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SEPTEMBER 2021	date
	revisions



E. INSTALLATION

- 1) ALL DRILLING AND CORING EQUIPMENT AND ALL METHODS FOR INSTALLATION OF POST-INSTALLED ANCHORS AND DOWELS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).
- 2) UNLESS SPECIFICALLY SHOWN OTHERWISE, ALL HOLES SHALL BE INSTALLED PERPENDICULAR TO THE CONCRETE OR MASONRY SURFACE.
- 3) ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGES OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS. ANCHOR SPACING AND EDGE DISTANCE VALUES SHALL NOT BE LESS THAN RECOMMENDED BY THE ANCHOR MANUFACTURER.

F. SPECIAL INSPECTION REQUIREMENTS

- 1) PER ACI 318-14 SECTION 17.8.2.4, ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS SHALL BE CONTINUOUSLY INSPECTED DURING INSTALLATION BY AN INSPECTOR SPECIFICALLY APPROVED FOR THAT PURPOSE BY THE BUILDING OFFICIAL. THE SPECIAL INSPECTOR SHALL FURNISH A REPORT TO THE ENGINEER AND BUILDING OFFICIAL THAT THE WORK COVERED BY THE REPORT HAS BEEN PERFORMED AND THAT THE MATERIALS AND INSTALLATION PROCEDURES USED CONFORM WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII).
- 2) PERIODIC SPECIAL INSPECTIONS SHALL BE PROVIDED FOR ALL OTHER POST-INSTALLED ANCHORS NOT INCLUDED IN THE NOTE ABOVE.
 - A) PARAMETERS FOR EXPANSION AND UNDERCUT ANCHORS
 - B) PARAMETERS FOR ADHESIVE ANCHORS
 - C) PROOF LOADING OF ADHESIVE ANCHORS
 - D) CORROSION PROTECTION FOR EXPOSED ANCHORS INTENDED FOR ATTACHMENT WITH FUTURE WORK

10. STEEL CONSTRUCTION NOTES

A. GOVERNING STANDARDS: ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND AS SUPPLEMENTED BY THESE GENERAL NOTES AND THE PROJECT DRAWINGS AND SPECIFICATIONS.

- 1) ANSI/AISC 360-10 "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" (JUNE 22, 2010).
- 2) AISC 303-10 "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (APRIL 14, 2010)
- 3) ANSI/AWS "D1.1-STRUCTURAL WELDING CODE - STEEL", 2011 EDITION.
- 4) RCSC-2010 "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS" (DECEMBER 31, 2009).

B. STRUCTURAL BOLTS & ANCHOR RODS:

- 1) STEEL CONTRACTOR SHALL FURNISH ERECTION BOLTS AS REQUIRED FOR FIELD CONNECTIONS.
- 2) ALL BOLTS SHALL BE 3/4 IN. DIAMETER ASTM A325 WITH SUITABLE WASHERS AND NUTS UNLESS OTHERWISE SHOWN IN THE CONSTRUCTION DOCUMENTS OR APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
- 3) ALL BOLTS SHALL BE TIGHTENED TO THE SNUG-TIGHTENED JOINT REQUIREMENTS OF RCSC-10 EXCEPT AT SLIP-CRITICAL JOINTS OR WHERE NOTED OTHERWISE IN CONSTRUCTION DOCUMENTS OR IN FABRICATOR'S CONNECTION DESIGN.
- 4) UNLESS OTHERWISE INDICATED IN THE DRAWINGS, ALL ANCHOR RODS SHALL CONFORM TO THE SPECIFIED MATERIAL GRADE SHALL BE A MINIMUM 3/4 INCH DIAMETER WITH A MINIMUM FOUNDATION EMBEDMENT AS INDICATED IN STRUCTURAL DETAILS. THE EMBEDDED END SHALL HAVE EITHER A STANDARD BOLT HEAD, A HEAVY HEX NUT WITH THE THREADS SPOILED ABOVE AND BELOW THE NUT, OR JAMMED DOUBLE NUTS. BASE PLATES SHALL BE LEVELLED WITH LEVELING NUTS AND OVERSIZED WASHER PLATES OR WITH SHIM PACKS AT THE ERECTOR'S OPTION.
- 5) STEEL PLATE TEMPLATES SHALL BE PROVIDED TO FACILITATE PLACEMENT OF ANCHOR RODS IN DETAILED PLAN POSITIONS AND ELEVATIONS WHILE PLACING CONCRETE.
- 6) AFTER FINAL BASE PLATE POSITIONING, ANCHOR ROD NUTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION AND WASHER PLATES SHALL BE FIELD WELDED AS INDICATED IN THE CONSTRUCTION DOCUMENTS.

C. STEEL FABRICATION & FINISH:

- 1) SHOP DRAWINGS SHALL BE SUBMITTED TO AND REVIEWED BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCING FABRICATION. ANY FABRICATION INITIATED PRIOR TO APPROVAL OF SHOP DRAWINGS WILL BE AT THE SOLE RISK OF THE FABRICATOR.
- 2) ALL SHOP AND FIELD WELDS SHALL BE MADE IN ACCORDANCE WITH THE ANSI/AWS "D1.1-STRUCTURAL WELDING CODE - STEEL", 2011 EDITION. ALL WELDING SHALL USE LOW HYDROGEN PROCESSES.
- 3) ALL BEAMS THAT ARE REQUIRED TO HAVE CAMBER SHALL BE FABRICATED WITH CAMBER UPWARD. BEAMS WITHOUT SPECIFIED CAMBER SHALL BE FABRICATED SUCH THAT AFTER ERECTION, ANY NATURAL CAMBER DUE TO ROLLING OR SHOP FABRICATION IS UPWARD.
- 4) CUTS, HOLES, COPING, ETC. REQUIRED FOR WORK OF OTHER TRADES SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
- 5) THE FABRICATOR SHALL BE RESPONSIBLE FOR ALL ERECTION AIDS. ANY SUCH ERECTION AIDS SHALL BE REMOVED FROM THE COMPLETED STRUCTURE IF DIRECTED BY THE OWNER'S REPRESENTATIVE.
- 6) ALL EXTENSION BARS, RUN-OFF PLATES, AND BACKING BARS USED IN WELDED CONNECTIONS SHALL BE REMOVED AND THE JOINTS SHALL BE GROUND SMOOTH WHERE SUCH CONNECTION IS PERMANENTLY EXPOSED TO VIEW OR IS DESIGNATED AS ARCHITECTURALLY EXPOSED STRUCTURAL STEEL.
- 7) HEADED STUDS AND DEFORMED BAR ANCHORS
 - A) ALL HEADED STUDS AND DEFORMED BAR ANCHORS SHALL BE INSTALLED USING AUTOMATIC END-WELDING EQUIPMENT RECOMMENDED BY THE STUD OR ANCHOR MANUFACTURER. MANUAL WELDING OF HEADED STUDS OR DEFORMED BAR ANCHORS WILL NOT BE ALLOWED.
 - B) IF A VISUAL INSPECTION REVEALS ANY STUD THAT DOES NOT SHOW A FULL 360-DEGREE FLASH OR ANY STUD THAT HAS BEEN REPAIRED BY MANUAL WELDING, SUCH STUD SHALL BE BENT TO AN ANGLE APPROXIMATELY 15-DEGREES FROM ITS ORIGINAL AXIS. THE DIRECTION OF BENDING FOR STUDS WITH LESS THAN A 360-DEGREE FLASH SHALL BE OPPOSITE TO THE MISSING PORTION OF THE FLASH.
 - C) HEADED STUDS AND DEFORMED BAR ANCHORS THAT HAVE SUCCESSFULLY PASSED THE BEND TEST WITHOUT SIGN OF FAILURE SHALL BE ACCEPTABLE FOR USE AND LEFT IN THE BENT POSITION UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
 - D) WELDED STUDS NOT CONFORMING TO THE REQUIREMENTS OF THE AWS D1.1 "STRUCTURAL WELDING CODE - STEEL" SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVISE THE WELDING PROCEDURE AS NECESSARY TO ENSURE THAT SUBSEQUENT STUD WELDING WILL MEET AWS D1.1 REQUIREMENTS.

8) STEEL EMBEDMENTS IN CONCRETE: ALL STEEL COMPONENTS TO BE EMBEDDED IN CONCRETE SHALL HAVE COATINGS AS DEFINED IN THE TABLE BELOW.

COATINGS FOR STEEL EMBEDMENTS IN CONCRETE		
EXPOSURE	FIELD WELDING	FINISH
EXTERIOR	EITHER	GALVANIZED
INTERIOR	YES	UNPAINTED
	NO	GALVANIZED

FOOTNOTES:
ALL WELDING TO PREVIOUSLY GALVANIZED COMPONENTS WILL REQUIRE REMOVAL OF THE GALVANIZING WITH GRINDING FOR AT LEAST 3-IN. FROM EITHER SIDE OF THE INTENDED WELD AND ON BOTH SIDES OF THE WORKPIECE.

FIELD WELDED AREAS AND OTHER AREAS WITH REMOVAL OF OR DAMAGE TO, THE GALVANIZED COATING SHALL HAVE THEIR COATING RESTORED IN ACCORDANCE TO ASTM A780, USING PAINT CONTAINING ZINC DUST OR SIMILAR PERMITTED PRODUCTS CAPABLE OF PROVIDING A MINIMUM ZINC-RICH COATING THICKNESS OF 2.0 MILS IN A SINGLE APPLICATION.

9) SHOP PRIMER

- A) ALL STEEL EXPOSED TO EXTERIOR WEATHER OR AN UNCONTROLLED ENVIRONMENT SHALL BE BLAST CLEANED AND PRIMED WITH A SUBMITTED AND APPROVED ZINC-RICH PRIMER.
- B) INTERIOR STEEL SHALL BE SHOP PRIMED WITH THE FABRICATORS STANDARD SHOP PRIMER.
- C) SHOP PRIMER SHALL NOT BE APPLIED TO THE FOLLOWING AREAS:
 - i) SURFACES EMBEDDED IN CONCRETE OR MORTAR. EXTEND PRIMING OF PARTIALLY EMBEDDED MEMBERS TO A DEPTH OF 2 INCHES.
 - ii) SURFACES TO BE FIELD WELDED.
 - iii) SURFACES TO BE HIGH-STRENGTH BOLTED WITH SLIP-CRITICAL CONNECTIONS.
 - iv) SURFACES TO RECEIVE SPRAYED FIRE-RESISTIVE MATERIALS.
 - v) GALVANIZED SURFACES.

D. STEEL MISCELLANEOUS:

- 1) ALL EDGE ANGLES SUPPORTING ROOF OR FLOOR DECK SHALL BE SPLICED OVER SUPPORTS.
- 2) ALL ELEVATED MECHANICAL EQUIPMENT SHALL BE SUPPORTED BY STEEL FRAMING. IF SPECIFIC FRAMING SIZES ARE NOT PROVIDED ON THE FRAMING PLAN, REFER TYPICAL DETAILS FOR ROOF OPENING FRAME DETAIL.
- 3) SUBSTITUTION OF POST-INSTALLED ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED UNLESS SPECIFICALLY APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
- 4) WHERE POST-INSTALLED ANCHORS ARE USED IN CONTINUOUS ANGLES, FABRICATE ANGLE WITH OPTIONAL HOLE LOCATIONS TO ALLOW REMEDIATION OF CASES WHERE ANCHORS FOUL WITH REBAR. AS AN EXAMPLE, FOR A CONTINUOUS ANGLE WITH ANCHORS AT 24" ON CENTER, PROVIDE HOLES AT 6" ON CENTER.
- 5) GALVANIZED LOOSE LEDGE ANGLES SHALL BE PROVIDED OVER ALL MASONRY VENEER OPENINGS OR RECESSES DEEPER THAN 1". LINTELS SHALL HAVE 1" OF BEARING AT EACH END FOR EVERY FOOT OF SPAN, WITH A MINIMUM OF 4" AND SIZED AS FOLLOWS UNLESS SHOWN OTHERWISE IN THE DRAWINGS.

A) UP TO 4'-0"L3-1/2 x 3-1/2 x 3/8
B) 4'-1" to 5'-0"L4 x 3-1/2 x 3/8 (LLV)
C) 5'-1" to 6'-6"L5 x 3-1/2 x 3/8 (LLV)
D) 6'-7" to 8'-0"L6 x 3-1/2 x 3/8 (LLV)

11. STEEL JOIST AND BRIDGING NOTES

A. COORDINATION BY GENERAL CONTRACTOR:

- 1) THE GENERAL CONTRACTOR SHALL CONFIRM OR REVISE MECHANICAL EQUIPMENT SIZE AND WEIGHT AND PROVIDE THE JOIST MANUFACTURER THE POINT LOADS FOR WHICH SPECIAL JOISTS ARE TO BE DESIGNED. PRELIMINARY ROOF TOP UNIT (RTU) WEIGHTS ARE SHOWN ON THE ROOF PLANS. SHOULD WEIGHTS EXCEED THOSE SHOWN, CONTRACTOR SHALL CONTACT THE OWNER'S REPRESENTATIVE FOR REVIEW.

B. JOIST DESIGN BY MANUFACTURER

- 1) AS A MINIMUM REQUIREMENT, THE JOIST MANUFACTURER SHALL DESIGN ALL JOISTS FOR THE DESIGN LOADS SPECIFIED IN THE STEEL JOIST INSTITUTE'S LOAD TABLES. IN ADDITION, JOISTS SHALL BE DESIGNED TO CARRY ANY OTHER LOADS INDICATED ON THE DRAWINGS.
- 2) UNLESS SHOWN OTHERWISE IN THE DRAWINGS, JOISTS SHALL BE DESIGNED BY THE JOIST MANUFACTURER FOR A NET UPLIFT OF 10 PSF IN THE FIELD OF THE ROOF AND 15 PSF WITHIN 10 FEET OF ROOF EDGES.
- 3) BETWEEN PANEL POINTS OF STEEL JOISTS THE CHORD MEMBERS SHALL BE DESIGNED TO SUPPORT 100 LBS VERTICAL LOAD WITHOUT REINFORCEMENT OF THE JOIST. TYPICALLY, UNDERHUNG LOADS SHALL BE SUPPORTED AT JOIST PANEL POINTS. OFF-PANEL POINT LOADING IN EXCESS OF 100 POUNDS WILL REQUIRE JOIST REINFORCING. REFER TYPICAL DETAILS FOR JOIST REINFORCING DETAIL.
- 4) JOISTS SEATS SHALL HAVE STANDARD JOIST SEAT DEPTHS UNLESS NOTED OTHERWISE. HOWEVER, FLAT BEARING SEATS SHALL BE PROVIDED FOR ALL JOISTS BY INCREASING THE DEPTH OF THE SEAT AT THE HIGH END OF SLOPED JOISTS. CONTRACTOR SHALL VERIFY FINAL SEAT DEPTHS PRIOR TO DETAILING SUPPORTING STRUCTURE. STANDARD JOIST SEAT DEPTHS ARE AS FOLLOWS:
 - A) K-SERIES: 2-1/2"
- 5) BOTTOM CHORDS ON ALL JOISTS SHALL BE EXTENDED TO RECEIVE CEILING OR POTENTIAL FUTURE CEILING.
- 6) IN STEEL FRAMES, WHERE COLUMNS ARE NOT FRAMED IN AT LEAST TWO DIRECTIONS WITH SOLID WEB STRUCTURAL STEEL MEMBERS, STEEL JOISTS SHALL BE FIELD-BOLTED TO THE COLUMNS TO PROVIDE LATERAL STABILITY TO THE COLUMNS DURING ERECTION AND BOTTOM CHORD STABILITY PLATES SHALL BE PROVIDED AS REQUIRED BY OSHA SAFETY STANDARDS.

C. JOIST BRIDGING

- 1) JOIST BRIDGING SHOWN ON FRAMING PLANS IS PRELIMINARY AND SHALL NOT BE USED AS THE BASIS FOR BID OR FOR ERECTION. ALL JOIST BRIDGING SHALL BE DESIGNED BY THE JOIST MANUFACTURER TO MEET OR EXCEED THE MINIMUM REQUIREMENTS OF THE SJI "STANDARD SPECIFICATION FOR K-SERIES, LH-SERIES, AND DLH SERIES OPEN WEB STEEL JOISTS AND FOR JOIST GIRDERS", AND ALL OSHA PROVISIONS REGARDING JOIST ERECTION.
- 2) ADDITIONAL BRIDGING LINES AT THE BOTTOM CHORD OUTSIDE PANEL POINT HAVE NOT BEEN SHOWN FOR CLARITY BUT ARE REQUIRED FOR THE SUPPORT OF UPLIFT LOADS. PROVIDE AS DESIGNED BY THE JOIST MANUFACTURER.
- 3) NO VERTICAL LOAD SHALL BE IMPOSED ON BRIDGING.
- 4) HORIZONTAL BRIDGING ANGLES FOR TOP AND BOTTOM CHORDS OF JOISTS ARE SHOWN ON FRAMING PLANS THUS: - - - - -

- 5) DIAGONAL BRIDGING IS SHOWN AS AN "X" ALONG A LINE OF HORIZONTAL BRIDGING. DIAGONAL BRIDGING SHALL BE PROVIDED WHERE SHOWN AND AT ANY DISCONTINUITIES IN THE ROW OF BRIDGING.
- 6) ALL BRIDGING LINES SHALL BE TERMINATED WITH AN "X" OR ANCHORED TO A STRUCTURAL WALL. REFER TYPICAL DETAILS FOR JOIST BRIDGING DETAILS.

D. JOIST ERECTION

- 1) ERECTION OF JOISTS SHALL FOLLOW THE STEEL JOIST INSTITUTE'S CODE OF STANDARD PRACTICE. JOISTS SHALL NOT BE FULLY LOADED UNTIL ALL BRIDGING LINES ARE SECURED AND METAL DECKING IS IN PLACE. THE JOIST MANUFACTURER AND ERECTOR SHALL PROVIDE ADDITIONAL BRIDGING DURING CONSTRUCTION SEQUENCING AS REQUIRED BY THE CURRENT SJI SPECIFICATIONS AND OSHA REQUIREMENTS.
- 2) NO LOAD APPLIED TO JOIST SHALL BE DONE IN A MANNER THAT EXCEEDS THE MOMENT OR SHEAR CAPACITY OF THE JOIST.
- 3) ANY HANGERS SUPPORTED FROM JOISTS SHALL BE CONNECTED WITHOUT FIELD WELDING OR DRILLING TO THE JOIST.

12. METAL DECK NOTES:

A. ROOF DECK:

- 1) BASIS OF DESIGN: VULCRAFT TYPE 1.5B WIDE RIB DECK WITH THE CHARACTERISTICS AND STRUCTURAL PROPERTIES OUTLINED BELOW. WIDE RIB DECKS OF OTHER MANUFACTURERS ARE ACCEPTABLE IF THEY PROVIDE SIMILAR LOAD-CARRYING CAPACITY FOR THE DECK SPANS APPLICABLE TO THIS PROJECT.
 - A) SDI DECK TYPE: WIDE RIB (WR)
 - B) DEPTH: 1-1/2 IN.
 - C) THICKNESS: 22 GAGE
 - D) FINISH: GALVANIZED
 - E) I = 0.155 IN⁴/FT
 - F) Sp = 0.186 IN³/FT
 - G) Sn = 0.192 IN³/FT
 - H) Fy = 33 KSI
 - I) SIDE LAPS: OVERLAPPED
- 2) SUPPORT FASTENERS: ROOF DECK SHALL BE CONNECTED TO SUPPORTS WITH #12 MECHANICAL FASTENERS AT 12" O.C. (36/4 PATTERN).
- 3) SIDE LAP FASTENERS: ROOF DECK SIDE LAPS SHALL BE FASTENED WITH #10 SIDE LAP FASTENERS AT 12" ON CENTER.
- 4) MINIMUM BEARING LENGTH: MINIMUM BEARING LENGTH ON SUPPORTS AT DISCONTINUOUS ENDS OF ROOF DECK IS 1.5 INCHES. MINIMUM BEARING LENGTH OF CONTINUOUS ROOF DECK OVER INTERIOR SUPPORTS IS 3.0 INCHES.

- B. SUBSTITUTION OF WELDING OR PINS FOR MECHANICAL SCREW ANCHORS WILL NOT BE PERMITTED.
- C. SUPPORTS FOR DECKING ARE DEFINED AS MEMBERS PROVIDING DIRECT TRANSVERSE SUPPORT AS WELL AS CONTINUOUS PARALLEL EDGE SUPPORT.
- D. ALL DECKING SHALL BE PLACED PERPENDICULAR TO SUPPORTING ROOF OR FLOOR MEMBERS AND SHALL SPAN A MINIMUM OF 3 SPANS UNLESS SHOWN OTHERWISE IN STRUCTURAL DRAWINGS.
- E. METAL DECKING SHALL NOT BE USED TO SUPPORT ANY HANGING LOADS INCLUDING, BUT NOT LIMITED TO, SUSPENDED MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT, CABLE TRAYS OR RACEWAYS, CEILING FINISHES OR CEILING FRAMING.
- F. ALL DECK OPENINGS UP TO 8-IN. SHALL BE REINFORCED WITH A MINIMUM 16-GAGE PLATE AS SHOWN IN TYPICAL ROOF DECK REINFORCING DETAIL.
- G. ALL DECK OPENINGS GREATER THAN 8-IN. SHALL BE SUPPORTED BY AN ANGLE FRAME. IF SPECIFIC FRAMING SIZES ARE NOT PROVIDED ON THE FRAMING PLAN, REFER TYPICAL DETAILS FOR ROOF OPENING FRAME DETAIL.
- H. METAL ROOF DECK SHALL BE LAPPED A MINIMUM OF 2" OVER SUPPORTS. FASTENERS SHALL PENETRATE BOTH PLIES OF DECKING INTO SUPPORTING SUBSTRATE OR 2 LINES OF FASTENERS SHALL BE PROVIDED.