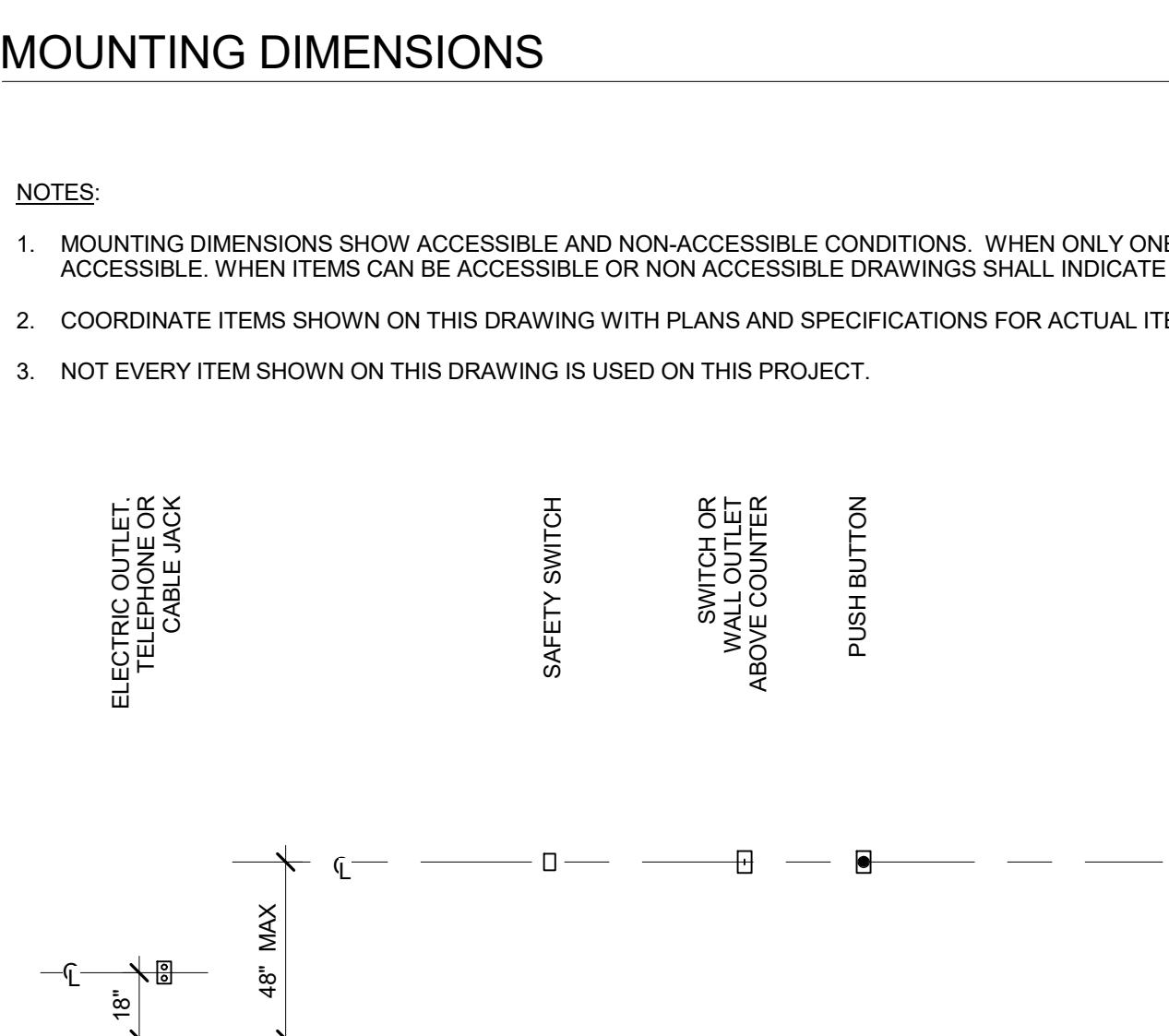


PLAN REVIEW DATA	
BUILDING CODE	2012 MICHIGAN BUILDING CODE INCORPORATING THE 2012 EDITION OF THE INTERNATIONAL BUILDING CODE
PLUMBING CODE	2012 MICHIGAN PLUMBING CODE INCORPORATING THE 2012 EDITION OF THE INTERNATIONAL PLUMBING CODE
ELECTRICAL CODE	2010 NATIONAL ELECTRICAL CODE AS AMENDED BY MICHIGAN STATE OF CONSTRUCTION CODE RULES, 2010 EDITION WITH UNIVERSITY OF MICHIGAN MODIFICATIONS.
FIRE CODE	2012 INTERNATIONAL FIRE CODE, AS REFERENCED IN THE 2012 MICHIGAN BUILDING CODE.
ACCESSIBILITY	2012 MICHIGAN BUILDING CODE INCLUDING MICHIGAN BARRIER FREE AND ICC/ANSI A117.1-2003
USE GROUP	U (SHEDS) FOR PAVILION NOTE: DRONE NETTING AREA IS NOT CONSIDERED A STRUCTURE.
CONSTRUCTION TYPE	TYPE VB (COMBUSTIBLE/NOT PROTECTED)
OCCUPANCY	NOT REGULARLY OCCUPIED
AREA AND HEIGHT	ACTUAL 660 S.F. TABULAR ALLOWABLE 5,500 S.F. ACTUAL HEIGHT 11'-0" TABULAR ALLOWABLE 40'-0"



PROJECT GENERAL NOTES

- NOTES:
- MOUNTING DIMENSIONS SHOW ACCESSIBLE AND NON-ACCESSIBLE CONDITIONS. WHEN ONLY ONE OPTION IS SHOWN - ALL ITEMS IN PROJECT SHALL BE ACCESSIBLE. WHEN ITEMS CAN BE ACCESSIBLE OR NON ACCESSIBLE DRAWINGS SHALL INDICATE LOCATION OF ACCESSIBLE ITEMS BY THIS SYMBOL
 - COORDINATE ITEMS SHOWN ON THIS DRAWING WITH PLANS AND SPECIFICATIONS FOR ACTUAL ITEMS USED ON THIS PROJECT.
 - NOT EVERY ITEM SHOWN ON THIS DRAWING IS USED ON THIS PROJECT.



UNIVERSITY OF
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College of Engineering &
Office of Research

M-AIR Test Facility
UNIVERSITY OF MICHIGAN PROJECT NO. - P00011963

Ann Arbor Michigan 48109-1340

Construction Set

08/25/2017

HED

2016-01099-000

DRAWING LIST		
Sheet Number	Sheet Name	Sheet Issued For
G-000	Title Sheet	Construction Set
L-101	Site/Civil Base Plan	Construction Set
S-001	General Notes	Construction Set
S-002	Special Inspection & Testing	Construction Set
S-101	Structural Plan	Construction Set
S-401	Enlarged Plans & Details	Construction Set
S-501	Construction Tolerances & Typical Details	Construction Set
A-101	Composite Floor Plan	Construction Set
A-102	Elevations, Sections and Details	Construction Set
E-021	Electrical Symbols, Riser Diagrams and Panel Schedules	Construction Set
E-501	Electrical Details	Construction Set
EL-101	Electrical Lighting Plan	Construction Set
EL-201	Electrical Photometrics Lighting Plan	Construction Set
EP-101	Electrical Power Plan	Construction Set
R-1	Topographical Survey	Reference Only

EARTHWORK

1. SUSPECT CONTAMINATED SOIL, GROUNDWATER, OR OTHER UNKNOWN MATERIAL. a. IF SUSPECTED CONTAMINATED SOIL, GROUNDWATER, OR OTHER UNKNOWN MATERIAL IS ENCOUNTERED CONTACT THE UNIVERSITY OF MICHIGAN CONSTRUCTION MANAGEMENT REPRESENTATIVE AND THE UM ENVIRONMENT, HEALTH & SAFETY DEPARTMENT (763-6973) IMMEDIATELY.
2. IMMEDIATELY CEASE ALL EXCAVATION, Dewatering, TRANSPORT, OR DISTURBANCE OF THE SUSPECT MATERIAL UNTIL GIVEN DIRECTION BY THE UM CONSTRUCTION MANAGEMENT REPRESENTATIVE.
3. GROUT SHALL BE PORTLAND CEMENT LIME MORTAR IN ACCORDANCE WITH ASTM C 270, TYPE S.
4. GROUT SHALL BE "FINE GROUT" IN ACCORDANCE WITH ASTM C 476. GROUT STRENGTH SHALL BE $f_c = 2500$ PSI MIN.
5. REINFORCEMENT: ASTM A 615 GRADE 60.
6. HORIZONTAL BOND BEAM AND VERTICAL REINFORCEMENT SHALL BE CONTINUOUS U.O.N.
7. LAP SPLICE HORIZONTAL REINFORCEMENT PER TYPICAL DETAILS OR PROVIDE MECHANICAL BAR COUPLERS. STAGGER SPLICE LOCATIONS.
8. GROUT SOLID ALL CORES AND BOND BEAMS WITH REINFORCEMENT.
9. GROUT SOLID ALL MASONRY BELOW FINISH FLOOR AND/OR FINISH GRADE.
10. PROVIDE BRACES TO THE WALLS TO RESIST WIND AND SEISMIC LOADS UNTIL FLOORS AND ROOFS ARE IN PLACE, AND THE MASONRY HAS REACHED 75% OF THE REQUIRED STRENGTH, fm.
11. PROVIDE TEMPORARY SHORING TO SUPPORT WALLS ABOVE LINTELS UNTIL:
 - a. THE FLOOR/ROOF ABOVE IS INSTALLED
 - b. THE MASONRY UNITS HAVE REACHED THE REQUIRED STRENGTH, fm.

REINFORCED HOLLOW CONCRETE MASONRY

1. MASONRY SHALL BE IN ACCORDANCE WITH BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES (ACI 530-11/ASCE 5-11) AND SPECIFICATIONS FOR MASONRY STRUCTURES (ACI 530-11/ASCE 6-11).
2. MORTAR SHALL BE PORTLAND CEMENT LIME MORTAR IN ACCORDANCE WITH ASTM C 270, TYPE S.
3. GROUT SHALL BE "FINE GROUT" IN ACCORDANCE WITH ASTM C 476. GROUT STRENGTH SHALL BE $f_c = 2500$ PSI MIN.
4. MINIMUM MASONRY STRENGTH SHALL BE $f_c = 2000$ PSI. UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI NET AREA (2000 SF).
5. EXCEPTION: IF PRISM TESTS ARE PERFORMED IN ACCORDANCE WITH ASTM E 447 METHOD B UNITS OF LESSER STRENGTH MAY BE USED TO ACHIEVE THE REQUIRED fm.
6. REINFORCEMENT: ASTM A 615 GRADE 60.
7. HORIZONTAL BOND BEAM AND VERTICAL REINFORCEMENT SHALL BE CONTINUOUS U.O.N.
8. LAP SPLICE HORIZONTAL REINFORCEMENT PER TYPICAL DETAILS OR PROVIDE MECHANICAL BAR COUPLERS. STAGGER SPLICE LOCATIONS.
9. GROUT SOLID ALL CORES AND BOND BEAMS WITH REINFORCEMENT.
10. PROVIDE BRACES TO THE WALLS TO RESIST WIND AND SEISMIC LOADS UNTIL FLOORS AND ROOFS ARE IN PLACE, AND THE MASONRY HAS REACHED 75% OF THE REQUIRED STRENGTH, fm.
11. PROVIDE TEMPORARY SHORING TO SUPPORT WALLS ABOVE LINTELS UNTIL:
 - a. THE FLOOR/ROOF ABOVE IS INSTALLED
 - b. THE MASONRY UNITS HAVE REACHED THE REQUIRED STRENGTH, fm.

POST-INSTALLED ANCHORS

1. WHERE SPECIFIC ANCHOR MANUFACTURER, TYPE, SIZE, AND EMBED REQUIREMENTS ARE SHOWN ON DETAILS, DRAWINGS, OR SPECIFICATIONS, SUBSTITUTIONS ARE NOT ACCEPTABLE.
2. FOR SUBSTITUTION PURPOSES, AT THE CONTRACTOR'S OPTION, SIGNED AND SEALED CALCULATIONS SHALL BE PROVIDED, INDICATING THE SUBSTITUTE ANCHOR MEETS THE CAPACITY REQUIREMENTS OF THE DETAILED ANCHOR, INCLUDE APPROPRIATE LOAD ADJUSTMENT FACTORS APPLICABLE TO ALL LOADING CONDITIONS INCLUDING BUT NOT LIMITED TO, ANCHOR GEOMETRY, EMBEDMENT LENGTH, AND ANCHOR TYPE (E.G. PRESTRESSED CONCRETE, SATURATED CONCRETE, AND OTHER SPECIFIED CONCRETE PROPERTIES). ASSUME DETAILED ANCHOR REQUIRES 100% OF ITS CAPACITY.
3. HOLES FOR THROUGH BOLTS SHALL BE FILLED WITH EPOXY TO ENSURE UNIFORM BEARING OF THE BOLT ON THE SUBSTRATE. THE VOLUME OF EPOXY SHALL BE SUFFICIENT TO FILL THE ANULAR SPACE BETWEEN THE BOLT AND THE HOLE THROUGH THE ENTIRE WIDTH OF THE SUPPORTING ELEMENT.
4. HOLES FOR POST INSTALLED ANCHORS (MECHANICAL OR EPOXY) SHALL BE DRILLED WITH HAMMER OR ROTARY DRILLS ONLY. CONTRACTOR SHALL NOT SUBSTITUTE WITH CORE-DRILLED HOLES UNLESS SPECIFICALLY INDICATED ON THE CONTRACT DOCUMENTS.
5. WHERE NOT SPECIFICALLY INDICATED OTHERWISE, CONTRACTOR SHALL USE Hilti HIT-HY 200 SAFE SET ADHESIVE SYSTEM WHERE INDICATED TO DRILL AND EPOXY DOWELS, ANCHORS, OR REINFORCING INTO HARDENED CONCRETE.

WOOD

1. WOOD FRAMING FABRICATION INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" PUBLISHED BY THE NATIONAL FOREST PRODUCTS ASSOCIATION.
2. FRAMING LUMBER 2" THICK OR LESS SHALL BE STRESS RATED OR GRADED FOR THE SPECIES AS SCHEDULED WITH A MOISTURE CONTENT OF 19% OR LESS. MINIMUM PROPERTIES SHALL BE AS SHOWN ON PLAN.
3. ROOF SHEATHING SHALL BE A.P.A. RATED SHEATHING, TREATED EXPOSURE 1, 5/8 INCH THICK, 32/16 RATING, CONTINUOUS OVER TWO OR MORE SPANS WITH LONG DIMENSION ACROSS SUPPORTS. FASTEN WITH 8D NAILS 6" O.C. @ EDGES AND 12" O.C. @ INTERMEDIATE SUPPORTS. STAGGER PANELS.
4. WOOD FRAMING CONNECTIONS SHALL BE SEALED CONNECTIONS, U.O.N. DO NOT COP ANY MEMBER. DO NOT USE TOE NAILING TO SUPPORT VERTICAL LOADS. PROVIDE STANDARD PREFABRICATED GALVANIZED MANUFACTURED FRAMING DEVICES PER ASTM D7781, DESIGNED TO SUPPORT THE MEMBER SIZE.
5. DO NOT CUT OR NOTCH STRUCTURAL LUMBER UNLESS SPECIFICALLY DETAILED OR INDICATED.
6. PROVIDE HOLES FOR BOLTS 1/32" TO 1/16" LARGER THAN NOMINAL BOLT DIAMETER. PROVIDE A307 BOLTS, UNLESS NOTED OTHERWISE, WITH STANDARD CUT UNDER HEAD, BOLT HEAD AND NUT. PROVIDE STANDARD WASHERS UNDER HEADS OF LAG SCREWS.
7. PRESSURE TREAT WOOD MEMBERS IN CONTACT WITH GROUND OR CONCRETE WITH WATERBORNE PRESERVATIVES IN COMPLIANCE WITH ICBC 2303.1. PROVIDED TREATED MEMBERS SHALL BE TREATED IN ACCORDANCE WITH THE ARCHITECTURAL PLANS. PROVIDE HOT-DIPPED GALVANIZED PER ASTM A153 STAINLESS STEEL FASTENERS, AND HARDWARE CONNECTORS PER ASTM A123 AT PRESERVE TREATED AND FIRE TREATED STRUCTURAL LUMBER.
8. PROVIDE LUMBER TREATED WITH WOOD-PRESERVATIVE-TREATING MATERIAL BY ONE OF THE FOLLOWING ACCEPTABLE MANUFACTURERS:
 - a. J. H. BAXTER CO.
 - b. CHEMICAL SPECIALTIES, INC.
 - c. C.C. WOOD PRESERVATIVES, INC.
 - d. HICKSON CORP.
 - e. HOOVER TREATER WOOD PRODUCTS, INC.
 - f. OSMOSE WOOD PRESERVING, INC.
9. ALL NAILS, UNLESS INDICATED OTHERWISE, ARE COMMON NAILS WITH DIMENSIONAL PROPERTIES COMPLYING WITH AF & PA NDS TABLE L4 AND ASTM F1667. INSTALL NAILS IN COMPLIANCE WITH CBC CHAPTER 23, INCLUDING TABLE 2304.9.1.
10. PROVIDE WOOD HARDWARE CONNECTORS AS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, INC. COMPLYING WITH IBC EVALUATION REPORT NOS. 1211 AND NER209.

CONCRETE

1. CONCRETE IS NORMAL WEIGHT AND SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
2. CONCRETE BAR REINFORCEMENT SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615 (60,000 PSI YIELD).
3. UNLESS OTHERWISE NOTED, CONCRETE WORK SHALL CONFORM TO THE ACI STANDARD "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-11) AND THE ACI "DETAILING MANUAL" (SP-66 2004 EDITION).
4. WALLS SHALL BE DOVELED TO FOOTINGS. WALL FOOTING DOWELS SHALL BE SAME SIZE AS WALL VERTICALS.
5. MINIMUM ELAPSED TIME BETWEEN ADJACENT CONCRETE PLACEMENTS SHALL BE 48 HOURS.
6. BEAMS AND SLABS SHALL BE PLACED MONOLITHICALLY EXCEPT WHERE OTHERWISE SHOWN. NO HORIZONTAL CONSTRUCTION JOINTS ARE TO BE MADE IN SLABS OR BEAMS, UNLESS SHOWN OR OTHERWISE NOTED.
7. DRILLED AND EPOXIED / GROUTED DOWELS ARE NOT AN EQUAL SUBSTITUTE FOR DOWELS SHOWN IN DETAILS UNLESS OTHERWISE INDICATED.
8. PROVIDE A SHEAR KEY 1/3 OF DEPTH OF STRUCTURAL MEMBER AT CONSTRUCTION JOINTS. SEE TYPICAL DETAILS FOR ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS.
9. VERTICAL CONSTRUCTION JOINTS USING APPROVED BULKHEADS MAY BE MADE AT 1/3 (THIRD POINT) OF BEAM AND SLAB SPANS WHERE STOP IN CONCRETE WORK IS NECESSARY.
10. MINIMUM CONCRETE COVER SHALL BE (UNLESS OTHERWISE NOTED):
 - a. UNFORMED SURFACES IN CONTACT WITH GROUND OR EXPOSED TO THE WEATHER 3"
 - b. SLABS ON GRADE (TOP COVER) 1"
 - c. FORMED SURFACES IN CONTACT WITH GROUND OR EXPOSED TO THE WEATHER (GRADE BEAMS, WALLS, ETC.) 2"
 - d. IN ALL CASES, CLEARANCE NOT LESS THAN THE DIAMETER OF THE BARS.

STRUCTURAL STABILITY

1. STRUCTURAL STABILITY IS DEPENDENT ON A FULLY COMPLETED STRUCTURE.
2. THE FULLY COMPLETED STRUCTURE IS DESIGNED TO BE STABLE AND TO RESIST THE CODE PRESCRIBED LATERAL AND GRAVITY FORCES.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE IN ITS INCOMPLETED STATE DURING THE CONSTRUCTION PHASE. TO DETERMINE THE FULLY COMPLETED STRUCTURE, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING ERECTION AND PLACING PROCEDURES, DESIGNING AND PROVIDING TEMPORARY SUPPORTS, SUCH AS TEMPORARY SHORING, BRACING, GUYS AND TIE-DOWNS.
4. TEMPORARY SHORING SHALL REMAIN IN PLACE AND SHALL CONSIDER THE REQUIREMENTS OF THE DRAWINGS UNTIL THE ABOVE REQUIREMENTS ARE MET.
5. DESIGNING AND PROVIDING SEI/ASCE 37-02, "DESIGN LOADS ON STRUCTURES DURING CONSTRUCTION" AS A REFERENCE TO DETERMINE LOADS FOR TEMPORARY SUPPORTS.

DESIGN LOADS

1. DESIGN CODE: MICHIGAN BUILDING CODE 2015
2. DESIGN LOAD COMBINATIONS: PER ASCE 7-10 SECTION 2.3 & 2.4 & MBC SECTION 1605
3. FLOOR LIVE LOADS, UNFACTORED (PAVILION ONLY):
 - a. TYP, INCLUDING PARTITION 55 PSF
 - b. FLAT ROOF DESIGN SNOW LOAD 25 PSF
 - c. GROUND SNOW LOAD 20 PSF
 - d. SNOW EXPOSURE FACTOR, "Ce" 1.2
 - e. SNOW THERMAL FACTOR, "Ct" 1.0
 - f. SNOW LOAD IMPORTANCE FACTOR, "Is" 1.0
 - g. SLOPED ROOF SNOW LOAD, "Ps" 25 PSF
 - h. ROOF SLOPE FACTOR, "Cs" 1.0
4. LIVE LOAD DEFLECTION (PAVILION ONLY):
 - a. ROOF AND FLOOR MEMBERS HAVE BEEN DESIGNED TO ALLOW A MAXIMUM DEFLECTION OF 1/360 OF THE SPANNING DISTANCE (FAÇADE ATTACHMENTS INCLUDING, BUT NOT LIMITED TO, ALUMINUM STOREFRONT AND ALUMINUM CURTAIN WALL SYSTEMS) SHALL BE DESIGNED TO ACCOMMODATE DEFLECTION OF THE PRIMARY STRUCTURE AS OUTLINED ABOVE)
5. SUPERIMPOSED DEAD LOADS, UNFACTORED (PAVILION ONLY):
 - a. PARTITION ALLOWANCE 20 PSF
 - b. CEILING 5 PSF
 - c. LIGHTING, MECHANICAL, ELECTRICAL ITEMS 5 PSF
 - d. ROOFING ASSEMBLY 5 PSF
6. ULTIMATE DESIGN WIND LOAD FOR STRUCTURAL FRAME:
 - a. RISK CATEGORY II
 - b. DESIGN SNOW LOAD B
 - c. ULTIMATE WIND SPEED 115 MPH
 - d. ULTIMATE MAIN WIND-FORCE RESISTING SYSTEM PRESSURE (WINDWARD PLUS LEeward)
BASE PRESSURE "q0" 25 PSF
H = HEIGHT: 0' < H < 15' 27 PSF
7. ULTIMATE DESIGN WIND LOAD FOR EXTERIOR COMPONENTS AND CLADDING COMBINING THE AREA OF 20 SQUARE FEET (PAVILION ONLY):
 - a. ROOF ZONE 1 (FIELD) +/- 32.0 PSF
 - b. ROOF ZONE 2 (EDGE) +/- 53.2 PSF
 - c. ROOF ZONE 3 (CORNER) +/- 74.3 PSF
 - d. WALL ZONE 4 (TYPICAL WALL) +/- 22.0 PSF
 - e. WALL ZONE 5 (ENDER) (WITHIN 3 FT EACH SIDE OF CORNER) +/- 44.0 PSF
 - f. PARAPET CASE A (PRESSURE TOWARDS BLDG) +/- 96.3 PSF
 - g. PARAPET CASE B (PRESSURE AWAY FROM BLDG) +/- 66.0 PSF
 - h. COMMON TRIBUTARY AREA GREATER THAN 20 SQ.FT. REFER TO MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES ASCE 7-10
8. SEISMIC LOADS:
 - a. RISK CATEGORY II
 - b. IMPORTANCE FACTOR "IE" 1.0
 - c. SEISMIC DESIGN CATEGORY "SDC" B
 - d. SHORT PERIOD PEAK SPECTRAL ACCELERATION "SS" 9.4% g
 - e. 1 SEC PERIOD PEAK SPECTRAL ACCELERATION "S1" 4.8% g
 - f. SEISMIC SITE CLASS "SDS" D
 - g. SPECTRAL RESPONSE COEFFICIENT "SDS" 0.100
 - h. SPECTRAL RESPONSE COEFFICIENT "SD1" 0.077
 - i. LONG TERM SPECTRAL RESPONSE "TL" 12 SEC
 - j. BASIC SEISMIC FORCE RESISTING SYSTEM (ASCE 7-10 TABLE 22-1): ORDINARY REINFORCED MASONRY SHEAR WALLS (PAVILION ONLY)
 - a. RESPONSE MODIFICATION FACTOR, "R" 2
 - b. SYSTEM OVERSTRENGTH FACTOR "OD" 2.5
 - c. DYNAMIC INTEGRATION FACTOR, "Cd" 1.75
 - d. SEISMIC RESPONSE COEFFICIENT "Cs" 0.05
 - e. ANALYSIS PROCEDURE EQUIVALENT LATERAL FORCE PROCEDURE 5 KIPS
 - k. SEISMIC BASE SHEAR, "V" (PAVILION ONLY)
9. BUILDING IS NOT DESIGNED FOR FUTURE VERTICAL OR HORIZONTAL EXPANSION.

GENERAL

1. THE STRUCTURAL DRAWINGS SHOW A PORTION OF THE WORK TO BE PERFORMED BY THE CONTRACTOR. SUPPLEMENTARY REQUIREMENTS FOR STRUCTURAL STEEL, CONCRETE, ETC., ARE FOUND WITHIN THE DRAWINGS OF OTHER DISCIPLINES AND REMAIN THE RESPONSIBILITY OF THE CONTRACTOR.
2. THESE NOTES ARE COMPLEMENTARY TO THE SPECIFICATIONS AND SHALL BE USED IN CONJUNCTION WITH THE SPECIFICATIONS.
3. SPECIFICATIONS AND DRAWINGS SHALL BE EQUAL IN AUTHORITY AND PRIORITY. SHOULD THE SPECIFICATIONS AND DRAWINGS DISAGREE IN THEMSELVES OR WITH EACH OTHER, CONSTRUCTION SHALL BE BASED ON THE MOST STRINGENT. THE WORK REQUIRED TO BE CONSTRUCTED BY THE DOCUMENTS SHALL BE DECIDED BY THE ARCHITECT/ENGINEER IN THE EVENT OF THE ABOVE MENTIONED DISAGREEMENTS.
4. VERIFY THE SIZES, LOCATIONS, ELEVATIONS, AND DETAILS OF EXISTING CONDITIONS THAT AFFECT THE WORK. INFORM THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES IN DIMENSIONS, SIZES, LOCATIONS, AND CONDITIONS, PROCEEDING WITH WORK ONLY AFTER DISCREPANCIES ARE RESOLVED.
5. PROVIDE SHORING, BRACING, UNDERPINNING, AND ANY OTHER MEANS REQUIRED TO PROTECT AND MAINTAIN THE SAFETY, INTEGRITY AND STABILITY OF ALL EXISTING AND NEW CONSTRUCTION.
6. NORMAL OPERATIONS WILL BE CONTINUED BY THE OWNER THROUGHOUT THE DURATION OF CONSTRUCTION. ANY INTERFERENCE WITH THE OWNER'S OPERATION OR INTERRUPTION TO UTILITIES SHALL BE COORDINATED WITH THE OWNER.
7. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AT THE PROJECT SITE, INCLUDING SERVICES, ETC., AND SHALL BE RESPONSIBLE FOR ANY DAMAGE HE CAUSES TO THE PROPERTY, EXISTING AND NEW CONSTRUCTION, AND FOR ANY UNAUTHORIZED DISRUPTIONS TO THE OWNER'S NORMAL USE OF UTILITIES, SERVICES AND THE SURROUNDING FACILITIES.
8. CONTRACTOR SHALL OBTAIN APPROVAL OF THE ARCHITECT/ENGINEER PRIOR TO PLACING OPENINGS OR SLEEVES NOT SHOWN ON DRAWINGS THROUGH ANY STRUCTURAL MEMBERS.
9. TYPICAL DETAILS APPLY TO ALL DRAWINGS AND SHALL BE USED EXCEPT WHERE OTHERWISE SHOWN OR NOTED.
10. SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, DRAWINGS, AND SHOP DRAWINGS FOR SIZE AND LOCATION OF WALL AND FLOOR OPENINGS, WALL OFFSETS, STAIR DETAILS, PIPES, VENTS, DUCTS, CONDUIT, AND OTHER OPENINGS AND DETAILS NOT SHOWN ON THE STRUCTURAL DRAWINGS.

STATEMENT OF SPECIAL INSPECTION

1. GENERAL:
 - a. THIS STATEMENT OF INSPECTIONS IS SUBMITTED AS A CONDITION FOR PERMIT ISSUANCE IN ACCORDANCE WITH THE SPECIAL INSPECTION REQUIREMENTS OF THE 2012 MICHIGAN BUILDING CODE.
 - b. REFERENCE SPECIFICATION SECTION 014010 "TESTING AND INSPECTION SERVICES - BUILDING" AND DRAWING SHEET S-002

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 48033 USA
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WWW.HED.DESIGN

SPECIAL INSPECTIONS & TESTING

1. THE FOLLOWING ITEMS REQUIRE TESTING AND/OR INSPECTION IN ACCORDANCE WITH THE STATEMENT OF SPECIAL INSPECTION, SPECIAL INSPECTION MATRIX LOCATED IN THE DRAWING SHEET S-002, SECTION 014010, TESTING AND INSPECTION SERVICES - BUILDING.
 - a. 033000 - CAST-IN-PLACE CONCRETE
 - b. 034000 - MASONRY CONSTRUCTION
 - c. 051200 - STRUCTURAL STEEL MATERIALS, WELDS, AND CONNECTIONS
 - d. 058010 - MECHANICAL EXPANSION AND ADHESIVE ANCHORS
 - e. 312020 - SOILS AND EARTHWORK

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U OF M PROJECT NO. - P00011963

General Notes

S-001



UNIVERSITY OF
MICHIGAN

College of
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Office of Research

503 Thompson Street
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M-AIR Test Facility

Ann Arbor
Michigan 48109-1340
North Campus

Date Issued For
03/28/2017 CD Review
06/19/2017 Bids
08/25/2017 Construction Set

INSPECTION TASK	FREQUENCY OF INSPECTION		Reference for Criteria		RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC	ACI 530/ASCE 5/TMS 402	ACI 530 1/ASCE 6/TMS 602	
1. Verification of slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with Specification Article 1.5 B.1.b.3 for self consolidating grout.	X				SI,PE
2. Verification of f'm and f'AC in accordance with Specification Article 1.4 B prior to construction except where specifically exempted by this code.	X				SI,PE
3. Verify compliance with the approved submittals.		X		Art. 1.5	SI,PE
4. As masonry construction begins, the following shall be verified to ensure compliance:					SI,PE
a. Proportions of site-prepared mortar.		X		Art. 2.1, 2.6A	
b. Construction of mortar joints.		X		Art. 3.3B	
c. Grade and size of anchorages.		X		Art. 2.4B, 2.4H	
d. Location of reinforcement, connectors and anchorages.		X		Art. 3.4, 3.6A	
e. Properties of thin-bed mortar for ACC masonry.	X			Art. 2.1C	
5. Prior to grouting, verify that the following are in compliance:					SI,PE
a. Grout space is clean.		X		Art. 3.2D, 3.2F	
b. Grade, type, and size of reinforcing and anchor bolts, and prestressing tendons and anchorages.		X	Sec 1.16	Art. 2.4, 3.4	
c. Placement of reinforcement and connectors and anchorages.		X	Sec 1.16	Art. 3.2E, 3.4, 3.6A	
d. Proportions of site-prepared grout.	X			Art. 2.6B, 2.4G.1b	
e. Construction of mortar joints.		X		Art. 3.3B	
6. Verify during construction:					SI,PE
a. Size and location of structural elements.	X			Art. 3.3F	
b. Type, size and locations of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	Sec 1.16.4.3, 1.17.1		
c. Welding of reinforcement.		X	Sec 21.7.7.2, 3.3.3.4(c), 8.3.3.4(b)		
d. Preparation, construction and protection of masonry during cold weather (temperature below 40 degrees F) or hot weather (temperatures above 90 degrees F).		X		Art. 1.8C, 1.8D	
e. Placement of grout is in compliance.	X			Art. 3.5, 3.6C	
f. Placement of ACC masonry units and construction of thin-bed mortar joints.	X			Art. 3.3B.8	
7. Observe preparation of grout specimens, mortar specimens and/or prisms.		X		Art. 1.4B.2.a.3, 1.4B.2.b.3, 1.4B.2.c.3, 1.4B.3, 1.4B.4	SI,PE

SPECIAL INSPECTION LEGEND & NOTES					
1. Special inspections shall be performed in accordance with 2015 Michigan Building Code Chapter 17 and as modified herein.					
2. SI: Special Inspector meeting the minimum qualification requirements to perform the indicated special inspection services. Shall demonstrate competence documented by certifications from recognized agencies and approved by the Building Official Having Jurisdiction.					
3. PE: Registered Professional Engineer licensed in the State of Michigan meeting the minimum qualification requirements to perform the indicated special inspection service and approved by the Building Official Having Jurisdiction.					
4. GEOR: The geotechnical engineer of record who provided the original project geotechnical soils investigation report and meets the minimum qualification requirements to perform the indicated special inspection service and approved by the Building Official Having Jurisdiction.					
5. GOR: shall submit records of the inspection results to the SI. The SI shall compile and submit inspection records to the Architect/Engineer of Record and Building Official. Records shall include statements of tests, whether installed/fabricated item complies with contract documents, remedial work performed, retests.					
6. Special Inspectors performing inspection services and authoring inspection reports shall be the certified individuals indicated in the Special Inspection Program submitted by the Special Inspection Agency.					
7. Special Inspectors performing inspection services shall refer to and familiarize themselves with the Contract Documents, approved submittals, RFI responses, and field directives related to the work being inspected.					
8. SI shall develop and maintain a list of each reported discrepancy and suggested remedial action. It shall list method of how discrepancy was resolved and when the remedial action is performed.					
9. The Special Inspection Agency and/or Special Inspector shall be paid by the Owner or the registered design professional in responsible charge acting as the Owner's agent, in compliance with the Michigan Building Code.					
10. Refer to the Michigan Building Code Chapter 35 for current reference standard editions.					
11. Refer to the International Code Council Special Inspection Manual 2015 Edition for additional information.					

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCED STANDARD	RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC		
1. Verify number and type of fasteners at adjoining panel edges, the nail or staple diameter and length, the number of fastener lines and that the spacing between fasteners in each line and at edge margins agrees with the approved building plans and/or shop drawings.		X		SI,PE
2. Verify height, length, width, and location of diaphragms. Size, location, quantity, and fastening of drag struts. Verify appropriate wood or gypsum sheathing panels.		X		SI,PE
3. Verify bolts and washers, connectors and fastening of connectors, anchor bolt size and spacing, and nailing schedule.		X		SI,PE
4. Verify connections to roof and sill plates, including hold down connections.		X		SI,PE

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCED STANDARD	RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC		
1. Verify materials below footings are adequate to achieve the design bearing capacity.		X		
2. Verify excavations are extended to proper depth and have reached proper material.		X		
3. Perform classification and testing of compacted fill materials.		X		
4. Verify use of proper materials, analysis of fill materials, densities and lift thicknesses during placement and compaction of compacted fill.	X			
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly (proof rolling).		X		
6. Verify earth retaining structures (permanent or temporary) are backfilled in accordance with performance specifications and delegated design submittals.	X			
7. Verify subgrade preparation for concrete slabs on grade in accordance with specification requirements and geotechnical recommendations contained within the geotechnical report, immediately prior to placement of the concrete slab on grade.	X			
8. Verify site prepared in accordance with the approved geotechnical report.		X		

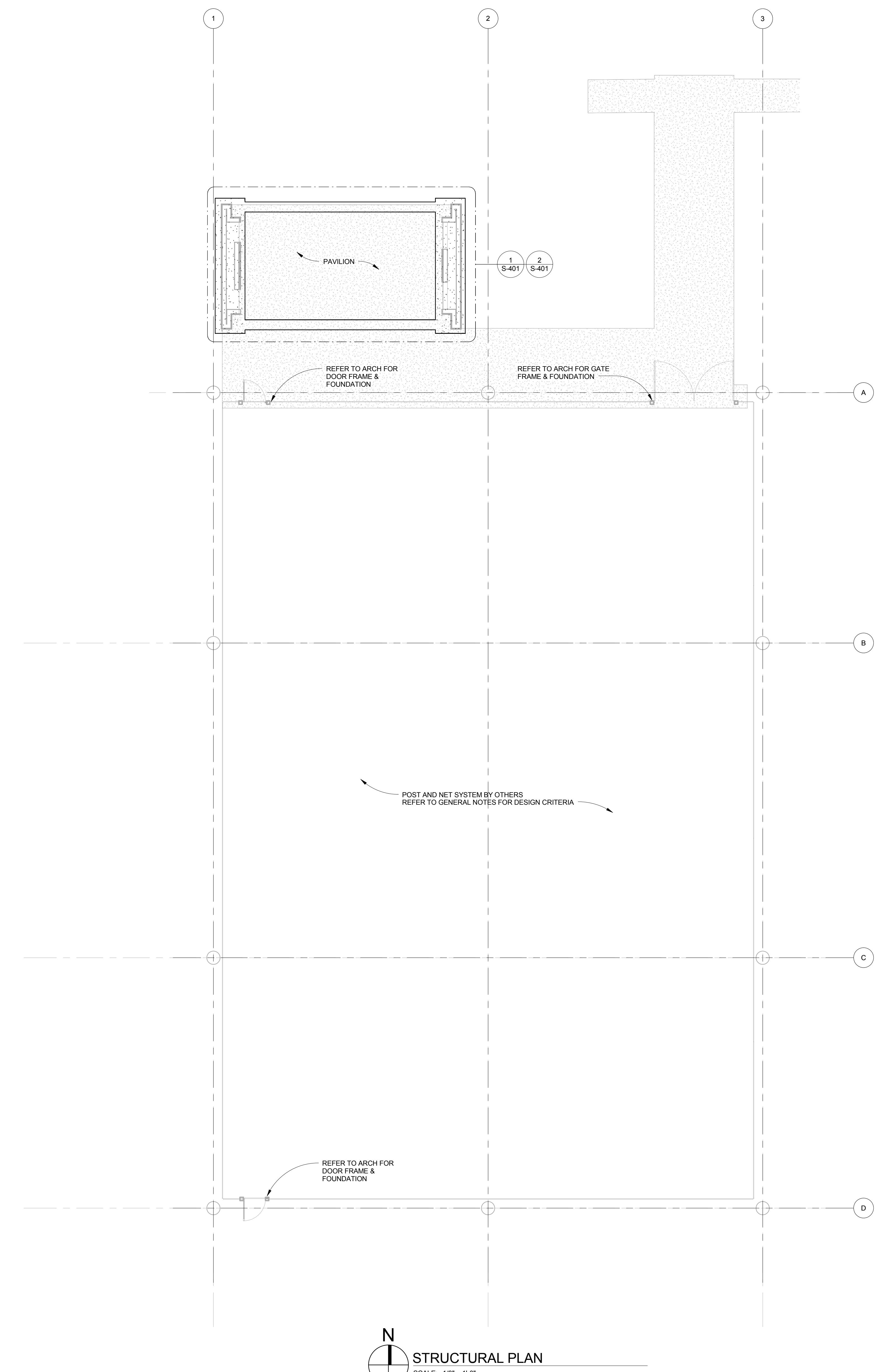
INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCED STANDARD	RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC		
1. Expansion, wedge, screw, and powder-actuated fasteners/anchors:				
a. Prior to installation, verify anchor type, anchor dimensions, concrete type, concrete compressive strength, and drill bit type.			X	
b. During installation, verify hole dimensions, hole cleaning procedures, anchor spacing, edge distance, concrete thickness, anchor embedment, and installation torque.			X	
2. Adhesive anchors installed in horizontal or overhead application:				
a. Prior to installation:			X	
1) Review certifications from each installer indicating completion of the ACI/CRSI Adhesive Anchor Installation Certification Program.				
a. During installation verify the following:				
1) Verify anchor type, adhesive identity and expiration date, anchor dimensions, concrete type, concrete compressive strength, hole drilling method, hole dimensions, hole-cleaning procedures, anchor spacing, edge distances, concrete thickness, anchor embedment, and installation torque.			X	
2) Verify compliance with proof-loading program (when required)			X	
3. Adhesive anchors not installed in horizontal or overhead application:				
a. Prior to installation verify the following:			X	
1) Review certifications from each installer indicating completion of the adhesive manufacturers training and quality assurance program, or ACI/CRSI Adhesive Anchor Installation Certification Program.				
2) Anchor type, anchor dimensions, concrete type, concrete compressive strength, adhesive identification and expiration date.			X	
b. During installation verify the following:				
1) Verify anchor type, adhesive identity and expiration date, anchor dimensions, concrete type, concrete compressive strength, hole drilling method, hole dimensions, hole-cleaning procedures, anchor spacing, edge distances, concrete thickness, anchor embedment, and installation torque.			X	
2) Verify initial installations of each type and size of adhesive anchor. Subsequent installations of the same anchor type and size by the same construction personnel may be performed in the absence of the special inspector and inspected on a periodic basis.				X
3) For ongoing installations, perform periodic inspections in accordance with item 3.b.1				X

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCED STANDARD	RESPONSIBLE AGENT
	CONTINUOUS	PERIODIC		
1. Inspection of reinforcing steel, placement, profile.		X	ACI 318: 3.5, 7.1-7	SI,PE
2. Inspection of reinforcing steel welding in accordance with Table 1705.2	—	—	AWS D1.4, ACI 318: 3.5.2	SI,PE
3. Inspect bolts to be installed in concrete prior to and during placement of concrete.	X		ACI 318: 8.1.3, 21.1.8	SI,PE
4. Verifying use of approved concrete mix designs.		X	ACI 318: Ch. 4, 5.2-5.4	SI,PE
5. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X		ASTM C 172, ASTM C 31, ACI 318: Sec. 5.6, 5.8	SI,PE
6. Inspection of concrete placement for proper application techniques.	X		ACI 318: 5.9, 5.10	SI,PE
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI 318: 5.11-5.13	SI,PE
8. Verification of in-situ concrete strength prior to removal of shoring and forms from structural slabs.		X	ACI 318: 6.2	SI,PE
9. Inspect formwork for shape, location and dimensions of the concrete member being formed.		X	ACI 318: 6.1.1	SI,PE

HED
2613 Northwestern Hwy
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Southfield, Michigan
48033 USA
(248) 262-1500
www.HED.DESIGN

Special Inspection & Testing
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2016-01099-000
U OF M PROJECT NO. - P0001963

S





UNIVERSITY OF MICHIGAN

College of Engineering & Office of Research

503 Thompson Street
Ann Arbor
Michigan 48109-1340

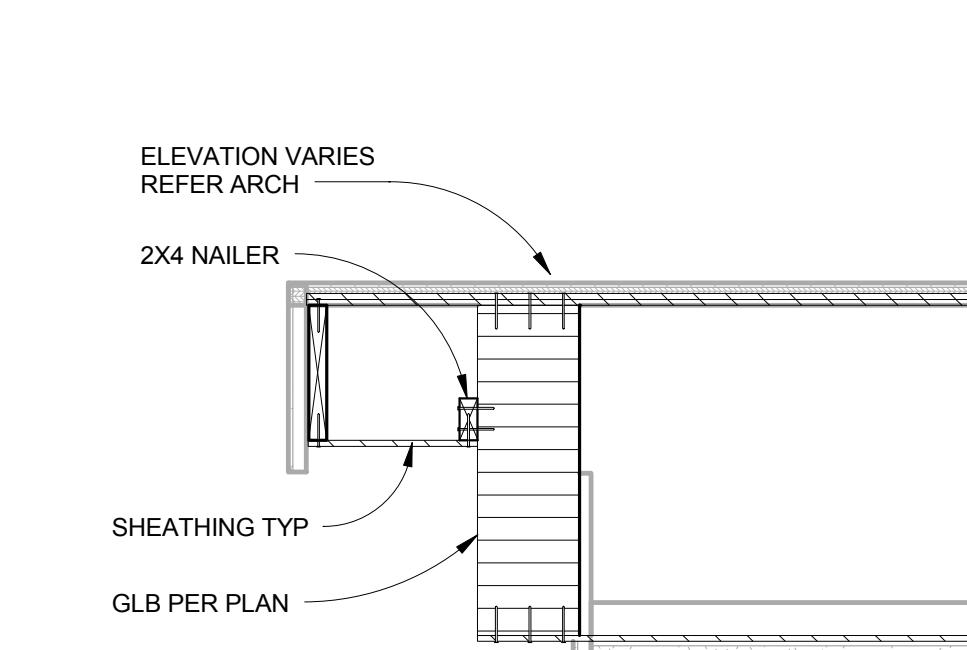
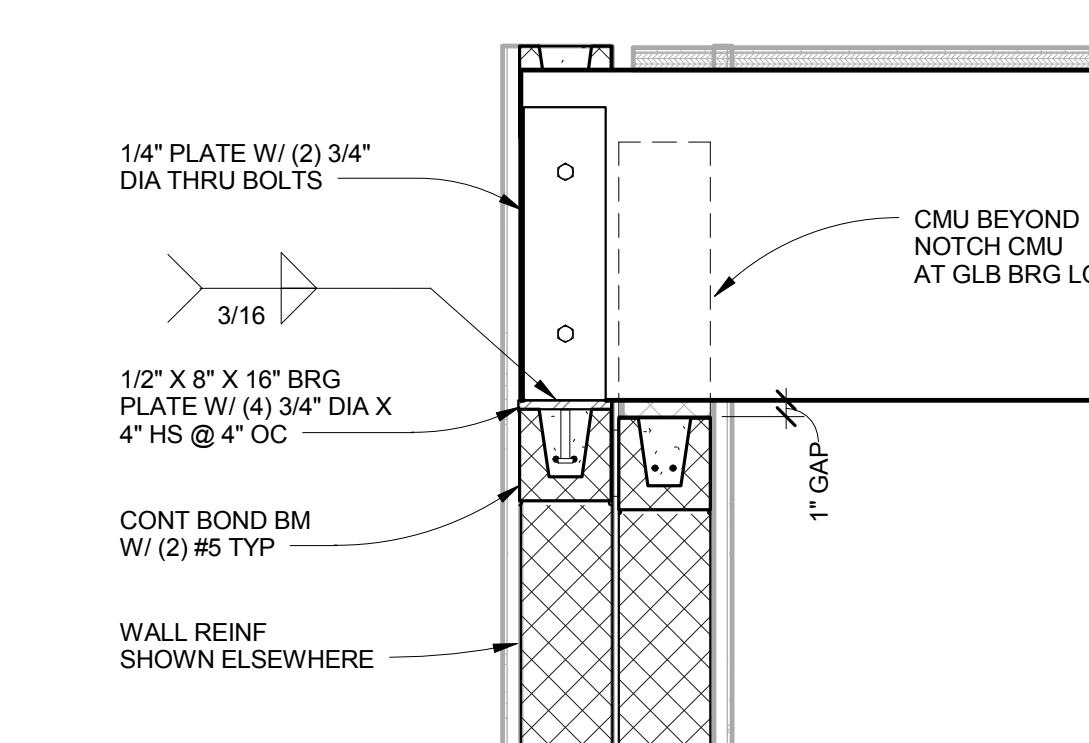
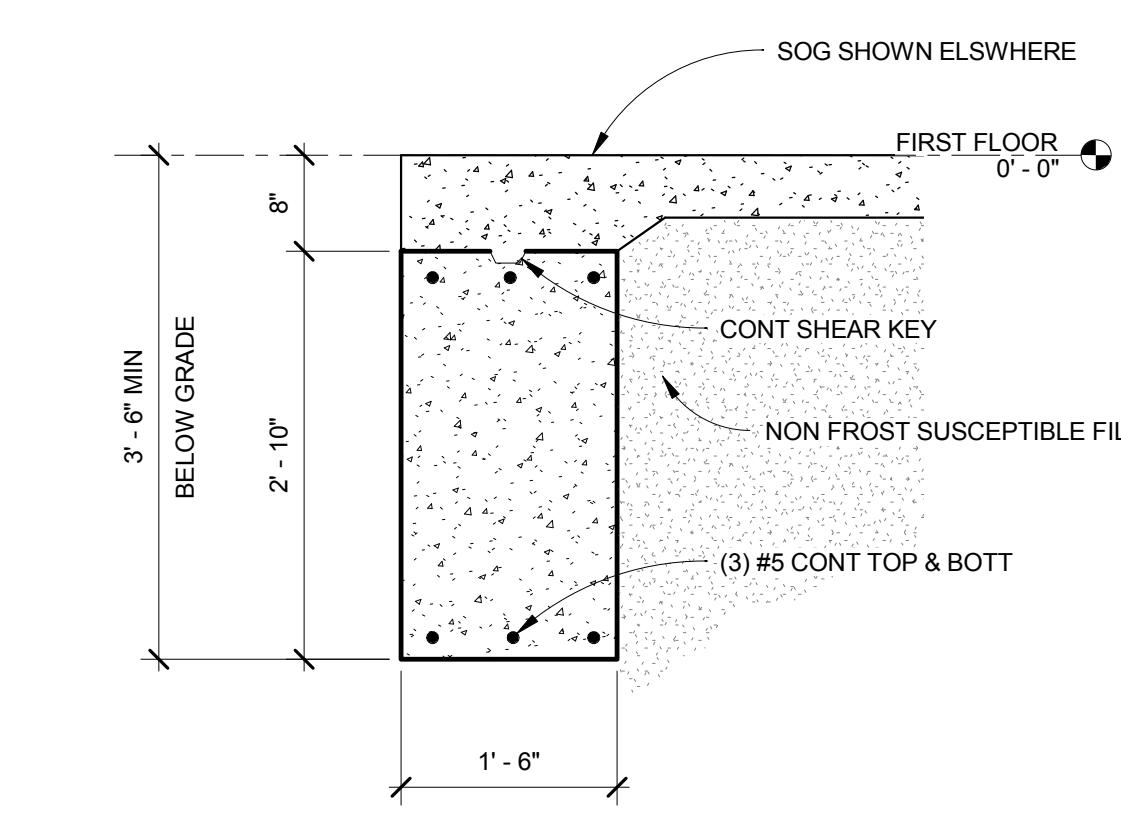
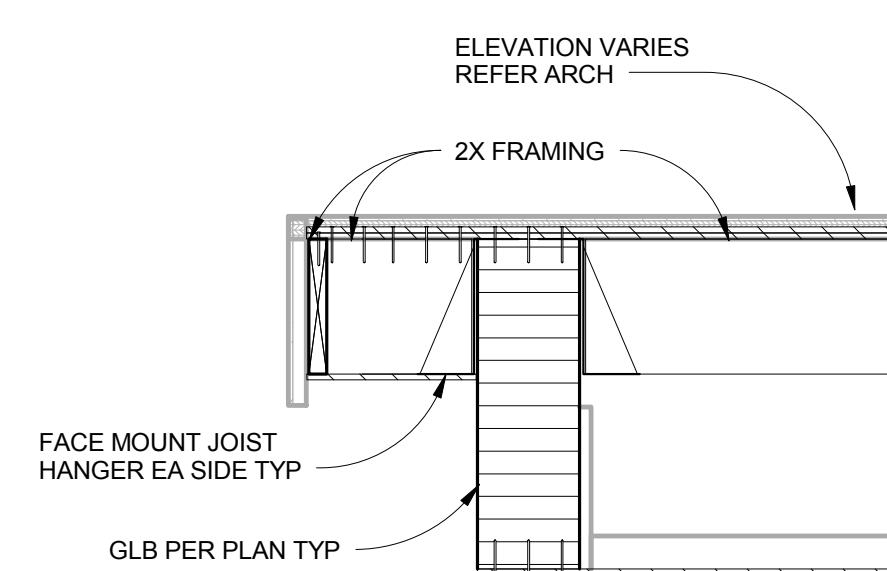
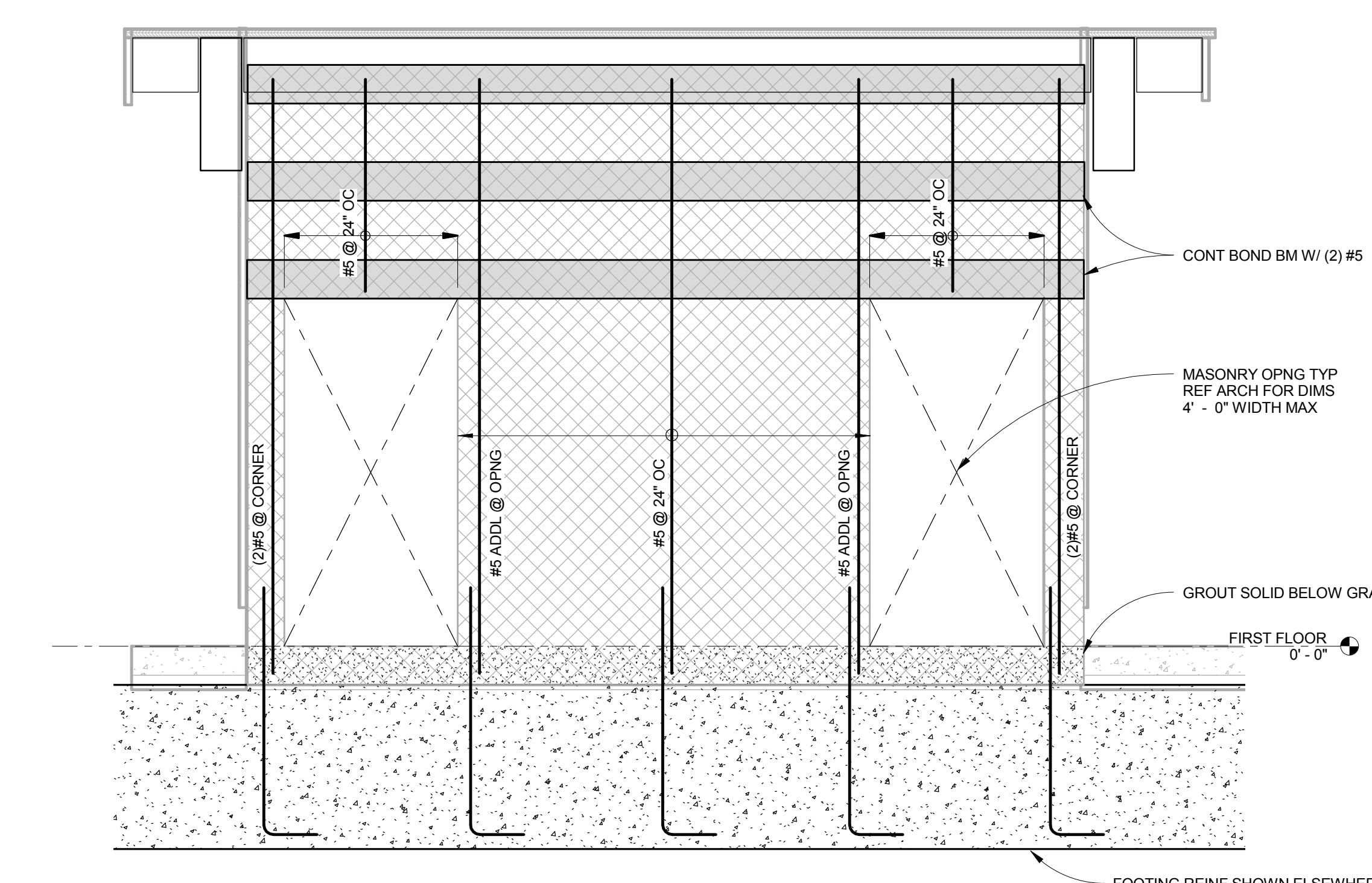
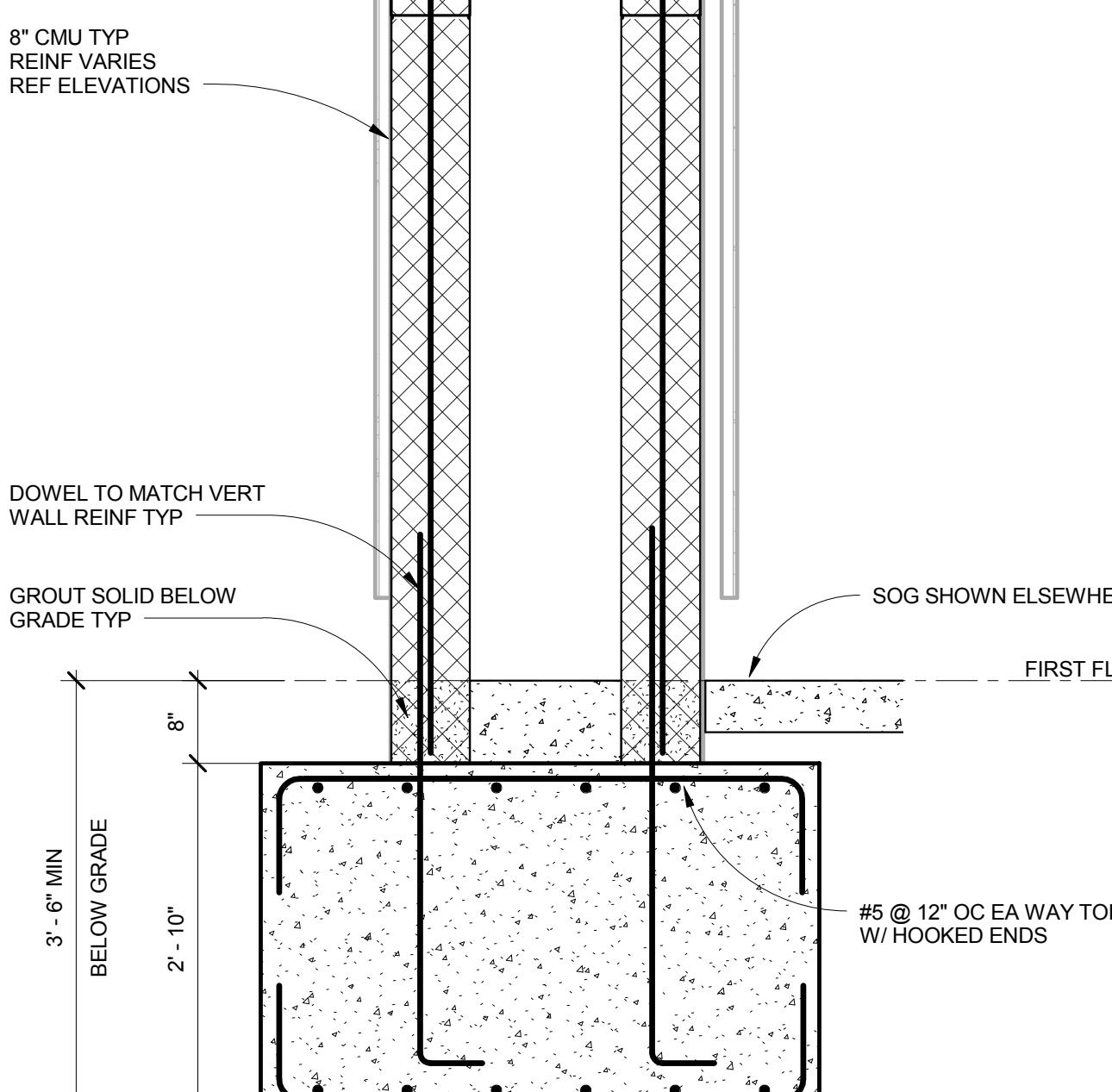
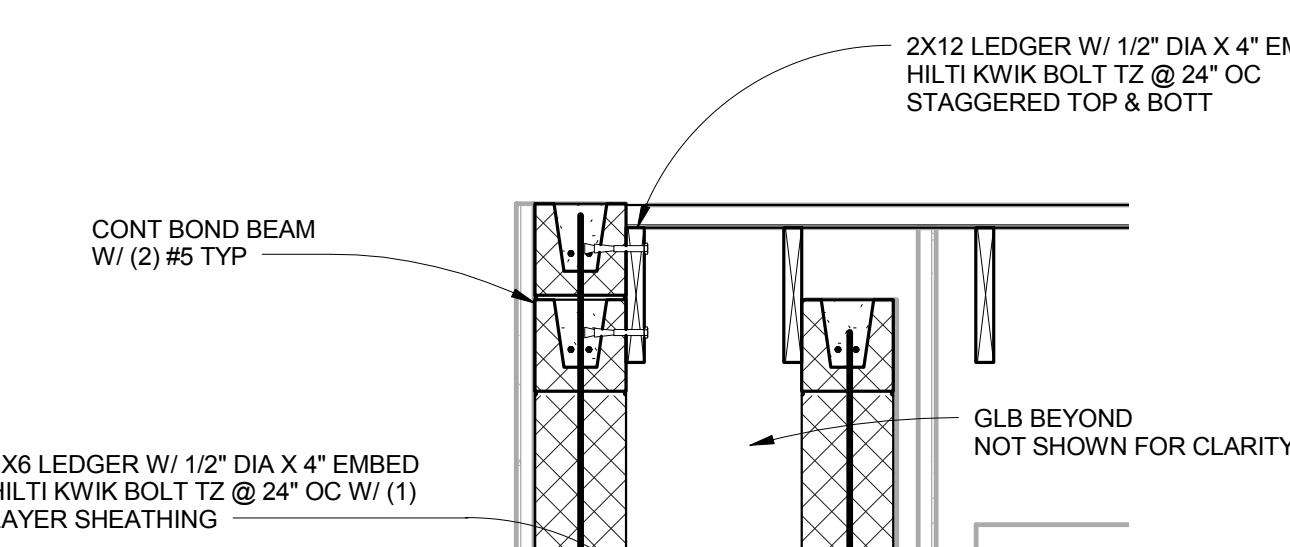
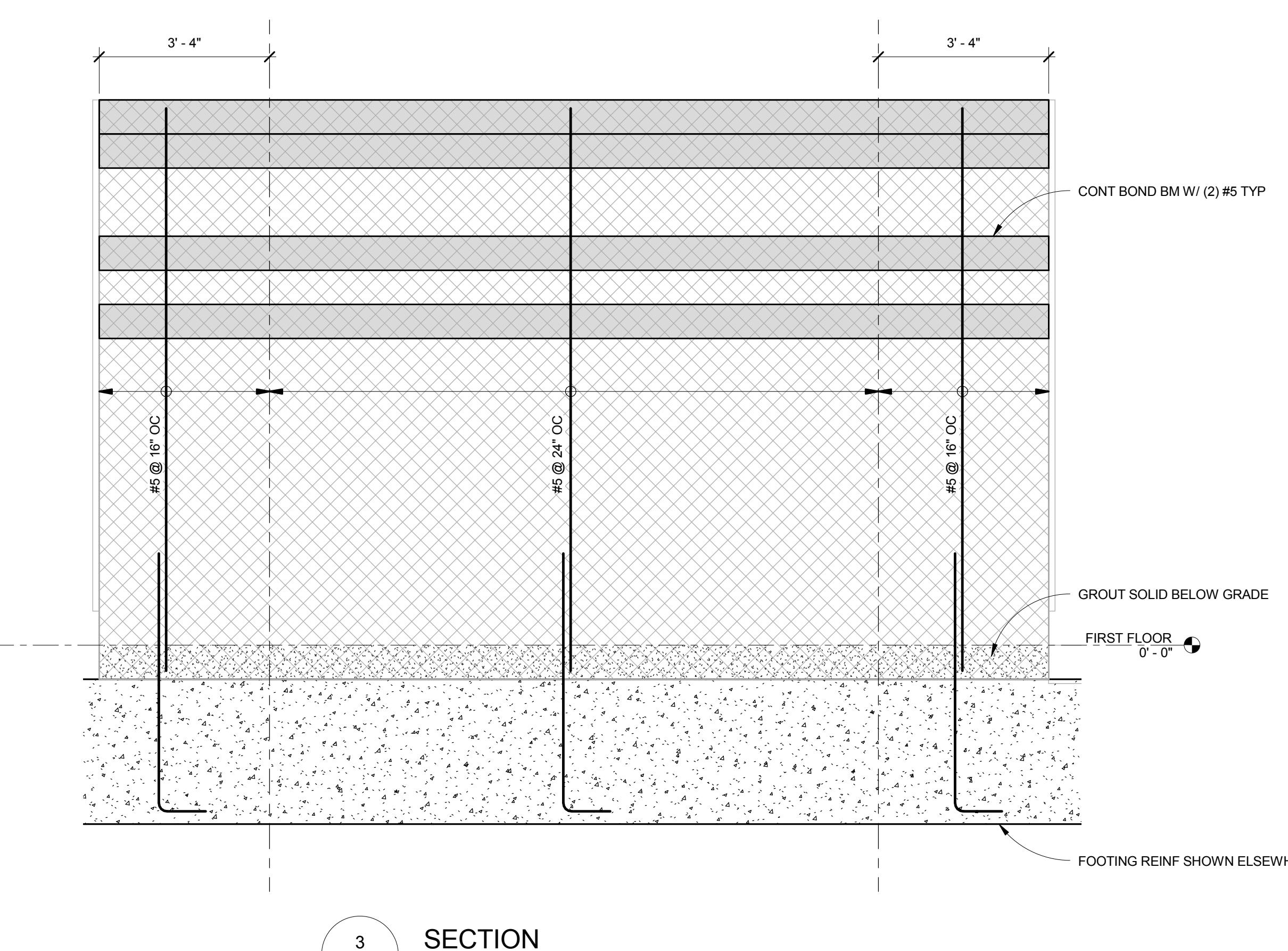
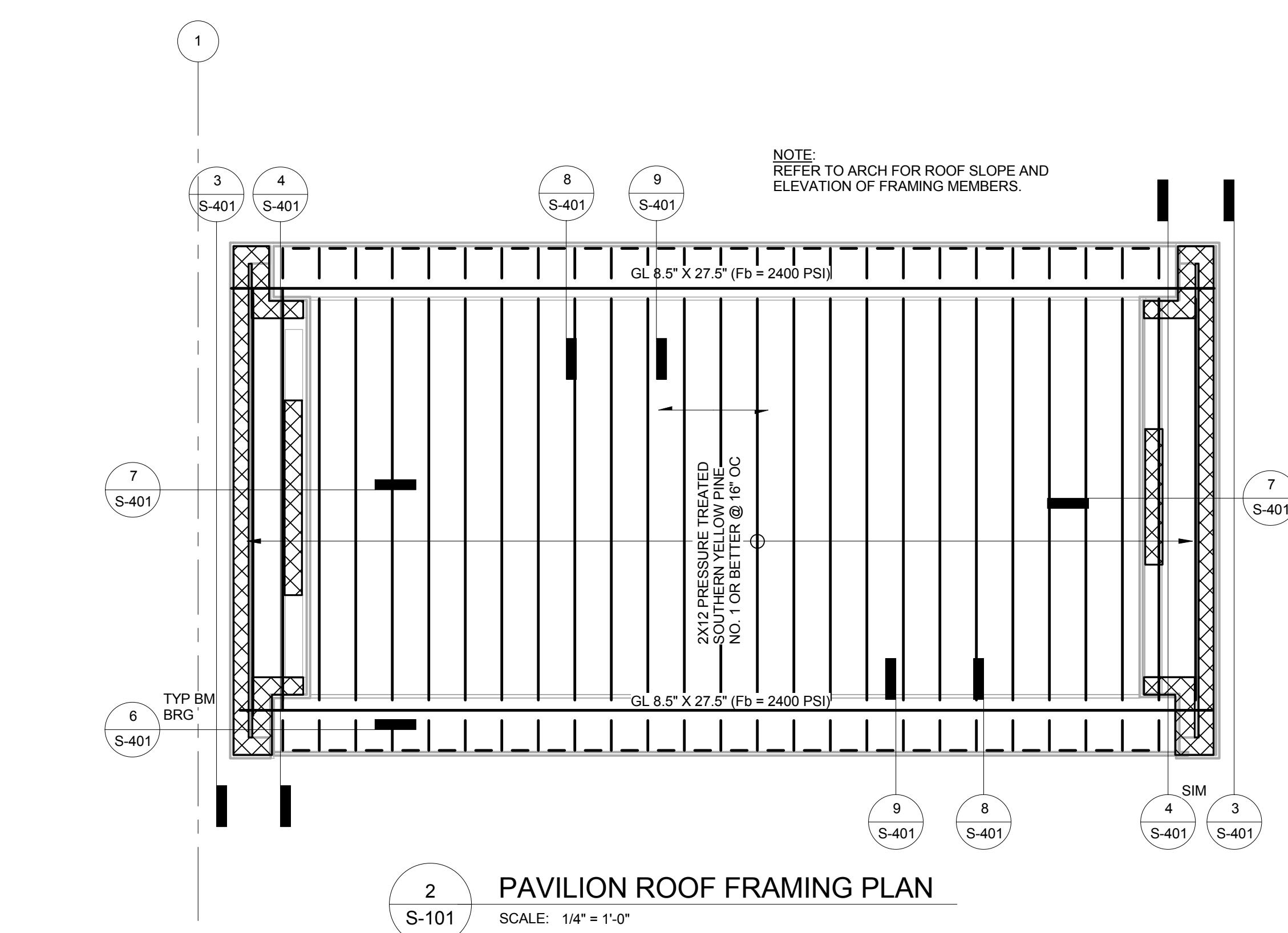
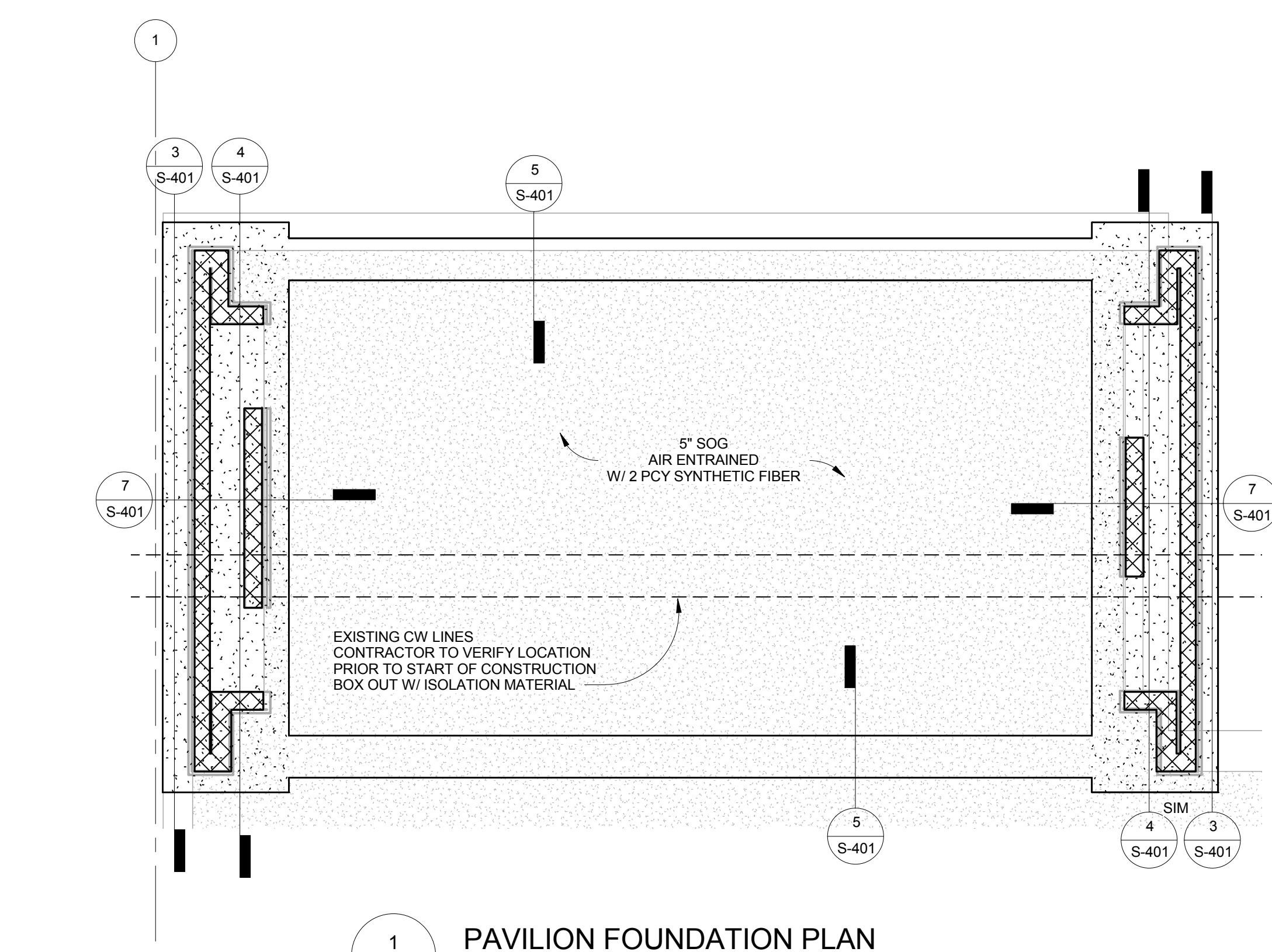
M-AIR Test Facility

Ann Arbor
Michigan 48109-1340
North CampusDate Issued For
12/02/2016 Schematic Design
03/28/2017 CD Review
06/19/2017 Bids
08/25/2017 Construction Set

FOUNDATION PLAN NOTES

NOTES:

1. REFER TO DRAWING S-001 FOR GENERAL NOTES.
REFER TO DRAWING S-002 FOR SPECIAL INSPECTION & TESTING.
2. TYPICAL DETAILS APPLY TO ALL DRAWINGS USE THROUGHOUT EXCEPT WHERE OTHERWISE SHOWN OR NOTED.
3. TYPICAL SLAB ON GRADE - 5" THICK NORMAL WEIGHT CONCRETE REINFORCING: 2 PCY - SHRINKAGE CONTROL SYNTHETIC FIBERS.
4. SLAB ON GRADE CONTROL JOINTS TO OCCUR AT 15' - 0" OC MAX.
5. TOP OF SLAB REFERENCE ELEVATION = 0' - 0" U.O.N.
6. REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL FOR PLUMBER PENETRATIONS OF CONDUIT AND PIPING. COORDINATE LOCATIONS W/ TRADES.
7. REFER TO ARCHITECTURAL FOR SLAB EDGE LOCATIONS.

SECTION
S-401
SCALE: 3/4" = 1'-0"SECTION
S-401
SCALE: 3/4" = 1'-0"SECTION
S-401
SCALE: 3/4" = 1'-0"SECTION
S-401
SCALE: 3/4" = 1'-0"SECTION
S-401
SCALE: 1/2" = 1'-0"SECTION
S-401
SCALE: 3/4" = 1'-0"SECTION
S-401
SCALE: 1/2" = 1'-0"PAVILION ROOF FRAMING PLAN
S-101
SCALE: 1/4" = 1'-0"PAVILION FOUNDATION PLAN
S-101
SCALE: 1/4" = 1'-0"

HED

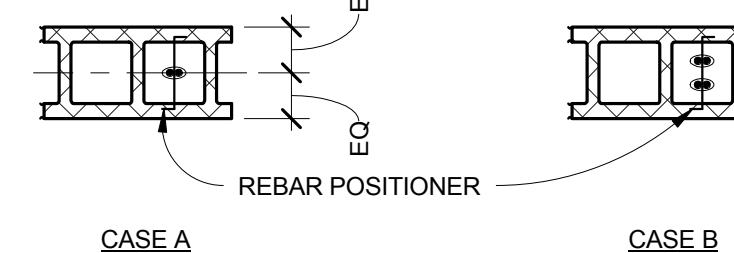
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(248) 262-1500
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2016-01099-000
U OF M PROJECT NO. - P00011963Enlarged Plans &
Details

S-401

TYPICAL SPLICE LENGTHS FOR MASONRY BLOCK - STRENGTH DESIGN														
BLOCK WIDTH	BARS CENTERED - CASE A					BARS EACH FACE - CASE B				VERTICAL BAR SIZE				
	#3	#4	#5	#6	#7	#8	#9	#3	#4	#5	#6	#7	#8	#9
8" BLOCK	14"	18"	22"	38"	52"	72"	*	15"	25"	39"	54"	63"	*	-

SYMBOLS:
 - REINFORCING CONFIGURATION NOT PERMISSIBLE
 MECHANICAL TENSION SPLICE REQD

NOTES:
 1) MECH TENSION SPLICE CAN BE FOR ANY BAR SIZE IF NOT NOTED.
 2) FOR USE WITH: f'm = 2,000 psi & fy = 60,000 psi



14 TYP MASONRY SPLICE LENGTHS

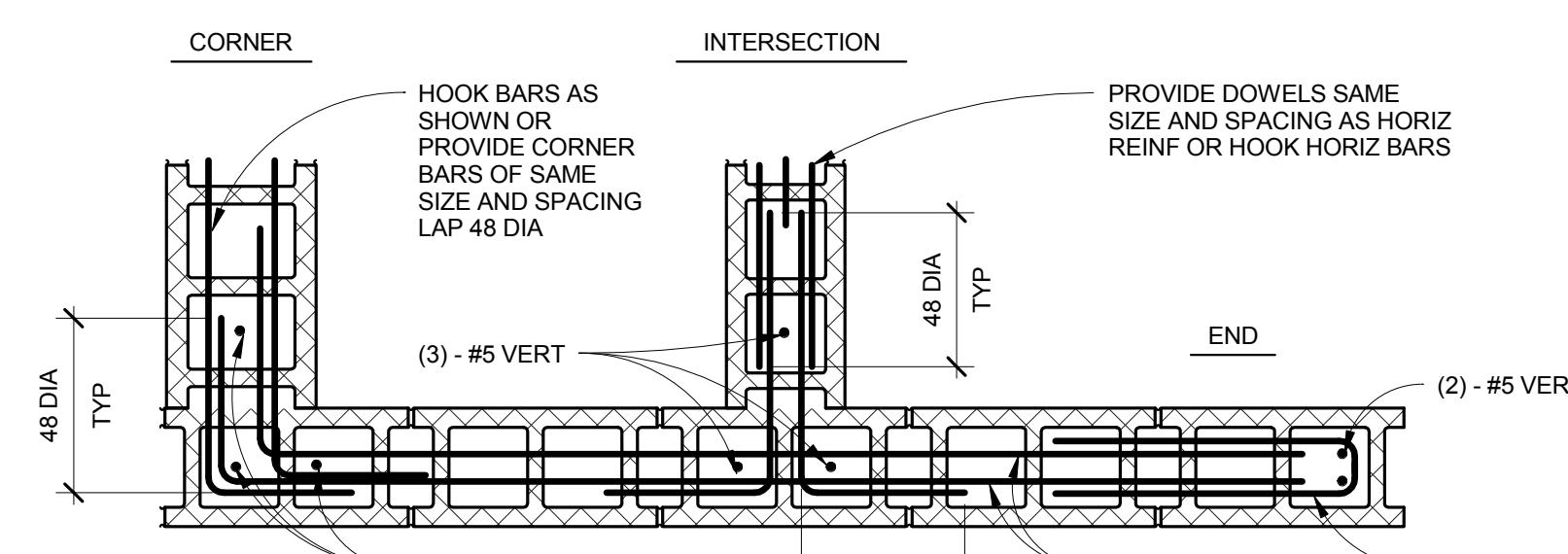
SCALE: N.T.S.

BAR SIZE	BEAM & MAT TOP BARS	BEAM & MAT BARS OTHER THAN TOP BARS	COLUMN & WALL BARS TENSION	COMPRESSION BARS (SEE NOTE #4)
f'c= 3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
3	13"	12"	17"	9"
4	18"	14"	22"	11"
5	22"	17"	26"	14"
6	26"	20"	33"	17"
7	38"	29"	48"	20"
8	43"	33"	55"	22"
9	49"	38"	62"	25"
10	55"	42"	70"	28"
11	61"	47"	78"	31"

NOTES:
 1. BEAM BARS SPACED @ NOT LESS THAN 5 db C/C
 2. COLUMN BARS SPACED @ NOT LESS THAN 5 db C/C
 3. REINFORCING BARS ARE CLASPED AS TOP BARS WHEN MORE THAN 12" OF CONCRETE IS CAST BEneath RESPECTIVE REINFORCING BAR.
 4. COMPRESSION DEVELOPMENT IS PERMISSIBLE ONLY WHEN SPECIFICALLY NOTED ON THE DRAWINGS, DETAILS, OR SCHEDULES.

11 TYP CONCRETE REINFORCING BAR DEVELOPMENT LENGTH (3000 PSI)

SCALE: N.T.S.



13 TYP MASONRY WALL REINFORCEMENT DETAIL (8" BLOCK)

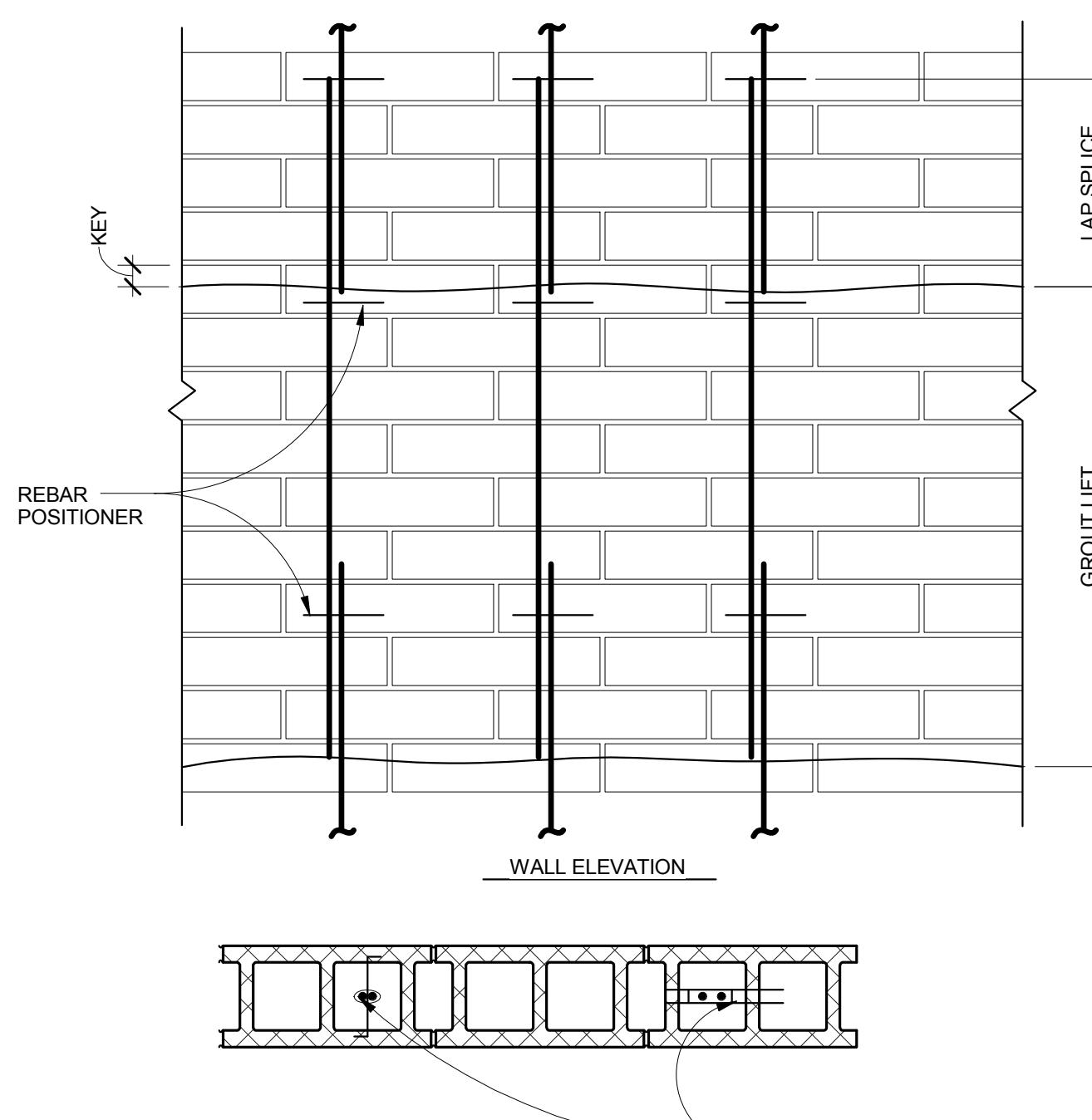
SCALE: N.T.S.

BAR SIZE	EMBEDMENT	90 DEGREE LEG	180 DEGREE LEG	MIN EMBED
f'c= 3000 PSI	3000 PSI	3000 PSI	3000 PSI	3000 PSI
3	8"	5"	2 1/2"	1 1/2"
4	11"	6"	2 1/2"	2"
5	14"	8"	2 1/2"	2 1/2"
6	16"	9"	3"	3"
7	19"	11"	3 1/2"	3 1/2"
8	22"	12"	4"	4"
9	25"	14"	4 1/2"	6"
10	28"	15"	5"	6"
11	31"	17"	6"	7"

NOTES:
 1. CORNERS AND INTERSECTIONS UNLESS OTHERWISE NOTED OR SPECIFIED, AT POINTS WHERE CONCRETE MASONRY WALLS MEET OR INTERSECT, LAY 50% OF UNITS IN MASONRY BOND WITH ALTERNATE UNITS HAVING A BEARING ON NOT LESS THAN 4" ON THE UNIT BELOW.
 2. DOWELS UNLESS OTHERWISE NOTED OR SPECIFIED, PROVIDE DOWELS FROM CONCRETE FOOTING OR WALL BELOW WITH SAME SIZE AND SPACING AS VERTICAL BARS AT LEVEL BELOW. LAP REINFORCING PER SPLICE LENGTH SCHEDULE.

10 TYP CONCRETE REINFORCING BAR STANDARD TENSION HOOK (3000 PSI)

SCALE: N.T.S.



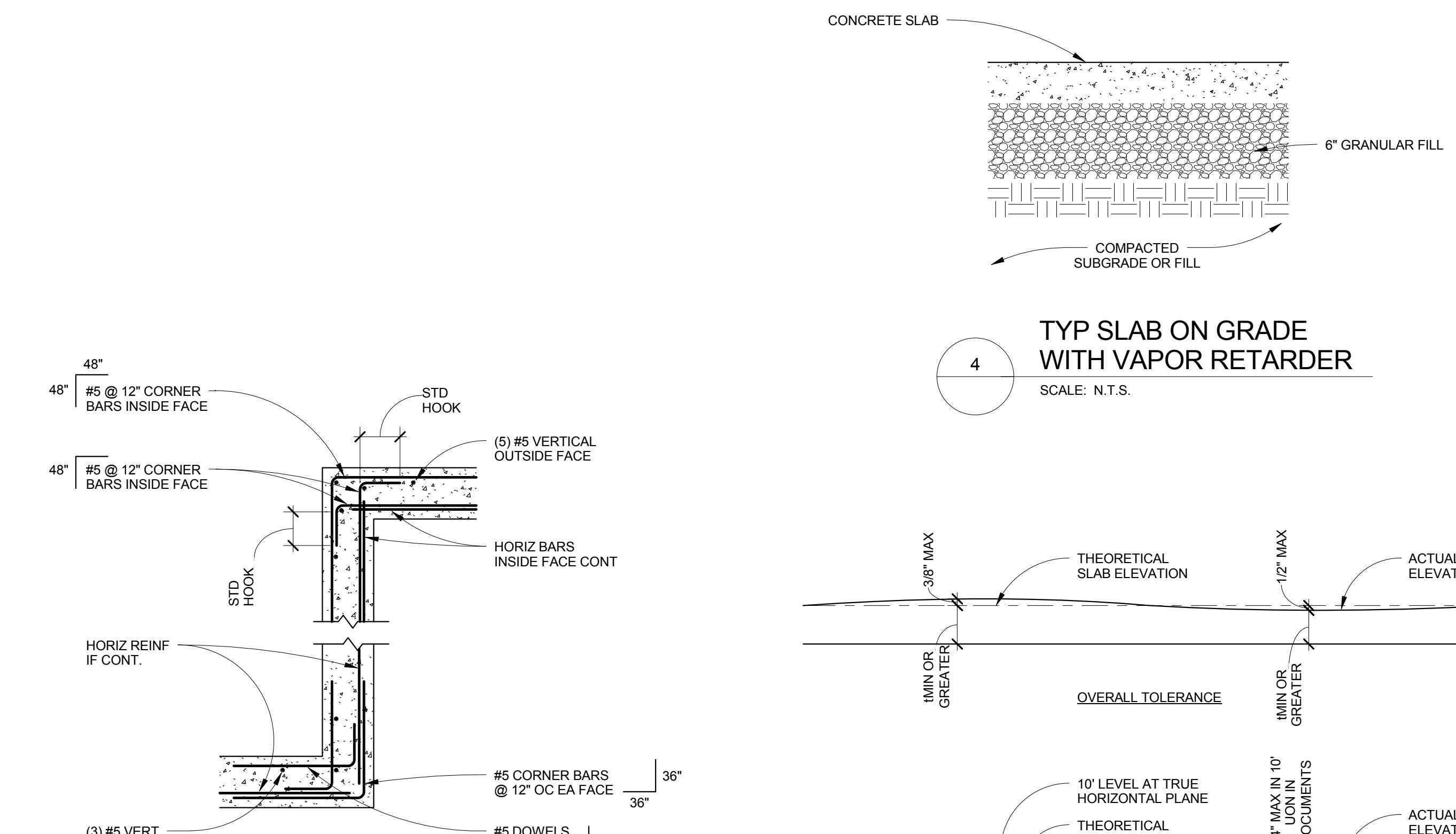
12 TYP REINFORCEMENT MASONRY VERTICAL LAP SPLICING DETAIL

SCALE: N.T.S.

NOTES: USE MECH. TENSION SPLICE FOR 125% TENSILE CAPACITY OF REINFORCEMENT
 1. BEAM BARS SPACED @ NOT LESS THAN 3 db C/C
 2. COLUMN BARS SPACED @ NOT LESS THAN 4 db C/C
 3. REINFORCING BARS ARE CLASPED AS TOP BARS WHEN MORE THAN 12" OF CONCRETE IS CAST BEneath RESPECTIVE REINFORCING BAR.
 4. COMPRESSION SPLICES ARE PERMISSIBLE ONLY WHEN SPECIFICALLY NOTED ON THE DRAWINGS, DETAILS, OR SCHEDULES.
 5. TENSION SPLICES SHALL BE USED IN ALL BEAMS, SLABS, AND WALLS UNLESS OTHERWISE NOTED
 6. WHEN LAPPING LARGER BAR WITH SMALLER BAR, LAP LENGTH OF THE SMALLER BAR SHALL GOVERN RESPECTIVE SPLICE.

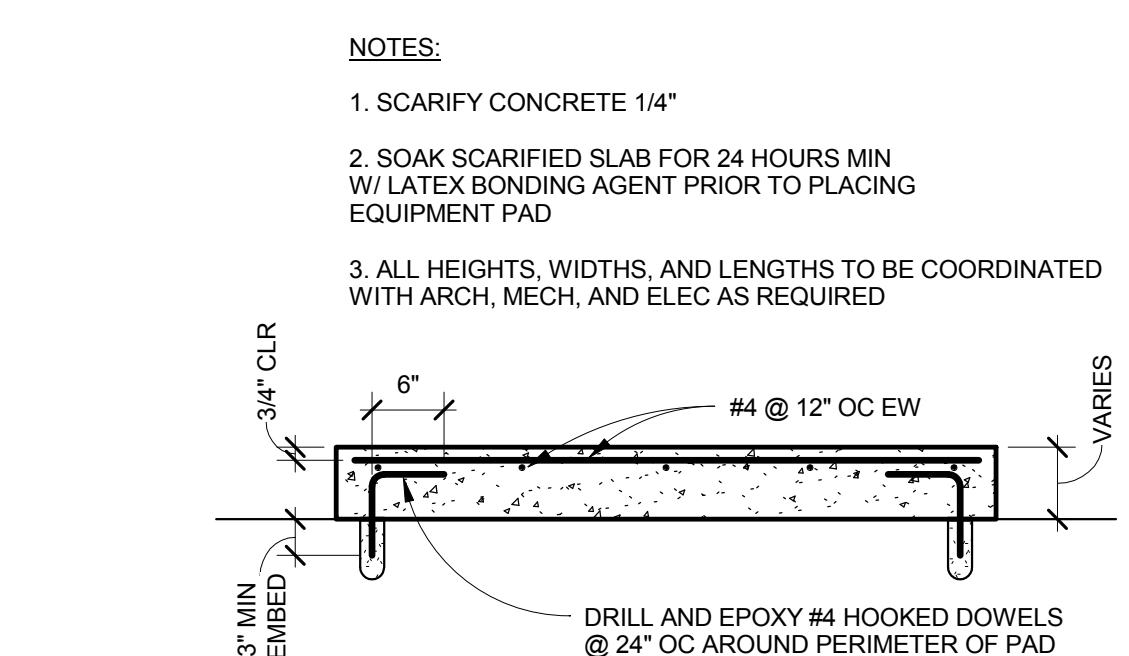
9 TYP CONCRETE REINFORCING BAR LAP SPLICE SCHEDULE (3000 PSI)

SCALE: N.T.S.



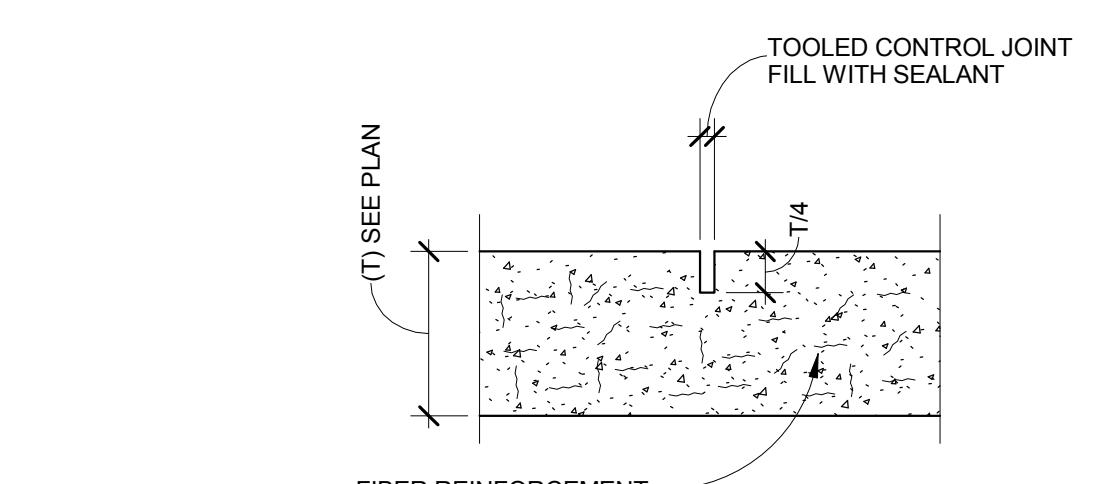
8 TYP DOUBLE LAYER REINFORCING AT CORNERS

SCALE: N.T.S.



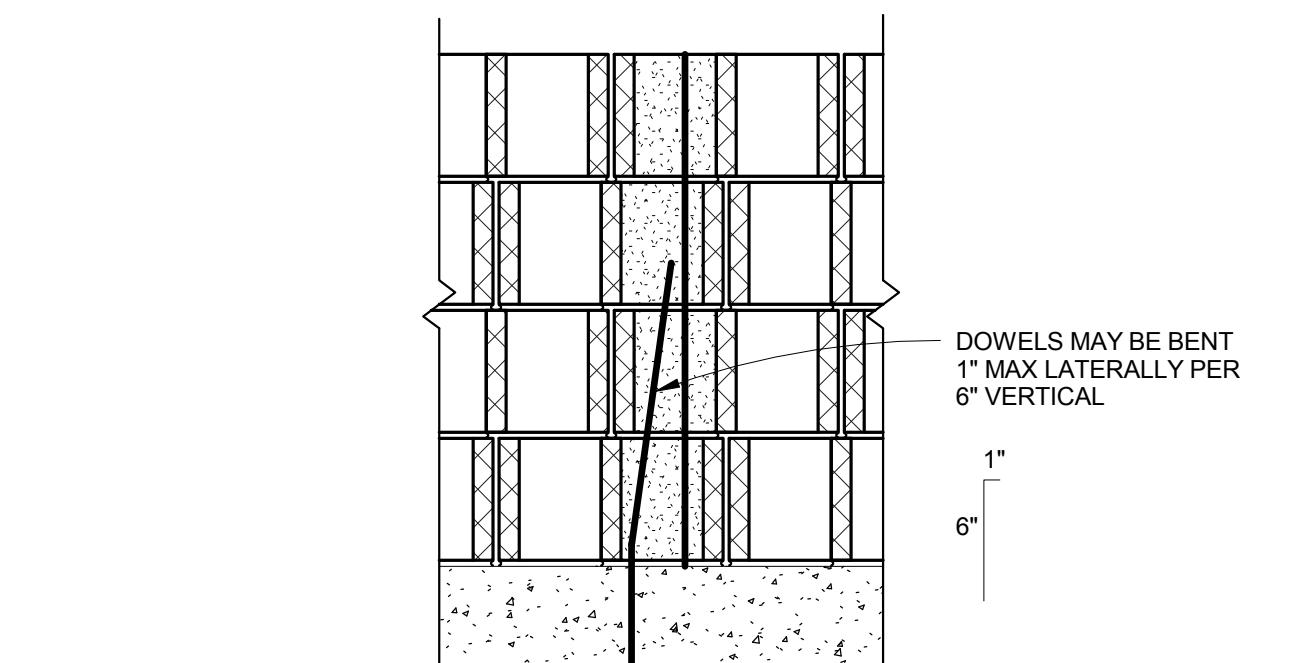
7 TYP CONCRETE EQUIPMENT PAD

SCALE: N.T.S.



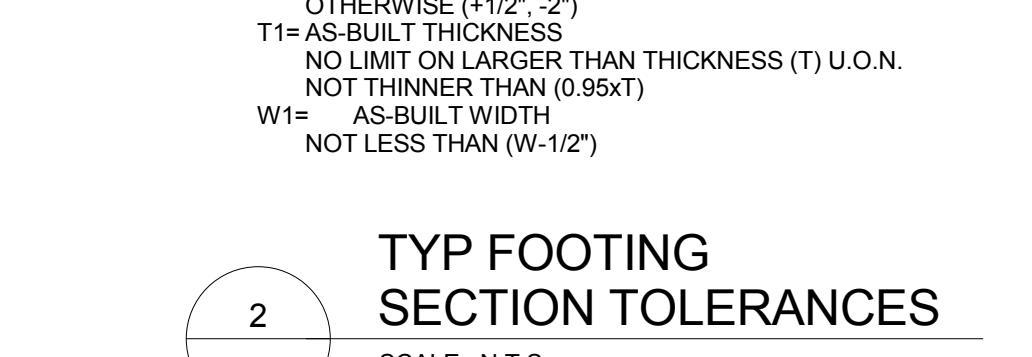
6 TYP CONTROL JOINT SLAB ON GRADE

SCALE: N.T.S.



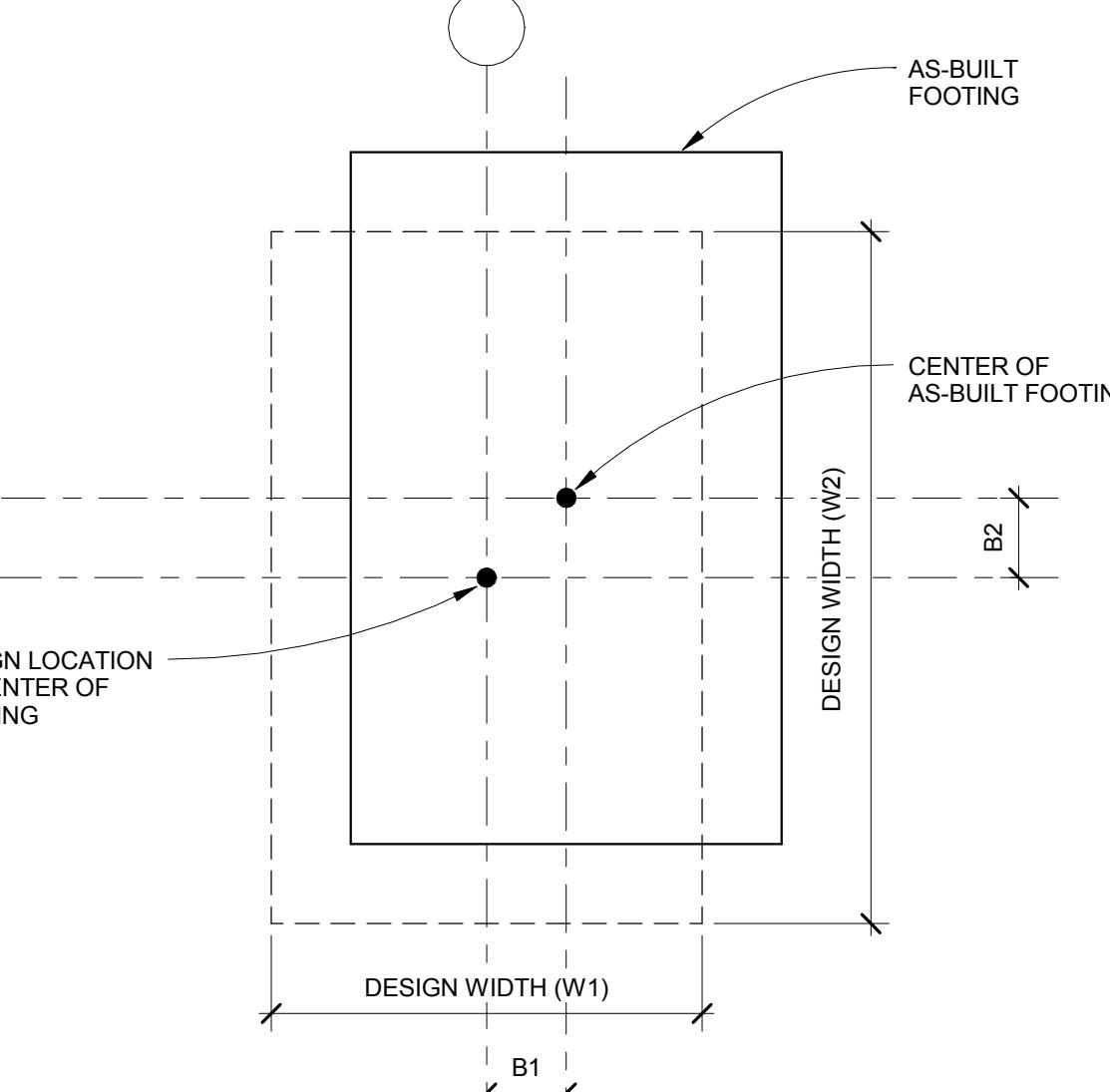
5 TYP MASONRY DOWEL POSITION TOLERANCE

SCALE: N.T.S.



2 TYP FOOTING SECTION TOLERANCES

SCALE: N.T.S.



1 TYP SPREAD FOOTING PLAN TOLERANCE

SCALE: N.T.S.

LUMINAIRE SYMBOLS

(REFER TO LUMINAIRE SCHEDULE)

STRIP LUMINAIRE - LENGTH AS INDICATED - RECESSED OR SURFACE MOUNTED (NORMAL POWER)

4' OR 8' STRIP LUMINAIRE - CEILING SURFACE OR COVE MOUNTED - EMERGENCY

● LUMINAIRE - CEILING RECESSED OR SURFACE MOUNTED (NORMAL POWER)

● LUMINAIRE - CEILING RECESSED OR SURFACE MOUNTED - NIGHT LIGHT/EMERGENCY

● EXIT LUMINAIRE - SHADING INDICATES ILLUMINATED FACE

SWITCHES AND SENSORS

\$ SINGLE POLE SWITCH

\$ DIMMER SWITCH, DIMMING SWITCH SHALL BE EQUIPPED WITH A COMPATIBLE DIMMING BALLAST/DRIVER

◊ ROOM OCCUPANCY SENSOR - CEILING MOUNTED, DUAL TECHNOLOGY, 360° COVERAGE (BASIS OF DESIGN - WATTSTOPPER DT-300)

RECEPTACLE SYMBOLS - WALL MOUNTED

Φ X 20A 120V 2P 3W DUPLEX CONVENIENCE RECEPTACLE - GROUNDED

Φ X MULT-OUTLET RACEWAY SYSTEM (DEVICES AS INDICATED)

TYPICAL NOTATIONS

a SWITCHED OUTLET, "a" - INDICATES SWITCH CONTROL

C MOUNTED 10" ABOVE COUNTER OR 42" AFF. COORDINATE EXACT MOUNTING

CLG HORIZONTAL MOUNTED

E CEILING MOUNTED

EM EMERGENCY

GFCI GROUND FAULT CIRCUIT INTERRUPTER, PERSONAL PROTECTION

H HORIZONTALLY MOUNTED

W WALL MOUNTED DEVICE AT 48" AFF UNLESS OTHERWISE INDICATED

WP WALL MOUNTED RECEPTACLE WITH TRAIL LISTED COVERPLATE FOR WET LOCATION WITH PLUG INSTALLED, MTD 48" AFF UNLESS OTHERWISE INDICATED

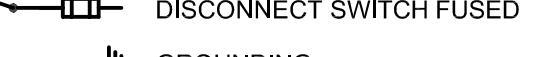
U ONE CONVENIENCE RECEPTACLE AND TWO USB OUTLETS

+ XX DIMENSIONED HEIGHT

LOH LOCK ON HANDLE

RISER DIAGRAM SYMBOLS

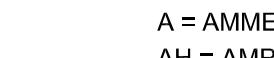
CIRCUIT BREAKER



DISCONNECT SWITCH UNFUSED



DISCONNECT SWITCH FUSED



GROUNDING



PANELBOARD

A = AMPMETER

AH = AMPERE-HOUR

PF = POWER FACTOR

V = VOLT

W = WATT

WH = WATT-HOUR

POWER DISTRIBUTION SYMBOLS

	TRANSFORMER
	RECEPTACLE PANEL OR LIGHTING PANEL
	POWER PANEL OR DISTRIBUTION PANEL
	RECEPTACLE PANEL OR LIGHTING PANEL ON EMERGENCY POWER
	POWER PANEL OR DISTRIBUTION PANEL ON EMERGENCY POWER
	DISCONNECT SWITCH - NON FUSED, XXA INDICATED AMPEREAGE
	DISCONNECT SWITCH - FUSED, XXAF INDICATES AMPEREAGE RATING, XXAF INDICATES FUSE SIZE
	ENCLOSED CIRCUIT BREAKER - XXAF INDICATES BREAKER FRAME SIZE, XXAT INDICATES BREAKER TRIP SIZE

GROUNDING SYMBOLS

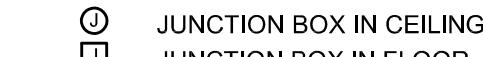
GROUND ROD



GROUND WIRE



CADWELD CONNECTION



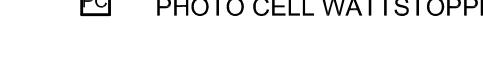
BUILDING GROUND MAT

MISCELLANEOUS SYMBOLS

JUNCTION BOX IN CEILING OR WALL



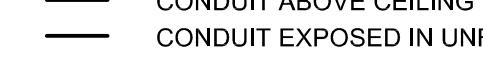
JUNCTION BOX IN FLOOR



PULLBOX



RELAY



CONTACTOR

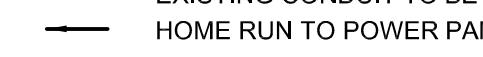


PHOTO CELL WATTSTOPPER LS-30

CONDUCTOR SYMBOLS

	CONDUIT ABOVE CEILING OR IN WALL IN FINISHED AREAS
	CONDUIT EXPOSED IN UNFINISHED AREAS
	CONDUIT IN FLOOR OR BELOW GRADE
	EXISTING CONDUIT TO BE REMOVED
	HOME RUN TO POWER PANEL OR MCC
	CONDUIT DOWN
	CONDUIT UP
	BREAK SYMBOL
	CONDUIT STUB TERMINATE WITH BUSHING
	NEW EQUIPMENT OR WORK
	EXISTING TO REMAIN
	RE-INSTALL PREVIOUSLY REMOVED DEVICE
	EXISTING DEVICE TO REMAIN

TELEPHONE AND DATA SYMBOLS

▲ TELEDATA OUTLET - 4x4x2-1/8" OUTLET BOX WITH SINGLE GANG TRIM RING & 1 1/4"C TO TELECOMMUNICATION CABINET

SECURITY SYSTEM SYMBOLS

□ FUTURE CCTV CAMERA "WP" INDICATES WEATHER PROOF, AND 4X4X2-1/8" OUTLET BOX WITH SINGLE GANG TRIM RING & 1 1/4"C, FLUSH TO FINISH SURFACE TO TELECOMMUNICATION CABINET, ALL SECURITY CAMERA AND EQUIPMENT BY OWNER, PROVIDE A WEATHERPROOF COVER PLATE.

PROJECT NAME		BY	PROJECT NO	SHT
UNIVERSITY OF MICHIGAN M-AIR LAB	DESIGNATION	DATE	2016-01099	OF
	LOCATION	RATING	MAIN	
DPL2-B539	RM B-539	277480V, 3PH, 4W+G	400A MLO	
POSITION	BREAKER	ITEM	EQUIPMENT RATING	CONN LOAD*
1	300 A/3P	TRANSF. T2-8539 (DPL2-B539)	EX	282 KVA 0.5 141 KVA
2	125 A/3P	VSD DRIVE 8539 200A SAFETY SW.	EX	62 KVA 0.5 31 KVA
3		SPACE	EX	
4	100 A/3P	LP2-1538E (LP-B)	EX	50 KVA 0.5 25 KVA
5	100 A/3P	LP2-8538E (LP-A)	EX	50 KVA 0.5 25 KVA
6	100 A/3P	ELEV.	EX	50 KVA 0.5 25 KVA
7	100 A/3P	LP2-2538E (LP-C)	EX	50 KVA 0.5 25 KVA
8	90 A/3P	LASER RM. 2543	EX	45 KVA 0.5 22 KVA
9	20 A/3P	EM LIGHT SIGNAL B539	EX	10 KVA 0.5 5 KVA
10	20 A/3P	CH. WATER & HEAT EX	EX	10 KVA 0.5 5 KVA
11	3P	SPACE	EX	
12				

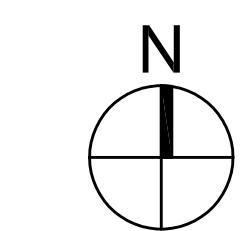
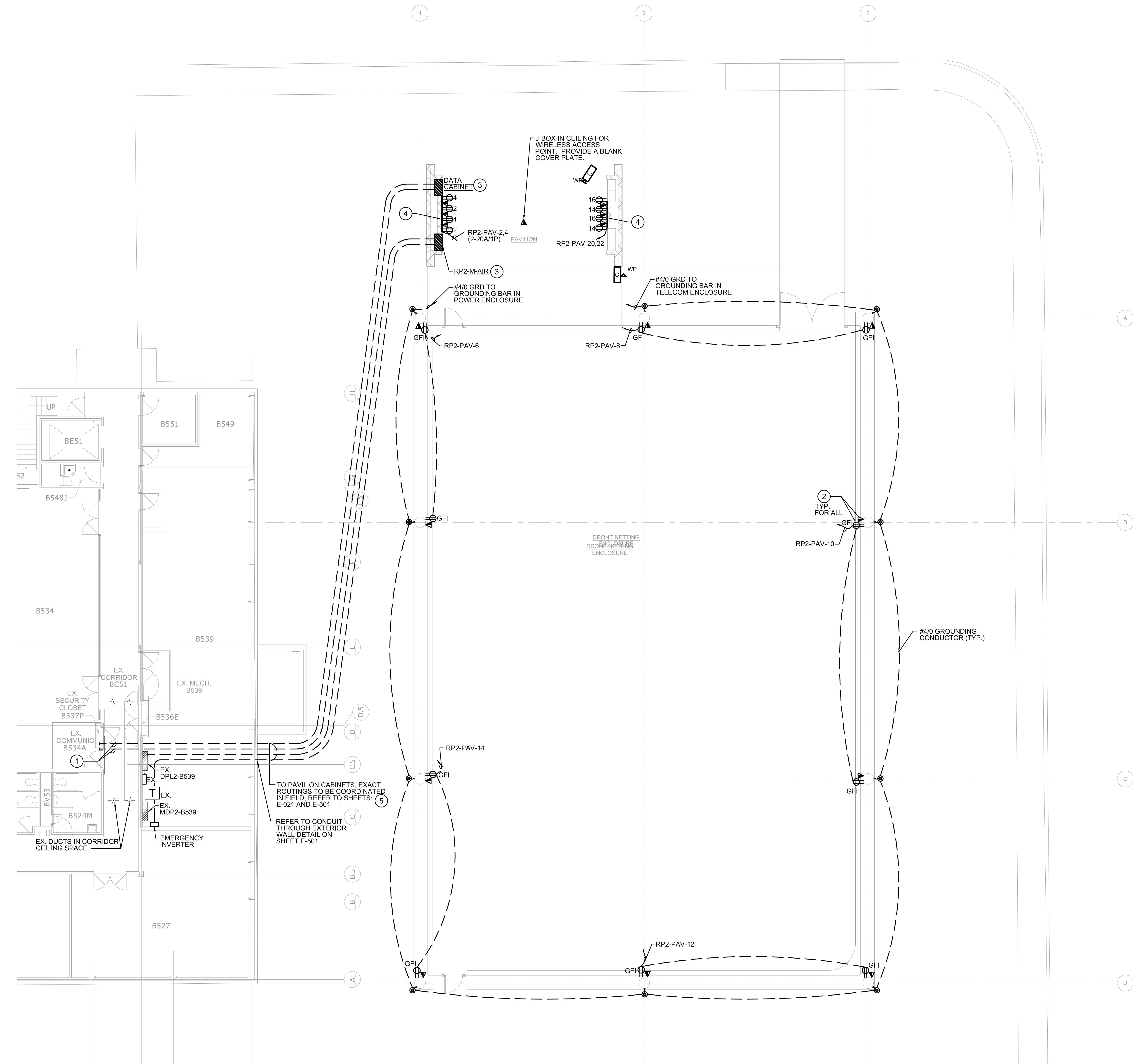
* LOADS INDICATED ARE ESTIMATED

SUB TOTALS 608 KVA 304 KVA

TOTAL CONNECTED LOAD 733 AMPS

TOTAL EST. DEMAND LOAD 368 AMPS

RP-2 PAV		VOLTS		LOCATION		MAINS		ISSUED FOR		A.I.C. RATING	
200		120		Ø 1 WIRE		225 A/3P MCB		NEUTRAL RATING 1		1000	
3 / 4		Ø 3 WIRE		30		100%		FED FROM:		MOUNTING: SURFACE	
BRANCH		VA		BRANCH		BRANCH		BRANCH		POLE NO.	
NO		POLE		BREAKER		ØA		ØB		ØC	
1		1 20		L		LIGHTING PAVILION		800		RACEWAY REC	
3		1 20		L		LIGHTING ENCLOSURE		800		RACEWAY REC	
5		1 20		L		LIGHTING ENCLOSURE		1050		REC. ENCLOSURE	
7		1 20		L		LIGHTING ENCLOSURE		800		REC. ENCLOSURE	
9		1 20		L		LIGHTING ENCLOSURE		1050		REC. ENCLOSURE	
11		1 20		L		LIGHTING ENCLOSURE		800		REC. ENCLOSURE	
13		1 20		L		LIGHTING ENCLOSURE		1050		REC. ENCLOSURE	
15		1 20		L		LIGHTING ENCLOSURE					



ELECTRICAL POWER COMPOSITE FLOOR PLAN

SCALE: 1/8" = 1'-0"

POWER GENERAL NOTES:

1. LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT TO REMAIN. HEAVY LINE WEIGHT INDICATES NEW ELECTRICAL EQUIPMENT.
2. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR WITHIN THE RACEWAY, ALONG WITH THE PHASE CONDUCTORS FOR ALL FEEDERS AND BRANCH CIRCUITS.
3. ALL BRANCH CIRCUITS SHALL CONSIST OF A MINIMUM OF 2#12 AND 1#12 GROUND IN 3/4" CONDUIT TO A 20A-1P CIRCUIT BREAKER UNLESS OTHERWISE INDICATED.
4. PROVIDE CONDUIT BUSHINGS AND PULL STRINGS IN ALL EMPTY CONDUITS.
5. PROVIDE NEW PERMANENT MECHANICALLY FASTENED EQUIPMENT TAGS FOR BOTH NEW AND EXISTING EQUIPMENT. REFER TO SPECIFICATIONS FOR ITEMS TO BE TAGGED.
6. WHERE CONDUITS PENETRATE FIRE WALLS, THE WALLS SHALL BE SEALED TO EQUAL OR GREATER THAN THE ORIGINAL FIRE RATING OF THE WALL.
7. PROVIDE A SEPARATE DEDICATED NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT PHASE CONDUCTOR, UNLESS OTHERWISE INDICATED.
8. PROVIDE FIRE PROOFING FOR ALL PENETRATIONS TO MAINTAIN THE RATINGS OF THE NEW AND EXISTING ASSEMBLIES.



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03/28/2017 CD Review
06/19/2017 Bids
08/25/2017 Construction Set

POWER KEY NOTES:

- ① RUN NEW CONDUITS ABOVE EXISTING DUCTWORK IN CORRIDOR, COORDINATE IN FIELD EXACT ROUTING. CORRIDOR WALLS ARE 2HR FIRE RATED. REFER TO GENERAL NOTE-6 THIS SHEET.
- ② PROVIDE WP TELECOMM DEVICE AND WP/GFCI DUPLEX RECEPTACLE, MOUNT DEVICES ON COLUMNS AT 36" ABOVE FINISHED GRADE ON THE EXTERIOR SIDE OF THE NET, TYPICAL FOR ALL, REFER TO DETAIL ON SHEET E-501.
- ③ POWER AND COMMUNICATIONS CABINETS, REFER TO DETAILS ON SHEET E-501.
- ④ PROVIDE TWO COMPARTMENT RACEWAY, 6" WIDE, 2 1/4" DEEP AND LENGTH AS INDICATED ON THE ARCHITECTURAL ELEVATIONS, INSTALLED FLUSH, POWER AND DATA COMPARTMENT WITH 2 1/4" C FOR POWER TO RP2-PAV AND 2 1/2" C FOR DATA TO COMMUNICATIONS CABINET.
- ⑤ EXCAVATION FOR UNDERGROUND CONDUITS FROM SR8 TO PAVILION TO BE VERIFIED FOR EXISTING UNDERGROUND SERVICES AND LANDSCAPING, COORDINATE WITH ARCHITECT.



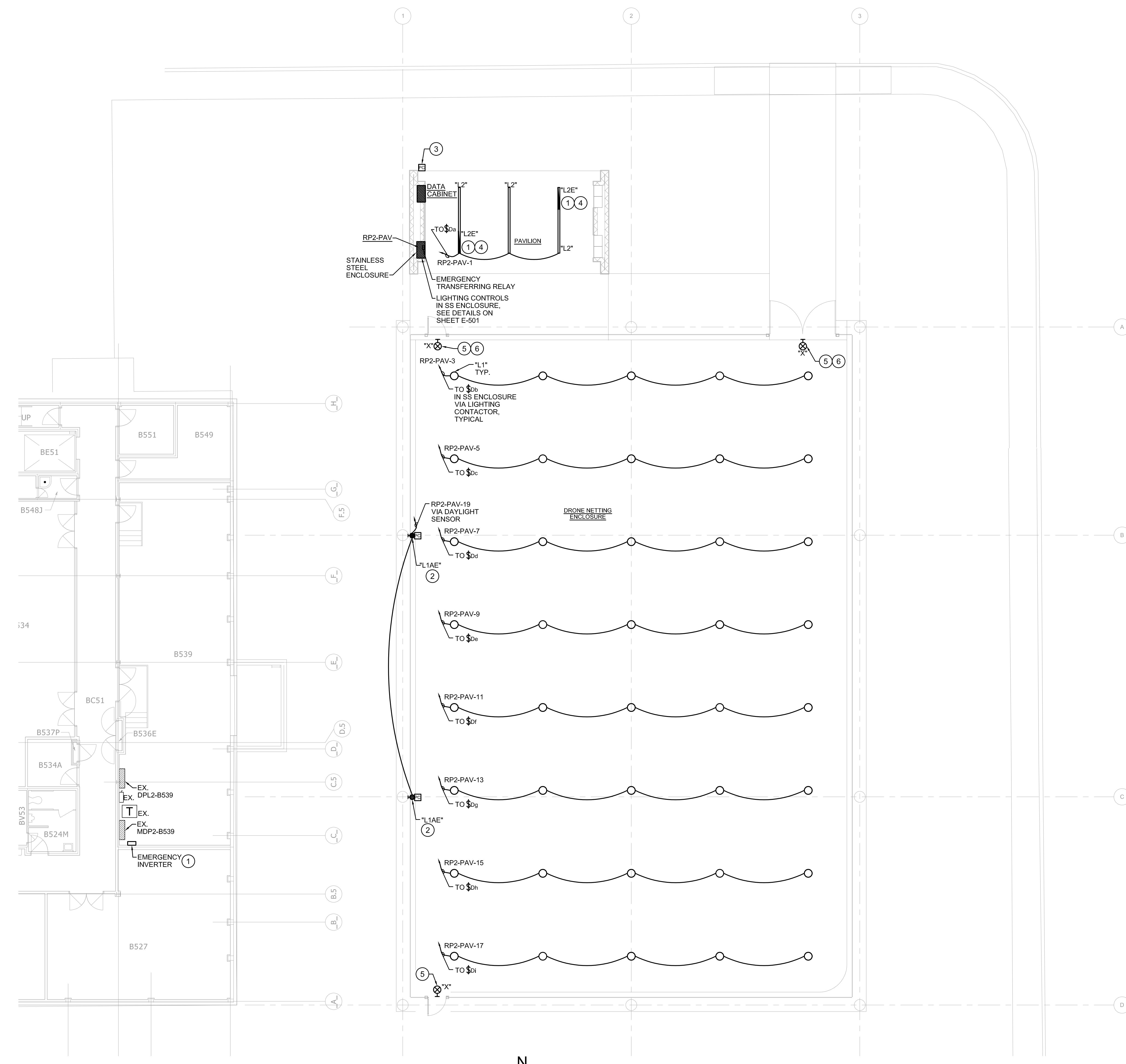
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Electrical Power
Composite Floor
Plan

EP-101



N
ELECTRICAL LIGHTING PLAN
SCALE: 1/8" = 1'-0"

LIGHTING GENERAL NOTES:

1. LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT TO REMAIN. HEAVY LINE WEIGHT INDICATES NEW ELECTRICAL EQUIPMENT.
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATION OF LIGHTING FIXTURES PRIOR TO INSTALLATION. COORDINATE ALL CEILING TRIMS AND MOUNTING HARDWARE WITH ARCHITECTURAL AND STRUCTURAL TRADES.
3. ALL LIGHT FIXTURES ARE TYPE 'L1' UNLESS OTHERWISE INDICATED.
4. PROVIDE FIRE PROOFING FOR ALL PENETRATIONS TO MAINTAIN THE RATINGS OF THE NEW AND EXISTING ASSEMBLIES.



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08/25/2017 Construction Set

LIGHTING KEY NOTES:

- ① PROVIDE INVERTER FOR EMERGENCY LIGHTING FIXTURES TO OPERATE SELECTED LIGHTING FIXTURES ON LOCAL ON/OFF, DIMMING AND DAYLIGHT SENSOR CONTROL, UL 924 LISTED, DUAL VOLTAGE, 120/277V INPUT/OUTPUT, 400VA, SURFACE REMOTE MOUNTING, PHILIPS BODINE ELS-400 OR SIMILAR BY IOTA.
- ② FULLY SHADED LIGHTING FIXTURES ARE MOUNTED ON STEEL POLE AT 10'-0" AFG, WIRED TO THE EMERGENCY TRANSFERRING RELAY AND EMERGENCY INVERTER, AND DAYLIGHT SENSOR CONTROL, NORMALLY OFF; ONLY TO TURN ON WHEN LOSS OF POWER AND THE DAYLIGHT SENSOR TURNS THEM ON, PROVIDE LOCK-ON HANDLE FOR BRANCH BREAKER IN RP2-PAV.
- ③ PROVIDE DAYLIGHT SENSOR/PHOTOCELL MOUNTED ON ROOF, AWAY FROM ARTIFICIAL LIGHTING.
- ④ HALF SHADED EMERGENCY LIGHTING FIXTURES TO BE WIRED TO THE TRANSFERRING RELAY, CONNECTED TO THE NORMAL POWER BRANCH CIRCUIT AND THE INVERTER OUTPUT. FIXTURES TO BE CONTROLLED AS THE NORMAL LIGHTING IN THE AREA.
- ⑤ EXIT SIGNS TO BE WIRED TO THE EMERGENCY INVERTER BRANCH CIRCUIT, CONTINUOUSLY ON, AHEAD OF LOCAL AND AUTOMATIC LIGHTING CONTROLS.
- ⑥ COORDINATE WITH ARCHITECT FOR EXACT LOCATION OF PEDESTRIAN GATE OPENING FOR EXIT SIGN.

LUMINAIRE SCHEDULE			
NOTE 1: PROVIDE ALL MOUNTING HARDWARE FOR THE TYPE OF INSTALLATION AS REQUIRED.			
NOTE 2: ALL LUMINAIRES MUST BE APPROVED THROUGH LOCAL DISTRIBUTION HOUSE AND HAVE LOCAL MANUFACTURER REPRESENTATIVE SUPPORT.			
NOTE 3: ALL LUMINAIRES SHALL BE PROVIDED WITH LAMP AND BALLAST/DRIVER AS SPECIFIED.			
NOTE 4: REFER TO SPECIFICATION SECTION 265100 FOR ADDITIONAL REQUIREMENTS.			
TYPE		LAMP AND BALLAST	MAX WATTS
'L1'	LED SURFACE MOUNTED 17 1/4" DIA LIGHTING FIXTURE, OUTDOOR WET LOCATION AND LOW TEMPERATURE RATED, DIE-CAST ALUMINUM HOUSING, SEALED, CLEAR TEMPERED GLASS, HIGH OUTPUT, FLOOD DISTRIBUTION, WIRE GUARD, BLACK FINISH, 0-10V DIMMING, PROVIDE CATENARY CABLE MOUNTING SYSTEM TO SUPPORT APPROXIMATE FIXTURE WEIGHT OF 45LBS FOR EACH LIGHTING FIXTURE, COLOR: WHITE, APPROVED EQUAL, LUMENPULSE LUMENBEAM	4000K 10166 LUMENS	205W
'L1AE'	SIZE AS TYPE 'L1' EXCEPT MOUNTED ON THE STEEL POLE, MEDIUM SIZE, 16" WIDE, FLOOD DISTRIBUTION, WIRE GUARD, BLACK FINISH, 28W AND WIRED TO THE EMERGENCY INVERTER, NON-DIMMING, PROVIDE SHORT YOKE, BACK PLATE AND STRAPS AROUND THE POLE FOR MOUNTING, LUMENPULSE 'LUMENBEAM MEDIUM' #LBM-120-40K-FL-LSH-BK-N0-SY SERIES OR APPROVED EQUAL.	4000K 1428 LUMENS	28W
'L2'	LED RECESSED MOUNTED 4" WIDTH AND 16' LONG LIGHTING FIXTURE, DAMP LOCATION AND COLD TEMPERATURE RATED, PROGRAMMABLE OUTPUT, OPAL FLUSH LENS, DIRECT DISTRIBUTION, SINGLE CIRCUIT, 120-277V INTEGRAL DIMMING DRIVER, COLD TEMPERATURE RATED, ZUMTOBEL SLOLIGHT LED II #SLDR-4 SERIES OR APPROVED EQUAL.	4000K 850 LM/FT	19W/FT
'L2E'	SAME AS TYPE 'L1' EXCEPT 4FT SECTION WIRED TO THE EMERGENCY TRANSFER RELAY AND INVERTER	4000K 850 LM/FT	19W/FT
X*	UNIVERSAL MOUNTING EXIT LIGHT, OUTDOOR WET LOCATION RATED, IMPACT RESISTANT, LOW TEMPERATURE RATED, SINGLE FACE, LITHONIA AWLTE-GY-1-R-TIP OR APPROVED EQUAL.	RED LED	3W

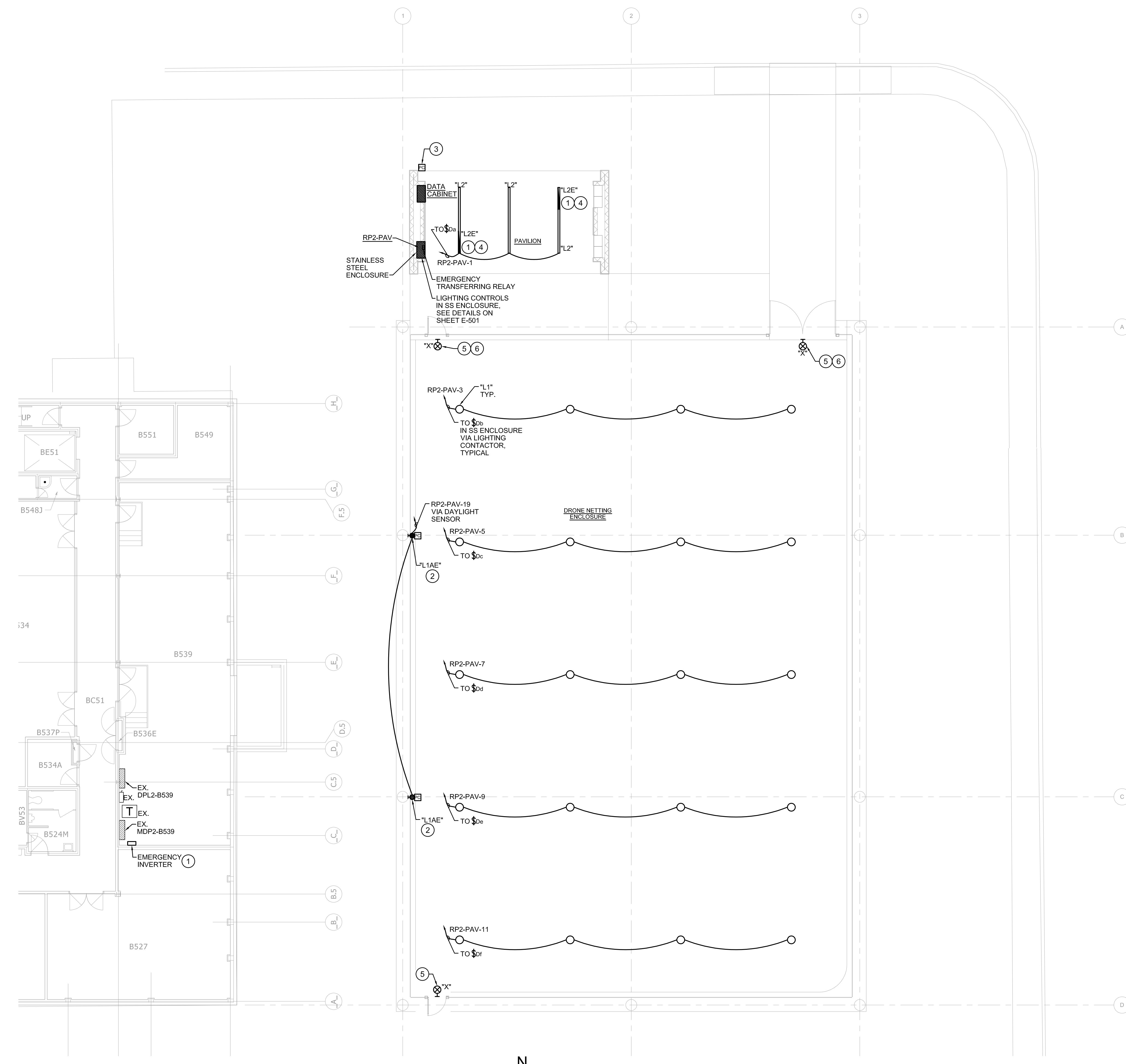
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Electrical Lighting
Plan

EL-101



LIGHTING GENERAL NOTES:

1. LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT TO REMAIN. HEAVY LINE WEIGHT INDICATES NEW ELECTRICAL EQUIPMENT.
2. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS FOR EXACT LOCATION OF LIGHTING FIXTURES PRIOR TO INSTALLATION. COORDINATE ALL CEILING TRIMS AND MOUNTING HARDWARE WITH ARCHITECTURAL AND STRUCTURAL TRADES.
3. ALL LIGHT FIXTURES ARE TYPE 'L1' UNLESS OTHERWISE INDICATED.
4. PROVIDE FIRE PROOFING FOR ALL PENETRATIONS TO MAINTAIN THE RATINGS OF THE NEW AND EXISTING ASSEMBLIES.



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08/25/2017 Construction Set

LIGHTING KEY NOTES:

- ① PROVIDE INVERTER FOR EMERGENCY LIGHTING FIXTURES TO OPERATE SELECTED LIGHTING FIXTURES ON LOCAL ON/OFF, DIMMING AND DAYLIGHT SENSOR CONTROL, UL 924 LISTED, DUAL VOLTAGE 120/277V INPUT/OUTPUT, 400VA, SURFACE REMOTE MOUNTING, PHILIPS BODINE ELS-400 OR SIMILAR BY IOTA.
- ② FULLY SHADED LIGHTING FIXTURES ARE MOUNTED ON STEEL POLE AT 10'-0" AFG, WIRED TO THE EMERGENCY TRANSFERRING RELAY AND EMERGENCY INVERTER, AND DAYLIGHT SENSOR CONTROL, NORMALLY OFF; ONLY TO TURN ON WHEN LOSS OF POWER AND THE DAYLIGHT SENSOR TURNS THEM ON, PROVIDE LOCK-ON HANDLE FOR BRANCH BREAKER IN RP2-PAV.
- ③ PROVIDE DAYLIGHT SENSOR/PHOTOCELL MOUNTED ON ROOF, FACING NORTH, AWAY FROM ARTIFICIAL LIGHTING.
- ④ HALF SHADED EMERGENCY LIGHTING FIXTURES TO BE WIRED TO THE TRANSFERRING RELAY, CONNECTED TO THE NORMAL POWER BRANCH CIRCUIT AND THE INVERTER OUTPUT, FIXTURES TO BE CONTROLLED AS THE NORMAL LIGHTING IN THE AREA.
- ⑤ EXIT SIGNS TO BE WIRED TO THE EMERGENCY INVERTER BRANCH CIRCUIT, CONTINUOUSLY ON, AHEAD OF LOCAL AND AUTOMATIC LIGHTING CONTROLS.
- ⑥ COORDINATE WITH ARCHITECT FOR EXACT LOCATION OF PEDESTRIAN GATE OPENING FOR EXIT SIGN.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	LAMP AND BALLAST	MAX WATTS
"L1"	LED SURFACE MOUNTED 17 1/4" Dia LIGHTING FIXTURE, OUTDOOR WET LOCATION AND LOW TEMPERATURE RATED, DIE-CAST ALUMINUM HOUSING, SEALED, CLEAR TEMPERED GLASS, HIGH OUTPUT, FLOOD DISTRIBUTION, WIRE GUARD, BLACK FINISH, 0-10V DIMMING. PROVIDE CATENARY CABLE MOUNTING SYSTEM TO SUPPORT APPROXIMATE FIXTURE WEIGHT OF 45LBS FOR EACH LIGHTING FIXTURE, COLOR COORDINATE AND MATCH EXISTING FIXTURES. PROVIDE WET LOCATION POWER CORD AND NYLON STRAP CABLE TIES, BLACK FINISH. LUMENPULSE "LUMENBEAM AM" #LEX-HO-120-4K-FU OR APPROVED EQUAL, MOUNTING V2 LIGHTING GROUP #CAT-BK-DM / 2020-0047 / 408-0032	4000K 10166 LUMENS	205W
"L1AE"	SAME AS TYPE "L1" EXCEPT MOUNTED ON STEEL POLE, MEDIUM SIZE, DIRECT FLOOD DISTRIBUTION, WIRE GUARD, BLACK FINISH, 28W AND WIRED TO THE EMERGENCY INVERTER, NON-DIMMING. PROVIDE SHORT YOKE, BACK PLATE AND STRAPS AROUND THE POLE FOR MOUNTING. LUMENPULSE "LUMENBEAM MEDIUM" #LBM-120-40K-FU-LSH-BK-KO-SY SERIES OR APPROVED EQUAL.	4000K 1428 LUMENS	28W
"L2"	LED RECESSED MOUNTED 4" WIDTH AND 16' LONG LIGHTING FIXTURE, DAMP LOCATION AND COLD TEMPERATURE RATED, PROGRAMMABLE OUTPUT, OPAL FLUSH LENS, DIRECT DISTRIBUTION, SINGLE CIRCUIT, 120-277V INTEGRAL DIMMING DRIVER, COLD TEMPERATURE RATED. ZUMTobel SLOLIGHT LED II #SLDR4-SERIES OR APPROVED EQUAL.	4000K 850 LM/FT	19W/FT
"L2E"	SAME AS TYPE "L" EXCEPT 4FT SECTION WIRED TO THE EMERGENCY TRANSFER RELAY AND INVERTER	4000K 850 LM/FT	19W/FT
"X"	UNIVERSAL MOUNTING EXIT LIGHT, OUTDOOR WET LOCATION RATED, IMPACT RESISTANT, LOW TEMPERATURE RATED, SINGLE FACE. LITHONIA AWLTE-GY-1-R-TIP OR APPROVED EQUAL.	RED LED	3W

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