CAN YOU SEE THE AIRPLANES? THE ADJACENT SAMPLES SHOW THREE DIFFERENT LEVELS OF SHADING. SETTINGS FOR VIEWING AND PRINTING DRAWING CONTENT ARE OPTIMIZED WHEN ALL THREE PLANES ARE VISIBLE. THIS GUIDANCE IS PROVIDED FOR REFERENCE ONLY.

light gray
dark gray
black

CONCRETE REINFORCING STEEL

CONCRETE REINFORCEMENT SHALL BE AS LISTED BELOW. ASTM A615 REINFORCEMENT MAY BE SUBSTITUTED FOR ASTM A706 REINFORCEMENT PROVIDED THAT THE ACTUAL YIELD STRENGTH BASED ON MILL TESTS DOES NOT EXCEED F_Y BY MORE THAN 18,000 PSI AND THE RATIO OF ACTUAL TENSILE STRENGTH TO ACTUAL YIELD STRENGTH IS NOT LESS THAN 1.25 AND THE ELONGATION REQUIREMENTS OF ASTM A706 ARE MET PER ACI 318-19 SECTION 20.2.2.5. MILL TESTS CERTIFICATIONS FOR SUBSTITUTED BARS SHALL BE SUBMITTED TO THE SPECIAL INSPECTOR AND SEOR PRIOR TO PLACEMENT. ASTM A706 REINFORCEMENT MAY BE SUBSTITUTED FOR ASTM A615 REINFORCEMENT.

REINFORCING LOCATION	MATERIAL GRADE
ALL OTHER USES U.N.O.	ASTM A615 GRADE 60
SMOOTH WELDED WIRE FABRIC (WWF)	ASTM A1064

ALL REINFORCING STEEL SHALL BE SECURELY TIED IN PLACE WITH #16 ANNEALED IRON WIRE. BARS IN BEAMS AND SLABS SHALL BE SUPPORTED ON WELL-CURED CONCRETE BLOCKS OR APPROVED METAL OR PLASTIC CHAIRS, AS SPECIFIED BY THE CRSI MANUAL OF STANDARD PRACTICE, MSP-1. REINFORCING STEEL SHALL BE DETAILED IN ACCORDANCE WITH ACI MNL-66 "ACI DETAILING MANUAL". SHOP DRAWINGS SHALL INCLUDE ELEVATIONS OF ALL BEAMS, WALLS AND COLUMNS SHOWING BAR LOCATIONS.

REINFORCING BARS SHALL NOT BE BENT OR STRAIGHTENED IN THE FIELD WITHOUT APPROVAL OF THE SEOR. PREHEATING METHODS SHALL BE SUBMITTED TO THE SEOR FOR APPROVAL PRIOR TO BENDING OF BARS #6 OR LARGER.

LAP ALL REINFORCING BARS PER THE TYPICAL LAP SPLICE LENGTH SCHEDULES, EXCEPT AS NOTED ON DRAWINGS. USE LAP LENGTH FOR SMALLER BAR WHEN SPLICING DIFFERENT BAR SIZES. BARS SPLICED WITH NONCONTACT LAPS SHALL BE SPACED NO FARTHER THAN 1/5TH THE LAP LENGTH OR 6 INCHES. MECHANICAL SPLICES NOTED ON THE PLANS SHALL BE DAYTON SUPERIOR BAR-LOCK OR TAPER-LOCK COUPLERS (UES ER-319) OR APPROVED EQUAL WITH A CURRENT EVALUATION REPORT. FOR CONCRETE STRENGTHS BETWEEN TABULATED VALUES, USE LAP SPLICE LENGTHS FOR NEAREST LOWER CONCRETE STRENGTH INDICATED.

TYP. LAP SPLICE LENGTH SCHEDULE (IN.) - 60 KSI

	3,000 PSI	4,000 PSI	5,000 PSI
#3	24	20	18
#4	38	34	30
#5	48	42	36
#6	56	50	44

TABLE NOTES:
1. SPLICE LENGTHS ARE FOR MEMBERS THAT ARE NOT PART OF THE SFRS. REFERENCE PLANS AND ELEVATIONS FOR LAP SPLICES LENGTHS AT SFRS ELEMENTS.
2. SPLICE LENGTHS APPLY TO ASTM A615 OR ASTM A706 GRADE 60 DEFORMED REINFORCING BARS ONLY.
3. SPLICE LENGTHS ARE BASED ON THE CLEAR COVER AND MINIMUM BAR CLEAR SPACING INDICATED BELOW.
4. SPLICE LENGTHS APPLY TO NORMAL WEIGHT CONCRETE ONLY. MULTIPLY TABLE VALUES BY 1.3 FOR LIGHT-WEIGHT CONCRETE.
5. SPLICE LENGTHS APPLY TO UNCOATED BARS ONLY. MULTIPLY TABLE VALUES BY 1.5 FOR EPOXY-COATED BARS.
6. COMBINATIONS OF EFFECTS DUE TO CONCRETE STRENGTH, CONCRETE WEIGHT, AND EPOXY COATING ARE CUMULATIVE.
7. SLAB, FOUNDATION AND MAT TOP BARS ARE BARS CAST ABOVE MORE THAN 12" OF FRESH CONCRETE. ALL OTHER SLAB BARS MAY BE CONSIDERED BOTTOM BARS.

REINFORCING STEEL SHALL HAVE PROTECTION AND SPACING AS FOLLOWS:

CONCRETE COVER

USE	CLEAR COVER	MIN. CLEAR SPACING
CONCRETE EXPOSED TO TRAFFIC	1 1/2" (TOP) 1" (BOTTOM)	2db OR 1"
CONCRETE EXPOSED TO EARTH OR WEATHER	1-1/2" (#5 AND SMALLER) 2" (#6 AND LARGER)	2db OR 1"
CONCRETE CAST AGAINST AND EXPOSED TO EARTH	3"	3db OR 1"

CONCRETE EMBEDMENTS

HEADED SHEAR STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS (ICC ESR-2856) OR APPROVED ALTERNATE. DEFORMED BAR ANCHORS (DBA) UP TO #6 BAR SHALL BE NELSON D6L A706 STUD WELDABLE REBAR, OR APPROVED ALTERNATE. STUDS AND DBA SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS. REINFORCING STEEL SHALL BE WELDED TO STEEL PLATE OR SECTIONS WITH A CJP WELD OR ALL AROUND FILLET WELD AS INDICATED BELOW:

TYP. REINFORCING STEEL WELDING SCHEDULE

BAR SIZE	FILLET WELD SIZE (IN.)	MIN. PLATE THICKNESS (IN.)
#3	1/4	1/4
#4	5/16	1/4
#5	3/8	1/4
#6	7/16	5/16

TABLE NOTES:
1. ALL WELDED REBAR TO BE ASTM A706 GRADE 60.
2. ALL AROUND FILLET WELD USING E70 ELECTRODE OR PROVIDE CJP AT CONTRACTOR'S OPTION.
3. BARS TO BE ORIENTATED PERPENDICULAR TO PLATE.
4. PLATE TO BE GRADE 36 MINIMUM.

CAST-IN-PLACE ANCHOR BOLTS SHALL FABRICATED FROM ALL-THREAD ROD CONFORMING TO ASTM F1554 GRADE 55, MEETING SUPPLEMENTAL REQUIREMENT S1 (WELDABLE) U.N.O.

NO LOADS OR WELDS SHALL BE PLACED ON EMBEDDED PLATES OR ANGLES FOR MINIMUM OF 7 DAYS AFTER CASTING.

SLEEVES, OPENINGS, CONDUIT, AND OTHER EMBEDDED ITEMS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER BEFORE PLACING CONCRETE. CONDUITS EMBEDDED IN SLABS SHALL NOT BE LARGER IN OUTSIDE DIMENSION THAN ONE THIRD OF THE THICKNESS OF THE SLAB AND SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS ON CENTER.

VERIFY ALL BLOCK OUTS WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING REQUIREMENTS.

POST-INSTALLED CONCRETE ANCHORS

POST-INSTALLED CONCRETE ANCHORS SHALL BE THE FOLLOWING PRODUCTS, U.N.O.:

TYPE	APPROVED ANCHOR
EXPANSION	HILTI KWIK BOLT TZ2 (ICC ESR-4266) SIMPSON STRONG-BOLT 2 (ICC ESR-3037) DEWALT POWER-STUD+ SD2 (ICC ESR-2502)
CONCRETE SCREW	HILTI KH-EZ (ICC ESR-3027) SIMPSON TITEN HD (ICC ESR-2713) DEWALT SCREW-BOLT+ (ICC ESR-3889)
ADHESIVE	HILTI HIT-RE 500 V3 (ICC ESR-3814) SIMPSON SET-3G (ICC ESR-4057) DEWALT PURE110+ (ICC ESR-3298)

ANCHORS SHALL BE INSTALLED IN STRICT CONFORMANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS AND PRODUCT EVALUATION REPORTS. EMBEDMENTS SPECIFIED ON DRAWINGS ARE ACTUAL EMBEDMENT DEPTHS. DO NOT CUT REINFORCING IN NEW OR EXISTING CONCRETE DURING INSTALLATION. ANCHORS SHALL NOT BE INSTALLED IN POST TENSIONED CONCRETE WITHOUT WRITTEN APPROVAL FROM THE SEOR.

REQUESTS FOR ANCHOR SUBSTITUTIONS SHALL BE SUBMITTED TO THE SEOR IN WRITING ALONG WITH EVIDENCE OF EQUAL OR GREATER CAPACITY UNDER THE SPECIFIC PROJECT CONDITIONS.

INSTALLATION OF ADHESIVE ANCHORS HORIZONTALLY OR UPWARDLY INCLINED SHALL BE PERFORMED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER AS CERTIFIED THROUGH ACI/CRSI AND IN ACCORDANCE WITH ACI 318-19 SECTION 26.7.2 AND ACI CPP 680.1-17. PROOF OF CURRENT CERTIFICATION SHALL BE SUBMITTED TO THE SEOR PRIOR TO INSTALLATION.

ALL-THREAD ROD FOR ADHESIVE ANCHORS SHALL CONFORM TO ASTM F1554 GRADE 55, U.N.O. ANCHORS EXPOSED TO EARTH OR WEATHER SHALL BE PROTECTED FROM CORROSION BY HOT-DIP GALVANIZING OR USE OF STAINLESS STEEL. PERMANENTLY EXPOSED EMBEDDED PLATES AND ANGLES SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION, U.N.O.

ADHESIVE ANCHORS SHALL NOT BE INSTALLED FOR A MINIMUM OF 21 DAYS AFTER CASTING CONCRETE IN ACCORDANCE WITH ACI 318-19 SECTION 17.2.2. LOADS SHALL NOT BE PLACED ON ADHESIVE ANCHORS UNTIL ADHESIVE IS FULLY CURED. CONCRETE SUBSTRATE SHALL BE DRY, WITHIN THE ALLOWABLE TEMPERATURE RANGE, HOLES SHALL BE MADE WITH A HAMMER DRILL USING A CARBIDE TIPPED DRILL BIT, AND CLEANED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.

EXPANSION AND SCREW ANCHORS SHALL NOT BE REMOVED AND RESET. SCREW ANCHORS SHALL NOT BE INSTALLED IN HOLES PREVIOUSLY THREADED BY A PRIOR SCREW ANCHOR.

STRUCTURAL STEEL

STRUCTURAL STEEL SHALL BE OF THE MATERIAL AND TYPE LISTED BELOW, U.N.O.:

STRUCTURAL STEEL

SHAPE	MATERIAL GRADE
WIDE FLANGE SHAPES	ASTM A992, GRADE 50
PLATES WHERE NOTED	ASTM A572, GRADE 50
CHANNELS, PLATES AND ANGLES, U.N.O.	ASTM A36
HOLLOW STRUCTURAL SECTIONS (RECTANGULAR)	ASTM A500, GRADE C (Fy=50KSI)
HOLLOW STRUCTURAL SECTIONS (ROUND)	ASTM A500, GRADE C (Fy=46KSI)
PIPES	ASTM A53, GRADE B (Fy=35 KSI)

DESIGN, DETAILING, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE AISC 360, "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" WITH "COMMENTARY" AND THE "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", WITH THE FOLLOWING CLARIFICATIONS AND ADDITIONS:

1. CLARIFY SECTIONS 7.5.1 AND 7.5.3 AS FOLLOWS:
   EMBEDMENT LOCATION DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER OF RECORD FOR INFORMATION ONLY. THE SEOR IS NOT RESPONSIBLE FOR THE APPROVAL OF EMBEDMENT LOCATION DRAWINGS.
2. ADD THE FOLLOWING PARAGRAPH TO SECTION 7.10.3:
   "THE ERECTOR SHALL HAVE THE SOLE RESPONSIBILITY FOR DETERMINING THE MEANS AND METHODS USED TO PROPERLY AND ADEQUATELY BRACE THE FRAMING DURING ERECTION."

BOLTS SHALL CONFORM TO THE ASTM AND RCSC SPECIFICATIONS FOR JOINTS USING HIGH STRENGTH BOLTS. BOLTS SHALL BE ASTM F3125 GRADE A325 AND GRADE A490 WHERE NOTED, AND SNUG-TIGHT UNLESS NOTED OTHERWISE.

WELDING SHALL CONFORM TO THE AWS CODES FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION. WELDING SHALL BE PERFORMED IN ACCORDANCE WITH A WELDING PROCEDURE SPECIFICATION (WPS) AS REQUIRED IN AWS D1.1 AND APPROVED BY THE STRUCTURAL ENGINEER. THE WPS VARIABLES SHALL BE WITHIN THE PARAMETERS ESTABLISHED BY THE FILLER-METAL MANUFACTURER.

WELDS SHALL BE MADE USING E70XX ELECTRODES AND SHALL BE 3/16" MINIMUM, UNLESS OTHERWISE NOTED. WELDING SHALL BE BY AWS CERTIFIED WELDERS.

PROVIDE WEEP HOLES AT EXTERIOR CLOSED SECTIONS WHERE MOISTURE MAY ACCUMULATE. LOCATE WEEP HOLES AT BOTTOM OF HORIZONTAL MEMBERS AT MIDSPAN UNLESS OTHER NOTED. LOCATE WEEP HOLES AT BOTTOM OF VERTICAL MEMBERS EXCEPT AT ROOF ASSEMBLIES. ALL WEEP HOLES TO BE APPROVED PRIOR TO FABRICATION.

NON-SHRINK GROUT USED UNDER BEARING AND BASE PLATES SHALL BE ASTM C 1107, FACTORY-PACKAGED, NONMETALLIC AGGREGATE GROUT, NONCORROSIVE, NONSTAINING, MIXED WITH WATER TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME. GROUT STRENGTH SHALL BE 8,000 PSI MINIMUM AT 28 DAYS.

DISSIMILAR METALS SHALL BE SEPARATED AS REQUIRED TO PREVENT GALVANIC CORROSION BY COMPLETELY COVERING CONTACT AREAS WITH HESKINS 3453 CORROSION PROTECTION TAPE OR APPROVED EQUAL MATERIAL.

GALVANIZING AND DUPLEX COATING

ALL STEEL EXPOSED TO WEATHER OR LOCATED OUTSIDE THE BUILDING ENVELOPE SHALL BE HOT-DIP GALVANIZED UNLESS NOTED OTHERWISE IN PROJECT SPECIFICATIONS OR DRAWINGS. WHERE THESE ELEMENTS ARE ALSO EXPOSED TO VIEW THEY SHALL ADDITIONALLY BE PAINTED OR POWDER COATED PER SPECIFICATIONS AND ARCHITECTURAL DRAWINGS.

CONTRACTOR TO COMMUNICATE WITH GALVANIZER FOR THE PROJECT EARLY ON TO INFORM THE GALVANIZER THAT THE STEEL IS TO RECEIVE A DUPLEX COATING. HOT DIPPED GALVANIZED STEEL THAT IS TO BE PAINTED SHALL BE PREPARED PER ASTM D6386. HOT DIPPED GALVANIZED STEEL THAT IS TO BE POWDER COATED SHALL BE PREPARED PER ASTM D7803.

ALL GALVANIZED STEEL IS TO BE DETAILED TO BE SHOP WELDED AND FIELD BOLTED. WHERE FIELD WELDING IS REQUIRED DUE TO FIELD CONDITIONS, REPAIR DAMAGED GALVANIZED COATING WITH ZINC RICH PAINT PER ASTM A780 WITH EFFECTIVE THICKNESS EQUAL TO HOT-DIP GALVANIZED COATING.

STRUCTURAL STAINLESS-STEEL FRAMING (SS)

STAINLESS STEEL MATERIAL SHALL BE:

SHAPE	MATERIAL GRADE
WIDE FLANGES, HOLLOW STRUCTURAL SECTIONS, ANGLES, CHANNELS, WT, PLATES AND BARS.	AISI 316 (UNS S31600/S31603) GRADE 30
WIDE FLANGES, HOLLOW STRUCTURAL SECTIONS, ANGLES, CHANNELS, WT, PLATES AND BARS. WHERE NOTED	AISI 2205 (UNS S32205) DUPLEX GRADE 65

STAINLESS STEEL FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" WITH "COMMENTARY" AND THE "CODE OF STANDARD PRACTICE", WITH THE EXCEPTIONS NOTED IN SPECIFICATIONS.

BOLTS SHALL CONFORM TO THE ASTM AND RCSC SPECIFICATION FOR JOINTS. BOLTS SHALL BE SNUG-TIGHT UNLESS NOTED OTHERWISE. BOLTS/NUTS/WASHERS FOR AISI S304 AND AISI S316 ELEMENTS: ASTM F593 FOR STAINLESS STEEL STRUCTURAL BOLTS, ASTM F594 HEAVY HEX STAINLESS STEEL NUTS; AISI 304/316 STAINLESS STEEL PLAIN WASHERS. PROVIDE ASTM A1082/A1082M BOLTS FOR AISI 2205 DUPLEX ELEMENTS, NUTS/WASHERS SHALL HAVE EQUIVALENT CORROSION RESISTANCE.

WELDING SHALL CONFORM TO AWS D1.6/D1.6M FOR STAINLESS STEEL AND AWS D10.18/D10.18M REQUIREMENTS FOR DUPLEX STAINLESS STEEL. FILLER METAL FOR DUPLEX STEEL SHALL HAVE EQUIVALENT CORROSION RESISTANCE.

NO.	DATE	BY	REVISIONS	APP
NO.	DATE	BY	REVISIONS	APP

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2025D018 DESIGN NUMBER

102970 PROJECT NUMBER

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 19608 DIGITALLY SIGNED OREGON JULY 14, 2006 CRAIG J. TOTTEN
EXPIRES 06-30-26

PORTLAND INTERNATIONAL AIRPORT

TERMINAL UPPER ROADWAY JOINT REPLACEMENT

GENERAL STRUCTURAL NOTES - 2

SUBMITTED BY	JAY OSTLUND		
DESIGN BY	S. THOMAS		
DRAWN BY	J. DE BOER		
CHECKED BY	C. TOTTEN		
DATE	OCTOBER 2026		
SHEET NO.	16	TYPE:	CD
DRAWING NO.	PDX 2026-514	DISC. SHT. NO.	S0.003

DRAWING SCALE IS REDUCED 50% WHEN SHEET SIZE IS 11" x 17". GRAPHIC SCALE FOR REFERENCE ONLY
0 1/4" 1/2" 1" 2"