

JOB NO: 23018
DRAWN BY: KL
CHECKED BY: JB
DATE: 08.31.2023

A141

ROOF PLAN

A1 Scale 1/8" = 1'-0" — Roof Plan

8' 4' 0' 8'

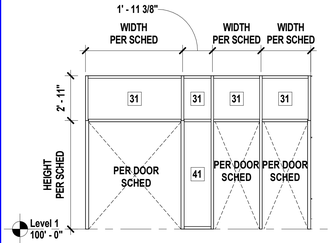
PROJECT NORTH TRUE NORTH

9/29/2023 1:58:46 PM

Please consider the environment before printing this.

DOOR SCHEDULE

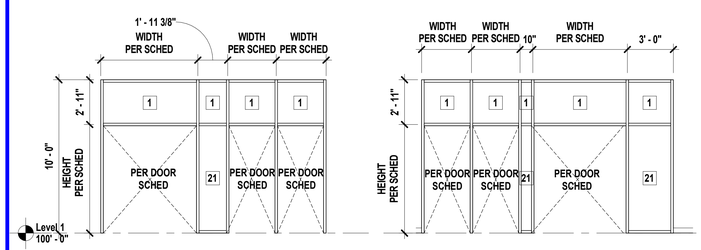
DOOR				Frame		All DETAILS on A501 UNO					
Number	Size	Type	Glass	Type	Material	Head	Strike	Hinge	Thresh	Fire Rating	Remarks
D-A100	PR 3'-0" x 7'-0" x 1 3/4"	E9	31	1	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	REMOVBALE CENTER MULLION
D-A100a	3'-0" x 7'-0" x 1 3/4"	E9	31	1	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION
D-A100b	3'-0" x 7'-0" x 1 3/4"	E9	31	1	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION, CR, CALL BOX, ADA CONTROL
D-A100c	PR 3'-0" x 7'-0" x 1 3/4"	E9	21	2	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	REMOVBALE CENTER MULLION
D-A100d	3'-0" x 7'-0" x 1 3/4"	E9	21	2	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION
D-A100e	3'-0" x 7'-0" x 1 3/4"	E9	21	2	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION
D-A101	PR 3'-0" x 7'-0" x 1 3/4"	E9	21	3	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	REMOVBALE CENTER MULLION
D-A101a	3'-0" x 7'-0" x 1 3/4"	E9	21	3	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION
D-A101b	3'-0" x 7'-0" x 1 3/4"	E9	21	3	ALUM	RE: FRAME ELEV	RE: FRAME ELEV	RE: FRAME ELEV	--	--	FIXED CENTER MULLION
D-A103	3'-0" x 7'-0" x 1 3/4"	F1	--	A	HM	A14/A501	A14/A501	A11/A501	--	90MIN	
D-A103a	PR 3'-0" x 7'-0" x 1 3/4"	F1	--	A	HM	A14/A501	--	A14/A503	--	90MIN	
D-A103b	4'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--	--	
D-A103c	3'-0" x 7'-0" x 1 3/4"	F1	--	A	HM	F14/A501	F11/A501	F11/A501	--	--	
D-A104	PR 3'-0" x 7'-0" x 1 3/4"	B3	--	A	HM	A7/A501	--	A1/A501 & A3/A501	--	--	
D-A104a	4'-0" x 7'-0" x 1 3/4"	F1	--	A	HM	F14/A501	F11/A501	F11/A501	--	90MIN	
D-A105	3'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A5/A501	--	--	
D-A106	3'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--	--	
D-A108	4'-0" x 7'-0" x 1 3/4"	F1	--	A	HM	F14/A501	F11/A501	F11/A501	--	--	
D-A110	PR 3'-2" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--		SINAGE INDICATING "NOT AN EXIT"
D-A110a	PR 3'-2" x 7'-0" x 1 3/4"	F1	--	A	HM	A14/A501	--	A14/A503	--	90MIN	HIGH WIND, FIRE HOLD OPEN, THUMB TURN INSIDE
D-A111	4'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--	--	
D-A112	4'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--	--	
D-A112a	4'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	A7/A501	A3/A501	A3/A501	--		
D-x118	4'-0" x 7'-0" x 1 3/4"	--	--	--	HM	--	--	--	--	--	EXISTING DOOR & FRAME TO REMAIN, PNT
D-x118a	4'-0" x 7'-0" x 1 3/4"	--	--	--	HM	--	--	--	--	--	EXISTING DOOR & FRAME TO REMAIN, PNT
D-x118b	PR 3'-0" x 7'-0" x 1 3/4"	--	--	--	HM	--	--	--	--	--	EXISTING DOOR & FRAME TO REMAIN, REMOVE MAGLOCK
D-x118c	PR 3'-0" x 7'-0" x 1 3/4"	--	--	--	HM	--	--	--	--	--	EXISTING DOOR & FRAME TO REMAIN, REMOVE MAGLOCK
D-x118d	4'-0" x 7'-0" x 1 3/4"	--	--	--	HM	--	--	--	--	--	EXISTING DOOR & FRAME TO REMAIN, REMOVE MAGLOCK



1 08 41 13.A02

6"

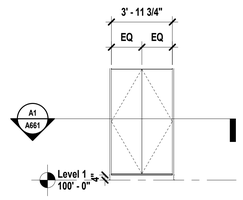
N10 Scale 1/4" = 1'-0" — Exterior Window Frame



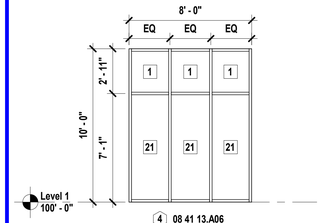
2 08 41 13.A06 4"

3 08 41 13.A06 4"

N13 Scale 1/4" = 1'-0" — Interior Window Frame



K10 Scale 1/4" = 1'-0" — Display Case

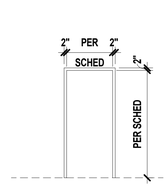


4 08 41 13.A06 4"

K14 Scale 1/4" = 1'-0" — Interior Window Frame by Gym

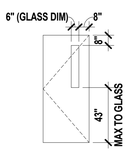
SHEET KEYNOTE LEGEND

06 10 00.A19	PLYWOOD BLOCKING AND BACKING PANELS
07 62 00.A27	DRIP EDGES
07 84 46.A01	FIRE RESISTIVE JOINT SYSTEM
07 92 00.A01	SEALANT
07 92 00.A02	SEALANT W/BACKER ROD
08 11 13.A21	HOLLOW METAL DOOR – HIGH WIND DOOR ASSEMBLY
08 11 13.A31	HOLLOW METAL FRAME
08 41 13.A02	THERMAL BROKEN STOREFRONT FRAMING (6")
08 41 13.A06	NON-THERMAL BROKEN STOREFRONT FRAMING (4.5")
09 21 16.A01	NON-STRUCTURAL FRAMING
09 29 00.A11	GYPSUM BOARD TRIM



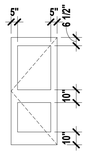
TYPE A DOORS - FLUSH

A3 - HOLLOW METAL (NON-INSULATED, HEAVY DUTY) 08 11 13.A01



TYPE B DOORS - NARROW LITE

B3 - HOLLOW METAL (NON-INSULATED, HEAVY DUTY) 08 11 13.A01



TYPE E DOORS - FULL LITE WITH MID-RAIL

E9 – ALUMINUM (STANDARD) 08 41 13.A11
E10 – ALUMINUM (HEAVY DUTY) 08 41 13. A12

F1

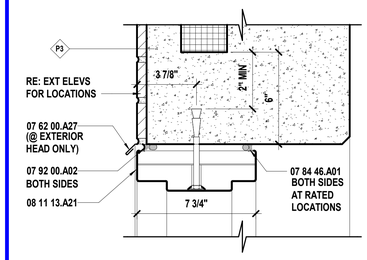
TYPE F DOORS - HIGH WIND ASSEMBLIES

F1 – HOLLOW METAL (HIGH WIND DOOR ASSEMBLY – NO LITE) 08 11 13.A21

G1 Scale 1/4" = 1'-0" — Hollow Metal Frame Types

G3 Scale 1/4" = 1'-0" — Door Types

F11 Scale 3" = 1'-0" — Exterior Detail - HM Door Frame @ Precast Jamb



F14 Scale 3" = 1'-0" — Exterior Detail - HM Door Frame @ Precast Head

GLASS LEGEND

GLASS TYPE = 1

FULLY-TEMPERED MONOLITHIC FLOAT GLASS

12 08 80 00.A12 3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS

LAMINATED GLASS

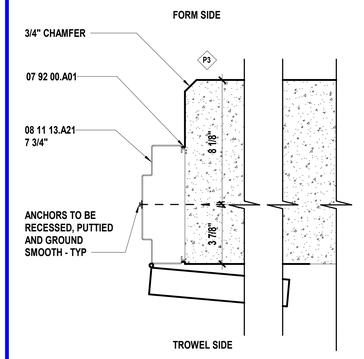
21 08 80 00.A21 CLEAR LAMINATED GLASS

INSULATING GLASS

31 08 80 00.A31 LOW-E CLEAR INSULATED GLASS

INSULATING FULL-TEMPERED GLASS

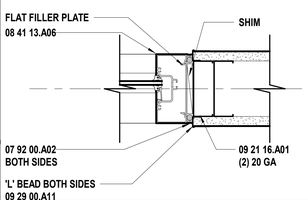
41 08 80 00.A41 LOW-E CLEAR INSULATED FULLY-TEMPERED GLASS



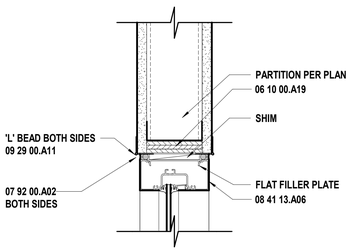
A14 Scale 3" = 1'-0" — Interior Detail - HM Door Frame - 175° Swing

DOOR TYPE NOTES

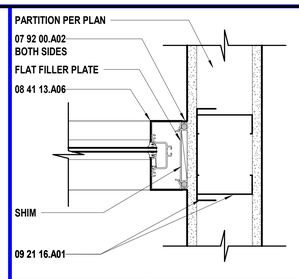
1. REFER TO DOOR SCHEDULE FOR OVERALL DOOR DIMENSIONS
2. DIMENSIONS ASSOCIATED WITH VISION LITES ARE TO THE OUTSIDE OF THE VISION LITE FRAME UNLESS NOTED OTHERWISE
3. REFER TO DOOR SCHEDULE TO DETERMINE WHICH DOORS ARE REQUIRED TO BE FIRE RATED
4. REFER TO DOOR SCHEDULE FOR GLASS TYPES IN DOORS



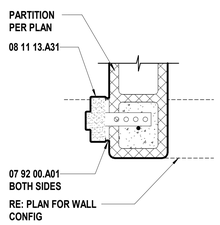
D1 Scale 3" = 1'-0" — Storefront Jamb @ Stud Wall (Interior)



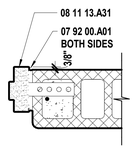
D4 Scale 3" = 1'-0" — Storefront Head @ Stud Wall (Interior)



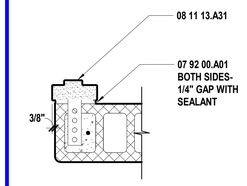
D8 Scale 3" = 1'-0" — Storefront Jamb Along Stud Wall (Interior)



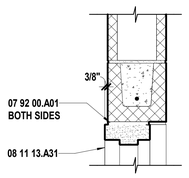
A1 Scale 1 1/2" = 1'-0" — HM Jamb @ CMU



A3 Scale 1 1/2" = 1'-0" — HM Jamb @ CMU



A5 Scale 1 1/2" = 1'-0" — HM Jamb @ CMU



A7 Scale 1 1/2" = 1'-0" — HM Head @ CMU

DOOR SCHEDULE, DOOR TYPES, FRAME TYPES & DETAILS

hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 2000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023

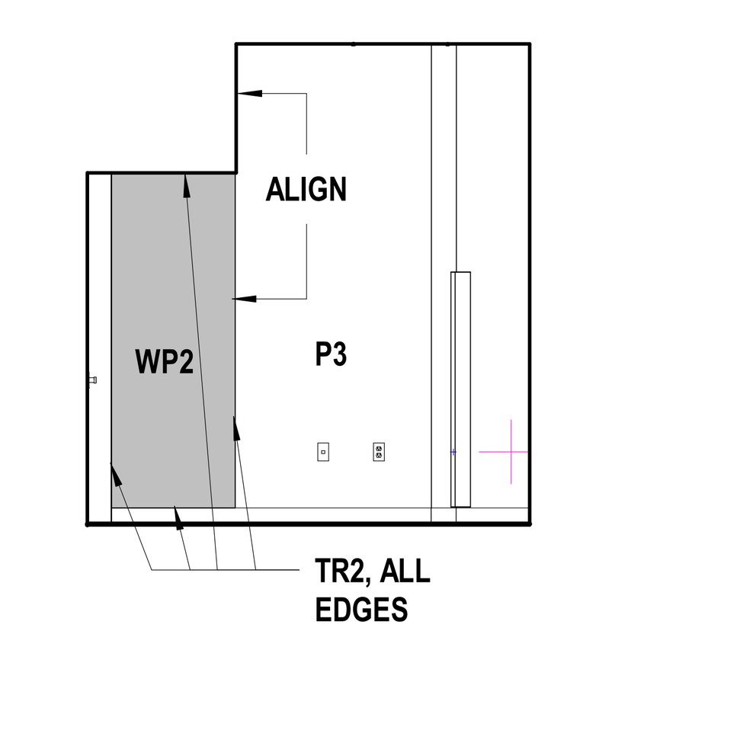
Kevin E. Nelson
A-2019015618

JOB NO: 23018
DRAWN BY: KL
CHECKED BY: JB
DATE: 08.31.2023

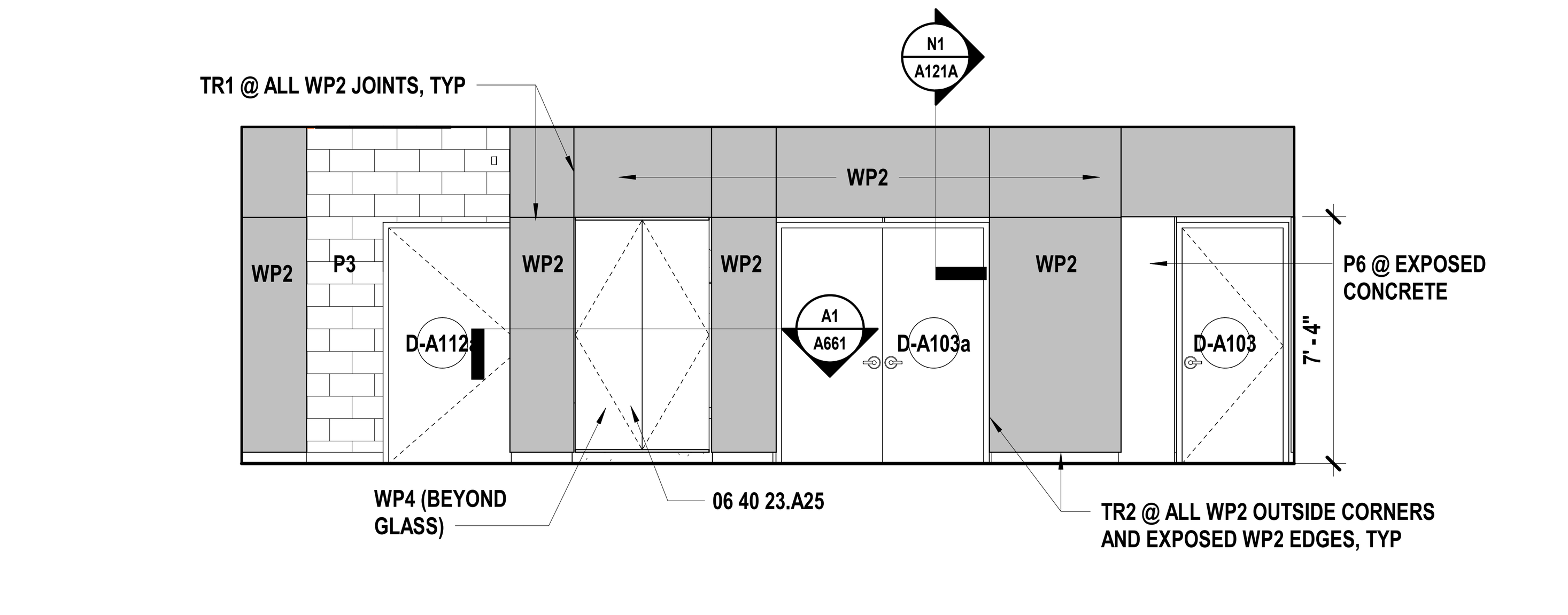
A501

9/29/2023 1:58:49 PM

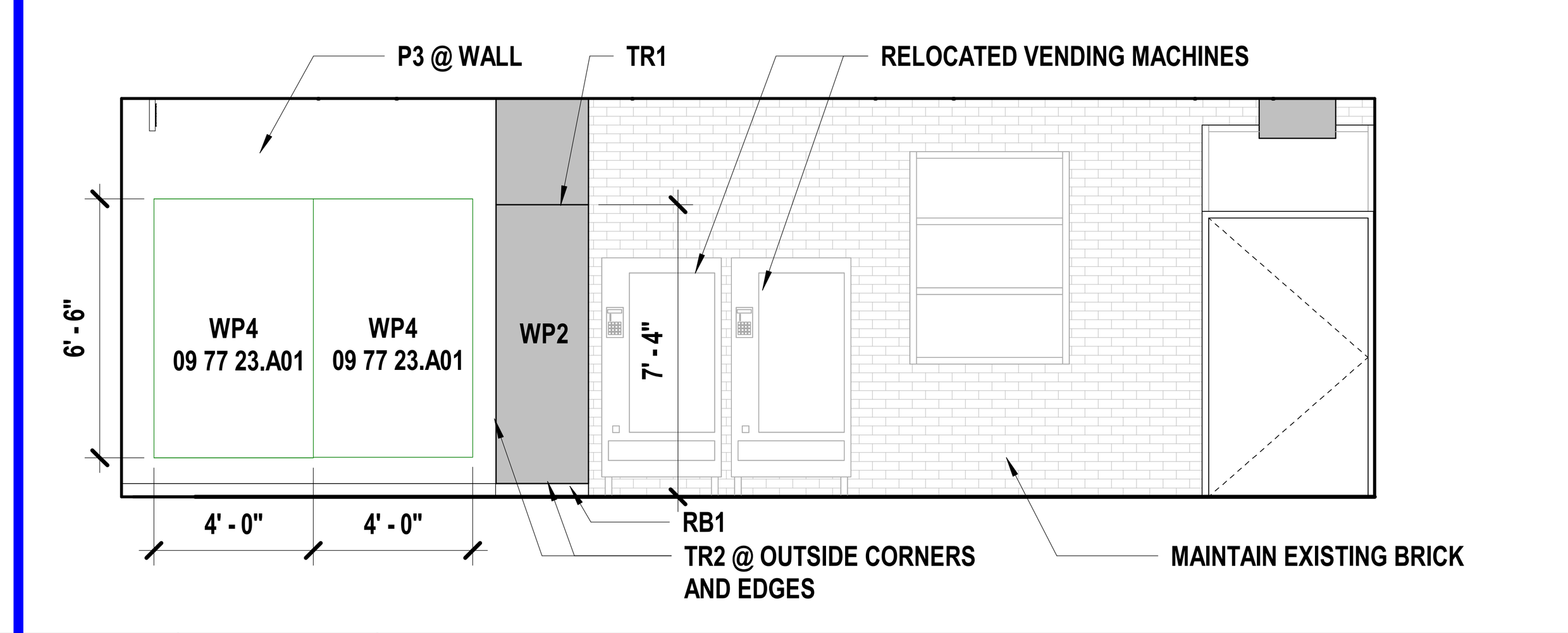
Please consider the environment before printing this.



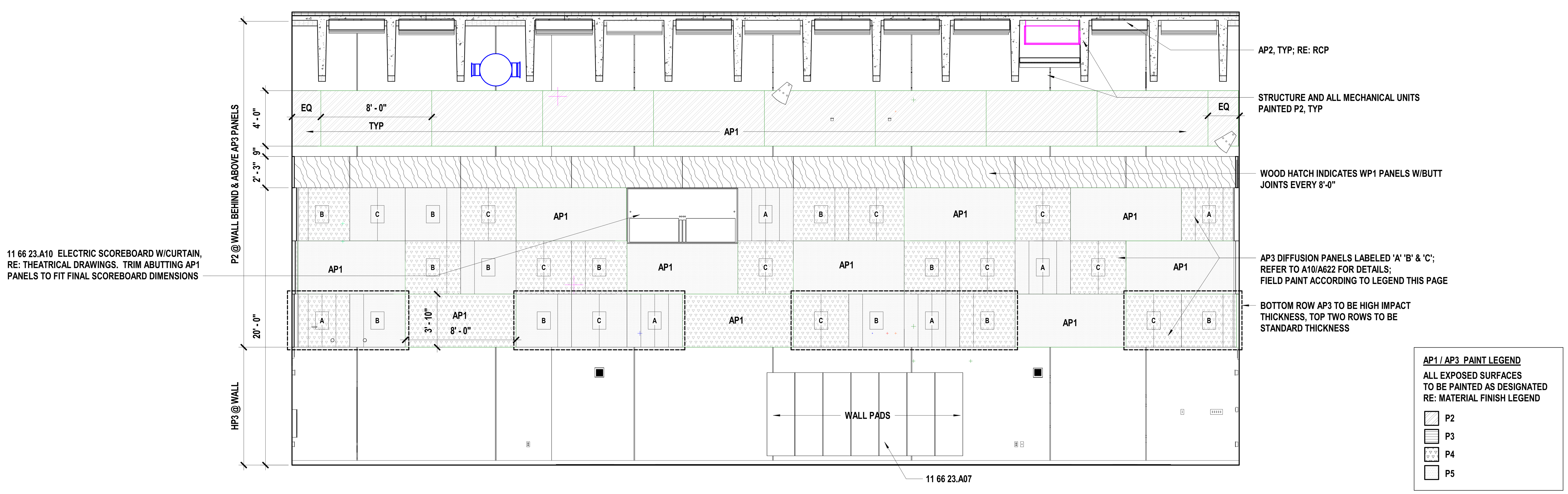
N4 Scale 1/4" = 1'-0" Interior Elevation - Vest 101 - N



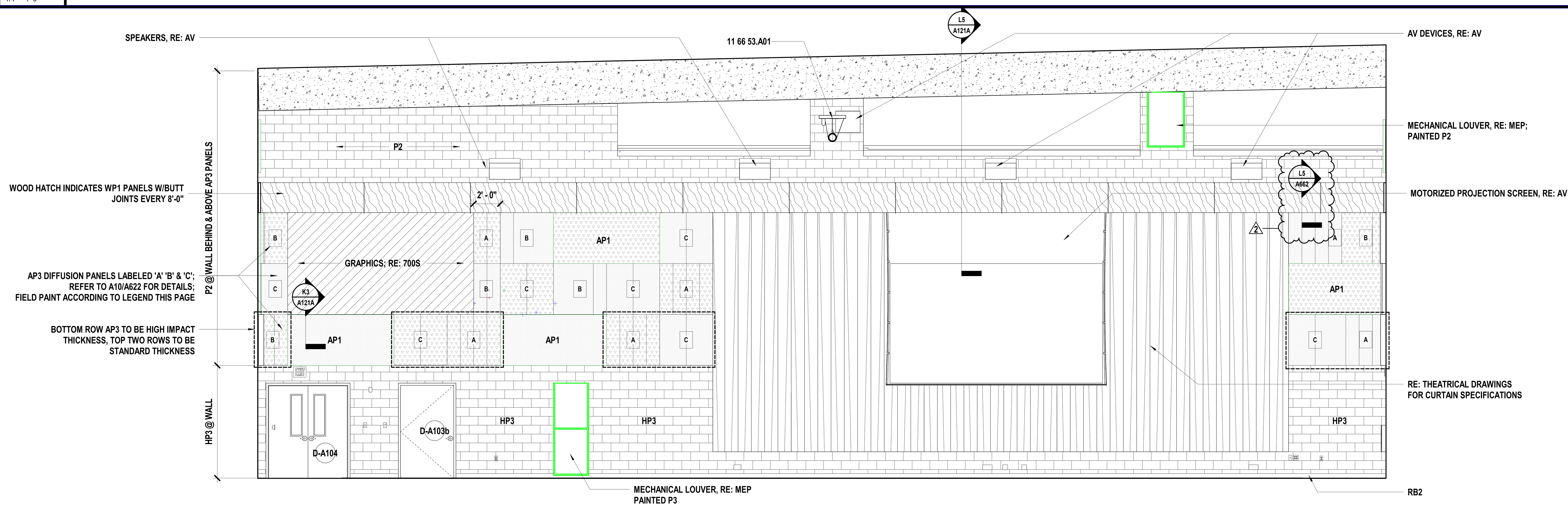
N6 Scale 1/4" = 1'-0" Interior Elevation - Vestibule A101 - W



N12 Scale 1/4" = 1'-0" Interior Elevation - Vestibule A101 - S



G1 Scale 1/4" = 1'-0" Interior Elevation - Multipurpose A103 -S



A1 Scale 1/4" = 1'-0" Interior Elevation - Multipurpose A103 - Plan W

SHEET KEYNOTE LEGEND

06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
09 77 23.A01	FABRIC-WRAPPED PANELS
11 66 23.A07	WALL SAFETY PADS
11 66 23.A10	SCOREBOARD
11 66 53.A01	GYMNASIUM DIVIDER CURTAIN ASSEMBLY

SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH
CLG1	Ceiling	White
CLG2	Ceiling	White
CLG3	Ceiling	White
CLG4	Ceiling	White
CLG5	Ceiling	White
CLG6	Ceiling	P2
HP1	High Performance Coating	SW 7011 Natural Choice
HP2	High Performance Coating	SW 6076 Cyberspace
HP3	High Performance Coating	SW 9170 Acier
MTL1	Metal Trim Piece	P2
P1	Paint	SW 7011 Natural Choice
P2	Paint	SW 7076 Cyberspace
P3	Paint	SW 9170 Acier
P4	Paint	SW 6966 Bluebood
P5	Paint	SW 6524 Commodore
P6	Paint	SW 7018 Dovetail
P7	Paint	SW 6967 Frank Blue
P8	Paint	SW 6811 Honorable Blue
TR1	Millwork Trim	
TR2	Millwork Trim	

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. COORDINATE LOCATIONS WHERE BACKING REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, AND TECHNOLOGY
3. COLOR/MATERIAL TRANSITIONS ARE NOTED WHEN THEY DO NOT OCCUR AT INSIDE CORNERS
4. REFER TO MEP SHEETS FOR LOCATION DIAGRAM OF SWITCHES, THERMOSTATS, FIRE ALARM STROBES TO BE MOUNTED ADJACENT TO ENTRY DOORS OR AT OUTSIDE CORNERS WITHIN ROOMS
5. COORDINATE WITH ELECTRICAL SHEETS FOR HEIGHT OF OUTLETS A.F.F. AND/OR ABOVE COUNTERTOPS
6. COORDINATE WITH MECHANICAL SHEETS FOR LOCATIONS OF WALL MOUNTED GRILLES AND REGISTERS
7. ALL EXPOSED SURFACES TO RECEIVE PLASTIC LAMINATE
8. ALL BACKSPLASH MATERIAL TO MATCH COUNTERTOP MATERIAL, UNO
9. PROVIDE 4" BACKSPLASH, UNO
10. PROVIDE 1" OVERHANG AT ALL COUNTERTOPS, UNO
11. PROVIDE ONE 2" DIAMETER GROMMET PER 30 INCH OF KNEE-SPACE - RECEPTION COUNTERS AND OTHER LOCATIONS – COORDINATE EXACT LOCATION WITH OWNER
12. REFER TO PLUMBING DRAWINGS FOR LOCATIONS OF SINKS AND OTHER PLUMBING FIXTURES LOCATED WITHIN CASEWORK
13. ALL BASE CABINETS ARE TO BE 24" DEEP, UNO
14. ALL UPPER CABINETS ARE TO BE 16" DEEP, UNO
15. ALL TALL STORAGE AND WARDROBE CABINETS ARE TO BE 24" DEEP, UNO
16. ALL SCIENCE AND NURSE CASEWORK TO HAVE LOCKS
17. FILE DRAWERS TO HAVE LOCKS
18. ALL WARDROBE CABINETS TO HAVE LOCKS
19. COORDINATE DOOR CONTROL BUTTON LOCATION AT RECEPTION DESK WITH OWNER
20. PROVIDE WOOD CLEAT AT BACK AND SIDE WALLS OF ALL COUNTERTOPS WITH NO BASE CABINET BELOW

hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1589
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

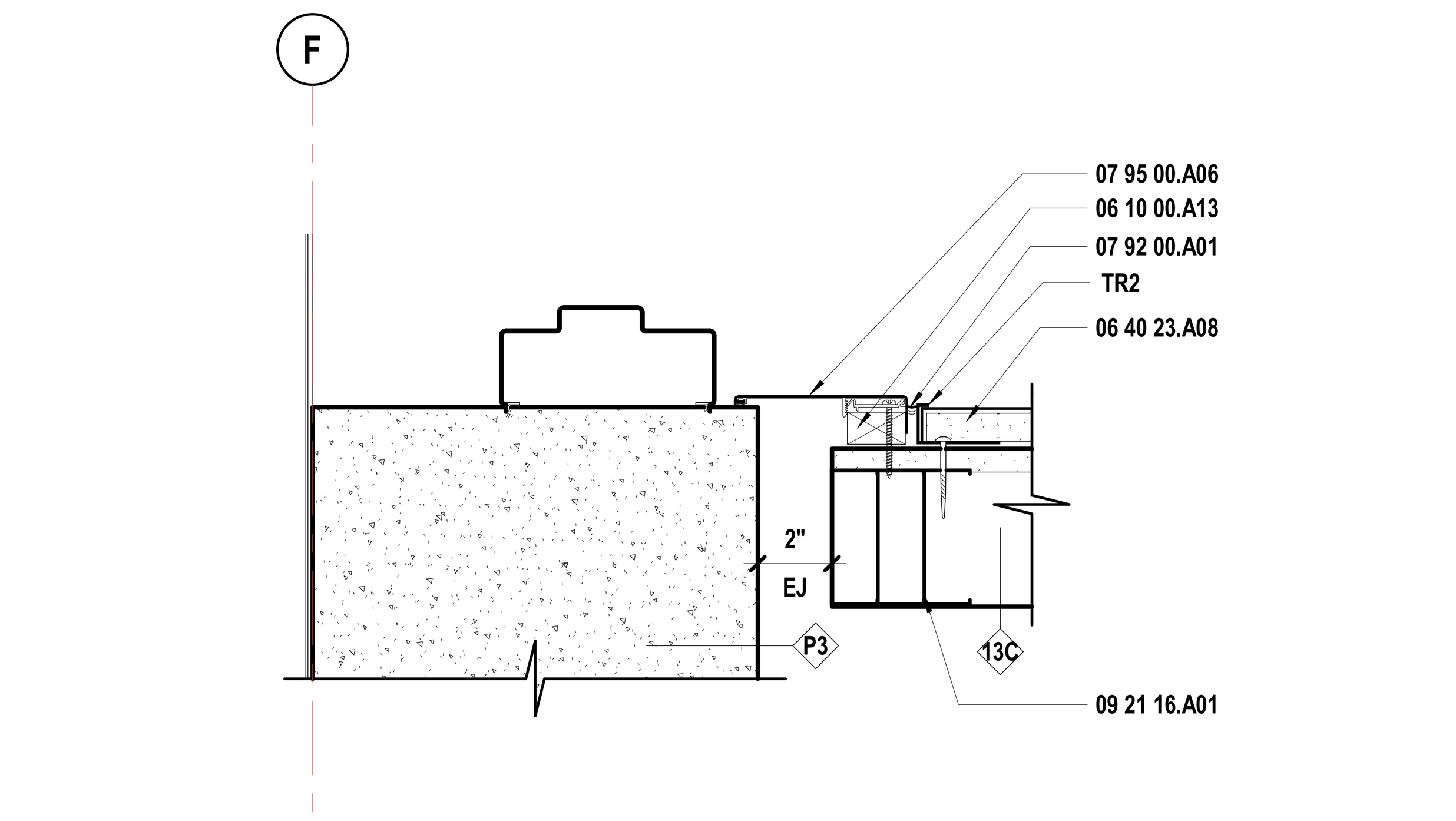
#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT
SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

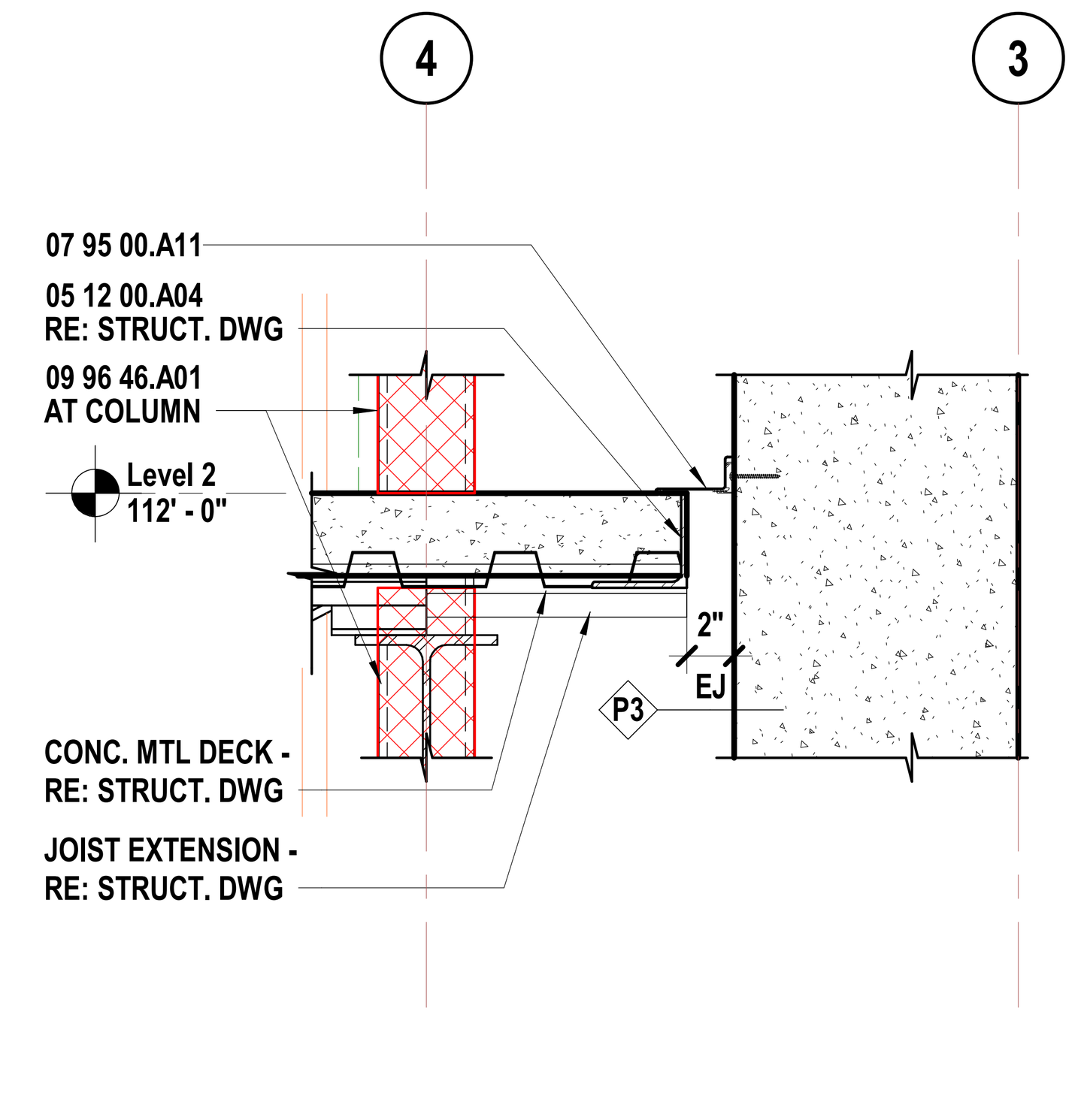
JOB NO: 23018
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

A622

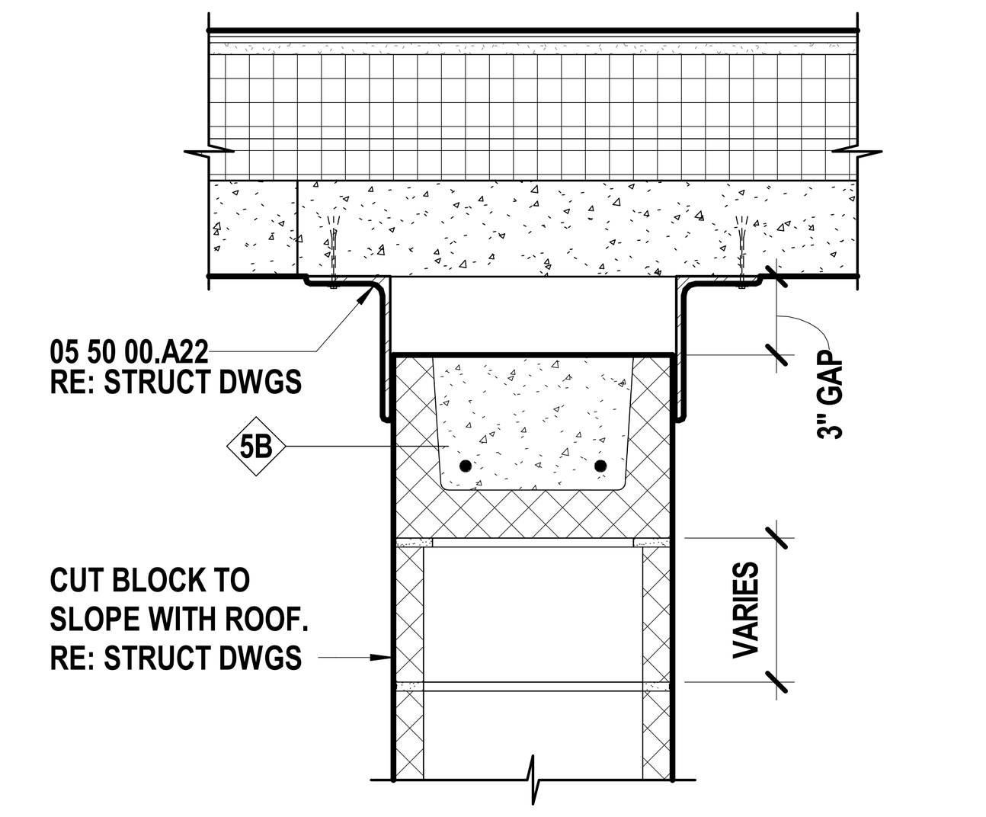
INTERIOR ELEVATIONS



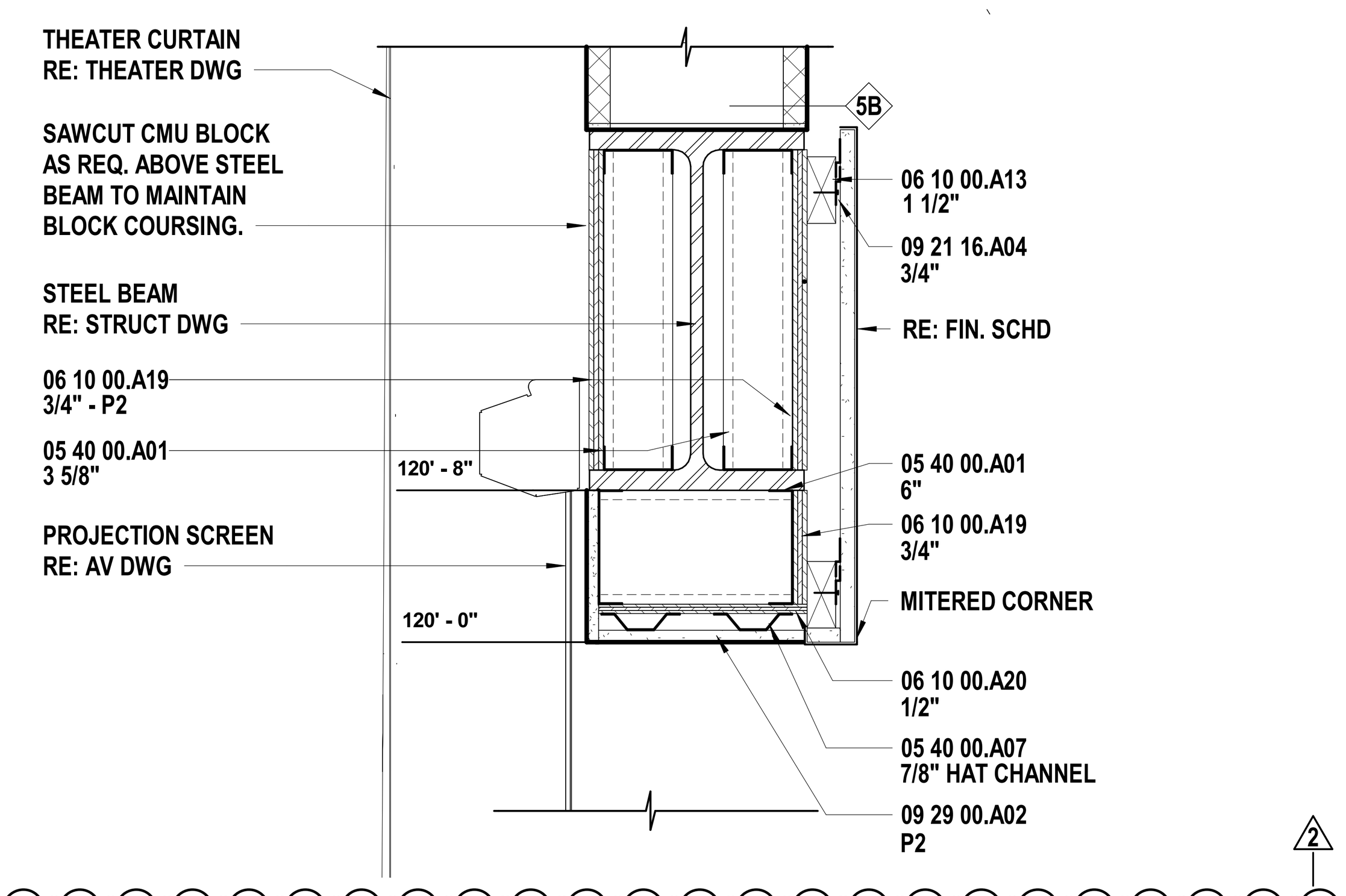
L1 Scale 3" = 1'-0" — Plan Detail - Expansion Joint at Vestibule A101 Corner



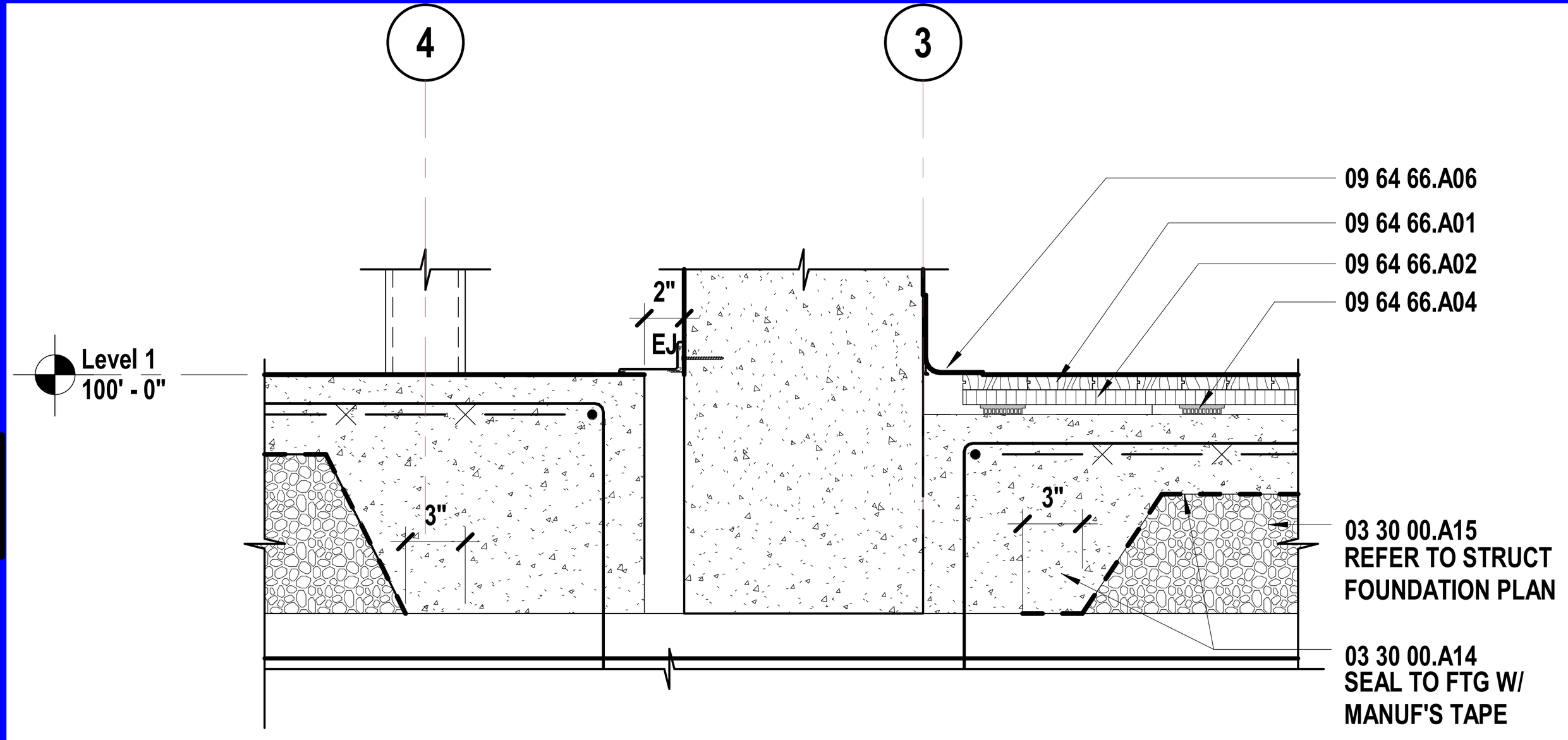
N6 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Storage to Multipurpose @ Level 2



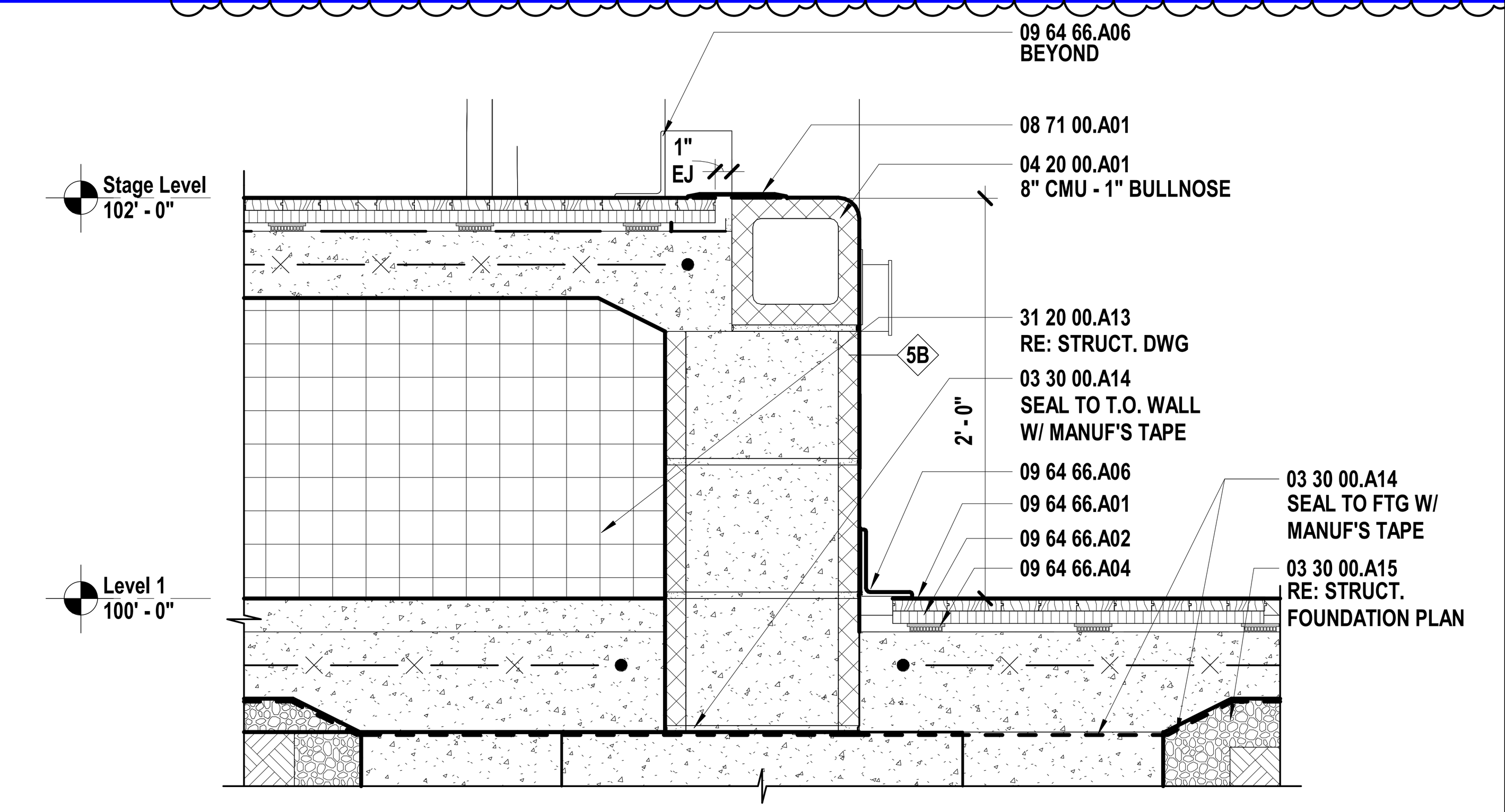
N9 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 - Top of Proscenium Wall



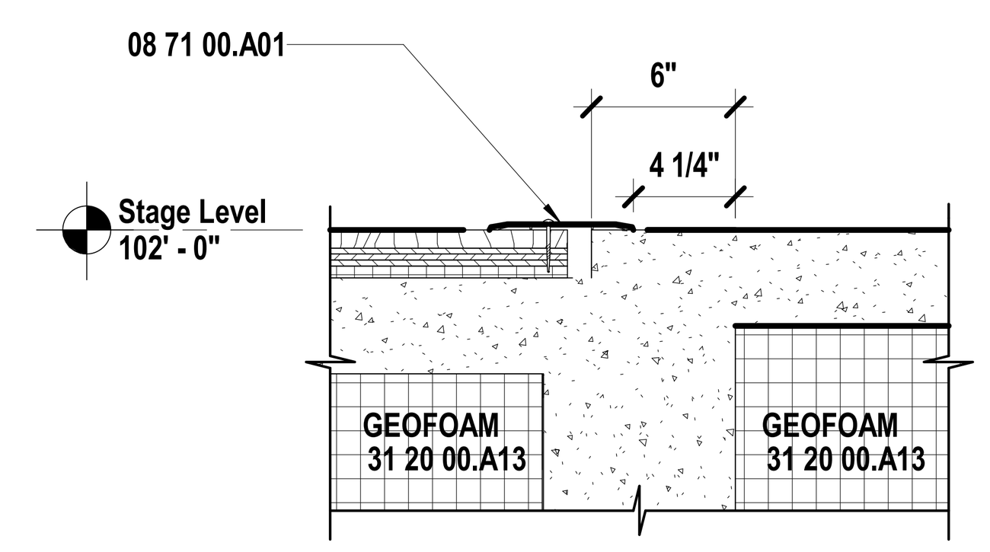
N12 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 - Proscenium Head



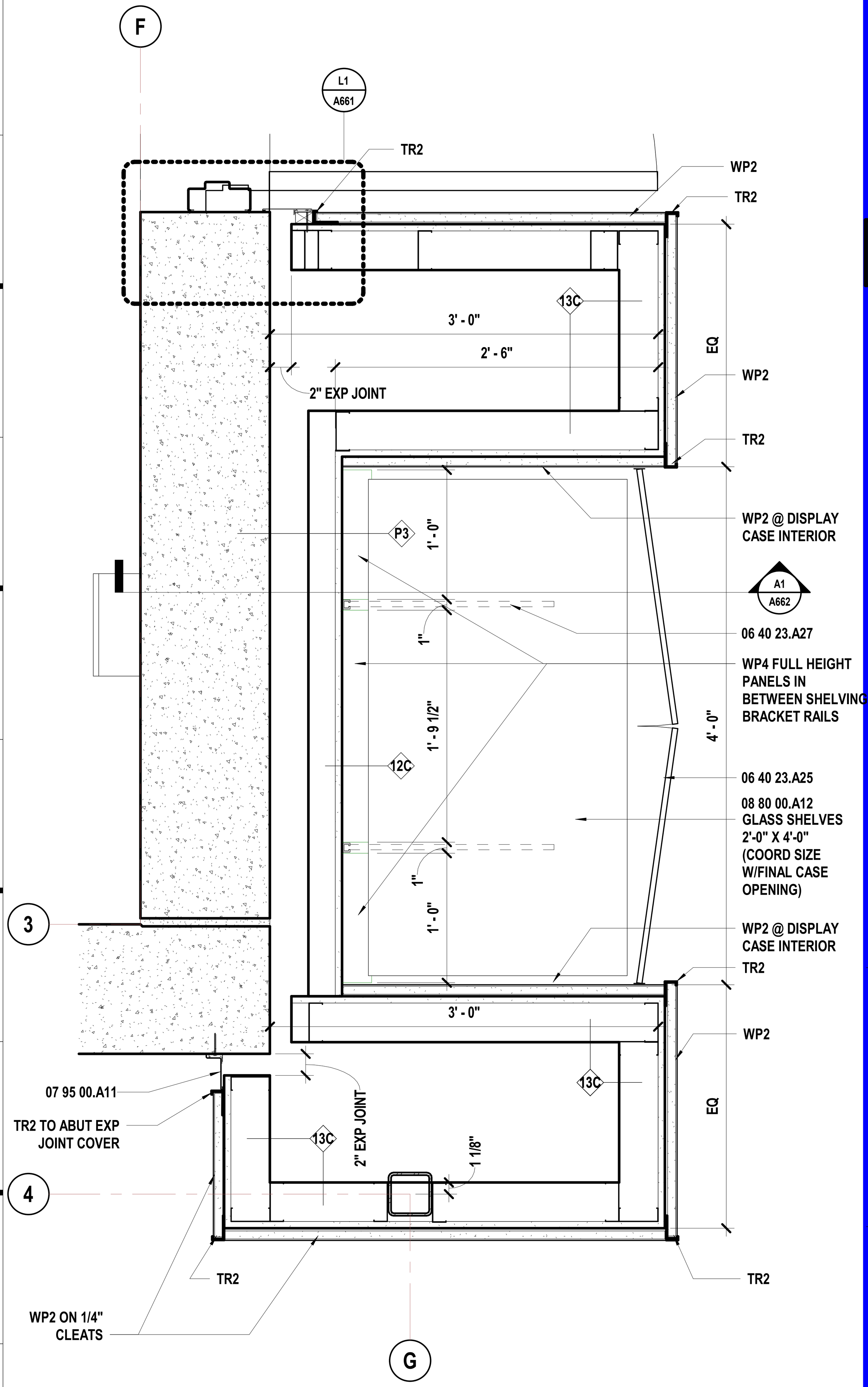
J6 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Storage to Multipurpose @ Level 1



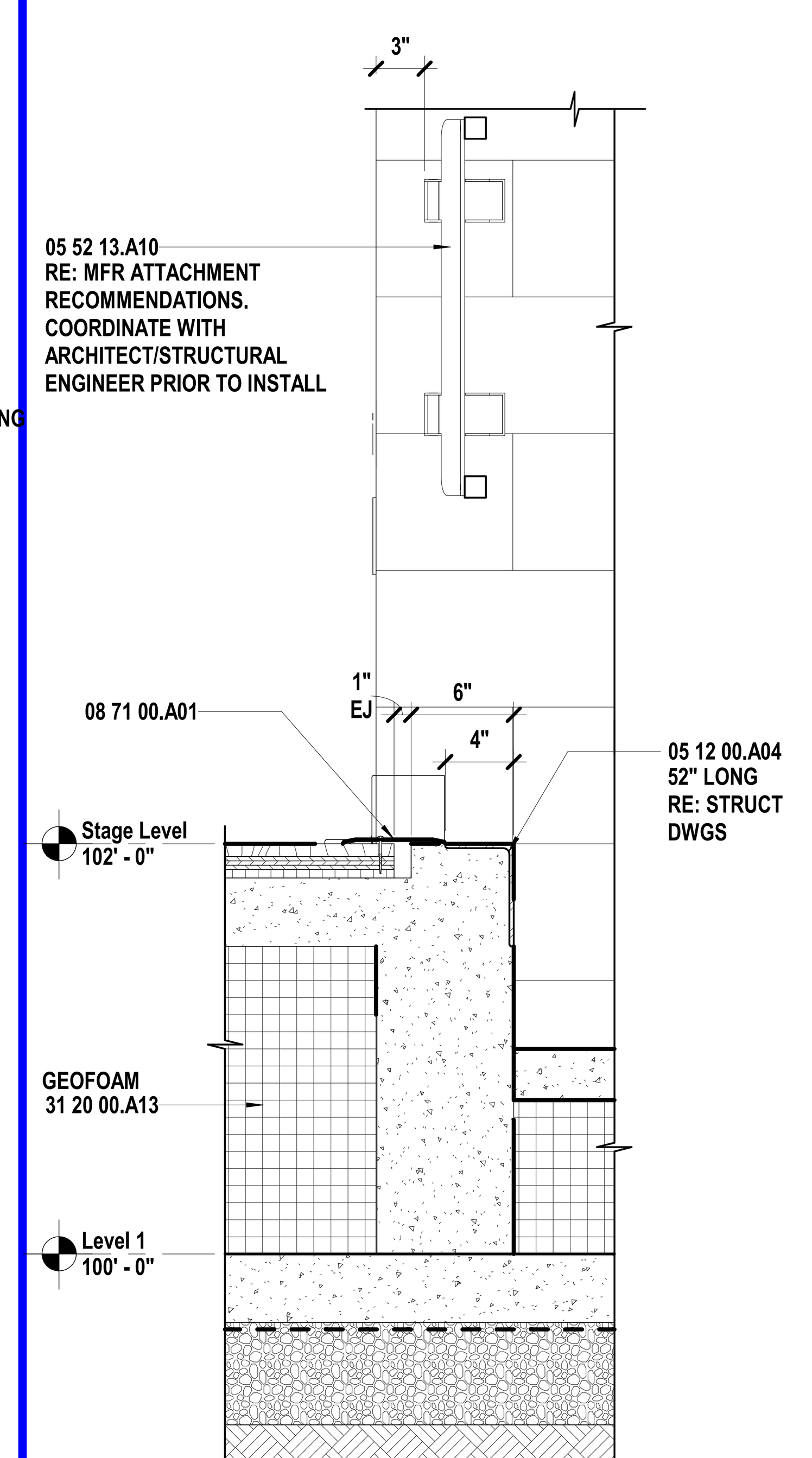
J11 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 - Proscenium Sill



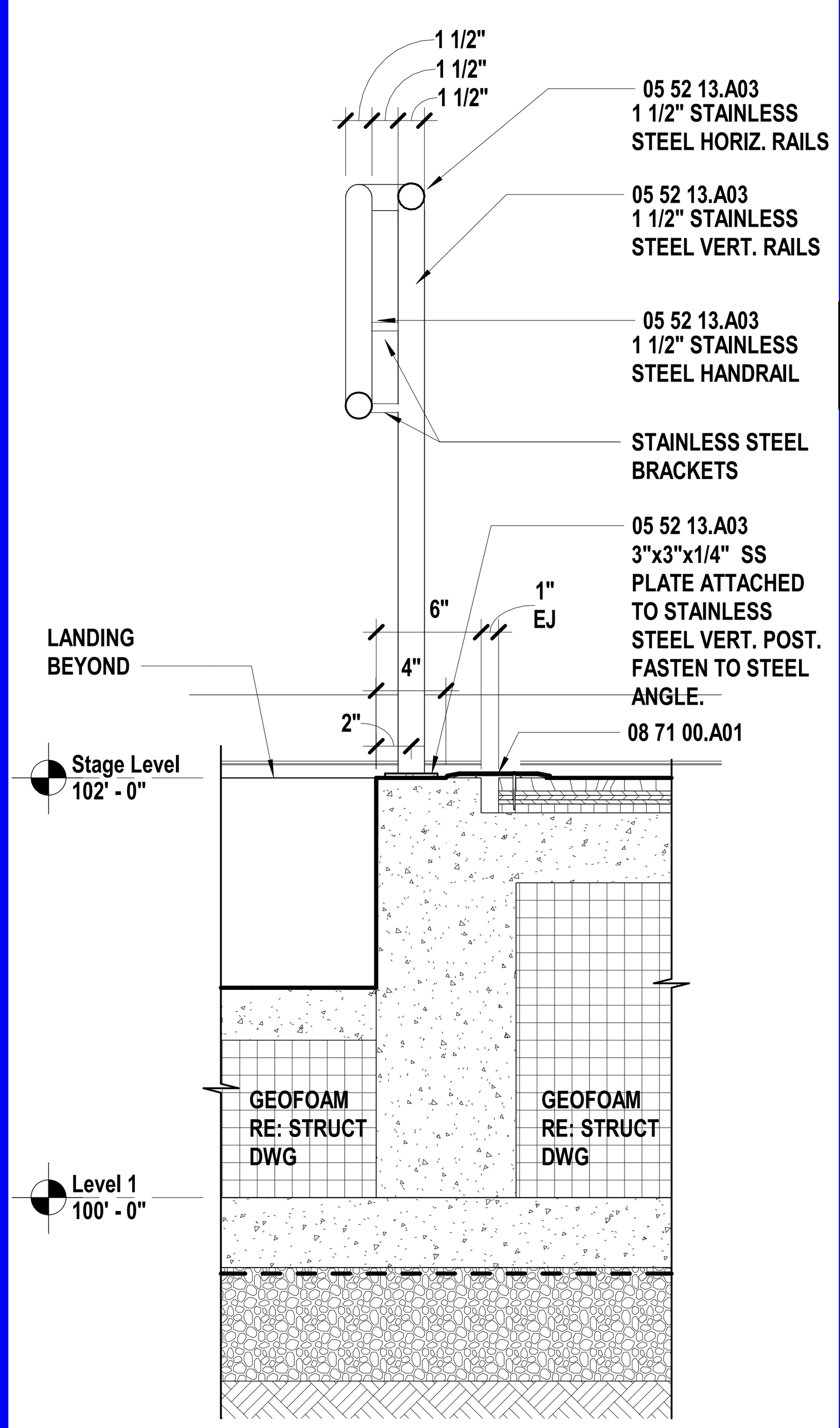
F12 Scale 1 1/2" = 1'-0" — Interior Detail - Platform and Ramp Threshold



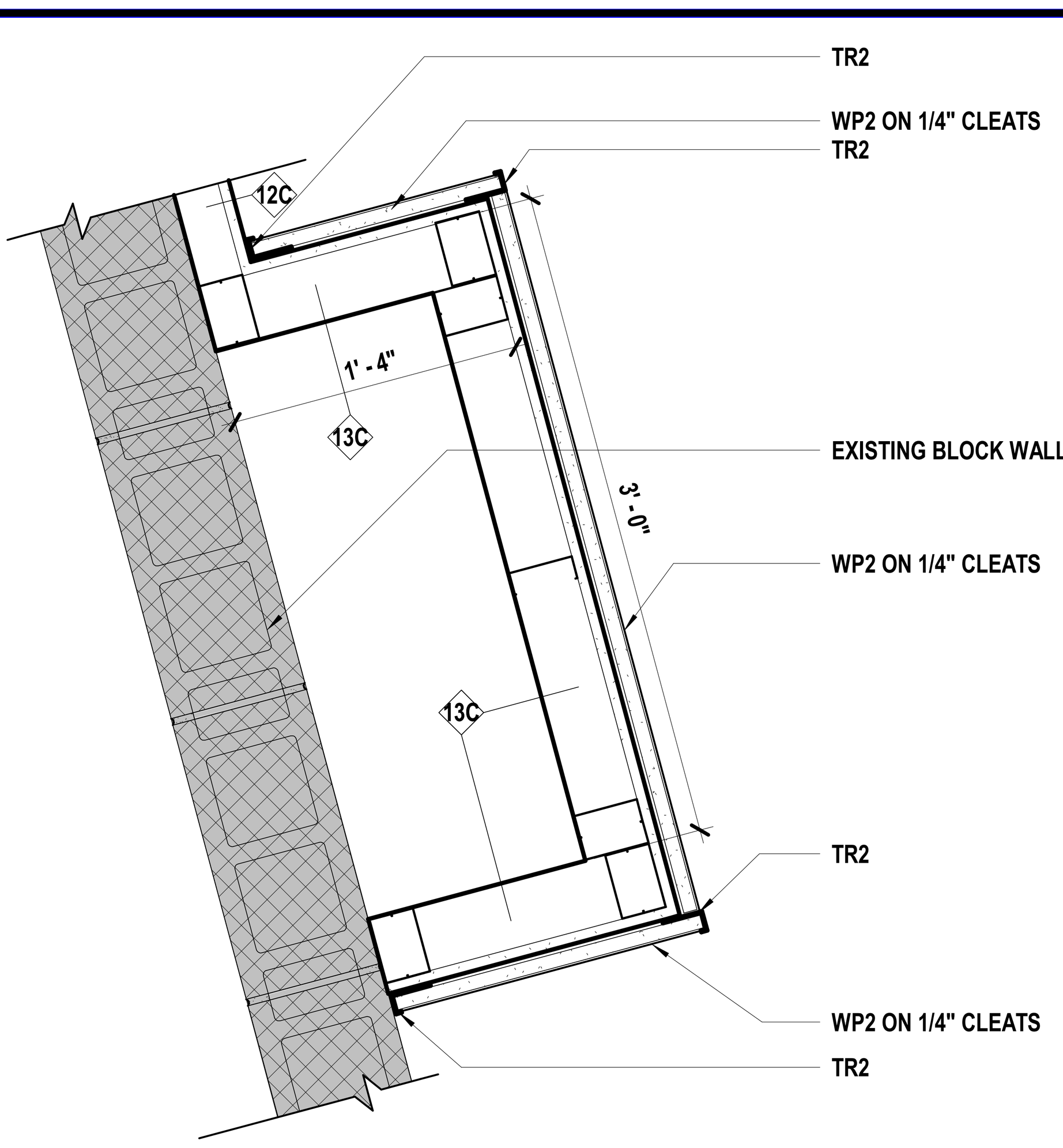
A1 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Vestibule A101 - Corner



A6 Scale 1 1/2" = 1'-0" — Section Detail - Circulation A104 to Platform A108 Railing E



A9 Scale 1 1/2" = 1'-0" — Section Detail - Circulation A104 to Platform A108 - W



A12 Scale 1 1/2" = 1'-0" — Plan Detail - Area A - Lobby A102 - Plan West

SHEET KEYNOTE LEGEND

03 30 00.A14	VAPOR RETARDERS
03 30 00.A15	GRANULAR DRAINAGE FILL
04 20 00.A01	CONCRETE MASONRY UNITS
05 12 00.A04	ANGLE
05 40 00.A01	COLD-FORMED METAL FRAMING
05 40 00.A07	MISCELLANEOUS FRAMING/FURRING
05 50 00.A22	LOOSE STEEL LINTEL
05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
05 52 13.A10	GATE
06 10 00.A13	WOOD BLOCKING/NAILERS
06 10 00.A19	PLYWOOD BLOCKING AND BACKING PANELS
06 10 00.A20	FIRE-RETARDANT TREATED PLYWOOD BLOCKING AND BACKING PANELS
06 40 23.A08	PLASTIC LAMINATE-CLAD PANELS
06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
06 40 23.A27	DISPLAY CASE SHELVING SYSTEM
07 92 00.A01	SEALANT
07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
07 95 00.A11	CEILING-TO-WALL JOINT SYSTEM
08 71 00.A01	THRESHOLDS
08 80 00.A12	3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS
09 21 16.A01	NON-STRUCTURAL FRAMING
09 21 16.A04	Z-SHAPED FURRING
09 29 00.A02	GYPSUM BOARD - TYPE X
09 64 66.A01	WOOD ATHLETIC FLOOR
09 64 66.A02	UNDERLAYMENT
09 64 66.A04	RESILIENT PADS
09 64 66.A06	RESILIENT WALL BASE (VENTED)
09 96 46.A01	INTUMESCENT PAINT
31 20 00.A13	GEOFOAM

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

CONSTRUCTION DOCUMENTS

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/29/2023

STATE OF MISSOURI — KEVIN E. NELSON — A-2019015618 — ARCHITECT

SEPTEMBER 29, 2023

Kevin E. Nelson
A-2019015618

JOB NO: 23018
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

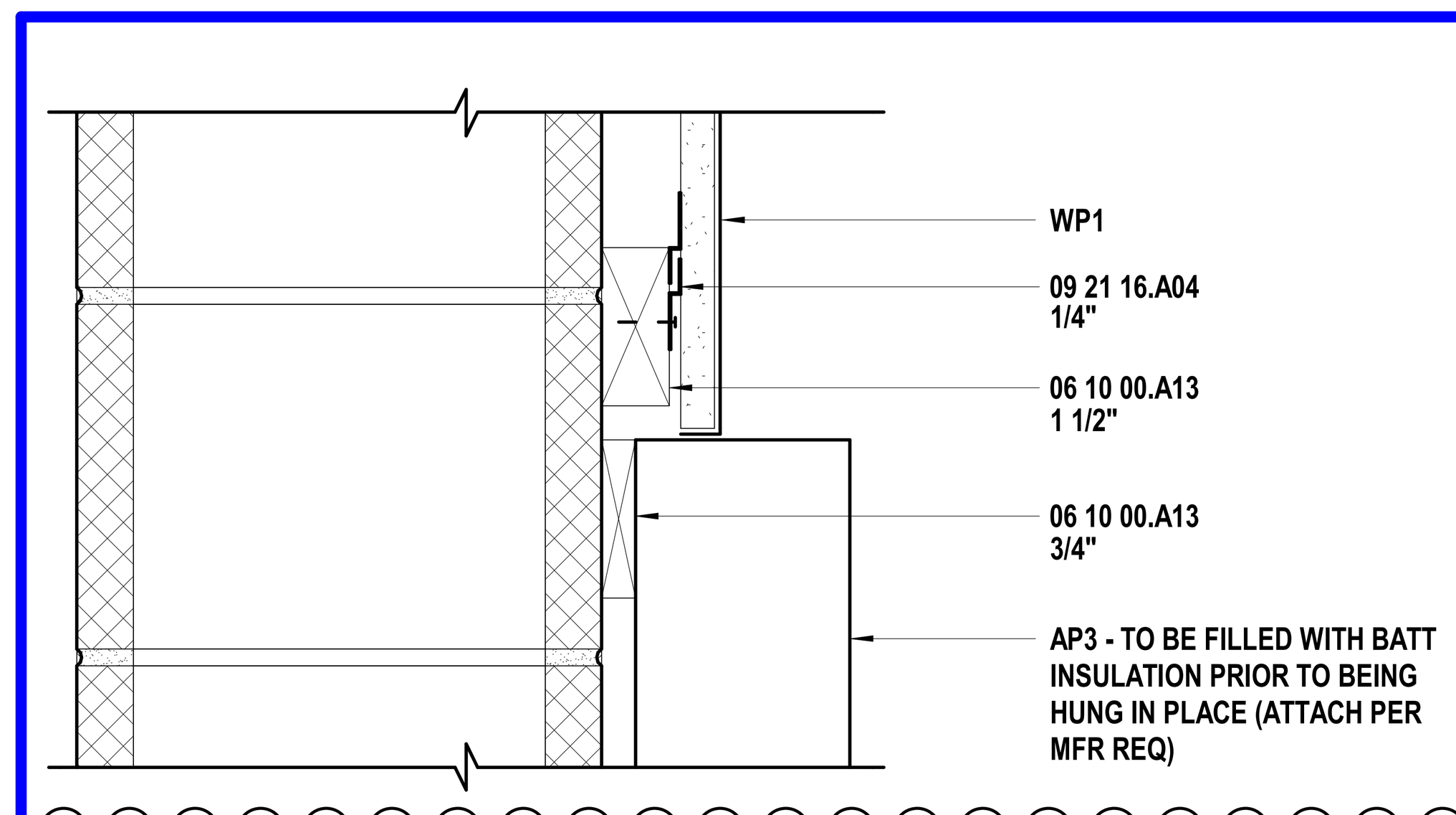
A661

INTERIOR DETAILS

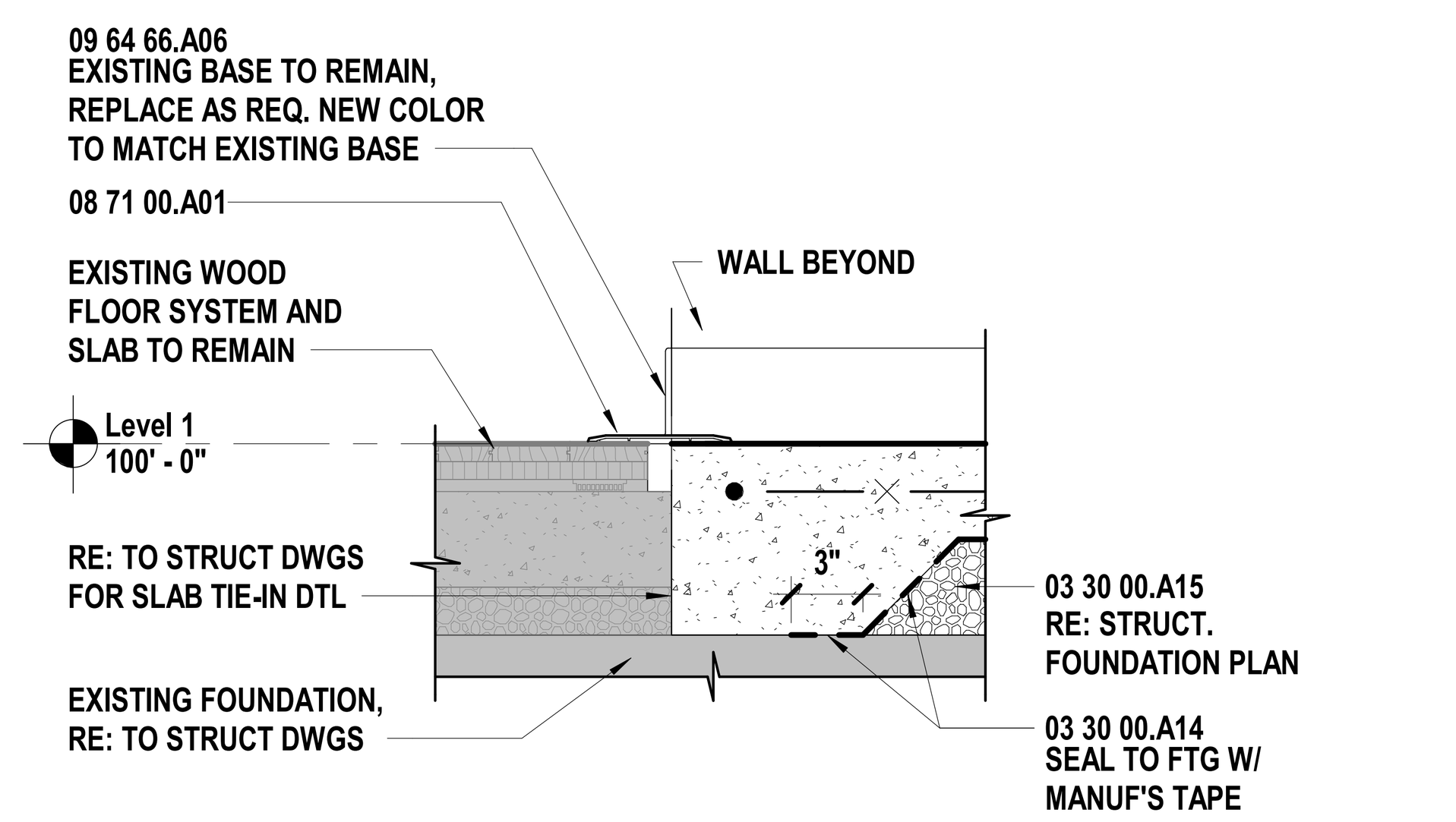
9/29/2023 1:59:07 PM

SHEET KEYNOTE LEGEND

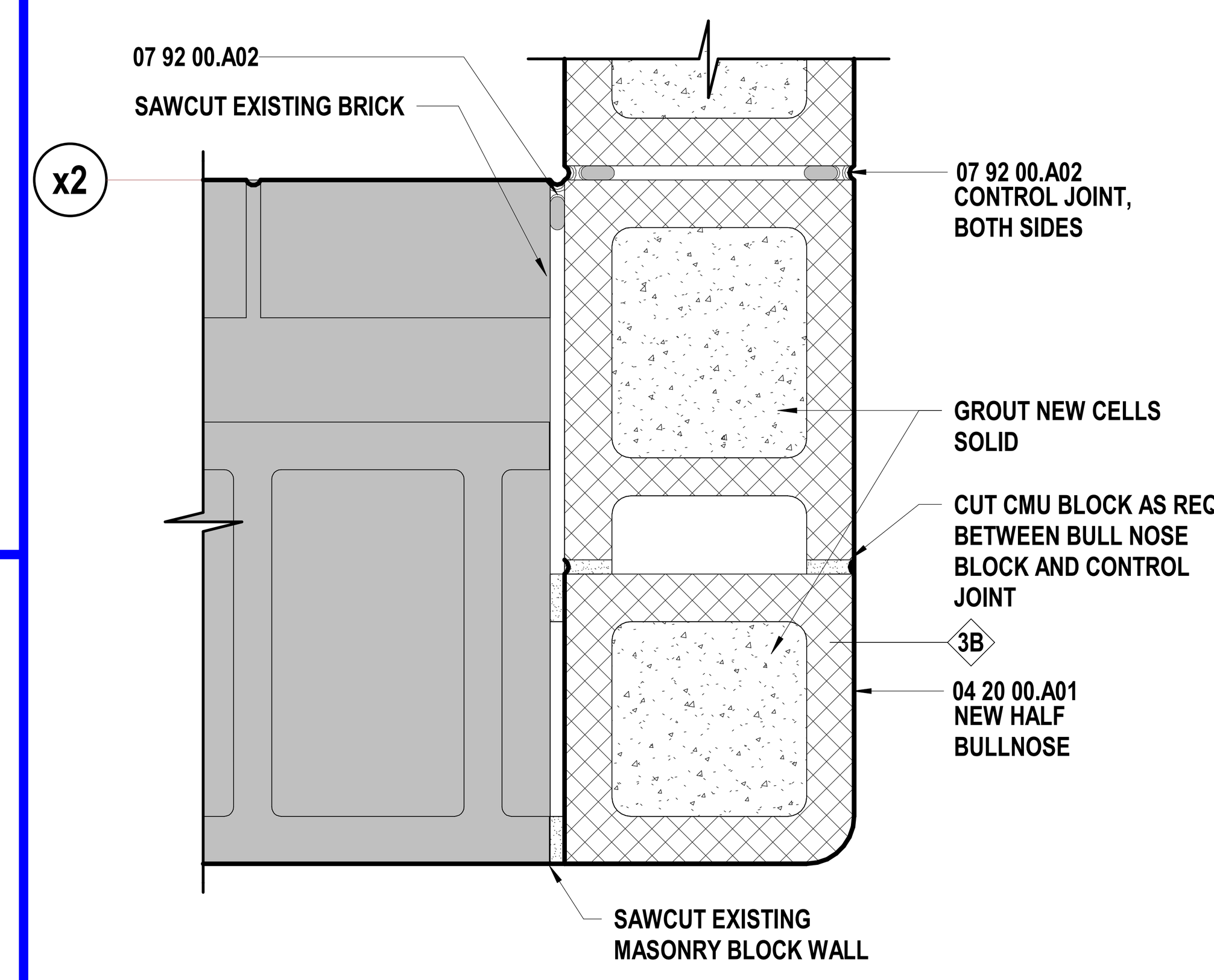
03 30 00.A14	VAPOR RETARDERS
03 30 00.A15	GRANULAR DRAINAGE FILL
04 20 00.A01	CONCRETE MASONRY UNITS
05 40 00.A01	COLD-FORMED METAL FRAMING
06 10 00.A13	WOOD BLOCKING/NAILERS
06 10 00.A16	FIRE-RETARDANT TREATED WOOD BLOCKING & NAILERS
06 40 23.A08	PLASTIC LAMINATE-CLAD PANELS
06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
06 40 23.A27	DISPLAY CASE SHELVING SYSTEM
07 92 00.A02	SEALANT W/BACKER ROD
08 71 00.A01	THRESHOLDS
08 80 00.A12	3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS
09 21 16.A04	Z-SHAPED FURRING
09 64 66.A06	RESILIENT WALL BASE (VENTED)
09 77 23.A01	FABRIC-WRAPPED PANELS



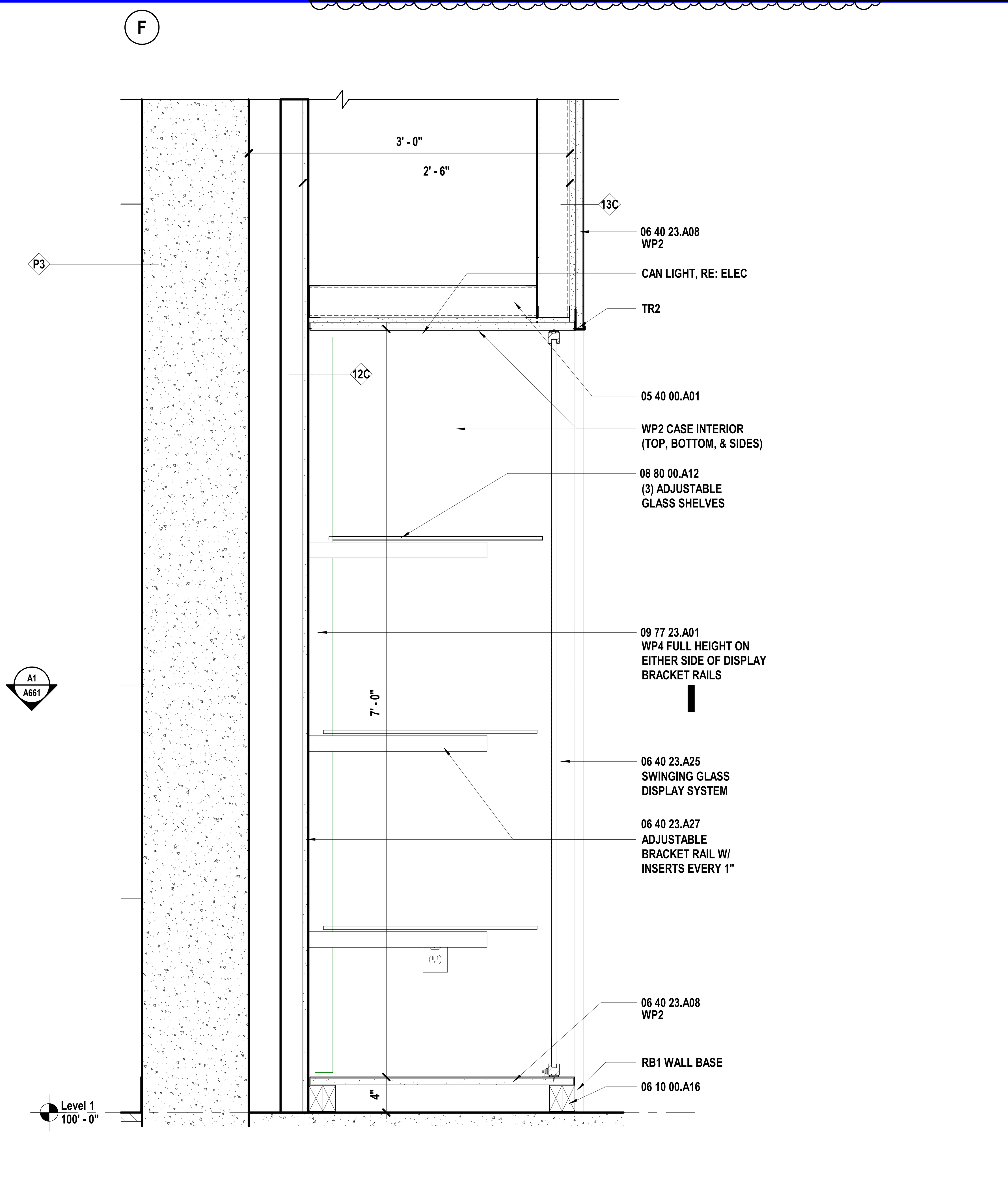
L5 | Scale 3" = 1'-0" | Interior Section - GFRG Panel and Wall Panel Detail



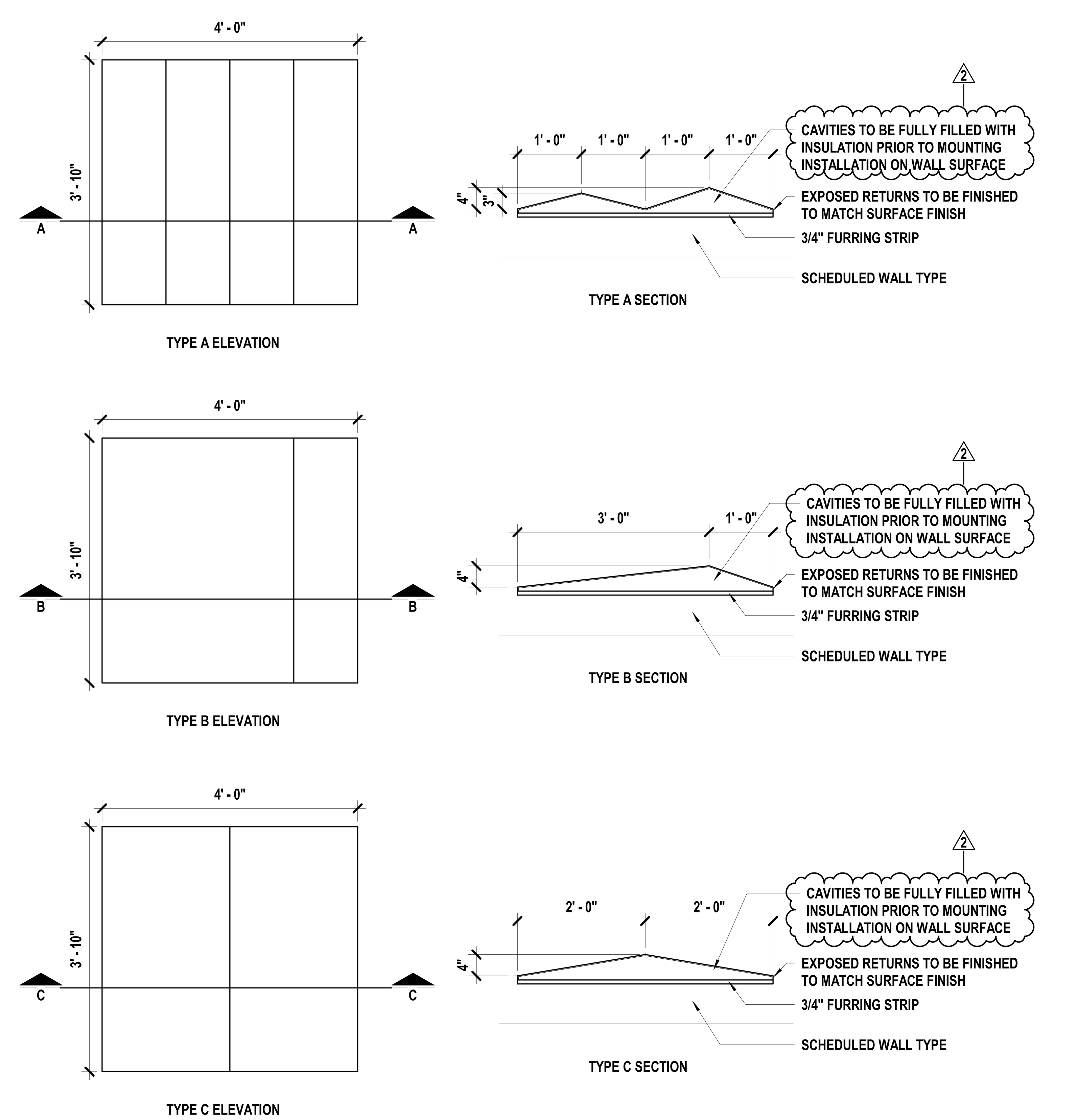
L9 | Scale 1 1/2" = 1'-0" | Interior Detail - Threhold from Existing Gym to New Connection Area



L13 | Scale 3" = 1'-0" | Interior Detail - Retrofit Jamb Opening at CMU



A1 | Scale 1 1/2" = 1'-0" | Interior Detail Section - Display Case



GENERAL NOTES
AP3 PANELS TO BE MECHANICALLY FASTENED TO 3/4" HORIZONTAL FURRING STRIPS @ EVERY 18" OR AS REQ'D BY MANUFACTURER;
FASTENER LOCATIONS TO BE FILLED AND PRIMED PRIOR TO PAINTED FINISH;
PANELS TO BE FIELD PAINTED ACCORDING TO PAINT LEGEND FOUND ON INTERIOR ELEVATIONS;
ALL EXPOSED PANELS TO HAVE FULLY FINISHED AND PAINTED RETURNS;
PANELS TO BE BUTT-JOINED WITH V-GROOVE EDGES AND CAULK

A10 | Scale 3/4" = 1'-0" | AP3 - GFRG Panel Details

hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1589
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2008031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

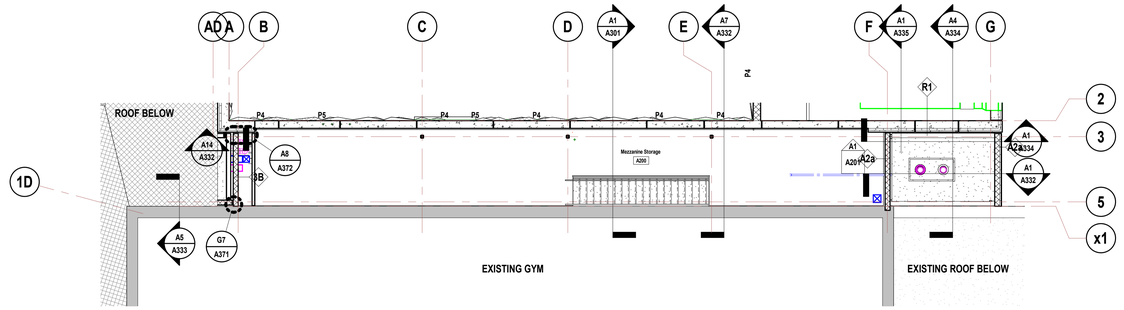
#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT
SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

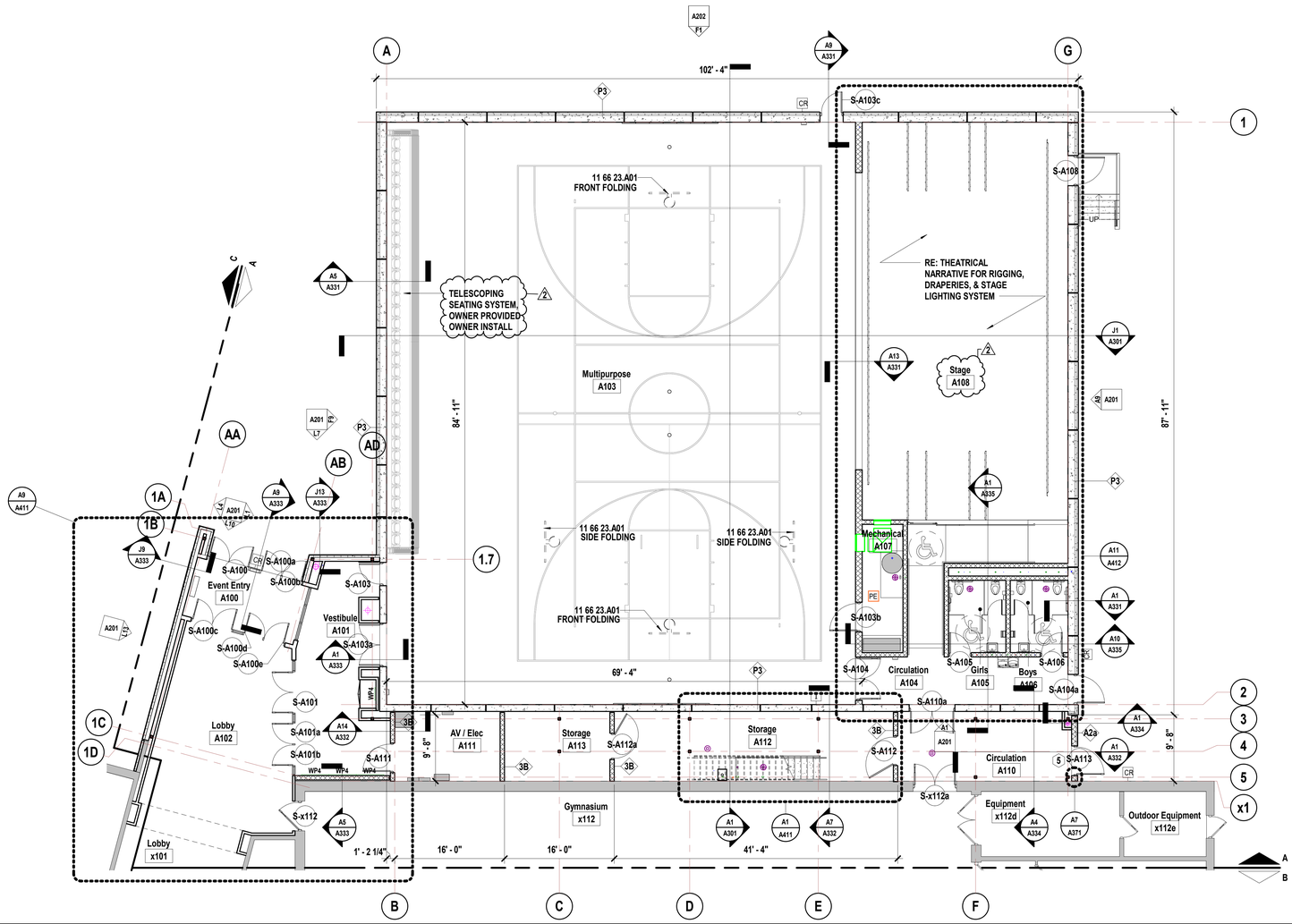
JOB NO: 23018
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

A662

INTERIOR DETAILS



N1 | Scale 1/8" = 1'-0" | Floor Plan - Mezzanine Level - Area A



A1 | Scale 1/8" = 1'-0" | Floor Plan - Level 1 - Area A

8' 4' 0' 8'

PROJECT NORTH TRUE NORTH

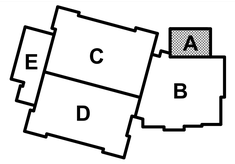
SHEET KEYNOTE LEGEND

11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. DO NOT SCALE THIS DRAWING
3. INTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   - A. TO FACE OF STUD
   - B. TO FACE OF MASONRY UNIT
   - C. TO FACE OF DOOR AND WINDOW ROUGH OPENINGS
4. EXTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   - A. TO FACE OF STUD
   - B. TO FACE OF MASONRY UNIT
   - C. TO FACE OF PRECAST
5. COORDINATE LOCATIONS WHERE BACKING IS REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, WALL HUNG ACCESSORIES AND TECHNOLOGY
6. COORDINATE FINISHES TO REMAIN WITH DEMOLITION SHEET

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09.14.2023
2	Addendum 04	09.28.2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023

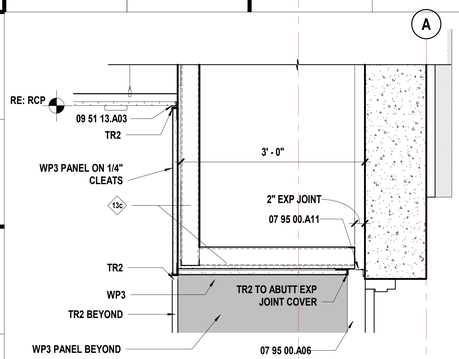
Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: LB
CHECKED BY: JB
DATE: 08.31.2023

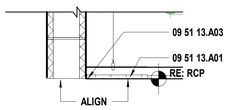
A101A

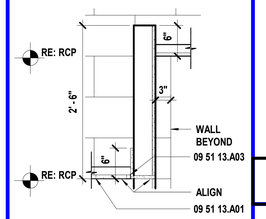
FLOOR PLAN - LEVEL 1 - AREA A

9/29/2023 2:05:50 PM



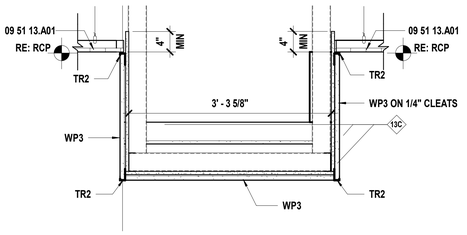
N1 Scale 1" = 1'-0" — Ceiling Detail - Multipurpose A103 - Entry



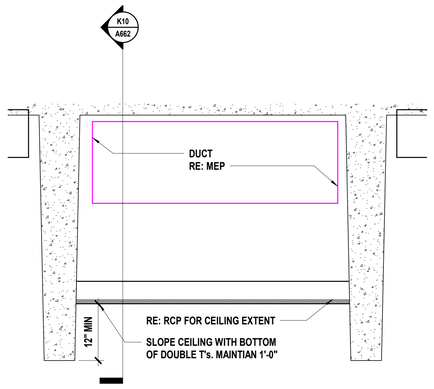


K1 Scale 1" = 1'-0" — Ceiling Detail - Circulation Ramp

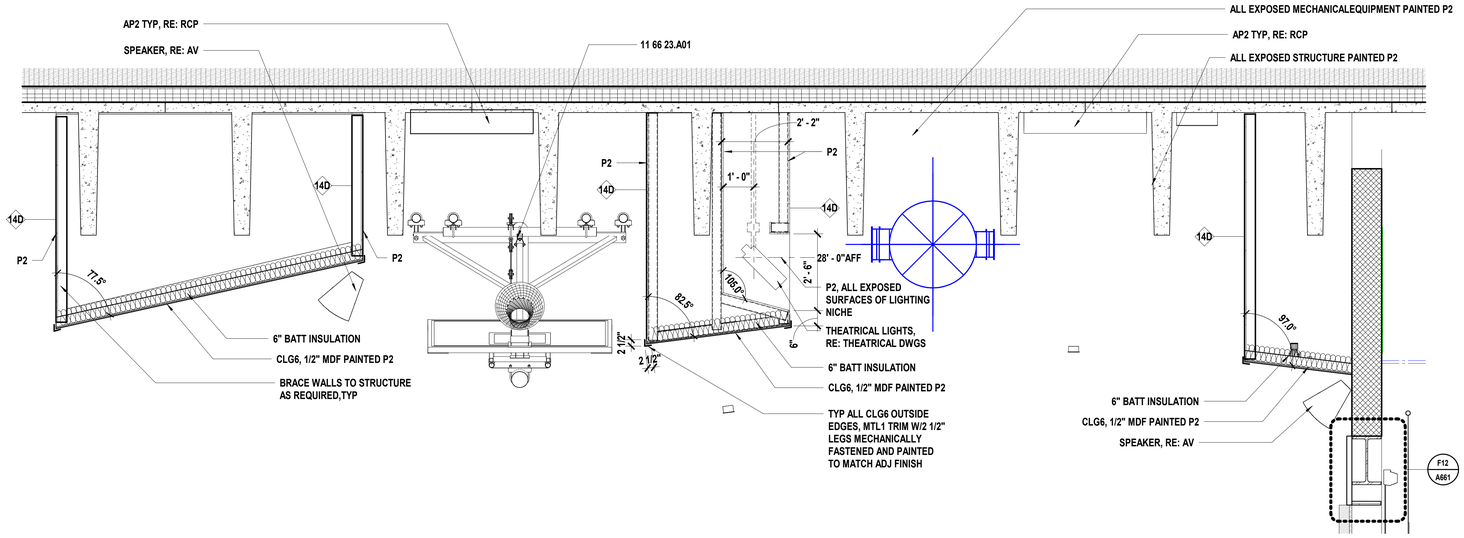
K3 Scale 1" = 1'-0" — Ceiling Detail - Circulation Ramp2



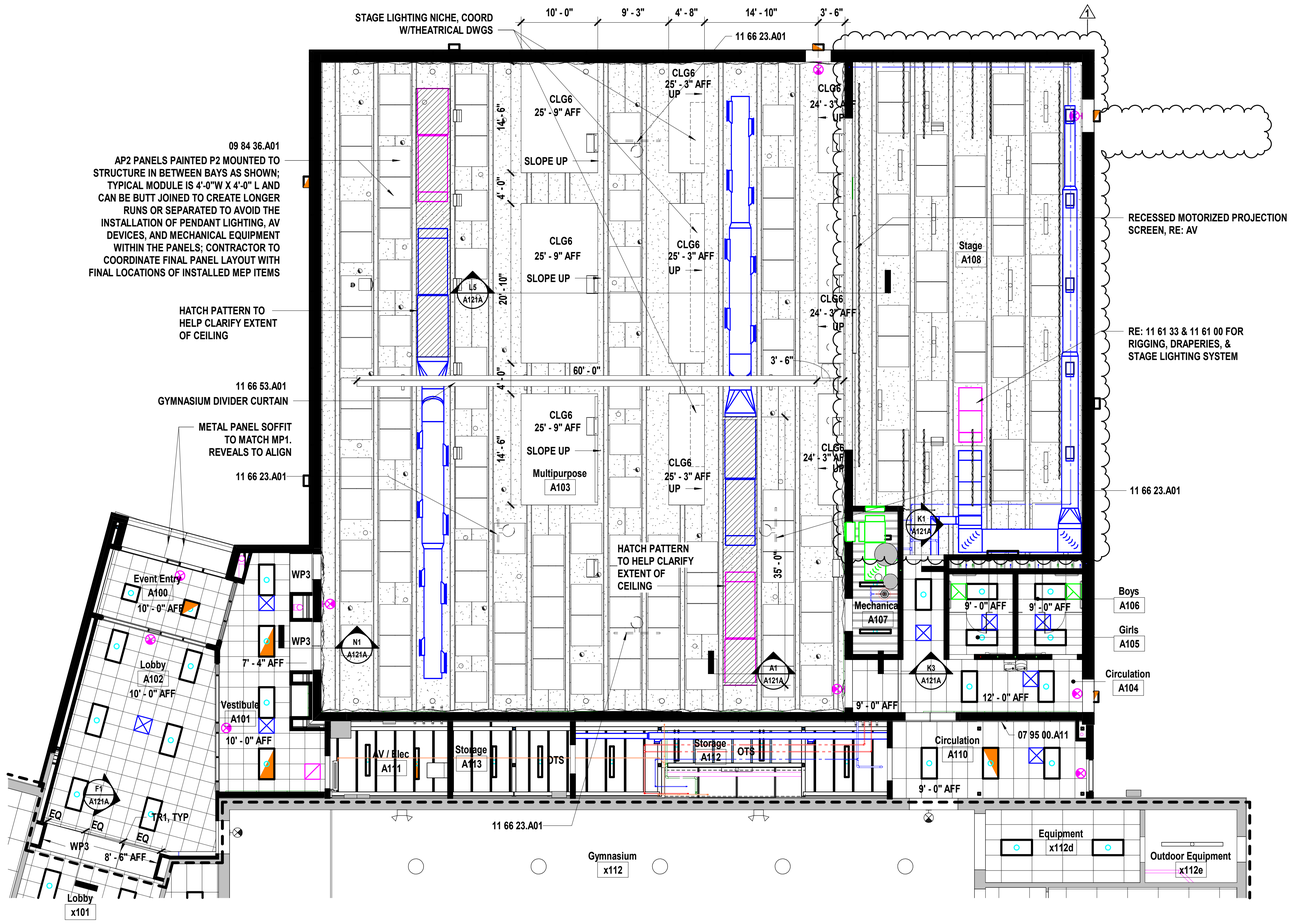
F1 Scale 1" = 1'-0" — Ceiling Detail - Lobby A102



A1 Scale 1" = 1'-0" — Ceiling Detail - Circulation Ramp1



L5 Scale 1/2" = 1'-0" — Ceiling Detail - CLG6 Clouds



A5 Scale 1/8" = 1'-0" — Reflected Ceiling Plan - Level 1 - Area A

SHEET KEYNOTE LEGEND

07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
07 95 00.A11	CEILING-TO-WALL JOINT SYSTEM
09 51 13.A01	ACOUSTICAL CEILING PANELS
09 51 13.A03	EDGE MOLDINGS AND TRIM
09 84 36.A01	SOUND-ABSORBING CEILING PANELS
11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS
11 66 53.A01	GYMNASIUM DIVIDER CURTAIN ASSEMBLY

SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH

SHEET NOTES

ALTERNATE NO.1 SCOPE WITHIN BOUNDARY LINE

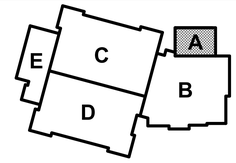
ALTERNATE NO.1
ALL EXISTING ROOMS TO RECEIVE NEW ACOUSTICAL CEILING TILE (ACT) TO REPLACE EXISTING. EXISTING GRIDS TO REMAIN.

1. CLASSROOMS, STORAGE ROOMS, OFFICES, LOCKER ROOMS, SUPPORT SPACES TO RECEIVE **CLG1** (24x48) OR **CLG2** (24x24) TO MATCH EXISTING GRID SIZE

2. LOBBIES, RECEPTION, PUBLIC CIRCULATION, CLASSROOM CORRIDORS, VESTIBULES, MEDIA CENTER, & COMMONS TO RECIEVE **CLG3**

3. KITCHEN, CAFETERIA, RESTROOMS, SHOWERS & OTHER WET SPACES TO RECEIVE **CLG4** (24x48) OR **CLG5** (24x24) TO MATCH EXISTING GRID SIZE

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000016I

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition

Liberty Public Schools

1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 04	09.29.2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023

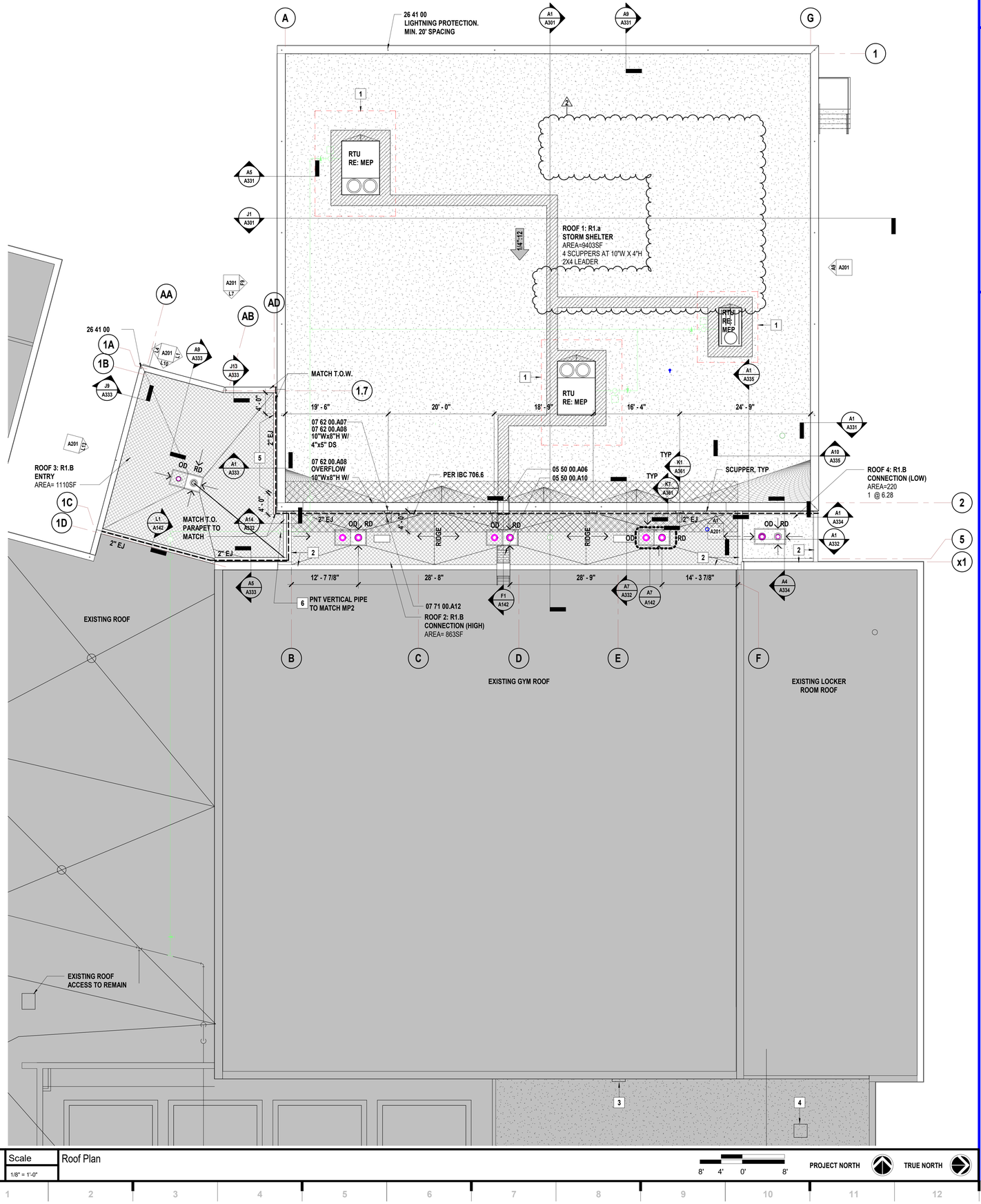
Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

A121A

REFLECTED CEILING PLAN - LEVEL 1 - AREA A

9/29/2023 2:05:00 PM



ROOF TYPE LEGEND

R1.a MOD BIT W/ 5.2" INSULATION

- 07 52 16.A01 W/ VENTED BASE SHEET
- 07 52 16.A25
- 07 52 16.A20
- PRE-CAST T RE: STRUCTURAL

R1.b MOD BIT TAPERED INSULATION

- 07 52 16.A01
- 07 52 16.A25
- 07 52 16.A20
- METAL DECK RE: STRUCTURAL

SHEET KEYNOTE LEGEND

05 50 00.A06	METAL LADDER
05 50 00.A10	SHIP'S LADDER WITH PLATFORM RETURN
07 52 16.A01	MODIFIED BITUMINOUS ROOFING SYSTEM
07 52 16.A20	ROOF INSULATION
07 52 16.A25	COVERBOARD
07 62 00.A07	DOWNSPOUTS
07 62 00.A08	SCUPPERS
07 71 00.A12	SPLASH PANS
26 41 00	

ROOF PLAN LEGEND

- SLOPED STRUCTURE RE: STRUCTURAL FOR ROOF BEARING HEIGHTS/SLOPE
- SLOPE PROVIDED BY TAPERED INSULATION OVER FLAT STRUCTURE @ SLOPE INDICATED
- TAPERED INSULATION CRICKET
- ROOF MEMBRANE 07 52 16.A01
- WALKWAY PADS 07 52 16.A16
- EXISTING ROOF AREA
- BUILDING EXPANSION JOINTS PATH. REFER TO SPECIFIC DETAILS FOR MORE INFORMATION.

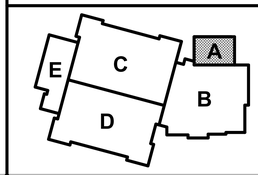
SHEET NOTES

1. REFER TO PLUMBING DRAWINGS FOR ROOF DRAIN DETAILS
2. REFER TO MECHANICAL DRAWINGS FOR ROOF MOUNTED EQUIPMENT AND CURBS
3. REFER TO PLUMBING DRAWINGS FOR EXPOSED GAS PIPING AND SUPPORTS

KEYNOTES

1. UNIT MOUNTED SCREEN. MFR TO PROVIDE FULL COLOR RANGE IN SUBMITAL. FINAL COLOR TO BE SELECTED BY ARCHITECT
   RE: MEP FOR MORE INFORMATION
2. NEW T.O.W. TO ALIGN WITH EXISTING T.O.W. COPING TO MATCH. SM2
3. EXISTING ROOF LADDER TO EXISTING GYM ROOF TO REMAIN
4. EXISTING ROOF ACCESS TO REMAIN
5. SLOPE TOP OF PAREPET. FIELD CUT REGLET PER PRECAST MFR
6. GAS LINE, RE: MEP

KEY PLAN



hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09.14.2023
2	Addendum 04	09.29.2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT
SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: KL
CHECKED BY: JB
DATE: 08.31.2023

A141

ROOF PLAN

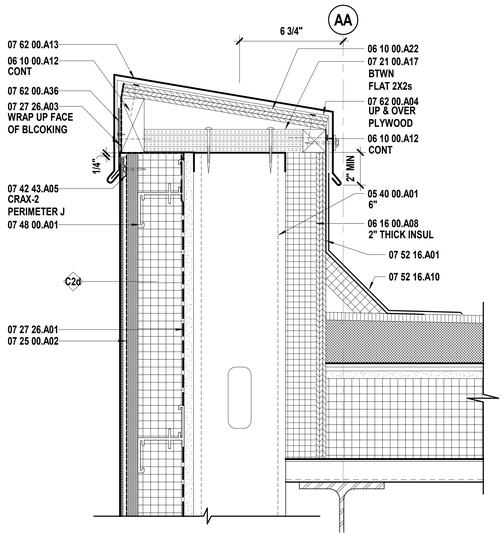
A1 | Scale 1/8" = 1'-0" | Roof Plan

8' 4' 0' 8'

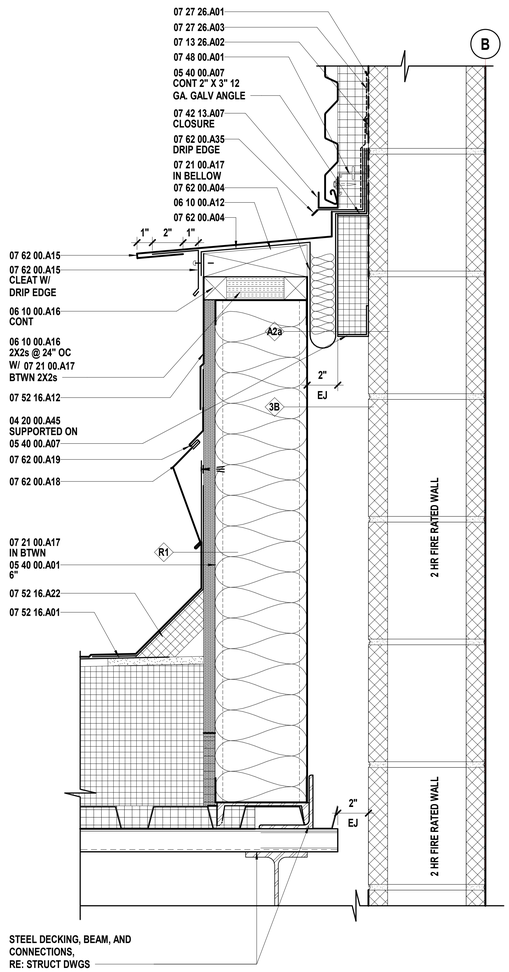
PROJECT NORTH | TRUE NORTH

9/29/2023 2:09:04 PM

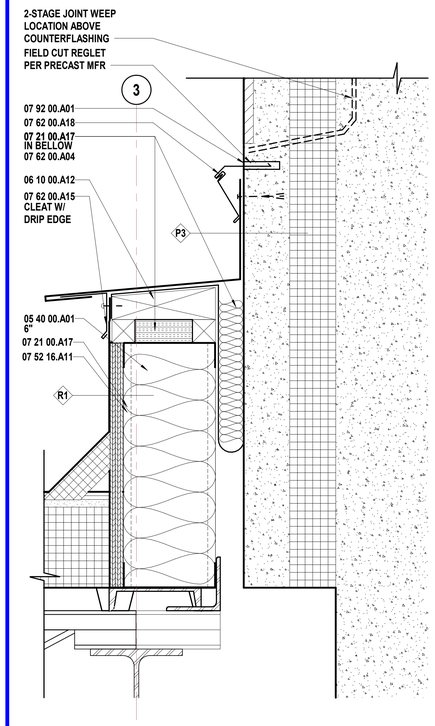
Please consider the environment before printing this.



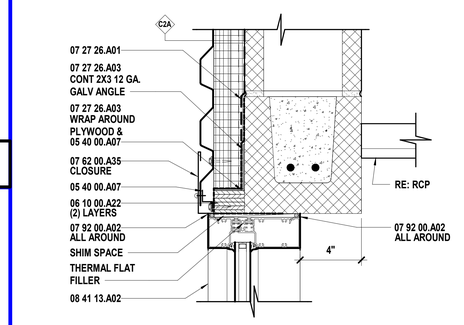
L1 Scale 3" = 1'-0" — Section Detail - Parapet at Entry



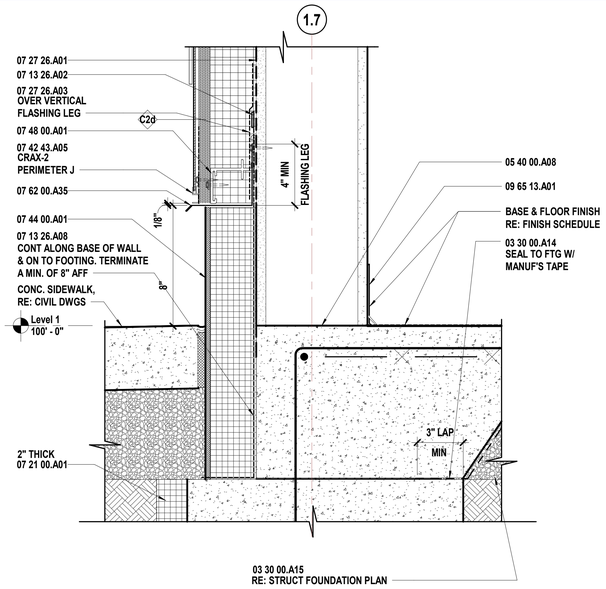
G7 Scale 3" = 1'-0" — Section Detail - Area A - Roof Connection



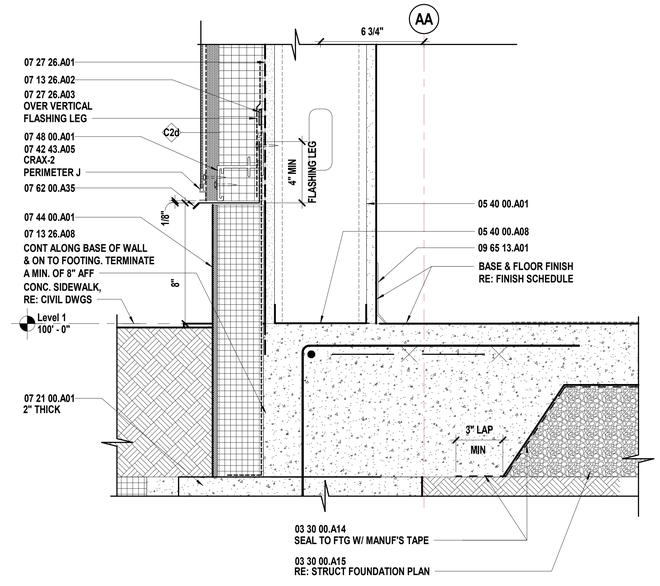
J13 Scale 3" = 1'-0" — Section Detail - Area B - Storage Connection to Multipurpose



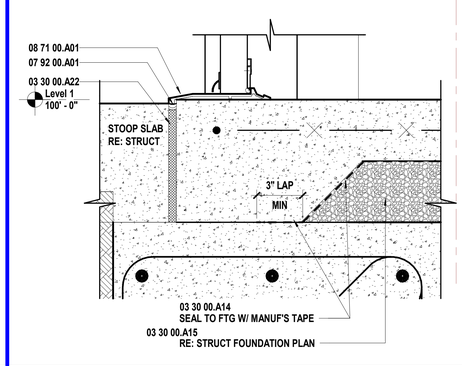
E13 Scale 3" = 1'-0" — Section Detail - Area A - Circulation A110 - Door Header - E



A1 Scale 3" = 1'-0" — Section Detail - Entry @ Footing



A7 Scale 3" = 1'-0" — Section Detail - Entry @ Slab



A13 Scale 3" = 1'-0" — Section Detail - Area A - Circulation A110 - E

SHEET KEYNOTE LEGEND

03 30 00.A14	VAPOR RETARDERS
03 30 00.A15	GRANULAR DRAINAGE FILL
03 30 00.A22	EXPANSION/ISOLATION JOINT
04 20 00.A45	CAVITY WALL INSULATION
05 40 00.A01	COLD-FORMED METAL FRAMING
05 40 00.A07	MISCELLANEOUS FRAMING/FURRING
05 40 00.A08	ISOLATION STRIP MEMBRANE
06 10 00.A12	PRESERVATIVE TREATED WOOD BLOCKING/NAILERS
06 10 00.A16	FIRE-RETARDANT TREATED WOOD BLOCKING & NAILERS
06 10 00.A22	PRESERVATIVE TREATED PLYWOOD BLOCKING
06 16 00.A08	COMPOSITE INSULATED ROOF SHEATHING
07 13 26.A02	TERMINATION BAR
07 13 26.A08	MOISTURE BARRIER
07 21 00.A01	EXTRUDED POLYSTYRENE BOARD INSULATION
07 21 00.A17	MINERAL WOOL
07 25 00.A02	SELF-ADHERING WEATHER BARRIERS
07 27 26.A01	VAPOR RETARDING FLUID-APPLIED AIR BARRIER
07 27 26.A03	TRANSITION MEMBRANE
07 42 13.A07	FLASHING AND TRIM
07 42 43.A05	TRIM
07 44 00.A01	CONCRETE-FACED RIGID INSULATION
07 48 00.A01	RAINSCREEN FURRING SYSTEM
07 52 16.A01	MODIFIED BITUMINOUS ROOFING SYSTEM
07 52 16.A10	BASE FLASHING
07 52 16.A11	VERTICAL WALL FLASHING (MODIFIED BITUMINOUS)
07 52 16.A12	VERTICAL WALL FLASHING (EPDM)
07 52 16.A22	INSULATION CANT STRIPS
07 62 00.A04	FLEXIBLE MEMBRANE CLOSURE
07 62 00.A13	COPING
07 62 00.A15	ROOF TO WALL EXPANSION JOINT COVER
07 62 00.A18	COUNTER FLASHING
07 62 00.A19	COUNTER FLASHING RECEIVER
07 62 00.A35	PRE-FINISHED MISC METAL FLASHING
07 62 00.A36	CLEAT
07 92 00.A01	SEALANT
07 92 00.A02	SEALANT W/BACKER ROD
08 41 13.A02	THERMAL BROKEN STOREFRONT FRAMING (6")
08 71 00.A01	THRESHOLDS
09 65 13.A01	RESILIENT BASE

hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09.14.2023
2	Addendum 04	09.29.2023

STATE OF MISSOURI — KEVIN E. NELSON — A-2019015618 — ARCHITECT

SEPTEMBER 29, 2023

Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: KL
CHECKED BY: JB
DATE: 08.31.2023

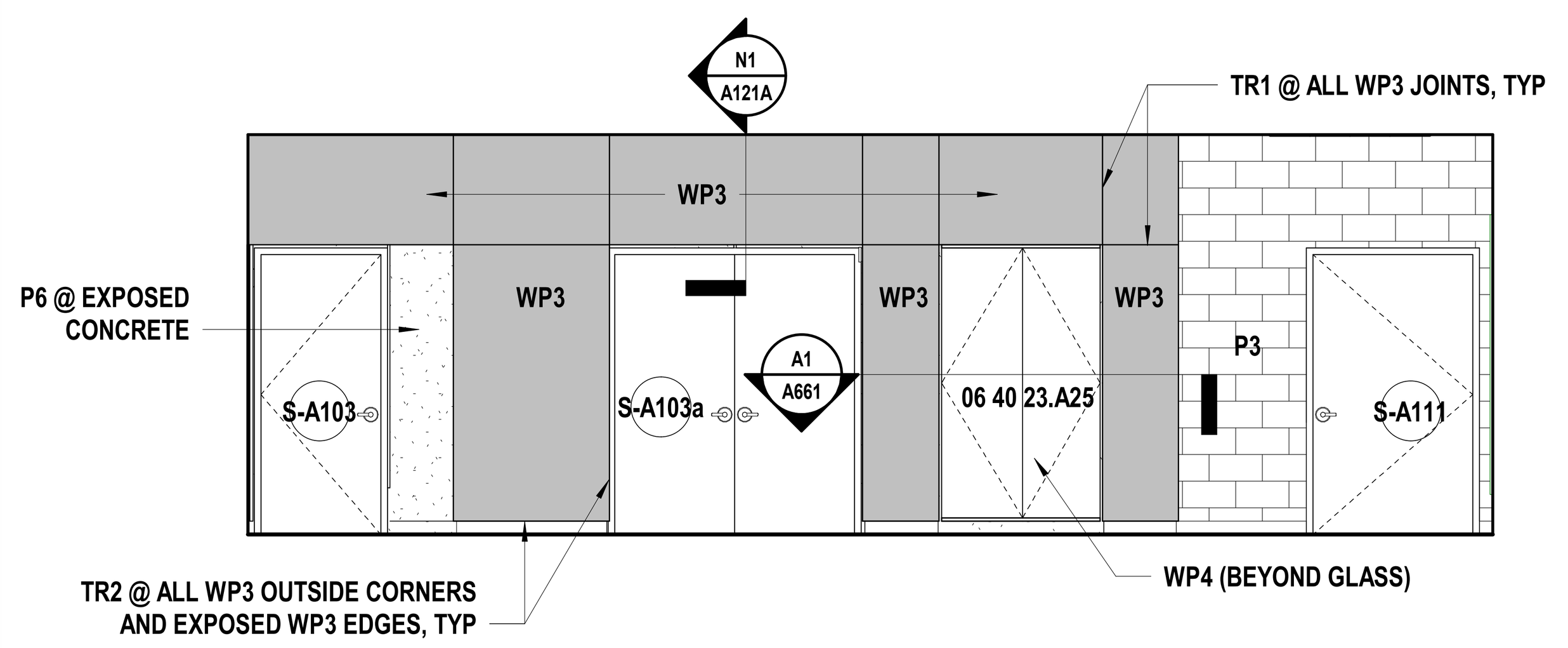
A363

EXTERIOR DETAILS

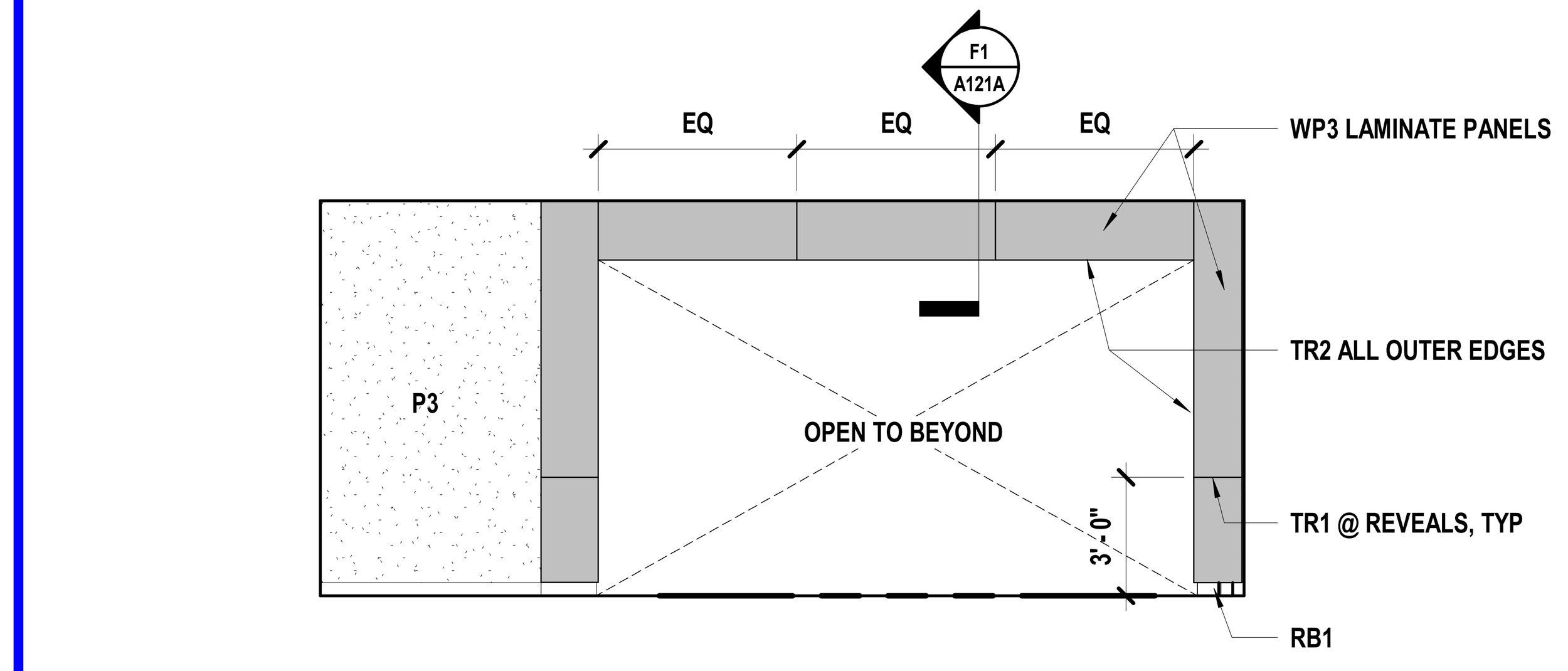
9/29/2023 2:09:07 PM

SHEET KEYNOTE LEGEND

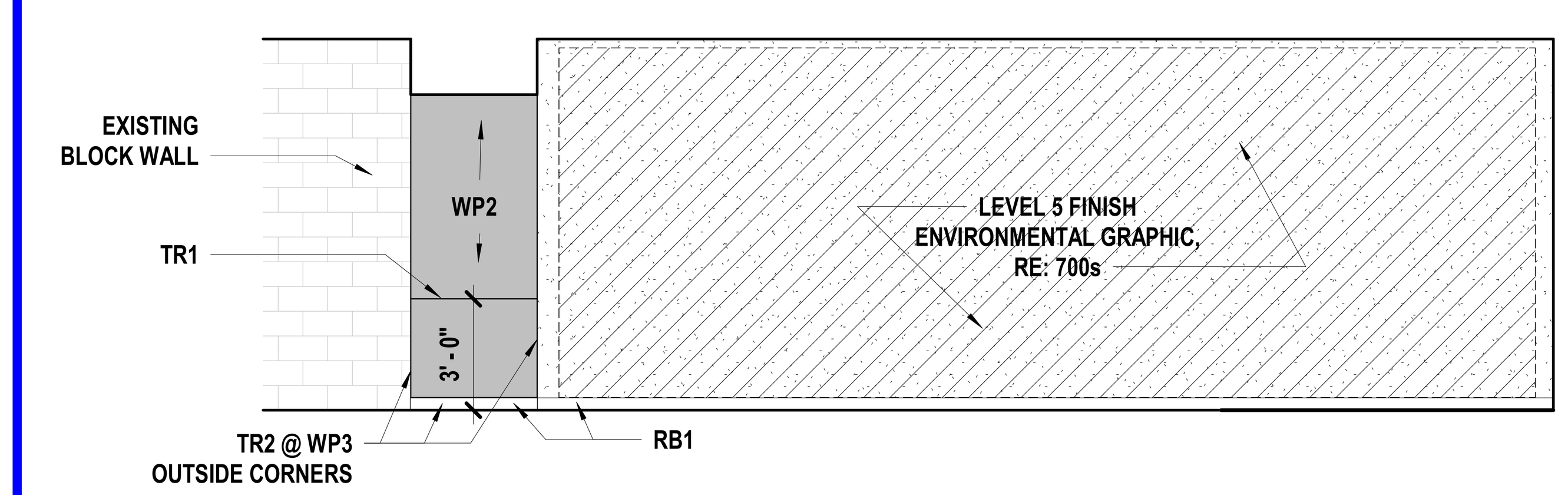
06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS
11 66 23.A07	WALL SAFETY PADS
11 66 53.A01	GYMNASIUM DIVIDER CURTAIN ASSEMBLY



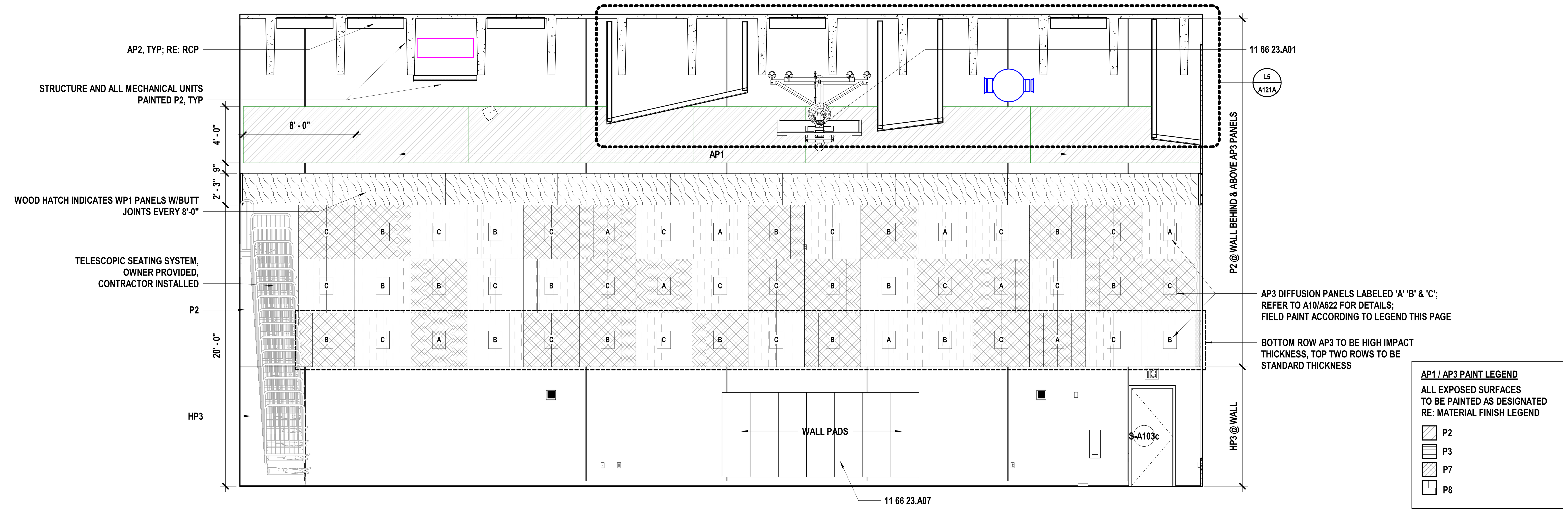
N1 Scale 1/4" = 1'-0" — Interior Elevation - Area A - Vestibule A101 - E



N6 Scale 1/4" = 1'-0" — Interior Elevation - Lobby A102 - S



N11 Scale 1/4" = 1'-0" — Interior Elevation - Area A - Lobby A102 - Graphic Wall

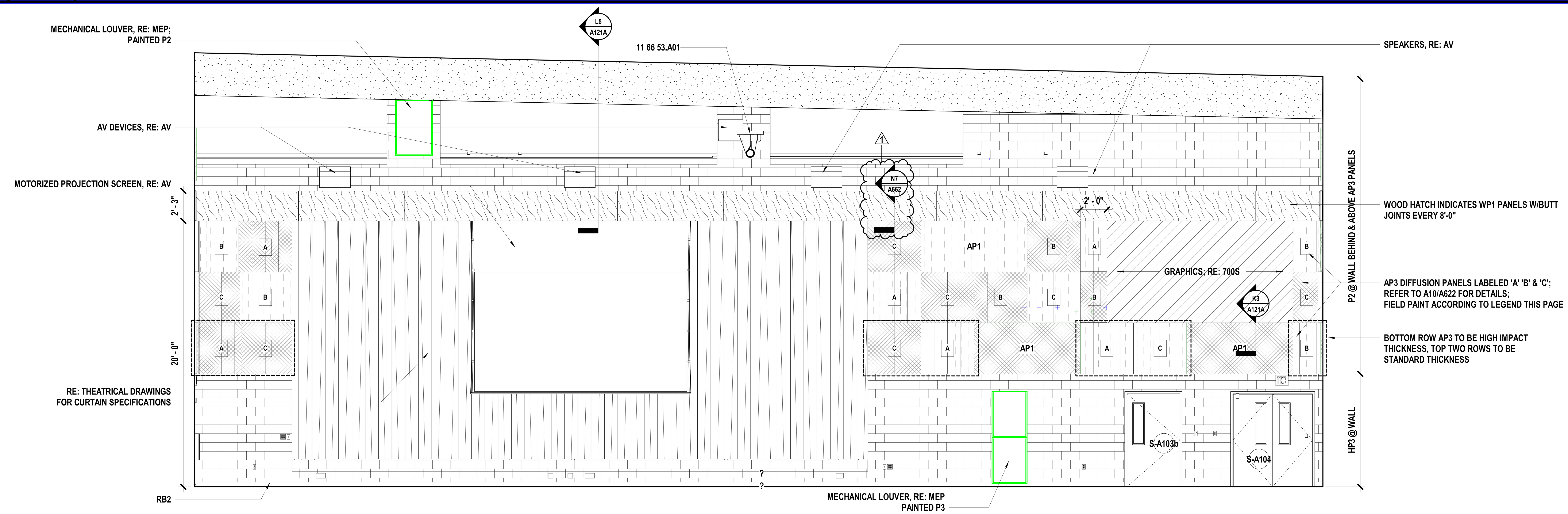


AP1 / AP3 PAINT LEGEND

ALL EXPOSED SURFACES TO BE PAINTED AS DESIGNATED RE: MATERIAL FINISH LEGEND

- P2
- P3
- P7
- P8

G1 Scale 1/4" = 1'-0" — Interior Elevation - Multipurpose A103 - N



A1 Scale 1/4" = 1'-0" — Interior Elevation - Multipurpose A103 - E

SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. COORDINATE LOCATIONS WHERE BACKING REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, AND TECHNOLOGY
3. COLOR/MATERIAL TRANSITIONS ARE NOTED WHEN THEY DO NOT OCCUR AT INSIDE CORNERS
4. REFER TO MEP SHEETS FOR LOCATION DIAGRAM OF SWITCHES, THERMOSTATS, FIRE ALARM STROBES TO BE MOUNTED ADJACENT TO ENTRY DOORS OR AT OUTSIDE CORNERS WITHIN ROOMS
5. COORDINATE WITH ELECTRICAL SHEETS FOR HEIGHT OF OUTLETS A.F.F. AND/OR ABOVE COUNTERTOPS
6. COORDINATE WITH MECHANICAL SHEETS FOR LOCATIONS OF WALL MOUNTED GRILLES AND REGISTERS
7. ALL EXPOSED SURFACES TO RECEIVE PLASTIC LAMINATE
8. ALL BACKSPLASH MATERIAL TO MATCH COUNTERTOP MATERIAL, UNO
9. PROVIDE 4" BACKSPLASH, UNO
10. PROVIDE 1" OVERHANG AT ALL COUNTERTOPS, UNO
11. PROVIDE ONE 2" DIAMETER GROMMET PER 30 INCH OF KNEE-SPACE - RECEPTION COUNTERS AND OTHER LOCATIONS – COORDINATE EXACT LOCATION WITH OWNER
12. REFER TO PLUMBING DRAWINGS FOR LOCATIONS OF SINKS AND OTHER PLUMBING FIXTURES LOCATED WITHIN CASEWORK
13. ALL BASE CABINETS ARE TO BE 24" DEEP, UNO
14. ALL UPPER CABINETS ARE TO BE 16" DEEP, UNO
15. ALL TALL STORAGE AND WARDROBE CABINETS ARE TO BE 24" DEEP, UNO
16. ALL SCIENCE AND NURSE CASEWORK TO HAVE LOCKS
17. FILE DRAWERS TO HAVE LOCKS
18. ALL WARDROBE CABINETS TO HAVE LOCKS
19. COORDINATE DOOR CONTROL BUTTON LOCATION AT RECEPTION DESK WITH OWNER
20. PROVIDE WOOD CLEAT AT BACK AND SIDE WALLS OF ALL COUNTERTOPS WITH NO BASE CABINET BELOW

hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 04	09.29.2023

STATE OF MISSOURI — KEVIN E. NELSON — A-2019015618 — ARCHITECT

SEPTEMBER 29, 2023

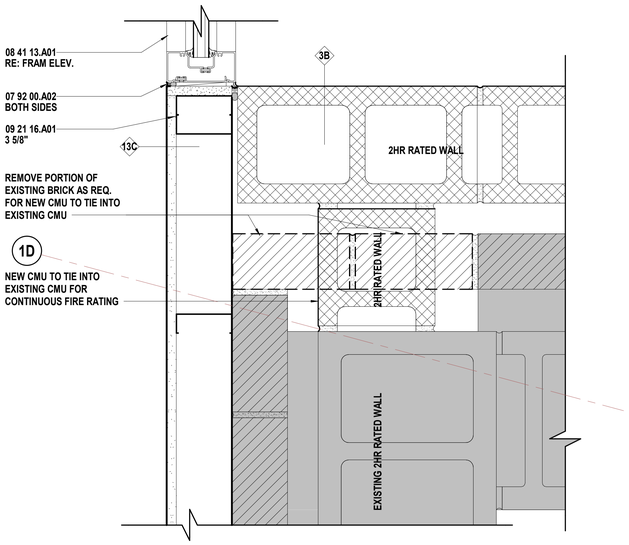
Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

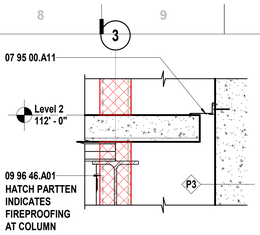
A621

INTERIOR ELEVATIONS

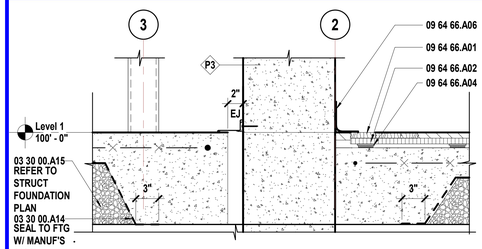
9/29/2023 2:09:27 PM



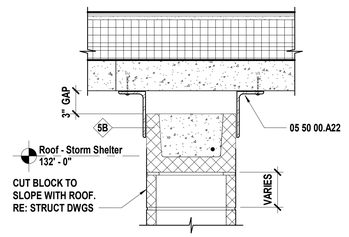
L1 Scale 3" = 1'-0" — Plan Detail - Area A - Lobby A102 / Vestibule A101



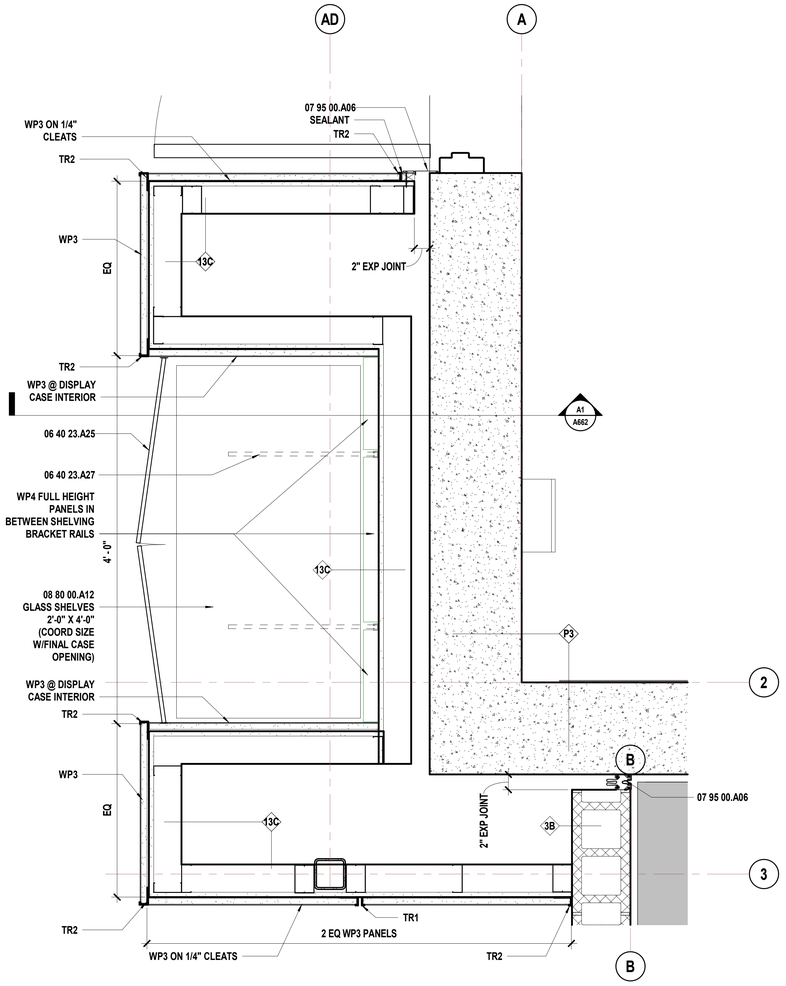
P8 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Storage to Multipurpose @ Level 2



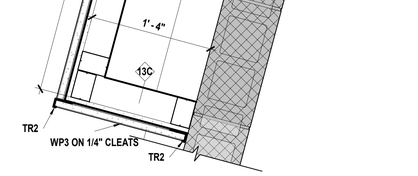
L8 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Storage to Multipurpose @ Base of Wall



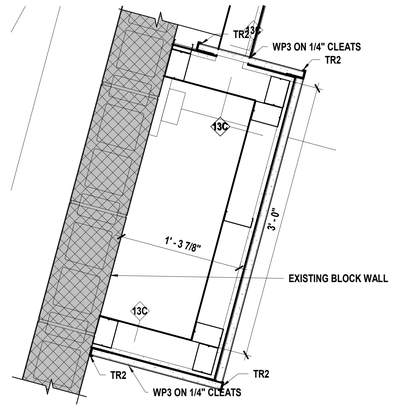
L12 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 / Multipurpose A103 Top of Wall



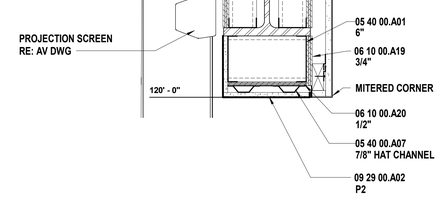
A1 Scale 1 1/2" = 1'-0" — Plan Detail - Area A - Vestibule A101 - Corner



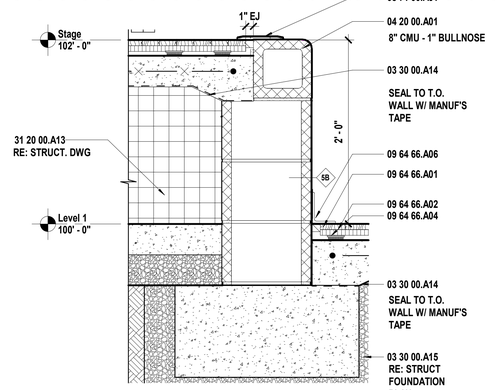
F8 Scale 1 1/2" = 1'-0" — Plan Detail - Area A - Lobby A102 - Plan East



A8 Scale 1 1/2" = 1'-0" — Plan Detail - Area A - Lobby A102 - Plan West



F12 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 - Proscenium Head



A12 Scale 1 1/2" = 1'-0" — Section Detail - Area A - Platform A108 - Proscenium Base

SHEET KEYNOTE LEGEND

03 30 00.A14	VAPOR RETARDERS
03 30 00.A15	GRANULAR DRAINAGE FILL
04 20 00.A01	CONCRETE MASONRY UNITS
05 40 00.A01	COLD-FORMED METAL FRAMING
05 40 00.A07	MISCELLANEOUS FRAMING/FURRING
05 50 00.A22	LOOSE STEEL LINTEL
06 10 00.A13	WOOD BLOCKING/NAILERS
06 10 00.A19	PLYWOOD BLOCKING AND BACKING PANELS
06 10 00.A20	FIRE-RETARDANT TREATED PLYWOOD BLOCKING AND BACKING PANELS
06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
06 40 23.A27	DISPLAY CASE SHELVING SYSTEM
07 92 00.A02	SEALANT W/BACKER ROD
07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
07 95 00.A11	CEILING-TO-WALL JOINT SYSTEM
08 41 13.A01	THERMAL BROKEN STOREFRONT FRAMING (4.5")
08 71 00.A01	THRESHOLDS
08 80 00.A12	3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS
09 21 16.A01	NON-STRUCTURAL FRAMING
09 21 16.A04	Z-SHAPED FURRING
09 29 00.A02	GYPSUM BOARD - TYPE X
09 64 66.A01	WOOD ATHLETIC FLOOR
09 64 66.A02	UNDERLAYMENT
09 64 66.A04	RESILIENT PADS
09 64 66.A06	RESILIENT WALL BASE (VENTED)
09 96 46.A01	INTUMESCENT PAINT
31 20 00.A13	GEOFOAM

hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09.14.2023
2	Addendum 04	09.29.2023

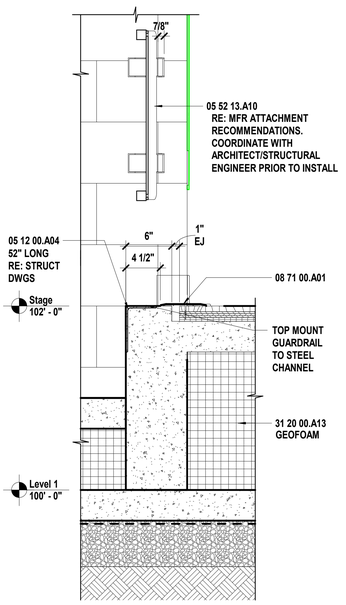
STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT
SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

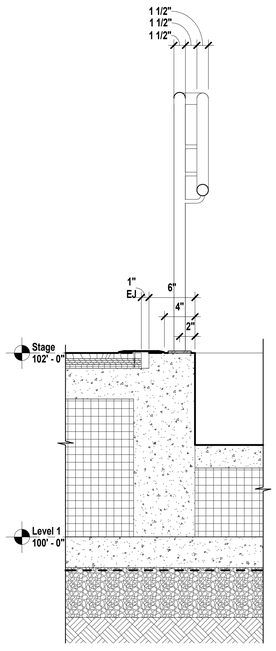
A661

INTERIOR DETAILS

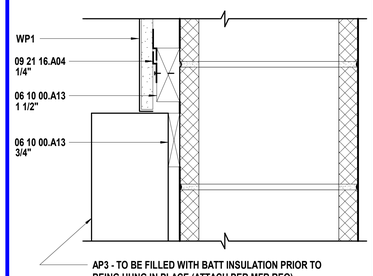
9/29/2023 2:09:32 PM



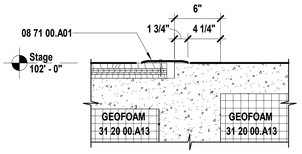
K1 | Scale 1 1/2" = 1'-0" | Section Detail - Circulation A104 to Platform A108 Railing



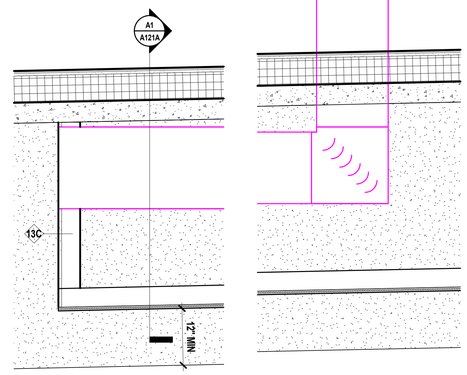
K4 | Scale 1 1/2" = 1'-0" | Ramp Section - Circulation - A104 -E - Callout 1



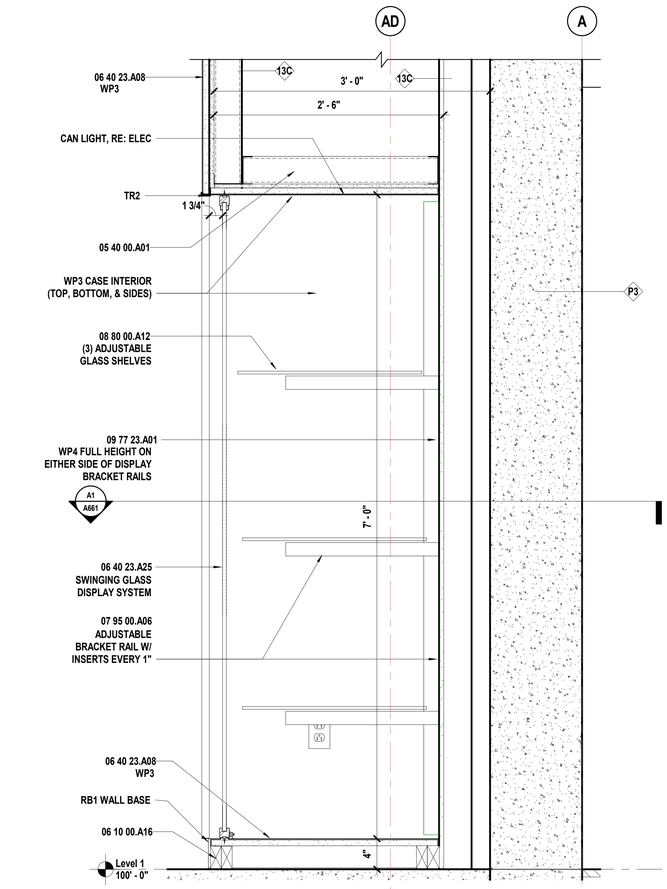
N7 | Scale 3" = 1'-0" | Interior Section - GFRG Panel and Wall Panel Detail



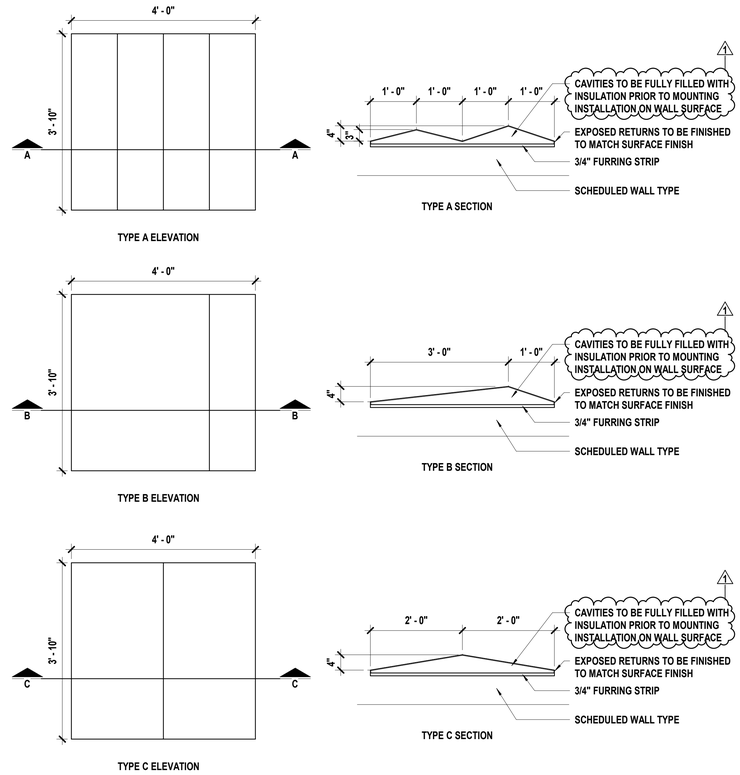
K7 | Scale 1 1/2" = 1'-0" | Interior Detail - Platform and Ramp Threshold



K10 | Scale 1" = 1'-0" | Ceiling Detail - Circulation Ramp4



A1 | Scale 1 1/2" = 1'-0" | Interior Detail Section - Display Case



GENERAL NOTES
AP3 PANELS TO BE MECHANICALLY FASTENED TO 3/4" HORIZONTAL FURRING STRIPS @ EVERY 18" OR AS REQ'D BY MANUFACTURER;
FASTENER LOCATIONS TO BE FILLED AND PRIMED PRIOR TO PAINTED FINISH;
PANELS TO BE FIELD PAINTED ACCORDING TO PAINT LEGEND FOUND ON INTERIOR ELEVATIONS;
ALL EXPOSED PANELS TO HAVE FULLY FINISHED AND PAINTED RETURNS;
PANELS TO BE BUTT-JOINED WITH V-GROOVE EDGES AND CAULK

A10 | Scale 3/4" = 1'-0" | AP3 - GFRG Panel Details

SHEET KEYNOTE LEGEND

05 12 00.A04	ANGLE
05 40 00.A01	COLD-FORMED METAL FRAMING
05 52 13.A10	GATE
06 10 00.A13	WOOD BLOCKING/NAILERS
06 10 00.A16	FIRE-RETARDANT TREATED WOOD BLOCKING & NAILERS
06 40 23.A08	PLASTIC LAMINATE-CLAD PANELS
06 40 23.A25	SWINGING DISPLAY CASE DOOR SYSTEM
07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
08 71 00.A01	THRESHOLDS
08 80 00.A12	3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS
09 21 16.A04	Z-SHAPED FURRING
09 77 23.A01	FABRIC-WRAPPED PANELS
31 20 00.A13	GEOFOAM

hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000516

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 04	09.29.2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023

Kevin E. Nelson
A-2019015618

JOB NO: 23019
DRAWN BY: ES
CHECKED BY: JB
DATE: 08.31.2023

A662

INTERIOR DETAILS

9/29/2023 2:09:35 PM

EPiC Elementary Storm Shelter Addition

Liberty Public Schools

650 Conistor St
Liberty, MO 64068

CONSTRUCTION DOCUMENTS

architects hollis + miller

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

INDEX OF DRAWINGS

4

ALTERNATES

ALTERNATE 1:

BASE BID: NO WORK
ALTERNATE: ALTERNATE INCLUDES ALL LABOR, MATERIALS, EQUIPMENT, AND APPURTENENANCES NECESSARY TO REPLACE ALL EXISTING CEILING TILE. REFER TO SHEETS DA 101 AND REFLECTED CEILING PLANS.

VICINITY MAP

DESIGN TEAM

ARCHITECT:
Hollis + Miller Architects
1828 Walnut Street Ste 922
Kansas City, MO 64108
CONTACT: Hannah Bain
PHONE: 816.442.7700
FAX: 816.599.2545

CONSTRUCTION MANAGER:
Newkirk & Novak Construction Partners
11200 W 79th Street
Lenexa, KS 66214
CONTACT: Brandon Stanley
PHONE: 913.312.9535

CIVIL ENGINEER:
MKEC Engineering, Inc.
11827 W 112th Street, Suite 200
Overland Park, KS 66210
CONTACT: Braden Taylor
PHONE: 913.317.9390

STRUCTURAL ENGINEER:
Bob D. Campbell & Co.
4338 Belleview Avenue
Kansas City, MO 64111
CONTACT: Ryan Hagedorn
PHONE: 816.531.4144
FAX: 816.531.8572

MECH/ELECT ENGINEER:
Smith & Boucher Engineers
25618 W 103rd Street
Olathe, KS 66061
CONTACT: Ryan Diediker
PHONE: 913.345.2127
FAX: 913.345.0617

GEOTECHNICAL ENGINEER:
Kruger Technologies, Inc.
8721 Melrose Drive
Lenexa, KS 66214
CONTACT: Dylan Kruger
PHONE: 913.498.1114
FAX: 913.498.1116

FOOD SERVICE CONSULTANT:
MHA Food Facility Consultants
7840 Conser Street
Overland Park, KS 66204
CONTACT: Mike Terlouw
PHONE: 785.266.5696

THEATRICAL CONSULTANT:
Peerbolte Creative
109 E. Pine St
Warrensburg, MO 64093-0754
CONTACT: Shannon Johnson
PHONE: 660.429.1383

4

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

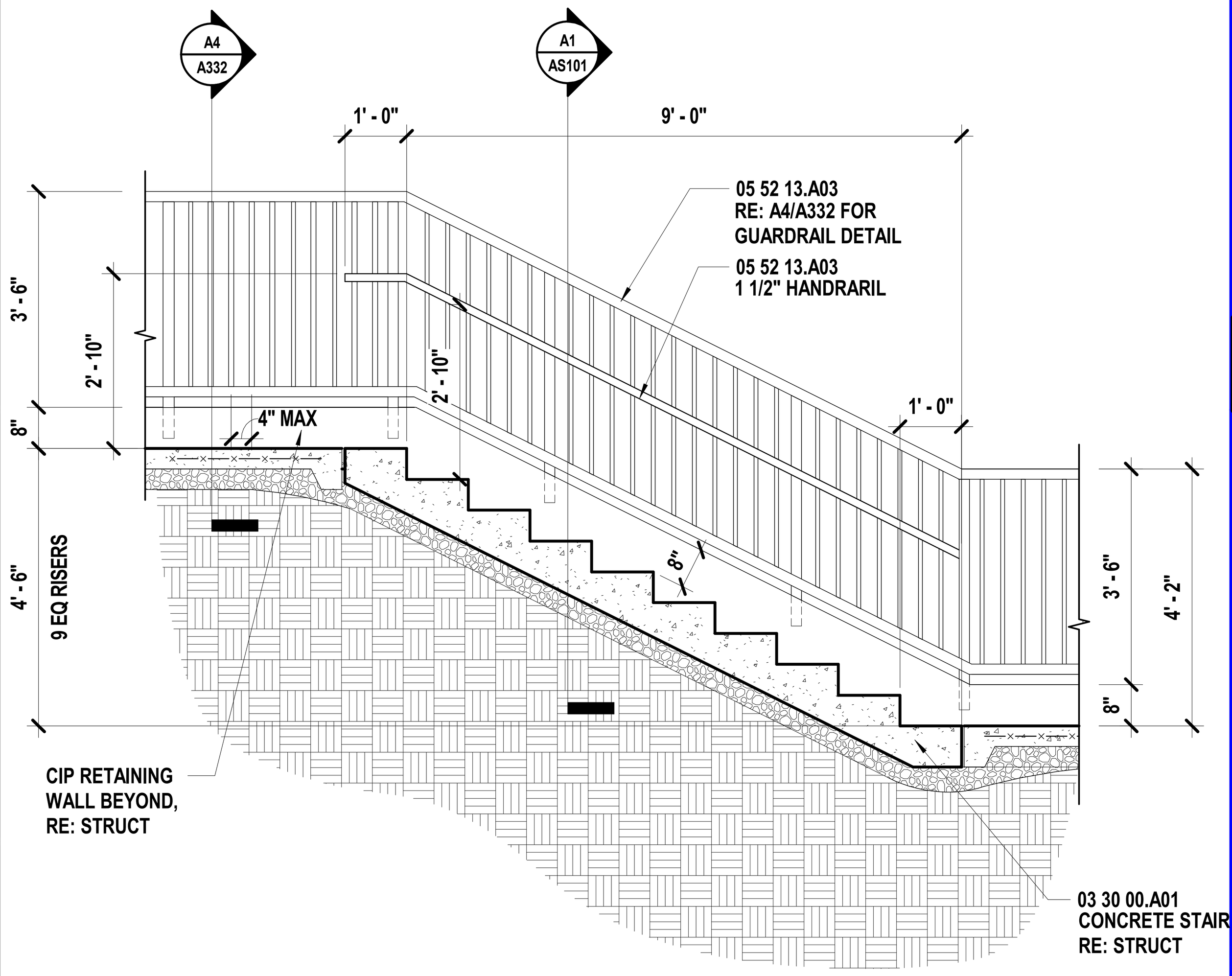
STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

September 29, 2023
Kevin E. Nelson
A-2019015618

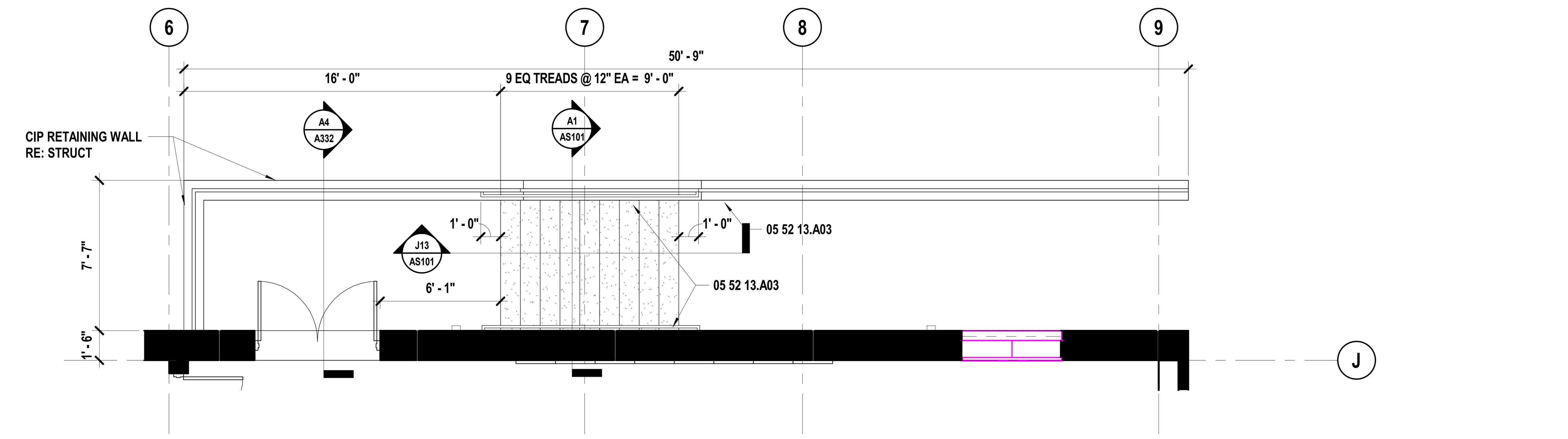
The Professional Architects seal affixed to this sheet applies only to the material and items shown on this sheet. All drawings, instruments or other documents not exhibiting this seal shall not be considered prepared by this architect, and this architect expressly disclaims any and all responsibility for such plan, drawings, or documents not exhibiting this seal.

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

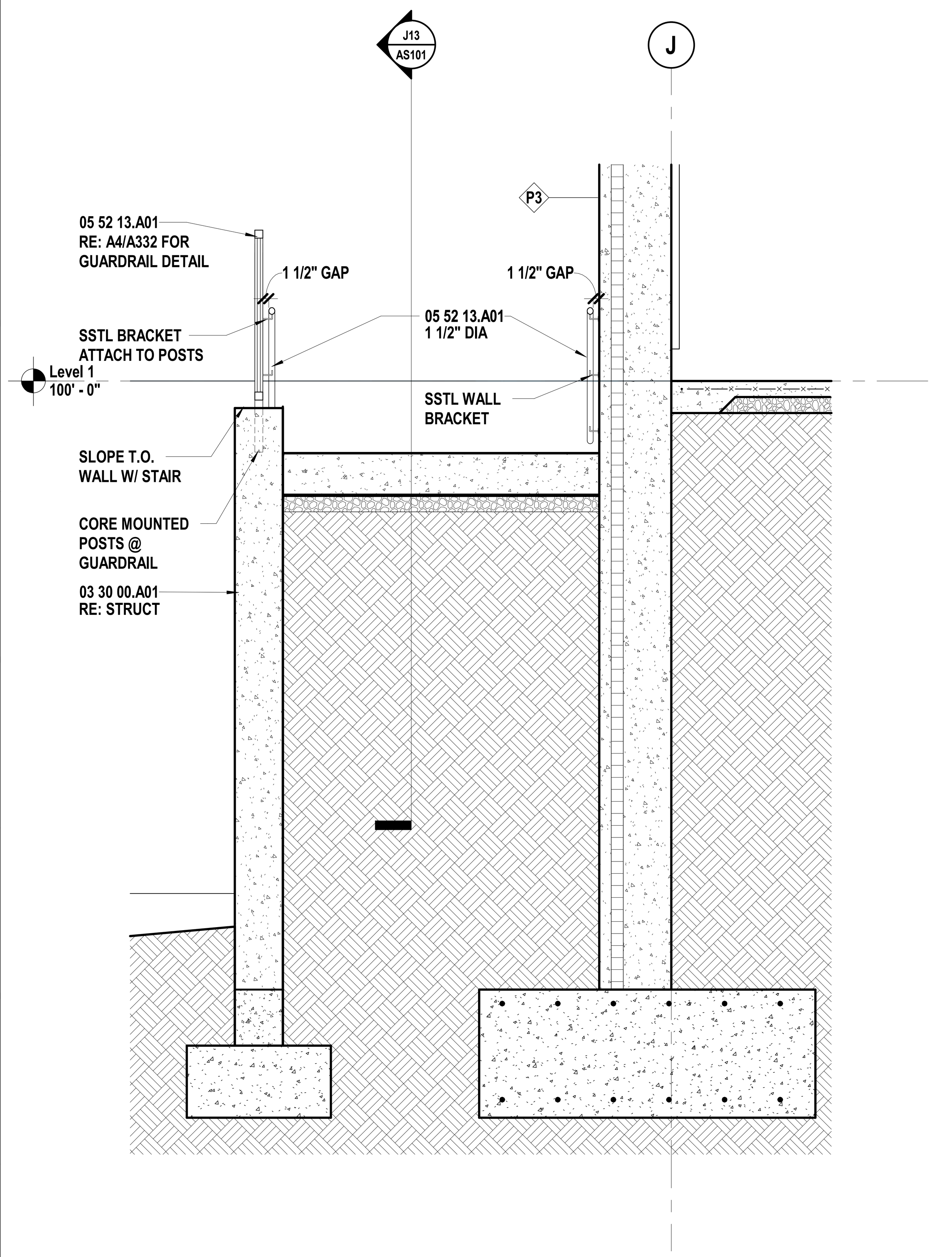
G000



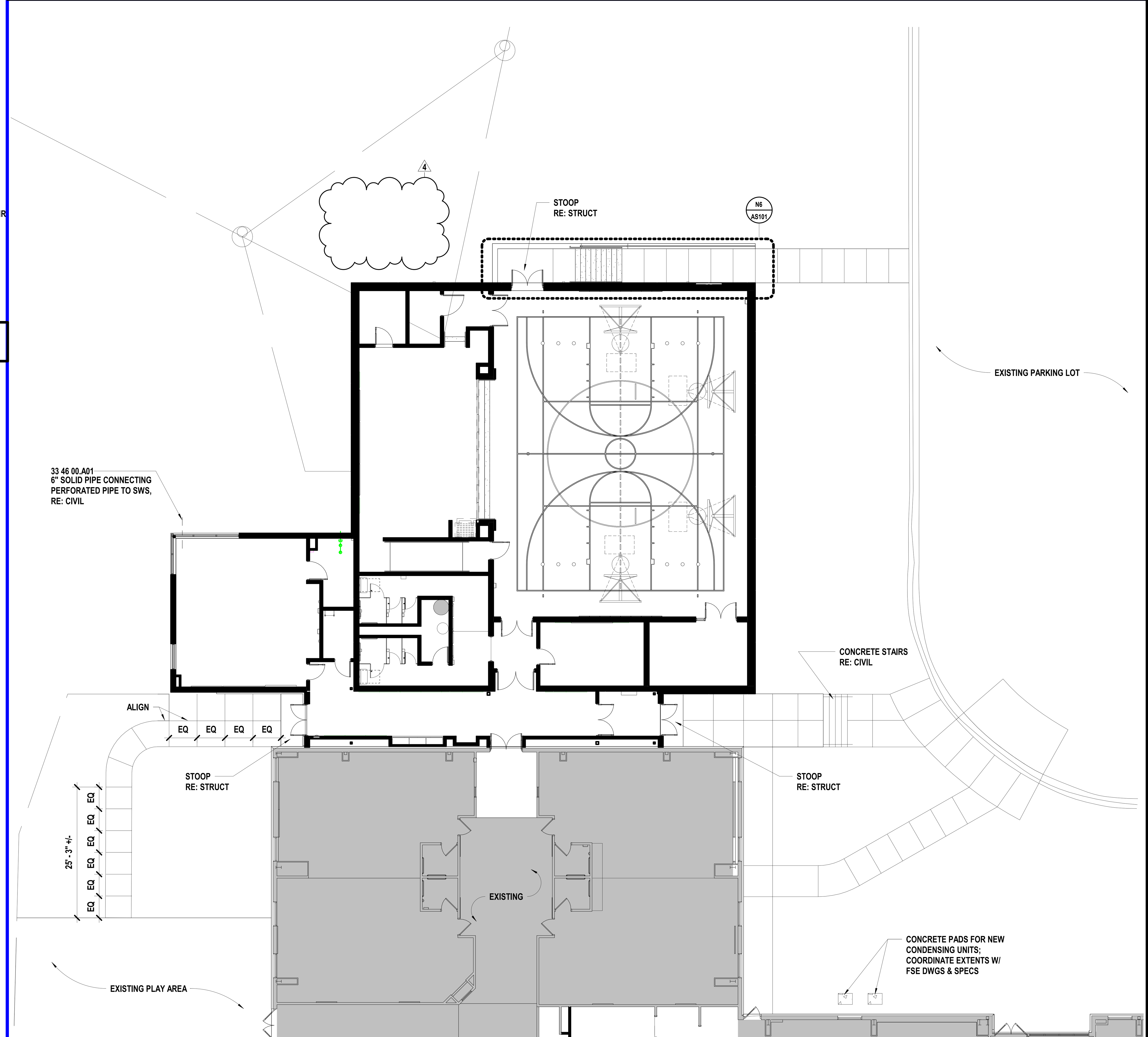
J13 Scale 1/2" = 1'-0" Section - Exterior Concrete Stairs 2



N6 Scale 1/4" = 1'-0" Enlarged Site Plan - Concrete Stair N



A1 Scale 1/2" = 1'-0" Section - Exterior Concrete Stairs 1

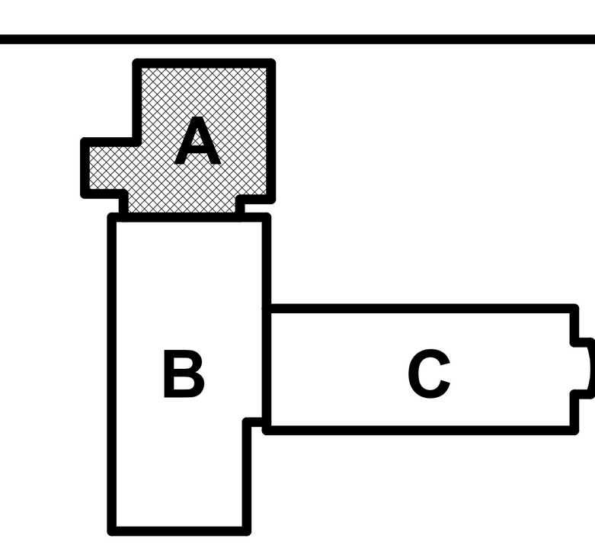


A6 Scale 1" = 10'-0" Site Plan

SHEET KEYNOTE LEGEND

03 30 00.A01	CAST-IN-PLACE CONCRETE
05 52 13.A01	STEEL PIPE AND TUBE RAILINGS
05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
33 46 00.A01	SUBDRAINAGE SYSTEM PIPING

KEY PLAN



hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI — KEVIN E. NELSON — A-2019015618 — ARCHITECT
Kevin E. Nelson
A-2019015618
September 29, 2023

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

AS101

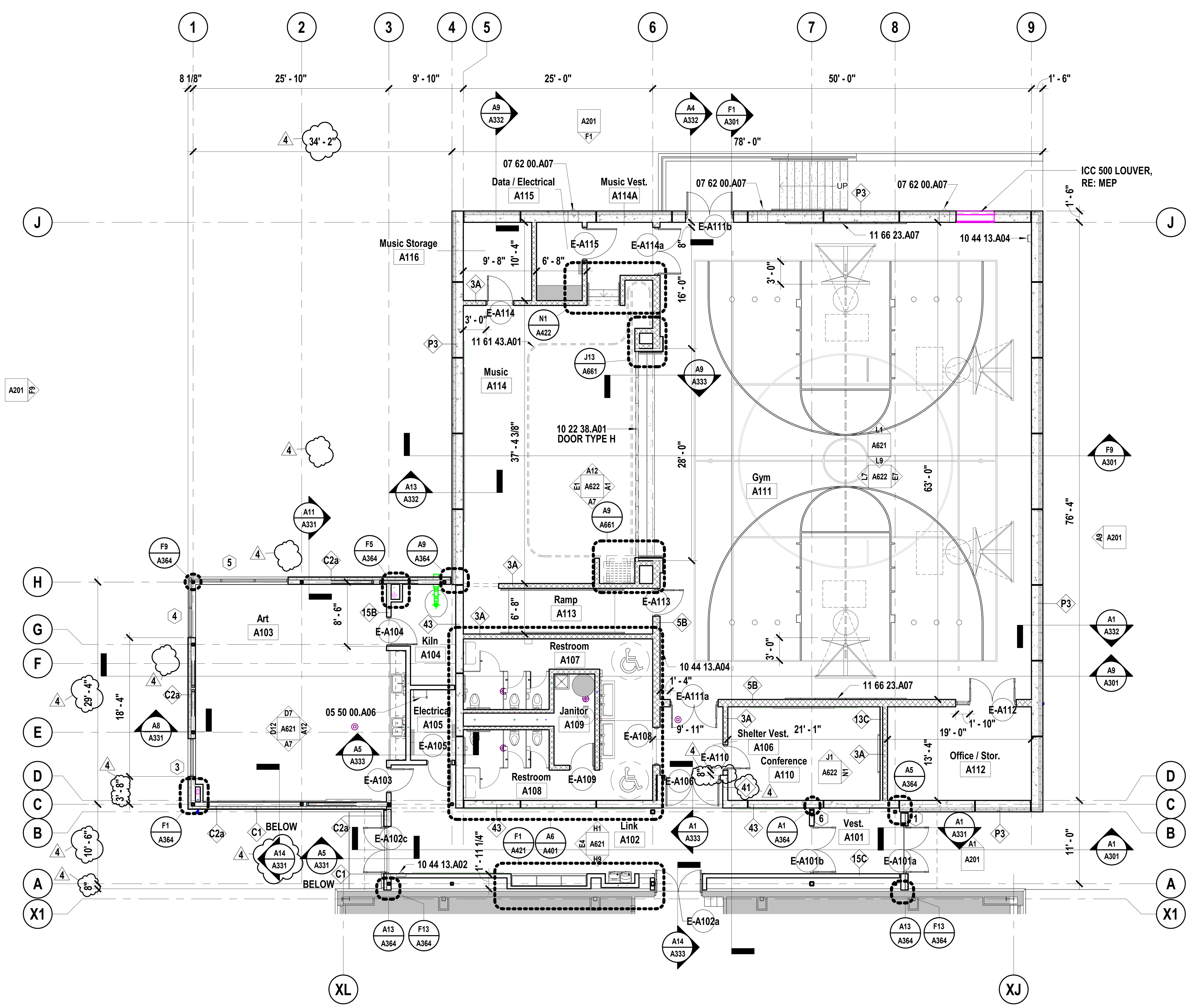
ARCHITECTURAL SITE PLAN

9/28/2023 4:12:48 PM

Please consider the environment before printing this.

SHEET KEYNOTE LEGEND

05 50 00.A06	METAL LADDER
07 62 00.A07	DOWNSPOUTS
10 22 38.A01	OPERABLE PANEL PARTITION (SINGLE PANEL)
10 44 13.A02	SEMI-RECESSED STEEL CABINET
10 44 13.A04	SURFACE MOUNTED STEEL CABINET
11 61 43.A01	STAGE CURTAINS
11 66 23.A07	WALL SAFETY PADS

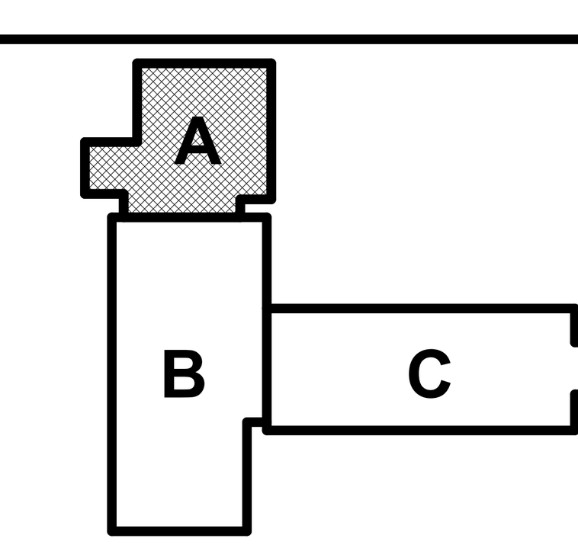


A6 | Scale 1/8" = 1'-0" | Area Floor Plan - Level 1 - Area A

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. DO NOT SCALE THIS DRAWING
3. ALL INTERIOR WALLS ARE WALL TYPE 3A UNLESS NOTED OTHERWISE.
4. ALL EXTERIOR WALLS ARE WALL TYPE P3 UNLESS NOTED OTHERWISE.
5. INTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   A. TO FACE OF STUD
   B. TO FACE OF MASONRY UNIT
   C. TO FACE OF DOOR AND WINDOW ROUGH OPENINGS
6. EXTERIOR DIMENSIONS ARE TO THE FOLLOWING, UNLESS NOTED OTHERWISE:
   A. TO FACE OF STUD
   B. TO FACE OF MASONRY UNIT
   C. TO FACE OF PRECAST
7. COORDINATE LOCATIONS WHERE BACKING IS REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, WALL HUNG ACCESSORIES AND TECHNOLOGY
8. COORDINATE WALL REPAIR AND INSTALLATION OF NEW DOORS AND WINDOWS WITH DEMOLITION SHEETS
9. COORDINATE FINISHES TO REMAIN WITH DEMOLITION SHEET
10. PRECAST PANEL JOINTS DIMENSIONSED ON SHEET A201 AND SHEET A422

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI — KEVIN E. NELSON — A-2019015618 — ARCHITECT
Kevin E. Nelson
A-2019015618
Sept. 29, 2023

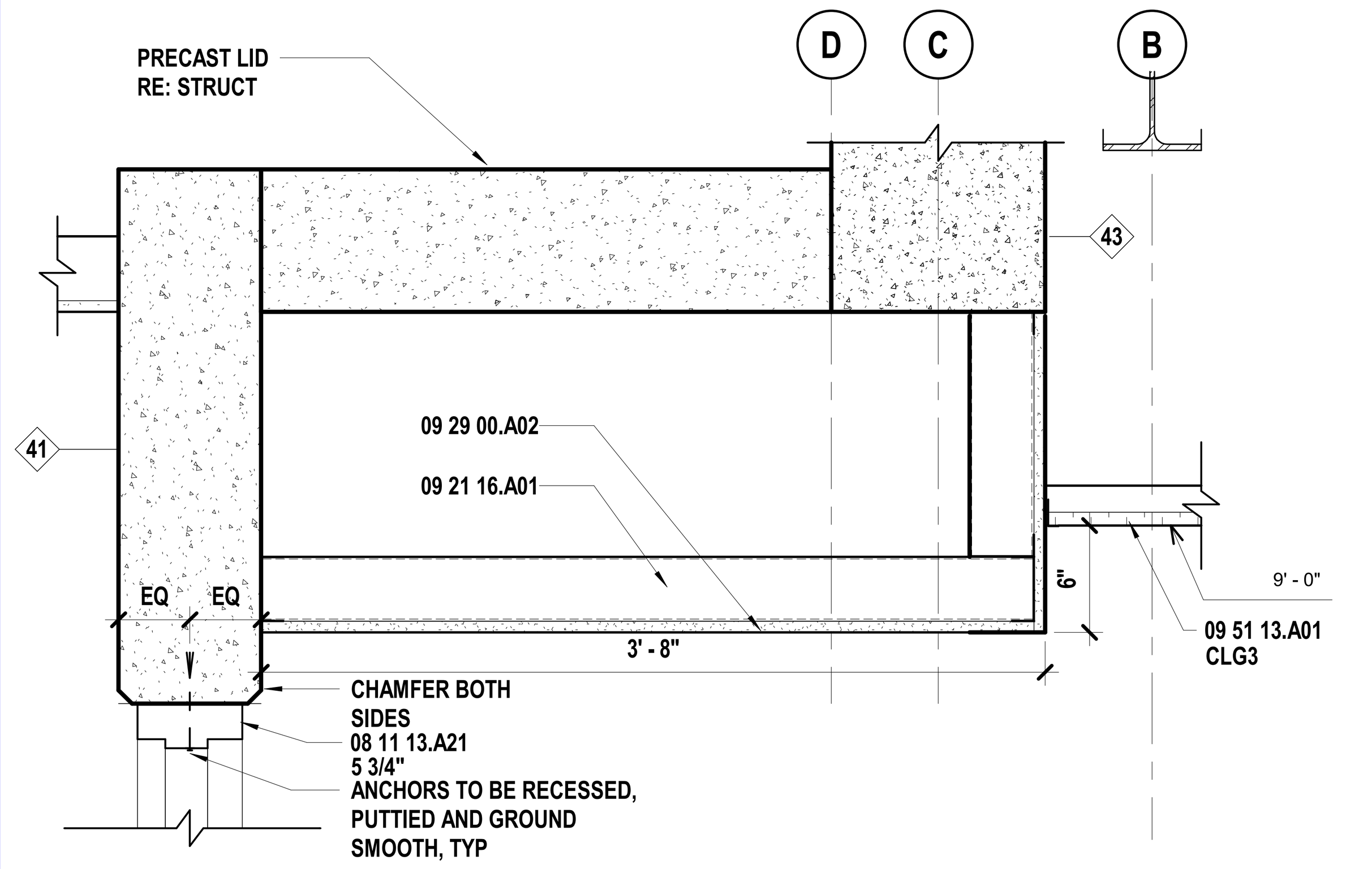
JOB NO: 23020.00
DRAWN BY: EW/HB
CHECKED BY: JB
DATE: 09/29/2023

A101A

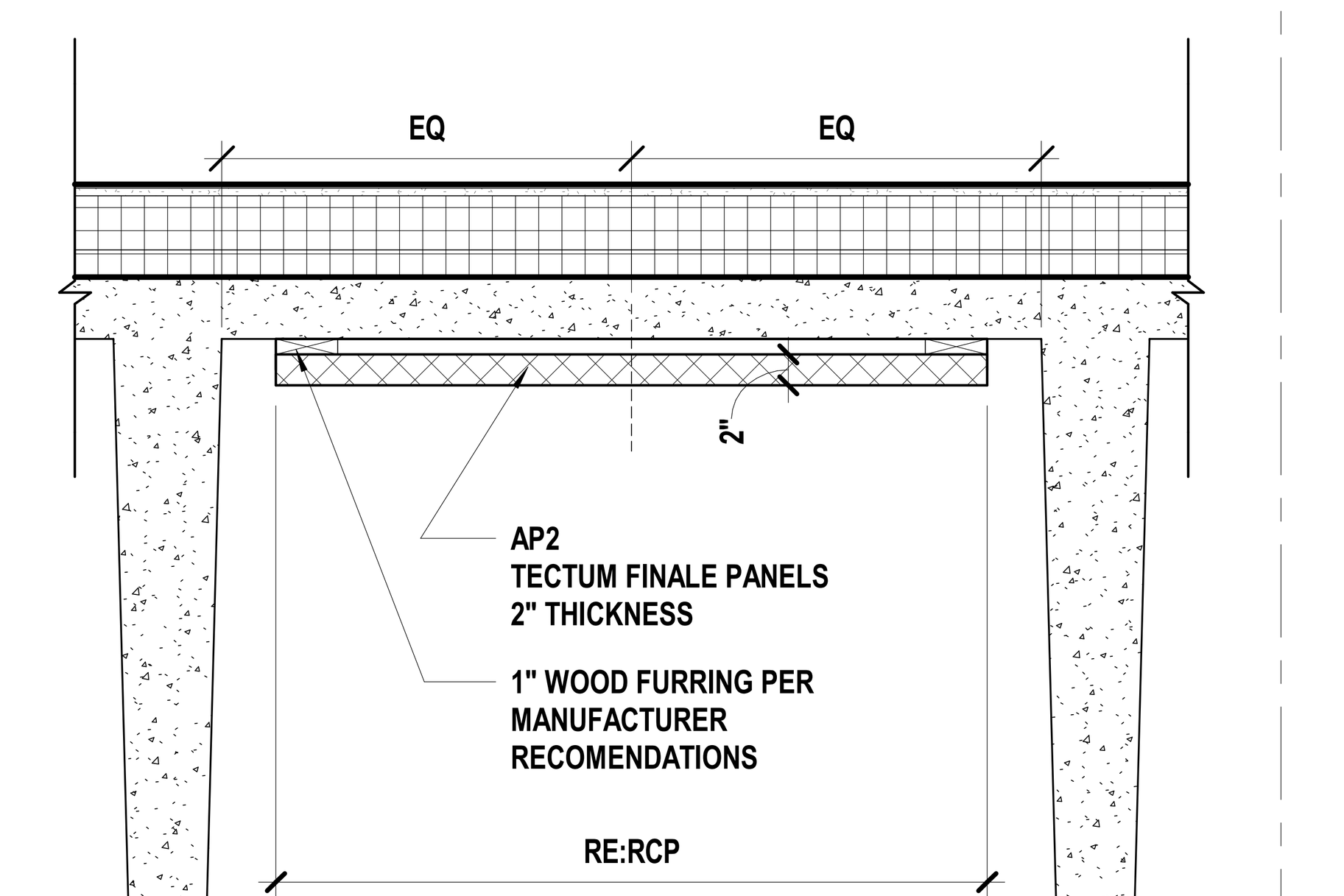
FLOOR PLAN - LEVEL 1 - AREA A

9/28/2023 4:12:51 PM

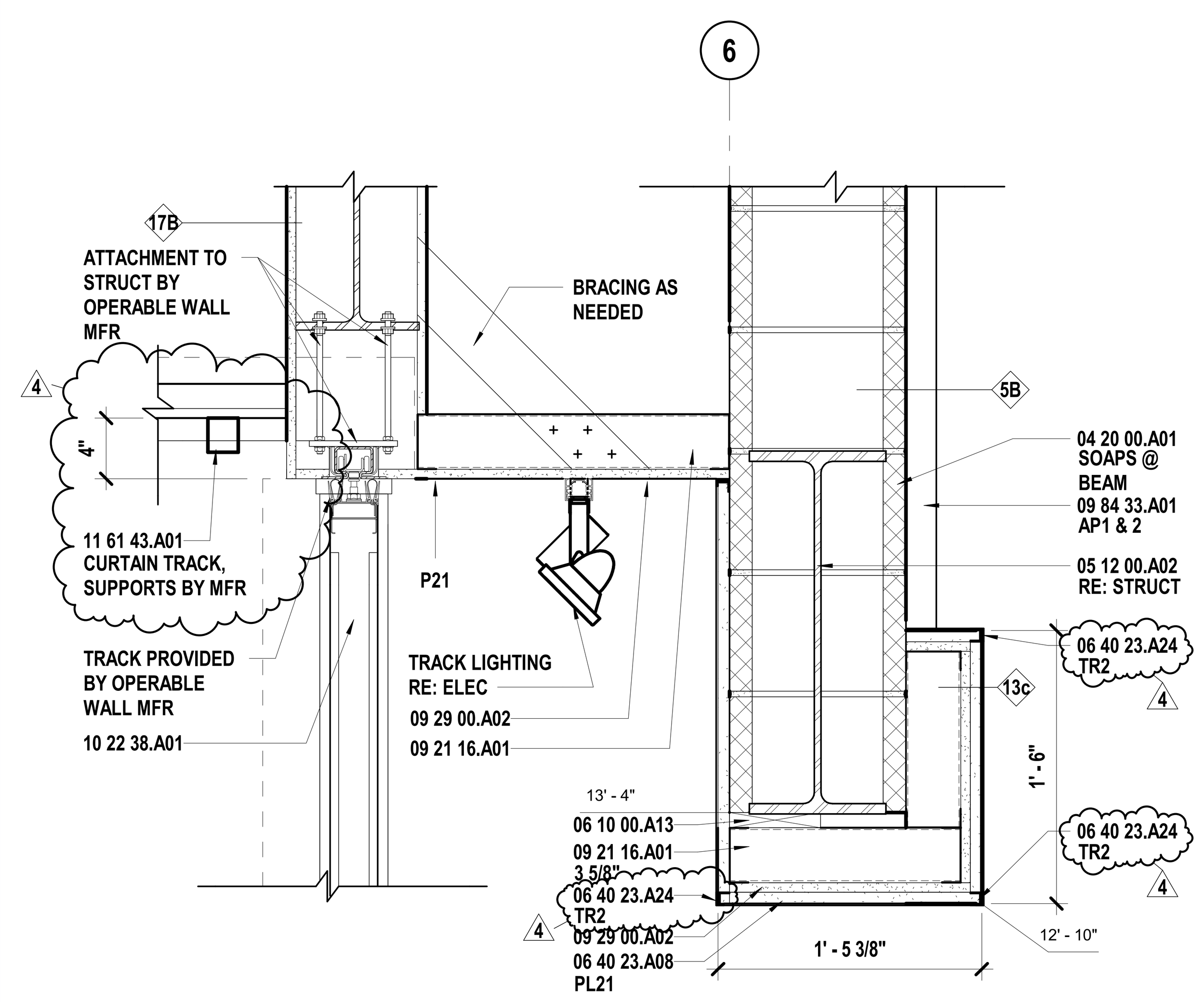
Please consider the environment before printing this.



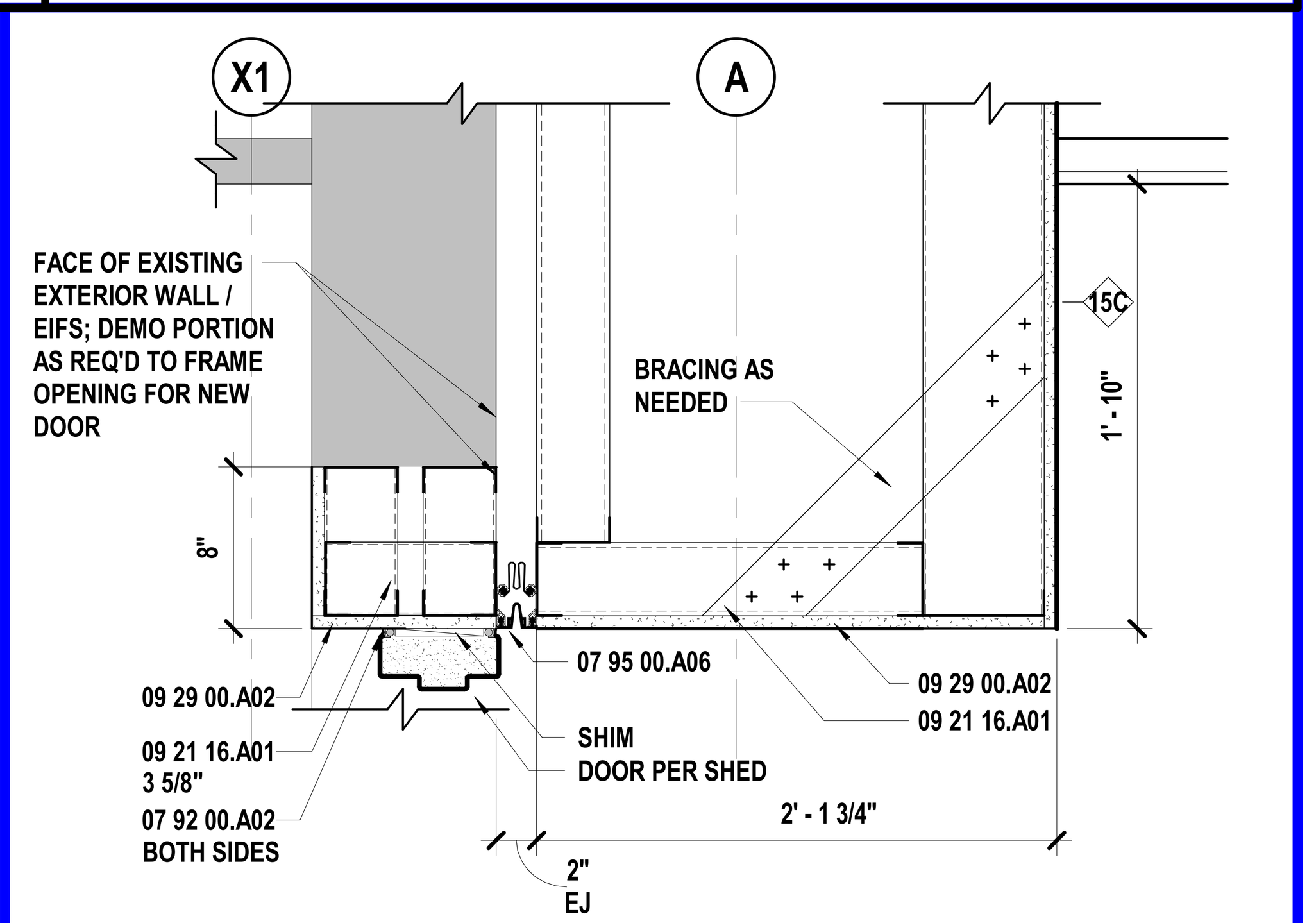
N8 Scale 1 1/2" = 1'-0" Ceiling Detail - Link to Gym Vestibule



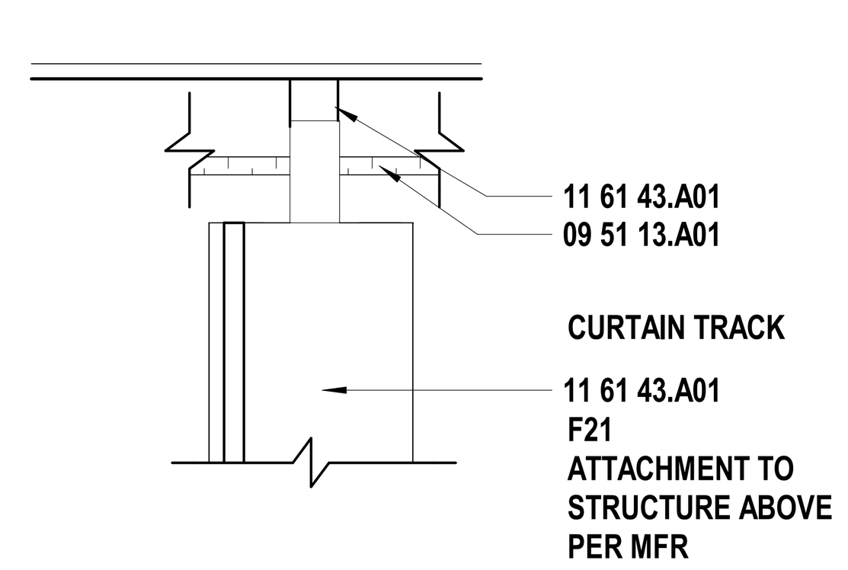
N13 Scale 1" = 1'-0" Ceiling Detail - Gym Acoustical Panels



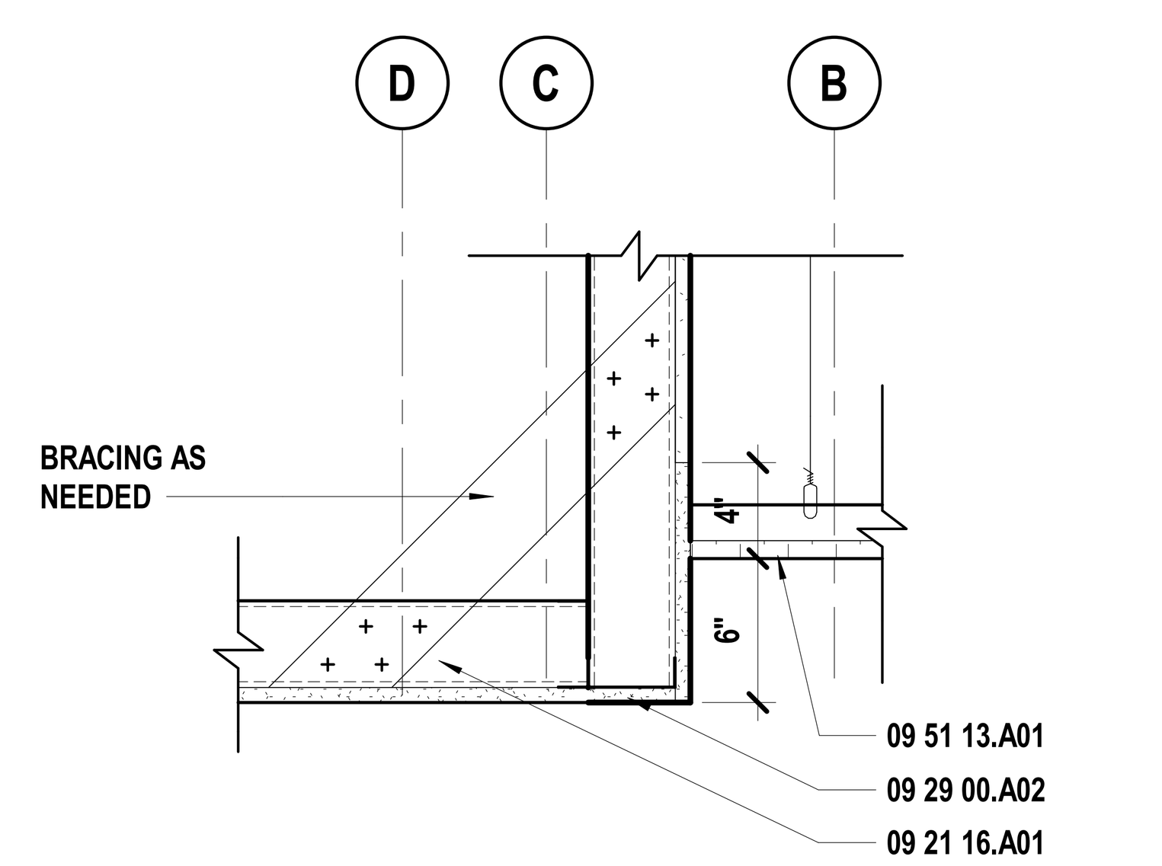
J4 Scale 1 1/2" = 1'-0" Ceiling Detail - Music Room Stage Opening



E4 Scale 1 1/2" = 1'-0" Ceiling Detail - Link to Existing Building



A1 Scale 1 1/2" = 1'-0" Ceiling Detail - Music Room Stage Curtain



A4 Scale 1 1/2" = 1'-0" Ceiling Detail - Link to Artroom Entry

A8 Scale 1/8" = 1'-0" Area RCP - Level 1 - Area A

SHEET KEYNOTE LEGEND

04 20 00.A01	CONCRETE MASONRY UNITS
05 12 00.A02	W SHAPE
06 10 00.A13	WOOD BLOCKING/NAILERS
06 40 23.A08	PLASTIC LAMINATE-CLAD PANELS
06 40 23.A24	METAL EDGE TRIM
07 42 13.A03	CONCEALED FASTENER METAL WALL PANELS
07 92 00.A02	SEALANT W/BACKER ROD
07 95 00.A06	WALL-TO-WALL JOINT SYSTEM
08 11 13.A21	HOLLOW METAL DOOR – HIGH WIND DOOR ASSEMBLY
09 21 16.A01	NON-STRUCTURAL FRAMING
09 29 00.A02	GYPSUM BOARD - TYPE X
09 51 13.A01	ACOUSTICAL CEILING PANELS
09 84 33.A01	SOUND-ABSORBING WALL PANELS
10 22 38.A01	OPERABLE PANEL PARTITION (SINGLE PANEL)
11 61 43.A01	STAGE CURTAINS

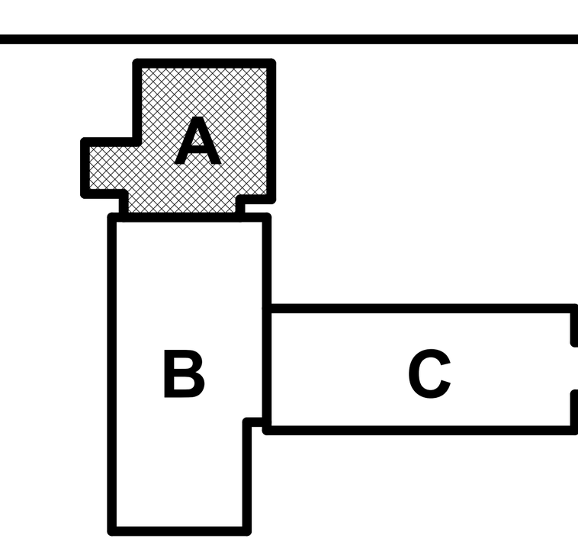
SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH
CLG2	Ceiling	White
CLG3	Ceiling	White
CLG5	Ceiling	White
CLG21	Ceiling	White
F21	Fabric	Bermuda
HP21	High Performance Coating	Natural Choice
HP22	High Performance Coating	Silver Grey
HP23	High Performance Coating	Adriatic Sea
HP24	High Performance Coating	Freshwater
HP25	High Performance Coating	Gentle Aquamarine
HP26	High Performance Coating	Grasshopper
HP27	High Performance Coating	Organic Green
HP28	High Performance Coating	Harvester
HP29	High Performance Coating	Serape
P21	Paint	Natural Choice
P22	Paint	Silver Grey
P23	Paint	Adriatic Sea
P24	Paint	Freshwater
P25	Paint	Gentle Aquamarine
P26	Paint	Grasshopper
P27	Paint	Organic Green
P28	Paint	Harvester
P29	Paint	Serape
P30	Paint	Iron Ore
P31	Paint	Virtual Green

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. REFER TO MEP AND TECHNOLOGY SHEETS FOR SPECIFIC CEILING MOUNTED DEVICES
3. CEILING GRIDS SHOULD BE CENTERED IN ROOM

KEY PLAN



hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

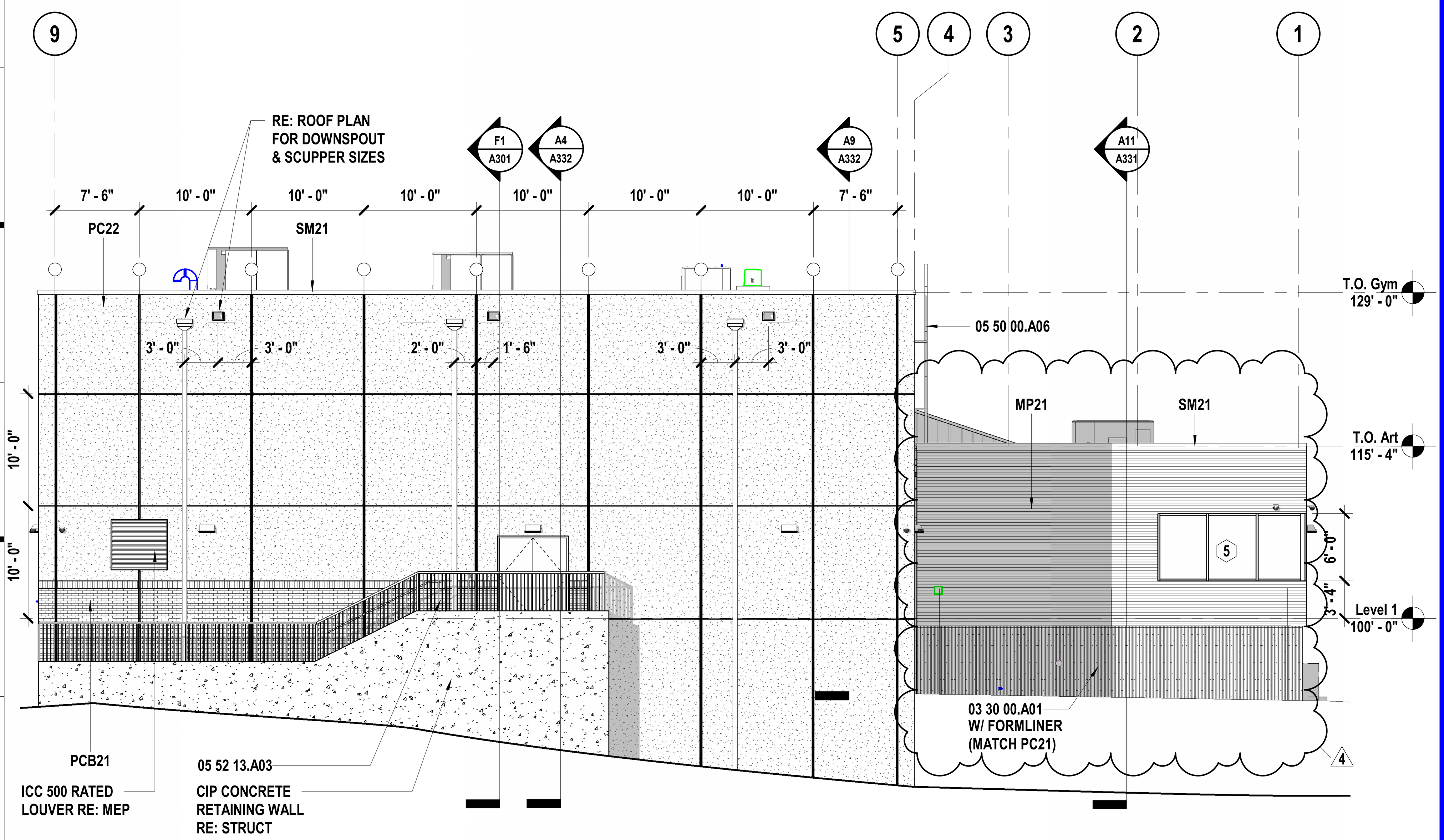
Kevin E. Nelson
A-2019015618
September 29, 2023

JOB NO: 23020.00
DRAWN BY: EW/HB
CHECKED BY: JB
DATE: 09/29/2023

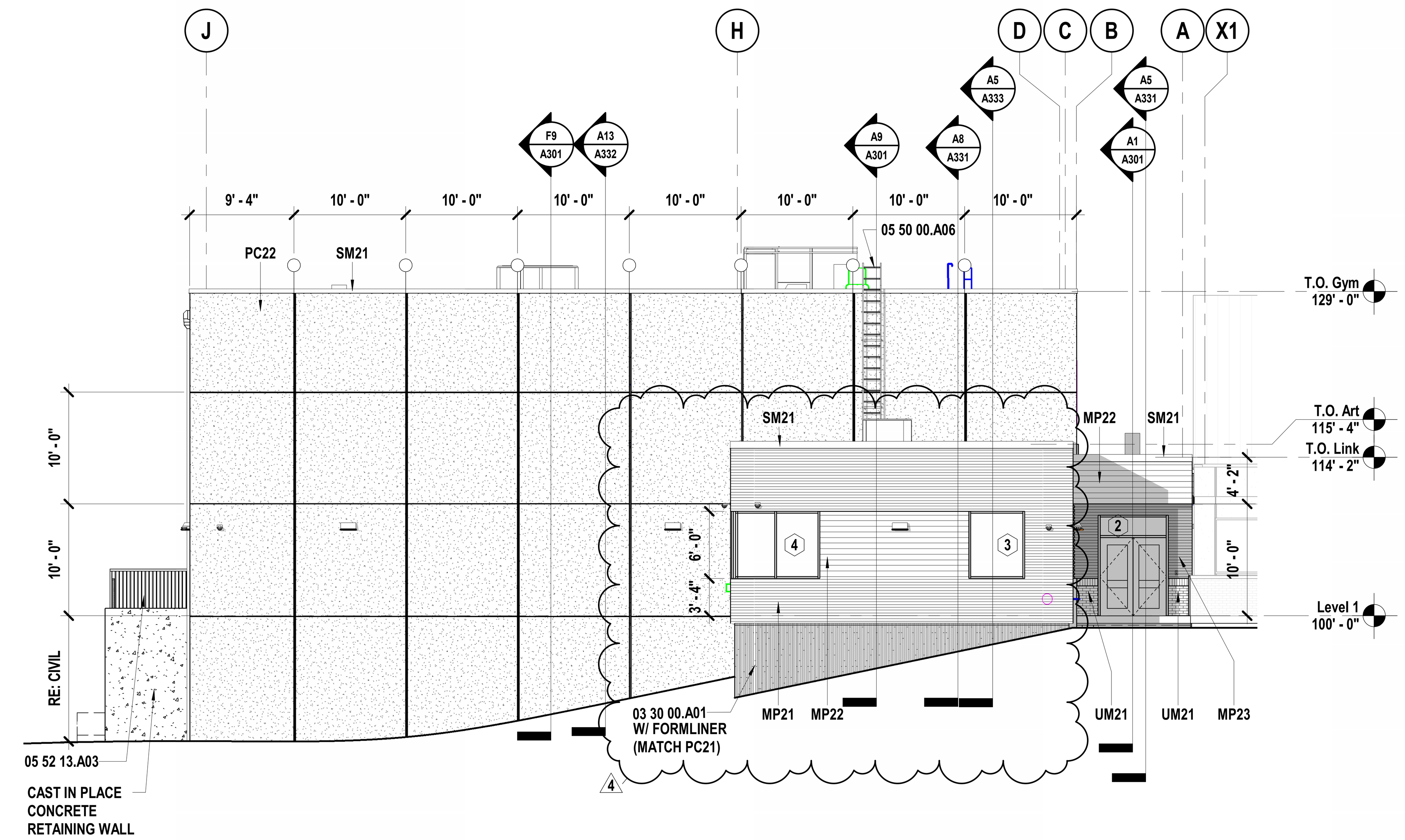
A121A

REFLECTED CEILING PLAN - LEVEL 1 - AREA A

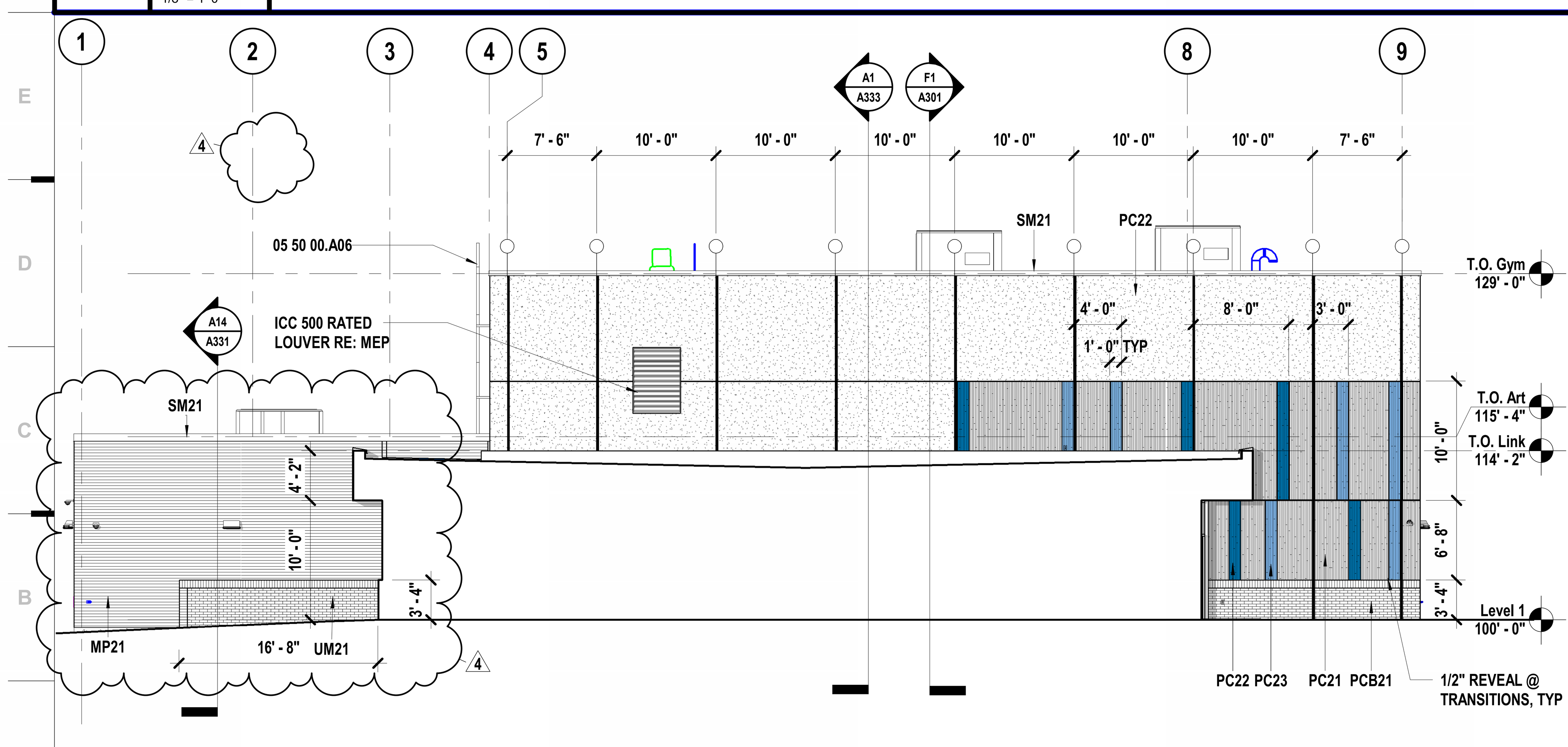
9/28/2023 4:12:57 PM



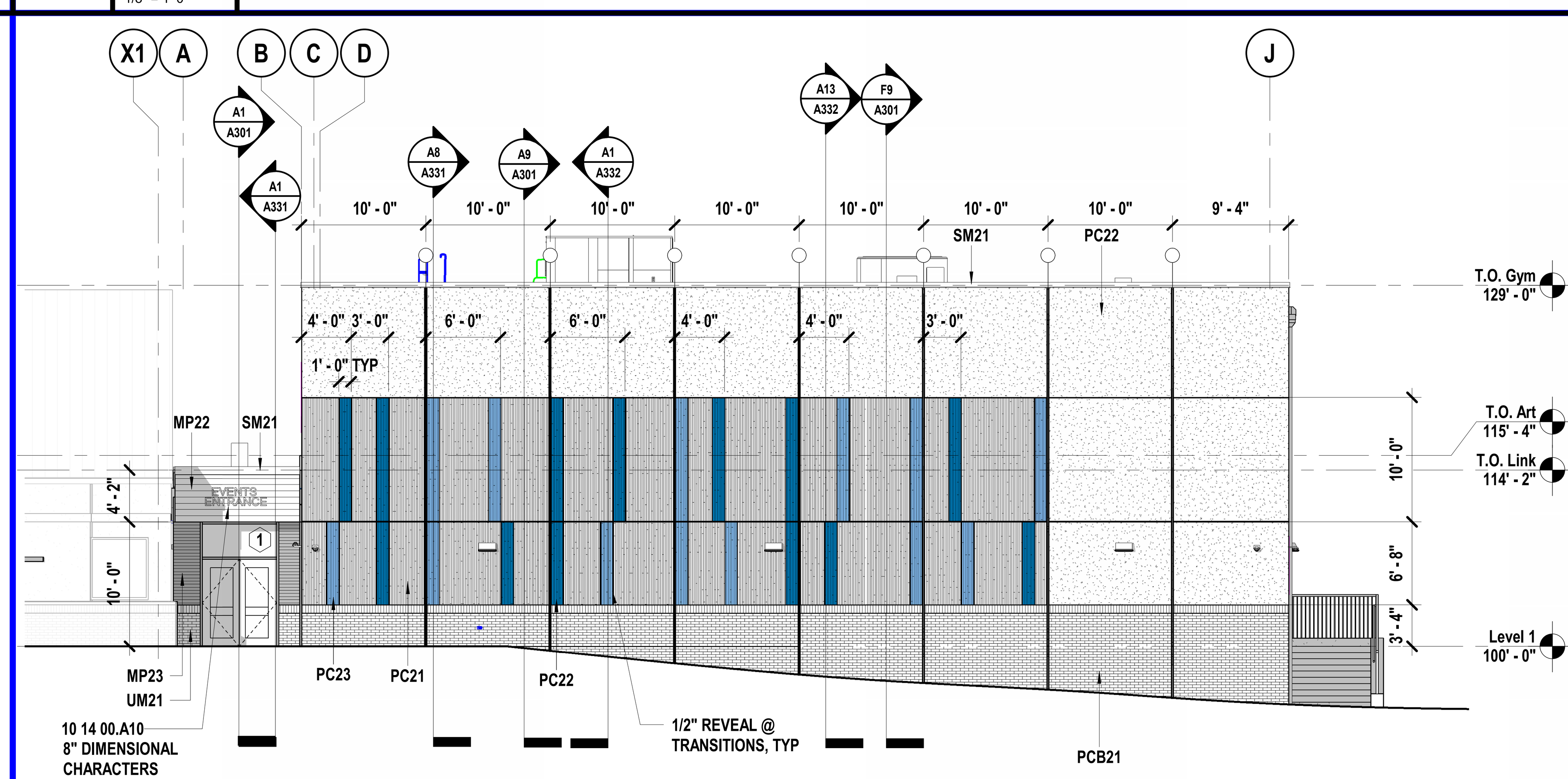
F1	Scale 1/8" = 1'-0"	Exterior Elevation - North



F9	Scale 1/8" = 1'-0"	Exterior Elevation - West



A1	Scale 1/8" = 1'-0"	Exterior Elevation - South



A9	Scale 1/8" = 1'-0"	Exterior Elevation - East

SHEET KEYNOTE LEGEND

03 30 00.A01	CAST-IN-PLACE CONCRETE
03 41 00.A03	BRICK-FACED PRECAST STRUCTURAL CONCRETE
03 41 00.A21	ABRASIVE-BLAST FINISH
03 41 00.A26	FORMLINER FINISH
05 50 00.A06	METAL LADDER
05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
07 42 13.A03	CONCEALED FASTENER METAL WALL PANELS
07 62 00.A13	COPING
08 41 13	ALUMINUM FRAMED ENTRANCES AND STOREFRONTS
09 97 23.A01	CONCRETE AND MASONRY COATINGS
10 14 00.A10	NON-ILLUMINATED

EXTERIOR MATERIAL LEGEND

PCB21 = PRECAST W/ THIN BRICK
03 41 00.A03 BRICK-FACED PRECAST STRUCTURAL CONCRETE
BOD: METROBRICK
COLOR: #320 SCHOOLHOUSE RED
SIZE/ PATTERN: MODULAR SIZE, RUNNING BOND
RE: ELEVATIONS FOR SOLDIER COURSE LOCATIONS

PC21 = PRECAST W/ FORMLINER
03 41 00.A26 FORMLINER FINISH
BOD: AP FORMLINERS, 315-M BRAINTREE
COLOR: INTEGRAL COLOR BUFF, MATCH ARCHITECTS SAMPLE
FINISH: LIGHT SANDBLAST

PC22 = PRECAST W/ MEDIUM SANDBLAST
03 41 00.A21 ABRASIVE-BLAST FINISH
BOD: CORESLAB SAMPLE
COLOR: INTEGRAL COLOR BUFF, MATCH ARCHITECTS SAMPLE
FINISH: MEDIUM SANDBLAST, EXPOSED AGGREGATE

PC23 = PRECAST W/ POST APPLIED STAIN
03 41 00.A26 FORMLINER FINISH W/
09 97 23.A01 CONCRETE AND MASONRY COATINGS
BOD: CORESLAB SAMPLE
COLOR: INTEGRAL COLOR BUFF, MATCH ARCHITECTS SAMPLE
STAIN: KEIM DESIGN LASUR, COLOR TO MATCH SW 6509 GEORGIAN BAY

PC24 = PRECAST W/ POST APPLIED STAIN
03 41 00.A26 FORMLINER FINISH W/
09 97 23.A01 CONCRETE AND MASONRY COATINGS
BOD: CORESLAB SAMPLE
COLOR: INTEGRAL COLOR BUFF, MATCH ARCHITECTS SAMPLE
STAIN: KEIM DESIGN LASUR, COLOR NR 9448

MP21 = METAL PANEL TYPE 1
07 42 13.A03 CONCEALED FASTENER METAL WALL PANELS
BOD: MORIN MATRIX MX-1
COLOR: REGAL BLUE
SIZE/ PATTERN: HORIZONTAL

MP22 = METAL PANEL TYPE 2
07 42 13.A03 CONCEALED FASTENER METAL WALL PANELS
BOD: MORIN MATRIX MX-10
COLOR: REGAL BLUE
SIZE/ PATTERN: HORIZONTAL

MP23 = METAL PANEL TYPE 3
07 42 13.A03 CONCEALED FASTENER METAL WALL PANELS
BOD: MORIN MATRIX MX-10
COLOR: SILVERSMITH
SIZE/ PATTERN: HORIZONTAL

SM21 = SHEET METAL TYPE 1
07 62 00.A13 COPING
BOD: N/A
COLOR: MATCH MP1 & MP2
SIZE/ PATTERN: PER DETAILS

UM21 = UNIT MASONRY TYPE 1
BOD: CLOUD CERAMICS
COLOR: BURGANDY SHADOWTEX
SIZE/ PATTERN: MODULAR SIZE, RUNNING BOND
RE: ELEVATIONS FOR SOLDIER COURSE LOCATIONS

AS1 = ALUMINUM FRAMES
08 41 13 ALUMINUM FRAMED ENTRANCES AND STOREFRONTS
BOD: KAWNEER
COLOR: ANODIZED ALUMINUM

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. DO NOT SCALE THIS DRAWING
3. WALL MOUNTED LIGHT FIXTURES, LAMBS TONGUES AND OTHER MEP ITEMS ARE SHOWN FOR PLACEMENT ONLY

hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM

MKEC Engineering, Inc.
Civil Engineer
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

Kevin E. Nelson
A-2019015618
Sept 29, 2023

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

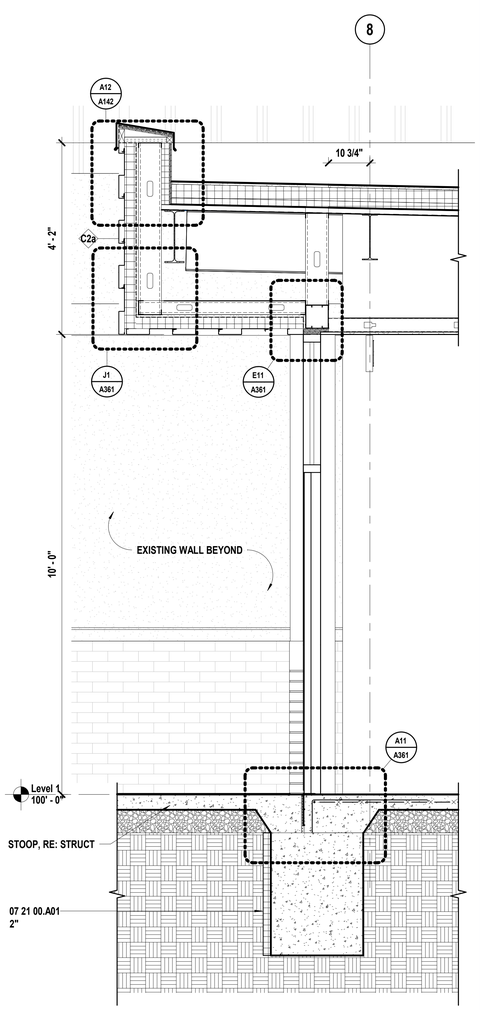
A201

EXTERIOR ELEVATIONS

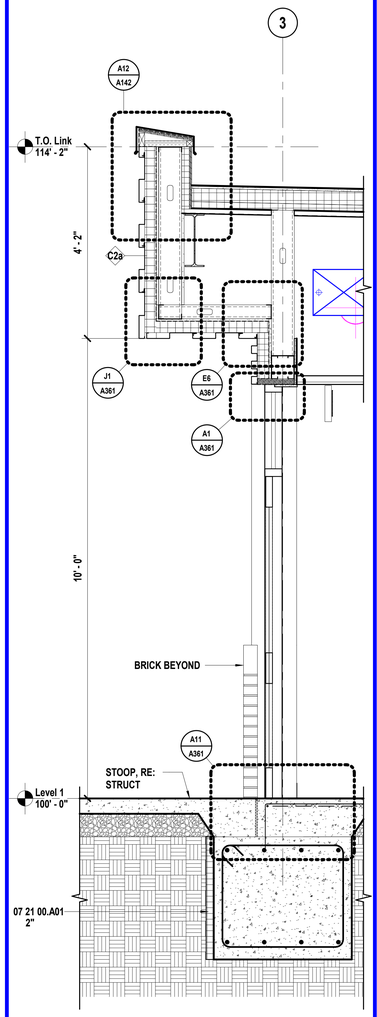
9/29/2023 1:08:49 PM

SHEET KEYNOTE LEGEND

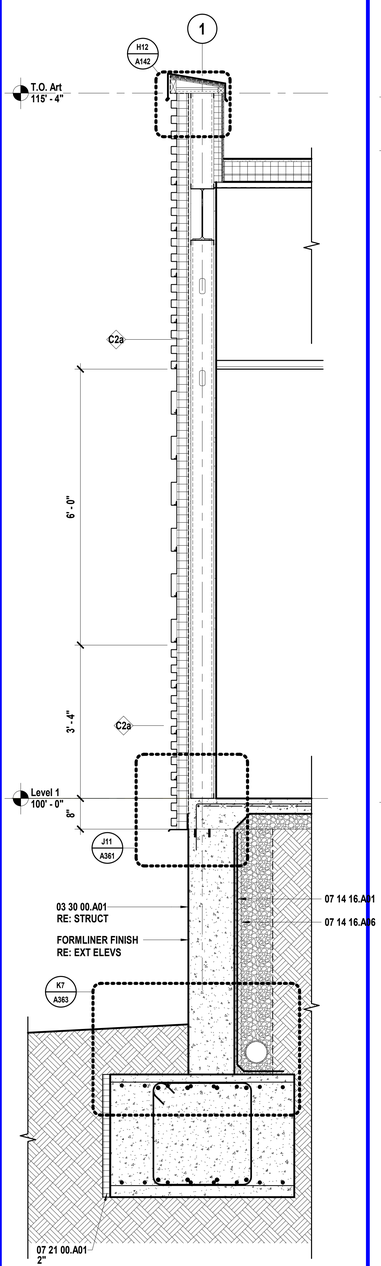
03 30 00.A01	CAST-IN-PLACE CONCRETE
07 14 16.A01	COLD FLUID-APPLIED WATERPROOFING
07 14 16.A06	MOLDED SHEET DRAINAGE PANELS
07 21 00.A01	EXTRUDED POLYSTYRENE BOARD INSULATION



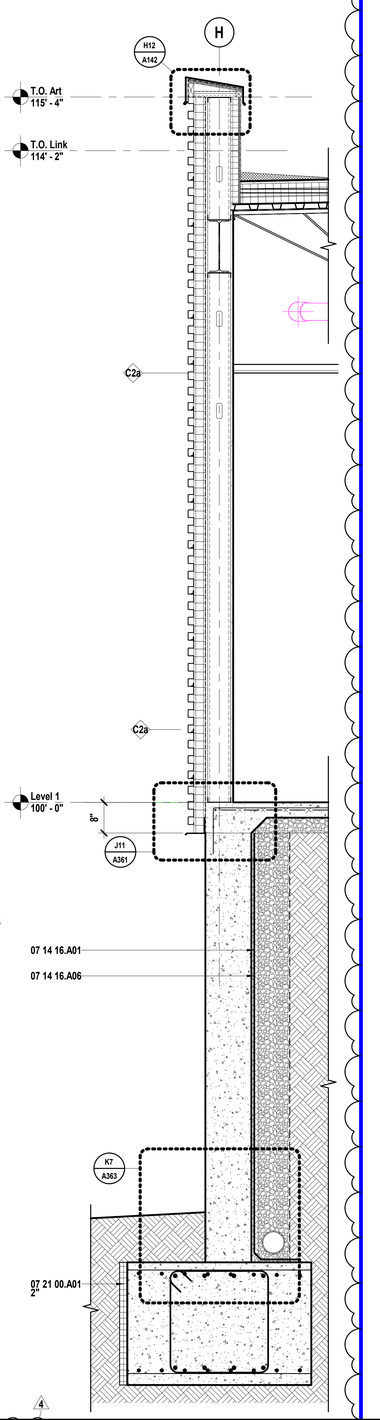
A1 Scale 3/4" = 1'-0" Wall Section - Vestibule E



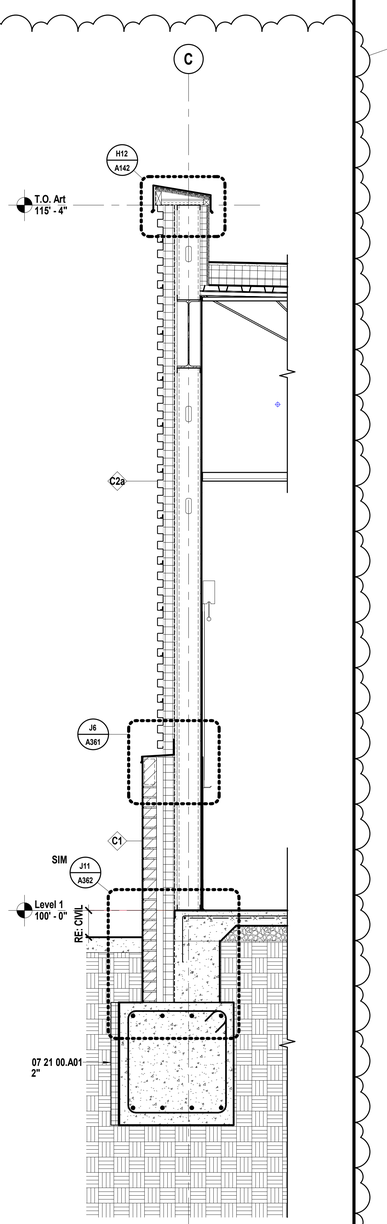
A5 Scale 3/4" = 1'-0" Wall Section - Link W



A8 Scale 3/4" = 1'-0" Wall Section - Art W



A11 Scale 3/4" = 1'-0" Wall Section - Art N



A14 Scale 3/4" = 1'-0" Wall Section - Art S

hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

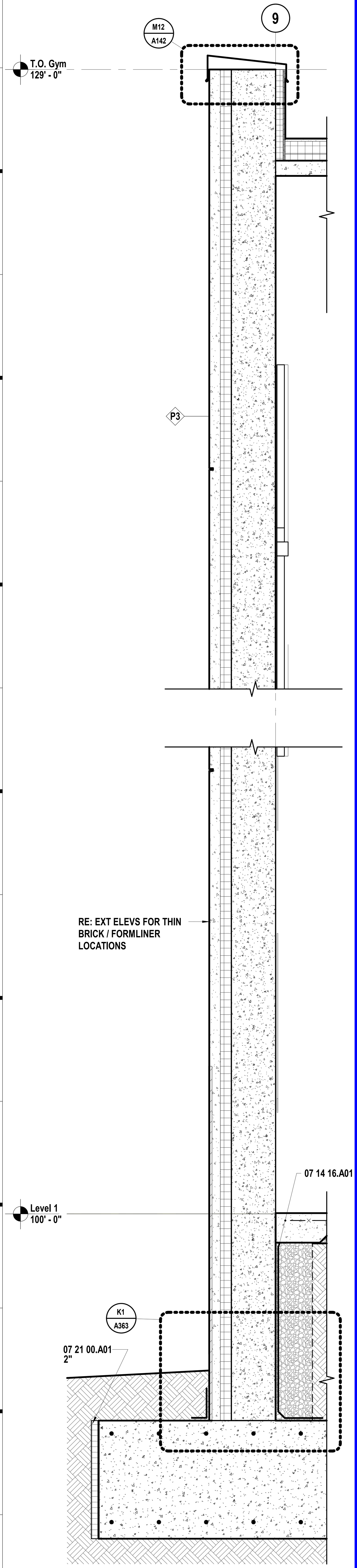
Kevin E. Nelson
A-2019015618
SEPTEMBER 29, 2023

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

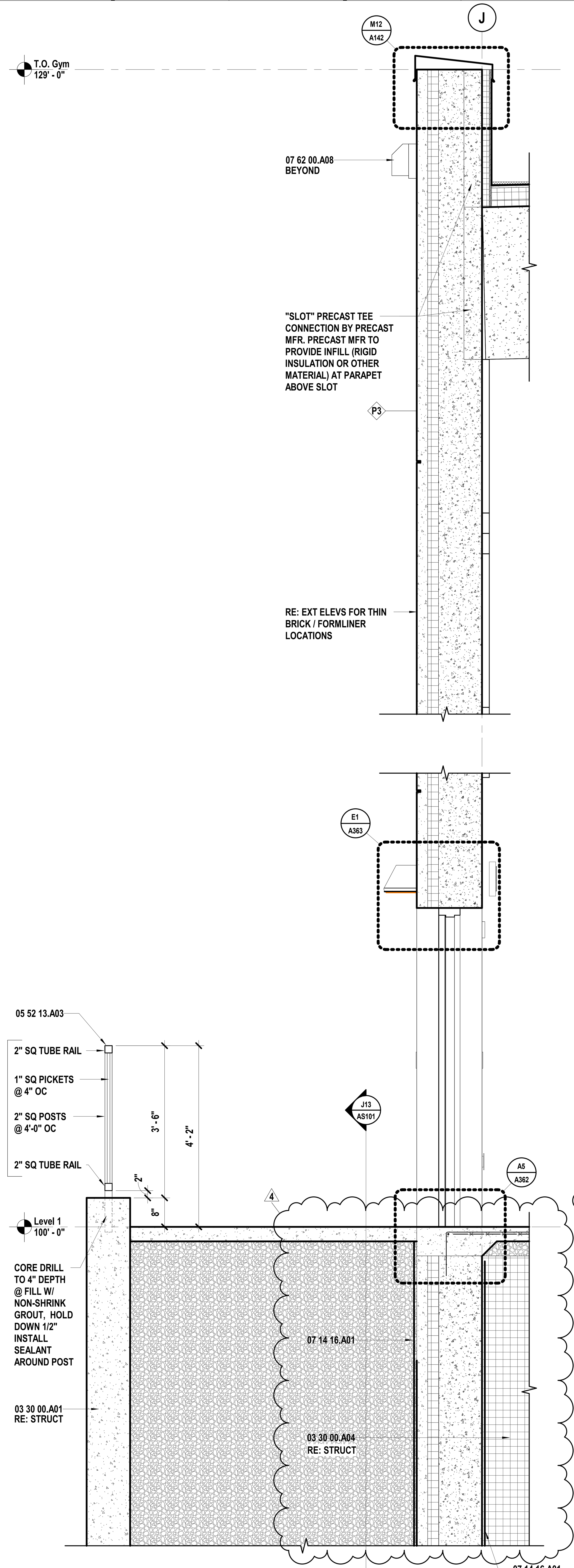
A331

WALL SECTIONS

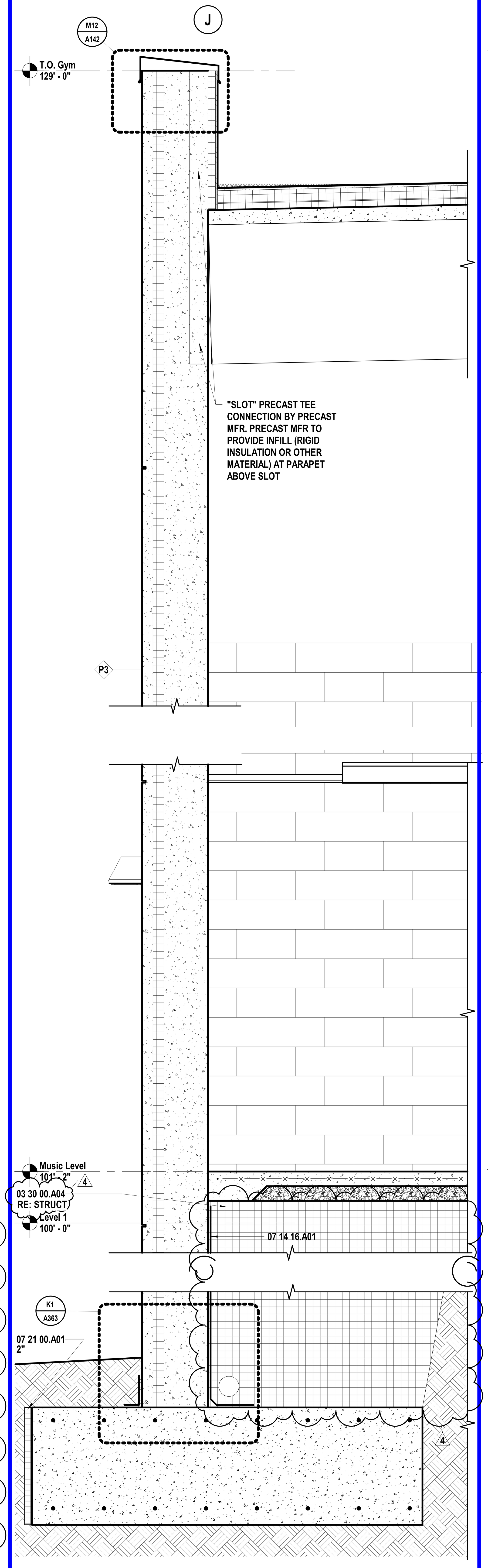
9/28/2023 4:19:03 PM



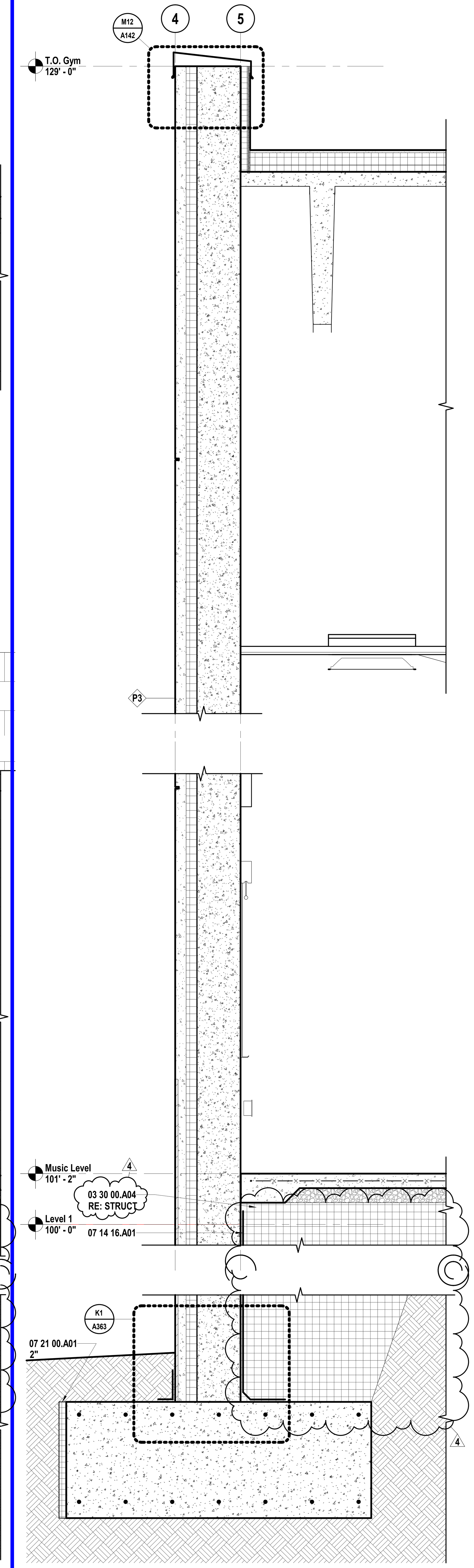
A1	Scale 3/4" = 1'-0"	Wall Section - Shelter E



A4	Scale 3/4" = 1'-0"	Wall Section - Shelter @ CIP Stair N



A9	Scale 3/4" = 1'-0"	Wall Section - Shelter/Music N



A13	Scale 3/4" = 1'-0"	Wall Section - Shelter/Music W

SHEET KEYNOTE LEGEND

03 30 00.A01	CAST-IN-PLACE CONCRETE
03 30 00.A04	FOAM VOID FILL
05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
07 14 16.A01	COLD FLUID-APPLIED WATERPROOFING
07 21 00.A01	EXTRUDED POLYSTYRENE BOARD INSULATION
07 62 00.A08	SCUPPERS

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPiC Elementary Storm Shelter Addition

Liberty Public Schools

650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

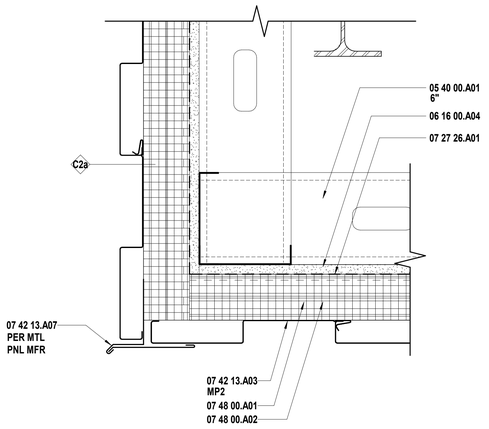
September 29, 2023

Kevin E. Nelson
A-2019015618

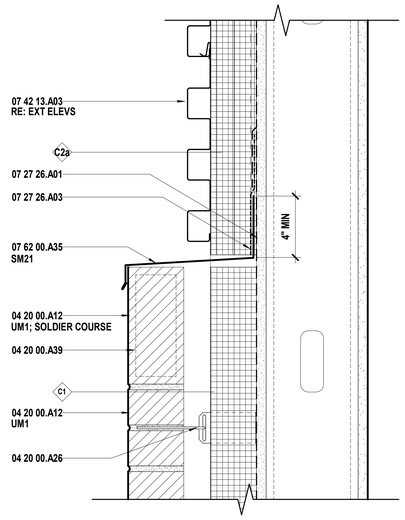
JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

A332

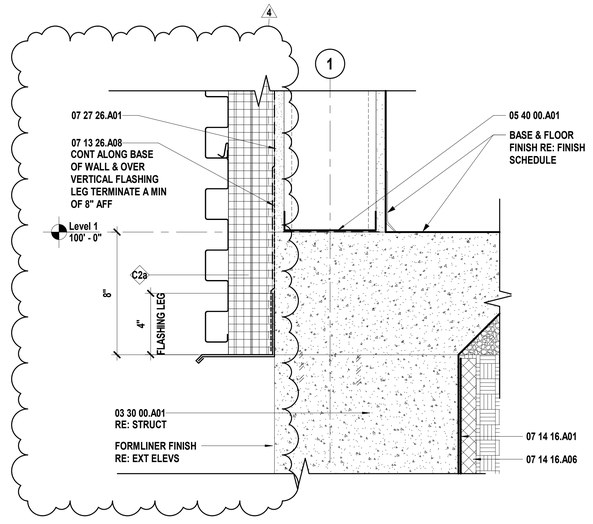
WALL SECTIONS



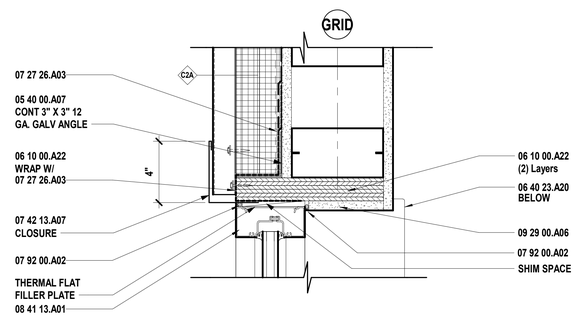
J1 | Scale 3" = 1'-0" | Exterior Detail - Mtl Panel Soffit - Outside Corner



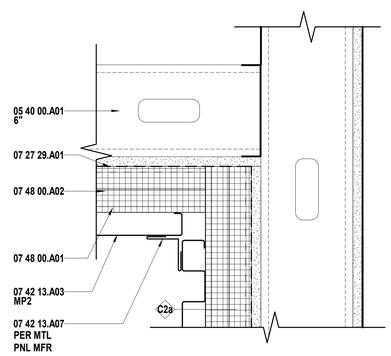
J6 | Scale 3" = 1'-0" | Exterior Detail - Wall Type C2a @ Wall Type C1



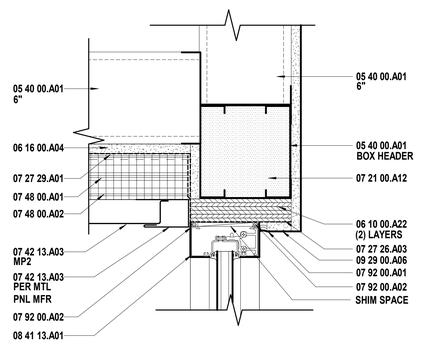
J11 | Scale 3" = 1'-0" | Exterior Detail - Slab Edge @ CIP/Dropped Footing



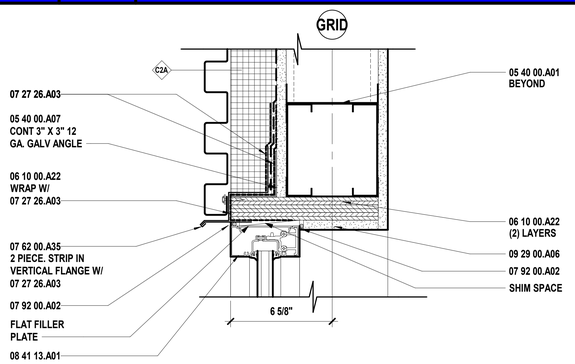
E1 | Scale 3" = 1'-0" | Exterior Detail - Wall Type C2A (Horiz Panel) Storefront Jamb



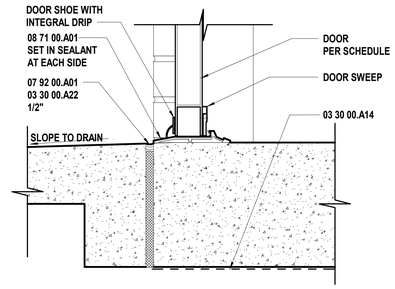
E6 | Scale 3" = 1'-0" | Exterior Detail -Mtl Pnl Inside Corner



E11 | Scale 3" = 1'-0" | Exterior Detail - Storefront Head @ Soffit



A1 | Scale 3" = 1'-0" | Exterior Detail - Wall Type C2A (Horiz Panel) Storefront Head @ Openings 6'-8" o Less



A11 | Scale 3" = 1'-0" | Threshold @ Exterior Door

SHEET KEYNOTE LEGEND

03 30 00.A01	CAST-IN-PLACE CONCRETE
03 30 00.A14	VAPOR RETARDERS
04 20 00.A12	FACE BRICK
04 20 00.A26	ADJUSTABLE MASONRY VENEER ANCHORS
04 20 00.A39	WEEP HOLE/VENT
05 40 00.A01	COLD-FORMED METAL FRAMING
05 40 00.A07	MISCELLANEOUS FRAMING/FURRING
06 10 00.A22	PRESERVATIVE TREATED PLYWOOD BLOCKING
06 16 00.A04	GLASS-MAT GYPSUM WALL SHEATHING
06 40 23.A20	SOLID SURFACE SILLS
07 13 26.A08	MOISTURE BARRIER
07 14 16.A01	COLD FLUID-APPLIED WATERPROOFING
07 14 16.A06	MOLDED SHEET DRAINAGE PANELS
07 21 00.A12	SPRAY-IN FOAM INSULATION
07 27 26.A01	VAPOR RETARDING FLUID-APPLIED AIR BARRIER
07 27 26.A03	TRANSITION MEMBRANE
07 27 29.A01	
07 42 13.A03	CONCEALED FASTENER METAL WALL PANELS
07 42 13.A07	FLASHING AND TRIM
07 48 00.A01	RAINSCREEN FURRING SYSTEM
07 48 00.A02	RAINSCREEN FURRING SYSTEM INSULATION
07 62 00.A35	PRE-FINISHED MISC METAL FLASHING
07 92 00.A01	SEALANT
07 92 00.A02	SEALANT W/BACKER ROD
08 41 13.A01	THERMAL BROKEN STOREFRONT FRAMING (4.5")
08 71 00.A01	THRESHOLDS
09 29 00.A06	MOLD AND MOISTURE RESISTANT GYPSUM BOARD

hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E NELSON
A-2019015618
ARCHITECT

SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

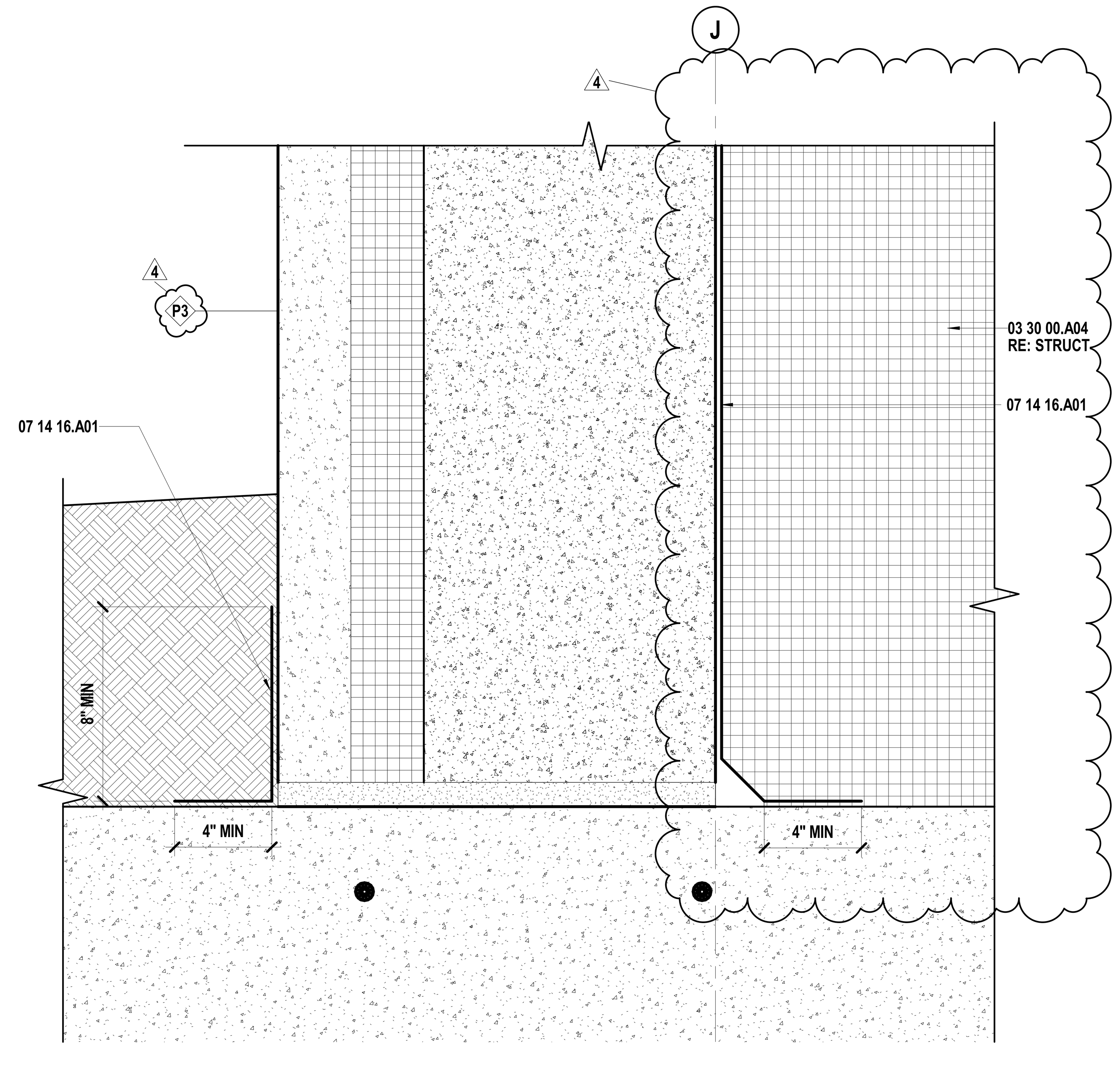
A361

EXTERIOR DETAILS

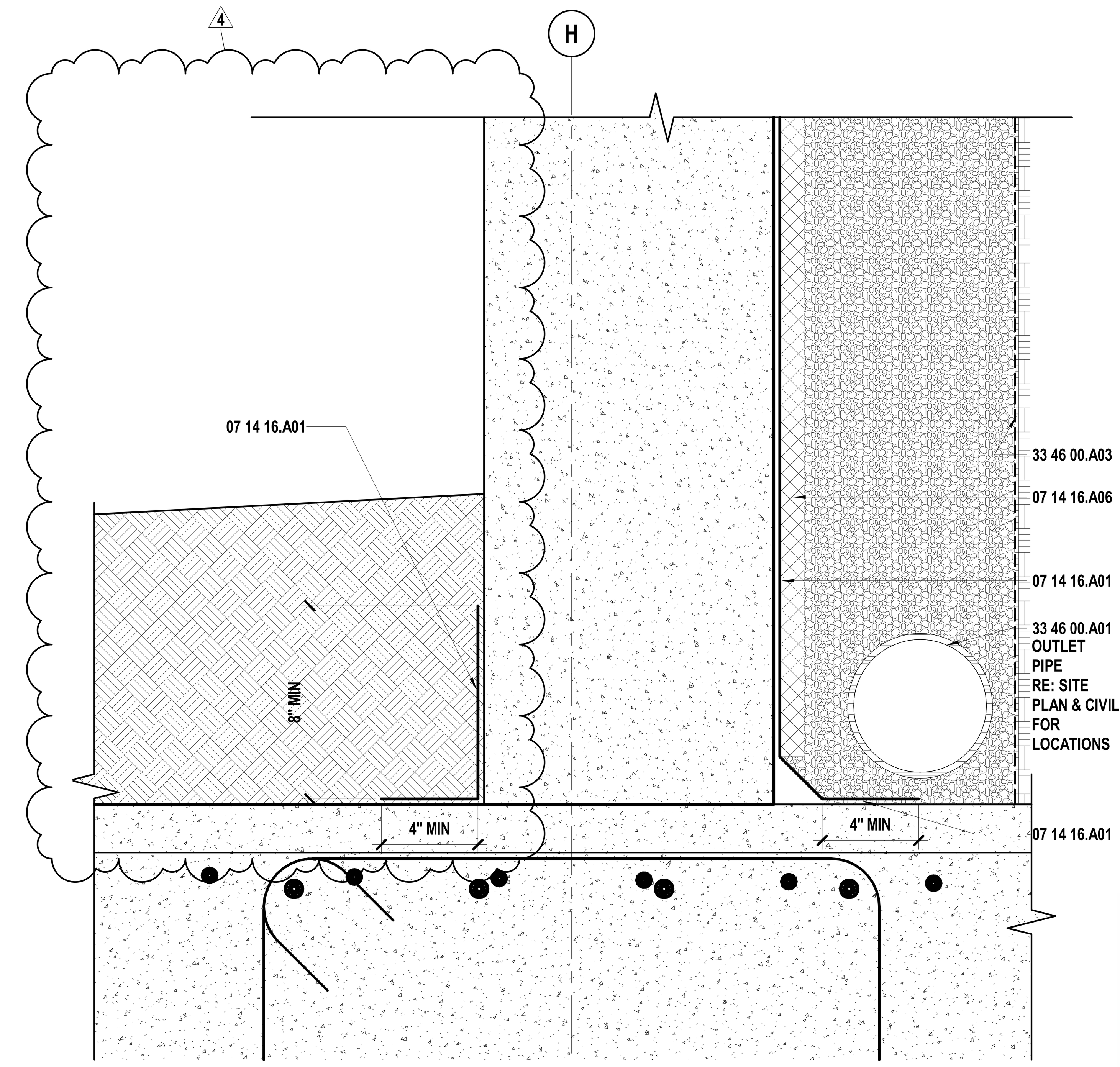
9/28/2023 4:13:25 PM

SHEET KEYNOTE LEGEND

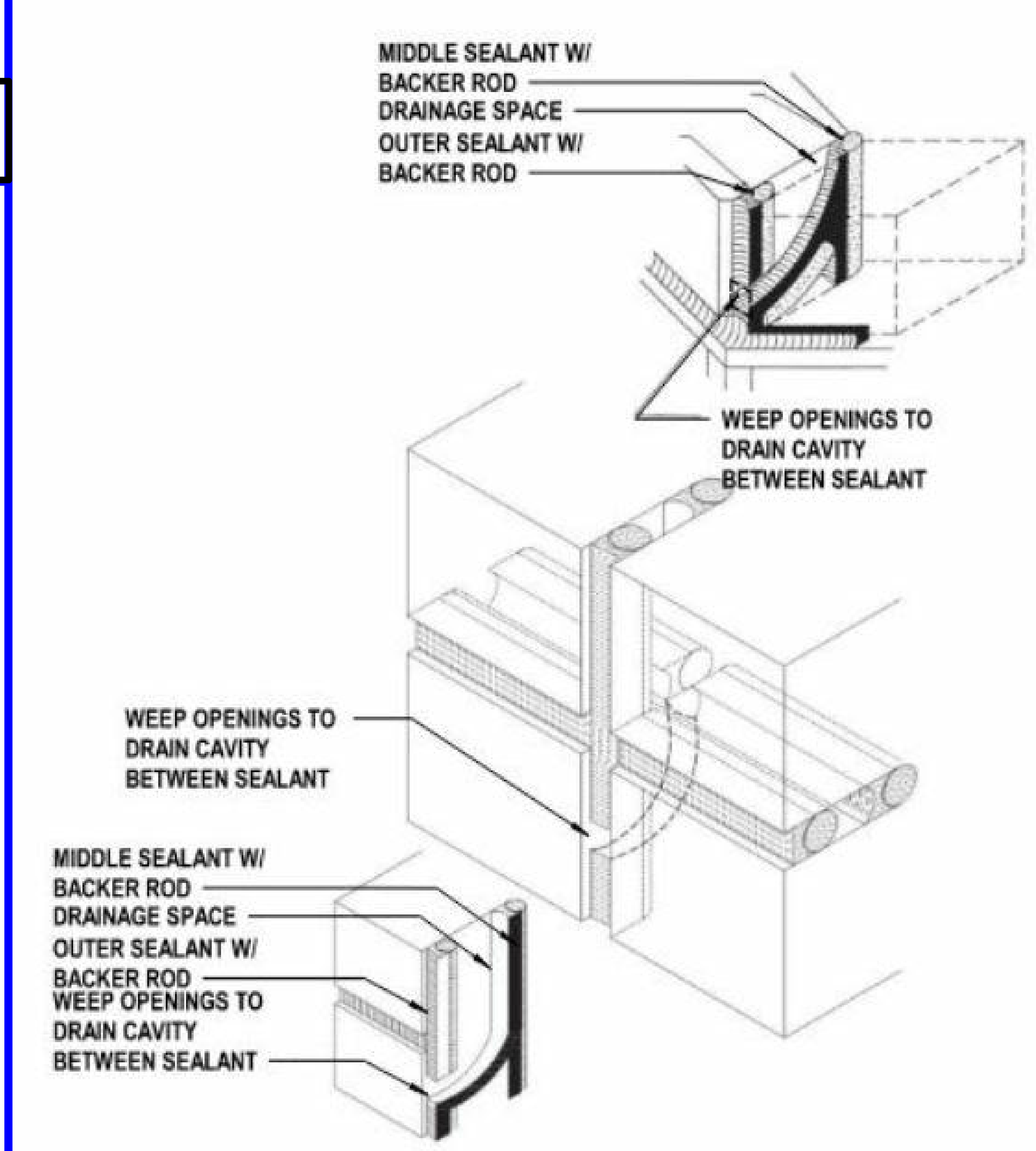
03 30 00.A04	FOAM VOID FILL
07 14 16.A01	COLD FLUID-APPLIED WATERPROOFING
07 14 16.A03	REINFORCING FABRIC
07 14 16.A04	WATERPROOFING FILLER
07 14 16.A06	MOLDED SHEET DRAINAGE PANELS
07 92 00.A02	SEALANT W/BACKER ROD
07 95 00.A23	PRE-FORMED CELLULAR FOAM SECONDARY SEAL
33 46 00.A01	SUBDRAINAGE SYSTEM PIPING
33 46 00.A03	GEOTEXTILE FILTER FABRICS

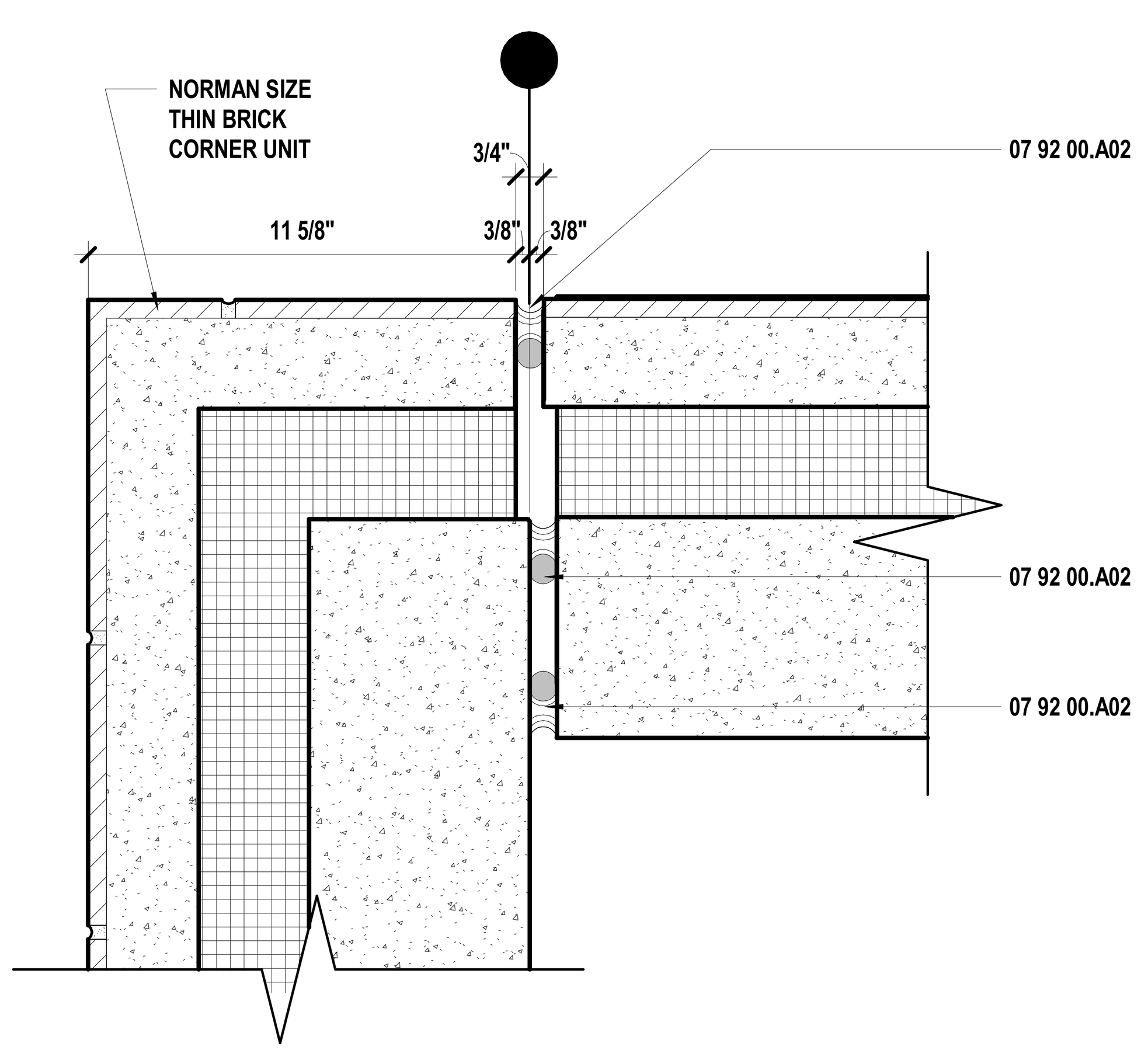


K1 Scale 3" = 1'-0" Exterior Detail - Base of Wall @ Precast/Retaining

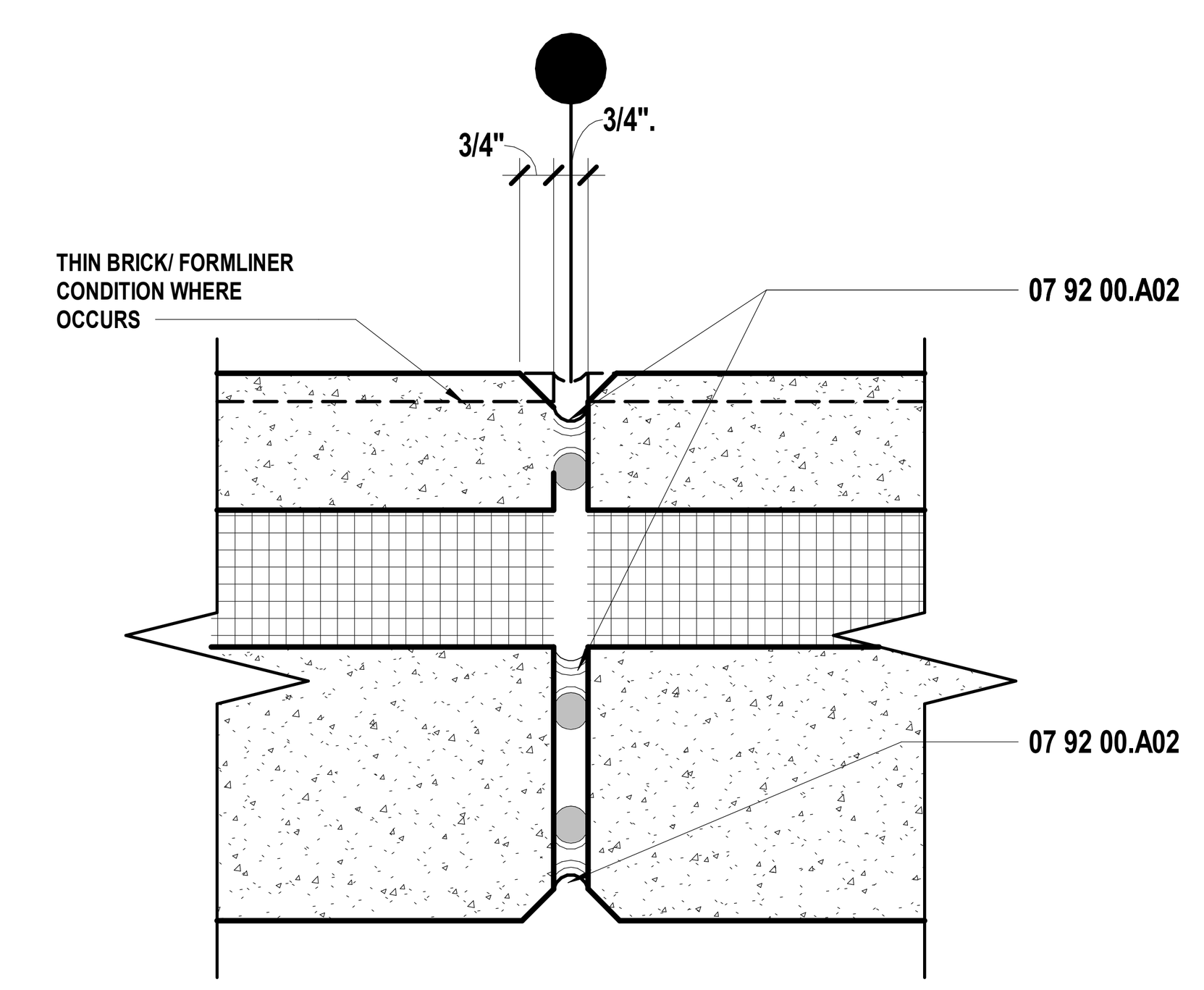


K7 Scale 3" = 1'-0" Exterior Detail - Base of Wall @ Retaining/CIP





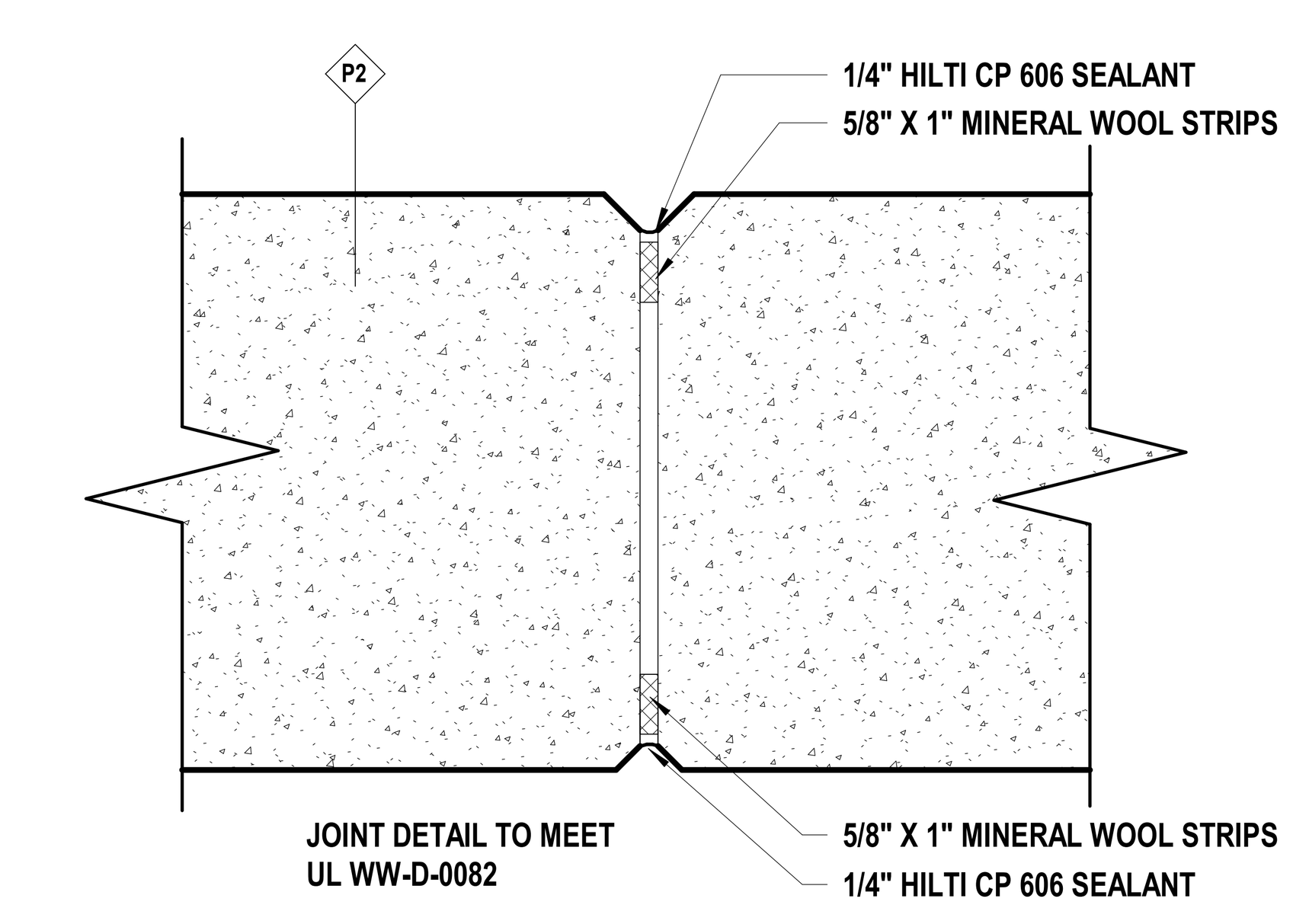
E1 Scale 3" = 1'-0" P3 - Precast Outside Corner @ Thin Brick - 2 Stage Sealant



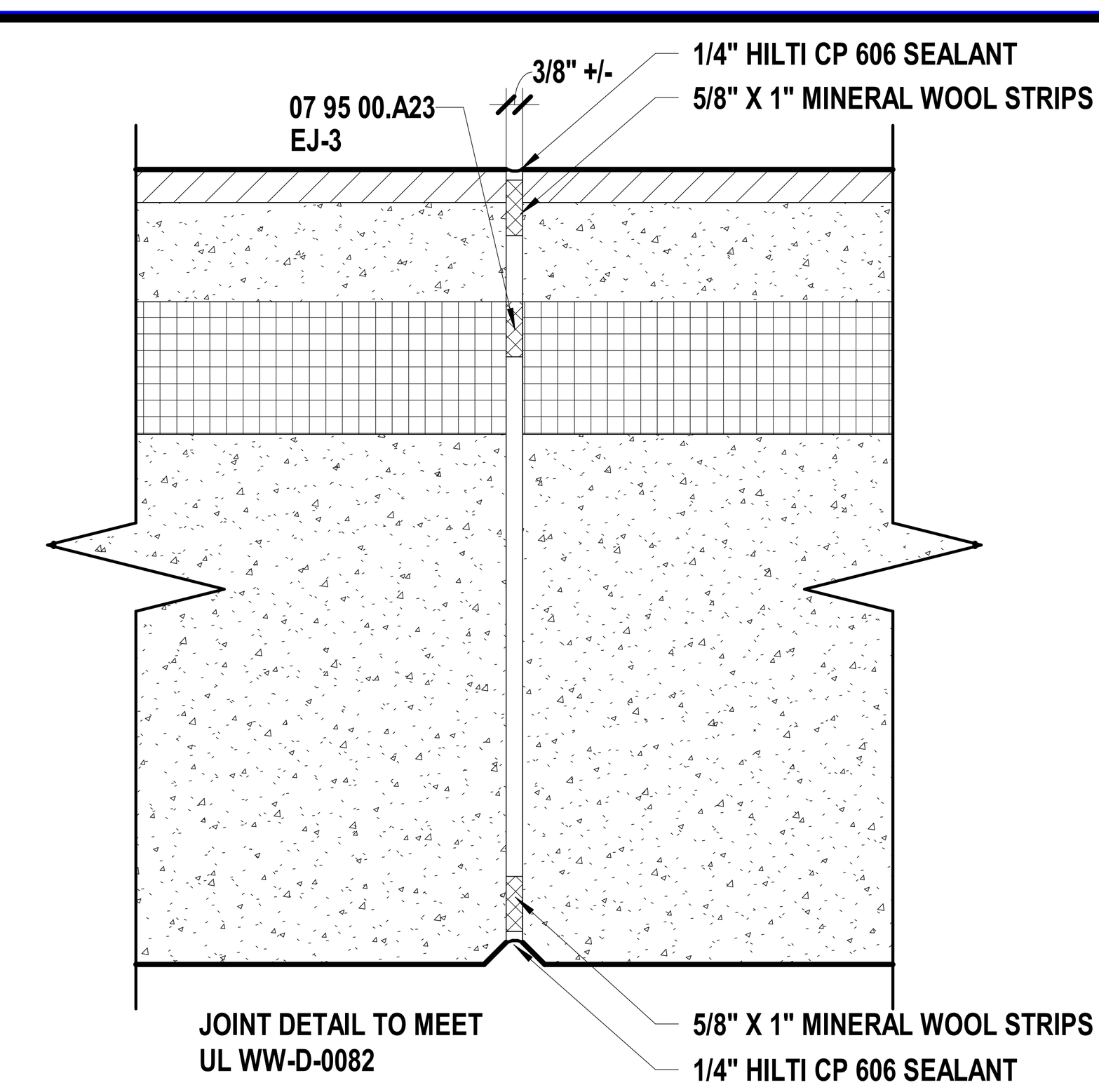
E7 Scale 3" = 1'-0" P3 - Precast Sandwich Panel Joint Exterior - 2 Stage Sealant

E13 Scale 1/4" = 1'-0" Typical Two Stage Exterior Precast Expansion Joint

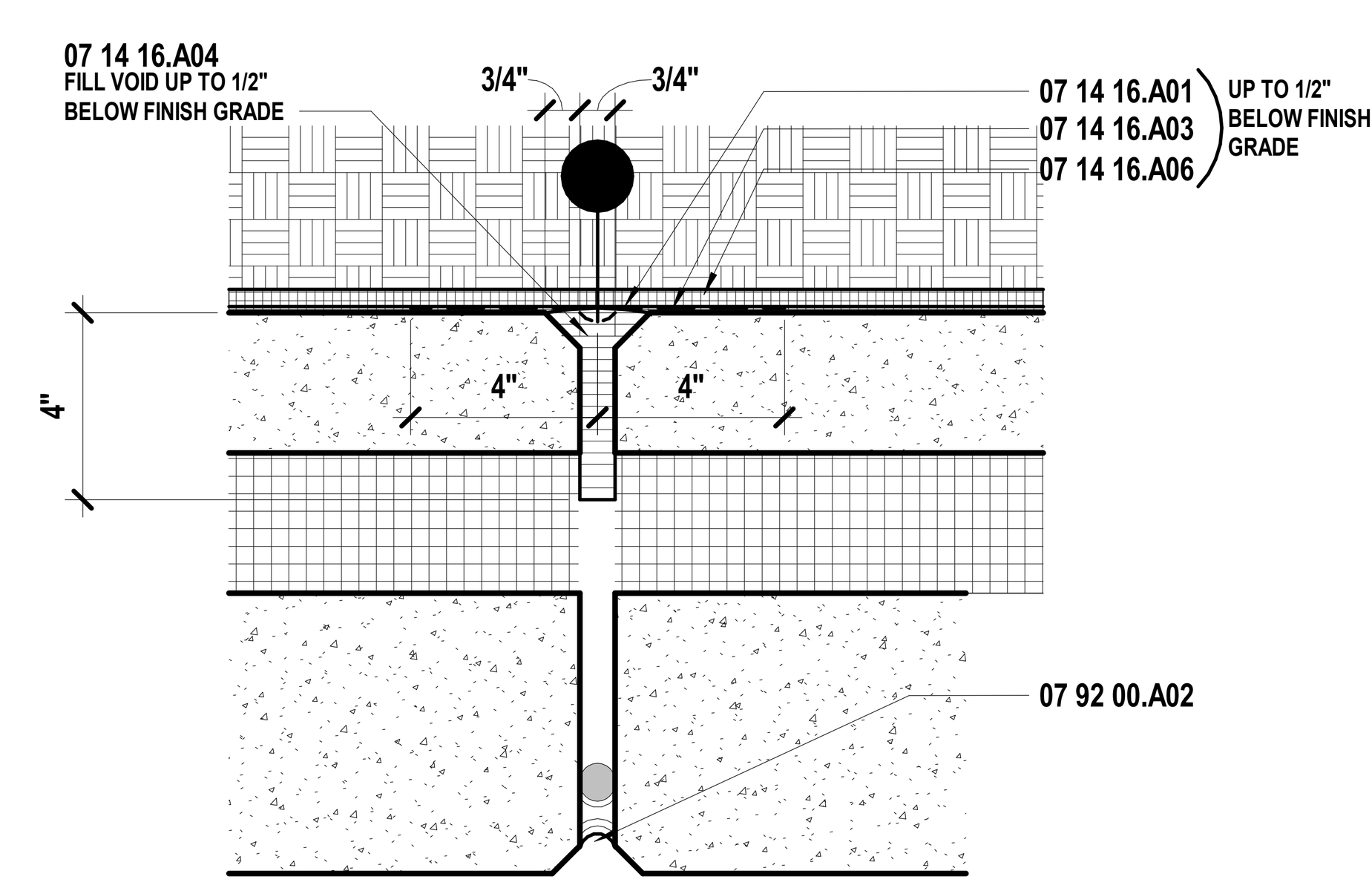
ACCEPTABLE JOINTS AT HIGH WIND SHELTER
3/8" WIDTH
3/4" WIDTH - WITH TESTED ASSEMBLY
3/4" OFFSET JOINT



A1 Scale 3" = 1'-0" 41 & 43 - Precast Joint - Interior 2 Hr rated



A7 Scale 3" = 1'-0" P3 - Precast Joint - Exterior - 2 Stage Sealant



A13 Scale 3" = 1'-0" P3 Precast Panel Joint Below Grade

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT

Kevin E. Nelson
A-2019015618

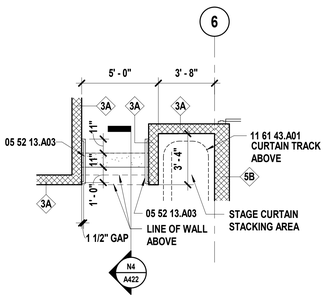
JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

A363

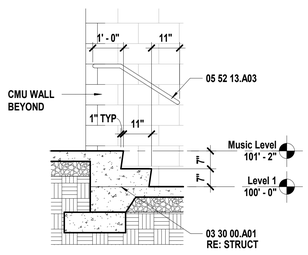
EXTERIOR DETAILS

Please consider the environment before printing this.

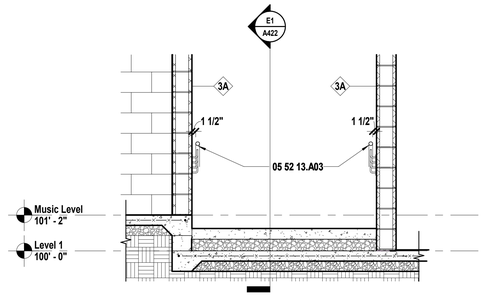
9/28/2023 4:13:28 PM



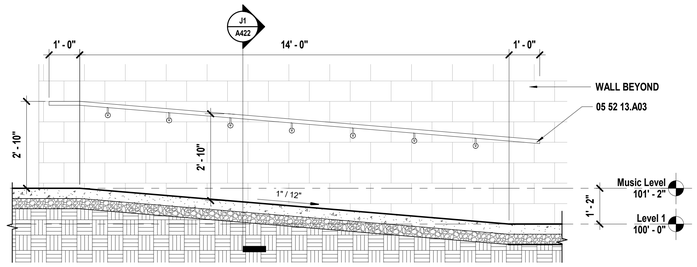
N1 Scale 1/4" = 1'-0" — Enlarged Floor Plan - Level 1 - Area A - Music Vest Stair



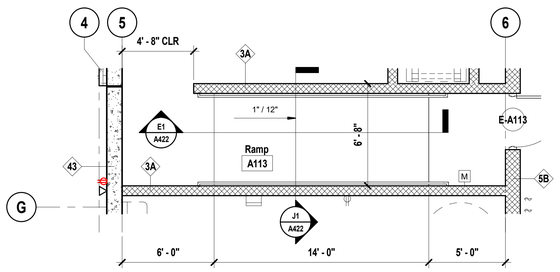
N4 Scale 1/2" = 1'-0" — Section Detail - Area A - Music Vest Stair



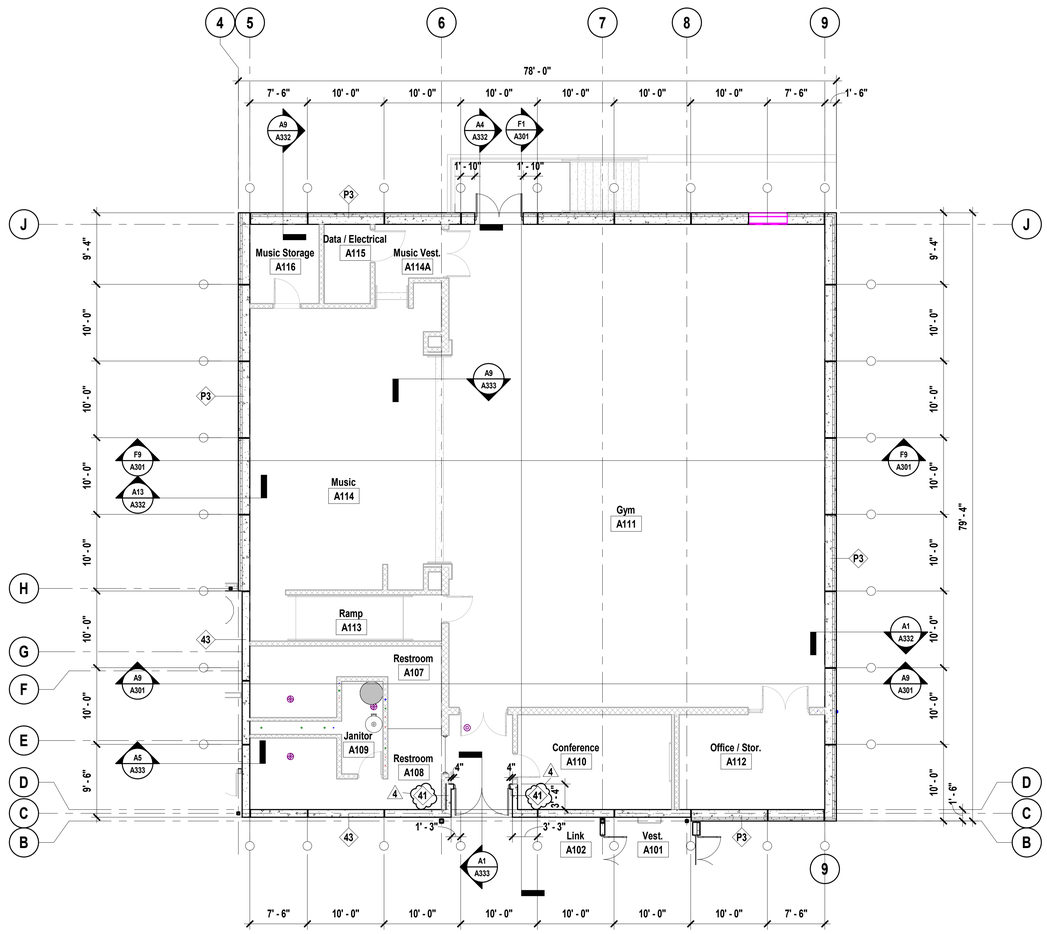
J1 Scale 1/2" = 1'-0" — Section Detail - Area A - Music Ramp



E1 Scale 1/2" = 1'-0" — Section Detail - Area A - Music Ramp Slope



A1 Scale 1/4" = 1'-0" — Enlarged Floor Plan - Level 1 - Area A - Music Ramp



A7 Scale 1/8" = 1'-0" — Precast Floor Plan - Level 1 - Area A

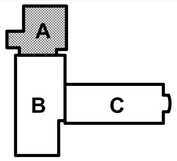
SHEET KEYNOTE LEGEND

03 30 00.A01	CAST-IN-PLACE CONCRETE
05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
11 61 43.A01	STAGE CURTAINS

SHEET NOTES

1. DO NOT SCALE THIS DRAWING

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition

Liberty Public Schools

650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

KEVIN E. NELSON
A-2019015618
STATE OF MISSOURI
ARCHITECT

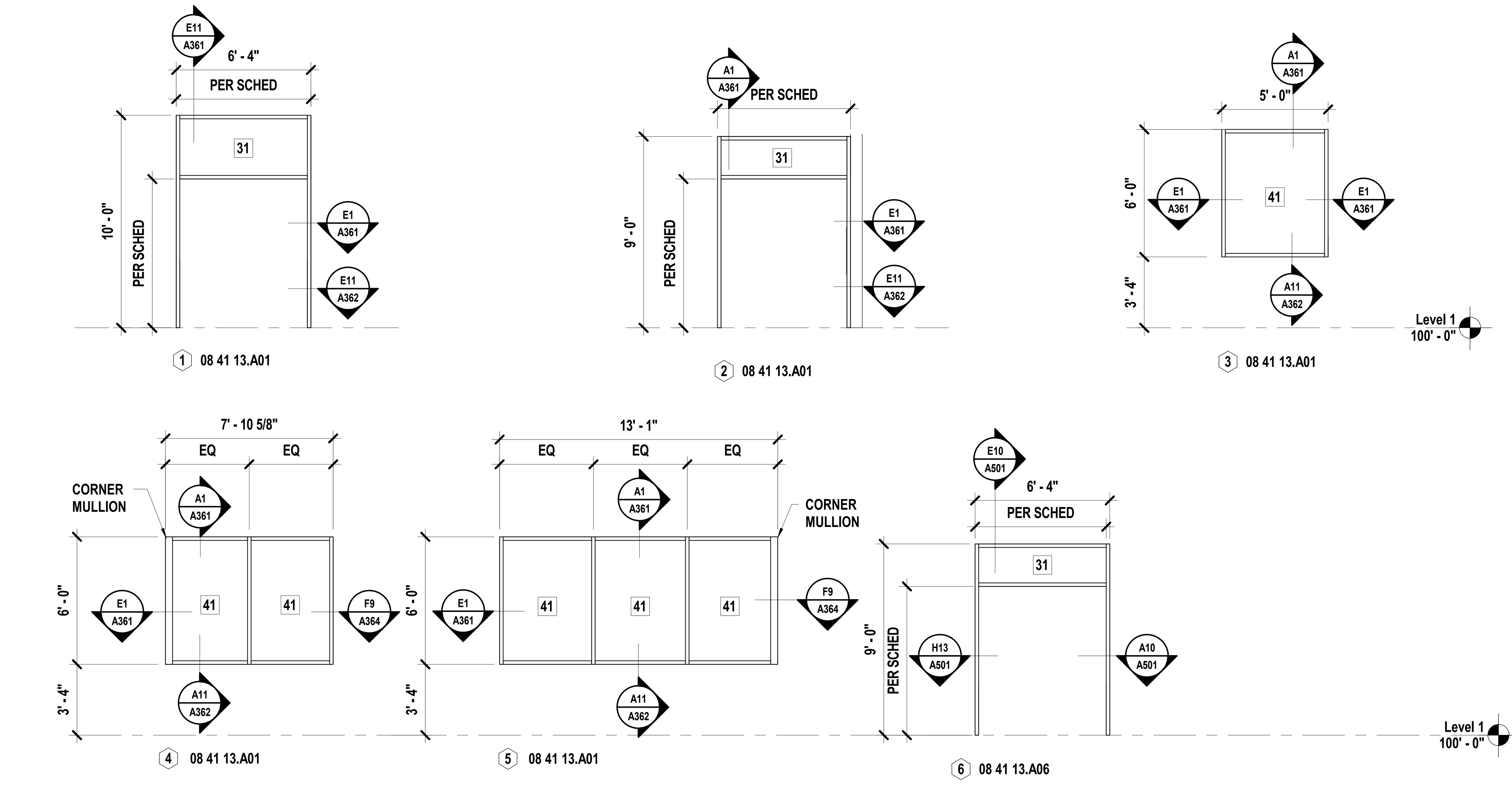
Kevin E. Nelson
A-2019015618
SEPTEMBER 29, 2023

JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

A422

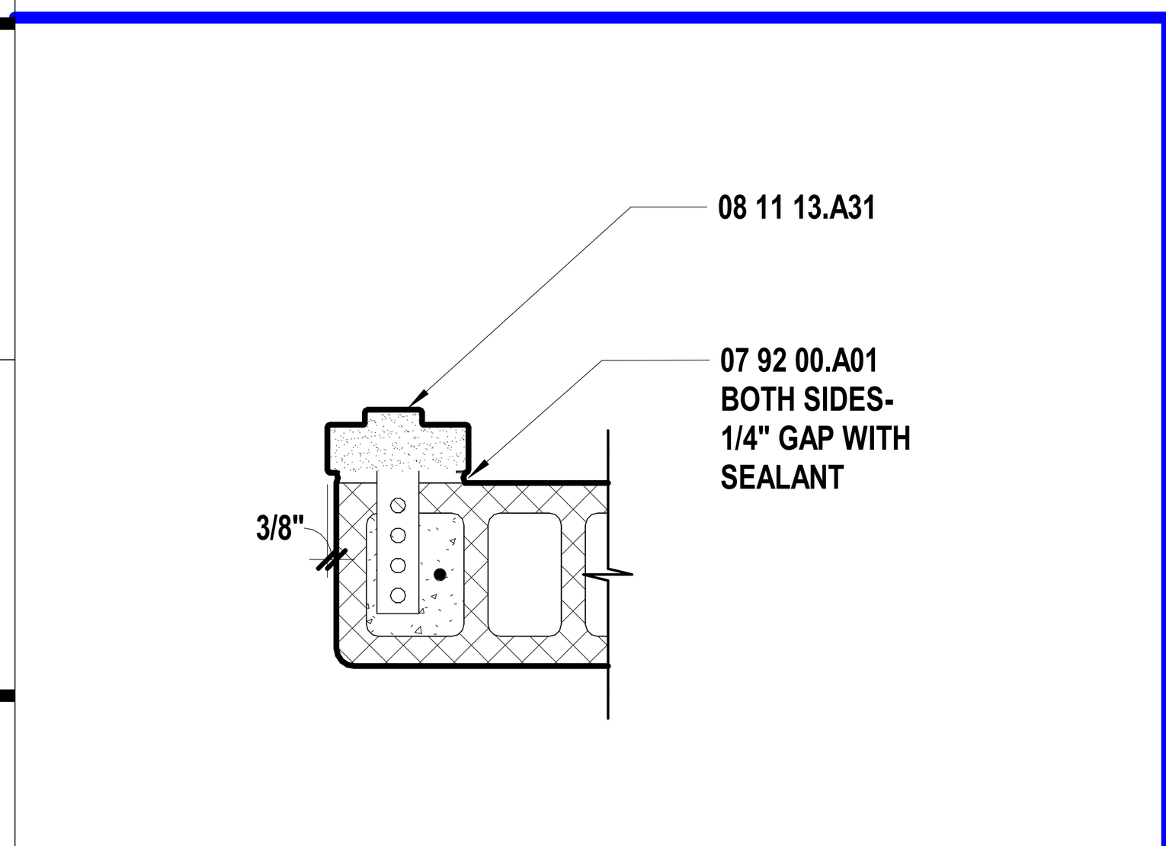
ENLARGED PLANS & DETAILS

9/28/2023 4:13:32 PM

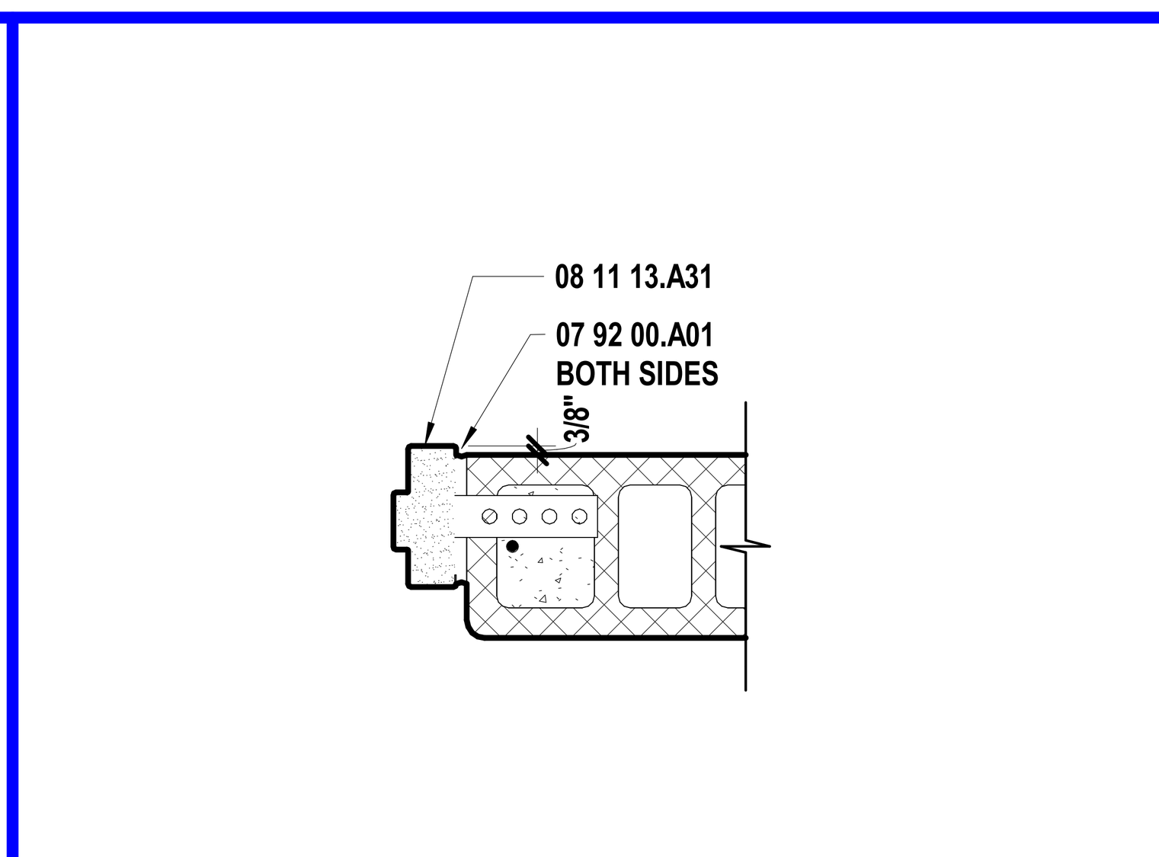


DOOR SCHEDULE

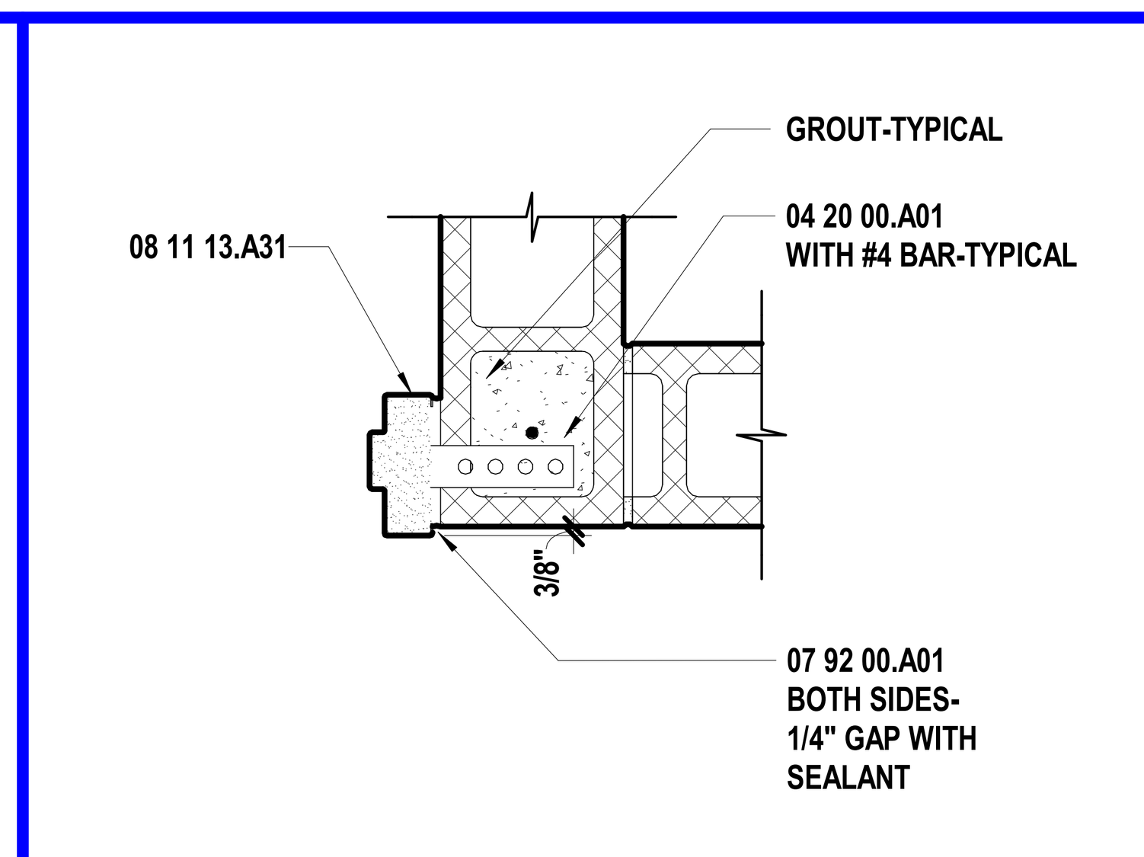
DOOR				Frame		All DETAILS on A521 UNO					
Number	Size	Type	Glass	Type	Material	Head	Strike	Hinge	Thresh	Fire Rating	Remarks
E-A101a	PR 3'-0" x 7'-0" x 1 3/4"	E10	41	1	ALUM	--	--	--		--	
E-A101b	PR 3'-0" x 7'-0" x 1 3/4"	E10	41	6	ALUM	A13	--	--		--	
E-A102a	PR 3'-0" x 7'-0" x 1 3/4"	B1	11	A	HM	E4/A121A	--	J1/A421		--	
E-A102c	PR 3'-0" x 7'-0" x 1 3/4"	E10	41	2	ALUM	A1/A361	--	--		--	
E-A103	3'-0" x 7'-0" x 1 3/4"	B1	11	A	HM	E10	E13	E13		--	
E-A104	3'-6" x 7'-0" x 1 3/4"	B1	11	A	HM	E10	E13	E13		--	
E-A105	3'-0" x 7'-0" x 1 3/4"	A1	--	A	HM	E10	E13	E13		--	
E-A106	PR 3'-6" x 8'-0" x 1 3/4"	F1	--	A	HM	A1/A362	--	A1/A362		90 MIN	PAINT DOOR & FRAME P26
E-A108	4'-8" x 7'-2" CO (4)	--	--	A	HM	E1	H4	H4		--	CASED OPENING (4)
E-A109	3'-0" x 7'-0" x 1 3/4"	A3	--	A	HM	E1	H4	E4		--	
E-A110	3'-0" x 7'-0" x 1 3/4"	B1	11	A	HM	E1	H4	A1/A362		--	
E-A111a	PR 3'-0" x 7'-2" x 1 3/4"	B1	11	A	HM	E1	--	H4		--	
E-A111b	PR 3'-0" x 7'-2" x 1 3/4"	F1	--	A	HM	E1/A362	--	E1/A362		--	
E-A112	PR 3'-0" x 7'-0" x 1 3/4"	B1	11	B	HM	E1	--	H4		--	
E-A113	3'-4" x 7'-2" x 1 3/4"	B1	11	A	HM	E1	H4	H4		--	
E-A114	3'-4" x 7'-2" x 1 3/4"	B1	11	A	HM	E1	H4	H4		--	
E-A114a	PR 3'-0" x 7'-0" x 1 3/4" (4)	A3	--	A	HM	E1	--	H4		--	
E-A115	4'-0" x 7'-2" x 1 3/4"	A1	11	A	HM	E1	H4	H4		--	
E-B124c	3'-6" x 7'-0" CO	--	--	A	HM	E10	E13	E13		--	CASED OPENING
E-B146	PR 2'-0" x 7'-0" x 1 3/4"	A1	--	A	HM	E10	--	E13		--	
E-B147	4'-0" x 7'-0" CO	--	--	A	HM	E10	E13	E13		--	CASED OPENING
E-B148	3'-0" x 7'-0" x 1 3/4"	A1	--	A	HM	E10	E13	E13		--	
E-B149	3'-0" x 7'-0" x 1 3/4"	A1	--	A	HM	E10	E13	E13		--	
E-B150	3'-0" x 7'-0" x 1 3/4"	A1	--	A	HM	E10	E13	E13		--	
E-C124	3'-0" x 7'-0" x 1 3/4"	B1	11	A	HM	E10	E13	E13		--	



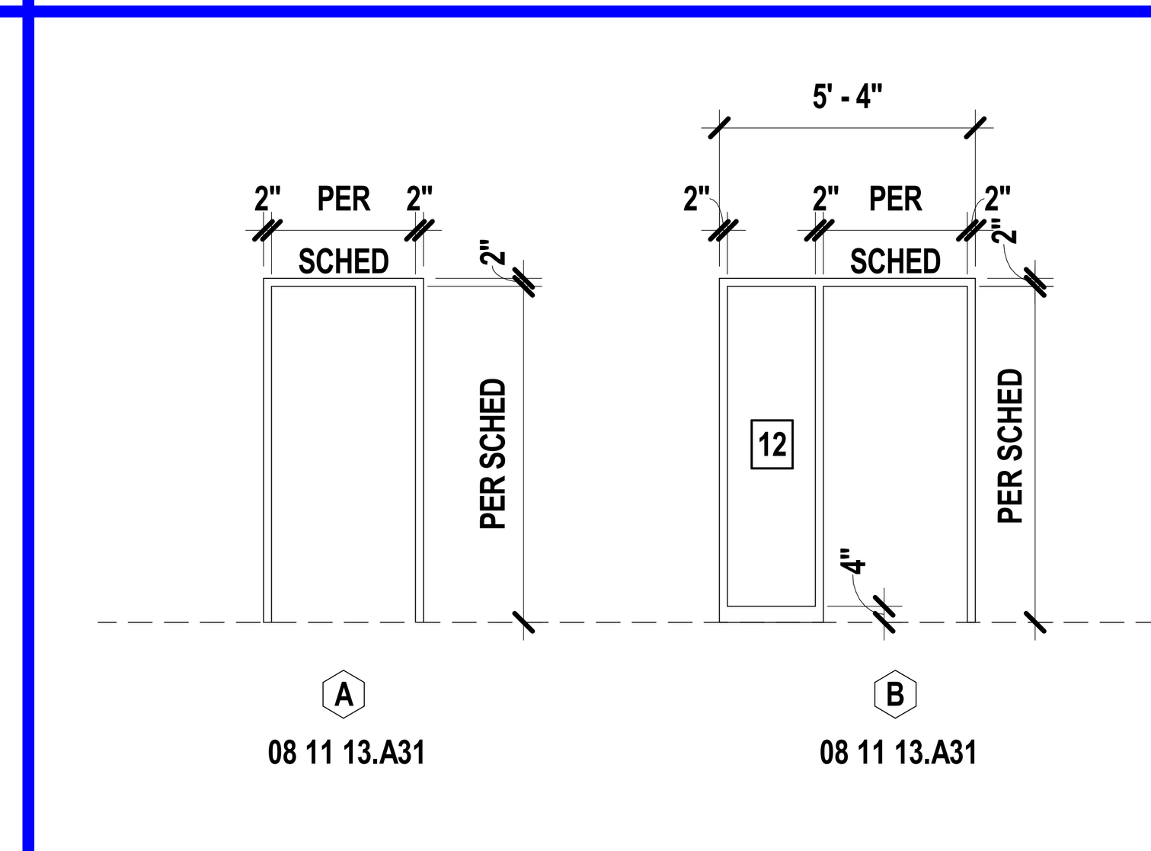
H1 Scale 1 1/2" = 1'-0" HM Jamb @ CMU



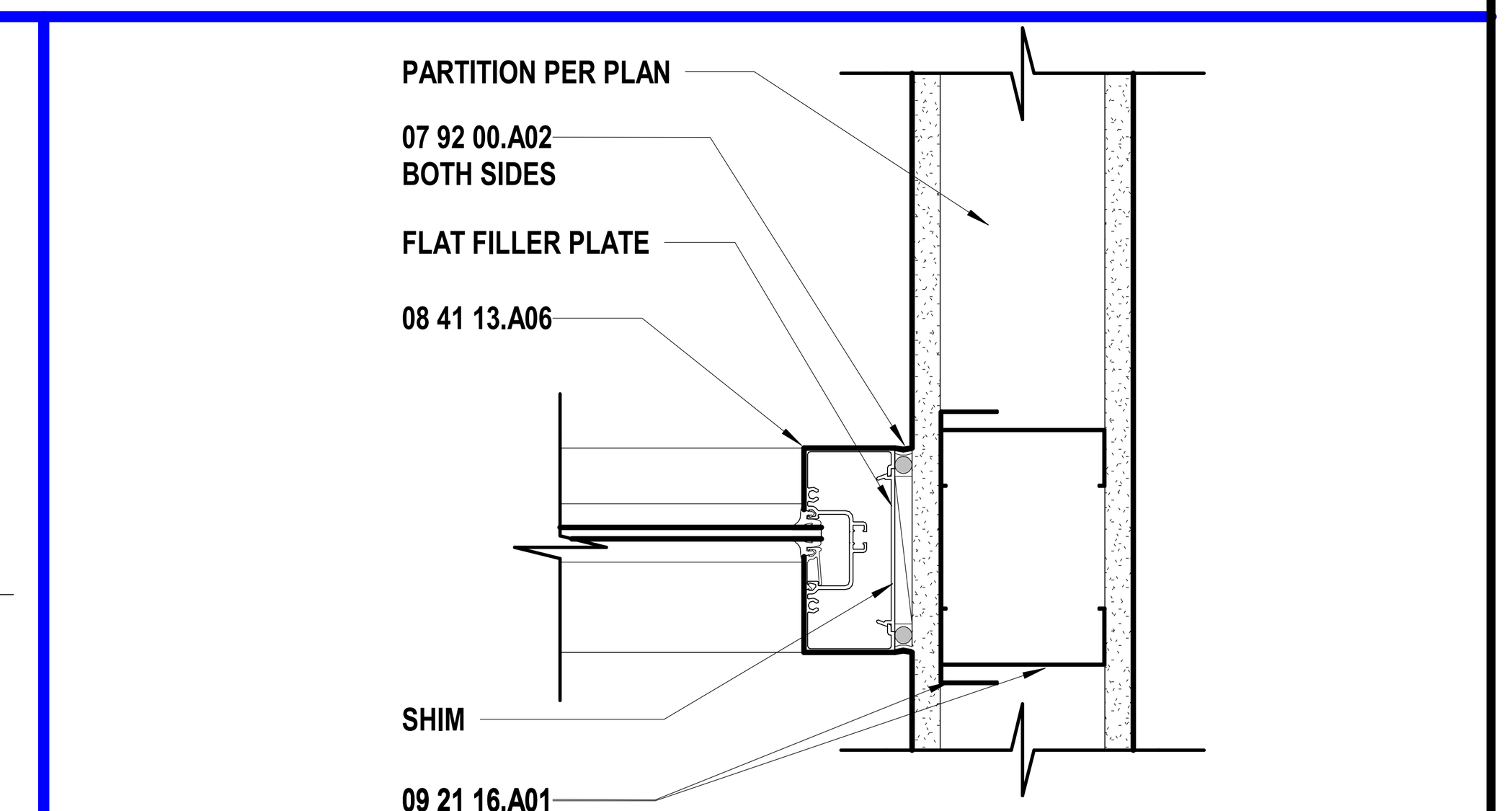
H4 Scale 1 1/2" = 1'-0" HM Jamb @ CMU



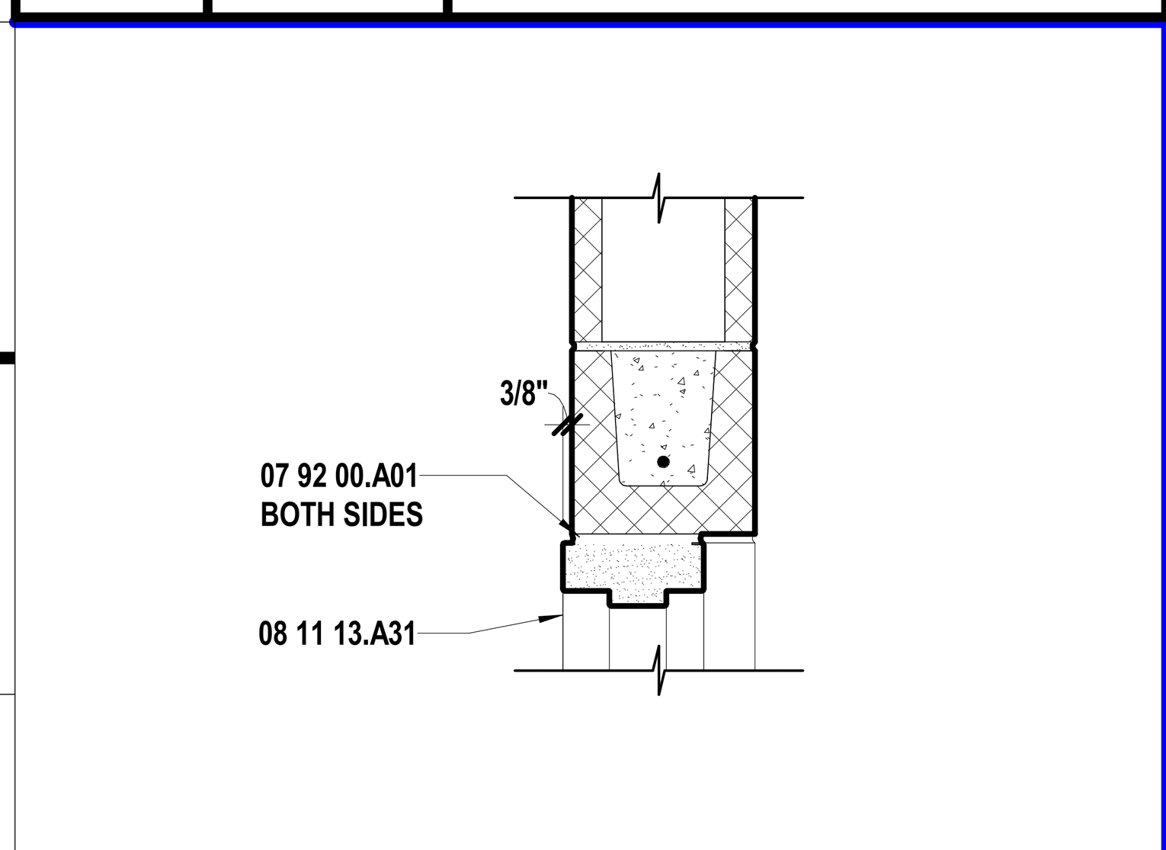
H7 Scale 1 1/2" = 1'-0" HM Jamb @ CMU Corner



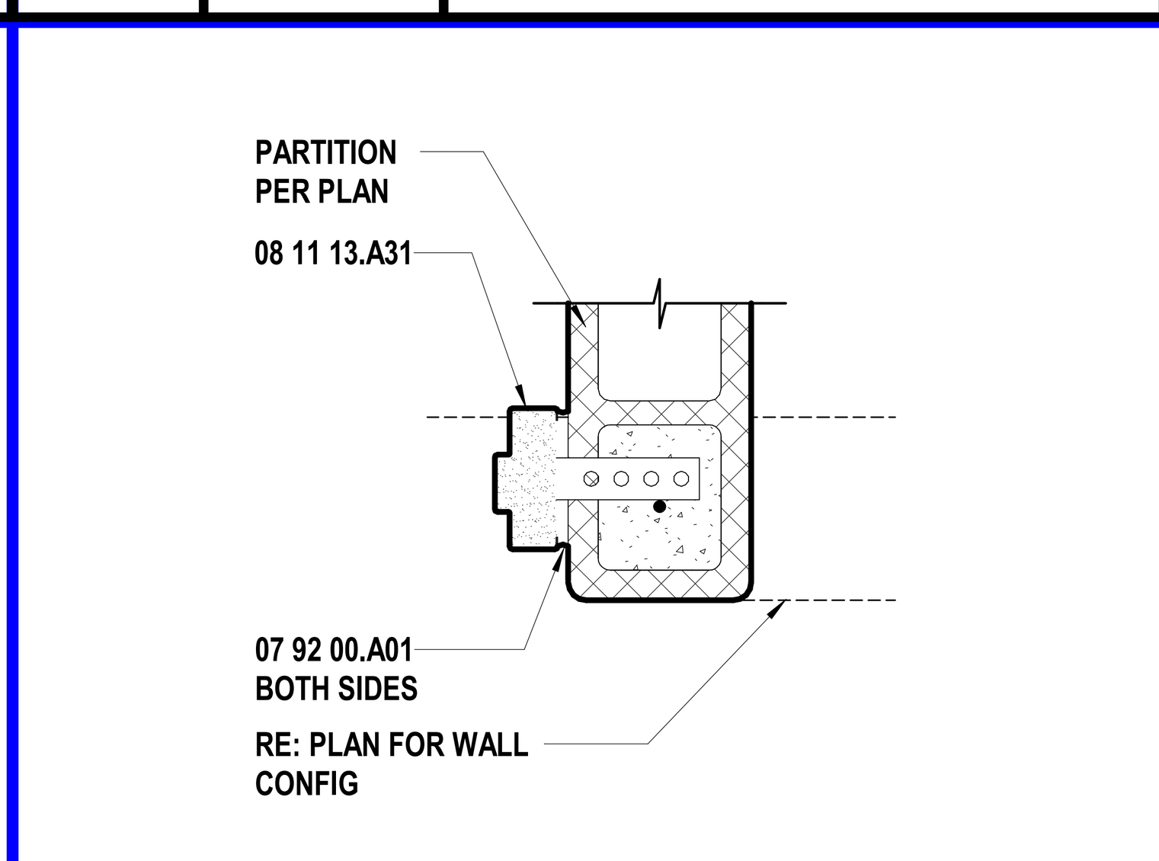
H10 Scale 1/4" = 1'-0" Hollow Metal Frame Types



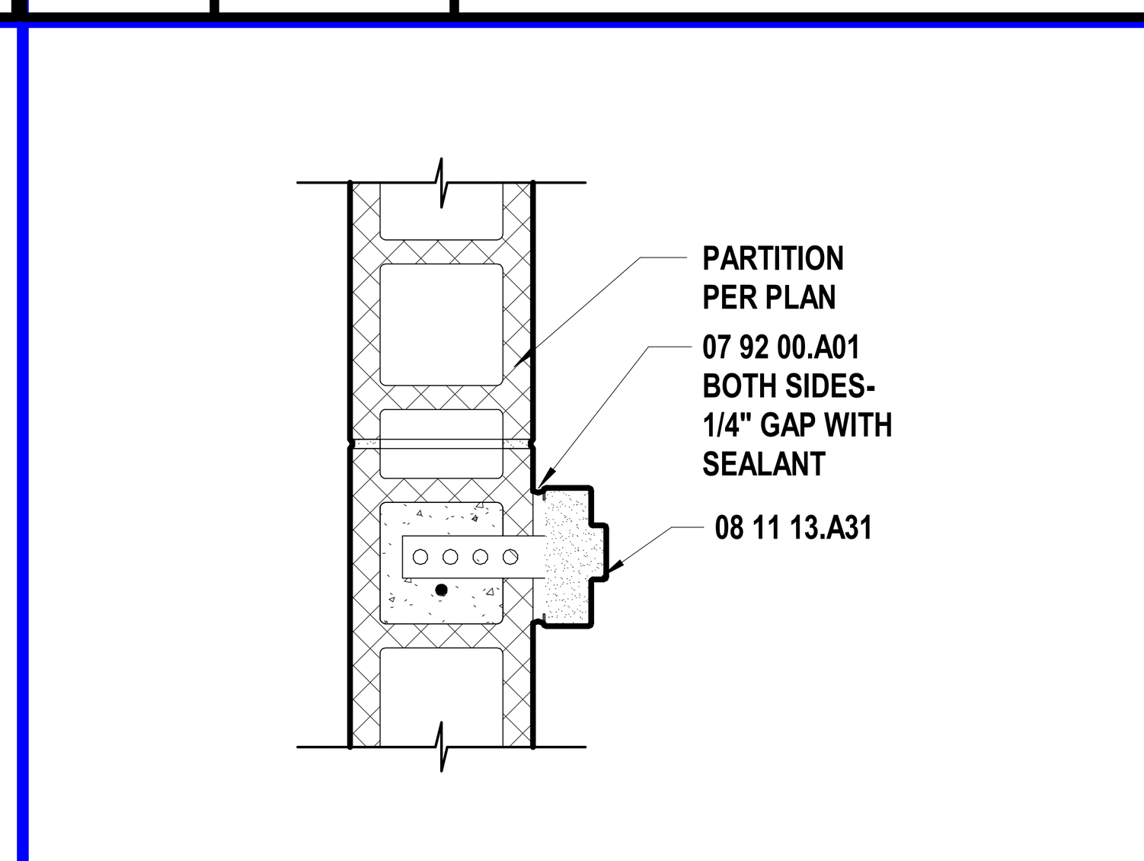
H13 Scale 3" = 1'-0" Storefront Jamb Along Stud Wall (Interior)



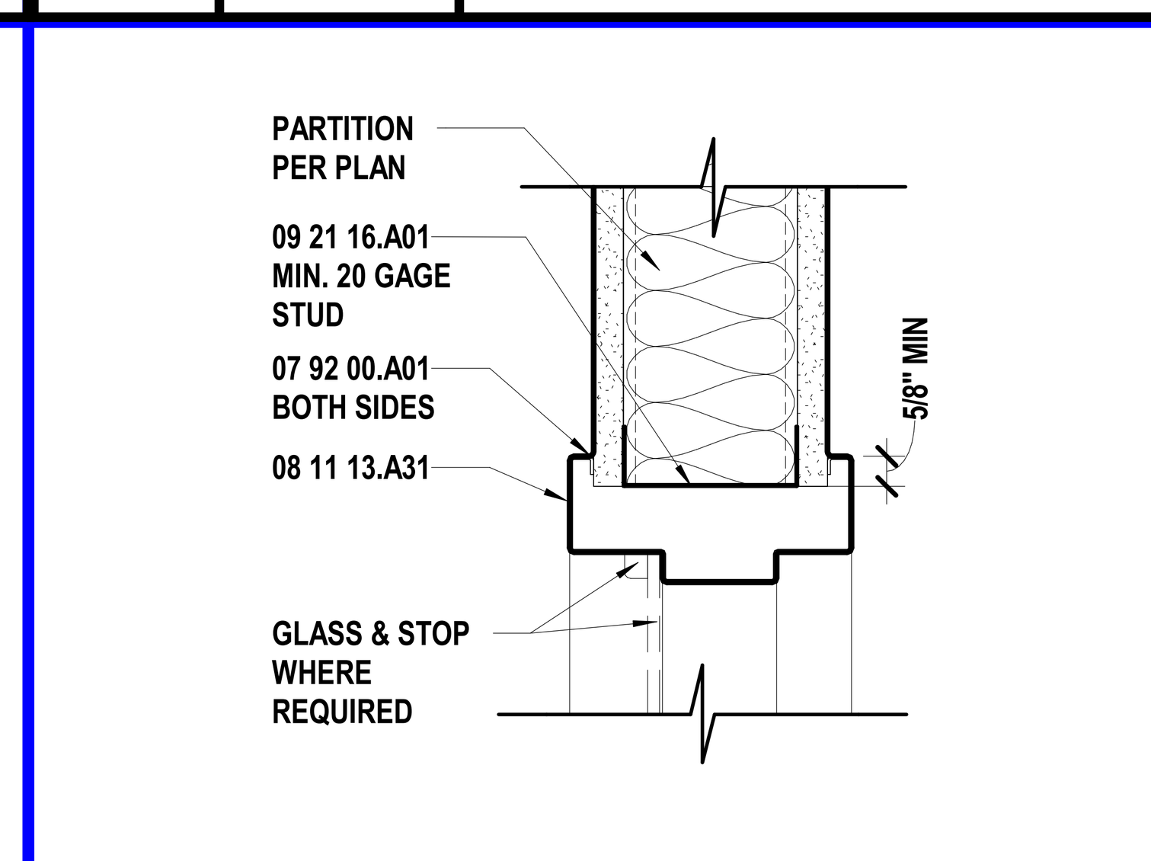
E1 Scale 1 1/2" = 1'-0" HM Head @ CMU



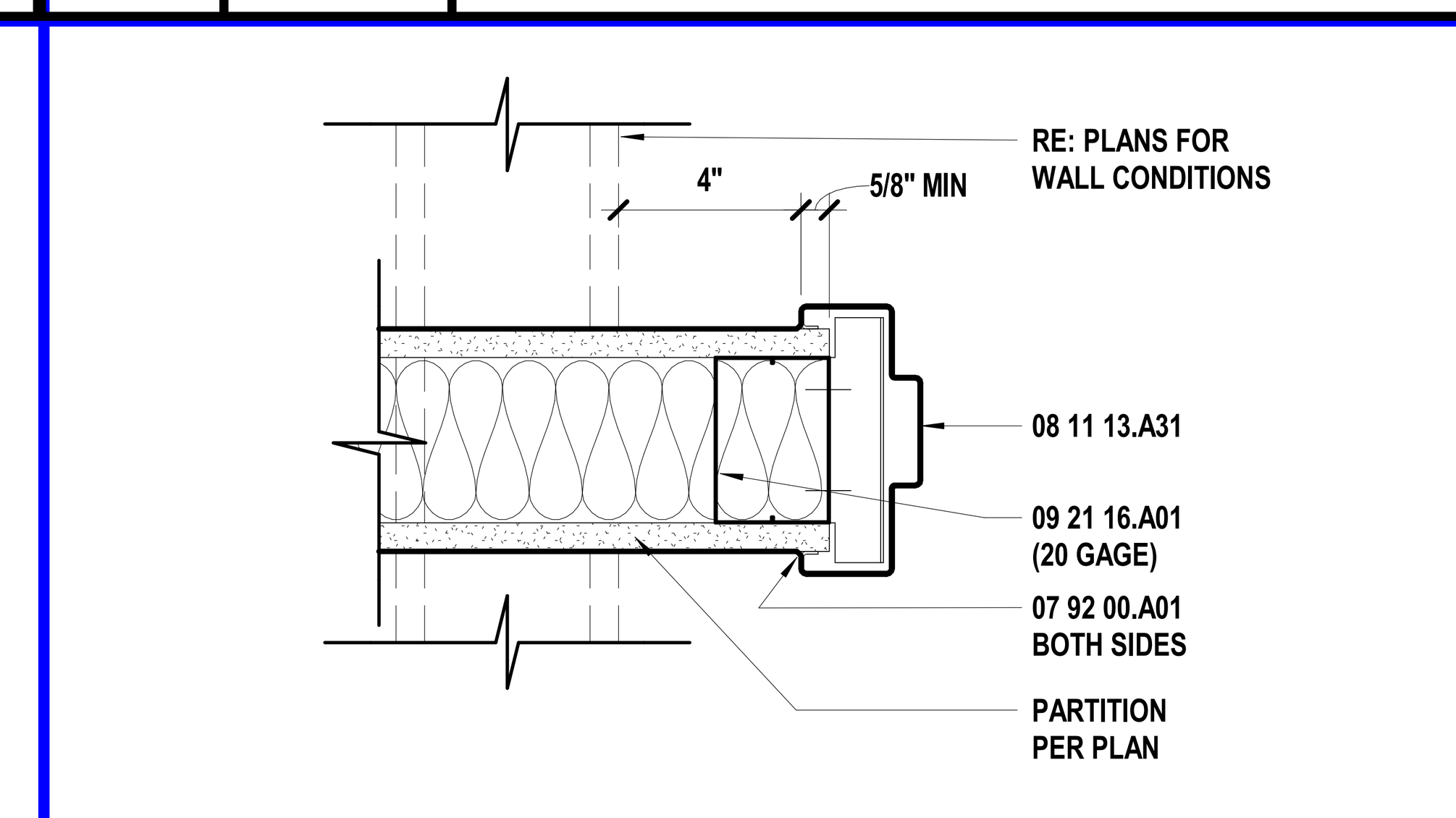
E4 Scale 1 1/2" = 1'-0" HM Jamb @ CMU



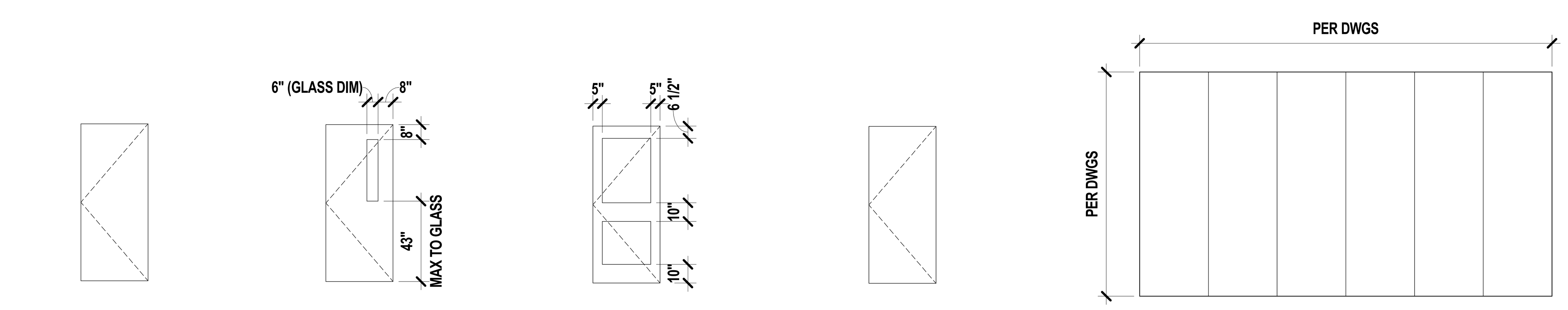
E7 Scale 1 1/2" = 1'-0" HM Jamb @ CMU Along Wall



E10 Scale 3" = 1'-0" HM Head @ Metal Stud



E13 Scale 3" = 1'-0" HM Jamb @ Metal Stud



TYPE A DOORS - FLUSH

A1 - SOLID CORE WOOD 08 14 16.A01

A3 - HOLLOW METAL (NON-INSULATED, HEAVY DUTY) 08 11 13.A01

TYPE B DOORS - NARROW LITE

B1 - SOLID CORE WOOD 08 14 16.A01

TYPE E DOORS - FULL LITE WITH MID-RAIL

E9 – ALUMINUM (STANDARD) 08 41 13.A11

E10 – ALUMINUM (HEAVY DUTY) 08 41 13. A12

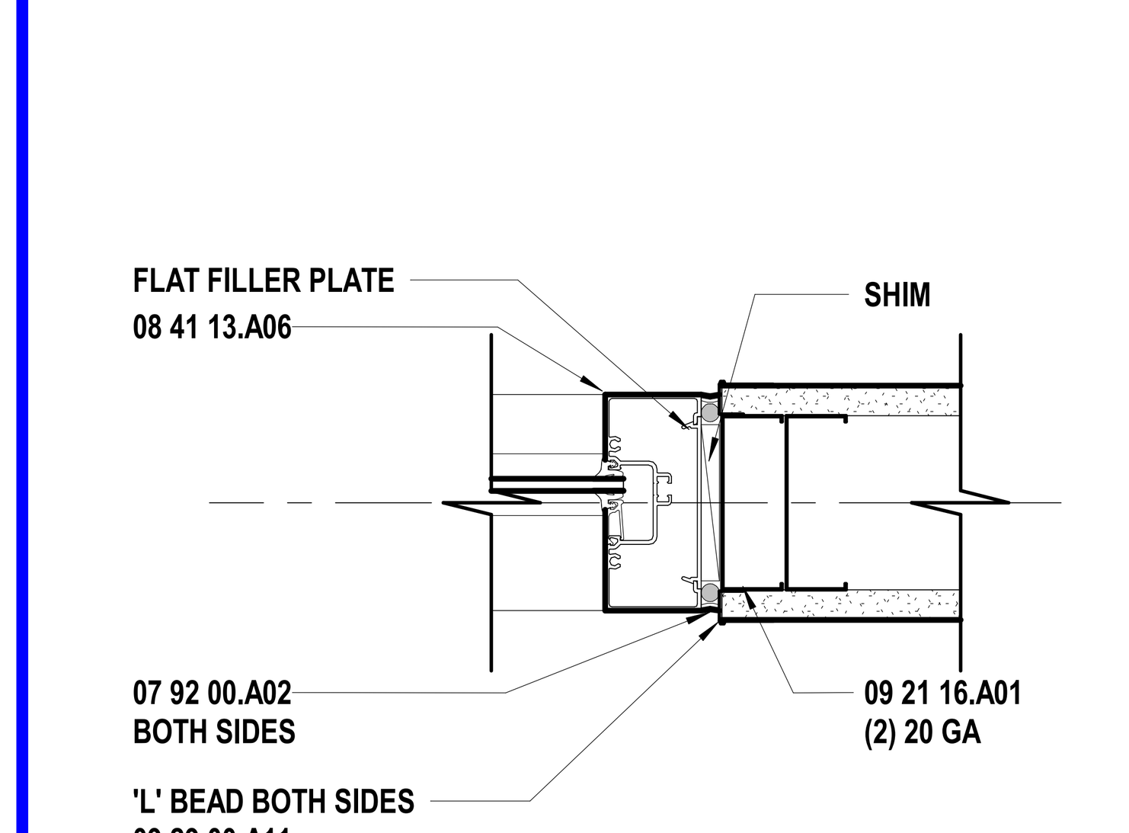
TYPE F DOORS - HIGH WIND ASSEMBLIES

F1 – HOLLOW METAL (HIGH WIND DOOR ASSEMBLY – NO LITE) 08 11 13.A21

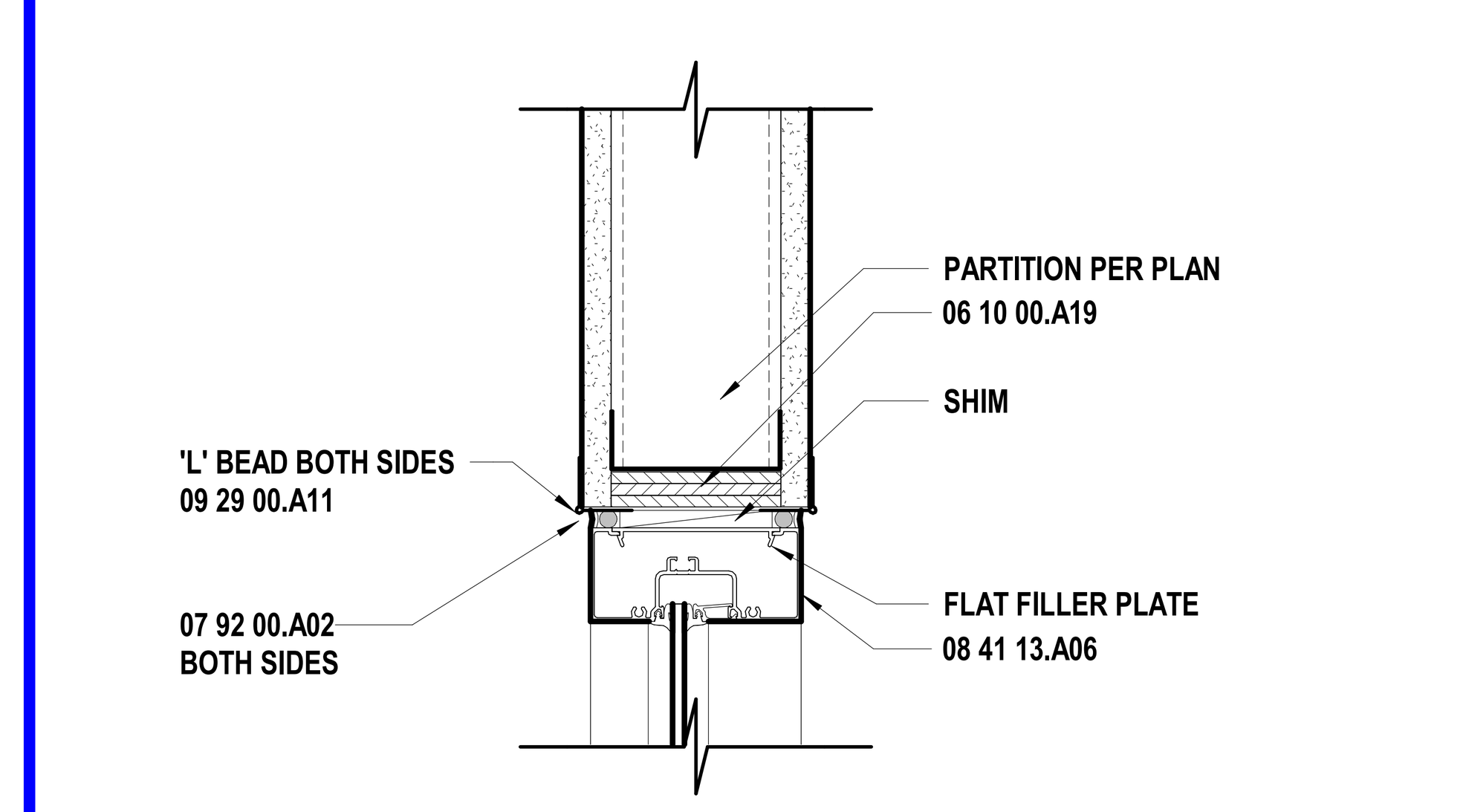
TYPE H DOORS - OPERABLE PANELS (SOLID)

H1 - OPERABLE PANEL PARTITION (SINGLE PANEL) 10 22 38.A01

A1 Scale 1/4" = 1'-0" Door Types



A10 Scale 3" = 1'-0" Storefront Jamb @ Stud Wall (Interior)



A13 Scale 3" = 1'-0" Storefront Head @ Stud Wall (Interior)

SHEET KEYNOTE LEGEND

04 20 00.A01	CONCRETE MASONRY UNITS
06 10 00.A19	PLYWOOD BLOCKING AND BACKING PANELS
07 92 00.A01	SEALANT
07 92 00.A02	SEALANT W/BACKER ROD
08 11 13.A01	HOLLOW METAL FRAME
08 41 13.A01	THERMAL BROKEN STOREFRONT FRAMING (4.5")
08 41 13.A06	NON-THERMAL BROKEN STOREFRONT FRAMING (4.5")
09 21 16.A01	NON-STRUCTURAL FRAMING
09 29 00.A11	GYPSUM BOARD TRIM

GLASS LEGEND

GLASS TYPE = 1

FULLY-TEMPERED MONOLITHIC FLOAT GLASS

11 08 80 00.A11 1/4" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS

12 08 80 00.A12 3/8" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS

13 08 80 00.A13 1/2" CLEAR FULLY-TEMPERED MONOLITHIC FLOAT GLASS

INSULATING GLASS

31 08 80 00.A31 LOW-E CLEAR INSULATED GLASS

INSULATING FULLY-TEMPERED GLASS

41 08 80 00.A41 LOW-E CLEAR INSULATED FULLY-TEMPERED GLASS

DOOR TYPE NOTES

1. REFER TO DOOR SCHEDULE FOR OVERALL DOOR DIMENSIONS
2. DIMENSIONS ASSOCIATED WITH VISION LITES ARE TO THE OUTSIDE OF THE VISION LITE FRAME UNLESS NOTED OTHERWISE
3. REFER TO DOOR SCHEDULE TO DETERMINE WHICH DOORS ARE REQUIRED TO BE FIRE RATED
4. REFER TO DOOR SCHEDULE FOR GLASS TYPES IN DOORS

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

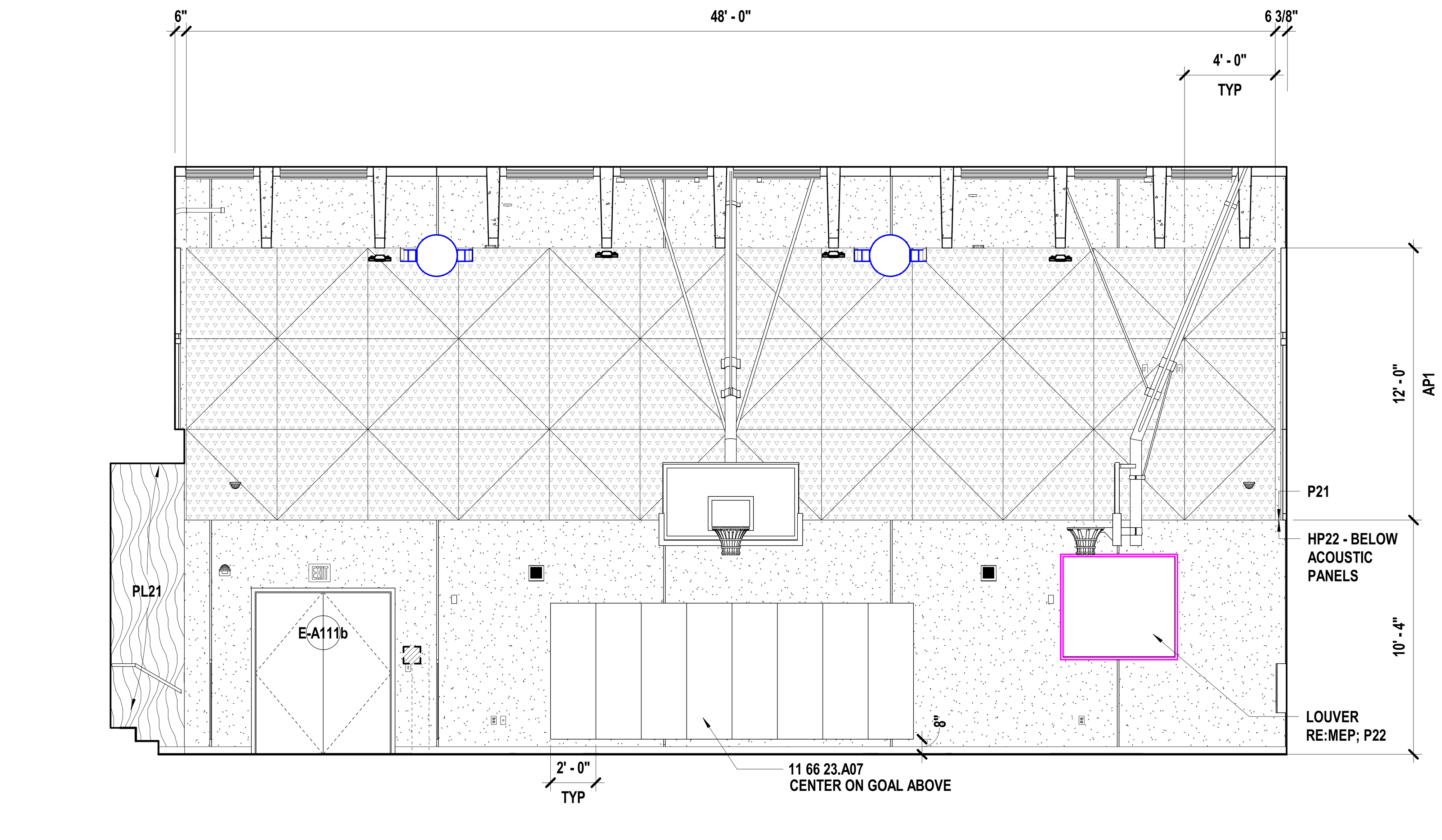
#	Description	Date
4	Addendum 04	09/29/2023

SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

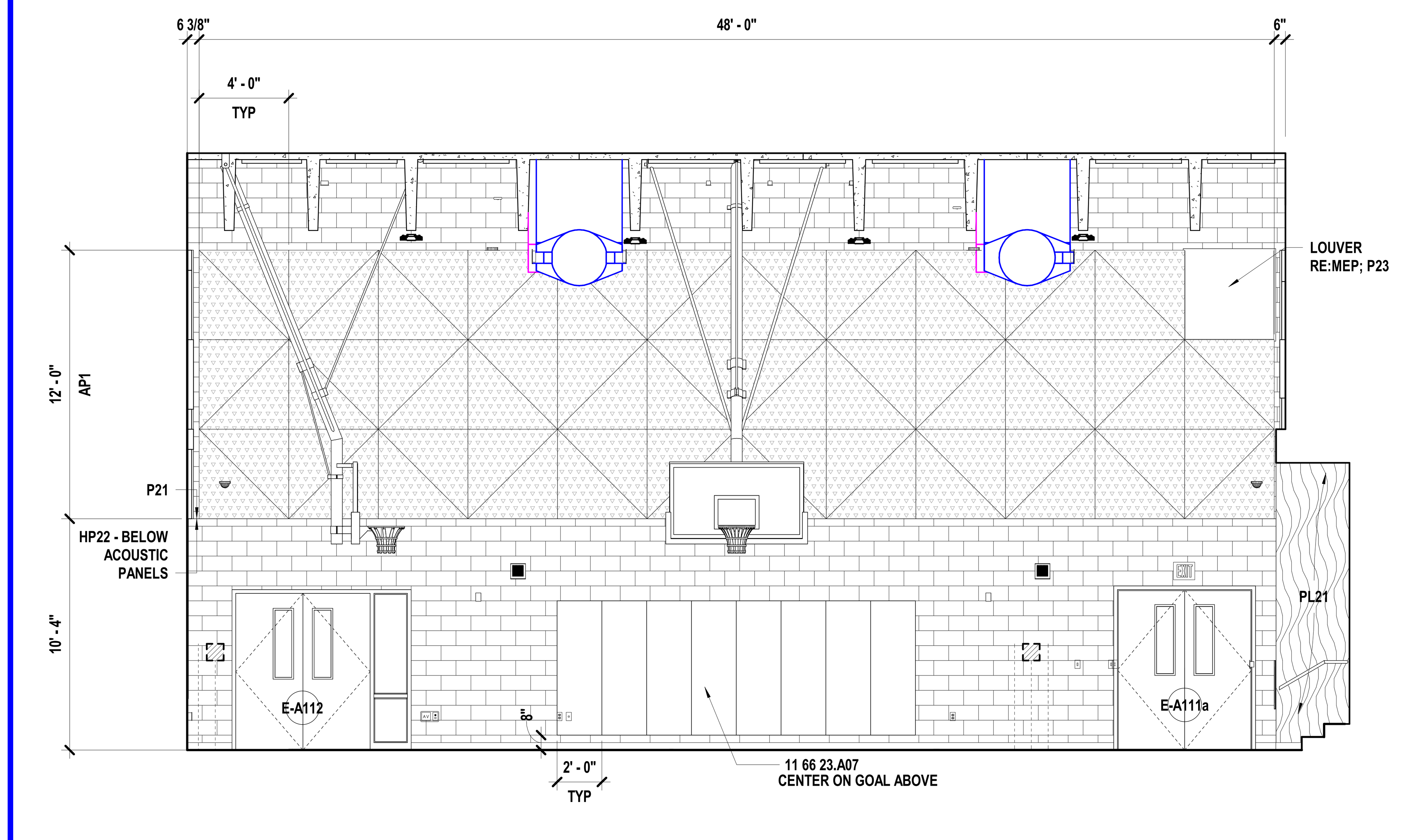
JOB NO: 23020.00
DRAWN BY: HB
CHECKED BY: JB
DATE: 09/29/2023

A501

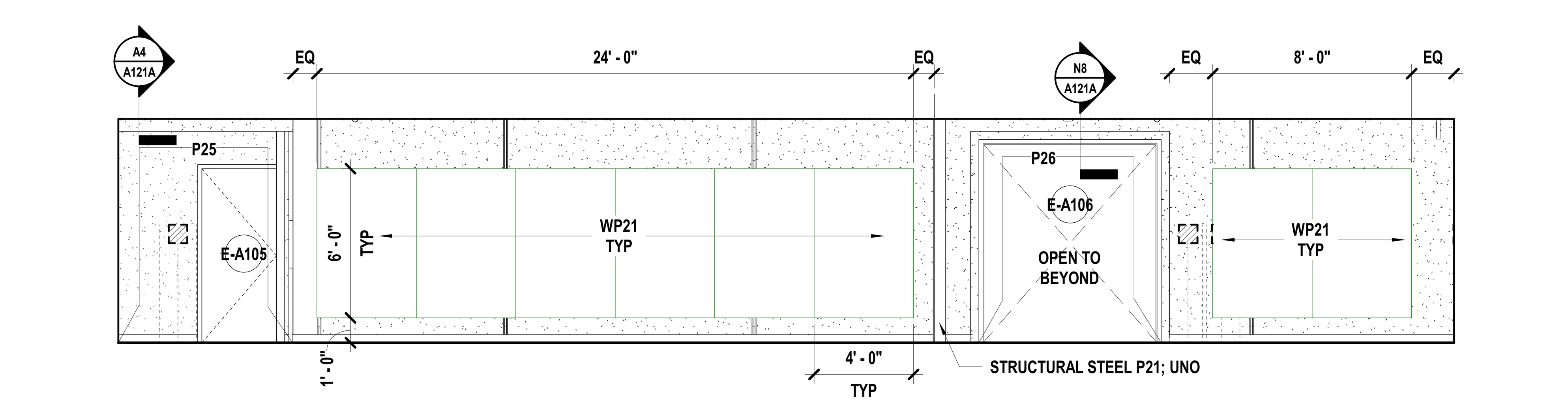
DOOR TYPES & FRAME TYPES



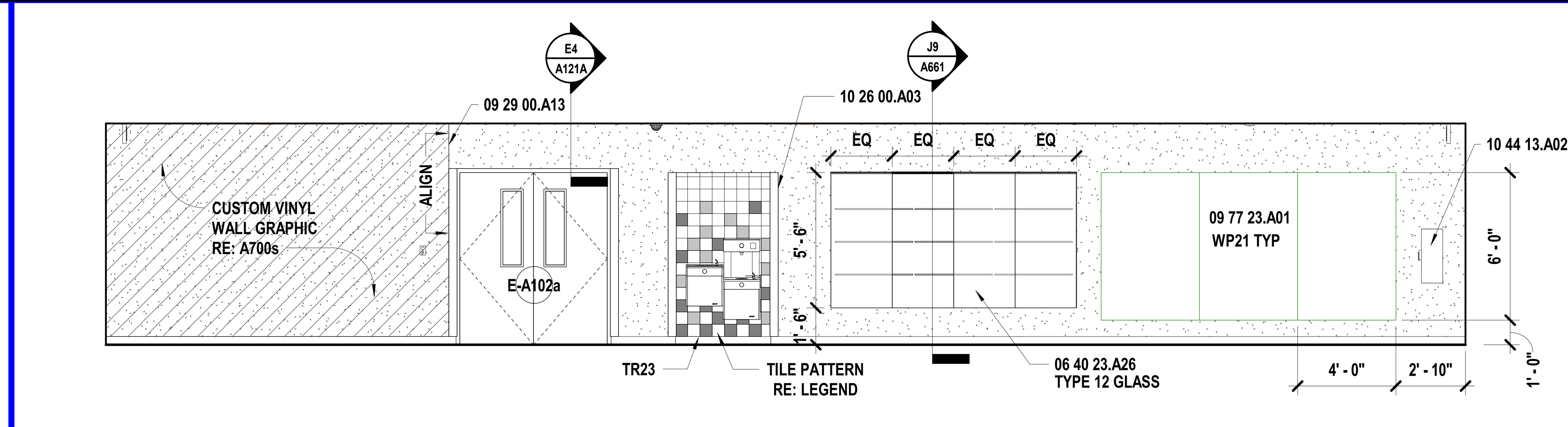
L1 Scale 1/4" = 1'-0" Interior Elevation - Gym A111 - N



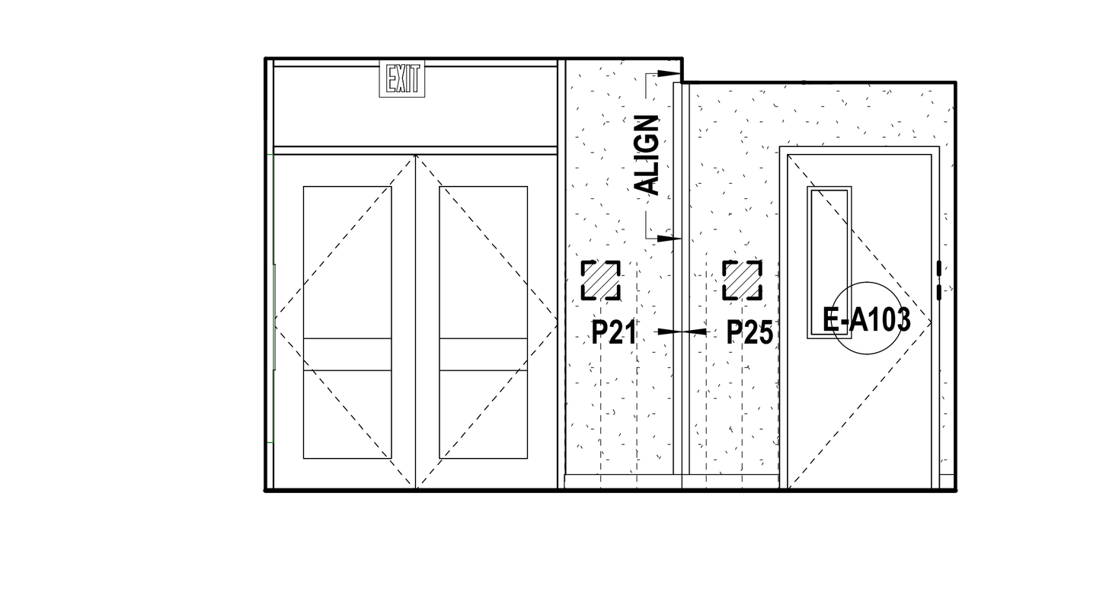
L9 Scale 1/4" = 1'-0" Interior Elevation - Gym A111 - S



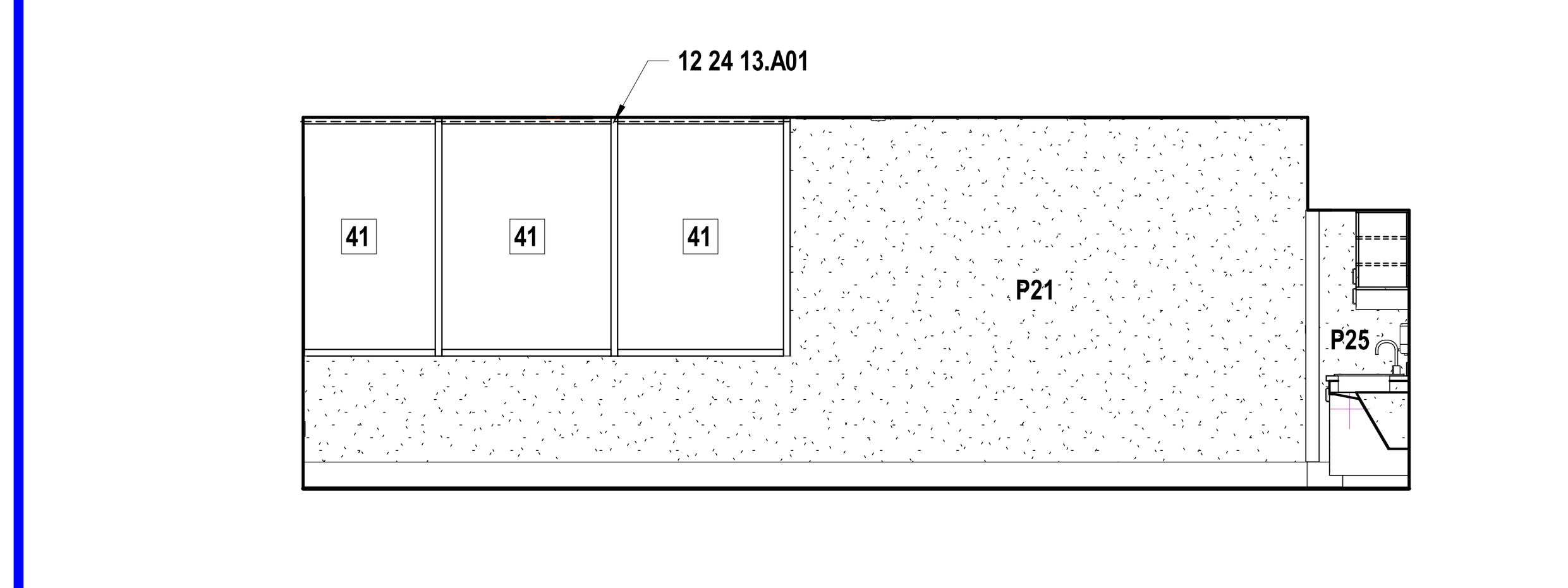
H1 Scale 1/4" = 1'-0" Interior Elevation - Link A102 - N



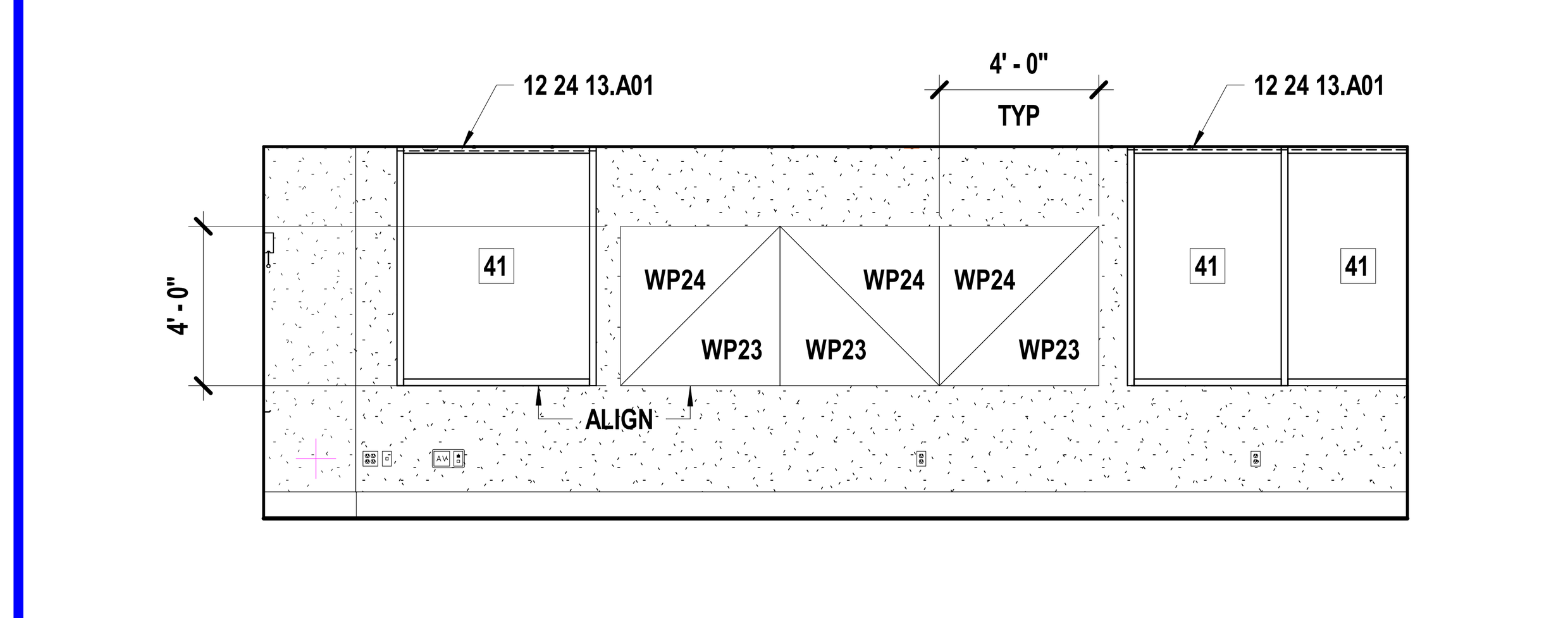
H9 Scale 1/4" = 1'-0" Interior Elevation - Link A102 - S



E4 Scale 1/4" = 1'-0" Interior Elevation - Link A102 - W



D7 Scale 1/4" = 1'-0" Interior Elevation - Art A103 - N



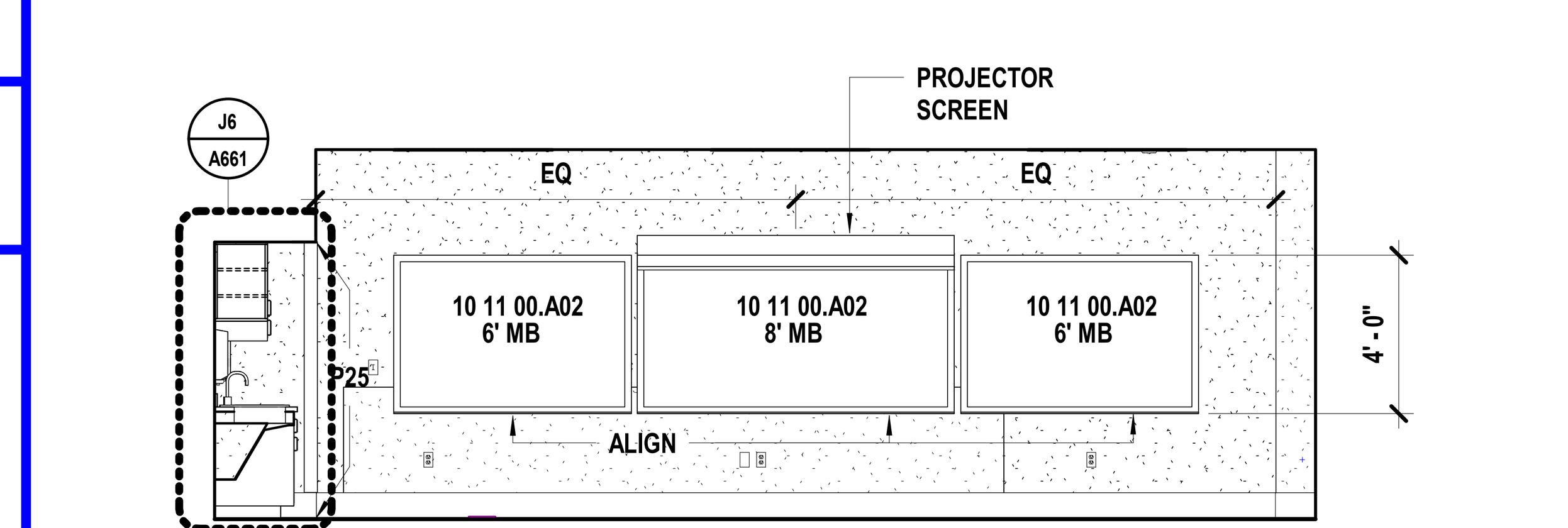
D12 Scale 1/4" = 1'-0" Interior Elevation - Art A103 - W

TILE PATTERN LEGEND

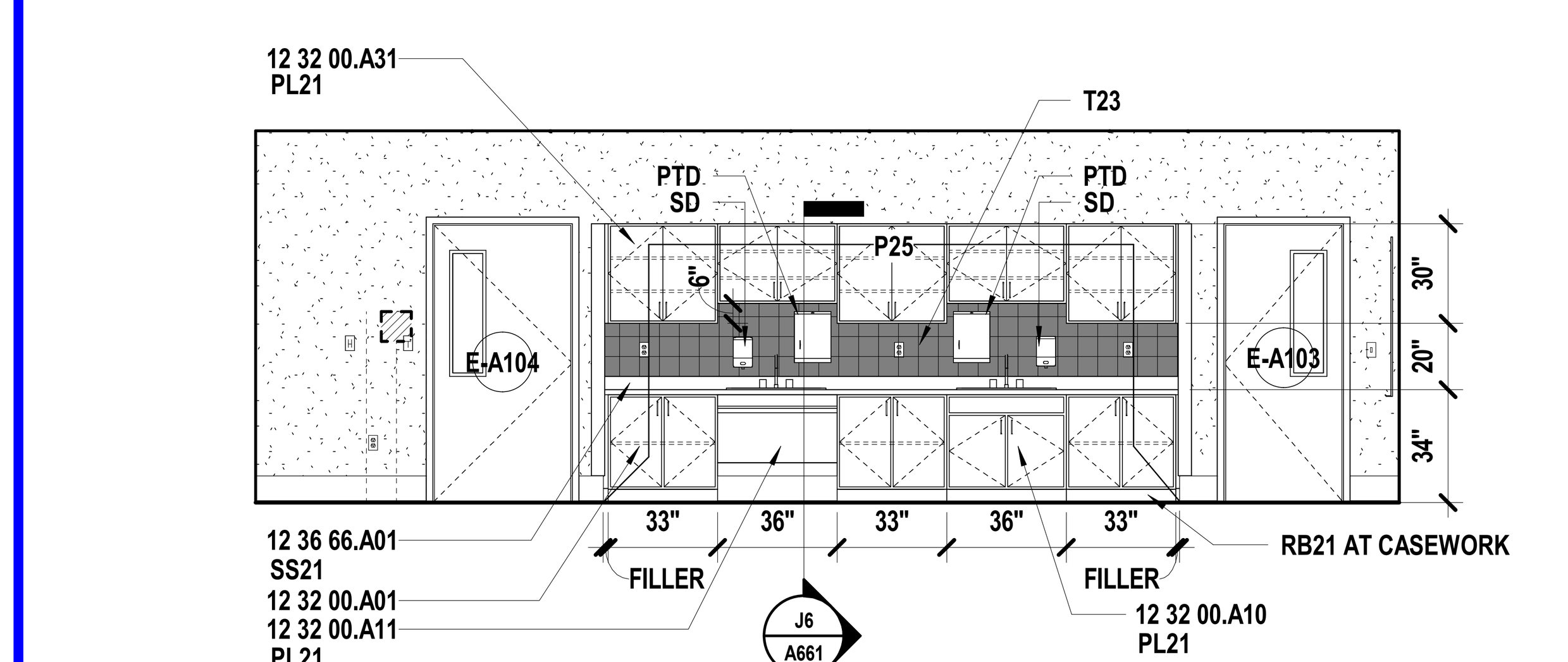
T21 - BISCUIT

T22 - DESERT GRAY

T23 - ELECTRIC BLUE



A7 Scale 1/4" = 1'-0" Interior Elevation - Art A103 - S



A12 Scale 1/4" = 1'-0" Interior Elevation - Art A103 - E

SHEET KEYNOTE LEGEND

06 40 23.A26	SLIDING DISPLAY CASE DOOR SYSTEM
09 29 00.A13	REVEAL TRIM
09 77 23.A01	FABRIC-WRAPPED PANELS
10 11 00.A02	MARKERBOARDS
10 26 00.A03	CORNER GUARDS
10 44 13.A02	SEMI-RECESSED STEEL CABINET
11 66 23.A07	WALL SAFETY PADS
12 24 13.A01	ROLLER SHADES (MANUAL)
12 32 00.A01	BASE CABINET
12 32 00.A10	SINK BASE
12 32 00.A11	ADA SINK BASE
12 32 00.A31	WALL CABINET
12 36 66.A01	SOLID SURFACE COUNTERTOP

ACOUSTICAL PANEL LEGEND

AP1 - TECTUM FINALE PANELS - 2" THICKNESS - PAINTED P21

AP1 - TECTUM FINALE PANELS - 2" THICKNESS - PAINTED P23

AP21 - TECTUM FINALE PANELS - 3" THICKNESS ; REFER TO ELEVATION FOR PAINT DESIGNATION

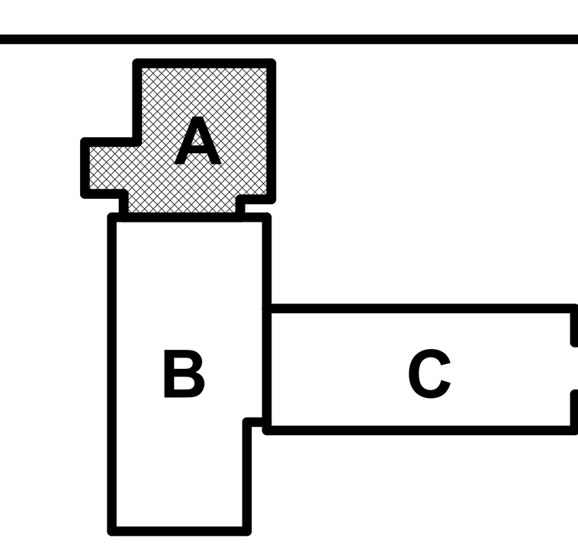
SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH
CLG2	Ceiling	White
CLG3	Ceiling	White
CLG5	Ceiling	White
CLG21	Ceiling	White
F21	Fabric	Bermuda
HP21	High Performance Coating	Natural Choice
HP22	High Performance Coating	Silver Grey
HP23	High Performance Coating	Adriatic Sea
HP24	High Performance Coating	Freshwater
HP25	High Performance Coating	Gentle Aquamarine
HP26	High Performance Coating	Grasshopper
HP27	High Performance Coating	Organic Green
HP28	High Performance Coating	Harvester
HP29	High Performance Coating	Serape
P21	Paint	Natural Choice
P22	Paint	Silver Grey
P23	Paint	Adriatic Sea
P24	Paint	Freshwater
P25	Paint	Gentle Aquamarine
P26	Paint	Grasshopper
P27	Paint	Organic Green
P28	Paint	Harvester
P29	Paint	Serape
P30	Paint	Iron Ore
P31	Paint	Virtual Green

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. COORDINATE LOCATIONS WHERE BACKING REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, AND TECHNOLOGY
3. COLOR/MATERIAL TRANSITIONS ARE NOTED WHEN THEY DO NOT OCCUR AT INSIDE CORNERS
4. REFER TO MEP SHEETS FOR LOCATION DIAGRAM OF SWITCHES, THERMOSTATS, FIRE ALARM STROBES TO BE MOUNTED ADJACENT TO ENTRY DOORS OR AT OUTSIDE CORNERS WITHIN ROOMS
5. COORDINATE WITH ELECTRICAL SHEETS FOR HEIGHT OF OUTLETS A.F.F. AND/OR ABOVE COUNTERTOPS
6. COORDINATE WITH MECHANICAL SHEETS FOR LOCATIONS OF WALL MOUNTED GRILLES AND REGISTERS
7. ALL BACKSPLASH MATERIAL TO MATCH COUNTERTOP MATERIAL, UNO
8. PROVIDE 4" BACKSPLASH, UNO
9. PROVIDE 1" OVERHANG AT ALL COUNTERTOPS, UNO
10. REFER TO PLUMBING DRAWINGS FOR LOCATIONS OF SINKS AND OTHER PLUMBING FIXTURES LOCATED WITHIN CASEWORK
11. ALL BASE CABINETS ARE TO BE 24" DEEP, UNO
12. ALL UPPER CABINETS ARE TO BE 16" DEEP, UNO
13. ALL TALL STORAGE AND WARDROBE CABINETS ARE TO BE 24" DEEP, UNO
14. ALL CLASSROOM CASEWORK TO HAVE LOCKS
15. PROVIDE WOOD CLEAT AT BACK AND SIDE WALLS OF ALL COUNTERTOPS WITH NO BASE CABINET BELOW
16. CONFIRM TACKBOARD AND MARKERBOARD MOUNTING HEIGHTS WITH OWNER PRIOR TO FINAL INSTALL.

KEY PLAN



hollis + miller architects

we design the future

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

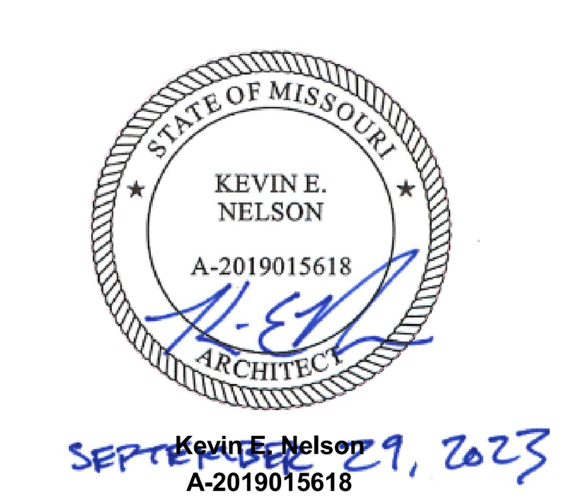
EPiC Elementary Storm Shelter Addition

Liberty Public Schools

650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023



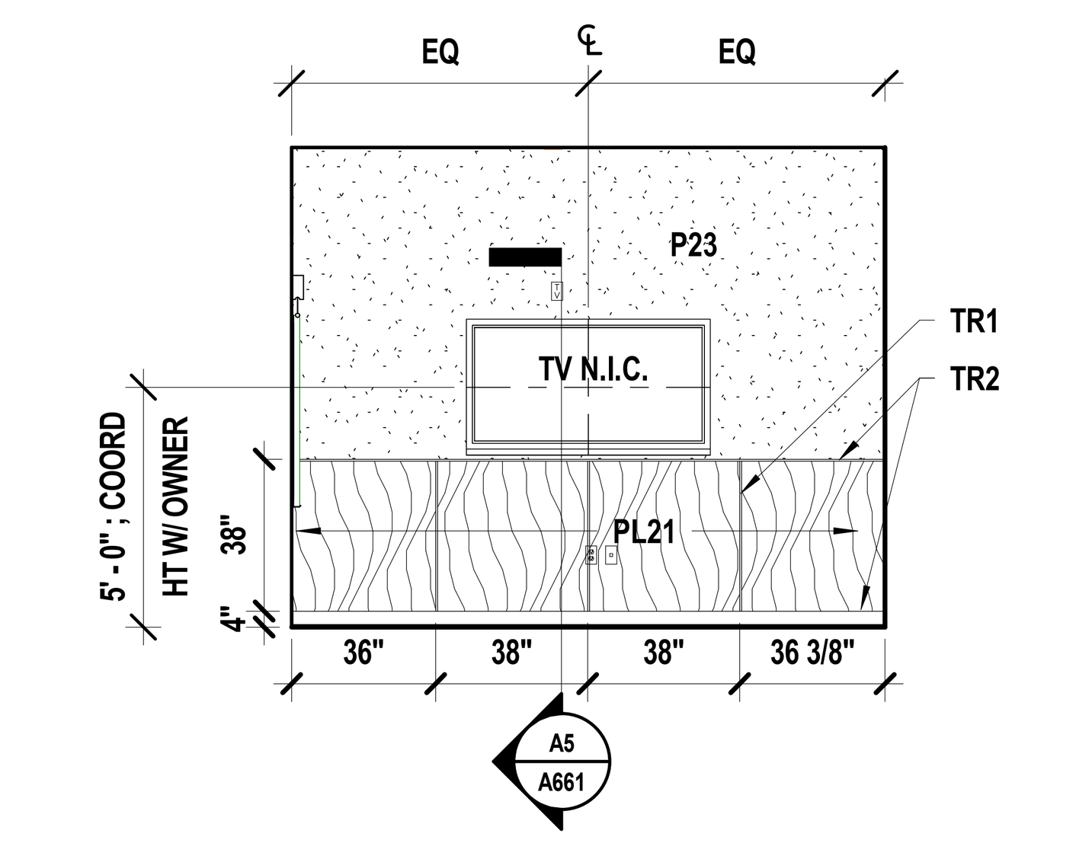
Kevin E. Nelson
A-2019015618

JOB NO: 23020.00
DRAWN BY: EW
CHECKED BY: JB
DATE: 09/29/2023

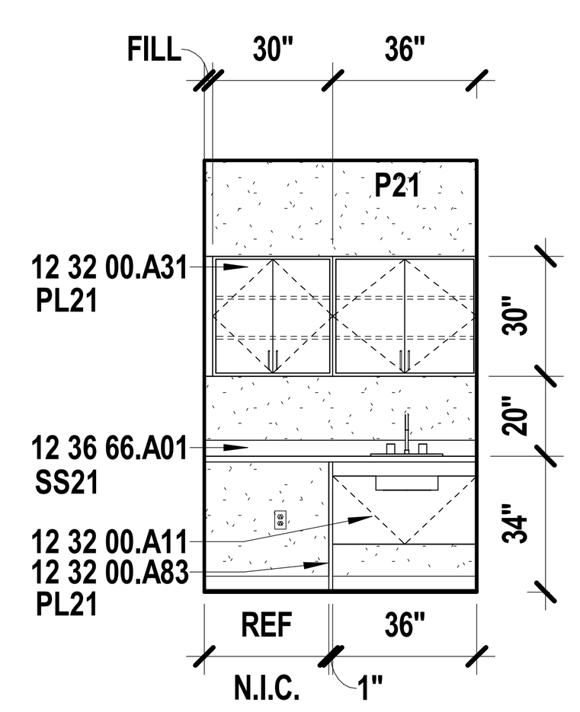
A621

INTERIOR ELEVATIONS

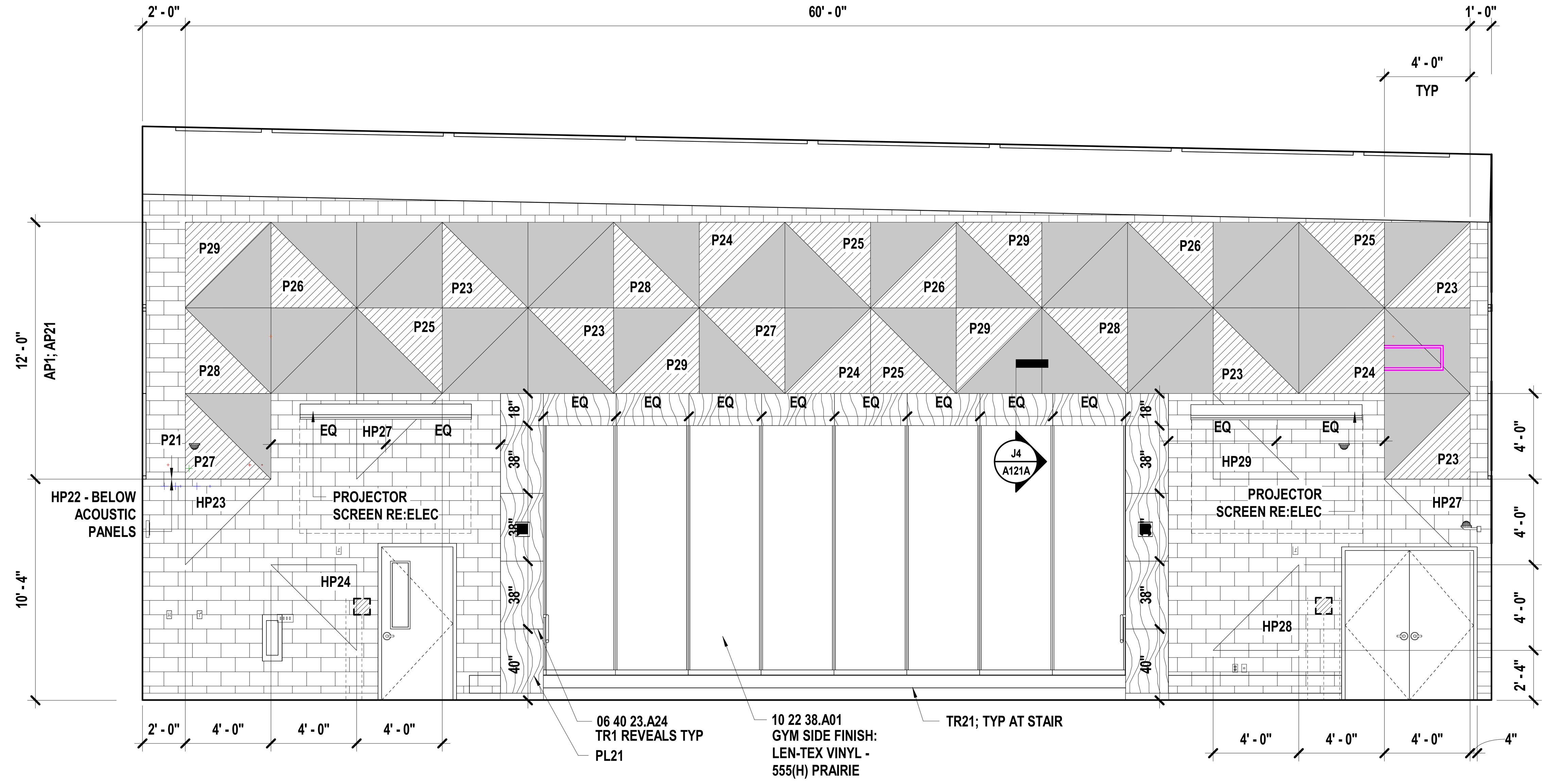
9/28/2023 4:13:46 PM



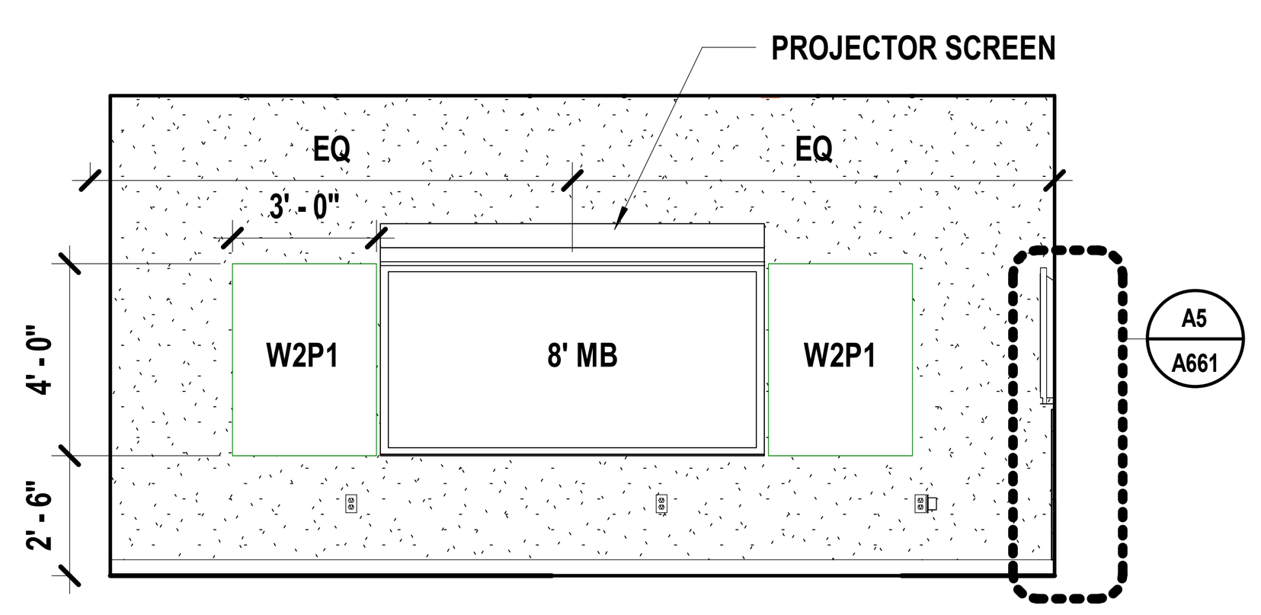
N1 Scale 1/4" = 1'-0" Interior Elevation - Conference - E



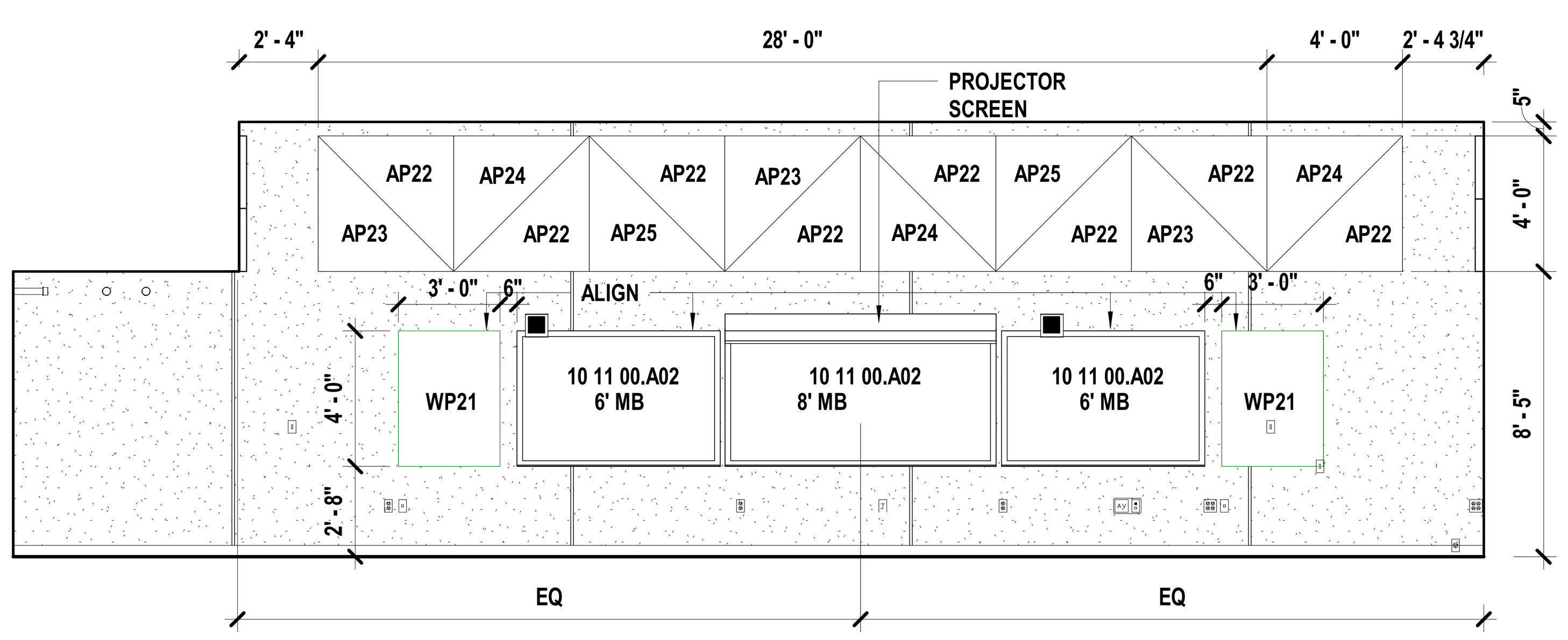
N4 Scale 1/4" = 1'-0" Interior Elevation - Mothers room - S



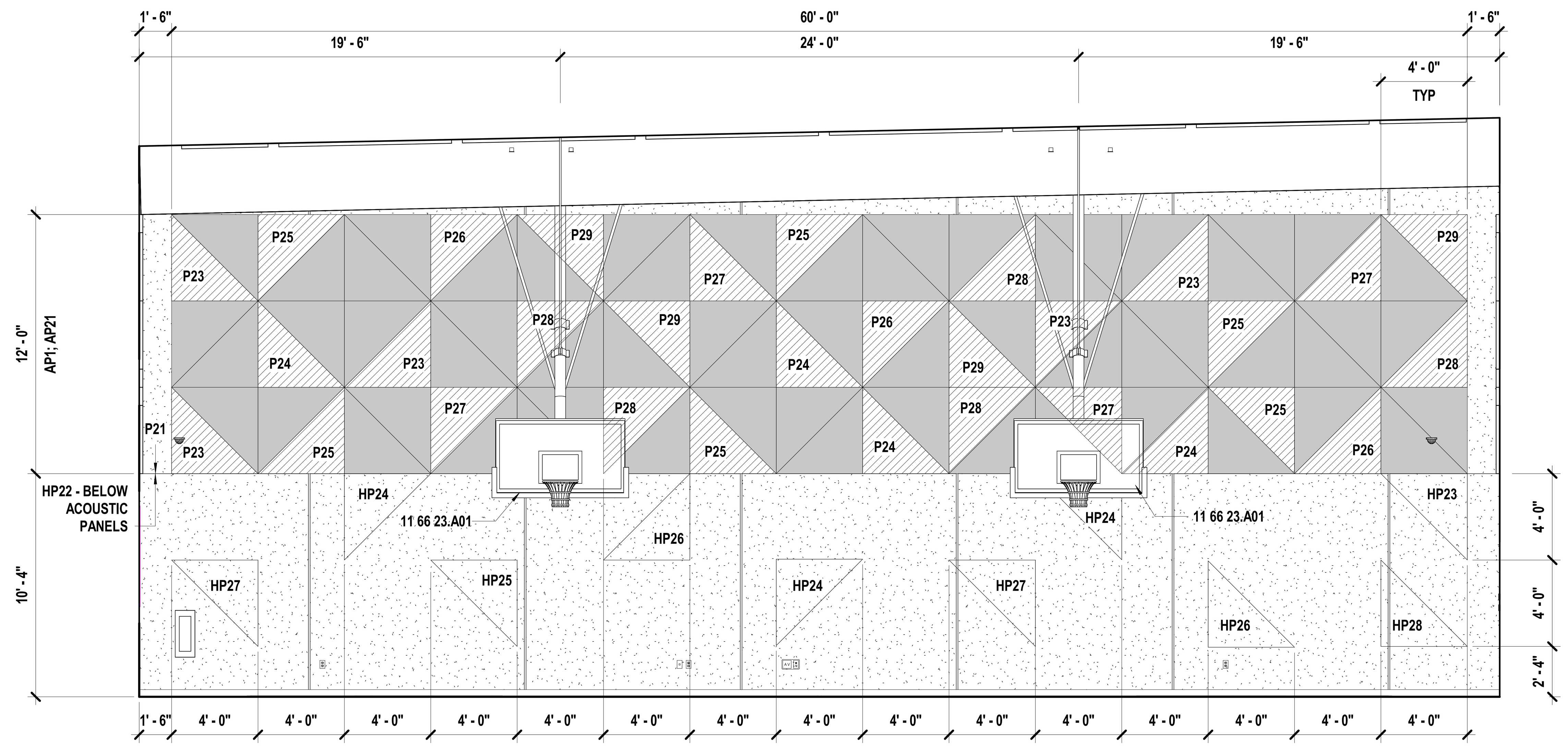
L7 Scale 1/4" = 1'-0" Interior Elevation - Gym A111 - W



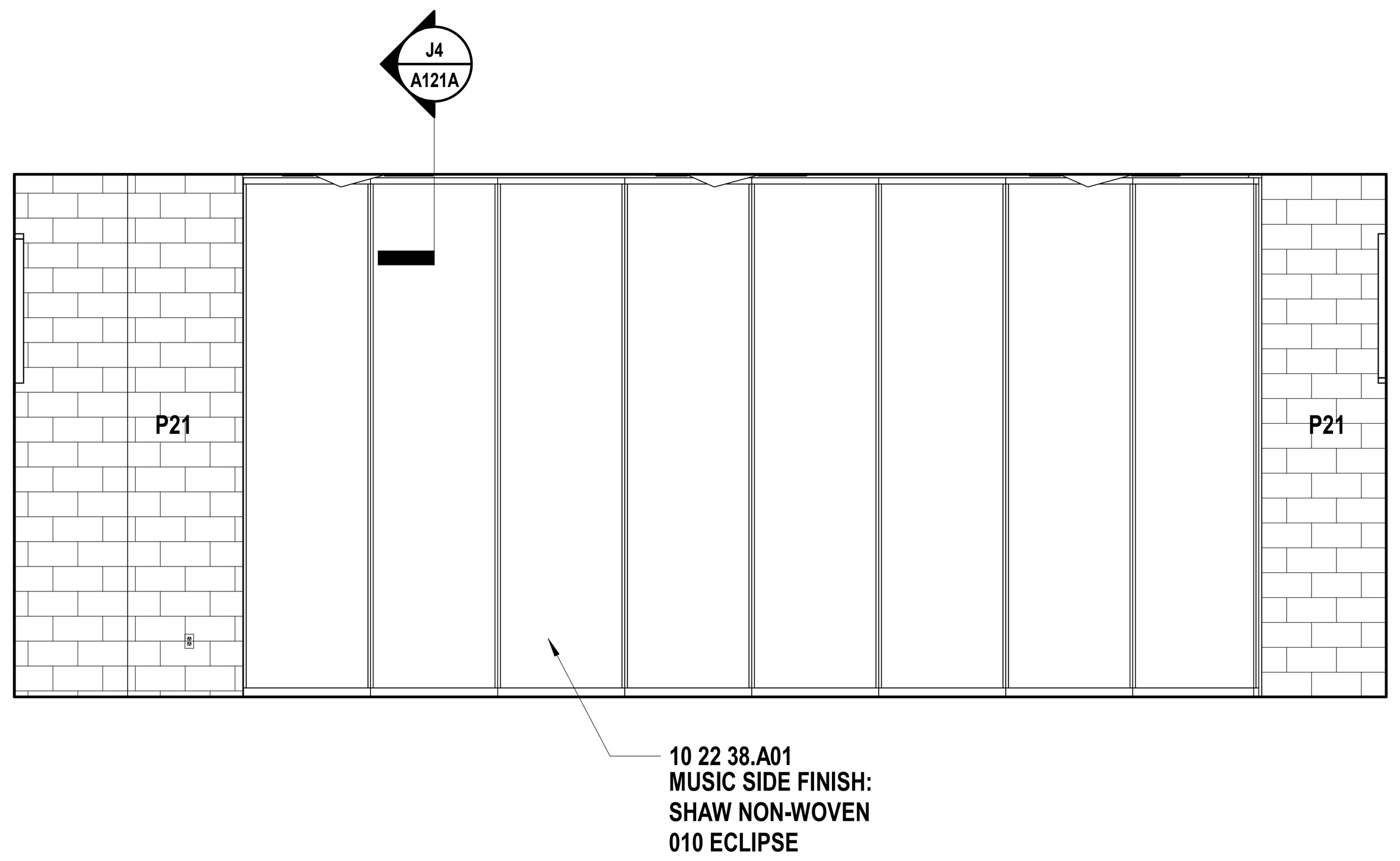
J1 Scale 1/4" = 1'-0" Interior Elevation - Conference - N



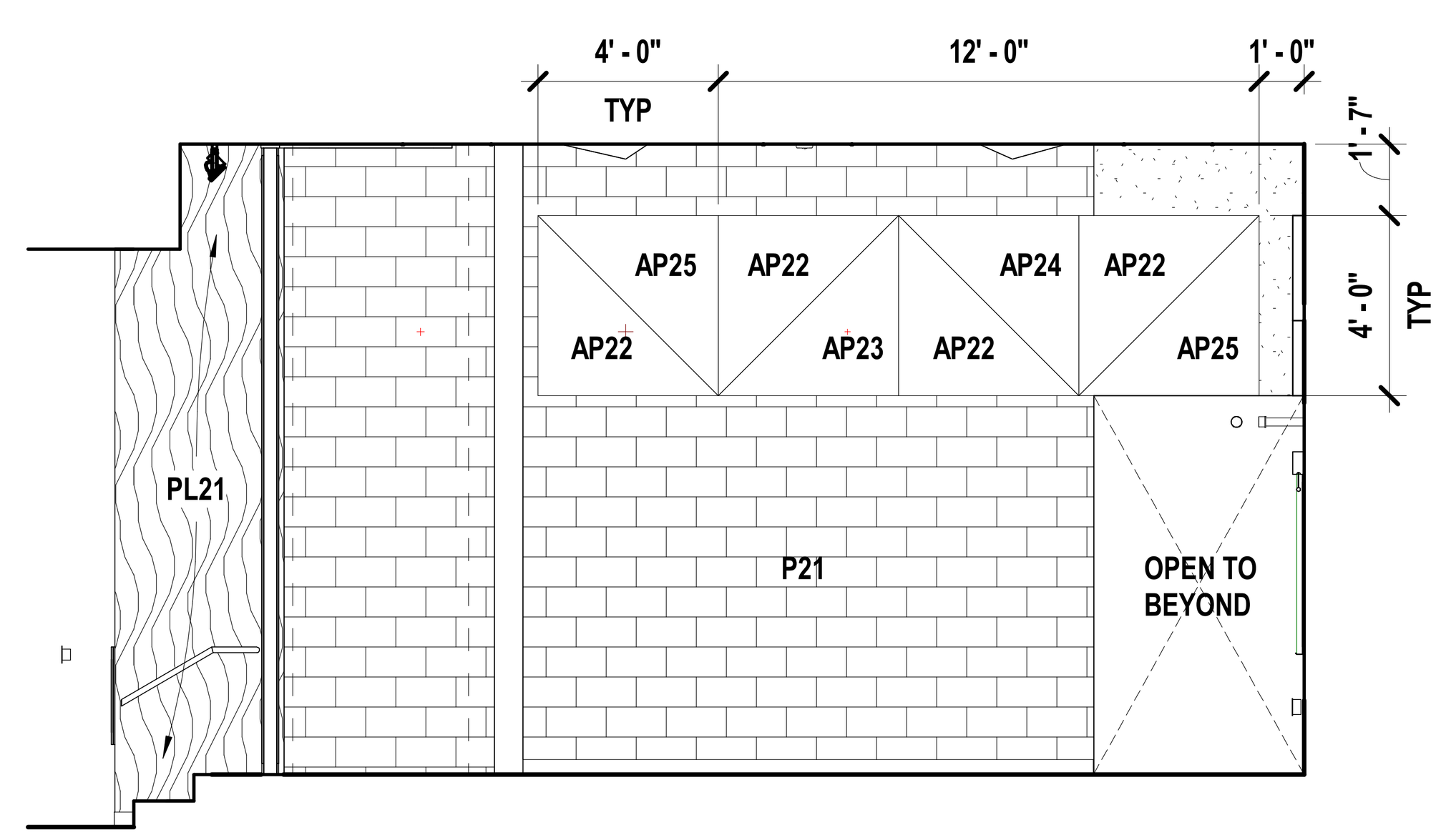
E1 Scale 1/4" = 1'-0" Interior Elevation - Music A114 - W



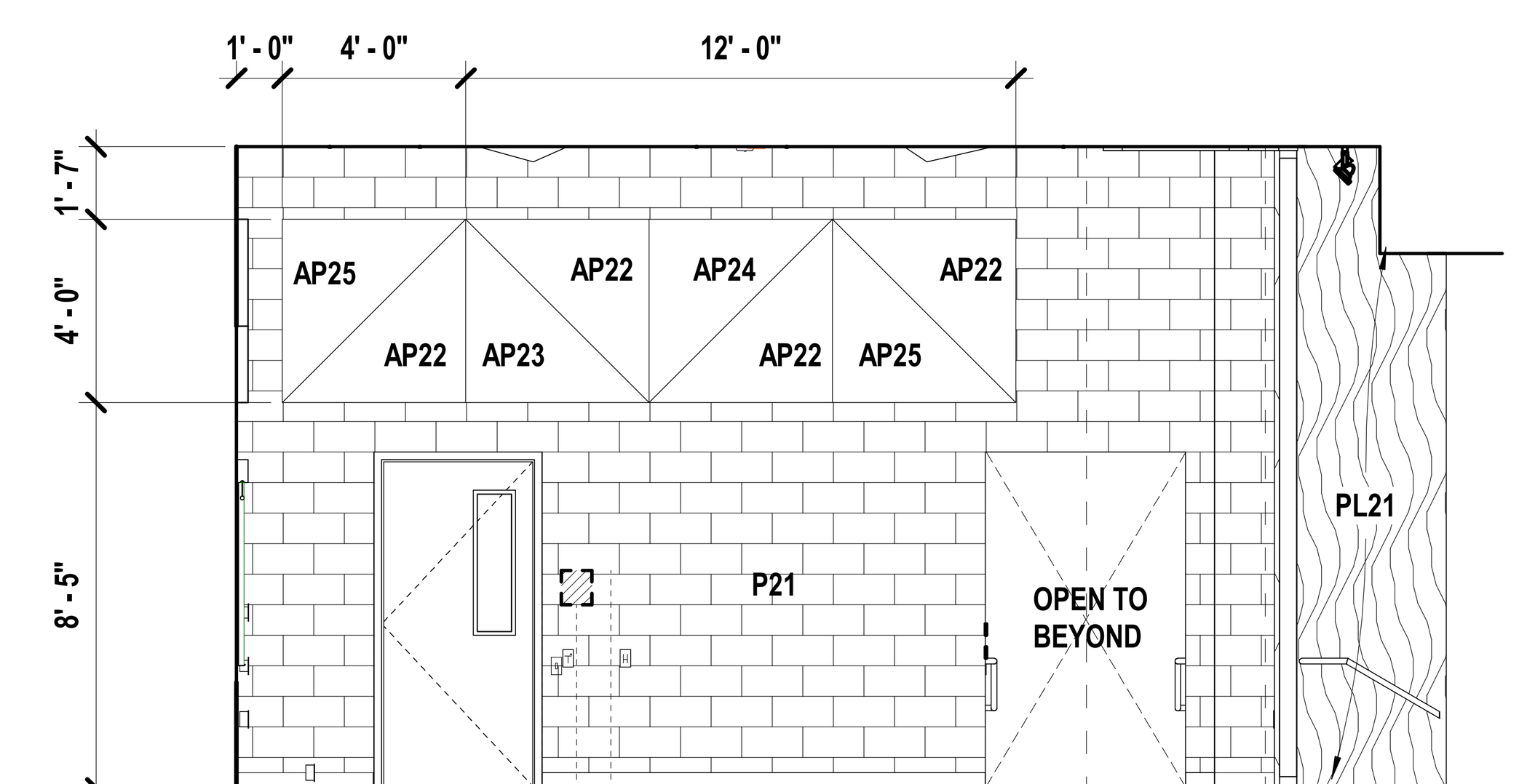
E7 Scale 1/4" = 1'-0" Interior Elevation - Gym A111 - E



A1 Scale 1/4" = 1'-0" Interior Elevation - Music A114 - E



A7 Scale 1/4" = 1'-0" Interior Elevation - Music A114 - S



A12 Scale 1/4" = 1'-0" Interior Elevation - Music A114 - N

SHEET KEYNOTE LEGEND

06 40 23.A24	METAL EDGE TRIM
10 11 00.A02	MARKERBOARDS
10 22 38.A01	OPERABLE PANEL PARTITION (SINGLE PANEL)
11 66 23.A01	OVERHEAD BACKBOARD SUPPORTS
12 32 00.A11	ADA SINK BASE
12 32 00.A31	WALL CABINET
12 32 00.A83	END PANEL
12 36 66.A01	SOLID SURFACE COUNTERTOP

ACOUSTICAL PANEL LEGEND

- AP1 - TECTUM FINALE PANELS - 2" THICKNESS - PAINTED P21
- AP1 - TECTUM FINALE PANELS - 2" THICKNESS - PAINTED P23
- AP21 - TECTUM FINALE PANELS - 3" THICKNESS ; REFER TO ELEVATION FOR PAINT DESIGNATION

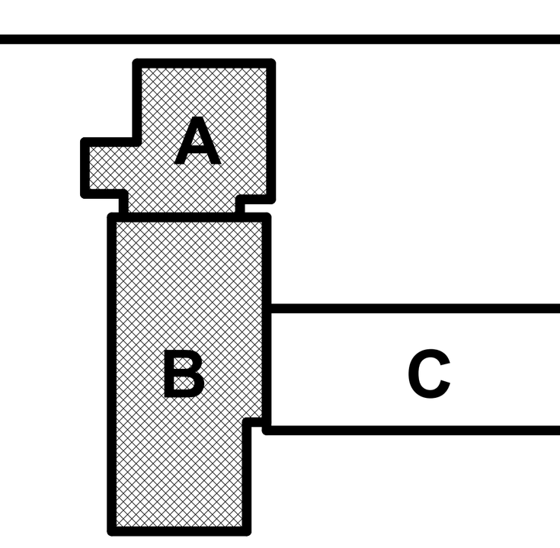
SHEET MATERIAL FINISH LEGEND

ID	MATERIAL	COLOR/FINISH
CLG2	Ceiling	White
CLG3	Ceiling	White
CLG5	Ceiling	White
CLG21	Ceiling	White
F21	Fabric	Bermuda
HP21	High Performance Coating	Natural Choice
HP22	High Performance Coating	Silver Grey
HP23	High Performance Coating	Adriatic Sea
HP24	High Performance Coating	Freshwater
HP25	High Performance Coating	Gentle Aquamarine
HP26	High Performance Coating	Grasshopper
HP27	High Performance Coating	Organic Green
HP28	High Performance Coating	Harvester
HP29	High Performance Coating	Serape
P21	Paint	Natural Choice
P22	Paint	Silver Grey
P23	Paint	Adriatic Sea
P24	Paint	Freshwater
P25	Paint	Gentle Aquamarine
P26	Paint	Grasshopper
P27	Paint	Organic Green
P28	Paint	Harvester
P29	Paint	Serape
P30	Paint	Iron Ore
P31	Paint	Virtual Green

SHEET NOTES

1. REFER TO SHEET G000 FOR SHEET INDEX
2. COORDINATE LOCATIONS WHERE BACKING REQUIRED FOR WALL HUNG CASEWORK, MARKERBOARDS, AND TECHNOLOGY
3. COLOR/MATERIAL TRANSITIONS ARE NOTED WHEN THEY DO NOT OCCUR AT INSIDE CORNERS
4. REFER TO MEP SHEETS FOR LOCATION DIAGRAM OF SWITCHES, THERMOSTATS, FIRE ALARM STROBES TO BE MOUNTED ADJACENT TO ENTRY DOORS OR AT OUTSIDE CORNERS WITHIN ROOMS
5. COORDINATE WITH ELECTRICAL SHEETS FOR HEIGHT OF OUTLETS A.F.F. AND/OR ABOVE COUNTERTOPS
6. COORDINATE WITH MECHANICAL SHEETS FOR LOCATIONS OF WALL MOUNTED GRILLES AND REGISTERS
7. ALL BACKSPLASH MATERIAL TO MATCH COUNTERTOP MATERIAL, UNO
8. PROVIDE 4" BACKSPLASH, UNO
9. PROVIDE 1" OVERHANG AT ALL COUNTERTOPS, UNO
10. REFER TO PLUMBING DRAWINGS FOR LOCATIONS OF SINKS AND OTHER PLUMBING FIXTURES LOCATED WITHIN CASEWORK
11. ALL BASE CABINETS ARE TO BE 24" DEEP, UNO
12. ALL UPPER CABINETS ARE TO BE 16" DEEP, UNO
13. ALL TALL STORAGE AND WARDROBE CABINETS ARE TO BE 24" DEEP, UNO
14. ALL CLASSROOM CASEWORK TO HAVE LOCKS
15. PROVIDE WOOD CLEAT AT BACK AND SIDE WALLS OF ALL COUNTERTOPS WITH NO BASE CABINET BELOW
16. CONFIRM TACKBOARD AND MARKERBOARD MOUNTING HEIGHTS WITH OWNER PRIOR TO FINAL INSTALL.

KEY PLAN



hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

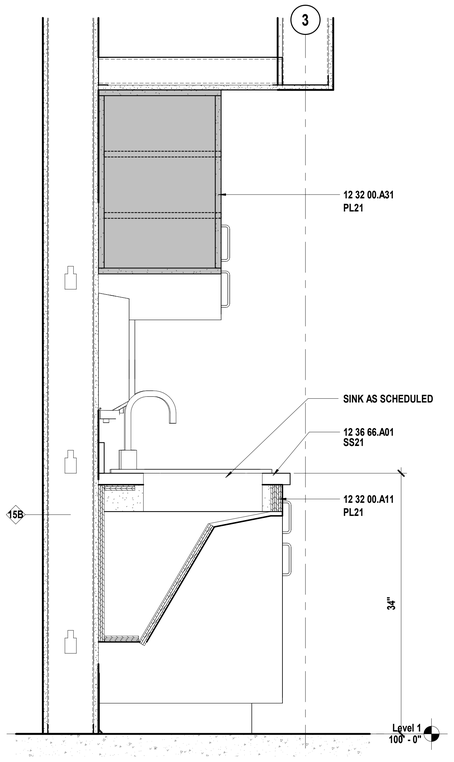
STATE OF MISSOURI
KEVIN E. NELSON
A-2019015618
ARCHITECT
Kevin E. Nelson
A-2019015618
Sept. 29, 2023

JOB NO: 23020.00
DRAWN BY: EW
CHECKED BY: JB
DATE: 09/29/2023

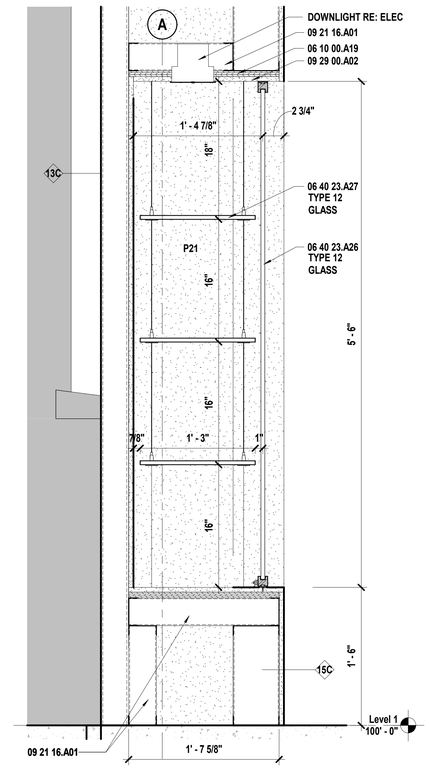
A622

INTERIOR ELEVATIONS

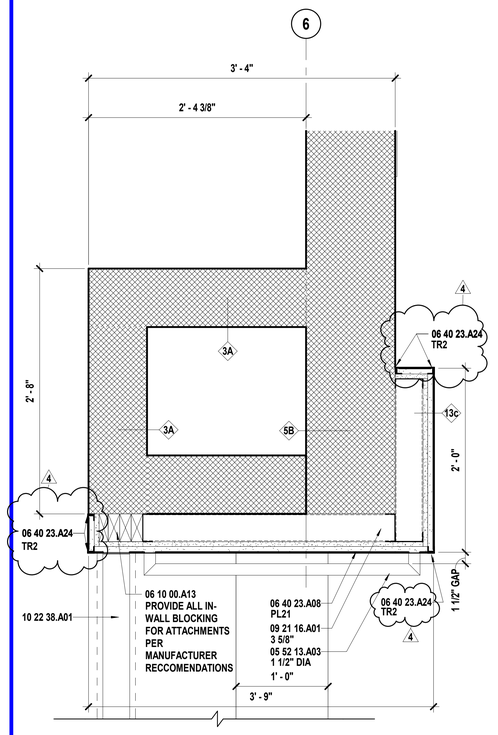
9/28/2023 4:13:54 PM



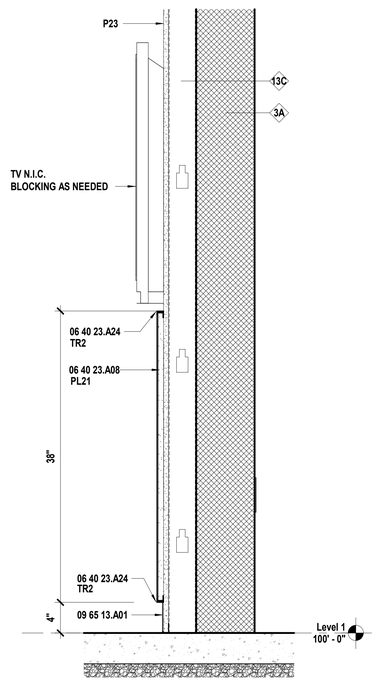
J6 | Scale 1 1/2" = 1'-0" | Interior Millwork detail - ADA sink @ Art



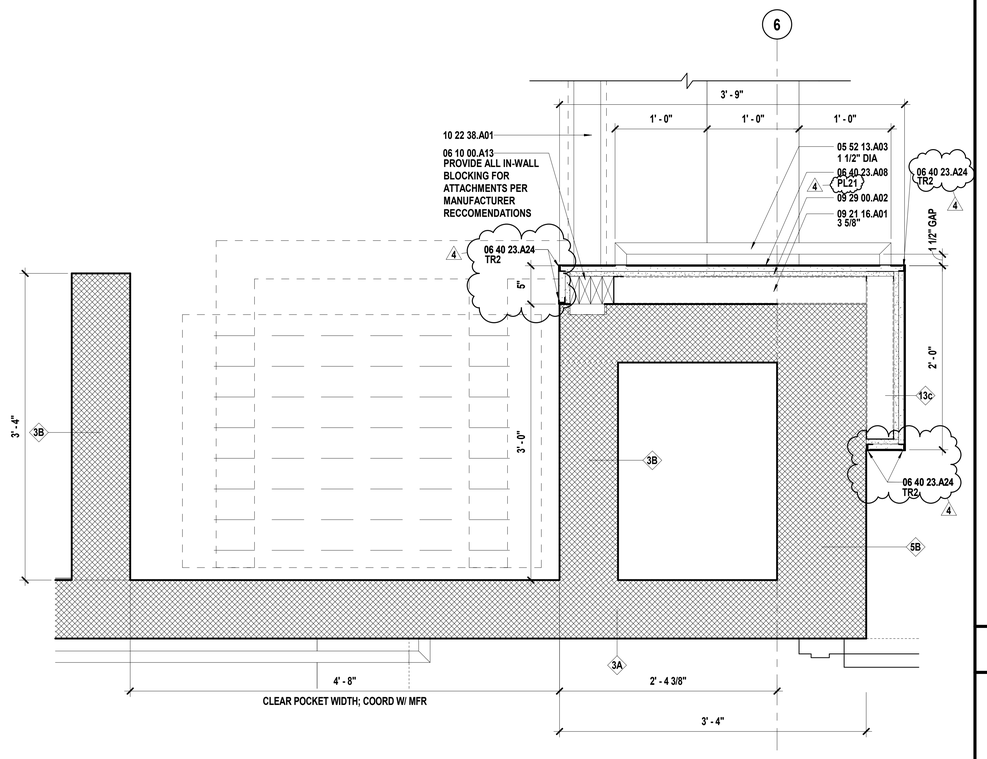
J9 | Scale 1 1/2" = 1'-0" | Section Detail - Area A - The Link Display Case



J13 | Scale 1 1/2" = 1'-0" | Plan Detail - Stage Surround



A5 | Scale 1 1/2" = 1'-0" | Interior Millwork Detail - Conference room feature wall

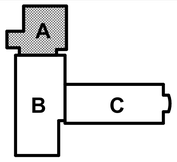


A9 | Scale 1 1/2" = 1'-0" | Plan Detail - Music Level - Operable Partition

SHEET KEYNOTE LEGEND

05 52 13.A03	STAINLESS STEEL PIPE AND TUBE RAILINGS
06 10 00.A13	WOOD BLOCKING/NAILERS
06 10 00.A19	PLYWOOD BLOCKING AND BACKING PANELS
06 40 23.A08	PLASTIC LAMINATE-CLAD PANELS
06 40 23.A24	METAL EDGE TRIM
06 40 23.A26	SLIDING DISPLAY CASE DOOR SYSTEM
06 40 23.A27	DISPLAY CASE SHELVING SYSTEM
09 21 16.A01	NON-STRUCTURAL FRAMING
09 29 00.A02	GYPSUM BOARD - TYPE X
09 65 13.A01	RESILIENT BASE
10 22 38.A01	OPERABLE PANEL PARTITION (SINGLE PANEL)
12 32 00.A11	ADA SINK BASE
12 32 00.A31	WALL CABINET
12 36 66.A01	SOLID SURFACE COUNTERTOP

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

KEVIN E. NELSON
A-2019015618
STATE OF MISSOURI
ARCHITECT

Kevin E. Nelson
A-2019015618
SEPTEMBER 29, 2023

JOB NO: 23020.00
DRAWN BY: EW
CHECKED BY: JB
DATE: 09/29/2023

A661

INTERIOR DETAILS

9/28/2023 4:13:57 PM

MATERIAL FINISH LEGEND

MATERIAL	ID	KEYNOTE	MANUFACTURER	STYLE/MODEL NO	COLOR/FINISH	COMMENTS
Athletic Flooring	AF21	09 65 66.A01	Gerflor	Taraflex Sport M Plus Flooring	5742 Oak	7.5 MM
Athletic Flooring	AF22	09 65 66.A01	Gerflor	Taraflex Sport M Plus Flooring	6430 Blue	7.5 MM
Acoustical Panels	AP1	09 84 33.A04	Armstrong	TECTUM FINALE Wall Panels	RE:ELEV	2" Thickness
Acoustical Panels	AP2	09 84 36.A01	Armstrong Ceilings	TECTUM FINALE Ceiling Panels	RE:RCP	2" Thickness
Acoustical Panels	AP21	09 84 33.A04	Armstrong	TECTUM FINALE Wall Panels	RE:ELEV	3" Thickness
Acoustical Panels	AP22	09 84 33.A01	Golterman & Sabo Acoustics	Acousti-Panels	Designtex Rocket - Linen	
Acoustical Panels	AP23	09 84 33.A01	Golterman & Sabo Acoustics	Acousti-Panels	Designtex Rocket - Citrine	
Acoustical Panels	AP24	09 84 33.A01	Golterman & Sabo Acoustics	Acousti-Panels	Designtex Rocket - Marine	
Acoustical Panels	AP25	09 84 33.A01	Golterman & Sabo Acoustics	Acousti-Panels	Designtex Rocket - Carribean	
Carpet	C1	09 68 13.A01	Patcraft	Walk Right In I	Charcoal 00590	24x24 Tile; Non-Directional Installation
Carpet	C21	09 68 13.A01	Tarkett	Street Life	Street Corner 36104	24x24 Tile ; Brick Installation
Ceiling	CLG2	09 51 13.A01	Armstrong Ceilings	Fine Fissured High NRC, #1754	White	24x24x3/4"
Ceiling	CLG3	09 51 13.A01	Armstrong Ceilings	ULTIMA Square Lay-in	White	24x24x3/4"
Ceiling	CLG5	09 51 13.A01	Armstrong Ceilings	Kitchen Zone	White	24x24x3/4"
Ceiling	CLG21	09 84 36.A02	Golterman & Sabo Acoustics	Ceiling Sound Diffusers	White	48 x 48
Concrete Finish	CON1	03 30 00.A01	RE:spec			
Fabric	F21	11 61 43.A01	Rosebrand	22oz. Encore Velour, Re: Spec Quartz Cremona TG	Bermuda	
Floor (Poured) Topping	FT21	09 67 23.A01	Desco		Whitewater	
Floor (Poured) Topping	FTB21	09 67 23.A02	Desco	Quartz Cremona TG	Whitewater	8" Integral Cove Base
High Performance Coating	HP21	09 96 00.A01	Sherwin Williams	SW7011	Natural Choice	
High Performance Coating	HP22	09 96 00.A01	Sherwin Williams	SW0049	Silver Grey	
High Performance Coating	HP23	09 96 00.A01	Sherwin Williams	SW6790	Adriatic Sea	
High Performance Coating	HP24	09 96 00.A01	Sherwin Williams	SW6774	Freshwater	
High Performance Coating	HP25	09 96 00.A01	Sherwin Williams	SW9046	Gentle Aquamarine	
High Performance Coating	HP26	09 96 00.A01	Sherwin Williams	SW6733	Grasshopper	
High Performance Coating	HP27	09 96 00.A01	Sherwin Williams	SW6732	Organic Green	
High Performance Coating	HP28	09 96 00.A01	Sherwin Williams	SW6373	Harvester	
High Performance Coating	HP29	09 96 00.A01	Sherwin Williams	SW6656	Serape	
Paint	P21	09 91 23.A02	Sherwin Williams	SW7011	Natural Choice	
Paint	P22	09 91 23.A02	Sherwin Williams	SW0049	Silver Grey	
Paint	P23	09 91 23.A02	Sherwin Williams	SW6790	Adriatic Sea	
Paint	P24	09 91 23.A02	Sherwin Williams	SW6774	Freshwater	
Paint	P25	09 91 23.A02	Sherwin Williams	SW9046	Gentle Aquamarine	
Paint	P26	09 91 23.A02	Sherwin Williams	SW6733	Grasshopper	
Paint	P27	09 91 23.A02	Sherwin Williams	SW6732	Organic Green	
Paint	P28	09 91 23.A02	Sherwin Williams	SW6373	Harvester	
Paint	P29	09 91 23.A02	Sherwin Williams	SW6656	Serape	
Paint	P30	09 91 23.A02	Sherwin Williams	SW7069	Iron Ore	
Paint	P31	09 91 23.A02	Pro Cyc	Chroma Key Paint & Primer	Virtual Green	
Plastic Laminate	PL21		Wilsonart		Fusion Maple	
Resilient Base & Accessories	RB21	09 65 13.A01	ROPPE	Pinnacle Rubber Base	123 Charcoal	4" cove
Trim	RB22	09 65 13.A06	Tarkett	Rubber Stair Nosing VIVCD w/Grit Tape	Moon Rock	
Simulated Stone	SS21	12 36 66.A01	Corian	Solid Surface Countertops	Linen	
Tile	T21	09 30 00.A01	Daltile	Color Wheel Classic	Biscuit K175	6x6" ; RE:ELEV for layout
Tile	T22	09 30 00.A01	Daltile	Color Wheel Classic	Desert gray X114	6x6" ; RE:ELEV for layout
Tile	T23	09 30 00.A01	Daltile	Color Wheel Classic	Electric Blue 0166	6x6" ; RE:ELEV for layout
Trim	TR1	06 40 23.A24	Fry Reget	Millwork Channel W / Return Keys	Buffed Satin Stainless Steel	
Trim	TR2	06 40 23.A24	Fry Reget	Millwork Reveal L Angle W/ Return Keys	Buffed Satin Stainless Steel	
Trim	TR22	09 68 13.A02	Gradus	RT42/AFT28	Black	
Tile	TR23	09 30 00.A04	Schluter	Quadec	Brushed Stainelss Steel	
Wall Paneling	WP21	09 77 23.A01	Guilford of Maine	Bailey	Allagash Mist	
Wall Paneling	WP22	09 77 23.A01	Designtex	Rocket	Marine	
Wall Paneling	WP23	09 77 23.A01	Designtex	Rocket	Carribean	

GENERAL FINISH NOTES

1. REFER TO FINISH FLOOR PLANS, REFLECTED CEILING PLANS, ELEVATIONS, AND DETAILS FOR EXTENT OF MULTIPLE FINISHES.
2. DO NOT PAINT NATURAL OR MANUFACTURED STONE, BRICK, GLAZED BLOCK OR ANY OTHER PREFINISHED MATERIALS.
3. DO NOT PAINT ALUMINUM OR OTHER NON-FERROUS METALS THAT ARE PREFINISHED.
4. MATCH VERTICAL FINISH OF ALL INTERIOR GYPSUM BOARD SOFFITS TO HORIZONTAL FINISH AS NOTED ON RCP OR ROOM FINISH SCHEDULE, UNO.
5. PAINT ALL EXPOSED CEILINGS DESIGNATED AS 'OTS' AS INDICATED ON ROOM FINISH SCHEDULE. PAINTING INCLUDES, BUT IS NOT LIMITED TO: EXPOSED STRUCTURE, JOISTS, METAL DECKING, EXISTING TECTUM PANELS, DUCTWORK AND MECHANICAL EQUIPMENT.
6. PAINT ALL EXPOSED STEEL, UNO.
7. PAINT ALL INTERIOR HOLLOW METAL DOORS AND FRAMES COLOR < P30 >, UNO.
8. PAINT OR FINISH THE FOLLOWING ITEMS TO MATCH ADJACENT PAINT OR FINISH:
   a. ELECTRICAL PANELS IN FINISHED ROOMS
   b. GRILLES, LOUVERS ETC. PRIMED OR SPECIFIED TO BE PAINTED, UNO.
   c. UNFINISHED SPEAKER OUTLET GRILLES
   d. VISIBLE PORTIONS OF DUCTWORK AND MECH EQUIPMENT BEHIND VENTS, GRILLES AND DIFFUSERS

hollis+miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI
KEVIN E NELSON
A-2019015618
ARCHITECT

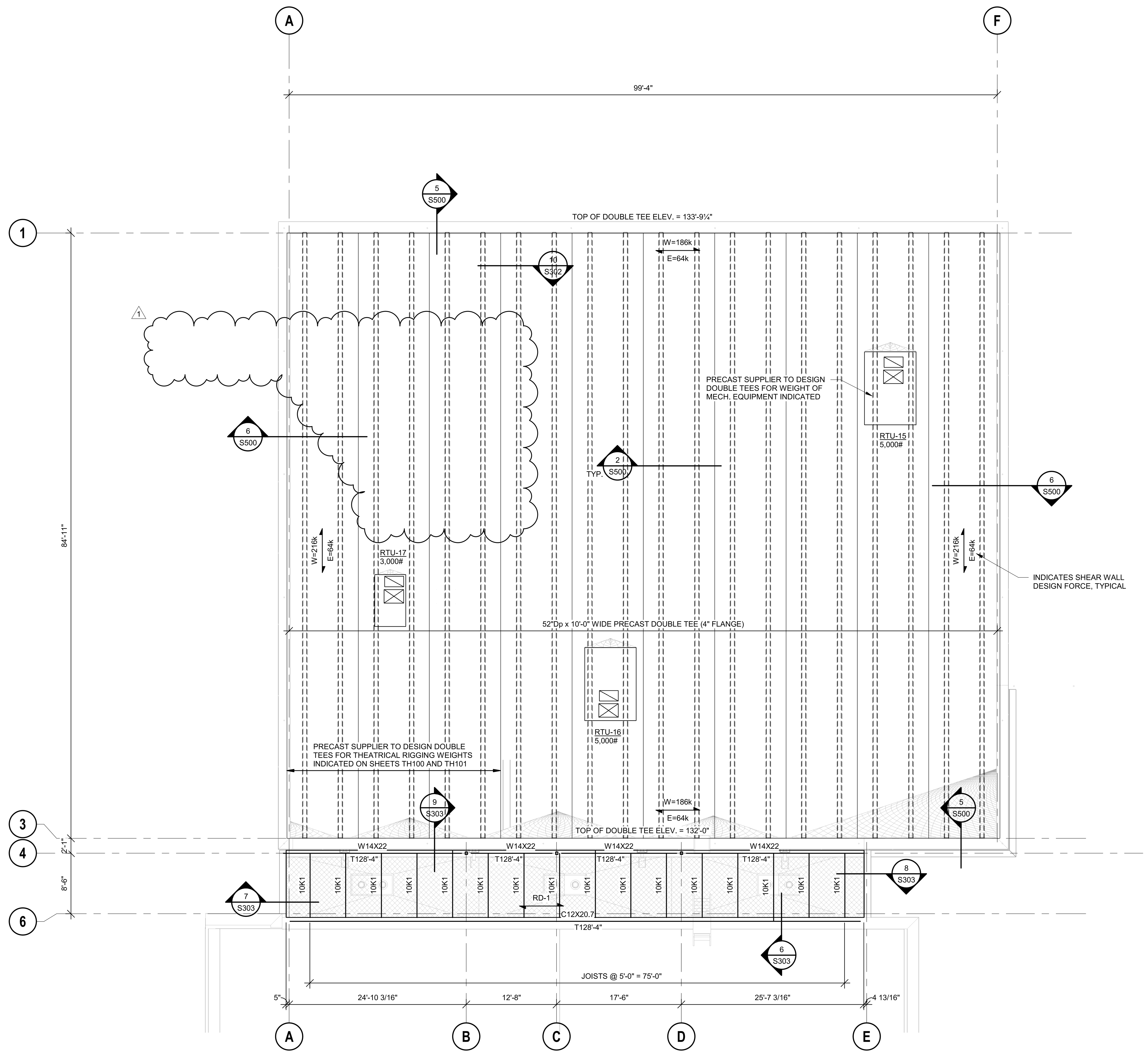
SEPTEMBER 29, 2023
Kevin E. Nelson
A-2019015618

JOB NO: 23020.00
DRAWN BY: EW
CHECKED BY: JB
DATE: 09/29/2023

A681

MATERIAL FINISH LEGEND

9/28/2023 4:13:57 PM



1 ROOF FRAMING PLAN

1/8" = 1'-0"

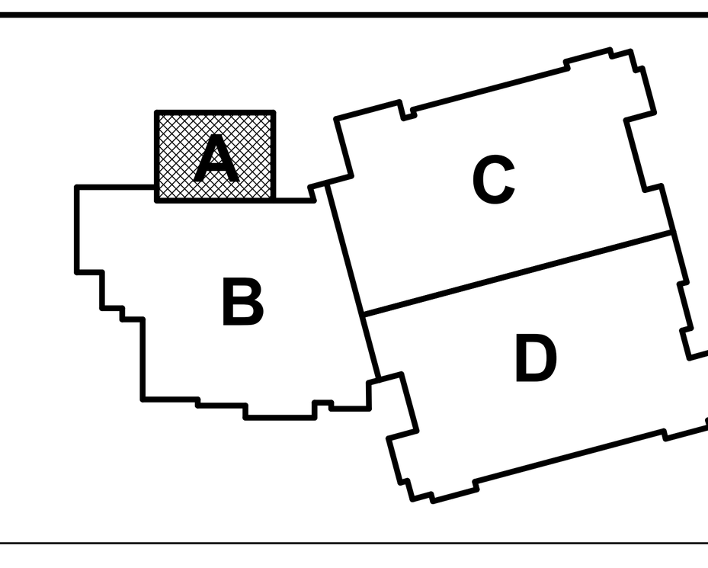
NOTES:

1. REFER TO GENERAL NOTES AND LEGEND ON SHEET S001

PROJECT NORTH

TRUE NORTH

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Discovery Middle School Storm Shelter Addition

Liberty School District

800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

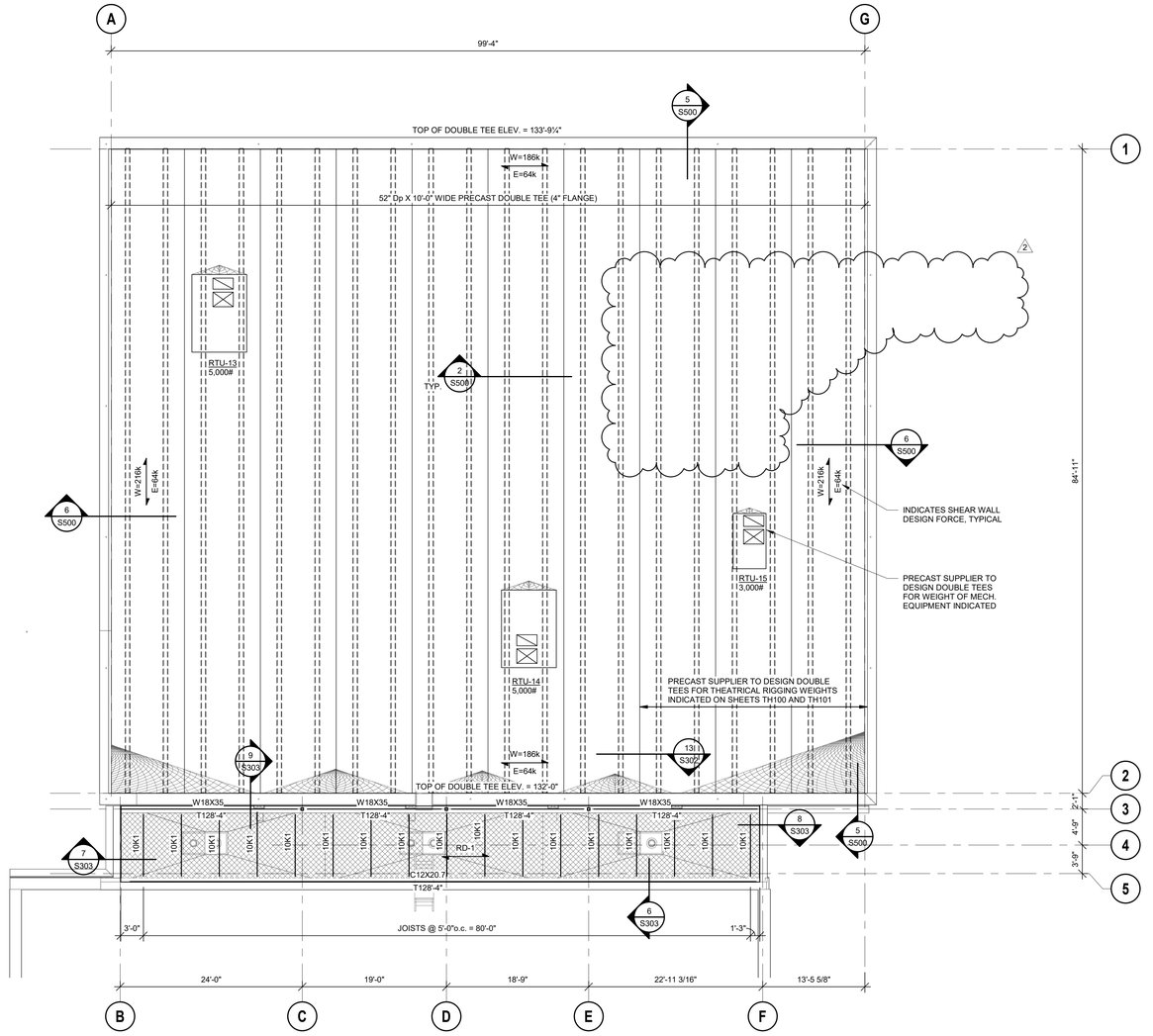
#	Description	Date
1	Addendum 04	09/29/2023

9-29-23

JOB NO: 23018
DRAWN BY: TAJ
CHECKED BY: WED
DATE: 08.31.2023

S102

HIGH ROOF FRAMING PLAN



1 ROOF FRAMING PLAN

1/8" = 1'-0"

hollis+miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001005364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0754
660.429.1383 phone

South Valley Middle School Storm Shelter Addition
Liberty School District
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

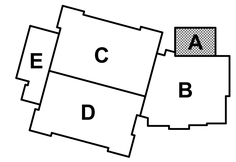
#	Description	Date
2	Addendum 04	09/29/2023

STATE OF MISSOURI
TRAVIS A. JOHNSON
NUMBER 2006031333
REGISTERED PROFESSIONAL ENGINEER
9-29-23

JOB NO: 23019
DRAWN BY: TAJ
CHECKED BY: WED
DATE: 08.31.2023

S102

KEY PLAN



PROJECT NORTH

TRUE NORTH

HIGH ROOF FRAMING PLAN

Please consider the environment before printing this.

9/29/2023 8:44:04 AM

GENERAL NOTES - STRUCTURAL

1. General Information

A. The contractor shall verify dimensions and conditions before construction and notify the engineer of any discrepancies, inconsistencies, or difficulties affecting the work before proceeding.
B. The contractor shall coordinate all disciplines, verifying size and location of all openings, whether shown on structural drawings or not, as called for on architectural, mechanical, or electrical drawings. In the case of work in an existing building the contractor shall scan existing structure to locate all rebar in the area of the new core/opening using ground penetrating radar and notify the engineer of record for review prior to coring/cutting. Conflicts, inconsistencies, or other difficulties affecting structural work shall be called to the architect or engineer's attention for direction before proceeding.
C. All design and construction work for this project shall conform to the requirements of the following governing codes:
1. International Building Code (IBC 2018) as amended by the city of Liberty, MO
2. Minimum Design Loads for Buildings and Other Structures (ASCE7-16)
3. Specification for Structural Steel Buildings (AISC 360-16)
Member Design Basis is Allowable Stress Design (ASD)
Connection Design Basis is Allowable Stress Design (ASD)
4. Structural Welding Code (AWS D1.4/D1.4M-17)
5. Building Code Requirements for Structural Concrete (ACI 318-14)
6. Building Code Requirements for Masonry Structures (TMS 402-16)
7. North American Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-16)
8. National Design Specification (NDS) for Wood Constriction with 2018 Supplements (ANSI/AWC NDS-2018)
9. Special Design Provisions for Wind and Seismic (AWC SDPWS-2015)
D. These drawings are for this specific project and no other use is authorized.

2. Structural Load Design Criteria (Building)

A. Floor Live = 100 psf
B. Roof Live = 20 psf; Roof Collateral Dead = 10psf
C. Snow: Pg = 20psf, Pf =14psf, Is = 1.0, Ce = 1.0, Ct = 1.0, Drift per ASCE/SEI 7
D. Lateral Loads:
1.) Wind: V = 120 mph, Exposure C
Occupancy [Risk] Category III, Iw=1.0 GCpi=+/-0.18
Design wind pressures to be used for the design of exterior component and cladding materials on the designated zones of wall and roof surfaces shall be per section 30.5 and Table 30.5-1 of ASCE/SEI 7. Tabulated pressures shall be multiplied by effective area reduction factors, exposure adjustment factors, and topographic factors where applicable
2.) Seismic: Ss = 0.094, S1 = 0.069
Occupancy [Risk] Category III, Ie=1.25,
Site Classification C; Sds = 0.082; Sd1 = 0.069
Seismic Design Category B
Basic Seismic Force-resisting System:
Steel system not detailed for seismic resistance
Equivalent Lateral Force Procedure
R = 3.0; V = 0.034*W; Omega = 3.0; Cd=3.0
E. This project is designed to resist the most critical effects resulting from the load combinations of section 1605.3 of the International Building Code.

3. Concrete

A. All concrete for foundations (walls, grade beams, footings and piers) shall develop minimum ultimate compressive design strength of 3500 psi in 28 days, but not less than 500 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 6 gallons of water per 100 pounds of cement and not over 4 inches of slump.
B. All concrete for interior flatwork (without floor covering) shall develop minimum ultimate compressive design strength of 4000 psi in 28 days, but not less than 525 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 5.75 gallons of water per 100 pounds of cement and not over 4 inches of slump. Concrete mix shrinkage testing data providing concrete design mix shrinkage is less than 0.034% at 28 days when tested according to ASTM C157 (air drying method only).
C. All concrete for interior flatwork (with floor covering) shall develop minimum ultimate compressive design strength of 4000 psi in 28 days, but not less than 540 pounds of cement shall be used per cubic yard of concrete regardless of strengths obtained, not over 5.40 gallons of water per 100 pounds of cement and not over 4 inches of slump. Concrete mix shrinkage testing data providing concrete design mix shrinkage is less than 0.034% at 28 days when tested according to ASTM C157 (air drying method only).
D. All concrete for exterior flatwork shall have a minimum design compressive strength of 4500 psi in 28 days, with not less than 560 pounds of cement per cubic yard of concrete, not over 5 gallons of water per 100 pounds of cement, with 6% +/- 1% air entrainment, and a maximum of 4 inches of slump.
E. The preceding minimum mix requirements may have water-reducing admixtures conforming to ASTM C494 added to the mix at manufacturer's dosage rates for improved workability.
F. The preceding minimum mix requirements may have up to 15% maximum of the cement content replaced with an approved ASTM C618 Class C fly ash, provided the total minimum cementitious content is not reduced.
G. Combined aggregate (coarse plus fine) for all concrete shall be well graded from coarsest to finest with no more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 and finer sieves. Submit this gradation report with the concrete mix design shop drawings.
H. All interior concrete slabs on grade shall be placed over 15 mil, Class A Vapor Barrier per ASTM E1745 with less than 0.01 perms, tested after mandatory conditioning. All joints shall be lapped and sealed per manufacturer's recommendations. All penetrations, as well as damaged vapor barrier material shall also be sealed per manufacturer's recommendation prior to concrete placement. Install barrier per manufacturer recommended details at all discontinuous edges (at interior columns, exterior edge of slab, etc.) to ensure terms of warranty are followed. The vapor barrier shall be placed over free-draining granular material as prescribed by the project soils report.
I. Basement foundation walls shall be braced at the base and top of wall by the contractor until the slab on grade at the base and the floor framing/slab at the top of wall is complete and the concrete has achieved 75% of the design strength. The contractor is responsible for engineering and design of the wall bracing, if required.
J. All concrete is reinforced concrete unless specifically called out as unreinforced. Reinforce all concrete not otherwise shown with same steel as in similar sections or areas. Any details not shown shall be detailed per ACI 315 and meet requirements of ACI 318, current editions.
K. Control joints in dirt formed slab to be as shown on plans. Where not shown, limit controlled areas to not more than 144 square feet, or 12 feet on any side. Slab panel side ratio shall not exceed 1 1/2 to 1.
L. Contractor shall verify that all concrete inserts, reinforcing and embedded items are correctly located and rigidly secured prior to concrete placement.
M. Construction joints in beams, slabs, and grade beams shall occur at midspan (middle third) unless noted otherwise. Provide 2 x 4 horizontal keys at construction joints for shear transfer.
N. No aluminum items shall be embedded in any concrete.

4. Reinforcing Steel

A. All reinforcing steel shall conform to the requirements of ASTM A615 or A706 grade 60 steel. Welded plain wire fabric shall be supplied in sheets and conform to the requirements of ASTM A185.
B. Clear coverage of concrete over reinforcing steel shall be as follows:
1. Concrete placed against earth: 3"
2. Formed concrete against earth: 2"
3. Slabs: 1"
4. Beams or Columns: 1-1/2"
5. Other 2"
All coverage shall be nominal bar diameter minimum.
C. All dowels shall be the same size and spacing as adjoining main bars (splice lap 48 bar diameters or 24" minimum unless noted otherwise).
D. At corners of all walls, beams, and grade beams supply corner bars (minimum 2'-0" in each direction or 48 bar diameters) in outside face of wall, matching size and spacing of horizontal bars. Where there are no vertical bars in outside face of wall, supply 3 - #4 vertical support bars for corner bars.
E. Bars marked continuous and all vertical steel shall be lapped 48 bar diameters (2'-0" minimum) at splices and embedments, unless shown otherwise. Splice top bars near midspan and splice bottom bars over supports, unless noted otherwise.
F. At all holes in concrete walls and slabs, add 2 - #5 bars (opening dimension plus 96 diameters long) at each of four sides and add 2 - #5 x 5'-0" diagonally at each of four corners of hole. Openings in 8" thick walls are reinforced similar, but with 1 - # 5 instead of 2 - #5, respectively.
G. Unless otherwise covered on architectural plans or specifications, vertical control joints in concrete wall shall be spaced at a maximum of 20'-0" on center and coordinated with the architect. Every other horizontal wall reinforcing bar shall be discontinuous at control joints except heavy top and bottom bars unless noted otherwise. Provide base seal waterstop style number 772 (by Greenstreak Inc. or approved equal) on dirt face side of wall at all walls below grade.
H. Accessories shall be as specified in latest edition of the ACI Detailing Handbook and the concrete Reinforcing Steel Institute Design Handbook. Maximum accessory spacing shall be 4'-0" on center, and all accessories on exposed surfaces are to have plastic coated feet.
I. All slabs and stairs not shown otherwise shall be 6" thick with #4 bars at 12" on center each way. All exterior porches and stoops not otherwise detailed may be constructed in any standard manner, solid or hollow, but must be reinforced with #4 bars at 12" on center each way minimum. Porches shall be doweled to adjacent walls or grade beams with #4 bars at 12" on center, hooked or embedded 48 diameters into both members. Slope porches 1/8" per foot for drainage unless noted otherwise.
J. Allow 1.0 ton of reinforcing bars #4 or larger to be used as directed in the field for special conditions by the engineer of record (labor for placing same to be included).

5. Structural Steel

A. All structural steel beams and columns shall be ASTM A992, grade 50 steel and all miscellaneous steel shall be ASTM A36 grade steel (except at moment connections where plates shall be ASTM A572, grade 50). Hollow Structural Sections (HSS) shall be ASTM A500, grade C. Fabrication and erection shall be in accordance with AISC 303-16 "Code of Standard Practice for Steel Buildings and Bridges" in the 15th Edition of the AISC Steel Construction Manual.
B. All welding shall conform to the recommendations of the AWS.
C. All exterior steel and connections, and brick relief angles shall be hot-dip galvanized.
D. All bolts not otherwise specified shall be 3/4" diameter high strength (ASTM A325-N). All bolts shall be fully pretensioned. All beam connections shall be designed per the AISC Manual of Steel Construction "Framed Beam Connections" for the indicated reactions or at least 0.4 x beam total shear capacity, Vn/Omega, shown in the maximum total uniform load tables, whichever is greater; and, shall account for eccentricity when the bolt line is more than 2" from the center of the support. All connections must be two bolt minimum. Additional connection elements may not be specifically shown in the conceptual details in this set but may be required by the final connection design, such as stiffener plates, doubler plates, supplement/reinforcing plates or other connection material. Connection design and shop drawing preparation shall be completed under the direct supervision of a professional engineer licensed in the state the project is located and shop drawings and connection calculations shall bear his/her seal.
E. All anchor bolts shall be 3/4" diameter, ASTM F1554, Grade 36 unless noted otherwise. Washers of minimum size and thickness for the given anchor diameter in Table 14-2 of the AISC Steel Construction Manual shall be provided at every column anchor bolt. Washers shall have a standard size hole for the anchor bolt. At braced frames washers shall be welded all around to the column base plate with 3/16" fillet weld.
F. Design, fabrication and erection of all open-web bar joists shall comply with the recommendations of the Steel Joist Institute (SJI). Joists shall be designed to support loads given in the standard load tables of SJI Specs and Tables plus an additional point load of 200 lbs. on the top or bottom chord at any location without additional web reinforcing.
G. All K-series joists shall bear 2-1/2" minimum on structural steel beams and be welded to the beams with 1 1/2" of 1/8" fillet weld each side (minimum).
H. All K-series joists bearing on masonry walls shall have 6" x 3/8" x 6" bearing plates set in bond beams. Bearing plates shall be located not more than 1/2" from the face of the wall on the bearing side. Joists shall bear 4" minimum on bearing plates and be welded to bearing plates with 2-1/2" of 1/8" fillet weld each side (minimum).
I. All steel joists shall have horizontal bar or angle bridging per Steel Joist Institute Specifications. Provide rigid x-bridging in addition to and matching horizontal bridging where joists are discontinuous and/or where horizontal bridging is anchored to wall top and bottom. Joist weeper allowance shall comply with AISC Standard Practice.
J. Steel joists shall be designed for 20psf net uplift resulting from wind loading as measured 12ft. from a building corner, 15psf net uplift as measured 8ft. from the building edge, and 10psf otherwise.
K. All openings in steel joist roof to have 3x3x1/4 angle frame set between joists. Support mechanical equipment with 4x4x5/16 angles laid between joists framed to 4x4x5/16 angles (length equals mechanical unit dimension plus distance each end to next panel point) laid parallel to and welded to top and/or bottom cord of joists to distribute load to joist panel points.
L. All steel joists shall have a midspan camber approximately equal to that recommended by the Steel Joist Institute Specifications.
M. Design and installation of steel decking shall comply with the recommendations of the Steel Deck Institute (SDI). All decking shall be galvanized unless noted otherwise.
N. Allow 2.0 tons structural steel to be used as directed in field for special conditions by the engineer of record. Cost for shop drawings, fabrication, delivery, detailing, and erection to be included. 50% of structural steel allowance shall be bid as miscellaneous galvanized angle and plate.

6. Post Installed Anchors

A. Post-installed anchors shall be used only where specified on the drawings unless approved in writing by the engineer of record. See drawings for anchor diameter, spacing and embedment. Performance values of the anchors shall be obtained for specified products using appropriate design procedures and/or standards as required by the governing building code. Anchors installed in concrete shall have an ICC-ES Evaluation Service Report. Special inspection is required for all post installed anchors. The contractor shall coordinate an on-site meeting with the post installed anchor manufacturer field representative to educate the construction team on the anchor installation guidelines and requirements.
B. Mechanical anchors used in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ACI 355.2 and ICC-ES AC193. All anchors shall be installed per the anchor manufacturer's written instructions.
C. Adhesive anchors used in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ICC-ES AC308. All anchors shall be installed per the anchor manufacturer's written instructions.
D. Mechanical anchors used in solid grouted masonry shall have been tested and qualified for use in accordance with ICC-ES AC01. All anchors shall be installed per the anchor manufacturer's written instructions.
E. Adhesive anchors used in solid grouted masonry shall have been tested and qualified for use in accordance with ICC-ES AC58. All anchors shall be installed per the anchor manufacturer's written instructions.
F. Anchors used in hollow concrete masonry shall have been tested and qualified in accordance with ICC-ES AC106 or ICC-ES AC58 as appropriate. All anchors shall be installed per the anchor manufacturer's written instructions with appropriate screen tubes used for adhesives.

7. Foundations

A. The soil investigation was prepared by Kruger Technologies, Inc., the report number is 223118G and the telephone number is 913-498-1114.
B. Spread footings, grade beams, and retaining walls are designed to bear on engineered fill or undisturbed soil capable of safely sustaining 2,000 psf.
C. Retaining walls are designed for an active lateral load of 45 pcf equivalent fluid pressure.
D. Basement walls are designed for an at rest lateral load of 60 pcf equivalent fluid pressure. See General Note 3.J for wall bracing requirements.
E. Contractor shall provide for dewatering of excavations from either surface water or seepage.
F. All foundation excavations shall be inspected by a qualified soil engineer, approved by the architect and/or structural engineer, prior to placement of steel or concrete. This inspection shall be at the owner's expense.
G. All concrete in the structural portion retaining the backfill shall have attained its design strength prior to being backfilled.
H. Moisture content in soils beneath building locations should not be allowed to change after footing excavations and after grading for slabs on grade are completed. If subgrade materials become desiccated or softened by water or other conditions, recompact materials to the density and water content specified for engineered fill. Do not place concrete on frozen ground.

8. Concrete Masonry Units

A. Concrete block used in exterior walls or load bearing walls shall meet the requirements of ASTM C90 and have a minimum net compressive strength of 2650 psi and laid up using type N mortar such that fm equals 2000 psi. Mortar shall be volume proportion based cement lime mortar. Proportioning shall be completed by box measure. Any block in contact with earth shall be normal weight units, laid using type "S" mortar and grouted solid.
B. The contractor shall provide adequate temporary bracing for all masonry walls during construction.
C. All concrete block shall have 9 gage (or larger) horizontal joint reinforcing (ladder or truss) per architectural drawings and specifications (16" maximum vertical spacing).
D. Cavity wall construction shall be reinforced as designed for specific concrete block used. The horizontal joint reinforcing shall be of the ladder or truss style per specification and continuous between brick and block, as prescribed by the architectural drawings.
E. Concrete block shall be reinforced as follows in 6", 8", 10", and 12" walls:
1. Vertical reinforcing shall be a minimum of 1 - #4 bar in 6" and 8" walls and 2 - #4 bars in 10" and 12" walls at 4'-0" on center, at each corner, at each door and window jamb, each side of control joints and in the end void of each length of wall. Lap splices for masonry vertical reinforcing shall be 48 bar diameters, 24" minimum.
2. Horizontal reinforcing:
A. Horizontal joint reinforcing as noted above.
B. Continuous horizontal bars shall be included per section or detail in bond beam or optional running bond beam where noted. Where bond beams are continuous at corners of walls, supply corner bars matching size of horizontal bars (minimum 2'-0" or 40 bar diameters in each direction).
F. Grout, where noted above, shall have a minimum design ultimate compressive strength of 2500 psi at 28 day test and 3/8" maximum aggregate size.
G. Non-load bearing concrete block walls shall be isolated from adjacent structural elements with vertical 3/8" control joints and at the top of the wall with 1" air space or compressible material and support per architectural detail.
H. Unless otherwise covered on architectural plans or specifications, vertical control joints in masonry construction shall be 3/8" wide, full height of wall. Joints shall be spaced at a maximum of 24'-0" on center and coordinated with the architect. All horizontal joint reinforcing shall be discontinuous through control joints. All bond beam horizontal reinforcing shall be continuous through control joints.
I. Lintels over all openings up to 8'-0" wide in new and existing masonry walls not otherwise covered shall be one 6x3 1/2x5/16 angle for each 4" width of masonry. All exterior lintels to be galvanized.
J. Walls shall be anchored top and bottom by dowels matching wall vertical reinforcing(unless noted otherwise) from floor slab bottom and bracing angles at the top, per details on the drawings.

9. Light Gage Metal Structural Framing

A. All load bearing, light gage structural studs, track, and bridging shall be of the type, size, gage, and spacing as shown on the plans, minimum.
B. All materials shall be 33,000 psi minimum yield, except studs of 16 gage or heavier shall have a minimum yield of 50,000 psi.
C. All properties, fabrication, and erection shall be in accordance with latest editions of the AISI "Specifications for the Design of Cold-Formed Structural Members."
D. All framing components shall be cut squarely or at an angle to fit squarely against abutting members. Splicing of axially loaded members is not permitted. Members shall be held firmly in place until properly fastened. Attachments of similar components shall be by welding, screw attachment, or bolting. Wire tying of components is not permitted.
E. Tracks shall be securely anchored to floor and overhead members. Special anchorage requirements required for wind bracing shall be as shown on the plans.
F. Prior to fabrication and/or erection, the contractor shall submit shop drawings complete with detail of erection, fabrication, attachments, anchorages, lintels, etc., for review by the architect/engineer.
G. Gage of studs shown on documents is for bidding purposes only. Delegated cold-formed supplier to provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated. Sealed shop drawings and calculations shall be submitted to Bob D. Campbell & Co. for review.

10. Precast Concrete Members

A. The contractor/supplier is responsible for the design of all the precast members and connection between them and other structural members. Submit design calculations, sealed by an engineer licensed in the state of the project location, for review by the architect/engineer of record.
B. All precast members are to be designed in accordance with ACI 318-11, 2014 IBC and other applicable codes, standards (see specs) and design criteria shown on design documents.
C. Precast concrete members shall conform to the 2018 IBC for the required fire ratings (refer to architects documents).
D. All wall panels should be designed for building wind loads, seismic loads, gravity loads, and transmit these loads to the foundation through properly designed connections.
E. Provide blockouts and openings for mechanical/electrical equipment. Refer to mechanical/electrical documents.
F. Shop drawings shall be complete and shall include a layout plan, fabrication details, estimated camber, connection and anchorage details and member identification marks. Identification marks shall appear on manufactured units to facilitate correct field placement.
G. Precast supplier shall design all components to meet the requirements of the ICC500-2014 code. (4)

11. Deferred Submittal and Shop Drawing

A. Bob D. Campbell and Company, Inc. will review the General Contractor's (GC) shop drawings and related submittals (as indicated below) with respect to the ability of the detailed work, when complete, to be a properly functioning integral element of the overall structural system designed by Bob D. Campbell and Company, Inc.
B. Deferred submittals shall be submitted to the architect of record for review who shall forward to the building official for their review and approval. Design calculations for deferred sub mittals shall be submitted at the same time as the shop drawings for review. Design calculations shall be prepared and sealed by a Professional Engineer licensed in the state of the project. The deferred submittal items shall not be installed until the deferred submittal documents have been approved by the building official.
C. Prior to submittal of a shop drawing or any related submittal to Bob D. Campbell and Company, Inc., the GC shall:
1. Review each submission for conformance with the means, methods, techniques, sequences and operations of construction and safety precautions and programs incidental thereto, all of which are the sole responsibility of the GC.
2. Review and approve each submission.
3. Stamp each submission as approved.
D. Bob D. Campbell and Company, Inc. shall assume that no submission comprises a variation unless the GC advises Bob D. Campbell and Company, Inc. with written documentation.
E. Bob D. Campbell and Company, Inc. shall review shop drawings and related materials with comments provided that each submission has met the above requirements. Bob D. Campbell and Company, Inc. shall return without comment unrequired material or submissions without GC approval stamp.
F. Shop drawings and related material (if any) required are indicated below. Should Bob D. Campbell and Company, Inc. require more than ten (10) working days to perform the review, Bob D. Campbell and Company, Inc. shall so notify the GC.
1. Concrete mix designs and material certificates including admixtures and compounds applied to the concrete after placement.
2. Reinforcing steel shop drawings including erection drawings and bending details.Bar list will not be reviewed for correct quantities.
3. Elevations of all reinforced concrete masonry walls at a scale no smaller than 3/8" = 1'-0" showing all required reinforcing.
4. Grout mix designs (for CMU).
5. Construction and control joint plans and/or elevations.
6. Structural steel shop drawings including erection drawings and piece details. Include joist, decking and connector submittals. Include miscellaneous framing specified on the structural drawings, but do not submit framing specified on non-structural drawings for Bob D. Campbell and Company, Inc. review.
7. Deferred Submittal: Structural steel connections (including braced frames)
8. Deferred Submittal: Structural steel joists
9. Deferred Submittal: Railings and guardrails
10. Deferred Submittal: Exterior cold-formed metal framing
11. Miscellaneous anchors shown on the structural drawings.
12. Standard details and bridging information for light gage metal framing. Erection plans and details for light gage metal joists and lintels spanning more than 6'-0" shall be submitted. Standard wall framing need not be submitted.
13. Deferred Submittal: Precast concrete shop drawings including erection drawings and connection details.
14. Deferred Submittal: Precast concrete design calculations.

12. Statement of Structural Special Inspections

A. The structural design for this project is based on completion of special inspections during construction in accordance with section 1704 of the International Building Code. The owner shall employ one or more qualified special inspectors to provide the required special inspections.
B. The special inspector shall furnish inspection reports to the building official, owner, architect and structural engineer, and any other designated person.
C. All discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the proper design authority, building official and structural engineer.
D. The special inspector shall submit a final signed report stating that the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable workmanship provisions of the building code.
E. The following inspections and tests are required with the frequency (continuous or periodic) as defined within the referenced section or standard listed below. The General Contractor shall provide notification to the inspector when items requiring inspection are ready to be inspected and provide access for those inspections.
1. Shop Fabrication – structural steel and steel bar joist per Section 1704.2.5 unless AISC certified shop
2. Shop Fabrication – precast concrete per Section 1704.2.5 unless PC certified shop
3. Steel Construction per Section 1705.2 and the quality assurance requirements of AISC 341 Chapter J (as referenced by AISC 360)
4. Cold-Formed Steel Deck per Section 1705.2.2 and the quality assurance requirements of SDI QA/QC.
5. Concrete Construction per Section 1705.3 and Table 1705.3
a. Reinforcing Steel Placement
b. Reinforcing Steel Welding
c. Cast in Place Anchors
d. Post Installed Anchors
e. Design Mix Verification
f. Concrete Sampling and Testing
g. Concrete Placement
h. Concrete Curing
i. Prestressed Concrete Stressing and Grouting
j. Erection of Precast
k. Formwork Shape, Location and Dimensions
6. Masonry Construction per Section 1705.4 and the quality assurance requirements of TMS 402/ACI530/ASCE5 and TMS602/A530.1/ASCE6 [Level 2]
7. Verification of Soils per Table 1705.6

13. Copyright and Disclaimer

A. All drawings in the structural set (S-series drawings) are the copyrighted work of Bob D. Campbell and company, Inc. These drawings may not be photographed, traced, or copies in any manner without the written permission of Bob D. Campbell and Company, Inc. Exception: Original drawings may be printed for distribution to the owner, architect, and contractor for coordination, bidding, and construction. Subcontractors may not reproduce these drawings for any purpose or in any manner.
B. I, Ryan M. Hagedorn, P.E., registered engineer and a representative of Bob D. Campbell and Company, Inc., do hereby accept professional responsibility as required by the professional registration laws of this state for the structural design drawings consisting of S-series drawings. I hereby disclaim responsibility for all other drawings in the construction document package, they being the responsibility of other design professionals whose seals and signed statements may appear elsewhere in the construction document package.

Structural Foundation Schedule

NOTE:
1) EXTERIOR FOOTINGS OR FOOTING AT GRADE BEAM SHALL MATCH GRADE BEAM DEPTH AND BE PLACED WITH GRADE BEAM. PROVIDE SPECIFIED REBAR TOP AND BOTTOM WITH 4 STANDEES TO SUPPORT MATS.
2.) PROVIDE REINFORCING PER SCHEDULE EACH WAY IN TOP OF FTG. AT ALL MOMENT FRAME AND BRACED BAY COLUMNS.
3.) CENTER FOOTINGS ON COLUMNS AND/OR WALL CENTER LINES PER PLAN UNLESS NOTED OTHERWISE (U.N.O.).

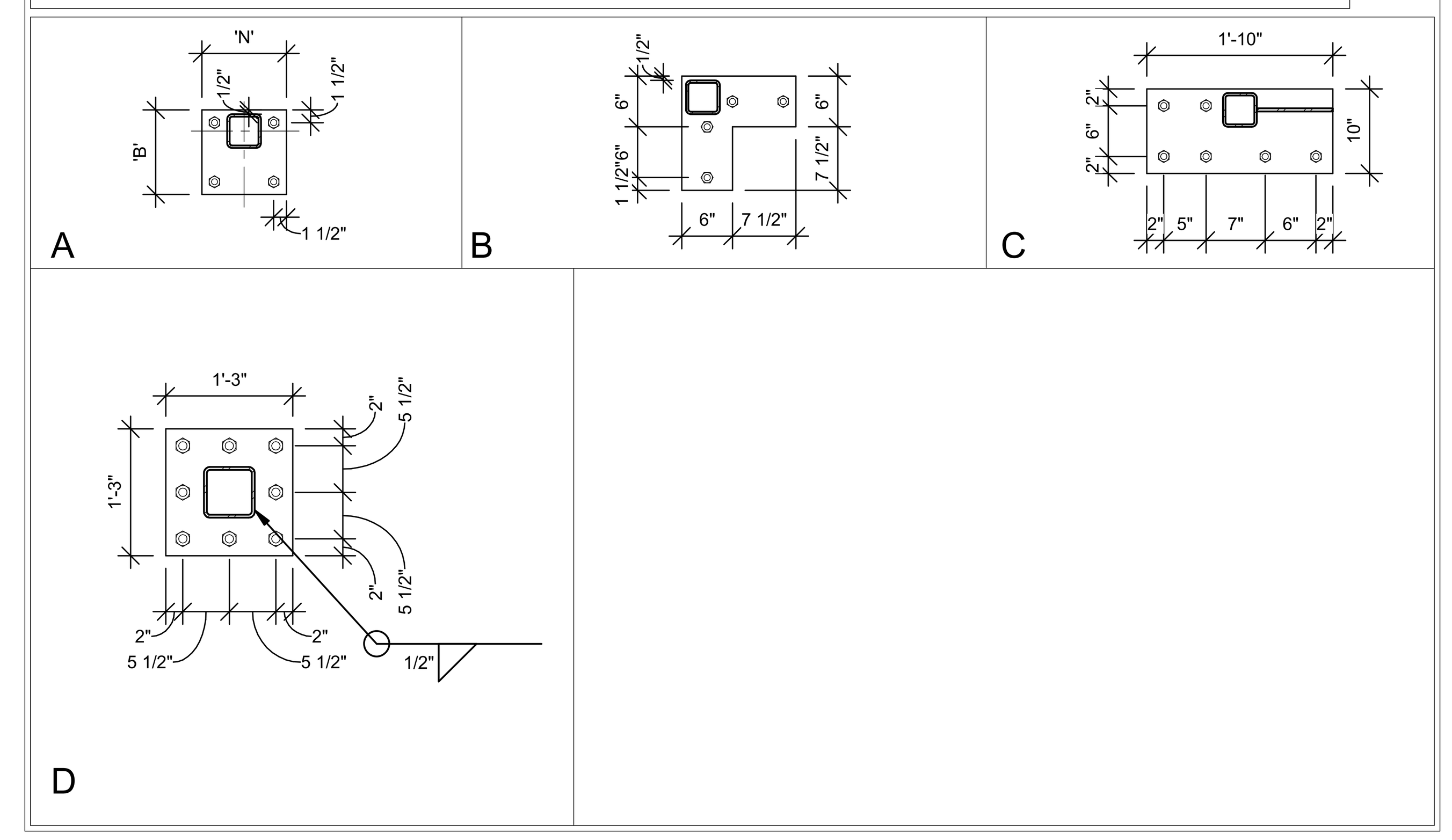
Type Mark	Length	Width	Footing Thickness	Rebar Size	Quantity (Ea way, Top & Bott)
4.0	4'-0"	4'-0"	2'-8"	Rebar : # 5	8
5.0	5'-0"	5'-0"	2'-8"	Rebar : # 5	10
5.0A (4)	5'-0"	5'-0"	2'-0"	Rebar : # 5	10

COLUMN BASE PLATE SCHEDULE

TYPE	COLUMN	BASE PLATE (txBxN)	SHAPE	ANCHOR RODS	EMBEDMENT
1	HSS4x4	¾"x10"x10"	A	4- ¾" DIA.	12"
2	HSS4x4	1"x10"x10"	A	4- ¾" DIA.	20"
3	HSS4x4	1"x (SEE DETAIL)	B	4- ¾" DIA.	12"
4	HSS4x4	1"x20"x10"	C	6- 1" DIA.	20"
5	HSS6x6	1¾"x15"x15"	D	8- 1" DIA.	20"

NOTES:
1. SEE PLAN FOR ORIENTATION OF COLUMNS.
2. PROVIDE PLATE WASHER & EMBEDDED PLATE PER SCHEDULE @ ALL ANCHOR BOLTS.
3. U.N.O. ALL THREADED ROD A.B's SHALL BE F1554 (36ksi) MATERIAL.

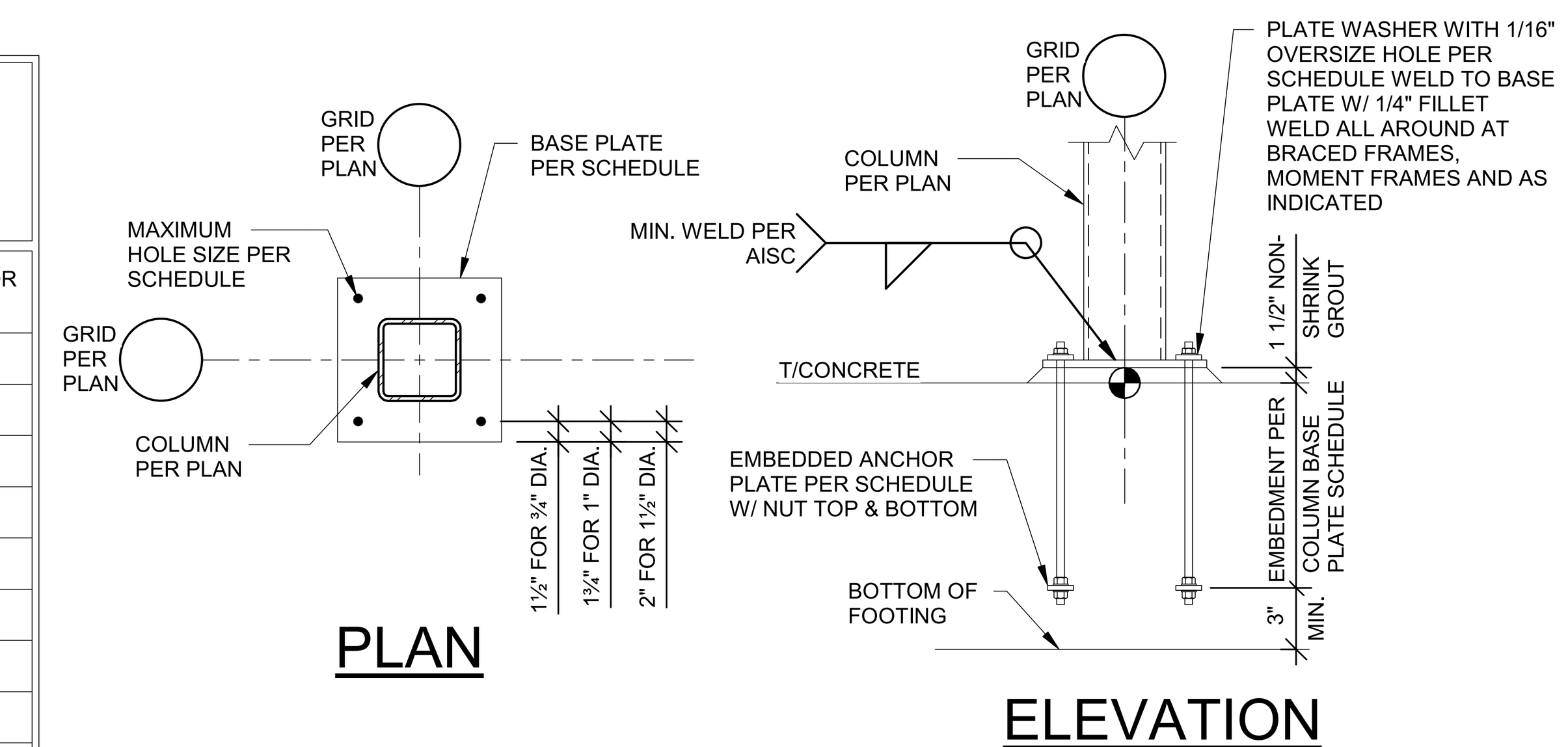
BASE PLATE SHAPE (NOT TO SCALE)



COLUMN BASE PLATE AND ANCHOR-ROD CRITERIA

ANCHOR-ROD DIAMETER.	MAX. BASE PLATE HOLE DIAMETER.	MIN. PLATE WASHER SIZE.	MIN. PLATE WASHER THICKNESS	EMBEDDED ANCHOR PLATE SIZE
3/4"	1 5/16"	2"	1/4"	1/2"x2 1/2"x2 1/2"
7/8"	1 9/16"	2 1/2"	5/16"	1/2"x2 1/2"x2 1/2"
1"	1 7/8"	3"	3/8"	5/8"x3"x3"
1 1/4"	2 1/8"	3 1/2"	1/2"	5/8"x3 1/2"x3 1/2"
1 1/2"	2 3/8"	4"	1/2"	5/8"x3 1/2"x3 1/2"
1 3/4"	2 7/8"	4 1/2"	5/8"	3/4"x3 1/2"x3 1/2"
2"	3 1/4"	5"	3/4"	3/4"x3 1/2"x3 1/2"
2 1/2"	3 3/4"	5 1/2"	7/8"	3/4"x3 1/2"x3 1/2"

NOTES:
1. HOLE SIZES PROVIDED ARE BASED ON ANCHOR ROD SIZE AND CORRELEATE WITH ACI 117 (ACI, 2010)
2. CIRCULAR OR SQUARE WASHERS MEETING THE WASHER SIZE ARE ACCEPTABLE.
3. HOLE IN PLATE WASHER SHALL BE 1/16" LARGER THAN ANCHOR DIAMETER.



LEGEND:

...... SPAN DIRECTION OF DECK

RD-1 ...... 1½" DEEP x 22ga GALVANIZED WIDE RIB METAL ROOF DECK (EXAMPLE: VULCRAFT 1.5B) 3-SPAN CONTINUOUS. PROVIDE 5/8" PUDDLE WELDS TO SUPPORTS IN 36/5 PATTERN (@12"oc FOR SUPPORTS PARALLEL TO DECK SPAN) AND (4) #10 TEK SCREEN SIDELAP FASTENERS PER SPAN.

(3.0) ...... FOOTING MARK - SEE SCHEDULE ON SHEET S001.

(1) HSS 8"x8"x5/16" ....COLUMN SIZE
BASE PLATE MARK - SEE SCHEDULE ON SHEET S001

LEVEL BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 117'-6" — TOP OF BEAM ELEVATION

SLOPING BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 133'-0" T 132'-5" — TOP OF BEAM ELEVATION EACH END

hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

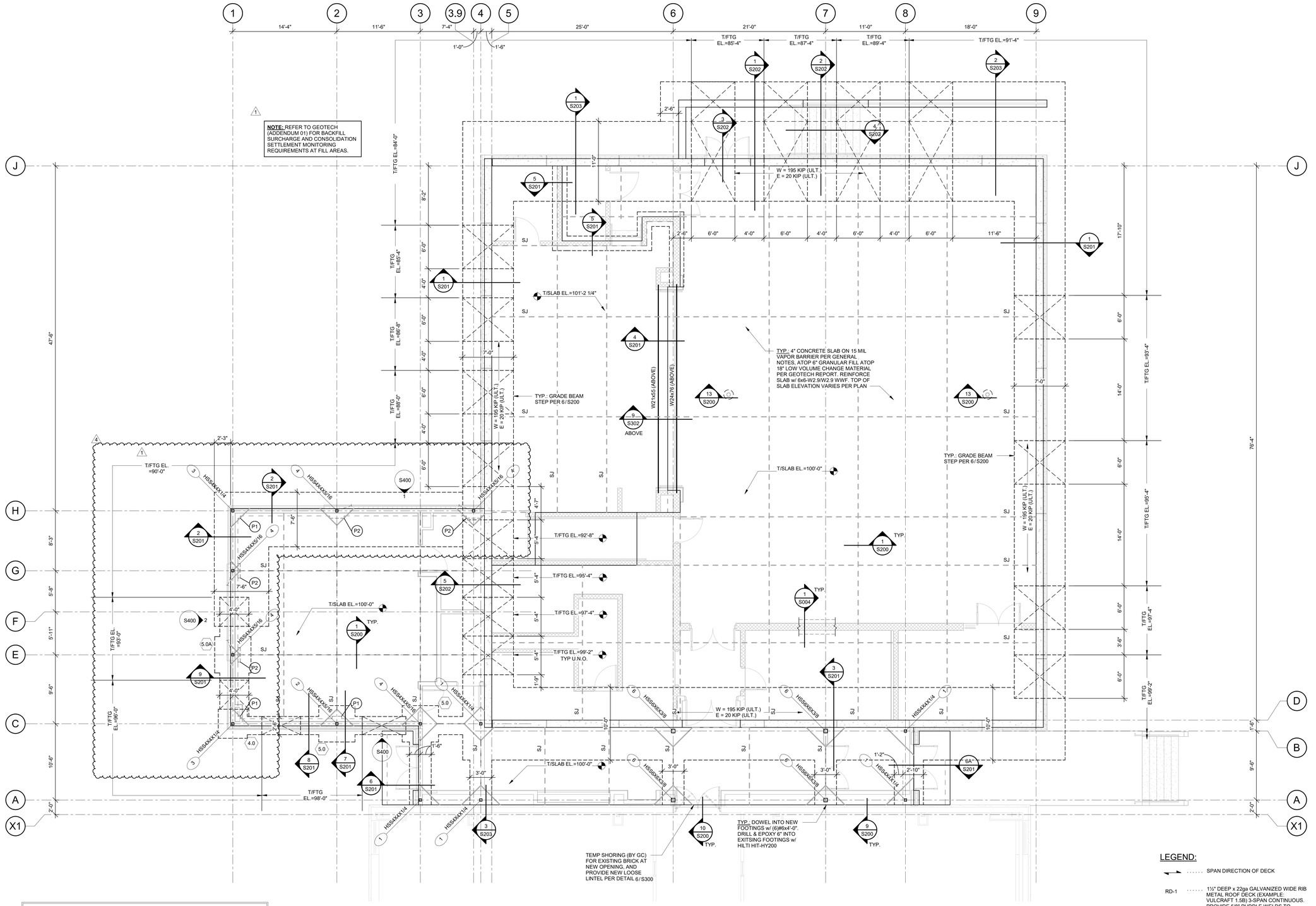
RYAN M. HAGEDORN NUMBER PE-2010000046 9.29.2023

JOB NO: 23020.00
DRAWN BY: RWO
CHECKED BY: RMH
DATE: 08/31/2023

S001

GENERAL NOTES

9/29/2023 10:20:44 AM



CONCRETE PILASTER SCHEDULE

CONCRETE (PSI): 3500		REBAR (KSI): 60			
MARK	SIZE	VERT. REINF.	TIES	TIE SPACING	SHAPE
P1	16"x16"	(8) #8	(2) #3	(3) @ 3"o.c. TOP REMAINDER @ 12"o.c.	
P2	16"x24"	(12) #8	(3) #4	(3) @ 3"o.c. TOP REMAINDER @ 12"o.c.	

1 FOUNDATION PLAN

3/16" = 1'-0"

NOTES:
1. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS
2. FIELD VERIFY ALL EXISTING CONDITIONS
3. REFER TO GENERAL NOTES ON ON SHEET S001
4. REFER TO SCHEDULES ON SHEET S001 AND THIS SHEET

LEGEND:

- ..... SPAN DIRECTION OF DECK
- RD-1 ..... 1½" DEEP x 22ga GALVANIZED WIDE RIB METAL ROOF DECK (EXAMPLE: VULCRAFT 1.5B) 3-SPAN CONTINUOUS. PROVIDE 5/8" PUDDLE WELDS TO SUPPORTS IN 36/5 PATTERN (@12"oc FOR SUPPORTS PARALLEL TO DECK SPAN) AND (4) #10 TEK SCREEN SIDELAP FASTENERS PER SPAN.
- (3.0) ..... FOOTING MARK - SEE SCHEDULE ON SHEET S001.
- (1) HSS 8"x8"x5/16" ....COLUMN SIZE
  BASE PLATE MARK - SEE SCHEDULE ON SHEET S001

LEVEL BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 117'-6" — TOP OF BEAM ELEVATION

SLOPING BEAM DESIGNATION: W14x22 — STEEL BEAM SIZE; T 133'-0" T 132'-5" — TOP OF BEAM ELEVATION EACH END

hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
4	Addendum 04	09/28/2023

STATE OF MISSOURI — RYAN M. HACKBART — NUMBER PE-2010009046 — 9.24.2023 — PROFESSIONAL ENGINEER

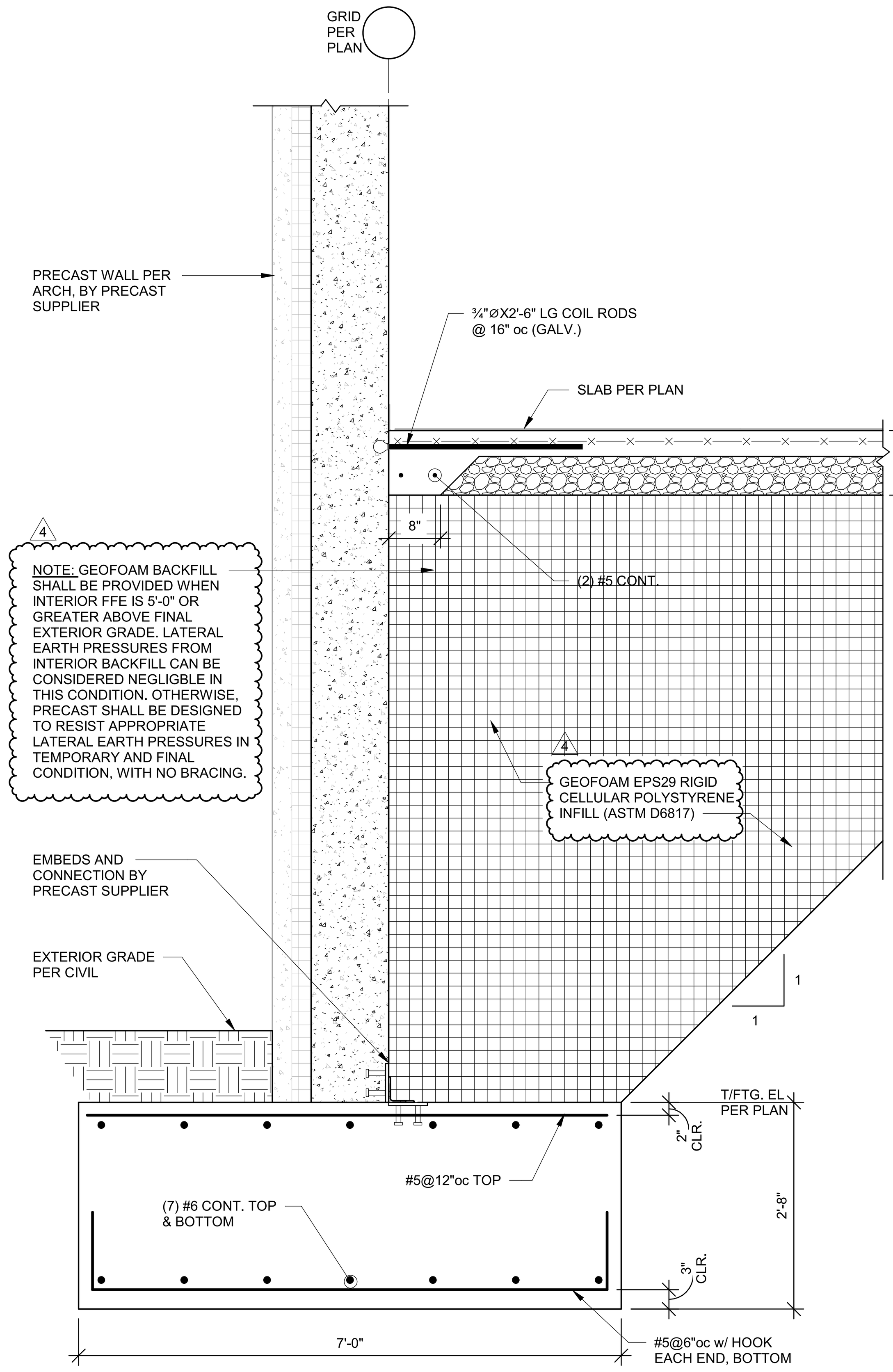
JOB NO: 23020.00
DRAWN BY: RWO
CHECKED BY: RMH
DATE: 08/31/2023

S100

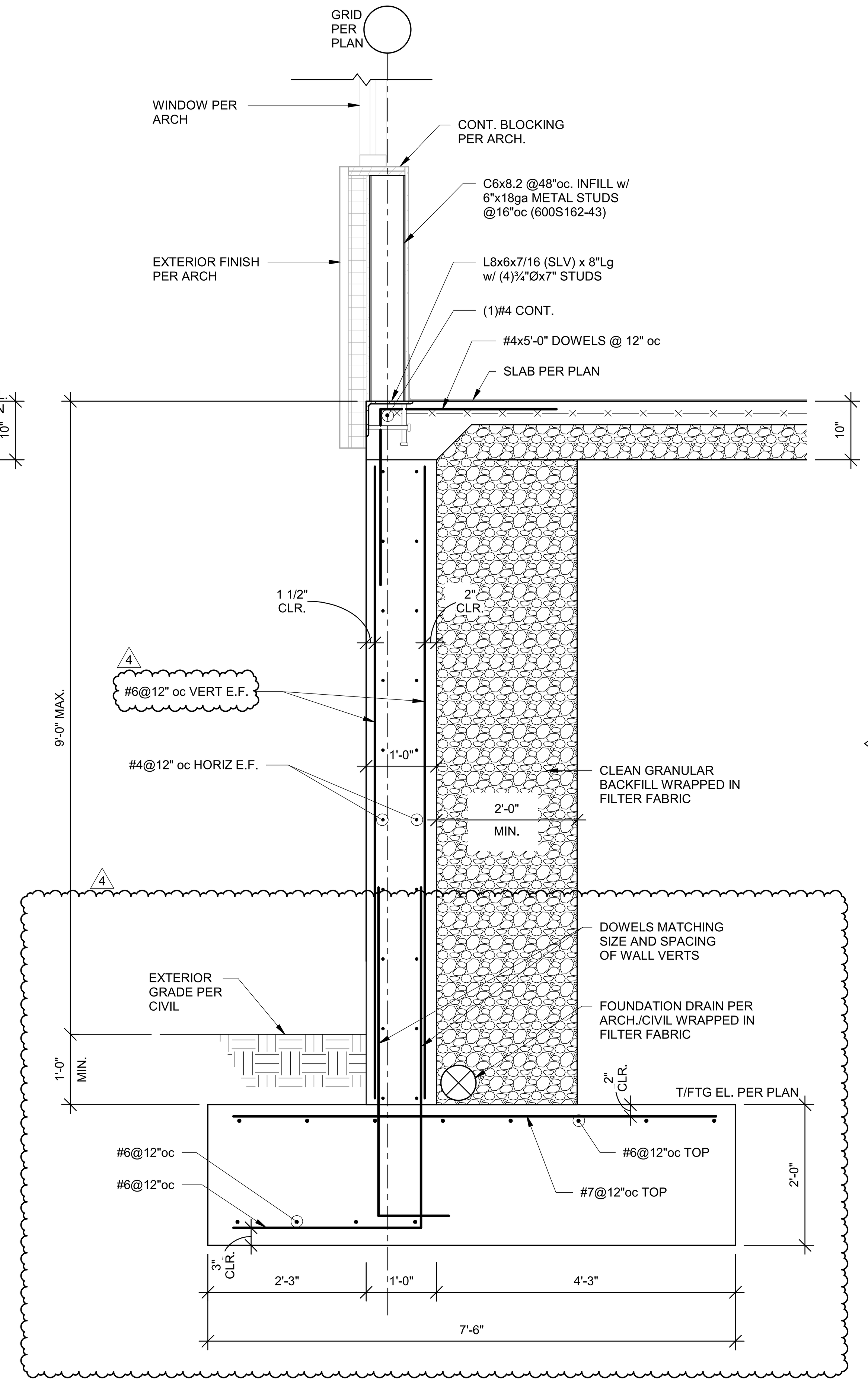
FOUNDATION PLAN

9/29/2023 10:20:44 AM

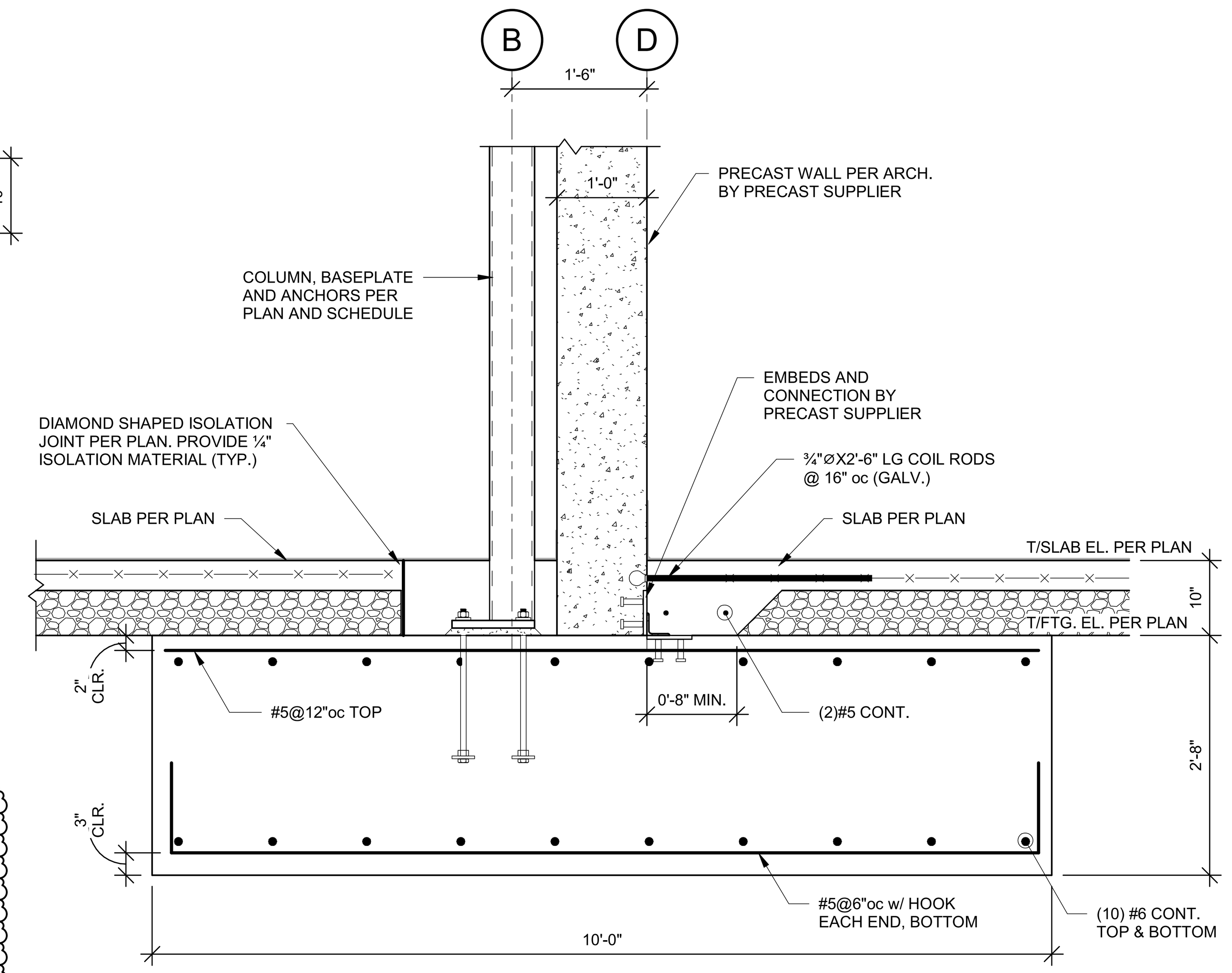
Please consider the environment before printing this.



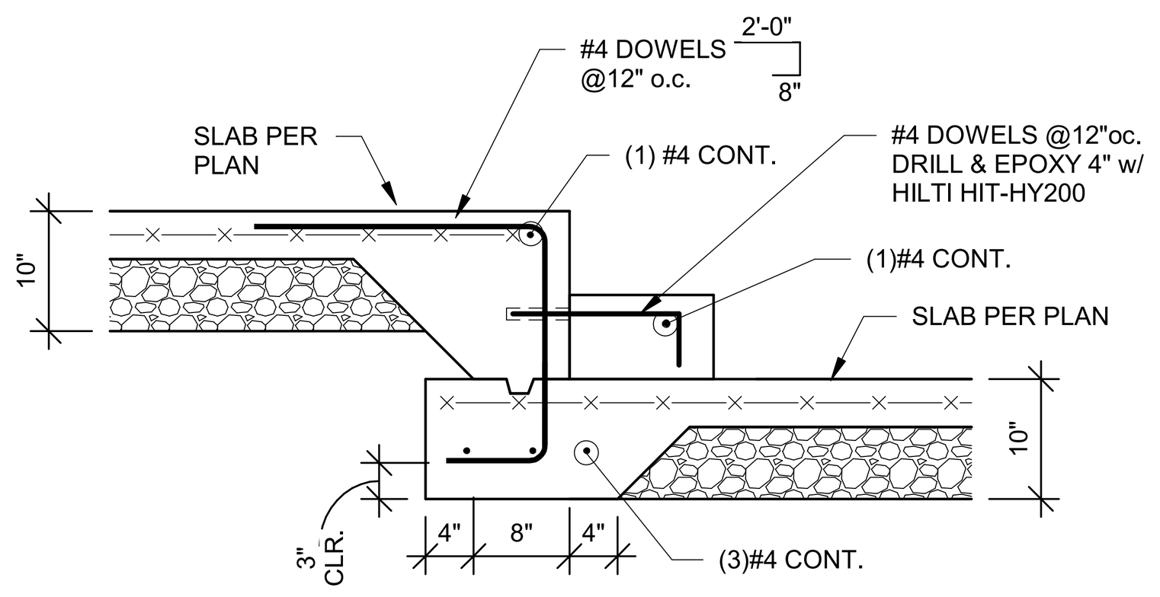
1 SECTION
3/4" = 1'-0"



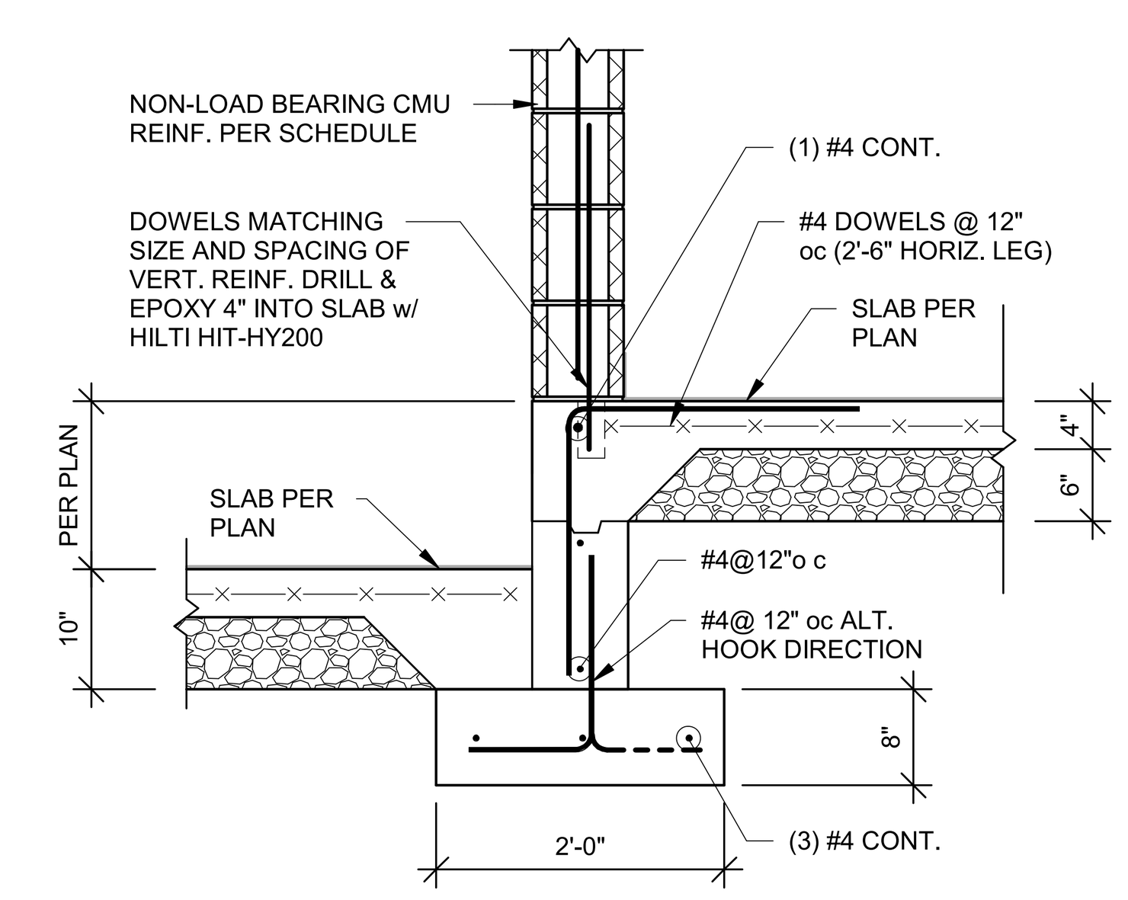
2 SECTION
3/4" = 1'-0"



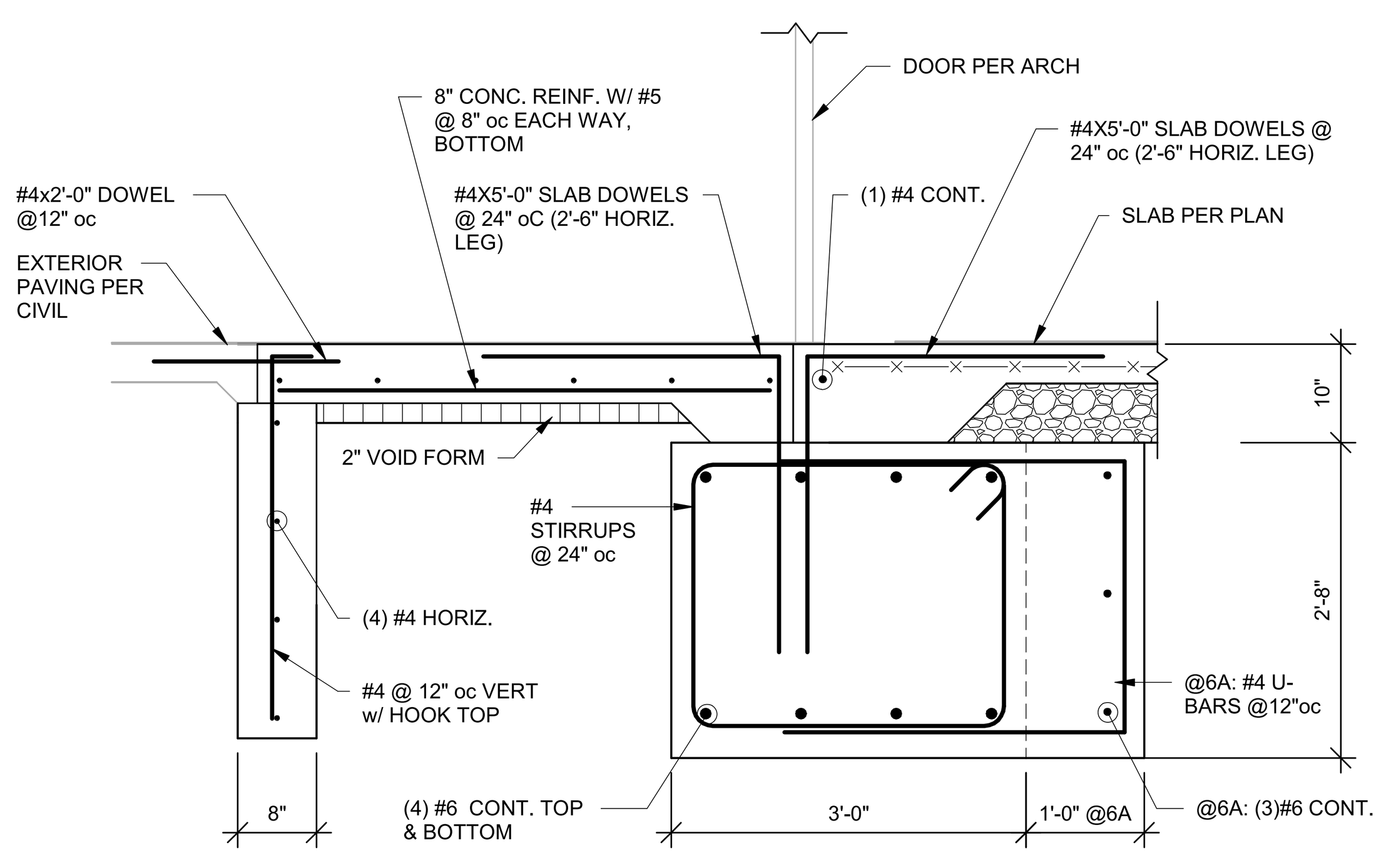
3 SECTION
3/4" = 1'-0"



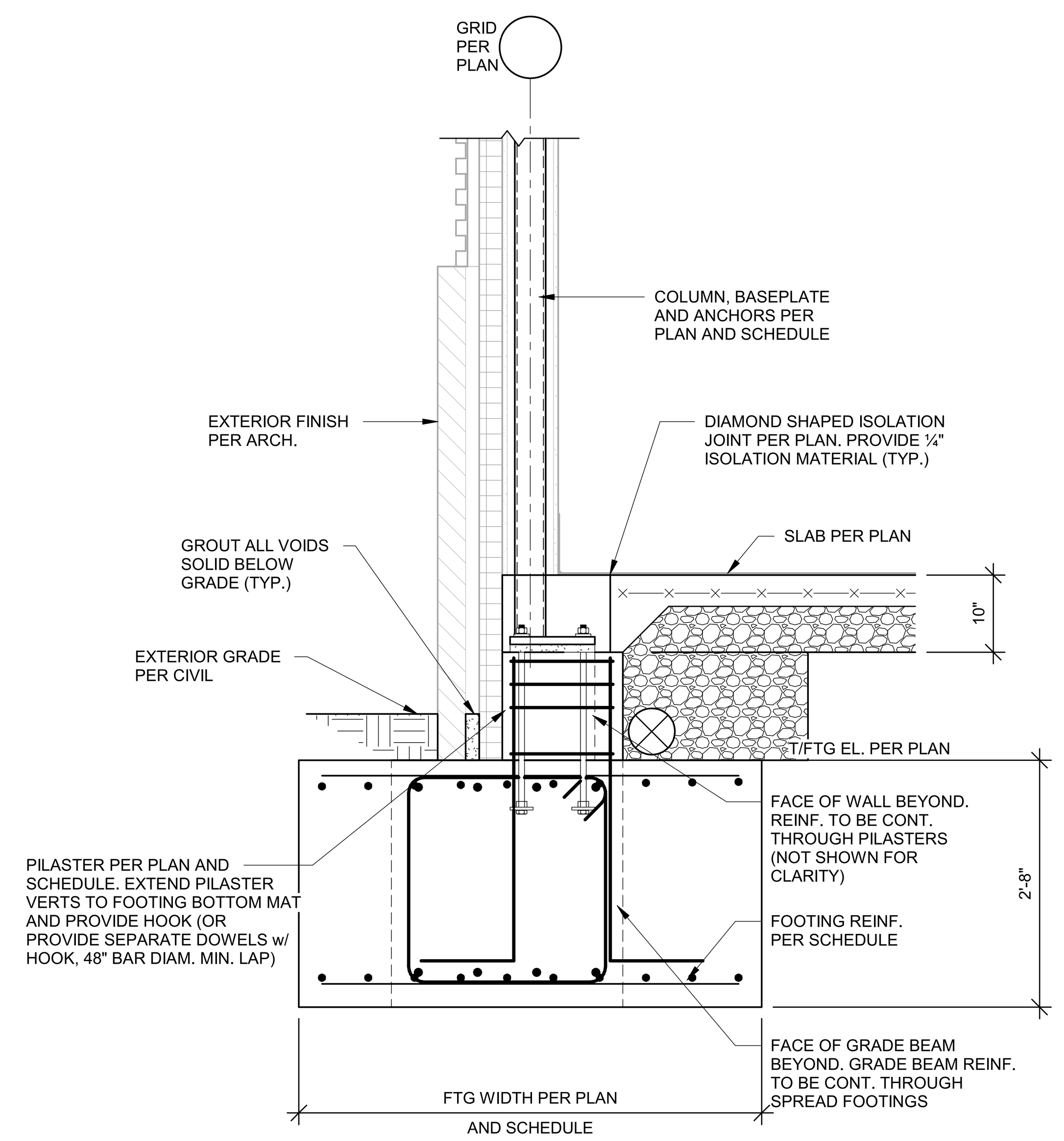
4 SECTION
3/4" = 1'-0"



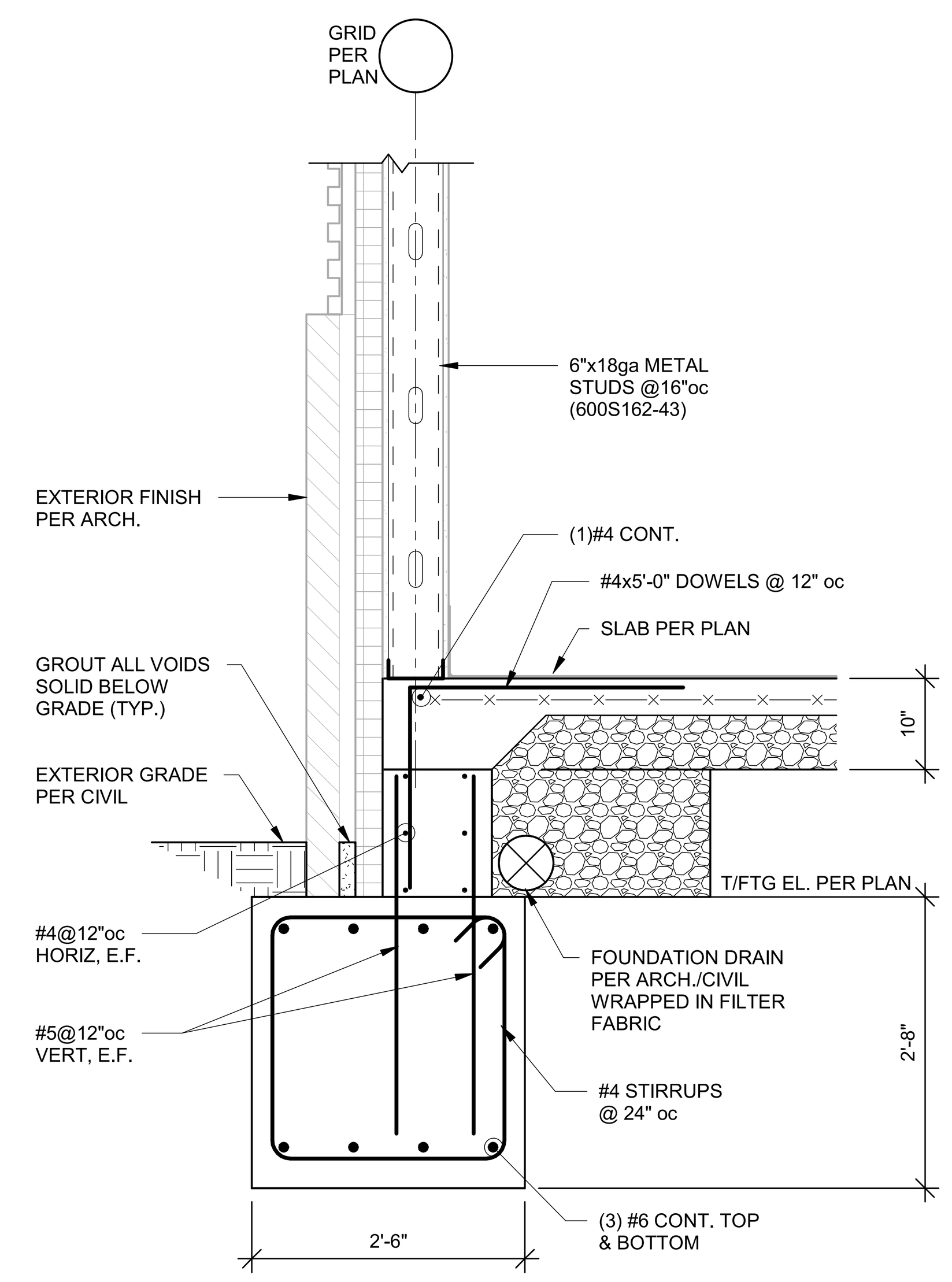
5 SECTION
3/4" = 1'-0"



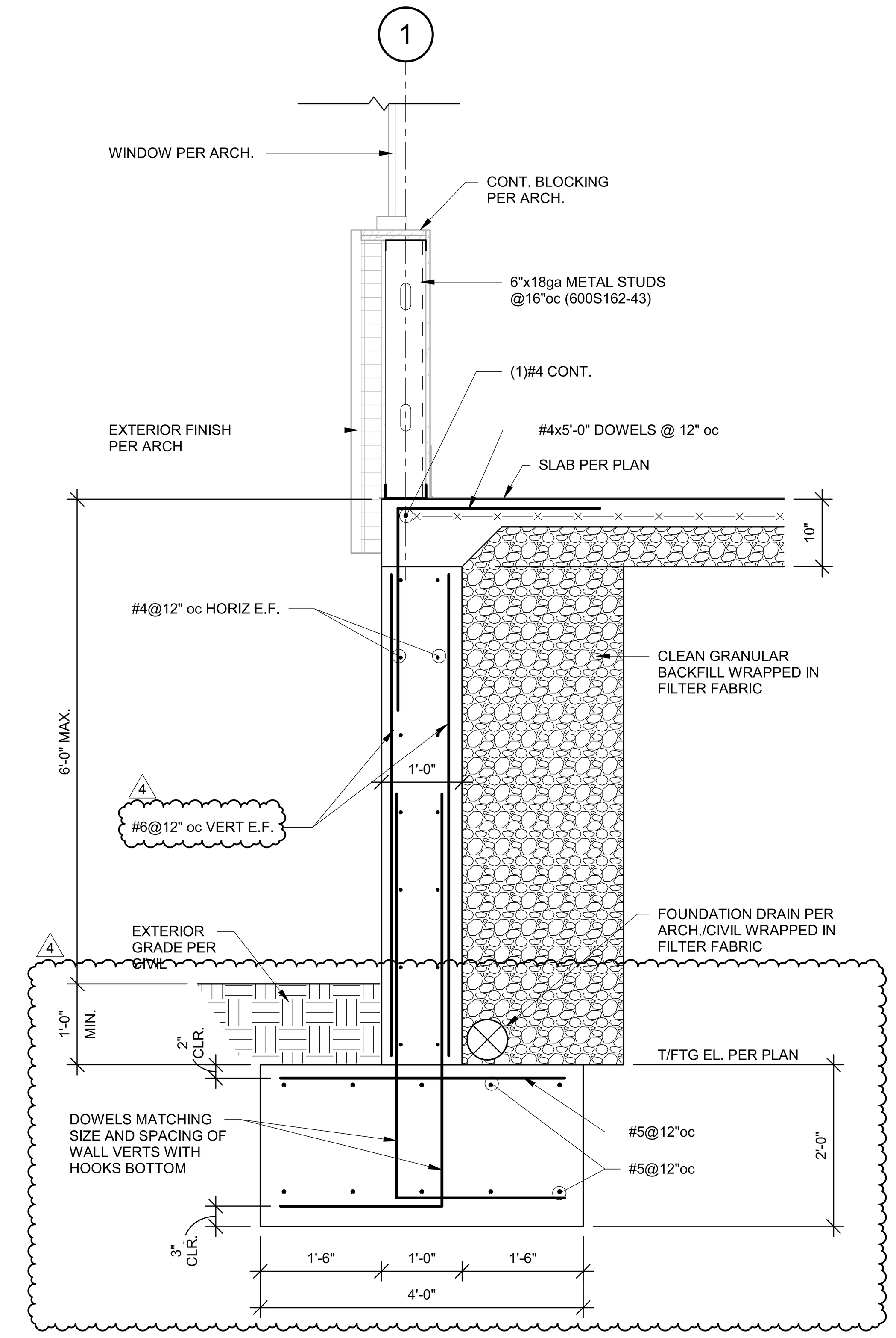
6,6A SECTION
3/4" = 1'-0"



7 SECTION
3/4" = 1'-0"



8 SECTION
3/4" = 1'-0"



9 SECTION
3/4" = 1'-0"

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

STATE OF MISSOURI
RYAN M. HACKNEY
NUMBER PE-2020000046
9.29.2023
PROFESSIONAL ENGINEER

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

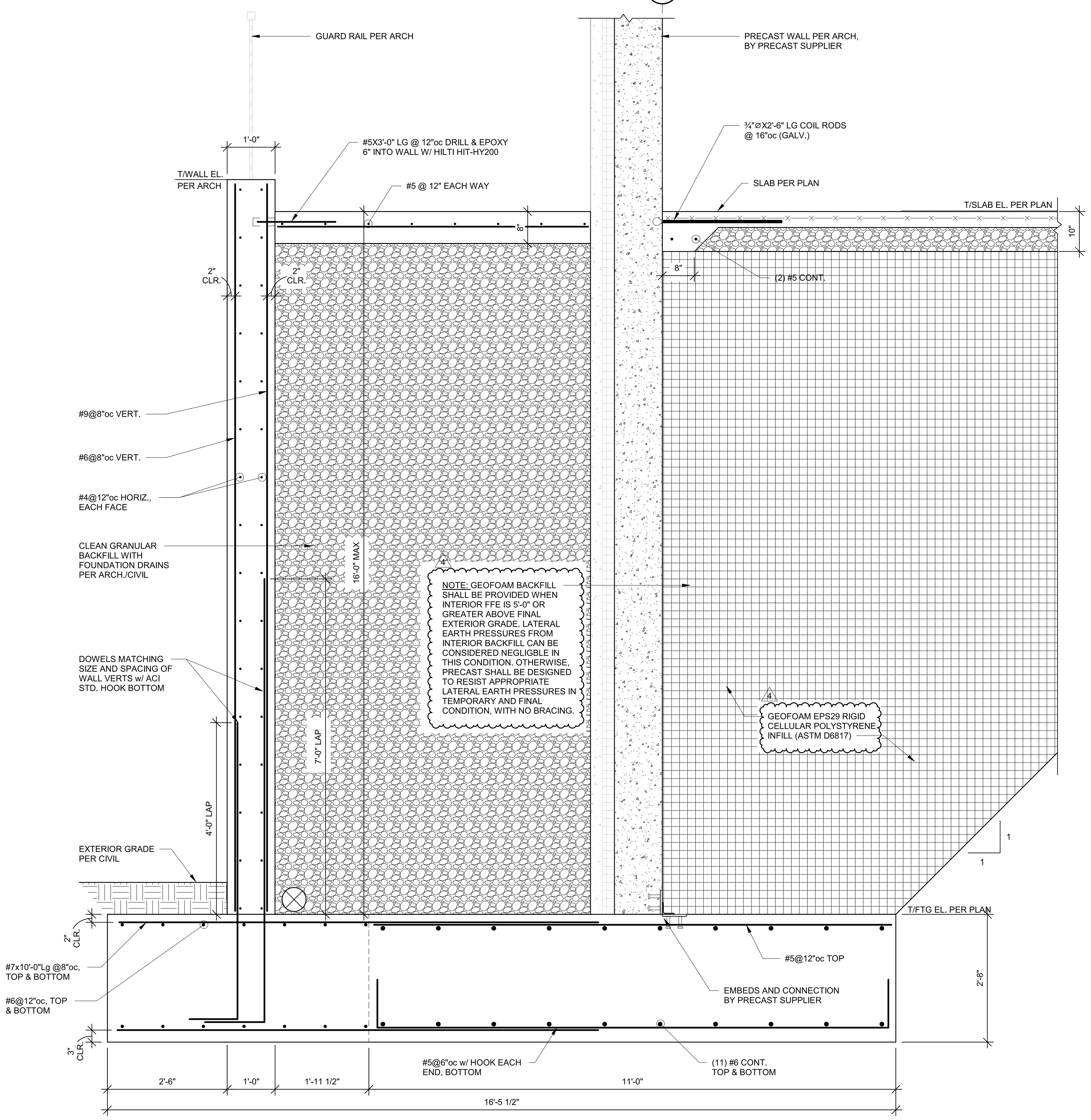
JOB NO: 23020.00
DRAWN BY: RWO
CHECKED BY: RMH
DATE: 08/31/2023

S201

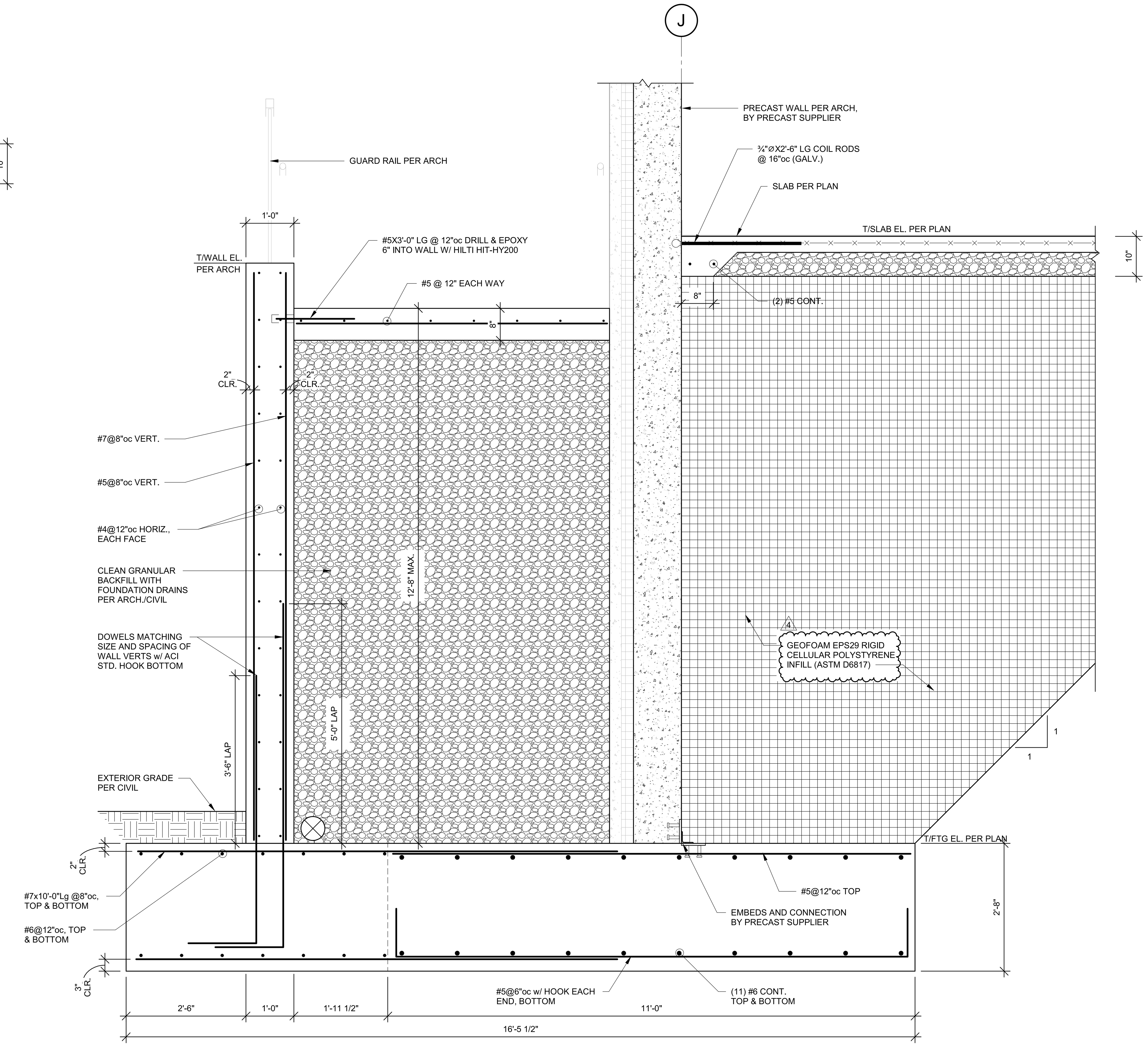
FOUNDATION SECTIONS

Please consider the environment before printing this.

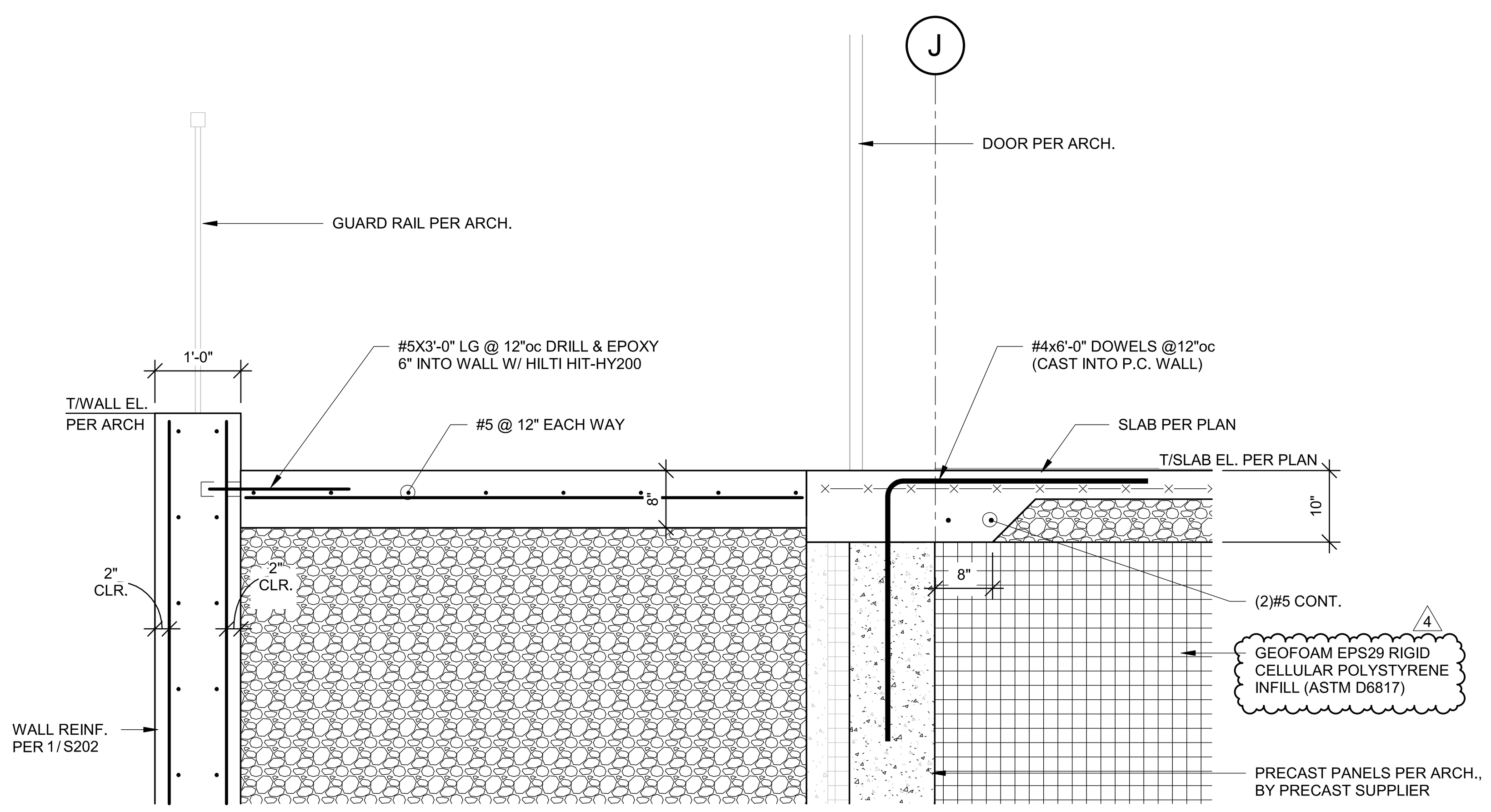
9/29/2023 10:20:45 AM



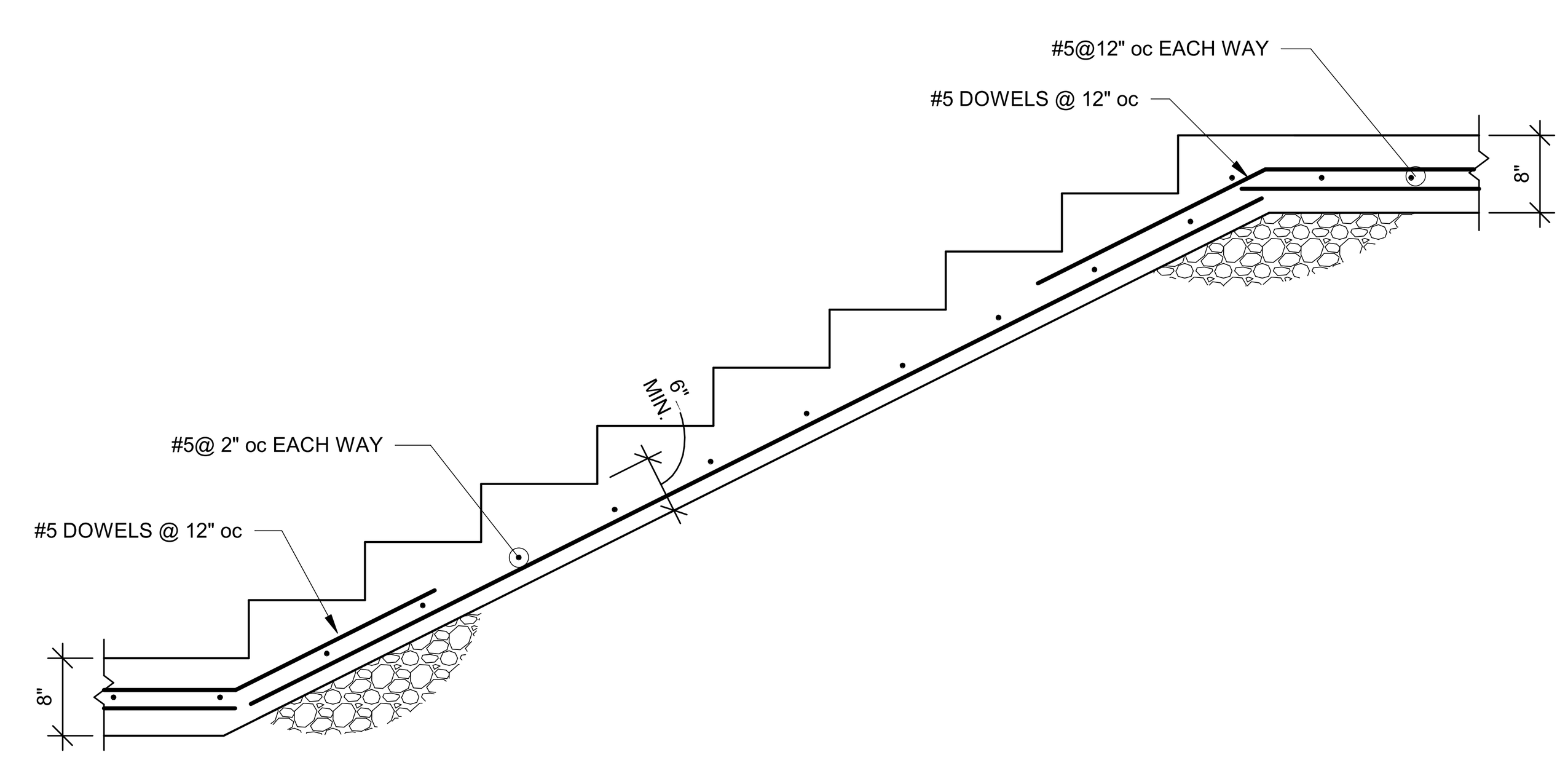
1 SECTION
3/4" = 1'-0"



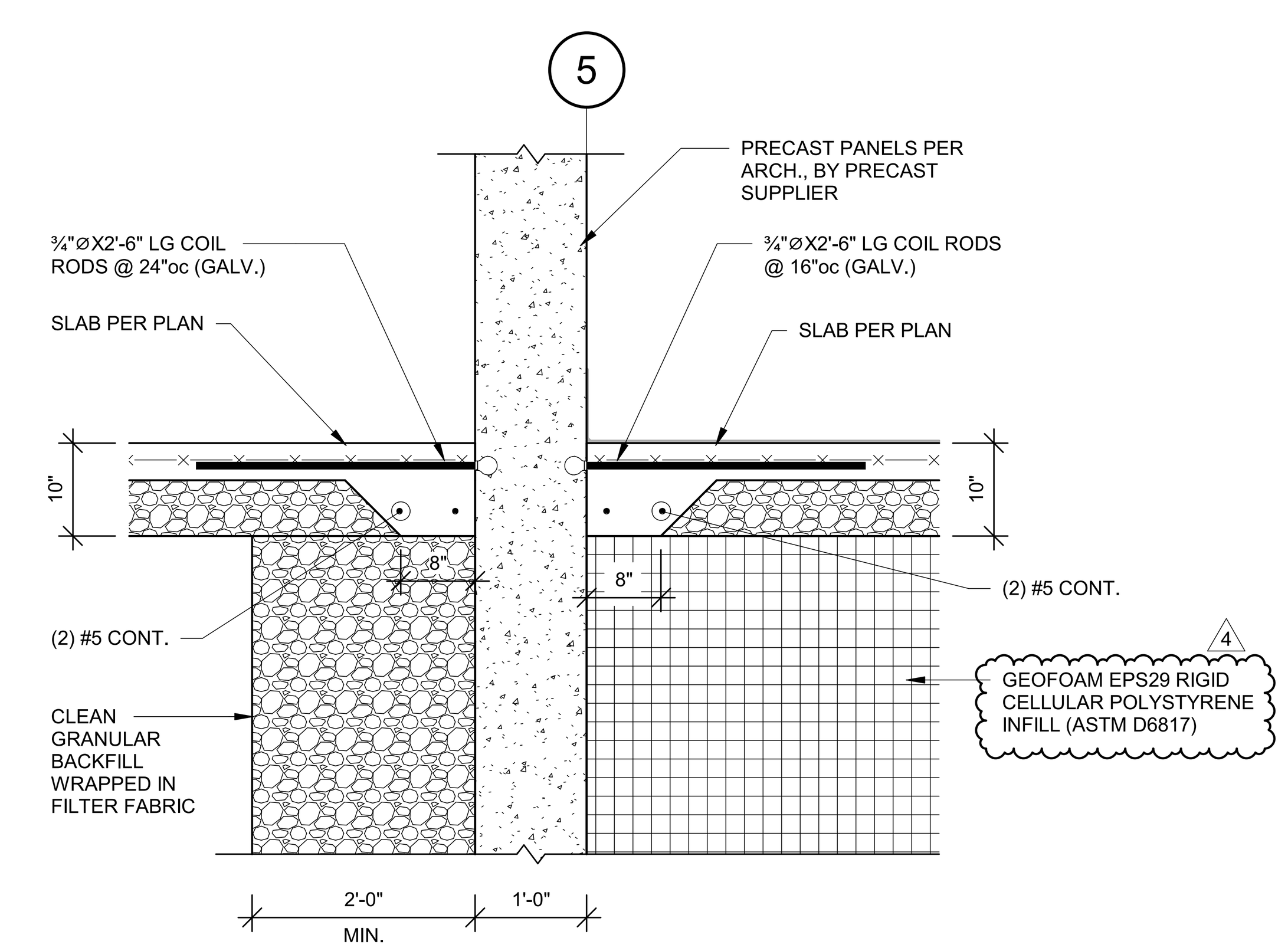
2 SECTION
3/4" = 1'-0"



3 SECTION
3/4" = 1'-0"



4 SECTION
3/4" = 1'-0"



5 SECTION
3/4" = 1'-0"

hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689
HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools

650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

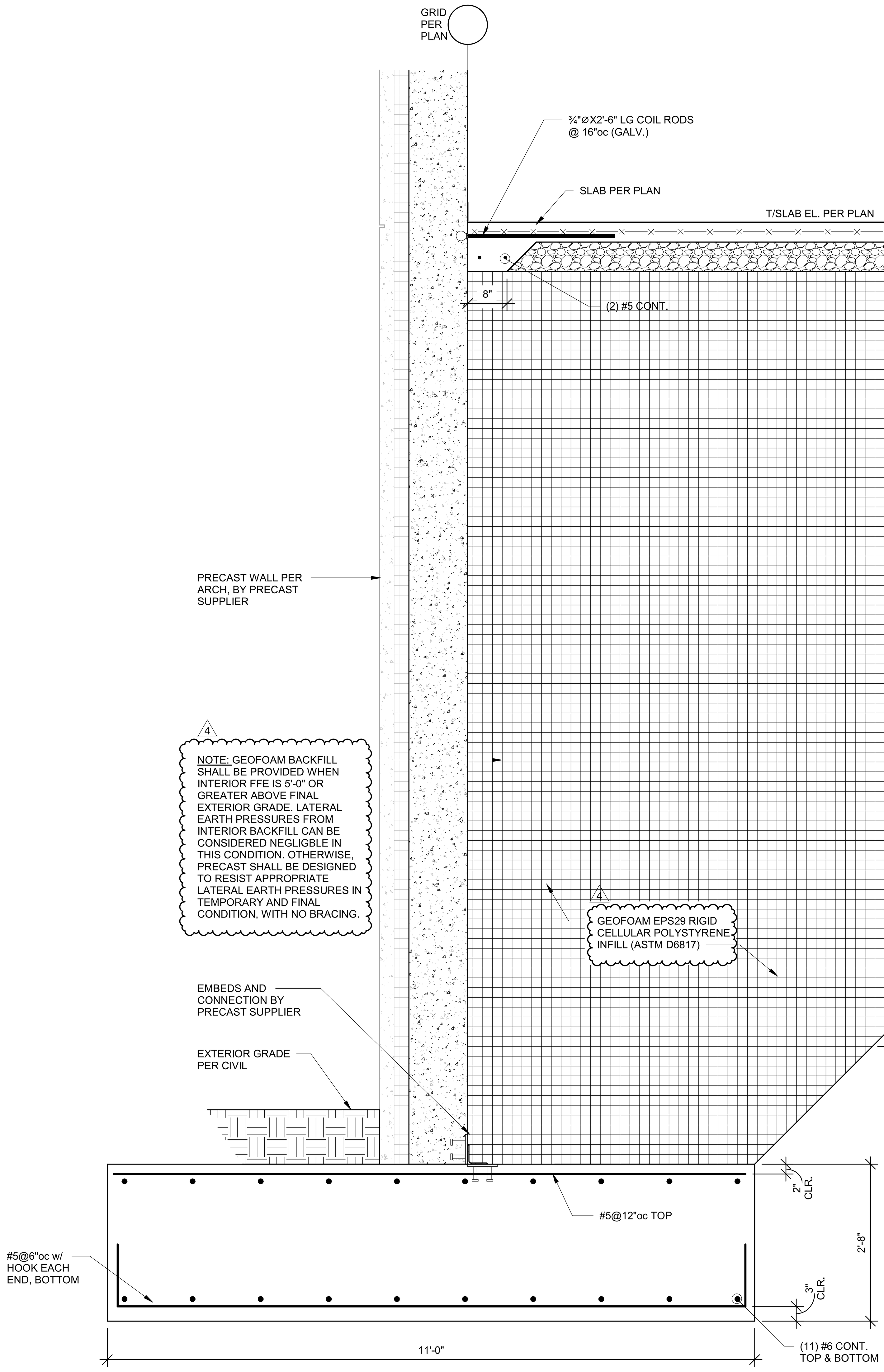
STATE OF MISSOURI — RYAN M. HAGEDORN — NUMBER PE-2020000046 — PROFESSIONAL ENGINEER — 9.29.2023

JOB NO: 23020.00
DRAWN BY: RWO
CHECKED BY: RMH
DATE: 08/31/2023

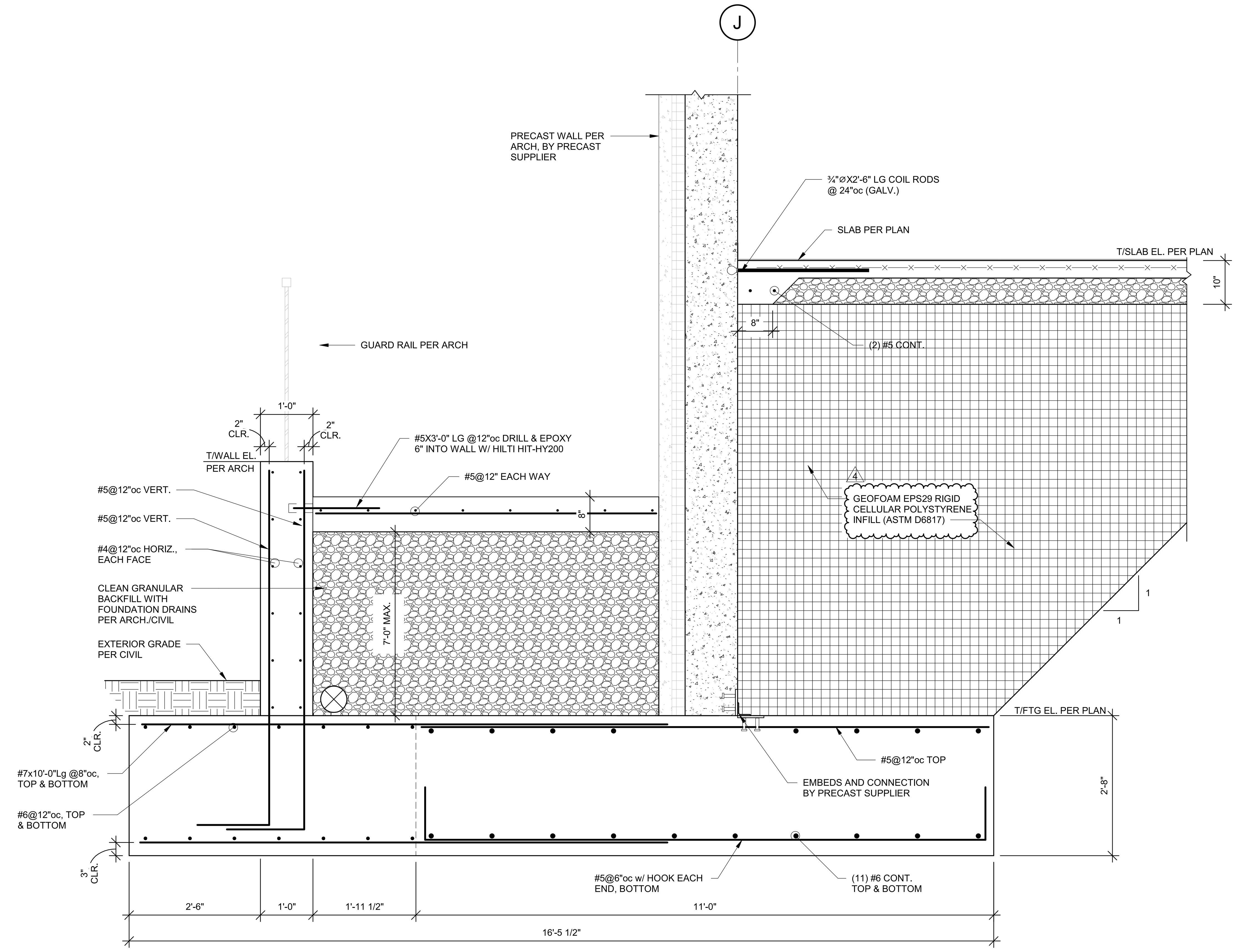
S202

FOUNDATION SECTIONS

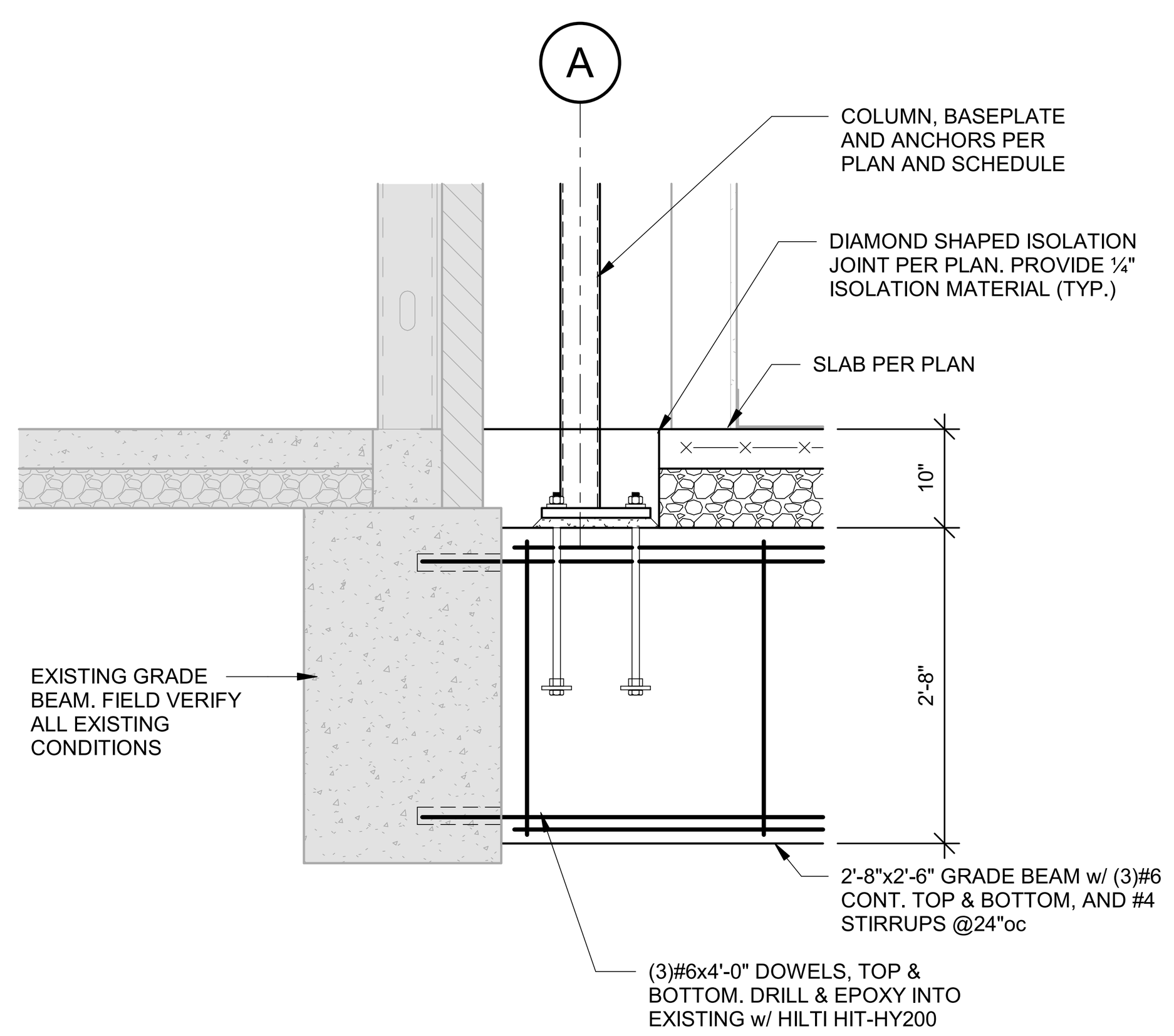
9/29/2023 10:20:45 AM



1 SECTION
3/4" = 1'-0"



2 SECTION
3/4" = 1'-0"



3 SECTION
3/4" = 1'-0"

hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

Construction Documents

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	Addendum 04	09/29/2023

STATE OF MISSOURI — RYAN M. HAGEMANN — NUMBER PE-2016000046 — PROFESSIONAL ENGINEER — 9.29.2023

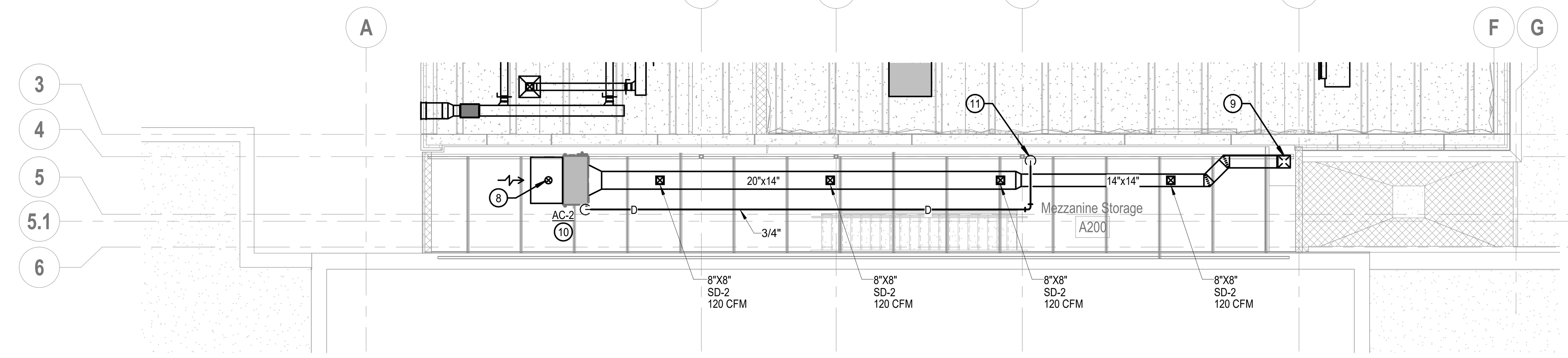
JOB NO: 23020.00
DRAWN BY: RWO
CHECKED BY: RMH
DATE: 08/31/2023

S203

FOUNDATION SECTIONS

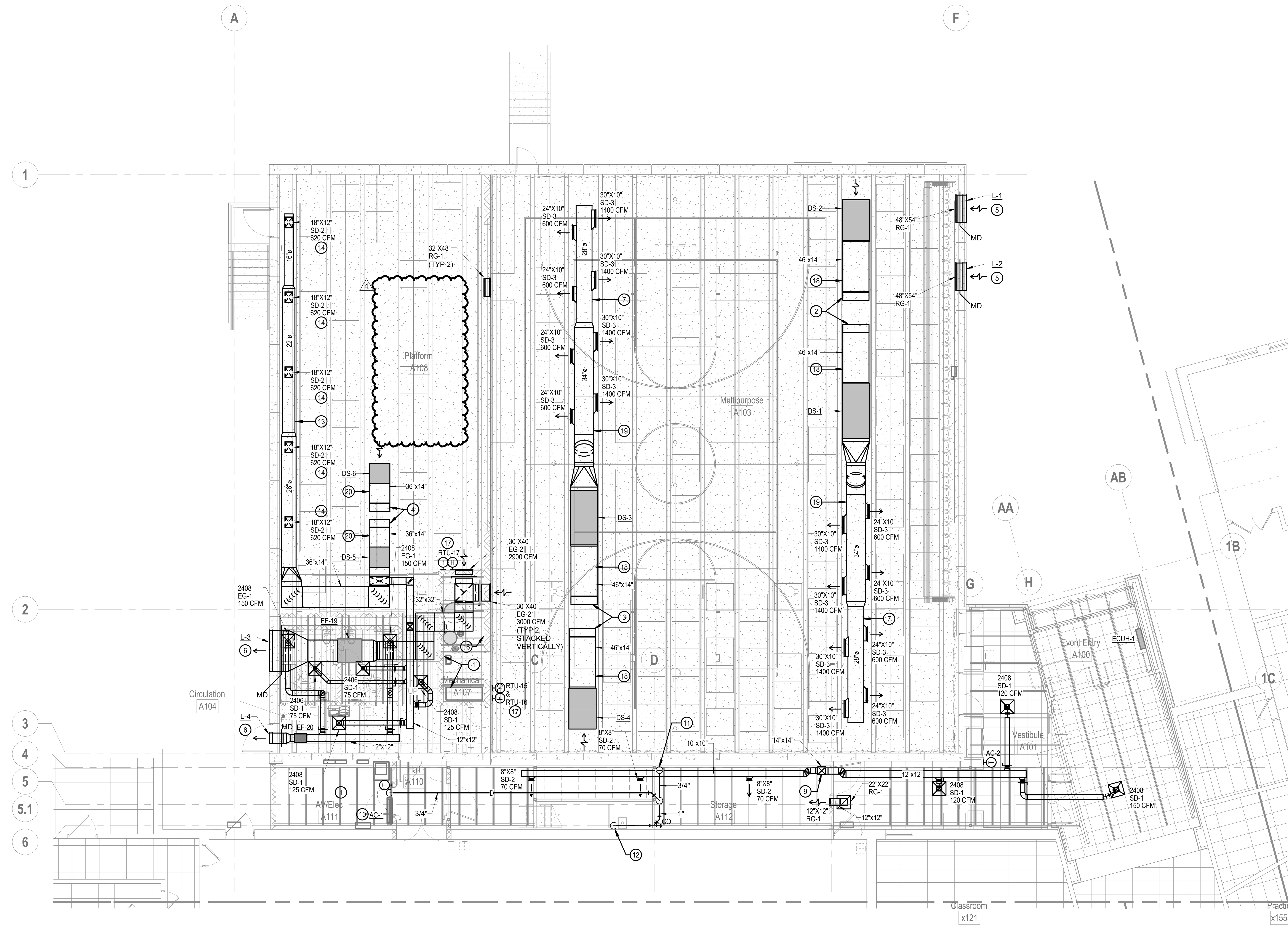
9/29/2023 10:20:45 AM

Please consider the environment before printing this.



N1 Scale 1/8" = 1'-0" HVAC PLAN - MEZZANINE - AREA A

8' 4' 0' 8' PROJECT NORTH TRUE NORTH



A1 Scale 1/8" = 1'-0" HVAC PLAN - LEVEL 1 - AREA A

8' 4' 0' 8' PROJECT NORTH TRUE NORTH

SHEET KEYNOTE LEGEND

GENERAL NOTES:

1. INFORMATION SHOWN ON THE DRAWINGS IS INTENDED TO CONVEY SCOPE AND IS ARRANGED FOR DRAWING CLARITY. IT IS NOT TO BE TAKEN AS AN AS-BUILT CONDITION. THE SYSTEM INSTALLATION SHALL BE COORDINATED WITH STRUCTURE, CEILINGS, WALLS, AND ALL OTHER TRADES TO PROVIDE FOR A COMPLETE AND WORKING SYSTEM.
2. ALL DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT INCLUDE ALL OFFSETS, DROPS, AND RISES. CAREFULLY COORDINATE DUCT AND PIPE ROUTING WITH STRUCTURE AS WELL AS ALL OTHER TRADES TO MAINTAIN EQUIPMENT CLEARANCES, EQUIPMENT ACCESSIBILITY, DESIRED CEILING HEIGHTS, AND AESTHETICS. THE CONTRACTOR SHALL INCULDE ANY NEEDED OFFSETS AND CHANGES OF DIRECTION IN THE BID PRICING.
3. COORDINATE ALL DUCT PENETRATIONS WITH STRUCTURAL PRIOR TO CUTTING FLOORS OR BEARING WALLS.
4. WALL MOUNTED DEVICES SUCH AS THERMOSTATS, TEMPERATURE SENSORS, HUMIDITY SENSORS, AND PRESSURE SENSORS ARE SHOWN ON PLANS FOR CLAIRTY AND GENERAL REFERENCE OF LOCATIONS. LOCATIONS SHOW ARE NOT TO BE CONSIDERED THE EXACT MOUNTING LOCATION. COORDINATE THE INSTALLATION OF ALL WALL MOUNTED DEVICES WITH THE ARCHITECTURAL ELEVATIONS AND OTHER TRADES WALL MOUNTED DEVICES. GROUP THE INSTALLATION OF ALL THE DEVICES TO THE EXTENT POSSIBLE AND LOCATED DEVICES SUCH THAT THEY DO NOT CONFLICT WITH MILL WORK, TELEVISIONS, FURNITURE, TEACHING BOARDS, AND OTHER SIMILAR OBSTRUCTIONS.
5. PROVIDE FIRESTOPPING AT PENETRATIONS OF ALL RATED WALLS. REFER TO CODE PLANS FOR LOCATIONS OF RATED WALLS.
6. FURNISH ALL EXPOSED DUCTWORK IN FINSHED SPACES WITH PAINTABLE FINISH. PROVIDE A TRIM FLANGE AT WALL PENETRATIONS OF EXPOSED DUCTWORK, FINISH BY ARCHITECT.
7. DUCT SIZES SHOWN ARE SHEET METAL DIMENSIONS. WHERE DUCT LINER IS REQUIRED, DUCT SIZES ARE NOT REQUIRED TO BE INCREASED TO ACCOUNT FOR LINER.
8. ALL SERVICES SHOWN WITH HALF TONE LINE WEIGHT ARE EXISTING.

PLAN NOTES:

(1) DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL PANELS AND EQUIPMENT.

(2) 46"X14" SUPPLY DUCT AND 46"X14" RETURN DUCT THROUGH ROOF TO RTU-15. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.

(3) 46"X14" SUPPLY DUCT AND 46"X14" RETURN DUCT THROUGH ROOF TO RTU-16. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.

(4) 36"X14" SUPPLY DUCT AND 36"X14" RETURN DUCT THROUGH ROOF TO RTU-17. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.

(5) ICC 500 AND WIND-DRIVEN RAIN INTAKE LOUVER ASSEMBLY. REFER TO SCHEDULE AND DETAIL. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION.

(6) ICC 500 AND WIND-DRIVEN RAIN EXHAUST LOUVER ASSEMBLY. REFER TO SCHEDULE AND DETAIL. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION.

(7) SLOPE DUCT WITH STRUCTURE.

(8) 8" DIAMETER OUTSIDE AIR DUCT UP THROUGH ROOF.

(9) 14"X14" SUPPLY DUCT BETWEEN MEZZANINE AND FIRST FLOOR. ROUTE WITHIN CHASE.

(10) PROVIDE REFRIGERATION LINESETS THROUGH THE ROOF BETWEEN THE INDOOR UNIT AND OUTDOOR CONDENSING UNIT. REFER TO THE MANUFACTURER'S REQUIREMENTS FOR PIPE SIZES AND QUANTITY.

(11) ROUTE 3/4" CONDENSATE DRAIN BETWEEN MEZZANINE AND FIRST FLOOR.

(12) ROUTE 1" CONDENSATE DRAIN UNDER THE STAIRS AND DOWN ALONG THE FACE OF THE WALL AND DISCHARGE OVER THE HUB DRAIN WITH AIR GAP.

(13) COORDINATE DUCT ROUTING WITH STAGE EQUIPMENT.

(14) MOUNT REGISTER ON THE BOTTOM OF THE DUCT AND POSITION THE DEFLECTION BLADES TO DIRECT THE AIRFLOW TOWARDS THE EXTERIOR WALL AND AWAY FROM THE CURTAINS.

4

(15) NOT USED.

(16) PROVIDE STORM SHELTER VENTILATION SWITCH AND SIGNAGE THAT INDICATES SWITCH WILL ACTIVATE SYSTEM TO PROVIDE EMERGENCY VENTILATION IN THE EVENT OF A TORNADO. REFER TO M301.

(17) PROVIDE GYM-RATED, LOCKABLE COVER/CAGE OVER SENSORS.

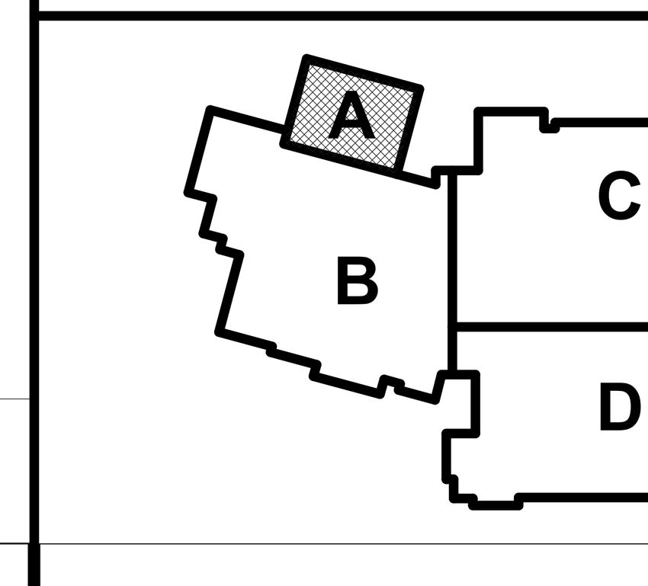
(18) INSTALL DUCTWORK TIGHT TO STRUCTURE WITHIN THE CONCRETE TEES. PROVIDE 7'-6" OF STRAIGHT DUCT BETWEEN THE ELBOW AND SILENCER, INCLUDING WITHIN THE ICC 500 RATED SHROUD.

(19) TRANSITION DUCT DOWN SO AIR DEVICES CAN BE INSTALLED BELOW THE CONCRETE TEES. INSTALL REGISTERS AT AN ANGLE PER THE EXPOSED ROUND DUCT WITH ANGLED DIFFUSERS DETAIL.

(20) INSTALL DUCTWORK TIGHT TO STRUCTURE WITHIN THE CONCRETE TEES. PROVIDE 3'-0" OF STRAIGHT DUCT BETWEEN THE ELBOW AND SILENCER, INCLUDING WITHIN THE ICC 500 RATED SHROUD.

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2314702

KEY PLAN



hollis + miller architects®
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689
HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

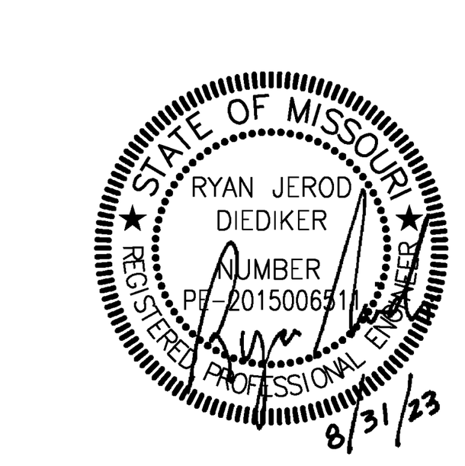
Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty School District
800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

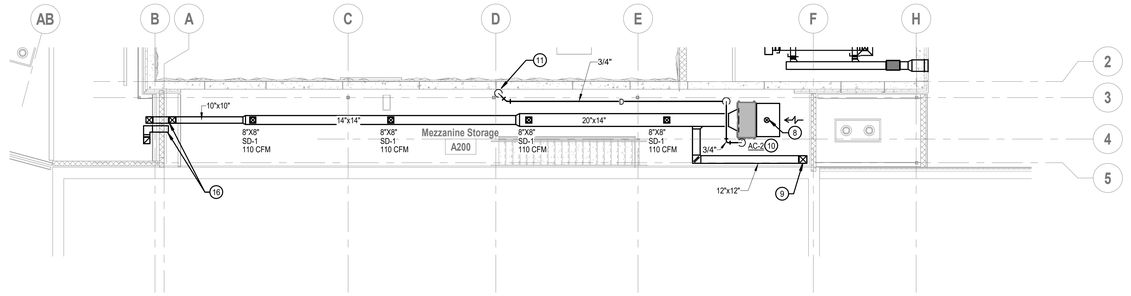
#	Description	Date
4	ADDENDUM 04	09-29-2023



JOB NO: 23018
DRAWN BY: SBI
CHECKED BY: RJD
DATE: 08.31.2023

M101A

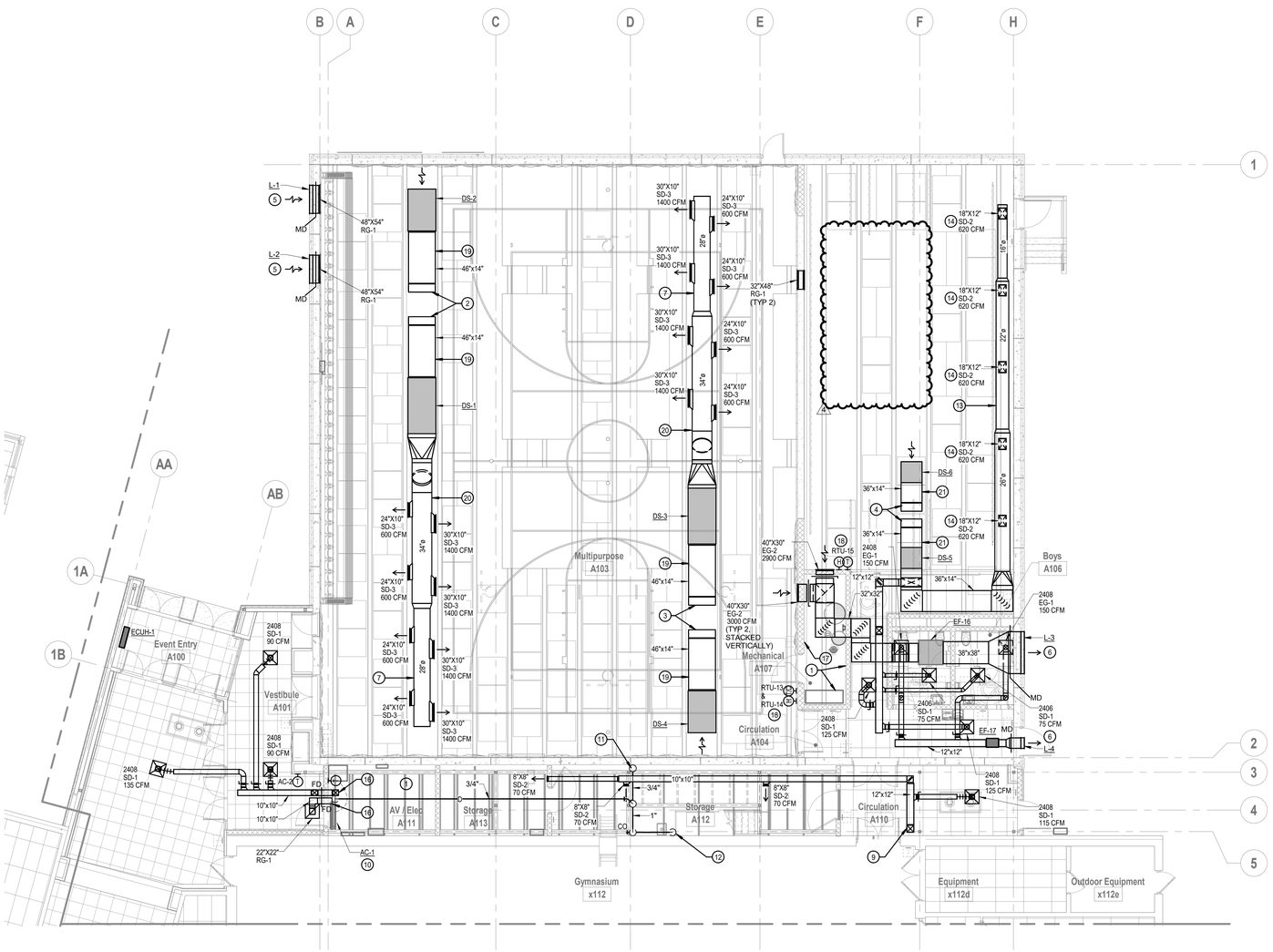
HVAC PLAN - LEVEL 1 & MEZZANINE - AREA A



N1 | Scale 1/8" = 1'-0" | HVAC PLAN - MEZZANINE - AREA A

8' 4' 0' 8'

PROJECT NORTH TRUE NORTH



A1 | Scale 1/8" = 1'-0" | HVAC PLAN - LEVEL 1 - AREA A

8' 4' 0' 8'

PROJECT NORTH TRUE NORTH

9/28/2023 2:09:43 PM

SHEET KEYNOTE LEGEND

GENERAL NOTES:

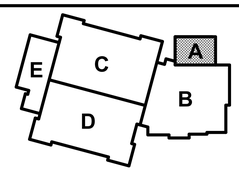
1. INFORMATION SHOWN ON THE DRAWINGS IS INTENDED TO CONVEY SCOPE AND IS ARRANGED FOR DRAWING CLARITY. IT IS NOT TO BE TAKEN AS AN AS-BUILT CONDITION. THE SYSTEM INSTALLATION SHALL BE COORDINATED WITH STRUCTURE, CEILINGS, WALLS, AND ALL OTHER TRADES TO PROVIDE FOR A COMPLETE AND WORKING SYSTEM.
2. ALL DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT INCLUDE ALL OFFSETS, DROPS, AND RISES. CAREFULLY COORDINATE DUCT AND PIPE ROUTING WITH STRUCTURE AS WELL AS ALL OTHER TRADES TO MAINTAIN EQUIPMENT CLEARANCES, EQUIPMENT ACCESSIBILITY, DESIRED CEILING HEIGHTS, AND AESTHETICS. THE CONTRACTOR SHALL INCULDE ANY NEEDED OFFSETS AND CHANGES OF DIRECTION IN THE BID PRICING.
3. COORDINATE ALL DUCT PENETRATIONS WITH STRUCTURAL PRIOR TO CUTTING FLOORS OR BEARING WALLS.
4. WALL MOUNTED DEVICES SUCH AS THERMOSTATS, TEMPERATURE SENSORS, HUMIDITY SENSORS, AND PRESSURE SENSORS ARE SHOWN ON PLANS FOR CLAIRTY AND GENERAL REFERENCE OF LOCATIONS. LOCATIONS SHOW ARE NOT TO BE CONSIDERED THE EXACT MOUNTING LOCATION. COORDINATE THE INSTALLATION OF ALL WALL MOUNTED DEVICES WITH THE ARCHITECTURAL ELEVATIONS AND OTHER TRADES WALL MOUNTED DEVICES. GROUP THE INSTALLATION OF ALL THE DEVICES TO THE EXTENT POSSIBLE AND LOCATED DEVICES SUCH THAT THEY DO NOT CONFLICT WITH MILL WORK, TELEVISIONS, FURNITURE, TEACHING BOARDS, AND OTHER SIMILAR OBSTRUCTIONS.
5. PROVIDE FIRESTOPPING AT PENETRATIONS OF ALL RATED WALLS. REFER TO CODE PLANS FOR LOCATIONS OF RATED WALLS.
6. FURNISH ALL EXPOSED DUCTWORK IN FINSHED SPACES WITH PAINTABLE FINISH. PROVIDE A TRIM FLANGE AT WALL PENETRATIONS OF EXPOSED DUCTWORK, FINISH BY ARCHITECT.
7. DUCT SIZES SHOWN ARE SHEET METAL DIMENSIONS. WHERE DUCT LINER IS REQUIRED, DUCT SIZES ARE NOT REQUIRED TO BE INCREASED TO ACCOUNT FOR LINER.
8. ALL SERVICES SHOWN WITH HALF TONE LINE WEIGHT ARE EXISTING.

PLAN NOTES:

1. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL PANELS AND EQUIPMENT.
2. 46"X14" SUPPLY DUCT AND 46"X14" RETURN DUCT THROUGH ROOF TO RTU-13. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.
3. 46"X14" SUPPLY DUCT AND 46"X14" RETURN DUCT THROUGH ROOF TO RTU-14. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.
4. 36"X14" SUPPLY DUCT AND 36"X14" RETURN DUCT THROUGH ROOF TO RTU-15. PROVIDE TRANSITION TO FULL-SIZE UNIT CONNECTIONS WITHIN THE CURB. PROVIDE ICC 500 RATED SHROUD AT EACH DUCT PENETRATION THROUGH THE ROOF.
5. ICC 500 AND WIND-DRIVEN RAIN INTAKE LOUVER ASSEMBLY. REFER TO SCHEDULE AND DETAIL. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION.
6. ICC 500 AND WIND-DRIVEN RAIN EXHAUST LOUVER ASSEMBLY. REFER TO SCHEDULE AND DETAIL. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION.
7. SLOPE DUCT WITH STRUCTURE.
8. 8" DIAMETER OUTSIDE AIR DUCT UP THROUGH ROOF.
9. 12"X12" SUPPLY DUCT BETWEEN MEZZANINE AND FIRST FLOOR. ROUTE WITHIN CHASE.
10. PROVIDE REFRIGERATION LINESETS THROUGH THE ROOF BETWEEN THE INDOOR UNIT AND OUTDOOR CONDENSING UNIT. REFER TO THE MANUFACTURER'S REQUIREMENTS FOR PIPE SIZES AND QUANTITY.
11. ROUTE 3/4" CONDENSATE DRAIN BETWEEN MEZZANINE AND FIRST FLOOR.
12. ROUTE 1" CONDENSATE DRAIN UNDER THE STAIRS AND DOWN ALONG THE FACE OF THE WALL AND DISCHARGE OVER THE HUB DRAIN WITH AIR GAP.
13. COORDINATE DUCT ROUTING WITH STAGE EQUIPMENT.
14. MOUNT REGISTER ON THE BOTTOM OF THE DUCT AND POSITION THE DEFLECTION BLADES TO DIRECT THE AIRFLOW TOWARDS THE EXTERIOR WALL AND AWAY FROM THE CURTAINS.
15. NOT USED.
16. 10"X10" SUPPLY DUCT AND 10"X10" RETURN DUCT BETWEEN MEZZANINE AND FIRST FLOOR. ROUTE WITHIN CHASE. PROVIDE FIRE DAMPER IN DUCT AT PENETRATION THROUGH FIRE-RATED WALL. COORDINATE WITH ARCHITECTURAL DRAWINGS.
17. PROVIDE STORM SHELTER VENTILATION SWITCH AND SIGNAGE THAT INDICATES SWITCH WILL ACTIVATE SYSTEM TO PROVIDE EMERGENCY VENTILATION IN THE EVENT OF A TORNADO. REFER TO M301.
18. PROVIDE GYM-RATED, LOCKABLE COVER/CAGE OVER SENSORS.
19. INSTALL DUCTWORK TIGHT TO STRUCTURE WITHIN THE CONCRETE TEES. PROVIDE 7'-6" OF STRAIGHT DUCT BETWEEN THE ELBOW AND SILENCER, INCLUDING WITHIN THE ICC 500 RATED SHROUD.
20. TRANSITION DUCT DOWN SO AIR DEVICES CAN BE INSTALLED BELOW THE CONCRETE TEES. INSTALL REGISTERS AT AN ANGLE PER THE EXPOSED ROUND DUCT WITH ANGLED DIFFUSERS DETAIL.
21. INSTALL DUCTWORK TIGHT TO STRUCTURE WITHIN THE CONCRETE TEES. PROVIDE 3'-0" OF STRAIGHT DUCT BETWEEN THE ELBOW AND SILENCER, INCLUDING WITHIN THE ICC 500 RATED SHROUD.

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2314703

KEY PLAN



hollis+miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone
Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone
MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority #
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone
Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone
Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

South Valley Middle School Storm Shelter Addition
Liberty School District
1000 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

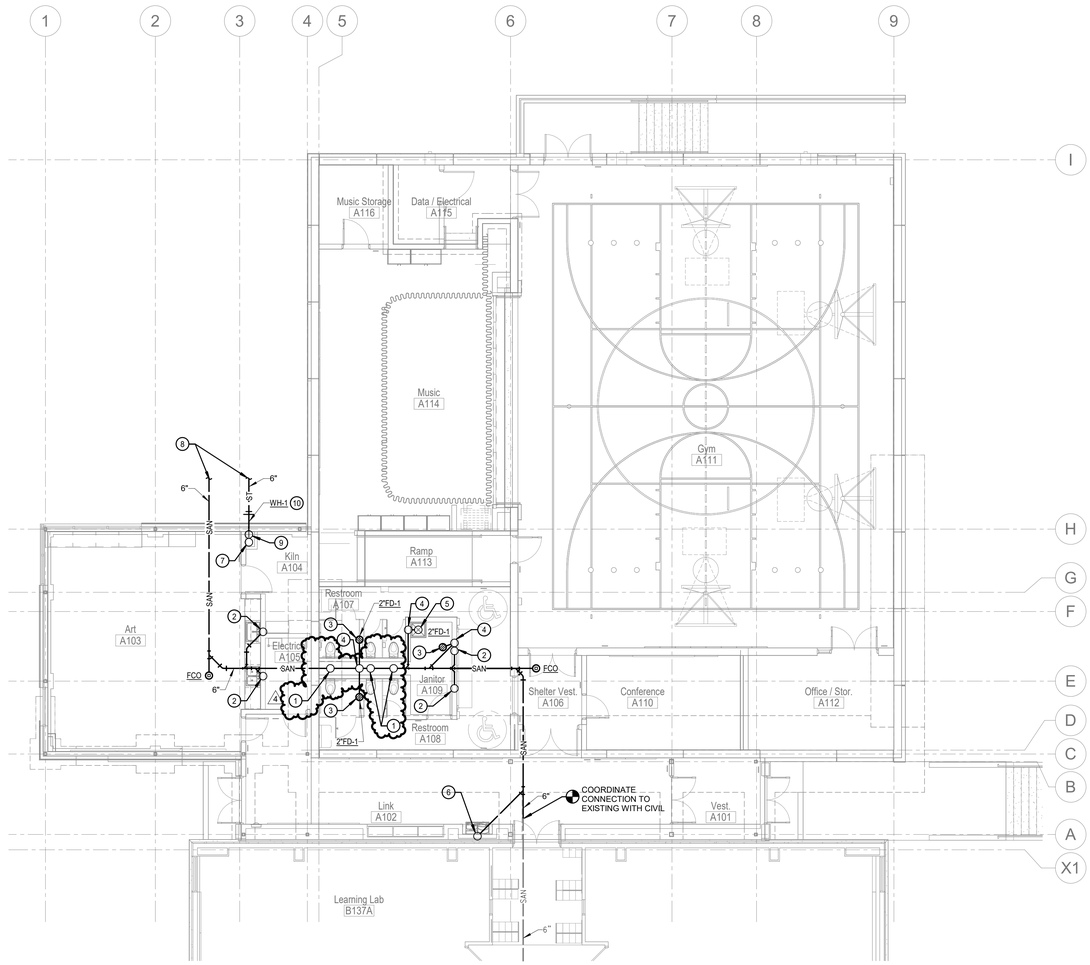
#	Description	Date
4	ADDENDUM 04	09-29-2023

JOB NO: 23019
DRAWN BY: SBI
CHECKED BY: RJD
DATE: 08.31.2023

M101A

HVAC PLAN - LEVEL 1 & MEZZANINE - AREA A

Please consider the environment before printing this.



SHEET KEYNOTE LEGEND

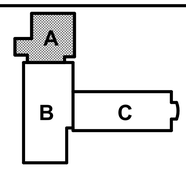
GENERAL NOTES:

1. INFORMATION SHOWN ON THE DRAWINGS IS INTENDED TO CONVEY SCOPE AND IS ARRANGED FOR DRAWING CLARITY. IT IS NOT TO BE TAKEN AS AN AS-BUILT CONDITION. THE SYSTEM INSTALLATION SHALL BE COORDINATED WITH STRUCTURE, CEILINGS, WALLS, AND ALL OTHER TRADES TO PROVIDE FOR A COMPLETE AND WORKING SYSTEM.
2. CAREFULLY COORDINATE PIPE ROUTING WITH NEW AND EXISTING STRUCTURE AS WELL AS ALL OTHER TRADES TO MAINTAIN EQUIPMENT CLEARANCES AND DESIRED CEILING HEIGHTS.
3. COORDINATE ALL PIPING PENETRATIONS WITH STRUCTURAL PRIOR TO CORE DRILLING.
4. WASTE PIPING SHALL BE SLOPED AT 1/8" PER FOOT FOR 3" AND LARGER PIPING AND ¼" PER FOOT FOR 2" AND SMALLER PIPING.
5. STORM PIPING SHALL BE SLOPED AT 1/8" PER FOOT.
6. PROVIDE WASTE AND STORM CLEANOUTS AS REQUIRED PER CODE AND SPECIFICATIONS. MORE CLEANOUTS MAY BE REQUIRED THAN AS SHOWN ON PLANS.
7. PROVIDE SHUT OFF VALVES ABOVE ACCESSIBLE CEILING OR OTHER ACCESSIBLE LOCATION FOR ALL BRANCH PIPING AND INDIVIDUAL CONNECTIONS TO PLUMBING FIXTURES. WHERE STOPS ARE PROVIDED FOR INDIVIDUAL FIXTURES SHUT OFF VALVES ARE ALSO REQUIRED AT THE BRANCH CONNECTION. PLUMBING STOPS ARE NOT CONSIDERED A SUBSTITUE FOR SHUT OFF VALVES.
8. AVOID ROUTING ANY PIPING THROUGH IT ROOMS OR ELECTRIC ROOMS. IN THE EVENT IT IS ABSOLUTELY NECESSARY, COORDINATE THE EXACT LOCATION SUCH THAT IT IS NOT DIRECTLY ABOVE ANY PANELS OR EQUIPMENT.
9. REFER TO RISER DIAGRAM FOR ADDITIONAL PLUMBING INFORMATION.
10. PROVIDE FIRESTOPPING AT PENETRATIONS OF ALL RATED WALLS. REFER TO CODE PLANS FOR LOCATIONS OF RATED WALLS.
11. ALL HOT WATER RECIRC BALANCE DEVICES SHALL BE 1 GPM CIRCUIT SETTERS UNLESS OTHERWISE NOTED.
12. PROVIDE WATER HAMMER ARRESTORS PER THE REQUIREMENTS OF THE SPECIFICATIONS AND PDI-WH201 FOR ALL FAST ACTING VALVES (FLUSH VALVES, SOLENOID FAUCETS, ETC).
13. PROVIDE ICC 500 PIPING SHROUD FOR ALL PENETRATIONS OF SHELTER 3" AND LARGER.

PLAN NOTES:

1. 4" SANITARY UP TO WATER CLOSET.
2. 2" SANITARY UP TO LAVATORY/SINK.
3. 2" SANITARY UP TO FLOOR DRAIN.
4. 2" SANITARY UP TO 1-1/2" VENT IN WALL/CHASE.
5. 2" SANITARY UP TO JANITOR SINK.
6. 2" SANITARY UP TO DRINKING FOUNTAIN.
7. 6" STORM UP IN CHASE.
8. 6" SANITARY SEWER EXIT LOCATION AND 6" STORM SEWER EXIT LOCATION. ROUTE EACH BELOW STRUCTURAL FOOTING. APPROXIMATE FLOWLINE 13'-6" BELOW FINISHED FLOOR. COORDINATE EXACT LOCATIONS AND DEPTHS WITH SITE UTILITIES CONTRACTOR PRIOR TO INSTALLATION. REFER TO CIVIL DRAWINGS FOR CONTINUATION.
9. 3/4" CW THROUGH FLOOR.
10. PROVIDE WALL HYDRANT ABOVE GRADE. COORDINATE MOUNTING HEIGHT WITH ARCHITECT, STRUCTURAL, AND CIVIL.

KEY PLAN



A8 | Scale 1/8" = 1'-0" | UNDERSLAB PLUMBING PLAN - LEVEL 1 - AREA A

8' 4' 0' 8'

hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
4	ADDENDUM 04	09-29-2023

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2314704

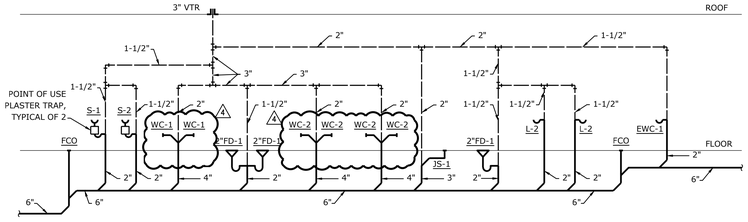
STATE OF MISSOURI
RYAN JEROD DIEDIKER
NUMBER PE-2015006871
REGISTERED PROFESSIONAL ENGINEER
8/31/23

JOB NO: 23020.00
DRAWN BY: SBI
CHECKED BY: RJD
DATE: 08/31/2023

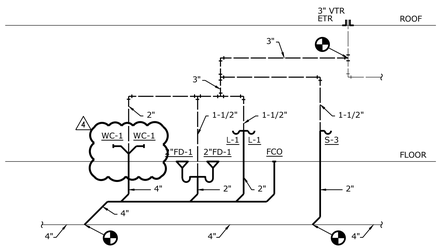
P100A

UNDERSLAB PLUMBING PLAN - LEVEL 1 - AREA A

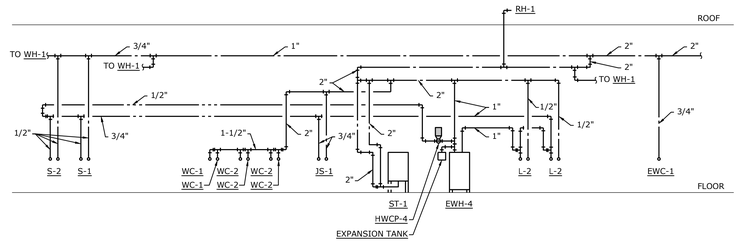
9/28/2023 1:55:17 PM



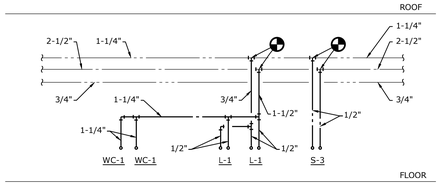
WASTE & VENT RISER DIAGRAM - AREA A
SCALE: NONE



WASTE & VENT RISER DIAGRAM - AREA B
SCALE: NONE



DOMESTIC WATER RISER DIAGRAM - AREA A
SCALE: NONE



DOMESTIC WATER RISER DIAGRAM - AREA B
SCALE: NONE

hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1683
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority #
Engineering: #2001009364
Landscaping: #2006027139
Surveying: #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Inc.
Mechanical, Electrical & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, Johnson County, KS 66061
913.345.2127 phone

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Bellview Ave.
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

CONSTRUCTION DOCUMENTS

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conistor St.
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	ADDENDUM 04	09-29-2023

STATE OF MISSOURI
RYAN JEROD DIEDIKER
NUMBER A-2015006
REGISTERED ARCHITECT
8/31/23

JOB NO: 23020.00
DRAWN BY: SBI
CHECKED BY: RJD
DATE: 08.31.2023

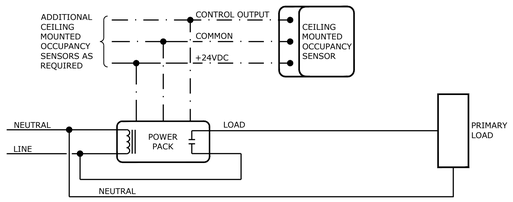
P301

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2314704

PLUMBING RISER DIAGRAMS

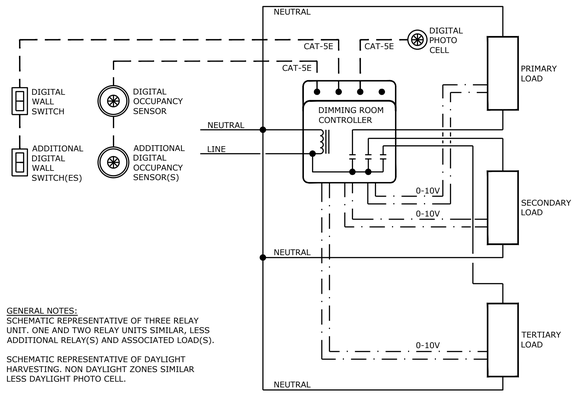
PROJECT NAME:
AUTOCAD FILE LOCATION \ NAME:
LAST CORRECTION BY ▸ DATE ▸ TIME:
PLOTTED BY ▸ DATE ▸ TIME:

2314704 Liberty SD 2023 EPIC Gym Addition & LED Lighting
X:\23\23147\2314704\Drawings\04-2314704_P301.dwg
Lkelsey Wednesday, September 27, 2023 2:34:32 PM
Lucinda Kelsey Wednesday, September 27, 2023 2:36:04 PM



LOW VOLTAGE OCCUPANCY SENSOR WIRING DIAGRAM WITH AUTOMATIC ON OPERATION

NOT TO SCALE



GENERAL NOTES:
SCHEMATIC REPRESENTATIVE OF THREE RELAY UNIT. ONE AND TWO RELAY UNITS SIMILAR, LESS ADDITIONAL RELAY(S) AND ASSOCIATED LOAD(S).

SCHEMATIC REPRESENTATIVE OF DAYLIGHT HARVESTING. NON DAYLIGHT ZONES SIMILAR LESS DAYLIGHT PHOTO CELL.

DIGITAL ROOM CONTROLLER WIRING DIAGRAM

NOT TO SCALE

LIGHTING CONTROL REQUIREMENTS & DESCRIPTIONS - PER SPACE TYPE

TYPE	LIGHTING CONTROL REQUIREMENTS FOR SPACE
1	CONTROL METHOD: OCCUPANCY ON - OCCUPANCY OFF: POWER PACKS/CONTROLLERS: -LOCAL DEVICES IN ACCESSIBLE LOCATIONS AS REQUIRED TO ACHIEVE CONTROL METHOD INDICATED. OCCUPANCY SENSOR(S): -TYPE AND MINIMUM QUANTITY NOTED ON PLANS, MODELS/SETTINGS AS NEEDED TO PROVIDE SMALL MOTION COVERAGE IN ENTIRE ROOM. -SET TIME DELAYS FOR SHUT-OFF AT 30 MINUTES.
2	CONTROL METHOD: MANUAL ON - OCCUPANCY OFF - MANUAL ON/OFF CONTROLS: POWER PACKS/CONTROLLERS: -LOCAL DEVICES IN ACCESSIBLE LOCATIONS AS REQUIRED TO ACHIEVE CONTROL METHOD INDICATED. OCCUPANCY SENSOR(S): -TYPE, LOCATION(S), AND MINIMUM QUANTITY NOTED ON PLANS. MODELS/SETTINGS AS NEEDED TO PROVIDE SMALL MOTION COVERAGE IN ENTIRE ROOM. -SET TIME DELAYS FOR SHUT-OFF AT 30 MINUTES. ON/OFF ZONE SWITCHES: -LOCATION(S) AND QUANTITIES SHOWN ON FLOOR PLANS. -ZONE QUANTITIES FOR EACH SWITCH LOCATION DENOTED ON FLOOR PLANS. -ZONE DESIGNATIONS ARE DENOTED FOR EACH SWITCH WHEN DIFFERENT ZONES ARE CONTROLLED FROM DIFFERENT SWITCHES WITHIN THE SAME ROOM. -ZONES ARE DENOTED ON EACH ASSOCIATED LIGHT FIXTURE WHEN MULTIPLE ZONES ARE PRESENT WITHIN ROOM, USING LOWER CASE LETTERS AS FOLLOWS: "a", "b", ETC. -ON AND OFF CONTROL FOR EACH ZONE, WITH EITHER SEPARATE BUTTONS OR SINGLE BUTTON ROCKER STYLE. NOT TOGGLE STYLE.
3	CONTROL METHOD: MANUAL ON - OCCUPANCY OFF - MANUAL DIMMING CONTROLS: POWER PACKS/CONTROLLERS: -LOCAL DEVICES IN ACCESSIBLE LOCATIONS AS REQUIRED TO ACHIEVE CONTROL METHOD INDICATED. OCCUPANCY SENSOR(S): -TYPE, LOCATION, AND MINIMUM QUANTITY NOTED ON PLANS. MODELS/SETTINGS AS NEEDED TO PROVIDE SMALL MOTION COVERAGE IN ENTIRE ROOM. -SET TIME DELAYS FOR SHUT-OFF AT 30 MINUTES. DIMMABLE ZONE SWITCHES: -LOCATION(S) AND QUANTITIES SHOWN ON FLOOR PLANS. -ZONE QUANTITIES FOR EACH SWITCH LOCATION DENOTED ON FLOOR PLANS. -ZONE DESIGNATIONS ARE DENOTED FOR EACH DIMMER LOCATION WHEN DIFFERENT ZONES ARE CONTROLLED FROM DIFFERENT DIMMERS WITHIN THE SAME ROOM. -ZONES ARE DENOTED ON EACH ASSOCIATED LIGHT FIXTURE WHEN MULTIPLE ZONES ARE PRESENT WITHIN ROOM, USING LOWER CASE LETTERS AS FOLLOWS: "a", "b", ETC. -ON AND OFF CONTROL FOR EACH ZONE, WITH EITHER SEPARATE BUTTONS OR SINGLE BUTTON ROCKER STYLE. NOT TOGGLE STYLE. -RAISE AND LOWER CONTROL FOR EACH ZONE, WITH EITHER SEPARATE BUTTONS OR SINGLE BUTTON ROCKER STYLE. NOT SLIDER STYLE. AUTOMATIC DAYLIGHT HARVESTING PHOTOCELL(S), WHEN SHOWN ON PLANS: -AUTOMATICALLY RAISE/LOWER LIGHTING OUTPUT OF EACH LIGHTING ZONE, EITHER FULLY ARE PARTIALLY, WITHIN EACH DAYLIGHT ZONE(S) NOTED ON FLOOR PLANS. -DEDICATED CLOSED LOOP PHOTOCELL FOR EACH ROOM WITH DAYLIGHT ZONE(S).
4	CONTROL METHOD: MANUAL ON - OCCUPANCY OFF - MANUAL DIMMING CONTROLS AND DMX COLOR MIXING: POWER PACKS/CONTROLLERS: -PROVIDE DMX STAGE LIGHTING MANUAL 8 CHANNEL COLOR MIXER FOR COLOR MIXING OF DMX TRACK LIGHT. PROVIDE NETWORK BRIDGE AND CONNECT DMX STAGE MIXER TO NETWORK CONNECTION FOR CONTROL OF STAGE LIGHTING VIA MOBILE APP/BROWSER. (4) OCCUPANCY SENSOR(S): -TYPE, LOCATION, AND MINIMUM QUANTITY NOTED ON PLANS. MODELS/SETTINGS AS NEEDED TO PROVIDE SMALL MOTION COVERAGE IN ENTIRE ROOM. -SET TIME DELAYS FOR SHUT-OFF AT 30 MINUTES. DIMMABLE ZONE SWITCHES: -LOCATION(S) AND QUANTITIES SHOWN ON FLOOR PLANS. -ZONE QUANTITIES FOR EACH SWITCH LOCATION DENOTED ON FLOOR PLANS. -ZONE DESIGNATIONS ARE DENOTED FOR EACH DIMMER LOCATION WHEN DIFFERENT ZONES ARE CONTROLLED FROM DIFFERENT DIMMERS WITHIN THE SAME ROOM. -ZONES ARE DENOTED ON EACH ASSOCIATED LIGHT FIXTURE WHEN MULTIPLE ZONES ARE PRESENT WITHIN ROOM, USING LOWER CASE LETTERS AS FOLLOWS: "a", "b", ETC. -ON AND OFF CONTROL FOR EACH ZONE, WITH EITHER SEPARATE BUTTONS OR SINGLE BUTTON ROCKER STYLE. NOT TOGGLE STYLE. -RAISE AND LOWER CONTROL FOR EACH ZONE, WITH EITHER SEPARATE BUTTONS OR SINGLE BUTTON ROCKER STYLE. NOT SLIDER STYLE. -ADDRESSABLE TRACK FIXTURE VIA DMX WITH COLOR CHANGING AND MIXING OF EACH HEAD.

GENERAL NOTES:
NOTE 1: WHERE NOTED ABOVE, SCHEDULED BUILDING HOURS OF OPERATION ARE AS FOLLOWS: 6:30 AM TO 6:30 PM.
NOTE 2: CONTRACTOR MUST INCLUDE SHOP DRAWINGS WITH LIGHTING CONTROLS SUBMITTAL SHOWING WIRING SCHEMATICS/DIAGRAMS OVERLAYED ON FLOOR PLANS FOR EACH ROOM.
NOTE 3: ALL WALL MOUNTED LIGHTING CONTROLS MUST HAVE MATCHING FINISHES TO THOSE LISTED IN SPECIFICATION SECTION 262726 - WIRING DEVICES.
NOTE 4: PROVIDE A DIGITAL LIGHTING CONTROL SYSTEM FROM A MANUFACTURER LISTED IN SPECIFICATION SECTION 260923 - LIGHTING CONTROL DEVICES. WIRELESS SYSTEMS ARE NOT PERMITTED.
NOTE 5: CONTRACTOR TO MODIFY OCCUPANCY SENSOR LOCATIONS, AND/OR INCREASE QUANTITIES, AS REQUIRED BASED ON COVERAGE CAPABILITIES OF SUBMITTED PRODUCTS.
NOTE 6: CONTRACTOR MUST COORDINATE WITH LIGHT FIXTURE SCHEDULE, AND MOST IMPORTANTLY THE LIGHT FIXTURE SUBMITTAL, TO VERIFY DIMMING TYPE NEEDED FOR EACH RELAY/CONTROLLER.
NOTE 7: PROGRAM DAYLIGHT HARVESTING SETPOINTS AT NIGHT WITH ALL LIGHT FIXTURES AT FULL LIGHT OUTPUT. PHOTOCELL TO DIM LIGHTING BASED ON THIS SETPOINT IN A CLOSED LOOP SYSTEM.
NOTE 8: CONTRACTOR TO MODIFY PHOTOCELL LOCATIONS AS REQUIRED BASED ON SUBMITTED PRODUCTS.

OCCUPANCY CONTROL DEVICE SCHEDULE

SYMBOL	DESCRIPTION	DETECTION TYPE	SETTINGS (TYPICAL)	MANUFACTURER/MODEL	NOTES
$_P	WALL MOUNTED SWITCH/OCCUPANCY SENSOR LINE VOLTAGE - SINGLE RELAY	PASSIVE INFRARED	ON: MANUAL OFF: 30 MINUTE DELAY	WATTSTOPPER CS-50	1,2
$_PD	WALL MOUNTED SWITCH/OCCUPANCY SENSOR LINE VOLTAGE - SINGLE RELAY - WITH DIMMING	DUAL TECHNOLOGY	ON: MANUAL OFF: 30 MINUTE DELAY	WATTSTOPPER DW-311	1,2
$_TS	WALL MOUNTED DIGITAL TIMER SWITCH LINE VOLTAGE - SINGLE RELAY	NONE	ON: MANUAL OFF: 2 HOUR DELAY TIME SCROLL: UP WARNING FLASH/SOUND: ON/ON	WATTSTOPPER TS-400	1,2
$_L#	WALL MOUNTED LIGHTING SYSTEM ON/OFF SWITCH # INDICATES QUANTITY OF ZONES CONTROLLED AT EACH LOCATION	-	-	PER SUBMITTAL	1,2
$_D#	WALL MOUNTED LIGHTING SYSTEM DIMMER SWITCH # INDICATES QUANTITY OF ZONES CONTROLLED AT EACH LOCATION	-	-	PER SUBMITTAL	1,2
◇	CEILING MOUNTED LIGHTING SYSTEM OCCUPANCY SENSOR	PASSIVE INFRARED	-	PER SUBMITTAL	1,3,4
◇_DT	CEILING MOUNTED LIGHTING SYSTEM OCCUPANCY SENSOR	DUAL TECHNOLOGY	-	PER SUBMITTAL	1,3,4

NOTE 1: THE MANUFACTURERS AND MODELS LISTED ARE THE BASIS OF DESIGN, ALL PRODUCT SUBSTITUTIONS SUBMITTED MUST BE APPROVED AS EQUAL. REFER TO DRAWINGS FOR QUANTITIES.
NOTE 2: ALL WALL MOUNTED LIGHTING CONTROLS MUST HAVE MATCHING FINISHES TO THOSE LISTED IN SPECIFICATION SECTION 262726 - WIRING DEVICES.
NOTE 3: OCCUPANCY SENSOR LOCATIONS SHOWN ON FLOOR PLANS ARE GENERIC, CONTRACTOR TO MODIFY LOCATIONS AS REQUIRED BASED COVERAGE CAPABILITIES OF SUBMITTED PRODUCTS.
NOTE 4: MODIFY LOCATIONS OF CEILING MOUNTED OCCUPANCY SENSORS AS REQUIRED SO THAT NO OCCUPANCY SENSOR IS WITHIN 4'-0" OF AN HVAC SUPPLY DIFFUSER.

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	MOUNTING	LAMP	VOLTS	MANUFACTURER	V-A
A	2'x4' RECESSED BACK LIT FLAT PANEL. INTEGRAL 0-10V DIMMING DRIVER. ADJUSTABLE LUMEN OUTPUT ON FIXTURE	RECESSED GRID	LED 4900 LUMENS (DELIVERED) 3500K 80 CRI	UNV	WILLIAMS SERIES BP GE CURRENT LPL LITHONIA CPX OR PRE-BID APPROVED EQUAL	50
A2	SAME AS TYPE A EXCEPT 2'X2' AND WITH LUMEN PACKAGE AS NOTED	RECESSED GRID	LED 3200 LUMENS (DELIVERED) 3500K 80 CRI	UNV	WILLIAMS SERIES BP GE CURRENT LPL LITHONIA CPX OR PRE-BID APPROVED EQUAL	50
B	4" OPEN APERTURE LED DOWNLIGHT WITH SEMI-SPECULAR LOW IRIDESCENT REFLECTOR, INTEGRAL DRIVER, PAINTED WHITE TRIM FLANGE. LISTED FOR DAMP LOCATIONS. PROVIDE WITH 0-10V DIMMING DRIVER UL LISTED FOR WET LOCATIONS, HIGH AMBIENT TEMP.	RECESSED	LED 1,000 LUMENS (DELIVERED) 3500K 80 CRI	UNV	PATHWAY LIGHTING SERIES 4LB79V W LITHONIA LDN4 LIGHTOLIER SERIES LYTEPROFILE WILLIAMS 4DR INTENSE SD4DR	15
C	12" X 23" HIGH BAY FIXTURE. LOW PROFILE. CAST ALUMINUM HEAT SINK. FROSTED ACRYLIC LENS. HARD STEM MOUNT TO FLUSH WITH JOIST. 0-10V DIMMING DRIVER MEDIUM DISTRIBUTION.	PENDANT	LED 24,000 LUMENS (DELIVERED) 3500K 80CRI	277	LITHONIA CPHB HIGH BAY OR PRE-BID APPROVED EQUAL	174
D DG -_'-	4" WIDE RECESSED LINEAR LED FIXTURE. FROSTED WHITE ACRYLIC LENS. INTEGRAL 0-10V DIMMING DRIVERS. FEILD PAINTABLE WHITE TRIM FINISH. INDICATES RECESSED IN GYP. CEILING. (INDICATES LENGTH OF FIXTURE, REFER TO PLANS	RECESSED GRID	LED 600 LUMENS PER FT (DELIVERED) 3500K 80 CRI	UNV	NULITE SERIES RP4 METALUMEN RAIL 4 MARK SLOT 4 LITECONTRL MOD 4 OR PRE-BID APPROVED EQUAL	6.5/FT
F	4'-0" LED STRIP LIGHT WITH WIRE GUARD. ROUND LENS. INTEGRAL DRIVER. WHITE FINISH. 0-10V DIMMING DRIVER.	CHAIN HANG TO 8'-0" AFF UNLESS NOTED	LED 3,000 LUMENS (DELIVERED) 3500K	UNV	WILLIAMS 75 SERIES LITHONIA Z SERIES DAY-BRITE FLUX STREAM STRIP COLUMBIA CSL OR PRE-BID APPROVED EQUAL	30
F2	SAME AS TYPE 'F' EXCEPT 8'-0" LONG AND WITH LUMEN PACKAGE AS NOTED. NO WIRE GUARD. AIR CRAFT CABLE MOUNT. BLACK FINISH.	PEDANT	LED 12,000 LUMENS (DELIVERED) 3500K	UNV	WILLIAMS 75 SERIES LITHONIA Z SERIES DAY-BRITE FLUX STREAM STRIP COLUMBIA CSL OR PRE-BID APPROVED EQUAL	30
G	LED EXTERIOR WEDGE TYPE WALL PACK, TYPE 3 DISTRIBUTION. COORDINATE FINISH WITH ARCHITECT.	WALL	LED 3,200 LUMEN (DELIVERED) 4000K 70 CRI	277	LITHONIA WEDGE2 GARDCO GWS OR PRE-BID APPROVED EQUAL	32
H	LED FLEXIBLE TAPE LIGHT, FROSTED ACRYLIC LENS, REMOTE DRIVER, PROVIDE POWER SUPPLIES AS REQUIRED FOR FIXTURE LENGTH(S) AS SHOWN ON PLAN. · PROVIDE WITH 45 DEGREE ALUMINUM MOUNTING CHANNEL	SURFACE	LED 235 LUMENS/FT 3500K 80 CRI	UNV	TIVOLI SERIES INDOOR TIVOTAPE ACOLYTE SERIES RIBBONLYTE OR PRE-BID APPROVED EQUAL	2.5/FT
TF	LINE VOLTAGE DMX CONTROLLED TRACK FIXTURE WITH COLOR MIXING DMX TRACK HEADS. FIELD INTERCHANGABLE OPTICS, PROVIDE (16) 66DEG OPTICS, AND AN EXTRA (8) 35DEG (8) 16 DEG PROVIDE WITH (16) HEADS. BLACK TRACK FINISH, AND BLACK FIXTURE FINISH CONFIRM WITH ARCH. SURFACE MOUNTEDTRACK, LENGTH PER PLANS.	SURFACE TRACK	LED 1500 LUMENS (DELIVERED) 90 CRI 3500K	120	TIMES SQUARE DMX TRACK TIMES SQUARE MOSAIC FLOOD	29/HEAD
X	EDGE LIT EXIT SIGN RED LETTERING. ALUMINUM TRIM. PROVIDE ARROWS AS NOTED ON DRAWINGS, AND SINGLE OR DOUBLE SIDED AS NEEDED AND SHOWN ON DRAWINGS. PROVIDE TOP, BACK, OR SIDE MOUNT HARDWARE AS REQUIRED BY ARCHITECTURAL CONDITIONS. BATTERY CAPABLE OF 90 MINUTES OF EMERGENCY OPERATION.	SURFACE	LED	UNV	OUAL LITE LES SERIES LITHONIA EDGE LIT EXIT EVENLITE TEX EMERGI-LITE TOTAL EDGE OR PRE-BID APPROVED EQUAL	5

NOTE: PROVIDE FIXTURES DESIGNATED WITH AN X ON PLAN WITH 1200 LUMEN (OR MAX FIXTURE OUTPUT) MINIMUM 90MINUTE EMERGENCY BATTERY BACKUP UNLESS WHERE PROVIDED WITH INVERTER, REFER TO PLANS.

hollis+miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1685
HOLLISANDMILLER.COM
Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 2003161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority #
Engineering: #2001009364
Landscaping: #2006027139
Surveying: #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Smith & Boucher Inc.
Mechanical, Electrical & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, Johnson County, KS 66061
913.345.2127 phone

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Bellview Ave.
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

CONSTRUCTION DOCUMENTS

EPIC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conistor St.
Liberty, MO 64068

REVISIONS:

#	Description	Date
4	ADDENDUM 04	09-29-2023

STATE OF MISSOURI
RYAN JEROD DIEDIKER
NUMBER A-2015006
REGISTERED PROFESSIONAL ENGINEER
8/31/23

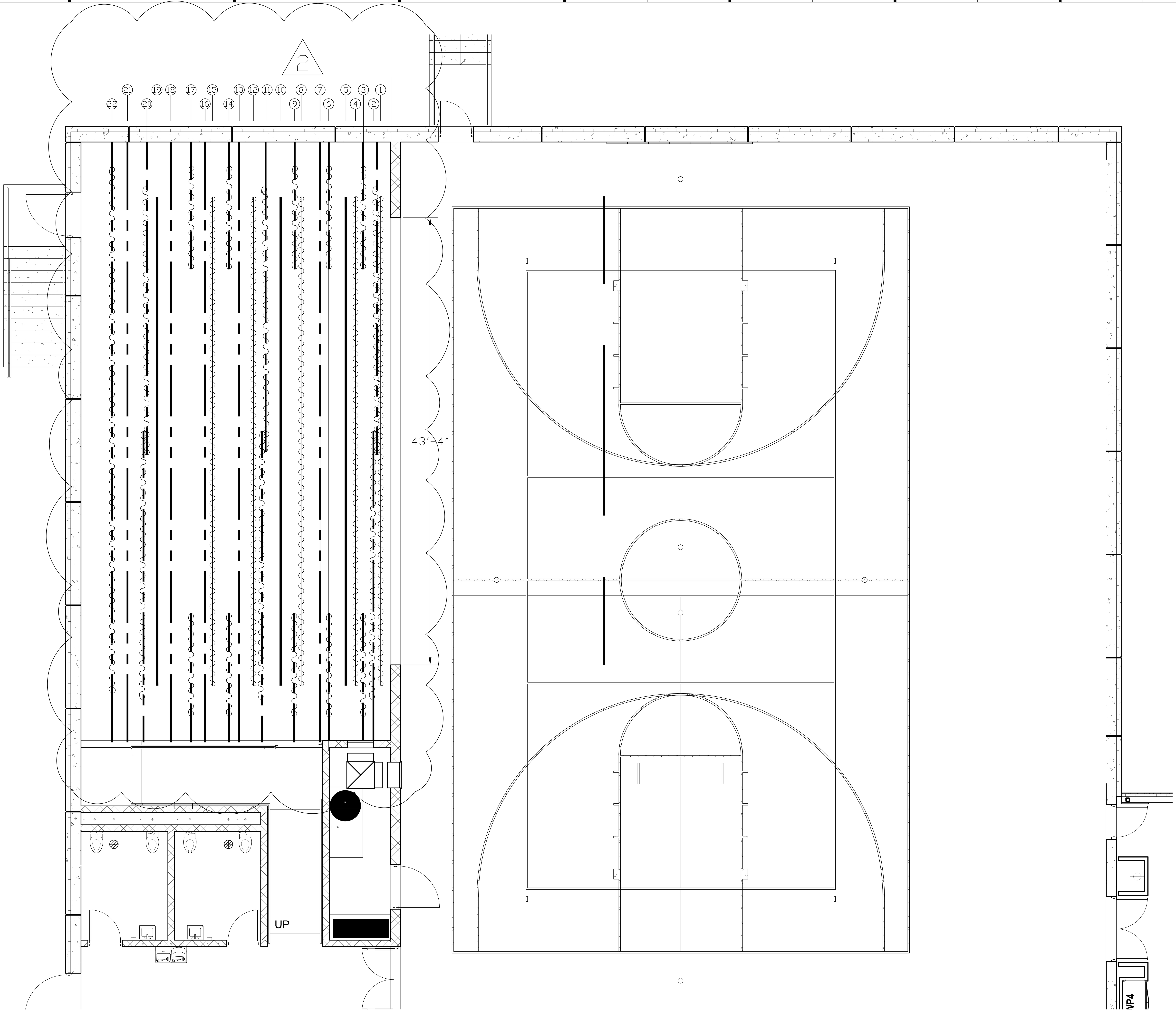
JOB NO: 23020.00
DRAWN BY: SBI
CHECKED BY: RJD
DATE: 08.31.2023

E302

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2314704

ELECTRICAL -SCHEDULES AND DETAILS

PROJECT NAME:
AUTOCAD FILE LOCATION \ NAME:
LAST CORRECTION BY ◆ DATE ◆ TIME:
PLOTTED BY ◆ DATE ◆ TIME:
2314704 Liberty, 09.2023 EPIC Gym Addition #4 LED Lighting
X:\2_23_23144_2314704\Drawings\105-2_2314704_E302.dwg
Jgraham Thursday, September 28, 2023 1:51:29 PM
Jeremy Graham Thursday, September 28, 2023 1:52:28 PM



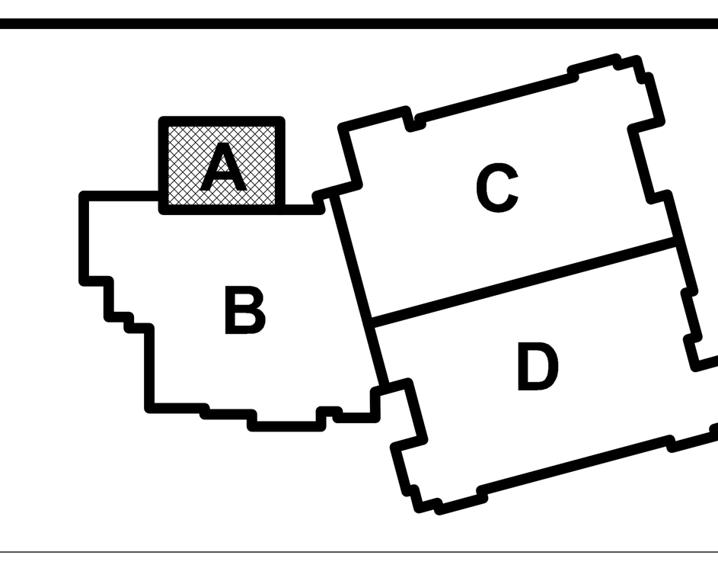
A1 | Scale 1/4" = 1'-0" | RIGGING PLAN

PEERBOLTE
CREATIVE LLC
THEATRICAL PLANNING AND DESIGN
109 E PINE STREET
PO BOX 754
WARRENSBURG MO, 64093
PHONE (660)429-1383
FAX (660)429-3666
www.peerbolte.com

NOTE: STRUCTURAL AND ELECTRICAL DRAWINGS ARE FURNISHED BY PEERBOLTE CREATIVE FOR REFERENCE ONLY. PC IS NOT LICENSED TO PERFORM ANY ENGINEERING FOR STRUCTURAL OR ELECTRICAL POWER.

SHEET KEYNOTE LEGEND

KEY PLAN



hollis + miller architects®

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition

Liberty Public Schools

800 Midjay Dr, Liberty, MO 64068

CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/28/2023

JOB NO: 23018
DRAWN BY: SCJ
CHECKED BY: SCJ
DATE: 08.31.2023

TH100

RIGGING PLAN

SHEET KEYNOTE LEGEND

2

IDEN #	DIST. FROM DATUM	LINE SET DESCRIPTION	CURTAIN WIDTH	CURTAIN HEIGHT	CURTAIN FULLNESS	CURTAIN FABRIC	CURTAIN COLOR	LOW TRIM AFF*	TRACK # OR BATTEN LENGTH	DIST FROM CENTER LINE	TRACK OPERATION	STACKING	NOTES	HANGING	ESTIMATED LOAD
1	12"	MAIN VALANCE	47'4"	2'10"	75%	22 OZ ENCORE	TBD	17'1"^	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	DEAD HUNG	DEAD HUNG	300#
2	1'8"	GRAND DRAPE	26'0"(2)	21'0"	75%	22 OZ ENCORE	TBD	3/4"	(1)30'4" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI–PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,200#
3	2'8"	1ST LEG	10'0"	22'0"	50%	15 oz	BLACK	3/4"	(2)12'4" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE–WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
4	3'5"	1ST BORDER	47'4"	6'0"	50%	15 OZ	BLACK	17'1"	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	DEAD HUNG	DEAD HUNG	300#
5	5'4"	1ST ELECTRIC	–	–	–	–	–	21'1"	47'4" PIPE BATTEN	–	–	–	–	DEAD HUNG	1000#
6	6'0"	2ND LEG	10'(2)	23'(2)	50%	15 OZ	BLACK	3/4"	(2)12'4" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE–WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
7	6'10"	SCENERY TRACK	–	–	–	–	–	21'0"	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
8	8'8"	2ND BORDER	47'4"	6'0"	50%	15 OZ	BLACK	18'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
9	9'4"	3RD LEG	10'(2)	23'(2)	50%	15 OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE–WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
10	10'8"	2ND ELECTRIC	–	–	–	–	–	21'0"^	47'4" PIPE BATTEN	–	–	–	DEAD HUNG	DEAD HUNG	1,500#
11	12'0"	MID TRAVELLER	26'0"(2)	22'0"	50%	15 OZ	BLACK	3/4"	(1)30'2" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI–PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,000#
12	13'4"	3RD BORDER	47'4"	5'0"	50%	15–OZ	BLACK	18'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
13	14'8"	SCENERY TRACK	–	–	–	–	–	21'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
14	15'8"	4TH LEG	10'(2)	23'(2)	50%	15–OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE–WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
15	17'4"	4TH BORDER	47'4"	6'0"	50%	15 OZ	BLACK	17'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
16	18'0"	SCENERY TRACK	–	–	–	–	–	23'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
17	19'4"	5TH LEG	10'(2)	23'(2)	50%	15–OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
18	21'4"	SCENERY TRACK	–	–	–	–	–	23'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
19	22'8"	3RD ELECTRIC	–	–	–	–	–	23'0"^	47'4" PIPE BATTEN	–	–	–	–	DEAD HUNG	1,500#
20	24'0"	UPSTAGE TRAVLER	26'0'(2)	22'0"	50%	15 OZ	BLACK	3/4"	(1)30'2" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI–PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,000#
21	25'6"	SCENERY TRACK	–	–"	–	–	–	23'0"^	58'2" TRACK	–	–	WALK ALONG	4 SCENERY CARRIERS	DEAD HUNG	1000#
22	27'0"	CYC	51'0"	22'0"	0%	–	GREY	3/4"	58'2" TRACK	–	ENDLESS LINE STAGE LEFT	ONE–WAY	2 CHAINS 8'AFF ONE 36" BAG	DEAD HUNG	500#

SCOREBOARD CURTAIN															
1	TBD	SCOREBOARD	5'6"	5'0"	0%	BANJO	TBD	15'7"	(1)17'8" 113 SPECIFINE	–	ENDLESS LINE HOUSE LEFT	BI–PARTING OP 10'0"AFF	MOUNT 3" ABOVE SCOREBOARD	WALL MOUNT	200#

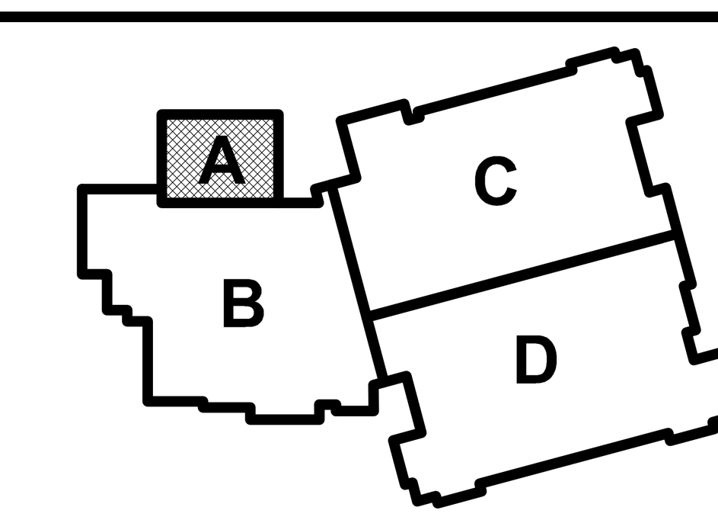
*ABOVE STAGE FLOOR, TO CENTERLINE OF ELECTRIC LOWER BATTEN, OR BOTTOM OF CURTAIN.
ALL DIMENSIONS ARE APPROXIMATE. ACTUAL SIZES AND ELEVATIONS SHALL BE DETERMINED BY EXISTING CONDITIONS AND FIELD MEASUREMENTS.

PEERBOLTE CREATIVE LLC
THEATRICAL PLANNING AND DESIGN
109 E PINE STREET
PO BOX 754
WARRENSBURG MO, 64093
PHONE (660)429–1383
FAX (660)429–3666
www.peerbolte.com

NOTE: STRUCTURAL AND ELECTRICAL DRAWINGS ARE FURNISHED BY PEERBOLTE CREATIVE FOR REFERENCE ONLY. PC IS NOT LICENSED TO PERFORM ANY ENGINEERING FOR STRUCTURAL OR ELECTRICAL POWER.

A1 | Scale: NO SCALE | RIGGING SCHEDULE

KEY PLAN



hollis + miller architects
we design the future®
1828 Walnut Street Suite 922
Kansas City, MO 64108
T 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
T 720.949.1689
HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

Discovery Middle School Storm Shelter Addition
Liberty Public Schools
800 Midjay Dr, Liberty, MO 64068

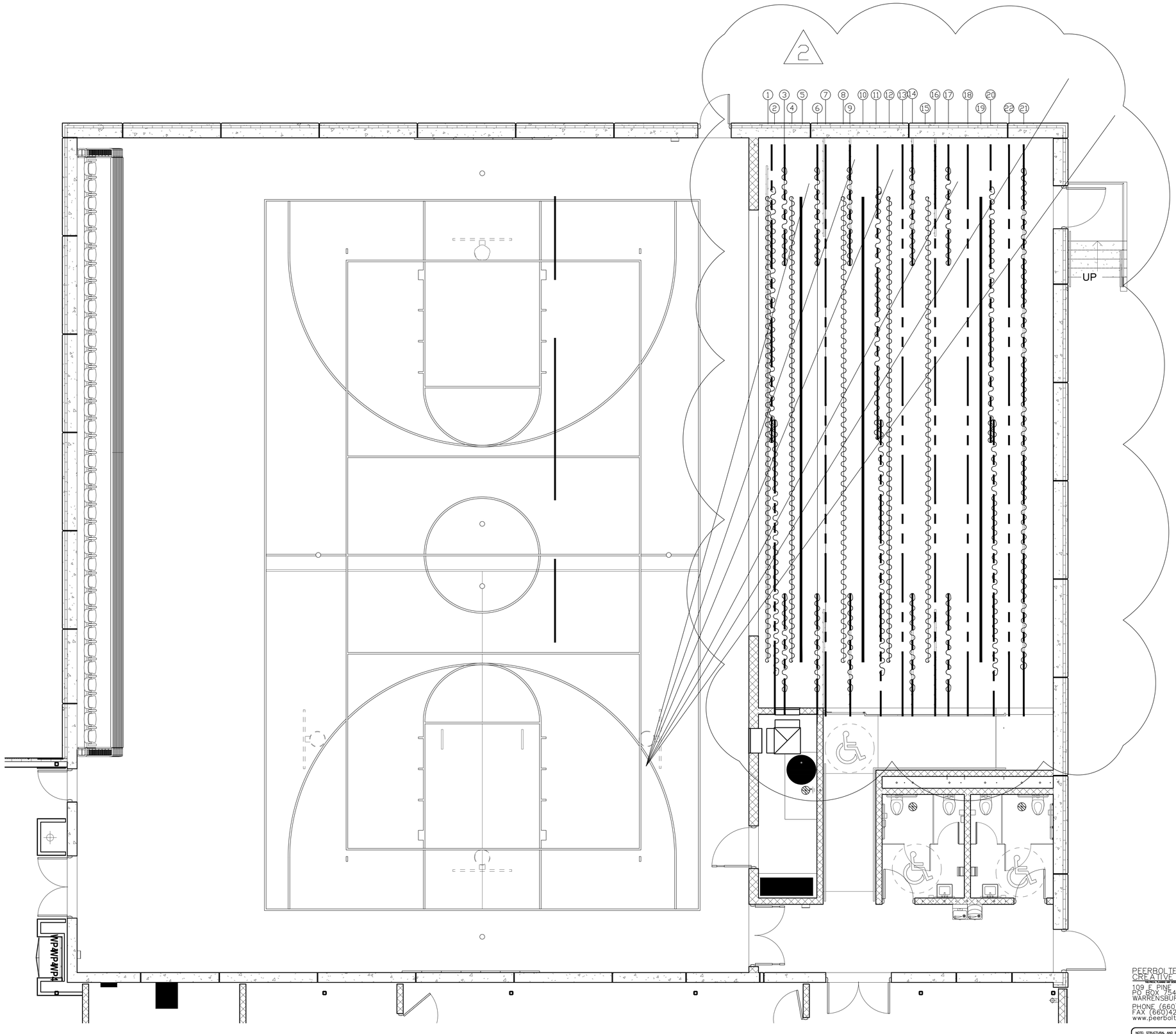
CONSTRUCTION DOCUMENTS

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/28/2023

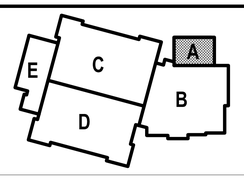
JOB NO: 23018
DRAWN BY: SCJ
CHECKED BY: SCJ
DATE: 08.31.2023

TH101



SHEET KEYNOTE LEGEND

KEY PLAN



hollis + miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0002161

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone

Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone

Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

PEERBOLTE CREATIVE, LLC
109 E. PINE STREET
PO BOX 754
WARRENSBURG MO, 64093
PHONE (660)429-1383
FAX (660)429-3666
www.peerbolte.com

NOTE: STRUCTURAL AND ELECTRICAL DRAWINGS PROVIDED BY PEERBOLTE CREATIVE, LLC FOR REFERENCE ONLY. PCI IS NOT LICENSED TO PERFORM ANY ENGINEERING FOR STRUCTURAL OR ELECTRICAL POWER.

CONSTRUCTION DOCUMENTS

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/28/2023

JOB NO: 23019
DRAWN BY: SCJ
CHECKED BY: SCJ
DATE: 08.31.2023

TH100

A1 Scale 1/4" = 1'-0" — RIGGING PLAN

8' 4' 0' 8'

PROJECT NORTH — TRUE NORTH

RIGGING PLAN

2

IDEN #	DIST. FROM DATUM	LINE SET DESCRIPTION	CURTAIN WIDTH	CURTAIN HEIGHT	CURTAIN FULLNESS	CURTAIN FABRIC	CURTAIN COLOR	LOW TRIM AFF*	TRACK # OR BATTEN LENGTH	DIST FROM CENTER LINE	TRACK OPERATION	STACKING	NOTES	HANGING	ESTIMATED LOAD
1	12"	MAIN VALANCE	47'4"	2'10"	75%	22 OZ ENCORE	TBD	17'1"^	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	DEAD HUNG	DEAD HUNG	300#
2	1'8"	GRAND DRAPE	26'0"(2)	21'0"	75%	22 OZ ENCORE	TBD	3/4"	(1)30'4" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI-PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,200#
3	2'8"	1ST LEG	10'0"	22'0"	50%	15 oz	BLACK	3/4"	(2)12'4" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE-WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
4	3'5"	1ST BORDER	47'4"	6'0"	50%	15 OZ	BLACK	17'1"	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	DEAD HUNG	DEAD HUNG	300#
5	5'4"	1ST ELECTRIC	–	–	–	–	–	21'1"	47'4" PIPE BATTEN	–	–	–	–	DEAD HUNG	1000#
6	6'0"	2ND LEG	10'(2)	23'(2)	50%	15 OZ	BLACK	3/4"	(2)12'4" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE-WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
7	6'10"	SCENERY TRACK	–	–	–	–	–	21'0"	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
8	8'8"	2ND BORDER	47'4"	6'0"	50%	15 OZ	BLACK	18'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
9	9'4"	3RD LEG	10'(2)	23'(2)	50%	15 OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE-WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
10	10'8"	2ND ELECTRIC	–	–	–	–	–	21'0"^	47'4" PIPE BATTEN	–	–	–	DEAD HUNG	DEAD HUNG	1,500#
11	12'0"	MID TRAVELLER	26'0"(2)	22'0"	50%	15 OZ	BLACK	3/4"	(1)30'2" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI-PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,000#
12	13'4"	3RD BORDER	47'4"	5'0"	50%	15-OZ	BLACK	18'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
13	14'8"	SCENERY TRACK	–	–	–	–	–	21'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
14	15'8"	4TH LEG	10'(2)	23'(2)	50%	15-OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE-WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
15	17'4"	4TH BORDER	47'4"	6'0"	50%	15 OZ	BLACK	17'0""	47'4" PIPE BATTEN	–	TIED TO BATTEN	–	–	DEAD HUNG	300#
16	18'0"	SCENERY TRACK	–	–	–	–	–	23'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
17	19'4"	5TH LEG	10'(2)	23'(2)	50%	15-OZ	TBD	3/4"	(1)12'4" (1) 12'6" #280 TRACK	–	ENDLESS LINE OFF STAGE	ONE WAY	4 CHAINS 8'AFF TWO 24" BAGS	DEAD HUNG	300#
18	21'4"	SCENERY TRACK	–	–	–	–	–	23'0"^	58'2" 280 TRACK	–	WALK ALONG	–	4 SCENERY CARRIERS	DEAD HUNG	1000#
19	22'8"	3RD ELECTRIC	–	–	–	–	–	23'0"^	47'4" PIPE BATTEN	–	–	–	–	DEAD HUNG	1,500#
20	24'0"	UPSTAGE TRAVLER	26'0'(2)	22'0"	50%	15 OZ	BLACK	3/4"	(1)30'2" (1) 30'0" #280 TRACK	–	ENDLESS LINE STAGE RIGHT	BI-PARTING	4 CHAINS 8'AFF TWO 36" BAGS	DEAD HUNG	1,000#
21	25'6"	SCENERY TRACK	–	–"	–	–	–	23'0"^	58'2" TRACK	–	–	WALK ALONG	4 SCENERY CARRIERS	DEAD HUNG	1000#
22	27'0"	CYC	51'0"	22'0"	0%	–	GREY	3/4"	58'2" TRACK	–	ENDLESS LINE STAGE LEFT	ONE-WAY	2 CHAINS 8'AFF ONE 36" BAG	DEAD HUNG	500#

SCOREBOARD CURTAIN															
1	TBD	SCOREBOARD	5'6"	5'0"	0%	BANJO	TBD	15'7"	(1)17'8" 113 SPECIFINE	–	ENDLESS LINE HOUSE LEFT	BI-PARTING OP 10'0"AFF	MOUNT 3" ABOVE SCOREBOARD	WALL MOUNT	200#

*ABOVE STAGE FLOOR, TO CENTERLINE OF ELECTRIC LOWER BATTEN, OR BOTTOM OF CURTAIN.
ALL DIMENSIONS ARE APPROXIMATE. ACTUAL SIZES AND ELEVATIONS SHALL BE DETERMINED BY EXISTING CONDITIONS AND FIELD MEASUREMENTS.

PEERBOLTE CREATIVE
109 E PINE STREET
PO BOX 754
WARRENSBURG MO, 64093
PHONE (660)429-1383
FAX (660)429-3666
www.peerbolte.com

NOTE: STRUCTURAL AND ELECTRICAL DRAWINGS ARE FURNISHED BY PEERBOLTE CREATIVE FOR REFERENCE ONLY. PC IS NOT LICENSED TO PERFORM ANY ENGINEERING FOR STRUCTURAL OR ELECTRICAL POWER.

A1 Scale NO SCALE — RIGGING SCHEDULE

PROJECT NORTH TRUE NORTH

SHEET KEYNOTE LEGEND

hollis + miller architects
we design the future
1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700
115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689
HOLLISANDMILLER.COM

Bob D Campbell
Structural Engineer
State Certificate of Authority #000442
4338 Belleview Ave
Kansas City, MO 64111
816.531.4144 phone
Smith & Boucher, Inc.
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC000178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone
MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 112th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone
Peerbolte Creative
Theatrical Consultant
109 E Pine St.
Warrensburg, MO 64093-0752
660.429.1383 phone
Avant Acoustics
AV/Acoustics Consultant
14827 West 95th St.
Lenexa, KS 66215
913.888.9111 phone

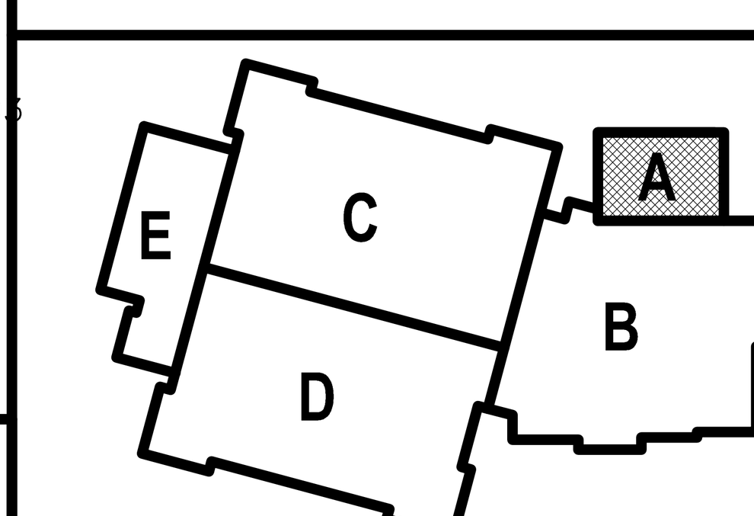
CONSTRUCTION DOCUMENTS

South Valley Middle School Storm Shelter Addition
Liberty Public Schools
1000 Midjay Dr, Liberty, MO 64068

REVISIONS:

#	Description	Date
1	Addendum 01	09/14/2023
2	Addendum 04	09/28/2023

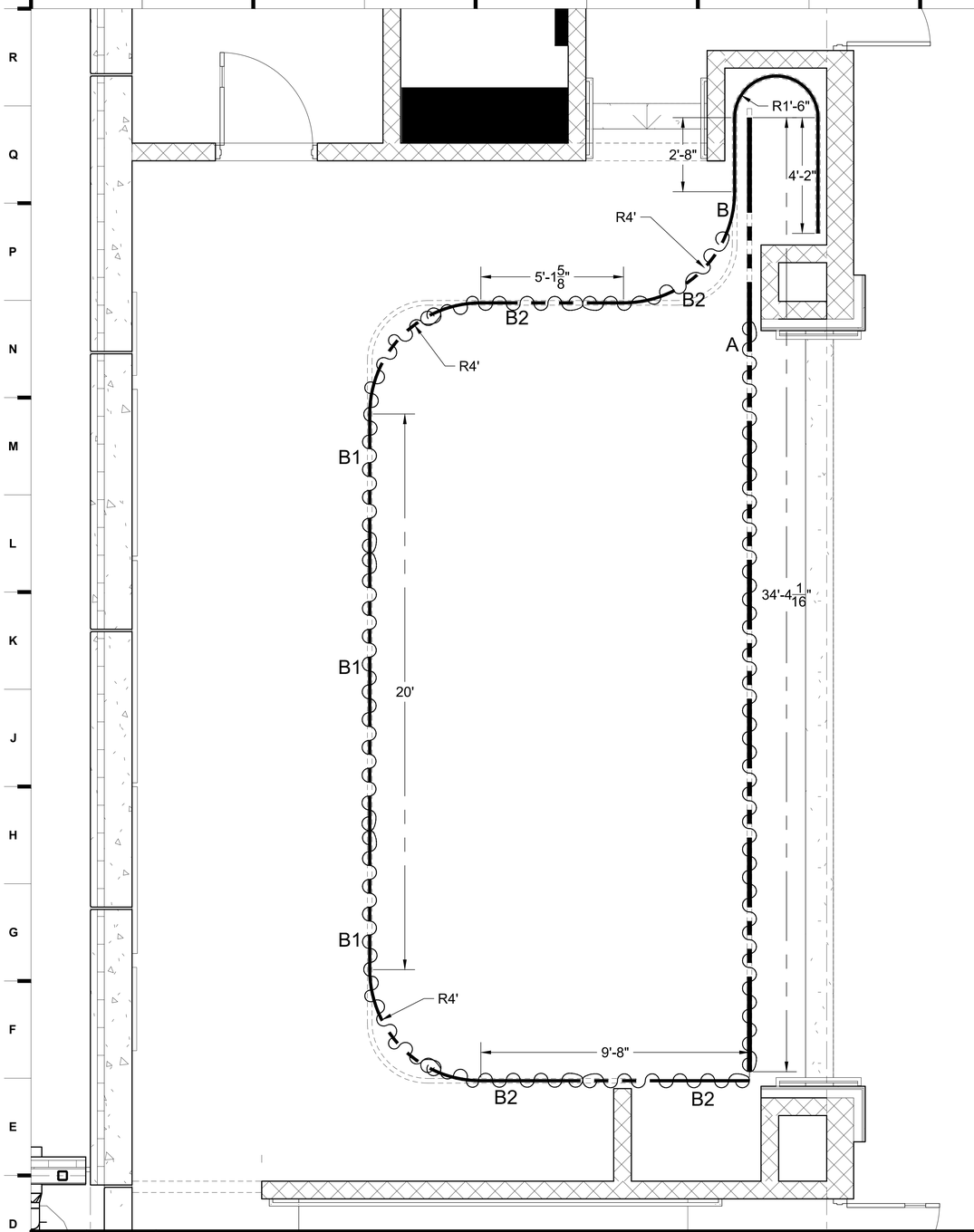
KEY PLAN



JOB NO: 23019
DRAWN BY: SCJ
CHECKED BY: SCJ
DATE: 08.31.2023

TH101

RIGGING SCHEDULE



D1 Scale 1/2" = 1'-0" — RIGGING PLAN

IDEN #	DIST. FROM DATUM	LINE SET DESCRIPTION	CURTAIN WIDTH	CURTAIN HEIGHT	CURTAIN FULLNESS	CURTAIN FABRIC	CURTAIN COLOR	LOW TRIM AFF*	TRACK # OR BATTEN LENGTH	DIST FROM CENTER LINE	TRACK OPERATION	STACKING	NOTES	HANGING	ESTIMATED LOAD
A	12"	GRAND DRAPE	27'0"	14'4"	50%	22 OZ ENCORE	TBD	3/4"	34'4" ADC #114	-	ENDLESS LINE STAGE LEFT	ONE WAY DRAW STAGE LEFT	BOTTOM OF TRACK TO BE ABOVE TRACK FOR AIR-WALL CURVES	DEAD HUNG	300#
B	VARIES	MASKING TRACK	-	-	-	-	-	14'6"	65'3" ADC #114	VARIES	WALK ALONG	-	(3) 90 DEGREE 48"R (1) 180 DEGREE 18"R	DEAD HUNG	200#
B1	-	MASKING CURTAIN TYPE 1	(3)10'0"	14'4"	25%	15 OZ ENCORE	BLACK	3/4"	MOUNT TO TRACK B	-	-	-	-	TRACK B	100#
B2	-	MASKING CURTAIN TYPE 2	(4)6'0"	14'4"	25%	15 OZ ENCORE	BLACK	3/4"	MOUNT TO TRACK B	-	-	-	-	TRACK B	100#

*ABOVE STAGE FLOOR, TO CENTERLINE OF ELECTRIC LOWER BATTEN, BOTTOM OF CURTAIN, OR BOTTOM OF TRACK.
ALL DIMENSIONS ARE APPROXIMATE. ACTUAL SIZES AND ELEVATIONS SHALL BE DETERMINED BY SITE CONDITIONS AND FIELD MEASUREMENTS.

A1 Scale NO SCALE — RIGGING SCHEDULE

16' 8' 0' 16'

SHEET KEYNOTE LEGEND

hollis+miller architects

we design the future®

1828 Walnut Street Suite 922
Kansas City, MO 64108
t 816.442.7700

115 Wilcox Street Suite 210
Castle Rock, CO 80104
t 720.949.1689

HOLLISANDMILLER.COM

Hollis + Miller Architects
Missouri State Certificate of Authority
Architecture # 0000161
Structure # 2006031333

MKEC Engineering, Inc.
Civil Engineer
State Certificate of Authority
Engineering #2001009364
Landscaping #2006027139
Surveying #2006027138
11827 W 11th Street, Suite 200
Overland Park, KS 66210
913.317.9390 phone

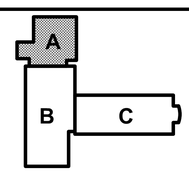
Smith & Boucher Engineers
Mechanical, Electrical, & Plumbing
State Certificate of Authority #EGC00178
25618 W 103rd Street
Olathe, KS 66061
913.345.2127 phone

Bob D. Campbell & Co.
Structural Engineers
State Certificate of Authority #000442
4338 Belleview Avenue
Kansas City, MO 64111
816.531.4144 phone
816.531.8572 fax

PEERBOLTE CREATIVE, 4
THEATRICAL PLANNING AND DESIGN
109 E PINE STREET
PO BOX 754
WARRENSBURG MO, 64093
PHONE (660)429-1383
FAX (660)429-3666
www.peerbolte.com

NOTE: STRUCTURAL AND ELECTRICAL DRAWINGS ARE FURNISHED BY PEERBOLTE CREATIVE FOR REFERENCE ONLY. THEY IS NOT LICENSED TO PROVIDE ENGINEERING FOR STRUCTURAL OR ELECTRICAL POWER.

KEY PLAN



EPiC Elementary Storm Shelter Addition
Liberty Public Schools
650 Conister St
Liberty, MO 64068

Construction Documents

REVISIONS:

#	Description	Date
1	ADDENDUM #4	09/28/2023

JOB NO: 23020.00
DRAWN BY: CSH
CHECKED BY: CSH
DATE: 08/31/2023

TH100

THEATRICAL CURTAINS AND TRACKS