ADDENDUM NO. 2

January 16, 2023

The Riviera Club Aquatics Center
5640 North Illinois Street
Indianapolis, IN 46208

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications and the Drawings dated December 5, 2022, by Schmidt Associates, Inc. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 2-1 through ADD 2-2, RFI List (Questions & Answers) and attached Schmidt Associates Addendum No. 2 Dated January 12, 2023, Consisting of 45 pages, Specification Sections: 061753 – Shop-Fabricated Wood Trusses, 075423 – Thermoplastic Polyolefin (TPO) Roofing, 081613.99 – Fiberglass Reinforced Plastic Doors and Frames, 093000 – Tiling, 105113 – Metal Lockers, 105126.99 – Plastic Lockers, 224000 – Plumbing Fixtures, 224700 – Drinking Fountains and Water Coolers, 237313 – Fixed Plate Air to Air Energy Recovery Unit, 263600 – Transfer Switches, 265119 – LED Interior Lighting, 265219 – Emergency Exit Lighting, 265619 – LED Exterior Lighting, 270500 – Common Work Results for Communication Systems, 270526 – Grounding and Bonding for Communications Systems, 270528 – Pathways for Communications Systems, 270553 – Identification for Communications Systems, 271313 – Communication Copper Backbone Cabling, 271513 – Communication Copper Horizontal Cabling, 280528 – Pathways for Electronic Safety and Security, 280544 – Sleeves and Sleeve Seals for Electronic Safety and Security, 283111 - Digital Addressable Fire-Alarm System, Addendum Drawings: G000, CD101, CL101, CL501, LP101, CG101, CU101, CU504, SF1A1, SF1AL, SF1AM, S-402, S-413, S-414, S-600, AF1A1, AF1B1, AR100, A-200, A-400, A-401, A-600, M101, M102, M601, P100, P101, P102, P601, E101, E201, E301, E500, E501.

A. SPECIFICATION SECTION 00 01 00 TITLE PAGE

a. Bid Received: Change Bid Date to February 9, 2023, 2:00PM, Via Email

B. SPECIFICATION SECTION 00 02 00 INVITATION TO BIDDERS

a. Change Bids are due to February 9, 2023, at 2:00PM (local time) via Email to Aaron Williams, awilliams@skillman.com.

C. SPECIFICATION SECTION 01 12 00 MULTIPLE CONTRACT SUMMARY

1. Paragraph 3.03 Bid Categories

A. BID CATEGORY NO. 1 – GENERAL TRADES

Add The Following Specification Sections:

06 17 53 Shop Fabricated Wood Trusses

B. BID CATEGORY NO. 11 - ELECTRICAL

Add The Following Specification Sections:

27 05 00 Common Work Results for Communication Systems
27 05 26 Grounding and Bonding for Communications Systems
27 05 28 Pathways for Communications Systems
27 05 53 Identification for Communications Systems
27 13 13 Communication Copper Backbone Cabling
27 15 13 Communication Copper Horizontal Cabling

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Bidding Questions & Responses

2021-178.RVI
Riviera Club Aquatics Center
1/12/2023

ID	Question	Answer
BID RFI-001	The General Notes #2 on Sheet CD101 states to "See Electrical Site Plan, for all Electrical , Phone and Technology Demolition Work. There wasn't any electrical site drawings for demolition or install issued in the contract drawings. Will these drawing be issued?	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-002	Both the civil drawings and the electrical drawings calls out the location of the generator, but I did not see any location calling out the location of the utility transformer. Please advise.	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-003	There are no details or detail drawings shown for the installation of the utility transformer or generator pad. Please provide details.	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-004	On Sheet E101, it shows a location for (1) flow & (1) tamper switch located in room BLDG MECH 04. Sheet Keynotes #20 states to coordinate the quantity and location of the tamper and flow switches with the Fire Protection contractor. There are no FP drawings issued in the contract drawing set. Is there a FP contractor and/or will there be any FP drawings issued?	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-005	Sheet E000 shows the symbols for the Fire Alarm System. In the Specifications, Division 28 has spec section 283100 – Digital, Addressable Fire-Alarm System. However, this spec section appears to be a PDF of the draft document because it has line items stating to insert data (i.e. approved manufacturer etc.). Is there a preferred fire alarm vendor the Riviera Club uses and what Make & model does the Fire system need to be?	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-006	In the spec section, the Table of Contents, under Division 27, states "NOT APPICABLE". On Sheet E000 there is not any schedule or table showing Division 27 Identity symbols. Sheet E000 does show Fire Alarm Identity symbols and some miscellaneous" Rough-IN Identity Symbols". Sheet E101 Sheet Keynotes#16 states to provide a wall mount hinged 26 RU Technology Rack Enclosure. This is typically a Division 27 item. Does this need to be included in the bid?	Response (Answered) from: Joyce Myers/Zach Markell (KBSO) Remarks: Addressed in Addenda No. 1 & 2.
Bid RFI-007	The following symbols have not been designated in the contract documents.	Response (Answered) from: Joyce Myers (KBSO) Remarks: Addressed in Addenda No. 1.

ID	Question	Answer
Bid RFI-008	Specification section calls for exterior doors to be Kawneer 500T thermally broken doors and the interior doors to be 500 wide stile doors. Would the doors exposed to the pool for example 19, 02.2, and 11.3 need to be thermally broken?	Response (Answered) from: Brandon Fox (SAI) Remarks: No.
Bid RFI-009	Spec Section 06 16 00 2.4 - Indicates this is a 3/4" ventilated nailbase. The roof assembly detail 1C - SH-1 on drawing AR100 does not indicate a ventilated nailbase. Please indicate which is correct?	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.
Bid RFI-010	Roof Assembly SP-2 / 1B on sheet AR100 - This roof assembly has a note that indicates there should be no penetrating fasteners. Spec section 07 54 23 3.4.2 indicates the substrate board should be fastened to the metal deck. Please indicate which is correct? (NRCA does not recommend adhering directly to the metal deck. In this instance, it would be recommended to fasten the substrate to the deck using stainless steel fasteners and adhering the remainder of the roof assembly to the vapor retarder with low rise foam adhesive)	Response (Answered) from: Brandon Fox (SAI) Remarks: No penetrating fasteners above pool environment.
Bid RFI-011	The substrate board in specification 07 54 23 2.5.A states it should be 5/8" thick. Roof assembly SP-2 on sheet AR100 indicates the substrate board to be 1/4". We assume 5/8" is the desired thickness. Please confirm.	Response (Answered) from: Brandon Fox (SAI) Remarks: Substrate boards as specified, with the exception of the bottom layer of substrate board at pool environment which can be 1/4" as indicated.
Bid RFI-012	Specification 07 54 23 2.5.A indicates the substrate board can be type X drywall. Please confirm this is correct.	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.
Bid RFI-013	Specification 07 54 23 2.8.D mentions a cover board but it is not specified. The roof assemblies SP-1 and SP-2 show / mention a coverboard but again it is not specified. What type of coverboard should this be? What thickness?	Response (Answered) from: Brandon Fox (SAI) Remarks: Per specs, roofing membrane manufacturer's approved and warranted cover board.
Bid RFI-014	Specification 07 54 23 2.9.A indicates there are walk way pads but there are none shown on the drawings. Please confirm no walk way pads are required?	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1. Also refer to General Roof Plan Note D.
Bid RFI-015	Can the fastening method of the roof assemblies SP-2 and SP-1 be clarified? Spec section 07 54 23 3.6.H indicates to fasten all layers of the insulation but paragraph 07 54 23 3.6.H.2 indicates to fasten the bottom layer and adhere the top layers. (Adhering a roof assembly with low rise foam adhesive is very expensive. The most cost effective assembly while still obtaining a thermal break would be to adhere an HD ISO cover board only and fasten all layers of insulation)	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.

ID	Question	Answer
Bid RFI-016	The AQ drawings indicate the Pool Concrete is to be Mix Design Class "B" however drawing S-600 doesn't reflect the mix designs as which is Class "B". Please confirm the mix design for the pool concrete work as I see the pool concrete is to contain DCI that Is not included in any of the S-600 mixes.	Response (Answered) from: Jake Shelley (LHB) Remarks: To be addressed in Addendum No. 1.
Bid RFI-017	Is there to be underdrain monitoring well as not shown on the AQ drawings?	Response (Answered) from: Marv Trietsch (ARD) Remarks: No requirement for monitoring well (soils report indicates water table at -12'. Structurally no reason for it
Bid RFI-018	Substitution Request: 095113 - Soundcore Single Baffles	Response (Answered) from: Asia Coffee Person (Firm) Schmidt Remarks:To be addressed in Addendum #1.
Bid RFI-019	Substitution Request: 081613.99 - Special-Lite AF-200 door and AF-150 frame	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.
Bid RFI-020	Substitution Request: 230923 - Reliable Controls	Response (Answered) from: Joyce Myers (KBSO) Remarks: After discussion with the manufacturer, Reliable Controls will not be allowed to bid this project as an acceptable manufacturer.
Bid RFI-021	102600 – Wall and Door Protection, states that Custom Digital Graphics by Construction Specialties – Acrovyn by Design, are to be made with 0.060" thickness. This material is only available in a 0.040" thickness material. Can the Architect please revise this thickness as such?	Response (Answered) from: Asia Coffee Person (Firm) Schmidt Remarks:To be addressed in Addendum #1.
Bid RFI-022	Substitution Request: 098413 Sound Seal S-2100 High Impact Acoustical Wall Panels	Response (Answered) from: Asia Coffee Person (Firm) Schmidt Remarks:To be addressed in Addendum #1.
Bid RFI-023	Substitution Request: 095113 - Sound Seal Vertex Slim	Response (Answered) from: Asia Coffee Person (Firm) Schmidt Remarks:Rejected.
Bid RFI-024	Plastic locker type Y is shown as a 4 tier unit on sheet A401. Specs call for 2 tier. Please clarify which is correct.	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.
Bid RFI-025	Is a certain fire rating or flame spread rating required on the plastic lockers?	Response (Answered) from: Brandon Fox (SAI) Remarks: Bid to the best of your ability based on available information.
Bid RFI-026	Are the loose benches in rooms 09 and 10 part of the scope? If so, please provide specification section and details.	Response (Answered) from: Brandon Fox (SAI) Remarks: To be addressed in Addendum No. 1.
Bid RFI-027	Fire protection: Are we to assume that the area surrounding the pool "Pool Deck" is to be protected?	Response (Answered) from: Joyce Myers (KBSO) Remarks: Yes.
Bid RFI-028	Sheet AR100 Note 6 calls out a pergola on the south side of the pool area. Will protection need to be accounted for under this pergola area?	Response (Answered) from: Brandon Fox (SAI) Remarks: Unable to address prior to addendum being issued.

ID	Question	Answer
Bid RFI-029	Electrical, referencing items from Addendum 1: Does both control panels need to be six pole, 365-day programmable control, astronomical timeclock, and photocell compatablity	Response (Answered) from: Joyce Myers (KBSO) Remarks: To be addressed in Addendum No. 2.
Bid RFI-030	Electrical, referencing items from Addendum 1: Are the approved manufacturers for the Lighting Control Panels the same as listed in Spec Section 260923.2.1.A?	Response (Answered) from: Joyce Myers (KBSO) Remarks: To be addressed in Addendum No 2.

ADDENDUM NO. 2
JANUARY 12, 2023

PREPARED BY SCHMIDT ASSOCIATES FOR:
THE RIVIERA CLUB AQUATICS CENTER
THE RIVIERA CLUB

This Addendum consists of 5 Addendum pages and 157 attachment pages totaling 162 pages.

Acknowledge receipt of this Addendum by inserting its number on the Bid Form. Failure to do so may subject the Bid to disqualification. This Addendum is part of the Contract Documents.

Bidder is encouraged to verify with reprographer of record all Addenda issued (do not rely exclusively on third party plan room services).

PART 1 - CHANGES TO PRIOR ADDENDA (NOT APPLICABLE)

PART 2 - CHANGES TO THE PROJECT MANUAL

Modifications described herein shall be incorporated in the Project Manual. All other Work shall remain unchanged.

2.1 DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

A. **Section 061753 "SHOP-FABRICATED WOOD TRUSSES"**

1. ADD Section 061753 per the attached.

2.2 DIVISION 07 – THERMAL AND MOISTURE PROTECTION

A. **Section 075423 "THERMOPLASTIC POLYOLEFIN (TPO) ROOFING"**

1. DELETE AND REPLACE Paragraph 2.5.A. as follows:

   "A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick."

2. DELETE Paragraph 2.5.B. in its entirety.

3. DELETE Text "each layer of insulation" from Paragraph 3.6.H.

2.3 DIVISION 08 – OPENINGS

A. **Section 081613.99 "FIBERGLASS REINFORCED PLASTIC DOORS AND FRAMES"**

1. ADD Subparagraph 2.1.A.1.d. as follows:

   "d. Special-Lite."

2.4 DIVISION 09 – FINISHES

A. **Section 093000 "TILING"**

1. DELETE AND REPLACE Section 093000 in its entirety per the attached.

2.5 DIVISION 10 – SPECIALTIES

A. **Section 105113 "METAL LOCKERS"**

1. DELETE Section in its entirety.

B. **Section 105126.99 "PLASTIC LOCKERS"**

1. DELETE AND REPLACE Paragraph 2.2.B. as follows:

   "B. Locker Arrangement: Multiple-tier as indicated on Drawings

2. MODIFY Paragraph 2.2.E. as follows:

   Add text "Refer to drawings for locations where RFID locks are required."

2.6 DIVISION 22 – PLUMBING

A. **Section 224000 "PLUMBING FIXTURES"**

1. ADD Subparagraph 2.2.A.1.d. as follows:

   "d. Acorn."

B. **Section 224700 "DRINKING FOUNTAINS AND WATER COOLERS"**

1. ADD Subparagraph 2.2.A.1.d. as follows:

   "d. Murdock."

2.7 DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING(HVAC)

A. **Section 237313 "FIXED PLATE AIR-TO-AIR ENERGY RECOVERY UNIT"**

1. ADD Subparagraph 2.1.A.4. as follows:

   "4. AnnexAir."

B. **Section 237416 "HEAT RECOVERY PACKAGED ROOFTOP AIR-CONDITIONING UNITS"**

1. ADD Paragraph 2.2.E. as follows:

   "E. AnnexAir."

2.8 DIVISION 26 – ELECTRICAL

A. **Section 263600 "TRANSFER SWITCHES"**

1. DELETE AND REPLACE Section 263600 in its entirety per the attached.

B. **Section 265119 "LED INTERIOR LIGHTING"**

1. DELETE AND REPLACE Section 265119 in its entirety per the attached.

C. **Section 265219 "EMERGENCY AND EXIT LIGHTING"**

1. DELETE AND REPLACE Section 265219 in its entirety per the attached.

D. **Section 265619 "LED EXTERIOR LIGHTING"**

1. DELETE AND REPLACE Section 265619 in its entirety per the attached.

2.9 DIVISION 27 – COMMUNICATIONS

A. **Section 270500 "COMMON WORK RESULTS FOR COMMUNICATION SYSTEMS"**

1. ADD Section 270500 per the attached.

B. **Section 270526 "GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS"**

1. ADD Section 270526 per the attached.

C. **Section 270528 "PATHWAYS FOR COMMUNICATIONS SYSTEMS"**

1. ADD Section 270528 per the attached.

D. **Section 270553 "IDENIFICATION FOR COMMUNICATIONS SYSTEMS"**

1. ADD Section 270553 per the attached.

E. **Section 271313 "COMMUNICATION COPPER BACKBONE CABLING"**

1. ADD Section 271313 per the attached.

F. **Section 271513 "COMMUNICATION COPPER HORIZONTAL CABLING"**

1. ADD Section 271313 per the attached.

2.10 DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

A. **Section 280528 "PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY"**

1. DELETE AND REPLACE Section 280528 in its entirety per the attached.

B. **Section 280544 "SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY"**

1. DELETE AND REPLACE Section 280544 in its entirety per the attached.

C. **Section 283111 "DIGITAL ADDRESSABLE FIRE-ALARM SYSTEM"**

1. DELETE AND REPLACE Section 283111 in its entirety per the attached.

PART 3 - CHANGES TO THE DRAWINGS

Modifications described herein shall be incorporated in the Drawings. All other Work shall remain un-changed.

3.1 DRAWING SHEETS: ADDITIONS, DELETIONS AND REPLACEMENTS

DRAWING NO.	INDICATE ACTION: REPLACE (R), ADD (A), DELETE (D)
G-SERIES DRAWINGS	
G-000	DELETE AND REPLACE
C-SERIES DRAWINGS	
CD101	DELETE AND REPLACE
CL101	DELETE AND REPLACE
CL501	DELETE AND REPLACE
LP101	DELETE AND REPLACE
CG101	DELETE AND REPLACE
CU101	DELETE AND REPLACE
CU504	DELETE AND REPLACE
S-SERIES DRAWINGS	
SF1A1	DELETE AND REPLACE
SF1AL	DELETE AND REPLACE
SF1AM	DELETE AND REPLACE
S-402	DELETE AND REPLACE
S-413	DELETE AND REPLACE
S-414	ADD
S-600	DELETE AND REPLACE

A-SERIES DRAWINGS		
	AF1A1	DELETE AND REPLACE
	AF1B1	ADD
	AR100	DELETE AND REPLACE
	A-200	DELETE AND REPLACE
	A-400	DELETE AND REPLACE
	A-401	DELETE AND REPLACE
	A-600	DELETE AND REPLACE
M-SERIES DRAWINGS		
	M101	DELETE AND REPLACE
	M102	DELETE AND REPLACE
	M601	DELETE AND REPLACE
P-SERIES DRAWINGS		
	P100	DELETE AND REPLACE
	P101	DELETE AND REPLACE
	P102	DELETE AND REPLACE
	P601	DELETE AND REPLACE
E-SERIES DRAWINGS		
	E101	DELETE AND REPLACE
	E201	DELETE AND REPLACE
	E301	DELETE AND REPLACE
	E500	DELETE AND REPLACE
	E501	DELETE AND REPLACE

END OF ADDENDUM 2

SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood girder trusses.

1.3 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

1. Design Loads: As indicated.
2. Maximum Deflection under Design Loads:

a. Roof Trusses: Vertical deflection of 1/360 of span.

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S.
4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.

B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom chords.

C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Alpine Engineered Products, Inc.; a division of ITW Building Components Group, Inc.
2. MiTek Industries, Inc.

B. Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

2.4 FASTENERS

A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Simpson Strong-Tie Co., Inc.

B. Allowable design loads, as published by manufacturer, shall comply with or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses 24 inches o.c.; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing to comply with Section 061000 "Rough Carpentry."

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

L. Replace wood trusses that are damaged or do not comply with requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Crack isolation membrane.
3. Metal edge strips.

B. Related Sections:

1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Division 09 Section "Direct-Applied Exterior Finish System (DEFS)
3. Division 09 Section "Water-Drainage Exterior Insulation and Finish System (EIFS)
4. Division 09 Section "Gypsum Board" for glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17 which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ANSI A137.1:

1. Level Surfaces: Minimum 0.42 dynamic coeffient of friction.

1.5 ACTION SUBMITTALS

A. Product Data with Shop Drawings:

1. Product Data: For each type of product indicated.
2. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled exterior wall tile samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square Insert size, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory.
4. Metal edge strips in 6-inch lengths.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Waterproof membrane.
2. Crack isolation membrane.
3. Joint sealants.
4. Metal edge strips.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of floor tile installation.
2. Build mockup of exterior wall tile installation.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation on exteriors, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type PMT: Factory-mounted unglazed ceramic mosaic tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Daltile Keystones or comparable product by one of the following:

a. American Olean; Division of Dal-Tile International Inc.
b. Crossville, Inc.

2. Composition: Porcelain.
3. Module Size: 1 by 1 inch.
4. Thickness: 1/4 inch.
5. Face: Plain with cushion edges.
6. Surface: Smooth, without abrasive admixture.
7. Tile Color:

a. PMT-1: Wheat Blend DK21.
b. PMT-2: Berry Blend DK24.
c. EWT-1: Galaxy D023.

8. Grout Color: As selected by Architect from manufacturer's full range.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

a. Base Cove: Cove, module size 1 by 1 inch.
b. External Corners for Thin-Set Mortar Installations: Surface bullnose, module size 1 by 1 inch.
c. Internal Corners: Cove, module size 1 by 1 inch.

B. Tile Type PFT: Porcelain floor tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Crossville Retro Active or comparable product by one of the following:
a. Daltile.
b. Florida Tile.

2. Composition: Porcelain.

3. Module Size: 12 by 24 inch.
4. Thickness: 1/4 inch.
5. Face: Plain with cushion edges.
6. Surface: Smooth, without abrasive admixture.
7. Tile Color: To be selected from manufacturer's standard colors.

8. Grout Color: As selected by Architect from manufacturer's full range..
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base Cove: Cove, module size 6 by 12 inch.

C. Tile Type: Unglazed ceramic wall tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Jeffrey Court Acquerello Verona Field Tile or comparable product by one of the following: :

    a. American Olean; Division of Dal-Tile International Inc.
    b. Crossville, Inc.

2. Composition: Porcelain.
3. Module Size: 6 by 6 inch.
4. Thickness: 1/4 inch1/4 inch.
5. Face: Plain with cushion edges.
6. Surface: Smooth, without abrasive admixture.
7. Tile Color:
    a. EWT-2: Cielo 80641.

8. Grout Color: As selected by Architect from manufacturer's full range.

D. Tile Type : Decorative glass wall tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Lunada Bay Tile Tozen Rio or comparable product by one of the following:

    a. SICIS.
    b. Artistic Tile.

2. Composition: Glass.
3. Module Size: Approximately 12 by 12 inch.
4. Thickness: 6 mm.
5. Surface: Smooth, without abrasive admixture.
6. Mounting:Paper faced.
7. Tile Color:

    a. EWT-3 Antimony.

8. Grout Color: As selected by Architect from manufacturer's full range.

a. CRACK ISOLATION MEMBRANE

E. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

F. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.

1. Products: Subject to compliance with requirements, provide the following:

a. Noble Company (The); Nobleseal CIS.

G. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

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

a. Bostik, Inc.; Durabond D-222 Duraguard Membrane.
b. Custom Building Products; FractureFree Crack Prevention Membrane.
c. TEC; a subsidiary of H. B. Fuller Company; HydraFlex - Waterproofing Crack Isolation Membrane.

H. Latex-Portland Cement: Flexible mortar consisting of cement-based mix and latex additive.

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

a. MAPEI Corporation; Mapelastic (PRP 315).
b. TEC; a subsidiary of H. B. Fuller Company; Triple Flex Waterproofing, Crack Isolation Membrane & Mortar.

2.3 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

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

a. Bonsal American; an Oldcastle company.
b. Bostik, Inc.
c. Custom Building Products.
d. Laticrete International, Inc.
e. MAPEI Corporation.
f. TEC; a subsidiary of H. B. Fuller Company.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

B. Medium-Bed, Latex-Portland Cement Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch.

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

a. Bonsal American; an Oldcastle company.
b. Bostik, Inc.
c. Custom Building Products.
d. Laticrete International, Inc.
e. MAPEI Corporation.
f. TEC; a subsidiary of H. B. Fuller Company.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.

2.4 GROUT MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7.

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

a. Bonsal American; an Oldcastle company.
b. Bostik, Inc.
c. Custom Building Products.
d. Laticrete International, Inc.
e. MAPEI Corporation.
f. TEC; a subsidiary of H. B. Fuller Company.

2. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

B. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.5 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

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

a. DAP Inc.; 100 percent Silicone Kitchen and Bath Sealant.
b. Dow Corning Corporation; Dow Corning 786.
c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
f. Tremco Incorporated; Tremsil 600 White.

D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

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

a. Bostik, Inc.; Chem-Calk 550.
b. Degussa Building Systems; Sonneborn Sonolastic SL 2.
c. Pecora Corporation; Dynatrol II-SG.
d. Sika Corporation; Sikaflex-2c SL.
e. Tremco Incorporated.; THC-901.

E. Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Atlas Minerals & Chemicals, Inc.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.7 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with adhesives or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

    a. Tile floors in wet areas.
    b. Tile swimming pool decks.
    c. Tile floors in laundries.
    d. Tile floors composed of tiles 8 by 8 inches or larger.
    e. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch.

F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.4 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F122: Thin-set mortar on waterproof membrane; TCA F122.

    a. Tile Type: PMT and PFT.
    b. Thin-Set Mortar: Latex- Medium-bed, latex- portland cement mortar.
    c. Grout: Polymer-modified unsanded grout.

B. Interior Wall Installations, DEFS or EIFS:

1. Exterior Tile Installation Unglazed Ceramic Wall Tile: Thin-set mortar; TCA W202E-22.

    a. Tile Type:Unglazed Ceramic Wall Tile .
    b. Thin-Set Mortar: Latex- portland cement mortar.
    c. Grout: Water-cleanable epoxy grout.

2. Exterior Tile Installation Glass Wall Tile: Thin-set mortar; TCNA W202E-22.

    a. Tile Type:Glass Wall Tile .
    b. Thin-Set Mortar: Latex- portland cement mortar.
    c. Grout: Polymer-modified unsanded grout.
    d. Movement and Expansion Joints: TCNA- EJ171.

END OF SECTION

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes **automatic** switches rated 600 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Single-Line Diagram: Show connections between transfer switch, power sources, and load.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For transfer switches, accessories, and components, from manufacturer.

B. Source quality control reports.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **Two years** from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 99.

D. Comply with NFPA 110.

E. Comply with UL 1008 unless requirements of these Specifications are stricter.

F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
2. Short-time withstand capability for three cycles.

H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

K. Service-Rated Transfer Switch:

1. Comply with UL 869A and UL 489.
2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.
3. In systems with a neutral, the bonding connection shall be on the neutral bus.
4. Provide removable link for temporary separation of the service and load grounded conductors.
5. Surge Protective Device: Service rated.
6. Ground-Fault Protection: Comply with UL 1008 for normal bus.
7. Service Disconnecting Means: Externally operated, manual mechanically actuated.

L. Neutral Terminal: Solid and fully rated unless otherwise indicated.

M. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.

N. Battery Charger: For generator starting batteries.

1. Float type, rated 10 A.
2. Ammeter to display charging current.
3. Fused ac inputs and dc outputs.

O. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via front access.

P. Enclosures: General-purpose NEMA 250, [**Type 1**] [**Type 3R**] [**Type 4X**] [**Type 12**], complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

A. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:

1. Russ Electric
2. ASCO
3. Manufacturer of provided Generator

B. Comply with Level 1 equipment according to NFPA 110.

C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
4. Conductor Connectors: Suitable for use with conductor material and sizes.
5. Material: Tin-plated aluminum or Hard-drawn copper, 98 percent conductivity.
6. Main and Neutral Lugs: Mechanical type.
7. Ground Lugs and Bus-Configured Terminators: Mechanical type.

8. Ground bar.
9. Connectors shall be marked for conductor size and type according to UL 1008.

D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.

1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

E. Automatic Delayed-Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer-switch controller. Interlocked to prevent the load from being closed on both sources at the same time.

1. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals for alternative source. Adjustable from zero to six seconds, and factory set for one second.
2. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
3. Fully automatic break-before-make operation with center off position.
4. Fully automatic break-before-make operation with transfer when two sources have near zero phase difference.

F. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.

G. Automatic Transfer-Switch Controller Features:

1. Controller operates through a period of loss of control power.
2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

H. Large-Motor-Load Power Transfer:

1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.
3. Programmed Neutral Switch Position: Switch operator with programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer. Adjustable pause from 0.5 to 30 seconds minimum, and factory set for 0.5 second unless otherwise indicated. Time delay occurs for both transfer directions. Disable pause unless both sources are live.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.

1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete." Retain first subparagraph below if seismic controls are a project requirement. Coordinate with Drawings.
2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
4. Provide workspace and clearances required by NFPA 70.

B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.

C. Identify components according to Section 260553 "Identification for Electrical Systems."

D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

E. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.

1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

E. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."

F. Connect twisted pair cable according to Section 271513 "Communications Copper Horizontal Cabling."

G. Route and brace conductors according to manufacturer's written instructions. Do not obscure manufacturer's markings and labels.

H. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 36 inches (914 mm) in length.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and required clearances.
d. Verify that the unit is clean.
e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
f. Verify that manual transfer warnings are attached and visible.
g. Verify tightness of all control connections.
h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.

i. Perform manual transfer operation.
j. Verify positive mechanical interlocking between normal and alternate sources.
k. Perform visual and mechanical inspection of surge arresters.
l. Inspect control power transformers.

1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

2. Electrical Tests:

a. Perform insulation-resistance tests on all control wiring with respect to ground.
b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
c. Verify settings and operation of control devices.
d. Calibrate and set all relays and timers.
e. Verify phase rotation, phasing, and synchronized operation.
f. Perform automatic transfer tests.
g. Verify correct operation and timing of the following functions:

1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

   a. Check for electrical continuity of circuits and for short circuits.
   b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
   c. Verify that manual transfer warnings are properly placed.
   d. Perform manual transfer operation.

4. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

   a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
   b. Simulate loss of phase-to-ground voltage for each phase of normal source.
   c. Verify time-delay settings.
   d. Verify pickup and dropout voltages by data readout or inspection of control settings.
   e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for one pole deviating by more than 50 percent from other poles.
   f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

   a. Verify grounding connections and locations and ratings of sensors.

B. Coordinate tests with tests of generator and run them concurrently.

C. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

D. Transfer switches will be considered defective if they do not pass tests and inspections.

E. Remove and replace malfunctioning units and retest as specified above.

F. Prepare test and inspection reports.

G. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

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

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following information on LED luminaires:
   1. Materials.
   2. Finishes.
   3. Luminaire support.

B. Related Requirements:

   1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
   2. Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, arranged by designation.

B. Shop Drawings: For nonstandard or custom luminaires.

   1. Include plans, elevations, sections, and mounting and attachment details.
   2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale and coordinated with each other, using input from installers of the items involved:

B. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.

C. Product Certificates: For each type of luminaire.

D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE 7.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Standards:

1. ENERGY STAR certified.

2. Listed by UL, ETL, or other third party listing agency
3. Recessed luminaires shall comply with NEMA LE 4.

C. CRI of minimum 80. CCT as noted on plans.

D. Rated lamp life of 50,000 hours to L70.

E. Lamps dimmable from 100 percent to 0 percent of maximum light output.

F. Internal driver.

G. Nominal Operating Voltage: 120 V ac or 277 V ac.

1. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

H. Housings:

1. Extruded-aluminum housing and heat sink.
2. Coordinate all finishes with architect.

2.3 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers, and Globes:
1. Acrylic: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

D. Housings:

1. Extruded-aluminum housing and heat sink.
2. Coordinate finishes with architect.

2.4 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, **12 gage (2.68 mm)**.

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports: Sized and rated for luminaire weight.

E. Flush-Mounted Luminaire Support: Secured to outlet box.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

G. Ceiling-Mounted Luminaire Support:

1. Ceiling mount with **two** 5/32-inch- (4-mm-) diameter aircraft cable supports adjustable to 120 inches (6 m) in length.
2. Ceiling mount with pendant mount with 5/32-inch- (4-mm-) diameter aircraft cable supports adjustable to 120 inches (6 m) in length.
3. Ceiling mount with hook mount.

H. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.

3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

I. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire using approved fasteners in a minimum of four locations, spaced near corners of luminaire.

J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

K. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION

SECTION 265219 - EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Emergency lighting units.
2. Exit signs.
3. Luminaire supports.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Emergency Lighting Unit: A lighting unit with integral or remote emergency battery powered supply and the means for controlling and charging the battery and unit operation.

D. Fixture: See "Luminaire" Paragraph.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support, arranged by designation.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, coordinated with each other, using input from installers of the items involved:

B. Product Certificates: For each type of luminaire.

C. Seismic Qualification Data: Certificates, for luminaires, accessories, and components, from manufacturer.

D. Sample Warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two year(s) from date of Substantial Completion.

B. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.

C. Comply with NFPA 70 and NFPA 101.

D. Comply with NEMA LE 4 for recessed luminaires.

E. Comply with UL 1598 for recessed luminaires.

F. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body and compatible with Driver.

1. Emergency Connection: Operate fixture continuously at a minimum output of 1/3 of total lumens upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture driver.
2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

    a. Ambient Temperature: Less than 0 deg F (minus 18 deg C) or exceeding 104 deg F (40 deg C), with an average value exceeding 95 deg F (35 deg C) over a 24-hour period.
    b. Ambient Storage Temperature: Not less than minus 4 deg F (minus 20 deg C) and not exceeding 140 deg F (60 deg C).
    c. Humidity: More than 95 percent (condensing).
    d. Altitude: Exceeding 3300 feet (1000 m).

4. Test Push-Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.

    a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

5. Battery: Sealed, maintenance-free, nickel-cadmium type.
6. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

G. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more lamps, remote mounted from luminaire.

1. Emergency Connection: Operate LED fixture continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire Driver.
2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
3. Nightlight Connection: Operate lamp in a remote fixture continuously.
4. Battery: Sealed, maintenance-free, nickel-cadmium type.

5. Charger: Fully automatic, solid-state, constant-current type.
6. Housing: NEMA 250, Type 1 enclosure listed for installation inside, on top of, or remote from luminaire. Remote assembly shall be located no less than half the distance recommended by the emergency power unit manufacturer.
7. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
8. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
9. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.3 EMERGENCY LIGHTING

A. General Requirements for Emergency Lighting Units: Self-contained units.

B. Emergency Luminaires:

1. Manufacturers as listed on plans
2. Emergency Luminaires: fixtures as indicated on Drawings, with the following additional features:

    a. Operating at nominal voltage of 120 V ac or 277 V ac.
    b. Internal emergency power unit.
    c. Rated for installation in damp locations, and for sealed and gasketed fixtures in wet locations.
    d. UL 94 HB flame rating.

2.4 EXIT SIGNS

A. Internally Lighted Signs:

1. Manufacturers as listed on plans
2. Operating at nominal voltage of 120 V ac or 277 V ac.
3. Lamps for AC Operation: Fluorescent, two for each fixture; 20,000 hours of rated lamp life.
4. Lamps for AC Operation: LEDs; 50,000 hours minimum rated lamp life.
5. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

2.5 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access:

1. Smooth operating, free of light leakage under operating conditions.
2. Designed to permit relamping without use of tools.
3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Diffusers and Globes:
1. Glass: Annealed crystal glass unless otherwise indicated.
2. Acrylic: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

CI. Housings:

1. Extruded aluminum housing.

CII. Conduit: Electrical metallic tubing, minimum 3/4 inch (21 mm) in diameter.

2.6 METAL FINISHES

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

2.7 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position when testing emergency power unit.
3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of fixture weight.

E. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.
2. Do not attach fixtures directly to gypsum board.

F. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of fixture oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

G. Ceiling Grid Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.

H. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION

SECTION 265619 - LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted photoelectric relays.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Section 260926 "Lighting Control Panelboards" for panelboard-based lighting control.
3. Section 260943.16 "Addressable-Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.
4. Section 265613 "Lighting Poles and Standards" for poles and standards used to support exterior lighting equipment.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.

2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports and seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale and coordinated.

B. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.

C. Product Certificates: For each type of the following:

1. Luminaire.
2. Photoelectric relay.

D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.6 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

D. UL Compliance: Comply with UL 1598 and listed for wet location.

E. Lamp base complying with ANSI C81.61.

F. CRI of minimum 80. CCT as noted on drawings.

G. L70 lamp life of 50,000 hours.

H. Lamps dimmable from 100 percent to 0 percent of maximum light output.

I. Nominal Operating Voltage: 120 V ac or 277 V ac.

J. In-line Fusing: Separate in-line fuse for each luminaire.

K. Lamp Rating: Lamp marked for outdoor use.

L. Source Limitations: Obtain luminaires from single source from a single manufacturer.

M. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.3 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Corrosion-resistant aluminum, Stainless steel or Epoxy-coated steel. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

D. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

G. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.

2.4 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear-Anodic Finish: AA-M32C22A41 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color-Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker), complying with AAMA 611.

D. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

    a. Color: As selected from manufacturer's standard catalog of colors.
    b. Color: Match Architect's sample of manufacturer's standard color.
    c. Color: As selected by Architect from manufacturer's full range.

2.5 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Install lamps in each luminaire.

D. Fasten luminaire to structural support.

E. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Support luminaires without causing deflection of finished surface.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.

G. Wiring Method: Install cables in raceways. Conceal raceways and cables.

H. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.

I. Coordinate layout and installation of luminaires with other construction.

J. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

K. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.2 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):

a. IES LM-5.
b. IES LM-50.
c. IES LM-52.
d. IES LM-64.
e. IES LM-72.

2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

D. Luminaire will be considered defective if it does not pass tests and inspections.

E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION

SECTION 270500 – COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. The work covered by this document is to furnish and install all materials for the communications systems indicated on the drawings and specifications. This includes but is not limited to structured cabling, equipment room fittings, and audio/video systems. These systems shall be installed so they are complete and operating as indicated on the drawings, specifications, and manufacturer’s recommendations.

1.3 QUALITY ASSURANCE

A. The communications systems components and equipment shall be listed by Underwriters Laboratories, Inc., and the components shall bear the UL label.

B. All work, including but not limited to: cabling, pathways, support structures, wiring, equipment, installation and workmanship shall comply with the latest editions of the requirements of the Authority Having Jurisdiction (AHJ), National Electrical Code, National Electrical Safety Code, all applicable local rules and regulations, equipment manufacturer's instructions, and the National Electrical Contractors Association (NECA) Standard of Installation. In case of discrepancy or disagreement between the documents noted above, the Contractor shall satisfy the most stringent requirements.

C. The Contractor shall be responsible for coordination of work among project specification divisions and contractor/subcontractors involved in this project. This coordination of Work Includes following instructions provided by the Construction Manager or General Contractor if project is managed by such.

D. The Contractor shall visit the site to become familiar with the working conditions.

E. The Contractor is responsible for any field measurements necessary for their Work. They shall be responsible for the accurate location and size of openings, recesses, slots, ferrules, and any other requirements for their installation.

F. Deviations from the Drawings, to avoid interferences, shall be considered a job condition and additional compensation will not be considered. In the event that such interferences occur in course of the Work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed. Interferences which may occur during the course of construction shall be brought to the immediate attention of the Architect/Engineer. The Architect/Engineer will review the condition and render a decision which shall be considered final. The decision will be confirmed in writing.

G. Contractors shall review all bid documents and report any discrepancies to the Architect/Engineer prior to bid.

H. If there is a discrepancy in quantities between drawings or between drawings and Specifications, the Contractor shall provide the greater of the two quantities in their bid price.

I. If the products specified are no longer available, Contractor shall provide a replacement product that meets or exceeds the performance requirements of the original specified model at no additional cost. Replacement product information shall be submitted to the Architect/Engineer for review.

J. Contractor shall submit a list of three (3) projects performed in the past five years, that are similar to size and scope of the one specified herein. The contractor shall arrange a site visit to any of these projects if requested. The list shall include the following:

1. Project location and completion date.
2. Contact person.
3. Brief description of the project.

K. The Architect/Engineer/Owner reserves the right to ask for replacement of management or field staff of the Contractor at any time during the project.

L. Contractor shall employ or have a contract with a Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI).

M. Contractor must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician
2. Field Inspector: Currently registered by BICSI as an RCDD to perform the on-site inspection.

N. Contractor shall employ or have a contract with a Certified Technology Specialist (CTS) registered with the Audiovisual and Integrated Experience Association (AVIXA).

1.4 SUBMITTALS

A. Submit shop drawings for every system component including equipment, cables, and connectors.

1. Each Specification Section will be submitted in its entirety. Partial submittals are not acceptable.
2. Each Specification Section will be submitted separately from other Sections. Combined submittals are not acceptable.
3. Provide an index for the Product Data for each Specification Section.
4. Provide a complete material list.

a. The list shall include the following for each product.

1) Quantity
2) Manufacturer Name
3) Model Number
4) Product Description
5) Paragraph number of the Specification where the product is specified.

5. Provide a Product Data Sheet for each component listed in the specifications and on the drawings.

a. Product Data sheets are to be assembled in the same sequence as they appear in the Specifications.
b. Items to be used on the project shall be highlighted if the data sheets cover more than one item.

6. Do not submit information on items that are not listed as acceptable in the documents.
7. If a specified product is no longer available or if the model number is in error or has been changed the Contractor shall note that a substitute product is being proposed. Clearly indicate the reason for the proposed substitution.

B. Provide certificate of the Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI) employed by the Contractor.

C. Provide Shop Drawings indicating the drop locations, backbone routing, and the location of major equipment for each system. Include wiring diagrams, riser diagrams, system interconnection drawings, cabinet/rack layout drawings, and labeling information.

D. Labeling scheme shall be submitted with the submittal drawings and approved prior to termination of devices.

E. Product data and shop drawing submittals will be returned and required to be resubmitted if they do not meet the requirements stated above.

F. Submittals shall be submitted in electronic format (PDF).

1.5 CLOSEOUT DOCUMENTATION

A. Provide the following as part of the closeout documentation:

1. Provide certificate of warranty required in the Division 27 Specification sections.
2. Provide Operation and Maintenance manuals for the active electronic communications systems equipment. The Operation and Maintenance manuals shall consist of the following:

    a. Equipment spreadsheet indicating the equipment manufacturer's name, model number, serial number, and serial number.
    b. Operational procedures for all equipment installed.
    c. Wiring diagrams.
    d. License requirements including renewal dates.

3. Provide test results documentation.

    a. Printouts generated for all cabling indicating the final test results.

        1) When repairs and re-tests are performed, the problem(s) found, and the corrective action(s) taken shall be noted. Both failed and passed test results shall be documented.

4. Where indicated on the drawings and specifications, provide the spare items to the owner. As part of the closeout documentation the Contractor shall provide a spreadsheet indicating the quantity of these items and that these items that have been turned over to the Owner.
5. Provide the following training documentation:

    a. Sign-in sheet with the name of attendees and the completion date.
    b. Video recordings of the trainings in digital format if applicable.

6. Provide project record drawings to be included in the closeout documentation:

    a. Project record drawings shall be provided in .pdf format. Marked up drawings or scanned field working drawings are not acceptable.
    b. DWG files will be made available to the Contractor for use in completing the project record drawings for a nominal fee.
    c. Each drawing sheet of the record set is to be stamped "Project Record Drawing".
    d. The Contractor's RCDD overseeing the project must stamp and sign each technology record drawing sheet to confirm compliance with the documents.
    e. Notations and labels on the record drawings shall be typed. Handwritten notes are not acceptable.
    f. All deviations from the bid documents are to be noted. Indicate changes made by Addenda, Architect Supplemental Instructions (ASI), Change Orders, and Field Directives.
    g. All devices are to be shown in their approximate installed location and labeled with the correct field designation.

h. The project record drawings shall indicate at a minimum the telecommunications rooms, telecommunications outlet labels, backbone cabling type and routing, backbone connector labeling, and communications systems wiring details.

B. Closeout documentation shall be submitted in electronic format (PDF).

1.6 TRAINING

A. Provide training sessions for the number of hours required in each Division 27 Specifications.

1. The total number of training hours indicated in the Division 27 Specifications may be separated into multiple training sessions on different dates at the Owner's discretion.
2. Training sessions shall take place no later than 6 months after the completion of the project.

B. Training session shall be an instruction program that includes individual training sessions for each system and equipment as required by individual Division 27 Specification sections.

C. Develop a learning objective and teaching outline for each session. Include a description of specific skills and knowledge that participant is expected to master. For each session, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria
2. Documentation
3. Emergencies
4. Operations
5. Troubleshooting
6. Maintenance
7. Repairs

D. Coordinate training schedule with Owner and Architect/Engineer, or Construction Manager.

E. Training program must be coordinated with Owner to establish goals, specific concerns, review program issues and analyze staff strengths and training logistics.

F. Conduct conference at Project site to review methods and procedures related to training.

G. Training shall be provided by a factory-authorized representative experienced in operation and maintenance procedures and training and who is familiar with the system and equipment installed in the building.

H. The training instructor must make recommendations concerning the optimum training program to address each level of needs from basic to advanced, to system administrator.

I. Provide a video recording of the training where indicated in the Division 27 Specification Sections.

1. Record each training session separately. Include instructions and demonstrations, board diagrams, and other visual aids.

2. Video recording shall be high quality video and audio so that the content of the video is easily viewed, and the audio is intelligible.
3. Training recordings shall be submitted on a USB drive or DVD as part of the closeout documentation.

J. Training participants, date, training session subject, and owner sign-off shall be documented and provided as part of the closeout documentation.

1.7 REFERENCES

A. All work, including but not limited to cabling, pathways, support structures, wiring, equipment, installation and workmanship shall meet or exceed the requirements of the most recent editions of the following codes or standards:

1. Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual (TDMM).
2. Building Industry Consulting Service International (BICSI) Information Technology Systems Installation Manual (ITSIMM).
3. Building Industry Consulting Service International (BICSI) Outside Plant Design Reference Manual (OSPDRM).
4. ANSI/NECA/BICSI-568-2006 - Standard for Installing Building Telecommunications Cabling
5. TIA-526-7 - Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
6. TIA-526-14 - Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant
7. ANSI/TIA-568.0-D – Generic Telecommunications Cabling for Customer Premises
8. ANSI/TIA-568.1-D - Commercial Building Telecommunications Cabling Standard
9. ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard
10. ANSI/TIA-568.3-D - Optical Fiber Cabling Components Standard
11. ANSI/TIA-569-D - Commercial Building Standard for Telecommunications Pathways and Spaces
12. ANSI/TIA/EIA-598-D - Optical Fiber Cable Color Coding
13. ANSI/TIA/EIA-604 – Fiber Optic Connector Intermateability Standard
14. ANSI/TIA-606 - Administration Standard for Commercial Telecommunications Infrastructure
15. ANSI/TIA-607 - Commercial Building Grounding and Bonding Requirements for Telecommunications
16. ANSI/TIA-758 - Customer Owned Outside Plant Telecommunications Infrastructure Standard
17. ANSI/TIA-862 - Structured Cabling Infrastructure Standard for Intelligent Building Systems
18. ANSI/TIA-942 - Telecommunications Infrastructure Standard for Data Centers
19. NFPA – National Fire Protection Association
20. NFPA 70 - National Electrical Code (NEC)
21. ADA Americans with Disabilities Act
22. Audio Systems Design and Installation (Giddings)

1.8 DEFINITIONS

A. Unless otherwise specified or indicated, electrical and electronics terms used in this specification shall be as defined in ANSI/TIA-568-C.1, ANSI/TIA-568-C.2, T ANSI/TIA-568-C.3, ANSI/TIA-569, ANSI/TIA-606 and herein.

1. Building Backbone Cabling

a. Cabling used to connect Telecommunications Rooms (TR) or other local collection points to the Main Cross Connect/Equipment Room (MC/ER). Building backbone cabling typically carries aggregate traffic and, as such, impacts multiple network devices and users. Building backbone cabling may include either fiber optic or copper cabling or both.

2. Certification

a. The testing and documentation of the transmission performance (e.g., Category 6 / Class E) of a permanent link or channel, based on sweep frequency (where applicable) testing of numerous parameters with results compared to a range of acceptable values. This project requires 100% certification (with documentation) of all channel cabling at the time of installation.

3. Channel

a. The entire physical pathway between active equipment ports, inclusive of all patch cords, patch panels, jacks and cabling segments.

4. Conduit

a. A raceway of circular cross-section.

5. Entrance Facility (EF)

a. Termination point of service provider cables that have entered the building and location of service demarcation point and interconnection point to the network. This space may be located in a Telecommunications Room (TR) or Main Cross Connect/Equipment Room (MC/ER).

6. Equipment Rooms (ER)

a. An Equipment Room (ER) is a special-purpose room that provides space and maintains a suitable operating environment for communications and/or computer equipment. An Equipment Room (ER) may contain terminations, interconnections, and cross-connects for telecommunications distribution cables as well as other low voltage equipment such as fire alarm panels, video-audio distribution, security, and other building signaling and communication systems. Sometimes referred to as MDF.

7. Horizontal Cabling

a. Cabling used to connect individual work area outlets to Telecommunications Rooms (TR), Main Cross Connect/Equipment Room (MC/ER), or other collection points. Unlike backbone cabling, horizontal cabling does not typically carry aggregate traffic and, as such, impacts only single network devices or users. In buildings, horizontal cabling almost exclusively consists of copper cabling. Fiber optic cabling may be used where situations dictate but, unlike horizontal copper cabling, horizontal fiber optic cabling is not installed in advance as default building facilities.

8. Main Cross-Connect (MC)

a. The Main Cross-Connect (MC) is typically located with the Equipment Room (ER) and is the main cross-connect and interconnection point for first level backbone.

9. Permanent Link

a. A stationary cabling segment, consisting of the permanently installed cable and the permanently affixed jack at both ends (typically at the outlet faceplate and closet patch panel, or on a patch panel on both ends). The concept assumes that, while patch cords might be disconnected or moved over time, the permanent cable and jacks will not be disturbed and the electrical characteristics of the permanent link will remain unaltered.

10. Plenum

a. A space within the building designed for the movement of environmental air; i.e., a space above a suspended ceiling or below an access floor.

11. Raceway

a. Any channel designed for holding wires or cables; i.e. conduit, electrical metal tubing, busways, wireways, ventilated flexible cableway.

12. Telecommunications Outlet (TO)

a. An assembly of interface ports for data, voice, and audio/video connections.

13. Telecommunications Enclosure (TE)

a. A Telecommunications Enclosure is a wall mounted equipment cabinet that feeds all of the Telecommunications Outlets (TO's) horizontal cabling in it's service zone. All TE's in a building are linked to the building's MC/ER via backbone cabling. TE's contain telecommunications equipment, control equipment, cable terminations, and cross connect wiring.

14. Telecommunications Rooms (TR)

a. A Telecommunications Room is a space that feeds all the Telecommunications Outlets (TO's) horizontal cabling in its service zone. All TR's in a building are

linked to the building's MC/ER via backbone cabling. TR's contain telecommunications equipment, control equipment, cable terminations, and cross connect wiring. Sometimes referred to as IDF.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSTALLATION

A. The contractor is responsible for providing complete and usable work per contract documents. All materials and equipment shall be provided with all accessories and additional work required for field conditions, as well as additional work and accessories required for complete, usable, and fully functional construction and systems, even if not explicitly specified or indicated. Communications system in this Contract shall be provided as complete and operable systems in full compliance with requirements on drawings and specification requirements.

B. Drawings are diagrammatic and specifications are performance-based, and Contractor shall provide all work required to comply with drawings and specifications, even if not explicitly indicated or specified.

C. Contractor shall be responsible for coordinating installation of electrical systems with all field conditions and work of other trades.

D. Minimum clearances and work required for compliance with NFPA 70, National Electrical Code® (NEC®), and manufacturer's instructions shall be provided. Comply with additional requirements indicated for access and clearances.

E. Contractor shall verify all field conditions and dimensions that affect selection and provision of materials and equipment, and shall provide any disassembly, reassembly, relocation, demolition, cutting and patching required to provide work specified or indicated, including relocation and reinstallation of existing wiring and equipment.

F. Contractor shall protect from damage resulting from Contractor's operations with existing facility, equipment, and wiring.

G. Extra charges for completion and contract time extension will not be allowed because of field conditions or additional work required for complete and usable construction and systems.

H. Drawings and specifications form complementary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Except where explicitly modified by a specific notation to contrary, it shall be understood that indication or description of any item, in drawings or specifications or both, carries with it instruction to furnish and install item, provided complete. As used in this specification, provide means furnish and install. Furnish means "to purchase and deliver to project site complete with every necessary appurtenance and support," and install means "to unload at delivery point at site and

perform every operation necessary to establish secure mounting and correct operation at proper location in project."

I. The Contractor shall install and/or connect Owner furnished equipment as directed in the Documents. The Contractor shall verify exact requirements and locations before installation.

3.2 COLOR CODE

A. Refer to the Technology Drawings for more information on the color of cables and jacks for each system.

3.3 DELIVERY AND STORAGE

A. Contractor shall be responsible for the deliveries, storing and handling of all materials relative to the communications systems, including materials supplied by others that are part of the communications installation contract. Material shall be stored and protected per manufacturer's instructions. Contractor shall be responsible for the security of all material during installation. For all material provided by contractor, or delivered to contractor on site, contractor assumes full responsibility and liability for any material shortages, damage or loss due to storage and handling methods.

3.4 PERMITS, FEES, REGULATIONS, INSPECTIONS

A. Contractor shall arrange and pay for permits, fees, and inspections required in connection with their work for this project, from local, county, state and public agencies, and shall obtain permits from railroad, state highway and utility companies.

B. Work shall be inspected by approved local and state inspection bureaus, Electrical Inspection Agency, and/or authority, and local utilities.

C. Upon completion of the Work, the Contractor shall furnish to the Architect/Engineer, a certification of inspection and approval from said Bureau or Agency before final payment will be approved.

D. Contractor shall verify the right of way with all local and state agencies.

3.5 HOISTS, RIGGING, TRANSPORTATION, AND SCAFFOLDING

A. Contractor shall provide scaffolding, staging, cribbing, tackle, hoists, and rigging necessary for the installation of their materials and equipment.

B. Contractor is responsible for transportation costs for getting materials and equipment to the job.

3.6 PROTECTION

A. Contractor shall protect the finished work of other trades from damage as a result of their operations and shall remedy such damage at their own expense.

1. Protect finished floors using protective paper, plastic or plywood as appropriate.

2. Protect countertops using protective paper as appropriate.
3. Protect all installed equipment and material from dirt, moisture and paint overspray.
4. Use gloves when removing installed ceiling tile.

3.7 CUTTING AND PATCHING

A. Patching of and repair of damage to Work in place shall be done in a neat and workmanlike manner, meeting with the approval of the Architect/Engineer. Contractor whose operations require cutting of work in place, or who causes damage which entails repairs of such work, shall employ mechanics of the particular trade whose work must be cut or which is damaged, and shall pay the costs of such patching or repair.

3.8 CLEANING

A. Contractor is responsible for cleanup of debris daily. Cost of cleanup is the responsibility of the Contractor.

B. During progress of work, remove equipment and unused material. Put building and premises in neat and clean condition. Perform cleaning and washing required to provide acceptable appearance and operation of equipment to satisfaction of Owner's Representative.

C. After completion of Project, clean exterior surface of all equipment, including concrete residue, dirt, and paint residue. Final cleaning shall be performed prior to Project acceptance by Owner's Representative.

3.9 MANUFACTURER AND PRODUCT LIST

A. Within 24 hours the apparent low bidder shall provide a complete materials list showing manufacturers name, catalog numbers, description, quantities, and labor and material unit pricing for each item in each system, arranged by Specification Section.

B. If a subcontractor is to be utilized for any portion of the work, the Contractor shall provide contact information, references, material list, and any other pertinent information as a part of this submission.

3.10 STARTUP AND OPERATIONAL TESTING

A. Owner maintains right to have access to entire project site to prepare facility for occupancy and operation. Completion of startup and field testing shall be accomplished as a prerequisite for substantial completion. Operate and maintain systems and equipment until final acceptance by Owner. All guarantees and warranties shall not begin until final acceptance of systems and equipment by Owner. Acceptance requires, at a minimum, complete systems startup and testing.

3.11 FINAL COMPLETION

A. All equipment and components shall be cleaned prior to Substantial Completion of the Work. Remove dust and dirt from cabinets, racks and installed components. Remove fingerprints, labels and protective wrap, paper or plastic from equipment.

B. Retouch or repaint factory painted prime and finish coats, where scratched or damaged. Whenever retouching will not be satisfactory, the Architect/Engineer may require complete repainting until the desired appearance is obtained.

C. Contractor shall restore damaged materials; remove grease, oil, chemicals, paint spots, and stains; and leave the Work in perfect condition.

D. Contractor shall remove their tools, equipment, surplus materials, and rubbish resulting from their operations, and pay costs for such removal and disposal upon completion of their work.

END OF SECTION 270500

SECTION 270526 – GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes, but is not limited to:

1. Grounding conductors
2. Grounding busbars
3. Grounding connectors

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. The Contractor shall provide a communications bonding and grounding system as described in this specification, documents and drawings specific to that project.

B. Bond the following items within the telecommunications grounding system:

1. All communications system active equipment.
2. All surge protection equipment.
3. Metallic raceway systems, including metallic cable trays.
4. Communications equipment enclosures (cabinets) or cross-connect frames.
5. Metallic splice cases.
6. Metallic cable screens, armor or shields.
7. All metal cable conduit.
8. Electrical service panels in entrance facilities, telecommunications and equipment rooms.
9. Wall and rack mounted grounding busbars.
10. Exposed building steel that is within 6 feet of equipment racking systems.
11. Building steel extending to earth in outside-plant.
12. All related bonding accessories.
13. Bond any conductive path within six feet of telecommunications cabinets/racks.

C. All metal equipment cabinets/racks, cable shields, strength members, splice cases, cable trays, conduits, and the like entering or residing in the MC/ER or TR shall be grounded to the appropriate PBB/SBB using a minimum 6AWG stranded copper bonding conductor and two-hole compression connectors.

1.3 QUALITY ASSURANCE

A. The Grounding and Bonding for Communications Systems components and equipment shall be listed by Underwriters Laboratories, Inc., and the components shall bear the UL label.

B. The Grounding and Bonding for Communications Systems shall be installed in accordance with all requirements set by all applicable standards, codes, and regulations including but not limited to the standards referenced in Section 270500 – Common Work Results for Communications.

C. All equipment and installation practices shall comply with the latest BICSI (TDMM) standards.

D. Installer shall employ or have a contract with a Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI).

E. Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician
2. Field Inspector: Currently registered by BICSI as an RCDD to perform the on-site inspection.

1.4 SUBMITTALS

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Submittals shall be submitted in electronic format (PDF).

1.5 CLOSEOUT DOCUMENTATION

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Closeout documentation shall be submitted in electronic format (PDF).

1.6 WARRANTY

A. All components, parts, and assemblies of the Grounding and Bonding for Communications Systems supplied by the installer shall be guaranteed against defects in materials and workmanship for a period of 2 years by the manufacturer and installer.

B. Warranties shall include all labor, material, travel expenses, test equipment, equipment rental and any other expense required to troubleshoot, remove, repair or replace equipment or components to bring the system up to the original performance criteria and operation.

C. Warranty services shall be provided by an installer certified by the equipment manufacturer during normal business hours.

D. Provide warranty certificate as part of the closeout documentation.

1.7 TRAINING

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Provide two (2) training hours for the Grounding and Bonding for Communications Systems.

PART 2 - PRODUCTS

2.1 TELECOMMUNICATIONS BONDING BACKBONE (TBB)

A. The telecommunications bonding backbone shall provide a conductor that interconnects the PBB in the MC/ER to the SBB in each TR.

B. The telecommunications bonding backbone shall reduce or equalize potential differences between telecommunications systems. While the telecommunications bonding backbone will carry some current under AC power ground fault conditions, it is not intended to provide the only ground fault path.

C. The telecommunications bonding backbone shall be bare or insulated copper, of minimum conductor size #6 AWG and sized at 2 kcmil per linear foot up to a maximum size of 750 kcmil.

D. TBB conductor size vs. length:

TBB Linear Length	TBB size (AWG)
Less than 13’	6
14’-20’	4
21’-26’	3
27’-33’	2
34’-41’	1
42’-52’	1/O
53’-66’	2/O
67’-84’	3/O
85’-105’	4/O
106’-125’	250kcmil
126’-150’	300kcmil
151’-175’	350kcmil
176’-250’	500kcmil
251’-300’	600kcmil
Greater than 301’	750kcmil

E. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

F. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

G. Where un-insulated, to be identified with green tape at termination location.

2.2 TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR (TEBC)

A. The telecommunications equipment bonding conductor shall provide a conductor that interconnects the PBB or SBB to the telecommunications equipment within the telecommunications room.

B. The telecommunications equipment bonding conductor shall reduce or equalize potential differences between telecommunications systems. While the telecommunications bonding backbone will carry some current under ace power ground fault conditions, it is not intended to provide the only ground fault path.

C. The telecommunications equipment bonding backbone shall be insulated copper, of minimum conductor size #6 AWG and sized at 2 kcmil per linear foot up to a maximum size of 3/0 AWG.

D. TEBC conductor size vs. length:

TEBC Linear Length	TEBC size (AWG)
Less than 13’	6
14’-20’	4
21’-26’	3
27’-33’	2
34’-41’	1
42’-52’	1/O
53’-66’	2/O
67’-84’	3/O

E. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

F. The telecommunications bonding backbone shall be green.

G. Maintain a minimum of two inches separation between the TEBC and telecommunications cabling.

2.3 PRIMARY BONDING BUSBAR (PBB)

A. The Primary Bonding Busbar (PBB) shall:

1. Be constructed of .25” thick solid copper bar.
2. Be 4” high and 20” long and shall have a minimum of 30 attachment points for two-hole grounding lugs.
3. Have a hole pattern for attaching grounding lugs shall meet the requirements of ANSI/TIA – 607-C.
4. Include wall-mount stand-off brackets, assembly screws and insulators creating a 4” standoff from the wall.
5. The busbar shall be UL Listed as grounding and bonding equipment.

B. Approved manufacturers:

1. Panduit
2. Hubbell
3. CPI
4. Harger
5. Erico
6. Ortronics

2.4 SECONDARY BONDING BUSBAR (SBB)

A. The Secondary Bonding Busbar (SBB) shall:

1. Be constructed of .25” thick solid copper bar.
2. Be 4” high and 12” long and shall have a minimum of 9 attachment points for two-hole grounding lugs.
3. Have a hole pattern for attaching grounding lugs shall meet the requirements of ANSI/TIA – 607-C.
4. Include wall-mount stand-off brackets, assembly screws and insulators creating a 4” standoff from the wall.
5. The busbar shall be UL Listed as grounding and bonding equipment.

B. Approved manufacturers:

1. Panduit
2. Hubbell
3. CPI
4. Harger
5. Erico

2.5 BONDING ACCESSORIES

A. Two Mounting Hole Ground Terminal Block

1. Ground terminal block shall be made of electroplated tin aluminum extrusion.

2. Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
3. The conductors shall be held in place by two stainless steel set screws.
4. Ground terminal block shall have two 1/4" holes spaced on 5/8" centers to allow secure two-bolt attachment to the rack or cabinet.
5. Ground terminal block shall be UL Listed as a wire connector.

B. Compression Lugs

1. Compression lugs shall be manufactured from electroplated tinned copper.
2. Compression lugs shall have two holes spaced on 5/8" or 1" centers, as stated below, to allow secure two bolt connections to busbars.
3. Compression lugs shall be sized to fit a specific size conductor, sizes #6 to 4/0, as stated below.
4. Compression lugs shall be UL Listed as wire connectors.

C. Antioxidant Joint Compound

1. Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.

D. C-Type, Compression Taps

1. Compression taps shall be manufactured from copper alloy.
2. Compression taps shall be C-shaped connectors that wrap around two conductors forming an irreversible splice around the conductors; installation requires a hydraulic crimping tool.
3. Compression taps shall be sized to fit specific size conductors, sizes #2 AWG to 4/0, as stated below.
4. Compression taps shall be UL Listed.

E. Pedestal Clamp with Grounding Connector

1. Pedestal clamp shall be made from electroplated tinned copper or bronze.
2. Installation hardware will be stainless steel.
3. Pedestal clamps shall be sized to fit a specific size conductor, size #6 and/or 2/0, as stated below.
4. Pedestal clamp installation hardware shall be sized to attach to round and/or square raised access floor pedestals that are 1-1/8" to 1-3/4" in diameter, as stated below.
5. Pedestal clamp shall provide straight (in-line) or cross (intersection) support for up to two conductors.
6. Pedestal clamp shall be UL Listed as grounding and bonding equipment.

F. Pipe Clamp with Grounding Connector

1. Pipe clamp shall be made from electroplated tinned bronze. Installation hardware will be stainless steel.
2. Pipe clamp shall be sized to fit up to two conductors ranging in size from #6 to 250 MCM; conductors must be the same size.
3. Pipe clamp installation hardware shall be sized to attach to pipes, sizes 1" to 6" (.75" to 6.63" in diameter).

4. Pipe clamp shall be UL Listed as grounding and bonding equipment.

G. Equipment Ground Jumper Kit

1. Kit includes one 24" L insulated ground jumper with a straight two-hole compression lug on one end and an L-shaped two-hole compression lug on the other end, two plated installation screws, an abrasive pad and a .5 once tube of antioxidant joint compound.
2. Ground conductor is an insulated green/yellow stripe #6 AWG wire.
3. Lugs are made from electroplated tinned copper and have two mounting holes spaces .5" to .625" apart that accept 1/4" screws.
4. Jumper will be made with UL Listed components

H. Approved manufacturers:

1. Panduit
2. Burndy
3. CPI
4. Hubbell
5. Cooper B-line
6. Thomas & Betts

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all components for the grounding and bonding for communications systems as specified herein and as shown on the drawings.

B. The grounding and bonding for communications systems shall be installed in accordance with TIA standards-based recommendations, the manufacturer's recommendations/installation guides, and industry best practices.

C. The grounding conductor shall be a continuous wire and carried throughout the grounding system.

D. Non-conductive coatings (such as paint, lacquer, and enamel) on equipment to be grounded/bonded shall be removed from threads and other contacts surfaces to ensure good electrical continuity or be connected by means of fittings designed so as to make such removal unnecessary. Install all parts as specified by the manufacturer.

E. Do not daisy chain bonding conductors from device to device.

F. Bonding conductors should not be placed in ferrous metallic conduit. If it is necessary to place bonding conductors in ferrous metallic conduit of any length (conduit sleeves etc), provide grounding bushing at each end of the conduit and bond the grounding conductor to the bushing at each end of the conduit with a conductor sized as a No. 4 AWG, minimum and then ground these conduit sleeves to the cable tray at each side of the wall.

G. Bond metallic conduit entering communications handholes and building service rooms (Demarc).

H. Provide a grounding conductor from the ground bus at the service entrance to each telecommunication room as shown on the drawings.

I. Provide continuous grounding in the cable tray.

J. Bond the shield of shielded cables to the PBB or SBB in the telecommunications room.

K. Primary Bonding Busbar (PBB)

1. The Primary Bonding Busbar (PBB) serves as the dedicated extension of the building grounding electrode system for the telecommunications infrastructure. The PBB also serves as the central attachment point for telecommunications bonding backbones (TBB) and equipment and shall be located such that it is accessible to telecommunications personnel.
2. Bonding to a panelboard for telecommunications:

    a. Where a panelboard for telecommunications is located in the same room or space as the PBB, that panel board's Alternating Current Equipment Ground (ACEG) bus or the enclosure shall be bonded to the PBB.
    b. The PBB shall be as close to the panelboard for telecommunications as practicable and shall be installed to maintain clearances required by applicable electrical codes.

3. Connections to the PBB:

    a. The connections of the bonding conductor for telecommunications and the TBBs to the PBB shall utilize listed 2-hole compression connectors, UL listed connections, or equivalent.
    b. The connections of conductors for bonding telecommunications equipment to the PBB shall be 2-hole compression connectors.
    c. All metallic raceways for telecommunications cabling located within the same room or space as the PBB shall be bonded to the PBB.

L. Secondary Bonding Busbars (SBB)

1. The Secondary Bonding Busbar (SBB) is the common central point of connection for telecommunications systems and equipment in the location served by that telecommunications closet or equipment room.
2. Bonds to the SBB

    a. TBB's and other TEGB's within the same space shall be bonded to the SBB with a conductor as specified above.
    b. The bonding conductor between a TBB and SBB shall be continuous and routed in the shortest possible straight-line path.
    c. Where a panelboard for telecommunications is located within the same room or space as the SBB, that panel board's ACEG bus or the enclosure shall be bonded to the SBB.

d. Where a panelboard for telecommunications is not located within the same room or space as the SBB, consideration should be given to bonding the panel board's ACEG bus or the enclosure to the SBB.
e. The SBB shall be bonded to the TEBC as specified above.
f. All metallic raceways for telecommunications cabling located within the same room or space as the SBB shall be bonded to the SBB.

3. Connections to the SBB:

a. Connections of TBB's to the SBB shall utilize listed 2-hole compression connectors.

M. Connections to Ladder Tray:

1. Sections of Ladder Tray or Basket Tray installed in the telecommunications rooms must be bonded together and bonded to the PBB or SBB.

a. Tray hardware provided by the manufacturer specifically for bonding the sections together may be used.
b. Basket tray sections may be bonded using a minimum #6 conductor and grounding type split bolts. Tin-plated split bolts shall be used on galvanized steel basket tray to minimize corrosion.

2. Ladder tray sections may be bonded using a minimum #6 conductor and two-hole, long barrel, compression lugs. Paint shall be removed from the tray where the lugs are attached or thread forming screws may also be used.

N. Wall-Mount Busbars

1. Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions.
2. Conductor connections to the PBB or SBB shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
3. Each lug shall be attached with stainless steel hardware after preparing the bond per manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
4. The wall-mount busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

O. Rack-Mount Busbars and Ground Bars

1. When a rack or cabinet supports active equipment or any type of shielded cable or cable termination device requiring a bonded connection, add a rack-mount horizontal or vertical busbar or ground bar to the rack or cabinet. The rack-mount busbar or bonding bar provides multiple bonding points on the rack for rack and rack-mount equipment.
2. Attach rack-mount busbars and bonding bars to racks or cabinets per the manufacturer's installation instructions.
3. Bond the rack-mount busbar or bonding bar to the room's PBB or SBB with appropriately sized hardware and conductor.

P. Ground Terminal Block

1. Every rack and cabinet shall be bonded to the PBB or SBB.
2. Minimum bonding connection to racks and cabinets shall be made with a rack-mount two-hole ground terminal block sized to fit the conductor and rack and installed per manufacturer recommendations.
3. Remove paint between rack/cabinet and terminal block, clean surface and use antioxidant between the rack and the terminal block to help prevent corrosion at the bond.

Q. Pedestal Clamp

1. At minimum, bond every fourth raised access floor pedestal (not to exceed six) with a minimum #6 AWG conductor to the SBB or PBB using a pedestal clamp sized to fit the pedestal and the conductor and installed per the manufacturer's recommendations.
2. If pedestal clamps are used to construct a signal reference grid, bond the signal reference grid to the PBB or SBB and bond each rack and/or cabinet to the signal reference grid using a compression tap or similar non-reversible bonding component sized to fit both conductors.
3. Remove paint between the pedestal and pedestal clamp, clean surface and use antioxidant between the pedestal and the clamp to help prevent corrosion at the bond.
4. Remove insulation from conductors where wires attach to the pedestal clamp.

R. Pipe Clamp

1. Bond metal pipes located inside the technology room with a minimum #6 AWG conductor to the PBB or SBB using a pipe clamp sized to fit the pipe and the conductor and installed per the manufacturer's recommendations.
2. Remove paint between the pipe and pipe clamp, clean surface and use antioxidant between the pipe and the clamp to help prevent corrosion at the bond.
3. Remove insulation from conductors where wires attach to the pipe clamp.

S. Equipment Ground Jumper Kit

1. Bond equipment to a vertical rack-mount busbar or ground bar using ground jumper per the manufacturer's recommendations.
2. Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount busbar or ground bar to help prevent corrosion at the bond.

T. Provide a minimum of #6 AWG ground cable from the PBB or SBB to the following:

1. Each communication cabinet/rack
2. Each service entrance device
3. Telecommunications room ladder tray
4. Each security system
5. Any other communications systems provided by the Contractors.

3.2 LABELING

A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-C and ANSI/TIA-607-C and coordinate with the Engineer and Owner.

B. Cables shall be identified by a self-adhesive, wrap around label at both ends.

C. All labels shall be typed and printed. Handwritten labels will not be accepted.

D. Refer to specification section 270553 – Identification for Communications Systems for more information.

3.3 TESTING

A. Perform the following field quality control testing:

1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with the following requirements.
2. Test completed grounding system at each telecommunications bus bar is located. Measure ground resistance not less than two full days after the last trace of precipitation, and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by fall-of-potential method according to IEEE 81.
3. Provide drawings locating each grounding bus bar and ground attachment location. Describe measures taken to improve test results. Test results shall comply with the following minimum requirements.

    a. Equipment Rated 500 kVA and Less: 10 ohms.
    b. Manhole Grounds: 10 ohms.

4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify A/E promptly and include recommendations to reduce ground resistance.

END OF SECTION 270526

SECTION 270528 – PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes, but is not limited to:

1. Cable supports
2. Conduit sleeves
3. Cable ties
4. Innerduct

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. Provide supports, cable ties, conduit sleeves, and related equipment for the pathways for communications systems as described herein and indicated on the drawings.

B. Bridal rings, D-rings or similar devices are not acceptable.

1.3 QUALITY ASSURANCE

A. The Pathways for Communications Systems components and equipment shall be listed by Underwriters Laboratories, Inc., and the components shall bear the UL label.

B. The Pathways for Communications Systems shall be installed in accordance with all requirements set by all applicable standards, codes, and regulations including but not limited to the standards referenced in Section 270500 – Common Work Results for Communications.

C. All equipment and installation practices shall comply with the latest BICSI (TDMM) standards.

D. Installer shall employ or have a contract with a Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI).

E. Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician

2. Field Inspector: Currently registered by BICSI as an RCDD to perform the on-site inspection.

1.4 SUBMITTALS

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Submittals shall be submitted in electronic format (PDF).

1.5 WARRANTY

A. All components, parts, and assemblies of the Pathways for Communications Systems supplied by the installer shall be guaranteed against defects in materials and workmanship for a period of 2 years by the manufacturer and installer.

B. Warranties shall include all labor, material, travel expenses, test equipment, equipment rental and any other expense required to troubleshoot, remove, repair or replace equipment or components to bring the system up to the original performance criteria and operation.

C. Warranty services shall be provided by an installer certified by the equipment manufacturer during normal business hours.

D. Provide warranty certificate as part of the closeout documentation.

PART 2 - PRODUCTS

2.1 CABLE SUPPORTS

A. Provide cable supports that meet UL, NEC, and TIA/EIA requirements for communications cabling.

B. Cable supports shall:

1. Be prefabricated wide base hangers
2. Attach to the building structural elements or be wall mounted
3. Not use ceiling grid support wire or support rods.
4. Be rated to be installed in plenum spaces
5. Have a minimum of 2 inch wide platform for the cable to rest.
6. Have flared edges to prevent damage while installing cables
7. Have a cable retainer to provide containment of cables within the hanger. The cable retainer shall be removable and reusable
8. Be installed at staggered intervals no further than 60 inches
9. Allow no more than 6 inches slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.

10. Provide a support at each change in direction.
11. Cable supports shall not be painted after installation.

C. Do not exceed manufacturer's recommendations for the number of cables to support. Provide additional supports if required.

D. Approved manufacturers:

1. nVent CADDY
2. Panduit
3. CPI
4. Cooper B-Line
5. Garvin Industries

2.2 CONDUIT SLEEVES

A. The conduit sleeves indicated on the drawings shall be provided under Division 26. Where additional sleeves are required, this contractor shall provide conduit sleeves that meet the following requirements:

1. Minimum of 2 inch metal sleeve with plastic bushing at each end
2. Install sleeve so that it is a minimum of 6 inches above finished ceiling

B. Provide all fittings required for routing of conduit.

C. Provide firestop in all conduit sleeves.

2.3 CABLE HOOK AND LOOP FASTENERS

A. Provide cable hook and loop fasteners to neatly bundle the communications cabling. No more than 50 cables shall be installed in a single bundle.

B. Cable hook and loop fasteners shall:

1. Plenum rated when installed above ceiling
2. Be of appropriate size to bundle and secure the communications cabling

C. Approved manufacturers:

1. Panduit
2. Leviton
3. Belden
4. Hubbell

2.4 INDOOR INNERDUCT

A. Provide 1.0 inch I.D. plenum rated corrugated innerduct for all non-armored fiber optic cable above lay in ceilings.

B. Approved manufacturers:

1. Enduct Ribbed
2. Carlon
3. Pyramid Industries
4. Eastern

2.5 OUTDOOR INNERDUCT

A. Provide 1.0 inch I.D. non-plenum polyethylene-type, ribbed inside tube, innerduct in conduit as indicated on the drawings.

B. Provide multi-cell fabric innerduct where indicated on the drawings.

C. Approved manufacturers:

1. Enduct Ribbed
2. Carlon
3. Pyramid Industries
4. Eastern
5. Maxcell

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all components for the Pathways for Communications Systems as specified herein and as shown on the drawings.

B. The Pathways for Communications Systems shall be installed in accordance with TIA standards-based recommendations, the manufacturer’s recommendations/installation guides, and industry best practices.

C. Install cables using techniques, practices, and methods that are consistent with Category 6 or higher requirements and that supports Category 6 or higher performance of completed and linked signal paths, end to end.

D. Install cables without damaging conductors, shield, or jacket.

E. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer or by ANSI/TIA 568.

F. Pull cables without exceeding cable manufacturer’s recommended pulling tensions or outlined in ANSI/TIA 569-D. Use pulling means that will not damage media.

G. Do not exceed load ratings specified by manufacturer.

H. Follow manufacturer’s recommendations for allowable fill capacity for each size.

I. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.

J. Cable supports shall be independently supported from wires, rods or be independently secured to structure using approved anchors. In above ceiling applications these wires or rods shall be visually distinguishable, independent of the ceiling grid supports and be affixed at both ends to minimize movement.

K. Cables in exposed ceiling areas shall be installed in conduit from the device to the nearest accessible lay-in ceiling or the nearest telecommunication room. Refer to the Division 26 drawings for conduit being provided. The contractor shall coordinate the conduit routing with the Division 26 contractor to minimize the cable distances.

L. Any cables that are damaged or exceeding the recommended installation parameters during installation shall be replaced by the installer at no cost to the owner.

M. Any communications cabling that is painted shall be replaced at no cost to the owner.

N. Separation from EMI Sources:

1. Comply with recommendations from BICSI's TDMM and TIA-569-D for separating communications cable from potential EMI sources, including electrical power lines and equipment.

3.2 FIRESTOPPING

A. Comply with TIA-569-D, Annex A, "Firestopping."

B. Comply with "Firestopping Systems" Article in BISCI's TDMM.

END OF SECTION 270528

SECTION 270553 – IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes identification requirements for communication systems cabling, faceplates, and equipment.

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. Provide identifications for communications systems as described herein and shown on the drawings.

B. Provide identifications for electronic safety and security systems as described herein and shown on the drawings.

1.3 QUALITY ASSURANCE

A. The Identification for Communications Systems shall be installed in accordance with all requirements set by all applicable standards, codes, and regulations including but not limited to the standards referenced in Section 270500 – Common Work Results for Communications.

1.4 SUBMITTALS

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. The contractor must submit a labeling scheme to the Engineer for approval as part of the submittal documentation. The labeling scheme shall include all communications systems and electronic safety and security cabling, faceplates, and equipment. Labeling installed without the Engineers approval will be subject to removal.

C. Submittals shall be submitted in electronic format (PDF).

1.5 CLOSEOUT DOCUMENTATION

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Closeout documentation shall be submitted in electronic format (PDF).

PART 2 - PRODUCTS

2.1 SELF-ADHESIVE LABELS

A. Provide self-adhesive labels on all communications cabling, faceplates, patch panels, and equipment.

B. All labels shall be typed and printed. Handwritten labels will not be accepted.

C. Where used for cabling, label shall be a wraparound label that shall have a white printing area with a clear tail that self-adheres the printed area when wrapped around the cable.

D. Approved manufacturers:

1. Panduit
2. Belden
3. Brady
4. Brother
5. Dymo

2.2 ENGRAVED LABELS

A. Provide engraved labels on all communications cabinets and racks.

B. The engraved labels shall:

1. Be laminated phenolic with a black surface and white core.
2. Use 1/16” thick material for engraved labels up to 2 inches by 4 inches. For larger sizes use 1/8” thick material.
3. Lettering to be a standard style. Use ¼” minimum height letters.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all components for the Identification for Communications Systems as specified herein and as shown on the drawings.

B. The Identification for Communications Systems shall be installed in accordance with ANSI/TIA standards-based recommendations, the manufacturer’s recommendations/installation guides, and industry best practices.

C. Identify system components, wiring, and cabling complying with ANSI/TIA-606-C and coordinate with the Engineer and Owner.

D. Communications cabling identification shall:

1. Be identified by a self-adhesive, wrap around label at both ends. The cable label shall be applied to the cable behind the faceplate, on a section of cable that can be accessed by removing the cover plate.
2. Be located within 6” of the termination.

E. Faceplate identification shall:

1. Provide label on the outside of each face plate in the provided space behind clear plastic label holder.
2. Contain the MC/ER or TR termination designation as well as the unique identifier for each jack.

F. Patch panel/110 block identification shall:

1. Provide label for each patch panel/110 block port in the provided space behind clear plastic label holder.

G. Equipment cabinet and rack identification shall:

1. Provide engraved label for each equipment cabinet or rack.
2. Attach directly to the communications cabinet or rack with screws or other means approved by the Architect/Engineer.

H. Equipment identification shall:

1. Be labeled with a unique identifier using a self-adhesive label.
2. Be installed in a location that is visible upon inspection of the equipment.

I. Room jack designations shall begin at the main entry point of the room or space and be consecutively numbered around the room in a clockwise rotation.

J. Where existing labeling schemes are being maintained, utilize the owner’s specific identification scheme.

K. All labels shall be typed and printed. Hand written labels will not be accepted.

L. Labels shall reflect the Owner’s final room naming and numbering scheme, which may not match the construction drawing numbers.

M. All labels shall be coordinated and approved by the Owner’s representative prior to installation.

N. Refer to technology drawings for more information on labeling.

END OF SECTION 270553

SECTION 271313 – COMMUNICATIONS COPPER BACKBONE CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes, but is not limited to:

1. Indoor Category 3 backbone cabling
2. Outdoor Category 3 backbone cabling
3. Copper termination hardware
4. Installation and termination of all backbone cabling
5. Testing of all horizontal cabling

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. The Contractor shall provide, install, and test a complete communications copper backbone cabling system that shall provide interconnections between the Main Cross Connect/Equipment Room (MC/ER) and demarcation point to the Technology Rooms (TR's) or other buildings. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in the MC/ER or TR or at entrance facilities. Bridged taps and splitters shall not be used as part of the communications copper backbone cabling system.

1.3 QUALITY ASSURANCE

A. The Communications Copper Backbone Cabling System components and equipment shall be listed by Underwriters Laboratories, Inc., and the components shall bear the UL label.

B. The Communications Copper Backbone Cabling System shall be installed in accordance with all requirements set by all applicable standards, codes, and regulations including but not limited to the standards referenced in Section 270500 – Common Work Results.

C. All equipment and installation practices shall comply with the latest BICSI (TDMM) standards.

D. Installer shall employ or have a contract with a Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI).

E. Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician
2. Field Inspector: Currently registered by BICSI as an RCDD to perform the on-site inspection.

1.4 SUBMITTALS

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. The contractor must submit a labeling scheme to the Engineer for approval as part of the submittal documentation. The labeling scheme shall include the cable, faceplate, and patch panel identification. Labeling installed without the Engineers approval will be subject to removal.

C. Submittals shall be submitted in electronic format (PDF).

1.5 CLOSEOUT DOCUMENTATION

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Closeout documentation shall be submitted in electronic format (PDF).

1.6 WARRANTY

A. All components, parts, and assemblies of the Communications Copper Backbone Cabling System supplied by the installer shall be guaranteed against defects in materials and workmanship for a period of 20 years by the manufacturer and installer.

B. Warranties shall include all labor, material, travel expenses, test equipment, equipment rental and any other expense required to troubleshoot, remove, repair or replace equipment or components to bring the system up to the original performance criteria and operation.

C. Warranty services shall be provided by an installer certified by the equipment manufacturer during normal business hours.

D. Provide warranty certificate as part of the closeout documentation.

1.7 TRAINING

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Provide two (2) training hours for the Communications Copper Backbone Cabling System.

PART 2 - PRODUCTS

2.1 INDOOR CATEGORY 3 COPPER BACKBONE CABLING

A. The indoor copper backbone cable shall be a 100-ohm, multi-pair UTP, 24 AWG, solid bare CU, formed into 25-pair binder groups covered with a gray thermoplastic jacket.

B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 3 cables.

C. Provide the number of twisted pairs indicated on the drawings.

D. Conductors: 100-ohm, 24 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: Plenum.

G. Approved manufacturers:

	Belden	General	BerkTek	Superior Essex
25 Pair (Plenum)	DPLN25	2131505		18-499-36
50 Pair (Plenum)	DPLN50	2131757		18-599-36
100 Pair (Plenum)	DPLN100	N/A		18-799-36

2.2 OUTDOOR CATEGORY 3 COPPER BACKBONE CABLING

A. The outdoor copper backbone cable shall be a 100-ohm, multi-pair UTP, 24 AWG, solid bare CU, formed into 25-pair binder groups covered with a black thermoplastic jacket.

B. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and TIA-568-C.2 for Category 3 cables.

C. Provide the number of twisted pairs indicated on the drawings.

D. Conductors: 100-ohm, 24 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: OSP.

G. Approved manufacturers:

	Belden	General	BerkTek	Superior Essex
25 Pair (Non-Plenum)	N/A	7525785		09-097-02
50 Pair (Non-Plenum)	N/A	7525793		09-100-02
100 Pair (Non-Plenum)	N/A	7525819		09-104-02

2.3 COPPER TERMINATION HARDWARE

A. Provide copper patch panels as specified herein and indicated on the drawings.

1. The copper patch panels shall:

a. Be 24 or 48 port patch panels with RJ45 jacks with 110 connecting blocks for termination of the UTP backbone cabling as indicated on the drawings.
b. Patch panels shall meet or exceed the transmission performance for Category 5e as indicated in TIA-568-C.2.

2. Terminate each RJ45 jack with two (2) pairs of UTP wire. Verify wiring configuration prior to installation.
3. Approved manufacturers:

	Panduit	Ortronics	Belden	Leviton
24 port patch panel	DP245E88TGY	SP5EU24	AX104013	5G596-U24
48 port patch panel	DP485E88TGY	SP5EU48	AX104014	5G596-U48

B. Provide 110 copper wiring block kit as specified herein and indicated on the drawings.

1. The 110 copper wiring block shall:

a. Be 100-pair or 300-pair with C-5 or C-4 connection blocks for termination of the UTP backbone cabling as indicated on the drawings.
b. Be wall mounted or rack mounted as indicated on drawings.

2. Approved manufacturers:

	Panduit	Ortronics	Belden	Leviton
100pr 110 frame	P110BW100-X	110ABC5E100	AX100693-S	41AB2-1FX
300pr 110 frame	P110BW300-X	110ABC5E300	AX100695-S	41AB2-3FX

2.4 PATCH CABLES

A. Provide factory made, four-pair patch cables terminated with an eight-position modular plug at each end for each horizontal cable run indicated on the drawings.

1. Provide 7 foot patch cables for each RJ45 jack at the patch panel end.

B. Patch cables shall be Category 5e.

C. Approved manufacturers:

1. Panduit
2. Leviton
3. Belden
4. Ortronics

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all components for the communications copper backbone cabling system as specified herein and as shown on the drawings.

B. The communications copper backbone cabling system shall be installed in accordance with ANSI/TIA standards-based recommendations, the manufacturer’s recommendations/installation guides, and industry best practices.

C. The communications copper backbone cabling system shall be installed using a star topology, extending from the MC/ER to the TR’s.

D. Outdoor rated communications copper backbone cabling shall be used in all underground conduits.

E. All outdoor cable shall have service entrance protection for the cable as it enters the building.

F. Cables shall be installed in continuous lengths from origin to destination.

G. Where cables are installed in an air return plenum, any non-plenum cable shall not be installed.

H. Contractor shall coordinate the location of termination hardware and cabling with service entrance providers for incoming services.

I. Provide a 25 foot service loop at each TR, a 25 foot service loop for each cable in the MC/ER, and a 25 foot service loop in each manhole.

J. All service loops shall be properly supported.

K. Cables shall not be attached to ceiling grid or lighting fixture wires. Do not use cable ties or hook-and-loop tape to secure cable runs to other building systems such as electrical conduit, Electric Metallic Tube (EMT), sprinkler pipes, ceiling suspension members.

L. Where support for backbone cable is required, the installer shall install appropriate carriers to support the cabling.

M. Any cables that are damaged or exceeding the recommended installation parameters during installation shall be replaced by the installer at no cost to the owner.

N. Any cabling that is painted shall be replaced at no cost to the owner.

O. General installation requirements for cabling:

1. Comply with TIA-568.1-D and TIA-568.2-D.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
6. Bundle and lace conductors to terminal points without exceeding manufacturer's limitations on bending radius, but not less than the radius specified in BICSI TDMM. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

P. Separation from EMI Sources:

1. Comply with recommendations from BICSI's TDMM and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in non-metallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2kVA: A minimum of (5”) five inches.
    b. Electrical Equipment Rating between 2 and 5kVA: A minimum of (12”) twelve inches.
    c. Electrical Equipment Rating More Than 5kVA: A minimum of (24”) twenty-four inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating less than 2KVA: A minimum of (2-1/2”) two and one-half inches.
    b. Electrical Equipment Rating between 2 and 5KVA: A minimum of (6”) six inches.
    c. Electrical Equipment Rating More Than 5KVA: A minimum of (12”) twelve inches.

4. Separation between Communications Cables and Fluorescent Fixtures: A minimum of (5”) five inches.

3.2 LABELING

A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-C and coordinate with the Engineer and Owner.

B. Cables shall be identified by a self-adhesive, wrap around label at both ends. The cable label shall be applied to the cable behind the faceplate, on a section of cable that can be accessed by removing the cover plate.

C. Provide label for each patch panel port in the provided space behind plastic label holder.

D. All labels shall be typed and printed. Handwritten labels will not be accepted.

E. Refer to technology drawings for more information on labeling.

F. Refer to specification section 270553 – Identification for Communications Systems for more information.

3.3 FIRESTOPPING

A. Comply with TIA-569-D, Annex A, "Firestopping."

B. Comply with "Firestopping Systems" Article in BISCI's TDMM.

3.4 TESTING

A. Perform tests and inspections for all the installed communications copper backbone cabling system.

B. Tests and Inspections:

1. Visually inspect twisted pair cabling jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-D series standards.

2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test each backbone cable run, patch panel, and patch cable to verify the performance of the warranty for the backbone cabling systems as defined in ANSI/TIA-1152-A.

    a. Test UTP copper backbone cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
    b. All test results shall meet or exceed the latest ANSI/TIA-568-D series performance standards for the category of cabling tested.

C. Installer shall configure the tester for the cable and connectors used in the installation. Generic test parameters will not be accepted.

D. Installer shall confirm the tester being used has been factory calibrated within the previous 12 months and that they are using the latest factory software. This information shall be provided with the testing results.

E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

F. End-to-end cabling will be considered defective if it does not pass tests and inspections.

G. Provide final test results in PDF format. No special software shall be required to review the test results.

END OF SECTION 271313

SECTION 271513 – COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes, but is not limited to:

1. Category 5e horizontal cabling
2. Category 6 horizontal cabling
3. Category 6A horizontal cabling
4. Faceplates and connectors/modular jacks
5. Horizontal cabling patch panels.
6. Patch cables.
7. Installation and termination of all horizontal cabling
8. Testing of all horizontal cabling

B. Related sections include the following:

1. Division 26 – Electrical
2. Division 27 – Communications
3. Division 28 – Electronic safety and security

1.2 DESCRIPTION OF WORK

A. The Contractor shall provide, install, and test a complete communications copper horizontal cabling system that shall provide interconnections between Main Cross Connect/Equipment Room (MC/ER) or Technology Rooms (TR's), and the telecommunications outlet. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, patch panels, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

1. Bridged taps and splices shall not be installed in the horizontal cabling.

B. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment or in the horizontal cross-connect.

1.3 QUALITY ASSURANCE

A. The Communications Copper Horizontal Cabling System components and equipment shall be listed by Underwriters Laboratories, Inc., and the components shall bear the UL label.

B. The Communications Copper Horizontal Cabling System shall be installed in accordance with all requirements set by all applicable standards, codes, and regulations including but not limited to the standards referenced in Section 270500 – Common Work Results for Communications.

C. All equipment and installation practices shall comply with the latest BICSI (TDMM) standards.

D. Installer shall employ or have a contract with a Registered Communications Distribution Designer (RCDD) registered with the Building Industries Consulting Services International (BICSI).

E. Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Technician
2. Field Inspector: Currently registered by BICSI as an RCDD to perform the on-site inspection.

1.4 SUBMITTALS

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. The contractor must submit a labeling scheme to the Engineer for approval as part of the submittal documentation. The labeling scheme shall include the cable, faceplate, and patch panel identification. Labeling installed without the Engineers approval will be subject to removal.

C. Submittals shall be submitted in electronic format (PDF).

1.5 CLOSEOUT DOCUMENTATION

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Closeout documentation shall be submitted in electronic format (PDF).

1.6 WARRANTY

A. All components, parts, and assemblies of the Communications Copper Horizontal Cabling System supplied by the installer shall be guaranteed against defects in materials and workmanship for a period of 20 years by the manufacturer and installer.

B. Warranties shall include all labor, material, travel expenses, test equipment, equipment rental and any other expense required to troubleshoot, remove, repair or replace equipment or components to bring the system up to the original performance criteria and operation.

C. Warranty services shall be provided by an installer certified by the equipment manufacturer during normal business hours.

D. Provide warranty certificate as part of the closeout documentation.

1.7 TRAINING

A. Refer to Section 270500 – Common Work Results for Communications for more information.

B. Provide four (4) training hours for the Communications Copper Horizontal Cabling System.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Communications copper horizontal cabling system cabling and connectivity component manufacturers shall work in agreement to provide a complete channel solution. The solution shall be warranted as indicated herein.

2.2 CATEGORY 5e COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 24 AWG, solid bare CU, FEP insulation for all 4 pairs.

B. Cable shall be certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.

C. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and ANSI/TIA-568.2-D for Category 5e cables.

D. Conductors: 100-ohm, 24 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: Plenum.

G. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

H. Approved manufacturers:

1. Belden – 1213
2. General – 6131690
3. Superior Essex - 52-241-28
4. BerkTek – Hyper+5e CMP
5. Mohawk 5eLAN
6. Hubbell – C5ERPB

2.3 OUTDOOR CATEGORY 5e COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 24 AWG, solid bare CU, insulation for all 4 pairs.

B. Cable shall be certified to meet transmission characteristics of Category 5e cable at frequencies up to 100 MHz.

C. Standard: Comply with ICEA S-90-661, NEMA WC 63.1, and ANSI/TIA-568.2-D for Category 5e cables.

D. Conductors: 100-ohm, 24 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: OSP.

G. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

H. Approved manufacturers:

1. Belden – 7997A
2. General – 5136100
3. Superior Essex - 04-001-58
4. BerkTek –
5. Mohawk-M58790

2.4 CATEGORY 6 COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 23 AWG, solid bare CU, FEP insulation for all 4 pairs.

B. Cable shall be certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and ANSI/TIA-568.2-D for Category 6 cables.

D. Conductors: 100-ohm, 23 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: Plenum.

G. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

H. Approved manufacturers:

1. Belden – 2413
2. General – 7131900
3. Superior Essex - 66-240-xB, x = color
4. BerkTek – LANmark-1000
5. Mohawk AdvancNet
6. Hubbell – HC6RPEx, x = color

2.5 OUTDOOR CATEGORY 6 COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 23 AWG, solid bare CU, insulation for all 4 pairs.

B. Cable shall be certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and ANSI/TIA-568.2-D for Category 6 cables.

D. Conductors: 100-ohm, 23 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: OSP.

G. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

H. Approved manufacturers:

1. Belden – OSP6U
2. General – 7136100
3. Superior Essex - 04-001-68
4. BerkTek –
5. Mohawk M57622
6. Hubbell – NextSpeed OSP Cat 6

2.6 CATEGORY 6A COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 23 AWG, solid bare CU, FEP insulation for all 4 pairs.

B. Cable shall be certified to meet transmission characteristics of Category 6A cable at frequencies up to 500 MHz.

C. Standard: Comply with ANSI/TIA-568.2-D for Category 6a cables.

D. Conductors: 100-ohm, 23 AWG solid copper.

E. Shielding/Screening: Unshielded twisted pairs (UTP).

F. Cable Rating: Plenum.

G. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

H. Approved manufacturers:

1. Belden – 10GXW13 D151000
2. General – GenSPEED 10 - 7141819
3. Superior Essex - 6A-272-xB, x = color
4. BerkTek – LANmark-10G2
5. Mohawk- GigaLan 10
6. Hubbell – C6ASPDSx x = color

2.7 OUTDOOR CATEGORY 6A COPPER HORIZONTAL CABLING

A. The copper horizontal cable shall be four unshielded twisted pair (UTP), 23 AWG, solid bare CU, insulation for all 4 pairs.

A. Cable shall be certified to meet transmission characteristics of Category 6A cable at frequencies up to 500 MHz.

B. Standard: Comply with ANSI/TIA-568.2-D for Category 6a cables.

C. Conductors: 100-ohm, 23 AWG solid copper.

D. Shielding/Screening: Unshielded twisted pairs (UTP).

E. Cable Rating: OSP.

F. Pair twisting shall be maintained to meet the cable performance but, maximum category cable untwisting allowed is one half (1/2) inch, cable diameter .2-inch.

G. Approved manufacturers:

1. Belden – OSP6AU
2. General – 8136100
3. Superior Essex - 04-001-A4
4. BerkTek –
5. Mohawk-M59198

2.8 MODULAR DATA JACK

A. The modular data jack shall be a flush mounted RJ-45 jack to fit into a modular faceplate installed in a one or two gang junction box, surface mounted raceway, or floorboxes.

B. General Requirements for Twisted Pair Cable Hardware:

1. Comply with the performance requirements of [**Category 5e**] [**Category 6**] [**Category 6a**]. **SPEC WRITTER NOTE: VERIFY WITH OWNER PRIOR TO SPECIFYING**
2. Comply with ANSI/TIA-568.2-D, IDC type, with modules designed for punch-down caps or lacing tools.
3. Cables shall be terminated with connecting hardware of same category or higher.

C. Approved manufacturers:

	Panduit	Leviton	Belden	Ortronics	Hubell
Category 5E	NKP5E88Mxx	5G110-R*5	AX101309	KT2J5E-xx	NSJ5Exx
Category 6	NK688Mxx	61110-R*6	AX101320	KT2J6-xx	NSJ6xx
Category 6A	NK6X88Mxx	6110G-R*6	RVAMJKUxx	KT2J6A-xx	HJU6Axx

2.9 MODULAR FACEPLATE

A. The modular faceplate shall be a single or double gang flush mounted faceplate as indicated on the drawings.

B. Modular faceplate shall fit standard NEMA openings.

C. Provide blank inserts for all unused openings in the modular faceplates.

D. Color of the modular faceplate shall be Office White or as selected by the Engineer. Confirm color in submittals prior to purchasing.

E. Approved manufacturers:

1. Panduit – CBE series
2. Leviton – Multimedia Outlet System (MOS) series
3. Belden – MediaFlex
4. Ortronics – KSFPx series
5. Hubbell – iStation series

2.10 MODULAR PATCH PANELS

A. Provide 24 or 48 modular port flat patch panels for termination of the UTP cabling as indicated on the drawings.

B. Provide 24 modular data jacks for each 24 port patch panels and 48 modular jacks for each 48 port patch panel.

A. General Requirements for Modular Patch Panels:

1. Comply with the performance requirements of [**Category 5e**] [**Category 6**] [**Category 6a**]. **SPEC WRITTER NOTE: VERIFY WITH OWNER PRIOR TO SPECIFYING**
2. Comply with ANSI/TIA-568.2-D, IDC type, with modules designed for punch-down caps or tools.
3. Cables shall be terminated with connecting hardware of same category or higher.

B. Approved manufacturers:

	Panduit	Leviton	Belden	Ortronics	Hubbell
24 port	NKPP24FMY	49255-H24	AX103114	SPKFU24	NSPJ24
48 port	NKPP48FMY	49255-H48	AX103115	SPKFU48	NSPJ48

2.11 PATCH CABLES

A. Provide factory made, four-pair patch cables terminated with an eight-position modular plug at each end for each horizontal cable run indicated on the drawings.

1. Provide 10 foot patch cable for each horizontal cable run at each telecommunications outlet end.
2. Provide 50% 3 foot patch cables, 30% 5 foot patch cables, and 20% 7 foot patch cables for each horizontal cable run at the patch panel end.

B. Patch cable shall be the same category of the horizontal cabling run.

C. Approved manufacturers:

1. Panduit
2. Leviton
3. Belden
4. Ortronics
5. Hubbell

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all components for the communications copper horizontal cabling system as specified herein and as shown on the drawings.

B. The communications copper horizontal cabling system shall be installed in accordance with TIA standards-based recommendations, the manufacturer’s recommendations/installation guides, and industry best practices.

C. The communications copper horizontal cabling system shall be installed using a star topology, extending from the TR or MC/ER to individual telecommunications outlets.

D. The installer shall install the communications copper horizontal cabling so that the maximum cable length is 295 feet. It is the installers responsibility to ensure that each cable run falls within the required parameters.

E. Refer to Section 270500 – Common Work Results for Communications for more information on colors of modular data jacks, cabling, and patch panels.

F. Terminate the modular data jacks per the manufacturer's recommendations. Cabling shall be terminated to the modular RJ-45 jacks in the faceplate and the patch panels as indicated in ANSI/TIA-568 wiring configuration T568B.

1. Wiring Color Scheme:

Wire Pair	Color	8-Position T568B
1 Tip	White - Blue	5
1 Ring	Blue	4
2 Tip	White - Orange	1
2 Ring	Orange	2
3 Tip	White - Green	3
3 Ring	Green	6
4 Tip	White - Brown	7
4 Ring	Brown	8

G. Outdoor rated communications copper horizontal cabling shall be used in all underground conduits. Installer shall provide entrance protection for the cable as it enters the building.

H. The pulling tension of any communications copper horizontal cable shall not exceed 25 lbf.

I. Cables shall be installed so that there are no bends smaller than 4 times the OD of the cable at any point in the run or at the termination points.

J. Cables shall be installed in continuous lengths from origin to destination.

K. Where cables are installed in an air return plenum, any non-plenum cable shall not be installed.

L. Provide a 3 foot service loop at each jack location and a 15 foot service loop for each cable in the TR or MC/ER.

M. All service loops shall be properly supported.

N. Cables shall not be attached to ceiling grid or lighting fixture wires. Do not use cable ties or hook-and-loop tape to secure cable runs to other building systems such as electrical conduit, Electric Metallic Tube (EMT), sprinkler pipes, ceiling suspension members.

O. Where support for horizontal cable is required, the installer shall install appropriate carriers to support the cabling.

P. Any cables that are damaged or exceeding the recommended installation parameters during installation shall be replaced by the installer at no cost to the owner.

Q. Any cabling that is painted shall be replaced at no cost to the owner.

R. General installation requirements for cabling:

1. Comply with TIA-568.1-D and TIA-568.2-D.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
4. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
7. Bundle and lace conductors to terminal points without exceeding manufacturer's limitations on bending radius, but not less than the radius specified in BICSI TDMM. Use lacing bars and distribution spools.
8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

S. Separation from EMI Sources:

1. Comply with recommendations from BICSI's TDMM and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in non-metallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2kVA: A minimum of (5”) five inches.
    b. Electrical Equipment Rating between 2 and 5kVA: A minimum of (12”) twelve inches.
    c. Electrical Equipment Rating More Than 5kVA: A minimum of (24”) twenty-four inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

a. Electrical Equipment Rating less than 2KVA: A minimum of (2-1/2”) two and one-half inches.
b. Electrical Equipment Rating between 2 and 5KVA: A minimum of (6”) six inches.
c. Electrical Equipment Rating More Than 5KVA: A minimum of (12”) twelve inches.

4. Separation between Communications Cables and Fluorescent Fixtures: A minimum of (5”) five inches.

3.2 ADDITIONAL CABLING

A. Provide the following additional communications copper horizontal cabling runs:

1. Provide ten (10) additional 200 foot communications copper horizontal cabling cables. Include jacks at both ends, labeling, and testing. The additional drops are to be installed as directed by the Engineer.

3.3 LABELING

A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-C and coordinate with the Engineer and Owner.

B. Cables shall be identified by a self-adhesive, wrap around label at both ends. The cable label shall be applied to the cable behind the faceplate, on a section of cable that can be accessed by removing the cover plate.

C. Provide label on the outside of each face plate in the provided space behind plastic label holder.

D. Provide label for each patch panel port in the provided space behind plastic label holder.

E. All labels shall be typed and printed. Handwritten labels will not be accepted.

F. Refer to technology drawings for more information on labeling.

G. Refer to specification section 270553 – Identification for Communications Systems for more information.

3.4 FIRESTOPPING

A. Comply with TIA-569-D, Annex A, "Firestopping."

B. Comply with "Firestopping Systems" Article in BISCI's TDMM.

3.5 TESTING

A. Perform tests and inspections for all the installed communications copper horizontal cabling system.

B. Tests and Inspections:

1. Visually inspect twisted pair cabling jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments and inspect cabling connections for compliance with ANSI/TIA-568-D series standards.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test each horizontal cable run, patch panel, and patch cable to verify the performance of the channel warranty for the horizontal cabling systems as defined in ANSI/TIA-1152-A.

    a. Each horizontal cable run shall be tested for length, continuity, insertion loss, return loss, PSNEXT, PSACR-N, and PSACR-F.
    b. All test results shall meet or exceed the latest ANSI/TIA-568-D series performance standards for the category of cabling tested.

C. Installer shall configure the tester for the cable and connectors used in the installation. Generic test parameters will not be accepted.

D. Installer shall confirm the tester being used has been factory calibrated within the previous 12 months and that they are using the latest factory software. This information shall be provided with the testing results.

E. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

F. End-to-end cabling will be considered defective if it does not pass tests and inspections.

G. Provide final test results in PDF format. No special software shall be required to review the test results.

END OF SECTION 271513

SECTION 280528 - PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetallic conduits, tubing, and fittings.
3. Optical-fiber-cable pathways and fittings.
4. Surface pathways.
5. Boxes, enclosures, and cabinets.
6. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
2. Section 270528 "Pathways for Communications Systems" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving communications systems.

1.2 ACTION SUBMITTALS

A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For pathway racks, enclosures, cabinets, and equipment racks and their mounting provisions, including those for internal components, from manufacturer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. ARC: Comply with ANSI C80.5 and UL 6A.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. FMC: Comply with UL 1; zinc-coated steel or aluminum.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Fittings for EMT:

a. Material: Steel or die cast.
b. Type: Setscrew or compression.

2. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.

G. Joint Compound for GRC or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. General Requirements for Nonmetallic Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

B. ENT: Comply with NEMA TC 13 and UL 1653.

C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. Continuous HDPE: Comply with UL 651B.

E. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

F. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

A. Description: Comply with UL 2024; flexible-type pathway, approved for general-use installation unless otherwise indicated.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

2.4 SURFACE PATHWAYS

A. General Requirements for Surface Pathways:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

B. Surface Metal Pathways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish.

C. Surface Nonmetallic Pathways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL-94 V-0 requirements for self-extinguishing characteristics.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-B.
2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.

B. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.

D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

E. Metal Floor Boxes:

1. Material: Cast or sheet metal.
2. Type: Fully adjustable
3. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Nonmetallic Floor Boxes: Nonadjustable, rectangular.

1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep)

J. Gangable boxes are prohibited.

K. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic or fiberglass
3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

M. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND CABLING

A. General Requirements for Handholes and Boxes:

1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Comply with TIA-569-B.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "TELECOM."

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Outdoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed Conduit: RNC, Type EPC-40-PVC.
2. Concealed Conduit, Aboveground: EMT.
3. Underground Conduit: RNC, Type EPC-40-PVC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric-Solenoid, or Motor-Driven Equipment): FMC maximum of 6’.
6. Damp or Wet Locations: GRC.
7. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, communications-cable pathway.
8. Pathways for Optical-Fiber or Communications-Cable Risers in Vertical Shafts: Riser-type, communications-cable pathway.
9. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: General-use, communications-cable pathway or EMT.
10. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

C. Minimum Pathway Size: 3/4-inch (21-mm) trade size. Minimum size for optical-fiber cables is 1 inch (27 mm).

D. Pathway Fittings: Compatible with pathways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Install surface pathways only where indicated on Drawings.

G. Do not install nonmetallic conduit where ambient temperature exceeds **120 deg F (49 deg C)**.

3.2 INSTALLATION

A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

B. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

D. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications wiring conduits for which only two 90-degree bends are allowed. Support within 12 inches (300 mm) of changes in direction.

E. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

F. Pathways Embedded in Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot (3-m) intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
3. Arrange pathways to keep a minimum of **1 inch (25 mm)** of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

G. Stub-ups to Above Recessed Ceilings:

1. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

H. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

I. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.

J. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to conduit assembly to assure a continuous ground path.

L. Spare Pathways: Install pull wires in empty pathways. Cap underground pathways designated as spare above grade alongside pathways in use.

M. Surface Pathways:

1. Install surface pathway for surface electrical outlet boxes only where indicated on Drawings.

N. Pathways for Optical-Fiber and Communications Cable: Install pathways as follows:

1. 3/4-Inch (21-mm) Trade Size and Smaller: Install pathways in maximum lengths of 50 feet (15 m).
2. 1-Inch (27-mm) Trade Size and Larger: Install pathways in maximum lengths of 75 feet (23 m).
3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements.

O. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound.

P. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service pathway enters a building or structure.
3. Where otherwise required by NFPA 70.

Q. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

a. Outdoor Locations Not Exposed to Direct Sunlight: **125 deg F (70 deg C)** temperature change.
b. Outdoor Locations Exposed to Direct Sunlight: **155 deg F (86 deg C)** temperature change.
c. Indoor Spaces Connected with Outdoors without Physical Separation: **125 deg F (70 deg C)** temperature change.
d. Attics: **135 deg F (75 deg C)** temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

R. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

S. Mount boxes at heights indicated on Drawings according to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.

T. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

5. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

C. Install handholes with bottom below frost line, 3’ below grade.

D. Field cut openings for conduits according to enclosure manufacturer's written instructions.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electronic Safety and Security Pathways and Cabling."

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

END OF SECTION

SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized-steel sheet.

2. Minimum Metal Thickness:

   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
   1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
   2. Pressure Plates: Stainless steel.
   3. Connecting Bolts and Nuts: **Stainless steel** of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

   1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

B. Silicone Foams: Multicomponent, silicone-based, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

   a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide **1/4-inch (6.4-mm)** annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed **or unless seismic criteria require different clearance**.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors **2 inches (50 mm)** above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using **steel** pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Heat detectors.
5. Notification appliances.
6. Magnetic door holders.
7. Remote annunciator.
8. Addressable interface device.
9. Digital alarm communicator transmitter.

B. Related Requirements:

1. Section 280513 "Conductors and Cables for Electronic Safety and Security" for cables and conductors for fire-alarm systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including furnished options and accessories.

B. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
2. Include plans, elevations, sections, details, and attachments to other work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. Detail assembly and support requirements.
5. Include voltage drop calculations for notification-appliance circuits.
6. Include battery-size calculations.
7. Include input/output matrix.
8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
9. Include performance parameters and installation details for each detector.
10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

11. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.

    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    b. Show field wiring required for HVAC unit shutdown on alarm.
    c. Locate detectors according to manufacturer's written recommendations.

12. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:

    a. Trained and certified by manufacturer in fire-alarm system design.
    b. NICET-certified, fire-alarm technician; Level IV minimum.
    c. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

C. Field quality-control reports.

D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:

a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
c. Complete wiring diagrams showing connections between all devices and equipment.
d. Riser diagram.
e. Record copy of site-specific software.
f. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:

1) Equipment tested.
2) Frequency of testing of installed components.
3) Frequency of inspection of installed components.
4) Requirements and recommendations related to results of maintenance.
5) Manufacturer's user training manuals.

g. Manufacturer's required maintenance related to system warranty requirements.
h. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.

C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

E. NFPA Certification: Obtain certification according to NFPA 72 in the form of a placard by an FM Global-approved alarm company.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.

C. Automatic sensitivity control of certain smoke detectors.

D. All components provided shall be listed for use with the selected system.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices **and systems**:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Automatic sprinkler system water flow.
6. Fire-extinguishing system operation.
7. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.

2. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Close smoke dampers in air ducts of designated air-conditioning duct systems.
8. Activate emergency lighting control.
9. Activate emergency shutoffs for gas and fuel supplies.
10. Record events in the system memory.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, or remote annunciator.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.
2. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

2.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.4 FIRE-ALARM CONTROL UNIT

A. Manufacturers:
1. Honeywell
2. Siemens
3. Kiddie

B. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.

C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:

1. Pathway Class Designations: NFPA 72, Class B.
2. Pathway Survivability: Level 1.

E. Notification-Appliance Circuit:

1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

G. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

H. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, [**supervisory signals**] [**supervisory and digital alarm communicator transmitters**] [**and**] [**digital alarm radio transmitters**] shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

I. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

2.5 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Dual-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

2.6 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be two-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.

    a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
    b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
    c. Multiple levels of detection sensitivity for each sensor.
    d. Sensitivity levels based on time of day.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.
    d. Present sensitivity selected.
    e. Sensor range (normal, dirty, etc.).

3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 CARBON MONOXIDE DETECTORS

A. General: Carbon monoxide detector listed for connection to fire-alarm system.

1. Mounting: Adapter plate for outlet box mounting.
2. Testable by introducing test carbon monoxide into the sensing cell.
3. Detector shall provide alarm contacts and trouble contacts.
4. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
5. Comply with UL 2075.
6. Locate, mount, and wire according to manufacturer's written instructions.
7. Provide means for addressable connection to fire-alarm system.
8. Test button simulates an alarm condition.

2.8 NONSYSTEM SMOKE DETECTORS

A. General Requirements for Nonsystem Smoke Detectors:

1. Nonsystem smoke detectors shall be listed as compatible with the fire-alarm equipment installed or shall have a contact closure interface listed for the connected load.
2. Nonsystem smoke detectors shall meet the monitoring for integrity requirements in NFPA 72.

2.9 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

1. Temperature sensors shall test for and communicate the sensitivity range of the device.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature or a rate of rise.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature.

1. Mounting: [**Adapter plate for outlet box mounting**] [**Twist-lock base interchangeable with smoke-detector bases**].
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.10 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Chimes: Vibrating type.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464.

D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Mounting: Wall mounted unless otherwise indicated.
2. Flashing shall be in a temporal pattern, synchronized with other units.
3. Strobe Leads: Factory connected to screw terminals.
4. Mounting Faceplate: Factory finished, white.

2.11 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnets: Require no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: 24-V ac or dc.
4. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

2.12 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.13 ADDRESSABLE INTERFACE DEVICE

A. General:

1. Include address-setting means on the module.

2. Store an internal identifying code for control panel use to identify the module type.
3. Listed for controlling HVAC fan motor controllers.

B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

C. Integral Relay: Capable of providing a direct signal **to circuit-breaker shunt trip for power shutdown**]

1. Allow the control panel to switch the relay contacts on command.
2. Have a minimum of two normally open and two normally closed contacts available for field wiring.

D. Control Module:

1. Operate notification devices.
2. Operate solenoids for use in sprinkler service.

2.14 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture [**one**] [**two**] telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply.
5. Loss of power.
6. Low battery.

7. Abnormal test signal.
8. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

C. Equipment Mounting: Install fire-alarm control unit on finished floor.

1. Comply with requirements for seismic-restraint devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."

D. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.

1. Comply with requirements for seismic-restraint devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."

E. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
2. Mount manual fire-alarm box on a background of a contrasting color.
3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.

F. Smoke- or Heat-Detector Spacing: Comply with NFPA 72.

G. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.

H. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.

I. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.

J. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

K. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

L. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.

M. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.2 PATHWAYS

A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.

B. Pathways shall be installed in EMT.

C. Exposed EMT shall be painted red enamel.

3.3 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Smoke dampers in air ducts of designated HVAC duct systems.
2. Magnetically held-open doors.
3. Electronically locked doors and access gates.
4. Alarm-initiating connection to elevator recall system and components.
5. Alarm-initiating connection to activate emergency lighting control.

6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
7. Supervisory connections at valve supervisory switches.
8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
9. Supervisory connections at elevator shunt-trip breaker.
10. Supervisory connections at fire-extinguisher locations.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by authorities having jurisdiction.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visual Inspection: Conduct visual inspection prior to testing.
    a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
    b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72

and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION

The Riviera Club
Aquatics Center

2021-178.RVI
5640 N Illinois St
Indianapolis, IN 46208

THE RIVIERA CLUB
EST. 1933

12.05.2022

2021-178.RVI

SHEETS ADDED BY ADDENDUM:

ADDENDUM NO. 1
S-402
P901
P902
P903
E101

ADDENDUM NO. 2
S-414
AF1B1

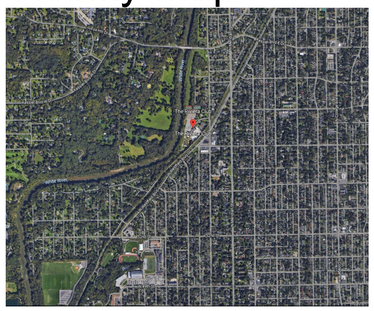
SHEET INDEX

General Notes

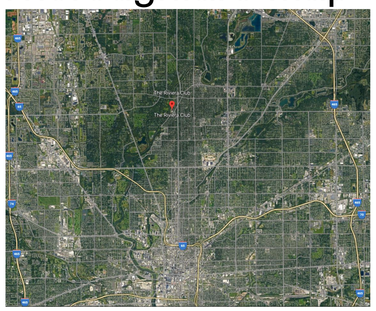
Nothing set forth in these Drawings shall release any Contractor from responsibility to provide appropriate quantities, field measurements, dimensional stability, installation, anchorage and coordination with other trades, or waive the Contractor's responsibility to identify and resolve deviations from the requirements of the Contract Documents, or waive the Contractor's responsibility to alert the Architect to errors or omissions contained therein.
Each Contractor shall verify in the field all existing applicable conditions and dimensions shown on the Drawings and as pertinent to the intent of these Drawings. Any discrepancy discovered shall be brought to the attention of the Architect prior to the commencement of any Work affected by, or related to, such discrepancy.
Each Contractor shall be responsible for all costs associated with, or caused by failure to comply with requirements.
Each Contractor shall review in advance all portions of the Work to verify that the Work will not prohibit completion of the Project as intended in these Contract Documents. Any questions shall be promptly referred to the Architect for resolution.

Each Contractor shall refer to the Project Manual for cleaning and disposal requirements.
Each Contractor shall be responsible for the protection of all surfaces and finishes at interior and exterior of building. Damaged surfaces and finishes resulting from the performance of the Work shall be repaired at no cost to the Owner by the responsible Contractor to match existing to the satisfaction of the Owner.
Each Contractor shall coordinate respective cutting and patching Work with the other Prime Contracts.
Each Contractor shall become completely familiar with all aspects of the Work, even those areas designated to be provided by others. This familiarization includes full and complete understanding of the Work described on all Sheets of the Drawings and in all Sections of the Project Manual. Failure by the Contractor to become completely familiar and cognizant of all aspects of the Work shall not relieve the Contractor of the responsibility to provide materials, assemblies, or services indicated in the Contract Documents.

Vicinity Map



Thoroughfare Map



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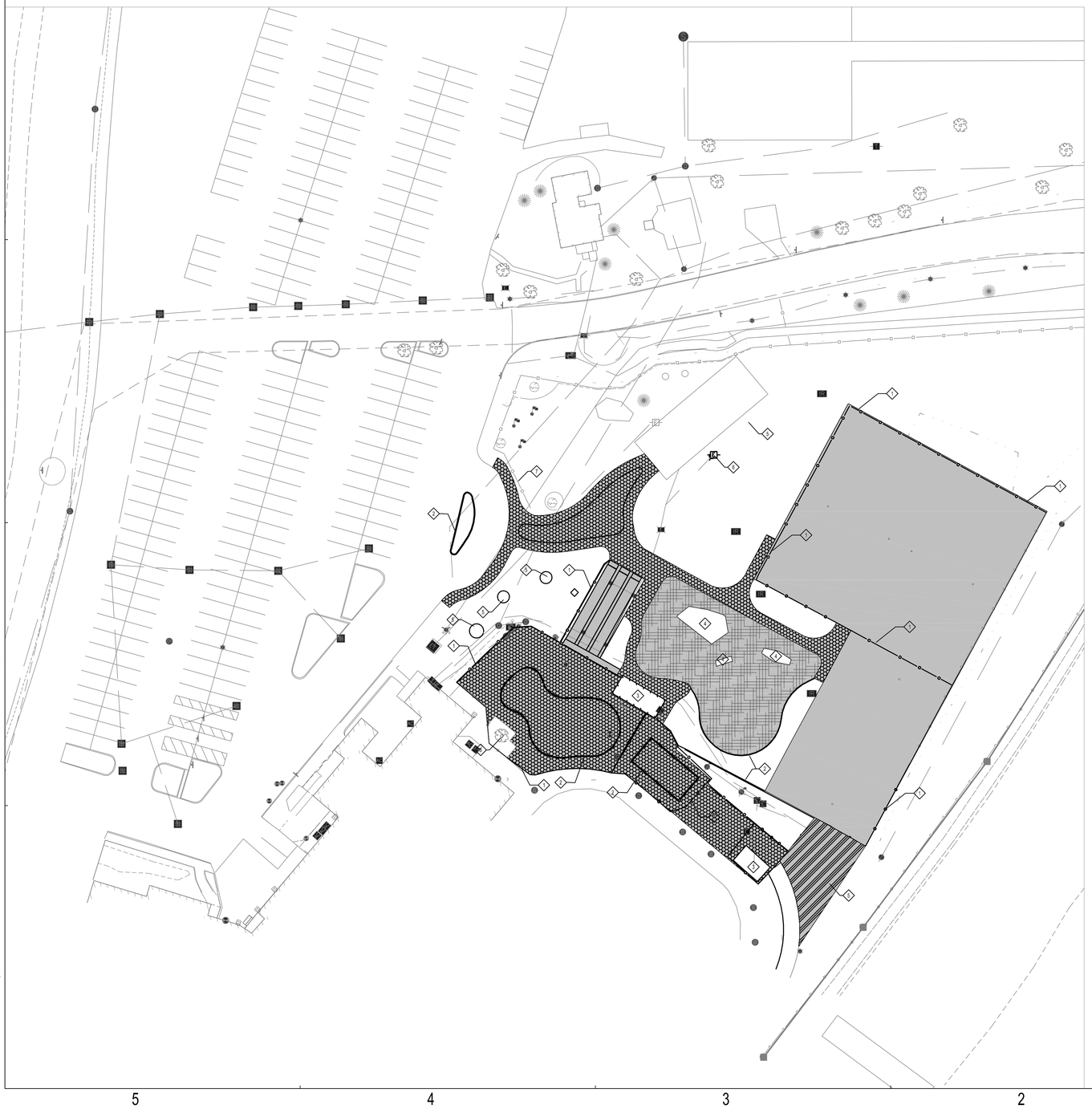

DEMOLITION NOTES

1. THE CONTRACTOR SHALL DEMOLISH AND REMOVE FROM THE SITE ALL MATERIALS INDICATED ON THE PLAN. GENERALLY, DEMOLITION AREAS AND FACILITIES ARE INDICATED WITH BOLD LINES, SHADED AREAS AND/OR KEY NOTES.
2. DISPOSAL OF ALL DEMOLITION MATERIALS SHALL BE IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL GUIDELINES AND PROCEDURES.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING FEATURES ALONG THE PERIMETER OF THE SITE. THESE FEATURES INCLUDE, BUT ARE NOT LIMITED TO: BUILDINGS, PAVEMENTS, FENCES, VEGETATION, UNDERGROUND UTILITIES, ABOVE GROUND UTILITIES, PROPERTY MARKERS, ETC. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE WHICH OCCURS DURING OR AS A RESULT OF CONSTRUCTION ACTIVITY. REPLACEMENT OF DAMAGED PROPERTY OR FEATURES SHALL BE EQUAL TO EXISTING CONDITIONS.
4. FOLLOWING THE REMOVAL OF INDICATED NATURAL FEATURES AND SITE IMPROVEMENTS, AND FOLLOWING THE COMPLETION OF EARTHWORK AS INDICATED ON THE GRADING PLAN, CONTRACTOR SHALL SUPPLY AND INSTALL TOPSOIL FILL IN ALL PROPOSED PLANTING AREAS TO THE GRADES INDICATED ON THE GRADING PLAN, AND IN ACCORDANCE WITH THE EARTHWORK SPECIFICATIONS.
5. ALL TREES, BRUSH, STUMPS, AND GRUBBING DEBRIS SCHEDULED FOR DEMOLITION SHALL BE REMOVED FROM THE SITE.
6. ALL TOPSOIL IN AREAS SUBJECT TO CONSTRUCTION SHALL BE STRIPPED AND STOCKPILED FOR REPLACEMENT DURING FINISH GRADING.
7. CURRENT FIELD CONDITIONS MAY VARY SOMEWHAT FROM THOSE INDICATED ON THIS PLAN. THE INFORMATION SHOULD NOT BE CONSIDERED AS EXACT OR COMPLETE.
   - 7.1. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LINE LOCATIONS PRIOR TO CONSTRUCTION. CONTACT THE INDIANA UNDERGROUND UTILITY PLANT PROTECTION SERVICE AT 1-800-382-5540 OR DIAL 811 (INDIANA). A PRIVATE UTILITY LOCATION SERVICE MAY BE REQUIRED IN AREAS NOT COVERED BY IUPPS.
   - 7.2. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE UTILITY COMPANIES AT LEAST 48 HOURS PRIOR TO THE COMMENCEMENT OR RESUMPTION OF WORK THAT COULD POTENTIALLY DISRUPT THE RESPECTIVE UTILITY SERVICE OF INFRASTRUCTURE.
   - 7.3. UNLESS NOTED OTHERWISE, THE CONTRACTOR IS RESPONSIBLE FOR THE RELOCATION OF ALL EXISTING UTILITIES WHICH ARE IN CONFLICT WITH THE PROPOSED SITE IMPROVEMENTS.
   - 7.4. ANY DAMAGE TO EXISTING UTILITY LINES SHALL BE REPAIRED AT THE EXPENSE OF THE CONTRACTOR.

DEMOLITION LEGEND

- SAW CUT AND REMOVE ASPHALT PAVEMENT
- SAW CUT AND REMOVE CONCRETE CURB
- SAW CUT AND REMOVE CONCRETE PAVEMENT
- SAW CUT AND REMOVE CONCRETE CURB AND MEDIAN FOR NEW DRIVE.
- CONSTRUCTION LIMITS

GENERAL NOTES

1. REFERENCE C-001 FOR GENERAL DEMOLITION PLAN NOTES.
2. SEE ELECTRICAL SITE PLAN, FOR ALL ELECTRICAL, PHONE AND TECHNOLOGY DEMOLITION WORK.
3. USE CAUTION NOT TO DAMAGE UTILITIES AND FEATURES TO REMAIN.

NOTE: WHILE EVERY EFFORT HAS BEEN MADE TO SHOW ALL DEMOLITION REQUIRED, THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO BID TO FULLY UNDERSTAND WHAT ITEMS ARE IN THE WAY OF NEW CONSTRUCTION. ONLY THOSE ITEMS UNDERGROUND AND NOT INDICATED ANYWHERE IN CONTRACT DOCUMENTS WILL BE CONSIDERED UNFORESEEN CONDITIONS. CHANGE ORDERS WILL NOT BE ISSUED FOR VISIBLE ITEMS.

DEMOLITION KEY NOTES

1. REMOVE CHAINLINK FENCE IN ITS ENTIRETY.
2. REMOVE CONCRETE CURB IN ITS ENTIRETY.
3. REMOVE BUILDING/ STRUCTURE IN ITS ENTIRETY. PROTECT AND REMOVE EQUIPMENT .
4. REMOVE AND PROTECT PLAYGROUND EQUIPMENT.
5. REMOVE VEGETATION IN ITS ENTIRETY.
6. REMOVE POLE/COMMUNICATIONS. REFER TO E-SERIES.
7. SALVAGE FENCE FOR REUSE.
8. PROTECT TREE AND SEATING PLATFORM.

1A UTILITY PLAN
1" = 30'

A2

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Indianapolis, IN 46204
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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced LZ

KYLE E. MILLER
REGISTERED
NO. 19900465
STATE OF INDIANA
PROFESSIONAL ENGINEER

#	Revision	Date
A2	Addendum #2	01.12.2023

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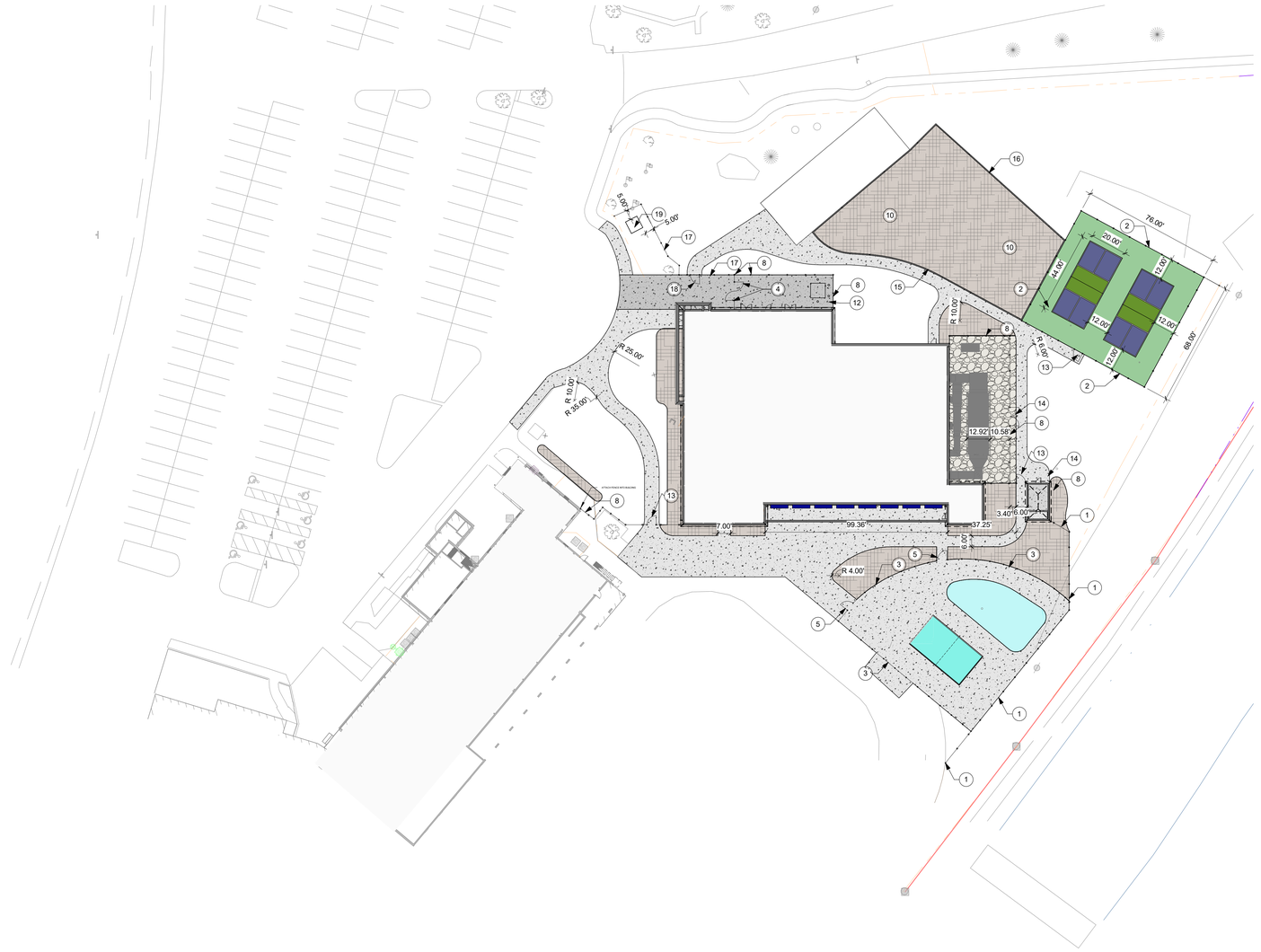
SITE DEMOLITION PLAN

CD101



1 **SITE PLAN**
1" = 30'-0"

GENERAL LAYOUT NOTES

1. REFERENCE C-001 FOR GENERAL LAYOUT PLAN NOTES.
2. NORTHING AND EASTING COORDINATES ARE STATE PLANE COORDINATES BASED ON A TOPOGRAPHIC SURVEY. REFER TO SURVEY DRAWINGS FOR HORIZONTAL CONTROL POINT DATA.
3. ALL EXISTING PAVEMENT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO MATCH EXISTING CONDITIONS.

SITE LAYOUT LEGEND

	STANDARD ASPHALT PAVING,
	HEAVY DUTY ASPHALT PAVING,
	STANDARD CONCRETE PAVING,
	HEAVY DUTY CONCRETE PAVING,

SITE LAYOUT NOTES

Key	Note
1	6' HIGH BLACK VINYL CHAINLINK FENCE.
2	8' HIGH BLACK VINYL CHAINLINK FENCE.
3	4' HIGH ORNAMENTAL FENCE.
4	6' HIGH, 8' WIDE BLACK VINYL CHAINLINK DOUBLE SWING GATE.
5	4' HIGH, 5' WIDE SINGLE SWING GATE.
7	6' HIGH , 5' WIDE CHAINLINK SINGLE SWING GATE.
8	8' HIGH BLACK VINYL CHAINLINK FENCE WITH PRIVACY SLATS.
9	ALTERNATE BID. NEW TENNIS COURT.
10	RELOCATED PLAYGROUND EQUIPMENT.
11	6' HIGH BLACK VINYL CHAINLINK FENCE WITH PRIVACY SLATS.
12	9" DIAMETER, 4' HIGH BOLLARDS
13	8' HIGH, 5' WIDE SINGLE SWING GATE.
14	8' HIGH, 10' WIDE DOUBLE SWING GATE.
15	INTEGRAL CURB. SEE DETAILS.
16	CONCRETE CURB. SEE DETAILS.
17	5' HIGH ORNAMENTAL FENCE. SALVAGED IF POSSIBLE.
18	5' HIGH, 5' WIDE SINGLE SWING GATE.
19	NEW TRANSFORMER. SEE E-SERIES FOR LOCATION.

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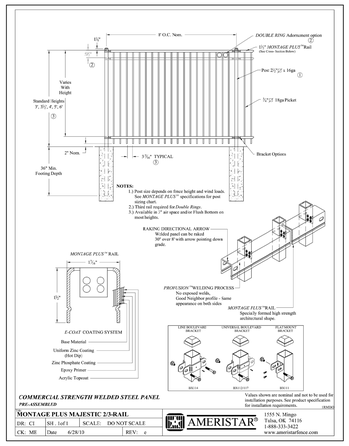
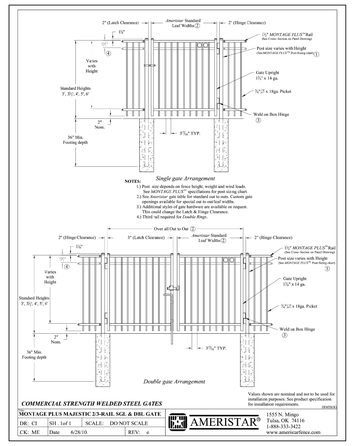
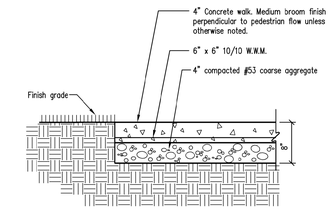
SITE LAYOUT PLAN

CL101

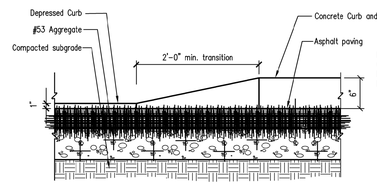
A2



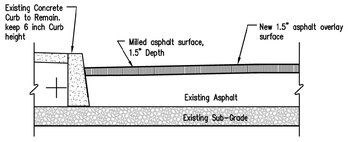




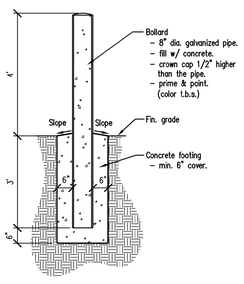
1D Regular Duty Concrete Pavement Detail
Scale 1"=1'-0"



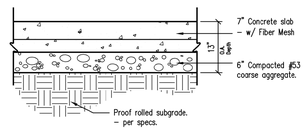
2C Curb Transition
Scale: 1" = 1'-0"



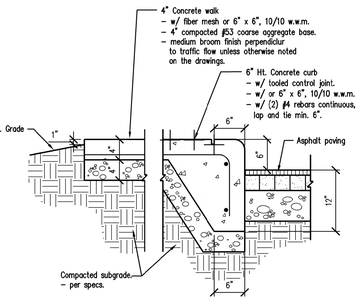
1C Asphalt Mill & Overlay Detail
Scale: 1" = 1'-0"



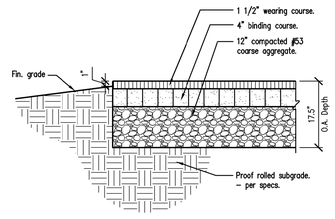
4B Metal Pipe Utility Bollard Detail
Scale: 1/2" = 1'-0"



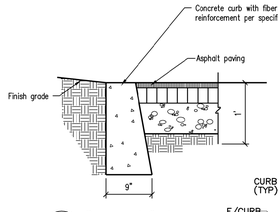
3B Heavy Duty Concrete Paving Detail
Scale: 1" = 1'-0"



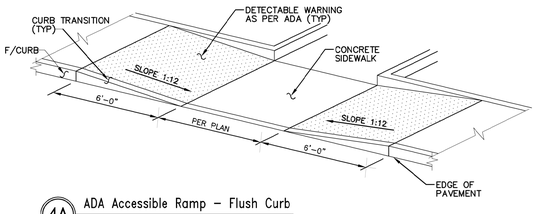
2B Integral Concrete Curb/Sidewalk Detail
Scale: 1" = 1'-0"



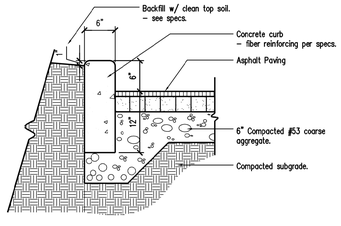
1B Heavy Duty Asphalt Paving Detail
Scale: 1" = 1'-0"



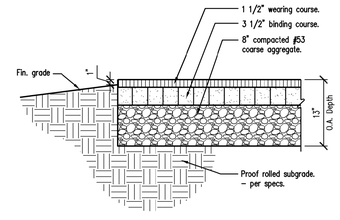
5A Depressed Curb
Scale 1"=1'-0"



4A ADA Accessible Ramp – Flush Curb
Not to Scale



2A Concrete Straight Curb Detail
Scale: 1" = 1'-0"



1A Car Lot Asphalt Pavement Detail
Scale: 1" = 1'-0"

A2

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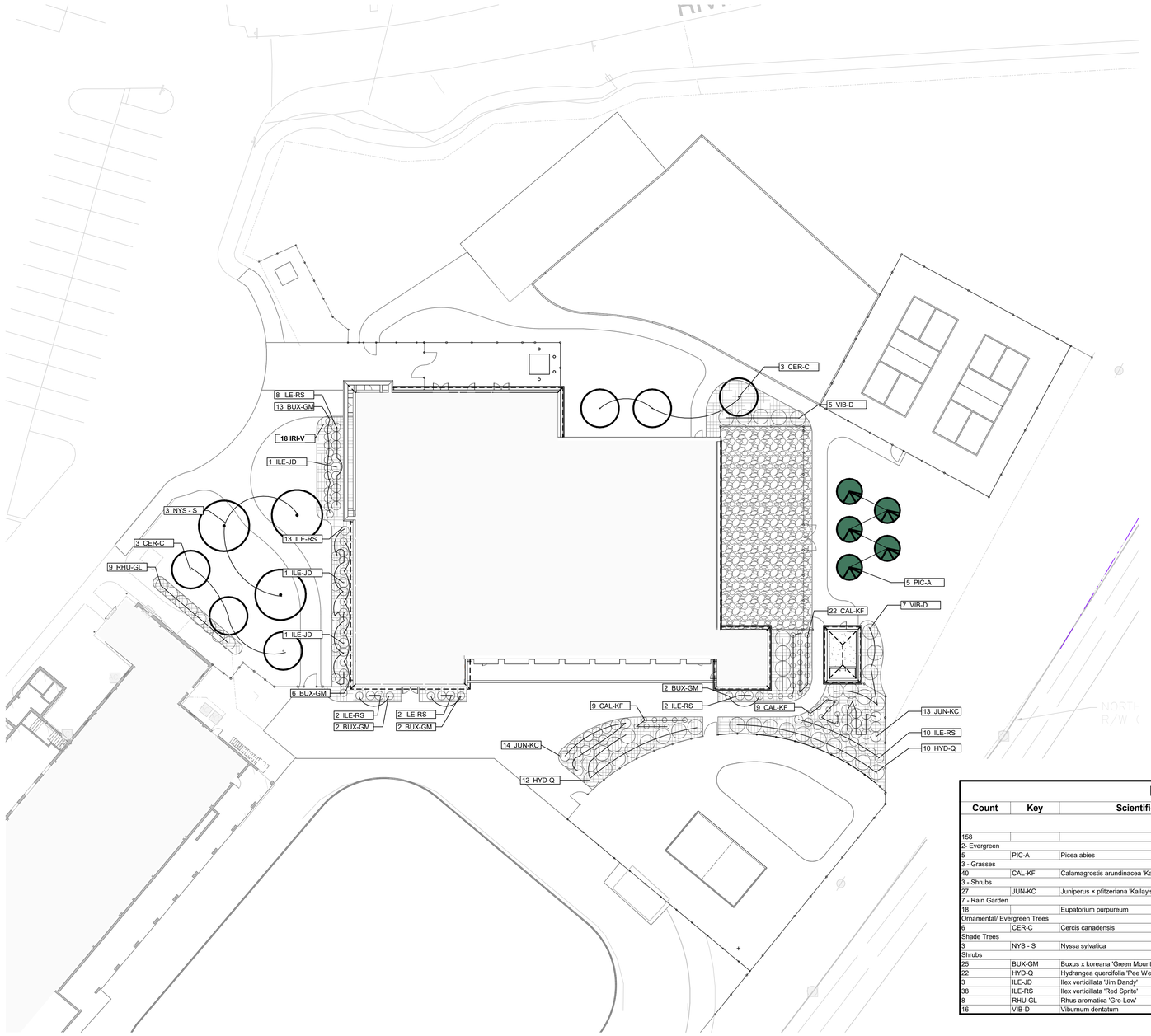
SITE LAYOUT DETAILS

CL501



LANDSCAPE LEGEND

	PROPOSED CANOPY TREE
	PROPOSED EVERGREEN TREE
	PROPOSED ORNAMENTAL TREE
	PROPOSED SHRUB
	GENERAL TURF SEED MIX. SEE SPECS

PLANTING SCHEDULE

Count	Key	Scientific Name	Common Name	Size	Condition
158					
2- Evergreen					
5	PIC-A	Picea abies	Norway Spruce	6' ht.	B&B
3 - Grasses					
40	CAL-KF	Calamagrostis arundinacea 'Karl Forester'	Karl Forester Feather Reed Grass	1 Gal.	Cont.
3 - Shrubs					
27	JUN-KC	Juniperus × pfitzeriana 'Kallay's Compact'	Kallay Pfitzer Juniper	3 Gal.	Cont.
7 - Rain Garden					
18		Eupatorium purpureum	Sweet Joe Pye Weed	18"	Cont.
Ornamental/ Evergreen Trees					
6	CER-C	Cercis canadensis	Eastern redbud	1.5" Cal.	B&B
Shade Trees					
3	NYS - S	Nyssa sylvatica	Black Tupelo	2.5" Cal.	B&B
Shrubs					
25	BUX-GM	Buxus x koreana 'Green Mountain'	green mountain boxwood	18"ht.	Cont.
22	HYD-Q	Hydrangea quercifolia 'Pee Wee'	Pee Wee oakleaf hydrangea	3 Gal, 24" min Ht	Cont.
3	ILE-JD	Ilex verticillata 'Jim Dandy'	early male winterberry	3 Gal, 24" min Ht	Cont.
38	ILE-RS	Ilex verticillata 'Red Sprite'	Red Sprite early female winterberry	3 Gal, 24" min Ht	Cont.
8	RHU-GL	Rhus aromatica 'Gro-Low'	'Gro-Low' Fragrant Sumac	3 Gal, 24" min Ht	Cont.
16	VIB-D	Viburnum dentatum	arrowwood viburnum	3 Gal, 24" min Ht	Cont.

1 **SITE PLAN - Landscape**
1" = 20'-0"

NOTE:
NEED 1 ILEX VERTICILLATA "JIM DANDY' PER EVERY 5 'RED SPIRTE' TO GET GOOD FRUITING

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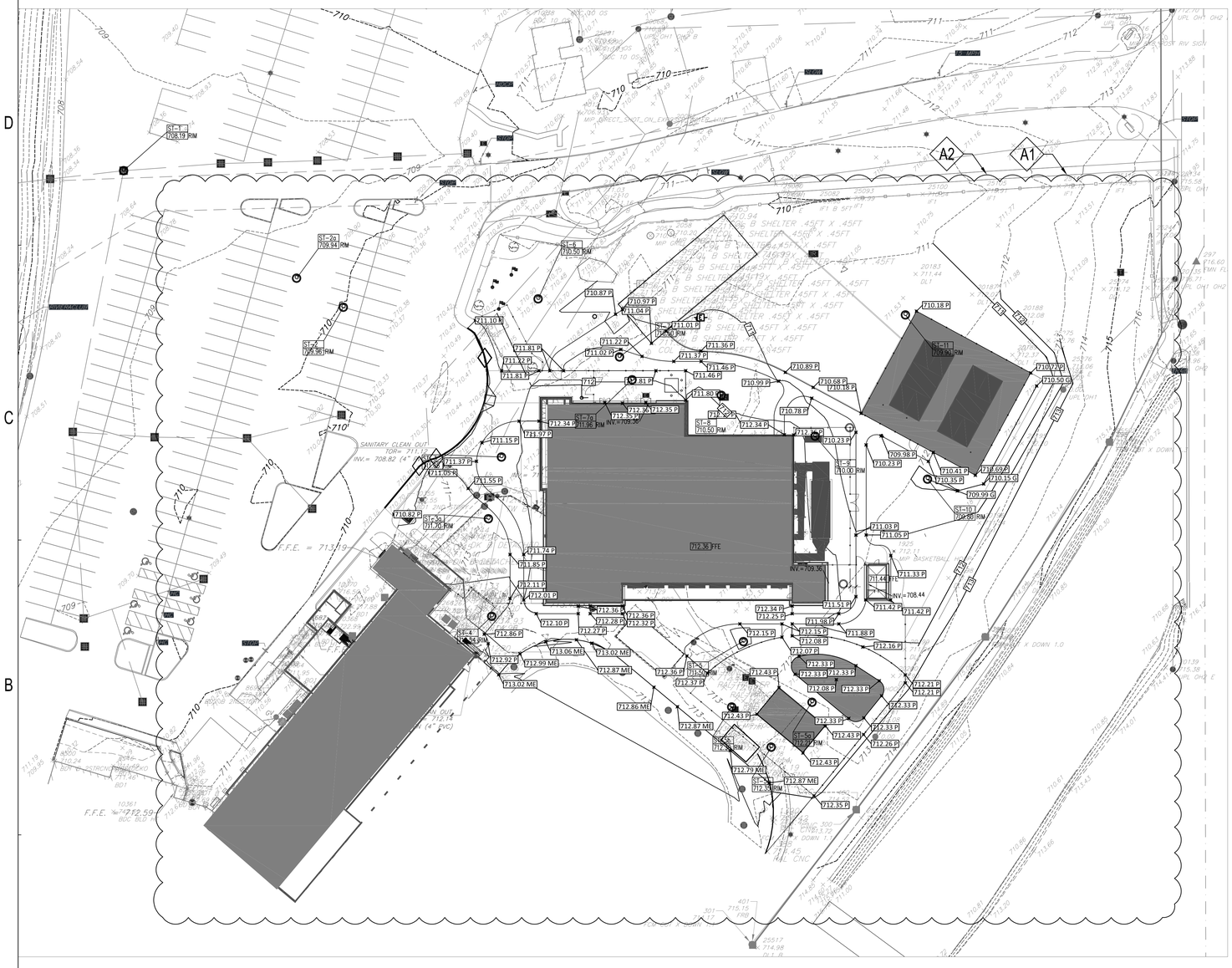
PLANTING PLAN

LP101



GENERAL GRADING NOTES

1. IF THE LOCAL BENCHMARK(S) WILL BE DISTURBED DURING CONSTRUCTION, IT THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH ADDITIONAL BENCHMARKS AS NEEDED.
2. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF SITE CONDITIONS AT THE TIME THIS PROJECT IS BID.
3. ALL TRANSITIONS IN CURB HEIGHTS SHALL BE SMOOTH WITH A CONSISTENT SLOPE.

GRADING LEGEND

828	EXISTING CONTOUR LINE
828	PROPOSED CONTOUR LINE
[1000.00]	PROPOSED ELEVATION
[1000.00]EX	EXISTING ELEVATION
[1000.00]ME	MATCH EXISTING ELEVATION
[1000.00]TC	TOP OF CURB ELEVATION
[1000.00]TW	TOP OF WALL ELEVATION
[1000.00]TR	TOP OF RIM ELEVATION
[1000.00]P	PAVEMENT ELEVATION
[1000.00]GU	GUTTER ELEVATION
[1000.00]G	GROUND ELEVATION
[1000.00]FL	FLOWLINE ELEVATION
[1000.00]BC	BOTTOM OF CURB ELEVATION
[1000.00]BW	BOTTOM OF WALL ELEVATION
[1004.50]FFE	FINISH FLOOR ELEVATION

1A GRADING PLAN
1" = 30'

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A1	Addendum #1	01.05.2023
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GRADING PLAN

CG101

GENERAL UTILITIES NOTES

1. IF THE LOCAL BENCHMARK(S) WILL BE DISTURBED DURING CONSTRUCTION, IT THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH ADDITIONAL BENCHMARKS AS NEEDED.
2. ALL LIDS, CASTINGS, GRATES, BOXES, AND HATCHES ASSOCIATED WITH EXISTING UTILITY STRUCTURES THAT ARE NOT INDICATED FOR MODIFICATION SHALL BE MAINTAINED AND PROTECTED DURING CONSTRUCTION. ADJUST THE TOP ELEVATIONS PER GRADING PLAN.
3. COMPACTED GRANULAR BACKFILL IS REQUIRED FOR ALL UTILITY TRENCHES LOCATED UNDER PAVED AREAS. SEE SPECIFICATIONS.
4. PIPE LENGTHS INDICATED ON THE DRAWINGS ARE FOR HYDRAULIC CALCULATION PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR FURNISHING THE AMOUNT OF PIPE MATERIALS NECESSARY FOR A COMPLETE INSTALLATION.
5. ALL EXISTING PIPES INVERTS ARE APPROXIMATE. VERIFY ALL INVERTS IN FIELD. IF INVERTS DO NOT MATCH THE PLAN, CONTACT THE ARCHITECT.

UTILITY LEGEND

- PIPE
- WATER VALVE
- FIRE HYDRANT
- MANHOLE
- END SECTION
- BOX STRUCTURE
- DOWNSPOUT BOOT
- CLEAN OUT
- STORM NETWORK
- SANITARY NETWORK

Utility Notes

1. CONNECT TO EXISTING. FIELD VERIFY LOCATION AND INVERT.
2. 4" SANITARY PIPE
3. C.O.
4. FIRE DEPT. CONNECTION
5. CONNECT TO BUILDING, SEE PLUMBING DRAWINGS.
6. GAS METER, SEE PLUMBING DRAWINGS FOR CONTINUATION.
7. RECOMMENDED GAS LINE ROUTE.
8. CONNECT TO EXISTING GAS LINE
9. 4" WATER LINE
10. 6" WATER LINE
11. POST INDICATOR VALVE W/TWO BOLLARDS(MIN. 40" AWAY FROM BLDG)
12. 6" VALVE
13. CONNECT TO EX. WATER MAIN. FIELD VERIFY THE LOCATION.
14. DOUBLE CHECK BACKFLOW ASSY & CONCRETE VAULT. SEE DETAIL THIS SHEET.
15. CONNECT BACKFLOW VAULT SUMP PUMP DISCHARGE LINE TO STORM STR ST-6.

1A UTILITY PLAN
1" = 30'

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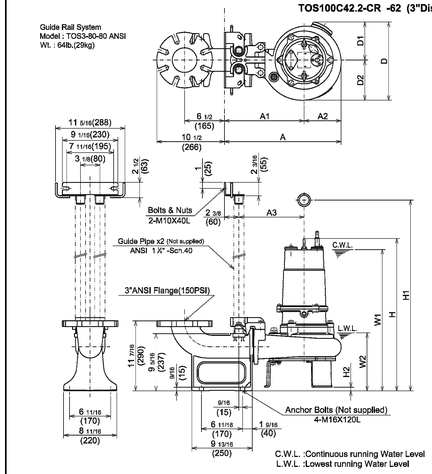
UTILITY PLAN

CU101

Nov.12 AM-00025-2

TSURUMI PUMP | C-SERIES CUTTER - TYPE - SEWAGE & WASTEWATER PUMPS | **DIMENSIONS**

TOS100C42.2-CR -62 (3"Dis.)



C.W.L. :Continuous running Water Level
L.W.L. :Lowest running Water Level

DIMENSIONS:USCS(Inch)

Model	HP	NOM. SIZE	Pump & Motor A	A1	A2	A3	D	D1	D2	H	H1	H2	C.W.L. W1	L.W.L. W2	*Wt. (lbs.)
TOS100C42.2-CR -62	3	3"	19 1/16	13	8 1/16	10 5/8	12 3/4	6 1/4	6 9/16	24 13/16	31 1/8	9/16	23	9 1/2	141

*Excluding TOS & Cable.

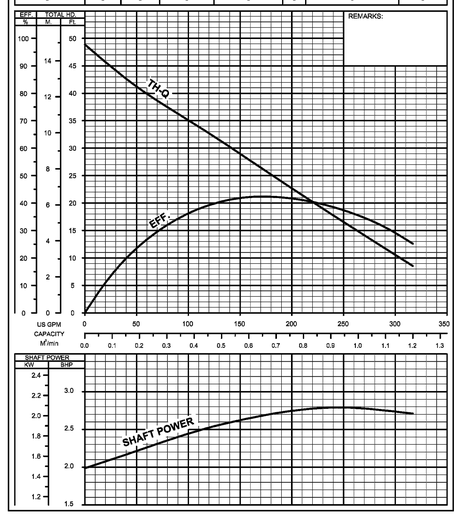
DIMENSIONS:METRIC(mm)

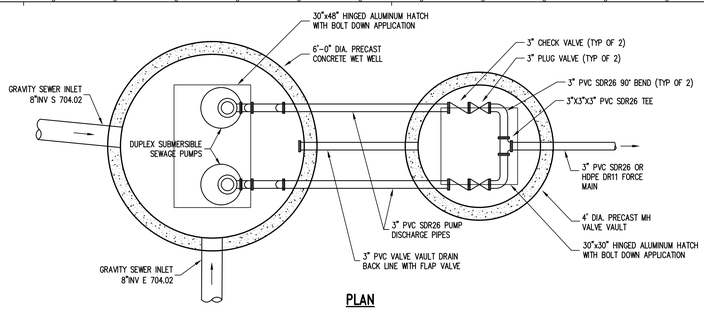
Model	kW	NOM. SIZE	Pump & Motor A	A1	A2	A3	D	D1	D2	H	H1	H2	C.W.L. W1	L.W.L. W2	*Wt. (kg)
TOS100C42.2-CR -62	2.2	80	484	330	154	270	324	158	166	631	790	15	585	240	64

Sep.13 AM-00003-1

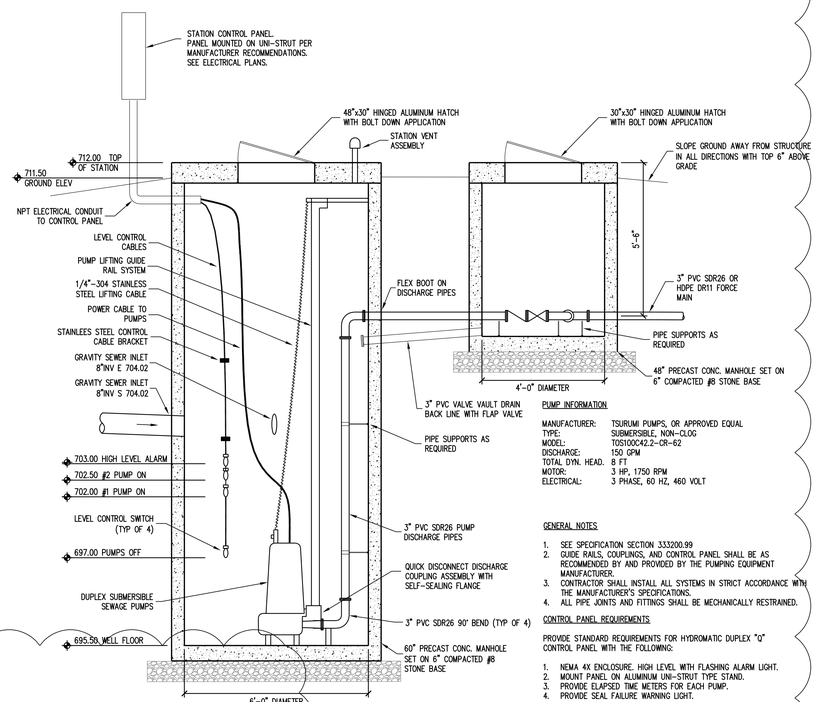
TSURUMI PUMP | C-SERIES CUTTER - TYPE - SEWAGE & WASTEWATER PUMPS | **PERFORMANCE CURVE**

MODEL	BORE	HP	KW	RPM	SOLIDS DIA.	LIQUID	SG.	VISCOSITY	TEMP.
(TOS)100C42.2-CR -62	4"/100mm	3	2.2	1700	1.73"/44mm	Water	1.0	1.123cSt.	60°F
PUMP TYPE	**PHASE**	**VOLTAGE**		**AMPERAGE**		**HZ**	**STARTING METHOD**		**INS.CLASS**
Cutter-Type-Sewage&Wastewater	3	208-230/460/575		9.4-8.5/4.3/3.5		60	Direct On Line		E
CURVE No.	**DATE**	**PHASE**	**VOLTAGE**		**AMPERAGE**	**HZ**	**STARTING METHOD**		**INS.CLASS**
-	-	-	-		-	-	-		-





PLAN



SECTION

PUMP INFORMATION

MANUFACTURER: TSURUMI PUMPS, OR APPROVED EQUAL
TYPE: SUBMERSIBLE, NON-CLOG
MODEL: TOS100C42.2-CR-62
DISCHARGE: 150 GPM
TOTAL DYN. HEAD. 8 FT
MOTOR: 3 HP, 1750 RPM
ELECTRICAL: 3 PHASE, 60 HZ, 460 VOLT

GENERAL NOTES

1. SEE SPECIFICATION SECTION 333200.99
2. GUIDE RAILS, COUPLINGS, AND CONTROL PANEL SHALL BE AS RECOMMENDED BY AND PROVIDED BY THE PUMPING EQUIPMENT MANUFACTURER.
3. CONTRACTOR SHALL INSTALL ALL SYSTEMS IN STRICT ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
4. ALL PIPE JOINTS AND FITTINGS SHALL BE MECHANICALLY RESTRAINED.

CONTROL PANEL REQUIREMENTS

PROVIDE STANDARD REQUIREMENTS FOR HYDROMATIC DUPLEX "O" CONTROL PANEL WITH THE FOLLOWING:

1. NEMA 4X ENCLOSURE. HIGH LEVEL WITH FLASHING ALARM LIGHT.
2. MOUNT PANEL ON ALUMINUM UNI-STRUT TYPE STAND.
3. PROVIDE ELAPSED TIME METERS FOR EACH PUMP.
4. PROVIDE SEAL FAILURE WARNING LIGHT.

A2

STRUCTURE DATA TABLE

STRUCTURE NUMBER	ST-1	ST-2	ST-2a	ST-3	ST-3a	ST-4	ST-5	ST-5a	ST-5b	ST-5c	ST-6
DESCRIPTION	MANHOLE	MANHOLE	BMP	MANHOLE	MANHOLE	MANHOLE	MANHOLE	BOX INLET	MANHOLE	BOX INLET	MANHOLE
DETAIL NUMBER	1A/CU501	1A/CU501	CU503	1A/CU501	1A/CU501	1A/CU501	1A/CU501	1C/CU501	1A/CU501	1C/CU501	1A/CU501
STRUCTURE SIZE	60"	48"	54"	48"	48"	48"	48"	24"X24"	48"	24"X24"	48"
CASTING NUMBER	R-2535	R-1772	R-1772	R-2535	R-2535	R-2535	R-2535	R-3405	R-2535	R-3405	R-2535
RIM ELEVATION	708.19	709.96	709.94	711.05	711.70	712.54	711.50	712.21	712.30	712.35	710.50
INVERTS	703.95 SE 703.92 W 703.92 S 704.41 E	704.80 E 704.56 NW 704.66 SE	704.43	706.94 E 707.15 SE 705.17 NW 705.27 SW	705.51 E 707.02 SE 705.42 N,S	705.68 E 705.65 N 707.62 NE	706.28	708.25	706.44	708.35	705.42 E 705.32 W

STRUCTURE NUMBER	ST-7	ST-7a	ST-8	ST-9	ST-10	ST-11
DESCRIPTION	MANHOLE	MANHOLE	MANHOLE	MANHOLE	BOX INLET	BOX INLET
DETAIL NUMBER	1A/CU501	1A/CU501	1A/CU501	1A/CU501	1C/CU501	1C/CU501
STRUCTURE SIZE	48"	48"	48"	48"	24"X24"	24"X24"
CASTING NUMBER	R-2535	R-2535	R-2535	R-2535	R-3405	R-3405
RIM ELEVATION	710.50	711.96	710.50	710.00	709.80	709.90
INVERTS	705.65	705.71 NW 705.81 S,E	706.02 W 706.12 E	706.37 W 706.47 N,S,E	706.75	706.82

NOTE:
The BMP structure Aqua Swirl XC-4 shall not be changed after the city approved the plan.
If the contractor wants another BMP structure for the project, the contractor shall cover the cost the re-permitting cost and engineering time.

A1

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415 Massachusetts Avenue
Indianapolis, IN 46204
www.schmidt-arch.com

Project No. 2021-178.RVI
Project Date 12.05.2022
Produced LZ

KYLE E. MILLER REGISTERED NO. 19900465 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
A1	Addendum #1	01.05.2023
A2	Addendum #2	01.12.2023

5640 N Illinois St,
Indianapolis, IN 46208

N

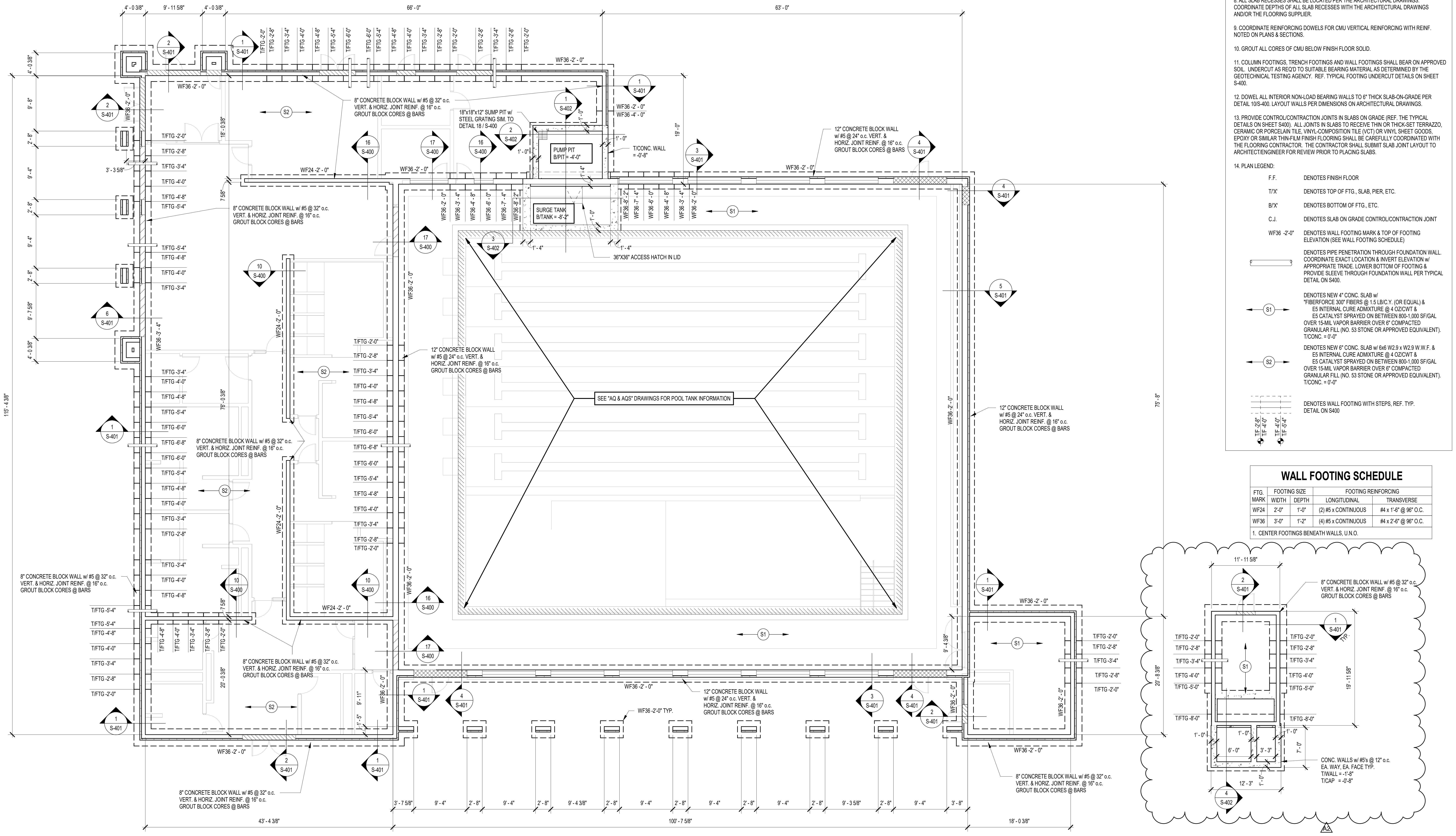
The Riviera Club

THE RIVIERA CLUB EST. 1933

Aquatic Center

SITE UTILITY DETAILS

CU504



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

FOUNDATION PLAN NOTES

1. REF. S-600 FOR STRUCTURAL NOTES, DESIGN DATA & SCHEDULES.

2. ALL CONTRACTORS ARE REQUIRED TO COORDINATE THEIR WORK WITH ALL DISCIPLINES TO AVOID CONFLICTS. THE MECHANICAL, ELECTRICAL, AND PLUMBING ASPECTS ARE NOT IN THE SCOPE OF THESE DRAWINGS. THEREFORE, ALL REQUIRED MATERIALS AND WORK MAY NOT BE INDICATED.

3. COORDINATE EXACT SIZE & LOCATION OF ALL MECHANICAL OPENINGS IN FOUNDATION WALLS WITH THE MECHANICAL, ELECTRICAL & PLUMBING CONTRACTORS.

4. ALL ELEVATIONS ARE REFERENCED FROM THE FIRST FLOOR FINISH FLOOR ELEVATION 0'-0" (U.S.G.S. 712.36). REF. CIVIL DWGS.

5. REF. ARCH. DRAWINGS FOR ALL DIMENSIONS NOT SHOWN. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION AND IMMEDIATELY NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.

6. REF. S-400 FOR TYPICAL FOUNDATION DETAILS.

7. NOTE: PERIMETER WALL AND COLUMN FOOTINGS SHALL BE LOWERED AND/OR SLEEVED TO PASS BELOW PLUMBING LINES (I.E. SANITARY & STORM SEWERS, WATER LINES, ETC.) SHOWN ON THE PLUMBING DRAWINGS. PROVIDE FOOTING STEPS AS REQUIRED PER THE TYPICAL DETAILS ON S400.

8. ALL SLAB RECESSES SHALL BE LOCATED PER THE ARCHITECTURAL DRAWINGS. COORDINATE DEPTHS OF ALL SLAB RECESSES WITH THE ARCHITECTURAL DRAWINGS AND/OR THE FLOORING SUPPLIER.

9. COORDINATE REINFORCING DOWELS FOR CMU VERTICAL REINFORCING WITH REINF. NOTED ON PLANS & SECTIONS.

10. GROUT ALL CORES OF CMU BELOW FINISH FLOOR SOLID.

11. COLUMN FOOTINGS, TRENCH FOOTINGS AND WALL FOOTINGS SHALL BEAR ON APPROVED SOIL. UNDERCUT AS REQ'D TO SUITABLE BEARING MATERIAL AS DETERMINED BY THE GEOTECHNICAL TESTING AGENCY. REF. TYPICAL FOOTING UNDERCUT DETAILS ON SHEET S-400.

12. DOWEL ALL INTERIOR NON-LOAD BEARING WALLS TO 6" THICK SLAB-ON-GRADE PER DETAIL 10/S-400. LAYOUT WALLS PER DIMENSIONS ON ARCHITECTURAL DRAWINGS.

13. PROVIDE CONTROL/CONTRACTION JOINTS IN SLABS ON GRADE (REF. THE TYPICAL DETAILS ON SHEET S400). ALL JOINTS IN SLABS TO RECEIVE THIN OR THICK-SET TERRAZZO, CERAMIC OR PORCELAIN TILE, VINYL-COMPOSITION TILE (VCT) OR VINYL SHEET GOODS, EPOXY OR SIMILAR THIN-FILM FINISH FLOORING SHALL BE CAREFULLY COORDINATED WITH THE FLOORING CONTRACTOR. THE CONTRACTOR SHALL SUBMIT SLAB JOINT LAYOUT TO ARCHITECT/ENGINEER FOR REVIEW PRIOR TO PLACING SLABS.

14. PLAN LEGEND:

F.F.	DENOTES FINISH FLOOR
T/'X'	DENOTES TOP OF FTG., SLAB, PIER, ETC.
B/'X'	DENOTES BOTTOM OF FTG., ETC.
C.J.	DENOTES SLAB ON GRADE CONTROL/CONTRACTION JOINT
WF36 -2'-0"	DENOTES WALL FOOTING MARK & TOP OF FOOTING ELEVATION (SEE WALL FOOTING SCHEDULE)
⊂⊃	DENOTES PIPE PENETRATION THROUGH FOUNDATION WALL. COORDINATE EXACT LOCATION & INVERT ELEVATION w/ APPROPRIATE TRADE. LOWER BOTTOM OF FOOTING & PROVIDE SLEEVE THROUGH FOUNDATION WALL PER TYPICAL DETAIL ON S400.
← S1 →	DENOTES NEW 4" CONC. SLAB w/ "FIBERFORCE 300" FIBERS @ 1.5 LB/C.Y. (OR EQUAL) & E5 INTERNAL CURE ADMIXTURE @ 4 OZ/CWT & E5 CATALYST SPRAYED ON BETWEEN 800-1,000 SF/GAL OVER 15-MIL VAPOR BARRIER OVER 6" COMPACTED GRANULAR FILL (NO. 53 STONE OR APPROVED EQUIVALENT). T/CONC. = 0'-0"
← S2 →	DENOTES NEW 6" CONC. SLAB w/ 6x6 W2.9 x W2.9 W.W.F. & E5 INTERNAL CURE ADMIXTURE @ 4 OZ/CWT & E5 CATALYST SPRAYED ON BETWEEN 800-1,000 SF/GAL OVER 15-MIL VAPOR BARRIER OVER 6" COMPACTED GRANULAR FILL (NO. 53 STONE OR APPROVED EQUIVALENT). T/CONC. = 0'-0"
T/F -2'-8" T/F -4'-0" T/F -4'-0" T/F -5'-4"	DENOTES WALL FOOTING WITH STEPS, REF. TYP. DETAIL ON S400

WALL FOOTING SCHEDULE

FTG. MARK	FOOTING SIZE		FOOTING REINFORCING	
	WIDTH	DEPTH	LONGITUDINAL	TRANSVERSE
WF24	2'-0"	1'-0"	(2) #5 x CONTINUOUS	#4 x 1'-6" @ 96" O.C.
WF36	3'-0"	1'-2"	(4) #5 x CONTINUOUS	#4 x 2'-6" @ 96" O.C.

1. CENTER FOOTINGS BENEATH WALLS, U.N.O.

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced JMS RMD

ROBERT M. DEE
No. 10100205
Robt M Dee

These Drawings and Specifications, and all copies thereof are and shall remain the property and copyright of the Architect. They shall be used only with respect to this Project and are not to be used on any other Project or Work without prior written permission from the Architect.

#	Revision	Date
A1	ADDENDUM #1	01/05/2023
A2	ADDENDUM #2	01/12/2023

5640 N Illinois St
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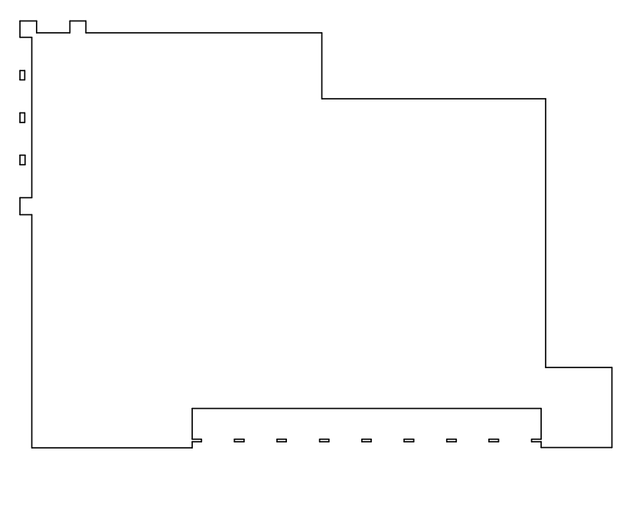


KEY PLAN

N

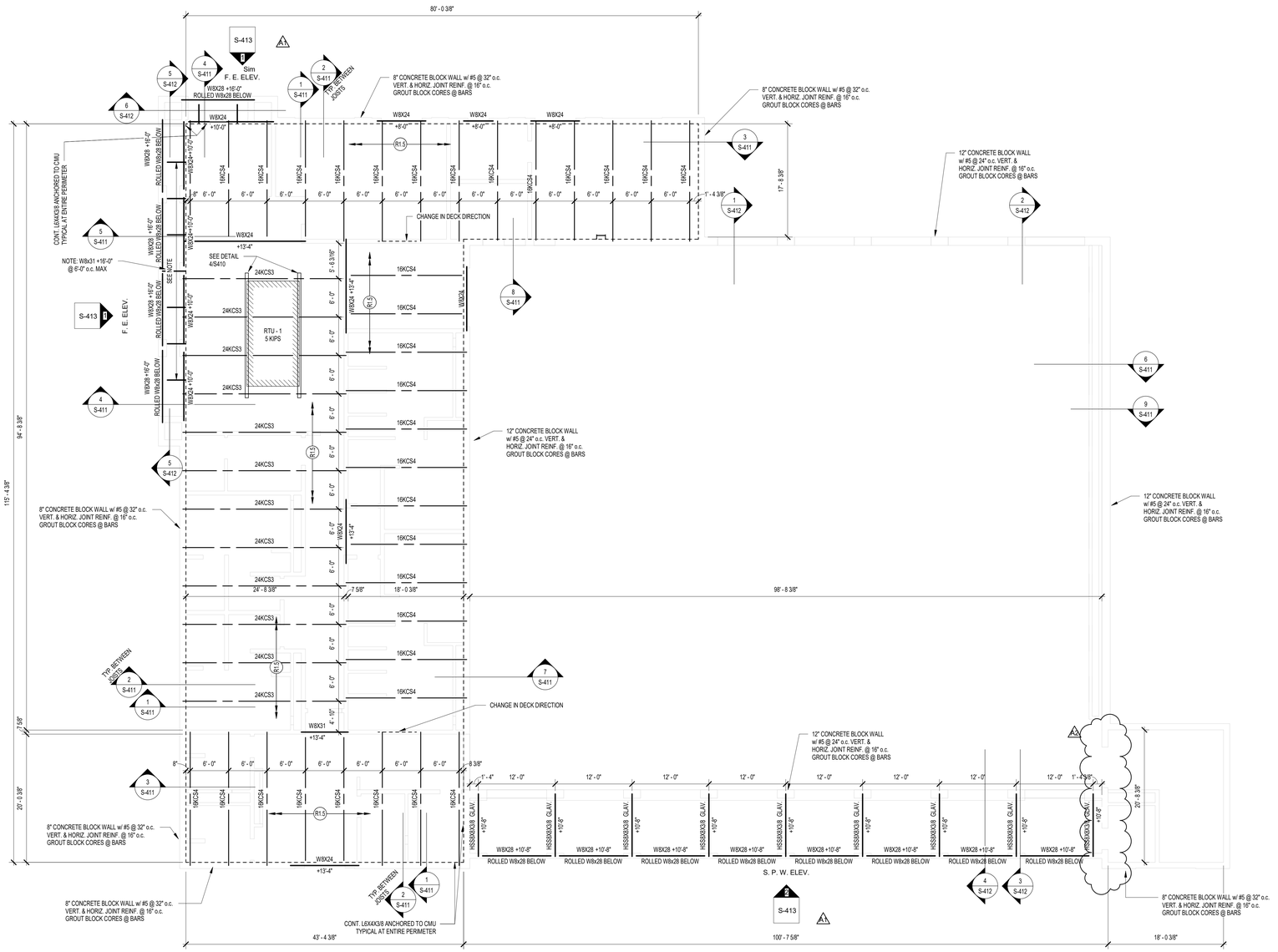
The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

FOUNDATION PLAN

SF1A1



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

FRAMING PLAN NOTES

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3. ALL CONTRACTORS ARE REQUIRED TO COORDINATE THEIR WORK WITH ALL DISCIPLINES TO AVOID CONFLICTS. THE MECHANICAL, ELECTRICAL, AND PLUMBING ASPECTS ARE NOT IN THE SCOPE OF THESE DRAWINGS. THEREFORE, ALL REQUIRED MATERIALS AND WORK MAY NOT BE INDICATED.
4. ALL ELEVATIONS ARE REFERENCED FROM THE FIRST FLOOR FIN. FLOOR ELEVATION +0'-0". COORD. USGS ELEVATION WITH CIVIL DWGS.
5. SEE FOUNDATION PLANS FOR SIZES OF STEEL COLUMNS SUPPORTED ON FOUNDATIONS.
6. INSTALL CONTINUOUS ANGLES AT ALL PERIMETER ROOF EDGES. SEE DETAIL 20/S-410 FOR ATTACHEMENT TO BEAM AND FOR ALL CONDITIONS NO SPECIFICALLY DEFINED IN FRAMING SECTIONS.
7. ALL WALLS SHALL BE LAID OUT FROM THE ARCHITECTURAL DRAWINGS.
8. REF. ARCH. DRAWINGS. FOR ALL DIMENSIONS NOT SHOWN. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION AND IMMEDIATELY NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
9. COORDINATE EXACT SIZE & LOCATION OF ANY MECHANICAL OPENINGS IN FLOOR SLAB, ROOF DECK, OR WALLS WITH THE MEP CONTRACTOR(S). LOCATION & SIZE OF ALL DUCT OPENINGS, GRILLES, ETC. SHALL BE VERIFIED PRIOR TO CONSTRUCTION.
10. ALL ELEVATIONS SHOWN ON PLAN INDICATE TOP OF STEEL BEAM UNLESS NOTED OTHERWISE.
11. PROVIDE FRAMES AT ALL ROOF DRAINS, ROOF HATCHES & OTHER ROOF OPENINGS PER TYPICAL DETAILS ON S-410. COORD. EXACT NUMBER, LOCATIONS & DIMENSIONS WITH THE APPROPRIATE CONTRACTORS & THE ARCH. & MEP DWGS.
12. PROVIDE CMU REINFORCING AS NOTED ON PLANS. IF NOT SHOWN ON PLANS OR DETAILS, MINIMUM CMU WALL REINFORCING TO BE #5 VERTS @ 48" O.C. PROVIDE OPEN-CORE BOND BEAMS AT TOPS OF WALLS, AT CHANGES IN CMU THICKNESS, AND WHERE INDICATED ON PLANS & SECTIONS (10'-0" O.C. MAX VERTICAL SPACING). PROVIDE 1/2 OF INTERRUPTED VERTICALS AT JAMBS OF OPENINGS AND PROVIDE ADDITIONAL VERT'S. AT ENDS OF WALLS.
13. ALL MASONRY BOND BEAMS, OTHER THAN BOND BEAM LINTELS OVER OPENINGS, SHALL BE "OPEN-CORE" BOND BEAMS TO ALLOW VERTICAL REINFORCING TO PASS THROUGH, UNLESS NOTED OTHERWISE.
14. REF. ARCH. DWGS. FOR MASONRY CONTROL & EXPANSION JOINT LOCATIONS.
15. ALL HORIZONTAL AND DIAGONAL BRIDGING FOR STEEL JOISTS SHALL BE DESIGNED, LOCATED & PROVIDED BY THE JOIST SUPPLIER PER SJI SPECIFICATIONS.
16. PLAN LEGEND:

F.F.	DENOTES FIN. FLOOR
T/'X'	DENOTES TOP OF STEEL, SLAB, ETC.
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E.O.L. (or EOL)	DENOTES EDGE OF ANGLE (MEASURED FROM BEAM C.L.) SEE TYPICAL DETAIL B/S-410
R1.5	DENOTES 1½", 20 GA. GALVANIZED WIDE RIB STEEL ROOF DECK REF. DETAIL 1/S410.
R4	DENOTES 4", 20 GA. TORIS 4A ACOUSTIC ROOF DECK BY EPIC METALS GALVANIZED AND PRIME PAINTED w/ EPIC'S NATACOAT SYSTEM. DECK. REF. DETAIL 2/S410.

23. WIDE-FLANGE BEAM & GIRDER NOTATION:

REF. THE STEEL CONNECTION NOTES ON S001 FOR DESIGN OF CONNECTIONS AT BEAMS & GIRDERS WITH NO REACTION SHOWN. THE MIN. SHEAR CONNECTION DESIGN LOAD SHALL BE 15 KIPS.

STEEL BEAM SIZE — W16x31

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ROBERT M. DEE — REGISTERED — No. 10100205 — STATE OF INDIANA — PROFESSIONAL ENGINEER

#	Revision	Date
A1	ADDENDUM #1	01/05/2023
A2	ADDENDUM #2	01/12/2023

5640 N Illinois St
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KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

LOW ROOF FRAMING PLAN

SF1AL

SF1AL_LOW ROOF FRAMING PLAN
2021-178.RVI_The Riviera Club_Aquatics Center_
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WOOD SHRINKAGE NOTES

The following is a list of recommendations to minimize potential issues related to wood shrinkage and veneer expansion (A portion of clay masonry veneer expansion is irreversible and a portion is seasonal. The majority of wood shrinkage will occur in the first 12-18 months of occupancy. The majority of irreversible clay masonry veneer expansion will occur in the first few weeks, but will continue at a lower rate for several years. Thermal movement is seasonal and variable depending on ambient temperature and sun exposure. The following is a list of recommendations to minimize potential issues related to wood shrinkage and veneer movement.

1. Refer to other notes and details to see estimated differential movement between wood framing and brick veneer. If not shown otherwise, a differential movement of 0.15" per floor shall be used for backing of light wood framing for up to 3 stories and 0.20" per floor shall be used for backing of light wood framing for up to 5 stories.

2. MEP System Considerations

   A. All plumbing pipe and electrical conduit joints and connections shall be flexible and allow for expansion/contraction to prevent a rigid assembly. The use of expansion or slip joints in vertical plumbing runs to allow for wood framing shrinkage is recommended. If not used, another means of mitigating the problem will be required.
   B. In lieu of or in addition to A above, provide oversized and vertically slotted holes at pipe horizontal penetration and notches. Refer to typical notching and cutting of stud wall detail for additional considerations on size limitations. Do not exceed the hole sizes allowed by the notes and details and the building code.
   C. Hangers and necessary rigid connections shall be adjusted prior to completion of construction or closing of wall/ ceiling assembly.
   D. Vent penetrations shall be provided with double flashing.
   E. All sheet metal vertical down spouts shall have intermediate slip joints.
   F. Roof drains shall be adjusted back to the roof finish sheathing elevation at the completion of construction and then shall be adjusted as required to maintain proper drainage.

3. Construction Tolerance Considerations

   A. All studs shall be cut level, square and tight to top and bottom plates to reduce any additional shortening of the building due to nesting.
   B. All wood structural panels on the walls shall have a relief gap at each floor level to reduce the potential for bulging.
   C. All floor sheathing shall have 1/8" gaps around all four sides at time of installation to allow for potential bulging.
   D. Temporary Expansion Joints in large buildings are required. Follow APA's Technical Note: Temporary Expansion Joints for Large Buildings U425.
   E. At stucco, EIFS and thin set veneer systems, provide horizontal expansion joints, and slip joints with appropriate flashing.
   F. At brick and stone veneers, provide veneer ties designed to accommodate differential movement.
   G. Refer to Architectural window and door head sill and jamb details; parapets; and horizontal material changes for specific horizontal gap requirements between materials.
   H. Delay placement of self-leveling gypsum underlayment/topping around stair and elevator towers until completion of construction.

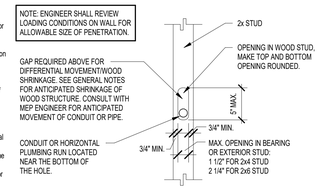
4. Material Storage and Protection

   A. All stored material shall remain covered from the elements to reduce and elevated off the ground to reduce the potential for an increase in moisture content.
   B. Do not allow water to pond on installed floor sheathing. Provide drain holes in the floor sheathing as required to relieve any water that might temporarily pond.

5. Post Occupancy Consideration

   A. Review roof drains every 3 months for the first 18 months of occupancy and then annually. Adjust as needed.
   B. Sealant Joints at exterior doors, windows and at changes in materials shall be reviewed and caulked as needed as wood shrinkage and veneer expansion occurs and original joint is distressed or fails.
   C. Remedial Self-Leveling work may be required around concrete or CMU stair and elevator towers as needed as wood shrinkage occurs.

NOTE: ENGINEER SHALL REVIEW LOADING CONDITIONS ON WALL FOR ALLOWABLE SIZE OF PENETRATION.



STUD HOLE SHRINKAGE DETAIL

WOOD FRAMING NOTES

1. For wood connections not specifically noted or detailed, follow the requirements of IBC 2012 Table 2304.9.1 or ESR 1539.
2. All nails are common nails unless noted otherwise. All nails shall be carefully driven and not overdriven. Submit all proposed fasteners for approval prior to construction. Installation of all fasteners shall meet the requirements of NDS and ISANTA guidelines, including those in ESR 1539, and Section 2303.6 of the IBC.
3. Refer to the Wall Schedules and/or Framing Plans for size, spacing, and species of wall studs and plates. If not shown otherwise, studs and plates are to be #1 or #2 Spruce-Pine-Fir (SPF) with stud spacing 16" o/c maximum. If not shown otherwise, bearing wall headers are to be #2 Southern Pine (SYP).
4. At the contractor's discretion, studs in non-load bearing interior walls may be premium stud grade spaced at 16" o.c. on all levels.
5. Fasten double (DBL) studs together with 0.131" x 3" nails at 6" o.c. unless noted otherwise. For more than two studs, fasten in the same way, nailing as each stud is added.
6. See the header schedule for all header sizes and materials. All headers in non-load-bearing interior walls are to be (2) 2x4 #2 SPF for openings up to 4'-0" and (2) 2x6 #2 SPF for openings over 4'-0". All headers in non-load-bearing walls to have (1) jack stud at each end.
7. Refer to the Shear Wall Schedule for sheathing, nailing, strap ties, hold downs, etc. required for wood-panel-sheathed and gypsum-wallboard-sheathed shear walls.
8. Use double top plates on all walls, including non-load-bearing walls, with all splices and corners lapped. At "T" intersections do not lap top plate of intersecting wall cutting the top plate of the continuous wall, rather use a metal tie plate as described in the exception to Section 2308.9.2.1 of the IBC.
9. Unless otherwise noted on plan or detail, anchor wall plates to foundations and/or supporting structure using Simpson Strong-Tie Titen HD Heavy Duty Screw Anchors, 5/8" diameter with minimum 5" embedment. Space anchors at 48" o.c. for load-bearing and non-load-bearing walls. Reduce spacing to 24" o.c. for all shear walls.
10. Coordinate final floor and roof framing including joist or truss layout & truss member configuration with Mechanical, Electrical, & Plumbing (MEP) drawings. Obtain additional MEP information as needed for complete coordination. Keep all mechanical chases free of framing. Do not locate joists or trusses at parallel plumbing walls.
11. Always bear floor and roof joists or trusses on available interior and exterior bearing walls. Do not cleartson framing disregarding an available bearing wall where such a bearing wall is identified.
12. Where floor trusses are used, use a minimum of (2)4x2 vertical members in floor trusses at all bearings unless noted otherwise. One of these verticals may be under a ribbon board at the end of the truss where ribbon boards are allowed. Do not allow for, nor use ribbon boards at the ends of trusses where solid, continuous full-height blocking or continuous wood-sheathed knee walls are indicated to be used. Where ribbon boards are used with floor trusses they are to be 2x6 minimum.
13. Design roof joists or trusses to support the weight of snow drifting where it applies, as well as rooftop mechanical units, exhaust fans, access hatches, etc. Confirm weights & locations before final design and show the loads for these units/fixtures on the sealed drawings. The Contractor shall ensure the units are installed at their design locations.
14. Where framing supported by a joist or truss can cause uplift on that joist or truss (such as at cantilevered balcony framing) the designer shall consider a load case that maximizes the uplift load in combination with no live load applied to the joist or truss supporting the uplift.
15. All exposed framing to be pressure preservative treated wood (PPT) as described in the Specifications. All PPT wood to be kiln dried after treatment (KDAT). Hardware used with PPT wood to be hot-dip galvanized or stainless steel.
16. All hardware to be by Simpson Strong-Tie or approved equal. Where hardware is not specifically designated, submit proposed hardware for approval. Where more than one type of fastener or fastener pattern is allowed by the hardware manufacturer, hardware fasteners are to be of the type, size, and quantity to maximize the load capacity of the hardware in the specific application shown on these plans, unless noted otherwise.
17. Where a wood-framed wall backs up a non-structural masonry veneer, ties must be fastened to the wood framing members using screws meeting the requirements of the tie manufacturer. Where the tie manufacturer allows the use of nails, ring shank nails must be used. Smooth shank nails may never be used to attach masonry ties to wood framing.
18. Reference the Architectural Plans for layout of all walls, openings, wall types, etc. Verify all dimensions prior to design of wall panels & immediately notify the Architect and Engineer of any discrepancies.
19. Where a Specialty Structural Engineer designs floor and/or roof framing (such as trusses or I-joists), the floor and/or roof designer shall provide the Wall Panel Designer the loads/reactions and locations of all girder or beam bearing points. The Wall Panel Designer shall specify and the Wall Panel Manufacturer shall install sufficient columns/studs to support all such loads from the girder or beam bearing location down to the supporting foundation or podium framing. The Contractor shall ensure the presence of such columns/studs. Similarly, where walls are field-framed, the Framing Contractor shall install the columns/studs for support of girders and beams. As a minimum, the number of studs shown on the plans shall be used, with a minimum of (2) 2x6 or (3) 2x4 studs.
20. At bearing walls, blocking must be added in the floor system to create continuity of all shear wall chord studs, posts and columns, jack/king studs at headers, etc. Such blocking shall be part of the sheathed shear blocking panels, or knee walls where they are used. Where there are wood walls below, these studs, columns, posts, etc. must be present in those walls as well creating a continuous load path to structural steel, the foundation, or other identified adequate support.
21. Where decks or balconies are wood-framed, if the railing relies on a connection to the wood balcony beams or rim joists for stability and load resistance, then the railing designer shall check torsion and other effects on the edge beams or joists and their connections.

FRAMING PLAN NOTES

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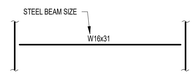
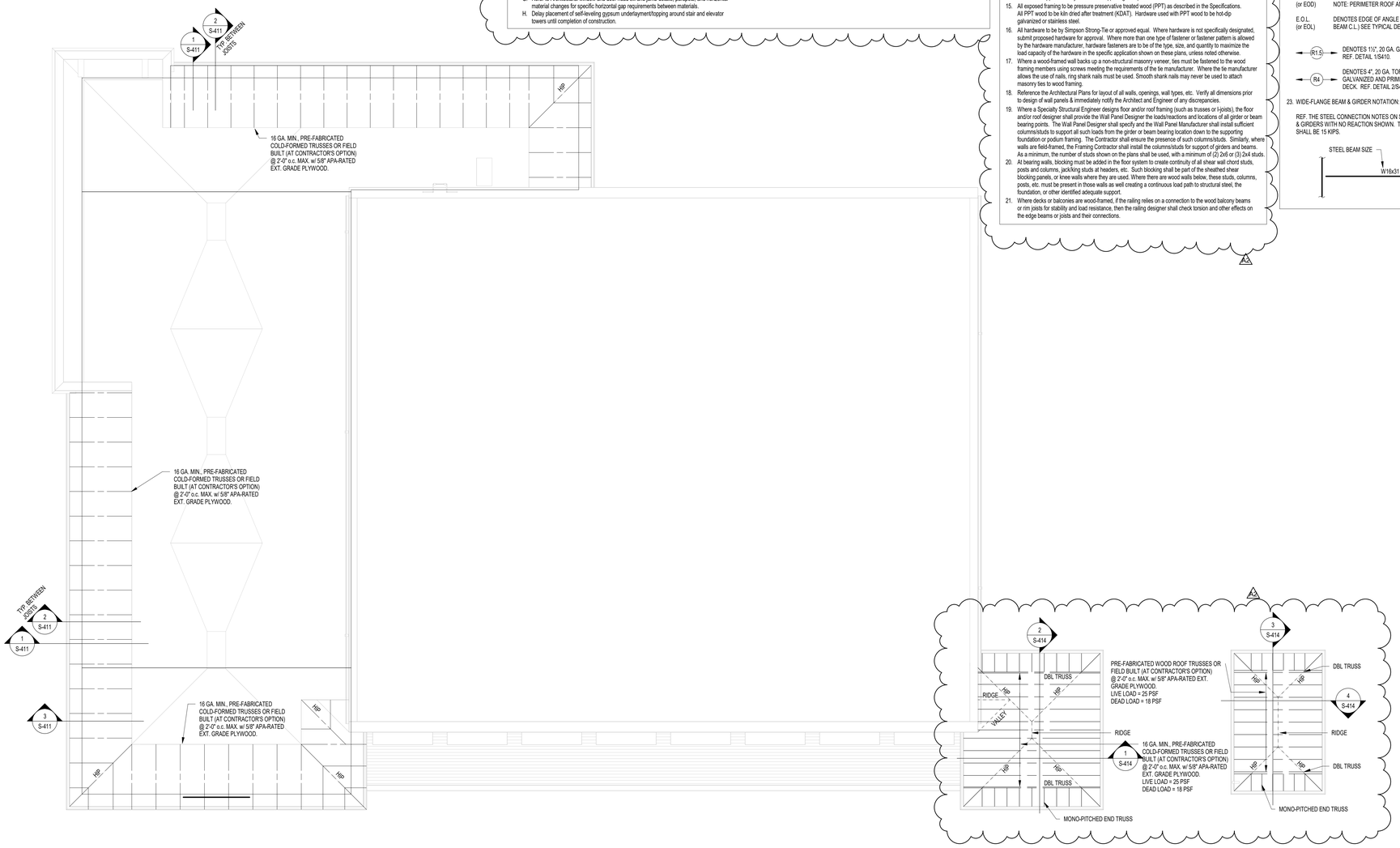
REF. THE STEEL CONNECTION NOTES ON S001 FOR DESIGN OF CONNECTIONS AT BEAMS & GIRDERS WITH NO REACTION SHOWN. THE MIN. SHEAR CONNECTION DESIGN LOAD SHALL BE 15 KIPS.





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

SCHMIDT
ASSOCIATES
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Indianapolis, IN 46204
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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced JMS RMD

ROBERT M. DEE REGISTERED No. 10100205 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
A2	ADDENDUM #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB EST. 1933

Aquatics Center

MANSARD FRAMING PLAN

SF1AM

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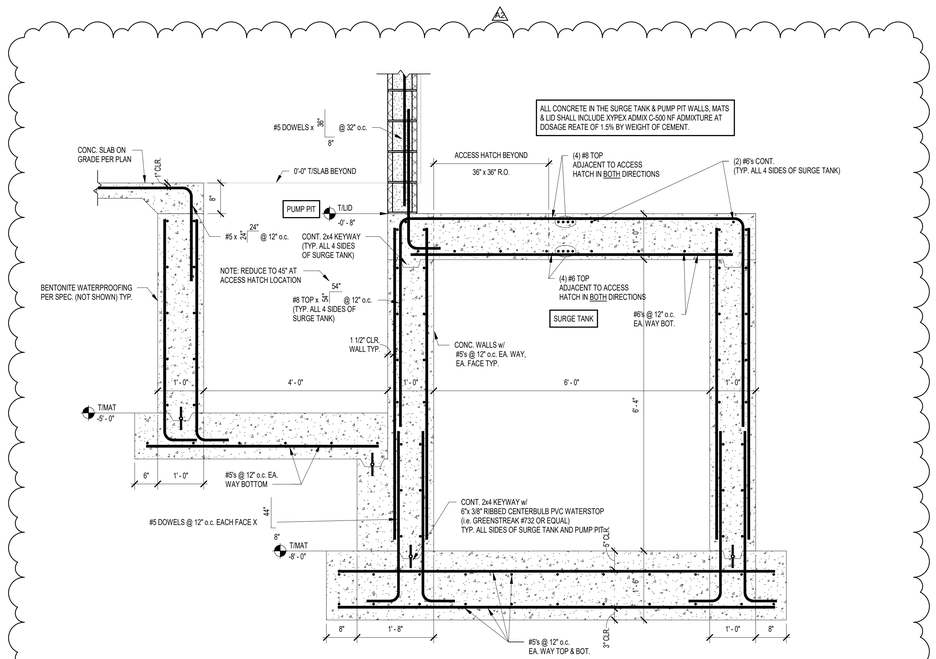
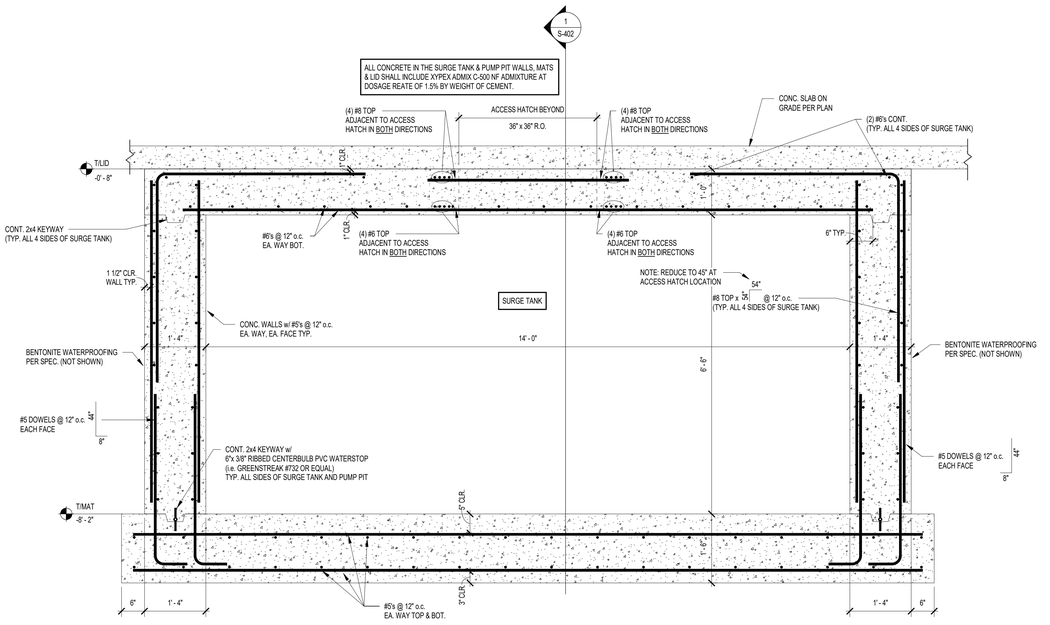
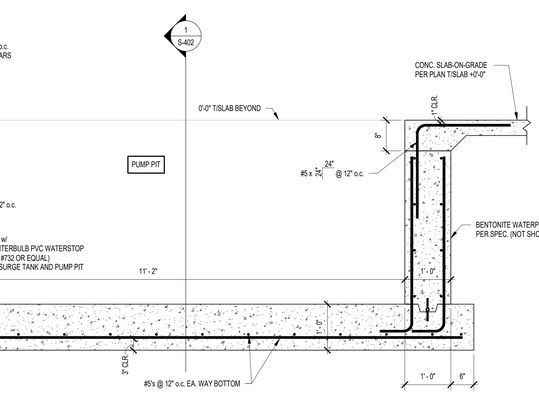


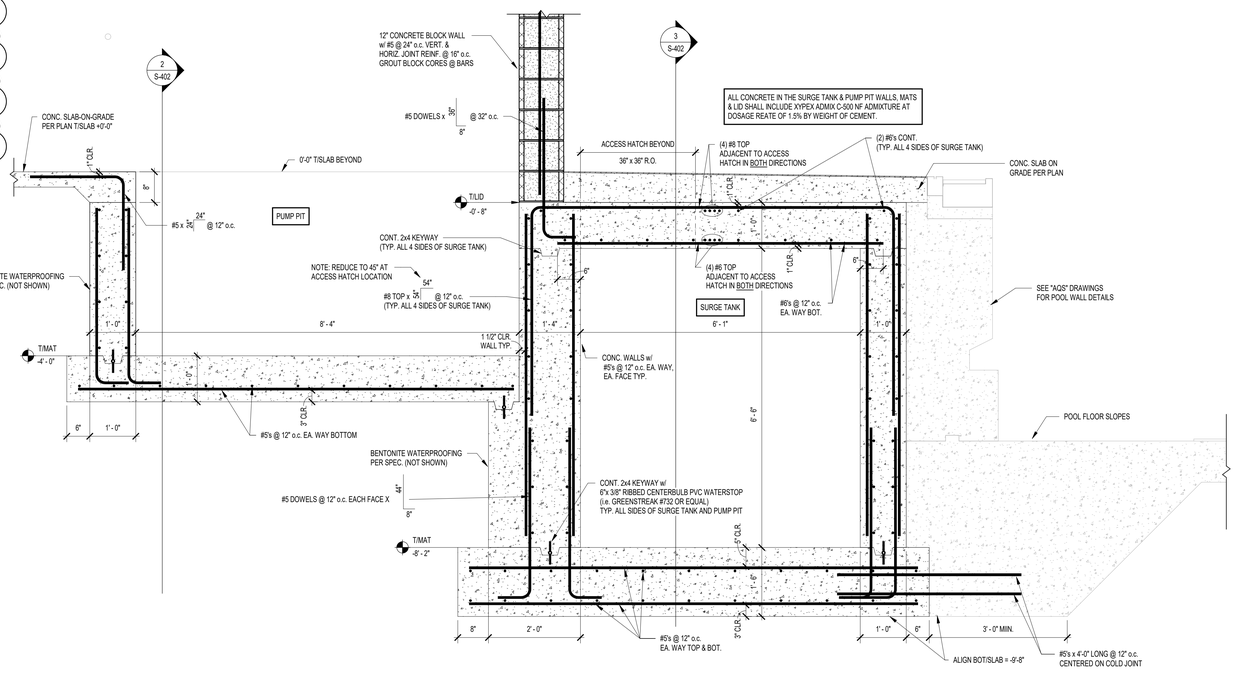
4 FOUNDATION SECTION
3/4" = 1'-0"



3 FOUNDATION SECTION
3/4" = 1'-0"



2 FOUNDATION SECTION
3/4" = 1'-0"



1 FOUNDATION SECTION
3/4" = 1'-0"

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#	Revision	Date
A1	ADDENDUM #1	01/05/2023
A2	ADDENDUM #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB EST. 1933

Aquatics Center

FOUNDATION SECTIONS & DETAILS

A2

S-402

S-402 - FOUNDATION SECTIONS & DETAILS
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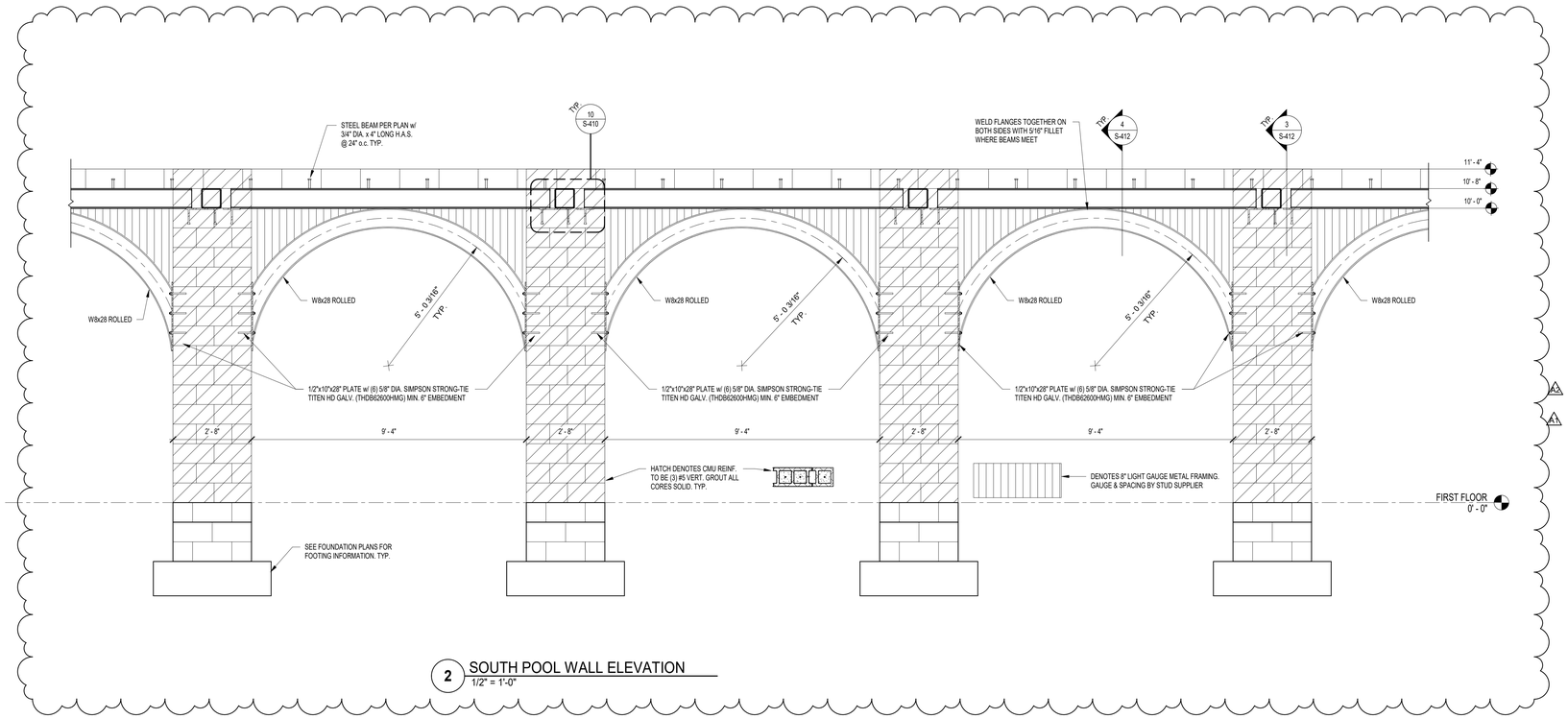
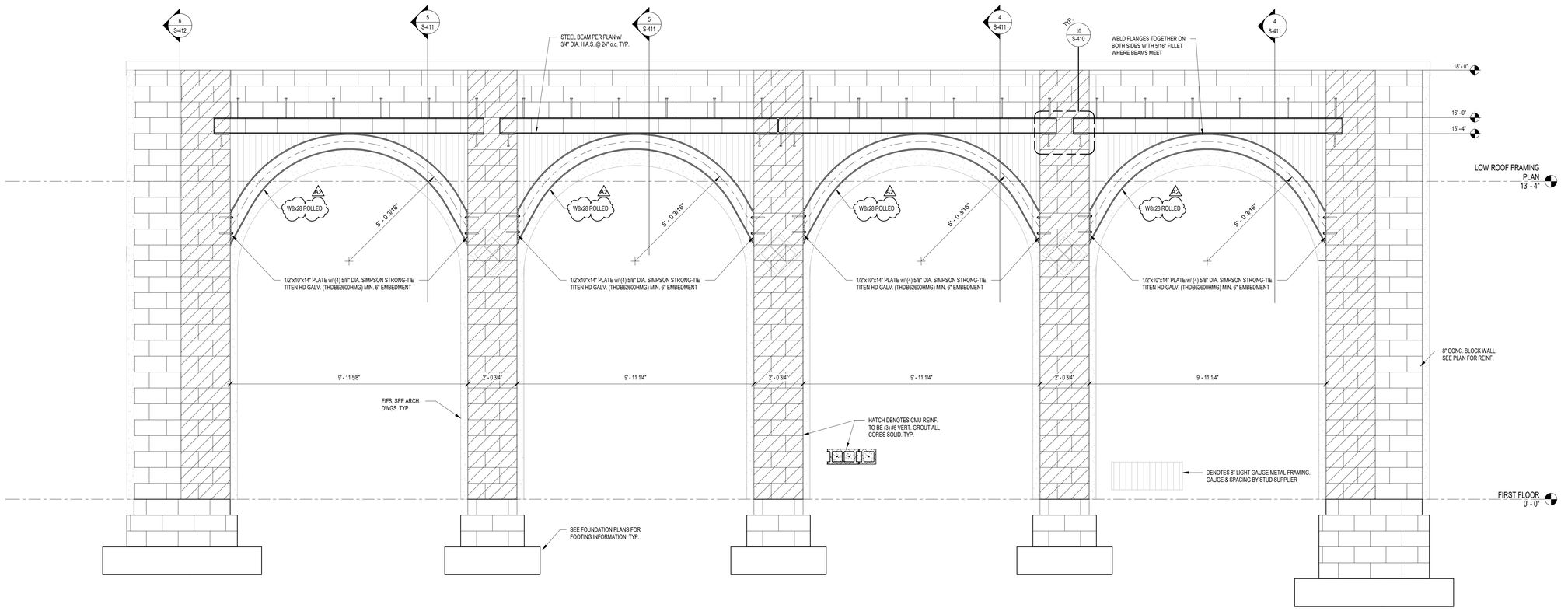


2 SOUTH POOL WALL ELEVATION
1/2" = 1'-0"



1 FRONT ENTRANCE ELEVATION
1/2" = 1'-0"

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5640 N Illinois St
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KEY PLAN

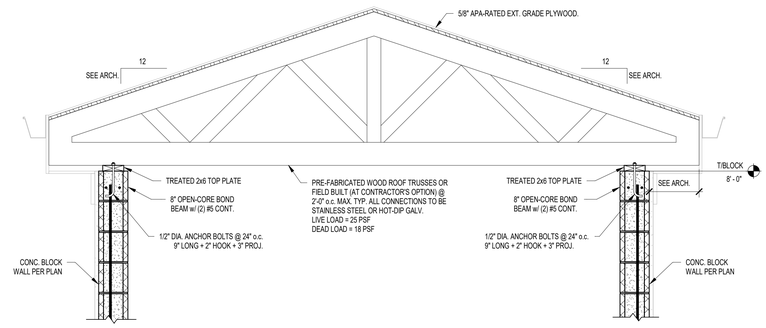
The Riviera Club

THE RIVIERA CLUB EST. 1933

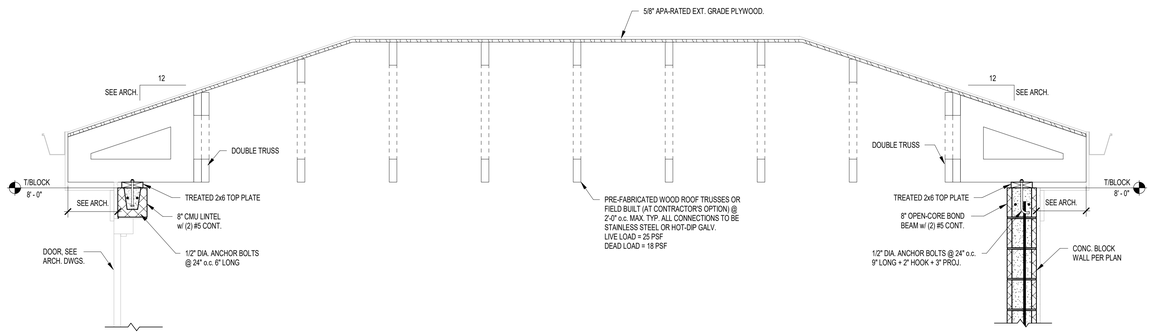
Aquatics Center

FRAMING ELEVATIONS

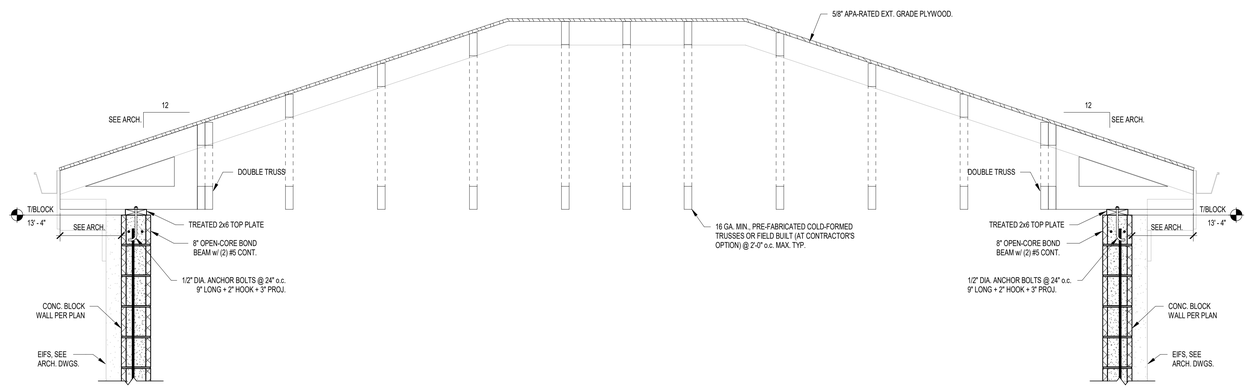
S-413



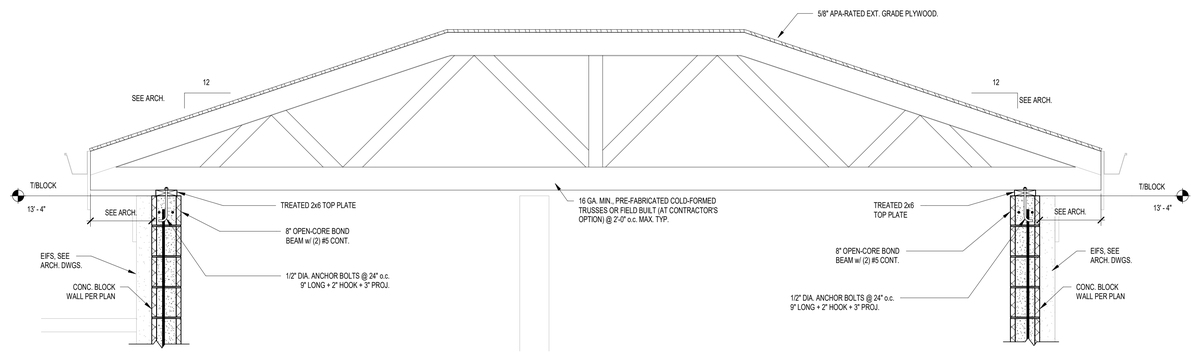
4 FRAMING SECTION
3/4" = 1'-0"



3 FRAMING SECTION
3/4" = 1'-0"



2 FRAMING SECTION
3/4" = 1'-0"



1 FRAMING SECTION
3/4" = 1'-0"

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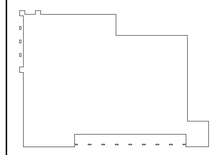

KEY PLAN

N

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

FRAMING SECTIONS & DETAILS

S-414

S-414_FRAMING SECTIONS & DETAILS
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PREFABRICATED, PLATE-CONNECTED WOOD TRUSSES

1. Wood trusses shall be designed by the manufacturer to support the following loads:
   A) Roof Trusses:
      Top Chord Loading:
      Live Load: 25 psf
      Dead Load: 18 psf
      Bottom Chord Loading:
      Dead Load: 8 psf
      Wind & Seismic Loading: Per the 2014 Indiana Building Code.
      Refer to the Design Criteria Notes for design info.
   Trusses shall meet the following deflection criteria, unless otherwise noted. Maximum live load deflection shall not exceed:
   A) Roofs with suspended ceilings: L/360
2. Wood trusses shall be designed by the manufacturer in accordance with the applicable provisions of the latest edition of the National Design Specification of the National Forest Products Association, The Design Specification for Metal Plate Connected Wood Trusses of the Truss Plate Institute (TPI), Wood Structural Building Components Association (SBCA) and the Indiana Building Code.
3. Wood trusses shall be fabricated by a Truss Manufacturer who maintains written procedural and quality control manuals and engages in periodic auditing of fabrication practices and inspections as required by ANSI/TPI 1, Chapter 3. In addition, the Truss Manufacturer shall engage in periodic, unannounced auditing by an approved third-party inspection agency such as TPI for review. If the Truss Manufacturer cannot fulfill these requirements, the Structural Engineer of Record may, at his discretion, require or accept from the Truss Manufacturer, a letter sealed by a Professional Engineer registered in the State of Indiana verifying his inspection of the manufactured wood trusses supplied for this project. The SSE shall verify that the trusses are in compliance with the quality standards of ANSI/TPI 1, Chapter 3. The SSE shall have significant prior experience in the inspection of metal plate-connected wood trusses.
4. Wood materials shall be Southern Pine, or Douglas Fir-Larch and shall be kiln-dried and used at 19% maximum moisture content. Provide Grade No. 2 or better as required to satisfy stress requirements.
5. Connector plates shall be not less than 0.036 inches (20 gauge) in coated thickness, shall meet or exceed ASTM Grade A or higher and shall be hot-dip galvanized according to ASTM A-653 (coating G60). Minimum steel yield stress shall be 33,000 psi.
6. Trusses shall be fabricated in a properly-equipped manufacturing facility of a permanent nature. Trusses shall be manufacture by experienced workmen, using precision cutting, jigging and pressing equipment under the requirements in quality control as indicated in ANSI/TPI 1, Chapter 3.
7. Secondary bending stresses in truss top and bottom chords due to dead, live, and wind loads shall be considered in the design. Load duration factors shall be per the "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION".
8. All girder trusses supporting other trusses of 2x framing members shall be a MINIMUM of (2) piles, unless otherwise approved. Refer to the Manufacturer's Truss Design Drawing for girder ply-to-ply connection requirements. Attach framing members or loads only after all girder piles are in place and properly fastened together, and the girder truss is properly braced to prevent lateral displacement. Refer to BCSI-B9 "Multi-Ply Girders" as published by SBCA and TPI for additional information.
9. Truss-to-girder connection information shall be on the MFr's Truss Design Drawing of the carried truss or girder truss, or the MFr's Truss Placement Drawing. Unless otherwise approved, all truss/joist hangers, strapping, ties, etc. shall be as manufactured by the Simpson Strong-Tie Company.
10. Unless otherwise shown or noted, ALL truss bearings shall be anchored using a mechanical fastener. As a minimum, provide (1) SCRE screw anchor by the Simpson Strong-Tie Company, installed as shown in the details on these plans.
11. Wood trusses shall be erected in accordance with the Truss Manufacturer's requirements. This work shall be done by a qualified and experienced contractor. Truss erection by an inexperienced or non-qualified contractor can result in construction collapse and/or serious injury damage.
12. Where long span trusses (greater than 60' span) are used, refer to BCSI (especially BCSI-B1 and BCSI-B2) special recommendations and requirements for the installation and temporary restraint/bracing of long span trusses. Follow all BCSI recommendations and requirements for the installation and temporary restraint/bracing of long span trusses including consulting a registered Professional Engineer familiar with the installation and temporary restraint/bracing of long span trusses.
13. The contractor shall provide all temporary and permanent bracing/restraints as required for safe erection and performance of the trusses. The guidelines set forth by the following publications of the Truss Plate Institute (TPI) and Structural Building Components Association (SBCA) shall be adhered to unless otherwise noted in the Contract Documents:
    BCSI-B1 GUIDE FOR HANDLING, INSTALLING, RESTRAINING & BRACING OF TRUSSES
    BCSI-B2 TRUSS INSTALLATION & TEMPORARY RESTRAINT/BRACING
    BCSI-B3 PERMANENT RESTRAINT/BRACING OF CHORDS & WEB MEMBERS
    BCSI-B4 CONSTRUCTION LOADING
    BCSI-B5 TRUSS DAMAGE, JOBSITE MODIFICATIONS, AND INSTALLATION ERRORS
    BCSI-B7 GUIDE FOR HANDLING, INSTALLING AND BRACING OF 3x2 & 4x2 PARALLEL CHORD TRUSSES
    BCSI-B8 USING TOE-NAILED CONNECTIONS TO ATTACH TRUSSES AT BEARING LOCATIONS
    BCSI-B9 MULTI-PLY GIRDERS
    BCSI-B10 POST FRAME TRUSS INSTALLATION & TEMPORARY RESTRAINT/BRACING
    BCSI-B11 FALL PROTECTION & TRUSSES
14. Unless otherwise shown or noted, permanent bracing shall consist of 2x4 stress-graded members spanning a minimum of four trusses and nailed at each intersection with a minimum of (2) 16d nails. Lap continuous bracing a minimum of 2'-0" (2 trusses).
15. Refer to Manufacturer's Truss Design Drawing for web members requiring web member permanent restraint or reinforcement. Continuous lateral restraints must ALWAYS be diagonally braced for rigidity.
16. Wherever possible, the temporary erection bracing as described in BCSI-B2 shall be left in place to function as permanent bracing.
17. "T" or "L" reinforcement of the type described in BCSI-B3 shall be used as the means of resisting web member buckling forces in girder trusses and small-quantity trusses. Girder trusses shall be those trusses supporting other trusses, beams, or framing, or trusses more than 24' o.c. Small quantity trusses shall be those where because of the small quantity of similar trusses with aligned web members requiring bracing/restraint (such as parallel step-down trusses), the installation of continuous lateral restraints and the diagonal bracing for the continuous lateral braces is impractical using the methods of BCSI. Such "T" or "L" reinforcement shall be designed by the Truss Design Engineer and shown on the sealed Truss Design Drawings.
18. Design all wood truss bearings using the compression perpendicular-to-grain value of the truss lumber OR the wall plate lumber/nailer, WHICHEVER IS LESS. The bearing length or area shown on the sealed truss drawings shall be based on this lesser value. Use additional truss plies or truss bearing enhancement devices to achieve the required bearing area. If the bearing enhancement device has a valid ESR report, it may be shown on the Truss Placement Plan instead of being shown on the sealed Truss Drawings.
19. Trusses which are too tall for delivery to the jobsite in one piece may be manufactured in two or more sections and "piggybacked" at the jobsite. The contractor MUST install temporary and permanent bracing for the lower supporting trusses as shown on the Manufacturer's Truss Design Drawing and/or the Contract Documents BEFORE installing the cap trusses. The connection between the cap and base truss shall be shown on the sealed Truss Design Drawing. Provide, as minimum, 4x2 sleepers laid flat on the top chord with a minimum of two 16d nails (see Truss Design Drawing for any other or additional requirement). Provide 4' o.c. (brace to brace) diagonal bracing at 45 degrees to brace the sleepers. Install diagonal braces on the bottom side of the top chord in the cap area, unless otherwise specified by the Truss Design Engineer.
20. When indicated on the plans or when a cap truss length exceeds 20', in lieu of the sleepers and diagonal bracing indicated above, structural wood sheathing on the top chord of the base truss in the cap area shall be used as the means of bracing/restraining the base truss in the cap area. The connection between the cap and base truss, shown on the sealed Truss Design Drawing, shall take this into account. Cap trusses must be directly above base trusses.
21. Truss members and components shall not be cut, notched, drilled nor otherwise altered in any way without the written approval of the Truss Design Engineer (See Specialty Structural Engineer notes).
22. Where trusses and/or wood joists and rafters are called to be supported by steel beams, provide continuous double 2x nailer(s) field-bolted to the top of the steel beam with 1/2" diameter carriage bolts spaced a maximum of 24" on center and staggered with both side of beam web. Width of nailer to be width of beam flange +1/2"/-1/4", unless otherwise noted. arriage bolts may be over-tightened to compress the rounded head in the nailer to facilitate installation of continuous band/rim joists, rafters, trusses, etc.
23. Coordinate final truss layout and truss web member configuration with mechanical, electrical and plumbing trades. Keep all mechanical chases free of trusses. Align floor truss web layout, including open Verendeel panels for all parallel trusses with similar spans to provide maximum flexibility of MEP installation. Do not locate trusses at parallel plumbing walls.
24. Submit complete shop drawings for all wood trusses showing member sizes, species, grade, moisture content, span, camber, dimensions, number of plies and truss ply-to-ply connections, reactions and bearing requirements, chord pitch, restraint/bracing requirements, and loadings including any girder loads, field assembly of multi-part trusses, and required cap truss to base truss connection. No reference to another drawing sheet, note external to that individual truss drawing, or detail not shown on that individual truss drawing may be used to convey any of this required information. Shop Drawings shall be submitted to the Structural Engineer of Record and shall bear the seal of a Professional Engineer registered in the State of Indiana.

COLD-FORMED (LIGHT GAUGE) METAL FRAMING NOTES

1. All cold-formed steel framing members, their design, fabrication, and erection shall conform to the SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" of the latest edition of the AISI.
2. All framing members shall be formed from steel conforming to ASTM A653, with a minimum yield strength as follows:
   A) 12, 14 & 16 gauge members: Fy=50ksi
   B) 18, 20 gauge members: Fy=33ksi
3. All framing members shall be galvanized with a G60 coating meeting the requirements of ASTM A653, unless otherwise indicated.
4. Members shall be the Manufacturer's standard 'C'-Shaped studs/joists of the size, flange width, and gauge indicated. All members shall have a minimum flange return of 1/2" and satisfy the minimum properties in accordance with the Steel Stud Manufacturers Association (SSMA).
5. The gauge of all tracks shall match the gauge of the associated stud or joist, unless otherwise noted.
6. All welding shall be in accordance with AWS Specification D1.3. No welding of members less than 14 gauge in thickness is permitted without the approval of the SER. All welding shall be performed by certified welders. All welds shall be touched up with zinc rich paint in accordance with ASTM A780.
7. Provide bridging for all load-bearing studs at a maximum spacing of 48" on center.
8. Provide bridging for all non load-bearing curtain wall studs at a maximum spacing of 54" o.c. Locate one row of bridging within 18" of the top track when a single-deep-leg deflection track is utilized.
9. Provide bridging for joists and rafters at midspan and at a maximum spacing of 6'-0" o.c., unless noted otherwise. All bridging shall be installed prior to the application of any loading. Connect bridging to each member by clip angles, or other approved method per the Manufacturer's requirements.
10. Provide web stiffeners at joist and rafter bearings in accordance with the Manufacturer's requirements.
11. All axially-loaded studs shall have full bearing against the track web, prior to stud and track alignment. Splices in axially loaded studs are not permitted.
12. Provide the Manufacturer's standard track, clip angles, bracing, reinforcement, fasteners, and accessories as recommended by the Manufacturer for the application indicated and as needed to provide a complete framing system. Unless otherwise indicated, install the metal framing system in accordance with the Manufacturer's shop drawings, written instructions and recommendations.
13. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with the stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from the item supported.
14. All field-cutting of studs must be done by sawing or shearing. Torch-cutting of cold-formed members is not allowed.
15. No notching or coping of studs is allowed, unless explicitly shown on the design or shop drawings. All field-cut holes must be reinforced.
16. The Framing Contractor is to ensure punch out alignment when assembling lateral bracing/bridging and field-cutting studs to length. Lateral bracing/bridging must be installed at the time the wall is erected.
17. Temporary bracing shall be provided and remain in place until work is completely stabilized.
18. Use a minimum of three studs at the corners of all exterior walls.
19. Use a minimum of three studs at the intersections and corners of all load-bearing walls.
20. All headers and built-up beams must be constructed of UNPUNCHED material only. Install insulation in built-up wood headers, unless specified otherwise, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
21. Shop drawings: Show layout, spacings, sizes, thicknesses, types of cold-formed metal framing, and fastening and accessory devices, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
22. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer (SSE) responsible for their preparation.
23. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   A) Design Loads: Reference the Design Criteria Notes
   B) Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      1. Wall Framing: Horizontal deflection of 1/240 of the wall height for walls with flexible finishes, e.g. metal siding, wood siding, EIFS, etc.
      2. Wall Framing: Horizontal deflection of 1/360 of the wall height for walls with cementitious finishes, e.g. cement plaster.
      3. Wall Framing: Horizontal deflection of 1/600 of the wall height for walls with masonry veneer finishes.
      4. Floor Joist Framing: Vertical deflection of 1/480 of the span under live load. Limit deflection under total load (dead + live) to 1/360 of the span.
      5. Roof Framing: Vertical deflection of 1/360 of the span under live/snow load. Limit deflection under total load (dead + live/snow) to 1/240 of the span.
24. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, undue strain on fasteners and anchors, or other detrimental effects when subject to an ambient temperature change of not less than 120 degrees F.
25. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows: Upward and downward movement of 3/4 inch.
26. Design exterior non-load-bearing curtain wall framing to accommodate horizontal deflection without regard for contribution or sheathing materials.

PREFABRICATED, COLD-FORMED (LIGHT GA.) METAL TRUSSES

1. Metal trusses shall be designed by the manufacturer to support the following loads:
   A) Roof Trusses:
      Top Chord Loading:
      Ground Snow Load: 20 psf + Drift Loads
      Dead Load: 12 psf + Add'tl. 5 psf at overbuild areas
      Bottom Chord Loading:
      Attic Live Load: 10 psf
      Dead Load: 8 psf
      Wind & Seismic Loading: Per the 2014 Indiana Building Code.
      Refer to the Design Criteria Notes for design info.
   Trusses shall meet the following deflection criteria, unless otherwise noted. Maximum live load deflection shall not exceed:
   A) Roofs with suspended ceilings: L/360
2. Metal trusses shall be designed by the manufacturer in accordance with the applicable provisions of the latest edition of the North American Standard For Cold-Formed Steel Structural Framing (AISI), Structural Building Components Association (SBCA) and the Indiana Building Code.
3. Secondary bending stresses in truss top and bottom chords due to dead, live, and wind loads shall be considered in the design.
4. All girder trusses supporting other metal trusses or purlins/joists shall be a MINIMUM of (2) piles, unless otherwise approved. Refer to the Manufacturer's Truss Design Drawing for girder ply-to-ply connection requirements. Attach framing members or loads only after all girder piles are in place and properly fastened together, and the girder truss is properly braced to prevent lateral displacement.
5. Truss-to-girder connection information shall be on the MFr's Truss Design Drawing of the carried truss or girder truss, or the MFr's Truss Placement Drawing. Unless otherwise approved, all truss/joist hangers, strapping, ties, etc. shall be as manufactured by the Simpson Strong-Tie Company.
6. Unless otherwise shown or noted, ALL truss bearings shall be anchored using a mechanical fastener as designed by the Truss Manufacturer.
7. Metal trusses shall be erected in accordance with the Truss Manufacturer's requirements. This work shall be done by a qualified and experienced contractor. Truss erection by an inexperienced or non-qualified contractor can result in construction collapse and/or serious injury damage.
8. Where long span trusses (greater than 60' span) are used, refer to BCSI (especially CFSBCSI-B1 and CFSBCSI-B2) and Technical Note 551d "Design Guide For Construction Bracing of Cold Formed Steel Trusses" of the Cold-Formed Steel Engineers Institute (CFSEI) special recommendations and requirements for the installation and temporary restraint/bracing of long span trusses. Follow all BCSI recommendations and requirements for the installation and temporary restraint/bracing of long span trusses including consulting a registered Professional Engineer familiar with the installation and temporary restraint/bracing of long span trusses.
9. The contractor shall provide all temporary and permanent bracing/restraints as required for safe erection and performance of the trusses. The guidelines set forth by the following publications of the Structural Building Components Association (SBCA) shall be adhered to unless otherwise noted in the Contract Documents:
    CFSBCSI-B1 GUIDE FOR HANDLING, INSTALLING, RESTRAINING & BRACING OF TRUSSES
    CFSBCSI-B2 TRUSS INSTALLATION & TEMPORARY RESTRAINT/BRACING
    CFSBCSI-B3 PERMANENT RESTRAINT/BRACING OF CHORDS & WEB MEMBERS
    CFSBCSI-B4 CONSTRUCTION LOADING
    CFSBCSI-B5 TRUSS DAMAGE, JOBSITE MODIFICATIONS, AND INSTALLATION ERRORS
    CFSBCSI-B11 FALL PROTECTION & TRUSSES
10. Unless otherwise shown or noted, permanent bracing/restraint shall consist of a minimum of 150F125-33 furring channels or 250S162-33 studs spanning a minimum of three trusses and fastened at each intersection with a minimum of (2) #10SDS. Lap continuous bracing/restraint a minimum of 4'-0" (2 trusses).
11. Refer to Manufacturer's Truss Design Drawing for web members requiring web member permanent restraint or reinforcement. Continuous lateral restraints must ALWAYS be diagonally braced for rigidity.
12. Wherever possible, the temporary erection bracing as described in CFSBCSI-B2 shall be left in place to function as permanent bracing.
13. Trusses which are too tall for delivery to the jobsite in one piece may be manufactured in two or more sections and "piggybacked" at the jobsite. The contractor MUST install temporary and permanent bracing for the lower supporting trusses as shown on the Manufacturer's Truss Design Drawing and/or the Contract Documents BEFORE installing the cap trusses. The connection between the cap and base truss shall be shown on the sealed Truss Design Drawing. Provide, as minimum, furring channel purlins laid on the top chord of the supporting trusses, spaced at 24' o.c. maximum and adequately fastened to the top chord (see Truss Design Drawing for any other or additional requirement). Provide 4'-o.c. (brace to brace) diagonal bracing at 45 degrees to brace the purlins. Install diagonal braces on the bottom side of the top chord in the cap area, unless otherwise specified by the Truss Design Engineer.
14. When indicated on the plans or when a cap truss length exceeds 20', in lieu of the purlins and diagonal bracing indicated above, structural wood sheathing on the top chord of the base truss in the cap area shall be used as the means of bracing/restraining the base truss in the cap area. The connection between the cap and base truss, shown on the sealed Truss Design Drawing, shall take this into account. Cap trusses must be directly above base trusses.
15. Truss members and components shall not be cut, notched, drilled nor otherwise altered in any way without the written approval of the Truss Design Engineer (See Specialty Structural Engineer notes).
16. Coordinate final truss layout and truss web member configuration with mechanical, electrical and plumbing trades. Keep all mechanical chases free of trusses. Align floor truss web layout, including open Verendeel panels for all parallel trusses with similar spans to provide maximum flexibility of MEP installation. Do not locate trusses at parallel plumbing walls.
17. Submit complete shop drawings for all metal trusses showing member sizes, camber, dimensions, number of plies and truss ply-to-ply connections, reactions and bearing requirements, chord pitch, restraint/bracing requirements, and loadings including any girder loads, field assembly of multi-part trusses, and required cap to base truss connection. No reference to another drawing sheet, note external to that individual truss drawing, or detail not shown on that individual truss drawing may be used to convey any of this required information. Shop Drawings shall be submitted to the Structural Engineer of Record and shall bear the seal of a Professional Engineer registered in the State of Indiana.

STEEL CONNECTION NOTES

1. Typical beam-to-beam and beam-to-column connections shall be bearing type using A325 bolts, unless noted otherwise.
2. Shop connections unless otherwise shown, may be either bolted or welded. All field connections shall be bolted unless otherwise shown on the Structural Drawings.
3. Connections shall be designed by the Steel Fabricator to support the reactions shown on the framing plan(s). Simple span connections without reactions listed on the Structural Drawings shall be designed by the Steel Fabricator in accordance with Table 3-6 of the AISC "Manual of Steel Construction, 14th Edition". For composite beams where reactions are not indicated, design connections for 75% of the Maximum Total Uniform Load ASD value for the applicable beam size and span given in Table 3-6. For non-composite beams, design connections for 50% of the tabulated ASD value.
4. Submit calculations for connections not detailed on the Structural Drawings and not covered by the AISC Tables, including but not limited to:
   A) Column Splices.
   B) Moment Connections.
   C) Bracing Connections including Collectors and Drag Struts.
5. All beam-to-beam connections shall be double angle, unless shown or noted otherwise.
6. All beam-to-column connections shall be at the column centerline, unless noted otherwise. Shear tab connections to tubes are permitted unless otherwise noted or detailed.
7. Typical beam-to-beam, and beam-to-column field-bolted connections may be tightened to the snug-tight condition, unless otherwise shown or noted.
8. Bolted connections in moment frames, bracing connections, hangers and stub columns, crane connections, and those designated PT (pretensioned) on the Drawings shall be pretensioned joints utilizing tension-control (TC) bolts or direct tension indicators. Holes for PT bolts shall be 1/16" larger than the bolt diameter. All pretensioned joints must be inspected by the Testing Agency.
9. Connect bracing members for two components of stress unless otherwise approved by the Structural Engineer of Record. Provide a minimum connection for calculated field conditions.
10. Locate centerlines of all vertical bracing members on column centerlines in vertical plane and on column and beam centerlines in horizontal plane, unless otherwise shown on the Structural Drawings.
11. All welding shall be in conformance with AWS D1.1, using E70XX electrodes, unless shown or noted otherwise. Welding, both shop and field, shall be performed by welders certified for the weld types and positions involved according to the current edition of AWS D1.1. Perform all AESS welds with care to provide a clean, uniform appearance.
12. Backup bars required for welded connections shall be continuous.
13. Holes in steel shall be drilled or punched. All slotted holes shall be provided with smooth edges. Burning of holes in structural steel shall not be allowed without approval of the Structural Engineer of Record.
14. The minimum thickness of all connection material shall be 5/16" unless noted.
15. Continuous bent plate and angle closures, roof edges, diaphragm chords, etc. around perimeter of the floor and roof, as well as around openings in floors, shall be welded with a minimum 1/4" fillet weld x 3" long at 12" o.c., top & bottom, unless noted otherwise. Butt weld joints in continuous diaphragm chord for continuity. For continuous perimeter angles and bent plates perpendicular to and connected to the top chords of joists, provide a minimum 3" of 1/4" weld at each joist. Continuous angle and bent plate closures may be shop-applied to the supporting structural members only when requested and approved by Structural Engineer of Record.
16. Where steel beams are called to have wood nailers supporting wood floor or roof framing, provide 1/2" diameter carriage bolts spaced at 24" on center and staggered each side of the beam web, unless noted otherwise. Carriage bolts may be over-tightened to compress the rounded head in the nailer to facilitate installation of continuous band/rim joists, rafters, trusses, etc.
17. A qualified independent Testing Agency shall be retained to perform inspection and testing of structural steel field weldaments as follows:

WELD INSPECTION SCHEDULE

WELD TYPE	VT	MT	UT	PT	CRT	COMMENTS
FILLET (SINGLE PASS)	25%	-	-	-	-	ROOT PASS AND FINISHED WELD
FILLET (MULTIPLE PASS)	50%	25%	-	-	-	
FLARE BEVEL/ FLARE V	25%	-	-	-	-	
GROOVE (PARTIAL PENETRATION)	100%	-	100%	-	-	REFERENCE NOTE 'E' BELOW
GROOVE (FULL PENETRATION)	100%	-	100%	-	-	ALL FULL PENE-TRATION WELDS

   A) Test procedures:
      VT = Visual Test (inspection)
      MT = Magnetic Particle Test: ASTM E109, cracks or incomplete fusion or penetration not acceptable.
      UT = Ultrasonic Test: ASTM E164.
      PT = Penetrant Test: ASTM E165.
      RT = Radiographic Test: ASTM E94 and ASTM E142, min. quality level 2-21.
   B) Acceptance standards in AWS D1.1 shall be followed for each test procedure.
   C) Test procedures may be substituted to meet feasibility requirements of test based upon weld geometry or other factors with the approval of the Structural Engineer of Record.
   D) Samples shall occur at random locations; additional tests may be required at locations noted on the Drawings.
   E) Groove welds include square, bevel, V, U, and J grooves including single and double pass types.
   F) Partial penetration square groove welds at end seal plates of tubular members do not require inspection.
   G) Weld Procedure Specifications (WPS) shall be produced and maintained in accordance with AWS D1.1. The independent Testing Agency shall have access to all WPS's during the course of testing and inspection.
   H) For highly-restrained welded joints, especially in thick plates and/or heavy structural shapes, details the welds so that shrinkage occurs as much as possible in the direction the steel was rolled. Refer to the AISC Manual for preferred welded-joint arrangements that reduce the possibility for lamellar tearing. Members selected to receive highly-restrained connections shall be tested by the independent Testing Agency by Ultrasonic Testing prior to commencing welding.
   I) In addition to inspection requirements for fillet welds in Table above, 100% of field welding of diagonal bracing members to gusset plates shall be visually inspected (VT).

STRUCTURAL WOOD PANEL/SHEATHING NOTES

1. All plywood and Oriented Strand Board (OSB) construction shall be in accordance with the American Plywood Association (APA) Specifications and DOC PS1 or PS2.
2. All roof panel sheathing for roofs with slopes greater than or equal to 3 in 12 shall be 5/8", APA-rated sheathing. Suitable edge support shall be provided by use of panel clips or blocking between framing unless otherwise noted. Fasten roof sheathing with 8d common (0.131" x 2 1/2") nails spaced 6" o.c. at supported edges and 12" o.c. at intermediate supports. For roofs with slopes less than 3 in 12, the roof sheathing shall be 3/4" nominal sheathing with 10d common (0.148" x 3") nails spaced 6" o.c. at supported edges and 12" o.c. at intermediate supports.
3. All floor sheathing shall be 3/4" nominal (23/32" actual) APA-rated Sturd-i-floor, with tongue-and-groove edges, unless otherwise noted. Fasten floor sheathing/subfloor with 10d common (0.148" x 3") nails spaced 6" o.c. at supported edges and 12" o.c. at intermediate supports. Field-glue using adhesives meeting APA-specification AFG-01, applied in accordance with the manufacturer's recommendations.
4. The use of heavily loaded drywall carts or similar conveyances to transport building materials and/or debris can exceed the APA PS2 concentrated load test standard capacity. In areas subject to cart traffic (eg. corridors, elevator lobbies, etc.), the contractor shall place a temporary second layer of dry wood structural panel to help avoid failures of the floor panels. Refer to APA Technical Note TT-024, February 2008.
5. All structural wall panel sheathing shall be 7/16", APA-rated PS2 sheathing, unless otherwise indicated. Fasten wall sheathing with 8d common (0.131" x 2 1/2") nails spaced 6" o.c. at supported panel and 12" o.c. at intermediate supports, unless otherwise noted in the Shear Wall Schedule.
6. All gypsum wall board wall sheathing to be 5/8", unless otherwise shown or noted on the Architectural Drawings. Fasten sheathing with 6d cooler nails or 0.120" wallboard nails x 2 3/8" long spaced 7" o.c. at supported edges and 12" o.c. at intermediate supports, unless otherwise noted in the Shear Wall Schedule.
7. Provide 2x blocking with specified edge nailing at unsupported panel edges as follows:
   A) Roofs and Floors - Not required unless indicated on the plans, noted, or details.
   B) Walls - Required at all wood panel joints, unless noted otherwise.
8. Unless otherwise noted or shown, install plywood sheathing with the strength axis of the panel across supports and with panel continuous over two or more spans. Allow 1/8" spacing at panel ends and edges unless otherwise recommended by the sheathing manufacturer.
9. Wood structural panels used in shear walls shall be 4' x 8' minimum. These panels may only be cut at wall or wall opening boundaries. All panel edges shall fall on framing members. Block all horizontal joints and fasten with edge nailing.
10. For shear walls, where a vertical sheathing joint falls on the joint between two adjacent studs (such as the ends of shop or site built panels or at a vertical step in the building floor), fasten the end studs together with 0.131"x3" nails at same spacing as for the shear wall sheathing.
11. In all wood-framed roof, floor, ceiling, and wall areas where wood sheathing and/or gypsum wall board sheathing is applied, attach the sheathing to all wood framing members regardless of the closeness of their spacing. Where gypsum wall board sheathing is applied over resilient channels, attach the resilient channels to all framing members.
12. Installation of gypsum panel products must follow the requirements of the Gypsum Association. The "Floating Interior Angles" method as described in GA-216 shall be used to avoid negative effects from potential truss uplift, wood shrinkage, and other causes of framing movement. An extensive discussion of this issue can be found in the TTB "Partition Separation Prevention and Solutions" from the Structural Building Components Association. The contractor shall familiarize himself with the content of these documents before beginning the installation of gypsum panel products.
13. The requirements shown on the structural drawings for sheathing are the minimum requirements for the structural needs of the structure. They do not account for all possible quality, aesthetic, and other considerations. The contractor is expected to be familiar with APA's construction guidelines and other common construction practices necessary to avoid quality and aesthetic issues. The use of panel edge gaps to avoid panel buckling is an example. Another is the allowance of the application of wood sheathing to walls with the face grain vertical, which can lead to greater buckling possibilities. The contractor will need to consider stud size, stud spacing, and sheathing thickness in these situations.
14. For wood sheathed shear walls, unless otherwise indicated, regardless of the extent of a wall indicated as a wood sheathed shear wall, wood shear wall sheathing must extend the full length of the wall to maintain a smooth wall and avoid an offset/bump in the wall. Sheathing must continue to a corner or offset in the wall. If any part of the wall extends past a corner or offset (such as dropped headers across an inset entry) then the sheathing must continue past this point so that a smooth wall is created.

MINIMUM COVER FOR REINFORCEMENT

	MINIMUM COVER
SUSPENDED SLABS AND JOISTS	
TOP & BOTTOM BARS FOR DRY CONDITIONS:	
#11 BARS & SMALLER	3/4"
#14 & #18 BARS	1 1/2"
FORMED CONCRETE SURFACES EXPOSED TO EARTH, WATER, OR WEATHER, AND OVER OR IN CONTACT WITH SEWAGE AND FOR BOTTOMS BEARING ON WORK MAT, OR SLABS SUPPORTING EARTH COVER:	
#5 BARS & SMALLER	1 1/2"
#6 THROUGH #18 BARS	2"
BEAMS & COLUMNS, FORMED	
FOR DRY CONDITIONS:	
STIRRUPS, SPIRALS & TIES	1 1/2"
PRINCIPAL REINFORCEMENT	2"
EXPOSED TO EARTH, WATER, SEWAGE, OR WEATHER:	
STIRRUPS & TIES	2"
PRINCIPAL REINFORCEMENT	2 1/2"
WALLS	
FOR DRY CONDITIONS:	
#11 BARS & SMALLER	3/4"
#14 & #18 BARS	1 1/2"
FORMED CONCRETE SURFACES EXPOSED TO EARTH, WATER, SEWAGE, WEATHER, OR IN CONTACT WITH GROUND	2"
FOOTINGS & BASE SLABS	
AT FORMED SURFACES & BOTTOMS BEARING ON CONCRETE WORK MAT	2"
AT UNFORMED SURFACES & BOTTOMS IN CONTACT WITH EARTH	3"
TOP OF FOOTINGS	SAME AS SLABS
OVER TOP OF PILES	2"

POST-INSTALLED DOWELS & ANCHOR BOLTS/RODS

1. All reinforcing steel and threaded rod anchors to be installed in a 2-part chemical anchoring system shall be treated as follows:
   A. Drill holes larger than bar or rod to be embedded. Coordinate hole diameter with Manufacturer's recommendations.
   B. Holes must be cleaned and prepared in accordance with Manufacturer's recommendations.
   C. When reinforcing steel is encountered during drilling for installation of anchors; stop drilling, use a sensor to locate the reinforcing in the surrounding area and install anchor(s) as close as possible to the original location. Contact the Structural Engineer of Record (SER) for direction when the revised location is more than 2" from the original location or when the original function of the anchorage is significantly altered. When in doubt, contact the SER for direction.
   D. Drill the hole a minimum of 15 bar diameters or as shown on the plans.
   E. Use a 2-part adhesive anchoring system, Hilti HY-200, or approved equal.
   F. For anchorage into hollow substrate, use Hilti HY-270, or approved equal.
   G. Reinforcing steel dowels shall be ASTM A615, Grade 60, unless noted.
   H. Anchor rods shall be Hilti HAS-V-36, unless noted. Provide finish as noted on the Drawings. If not noted, provide hot-dip galvanized finish for interior applications. Provide stainless steel finish for all exterior applications, unless noted.
2. When column anchor bolts have been omitted, or damaged by construction operations, the Contractor must obtain the written approval of the Structural Engineer of Record prior to repair or replacement.
   A. As a precaution, the affected column must be guyed and braced after repair for the balance of the erection period.
   B. As an alternate to guying and bracing, the Contractor may at his option, employ a testing agency to perform a tensile pull test to confirm the strength for the repaired or replaced anchor bolt. The tensile proof load must exceed 1.33 x the design load of the original anchor without causing distress of the anchor bolt or the surrounding concrete. Reference the following table for the minimum proof loads:

3/4" diameter:	12.8 kips
7/8" diameter:	17.4 kips
1" diameter:	22.7 kips
1 1/8" diameter:	28.8 kips
1 1/4" diameter:	35.6 kips

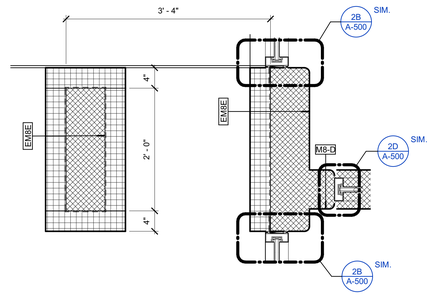
   Note: Values listed above are for ASTM F-1554, Grade 36 material. When higher grade or strength materials are specified, refer to the AISC Steel Design Guide 1, Table 3.1 for minimum allowable loads to be multiplied by 1.33.
   C. When affected anchor bolts are part of a fixed moment resisting column base, such as those in moment-resisting space frames, canopies, or fixed-base installations, the repaired anchor bolts must be proof-loaded, or the affected column footing and/or pier replaced in its entirety.
   D. When affected anchor bolts are part of a braced frame the affected column footing and/or pier must be replaced in its entirety.
   E. Prior to erection, the controlling Contractor must provide written notification to the Steel Erector if there has been a repair, replacement or modification of the anchor bolts for that column.

STEEL DECK NOTES

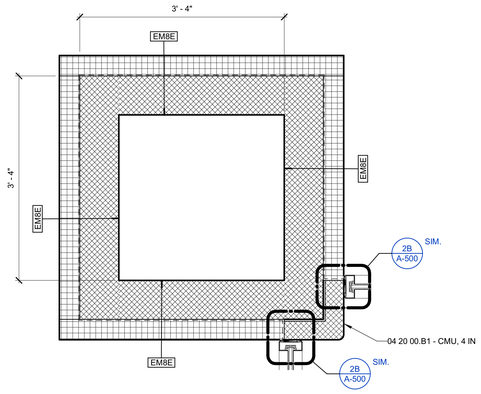
1. All steel deck material, fabrication and installation shall conform to the Steel Deck Institute "SDI SHORT FORM SPECIFICATIONS" and "SDI CODE OF STANDARD PRACTICE," current edition, unless noted.
2. Provide members for deck support at all deck span changes. Provide L3x3x3/16 deck support at all column where required.
3. All deck shall be provided in a minimum of 3-span lengths where possible.
4. All welding of steel deck shall be in conformance with AWS Specification D1.3. Provide welding washers for all floor deck less than 22 gauge in thickness.
5. Mechanical fasteners may be used in lieu of welding, providing fasteners meet, or exceed the strength of specified welds. Submit fastener type data to the Structural Engineer of Record for review.
6. Substitution of fiber secondary reinforcement for welded wire fabric on supported slabs is prohibited.
7. Do not suspend any items, such as ductwork, mechanical and electrical fixtures, ceilings, etc. from steel deck.
8. Roof deck sidelaps shall be attached at ends of cantilevers and at a maximum spacing 12" o.c. from cantilevered roof deck ends. The roof deck must be completely fastened to the supports and at the sidelaps before any load is applied to the cantilever.
9. Submit shop drawings for review of layout and determine its design concept in accordance with Specifications in the Project Manual. Erection drawings shall show type of deck, shop finish, accessories, method of attachment, edge details, deck openings and reinforcement, and sequence of installation.
10. Installation holes shall be sealed with a closure plate 2 gauges thicker than deck and mechanically fastened to deck. Steel deck holes visible from below will be rejected. Deck units that are bent, warped, or damaged in any way which would impair the strength and appearance of the deck shall be removed from the site.
11. Where gauge metal purposes are indicated, supply pourstops designed to meet, or exceed the gauges listed in the SDI Pourstop Selection Table (min. 18 ga.) as required for slab depth, concrete weight, and cantilever distance, unless noted otherwise.
12. The Erector shall shim between parallel roof beams and joists with differential mill and induced cambers for level deck bearing.

STEEL JOIST NOTES

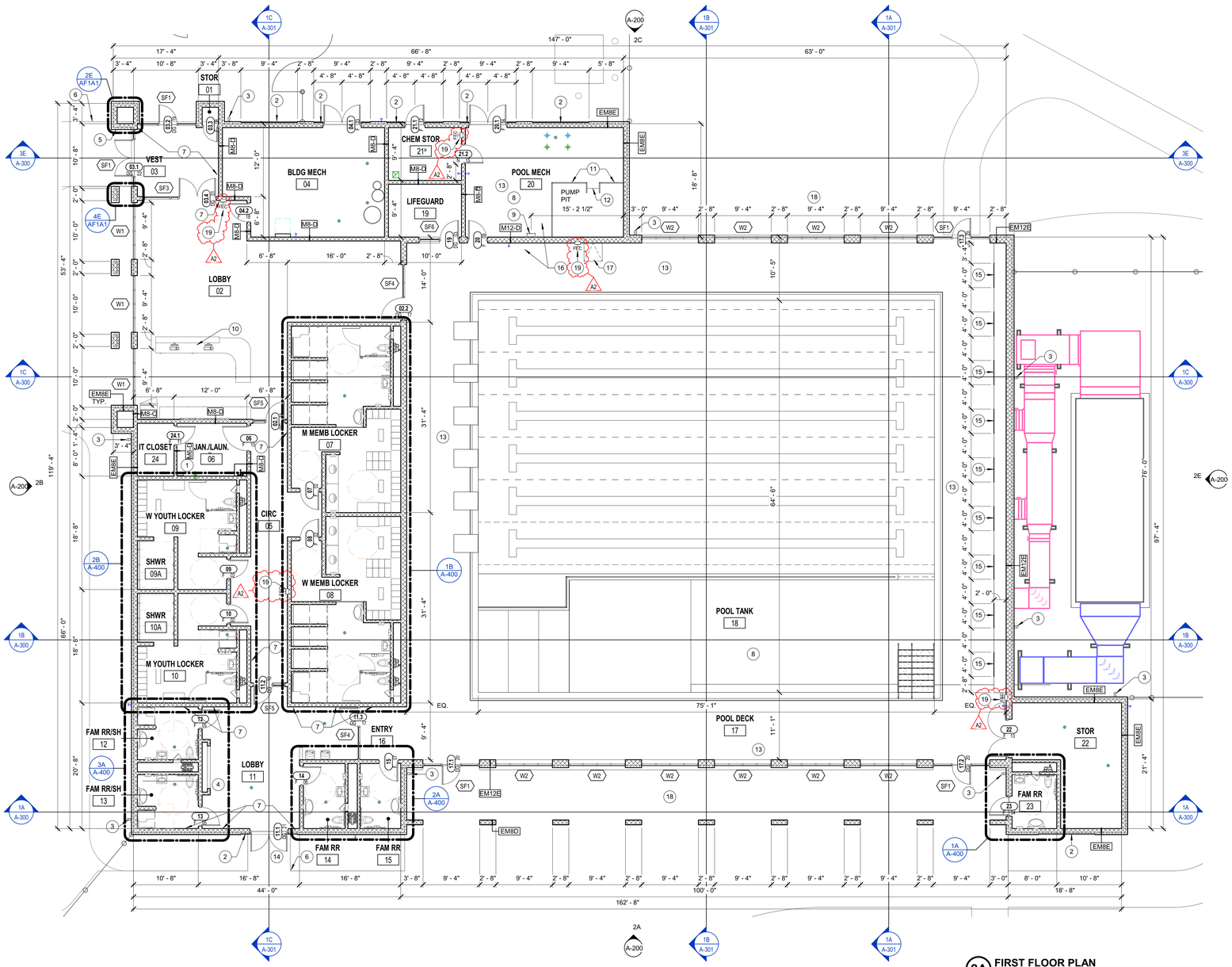
1. All steel joists shall be designed, fabricated, and erected in accordance with SJI Standard Specifications.
2. Joist bridging (if shown) is schematically indicated. Provide all bridging necessary to conform to SJI Specifications.
3. The ends of all bridging lines terminating at walls or beams shall be anchored to the wall or beam.
4. Joist bridging and connections shall be completely installed prior to placing any construction loads on the joists. Construction loading shall not exceed the joist design load.
5. All roof joists shall be capable of resisting the net uplift a noted on the Structural Drawings (min. 15 psf net). Provide an additional row of continuous horizontal bottom chord bridging at the first panel point location at each end of all roof joists.
6. Special joists (SP) shall be designed for the load designations specified on the Structural Drawings. Designs shall properly account for the distribution of concentrated loads, live loads, and for the effect of openings. Designs are to meet



4E **PLAN DETAIL**
1" = 1'-0"



2E **PLAN DETAIL**
1" = 1'-0"



2A **FIRST FLOOR PLAN**
1/8" = 1'-0"

General Plan Notes

A. All dimensions shown are to face of stud or masonry, unless noted otherwise. Dimensions designated as "CLR or "clear" indicate a clear dimension from face of finish to face of finish. Dimensions of exterior walls are to outside edge of foundation.

B. All openings for Mechanical, Plumbing, Fire Protection and Electrical shall be fire stopped at each floor penetration.

C. Provide bracing and blocking as required in walls supporting casework, tackboards, markerboards, and restroom accessories.

D. All door frames are located 4" from adjacent wall, unless noted otherwise.

E. All exposed outside corners of CMU shall be bullnosed.

F. Seal all joints between dissimilar materials.

G. All gypsum wallboard is 5/8" Type "X", unless noted otherwise.

H. Where new floors meet existing floors, a smooth, straight, and flush transition shall be constructed. Verify in field existing floor elevations and conditions where a new floor shall be constructed adjacent. Trim and patch existing floor as required to achieve desired transition.

I. All exterior windows are Type "XXX", unless noted otherwise.

J. All interior walls are Type "M8-D", unless noted otherwise.

K. Refer to C-Series drawings for base elevation height (0'-0") relative to USGS (United States Geological Survey) data.

L. Hatching within walls shown in plans and sections indicates new construction.

FLOOR PLAN NOTES

#	Note
1	OWNER PROVIDED WASHER & DRYER.
2	ARCHED INSET IN EIFS, 1"
3	07 71 00 - ALUMINUM DOWNSPOUT, 4X6. REFER TO C-SERIES DWGS. FOR BOOT CONNECTION.
A2 4	PLASTIC LOCKERS, REFER TO SHEET A-401.
5	FIREMAN'S EMERGENCY KEY BOX
6	08 71 00 - ADA ACTUATOR, PEDESTAL MOUNTED. COORDINATE LOCATION W/ARCHITECT.
7	08 71 00 - ADA ACTUATOR, WALL MOUNTED. COORDINATE LOCATION W/ARCHITECT.
8	REFER TO AQ-SERIES DRAWINGS FOR POOL TANK AND EQUIPMENT INFORMATION.
9	05 50 00 - ROOF ACCESS LADDER
10	RECEPTION DESK. REFER TO I-SERIES DRAWINGS
11	05 52 13 - RAILING TYPE A. REFER TO SHEET A-400.
12	STAINLESS STEEL LADDER
13	SLOPED FLOOR SLAB, 1/8" PER 1'-0".
14	CENTER DOOR OPENING ON ELEVATION.
15	233713 - HEAVY DUTY LINEAR BAR GRILLE MANDREL
16	PROVIDE EXPOY SEALER ON ALL SURFACES INSIDE THE SURGE TANK AND PUMP PIT.
17	FLOOR HATCH AND LADDER. REFER TO AQ-SERIES DRAWINGS.
18	REFER TO ELEVATIONS AND SECTIONS FOR UPPER WINDOWS (W3).
A2 19	104413 - FIRE EXTINGUISHER CABINET.

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced BMF TM

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#	Revision	Date
A2	ADDENDUM 2	01.12.2023

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Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

FIRST FLOOR PLAN - UNIT A

AF1A1

AF1A1_-_FIRST FLOOR PLAN - UNIT A
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General Roof Plan Notes

A. Where utilized, tapered insulation shall be installed to achieve positive drainage with a minimum resultant slope of 1/4" per foot, unless noted otherwise.

B. Low slope roof areas shall have a minimum of 4" rigid insulation over metal roof deck. Saddles, crickets, and slope portions of flat roof deck shall be formed by tapered insulation. Areas where tapered insulation is anticipated have been indicated, but shall not be considered all inclusive. It is Contractor's responsibility to provide sloped surfaces to achieve proper drainage.

C. Roof penetrations and equipment shown shall not be considered all inclusive. Coordinate with Mechanical, Plumbing and Electrical Documents to confirm penetrations and equipment locations. Flash all roof penetrations in accordance with roofing manufacturer's recommendations. Provide crickets to allow for proper drainage around units.

D. Roof walkway pads or blocks shall be installed in accordance with roofing manufacturer's recommendation where indicated and around entire perimeter of rooftop equipment.

ROOF PLAN NOTES

#	Note
1	077100 - 8" METAL GUTTER
2	072419 - EIFS CORNICE
3	077100 - MANUFACTURED METAL COPING.
4	077100 - ALUMINUM DOWNSPOUT, 4X6.
5	107313 - AWNING
6	PERGOLA
7	07 72 00 - ROOF ACCESS HATCH, 30"X54", WITH SAFETY RAILING. COORDINATE OPENING WITH S-SERIES DRAWINGS.
8	ROOF AND OVERFLOW DRAIN. REFER TO P-SERIES DRAWINGS.
9	ROOFTOP EQUIPMENT. REFER TO MPET-SERIES DRAWINGS.
10	055000 - ROOF ACCESS LADDER. PROVIDE ROOF WALKWAY PADS AT TOP & BOTTOM.

General Plan Notes

A. All dimensions shown are to face of stud or masonry, unless noted otherwise. Dimensions designated as "CLR or "clear" indicate a clear dimension from face of finish to face of finish. Dimensions of exterior walls are to outside edge of foundation.

B. All openings for Mechanical, Plumbing, Fire Protection and Electrical shall be fire stopped at each floor penetration.

C. Provide bracing and blocking as required in walls supporting casework, tackboards, markerboards, and restroom accessories.

D. All door frames are located 4" from adjacent wall, unless noted otherwise.

E. All exposed outside corners of CMU shall be bullnosed.

F. Seal all joints between dissimilar materials.

G. All gypsum wallboard is 5/8" Type "X", unless noted otherwise.

H. Where new floors meet existing floors, a smooth, straight, and flush transition shall be constructed. Verify in field existing floor elevations and conditions where a new floor shall be constructed adjacent. Trim and patch existing floor as required to achieve desired transition.

I. All exterior windows are Type "XXX", unless noted otherwise.

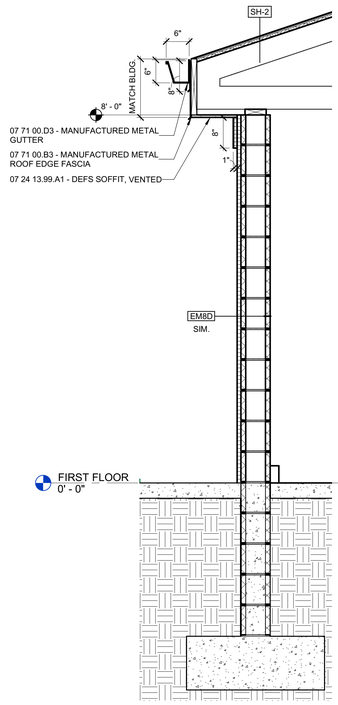
J. All interior walls are Type "M8-D", unless noted otherwise.

K. Refer to C-Series drawings for base elevation height (0'-0") relative to USGS (United States Geological Survey) data.

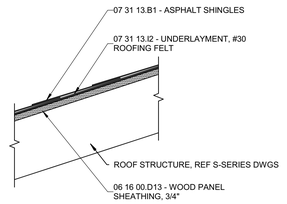
L. Hatching within walls shown in plans and sections indicates new construction.

FLOOR PLAN NOTES

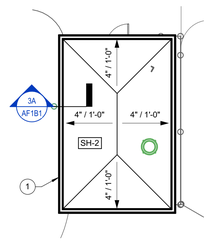
#	Note
1	OWNER PROVIDED WASHER & DRYER.
2	ARCHED INSET IN EIFS, 1"
3	07 71 00 - ALUMINUM DOWNSPOUT, 4X6. REFER TO C-SERIES DWGS. FOR BOOT CONNECTION.
4	PLASTIC LOCKERS, REFER TO SHEET A-401.
5	FIREMAN'S EMERGENCY KEY BOX
6	08 71 00 - ADA ACTUATOR, PEDESTAL MOUNTED. COORDINATE LOCATION W/ARCHITECT.
7	08 71 00 - ADA ACTUATOR, WALL MOUNTED. COORDINATE LOCATION W/ARCHITECT.
8	REFER TO AQ-SERIES DRAWINGS FOR POOL TANK AND EQUIPMENT INFORMATION.
9	05 50 00 - ROOF ACCESS LADDER
10	RECEPTION DESK. REFER TO I-SERIES DRAWINGS
11	05 52 13 - RAILING TYPE A. REFER TO SHEET A-400.
12	STAINLESS STEEL LADDER
13	SLOPED FLOOR SLAB, 1/8" PER 1'-0".
14	CENTER DOOR OPENING ON ELEVATION.
15	233713 - HEAVY DUTY LINEAR BAR GRILLE MANDREL
16	PROVIDE EXPOY SEALER ON ALL SURFACES INSIDE THE SURGE TANK AND PUMP PIT.
17	FLOOR HATCH AND LADDER. REFER TO AQ-SERIES DRAWINGS.
18	REFER TO ELEVATIONS AND SECTIONS FOR UPPER WINDOWS (W3).
19	104413 - FIRE EXTINGUISHER CABINET.



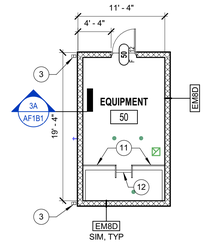
3A WALL SECTION
3/4" = 1'-0"



2B ROOF TYPE - SH-2
1 1/2" = 1'-0"



2A OVERALL ROOF PLAN - EQUIPMENT
1/8" = 1'-0"



1A FIRST FLOOR PLAN - EQUIPMENT BUILDING
1/8" = 1'-0"

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced BMF

SARAH KATHLEEN HEMPSTEAD REGISTERED No. AR10400134 STATE OF INDIANA ARCHITECT

#	Revision	Date
A2	ADDENDUM 2	01.12.2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

OUTDOOR EQUIPMENT BUILDING (ALT)

A2 AF1B1

AF1B1 - OUTDOOR EQUIPMENT BUILDING (ALT)
2021-178.RVI_The Riviera Club_Aquatics Center
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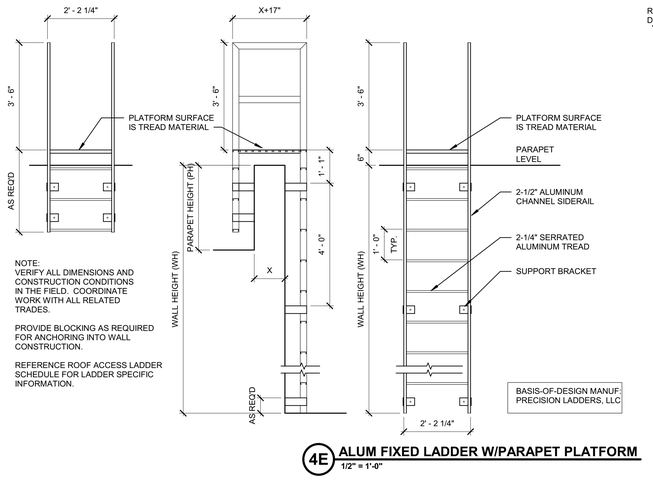
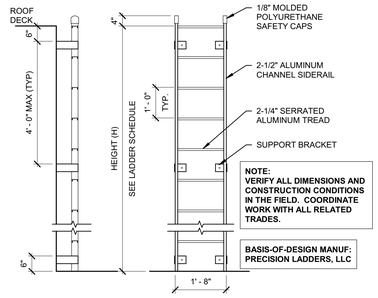
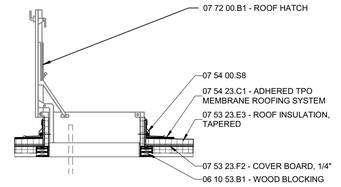


4E ALUM FIXED LADDER W/PARAPET PLATFORM
1/2" = 1'-0"



3E ALUM FIXED LADDER TO ROOF HATCH
1/2" = 1'-0"



2E ROOF HATCH
1/2" = 1'-0"

General Roof Plan Notes

A. Where utilized, tapered insulation shall be installed to achieve positive drainage with a minimum resultant slope of 1/4" per foot, unless noted otherwise.

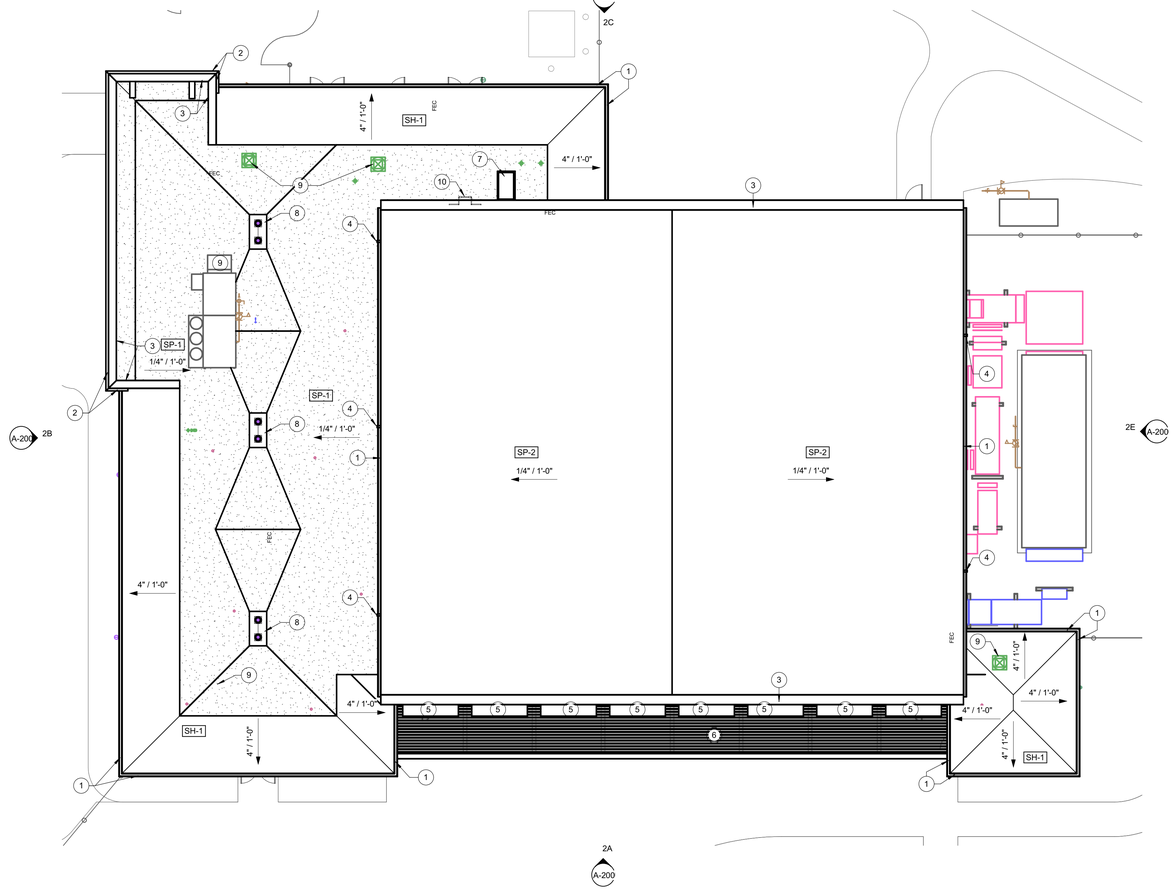
B. Low slope roof areas shall have a minimum of 4" rigid insulation over metal roof deck. Saddles, crickets, and slope portions of flat roof deck shall be formed by tapered insulation. Areas where tapered insulation is anticipated have been indicated, but shall not be considered all inclusive. It is Contractor's responsibility to provide sloped surfaces to achieve proper drainage.

C. Roof penetrations and equipment shown shall not be considered all inclusive. Coordinate with Mechanical, Plumbing and Electrical Documents to confirm penetrations and equipment locations. Flash all roof penetrations in accordance with roofing manufacturer's recommendations. Provide crickets to allow for proper drainage around units.

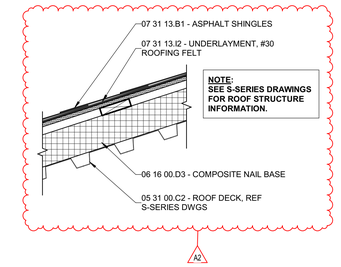
D. Roof walkway pads or blocks shall be installed in accordance with roofing manufacturer's recommendation where indicated and around entire perimeter of rooftop equipment.

ROOF PLAN NOTES

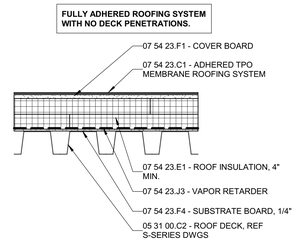
#	Note
1	077100 - 8" METAL GUTTER
2	072419 - EIFS CORNICE
3	077100 - MANUFACTURED METAL COPING.
4	077100 - ALUMINUM DOWNSPOUT, 4X6.
5	107313 - AWNING
6	PERGOLA
7	07 72 00 - ROOF ACCESS HATCH, 30"X54", WITH SAFETY RAILING. COORDINATE OPENING WITH S-SERIES DRAWINGS.
8	ROOF AND OVERFLOW DRAIN. REFER TO P-SERIES DRAWINGS. A2
9	ROOFTOP EQUIPMENT. REFER TO MPET-SERIES DRAWINGS.
10	055000 - ROOF ACCESS LADDER. PROVIDE ROOF WALKWAY PADS AT TOP & BOTTOM.



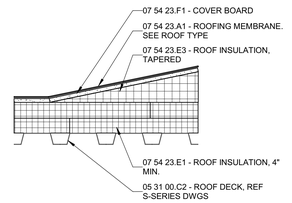
2A OVERALL ROOF PLAN
3/32" = 1'-0"



1C ROOF TYPE - SH-1
1 1/2" = 1'-0"



1B ROOF TYPE - SP-2
1 1/2" = 1'-0"



1A ROOF TYPE - SP-1
1 1/2" = 1'-0"

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KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

ROOF PLAN

AR100

#000_ROOF PLAN
2021-178.RVI_The Riviera Club_Aquatics Center_
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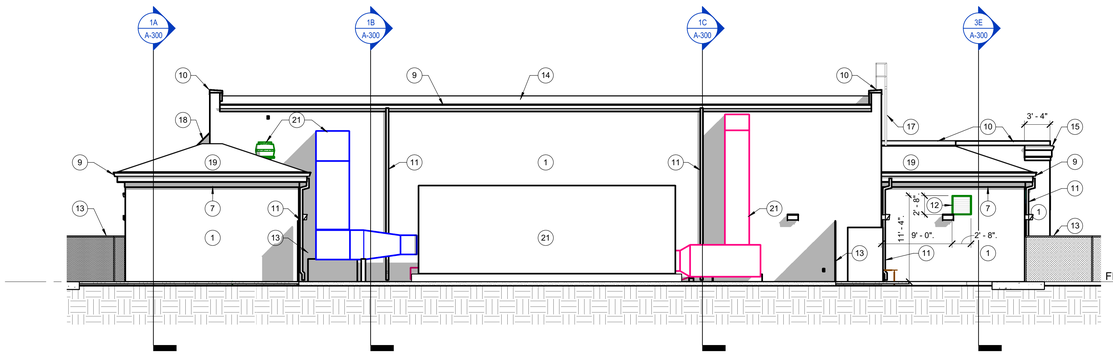
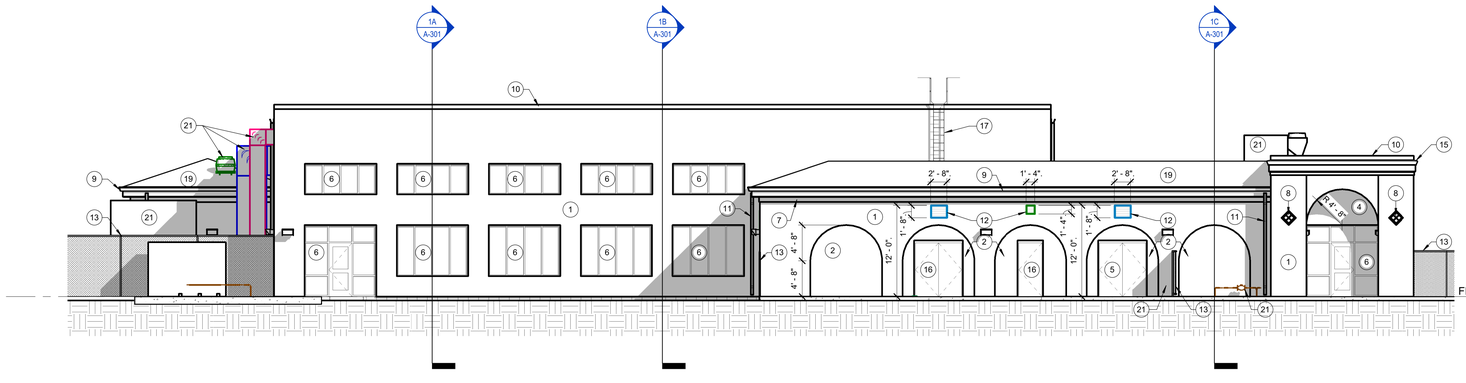
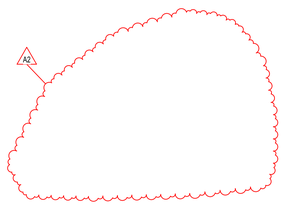
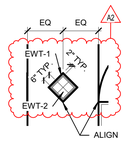


2E **EAST ELEVATION**
1/8" = 1'-0"

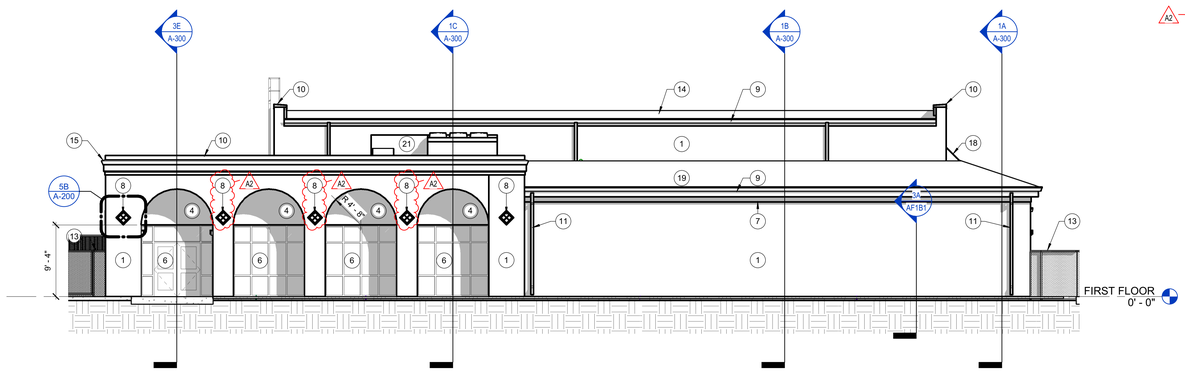


2C **NORTH ELEVATION**
1/8" = 1'-0"

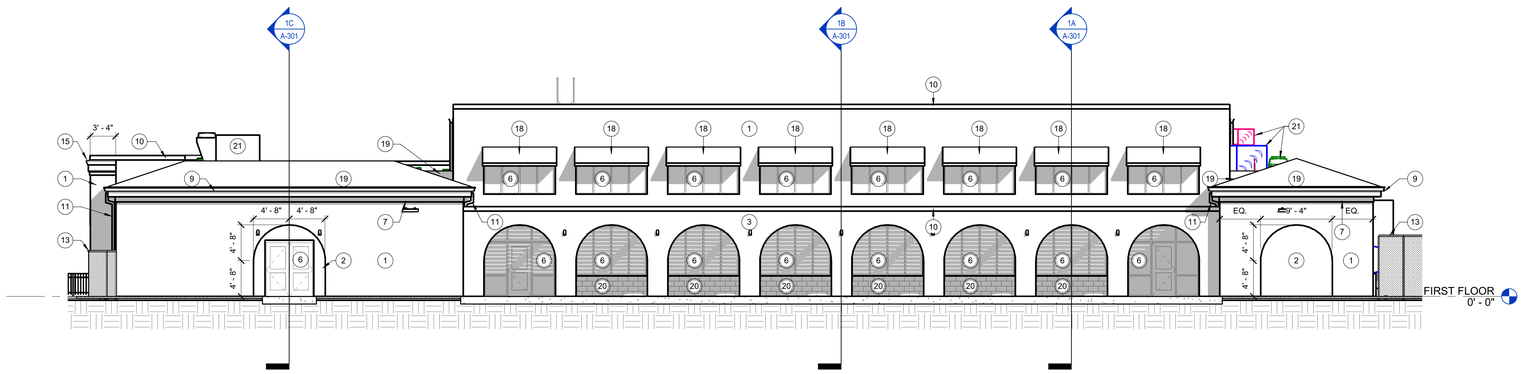




5B **TILE DETAIL - LARGE**
1/4" = 1'-0"



2B **WEST ELEVATION**
1/8" = 1'-0"



2A **SOUTH ELEVATION**
1/8" = 1'-0"

EXTERIOR FINISH SCHEDULE

THIS LEGEND IS PROVIDED FOR REFERENCE PURPOSES ONLY. PRODUCTS/COLORS INDICATED ARE BASED ON BASIS OF DESIGN MANUFACTURERS. REFER TO SPECIFICATIONS FOR LIST OF ACCEPTED EQUAL MANUFACTURERS/PRODUCTS.

SPEC SECTION	MAT'L	MARK. COLOR (BASIS OF DESIGN)	
042000	SPLIT FACE BLOCK	ARCTIC WHITE	
072419	EIFS	A. WHITE	
		B. (ACCENT COLOR)	
077100	FASCIA, GUTTERS, DOWNSPOUTS	DARK BRONZE	
079200	SEALANTS	ALL SEALANTS USED IN MASONRY CONTROL JOINTS SHALL MATCH THE MASONRY MORTAR	
		ALL SEALANTS USED IN EXPOSED CONCRETE SHALL MATCH THE SURROUNDING COLOR CONCRETE UNLESS NOTED OTHERWISE	
		ALL SEALANTS USED TO SEAL AROUND EXTERIOR WINDOWS AND DOOR FRAMES SHALL MATCH THE WINDOW AND DOOR FRAME COLOR.	
081113	HM DOORS AND FRAMES	PAINT COLOR AS SELECTED BY ARCHITECT	
083323	OH COILING DOOR	PAINT COLOR AS SELECTED BY ARCHITECT	
084113	ALUM. STOREFRONT	DARK BRONZE	
088000	GLAZING	INSUL. GLASS	SUNGUARD SUPER NEUTRAL 54
		SPAND. GLASS	SUNGUARD SUPER NEUTRAL W/ WARM GREY FRIT
		METAL SPAND.	DARK BRONZE
089000	LOUVERS	DARK BRONZE	
A2 093000	TILE	EWT-1	1X1 PORCELAIN MOSAIC
		EWT-2	6x6 DECORATIVE PORCELAIN TILE
		EWT-3	DECORATIVE GLASS WALL TILE

NOTE: EIFS & DEFS CONTROL JOINTS SHALL BE REVIEWED WITH MANUFACTURER, ARCHITECT, & STRUCTURAL ENGINEER DURING SUBMITTALS BASED ON MANUFACTURER'S RECOMMENDATIONS & CONTROL JOINT REQUIREMENTS OF LOAD-BEARING MASONRY WALL SUBSTRATE CONSTRUCTION.

BUILDING ELEVATION NOTES

#	Note
1	072419 - EIFS, TYPE A.
2	072419 - EIFS, TYPE A. INSET 1". A2
3	072413.99 - DEFS.
4	093000 TILING ON 072419 EIFS, EWT-3.
5	081113 - HOLLOW METAL DOOR AND FRAME, REFER TO PLANS & DOOR SCHEDULE.
6	084113 - ALUMINUM FRAMED STOREFRONT, REFER TO PLANS & FRAME ELEVATIONS.
7	072419 - 1" DEEP X 8" TALL EIFS PROFILE, TYPE A.
8	093000 TILE DETAIL, LARGE (SEE THIS PAGE), ON 072419 EIFS, EWT-1 AND EWT-2.
9	077100 - GUTTER, REFER TO SECTIONS FOR PROFILE.
10	077100 - MANUFACTURED METAL COPING. A2
11	077100 - METAL DOWNSPOUT. REFER TO ROOF PLAN FOR SIZE. COORD. WITH C-SERIES DWGS. FOR BOOT CONNECTION.
12	089119 - FIXED LOUVER. CENTER OVER DOOR WHERE APPLICABLE.
13	SITE FENCING, REFER TO C-SERIES DRAWINGS.
14	075423 - ROOFING MEMBRANE, REFER TO ROOF PLAN.
15	077100 - CUSTOM ROOF EDGE COPING. REFER TO SECTIONS.
16	081613.99 - FRP DOOR & FRAME, REFER TO PLANS & DOOR SCHEDULE.
17	055000 - ROOF ACCESS LADDER.
18	107313 - AWNING.
19	073113 - ASPHALT SHINGLES, REFER TO ROOF PLAN.
20	042000 - SPLIT FACE BLOCK.
A2 21	M/P/E EQUIPMENT, REFER TO M/P/E-SERIES DRAWINGS.

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ARCHITECT

#	Revision	Date
A2	ADDENDUM 2	01.12.2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

OVERALL ELEVATIONS

A-200

A-200_OVERALL ELEVATIONS
2021-178.RVI_The Riviera Club_Aquatics Center_
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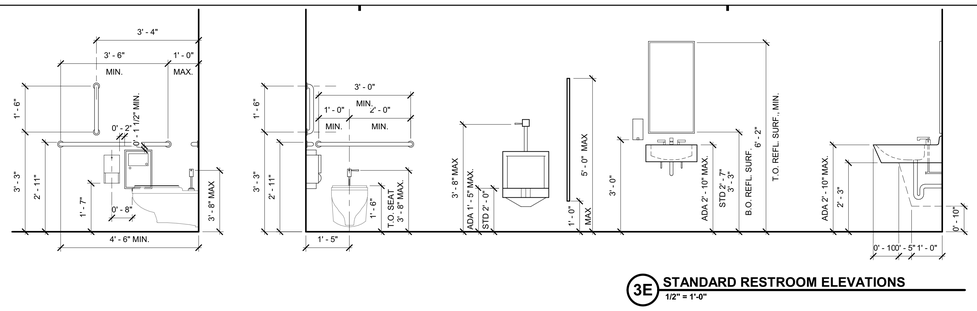
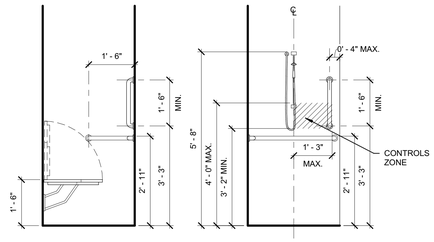
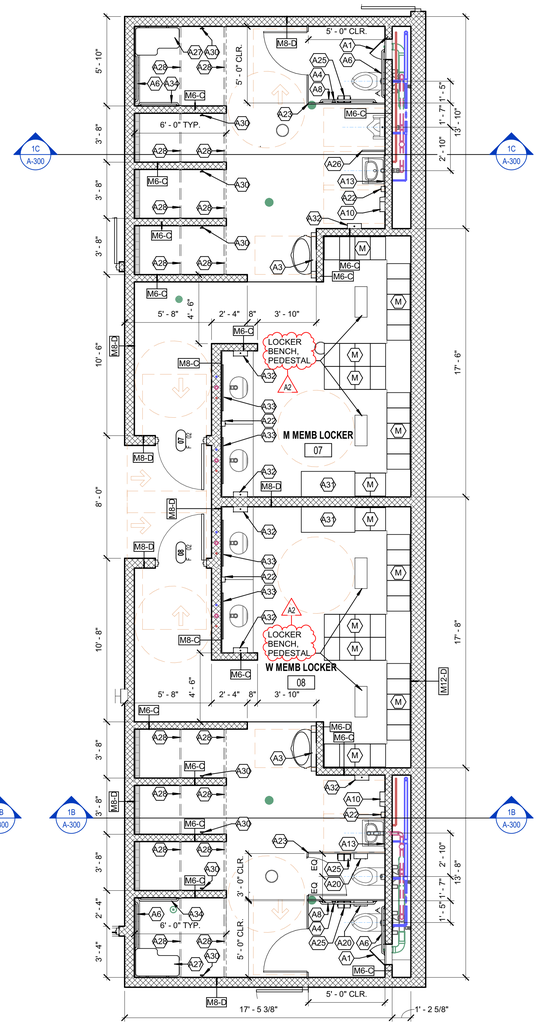


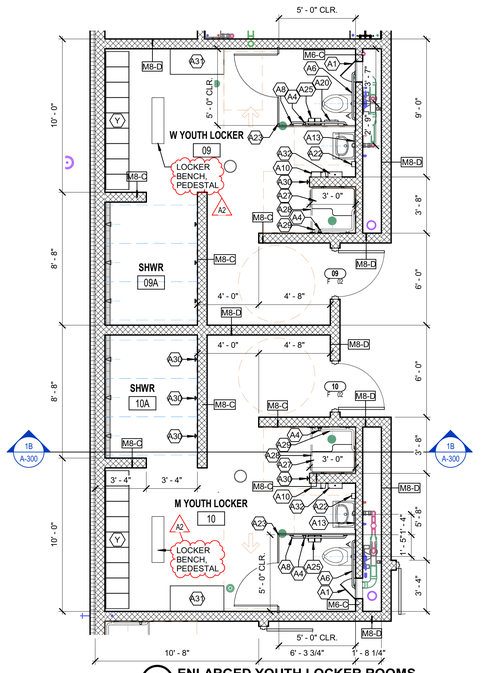
3E STANDARD RESTROOM ELEVATIONS
1/2" = 1'-0"



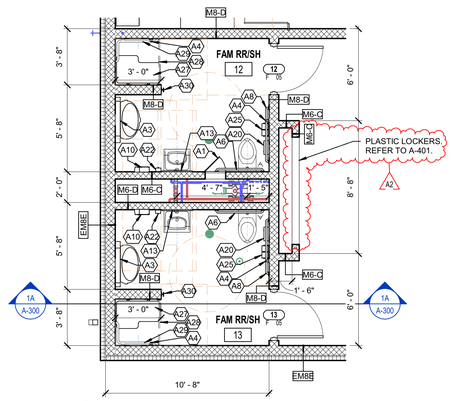
4D STANDARD SHOWER ELEVATIONS
1/2" = 1'-0"



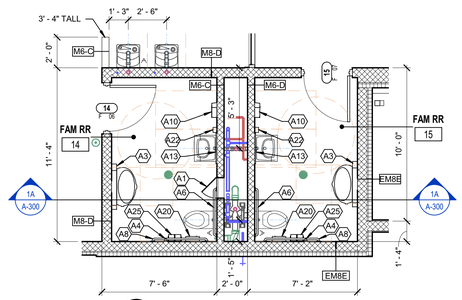
1B ENLARGED MEMBER LOCKER ROOMS
1/4" = 1'-0"



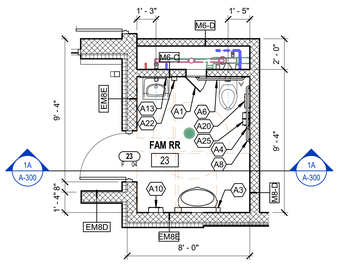
2B ENLARGED YOUTH LOCKER ROOMS
1/4" = 1'-0"



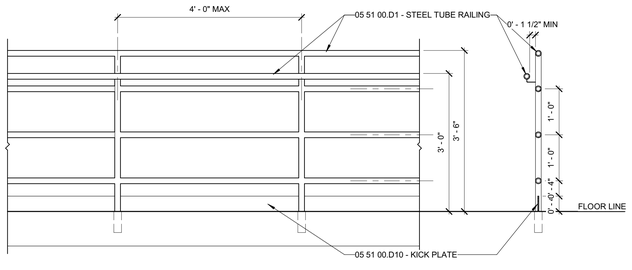
3A ENLARGED FAMILY RESTROOMS WITH SHOWER
1/4" = 1'-0"



2A ENLARGED FAMILY RESTROOMS
1/4" = 1'-0"



1A ENLARGED FAMILY RESTROOM
1/4" = 1'-0"



5A RAILING DETAIL
3/4" = 1'-0"

5.4.401 - RESTROOM ACCESSORY SCHEDULE

Type Mark	Keynote	Description	Mounting	Furnished By	Installed By
A1	08 31 13	ACCESS DOOR - 16" X 16"	BOTTOM @ 40" AFF	CONTRACTOR	CONTRACTOR
A3	10 28 00	CHANGING TABLE - SURFACE MOUNTED	UNDERSIDE OF BED @ 2' - 3" MIN AFF	CONTRACTOR	CONTRACTOR
A4	10 28 00	GRAB BAR - 18" VERTICAL	BOTTOM @ 40" AFF	CONTRACTOR	CONTRACTOR
A6	10 28 00	GRAB BAR - 36" HORIZONTAL	TOP @ 2'-11" AFF	CONTRACTOR	CONTRACTOR
A8	10 28 00	GRAB BAR - 42" HORIZONTAL	TOP @ 2'-11" AFF	CONTRACTOR	CONTRACTOR
A10	10 28 00	HAND DRYER - SLIM	BOTTOM @ 42" AFF	CONTRACTOR	CONTRACTOR
A13	10 28 13	MIRROR - 24" X 36"	BOTTOM @ 4" ABOVE FIXTURE	CONTRACTOR	CONTRACTOR
A20	10 28 00	SANITARY NAPKIN DISPOSAL - SURFACE	TOP @ 30" AFF	CONTRACTOR	CONTRACTOR
A22	10 28 00	SOAP DISPENSER	BOTTOM @ 4" ABOVE FIXTURE	OWNER	CONTRACTOR
A23	10 21 13	TOILET PARTITION	--	CONTRACTOR	CONTRACTOR
A25	10 28 00	TOILET TISSUE DISPENSER - DOUBLE	BOTTOM @ 1'-6 AFF	OWNER	CONTRACTOR
A26	10 21 13	URINAL SCREEN	--	CONTRACTOR	CONTRACTOR
A27	10 28 00	FOLDING SHOWER SEAT, ADA	--	CONTRACTOR	CONTRACTOR
A28	10 28 00	SHOWER CURTAIN ROD	--	CONTRACTOR	CONTRACTOR
A29	10 28 00	SHOWER GRAB BAR, BASIS OF DESIGN BOBRICK B-6861	BOTTOM @ 30"	CONTRACTOR	CONTRACTOR
A30	10 28 00	ROBE HOOK	CENTER @ 4'-6" AFF	CONTRACTOR	CONTRACTOR
A31	10 51 26.99	ADA BENCH - 20" X 42"	--	CONTRACTOR	CONTRACTOR
A32	10 28 00	PAPER TOWEL DISPENSER - SLIM	DISPENSER OPENING @ 42" AFF	OWNER	CONTRACTOR
A33	10 28 13	MIRROR - 36" X 36"	BOTTOM @ 4" ABOVE FIXTURE	CONTRACTOR	CONTRACTOR
A34	10 28 00	GRAB BAR - 30" HORIZONTAL	TOP @ 2'-11" AFF	CONTRACTOR	CONTRACTOR

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KEY PLAN

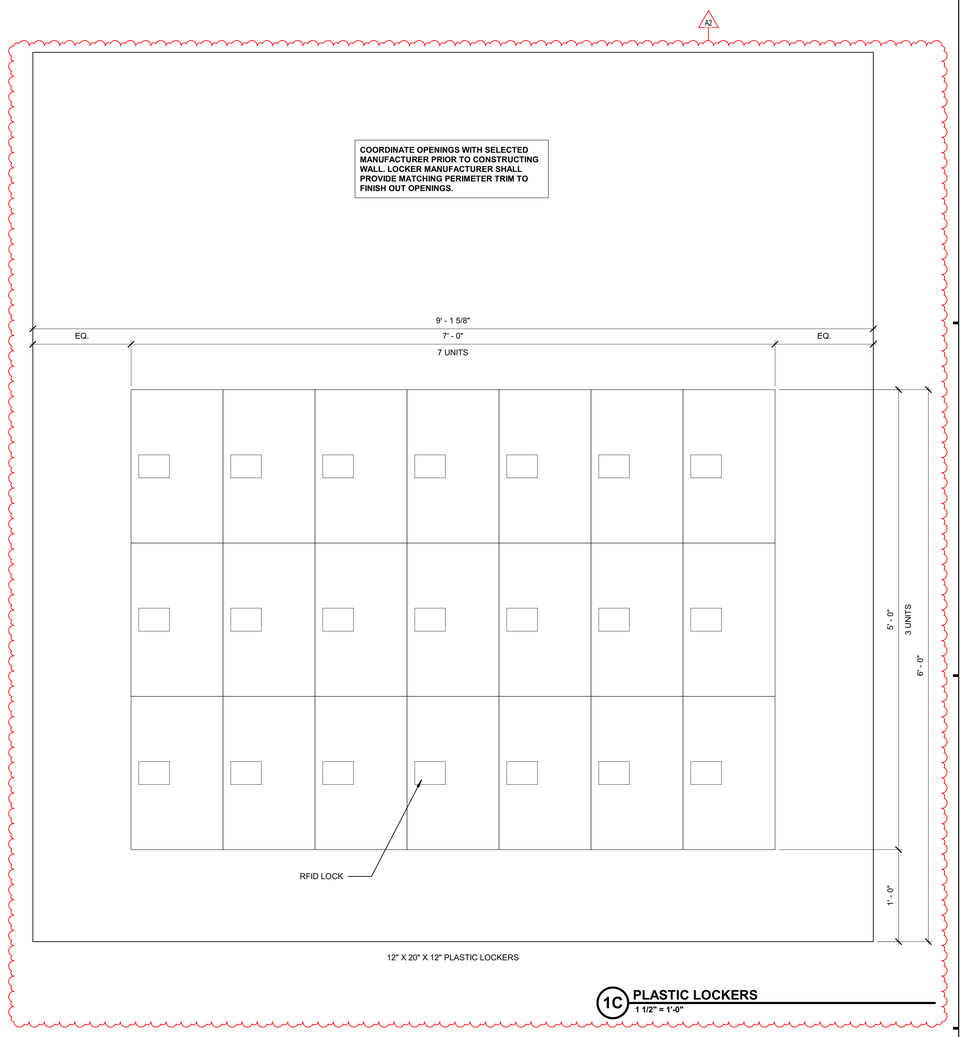
The Riviera Club

THE RIVIERA CLUB
EST. 1933

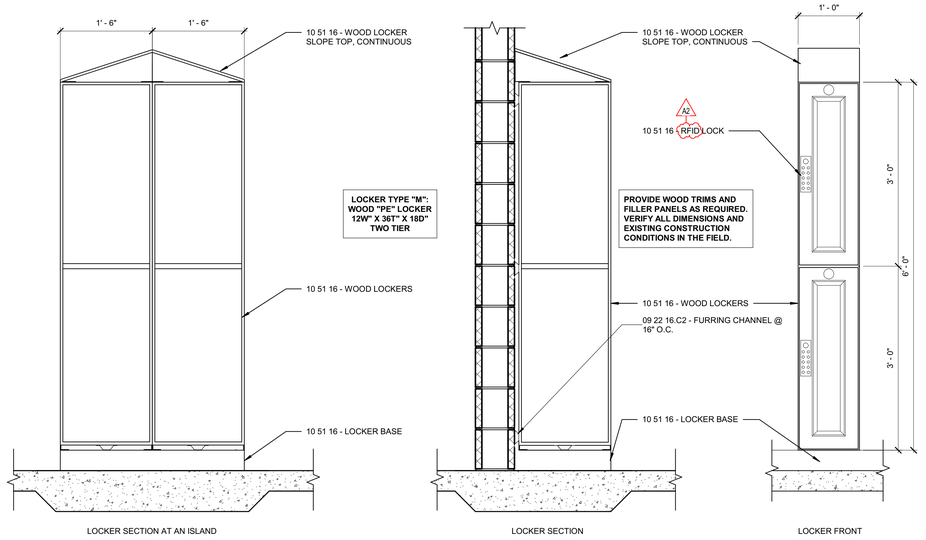
Aquatics Center

ENLARGED PLANS &
RAILING DETAILS

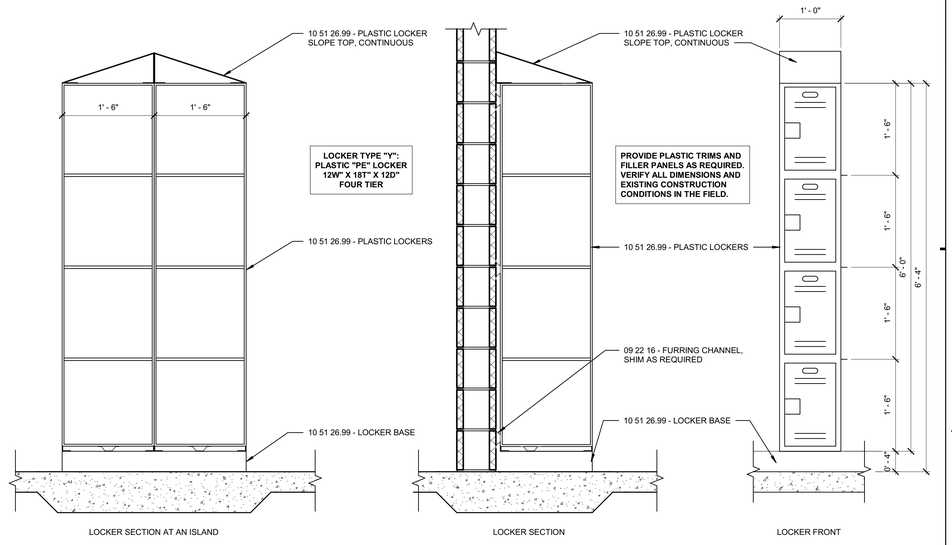
A-400



1C **PLASTIC LOCKERS**
1 1/2" = 1'-0"



4A **LOCKER TYPE "M"**
1" = 1'-0"



1A **LOCKER TYPE "Y"**
1" = 1'-0"

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Aquatics Center

LOCKER DETAILS

A-401

A-401_LOCKER DETAILS
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DOOR & FRAME SCHEDULE

MARK	DOOR PANEL TYPE	QTY	MATL	GLAZ	SIZE H	SIZE W	SIZE TH	FRAME MARK	FRAME MATL	FRAME GLAZ	LABEL	HDWR SET	NOTES	MARK
02.1	DG	1	AL	TG	7' - 0"	3' - 0"	0' - 1 3/4"	SF5	AL	TG		16	1	02.1
02.2	DG	1	AL	TG	7' - 0"	3' - 6"	0' - 1 3/4"	SF4	AL	TG		17	1	02.2
03.1	DG	2	AL	IG	7' - 0"	6' - 0"	0' - 1 3/4"	SF1	AL	IG		22	1	03.1
03.2	DG	1	AL	IG	7' - 0"	3' - 0"	0' - 1 3/4"	SF1	AL	IG		19		03.2
03.3	F	1	HM	--	7' - 0"	2' - 4"	0' - 1 3/4"	F1	HM	--		08		03.3
03.4	DG	2	AL	TG	7' - 0"	6' - 0"	0' - 1 3/4"	SF3	AL	TG		01	1	03.4
04.1	F	2	HM	--	7' - 0"	6' - 0"	0' - 1 3/4"	F1	HM	--		23		04.1
04.2	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		18		04.2
06	F	1	HM	--	7' - 0"	4' - 0"	0' - 1 3/4"	F1	HM	--		10		06
07	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		02		07
08	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		02		08
09	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		02		09
10	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		02		10
11.1	DG	2	AL	IG	7' - 0"	6' - 0"	0' - 1 3/4"	F1	AL	--		21	1	11.1
11.2	DG	1	AL	TG	7' - 0"	3' - 0"	0' - 1 3/4"	SF5	AL	TG		16	1	11.2
11.3	DG	1	AL	TG	7' - 0"	3' - 0"	0' - 1 3/4"	SF4	AL	TG		17	1	11.3
12	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		05	1	12
13	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		05	1	13
14	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		06		14
15	F	1	FRP	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	FRP	--		07		15
17.1	DG	1	AL	IG	7' - 0"	3' - 0"	0' - 1 3/4"	SF2	AL	IG		20		17.1
17.2	DG	1	AL	IG	7' - 0"	3' - 0"	0' - 1 3/4"	SF2	AL	IG		20		17.2
17.3	DG	1	AL	IG	7' - 0"	3' - 0"	0' - 1 3/4"	SF2	AL	IG		20		17.3
19	DG	1	AL	TG	7' - 0"	3' - 0"	0' - 1 3/4"	SF6	AL	TG		03		19
20	F	1	FRP	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	FRP	--		09		20
20.1	F	2	FRP	--	7' - 0"	6' - 0"	0' - 1 3/4"	F1	FRP	--		14		20.1
21.1	F	1	FRP	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	FRP	--		12		21.1
21.2	N	1	FRP	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	FRP	--		15		21.2
22	F	2	FRP	--	7' - 0"	6' - 0"	0' - 1 3/4"	F1	FRP	--		13		22
23	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		04		23
24.1	F	1	HM	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1	HM	--		11		24.1
A2 50	F	1	FRP	--	7' - 0"	3' - 0"	0' - 1 3/4"	F1		--		12		50

GENERAL NOTES

A. This Door Schedule(s) is furnished for whatever assistance it may afford the Contractor. Do not consider it as entirely inclusive. Carefully examine the Drawings (especially the Floor Plans) and the Specifications to determine the extent of door and frame quantities required (including interior borrowed lite or sidelite openings). Should any particular door, frame, or interior borrowed lite or sidelite shown on the Drawings be inadvertently omitted from this Schedule, supply same as required for similar openings.

B. The "QTY" column designates the number of leaves in the opening. The "Door Width" column designates the total width of all leaves. In multiple leaf conditions, the leaves shall equally divide the "Door Width" unless noted otherwise; however, the active leaf shall not be less than 3'-0" wide.

C. Door Type "X" denotes a frame with no door such as a borrowed lite, reference Frame Elevations.

D. An asterisk (*) in a dimension denotes a width that varies, reference plans, elevations, details and schedules.

E. Verify locksets with the Owner during submittals.

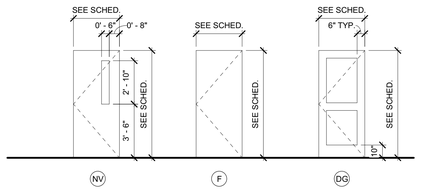
ABBREVIATIONS

AL Aluminum
HM Hollow Metal
ST Steel
WD Wood
TG Tempered Glazing
IG Insulated Glazing
LG Laminated Glazing
FG Frosted Glazing
SP Spandrel Panel

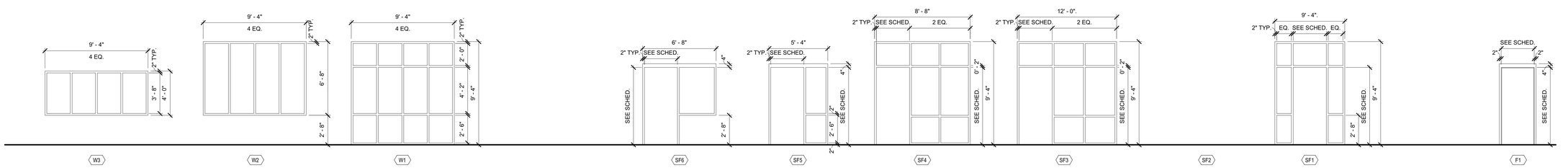
DOOR & FRAME SCHEDULE NOTES

See Door Schedule

1. Prepare door and frame for ADA operator
2. Prepare door and frame for Card Reader



5.4.602 - DOOR PANEL ELEVATIONS
1/4" = 1'-0"



5.4.603 - FRAME ELEVATIONS
1/4" = 1'-0"

SCHMIDT
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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced BMF TM

SARAH KATHLEEN HEMPSTEAD REGISTERED NO. AR10400134 STATE OF INDIANA ARCHITECT

#	Revision	Date
A2	ADDENDUM 2	01.12.2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

THE RIVIERA CLUB
EST. 1933

Aquatics Center

DOOR & FRAME SCHEDULE

A-600

A600_DOOR & FRAME SCHEDULE
2021-178.RVI_The Riviera Club_Aquatics Center
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VENTILATION SCHEDULE

Room	Design occupancy	Required minimum ventilation airflow			
	(People)	(cfm)	(cfm/person)	(cfm/ft²)	(ACH)
101 CHEM STOR	0.0	22.8	0.0	0.12	0.51
103 VEST	0.0	6.1	0.0	0.06	0.26
104 LIFEGAURD	4.2	31.1	7.4	0.18	0.79
105 MENS LOCKER	5.8	151.5	26.0	0.26	1.11
106 WOMENS LOCKER	5.9	152.5	26.0	0.26	1.11
107 VEST	0.0	12.9	0.0	0.06	0.26
108 SWIM LOCKER WOMEN	4.6	118.7	26.0	0.26	1.11
109 SWIM LOCKER MEN	3.5	91.1	26.0	0.26	1.11
110 LOBBY	160.9	868.8	5.4	0.81	4.86
111 FAM RR 31	0.0	0.0	0.0	0.00	0.00
112 FAM RR 30	0.0	0.0	0.0	0.00	0.00
116 LOBBY	68.2	368.3	5.4	0.81	3.47
115 ENTRY	0.0	4.2	0.0	0.06	0.26
114 FAM RR 37	0.0	0.0	0.0	0.00	0.00
113 FAM RR 4	0.0	0.0	0.0	0.00	0.00

GENERAL NOTES

A REFER TO SHEET M000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

B REFER TO ARCHITECT'S REFLECTED CEILING PLAN FOR FINAL LOCATIONS OF AIR OUTLETS AND INLETS. ADJUST BRANCH DUCTWORK AS REQUIRED.

C DUCT RUNOUTS TO TERMINAL UNITS SHALL BE TWO DIAMETERS LARGER THAN TERMINAL UNIT CONNECTION SIZE UNLESS NOTED OTHERWISE.

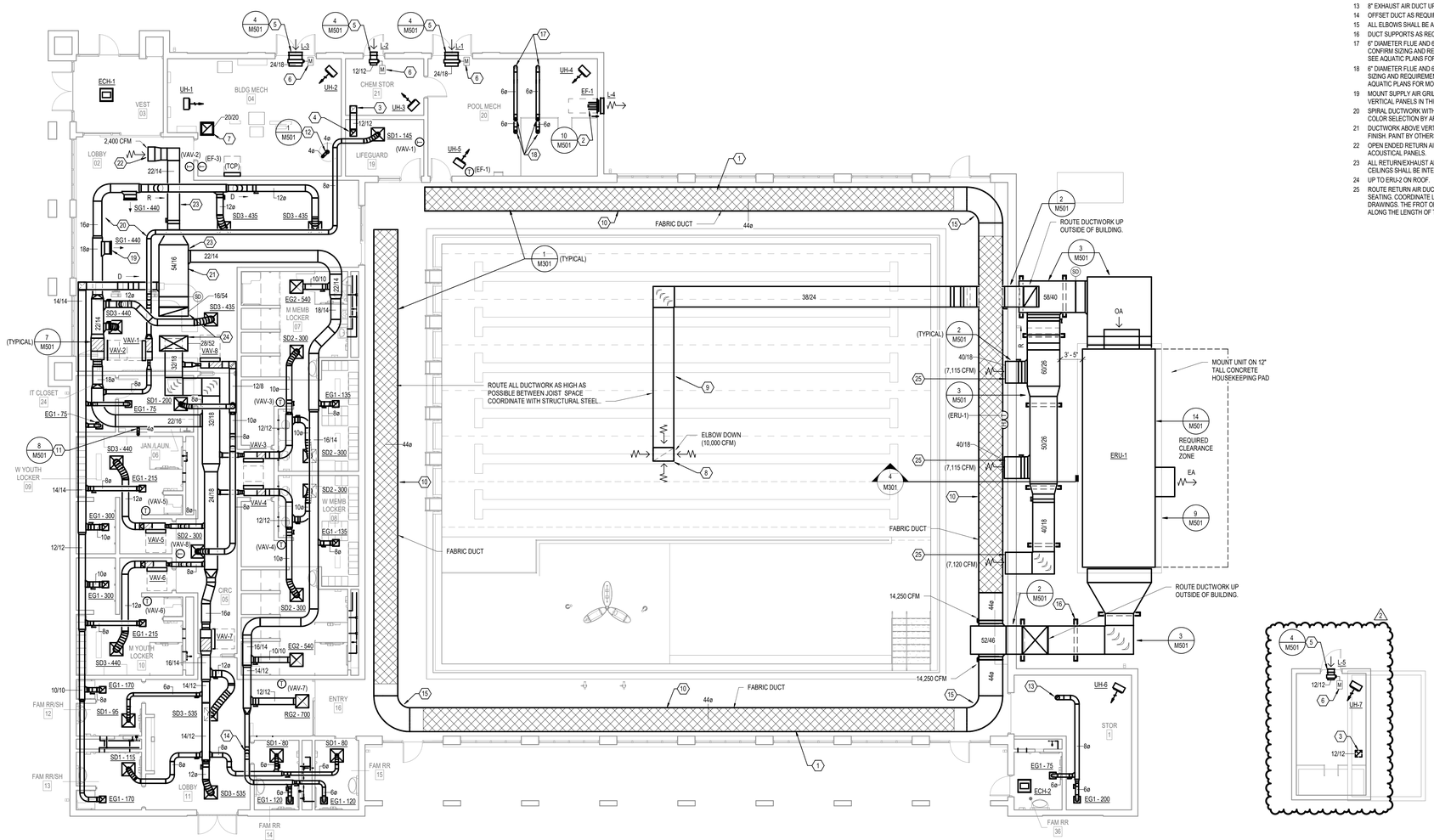
D CONTRACTOR SHALL PROVIDE ALL BALANCE DAMPERS AS REQUIRED TO PROVIDE A COMPLETE AND BALANCED SYSTEM.

E ALL DUCTWORK, DIFFUSERS AND GRILLES IN "WET AREAS" SHALL BE ALUMINUM CONSTRUCTION UNLESS NOTED OTHERWISE.

F ALL HANGERS, SUPPORTS AND MISCELLANEOUS ACCESSORIES IN POOL BUILDING AND POOL CHEMICAL ROOMS SHALL HAVE A CHLORINE RESISTANT COATING FOR USE IN INDOOR POOLS.

SHEET KEYNOTES

1 DIRECT A PORTION OF NOZZLES TOWARDS EXTERIOR WALLS AND WINDOWS.
2 SIDEWALL MECHANICAL ROOM VENTILATION FAN. MOUNT CENTERLINE OF FAN AT APPROXIMATELY 10'-0" AFF. COORDINATE WITH STRUCTRUAL, ARCHITECTURAL AND POOL EQUIPMENT DRAWINGS.
3 TERMINATE ALUMINUM DUCT WITH WIRE MESH SCREEN AT 18" AFF. PROVIDE CHLORINE RESISTANT COATING ON THE INSIDE AND OUTSIDE OF DUCTWORK AND ON ALL VOLUME DAMPERS AND MISCELLANEOUS ACCESSORIES.
4 OFFSET DUCT UP TO EF-4 ON ROOF. PROVIDE CHLORINE RESISTANT COATING ON THE INSIDE AND OUTSIDE OF DUCTWORK AND ON ALL VOLUME DAMPERS AND MISCELLANEOUS ACCESSORIES.
5 CENTER LOUVER ABOVE DOOR. COORDINATE EXACT LOCATION WITH ARCHITECTURAL PLANS.
6 INTERLOCK MOTORIZED DAMPER WITH ASSOCIATED EXHAUST FAN OPERATION. 120 V CONNECTION BY EC.
7 OPEN ENDED EXHAUST AIR DUCT WITH WIRE MESH SCREEN UP THROUGH ROOF TO EF-3. TERMINATE DUCT JUST BELOW ROOF DECK.
8 OPEN ENDED RETURN AIR DUCT. MOUNT SO OPENING IS FLUSH WITH BOTTOM OF JOISTS.
9 MOUNT RETURN AIR DUCT UP IN JOIST SPACE BETWEEN WEBBING. COORDINATE LOCATION WITH STRUCTURAL STEEL. PROVIDE CHLORINE RESISTANT COATING ON ALL MISCELLANEOUS ACCESSORIES.
10 MOUNT FABRIC DUCT UP IN JOIST SPACE BETWEEN WEBBING. COORDINATE LOCATION WITH STRUCTURAL STEEL.
11 4" DRYER VENT UP THROUGH ROOF. CONFIRM SIZE WITH DRYER MANUFACTURER.
12 4" FLUE AND 4" INTAKE FOR WATER HEATER. CPVC OR MANUFACTURER APPROVED VENT AND INTAKE UP THROUGH ROOF. TERMINATE WITH CONCENTRIC FLUE FITTING.
13 8" EXHAUST AIR DUCT UP TO EF-5 ON ROOF.
14 OFFSET DUCT AS REQUIRED.
15 ALL ELBOWS SHALL BE ALUMINUM RIGID DUCTWORK.
16 DUCT SUPPORTS AS REQUIRED, TYPICAL.
17 6" DIAMETER FLUE AND 6" DIAMETER INTAKE DOWN TO POOL HEATER. CONFIRM SIZING AND REQUIREMENTS WITH POOL HEATER MANUFACTURER. SEE AQUATIC PLANS FOR MORE INFORMATION.
18 6" DIAMETER FLUE AND 6" DIAMETER INTAKE UP THROUGH ROOF. CONFIRM SIZING AND REQUIREMENTS WITH POOL HEATER MANUFACTURER. SEE AQUATIC PLANS FOR MORE INFORMATION.
19 MOUNT SUPPLY AIR GRILLES OFF SIDE OF DUCT ABOVE THE ACOUSTICAL VERTICAL PANELS IN THIS AREA. TYPICAL.
20 SPIRAL DUCTWORK WITH PAINT GRIP FINISH. TO BE PAINTED BY OTHERS. COLOR SELECTION BY ARCHITECT.
21 DUCTWORK ABOVE VERTICAL ACOUSTICAL PANELS SHALL HAVE PAINT GRIP FINISH. PAINT BY OTHERS. COLOR SELECTION BY ARCHITECT.
22 OPEN ENDED RETURN AIR DUCT WITH WIRE MESH SCREEN ABOVE ACOUSTICAL PANELS.
23 ALL RETURN/EXHAUST AIR DUCT ABOVE EXPOSED ACOUSTICAL PANEL CEILINGS SHALL BE INTERNALLY LINED.
24 UP TO ERU-2 ON ROOF.
25 ROUTE RETURN AIR DUCT DOWN LOW TO BE STUB WITHIN BACK OF BENCH SEATING. COORDINATE LOCATIONS WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS. THE FROT OF THE BENCH WILL HAVE A RETURN AIR OPENING ALONG THE LENGTH OF THE BENCH TO ALLOW FOR LOW RETURN AIR PATH.



1 FIRST FLOOR MECHANICAL PLAN
1/8" = 1'-0"

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced CME CME

JOYCE ELLEN JONES REGISTERED No. PE60920263 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

Aquatics Center

FIRST FLOOR MECHANICAL PLAN

M101

M101 - FIRST FLOOR MECHANICAL PLAN
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GENERAL NOTES

A REFER TO SHEET M000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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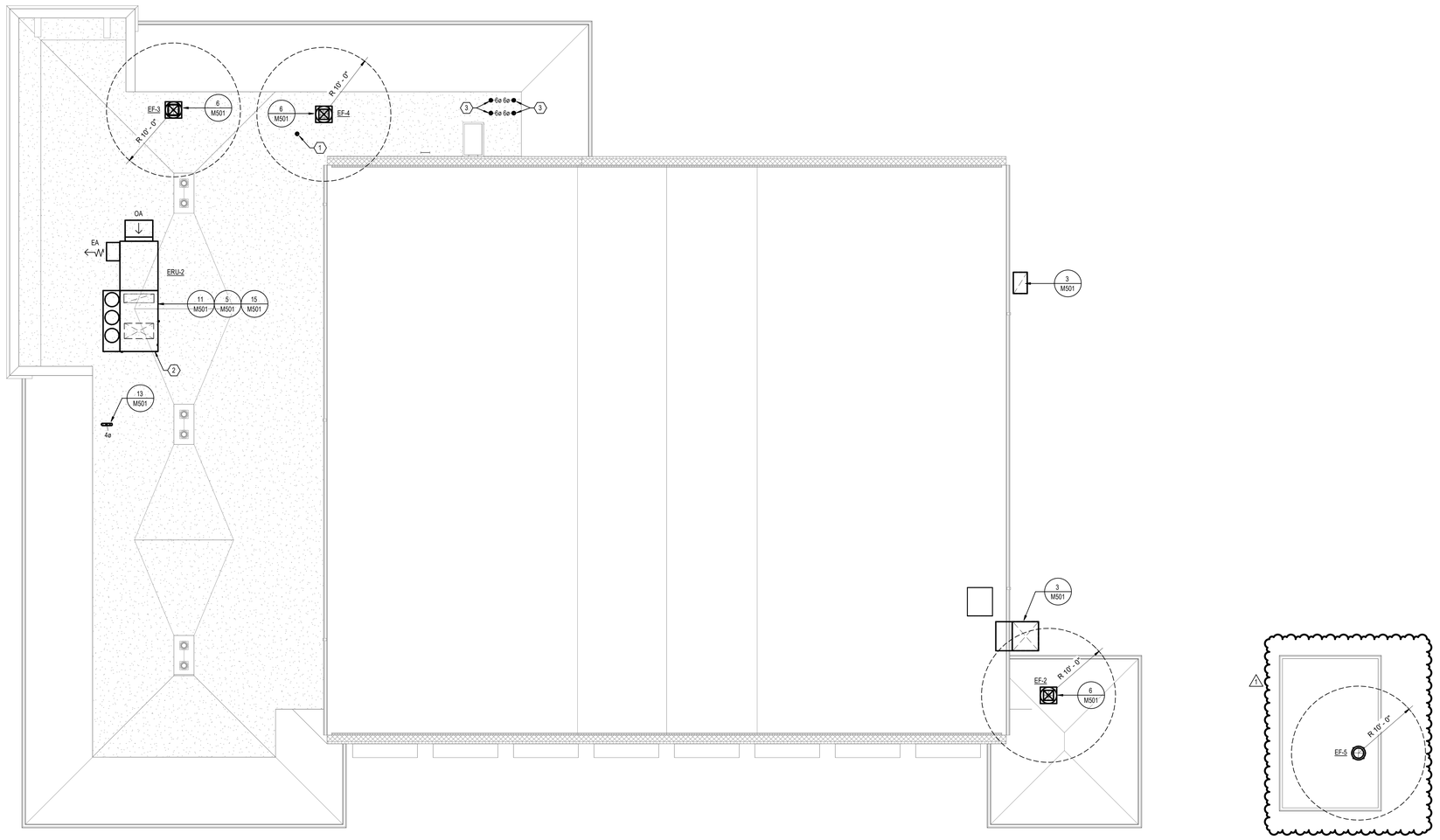
F ALL HANGERS, SUPPORTS AND MISCELLANEOUS ACCESSORIES IN POOL BUILDING AND POOL CHEMICAL ROOMS SHALL HAVE A CHLORINE RESISTANT COATING FOR USE IN INDOOR POOLS.

SHEET KEYNOTES

1 WATER HEATER FLUE/INTAKE.

2 MOUNT UNIT ON 18" ROOF CURB. COORDINATE EXACT LOCATION WITH STRUCTURAL DRAWINGS.

3 6" DIAMETER FLUE AND 6" DIAMETER INTAKE FROM POOL HEATER. TERMINATE INTAKE 1'-0" ABOVE ROOF WITH APPROVED INTAKE. TERMINATE FLUE AT 3'-0" ABOVE ROOF WITH APPROVED VENT CAP. COORDINATE WITH POOL HEATER MANUFACTURER FOR APPROVED TERMINATIONS. SEE AQUATIC SHEETS FOR MORE INFORMATION.



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

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced CME CME

JOYCE ELLEN JONES REGISTERED No. PE60920263 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

N

The Riviera Club

Aquatics Center

ROOF MECHANICAL PLAN

M102

M102_ROOF MECHANICAL PLAN
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AIR TO AIR ENERGY RECOVERY UNIT SCHEDULE

UNIT ID	AIR CAPACITY: SUPPLY CFM	AIR CAPACITY: MIN. OUTSIDE AIR CFM	AIR CAPACITY: EXHAUST CFM	PLATE EXCHANGER MODEL	WINTER DESIGN CONDITIONS: SUMMER DESIGN CONDITIONS: EAT: DB	EAT: WB	LAT: DB	LAT: WB	EAT: DB	EAT: WB	LAT: DB	LAT: WB	SUPPLY FAN DATA: TYPE	OTY.	SUPPLY FAN DATA: SIZE (IN)	ESP	TOTAL BHP	RPM	TOTAL HP	EXHAUST FAN DATA: TYPE	OTY.	SIZE (IN)	ESP	TOTAL BHP	RPM	TOTAL HP	DX COOLING COIL DATA: TOTAL MBH	SENS MBH	EER	NATURAL GAS HEATING COIL DATA (QTY. 2): INPUT MBH	MIN AFUE%	HOT GAS REHEAT: EAT DB	LAT DB	EAT WB	LAT WB	MBH	FILTER DATA: TYPE	MERV	QTY.	ELECTRICAL DATA: MCA	VOLTS	PHASE	CABINET DIMENSIONS: HEIGHT	WIDTH	LENGTH	UNIT WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER	NOTES
ERU-1	28500 CFM	14250 CFM	17100 CFM	H-1-50C-1950	87.6	78.2	85.5	77.7	-10	-10.9	62	40	PLENUM	2	27	2.00 in-wg	32.4	1800	40	PLENUM	1	30	1.25 in-wg	12.3	1200	15	1165.2	481.3	10.0	600.0	80	65.1 °F	46.3 °F	77.7 °F	54.9	55 °F	1165.20	PLEATED	8		259.5	460	3	11' - 6 1/2"	11' - 2"	33' - 6"	20100.00	INNOVENT NDHU-OU-PL-28500-AC-IF-460	1, 2
ERU-2	7000 CFM	4000 CFM	4000 CFM	VXC-212-FL-20I-JA1	91.1	78.2	80	68.5	-0.5	-2.0	47.4	41.6	PLENUM	1		0.25 in-wg	8.3	1986	10	PLENUM	2		1.50 in-wg	5.0	1454	10	289	194	10.6	300.0	80	58.0 °F	89.7	7000					142.80	PLEATED	8	8	60.2	460	3	6' - 4 3/16"	8' - 2 5/16"	16' - 5 5/16"	5017.00	VALENT VCX-212-FL-20I-JA1	1, 2

NOTES:
1. SEE ADDITIONAL SCHEDULE INFO BELOW.
2. MANUFACTURER PROVIDED AND MOUNTED VFD'S AS REQUIRED.

ERU-1 ADDITIONAL INFO

MODEL	ALTITUDE (Ft)
NDHU-OU-PL-28500-AC-HG-IF-460	0.00

OUTSIDE FILTER — OUTSIDE

CFM	TYPE	DEPTH (in)	FACE VEL. (FPM)	MERV	QTY	WIDTH (in)	HEIGHT (in)	CLEAN PD	TOTAL PD
14250	Pleated	2	428	8	10	24	20	0.24	0.62

PLATE HEAT EXCHANGER — SUPPLY & RETURN

	OUTSIDE AIR DATA: CFM	EAT (DB/WB)(°F)	LAT (DB/WB)(°F)	PD	RETURN AIR DATA: CFM	EAT (DB/RH)(°F/%)	LAT (DB/RH)(°F/%)	PD
Cooling	14250	87.6/78.2	85.5/77.7	0.70	17100	84.0/60.0	85.8/56.6	0.94
Purge Heating	14250	-10.0/-10.9	46.1/31.0	0.56	17100	84.0/24.0	40.3/100.0	0.88
Heating	7125	-10.0/-10.9	62.0/40.0	0.20	9975	84.0/53.9	53.0/100.0	0.37
MODEL: H-1-50C-1950								

DX COIL — SUPPLY

CFM	FPM	EAT (DB/WB)(°F)	LAT (DB/WB)(°F)	MBH (T/S)	REF	CIRCUITS	SST (°F)	ROWS	FPI	PD
14250	500	85.5/77.7	54.9/54.9	1165.2/481.3	R-410A	1	42.5	6	12	0.87

HOT GAS REHEAT — SUPPLY

CFM	FPM	EDB/WB (°F)	LDB/WB (°F)	MBH	REF.	CIRCUITS	ROWS	FPI	PD
28500	667	69.5/64.9	90.1/71.3	635	R-410A	1	2	10	0.28

SUPPLY FAN — SUPPLY

QTY	CFM	CLASS	SIZE (in)	TYPE	TSP ("WC)	BHP	MHP	RPM	MOTOR RPM	VFD Hz	MOTOR TYPE
2	14250	II	27	Plenum	5.14	16.2	20.0	1734	1800	59.5	TEFC
TOTAL:	28500	-	-	-	5.14	32.4	40.0	-	-	-	-

TSP CALCULATION

SA ESP ("WC)	2.00	Outside Filter Loading PD ("WC)	0.38
Casing Loss ("WC)	0.30	Plate Heat Exchanger ("WC)	0.70
Outside Filter Clean PD ("WC)	0.24	DX Coil ("WC)	0.87
Hot Gas Reheat ("WC)	0.27		
Indirect Fired Furnace ("WC)	0.38		
TSP:	5.14 "WC		

INDIRECT FIRED FURNACE — SUPPLY

CFM	EDB (°F)	LDB (°F)	MBH IN	MBH OUT	FUEL TYPE	GAS PRESSURE	PD
28500	65.1	96.3	1200	960	NG	6-14"WC	0.38

FURNACE#	MBH IN	MBH OUT
IDF #1	600	480
IDF #2	600	480

RETURN FILTER — RETURN

CFM	TYPE	DEPTH (in)	FACE VEL. (FPM)	MERV	QTY	WIDTH (in)	HEIGHT (in)	CLEAN PD	TOTAL PD
31350	Aluminum	2	523	N/A	15	24	24	0.14	0.57

EXHAUST FAN — EXHAUST

QTY	CFM	CLASS	SIZE (in)	TYPE	TSP ("WC)	BHP	MHP	RPM	MOTOR RPM	VFD Hz	MOTOR TYPE
1	17100	II	30	Plenum	3.06	12.3	15.0	1361	1200	69.8	TEFC

TSP CALCULATION

RA ESP ("WC)	1.25	Return Filter Clean PD ("WC)	0.14	-	-
Casing Loss ("WC)	0.30	Plate Heat Exchanger ("WC)	0.94	TSP:	3.06 "WC

AIR-COOLED REFRIGERATION — NONAIRSTREAM

TONS	AMBIENT (°F)	CIRCUITS	# OF STAGES	REF. EER
97.1	95.0	2	4	10.0

ELECTRICAL INFORMATION — UNIT POWER

COMPONENT	VOLTS	PHASE	FREQ. (Hz)	MOP	MCA
Electrical Enclosure	460	3	60	300	259.5
AMP SUMMARY					
Exhaust Fan	21.0	Air-Cooled Refrigeration	37.8 x 4	--	--
Air-Cooled Refrigeration	4.0 x 6	Supply Fan	24.0 x 2	Total:	244.2

ERU-2 ADDITIONAL INFO

Unit Performance

Design Conditions

Elevation (ft)	Summer DB (F)	Summer WB (F)	Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
807	91.1	78.2	-0.5	7,000	4,000	4,000

Unit Specifications

Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing	Furnace ETL Listing
1	5,017 (+/- 5%)	Packaged DX	Indirect Gas	Outdoor	ULtcUL 1995	ANSI Z83.8 / CSA 2.6

Configuration

Outdoor Air: Intake	Outdoor Air: Discharge	Exhaust Air: Intake	Exhaust Air: Discharge
End	Bottom	Bottom	Side

ASHRAE 90.1-2019 Compliance

	ASHRAE 90.1 Min. Efficiency	Calculated Efficiency	Compliance
EER	9.8	10.6	✓
IEER	13	16.5	✓
Enthalpy Recovery Ratio (%)	50	65.7	✓

Energy Recovery Performance

Design Condition	Temperature (F): Outdoor Air: DB	Outdoor Air: WB	Supply Air: DB	Supply Air: WB	Return Air: DB	Return Air: WB/RH	Exhaust Air: DB	Exhaust Air: WB	Capacity Reduction (BTU/h)
Summer	91.1	78.2	80.0	68.5	75.0	62.4/50	86.0	73.3	163,800.0
Winter	-0.5	-2.0	47.4	41.6	72.0	55.7/35	21.6	19.6	206,928.0

Cooling Specifications

Type	Total Capacity (MBH)	Sensible Capacity (MBH)	Lead Compressor Type	Coil (DB/WB): EAT (F)	Coil (DB/WB): LAT (F)	Reheat: Capacity (MBH)	Reheat: LAT (F)
Packaged DX	289.9	194.0	Inverter Scroll	77.9 / 66.0	52.6 / 52.5	142.8	71.5

Heating Specifications

Type	Gas Type	Input (MBH)	Output (MBH)	Temperature Rise: Min (F)	Temperature Rise: Max (F)	Turndown	Performance: EAT (F)	Performance: LAT (F)
Indirect Gas	Natural	300.0	240.0	3.0	32.0	12:1	58.0	89.7

Air Performance

Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan: Qty	Fan: Type	Fan: Drive-Type
Supply	7,000	0.25	4.868	1986	1	Plenum	Direct
Exhaust	4,000	1.5	3.01	1454	1	Plenum	Direct
Economizer	4,000	1.5	1.746	1210	1	Plenum	Direct

Motor Specifications

Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	8.29	10	ODP	PE	1770
Exhaust	1	3.14	5	ODP	PE	1760

Electrical Specifications

Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	Fan Power (W/CFM)*
Unit	460/60/3	60.2	70.0	1.217

FAN SCHEDULE

SPECIFICATION SECTION 233423

UNIT ID	DESCRIPTION	FAN DATA: WHEEL SIZE	DRIVE TYPE	CFM	TSP	BHP	RPM	SONES	MOTOR DATA: HP	VOLTS	PH	ACCESSORIES: ROOF CURB	DISCONNECT SWITCH	GRAVITY BACKDRAFT DAMPER	VIBRATION ISOLATORS	BIRD SCREEN	UNIT WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER	NOTES
EF-1	SIDEWALL BELT DRIVE FAN	20	BELT	750 CFM	0.5	0.35	1725	17.1	1/2	120	1	NO	YES	YES	NO	YES	62.00	GREENHECK SBE-2H20-5	1, 2
EF-2	DIRECT DRIVE CENTRIFUGAL ROOF EXHAUST FAN	7	DIRECT	275 CFM	0.25	0.03	1725	4.9	1/15	120	1	YES	YES	YES	NO	YES	22.00	GREENHECK G-070-VG	3
EF-3	DIRECT DRIVE CENTRIFUGAL ROOF EXHAUST FAN	9.5	DIRECT	750 CFM	0.5	0.15	1725	10.2	1/6	120	1	YES	YES	YES	NO	YES	32.00	GREENHECK G-095-VG	2
EF-4	DIRECT DRIVE CENTRIFUGAL ROOF EXHAUST FAN	9.7	DIRECT	100 CFM	0.25	0.12	1725	9.5	1/4	120	1	YES	YES	YES	NO	YES	48.00	GREENHECK G-097-A	1, 3
EF-5	DIRECT DRIVE CENTRIFUGAL ROOF EXHAUST FAN	9.7	DIRECT	100 CFM	0.25	0.12	1725	9.5	1/4	120	1	YES	YES	YES	NO	YES	48.00	GREENHECK G-097-A	1, 3

NOTES:
1. PROVIDE WITH HI-PRO-POLYESTER COATING.
2. FAN CONTROLLED OFF ROOM THERMOSTAT.
3. FAN SHALL RUN CONTINUOUSLY.

ELECTRIC UNIT HEATER SCHEDULE

UNIT ID	CONFIGURATION	CFM	HEATING DATA: MIN. KW	HEATING DATA: MBH	ELECTRICAL DATA: AMPS	ELECTRICAL DATA: VOLTAGE	ELECTRICAL DATA: PHASE	ACCESSORIES: DISCONNECT SWITCH	ACCESSORIES: INTEGRAL THERMOSTAT	ACCESSORIES: WALL BRACKET	MANUFACTURER WITH MODEL NUMBER	NOTES
ECH-1	CEILING RECESSED	300	4	13.7	19.2	208	1	YES	YES	NO	QMARK - CDFRE 548	2, 4
ECH-2	CEILING RECESSED	300	4	13.7	19.2	208	1	YES	YES	NO	QMARK - CDFRE 548	2, 4
UH-1	VERTICAL	350	3	10.2	14.5	208	1	YES	YES	NO	QMARK - MUH0381	1, 2, 4
UH-2	VERTICAL	350	3	10.2	14.5	208	1	YES	YES	NO	QMARK - MUH0381	1, 2, 4
UH-3	VERTICAL	700	3	10.2	16.7	208	1	YES	YES	NO	BERKO - RUX300812	1, 2, 3, 4
UH-4	VERTICAL	700	3	10.2	16.7	208	1	YES	YES	NO	BERKO - RUX300812	1, 2, 3, 4
UH-5	VERTICAL	700	3	10.2	16.7	208	1	YES	YES	NO	BERKO - RUX300812	1, 2, 3, 4
UH-6	VERTICAL	700	3	10.2	16.7	208	1	YES	YES	NO	BERKO - RUX300812	1, 2, 3, 4
UH-7	VERTICAL	700	3	10.2	14.5	208	1	YES	YES	NO	QMARK - MUH0381	1, 2, 4

NOTES:
1. PROVIDE WITH ALL REQUIRED MOUNTING BRACKETS.
2. MAINTAIN ALL REQUIRED CLEARANCES.
3. UNIT SHALL BE EXPLOSION PROOF.
4. PROVIDE WITH UNIT MOUNTED THERMOSTAT.

DIFFUSERS & GRILLES SCHEDULE

SPECIFICATION SECTION 233713

UNIT ID	MAX CFM	DIMENSIONAL DATA: FACE SIZE	DIMENSIONAL DATA: SLOT INFO	DIMENSIONAL DATA: CONN. SIZE	THROW DATA: DIRECTION	THROW DATA: DISTANCE @ NOM. CFM	MOUNT	MAX NC SOUND LEVEL	ACCESSORIES: BALANCE DAMPER	ACCESSORIES: PLENUM BOX	ACCESSORIES: TAMPER-PROOF SCREWS	MANUFACTURER WITH MODEL NUMBER	NOTES
EG1	720	12"x12"	-	10"x10"	-	-	SEE RCP	25	YES	YES	NO	PRICE 80	1, 2, 4
EG2	2005	24"x24"	-	22"x22"	-	-	SEE RCP	25	YES	YES	NO	PRICE 80	1, 2, 4
RG2	2005	24"x24"	-	22"x22"	-	-	SEE RCP	25	NO	YES	NO	PRICE 80	2, 4
SD1	213	24"x24"	-	6"	4-WAY	3-4-7	SEE RCP	25	NO	NO	NO	PRICE SPD	1, 2, 3
SD2	332	24"x24"	-	8"	4-WAY	5-7-10	SEE RCP	25	NO	NO	NO	PRICE SPD	1, 2, 3
SD3	490	24"x24"	-	10"	4-WAY	6-8-12	SEE RCP	25	NO	NO	NO	PRICE SPD	1, 2, 3
SG1	590	24"x12"	-	22"x10"	45 DEG.	7-10-12	DUCT	25	YES	NO	NO	PRICE 535FL	5

NOTES:
1. ALUMINUM CONSTRUCTION.
2. FURNISH WITH LAY-IN STYLE PLASTER FRAMES FOR DRYWALL CEILING INSTALLATION. REFER TO ARCHITECT'S CEILING PLAN FOR DRYWALL CEILING LOCATIONS.
3. FURNISH WITH 4-WAY THROW FULL FLAT FACE PANEL.
4. FURNISH WITH 1/2"x1/2"x1/2" CORE.
5. FURNISH WITH 45 DEGREE DEFLECTION 1/2" SPACED BLADES PARALLEL TO THE LONG DIMENSION.

LOUVER SCHEDULE

SPECIFICATION SECTION 233300

UNIT ID	TYPE	WIDTH (INCHES)	HEIGHT (INCHES)	DEPTH (INCHES)	FREE AREA (SQ. FT.)	MAX AIRFLOW (CFM)	MAX AIR VELOCITY (FPM)	MANUFACTURER WITH MODEL NUMBER	NOTES
L-1	STATIONARY DRAINABLE	24"	18"	6"	1.38	750 CFM	600	RUSKIN - ELF6375DX	
L-2	STATIONARY DRAINABLE	12"	12"	6"	.36	100 CFM	600	RUSKIN - ELF6375DX	
L-3	STATIONARY DRAINABLE	24"	18"	6"	1.38	750 CFM	600	RUSKIN - ELF6375DX	
L-4	STATIONARY DRAINABLE	12"	12"	6"	.36	100 CFM	600	RUSKIN - ELF6375DX	
L-5	STATIONARY DRAINABLE	12"	12"	6"	.36	100 CFM	600	RUSKIN - ELF6375DX	

ELECTRIC REHEAT TERMINAL UNIT SCHEDULE

SPECIFICATION SECTION 233600

UNIT ID	LOCATION: NAME	LOCATION: NUMBER	DESIGN CFM	MIN CFM	HEAT CFM	UNIT INLET SIZE	DESIGN INLET PRESSURE IN. WG	SOUND LEVEL @ DESIGN AIRFLOW	MIN KW	EAT	LAT	AMPS	VOLTS	PH	MANUFACTURER WITH MODEL NUMBER	NOTES
VAV-1	LIFEGUARD	2	145	75	75	4	1	28	0.7	55 °F	85 °F	2.53	277	1	PRICE SCRA	
VAV-2	LIFEGUARD	2	2625	800	1315	14	1	21	12.1	55 °F	84 °F	43.68	277	1	PRICE SCRA	
VAV-3	CIRC-1	38-1	600	180	300	7	1	29	2.8	55 °F	85 °F	10.11	277	1	PRICE SCRA	
VAV-4	CIRC-1	38-1	600	180	300	7	1	29	2.8	55 °F	85 °F	10.11	277	1	PRICE SCRA	
VAV-5			440	135	220	5	1	34	2.1	55 °F	85 °F	7.58	277	1	PRICE SCRA	
VAV-6			440	135	220	5	1	34	2.1	55 °F	85 °F	7.58	277	1	PRICE SCRA	
VAV-7	CIRC-1	38-1	1440	435	720	10	1	25	6.8	55 °F	85 °F	24.55	277	1	PRICE SCRA	
VAV-8	LIFEGUARD	2	500	150	250	5	1	36	2.4	55 °F	85 °F	8.66	277	1	PRICE SCRA	
			6790													

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced CME CME

JOYCE ELLEN JONES — REGISTERED — No. PE60920263 — STATE OF INDIANA — PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

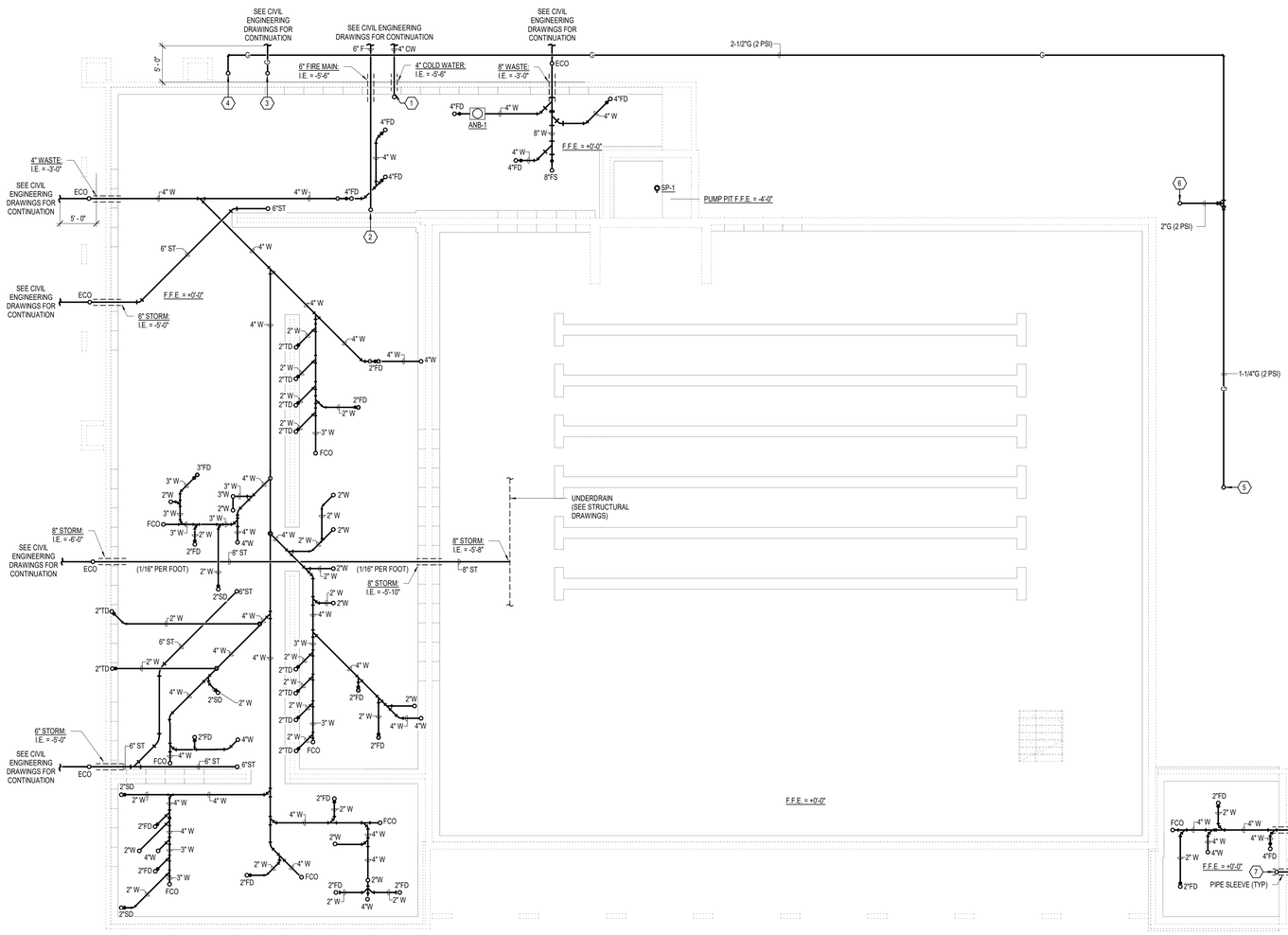
KEY PLAN

The Riviera Club

Aquatics Center

MECHANICAL SCHEDULES

M601



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

GENERAL NOTES

A REFER TO DRAWING P-000 FOR PLUMBING AND FIRE PROTECTION SYMBOLS AND ABBREVIATIONS.
B REFER TO DRAWING P-500 SERIES FOR PLUMBING DETAILS.
C REFER TO DRAWING P-600 SERIES FOR PLUMBING SCHEDULES.
D ALL FLOOR DRAINS AND AND FLOOR CLEANOUTS TO BE FLUSH AND LEVEL WITH FINISHED FLOORS. CONTRACTOR IS RESPONSIBLE FOR ANY REWORK NECESSARY FOR IMPROPER INSTALLATION.
E REFER TO THE "PLUMBING FIXTURE ROUGH-IN SCHEDULE" TO SIZE BRANCH LINES TO INDIVIDUAL PLUMBING FIXTURES.
F INSTALL UNDERGROUND PVC DWV PIPING ACCORDING TO ASTM D 2321.
G SLEEVE ALL PIPING PASSING THROUGH FOUNDATION WALLS AND BELOW FOOTINGS. SLEEVE SHALL BE TWO PIPE DIAMETERS LARGER THAN PIPE. SLEEVE SHALL EXTEND BEYOND THE ANGLE OF REPOSE.
H AVOID ALL CONFLICTS BETWEEN PLUMBING SYSTEMS, AND UNDERGROUND CONDUIT, PIPING, STRUCTURAL MEMBERS, AND ANY OTHER OBSTRUCTIONS ENCOUNTERED. PIPING LAYOUTS ARE DIAGRAMMATIC AND SHOW SYSTEM INTENT. PIPING MAY REQUIRE ADDITIONAL OFFSETS, DROPS, FITTINGS ETC.

SHEET KEYNOTES

1 4"CW MAIN UP.
2 6" FIRE MAIN UP.
3 GAS SERVICE BY UTILITY COMPANY
4 2-1/2"G (2 PSI) FROM ABOVE.
5 1-1/4"G (2 PSI) UP.
6 2"G (2 PSI) UP.
7 1-1/2" CW DROP ABOVE.
8 1-1/2" CW MAKE-UP UP TO SERVE POOL EQUIPMENT.

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	Addendum #1	01/05/2023
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KEY PLAN

The Riviera Club

Aquatics Center

FOUNDATION PLUMBING PLAN

P100

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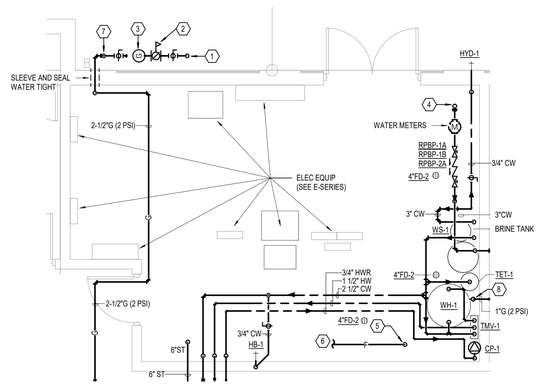
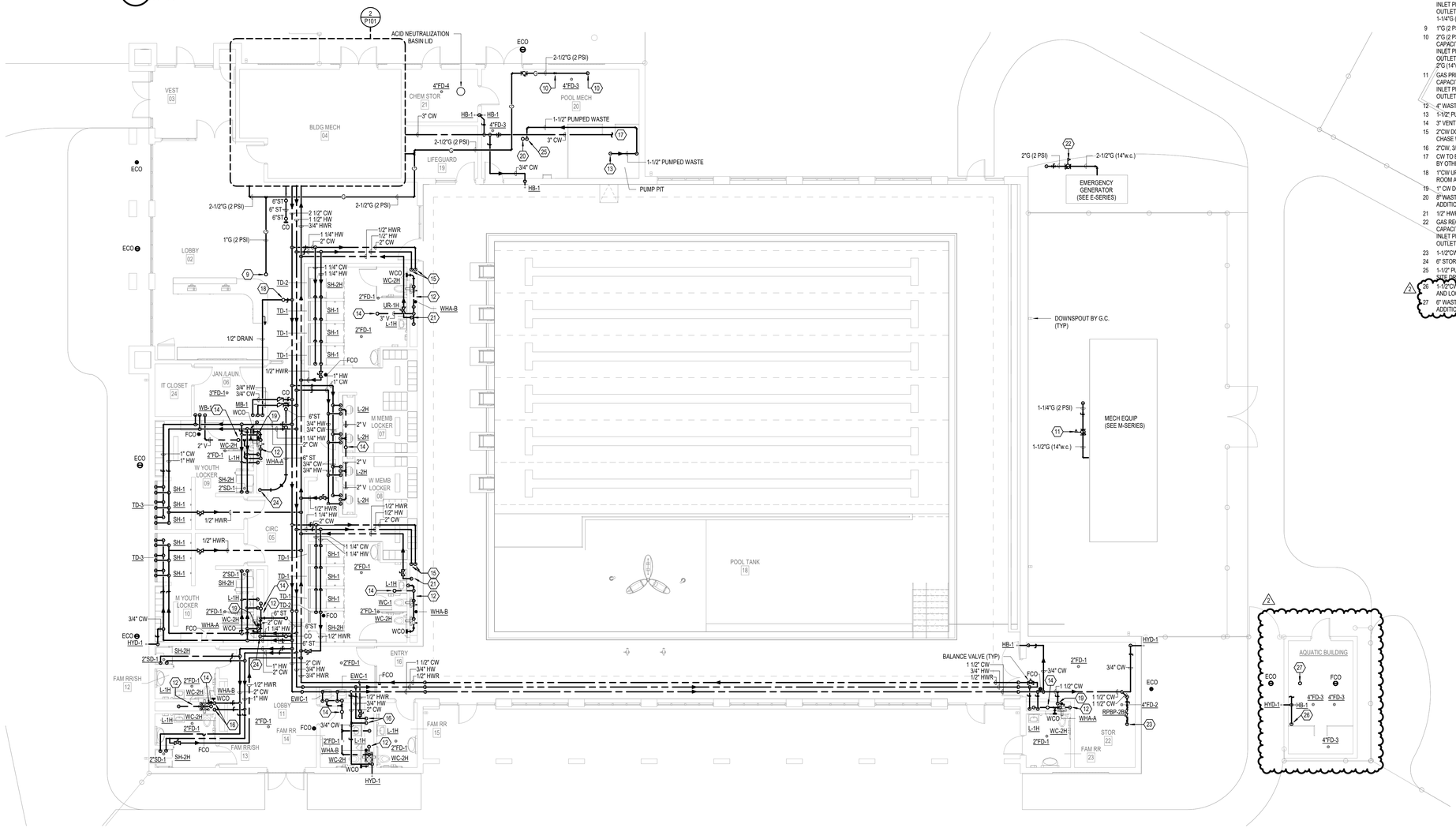


2 ENLARGED BUILDING MECH ROOM PLUMBING PLAN

1/4" = 1'-0"



1 FIRST FLOOR PLUMBING PLAN

1/8" = 1'-0"

GENERAL NOTES

A REFER TO DRAWING P-000 FOR PLUMBING AND FIRE PROTECTION SYMBOLS AND ABBREVIATIONS.

B REFER TO DRAWING P-500 SERIES FOR PLUMBING DETAILS.

C REFER TO DRAWING P-600 SERIES FOR PLUMBING SCHEDULES.

D ALL FLOOR DRAINS AND AND FLOOR CLEANOUTS TO BE FLUSH AND LEVEL WITH FINISHED FLOORS. CONTRACTOR IS RESPONSIBLE FOR ANY REWORK NECESSARY FOR IMPROPER INSTALLATION.

E REFER TO THE "PLUMBING FIXTURE ROUGH-IN SCHEDULE" TO SIZE BRANCH LINES TO INDIVIDUAL PLUMBING FIXTURES.

F LOCATE SHUT-OFF VALVES ABOVE ACCESSIBLE CEILINGS OR ACCESS PANELS IN GYP. CEILINGS.

G INSTALL PIPING AS HIGH AS POSSIBLE. MAINTAIN CODE REQUIRED SLOPE ON ALL WASTE AND VENT PIPING.

H AVOID ALL CONFLICTS BETWEEN PLUMBING SYSTEMS, AND CONDUIT, DUCT, EQUIPMENT, PIPING, STRUCTURAL MEMBERS, AND ANY OTHER OBSTRUCTIONS ENCOUNTERED. PIPING LAYOUTS ARE DIAGRAMMATIC AND SHOW INTENT. PIPING MAY REQUIRE ADDITIONAL OFFSETS, DROPS, FITTING, ETC.

I PROVIDE SHUT-OFF, DIRT LEG AND UNION AT EACH NATURAL GAS CONNECTION TO GAS FIRED EQUIPMENT.

J COORDINATE LOCATION OF NATURAL GAS CONNECTION WITH EQUIPMENT MANUFACTURER'S DATA.

K PRIME AND PAINT GAS PIPING OUTSIDE BUILDING TO PREVENT RUSTING. APPLY TWO COATS OF RUST-INHIBITING PRIMER AND TWO COATS OF ENAMEL PAINT FORMULATED FOR EXTERIOR USE. COLOR AS SELECTED BY ARCHITECT.

SHEET KEYNOTES

1 GAS SERVICE LINE DOWN BELOW GRADE.
2 GAS SERVICE, GAS REGULATOR, AND GAS METER BY UTILITY.
3 GAS METER - SIZE FOR:
TOTAL CONNECTED LOAD: 6.130,000 BTUH
SERVICE PRESSURE: 2 PSI
4 3" CW MAIN FROM BELOW.
5 6" FIRE RISER WITH SUPERVISED CONTROL VALVE, FLOW SWITCH, AND MAIN DRAIN.
6 TO SPRINKLER SYSTEM.
7 2-1/2"G (2 PSI) DOWN.
8 1"G (2 PSI) DOWN WITH SHUT-OFF AND GAS REGULATOR - SIZE FOR:
CAPACITY: 285,000 BTUH
INLET PRESSURE: 2 PSI
OUTLET PRESSURE: 14"w.c.
1-1/4"G (14"w.c.) TO WATER HEATER.
9 1"G (2 PSI) UP TO ROOF.
10 2"G (2 PSI) DOWN WITH SHUT-OFF AND GAS REGULATOR - SIZE FOR:
CAPACITY: 1,442,000 BTUH
INLET PRESSURE: 2 PSI
OUTLET PRESSURE: 14"w.c.
2"G (14"w.c.) TO POOL HEATER.
11 GAS PRESSUE REGULATOR - SIZE FOR:
CAPACITY: 600,000 BTUH
INLET PRESSURE: 2 PSI
OUTLET PRESSURE: 14"w.c.
12 4" WASTE DOWN.
13 1-1/2" PUMPED WASTE FROM (SP-1) IN PUMP PIT.
14 3" VENT UP TO 4" V.T.R.
15 2"CW DOWN IN CHASE WITH HEADER TO SERVE FIXTURES, 1/2"HW DOWN IN CHASE WITH HEADER TO SERVE FIXTURES..
16 2"CW, 3/4"HW DOWN IN CHASE.
17 CW TO EXTEND AND CONNECT TO POOL EQUIPMENT. DESIGN AND LOCATIONS BY OTHERS.
18 1"CW UP TO SERVE ROOF HYDRANT. ROUTE 1/2" DRAIN LINE TO JAN/LAUN ROOM AND TERMINATE ABOVE MOP BASIN.
19 1" CW DOWN TO SERVE WATER CLOSET.
20 8" WASTE STANDPIPE FOR POOL BACKWASH. SEE POOL DRAWINGS FOR ADDITIONAL INFORMATION.
21 1/2" HWR FROM LAVATORY.
22 GAS REGULATOR - SIZE FOR:
CAPACITY: 2,061,000 BTUH
INLET PRESSURE: 2 PSI
OUTLET PRESSURE: 14"w.c.
23 1-1/2"CW DOWN. EXTEND TO POOL EQUIPMENT BUILDING.
24 6" STORM DOWN IN CHASE.
25 1-1/2" PUMPED WASTE DOWN AND TERMINATE WITH AIR GAP ABOVE 8" OPEN SITE DRAIN STANDPIPE.
2 26 1-1/2"CW MAKE-UP TO EXTEND AND CONNECT TO POOL EQUIPMENT. DESIGN AND LOCATION BY OTHERS.
27 6" WASTE STANDPIPE FOR POOL BACKWASH. SEE POOL DRAWINGS FOR ADDITIONAL INFORMATION.

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#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

N

The Riviera Club

Aquatics Center

FIRST FLOOR PLUMBING PLAN

P101

P101 - FIRST FLOOR PLUMBING PLAN
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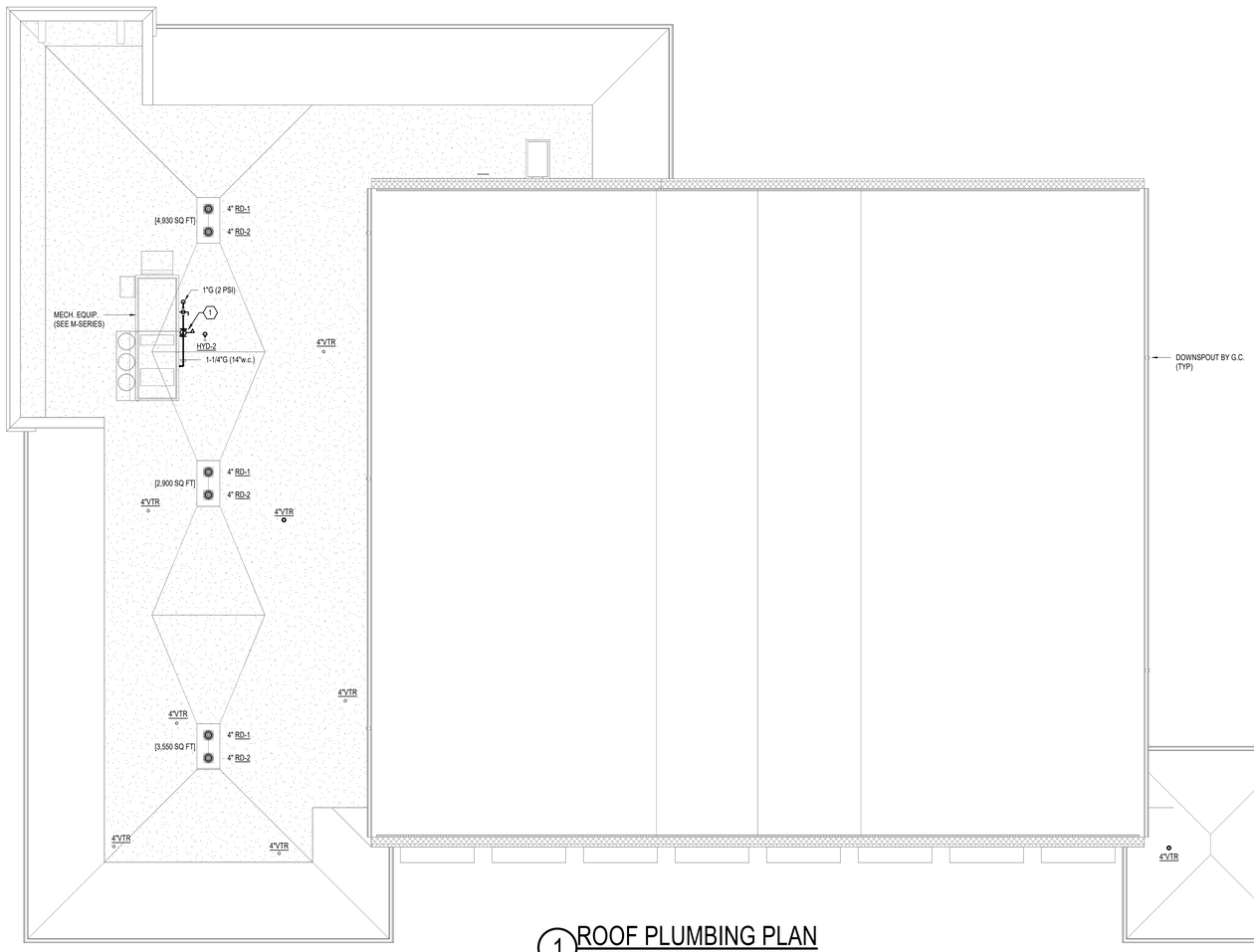

1 ROOF PLUMBING PLAN
1/8" = 1'-0"

GENERAL NOTES

A PROVIDE SHUT-OFF, DIRT LEG AND UNION AT EACH NATURAL GAS CONNECTION TO GAS FIRED EQUIPMENT.

B COORDINATE LOCATION OF NATURAL GAS CONNECTION WITH EQUIPMENT MANUFACTURER'S DATA.

C PRIME AND PAINT GAS PIPING OUTSIDE THE BUILDING TO PREVENT RUSTING. APPLY TWO COATS OF RUST-INHIBITING PRIMER AND TWO COATS OF OIL-BASE ENAMEL PAINT FORMULATED FOR OUTDOOR USE.

1 D SUPPORT NEW GAS PIPING ON ROOF WITH PRE-MANUFACTURED PIPE SUPPORT SYSTEM (MIFAB, MAPA, MIRO, ROOFTOP FLOW).

E LOCATE PLUMBING VENT TERMINATIONS THROUGH ROOF NOT CLOSER THAN 15 FEET FROM ANY FRESH AIR INTAKES (SEE MECHANICAL DRAWINGS FOR INFORMATION RELATED TO MECHANICAL ROOF TOP UNITS).

F PAINT EXTERIOR EXPOSED PVC PLUMBING VENT PIPING TO PREVENT UV DEGRADATION. PAINT SHALL BE WATER-BASED FORMULATED FOR EXTERIOR USE.

SHEET KEYNOTES

1 GAS REGULATOR - SIZE FOR:
CAPACITY: 300,000 BTUH
INLET PRESSURE: 2 PSI
OUTLET PRESSURE: 14"w.c.

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#	Revision	Date
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5640 N Illinois St
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KEY PLAN

The Riviera Club

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ROOF PLUMBING PLAN

P102

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PLUMBING FIXTURE ROUGH-IN SCHEDULE

TAG	FIXTURE DESCRIPTION	HW	CW	TRAP	W	V	MOUNTING HEIGHT
WC-1	WATER CLOSET - FLUSH VALVE	-	1"	INTEGRAL	4"	2"	15" TO SEAT
WC-2H	WATER CLOSET - FLUSH VALVE, ADA	-	1"	INTEGRAL	4"	2"	17" TO SEAT
UR-1H	URINAL - ADA	-	3/4"	INTEGRAL	2"	2"	17" TO RIM
L-1H	WALL-MOUNTED LAVATORY - ADA	1/2"	1/2"	1-1/4"	2"	2"	34" TO DECK
L-2H	UNDERMOUNT LAVATORY - ADA	1/2"	1/2"	1-1/4"	2"	2"	SEE ARCHITECTURAL ELEVATIONS
SH-1	SHOWER	1/2"	1/2"	-	-	-	78" (HEAD), 48" (VALVE)
SH-2H	SHOWER - ADA	1/2"	1/2"	-	-	-	72" (WATER/HOSE ROUGH-IN), 48" (HANDSPRAY), 48" (VALVE)
EWC-1H	ELECTRIC WATER COOLER WITH BOTTLE FILLER	-	1/2"	1-1/2"	2"	2"	36" TO BUBBLER
HB-1	HOSE BIBB	-	1/2"	-	-	-	36" A.F.F.
HYD-1	WALL HYDRANT - FREEZELESS	-	3/4"	-	-	-	18" ABOVE ADJACENT GRADE
HYD-2	ROOF HYDRANT - FREEZELESS	-	1/2"	-	-	-	
WB-1	WASHER BOX	1/2"	1/2"	2"	2"	2"	42" A.F.F. TO BOTTOM
MB-1	MOP BASIN	3/4"	3/4"	3'	3"	2"	36" A.F.F. TO FAUCET

DRAINAGE FITTING SCHEDULE

MARK NO.	FIXTURE DESCRIPTION	MANUFACTURER/ MODEL NUMBER
FD-1	FLOOR DRAIN: CAST IRON, FLASHING COLLAR, BOTTOM NO-HUB OUTLET, WITH TRAP SEALER. STRAINER: NICKEL BRONZE, ADJUSTABLE, ROUND, FLAT.	JAY R. SMITH 2005Y-A TRAP SEALER: JAY R SMITH 2692-02
FD-2	FLOOR SINK: CAST-IRON, DEEP BODY RECEPTOR, NO-HUB BOTTOM OUTLET. STRAINER: CAST IRON, ROUND, BAR GRATE, SEDIMENT BUCKET	J.R. SMITH 2240Y
FD-3	FLOOR SINK: HIGH STRENGTH CHEMICALLY RESISTANT PVC, 8" DIA. GRATE, BODY, SEEPAGE HOLES, SEDIMENT BUCKET, FLANGE AND FLASHING CLAMP.	J.R. SMITH 225-H04
FD-4	FLOOR DRAIN: FLOWAY SERIES F1000 POLPROPYLENE ADJUSTABLE FLOOR DRAIN WITH 6" DIAMETER STRAINER, SEDIMENT BUCKET, AND PLAIN END OUTLET. BODY WITH 14-1/2" DIAMETER FLANGE, AND NON-PUNCTURING STYLE FLASHING COLLAR WITH WEEP HOLES.	FLOWAY F1402P
TD-1	SHOWER TRENCH DRAIN: LENGTH = 3'-0" CHANNEL: 2" WIDE, POLYMER FIBER REINFORCED CONCRETE, WITH SQUARE BOTTOM AT 1% SLOPE, SCH. 40 PVC CENTER OUTLET. FRAMES: MEDIUM DUTY 18 GAUGE (T304) STAINLESS STEEL FRAMES, WITH HEAVY GAUGE METAL REBAR BRACKETS AND 1-1/8" LONG BY 1/4" DIAMETER METAL NELSON CONCRETE ANCHOR STUDS. GRATES: 3" WIDE X 1/2" THICK, T404 STAINLESS STEEL "WAVE" PATTERN (DIN CLASS "A") WITH STAINLESS STEEL GRATE LOCKS.	DURA TRENCH #DTPF2-03W48SSA-MDSS05ZSA-GLZN2-NSR-2b
TD-2	SHOWER TRENCH DRAIN: LENGTH = 5'-0" CHANNEL: 2" WIDE, POLYMER FIBER REINFORCED CONCRETE, WITH SQUARE BOTTOM AT 1% SLOPE, SCH. 40 PVC CENTER OUTLET. FRAMES: MEDIUM DUTY 18 GAUGE (T304) STAINLESS STEEL FRAMES, WITH HEAVY GAUGE METAL REBAR BRACKETS AND 1-1/8" LONG BY 1/4" DIAMETER METAL NELSON CONCRETE ANCHOR STUDS. GRATES: 3" WIDE X 1/2" THICK, T404 STAINLESS STEEL "WAVE" PATTERN (DIN CLASS "A") WITH STAINLESS STEEL GRATE LOCKS.	DURA TRENCH #DTPF2-03W48SSA-MDSS05ZSA-GLZN2-NSR-2b
TD-3	SHOWER TRENCH DRAIN: LENGTH = 7'-10" CHANNEL: 2" WIDE, POLYMER FIBER REINFORCED CONCRETE, WITH SQUARE BOTTOM AT 1% SLOPE, SCH. 40 PVC CENTER OUTLET. FRAMES: MEDIUM DUTY 18 GAUGE (T304) STAINLESS STEEL FRAMES, WITH HEAVY GAUGE METAL REBAR BRACKETS AND 1-1/8" LONG BY 1/4" DIAMETER METAL NELSON CONCRETE ANCHOR STUDS. GRATES: 3" WIDE X 1/2" THICK, T404 STAINLESS STEEL "WAVE" PATTERN (DIN CLASS "A") WITH STAINLESS STEEL GRATE LOCKS.	DURA TRENCH #DTPF2-03W48SSA-MDSS05ZSA-GLZN2-NSR-2b
SD-1	SHOWER DRAIN: CAST IRON, FLASHING COLLAR, BOTTOM NO-HUB OUTLET. STRAINER: NICKEL BRONZE, ADJUSTABLE, ROUND.	JAY R. SMITH 2005Y
FCO	FLOOR CLEANOUT: CAST IRON BODY, ROUND ADJUSTABLE SECURED NICKEL BRONZE COVER, BRONZE PLUG, GASKET SEAL.	JAY R. SMITH 4221S
WCO	WALL CLEANOUT: STAINLESS STEEL SHALLOW COVER WITH CENTER VANDAL PROOF SCREW.	JAY R. SMITH 4710
ECO	EXTERIOR CLEANOUT: CAST IRON BODY, DOUGLE FLANGED HOUSING, HEAVY DUTY SECURED SCORIATED CAST IRON COVER WITH LIFTING RING, ABS PLUG, GASKET SEAL.	JAY R. SMITH 4253S
ANB-1	ACID NEUTRALIZATION BASIN: CAPACITY - 15 GAL., WEIGHT - 30 LBS. W/ COVER, STANDARD COVER HANDLES 450 LBS. WHEN UNIT IS INSTALLED ABOVE-GRADE AND 2,500 LBS. WHEN BURIED WITH SR16 RISER, MAXIMUM OPERATING TEMPERATURE 140 DEG. F. CONTINUOUS.	STRIEM LB-15

WATER HAMMER ARRESTERS

TAG	I.P.S.	F.U. RATING	J.R. SMITH NO.	WADE NO.	REMARK
A	3/4"	1 - 11	5005	W-5	P.D.I. CERTIFIED
B	1"	12 - 32	5010	W-10	P.D.I. CERTIFIED
C	1"	33 - 60	5020	W-20	P.D.I. CERTIFIED
D	1"	61 - 113	5030	W-50	P.D.I. CERTIFIED

PLUMBING FIXTURE SCHEDULE

TAG	FIXTURE DESCRIPTION	FIXTURE	TRIM & ACCESSORIES
WC-1, 2H	WATER CLOSET: WALL HUNG, VITREOUS CHINA, 1.28 GPF, 1,000 GRAMS MaP SCORE, ELONGATED BOWL, 1-1/2" TOP SPUD, 10" X 12" WATER SURFACE AREA, 1,000 LBS STATIC WEIGHT LOAD, CONVENTIONAL GLAZE, DIRECT-FED SIPHON JET ACTION. FLUSH VALVE: QUIET, EXPOSED, DIAPHRAGM TYPE, CHROME PLATED, HIGH CHLORAMINE RESISTANT PERMEX SYNTHETIC RUBBER DIAPHRAGM WITH DUAL FILTERED BYPASS, 1" IPS SCREWDRIVER BAK-CHECK ANGLE STOP WITH VANDAL RESISTANT STOP COVER, VACUUM BREAKER WITH FLUSH CONNECTION, 1-1/2" TOP SPUD COUPLING, NON-HOLD-OPEN HANDLE, ADA COMPLIANT. SEAT: OPEN FRONT LESS COVER, ELONGATED, HEAVY DUTY, INJECTION MOLDED SOLID PLASTIC, MOLDED IN BUMPERS, SELF-SUSTAINING CHECK HINGES, STAINLESS STEEL POSTS AND PINTLES, STA-TITE COMMERCIAL FASTENING SYSTEM. CARRIER: HEAVY DUTY WATER CLOSET CARRIER, 4" WASTE.	WATER CLOSET: AMERICAN STANDARD AFWALL MILLENIUM 2257.101	FLUSH VALVE: SLOAN ROYAL 111-1.28-DFB SEAT: BEMIS 1955SSCT CARRIER: JAY R. SMITH 0200 SERIES
UR-1H	URINAL: VITREOUS CHINA, ULTRA HIGH EFFICIENCY, 1.0 GPF, FLUSHING RIM, ELONGATED 14" RIM FROM FINISHED WALL, WASHOUT FLUSH ACTION, 3/4" INLET SPUD, ADA COMPLIANT. FLUSH VALVE: 1.0 GPF, POLISHED CHROME FINISH, FIXTURE CONNECTION TOP SPUD, SINGLE FLUSH, ROYAL EXPOSED MANUAL URINAL FLUSHOMETER.	URINAL: AMERICAN STANDARD WASHBROOK 6590.001	FLUSH VALVE: SLOAN ROYAL 186-1.0 CARRIER: JAY R. SMITH 0614
L-1H	LAVATORY: WALL HUNG, VITREOUS CHINA, FRONT OVERFLOW, D-SHAPED BOWL, SELF-DRAINING DECK WITH CONTOURED BACK AND SIDE SPLASH SHIELDS, FAUCET LEDGE, ADA COMPLIANT. FAUCET: CAST BRASS CENTERSET FAUCET, 1.5 GPM AERATOR, SINGLE CONTROL, 4" CENTERS, POLISHED CHROME-PLATED FINISH, CERAMIC CARTRIDGE WITH ROTATIONAL LIMIT STOP, VANDAL RESISTANT, ADA COMPLIANT. DRAIN / TAILPIECE: HEAVY CAST BRASS, 1-1/4" DIA., 17 GAUGE, SEAMLESS BRASS, BRASS LOCKNUT, HEAVY RUBBER BASIN WASHER, FIBER FRICTION WASHER, CHROME PLATED. 2 P-TRAP: HEAVY CAST BRASS, 1-1/4" X 1-1/2", ADJUSTABLE, CLEANOUT PLUG, SLIP NUTS, 17 GAUGE TUBULAR WALL BEND, STEEL SHALLOW FLANGE, CHROME PLATED. SUPPLIES: QUARTER TURN BALL VALVES, 1/2" IPS X 3/8" OD, COPPER FLEXIBLE RISERS, STEEL SHALLOW FLANGES, CHROME PLATED. PROTECTIVE COVERING: (L-1H) OPENS AT 180° FOR EASY INSTALLATION AND SECURE FIT, FORM FITTING, EVA FOAM MATERIAL, FADE RESISTANT, CERTIFIED ANTI-MICROBIAL PER ISO 846 METHOD C, ASTM E-84, ADA COMPLIANT, WHITE, COVERS FOR DRAIN, P-TRAP, WALL BEND, SUPPLY STOPS AND SUPPLY LINES. CARRIER: LAVATORY SUPPORT WITH CONCEALED ADJUSTABLE ARMS AND SURE-SET MECHANICAL LOCKING DEVICE, AND ROUND STEEL UPRIGHTS WITH WELDED BASES.	LAVATORY: AMERICAN STANDARD LUCERNE 0355.012	FAUCET: DELTA 22C131 2 DRAIN / TAILPIECE: McGUIRE 155A P-TRAP: McGUIRE 8902C SUPPLIES: McGUIRE LFBV2165 PROTECTIVE COVERING: (L-2H) DEARBORN ADA100 CARRIER: JAY R. SMITH 0700 SERIES
L-2H	LAVATORY: OVALYN UNIVERSAL ACCESS SINK, UNDERMOUNT, MADE FROM VITREOUS CHINA, UNGLAZED RIM FOR UNDER COUNTER MOUNT, REAR OVERFLOW, SUPPLIED WITH MOUNTING KIT (047194-0070A) AND TEMPLATE. BOWL SIZE: 16-3/4" WIDE, 13-1/4" FRONT TO BACK, 5-1/2" DEEP. 4" BOWL DEPTH. FAUCET: CAST BRASS CENTERSET FAUCET, 1.5 GPM AERATOR, SINGLE CONTROL, 4" CENTERS, POLISHED CHROME-PLATED FINISH, CERAMIC CARTRIDGE WITH ROTATIONAL LIMIT STOP, VANDAL RESISTANT, ADA COMPLIANT. DRAIN / TAILPIECE: HEAVY CAST BRASS, 1-1/4" DIA., 17 GAUGE, SEAMLESS BRASS, BRASS LOCKNUT, HEAVY RUBBER BASIN WASHER, FIBER FRICTION WASHER, CHROME PLATED. 2 P-TRAP: HEAVY CAST BRASS, 1-1/4" X 1-1/2", ADJUSTABLE, CLEANOUT PLUG, SLIP NUTS, 17 GAUGE TUBULAR WALL BEND, STEEL SHALLOW FLANGE, CHROME PLATED. SUPPLIES: QUARTER TURN BALL VALVES, 1/2" IPS X 3/8" OD, COPPER FLEXIBLE RISERS, STEEL SHALLOW FLANGES, CHROME PLATED.	LAVATORY: AMERICAN STANDARD OVALYN 9482.000	FAUCET: DELTA 22C131 2 DRAIN / TAILPIECE: McGUIRE 155A P-TRAP: McGUIRE 8902C SUPPLIES: McGUIRE LFBV2165
SH-1	SHOWER VALVE & HEAD ASSEMBLY: SURFACE MOUNTED, PRESSURE ACTUATED SHOWER MIXER, STAINLESS STEEL PRESSURE BALANCING PISTON, BUILT-IN SHUTOFF FOR SINGLE HANDLE OPERATION, COLOR CODED DIAL, ADJUSTABLE HIGH TEMPERATURE LIMIT STOP SET FOR 110°F, INLET STOPS, SOAP DISH, ADJUSTABLE SPRAY BALL JOINT MASSAGE SHOWER HEAD, 1.5 GPM, HIGH-IMPACT ABS BODY CHROME PLATED.		SHOWER VALVE & HEAD ASSEMBLY: LEONARD SS-PAM-H15-RSD
SH-2H	SHOWER VALVE & HEAD ASSEMBLY: SURFACE MOUNTED, PRESSURE ACTUATED SHOWER MIXER, STAINLESS STEEL PRESSURE BALANCING PISTON, BUILT-IN SHUTOFF FOR SINGLE HANDLE OPERATION, COLOR CODED DIAL, ADJUSTABLE HIGH TEMPERATURE LIMIT STOP SET FOR 110°F, INLET STOPS, SOAP DISH, ADJUSTABLE SPRAY BALL JOINT MASSAGE SHOWER HEAD, 1.5 GPM, HIGH-IMPACT ABS BODY CHROME PLATED, IN-LINE DIVERTER VALVE WITH LEVER HANDLE, HAND SHOWER, 1.5 GPM, 69" HOSE, 24" GLIDE BAR, DOUBLE CHECK VALVE ASSEMBLY SUPPLY ELBOW, ADA COMPLIANT.		SHOWER VALVE & HEAD ASSEMBLY: LEONARD SS-PAM-H-15-D2L515P(G)-44
EWC-1H	ELECTRIC WATER COOLER WITH BOTTLE FILLER: SINGLE ADA, HIGH EFFICIENCY FILTERED, CHILLING CAPACITY OF 8 GPH OF 50 DEG F DRINKING WATER BASED ON 80 DEG F INLET WATER AND 90 DEG F AMBIENT PER ASHRAE 18 TESTING, WALL MOUNTED, UL 399, LEAD-FREE NSF 61 & 372, MECHANICAL FRONT PUSHBUTTON ACTIVATION, STAINLESS STEEL TOP, HEAVY DUTY GALVANIZED STEEL FRAME, VANDAL RESISTANT, CHROME PLATED BRASS BUBBLER. BOTTLE FILLING STATION: ADA COMPLIANT, INDEPENDENT MANUAL ACTIVATION, ANTIMICROBIAL COMPOUND TO PROTECT ALCOVE AND ACTIVATION BUTTON, BRUSHED STAINLESS STEEL CABINET.	ELECTRIC WATER COOLER WITH BOTTLE FILLER: OASIS PG8SBF	P-TRAP: McGUIRE 8902C SUPPLIES: McGUIRE LFBV2165
HB-1	HOSE BIBB: ANTI-SIPHON, VACUUM BREAKER PROTECTED, ASSE 1011 APPROVED, 3/4" MALE HOSE THREAD, EPDM PACKING, ADJUSTABLE BRASS NUT WITH DEEL STEM GUARD, STANDARD "O" SIZE WASHER VALVE SEAT, METAL WHEEL HANDLE, CHROME PLATED FINISH.		HOSE BIBB: WOODFORD 24
HYD-1	WALL HYDRANT: (FREEZELESS) AUTOMATIC DRAINING WITH ANTI-SIPHON VACUUM BREAKER, ASSE 1011 APPROVED, 3/4" INLET AND OUTLET, HARDENED STAINLESS STEEL OPERATING STEM AND ONE-PIECE VALVE PLUNGER TO CONTROL BOTH FLOW AND DRAIN FUNCTIONS, EXTERIOR FINISH TO BE CHROME PLATED, RECESSED WALL BOX WITH LOCKABLE DOOR, LOOSE TEE KEY (FURNISHED WITH EACH HYDRANT).		WALL HYDRANT: WOODFORD B65
HYD-2	ROOF HYDRANT: (FREEZELESS) BACKFLOW PROTECTED HOSE CONNECTION, ASSE 1052, 1" NPT FEMALE INLET CONNECTION, 1-1/4" GALVANIZED PIPE CASING, 1/8" NPT DRAIN HOLE (PIPED TO DRAIN), ROOF MOUNTING SYSTEM.		ROOF HYDRANT: WOODFORD RHY2-MS
WB-1	WASHER BOX: WHITE POWDER COATED RECESSED BOX, QUARTER TURN VALVES AND 2" SLIPNUT DRAIN.		WALL HYDRANT: GUY GREY SSWB1
MB-1	MOP BASIN: 24" x 24" x 10" OVERALL DIMENSIONS, ONE PIECE HOMOGENOUS MOLD, 3" STAINLESS STEEL DRAIN BODY DESIGNED FOR CAULK CONNECTION, STAINLESS STEEL COMBINATION DOME STRAINER AND LINT BASKET. FAUCET: 8" WALL MOUNT MIXING FAUCET WITH ROUGH CHROME PLATED BRASS BODY, ROUGH CHROME PLATED BRASS SPOUT WITH VACUUM BREAKER, PAIL HOOK, GARDEN HOSE MALE OUTLET, COMPRESSION CARTRIDGES WITH SPRING CHECKS, LEVER HANDLES, 1/2" NPT FEMALE INLETS, BUILT-IN SERVICE STOPS IN BODY, UPPER SUPPORT ROD, ASME/CSA CERTIFIED, NSF 61 COMPLIANT, ADA COMPLIANT.	MOP BASIN: FIAT MSB-2424	FAUCET: T&S B-0665-BSTR

PLUMBING EQUIPMENT SCHEDULE

			UNIT			ELECTRICAL DATA			GAS DATA		NOTES
TAG	SPECIFICATION NAME	MANUFACTURER	MODEL #	WEIGHT	CAPACITY	V-PH-HZ	HP	KW	MBH IN	MBH OUT	
WH-1	DOMESTIC WATER HEATER (GAS)	LOCHINVAR	SWR285N		110 GAL. CAPACITY 328 GPH @ 100 DEG TEMPERATURE RISE GAS INPUT: 285,000 BTUH	-	-	-	285	-	1, 2
TMV-1	THERMOSTATIC MIXING VALVE	LAWLER	MODEL 801 UNIT #86208		16 PSI DROP @ 30 GPM	-	-	-	-	-	7
TET-1	THERMAL EXPANSION TANK	CALEFACTIO	HGTE-25		8 GAL. CAPACITY	-	-	-	-	-	3
CP-1	CIRCULATOR PUMP	ARMSTRONG	E9		4 GPM FLOW @ 35 FT TOTAL DYNAMIC HEAD	120V-1PH	1/6 HP	-	-	-	4, 5, 6
RPBP-1A RPBP-1B	BACKFLOW PREVENTER	WILKINS	S-975XL2 - 2"		15 PSI PRESSURE DROP @ 90 GPM	-	-	-	-	-	8, 9
RPBP-2A RPBP-2B	BACKFLOW PREVENTER	WILKINS	975XL2-S-AG - 3/4"		13 PSI PRESSURE DROP @ 18 GPM	-	-	-	-	-	8, 9
WS-1	WATER SOFTENER	AQUA SYSTEMS	WS3DSF1000HL		10 CUBIC FOOT, 250,000 GRAINS OF CAPACITY AT 10 LBS/CU FT. 98 GPM FLOW RATE AT 15 PSI PRESSURE DROP	24V-1PH	-	-	-	-	10
SP-1	SUMP PUMP	MYERS	MS-33		1/2 HP @ 56 GPM	115V-1PH-60Hz	1/2 HP	-	-	-	-

NOTES:

1. SET OUTLET TEMPERATURE AT 140°F.
2. PLUMB DRAIN FROM TEMPERATURE AND PRESSURE RELIEF AND TERMINATE AT +2" ABOVE FLOOR DRAIN.
3. ADJUST TANK PRESSURE TO BE EQUAL TO THE INCOMING WATER PRESSURE.
4. LEAD-FREE BRONZE CONSTRUCTION.
5. PUMP ON/OFF: CONTROLLED BY AQUASTAT.
6. OPERATION SCHEDULE: 24-HR, 7-DAY PROGRAMMABLE TIME CLOCK.
7. SET OUTLET TEMPERATURE AT 110°F.
8. PROVIDE AIR GAP ASSEMBLY - PIPE TO FLOOR DRAIN.
9. PROVIDE IN-LINE Y-STRAINER AHEAD OF BACKFLOW PREVENTER.
10. ROUTE BACKWASH DRAIN LINE AND TERMINATE ABOVE FLOOR DRAIN.

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced ABT ABT

JOYCE ELLEN JONES REGISTERED No. PE60920263 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

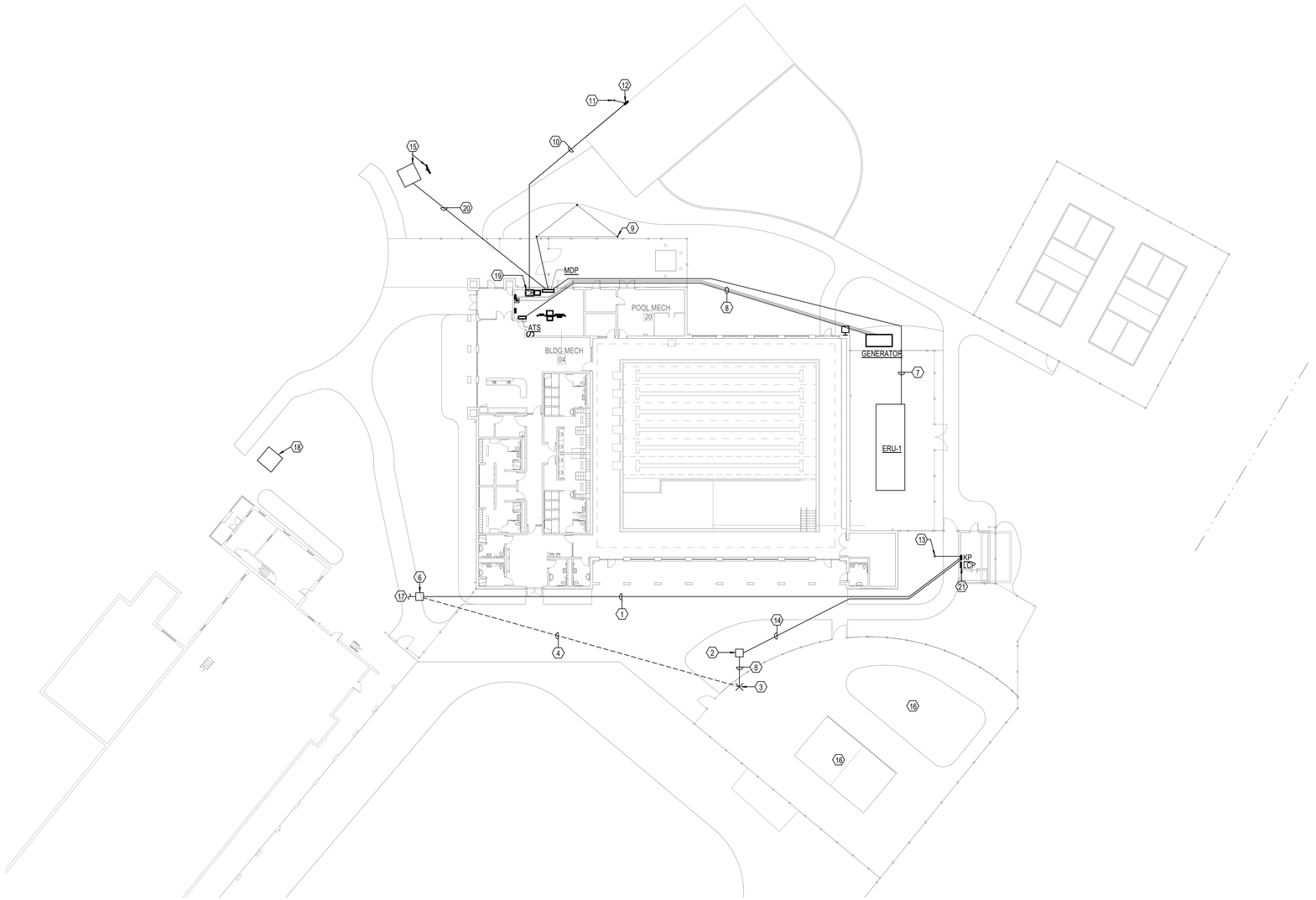
N

The Riviera Club

Aquatics Center

PLUMBING SCHEDULES

P601



1 ELECTRICAL SITE PLAN
1" = 20'-0"

SHEET KEYNOTES

1. PROVIDE 2-1/2" CONDUIT FROM HANDHOLE ESTABLISHED IN THE DEMOLISHION PHASE TO NEW PANEL WITHIN SPLASH PADKIDDIE POOL EQUIPMENT ROOM. PROVIDE NEW WIRING TO NEW PANEL FROM EXISTING BREAKER SERVING DEMOLISHED PANEL, CIRCUIT SHALL CONSIST OF (4) #3/0, #6 G.
2. IN DEMOLITION PHASE OF CONSTRUCTION PROVIDE 36" L x 36" W x 30" D, POLYMER CONCRETE, OPEN BASE HANDHOLE FOR CONSOLIDATION POINT FOR EXISTING CIRCUITS FROM DEMOLISHED PANEL ON UNISTRUT. BASIS OF DESIGN HUBBELL QUAZITE HANDHOLE. PROVIDE LABEL ON LID OF HANDHOLE TO READ "POWER". LOCATION OF HANDHOLE IS SHOWN APPROXIMATLY BUT SHALL BE IN GRASSY AREA OUTSIDE OF KIDDIE POOL ENCLOSURE SIMILAR TO SHOWN. PROVIDE PROTECTION FOR EXISTING CONDUITS AND HANDHOLE THROUGH CONSTRUCTION TO MAINTAIN MATERIAL INTEGRITY.
3. LOCATION OF EXISTING EXTERIOR UNISTRUT MOUNTED PANEL AND LIGHTING CONTACTOR SERVING EXISTING KIDDY POOL MECHANICAL SHED AND EXTERIOR POOL LIGHTING. PANEL TO BE DEMOLISHED DURING SITE PREPERATION PHASE. CONDUITS FOR PANEL SHALL BE EXTENDED AS NOTED BY SEPARATE KEYNOTE. WIRE FROM PANEL SHALL BE REMOVED BACK TO FIRST DEVICE OF CIRCUIT TO BE REPLACED BY NEW WHEN CIRCUITS ARE REFED FROM PANEL KP AND ASSOCIOATED LIGHTING CONTROL PANEL. ANY CIRCUITS (CONDUIT AND WIRE) FROM PANEL TO LOADS WITHIN EXISTING KIDDDY POOL SHEDS OR LOADS THAT ARE BEING REMOVED AS NOTED BY OTHERS ARE TO BE DEMOLISHED WITH ASSOCIATED LOADS.
4. CONDUIT FOR EXISTING UNISTRUT MOUNTED PANEL FROM EXISTING BUILDING TO BE DEMOLISHED FROM PANEL TO HANDHOLE AS SHOWN. AT HANDHOLE CONDUIT TO BE MODIFIED TO STUB UP INTO HANDHOLE. WIRE FOR SERVICE TO PANEL SHALL BE COMPLETELY REMOVED.
5. CONDUITS FOR CIRCUITS OF THE UNISTRUT PANEL TO BE DEMOLISHED THAT ARE TO REMAIN PER THE PANEL'S KEYNOTE SHALL BE DEMOLISHED DOWN TO FIRST BELOW GRADE STRAIGHT HORIZANTAL SECTION. FROM NEW END OF CONDUIT, CONDUIT SHALL BE EXTEDED TO HANDHOLE AS SHOWN AND STUBBED UP INTO ASSOCIATED HANDHOLE TO BE USED AS A JUCTION POINT FOR REFEED TO EXISTING LOADS.
6. IN DEMOLITION PHASE OF CONSTRUCTION PROVIDE 24" L x 24" W x 30" D, POLYMER CONCRETE, OPEN BASE HANDHOLE FOR JUNCTION POINT FOR NEW KP PANEL FEEDER. BASIS OF DESIGN HUBBELL QUAZITE HANDHOLE. PROVIDE LABEL ON LID OF HANDHOLE TO READ "POWER". LOCATION OF HANDHOLE IS SHOWN APPROXIMATLY BUT SHALL BE IN GRASSY AREA, OUTSIDE OF POOL ENCLOSURE, AND ALONG FEEDER PATH TO EXISTING UNISTRUT MOUNTED PANEL, SIMILAR TO SHOWN. PROVIDE PROTECTION FOR EXISTING CONDUITS AND HANDHOLE THROUGH CONSTRUCTION TO MAINTAIN MATERIAL INTEGRITY.
7. APPROXIMATE ROUTING OF FEEDER FROM PANEL MDP TO ERU-1. ROUTING SHALL AVOID GOING UNDER GENERATOR AND BUILDING EXCEPT WITHIN MECHANICAL ROOM AS REQUIRED.
8. APPROXIMATE ROUTING OF FEEDER FROM GENERATOR TO ATS. ADDITIONALLY, CONTROL CONDUITS FOR ESTOP AND ANNUNCIATOR PANEL ARE TO BE ROUTED PARRALLEL WITH FEEDER BETWEEN GENERATOR AND ATS. ROUTING SHALL AVOID GOING BUILDING TO THE EXCEPT WITHIN MECHANICAL ROOM ATS IS IN.
9. PROVIDE BUILDING GROUNDING TRIAD WITHIN GRASSY AREA AS SHOWN. ARROW SHOWN INDICATES TYPICAL GROUND ROD.
10. APPROXIMATE ROUTING FOR NEW FEEDER TO EXISTING PANEL ON RIVIERA PAVILLION. REFER TO RISER DIAGRAM FOR FUTHER FEEDER INFORMATION.
11. PROVIDE REMOTE BUILDING GROUND ROD FOR EXISTING PANEL IN GRASSY AREA AS SHOWN.
12. EXISTING PANEL NOTED AS PANEL EX ON RISER DIAGRAM. ENSURE EXISTING PANEL HAS A NEUTRAL TO GROUND CONNECTION. IF PANEL DOES NOT HAVE NEUTRAL TO GROUND CONNECTION CREATE NEUTRAL TO GROUND CONNECTION. IF REQUIRED TO MAKE NEUTRAL TO GROUND CONNECTION REPLACE MAIN CIRCUIT BREAKER WITH SERVICE ENTRY RATED 125A/3P BREAKER COMPATIBLE WITH PANEL. PANEL IS SEIMENS P1X3OMC250AT. EXISTING CONDUIT FEED SHALL BE ABANDONED AND MODIFIED TO ALLOW FOR NEW FEED PER RISER DIAGRAM.WIRE OF EXISTING FEED SHALL BE REMOVED.
13. PROVIDE REMOTE BUILDING GROUND ROD FOR NEW PANEL KP IN GRASSY AREA AS SHOWN.
14. EXTEND EXISTING LOAD CONDUITS FROM THE DEMOLISHED UNISTRUT MOUNTED PANEL TO NEW PANEL KP. USING RENOVATED CONDUIT PATHS PROVIDE WIRE TO EXIKISTING LOADS UTILIZE (2) #10, #10 G. TO FEED ALL 20A/1 POLE CIRCUITS REMAINING. FOR ANY LOADS REMAINING OF HIGHER APPERAGE OR POLE COUNT SUBMIT RFI FOR ENGINEER SHOWING LOAD LOCATION AND LOAD NAMEPLATE INFORMATION FOR ASSOCIATED WIRE SIZE.
15. NEW UTILITY TRANSFORMER AND UNISTRUT MOUNTED METER. PROVIDE TRANSFORMER PAD PER AES STANDARDS. COORDINATE WITH AES FOR ANY ADDITIONAL ROUGH IN REQUIREMENTS.
16. PRIOR TO EXCAVATION SITEWORK ELECTRICAL CONTRACTOR SHALL CONFIRM THAT NO EXISTING TO REMAIN CONDUITS/CIRCUITS ARE WITHIN 5' FOOTPRINT OF WATER FEATURE. IF THERE ARE CONDUITS IN SUCH SENERIO CONTACT ENGINEER FOR DIRECTION.
17. TO PANEL AND BREAKER WITHIN EXISTING BUILDING PREVIOUSLY SERVING EXTERIOR UNISTRUT PANEL.
18. EXISTING UTILITY TRANSFORMER TO REMAIN
19. ENCLOSED CIRCUIT BREAKER FOR PAVILION PANEL EX. PROVIDE AS NOTED ON ELECTRICAL RISER DIAGRAM.
20. APPROXIMATE ROUTING OF SECOINDARY FROM UTILITY TRANSFORMER TO [illegible] 2
21. REUSE EXISTING LIGHTING CONTROL PANEL PREVIOUSLY ON EXTERIOR UNISTRUT RACK. RECONNECT CIRCUITS AS THEY WERE PRIOR TO DEMOLITION.

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Project No. 2021-178.RVI
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PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

N

The Riviera Club

Aquatics Center

ELECTRICAL SITE PLAN

E101

E:\1_ELECTRICAL SITE PLAN
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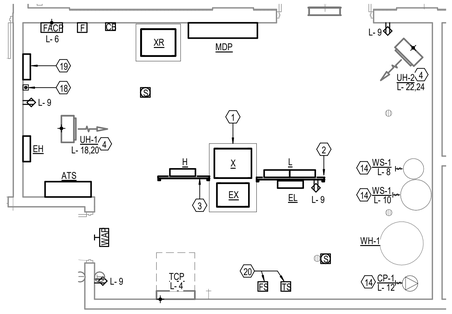
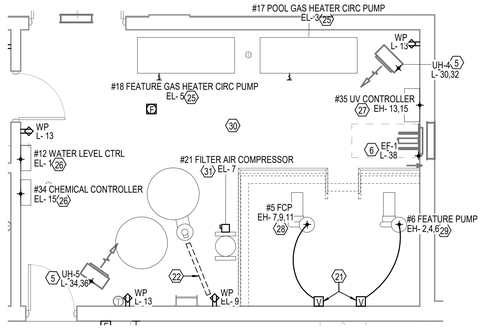
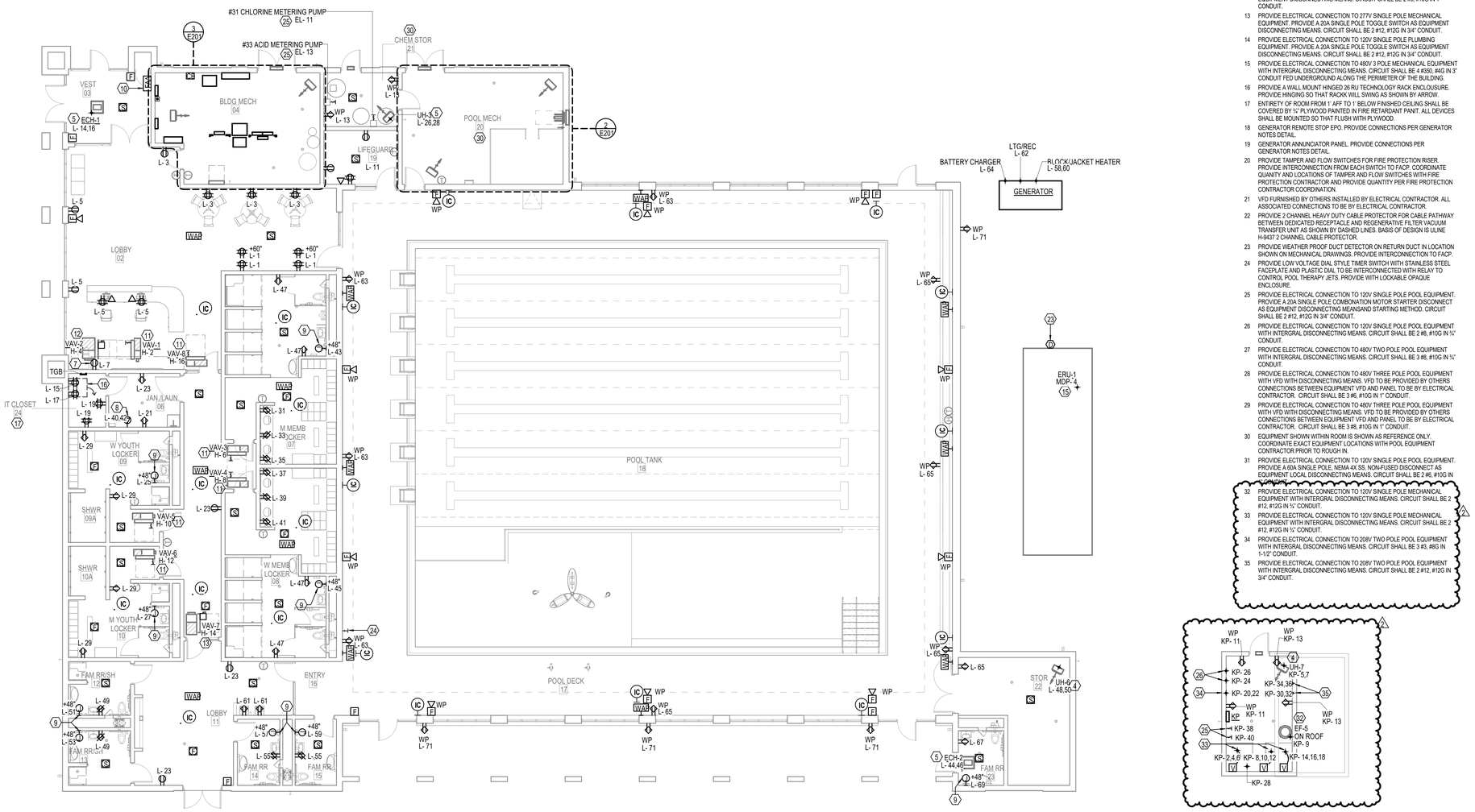


3 ENLARGED ELECTRICAL ROOM
1/4" = 1'-0



2 ENLARGED POOL MECHANICAL
1/4" = 1'-0



1 FIRST FLOOR ELECTRICAL PLAN
1/8" = 1'-0

GENERAL NOTES

A REFER TO SHEET E-000 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.

B CIRCUIT DESIGNATION AT THE CENTER OF THE ROOM OR BELOW ROOM TAG SIGNIFIES THAT ALL DEVICES WITHIN THAT SPACE ARE TO BE ON NOTED CIRCUIT.

C ALL RECEPTACLES WITHIN PROJECT SHALL BE TAMPER RESISTANT TYPE.

D COORDINATE ALL POOL EQUIPMENT LOCATIONS WITH POOL CONTRACTOR. MODIFY POWER FEEDS AND LOCAL DISCONNECT LOCATIONS PER POOL CONTACTOR COORDINATION.

SHEET KEYNOTES

1 PROVIDE 4" TALL EQUIPMENT PAD FOR EQUIPMENT AS SHOWN. DIMMSIONS OF PAD SHALL EXTEND 4" PAST THE EXTENT OF EQUIPMENT FOOTPRINT.

2 PROVIDE 6'-6" TALL, 4'-6" WIDE, DOUBLE SIDED, FLOOR MOUNTED SECTION OF ALUMINUM UNISTRUT RACK. PROVIDE HORIZANTAL SUPPORTS AS REQUIRED TO SUPPORT ELEMENTS AS SHOWN.MOUNT UNISTRUT DIRECTLY ADJACENT TO TRANSFORMER EQUIPMENT PAD.

3 PROVIDE 6'-6" TALL, 3'-4" WIDE, DOUBLE SIDED, FLOOR MOUNTED SECTION OF ALUMINUM UNISTRUT RACK. PROVIDE HORIZANTAL SUPPORTS AS REQUIRED TO SUPPORT ELEMENTS AS SHOWN.MOUNT UNISTRUT DIRECTLY ADJACENT TO TRANSFORMER EQUIPMENT PAD.

4 PROVIDE ELECTRICAL CONNECTION TO 208V 2 POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISSCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN ¾" CONDUIT.

5 PROVIDE ELECTRICAL CONNECTION TO 208V 2 POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISSCONNECTING MEANS. CIRCUIT SHALL BE 2 #10, #10G IN ¾" CONDUIT.

6 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN ¾" CONDUIT.

7 INSTALL RECEPTACLE SO THAT IT IS FLUSH WITH BACK OF CASEWORK. PROVIDE GROMMETED HOLE ON SIDE OF CASEWORK FOR PATHWAY FOR CORDED CONNECTION OF REFRIGERATED MERCHANDISER. RECEPTACLE SHALL BE DEDICATED TO REFRIGERATED MERCHANDISER.

8 PROVIDE NEMA 14-30R FOR CLOTHES DRYER. CIRCUIT TO RECEPTACLE SHALL BE 3 #10, #10G IN ¾" CONDUIT.

9 PROVIDE DEDICATED 20A ELECTRICAL CONNECTION FOR HAND DRYER PROVIDED BY OTHERS. CIRCUIT TO HAND DRYER SHALL BE 2#12, #12 G. IN ¾" CONDUIT.

10 FIRE ALARM ANNUNCIATOR PANEL SHALL BE RECESS MOUNTED SO THAT FLUSH WITH WALL.

11 PROVIDE ELECTRICAL CONNECTION TO 277V SINGLE POLE MECHANICAL EQUIPMENT. PROVIDE A 20A SINGLE POLE TOGGLE SWITCH AS EQUIPMENT DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN 3/4" CONDUIT.

12 PROVIDE ELECTRICAL CONNECTION TO 277V SINGLE POLE MECHANICAL EQUIPMENT. PROVIDE A 60A/1PN1 NON-FUSED DISCONNECT SWITCH AS EQUIPMENT DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #6, #10G IN 1" CONDUIT.

13 PROVIDE ELECTRICAL CONNECTION TO 277V SINGLE POLE MECHANICAL EQUIPMENT. PROVIDE A 20A SINGLE POLE TOGGLE SWITCH AS EQUIPMENT DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN 3/4" CONDUIT.

14 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE PLUMBING EQUIPMENT. PROVIDE A 20A SINGLE POLE TOGGLE SWITCH AS EQUIPMENT DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN 3/4" CONDUIT.

15 PROVIDE ELECTRICAL CONNECTION TO 480V 3 POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 4 #350, #4G IN 3" CONDUIT FED UNDERGROUND ALONG THE PERIMETER OF THE BUILDING.

16 PROVIDE A WALL MOUNT HINGED 26 RU TECHNOLOGY RACK ENCLOUSURE. PROVIDE HINGING SO THAT RACKK WILL SWING AS SHOWN BY ARROW.

17 ENTIRETY OF ROOM FROM 1' AFF TO 1' BELOW FINISHED CEILING SHALL BE COVERED BY ½" PLYWOOD PAINTED IN FIRE RETARDANT PAINT. ALL DEVICES SHALL BE MOUNTED SO THAT FLUSH WITH PLYWOOD.

18 GENERATOR REMOTE STOP EPO. PROVIDE CONNECTIONS PER GENERATOR NOTES DETAIL.

19 GENERATOR ANNUNCIATOR PANEL. PROVIDE CONNECTIONS PER GENERATOR NOTES DETAIL.

20 PROVIDE TAMPER AND FLOW SWITCHES FOR FIRE PROTECTION RISER. PROVIDE INTERCONNECTION FROM EACH SWITCH TO FACP. COORDINATE QUANITY AND LOCATIONS OF TAMPER AND FLOW SWITCHES WITH FIRE PROTECTION CONTRACTOR AND PROVIDE QUANTITY PER FIRE PROTECTION CONTRACTOR COORDINATION.

21 VFD FURNISHED BY OTHERS INSTALLED BY ELECTRICAL CONTRACTOR. ALL ASSOCIATED CONNECTIONS TO BE BY ELECTRICAL CONTRACTOR.

22 PROVIDE 2 CHANNEL HEAVY DUTY CABLE PROTECTOR FOR CABLE PATHWAY BETWEEN DEDICATED RECEPTACLE AND REGENERATIVE FILTER VACUUM TRANSFER UNIT AS SHOWN BY DASHED LINES. BASIS OF DESIGN IS ULINE H-9437 2 CHANNEL CABLE PROTECTOR.

23 PROVIDE WEATHER PROOF DUCT DETECTOR ON RETURN DUCT IN LOCATION SHOWN ON MECHANICAL DRAWINGS. PROVIDE INTERCONNECTION TO FACP.

24 PROVIDE LOW VOLTAGE DIAL STYLE TIMER SWITCH WITH STAINLESS STEEL FACEPLATE AND PLASTIC DIAL TO BE INTERCONNECTED WITH RELAY TO CONTROL POOL THERAPY JETS. PROVIDE WITH LOCKABLE OPAQUE ENCLOSURE.

25 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE POOL EQUIPMENT. PROVIDE A 20A SINGLE POLE COMBONATION MOTOR STARTER DISCONNECT AS EQUIPMENT DISCONNECTING MEANSAND STARTING METHOD. CIRCUIT SHALL BE 2 #12, #12G IN 3/4" CONDUIT.

26 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE POOL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #8, #10G IN ¾" CONDUIT.

27 PROVIDE ELECTRICAL CONNECTION TO 480V TWO POLE POOL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 3 #8, #10G IN ¾" CONDUIT.

28 PROVIDE ELECTRICAL CONNECTION TO 480V THREE POLE POOL EQUIPMENT WITH VFD WITH DISCONNECTING MEANS. VFD TO BE PROVIDED BY OTHERS CONNECTIONS BETWEEN EQUIPMENT VFD AND PANEL TO BE BY ELECTRICAL CONTRACTOR. CIRCUIT SHALL BE 3 #6, #10G IN 1" CONDUIT.

29 PROVIDE ELECTRICAL CONNECTION TO 480V THREE POLE POOL EQUIPMENT WITH VFD WITH DISCONNECTING MEANS. VFD TO BE PROVIDED BY OTHERS CONNECTIONS BETWEEN EQUIPMENT VFD AND PANEL TO BE BY ELECTRICAL CONTRACTOR. CIRCUIT SHALL BE 3 #8, #10G IN 1" CONDUIT.

30 EQUIPMENT SHOWN WITHIN ROOM IS SHOWN AS REFERENCE ONLY. COORDINATE EXACT EQUIPMENT LOCATIONS WITH POOL EQUIPMENT CONTRACTOR PRIOR TO ROUGH IN.

31 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE POOL EQUIPMENT. PROVIDE A 60A SINGLE POLE, NEMA 4X SS, NON-FUSED DISCONNECT AS EQUIPMENT LOCAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #6, #10G IN 1" CONDUIT.

32 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN ¾" CONDUIT.

33 PROVIDE ELECTRICAL CONNECTION TO 120V SINGLE POLE MECHANICAL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN ¾" CONDUIT.

34 PROVIDE ELECTRICAL CONNECTION TO 208V TWO POLE POOL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 3 #3, #8G IN 1-1/2" CONDUIT.

35 PROVIDE ELECTRICAL CONNECTION TO 208V TWO POLE POOL EQUIPMENT WITH INTERGRAL DISCONNECTING MEANS. CIRCUIT SHALL BE 2 #12, #12G IN 3/4" CONDUIT.

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced Designer Author

JOYCE ELLEN JONES REGISTERED No. PE60920263 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

Aquatics Center

FIRST FLOOR ELECTRICAL PLAN

E201

E201_FIRST FLOOR ELECTRICAL PLAN
2021-178.RVI, The Riviera Club, Aquatics Center
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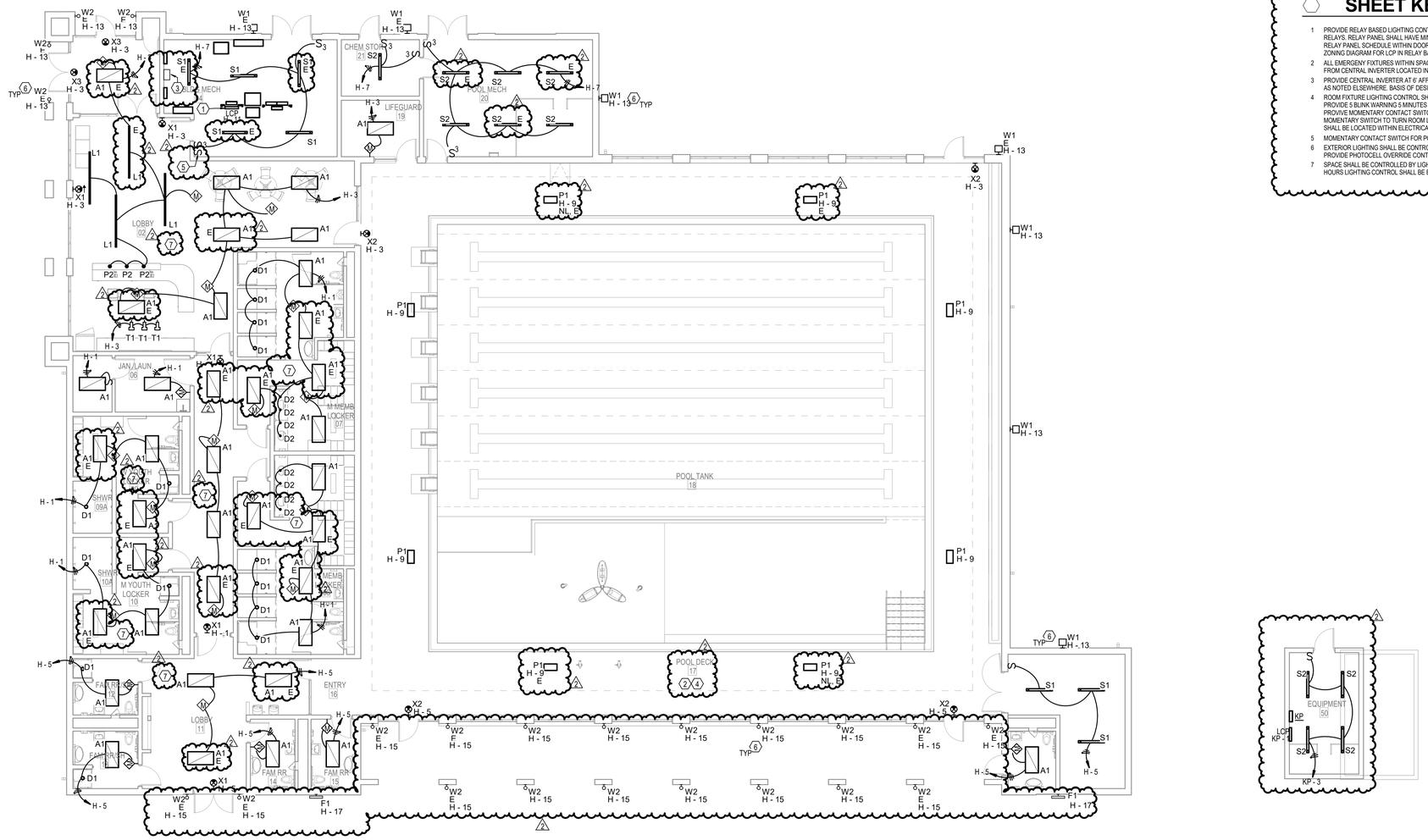

1 FIRST FLOOR LIGHTING PLAN

1/8" = 1'-0"

GENERAL NOTES

A ANY LIGHT FIXTURE WITH AN "E" DESIGNATION SHALL BE PROVIDED WITH INTEGRAL MANUFACTURER INSTALLED EMERGENCY BATTERY BACKUP UNLESS NOTED OTHERWISE.

B "NL" SYMBOL REPRESENTS NIGHT LIGHT AND SHOULD REMAIN ALWAYS ON.

SHEET KEYNOTES

1 PROVIDE RELAY BASED LIGHTING CONTROL PANEL WITH ALL DIMMABLE RELAYS. RELAY PANEL SHALL HAVE MINIMUM OF 6 SPARE RELAYS. PROVIDE RELAY PANEL SCHEDULE WITHIN DOOR PANEL. PROVIDE SCHEDULE AND ZONING DIAGRAM FOR LCP IN RELAY BASED LIGHTING CONTROL SUBMITTAL.

2 ALL EMERGENY FIXTURES WITHIN SPACE SHALL HAVE EMERGENCY FEED FROM CENTRAL INVERTER LOCATED IN ELECTRICAL ROOM.

3 PROVIDE CENTRAL INVERTER AT 6' AFF FOR EMERGENCY FEED TO FIXTURES AS NOTED ELSEWHERE. BASIS OF DESIGN FOR INVERTER IS IOTA 550 HE.

4 ROOM FIXTURE LIGHTING CONTROL SHALL BE BY LIGHTING CONTROL PANEL. PROVIDE 5 BLINK WARNING 5 MINUTES BEFORE FIXTURES ARE TO TURN OFF. PROVIVE MOMENTARY CONTACT SWITCH FOR OFF HOURS OPERATION. MOMENTARY SWITCH TO TURN ROOM LIGHTING ON FOR ONE HOUR. SWITCH SHALL BE LOCATED WITHIN ELECTRICAL ROOM.

5 MOMENTARY CONTACT SWITCH FOR POOL SPACE LIGHTING.

6 EXTERIOR LIGHTING SHALL BE CONTROLLED BY LIGHTING CONTROL PANEL. PROVIDE PHOTOCELL OVERRIDE CONTROL DURING OPERATING HOURS.

7 SPACE SHALL BE CONTROLLED BY LIGHTING CONTROL PANEL. DURRING OFF HOURS LIGHTING CONTROL SHALL BE BY OCCUPANCY SENSORS.

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	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
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KEY PLAN

N

The Riviera Club

Aquatics Center

FIRST FLOOR LIGHTING

E301

Branch Panel: L

Location: BLDG MECH-1 8-1 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 30,000
Supply From: X | **Phases:** 3 | **Mains Type:** MCB
Mounting: SURFACE, UNISTRUT | **Wires:** 4 | **Mains Rating:** 250 A
Enclosure: NEMA 1 | **MCB Rating:** 250 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	RECEPT: LOBBY	20 A	1	1440	0					1	20 A	SPARE	2
3	RECEPT: ENTRY VEST, LOBBY	20 A	1			1260	180			1	20 A	MECHANICAL CONTROLLER TCP	4
5	RECEPT: LOBBY DESK	20 A	1					1080	180	1	20 A	FACP	6
7	RECEPT: LOBBY FRIDGE	20 A	1	180	200					1	20 A	WATER SOFTENER WS-1	8
9	RECEPT: BLDG MECH	20 A	1			720	200			1	20 A	WATER SOFTENER WS-1	10
11	RECEPT: LIFEGUARD	20 A	1					720	0	1	20 A	CIRCULATION PUMP CP-1	12
13	RECEPT: CHEM STORAGE, POOL MECH	20 A	1	900	1997					2	25 A	HVAC: ECH-1	14
15	RECEPT: IT EQUIPMENT	20 A	1			1500	1997						16
17	RECEPT: IT EQUIPMENT	20 A	1					1500	1500	2	20 A	HVAC: UH-1	18
19	RECEPT: IT CLOSET	20 A	1	720	1500								20
21	RECEPT: CLOTHES WASHER	20 A	1			1300	1500			2	20 A	HVAC: UH-2	22
23	RECEPT: JANITOR, LOBBY, CORRIDOR	20 A	1					720	1500				24
25	W YOUTH LOCKER HAND DRYER	20 A	1	1200	1737					2	25 A	HVAC: UH-3	26
27	M YOUTH LOCKER HAND DRYER	20 A	1			1200	1737						28
29	RECEPT: YOUTH LOCKERS	20 A	1					720	1737	2	25 A	HVAC: UH-4	30
31	RECEPT: M MEMBER VANITY	20 A	1	180	1737								32
33	RECEPT: M MEMBER VANITY	20 A	1			180	1737			2	25 A	HVAC: UH-5	34
35	RECEPT: M MEMBER VANITY	20 A	1					180	1737				36
37	RECEPT: W MEMBER VANITY	20 A	1	180	1176					1	15 A	HVAC: EF-1	38
39	RECEPT: W MEMBER VANITY	20 A	1			180	3120			2	30 A	RECEPT: CLOTHES DRYER	40
41	RECEPT: W MEMBER VANITY	20 A	1					180	3120				42
				Total Load:	20887 VA		27531 VA		24146 VA				
				Total Amps:	174 A		234 A		205 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	30352 VA	100.00%	30352 VA		
RECEPT	25300 VA	69.76%	17650 VA	**Total Conn. Load:**	72564 VA
Miscellaneous Power	16912 VA	100.00%	16912 VA	**Total Est. Demand:**	64914 VA
				Total Conn.:	201 A
				Total Est. Demand:	180 A

Notes:
DOUBLE TUB PANEL SECOND SECTION CONTINUED ON PANEL SCHEDULE L WITH CIRCUIT NUMBERS 42-84. LOAD CALCULATION SHOWN ON THIS PANEL ACCOUNTS FOR SECOND SECTION LOAD.

Branch Panel: L

Location: BLDG MECH-1 8-1 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 30,000
Supply From: L | **Phases:** 3 | **Mains Type:** MCB
Mounting: SURFACE, UNISTRUT | **Wires:** 4 | **Mains Rating:** 250 A
Enclosure: NEMA 1 | **MCB Rating:** 250 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
43	M MEMBER LOCKER HAND DRYER	20 A	1	1200	1997					2	25 A	HVAC: ECH-2	44
45	W MEMBER LOCKER HAND DRYER	20 A	1			1200	1997						46
47	RECEPT: MEMBER LOCKERS	20 A	1					720	1508	2	20 A	HVAC: UH-6	48
49	RECEPT: FAMILY RR/SH	20 A	1	360	1508								50
51	FAMILY RR/SH HAND DRYER	20 A	1			1200	528			1	15 A	HVAC: EF-2	52
53	FAMILY RR/SH HAND DRYER	20 A	1					1200	528	1	15 A	HVAC: EF-3	54
55	RECEPT: FAMILY RR	20 A	1	360	696					1	15 A	HVAC: EF-4	56
57	FAMILY RR HAND DRYER	20 A	1			1200	2496			2	30 A	GENERATOR BLOCK HEATER	58
59	FAMILY RR HAND DRYER	20 A	1					1200	2496				60
61	RECEPT: EDF	20 A	1	360	180					1	20 A	GENERATOR LTG/RCPT	62
63	RECEPT: N & W POOL SPACE	20 A	1			720	180			1	20 A	GENERATOR BATTERY CHARGER	64
65	RECEPT: N & E POOL SPACE	20 A	1					900	0	1	20 A	SPARE	66
67	RECEPT: FAMILY RR	20 A	1	180	0					1	20 A	SPARE	68
69	FAMILY RR HAND DRYER	20 A	1			1200	0			1	20 A	SPARE	70
71	RECEPT: EXTERIOR	20 A	1					720	0	1	20 A	SPARE	72
73	RECEPT: ROOF	20 A	1	900	0					1	20 A	SPARE	74
75	SPARE	20 A	1			0	0			1	20 A	SPARE	76
77	SPARE	20 A	1					0	0	1	20 A	SPARE	78
79	SPARE	20 A	1	0	0					1	20 A	SPARE	80
81	SPARE	20 A	1			0	0			1	20 A	SPARE	82
83	SPARE	20 A	1					0	0	1	20 A	SPARE	84
				Total Load:	7741 VA		10721 VA		9272 VA				
				Total Amps:	65 A		91 A		79 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	8762 VA	100.00%	8762 VA		
RECEPT	5220 VA	100.00%	5220 VA	**Total Conn. Load:**	27734 VA
Miscellaneous Power	13752 VA	100.00%	13752 VA	**Total Est. Demand:**	27734 VA
				Total Conn.:	77 A
				Total Est. Demand:	77 A

Notes:
DOUBLE TUB PANEL FIRST SECTION SCHEDULE IS ON PANEL SCHEDULE L WITH CIRCUIT NUMBERS 1-42.

Branch Panel: H

Location: BLDG MECH-1 8-1 | **Volts:** 480/277 Wye | **A.I.C. Rating:** 42,000
Supply From: MDP | **Phases:** 3 | **Mains Type:** MLO
Mounting: SURFACE, UNISTRUT | **Wires:** 4 | **Mains Rating:** 100 A
Enclosure: NEMA 1 | **MCB Rating:** 100 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	LIGHTING: LOCKER ROOMS	20 A	1	1177	701					1	15 A	HVAC: VAV-1	2
3	LIGHTING: FRONT LOBBY	20 A	1			617	12099			1	50 A	HVAC: VAV-2	4
5	LIGHTING: AUXILLRY LOBBY	20 A	1					476	2800	1	15 A	HVAC: VAV-3	6
7	LIGHTING: BACK OF HOUSE	20 A	1	417	2800					1	15 A	HVAC: VAV-4	8
9	LIGHTING: POOL LIGHTING	20 A	1			3480	2100			1	20 A	HVAC: VAV-5	10
11	LIGHTING: EXTERIOR W	20 A	1					0	2100	1	20 A	HVAC: VAV-6	12
13	LIGHTING:EXTERIOR N+E	20 A	1	436	6800					1	40 A	HVAC: VAV-7	14
15	LIGHTING: EXTERIOR SOUTH	20 A	1			396	2399			1	15 A	HVAC:VAV-8	16
17	LIGHTING: FLOOD LIGHTING	20 A	1					148	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
25	SPARE	20 A	1	0	0					1	20 A	SPARE	26
27	SPARE	20 A	1			0	0			1	--	SPACE	28
29	SPARE	20 A	1					0	--	1	--	SPACE	30
31	SPARE	20 A	1	0	--					1	--	SPACE	32
33	SPARE	20 A	1			0	--			1	--	SPACE	34
35	SPARE	20 A	1					0	--	1	--	SPACE	36
37	SPARE	20 A	1	0	--					1	--	SPACE	38
39	SPARE	20 A	1			0	--			1	--	SPACE	40
41	SPARE	20 A	1					0	--	1	--	SPACE	42
				Total Load:	12381 VA		21090 VA		5524 VA				
				Total Amps:	49 A		80 A		20 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	31800 VA	100.00%	31800 VA		
LIGHTING	7196 VA	125.00%	8995 VA	**Total Conn. Load:**	38996 VA
				Total Est. Demand:	40795 VA
				Total Conn.:	47 A
				Total Est. Demand:	49 A

Notes:

Branch Panel: EL

Location: BLDG MECH-1 8-1 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 30,000
Supply From: EX | **Phases:** 3 | **Mains Type:** MCB
Mounting: SURFACE, UNISTRUT | **Wires:** 4 | **Mains Rating:** 100 A
Enclosure: NEMA 1 | **MCB Rating:** 100 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	#12 WATER LEVEL CONTROLLER	45 A	1	3900	0					1	20 A	SPARE	2
3	#17 POOL GAS HEATER CIRC PUMP	20 A	1			1176	0			1	20 A	SPARE	4
5	#18 FEATURE GAS HEATER CIRC PUMP	20 A	1					1176	0	1	20 A	SPARE	6
7	#21 FILTER AIR COMPRESSOR	50 A	1	2880	0					1	20 A	SPARE	8
9	RECEPT: #24 FILTER VACUUM UNIT	20 A	1			180	0			1	20 A	SPARE	10
11	#31 CHLORINE METERING PUMP	15 A	1					100	0	1	20 A	SPARE	12
13	#33 ACID METERING PUMP	15 A	1	100	0					1	20 A	SPARE	14
15	#34 CHEMICAL CONTROLLER	45 A	1			3900	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21													22
23													24
25													26
27													28
29													30
				Total Load:	6880 VA		5256 VA		1276 VA				
				Total Amps:	62 A		49 A		11 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	180 VA	100.00%	180 VA		
Miscellaneous Power	13232 VA	100.00%	13232 VA	**Total Conn. Load:**	13412 VA
				Total Est. Demand:	13412 VA
				Total Conn.:	37 A
				Total Est. Demand:	37 A

Notes:

Branch Panel: EH

Location: BLDG MECH-1 8-1 | **Volts:** 480/277 Wye | **A.I.C. Rating:** 42,000
Supply From: ATS | **Phases:** 3 | **Mains Type:** MCB
Mounting: SURFACE | **Wires:** 4 | **Mains Rating:** 200 A
Enclosure: NEMA 1 | **MCB Rating:** 200 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1				6880	3730								2
3	TRANSFORMER EX	45 A	3			5256	3730			3	35 A	#6 FEATURE PUMP	4
5								1276	3730				6
7				6213									8
9	#5 FILTER SYSTEM CIRCULATING PUMP (FCP)	60 A	3			6213							10
11								6213					12
13	#35 UV CONTROLLER	40 A	2	7680									14
15						7680							16
17													18
19													20
21													22
23													24
25													26
27													28
29													30
				Total Load:	24503 VA		22879 VA		11219 VA				
				Total Amps:	95 A		89 A		41 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
RECEPT	180 VA	100.00%	180 VA		
Miscellaneous Power	58422 VA	100.00%	58422 VA	**Total Conn. Load:**	58602 VA
				Total Est. Demand:	58602 VA
				Total Conn.:	70 A
				Total Est. Demand:	70 A

Notes:

Switchboard: MDP

Location: BLDG MECH-1 8-1 | **Volts:** 480/277 Wye | **A.I.C. Rating:** 65,000
Supply From: | **Phases:** 3 | **Mains Type:** MCB
Mounting: SURFACE | **Wires:** 4 | **Mains Rating:** 1200 A
Enclosure: NEMA 1 | **MCB Rating:** 1200 A

Notes:

CKT	Circuit Description	# of Poles	Trip Rating	Load	Remarks
1	SPD TYPE 1	3	60 A	0 VA	REFER TO NOTE 1 IN NOTES SECTION
2	PANEL H	3	100 A	38996 VA	
3	ATS	3	200 A	58602 VA	
4	HVAC: ERU-1	3	300 A	215645 VA	
5	HVAC: ERU-2	3	70 A	50026 VA	
6	TRANSFORMER XR	3	70 A	0 VA	
7	TRANSFORMER X	3	125 A	72564 VA	
8	SPARE	1	250 A	0 VA	
9	SPARE	1	400 A	0 VA	
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
				435832 VA	
				524 A	

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	327822 VA	100.00%	327822 VA		
LIGHTING	7196 VA	125.00%	8995 VA	**Total Conn. Load:**	435832 VA
RECEPT	25480 VA	69.62%	17740 VA	**Total Est. Demand:**	429891 VA
Miscellaneous Power	75334 VA	100.00%	75334 VA	**Total Conn.:**	524 A
				Total Est. Demand:	517 A

Notes:
1. COORDINATE BREAKER AMPERAGE WITH SPD MANUFACTURER. PROVIDE BREAKER AMPERAGE PER MANUFACTURER RECOMENDATIONS.

Branch Panel: KP

Location: EQUIPMENT 50 | **Volts:** 120/208 Wye | **A.I.C. Rating:** 30,000
Supply From: | **Phases:** 3 | **Mains Type:** MCB
Mounting: | **Wires:** 4 | **Mains Rating:** 225 A
Enclosure: | **MCB Rating:** 225 A

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	LIGHTING: LCP	20 A	1	0	1320								2
3	LIGHTING: EQUIPMENT	20 A	1			136	1320			3	20 A	FEATURE PUMP	4
5	HVAC: UH-7	20 A	2					1508	1320				6
7				1508	1320								8
9	HVAC: EF-5	20 A	1			696	1320			3	20 A	FEATURE PUMP	10
11	RECEPT: EQUIPMENT	20 A	1					360	1320				12
13	RECEPT: EQUIPMENT	20 A	1	360	1320								14
15	SPARE	20 A	1			0	1320			3	20 A	FEATURE PUMP	16
17	SPARE	20 A	1					0	1320				18
19	SPARE	20 A	1	0	7200					2	90 A	UV CONTROLLER	20
21	SPARE	20 A	1			0	7200						22
23	SPARE	20 A	1					0	3900	1	40 A	CONTROLLER	24
25	SPARE	20 A	1	0	3900					1	40 A	CONTROLLER	26
27	SPARE	20 A	1			0	3960			1	20 A	SUMP PUMP	28
29	SPARE	20 A	1					0	718	2	15 A	CHEM BOOSTER PUMP	30
31	SPARE	20 A	1	0	718								32
33	SPARE	20 A	1			0	718			2	15 A	CHEM BOOSTER PUMP	34
35	SPARE	20 A	1					0	718				36
37	SPARE	20 A	1	0	100					1	15 A	METERING PUMP	38
39	SPARE	20 A	1			0	100			1	15 A	METERING PUMP	40
41	SPARE	20 A	1					0	0	1	20 A	SPARE	42
43	SPARE	20 A	1	0	0					1	20 A	SPARE	44
45	SPARE	20 A	1			0	0			1	20 A	SPARE	46
47	SPARE	20 A	1					0	0	1	20 A	SPARE	48
49	SPARE	20 A	1	0	0					1	20 A	SPARE	50
51	SPARE	20 A	1			0	0			1	20 A	SPARE	52
53	SPARE	20 A	1					0	0	1	20 A	SPARE	54
55	SPARE	20 A	1	0	0					1	20 A	SPARE	56
57	SPARE	20 A	1			0	0			1	20 A	SPARE	58
59	SPARE	20 A	1					0	0	1	20 A	SPARE	60
				Total Load:	17746 VA		16770 VA		11163 VA				
				Total Amps:	155 A		147 A		93 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
HVAC	3712 VA	100.00%	3712 VA		
LIGHTING	136 VA	125.00%	170 VA	**Total Conn. Load:**	45678 VA
RECEPT	720 VA	100.00%	720 VA	**Total Est. Demand:**	45712 VA
Miscellaneous Power	41110 VA	100.00%	41110 VA	**Total Conn.:**	127 A
				Total Est. Demand:	127 A

Notes:

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Project No. 2021-178.RVI
Project Date 12.05.2022
Produced Designer Author

JOYCE ELLEN JONES REGISTERED No. PE60920263 STATE OF INDIANA PROFESSIONAL ENGINEER

#	Revision	Date
	Addendum #1	01/05/2023
	Addendum #2	01/12/2023

5640 N Illinois St
Indianapolis, IN 46208

KEY PLAN

The Riviera Club

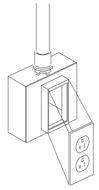
Aquatics Center

ELECTRICAL PANEL SCHEDULES

E500

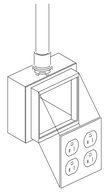
LIGHT FIXTURE SCHEDULE

UNIT ID	DESCRIPTION	DRIVER	VOLTS (V)	LIGHT			LOAD		MOUNTING	MOUNTING HEIGHT (AFF)	MANUFACTURER: MODEL NUMBER	EQUAL MANUFACTURERS
				COLOR (K)	QTY (LM)	UNITS	QTY (W)	UNITS				
A1	2-FOOT BY 4-FOOT FLAT PANEL, WHITE FINISH, DLC LISTED.	0-10V DIMMING TO 10%	277	3500	5037	/FIXTURE	39.3	/FIXTURE	RECESSED	CEILING	COLUMBIA LIGHTING: CBT24-I-SCS	LITHONIA LIGHTING: CPX-2X4-4000LM-80CRI-35K-SWL-MIN10-ZT-MVOLT
D1	LENSED SHOWER RATED DOWNLIGHT, 6-INCH DIAMETER APERTURE, CLEAR SEMI-SPECULAR REFLECTOR, SELF FLANGED [VERIFY MUD IN FLANGE IS NOT REQUIRED], WET LOCATION LISTED, ENERGY STAR LISTED.	0-10V DIMMING TO 10%	277	3500	1684	/FIXTURE	19.5	/FIXTURE	RECESSED	CEILING	PRESCOLITE: LFR-4RD-M-20L35KB-WD-DM1-LFR4RDTSHWTAML-LFR-4RD-H	GOTHAM: EVO4SH-35/20-DFF-SMO-MVOLT-EZ10-NLT
D2	LENSED SHOWER RATED DOWNLIGHT, 2-INCH DIAMETER APERTURE, CLEAR SEMI-SPECULAR REFLECTOR, SELF FLANGED, WET LOCATION LISTED, ENERGY STAR LISTED.	0-10V DIMMING	277	3500	717	/FIXTURE	8.6	/FIXTURE	RECESSED	CEILING	ALPHEBET: [illegible]	GOTHAM: [illegible]
F1	ADJUSTABLE FLOOD,TYPE 4 LIGHT DISTRIBUTION, INTEGRAL POWER SUPPLY, WET LOCATION LISTED, IP67 RATED, FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S CATALOG OF STANDARD COLORS.	ELECTRONIC	277	3000	8405	/FIXTURE	74	/FIXTURE	SURFACE WALL	+138"	LIGMAN: UGA-5112-74WLED-T4-W30-01-120/277-F	OR APPROVED EQUAL
F2	LINEAR SMOOTH WALL WASH, SURFACE MOUNT, CAST ALUMINUM HOUSING, SEMI-RECESSED LENS, DLC LISTED.	0-10V DIMMING TO 10%	277	4000	6906	/FIXTURE	54	/FIXTURE	SURFACE WALL	+96"	HALO: HF2-P-D-8-B-835-F-98LO-277-SC-FC-10%-FA50-C3-FE-SW	OR APPROVED EQUAL
P1	2-FOOT EXTRUUDED ALUMINUM NATATORIUM FIXTURE WITH PRIMARY DISTRUBUTION INDIRCTLY AND SMALL DIRECT COMPONANT	0-10V DIMMING TO 10%	277	3500	64896	/FIXTURE	435	/FIXTURE	PENDANT MOUNT	17' AFF	LUX DYNAMICS: WAVEP-2-835-U10-WSA4-DEF4	OR APPROVED EQUAL. EQUALS TO PROVIDE PHOTOMETRIC CALCULATIONS FOR APPROVAL.
P2	10-INCH NOMINAL DIAMETER CYLINDER, STEM MOUNTED, FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S CATALOG OF STANDARD FINISHES, ENERGY STAR LISTED.	0-10V DIMMING TO 10%	277	3500	900	/FIXTURE	10	/FIXTURE	PENDANT MOUNT	+78"	LUMEN ART LIGHTING SOLUTIONS VMM-RALED-277-3500K-M-WC-WHG-10V	OR APPROVED EQUAL
S1	4-FOOT LENSED STRIP, CHAIN HUNG, FORMED STEEL HOUSING, CURVED FROSTED ACRYLIC LENS, WHITE ENAMEL FINISH, DLC LISTED.	0-10V DIMMING TO 10%	277	3500	4135	/FIXTURE	35.8	/FIXTURE	SUSPENDED	+108"	COLUMBIA LIGHTING: CSL4-LSCS	LITHONIA LIGHTING: CSS-L48-MVOLT-35K-80CRI
S2	4-FOOT VAPOR TIGHT LENSED STRIP, AIRCRAFT CABLE HUNG, POLYCARBONATE HOUSING, POLYCARBONATE LATCHES, GASKETED LENS SEAL, CURVED POLYCARBONATE LENS, DLC LISTED.	0-10V DIMMING TO 10%	<varies>	3500	4065	/FIXTURE	34	/FIXTURE	SUSPENDED	+108"	COLUMBIA LIGHTING: LXEM4-40ML-RFA-EDU	LITHONIA LIGHTING: CSVT-L48-400LM-MVOLT-40K-80CRI
T1	STEM MOUNTED AIMABLE LIGHT, NARROW DISTRIBUTION, FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S CATALOG OF STANDARD FINISHES.	0-10V DIMMING	277	3500	541	/FIXTURE	5	/FIXTURE	PENDANT	+96"	BRUCK LIGHTING: [illegible]	EUREKA: [illegible]
W1	ARCHITECTURAL WALL PACK, WET LOCATION LISTED, FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S CATALOG OF STANDARD COLORS.	ELECTRONIC	277	3000	5121	/FIXTURE	37	/FIXTURE	SURFACE WALL	+96"	LIGMAN: UQU-31343-37WLED-T3-W30-01-120/277V	OR APPROVED EQUAL
W2	ARCHITECTURAL WALL SCONCE, WET LOCATION LISTED, FINISH TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S CATALOG OF STANDARD COLORS.	ELECTRONIC	277	3000	129	/FIXTURE	22	/FIXTURE	SURFACE WALL	+72"	LANDSCAPEFORMS: AP-108L3-070F-30K-UV1-20K-MW1-NTW	OR APPROVED EQUAL
X1	WHITE THERMOPLATIC EXIT SIGN, CLEAR FACE, RED LETTERING, IMPACT RESISTANT, SELF POWERED, SELF DIAGNOSTIC. PROVIDE DIRECTIONAL ARROWS AS SHOWN ON PLANS.	ELECTRONIC	277				5	/FIXTURE	SURFACE	N/A	ACUITY BRANDS: CER	LITHONIA: LQM-S-W-3-R-120/277-EL_N-SD
X2	NEMA 4X POLYCARBONATE SHEILDED EXIT SIGN, WHITE FACE,TAMPER RESISTANT, RED LETTERING, SELF POWERED, SELF DIAGNOSTIC. PROVIDE DIRECTIONAL ARROWS AS SHOWN ON PLANS.	ELECTRONIC	277				5	/FIXTURE	SURFACE	N/A	DUALLITE: SEWLSRWE	LITHONIA: LV-W-1-R-120/277-EL_N-SD-4X
X3	WHITE THERMOPLATIC EXIT SIGN, CLEAR FACE, RED LETTERING, IMPACT RESISTANT, SELF POWERED, SELF DIAGNOSTIC. PROVIDE DIRECTIONAL ARROWS AS SHOWN ON PLANS.	ELECTRONIC	277				5	/FIXTURE	CEILING	N/A	COMPASS: CER	LITHONIA: LQM-S-W-3-R-120/277-EL_N-SD



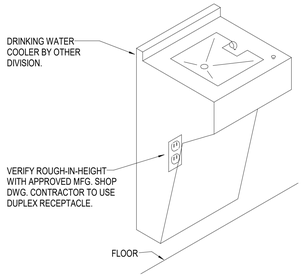
DUPLEX RECEPTACLE IN FLUSH MOUNTED 4" OR 4-11/16" SQUARE BOX WITH SINGLE-GANG PLASTER RING. MOUNT AT +20" AFF TO TOP.

10 TYPICAL FLUSH MOUNTED DUPLEX OUTLET
NOT TO SCALE

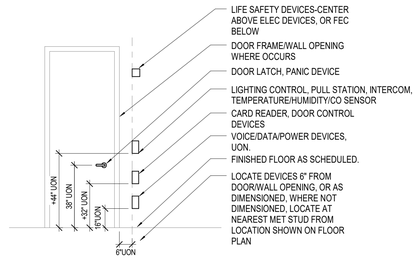


DOUBLE DUPLEX RECEPTACLE IN FLUSH MOUNTED 4" OR 4-11/16" SQUARE BOX WITH SINGLE-GANG PLASTER RING. MOUNT AT +20" AFF TO TOP.

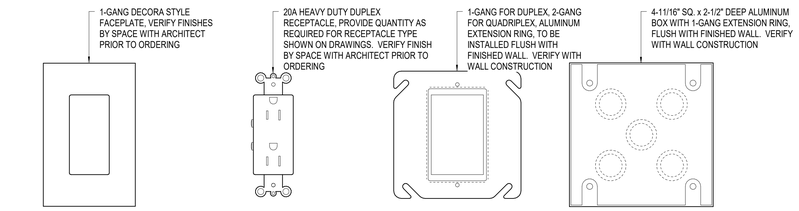
5 TYPICAL FLUSH MOUNTED DOUBLE DUPLEX
NOT TO SCALE

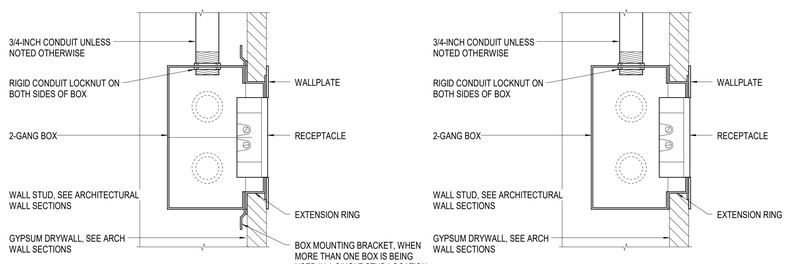


2 EWC WIRING
NOT TO SCALE

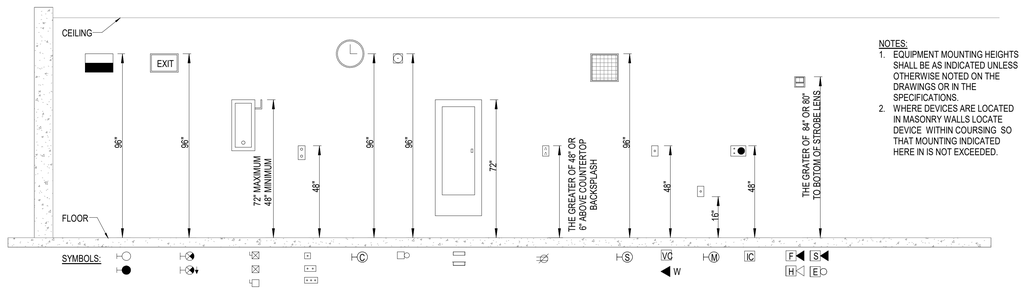


1 DEVICE MOUNTING ELEVATION
NOT TO SCALE

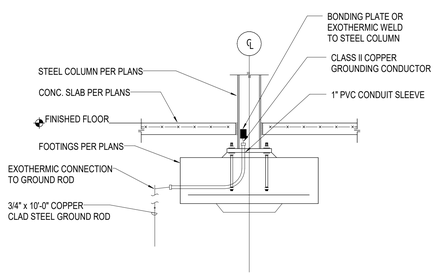




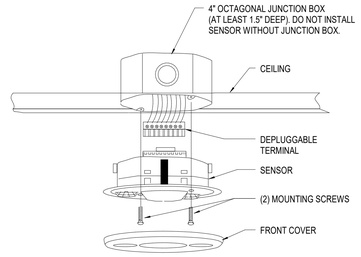
6 TYPICAL RECEPTACLE BOX ASSEMBLY
NOT TO SCALE



5 TYPICAL ELECTRICAL ELEVATION
NOT TO SCALE



8 COLUMN GROUNDING - SLEEVE
NOT TO SCALE



7 TYPICAL OCCUPANCY SENSOR MOUNTING DETAIL
NOT TO SCALE

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ELECTRICAL SCHEDULES AND DETAILS

E501