

**STRUCTURAL GENERAL NOTES:**

1. GENERAL:
  - A. THESE NOTES, AND OTHER DRAWING NOTES CONTAINED WITHIN, ARE PROVIDED TO MEET SPECIFIC REQUIREMENTS AND TO SUPPLEMENT CONTRACT SPECIFICATIONS. THESE NOTES NEITHER REPLACE NOR OVERRIDE PROVISIONS AND REQUIREMENTS OF CONTRACT SPECIFICATIONS.
  - B. COORDINATE STRUCTURAL WORK WITH WORK SHOWN ON OTHER DISCIPLINE DRAWINGS.
  - C. VERIFY DIMENSIONS OF EXISTING CONSTRUCTION AND REPORT ANY DISCREPANCIES FROM CONTRACT DRAWINGS TO ENGINEER PRIOR TO COMMENCING WITH WORK. SCALING OF WORKING DIMENSIONS FROM STRUCTURAL DRAWINGS IS PROHIBITED.
  - D. CONTRACT DOCUMENTS REPRESENT FINISHED STRUCTURE. SUBCONTRACTOR IS RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO SHORING AND TEMPORARY BRACING IN ACCORDANCE WITH ASCE 37, DESIGN LOADS ON STRUCTURES DURING CONSTRUCTION. UNDERTAKE MEASURES TO ENSURE SAFETY OF PERSONS AND STRUCTURES AT SITE AND ADJACENT TO SITE. VISITS TO SITE BY ENGINEER DO NOT RELIEVE SUBCONTRACTOR OF SUCH RESPONSIBILITY.
  - E. IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR IN CONTRACT DOCUMENTS, PROVIDE CONSTRUCTION OF SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE SHOWN OR CALLED FOR, WITH APPROVAL OF ENGINEER. WHERE SECTIONS VARY, PROVIDE FOR SMOOTH TRANSITIONS BETWEEN THEM, UNLESS NOTED OTHERWISE.
  - F. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS AND RECOMMENDATIONS, UNLESS NOTED OTHERWISE.
2. DESIGN STANDARDS:
  - A. PRINCIPAL CODE OF RECORD: 2022 OREGON STRUCTURAL SPECIALTY CODE (OSSC) BASED ON INTERNATIONAL BUILDING CODE (IBC) 2021.
  - B. STATE OF OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FUEL TANK SEISMIC STABILITY RULES ADOPTED SEPT. 14, 2023.
  - C. ASCE/SEI 7, MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES, 2016.
  - D. ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 2019.
  - E. ACI 350, CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES, 2020.
  - F. AISC 325, STEEL CONSTRUCTION MANUAL, 15TH EDITION, 2017.
  - G. AISC 360, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, 2016.
3. SPECIAL INSPECTIONS: SEE S-003 THROUGH S-004.
4. DESIGN LOADS:
  - A. RISK CATEGORY: IV.
  - B. DEAD LOAD
    1. CONCRETE STRUCTURES 150 PCF
    2. EQUIPMENT LOADS: ACTUAL WEIGHTS
    3. EXTERIOR RATED CABLE TRAY WITH CABLING: 6 INCH = 11 PLF; 12-INCH = 20 PLF
    4. RIGID GALVANIZED STEEL CONDUIT: 1INCH = 1.32 PLF; 2-INCH = 2.38 PLF
  - C. LIVE LOADS
    1. PILE SUPPORTED FLOOR LIVE LOAD: 150 PSF
    2. SLAB ON GRADE: 250 PSF
  - D. WHEEL LOADS
    1. AASHTO HS20-44
      - a. MAGNITUDE: 32 KIPS.
      - b. CONTACT AREA: 100 SQUARE INCHES.
      - c. CENTER-TO-CENTER SPACING: 60".
  - E. RAIN LOAD
    1. RAIN INTENSITY: 1" PER HOUR.
  - F. SNOW LOADS
    1. GROUND SNOW LOAD: 11 PSF.
  - G. ICE LOADS
    1. ICE THICKNESS: 2 INCHES
    2. IMPORTANCE FACTOR: 1.25
    3. WIND ON ICE SPEED: 30 MPH 3-SECOND GUST
    4. WIND ON ICE IMPORTANCE FACTOR: 1.00
  - H. WIND LOADS
    1. BASIC DESIGN WIND SPEED: 107 MPH 3-SECOND GUST.
    2. ALLOWABLE STRESS DESIGN WIND SPEED: 85 MPH 3-SECOND GUST.
    3. EXPOSURE: C.
  - I. EARTHQUAKE LOADS
    1. MAPPED SPECTRAL RESPONSE ACCELERATION PARAMETERS  $S_s = 0.848$ ,  $S_1 = 0.376$ .
    2. SITE CLASS: E.
    3. DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS  $S_{ds} = 0.590$ ,  $S_{d1} = 0.739$ .
    4. SEISMIC DESIGN CATEGORY: D.
    5. IMPORTANCE FACTOR: 1.5.
    6. ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE.
  - J. THERMAL LOADS
    1. DESIGN TEMPERATURE CHANGE: 46 DEGREES FAHRENHEIT.
5. GEOTECHNICAL INFORMATION:
  - A. SOURCE: REPORT OF GEOTECHNICAL ENGINEERING SERVICES (HALEY & ALDRICH NOVEMBER 2023).
  - B. SITE PREPARATION
    1. PROVIDE EXCAVATION, FILL, AND BACKFILL IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS DIVISION 31.
    2. NOTIFY CONTRACTOR AND ENGINEER WHEN LOOSE OR SOFT SOILS ARE EXPOSED WHERE SLABS, MATS, OR FOOTINGS ARE TO BE PLACED SO THAT A DETERMINATION MAY BE MADE REGARDING IMPROVEMENT OF THIS POTENTIALLY UNDESIRABLE CONDITION.
  - C. SOIL CHARACTERISTICS
    1. UNIT WEIGHT: 110 PCF DRY.
    2. MINIMUM FOUNDATION BEARING DEPTH: 1'-6".
    3. WATER TABLE DEPTH: 4 FEET.
  - D. LATERAL EARTH PRESSURE, EQUIVALENT FLUID
    1. PASSIVE CONDITION,  $K_p$ : 250 PCF.
  - E. SLAB, MAT, AND FOOTING DESIGN PARAMETERS
    1. MODULUS OF SUBGRADE REACTION: 100 PCL.
    2. ALLOWABLE NET BEARING CAPACITIES
      - a. GRAVITY LOADS: 1500 PSF.
      - b. TRANSIENT LOADS: 2000 PSF.
    3. MINIMUM BEARING DEPTH: 1'-6".
    4. CONCRETE-SOIL COEFFICIENT OF FRICTION: 0.30
    5. CONCRETE-AGGREGATE BASE SUBGRADE COEFFICIENT OF FRICTION: 0.45
  - F. CONCRETE FILLED STEEL PIPE PILES
    1. PROVIDE IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS SECTION 31 62 18.
    2. SEE DRAWING S-503 FOR PIPE PILE CAPACITIES PER STRUCTURE.
6. MATERIALS: SEE CONTRACT SPECIFICATIONS FOR COMPLETE REQUIREMENTS. COMPLY WITH APPLICABLE OSHA REGULATIONS.
  - A. REINFORCED CONCRETE: SPECIFICATIONS SECTION 03 30 00
    1. PREPARE AND PLACE REINFORCED CONCRETE IN ACCORDANCE WITH ACI MANUAL OF CONCRETE PRACTICE AS MODIFIED BY CONTRACT DOCUMENTS.
    2. CONCRETE
      - A. PILE CAPS, STRUCTURAL SLABS AND ASSOCIATED TIE BEAMS: MINIMUM 28-DAY COMPRESSIVE STRENGTH  $f_c = 6,000$  PSI, NORMALWEIGHT WITH A MAXIMUM W/C RATIO OF 0.45.
      - B. DRIVE SLABS, SLAB ON GRADE, SHALLOW FOUNDATIONS: MINIMUM 28-DAY COMPRESSIVE STRENGTH  $f_c = 4,500$  PSI, NORMALWEIGHT WITH A MAXIMUM W/C RATIO OF 0.45.
      - C. DUCTBANKS: MINIMUM 28-DAY COMPRESSIVE STRENGTH  $f_c = 3,000$  PSI, NORMALWEIGHT
    3. FORMWORK
      - A. SUBCONTRACTOR IS RESPONSIBLE FOR DESIGN, ENGINEERING, STRUCTURAL ADEQUACY, AND CONSTRUCTION OF CONCRETE FORMWORK IN ACCORDANCE WITH CONTRACT SPECIFICATIONS.
      - B. COORDINATE CONCRETE WORK WITH PLACEMENT OF PIPING, INSERTS, FLOOR DRAINS, AND OTHER EMBEDDED ITEMS INDICATED IN CONTRACT DOCUMENTS.
      - C. SLEEVE PIPING OR UTILITIES PASSING THROUGH CONCRETE, UNLESS NOTED OTHERWISE. SEE OTHER DISCIPLINE DRAWINGS FOR SLEEVE DETAILS.
      - D. PROVIDE MEASURES TO ENSURE THAT SLEEVES REMAIN FREE OF DEBRIS AND WATER DURING CONSTRUCTION.
      - E. PROVIDE 3/4" CHAMFER STRIPS ON EDGES OF EXPOSED CONCRETE, UNLESS NOTED OTHERWISE.
    4. REINFORCING STEEL
      - A. BARS: ASTM A615 GRADE 60 EXCEPT PROVIDE ASTM A706 GRADE 60 FOR WELDING.
      - B. REINFORCE ALL CONCRETE UNLESS SPECIFICALLY MARKED "NOT REINFORCED" OR "UNREINFORCED".
      - C. DETAIL AND PLACE REINFORCEMENT IN ACCORDANCE WITH ACI SP-66, ACI 301, ACI 318, AND CRSI MANUAL OF STANDARD PRACTICE. DO NOT INSERT REINFORCEMENT INTO FRESH OR PARTIALLY HARDENED CONCRETE.
      - D. PROVIDE MINIMUM CONCRETE CLEAR COVER OVER REINFORCEMENT AS FOLLOWS, UNLESS NOTED OTHERWISE:
        1. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3".
        2. CONCRETE EXPOSED TO EARTH OR WEATHER: #6 AND LARGER BARS - 2"; OTHER REINFORCEMENT - 1 1/2".
        3. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND: SLABS AND WALLS - 3/4"; OTHER MEMBERS - 1 1/2".
      - E. CONFORM EMBEDMENT AND LAP SPLICE LENGTHS TO TABLES AND DETAILS ON CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.
      - F. PROVIDE ADDITIONAL REINFORCEMENT AT OPENINGS AND CORNER BARS AT INTERSECTING GRADE BEAMS, WALLS, AND CURBS IN ACCORDANCE WITH TYPICAL DETAILS ON CONTRACT DRAWINGS, UNLESS NOTED OTHERWISE.
  - B. POST-INSTALLED ANCHORS: SPECIFICATIONS SECTION 05 05 19
    1. PROVIDE ANCHORS OF INDICATED TYPE WITH CAPACITIES ADEQUATE FOR INDICATED SHEAR AND TENSION LOADS ACTING SIMULTANEOUSLY BASED ON ACTUAL SUBSTRATE MATERIAL, EMBEDMENT LENGTH, EDGE DISTANCE, AND SPACING. SUBMIT PRODUCT DATA AND CALCULATIONS NOT LESS THAN 30 DAYS PRIOR TO INSTALLATION.
    2. PROVIDE ANCHORS INTO CONCRETE THAT ARE APPROVED AND DESIGNED FOR INSTALLATION IN CRACKED CONCRETE, UNLESS NOTED OTHERWISE.
    3. MECHANICAL ANCHORS
      - A. STAINLESS STEEL MANUALLY EXPANDED WEDGE TYPE, UNLESS NOTED OTHERWISE.
      - B. PROVIDE ANCHORS THAT HAVE BEEN TESTED AND ASSESSED IN ACCORDANCE WITH LATEST EDITION OF APPLICABLE ACCEPTANCE CRITERIA AS DOCUMENTED BY EVALUATION SERVICE REPORTS.
        - (1) MECHANICAL ANCHORS IN CONCRETE: ICC-ES AC193.
    4. ADHESIVE ANCHORS
      - A. STAINLESS STEEL THREADED ROD WITH EPOXY OR HYBRID RESIN ADHESIVE, UNLESS NOTED OTHERWISE.
      - B. DO NOT USE BULK-MIXED ADHESIVES. PROVIDE THREADED ROD COMPATIBLE WITH ADHESIVE AND ACCEPTABLE TO MANUFACTURER.
      - C. PROVIDE ANCHORS AS ENTIRE SYSTEM INCLUDING, BUT NOT LIMITED TO, MANUFACTURER'S PRINTED INSTRUCTIONS AS FURNISHED WITH ADHESIVE, ADHESIVE CARTRIDGE, MIXING NOZZLE, EXTENSION TUBE, DISPENSER, AND ALL REQUIRED EQUIPMENT FOR PROPERLY CLEANING DRILLED HOLE.
      - D. PROVIDE ANCHOR SYSTEMS THAT HAVE BEEN TESTED AND ASSESSED IN ACCORDANCE WITH LATEST EDITION OF APPLICABLE ACCEPTANCE CRITERIA AS DOCUMENTED BY EVALUATION SERVICE REPORTS.
        - (1) ADHESIVE ANCHORS IN CONCRETE: ICC-ES AC308.
  5. LOCATE ANCHORS IN EXISTING CONCRETE TO AVOID EXISTING REINFORCEMENT, ND ARRANGE REINFORCEMENT IN CONCRETE TO AVOID ANCHOR LOCATIONS. DO NOT DAMAGE REINFORCEMENT WITHOUT APPROVAL OF ENGINEER.
  6. IF GROUT, FLOOR TOPPING, OR CONSTRUCTION JOINT IS PRESENT WITHIN EMBEDMENT LENGTH OF ANCHOR IN CONCRETE, PROVIDE FULL EMBEDMENT LENGTH BEYOND INTERFACE.
- C. STRUCTURAL STEEL: SPECIFICATIONS SECTION 05 12 00
  1. FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC 325 INCLUDING AISC 303, CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES, AS MODIFIED BY CONTRACT DOCUMENTS.
  2. DESIGN AND PROVIDE TEMPORARY ERECTION BRACING AS REQUIRED, AND DO NOT REMOVE IT UNTIL ALL PERMANENT LATERAL-LOAD-RESISTING ELEMENTS AND CONNECTIONS ARE COMPLETELY INSTALLED.
  3. UNLESS OTHERWISE NOTED, HOT-DIP GALVANIZE EXTERIOR STRUCTURAL STEEL, NUTS, BOLTS, WASHERS, AND ANCHORS IN ACCORDANCE WITH:
    - A. STRUCTURAL STEEL: ASTM A123
    - B. STEEL HARDWARE: ASTM A153
    - C. THREADED PARTS: ASTM F2329
  4. WIDE FLANGE SHAPES, WT-SHAPES & CHANNELS 8" OR GREATER: ASTM A992,  $F_y = 50$  KSI.
  5. CHANNELS LESS THAN 8": ASTM A36  $F_y = 36$  KSI.
  6. ANGLES, OTHER SHAPES AND PLATES: ASTM A572 GRADE 50,  $F_y = 50$  KSI.
  7. THREADED RODS: ASTM A36 OR ASTM A307 TYPE B, UNLESS NOTED OTHERWISE.
  8. HOLLOW STRUCTURAL SECTIONS: ASTM A1085,  $F_y = 50$  KSI.
    - A. PROVIDE 3/16" THICK CAP PLATE AT OPEN ENDS AND SEAL WELD ALL-AROUND, UNLESS NOTED OTHERWISE.
  9. PIPE: ASTM A53 TYPE E OR S, GRADE B,  $F_y = 35$  KSI.
  10. BOLTS
    - A. 3/4" DIAMETER ASTM F3125 GRADE A325 WITH ASTM F959 DIRECT TENSION INDICATOR WASHERS OR ASTM F3125 GRADE F1852 TENSION CONTROL BOLTS, UNLESS NOTED OTHERWISE.
    - B. FRAMING CONNECTIONS: PRETENSIONED JOINTS WITH OVERSIZE HOLES, UNLESS NOTED OTHERWISE.
    - C. BRACING CONNECTIONS: PRETENSIONED JOINTS WITH OVERSIZE HOLES, UNLESS NOTED OTHERWISE.
    - D. ON ONE SIDE OF EACH DOUBLE ANGLE CONNECTION OF BEAMS TO COLUMN WEB OR GIRDER WEB DIRECTLY OVER COLUMN, PROVIDE TEMPORARY SEAT ANGLE ATTACHED TO COLUMN OR GIRDER WEB AND TO BOTTOM FLANGE OF BEAM, MINIMUM L4X3X3/8 LLH WITH TWO BOLTS EACH LEG. SINGLE AND DOUBLE STAGGERED CONNECTIONS ARE PROHIBITED WITHOUT EXPLICIT PRIOR APPROVAL IN WRITING FROM STRUCTURAL ENGINEER OF RECORD.
  11. WELDING: AWS D1.1 USING E70 ELECTRODE, WITH LOW HYDROGEN WHERE REQUIRED.
    - A. PROVIDE SEAL WELDS ALONG PERIMETER OF COMPONENTS WELDED TO MEMBERS TO BE INSTALLED OUTDOORS TO PREVENT CORROSION IN JOINT CREVICES.
    - B. PERFORM ULTRASONIC TESTING ON 100% OF COMPLETE JOINT PENETRATION GROOVE WELDS FOR MATERIALS GREATER THAN 5/16" THICK.
    - C. THE RATE OF ULTRASONIC TESTING MAY BE REDUCED TO 25% PROVIDED THE WELD REJECTION RATE IS DEMONSTRATED TO BE 5% OR LESS WITH A SAMPLE OF AT LEAST 40 COMPLETED WELDS FOR THE WELDER OR WELD OPERATOR.
    - D. INCREASE THE RATE OF ULTRASONIC TESTING TO 100% IF THE WELD REJECTION RATE EXCEEDS 5% WITH A SAMPLE OF AT LEAST 20 COMPLETED WELDS FOR THE WELDER OR WELD OPERATOR.
  12. PROVIDE SPACER PLATES FOR DOUBLE ANGLE MEMBERS TO COMPLY WITH AISC 360 PARAGRAPH E6.2.
    - A. THICKNESS: MATCH END GUSSET PLATES.
    - B. MINIMUM ATTACHMENT: CONNECT TO HEEL AND TOE OF EACH ANGLE USING 3/16" X 1" LONG FILLET WELDS.
  13. ANCHOR RODS
    - A. ASTM F1554 GRADE 36 (UNLESS SPECIFICALLY NOTED AS GRADE 55 OR 105).
    - B. LOCATE ANCHOR RODS ACCURATELY, SET WITH TEMPLATES, AND SECURELY HOLD IN POSITION WHILE PLACING CONCRETE. PROTECT IN-PLACE ANCHOR RODS FROM CONSTRUCTION ACTIVITY.
    - C. THE FOLLOWING ARE PROHIBITED WITHOUT EXPLICIT PRIOR APPROVAL IN WRITING FROM STRUCTURAL ENGINEER OF RECORD:
      - (1) INSERTING ANCHOR RODS INTO FRESH OR PARTIALLY HARDENED CONCRETE.
      - (2) SUBSTITUTING POST-INSTALLED ANCHORS WHERE EMBEDDED ANCHOR RODS ARE INDICATED.
      - (3) REPAIRING, REPLACING, OR MODIFYING INSTALLED ANCHOR RODS.
  14. SEE OTHER DISCIPLINE DRAWINGS FOR MISCELLANEOUS STEEL NOT SHOWN ON STRUCTURAL DRAWINGS AND SUBMIT SEPARATE SHOP DRAWINGS FOR REVIEW AND APPROVAL
  15. PROVIDE ADDITIONAL MISCELLANEOUS STEEL AS REQUIRED TO PROVIDE SUPPORT OR STABILIZATION AROUND AND THROUGHOUT THE STRUCTURE. NOT EVERY DETAIL IS SHOWN.
  16. NON-SHRINK GROUT
    - A. CEMENTITIOUS NON-SHRINK, NON-METALLIC, ASTM C1107, RATED FOR OUTDOOR USE.
    - B. SUPPORTED EQUIPMENT MUST NOT BE PLACED INTO SERVICE UNTIL FULLY GROUTED.
    - C. BASE PLATES THAT ARE TEMPORARILY SUPPORTED ON LEVELING NUTS AND WASHERS, STEEL SHIMS OR OTHER SIMILAR LEVELING DEVICES, MUST BE PROMPTLY GROUTED ONCE LEVELED.
  17. STEEL BAR GRATING
    - A. FABRICATE AND INSTALL STEEL BAR GRATING IN ACCORDANCE WITH NAAMM MBG 531 MANUAL AS MODIFIED BY CONTRACT DOCUMENTS.
    - B. MATERIAL: ASTM A1011, GALVANIZED.
    - C. CONSTRUCTION: WELDED.
    - D. MAIN BEARING BARS: 3/16" X 1 1/4" SPACED AT 1 3/16" CENTERS, UNLESS NOTED OTHERWISE.
    - E. CROSS BARS: AT 4" CENTERS.
    - F. SURFACE: SERRATED.
    - G. FABRICATE GRATING IN SECTIONS NOT GREATER THAN 3 FEET WIDE.
      - a. BAND ALL EDGES.
  18. ABOVE GROUND STORAGE TANKS
    - A. SEE S-511 FOR REQUIREMENTS OF CONSTRUCTION.
  19. PIPE SUPPORTS
    - A. SEE S-551 FOR REQUIREMENTS OF CONSTRUCTION.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

**ISSUED FOR PERMIT ONLY**



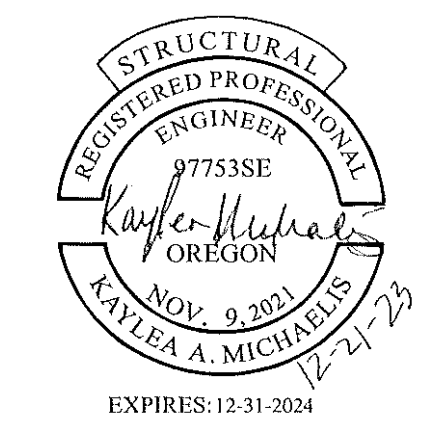
date	6/9/23	detailed	M. PATEL
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**PDX FACILITY IMPROVEMENTS**  
STRUCTURAL GENERAL NOTES

project	153929	contract	
drawing		rev.	
<b>S-001 - A</b>			
file			



**STRUCTURAL ABBREVIATIONS:**

#	NUMBER OR POUND(S)	CRSI	CONCRETE REINFORCING STEEL INSTITUTE	GR	GRADE	NAAMM	NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS	SCHED	SCHEDULE
%	PERCENT	CTJ	CONTRACTION JOINT	GRT	GROUT(ED)	NAVD	NORTH AMERICAN VERTICAL DATUM	SDI	STEEL DECK INSTITUTE
&	AND	CTR	CENTER(ED)	GRTG	GRATING	NCMA	NATIONAL CONCRETE MASONRY ASSOCIATION	SE	SOUTHEAST
@	AT	CY	CUBIC YARD(S)	H	HIGH (HEIGHT)	NE	NORTHEAST	SECT	SECTION
AA	ALUMINUM ASSOCIATION	D	DEEP (DEPTH)	HC	HOLLOW CORE	NF	NEAR FACE OR NEAR FLANGE	SEI	STRUCTURAL ENGINEERING INSTITUTE
AB	ANCHOR BOLT	DBL	DOUBLE	HCTS	HYDRANT CART TEST STAND	NIC	NOT IN CONTRACT	SF	SWAY FRAME
ACI	AMERICAN CONCRETE INSTITUTE	DEG	DEGREE(S)	HDPE	HIGH DENSITY POLYETHYLENE	NO	NUMBER	SHT	SHEET
ADDL	ADDITIONAL	DEMO	DEMOLISH (DEMOLITION)	HGR	HANGER	NOM	NOMINAL	SIM	SIMILAR
ADH	ADHESIVE	DET	DETAIL	HORIZ	HORIZONTAL	NS	NEAR SIDE	SJI	STEEL JOIST INSTITUTE
ADJ	ADJACENT	DIA	DIAMETER	HP	BEARING PILE SHAPE	NSFC	NOT SHOWN FOR CLARITY	SLNT	SEALANT
AFF	ABOVE FINISH FLOOR	DIAG	DIAGONAL	HPT	HIGH POINT	NTS	NOT TO SCALE	SLO	SHORT LEG OUTSTANDING
AGGR	AGGREGATE	DIM	DIMENSION	HS	HIGH STRENGTH	NW	NORTHWEST	SLV	SLEEVE
AHJ	AUTHORITY HAVING JURISDICTION	DIR	DIRECTION	HSS	HOLLOW STRUCTURAL SECTION	OC	ON CENTER	SP	SPACE(S)
AHR	ANCHOR	DIV	DIVISION	I	MOMENT OF INERTIA	OD	OUTSIDE DIAMETER	SPEC	SPECIFICATION(S)
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	DK	DECK	IBC	INTERNATIONAL BUILDING CODE	OF	OUTSIDE FACE	SQ	SQUARE
AISI	AMERICAN IRON AND STEEL INSTITUTE	DL	DEAD LOAD	ID	INSIDE DIAMETER	OPH	OPPOSITE HAND	SSL	SHORT-SLOT HOLE(S)
ALT	ALTERNATE	DWG	DRAWING	IF	INSIDE FACE	OPNG	OPENING	SSMR	STANDING SEAM METAL ROOF
ALUM	ALUMINUM	DWL	DOWEL(S)	IJ	ISOLATION JOINT	OPP	OPPOSITE	SST	STAINLESS STEEL
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	E	EAST	IN	INCH(ES)	OR	OUTSIDE RADIUS	ST	SNUG-TIGHT JOINT
APPD	APPROVED	EA	EACH	INFO	INFORMATION	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	STD	STANDARD
APPROX	APPROXIMATE	ED	EDGE DETAIL	INT	INTERIOR	OVS	OVERSIZE HOLE(S)	STIF	STIFFENER
ARCH	ARCHITECT(URAL)	EF	EACH FACE	INV	INVERT	PAR	PARALLEL	STIR	STIRRUP
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS	EJ	EXPANSION JOINT	IR	INSIDE RADIUS	PCA	PORTLAND CEMENT ASSOCIATION	STL	STEEL
ASTM	ASTM INTERNATIONAL	EL	ELEVATION	JST	JOIST	PCC	PRECAST CONCRETE	STR	STRAIGHT
AWS	AMERICAN WELDING SOCIETY	EL	EARTHQUAKE LOAD	JT	JOINT	PCF	POUND(S) PER CUBIC FOOT	STRUCT	STRUCTURAL
B/B	BACK TO BACK	ELEC	ELECTRICAL	KB	KNEE BRACE	PCI	POUND(S) PER CUBIC INCH OR PRECAST/PRESTRESSED CONCRETE INSTITUTE	SUB	SUBSTITUTE
BC	BOLT CIRCLE	ELEV	ELEVATOR	KIP	THOUSAND POUNDS	PED	PEDESTAL	SUPT	SUPPORT
BFF	BELOW FINISH FLOOR	EMBED	EMBEDMENT	KLF	KIP(S) PER LINEAR FOOT	PERP	PERPENDICULAR	SW	SOUTHWEST
BLDG	BUILDING	ENGR	ENGINEER	KPL	KICK PLATE	PH	PHASE	SYMM	SYMMETRICAL
BLW	BELOW	EOD	EDGE OF DECK	KSF	KIP(S) PER SQUARE FOOT	PL	PLATE	T	TON(S) OR TREAD(S)
BM	BEAM	EOS	EDGE OF SLAB	KSI	KIP(S) PER SQUARE INCH	PLBG	PLUMBING	T&B	TOP AND BOTTOM
BOS	BOTTOM OF STEEL	EQ	EQUAL	L	ANGLE SHAPE OR LENGTH	PLC	PLACE(S)	TB	THROUGH BOLT
BOT	BOTTOM	EQUIP	EQUIPMENT	LAD	LADDER	PLF	POUND(S) PER LINEAR FOOT	TD	TRENCH DRAIN
BRCG	BRACING	EQUIV	EQUIVALENT	LBS	POUND(S)	PREFAB	PREFABRICATE(D)	TEMP	TEMPORARY
BRDG	BRIDGING	ETC	AND SO FORTH	LD	DEVELOPMENT LENGTH	PREP	PREPARATION	THD	THREAD(ED)
BRG	BEARING	EW	EACH WAY	LG	LONG	PS	PIPE SUPPORT	THK	THICK(NESS)
BTWN	BETWEEN	EXP	EXPANSION	LL	LIVE LOAD	PSF	POUND(S) PER SQUARE FOOT	THRU	THROUGH
C	CHANNEL SHAPE	EXST	EXISTING	LLH	LONG LEG HORIZONTAL	PSI	POUND(S) PER SQUARE INCH	TMS	THE MASONRY SOCIETY
C TO C	CENTER TO CENTER	EXT	EXTERIOR OR EXTERNAL	LLO	LONG LEG OUTSTANDING	PT	PRETENSIONED JOINT	TOC	TOP OF CONCRETE
CAP	CAPACITY	EXTN	EXTENSION	LLV	LONG LEG VERTICAL	PUR	PURLIN	TOM	TOP OF MASONRY
CFS	COLD-FORMED STEEL	FAB	FABRICATE	LONG	LONGITUDINAL	Q	QUALITY ASSURANCE	TOS	TOP OF STEEL
CHFR	CHAMFER	FD	FLOOR DRAIN	LPT	LOW POINT	QC	QUALITY CONTROL	TOW	TOP OF WALL
CIP	CAST-IN-PLACE	FDTN	FOUNDATION	LSL	LONG-SLOT HOLE(S)	R	RADIUS OR RISER(S)	TYP	TYPICAL
CIR	CIRCLE	FF	FAR FACE	LTWT	LIGHTWEIGHT	RD	ROOF DRAIN	UNO	UNLESS NOTED OTHERWISE
CJ	CONSTRUCTION JOINT	FIN	FINISH	MATL	MATERIAL	REBAR	REINFORCING STEEL BAR(S)	VAR	VARIES
CJP	COMPLETE JOINT PENETRATION	FLG	FLANGE	MAX	MAXIMUM	REF	REFERENCE	VB	VAPOR BARRIER
CL	CENTER LINE	FLR	FLOOR	MBMA	METAL BUILDING MANUFACTURERS ASSOCIATION	REINF	REINFORCE(D)	VERT	VERTICAL
CLJ	CONTROL JOINT	FML	FLEXIBLE MEMBRANE LINER	MBS	METAL BUILDING SYSTEM	REQD	REQUIRED	VNR	VENEER
CLL	COLUMN LINE	FR	FRAME	MC	MISCELLANEOUS CHANNEL SHAPE OR MOMENT CONNECTION	REV	REVISION	VR	VAPOR RETARDER
CLR	CLEAR	FRMG	FRAMING	MECH	MECHANICAL	RF	ROOF	W	WEST OR WIDE (WIDTH) OR WIDE FLANGE SHAPE
CMPST	COMPOSITE	FRP	FIBER-REINFORCED POLYMER	MEZZ	MEZZANINE	RGS	RIGID GALVANIZED STEEL	W/	WITH
CMU	CONCRETE MASONRY UNIT	FS	FAR SIDE	MFR	MANUFACTURER	RM	ROOM	W/O	WITHOUT
CNR	CORNER	FTG	FOOT (FEET)	MIN	MINIMUM	RST	REINFORCING STEEL	WH	WEEP HOLE
COL	COLUMN	FUT	FUTURE	MISC	MISCELLANEOUS	S	SECTION MODULUS OR SOUTH OR AMERICAN STANDARD BEAM SHAPE	WL	WIND LOAD
CONC	CONCRETE	GA	GAGE	MSL	MEAN SEA LEVEL	SB	SHEAR BAR	WLD	WELD(ED)
CONN	CONNECTION	GALV	GALVANIZE(D)	MTL	METAL	SC	SLIP-CRITICAL JOINT	WP	WORKING POINT
CONSTR	CONSTRUCTION	GB	GRADE BEAM	N	NORTH			WS	WATERSTOP
CONT	CONTINUOUS	GC	GENERAL CONTRACTOR	NA	NOT APPLICABLE			WT	WEIGHT OR WIDE FLANGE TEE SHAPE
CONTR	CONTRACTOR	GDR	GUARDRAIL					WWR	WELDED WIRE REINFORCEMENT
COORD	COORDINATE	GEN	GENERAL					X	EXTRA STRONG
CPRS	COMPRESSIBLE							XX	DOUBLE EXTRA STRONG

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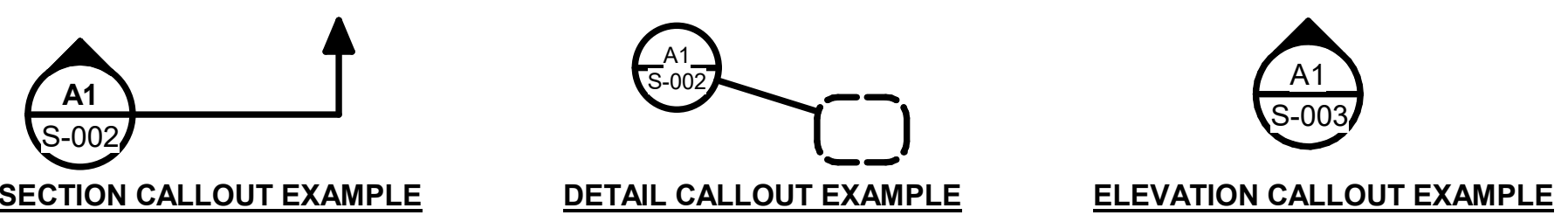
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**PDX FACILITY IMPROVEMENTS  
 LEGEND & ABBREVIATIONS**

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ONE OR TWO CHARACTER DISCIPLINE DESIGNATOR (MAY NOT BE PRESENT IF CALLOUT AND TITLE ARE ON DRAWINGS WITHIN THE SAME DISCIPLINE)

LETTER-NUMBER DESIGNATOR INDICATES SHEET COORDINATES WHERE TITLE IS LOCATED

DRAWING SEQUENCE NUMBER INDICATES WHERE TITLE IS LOCATED (MAY NOT BE PRESENT IF CALLOUT AND TITLE ARE ON THE SAME DRAWING)

THE WORD "DETAIL" MAY BE REPLACED WITH "ELEVATION" OR "SECTION"

**SECTION, DETAIL, AND ELEVATION SYMBOL IDENTIFIERS**

**SECTION, DETAIL, OR ELEVATION TITLE EXAMPLE**

**SECTION, DETAIL, AND ELEVATION IDENTIFICATION SYSTEM**

**NOTES:**

1. STATEMENT OF SPECIAL INSPECTIONS:
  - A. THIS "STATEMENT OF SPECIAL INSPECTIONS" HAS BEEN PREPARED IN ACCORDANCE WITH IBC 2021, SECTION 1704.
  - B. THE ENGINEER, ACTING AS THE OWNER'S AGENT, WILL RETAIN PRE-COORDINATED AND AHJ-APPROVED THIRD-PARTY QUALITY ASSURANCE AGENCIES TO PROVIDE SPECIAL INSPECTIONS DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2021, CHAPTER 17.
  - C. PRIOR TO THE START OF THE CONSTRUCTION, THE APPROVED AGENCIES MUST PROVIDE WRITTEN DOCUMENTATION DEMONSTRATING THE COMPETENCE AND RELEVANT EXPERIENCE OR TRAINING OF EACH SPECIAL INSPECTOR TO THE SATISFACTION OF THE AHJ, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.
  - D. SPECIAL INSPECTION AGENCY MUST SUBMIT INSPECTION REPORTS DURING CONSTRUCTION FOR VERIFICATION, INCLUDING FINAL REPORTS IN ACCORDANCE WITH IBC 2021, SECTION 1704.2.4.
  - E. SPECIAL INSPECTOR MUST USE THE LATEST ISSUE OF THE STRUCTURAL DRAWINGS FOR ALL INSPECTIONS. SHOP FABRICATION DRAWINGS MUST NOT BE USED FOR SUCH PURPOSES.
  - F. THE FOLLOWING TABLES SHOWN ON S-003 AND S-004 IDENTIFY THE MATERIALS, SYSTEMS, AND COMPONENTS FOR WHICH SPECIAL INSPECTION IS REQUIRED.
  - G. IF CONTINUOUS OR PERIODIC SPECIAL INSPECTION IS NOT INDICATED, PERFORM THE INSPECTION IN ACCORDANCE WITH THE NOTATION USED IN THE REFERENCED STANDARD WHERE THE INSPECTIONS ARE DEFINED.
  - H. ALL COSTS DUE TO SPECIAL INSPECTIONS IN ACCORDANCE WITH IBC 2021 AND AISC 360-16 MUST BE THE RESPONSIBILITY OF THE CONTRACTOR. THIS INCLUDES ALL QC AND QA REQUIREMENTS INDICATED ON DRAWINGS S-003, S-004 AND S-005.
2. TESTING REQUIREMENTS:
  - A. OWNER OR OWNER'S REPRESENTATIVE, OTHER THAN THE CONTRACTOR, MUST RETAIN PRE-COORDINATED AND GOVERNMENT-APPROVED THIRD-PARTY TESTING AGENCIES TO PROVIDE STRUCTURAL TESTING DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2021, CHAPTER 17.
  - B. TESTING AGENCY MUST SUBMIT TEST RESULTS DURING CONSTRUCTION FOR VERIFICATION INCLUDING A FINAL REPORT IN ACCORDANCE WITH IBC 2021, 1704.2.4.
  - C. THE TABLES BELOW IDENTIFY THE STRUCTURAL TESTS REQUIRED FOR THIS PROJECT.
3. STRUCTURAL OBSERVATIONS:
  - A. OWNER OR OWNER'S REPRESENTATIVE, OTHER THAN THE CONTRACTOR, MUST RETAIN PRE-COORDINATED AND GOVERNMENT-APPROVED THIRD-PARTY REGISTERED DESIGN PROFESSIONALS TO PROVIDE STRUCTURAL OBSERVATIONS DURING CONSTRUCTION IN ACCORDANCE WITH IBC 2021, CHAPTER 17.
  - B. EACH STRUCTURAL OBSERVER MUST SUBMIT WRITTEN STATEMENTS IDENTIFYING FREQUENCY AND EXTENT OF STRUCTURAL OBSERVATIONS AND ANY REPORTED DEFICIENCIES WHICH, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.
4. DEFINITIONS
  - A. O = OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT TO BE DELAYED PENDING THESE INSPECTIONS.
  - B. P = PERFORM THESE TASKS FOR EACH JOINT OR MEMBER.
  - C. QA = INSPECTION THAT THE WORK IS IN COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS.
  - D. QC = INSPECTION THAT THE WORK IS PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.
  - E. R = REQUIRED.
  - F. NR = NOT REQUIRED.
  - G. CONTINUOUS SPECIAL INSPECTION: SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS PRESENT WHEN AND WHERE THE WORK TO BE INSPECTED IN BEING PERFORMED.
  - H. PERIODIC SPECIAL INSPECTION: SPECIAL INSPECTION BY THE SPECIAL INSPECTOR WHO IS INTERMITTENTLY PRESENT WHERE THE WORK TO BE INSPECTED HAS BEEN OR IS BEING PERFORMED.
  - I. QUALITY CONTROL: CONTROLS AND INSPECTIONS IMPLEMENTED BY THE FABRICATOR OR ERECTOR, AS APPLICABLE, TO ENSURE THAT THE MATERIAL PROVIDED AND WORK PERFORMED MEET THE REQUIREMENTS OF THE APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS.
  - J. QUALITY ASSURANCE: MONITORING AND INSPECTION TASKS PERFORMED BY AN AGENCY OR FIRM OTHER THAN THE FABRICATOR OR ERECTOR TO ENSURE THAT THE MATERIAL PROVIDED AND WORK PERFORMED BY THE FABRICATOR AND ERECTOR MEET THE REQUIREMENTS OF THE APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. QUALITY ASSURANCE INCLUDES THOSE TASKS DESIGNATED "SPECIAL INSPECTION" BY THE APPLICABLE BUILDING CODE.

**IBC 2021 TABLE 1705.3 REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION**

VERIFICATION AND INSPECTION		CONTINUOUS	PERIODIC	REFERENCED STANDARD	IBC REFERENCE
1.	INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	-	X	ACI 318: 20, 25.2, 25.3, 26.5.1-26.5.3	
2.	REINFORCING BAR WELDING.			AWS D1.4 ACI 318: 26.6.4	
a.	VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	-	X		
b.	INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16".	-	X		
c.	INSPECT ALL OTHER WELDS.	X	-		
3.	INSPECTION OF ANCHORS CAST IN CONCRETE.	-	X	ACI 318: 17.8.2	
4.	INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.				
a.	ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	X	-	ACI 318: 17.8.2.4	
b.	MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.a.	-	X	ACI 318: 17.8.2	
5.	VERIFYING USE OF REQUIRED DESIGN MIX.	-	X	ACI 318: 19, 26.4.3, 26.4.4	1904.1, 1904.2
6.	PRIOR TO CONCRETE PLACEMENT, 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: 26.5, 26.12	
7.	INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.5	
8.	VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X	ACI 318: 26.4.7-26.4.9	
9.	INSPECT PRESTRESSED CONCRETE.			ACI 318: 26.10	
a.	APPLICATION OF PRESTRESSING FORCES; AND	X	-		
b.	GROUTING OF BONDED PRESTRESSING TENDONS.	X	-		
10.	INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	-	X	ACI 318: 26.9	
11.	FOR PRECAST CONCRETE DIAPHRAGM CONNECTIONS OR REINFORCEMENT AT JOINTS CLASSIFIED AS MODERATE OR HIGH DEFORMABILITY ELEMENTS (MDE OR HDE) IN STRUCTURES ASSIGNED TO SEISMIC DESIGN CATEGORY C, D, E OR F, INSPECT SUCH CONNECTIONS AND REINFORCEMENT IN THE FIELD FOR:			ACI 318: 26.13.1.3	
a.	INSTALLATION OF THE EMBEDDED PARTS	X	-		
b.	COMPLETION OF THE CONTINUITY OF REINFORCEMENT ACROSS JOINTS.	X	-	ACI 550.5	
c.	COMPLETION OF CONNECTIONS IN THE FIELD.	X	-		
12.	INSPECT INSTALLATION TOLERANCES OF PRECAST CONCRETE DIAPHRAGM CONNECTIONS FOR COMPLIANCE WITH ACI 550.5.	-	X	ACI 318: 26.13.1.3	
13.	VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	-	X	ACI 318: 26.11.2	
14.	INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	-	X	ACI 318: 26.11.1.2(b)	
15.	INSPECT WELDING OF REINFORCEMENT BARS.	X	-	AWS D1.4, AWS QC1	IBC 1705.3.1

- FOR SI: 1 INCH = 25.4 MM
- a. WHERE APPLICABLE, SEE ALSO SECTION 1705.13, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.
  - b. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION MUST BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.2.5 IN ACI 318, OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS MUST BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND MUST BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF THE WORK.
  - c. WHEN DIRECTED BY THE CONTRACT DOCUMENTS TO PROVIDE POST-INSTALLED ANCHORAGES THE FOLLOWING GUIDELINES MUST BE FOLLOWED:
    1. A REPRESENTATIVE OF THE ANCHOR MANUFACTURER OR PROJECT SPECIAL INSPECTOR MUST BE ON SITE TO OVERSEE THE INSTALLATION OF THE FIRST FOUR ANCHORS FOR EACH TYPE OF ANCHOR INSTALLED. THIS MEASURE MUST BE TAKEN FOR EACH INSTALLER OF THE ANCHORS. THIS SERVICE IS TYPICALLY PROVIDED FREE BY THE LOCAL ANCHOR REPRESENTATIVE.
    2. THE FIRST FOUR ANCHORS MUST BE TENSION TESTED ONCE INSTALLATION IS COMPLETE FOR 200% OF THE SERVICE LEVEL LOAD CAPACITY AS SPECIFIED BY THE MANUFACTURER.

**IBC 2021 TABLE 1705.8 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS**

TYPE	CONTINUOUS	PERIODIC
1. INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X	-
2. VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, BELL DIAMETERS (IF APPLICABLE), LENGTHS, EMBEDMENT INTO BEDROCK (IF APPLICABLE) AND ADEQUATE END-BEARING STRATA CAPACITY. RECORD CONCRETE OR GROUT VOLUMES.	X	-
3. FOR CONCRETE ELEMENTS, PERFORM TESTS AND ADDITIONAL SPECIAL INSPECTIONS IN ACCORDANCE WITH SECTION 1705.3.	IN ACCORDANCE WITH SECTION 1705.3	

**IBC 2021 TABLE 1705.6 REQUIRED VERIFICATION AND INSPECTION OF SOILS**

TASKS	CONTINUOUS	PERIODIC
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS 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. DURING FILL PLACEMENT, VERIFY USE OF PROPER MATERIALS AND PROCEDURES IN ACCORDANCE WITH THE PROVISIONS OF THE APPROVED GEOTECHNICAL REPORT. VERIFY DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X

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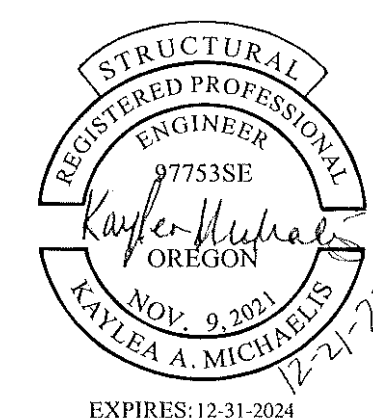
date	4/03/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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**PDX FACILITY IMPROVEMENTS**  
STATEMENT OF SPECIAL INSPECTIONS - SHEET 1

project	153929	contract	
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**AISC 360-16 INSPECTIONS FOR WELDING**

TABLE N5.4-1 INSPECTION TASKS PRIOR TO WELDING	QC	QA
WELDER QUALIFICATION RECORDS AND CONTINUITY RECORDS	P	O
WELDING PROCEDURE SPECIFICATION (WPSs) AVAILABLE	P	P
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	P	P
MATERIAL IDENTIFICATION (TYPE/GRADE)	O	O
WELDER IDENTIFICATION SYSTEM (1)	O	O
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY) <ul style="list-style-type: none"> <li>JOINT PREPARATION</li> <li>DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL)</li> <li>CLEANLINESS (CONDITION OF STEEL SURFACES)</li> <li>TACKING (TACK WELD QUALITY AND LOCATION)</li> <li>BACKING TYPE AND FIT (IF APPLICABLE)</li> </ul>	P	O
FIT-UP OF CJP GROOVE WELDS OF HSS T-, Y-, AND K-JOINTS WITHOUT BACKING (INCLUDING JOINT GEOMETRY) <ul style="list-style-type: none"> <li>JOINT PREPARATION</li> <li>DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL)</li> <li>CLEANLINESS (CONDITION OF STEEL SURFACES)</li> <li>TACKING (TACK WELD QUALITY AND LOCATION)</li> </ul>	P	O
CONFIGURATION AND FINISH OF ACCESS HOLES	O	O
FIT-UP OF FILLET WELDS <ul style="list-style-type: none"> <li>DIMENSIONS (ALIGNMENT, GAPS AT ROOT)</li> <li>CLEANLINESS (CONDITION OF STEEL SURFACES)</li> <li>TACKING (TACK WELD QUALITY AND LOCATION)</li> </ul>	O	O
CHECK WELDING EQUIPMENT	O	-
TABLE N5.4-2 INSPECTION TASKS DURING WELDING		
CONTROL AND HANDLING OF WELDING CONSUMABLES <ul style="list-style-type: none"> <li>PACKAGING</li> <li>EXPOSURE CONTROL</li> </ul>	O	O
NO WELDING OVER CRACKED TACK WELDS	O	O
ENVIRONMENTAL CONDITIONS <ul style="list-style-type: none"> <li>WIND SPEED WITHIN LIMITS</li> <li>PRECIPITATION AND TEMPERATURE</li> </ul>	O	O
WPS FOLLOWED <ul style="list-style-type: none"> <li>SETTINGS ON WELDING EQUIPMENT</li> <li>TRAVEL SPEED</li> <li>SELECTED WELDING MATERIALS</li> <li>SHIELDING GAS TYPE/FLOW RATE</li> <li>PREHEAT APPLIED</li> <li>INTERPASS TEMPERATURE MAINTAINED (MIN/MAX)</li> <li>PROPER POSITION (F, V, H, OH)</li> </ul>	O	O
WELDING TECHNIQUES <ul style="list-style-type: none"> <li>INTERPASS AND FINAL CLEANING</li> <li>EACH PASS WITHIN PROFILE LIMITATIONS</li> <li>EACH PASS MEETS QUALITY REQUIREMENTS</li> </ul>	O	O
PLACEMENT AND INSTALLATIONS OF STEEL HEADED STUD ANCHORS	P	P
TABLE N5.4-3 INSPECTION TASKS AFTER WELDING		
WELDS CLEANED	O	O
SIZE, LENGTH AND LOCATION OF WELDS	P	P
WELDS MEET VISUAL ACCEPTANCE CRITERIA <ul style="list-style-type: none"> <li>CRACK PROHIBITION</li> <li>WELD/BASE-METAL FUSION</li> <li>CRATER CROSS SECTION</li> <li>WELD PROFILES</li> <li>WELD SIZE</li> <li>UNDERCUT</li> <li>POROSITY</li> </ul>	P	P
ARC STRIKES	P	P
K-AREA (2)	P	P
WELD ACCESS HOLES IN ROLLED HEAVY SHAPES AND BUILT-UP HEAVY SHAPES (3)	P	P
BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)	P	P
REPAIR ACTIVITIES	P	P
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	P	P
NO PROHIBITED WELDS HAVE BEEN ADDED WITHOUT THE APPROVAL OF THE EOR	O	O
(1) THE FABRICATOR OR ERECTOR, AS APPLICABLE, MUST MAINTAIN A SYSTEM BY WHICH A WELDER WHO HAS WELDED A JOINT OR MEMBER CAN BE IDENTIFIED. STAMPS, IF USED, MUST BE THE LOW-STRESS TYPE. (2) WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN THE K-AREA, VISUALLY INSPECT THE WEB K-AREA FOR CRACKS WITHIN 3 IN. (75 MM) OF THE WELD. (3) AFTER ROLLED HEAVY SHAPES (SEE SECTION A3.1C) AND BUILT-UP HEAVY SHAPES (SEE SECTION A3.1D) ARE WELDED, VISUALLY INSPECT THE WELD ACCESS HOLE FOR CRACKS.		

**IBC 2021 TABLE 1705.2.3 REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS**

TYPE	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. INSTALLATION OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS.			
a. END CONNECTIONS - WELDING OR BOLTED.	-	X	SJI SPECIFICATIONS LISTED IN SECTION 2207.1.
b. BRIDGING - HORIZONTAL OR DIAGONAL.	-	-	
1. STANDARD BRIDGING.	-	X	SJI SPECIFICATIONS LISTED IN SECTION 2207.1.
2. BRIDGING THAT DIFFERS FROM THE SJI SPECIFICATIONS LISTED IN SECTION 2207.1.	-	X	

**AISC 360-16 INSPECTIONS FOR BOLTING**

TABLE N5.6-1 INSPECTION TASKS PRIOR TO BOLTING	QC	QA
MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS	O	P
FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	O	O
CORRECT FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE)	O	O
CORRECT BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	O	O
CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	O	O
PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED	P	O
PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	O	O
TABLE N5.6-2 INSPECTION TASKS DURING BOLTING		
FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS AND NUTS ARE POSITIONED AS REQUIRED	O	O
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	O	O
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	O	O
FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	O	O
TABLE N5.6-3 INSPECTION TASKS AFTER BOLTING		
DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	P	P

**AISC 360-16 FABRICATOR AND ERECTOR QUALITY CONTROL PROGRAM**

FABRICATOR INSPECTION TASKS	QC	QA
DETAILS IN ACCORDANCE WITH SECTION N5	P	-
SHOP CUT AND FINISHED SURFACES IN ACCORDANCE WITH SECTION M2	P	-
SHOP HEATING FOR STRAIGHTENING, CAMBERING AND CURVING IN ACCORDANCE WITH SECTION M2.1	P	-
TOLERANCES FOR SHOP FABRICATION IN ACCORDANCE WITH CODE OF STANDARD PRACTICE SECTION 6.4	P	-
INSPECT THE FABRICATED STEEL TO VERIFY COMPLIANCE WITH DETAILS SHOWN ON SHOP DRAWINGS, SUCH AS PROPER APPLICATION OF JOINT DETAILS AT EACH CONNECTION	P	-
ERECTOR INSPECTION TASKS		
DETAILS IN ACCORDANCE WITH SECTION N5	P	-
STEEL DECK IN ACCORDANCE WITH SDI STANDARD FOR QUALITY CONTROL AND QUALITY ASSURANCE FOR INSTALLATION OF STEEL DECK	P	-
HEADED STEEL STUD ANCHOR PLACEMENT AND ATTACHMENT IN ACCORDANCE WITH SECTION N5.4	P	-
FIELD CUT SURFACES IN ACCORDANCE WITH SECTION M2.2	P	-
FIELD HEATING FOR STRAIGHTENING IN ACCORDANCE WITH SECTION M2.1	P	-
TOLERANCES FOR FIELD ERECTION IN ACCORDANCE WITH CODE OF STANDARD PRACTICE SECTION 7.13	P	-
INSPECT THE ERECTED STEEL FRAME TO VERIFY COMPLIANCE WITH THE DETAILS SHOWN ON THE ERECTION DRAWINGS, SUCH AS BRACES, STIFFENERS, MEMBER LOCATIONS AND PROPER APPLICATION OF JOINT DETAILS AT EACH CONNECTION	P	-
INSPECT PLACEMENT OF ANCHOR RODS AND OTHER EMBEDMENTS SUPPORTING STRUCTURAL STEEL FOR COMPLIANCE WITH CONSTRUCTION DOCUMENTS. AS A MINIMUM, THE DIAMETER, GRADE, TYPE AND LENGTH OF THE ANCHOR ROD OR EMBEDDED ITEM, AND THE EXTENT OR DEPTH OF EMBEDMENT INTO CONCRETE, MUST BE VERIFIED PRIOR TO PLACEMENT OF CONCRETE	-	P
INSPECT THE FABRICATED STEEL OR ERECTED STEEL FRAME, AS APPROPRIATE, TO VERIFY COMPLIANCE WITH THE DETAILS SHOWN ON CONSTRUCTION DOCUMENTS, SUCH AS BRACES, STIFFENERS, MEMBER LOCATIONS AND PROPER APPLICATION OF JOINT DETAILS AT EACH CONNECTION	-	O
REVIEW THE MATERIAL TEST REPORTS AND CERTIFICATIONS FOR COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS	-	P

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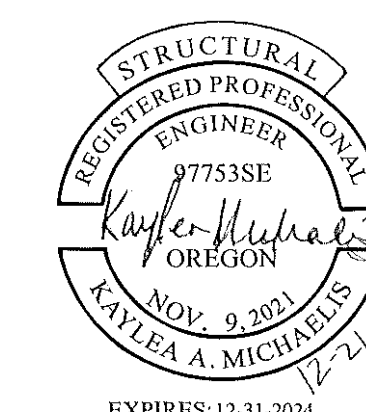
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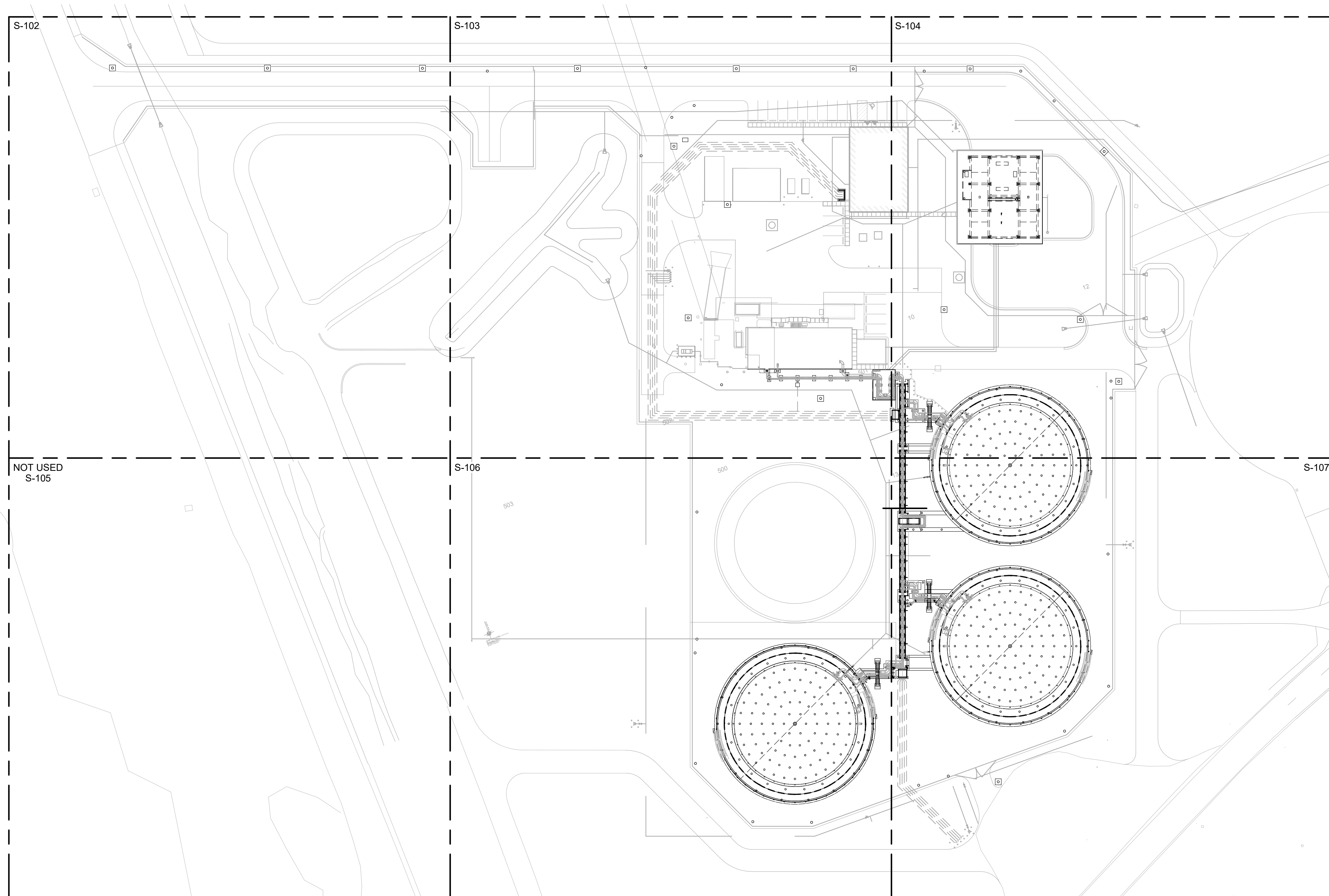
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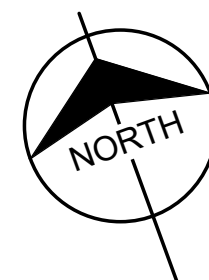
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STATEMENT OF SPECIAL INSPECTIONS - SHEET 2

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<b>S-004 - A</b>			
file			

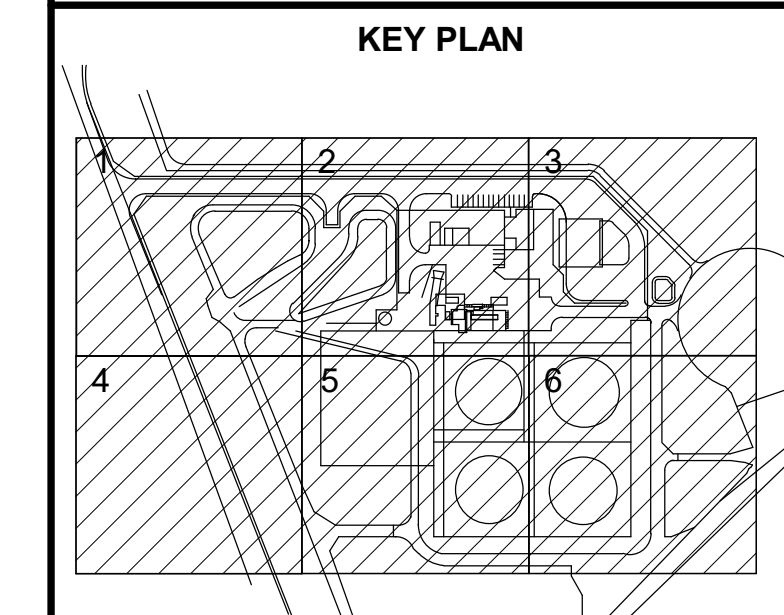




OVERALL STRUCTURAL LAYOUT



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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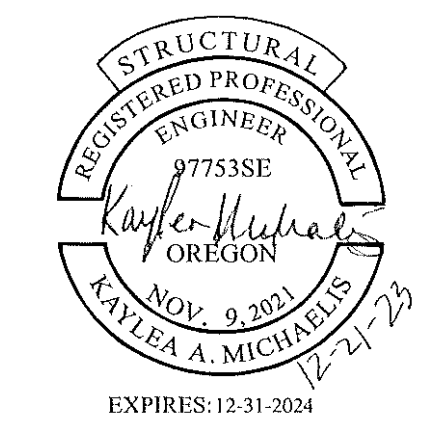
**BURNS  
MCDONNELL**  
9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

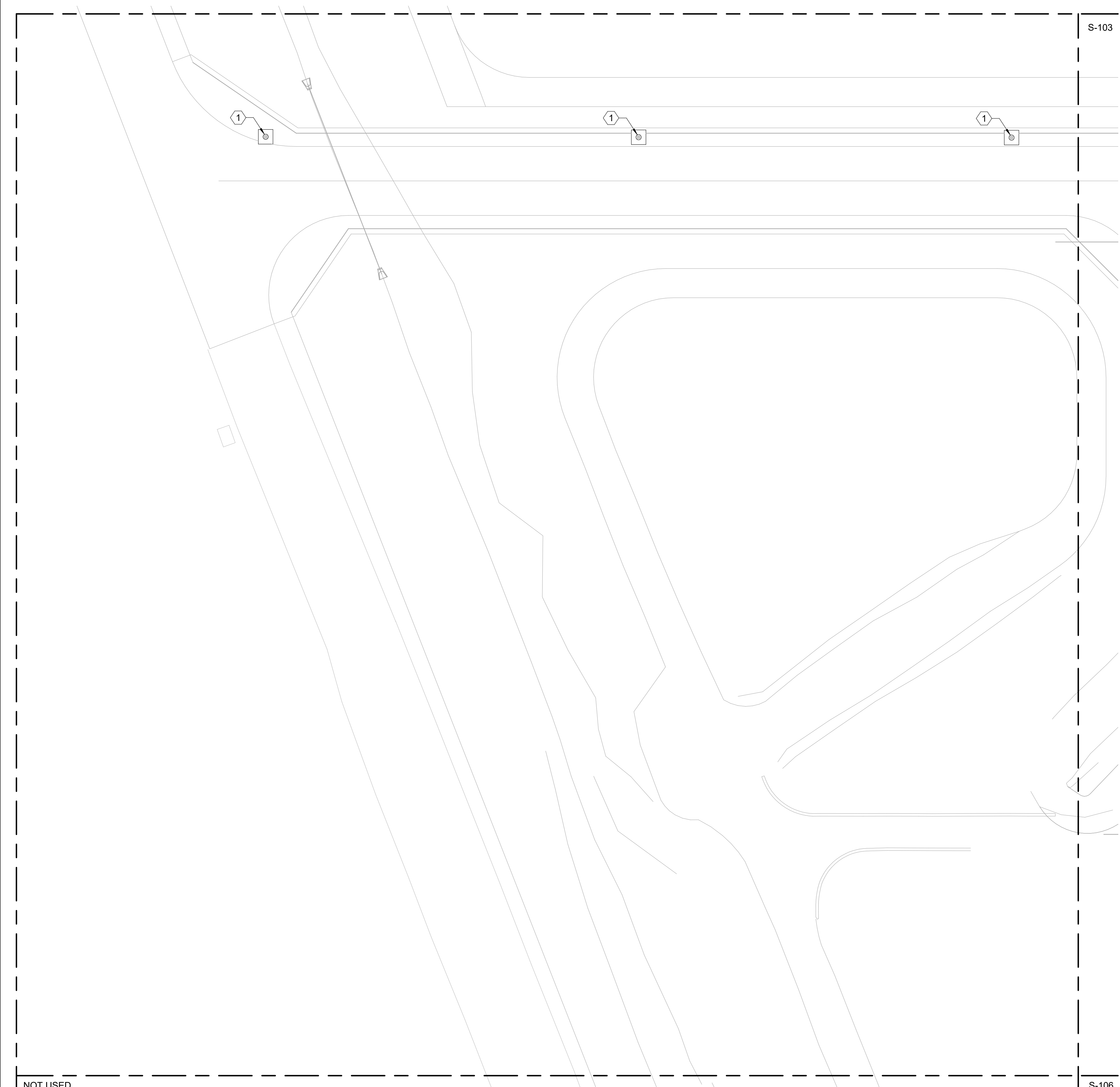
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
  
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS  
OVERALL STRUCTURAL LAYOUT**

project	153929	contract	
drawing	S-101 - A		
rev.			



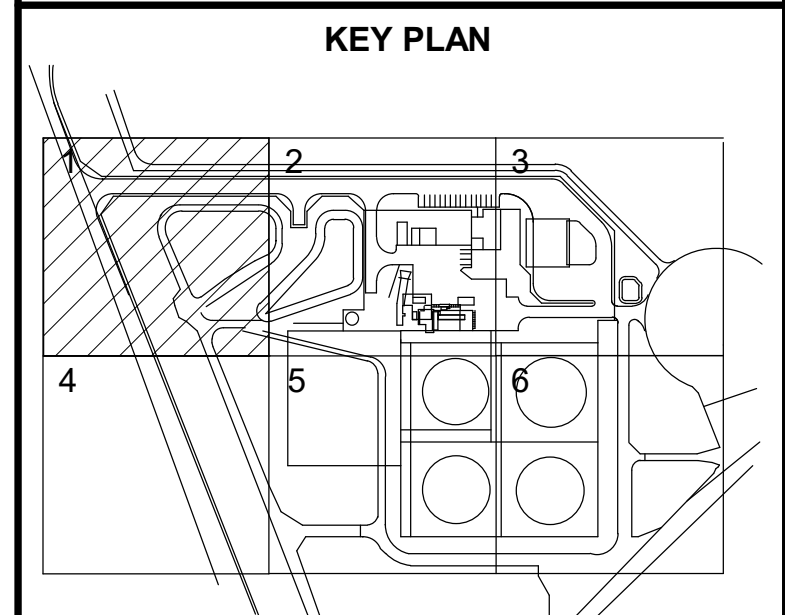


S-103

- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

- KEYED NOTES:**
- ① LIGHTPOLE FOUNDATION SEE S-531.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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MCDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

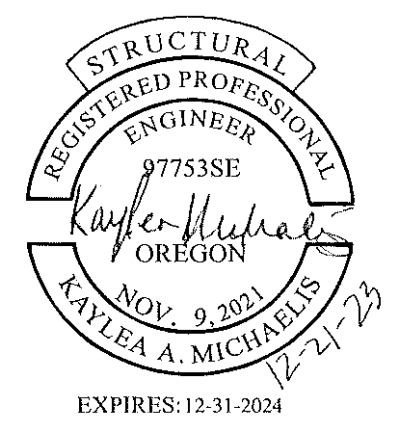
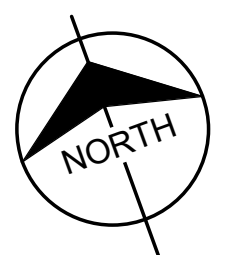
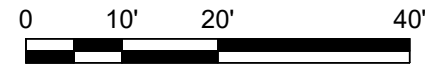
**PDX FUEL COMPANY L.L.C**

PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS  
ENLARGED SITE PLAN 1**

project	153929	contract	
drawing	<b>S-102 - A</b>		rev.
file			

**ENLARGED SITE PLAN 1**



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NOT USED  
S-105

S-106

S-102

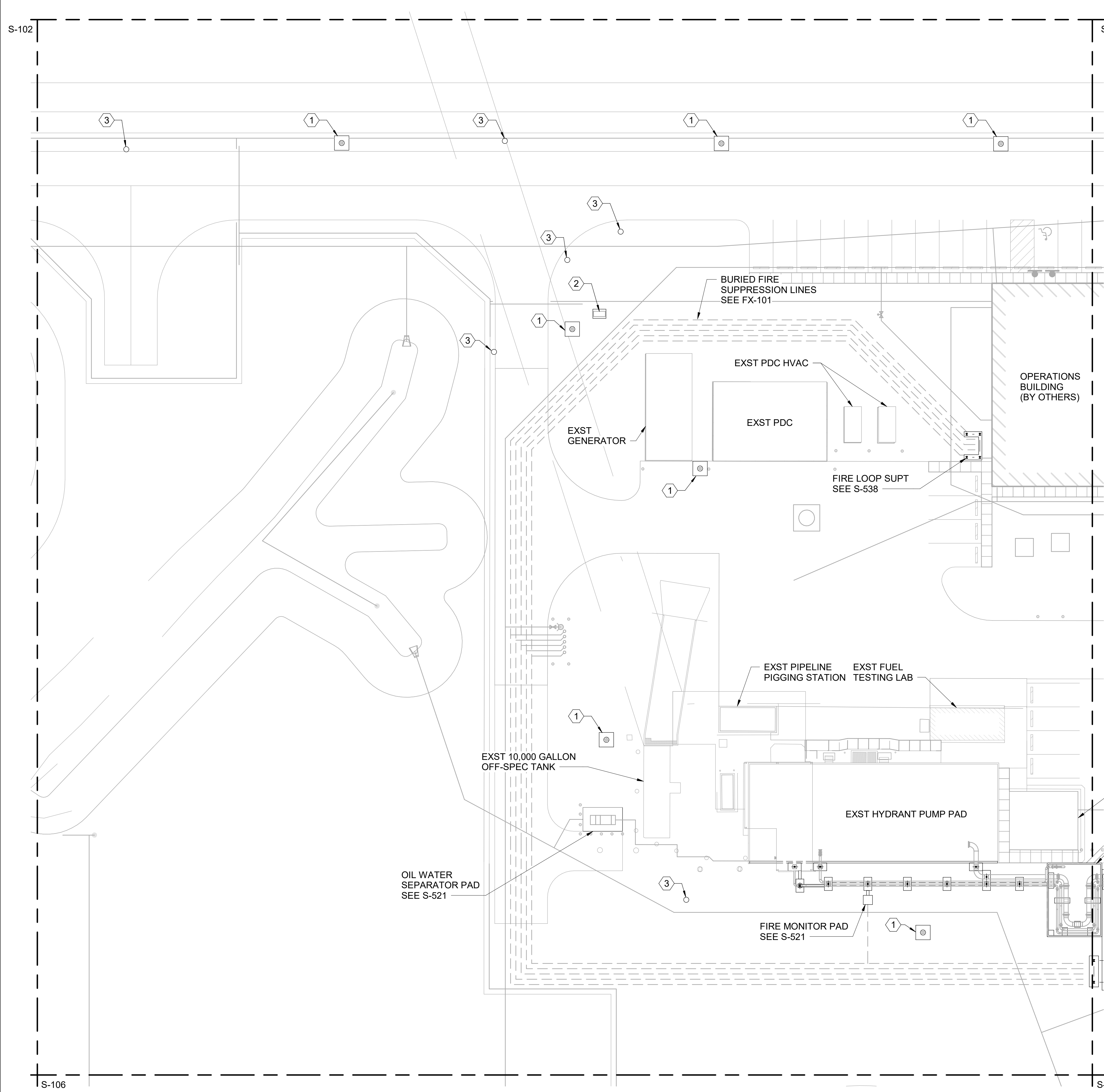
S-104

**NOTES:**

1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

**KEYED NOTES:**

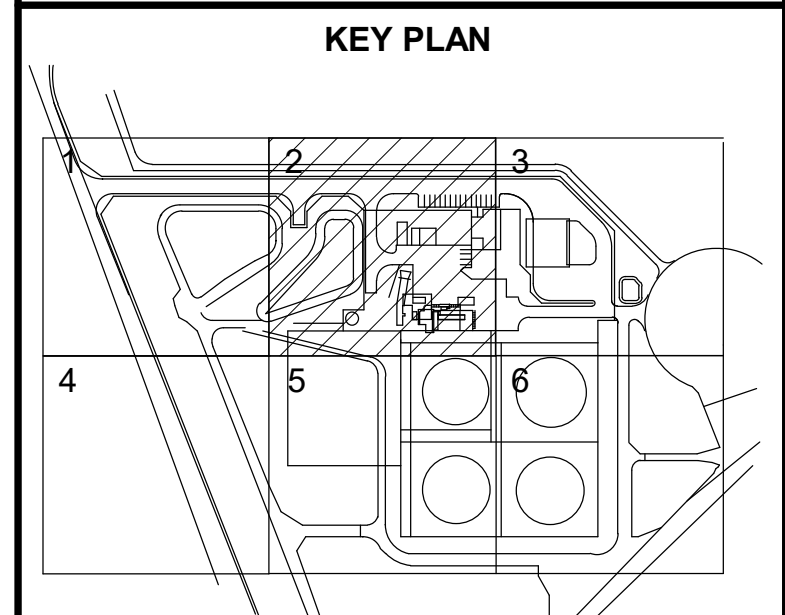
- ① LIGHTPOLE FOUNDATION SEE S-531.
- ② 5'-0" X 3'-6" CONC SLAB SEE DETAILS ON S-525.
- ③ SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.



S-106

S-107

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
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date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

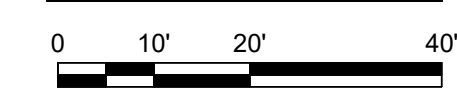
**PDX FACILITY IMPROVEMENTS**  
 ENLARGED SITE PLAN 2

project	153929	contract	
drawing		rev.	

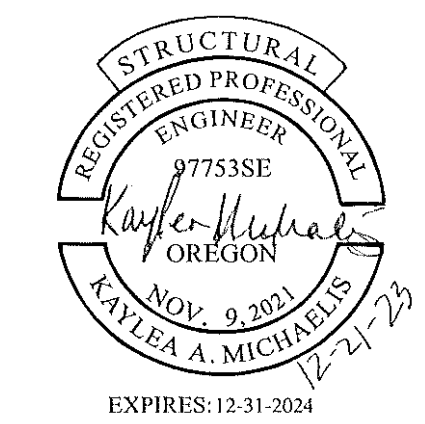
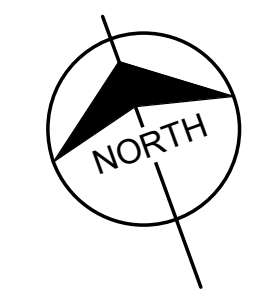
**S-103 - A**

file

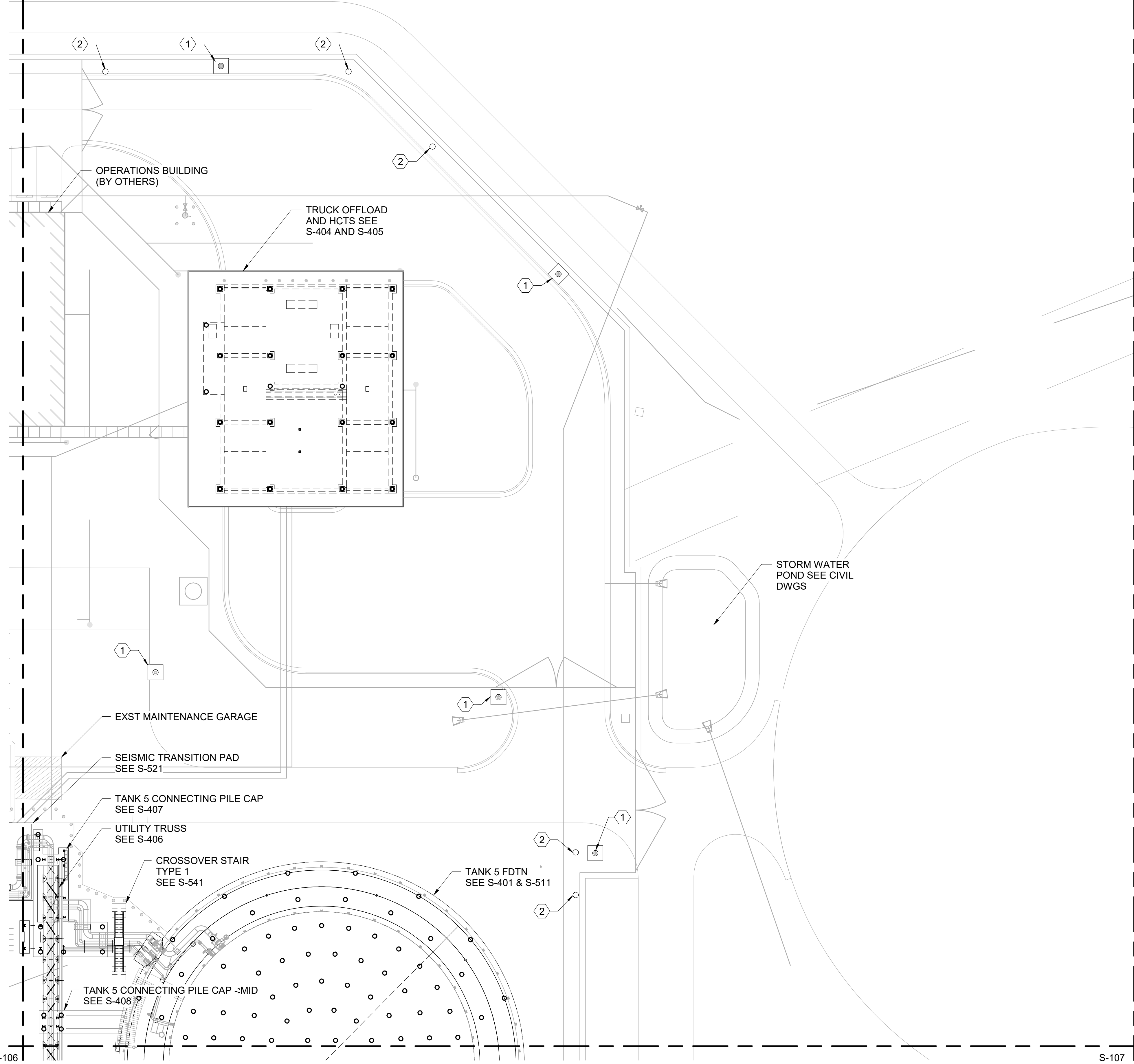
**ENLARGED SITE PLAN 2**



SCALE IN FEET



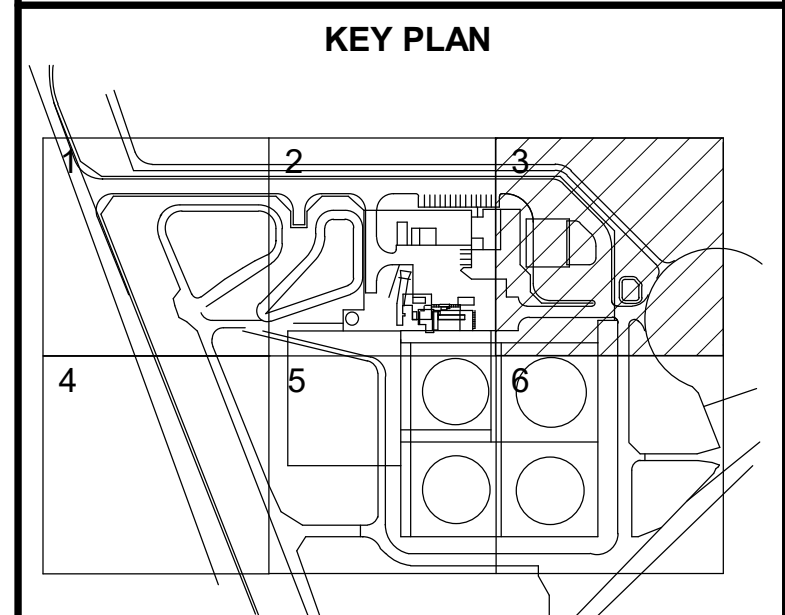
S-103



- NOTES:**
1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

- KEYED NOTES:**
- 1 LIGHTPOLE FOUNDATION SEE S-531.
  - 2 SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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816-333-9400  
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date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

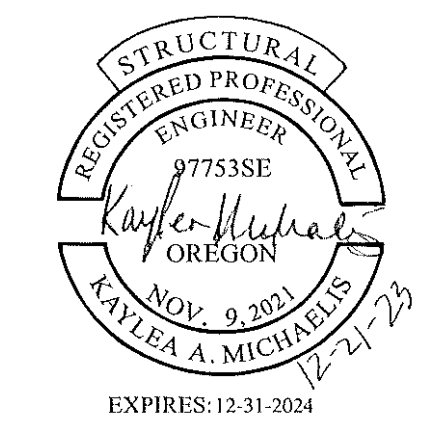
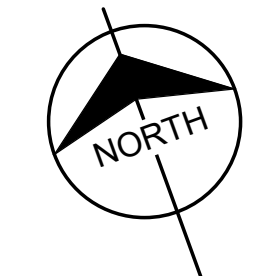
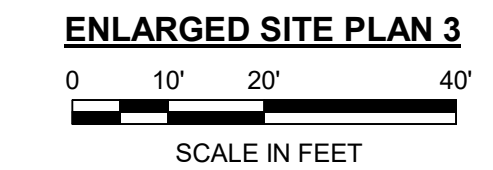
**PDX FUEL COMPANY L.L.C**  
  
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
ENLARGED SITE PLAN 3

project	153929	contract	
drawing		rev.	

**S-104 - A**

file



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S-106

S-107

A  
B  
C  
D  
E  
F  
G  
H  
I



S-103

S-107

**NOTES:**

- 1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
- 2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
- 3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
- 4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

**KEYED NOTES:**

- ① SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.

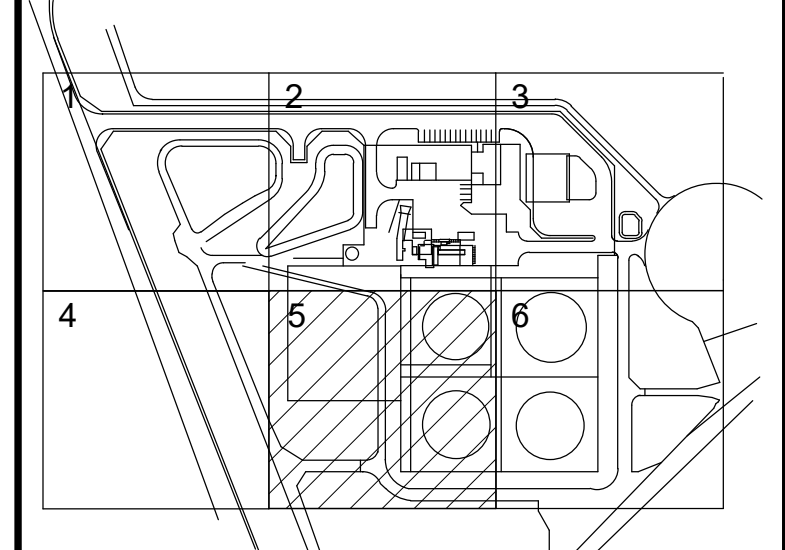
CROSSOVER STAIR  
TYPE 1  
SEE S-541

TANK 7 PILE CAP  
SEE S-409

TANK 6 FDTN  
SEE S-402  
& S-511

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

**KEY PLAN**



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Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

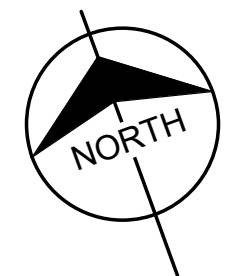
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS  
ENLARGED SITE PLAN 5**

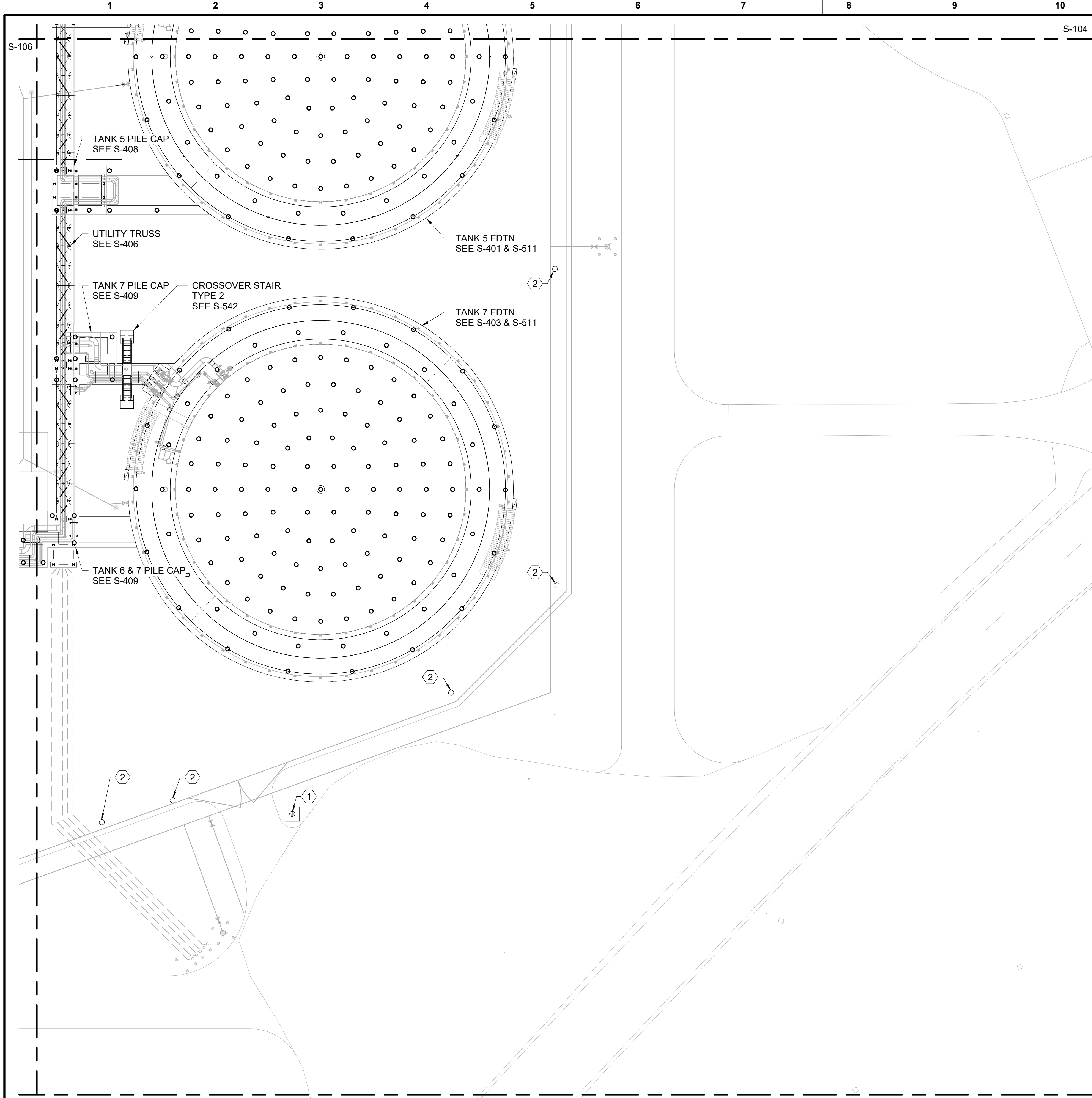
project	153929	contract	
drawing	S-106 - A		

file

**ENLARGED SITE PLAN 5**



12/20/2023 8:27:54 PM



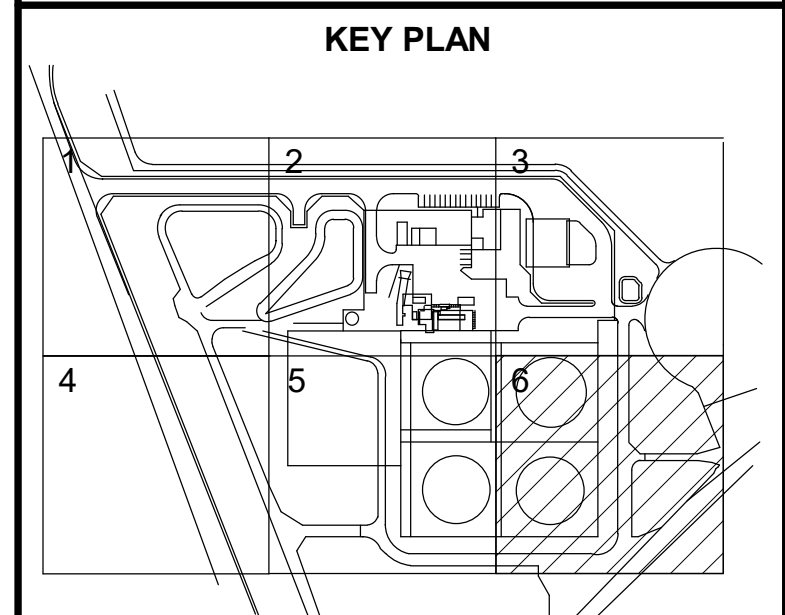
**NOTES:**

1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

**KEYED NOTES:**

- ① LIGHTPOLE FOUNDATION SEE S-531.
- ② SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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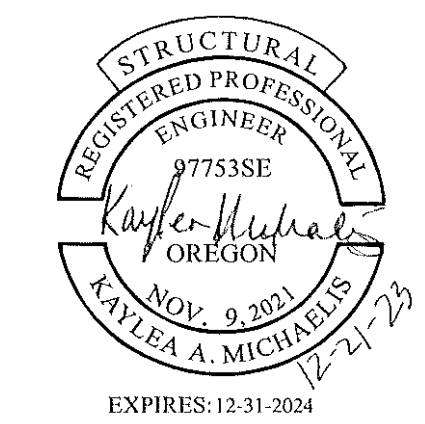
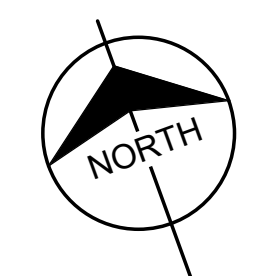
**BURNS  
MCDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

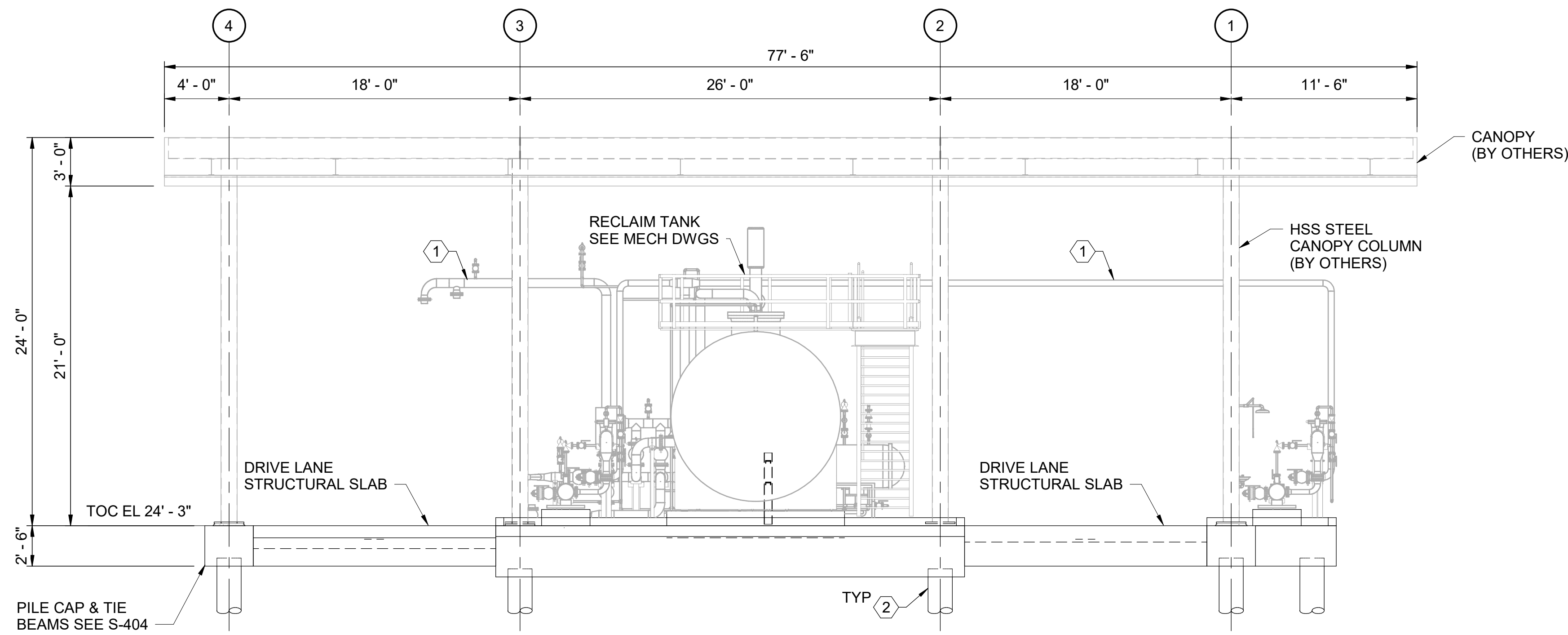
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

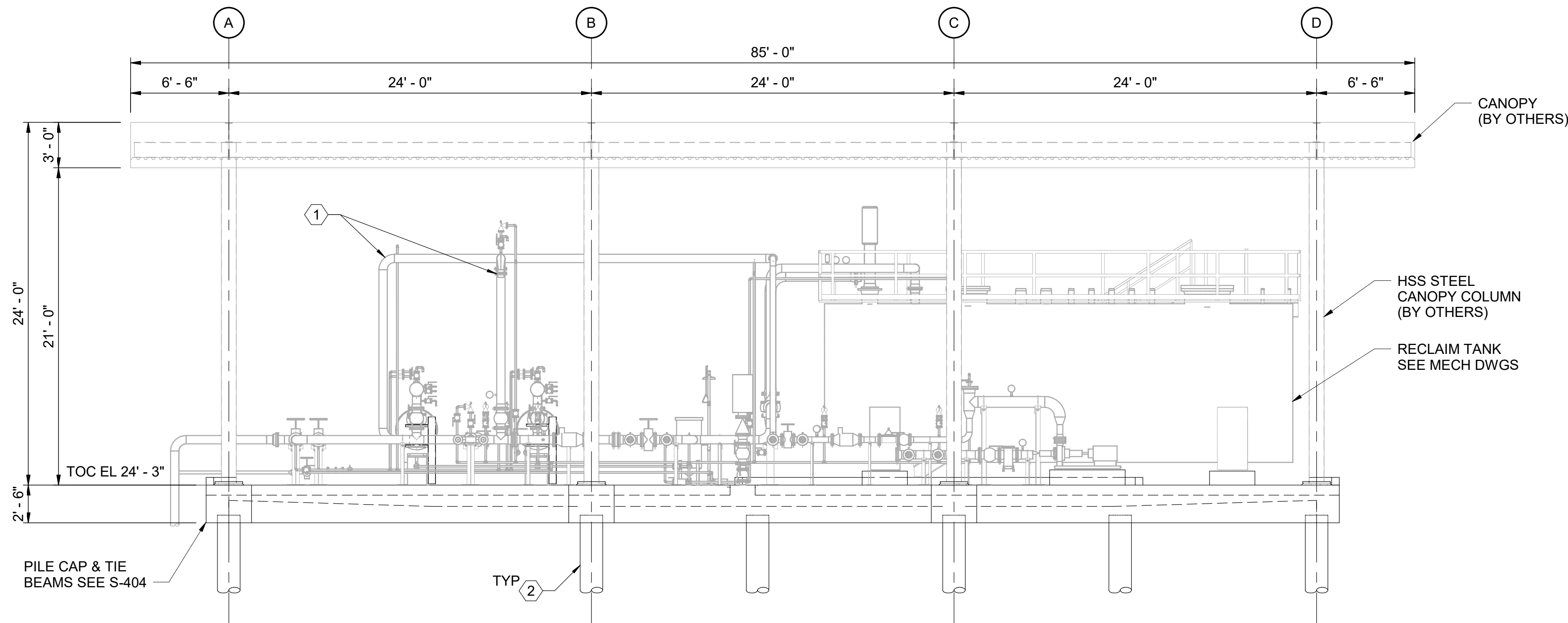
<b>PDX FACILITY IMPROVEMENTS ENLARGED SITE PLAN 6</b>	
project	contract
153929	
drawing	rev.
<b>S-107 - A</b>	
file	

**ENLARGED SITE PLAN 6**  
 0 25' 50' 100'  
 SCALE IN FEET





**ELEVATION**  
A  
S-405  
SCALE IN FEET



**ELEVATION**  
B  
S-405  
SCALE IN FEET

**NOTES:**

1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

**KEYED NOTES:**

- ① FUEL PIPING SEE MECHANICAL DRAWINGS. ELEVATED PIPE SUPPORTS ARE BEING PROVIDED (BY OTHERS).
- ② CONCRETE FILLED STEEL PIPE PILE.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

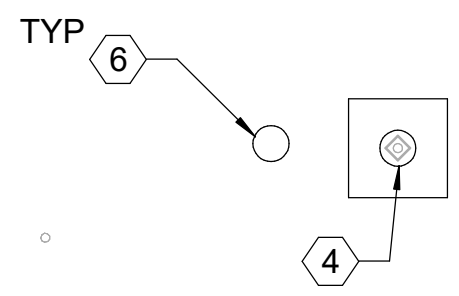
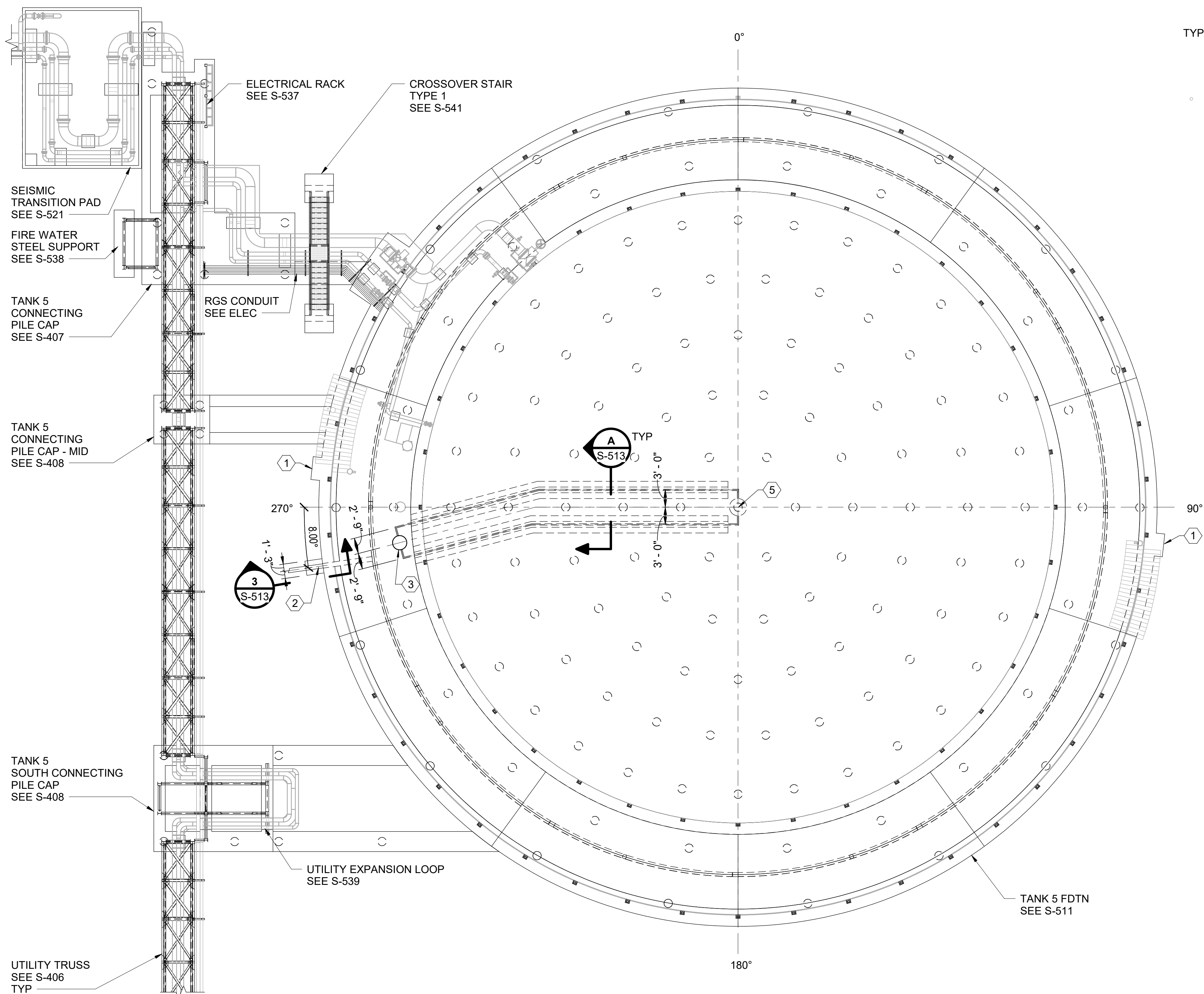
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
TRUCK OFFLOAD / HCTS AREA - ELEVATION

project	153929	contract	
drawing		rev.	

**S-201 - A**

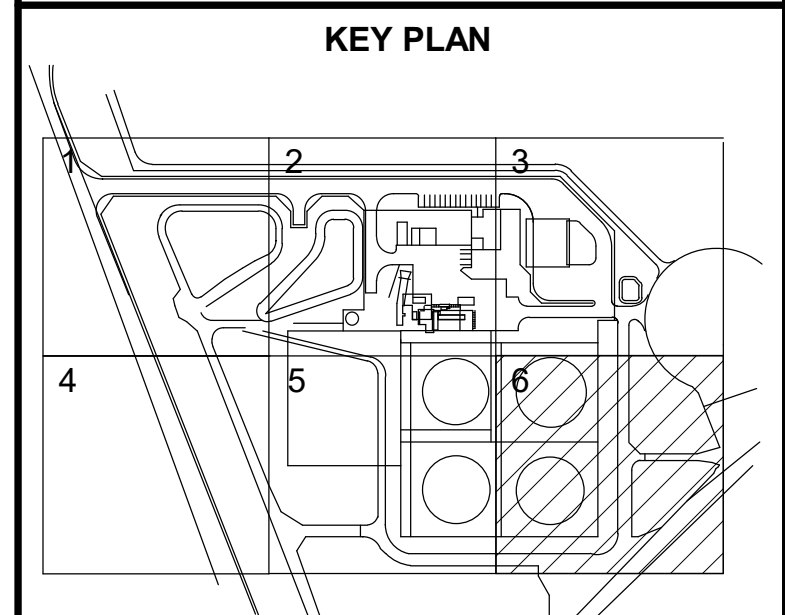




- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-500 DRAWING SERIES FOR EXACT LOCATION AND ORIENTATION.
  - SEE M-901 FOR TANK APPURTENANCE PLAN.

- KEYED NOTES:**
- TANK FOUNDATION EXTENSION FOR STAIR LANDING PER S-513.
  - CONTAINMENT DRAIN ECCENTRIC PLUG VALVE, SEE CIVIL DRAWINGS & B/S-513.
  - FOUNDATION DEWATERING SUMP SEE S-514.
  - LIGHTPOLE FOUNDATION SEE S-531.
  - CENTER SUMP SEE S-514.
  - SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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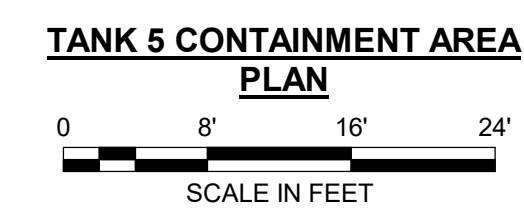
**BURNS MEDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

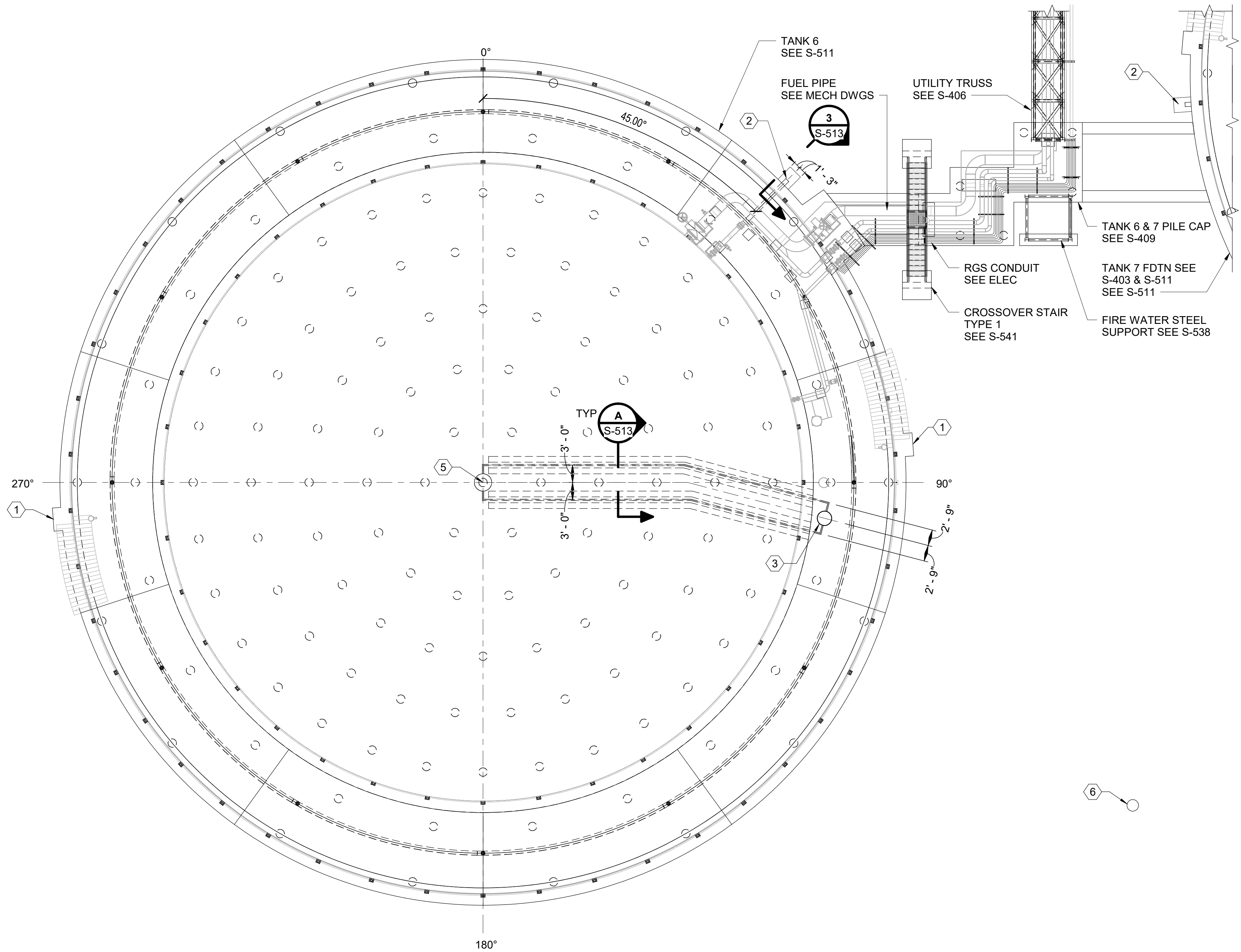
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 TANK 5 CONTAINMENT AREA PLAN

project	153929	contract	
drawing	S-401 - A		
file			

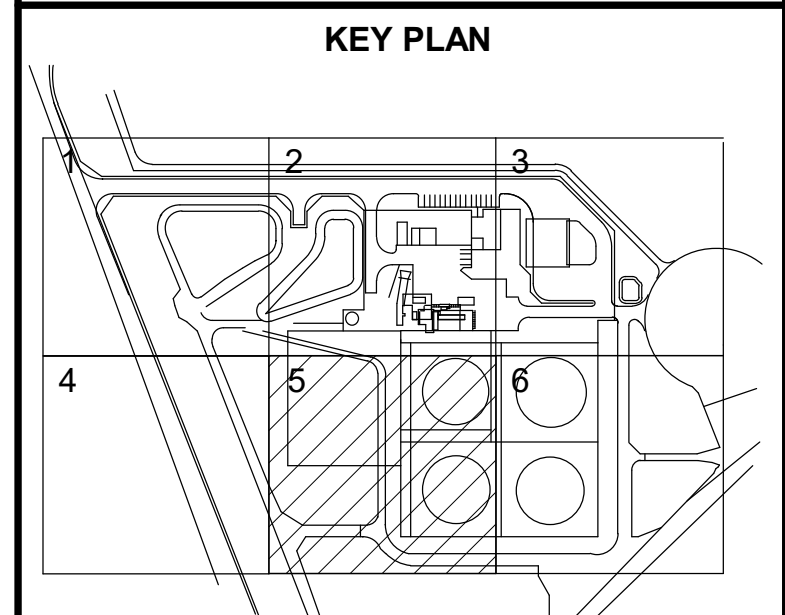




- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - SEE M-902 FOR TANK APPURTENANCE PLAN.

- KEYED NOTES:**
- TANK FOUNDATION EXTENSION FOR STAIR LANDING PER S-513.
  - CONTAINMENT DRAIN ECCENTRIC PLUG VALVE, SEE CIVIL DRAWINGS & B/S-513.
  - FOUNDATION DEWATERING SUMP, SEE S-514.
  - LIGHTPOLE FOUNDATION SEE S-531.
  - CENTER SUMP SEE S-514.
  - SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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KANSAS CITY, MO 64114  
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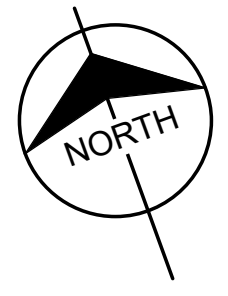
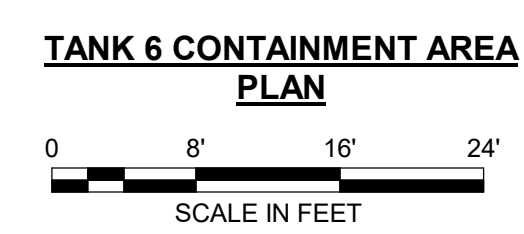
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

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PORTLAND, OREGON 97218

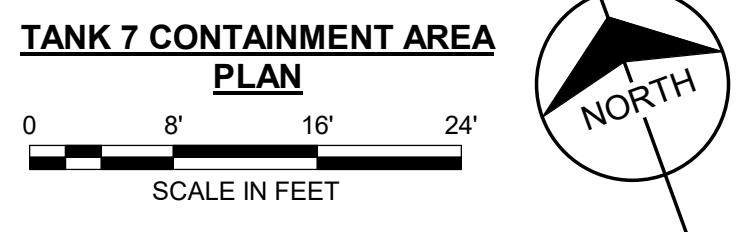
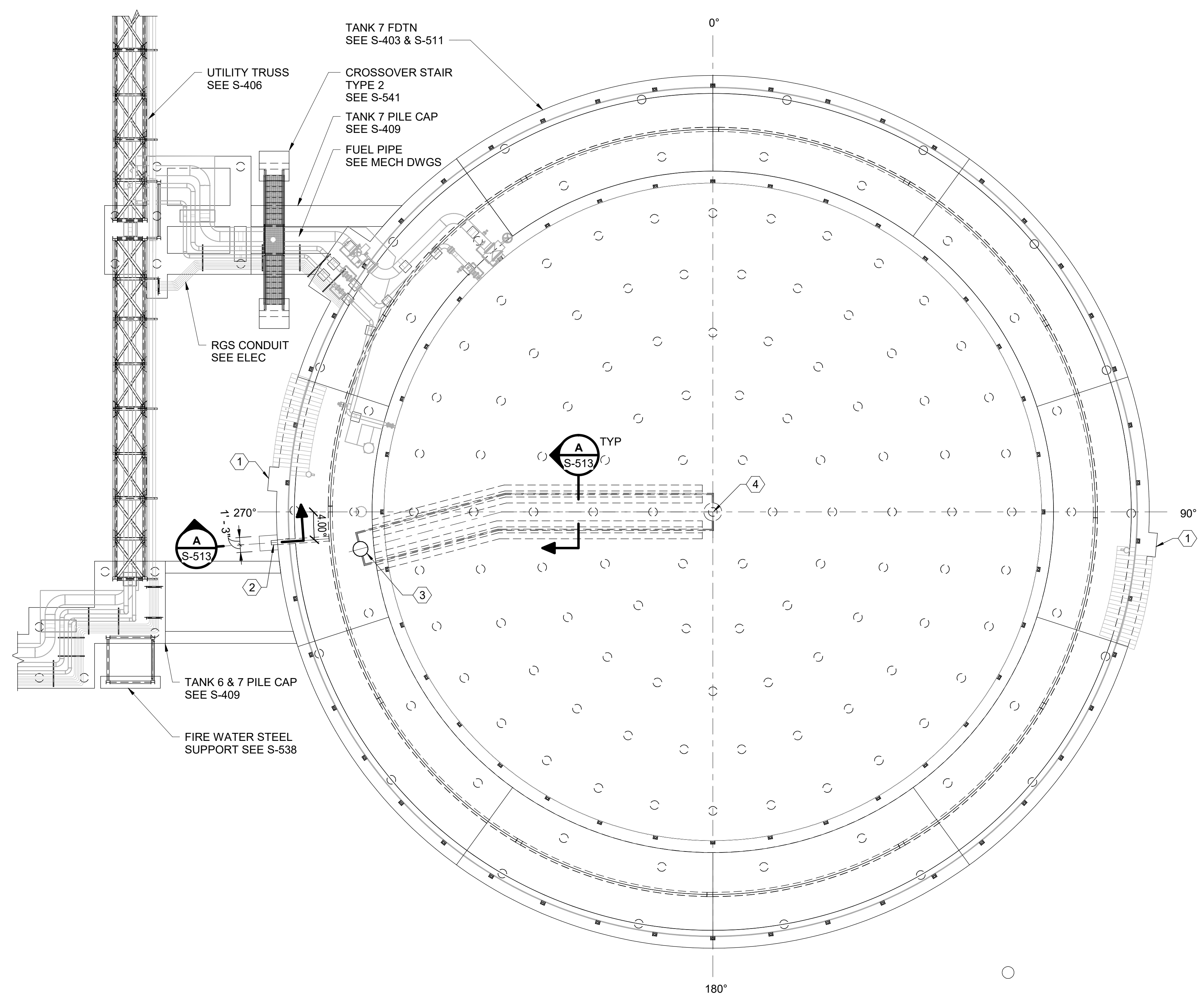
**PDX FACILITY IMPROVEMENTS**  
TANK 6 CONTAINMENT AREA PLAN

project	153929	contract	
drawing		rev.	
<b>S-402 - A</b>			
file			

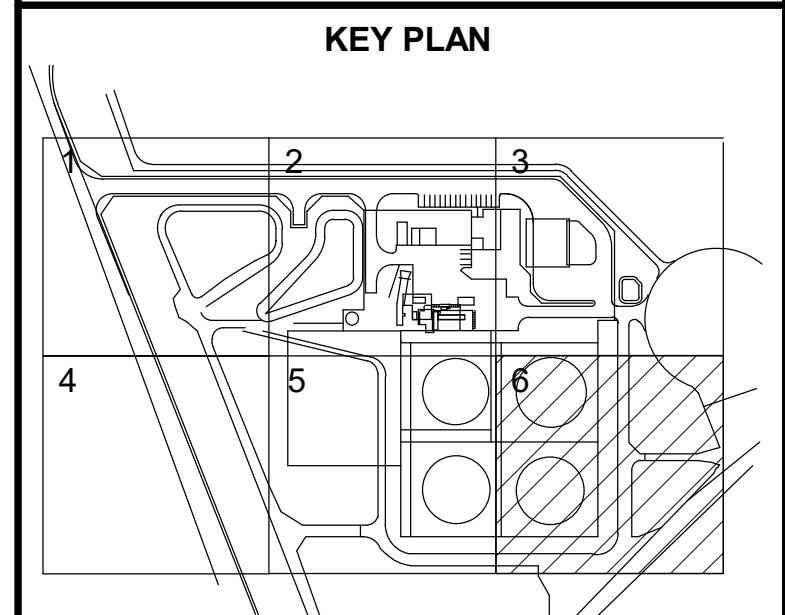


- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - SEE M-903 FOR TANK APPURTENANCE PLAN.

- KEYED NOTES:**
- TANK FOUNDATION EXTENSION FOR STAIR LANDING PER S-513.
  - CONTAINMENT DRAIN ECCENTRIC PLUG VALVE, SEE CIVIL DRAWINGS & B/S-513.
  - FOUNDATION DEWATERING SUMP, SEE S-514
  - CENTER SUMP, SEE S-514.
  - SECURITY EQUIP FOUNDATION, SEE ELECTRICAL DRAWINGS.



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

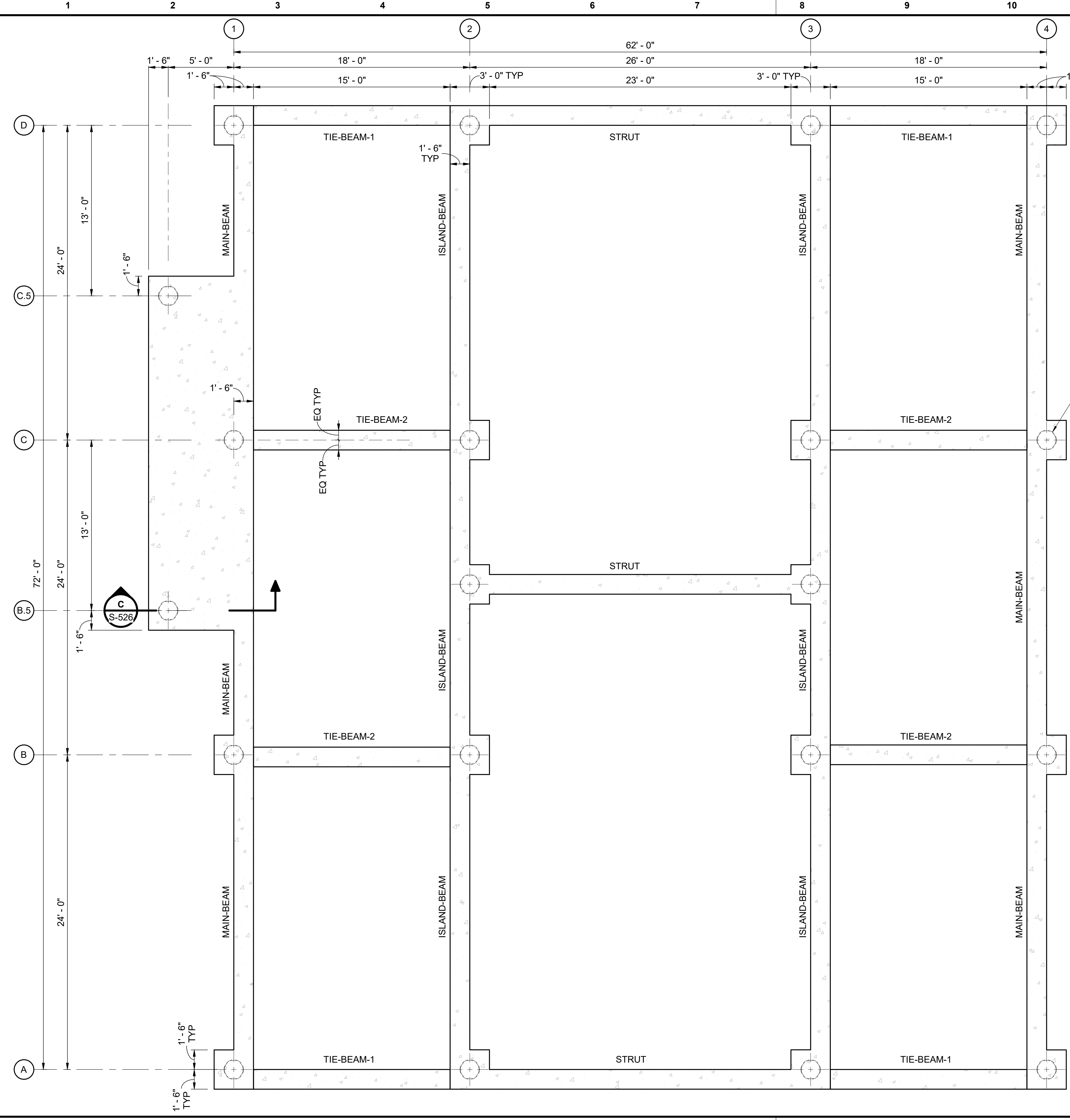
PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 TANK 7 CONTAINMENT AREA PLAN

project	153929	contract	
drawing		rev.	
<b>S-403 - A</b>			
file			



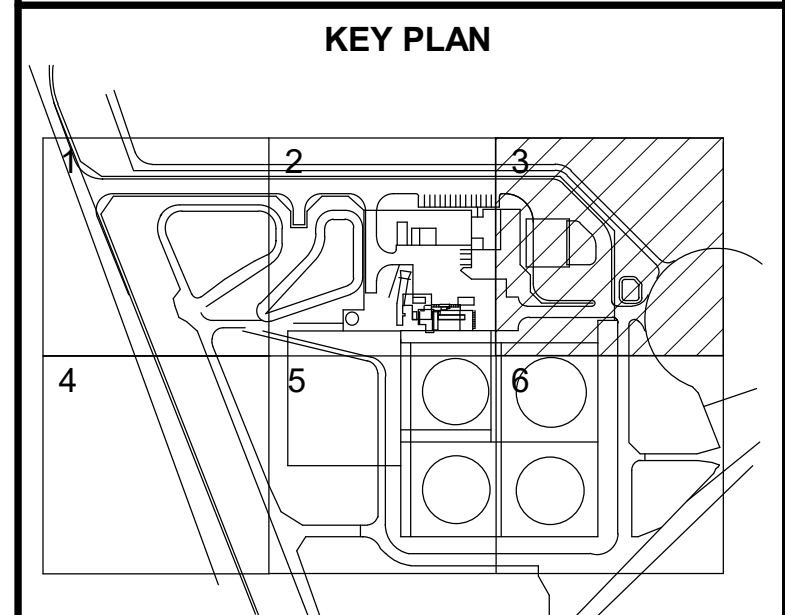
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- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - SEE S-526 FOR TIE BEAM SCHEDULE.
  - SEE S-503 FOR PILE INFORMATION.

- KEYED NOTES:**
- ① CONCRETE FILLED STEEL PIPE PILE SEE S-503.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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**BURNS MEDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
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date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

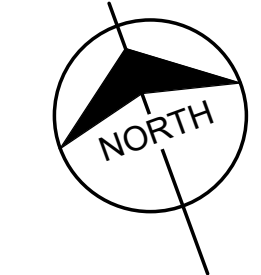
**PDX FACILITY IMPROVEMENTS**  
 TRUCK OFFLOAD / HCTS AREA - PILING & TIE BEAM PLAN

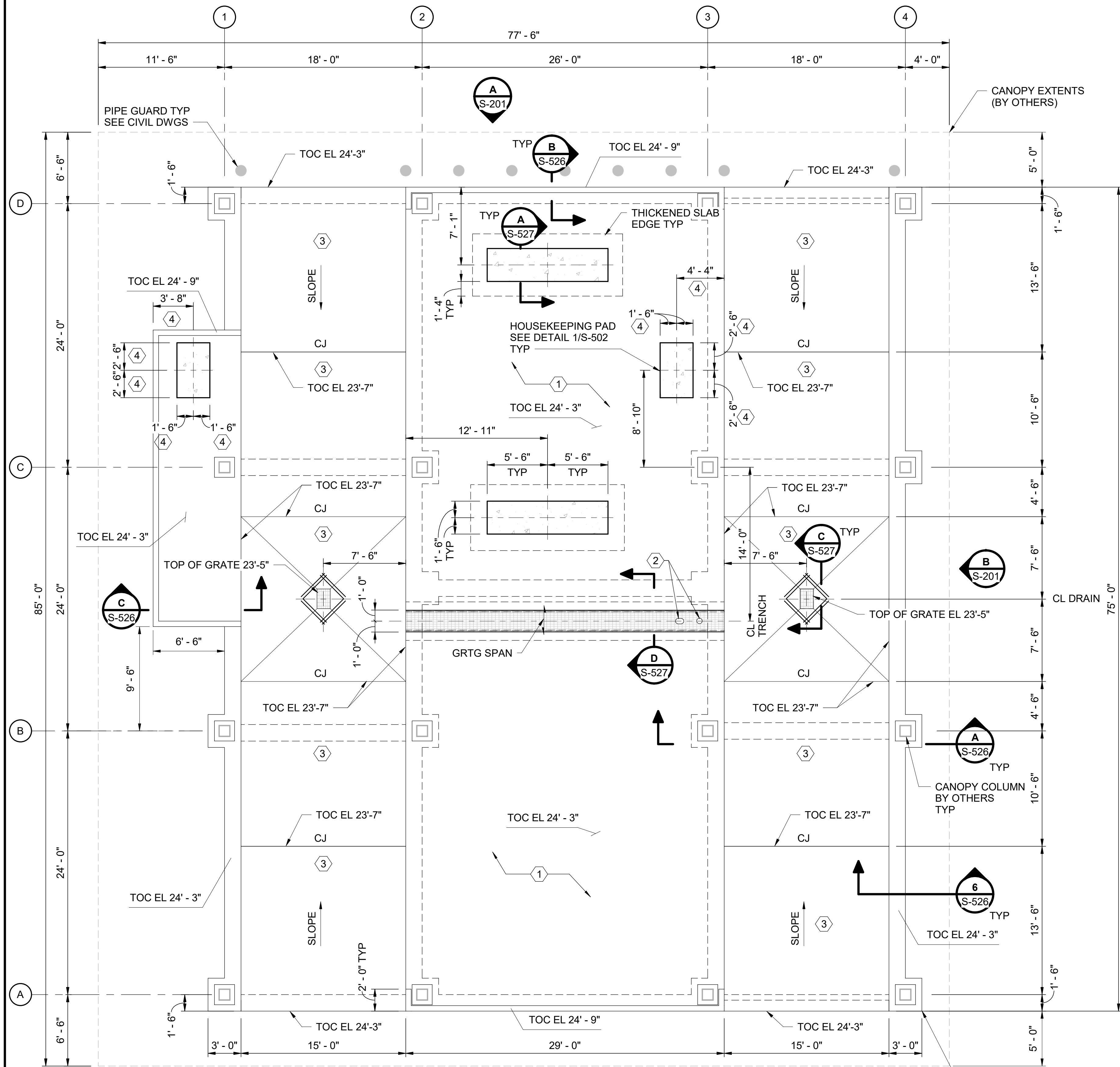
project	153929	contract	
drawing		rev.	
<b>S-404 - A</b>			

file

**OFFLOAD / HCTS AREA PILING & TIE BEAM PLAN**

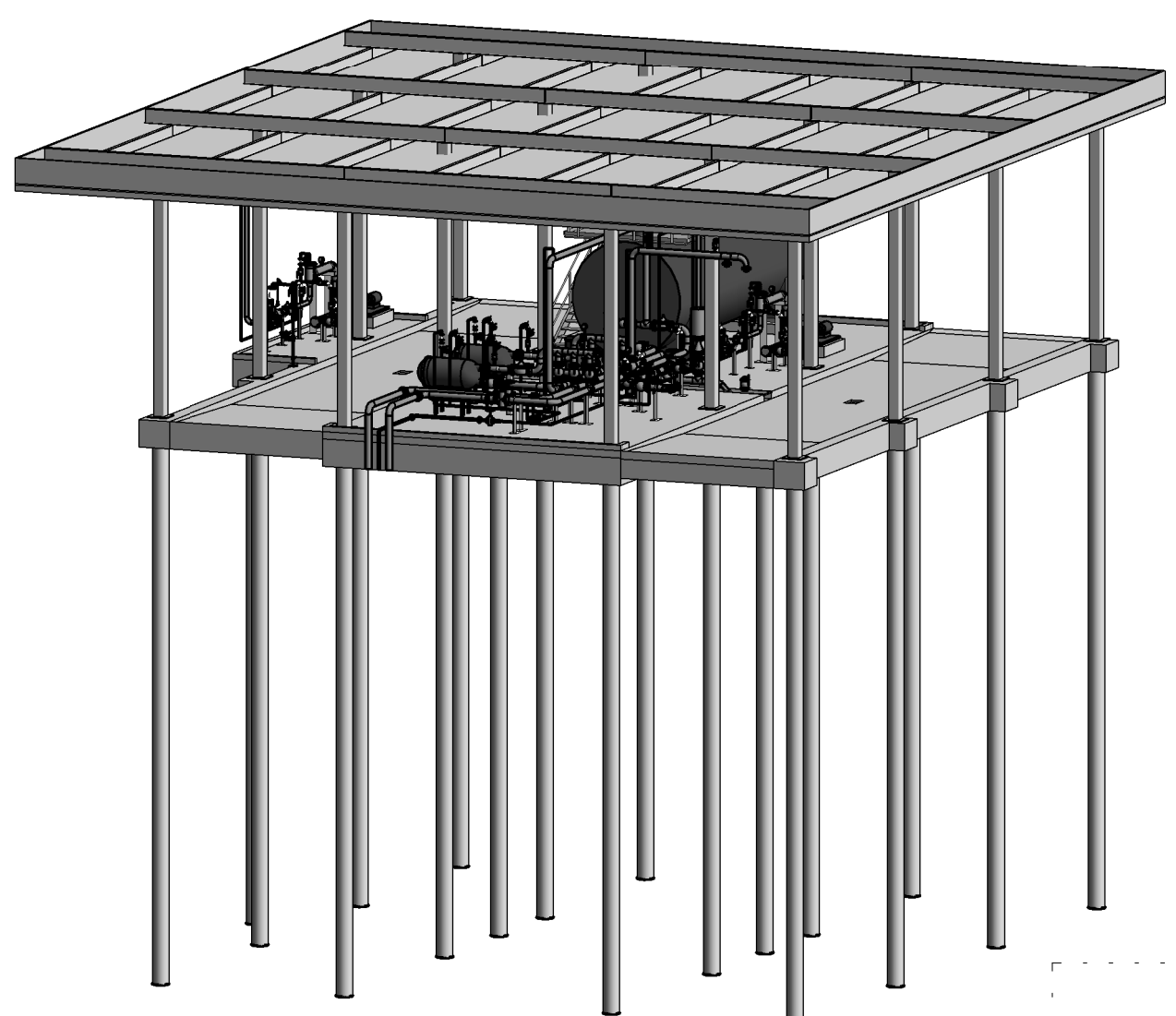
0 2' 4' 8'  
 SCALE IN FEET



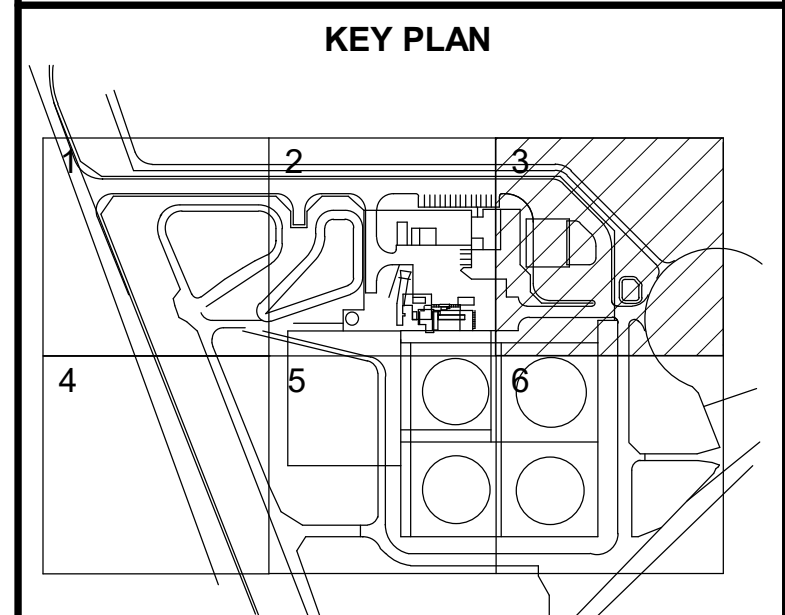


- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - FOR CONSTRUCTION JOINTS (CJ) DETAILS, SEE S-501 ALL JOINTS MUST BE SEALED WITH FUEL RESISTANT SEALANT.
  - PROVIDE NEENAH R-4003 TYPE C OR APPROVED EQUAL GRATED CONTAINMENT DRAIN. SEE CIVIL DRAWINGS FOR DRAIN PIPE ROUTING.
  - FOR SIZE, LOCATION, AND DETAIL OF PIPE AND CONDUIT PENETRATIONS NOT SHOWN, SEE MECHANICAL AND ELECTRICAL DRAWINGS.
  - PROVIDE BROOMED FINISH.
  - PROVIDE TWO COATS OF PENETRATING SEALER/HARDENER TO ALL EXPOSED CONCRETE SURFACES OF THE TRUCK OFFLOAD / HCTS AREA. SEE 03 30 00 LIQUID FLOOR TREATMENTS.
  - SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 DRAWING SERIES FOR PIPE SUPPORT DETAILS. PIPE SUPPORTS NOT SHOWN FOR CLARITY.
  - COORDINATE TANK ANCHORAGE REQUIREMENTS WITH THE TANK MFR. UNLESS LARGER QUANTITY OR SIZE IS REQUIRED BY TANK MFR, PROVIDE THE FOLLOWING TANK ANCHORAGE TO THE FOUNDATION PER S-527.
  - TANK ACCESS PLATFORM AND STAIR MUST BE PROVIDED BY TANK MFR. DESIGN PLATFORMS AND STAIRS FOR 100 PSF LIVE LOAD AND APPROPRIATE SEISMIC AND WIND LOADS BASED ON CRITERIA ON S-001.
  - TANK SEISMIC DESIGN PARAMETERS: HORIZONTAL, SADDLE-SUPPORTED WELDED STEEL VESSELS  
 R = 3.0  
 Ω = 2.0  
 Cd = 2.5
  - FOUNDATION BASE SHEAR:  
 A. Cs = 0.266  
 B. SHEAR = 351 KIPS

- KEYED NOTES:**
- 8" STRUCTURAL SLAB WITH #5 @ 10" EACH WAY MID DEPTH.
  - GRATING OPENINGS FOR MECHANICAL PIPING, COORDINATE WITH MECHANICAL DRAWINGS FOR SIZE AND LOCATION, BAND ALL EDGES.
  - 9" STRUCTURAL SLAB WITH #5 @ 12" NORTH-SOUTH TOP AND BOTTOM AND #5 @ 6" EW TOP AND BOTTOM EAST-WEST.
  - COORDINATE FINAL DIMENSIONS AND TOP OF CONCRETE OF HOUSEKEEPING PADS WITH ACTUAL EQUIPMENT PROVIDED.



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 9400 WARD PARKWAY  
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 Burns & McDonnell Engineering Co, Inc.

date	6/06/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

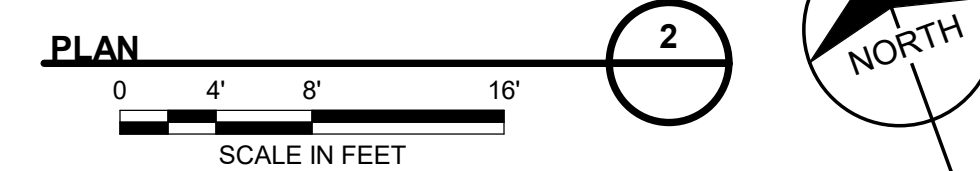
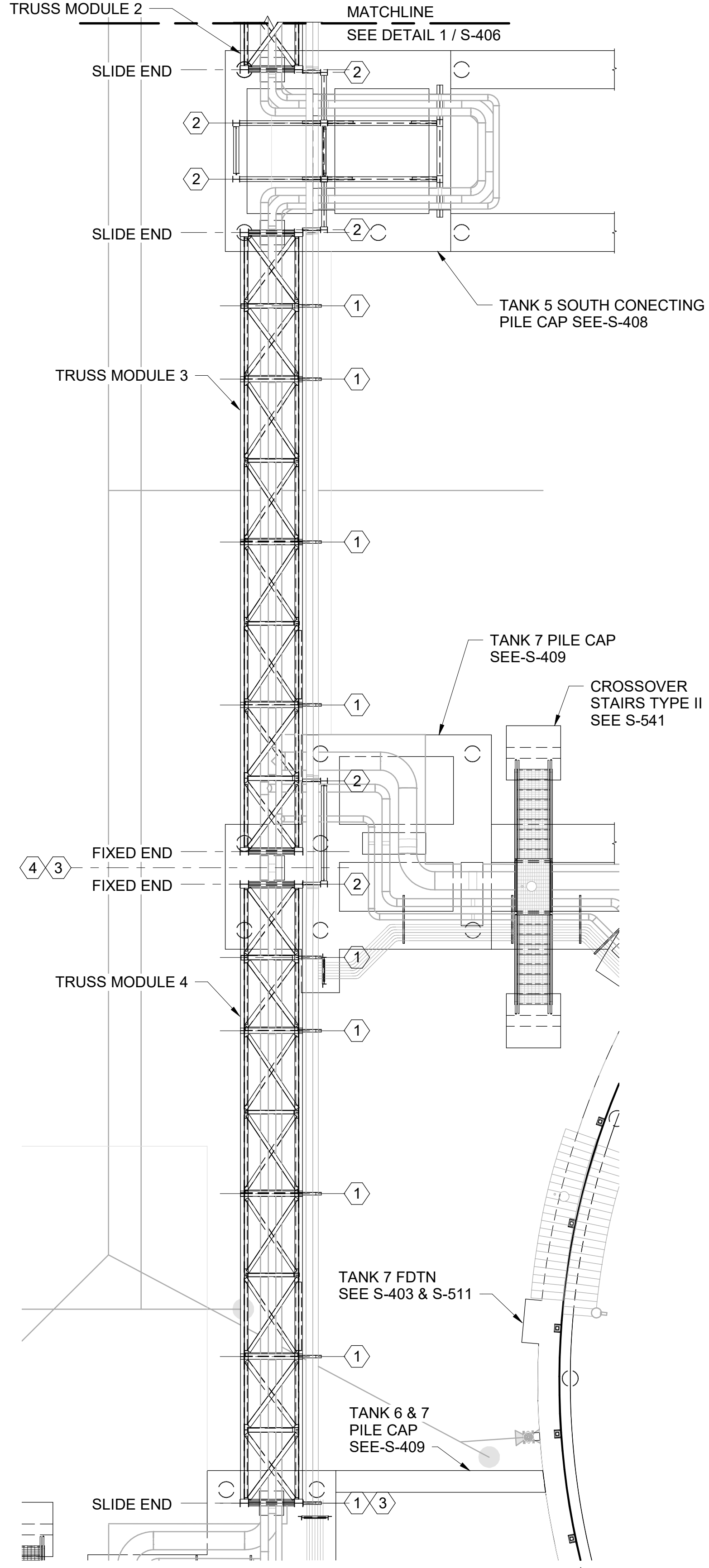
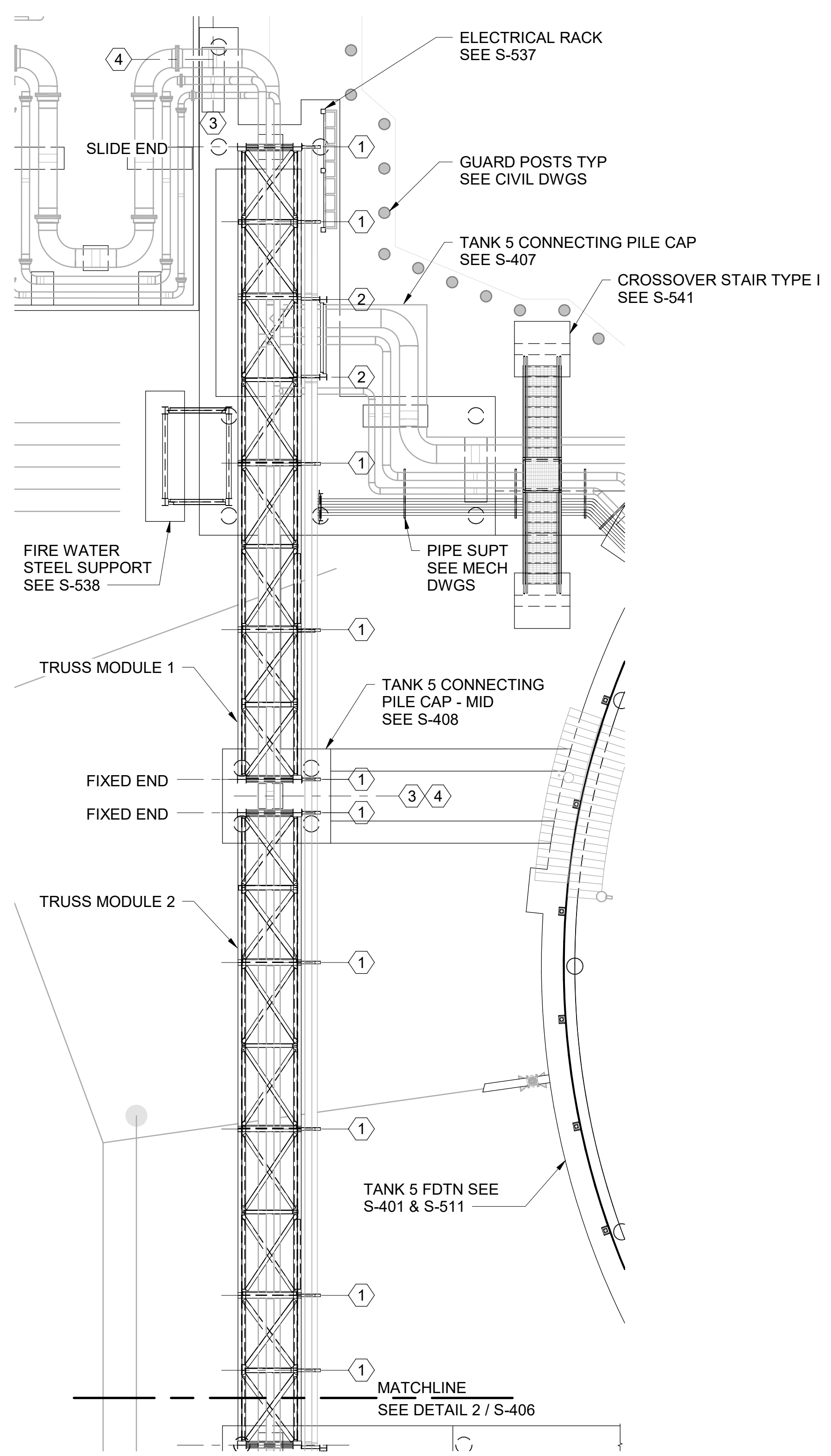
**PDX FACILITY IMPROVEMENTS**  
 TRUCK OFFLOAD / HCTS AREA - PILE CAP PLAN

project	153929	contract	
drawing		rev.	
<b>S-405 - A</b>			

file







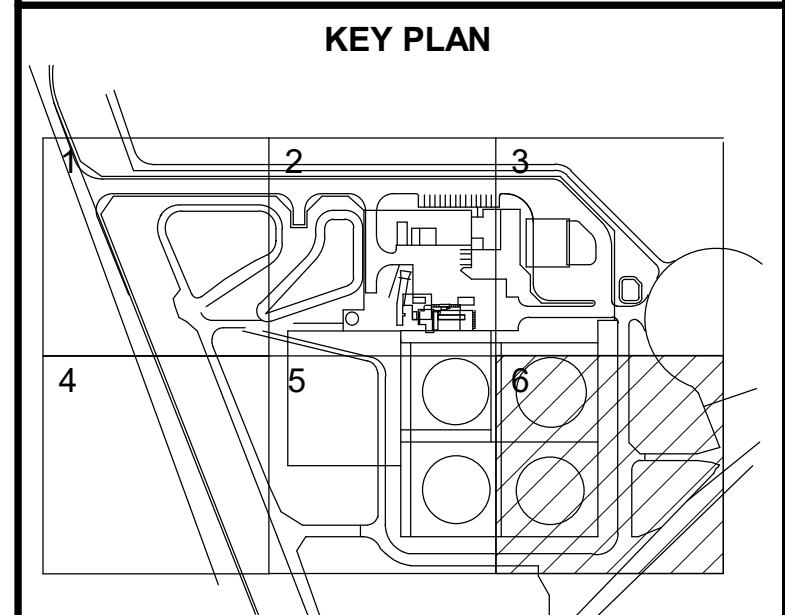
**NOTES:**

1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
5. SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.
6. SEE S-532 THROUGH S-536 FOR UTILITY TRUSS DETAILS.
7. UTILITY TRUSS MODULES STEEL SEISMIC DESIGN PARAMETERS:
  - A. STEEL ORDINARY MOMENT FRAMES (ALL DIRECTIONS)
  - R = 1.0
  - Ω = 1.0
  - Cd = 1.0
  - p = 1.3
  - EQUIVALENT LATERAL FORCE ANALYSIS
  - Cs = 0.885
  - BASE SHEAR = 26.16 KIPS

**KEYED NOTES:**

- ① INDICATES LOCATION OF CABLE TRAY SUPPORT AT TRUSS MODULE, SEE S-534 FOR DETAILS.
- ② INDICATES LOCATION OF CABLE TRAY SUPPORT BY SEPARATE STEEL STRUCTURE, SEE S-537 AND ELECTRICAL DRAWINGS.
- ③ INDICATES GUIDED SUPPORT AT PIPING, SEE MECHANICAL DRAWINGS.
- ④ INDICATES LINSTOP SUPPORT AT PIPING, SEE MECHANICAL DRAWINGS.

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date	6/06/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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PORTLAND INTERNATIONAL AIRPORT  
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**PDX FACILITY IMPROVEMENTS  
UTILITY TRUSS PLAN**

project	153929	contract	
drawing		rev.	
		<b>S-406 - A</b>	

file

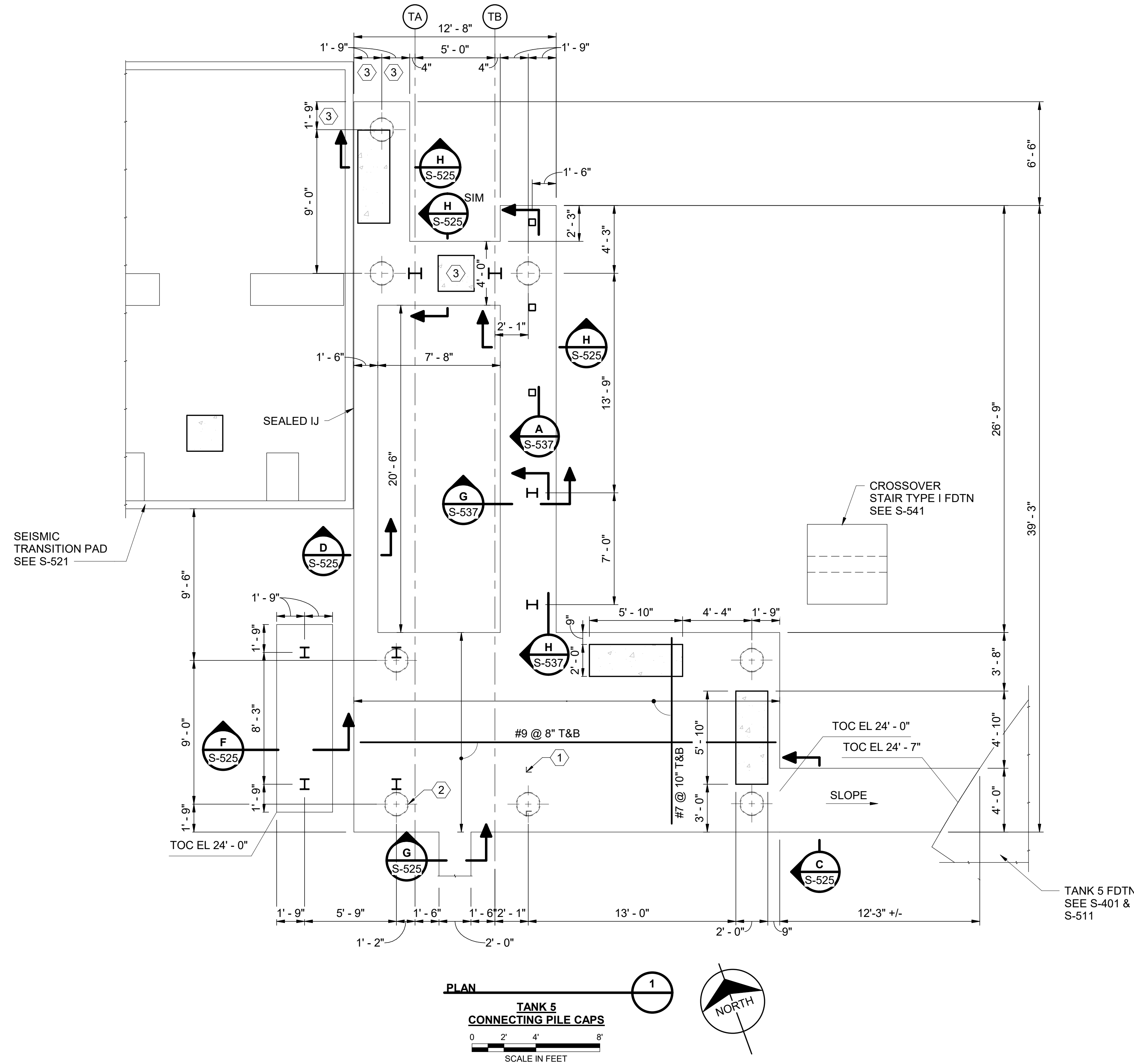


**NOTES:**

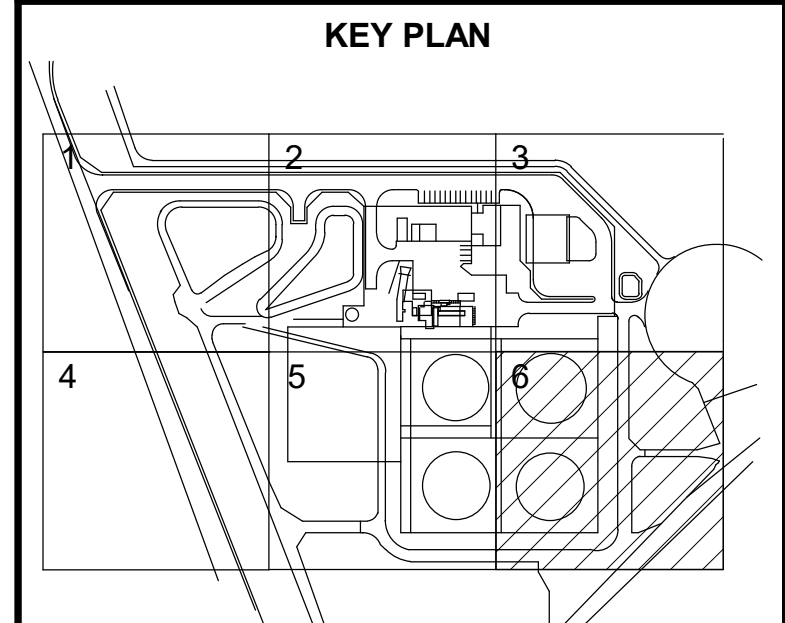
1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
5. SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.

**KEYED NOTES:**

- ① CONDUIT SUPPORT SEE S-537.
- ② SEE S-503 FOR CONCRETE FILLED STEEL PIPE PILE INFORMATION.
- ③ COORDINATE FINAL DIMENSIONS AND TOP OF CONCRETE WITH ACTUAL EQUIPMENT PROVIDED.



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date	11/19/23	detailed	M. PATEL
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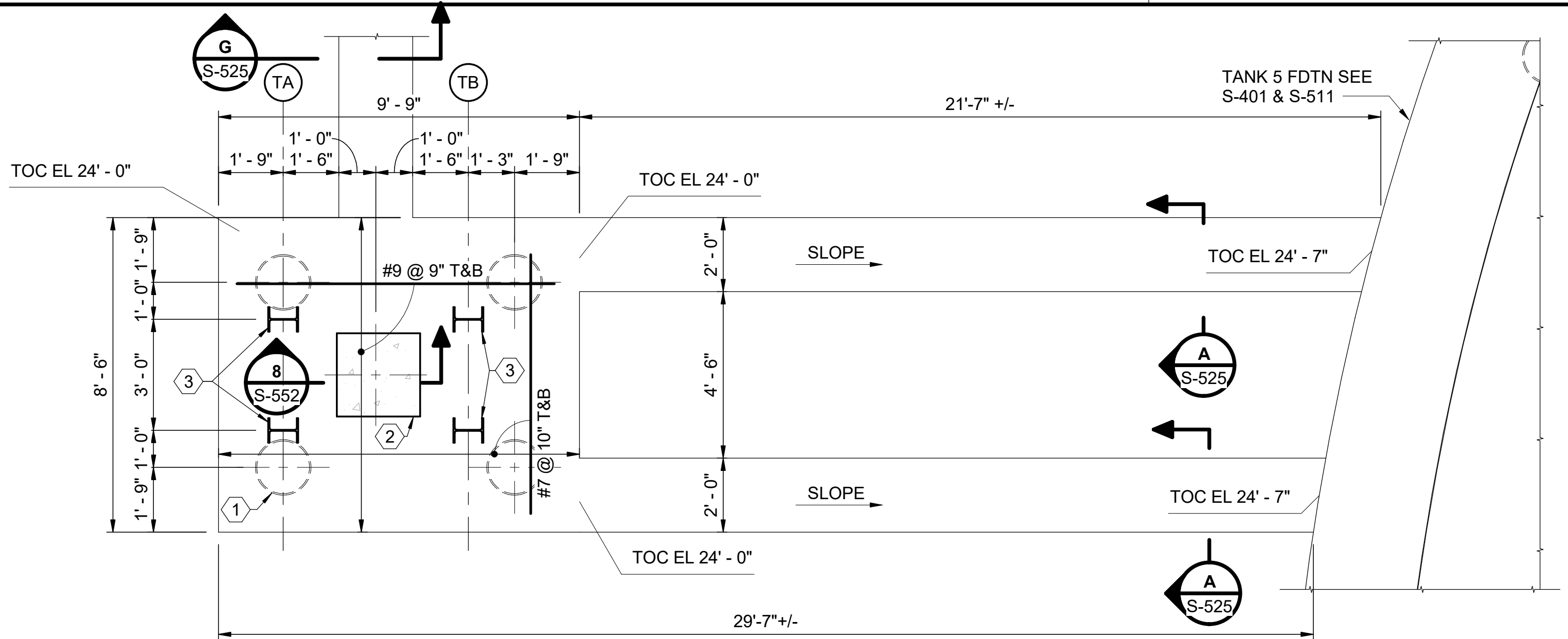
**PDX FACILITY IMPROVEMENTS**  
TANK 5 NORTH CONNECTING PILE CAP

project	153929	contract	
drawing		rev.	

**S-407 - A**

file

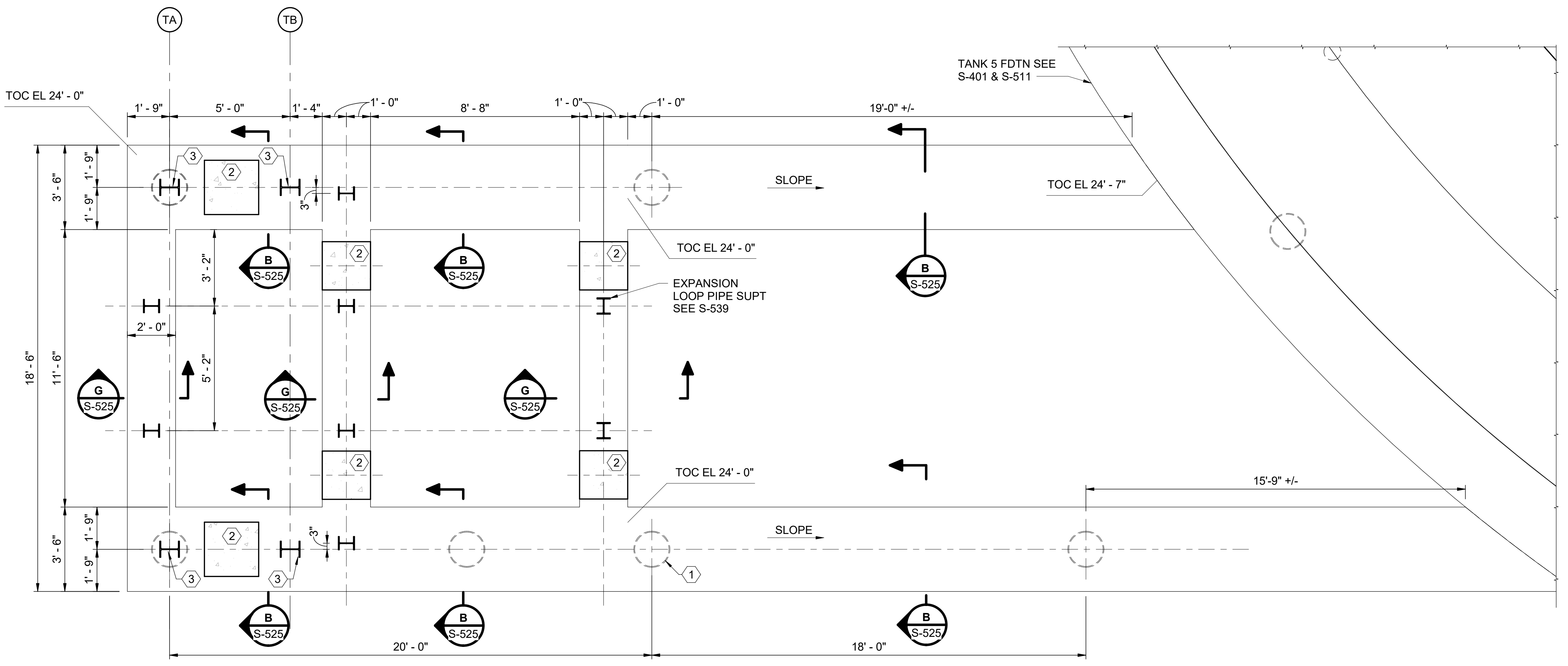




**PLAN**  
**TANK 5**  
**CONNECTING PILE CAP - MID**  
 SCALE IN FEET

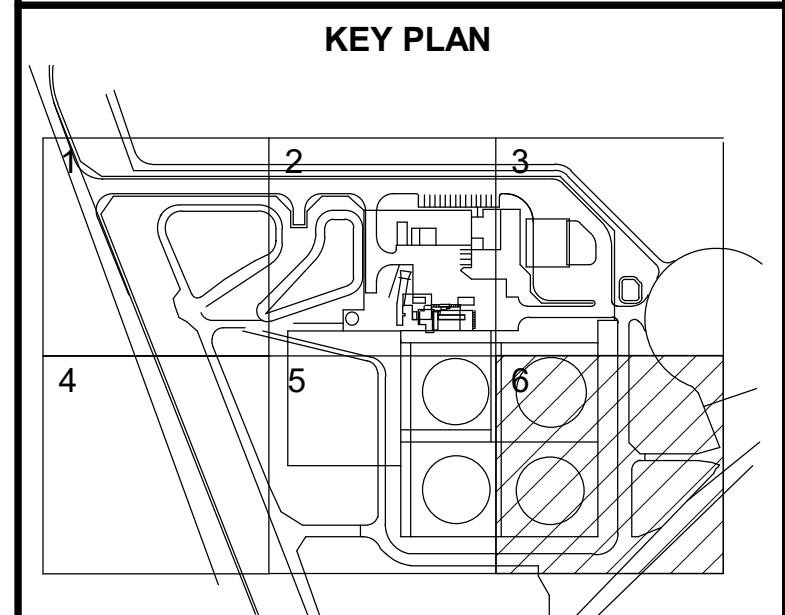
- NOTES:**
1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  5. SEE S-503 FOR CONCRETE FILLED STEEL PIPE PILE INFORMATION.
  6. SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.

- KEYED NOTES:**
- ① SEE S-503 FOR CONCRETE FILLED STEEL PIPE PILE INFORMATION.
  - ② COORDINATE FINAL DIMENSIONS AND TOP OF CONCRETE WITH ACTUAL EQUIPMENT PROVIDED.
  - ③ UTILITY TRUSS SEE S-406.



**PLAN**  
**TANK 5**  
**SOUTH CONNECTING PILE CAP**  
 SCALE IN FEET

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designed	A. KRAL	checked	K. MICHAELIS

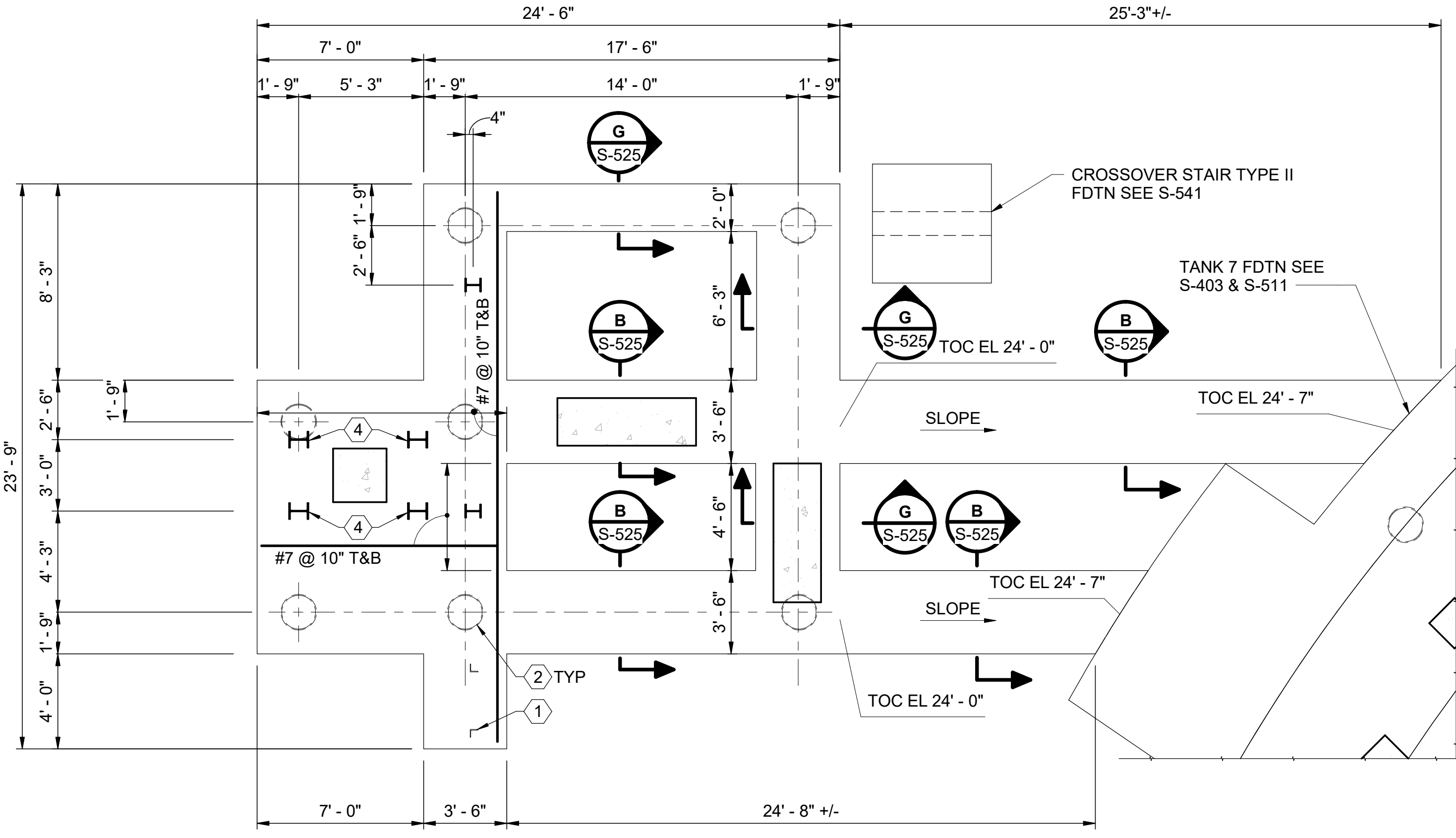
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**PDX FACILITY IMPROVEMENTS**  
 TANK 5 MIDDLE & SOUTH CONNECTING PILE CAPS

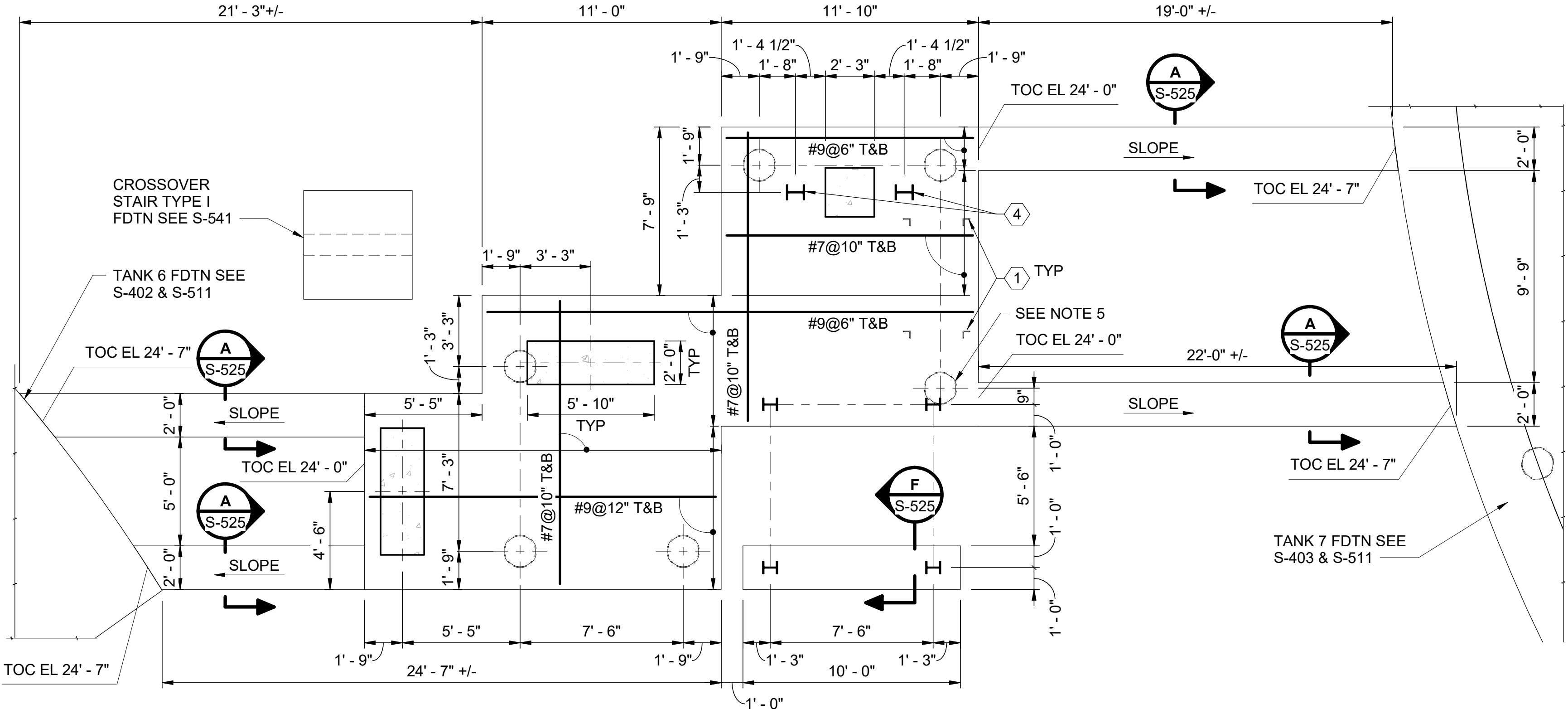
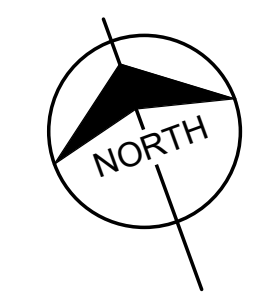
project	153929	contract	
drawing		rev.	

**S-408 - A**

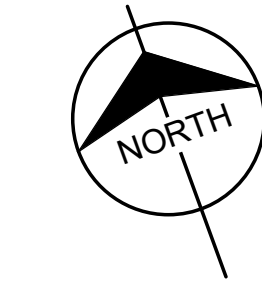




**TANK 7 PILE CAP**  
SCALE IN FEET



**TANK 6 & 7 PILE CAP**  
SCALE IN FEET



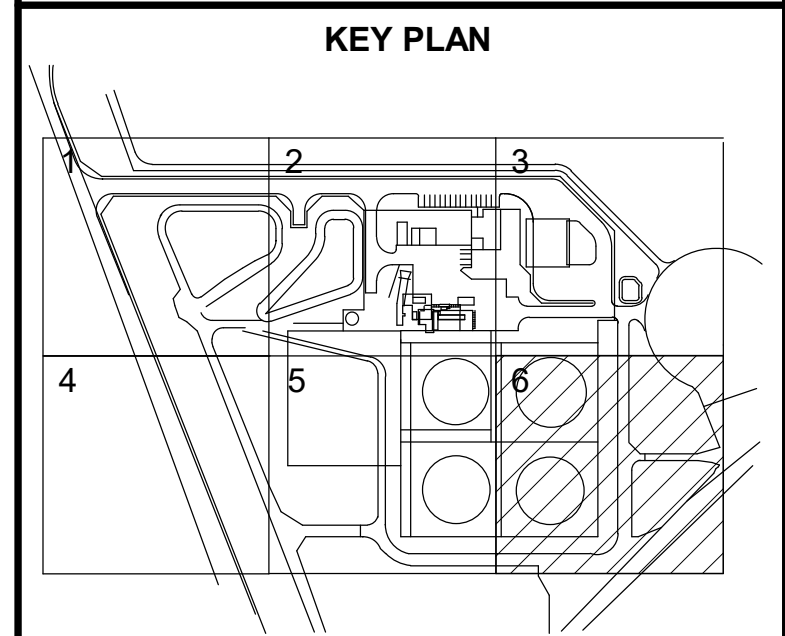
**NOTES:**

1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
5. SEE S-503 FOR CONCRETE FILLED STEEL PIPE PILE INFORMATION.
6. SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.

**KEYED NOTES:**

- ① CONDUIT SUPPORT SEE S-537.
- ② SEE S-503 FOR CONCRETE FILLED STEEL PIPE PILE INFORMATION.
- ③ COORDINATE FINAL DIMENSIONS AND TOP OF CONCRETE WITH ACTUAL EQUIPMENT PROVIDED.
- ④ UTILITY TRUSS SEE S-406.

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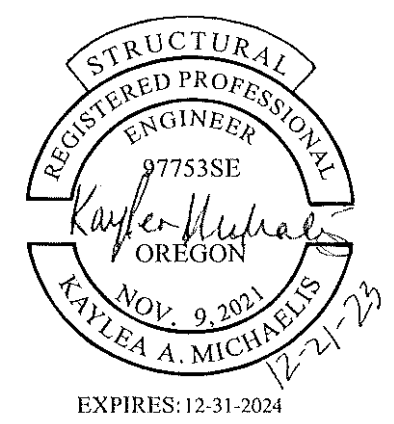
date	11/19/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
TANK 6 & 7 CONNECTING PILE CAPS

project	153929	contract	
drawing		rev.	
<b>S-409 - A</b>			

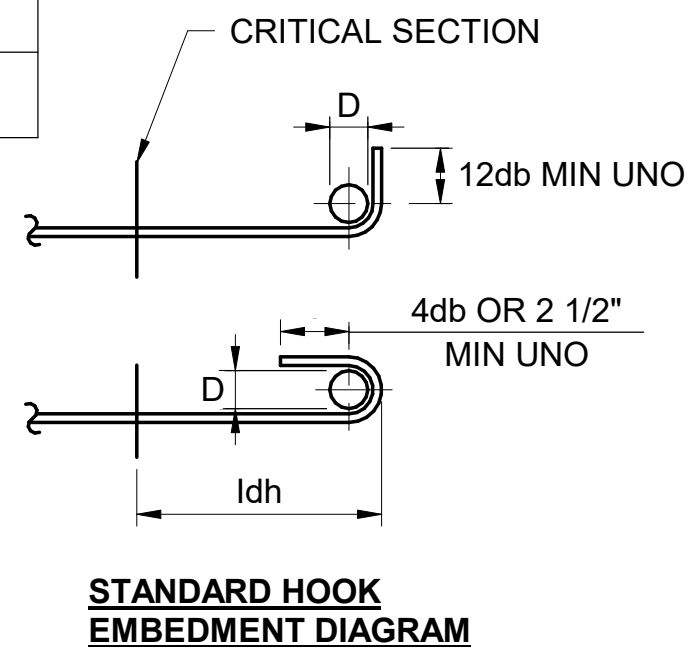


BAR SIZE	BAR DIAMETER (db) in.	INSIDE BEND DIAMETER (D) in.	6,000 PSI CONCRETE (PILE CAPS, STRUCTURAL SLABS & ASSOCIATED TIE BEAMS)		
			DEVELOPMENT SPLICE LENGTH		STD HOOK EMBEDMENTS (ldh)
			TYPICAL BARS	TOP BARS	
#3	0.375	2.25	12	12	6
#4	0.500	3.00	13	16	7
#5	0.625	3.75	18	24	9
#6	0.750	4.50	25	33	12
#7	0.875	5.25	41	53	15
#8	1.000	6.00	51	66	18
#9	1.128	9.00	62	80	22
#10	1.270	10.13	75	97	26
#11	1.410	11.28	89	115	30

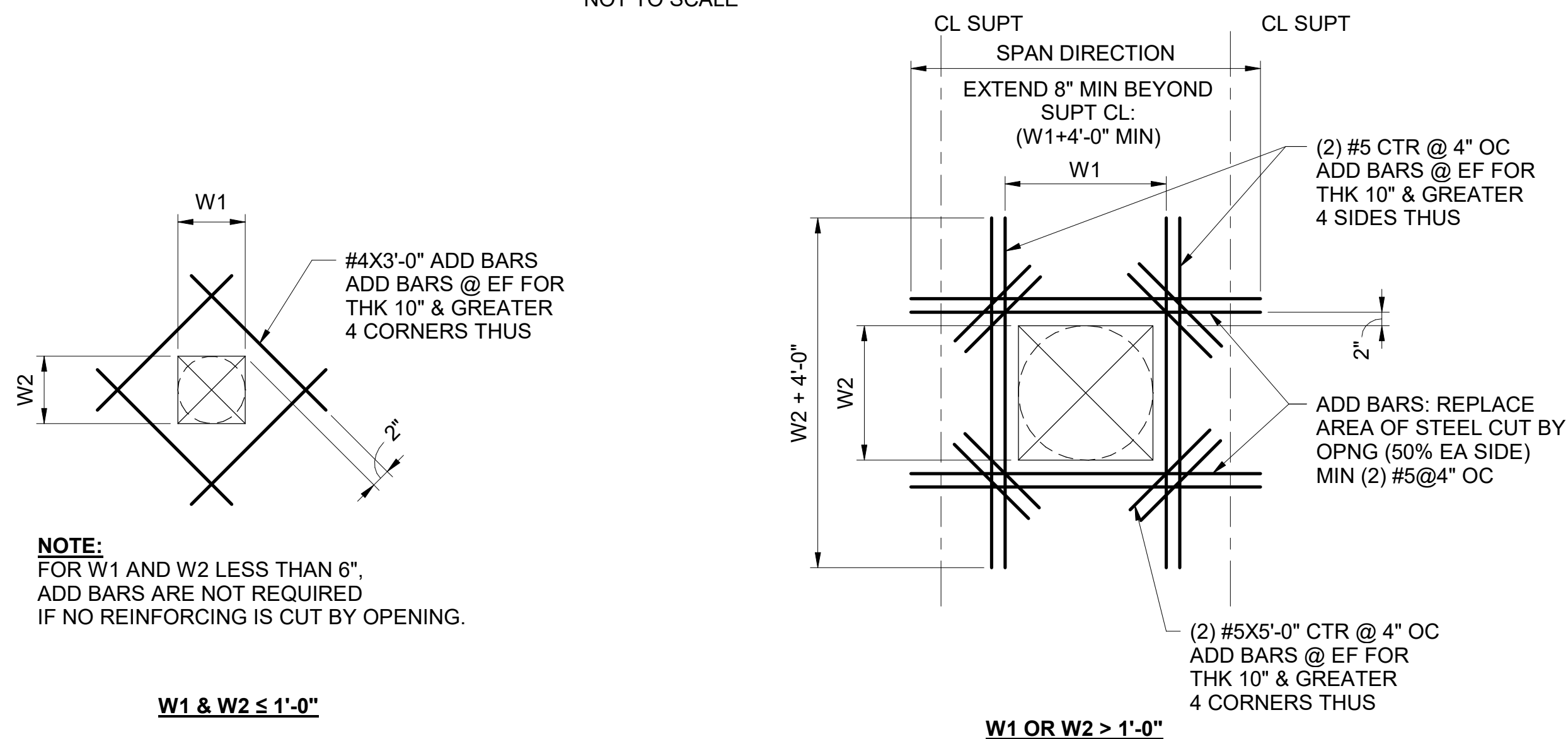
BAR SIZE	BAR DIAMETER (db) in.	INSIDE BEND DIAMETER (D) in.	4,500 PSI CONCRETE (EXTERIOR)		
			DEVELOPMENT SPLICE LENGTH		STD HOOK EMBEDMENTS (ldh)
			TYPICAL BARS	TOP BARS	
#3	0.375	2.25	12	14	6
#4	0.500	3.00	14	19	7
#5	0.625	3.75	21	27	10
#6	0.750	4.50	29	38	12
#7	0.875	5.25	47	61	15
#8	1.000	6.00	59	76	19

**TABLE NOTES:**

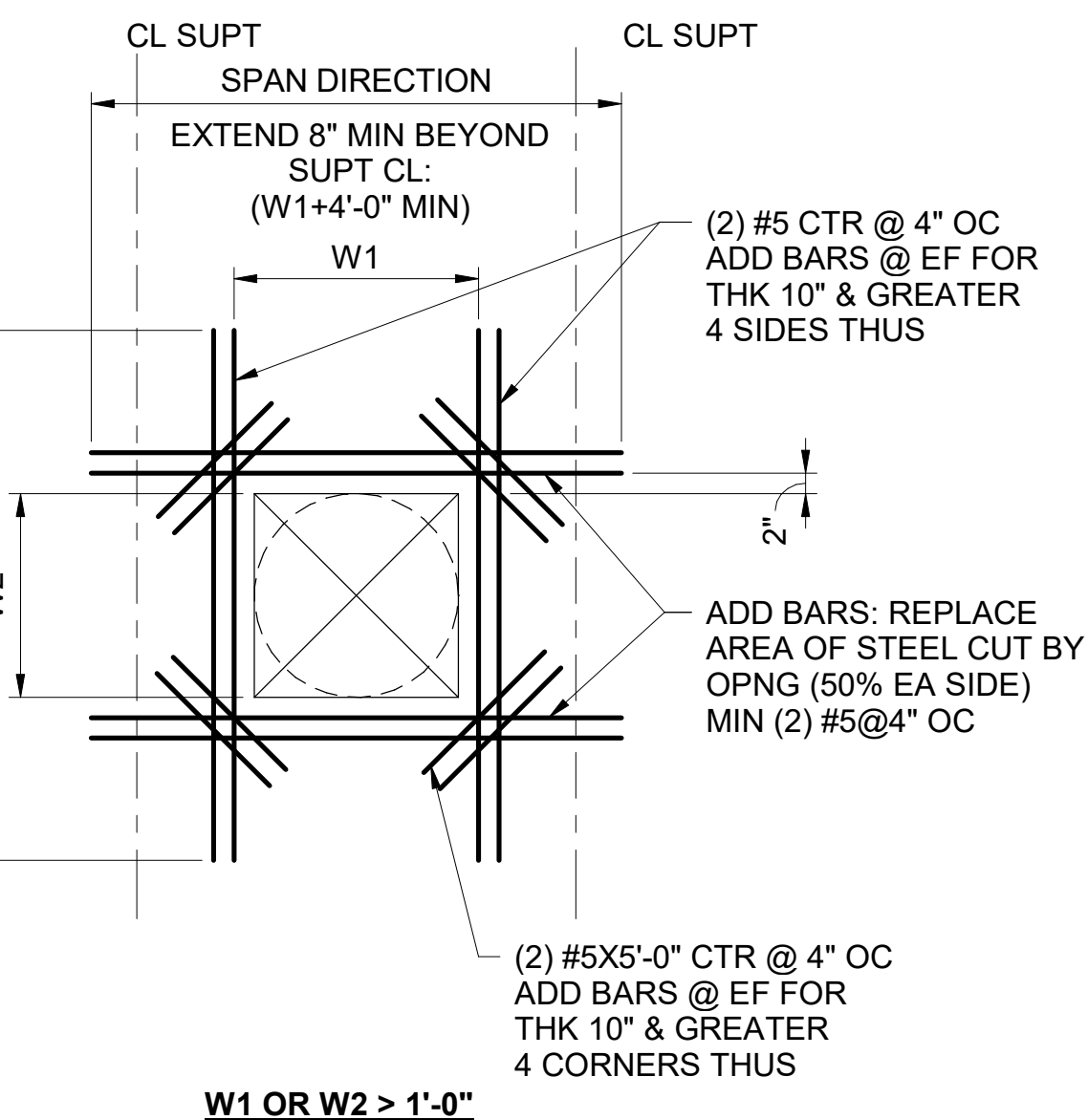
- THIS TABLE CONFORMS TO ACI 318, CLASS B TENSION LAP SPLICE FOR NORMAL WEIGHT CONCRETE AND 60,000 PSI UNCOATED REINFORCEMENT WITH CLEAR SPACING BETWEEN BARS GREATER THAN 2" AND CLEAR COVER GREATER THAN 1". PROVIDE 2" MINIMUM COVER BEYOND END OF STANDARD HOOKS. MAKE ADJUSTMENTS FOR OTHER MORE CRITICAL CONDITIONS.
- PROVIDE SPLICES AS SHOWN ABOVE UNLESS OTHERWISE NOTED ON THE DRAWINGS. SUBSTITUTION OF SPLICE LENGTHS SHORTER THAN THOSE GIVEN MUST BE IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF ACI 318 WITH WRITTEN APPROVAL OF ENGINEER.
- TOP BARS ARE ANY HORIZONTAL OR INCLINED REINFORCEMENT HAVING MORE THAN 12" OF CONCRETE PLACED BELOW THE REINFORCEMENT. VERTICAL BARS MAY BE CLASSIFIED AS NON-TOP BARS.
- EMBEDMENT FOR STANDARD HOOK (ldh) IS THE MINIMUM STRAIGHT LINE DISTANCE FROM THE CRITICAL SECTION IN THE BAR (I.E. AT A JOINT) TO THE FARTHEST EDGE OF THE HOOK. SEE HOOK EMBEDMENT DIAGRAM.



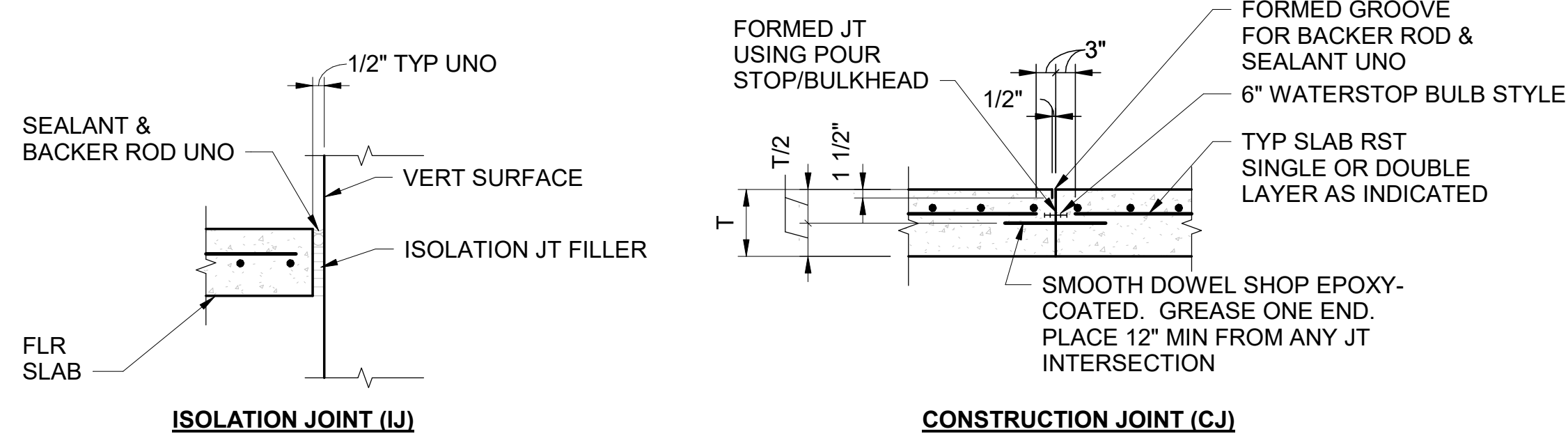
**DETAIL 1**  
MINIMUM EMBEDMENT AND LAP SPLICE LENGTHS (INCHES)  
NOT TO SCALE



**DETAIL 4**  
TYPICAL ADDED REINFORCEMENT AROUND CONCRETE OPENINGS LESS THAN 1'-0"  
NOT TO SCALE



**DETAIL 5**  
TYPICAL ADDED REINFORCEMENT AROUND CONCRETE OPENINGS GREATER THAN 1'-0"  
NOT TO SCALE



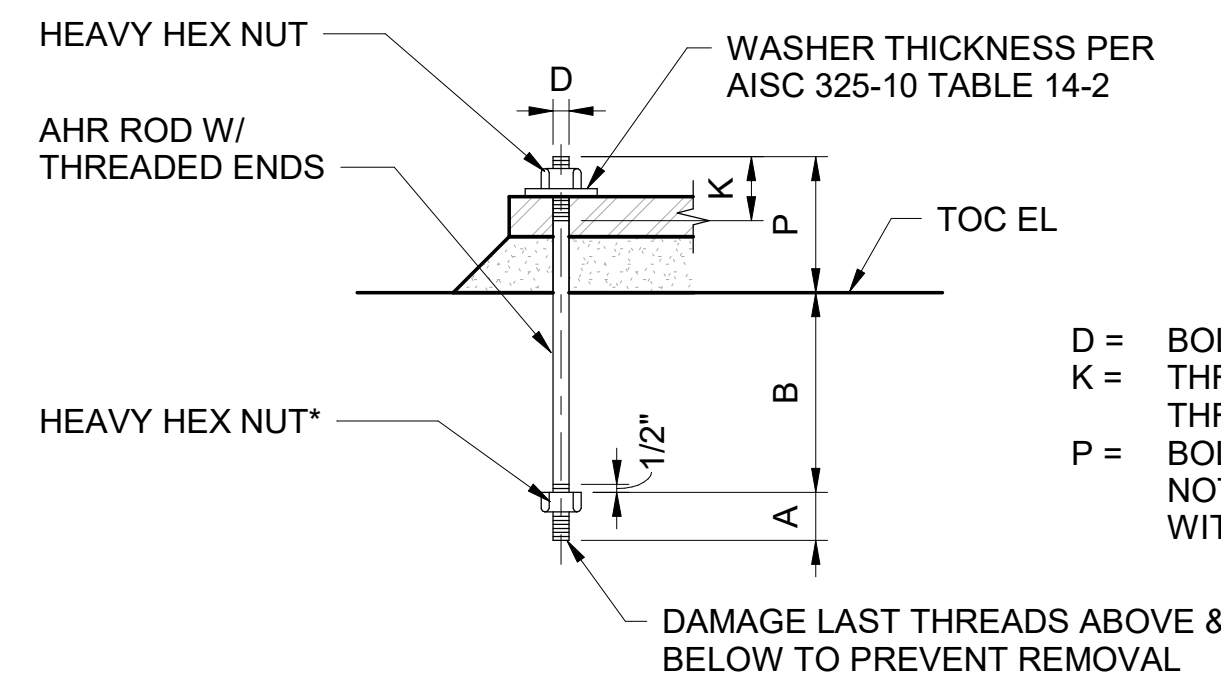
SMOOTH DOWEL SCHEDULE			
LOCATION	DIAMETER	LENGTH	SPACING
9"-12" SLAB	1"	1'-6"	1'-0"

**NOTES:**

- PROVIDE FUEL RESISTANT JOINT SEALANT, UNLESS NOTED OTHERWISE.
- PROVIDE SMOOTH DOWELS IN JOINTS OF THICKENED SLAB EDGES SIMILARLY AS SHOWN ABOVE.
- INSTALL DOWELS IN CONTRACTION JOINTS USING PREFABRICATED DOWEL BASKET ASSEMBLIES.

**DETAIL 2**  
TYPICAL JOINT DETAILS  
NOT TO SCALE

SCHEDULE			
D	A*	B	REMARKS
3/8"	2"	6"	
1/2"	2"	7"	
5/8"	2"	10"	
3/4"	2"	1'-0"	
7/8"	3"	1'-2"	
1"	3"	1'-4"	
1 1/8"	3"	1'-6"	
1 1/4"	3"	1'-8"	
1 3/8"	4"	1'-10"	
1 1/2"	4"	2'-0"	
1 3/4"	4"	2'-5"	
2"	4"	2'-10"	

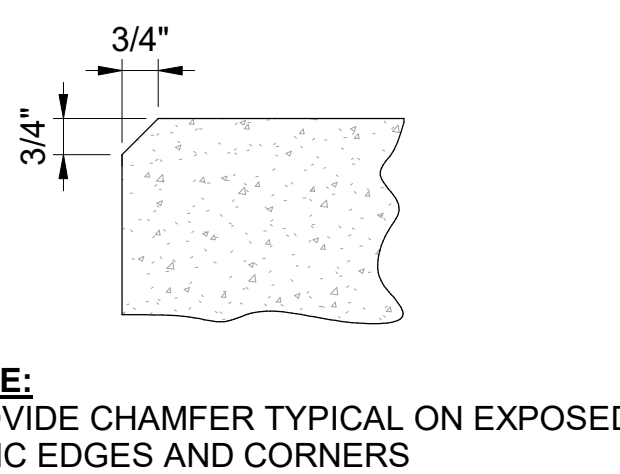


- D = BOLT DIAMETER
- K = THREADS (2D+3" SINGLE NUT) THREADS (3D+3" DOUBLE NUTS)
- P = BOLT PROJECTION, SEE PLAN. IF NOT INDICATED, COORDINATE WITH EQUIPMENT

**NOTES:**

- \* NOT REQUIRED FOR MACHINE BOLTS
- SUBCONTRACTOR HAS OPTION OF USING HEADED MACHINE BOLTS IN LIEU OF THREADED RODS.
- HEADED ANCHOR ROD MUST CONFORM TO ASTM F1554, GRADE 36 (UNO).
- FULLY THREADED RODS ARE NOT PERMITTED.
- B DIMENSION BASED ON ASTM F1554, GRADE 36.

**DETAIL 3**  
TYPE VII ANCHOR BOLT  
NOT TO SCALE



**DETAIL 6**  
TYPICAL CHAMFER  
NOT TO SCALE

no.	date	by	ckd	description
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Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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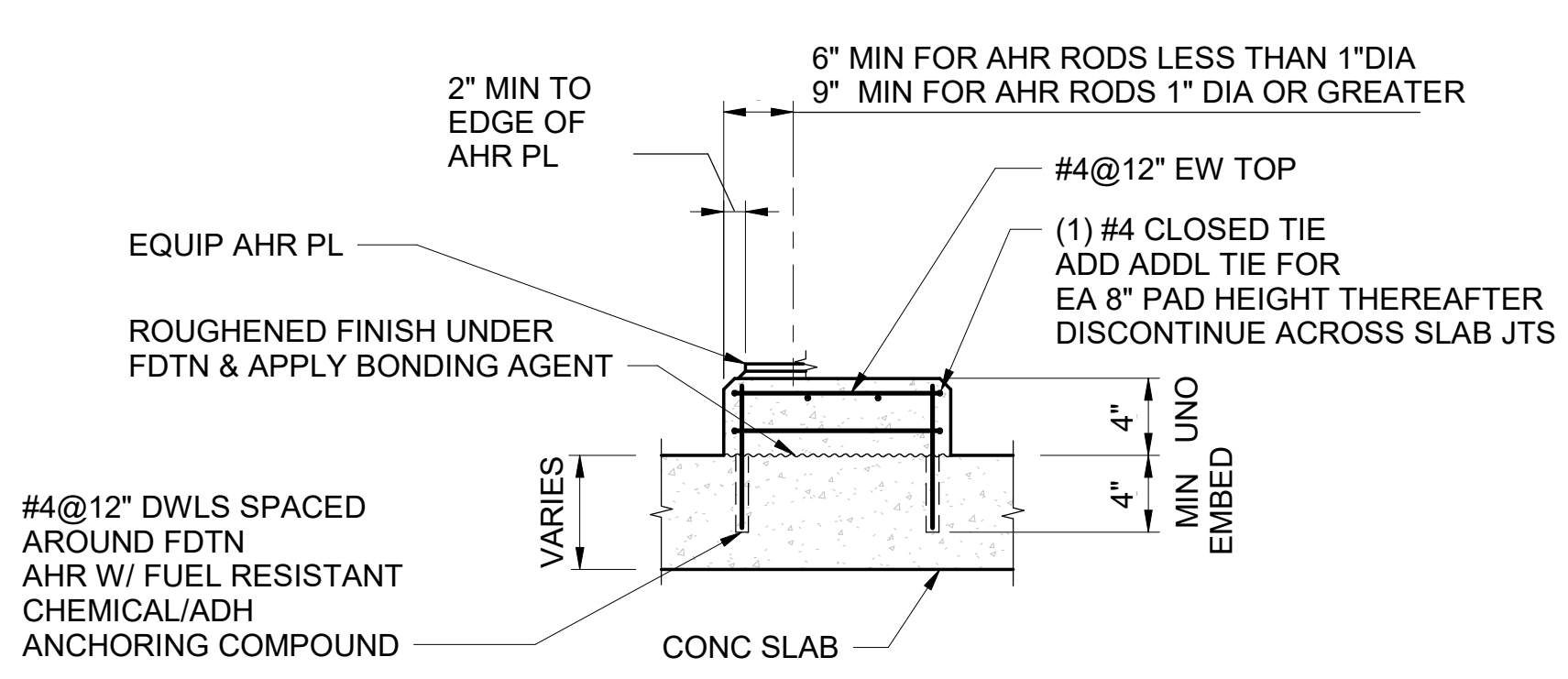
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**PDX FACILITY IMPROVEMENTS**  
STANDARD STRUCTURAL DETAILS

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drawing		rev.	

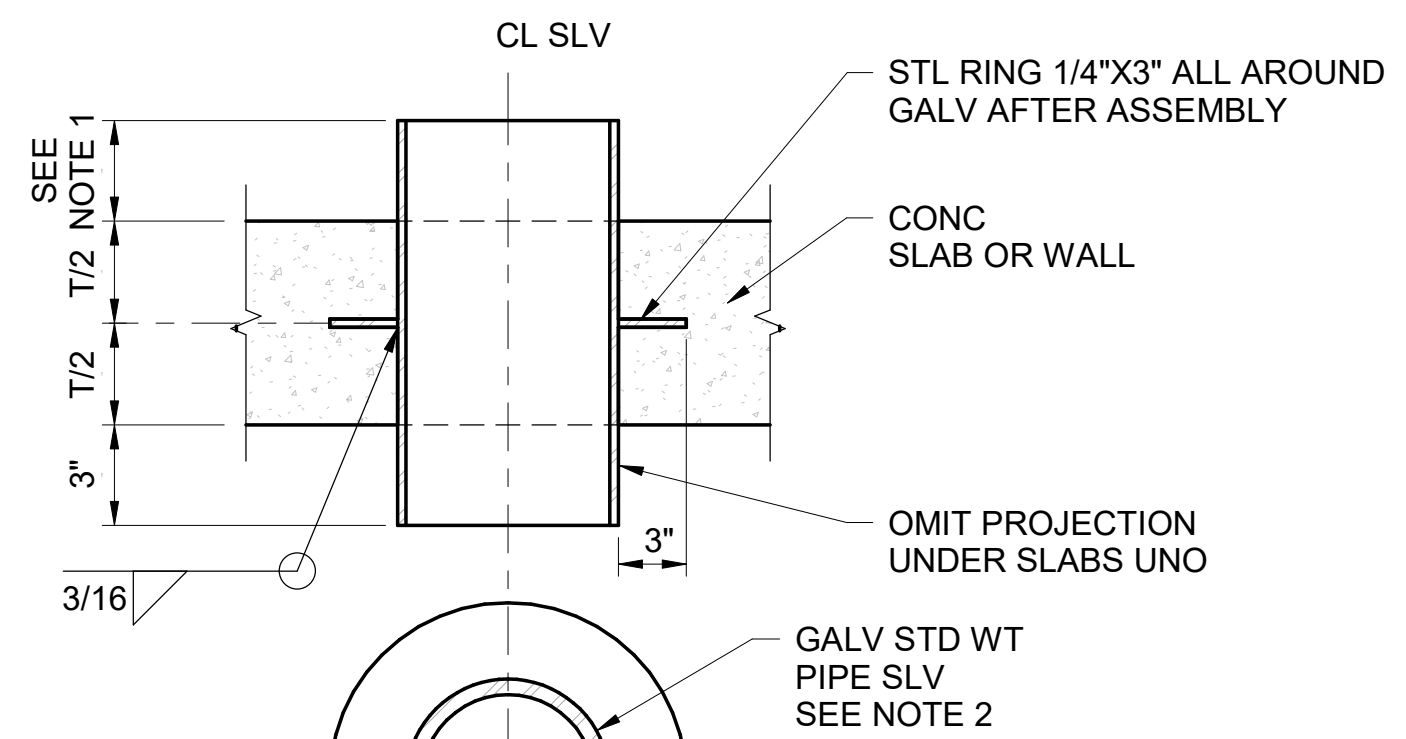
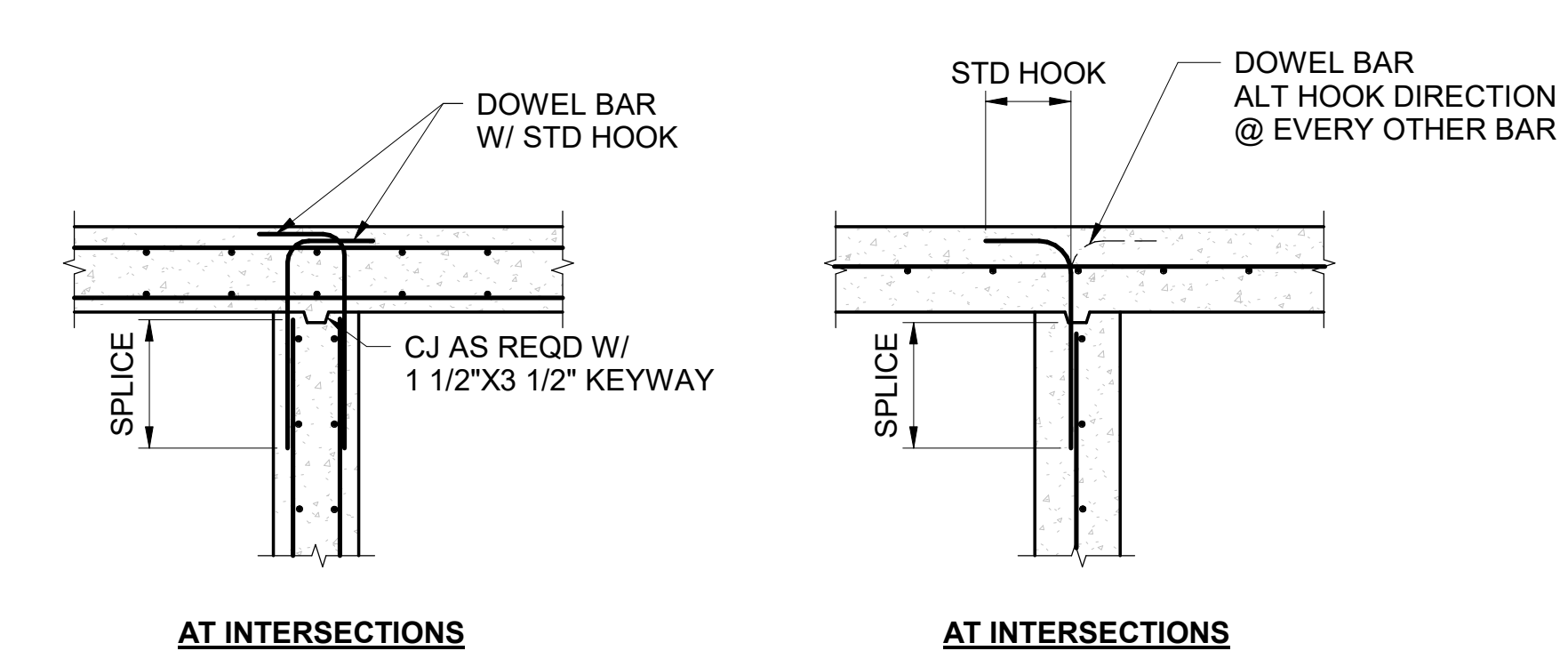
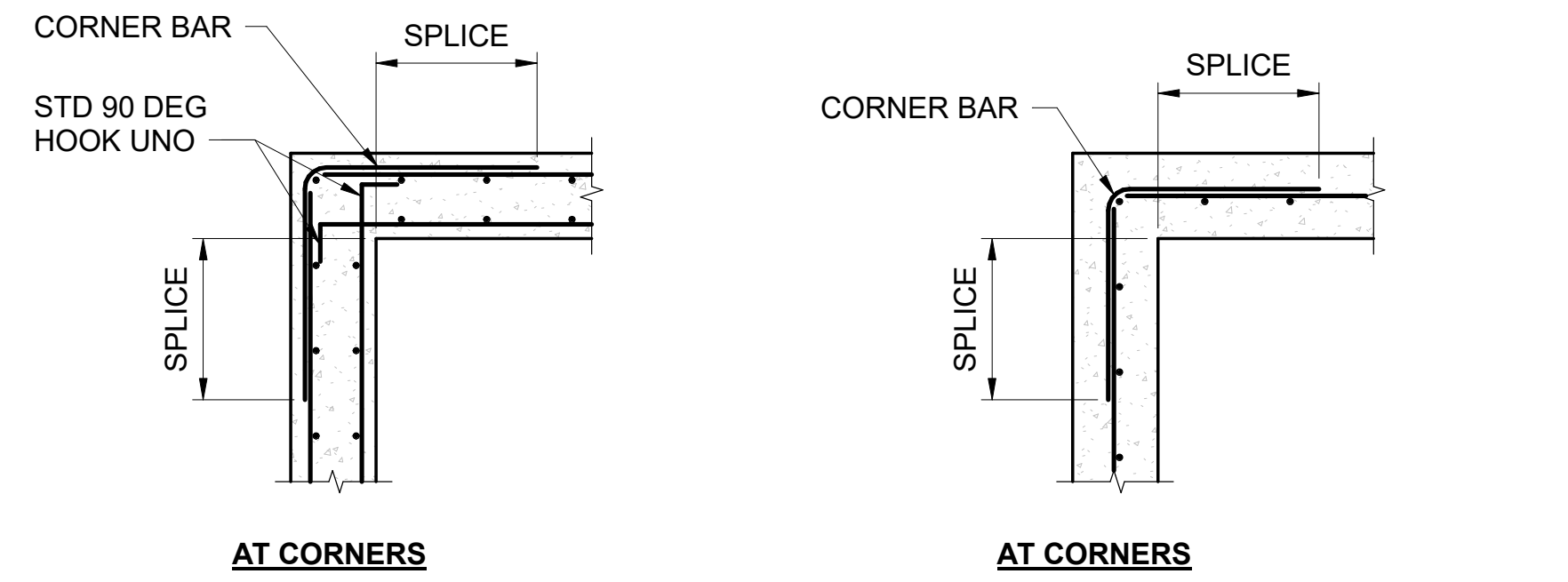
**S-501 - A**





- NOTES:**
1. PROVIDE HOUSEKEEPING PAD FOR EQUIPMENT WHEN OTHER FOUNDATIONS HAVE NOT BEEN INDICATED. COORDINATE PAD SIZE AND THICKNESS WITH FINAL EQUIPMENT TO BE INSTALLED.
  2. PROVIDE ANCHOR BOLTS AND GROUT AS REQUIRED BY EQUIPMENT MANUFACTURER. CONFORM HOUSEKEEPING PAD TO THIS DETAIL, EQUIPMENT MANUFACTURER'S REQUIREMENTS, AND THE FOLLOWING:
    - A. REINFORCE PAD TO CONFORM WITH THIS DETAIL. IF THE FLOOR IS CONSTRUCTED BEFORE DOWELS ARE PLACED, INSTALL DOWELS USING ADHESIVE ANCHORS INTO FLOOR SLAB.
    - B. GROUT EQUIPMENT IN PLACE WITH NON-SHRINK GROUT, UNLESS OTHERWISE RECOMMENDED BY MANUFACTURER.
    - C. PROVIDE POST-INSTALLED ADHESIVE ANCHOR FOR EQUIPMENT, UNLESS OTHERWISE RECOMMENDED BY MANUFACTURER. WHEN TYPE VII CAST-IN-PLACE ANCHOR RODS ARE REQUIRED, CONSTRUCT PAD MONOLITHIC WITH SLAB.
  4. PROVIDE DOWELS AT 12" MINIMUM CENTER TO CENTER, OR PROVIDE NUMBER OF DOWELS TO EQUAL TOTAL CROSS SECTIONAL AREA OF ANCHOR BOLTS OF PAD, EQUALLY SPACED AROUND PAD.
  5. UNLESS INDICATED OTHERWISE, PROVIDE REQUIRED EMBEDMENT DEPTH FOR ANCHOR BOLTS LARGER THAN 5/8" DIAMETER WITHIN BASE SLAB BELOW EQUIPMENT PAD.

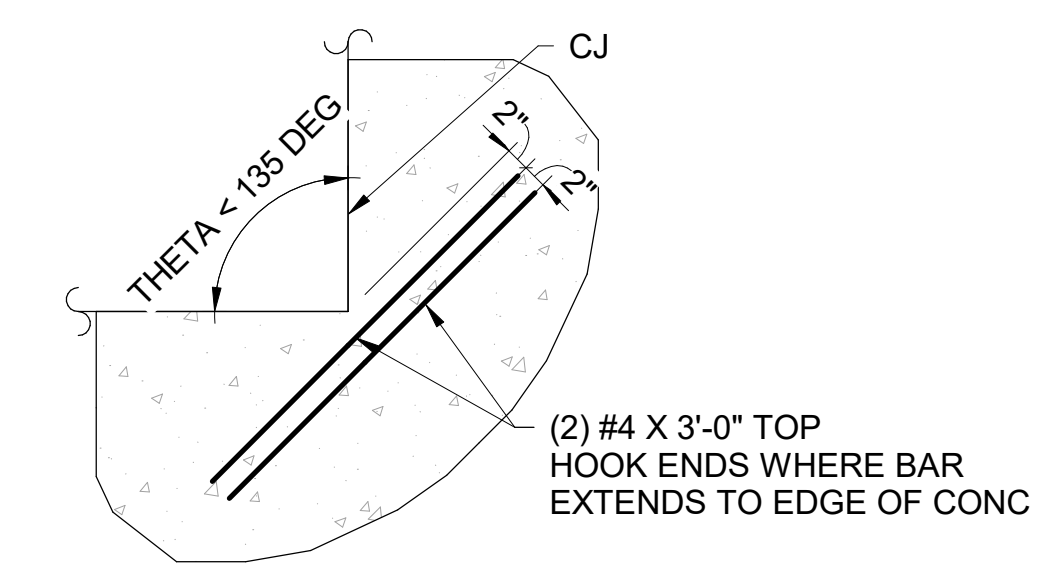
**DETAIL 1**  
TYPICAL HOUSEKEEPING PAD  
NOT TO SCALE



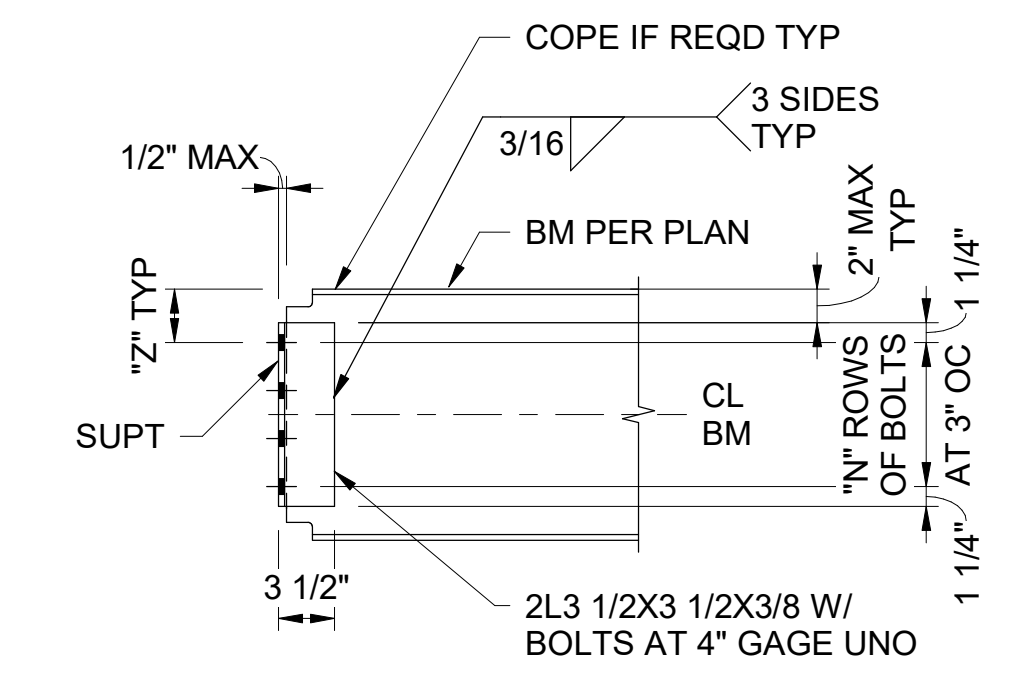
**DETAIL 4**  
TYPICAL GRATING SUPPORT  
SCALE IN FEET

**DETAIL 2**  
TYPICAL LATERAL TIE & GRADE BEAM REINFORCEMENT DETAILS  
NOT TO SCALE

**DETAIL 3**  
TYPICAL PIPE SLEEVE DETAIL  
NOT TO SCALE



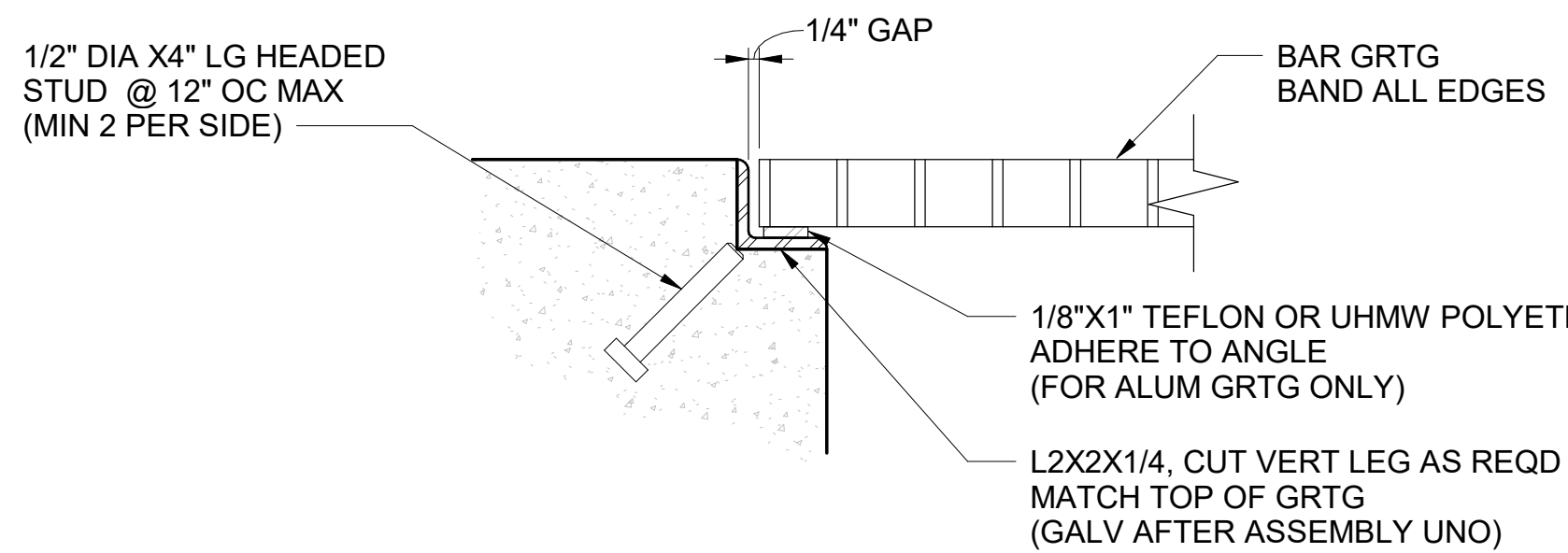
**DETAIL 5**  
RE-ENRANT CORNER BARS IN SLAB  
NOT TO SCALE



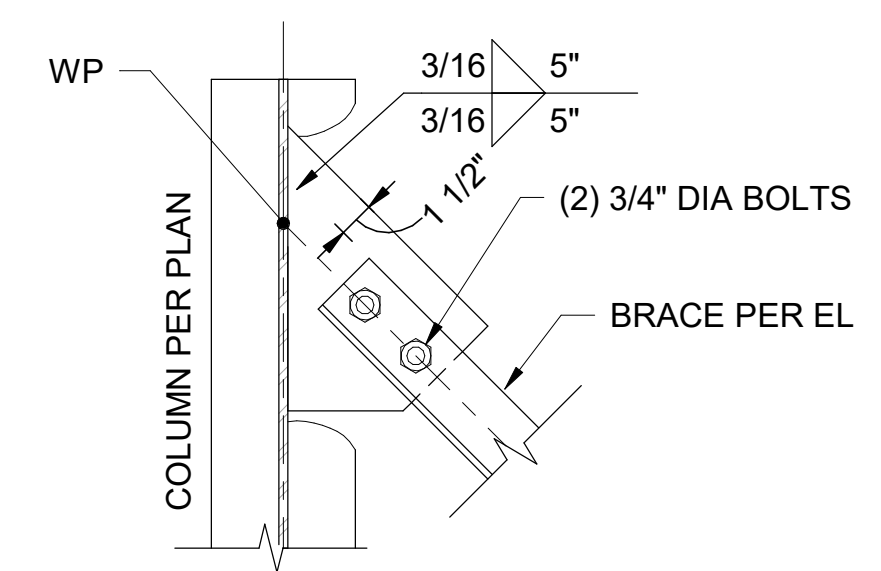
MEMBER SIZE	"N" UNO
W33, W30	7
W27, W24	6
W21	5
W18, W16	4
W14, W12, C12	3
W10, W8	2

- NOTES:**
1. PROVIDE WHERE CONNECTION IS NOT OTHERWISE INDICATED ON PLANS, NOTES, ELEVATIONS, SECTIONS, OR DETAILS.
  2. WITH STANDARD HOLES, "Z" IS 2" MINIMUM FOR W12 AND LARGER BEAMS OR 1 1/4" MINIMUM FOR W10 AND SMALLER BEAMS.
  3. WITH OVERSIZE AND SHORT-SLOT HOLES, "Z" IS 2 1/4" MINIMUM FOR W12 AND LARGER BEAMS OR 1 3/8" MINIMUM FOR W10 AND SMALLER BEAMS.

**DETAIL 6**  
STANDARD DOUBLE ANGLE BEAM CONNECTION  
NOT TO SCALE

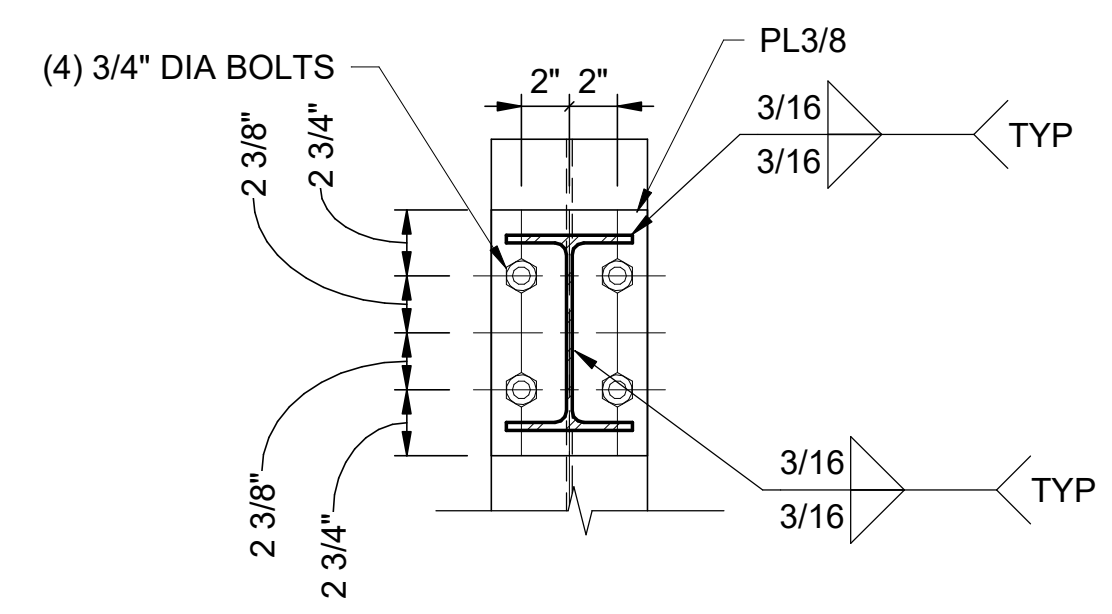


**DETAIL 7**  
TYPICAL VERTICAL BRACE CONNECTION  
SCALE IN FEET



**NOTE:** COLUMN FLANGE NOT SHOWN FOR CLARITY

**DETAIL 8**  
TYPICAL VERTICAL BRACE CONNECTION  
SCALE IN FEET



**DETAIL 9**  
TYPICAL BEAM MOMENT CONNECTION  
SCALE IN FEET

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date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

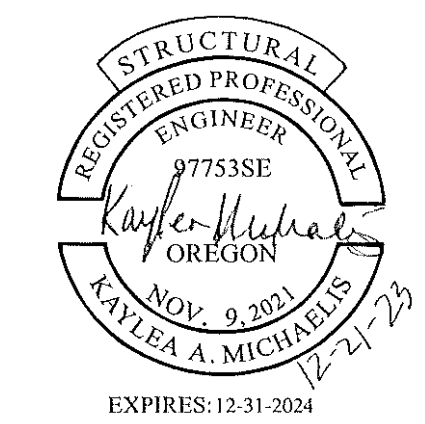
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**PDX FACILITY IMPROVEMENTS**  
STANDARD STRUCTURAL DETAILS

project	153929	contract	
drawing		rev.	

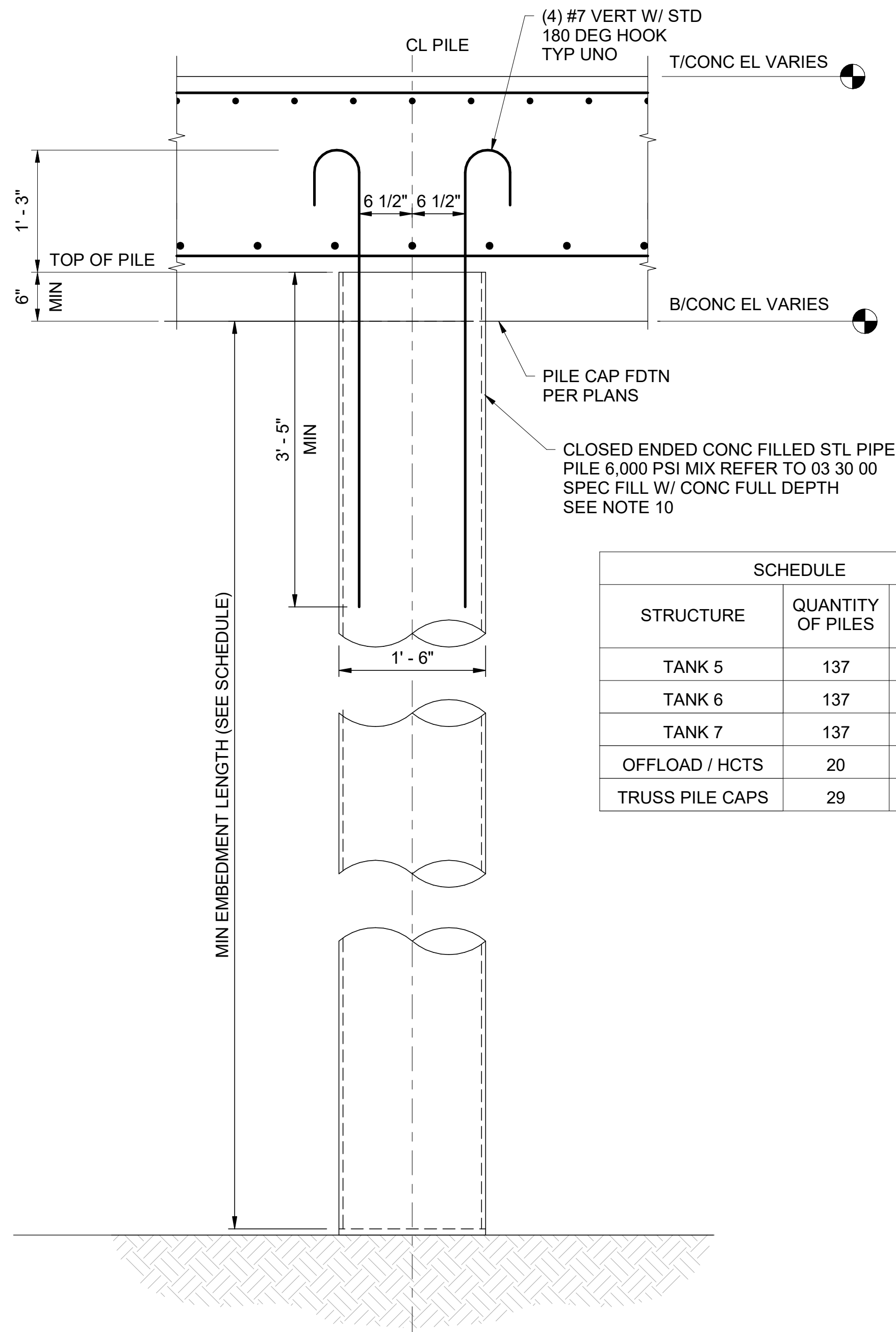
**S-502 - A**



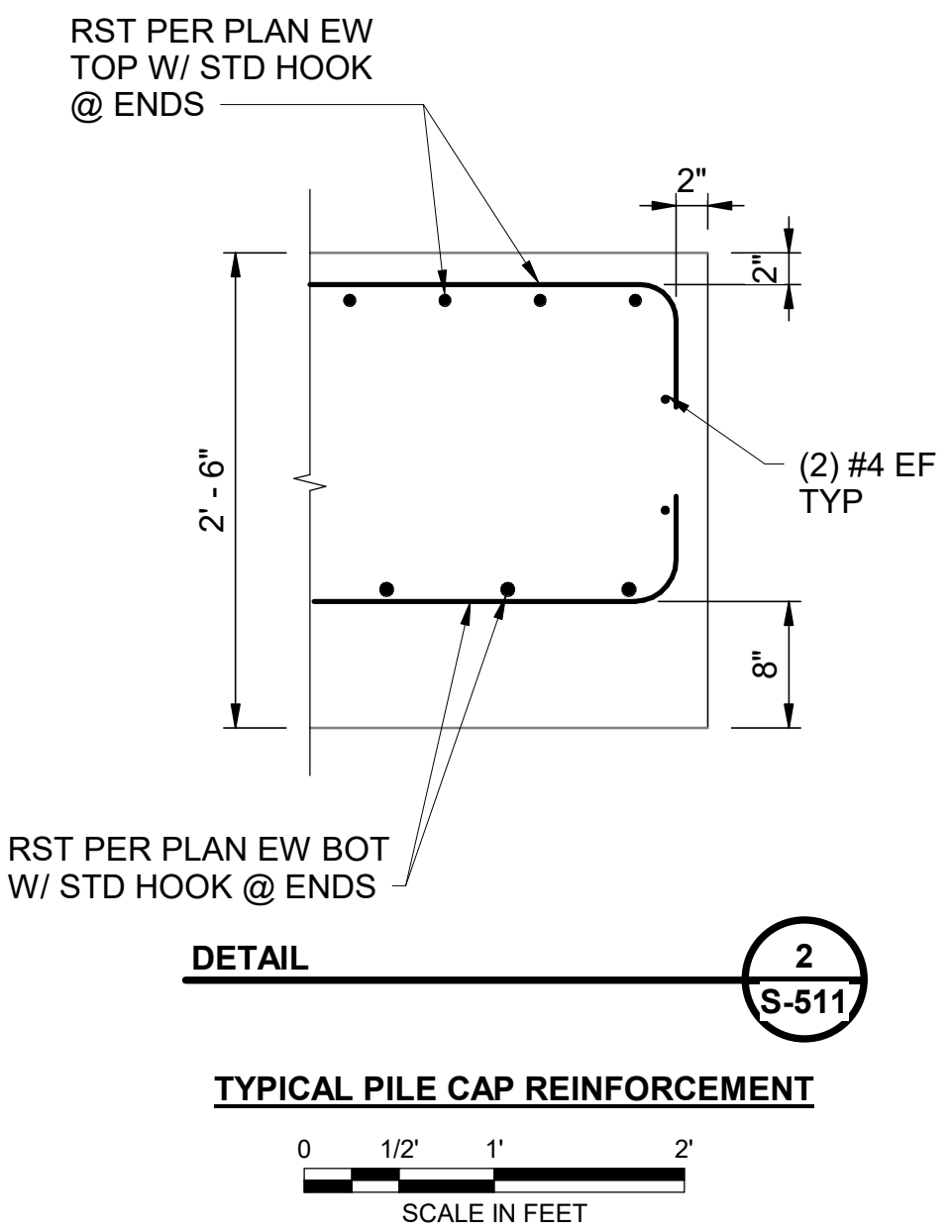
CONCRETE FILLED STEEL PIPE PILES MINIMUM DESIGN REQUIREMENTS							
OUTER DIA (in.)	MIN WALL THICKNESS (in.)	MIN EMBEDMENT LENGTH (ft.) SEE NOTE 4	TIP ELEVATION (ft.)	DESIGN SUSTAINED COMPRESSIVE CAPACITY (kip) SEE NOTE 2 & 8	DESIGN TRANSIENT COMPRESSIVE CAPACITY (kip) SEE NOTE 2 & 8	DESIGN UPLIFT CAPACITY (kip)	DESIGN LATERAL CAPACITY (kip) SEE NOTE 2 & 9
18.0	0.5	SEE SCHEDULE	N/A	166	250	N/A	23

**CLOSED ENDED CONCRETE FILLED STEEL PIPE PILE NOTES:**

1. PROVIDE IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS SECTION 31 62 18.
2. DESIGN CAPACITIES ARE ALLOWABLE STRESS DESIGN LEVELS.
3. TOP OF PILE ELEVATION VARIES BASED ON TOP OF FOUNDATION ELEVATION.
4. EMBEDMENT LENGTH IS MEASURED FROM BOTTOM OF PILE CAP.
5. ESTIMATED EMBEDMENT LENGTH OF EACH PILE FOR BIDDING PURPOSES MUST BE A MINIMUM OF 130 FEET REGARDLESS OF ACTUAL SUBSURFACE CONDITIONS.
6. STATIC PILE LOAD TESTING MUST BE PERFORMED IN ACCORDANCE WITH SPECIFICATION 31 08 13.
7. DYNAMIC PILE TESTING MUST BE PERFORMED IN ACCORDANCE WITH SPECIFICATION 31 08 17.
8. DESIGN FACTOR OF SAFETY IS EQUAL TO 2.0.
9. DESIGN FACTOR OF SAFETY IS EQUAL TO 1.0.
10. FINAL DECISION OF CLOSED ENDED VS. OPEN ENDED PIPE PILES WILL BE DETERMINED BASED ON THE RESULTS OF THE PILE INDICATOR PROGRAMS.



SCHEDULE		
STRUCTURE	QUANTITY OF PILES	MIN EMBEDMENT LENGTH (ft.)
TANK 5	137	131 FT
TANK 6	137	131 FT
TANK 7	137	131 FT
OFFLOAD / HCTS	20	101 FT
TRUSS PILE CAPS	29	75 FT



**DETAIL 1**  
**TYPICAL PILE CONNECTION**  
NOT TO SCALE

**DETAIL 2**  
**TYPICAL PILE CAP REINFORCEMENT**  
SCALE IN FEET

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**PDX FACILITY IMPROVEMENTS**  
STANDARD STRUCTURAL DETAILS

project	153929	contract	
drawing		rev.	

**S-503 - A**



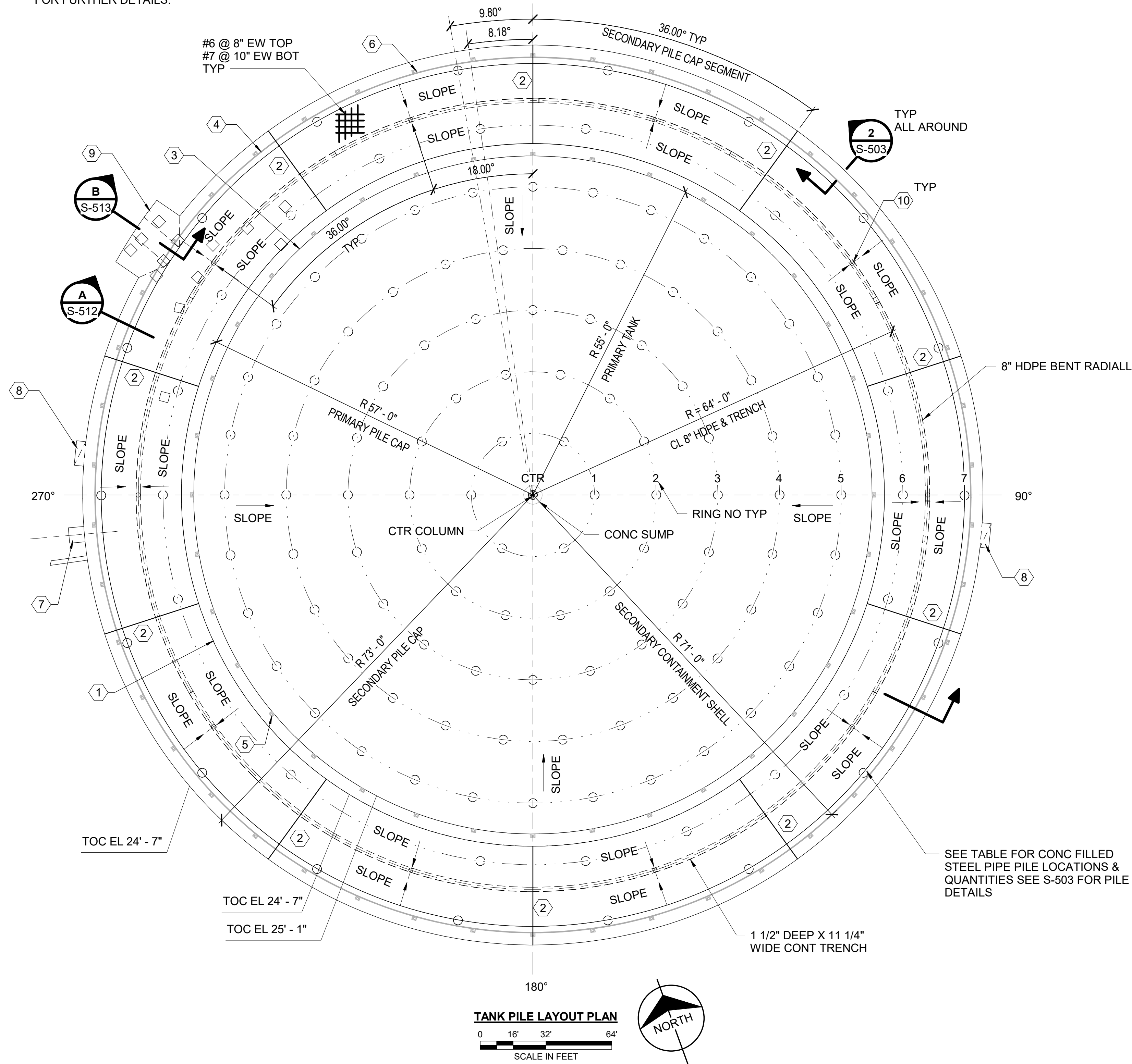
**KEYED NOTES:**

- 1 CONSTRUCTION JOINT ALONG ENTIRE CIRCUMFERENCE, REFER TO 3/S-514 FOR REQUIREMENTS.
- 2 CONSTRUCTION JOINT AS SHOWN, REFER TO 3/S-514 FOR REQUIREMENTS.
- 3 PRIMARY ABOVE GROUND STORAGE TANK.
- 4 SECONDARY CONTAINMENT SHELL.
- 5 ASSUME (36) 1 1/2" DIAMETER GRADE 55 TYPE VII PRIMARY TANK ANCHORS RODS; REFER TO A/S-514.
- 6 ASSUME (46) 1 1/2" DIAMETER GRADE 55 TYPE VII SECONDARY CONTAINMENT ANCHOR RODS; REFER TO B/S-514.
- 7 PILE CAP EXTENSION FOR CONTAINMENT DRAIN ECCENTRIC PLUG VALVE SEE S-513. REFER TO S-400 SERIES FOR LOCATION AT EACH TANK.
- 8 TANK STAIR LANDING COORDINATE WITH TANK VENDOR AND MECHANICAL DRAWINGS.
- 9 TANK EXTENSION FOR PIPING (PORCH) SEE MECH DRAWINGS.
- 10 NEENAH R-4937-B GRATE WITH HDPE 8"x4" BRANCH SADDLE REDUCING TEE. TYPICAL 10 PLACES, SEE 1/S-514 FOR FURTHER DETAILS.

CONCRETE FILLED STEEL PIPE PILE LOCATION SCHEDULE			
RING NUMBER	RING RADIUS	NO. OF PILES IN RING (EQUALLY SPACED)	TOP OF PILE EL
CENTER	0'-0"	1	21'-3 1/4"
1	10'-0"	6	21'-6 1/4"
2	20'-0"	12	21'-10 3/4"
3	30'-0"	20	22'-2"
4	40'-0"	26	22'-6 1/2"
5	50'-0"	32	22'-11"
6	60'-0"	22	22' - 6 1/2"
7	70'-0"	18	22' - 7 1/4"

**NOTES:**

- 1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
- 2. ABOVE GROUND STORAGE TANK DESIGN REQUIREMENTS:
  - A. DESIGN BY THE TANK MANUFACTURER IN ACCORDANCE AND COMPLIANCE WITH THE FOLLOWING:
    - a. API 650 - GOVERNING DOCUMENT IN ALL PHASE OF TANK DESIGN, UNLESS NOTED OR AMENDED OTHERWISE.
    - b. THE STATE OF OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FUEL TANK SEISMIC STABILITY RULES ADOPTED SEPT. 14, 2023.
    - c. TANK DESIGN MUST BE CERTIFIED BY A LICENSED STRUCTURE ENGINEER REGISTER IN THE STATE OF OREGON.
    - d. DESIGN STANDARD AND LOADING REQUIREMENTS INDICATED ON S-001.
  - B. MAXIMUM TOTAL TANK VERTICAL UPLIFT:
    - a. 1 INCH
  - C. MAXIMUM TOTAL TANK LATERAL DISPLACEMENT:
    - a. 1/2 INCH
  - D. PROVIDE A CONE ROOF STEEL TANK WITH CENTER COLUMN AS SHOWN.
- 3. PRIMARY AND SECONDARY TANK ANCHORAGE:
  - A. DETAILS AND LOCATIONS PER TANK MANUFACTURER.
  - B. WHEN REQUIRED, PROVIDE ANCHORS EQUALLY SPACED (10'-0" MAX SPACING) ALONG PERIMETER OF PRIMARY AND SECONDARY TANKS.
  - C. MUST BE IN COMPLIANCE WITH REQUIREMENTS LISTED ABOVE.
- 4. SUBMITTALS:
  - A. TANK FABRICATION DRAWINGS
  - B. SUBMIT ANCHOR ROD DETAILS
  - C. LOADING INFORMATION
  - D. DO NOT COMMENCE TANK FOUNDATION CONSTRUCTION UNTIL VERIFICATION BY ENGINEER HAS BEEN COMPLETED.
- 5. TANK CONSTRUCTION REQUIREMENTS:
  - A. PROVIDE CONCRETE SHRINKAGE REDUCING ADMIXTURE TO ALL PRIMARY AND SECONDARY TANK PILE CAP POURS PER 03 30 00 SPECIFICATIONS.
  - B. SUBCONTRACTOR MUST INCLUDE THE USAGE OF AT LEAST (2) SIMULTANEOUS CONCRETE PUMPER TRUCKS OR BOOMS AND (1) ONE BACK-UP TRUCKS OR BOOMS FOR EACH PRIMARY TANK PLACEMENT.
  - C. THE TOP OF CONCRETE FOUNDATION SURFACES UNDER THE TANK SHELL MUST BE LEVEL TO WITHIN:
    - a. 1/8" OF THE SPECIFIED ELEVATION IN 30'-0"
    - b. 1/4" OF THE SPECIFIED ELEVATION IN THE TOTAL CIRCUMFERENCE.
  - D. AFTER MAT FOUNDATION CONSTRUCTION AND GROUTING OF CENTER STEEL SUMP:
    - a. FLUSH DRAIN PIPE WITH WATER TO VERIFY PIPE CONTINUITY.
- 6. PRIMARY TANK CONSTRUCTION:
  - A. CONSTRUCT THE PRIMARY TANK FOUNDATION IN ONE MONOLITHIC PLACEMENT, (NO CONSTRUCTION JOINT).
  - B. PROVIDE STEEL TROWEL FINISH ON THE TOP SURFACES OF THE FOUNDATION.
  - C. THE TOP AND SIDE SURFACES OF THE FOUNDATION MUST BE COATED WITH FUEL-RESISTANT PENETRATING SEALER/HARDENER, REFER TO 03 30 00 LIQUID FLOOR TREATMENTS.
  - D. PROVIDE DRAIN GROOVES ON TOP SURFACE OF PRIMARY SURFACE OF MAT FOUNDATION PER 1/S-513.
- 7. SECONDARY TANK CONSTRUCTION:
  - A. SECONDARY CONTAINMENT PILE CAPS MUST BE CAST WITH CONSTRUCTION JOINTS AS SHOWN.
  - B. SECONDARY CONTAINMENT PILE CAPS MUST BE INSTALLED IN A SKIP PATTERN PLACEMENT WITH A MINIMUM OF 7 DAYS OF CURING PRIOR TO PLACING ADJACENT CONCRETE POUR.
  - C. THE TOP AND SIDE SURFACES OF THE FOUNDATION (WHERE NOT COVERED BY FLEXIBLE MEMBRANE LINER) MUST BE COATED WITH FUEL-RESISTANT PENETRATING SEALER/HARDENER, REFER TO 03 30 00 LIQUID FLOOR TREATMENTS.
- 8. PVC PIPES:
  - A. MUST BE ASTM D1785 SCHEDULE 80 PIPES.
  - B. MUST BE JET FUEL RESISTANT
  - C. MUST BE RATED FOR ULTRAVIOLET RESISTANCE.
  - D. CONNECT USING ASTM D2564 FUEL RESISTANT JOINT CEMENT.
  - E. ADEQUATELY SECURE ALL PIPING TO SURROUNDING REINFORCEMENT STEEL BY MEANS OF PIPE STRAPS OR OTHER MEASURES TO MAINTAIN PIPE SLOPE AND PREVENT MOVEMENT DURING CONCRETE PLACEMENT.
- 9. HDPE PIPES:
  - A. MUST BE ASTM D3035 MANUFACTURER FROM PE4710 RESIN
  - B. WALL THICKNESS MUST BE CLASS DR7 MINIMUM.
  - C. MUST BE JET FUEL RESISTANT.
  - D. MUST BE RATED FOR ULTRAVIOLET RESISTANCE.
  - E. ADEQUATELY SECURE ALL PIPING TO SURROUNDING REINFORCEMENT STEEL BY MEANS OF PIPE STRAPS OR OTHER MEASURES TO PREVENT MOVEMENT DURING CONCRETE PLACEMENT.
- 10. COORDINATION:
  - A. REFER TO S-401 THROUGH S-403 FOR INDIVIDUAL TANK AREA PLANS.
  - B. REFER TO S-512 THROUGH S-514 FOR FURTHER DETAILS OF FOUNDATION AND EMBEDDED ITEMS.
  - C. COORDINATE WITH MECHANICAL DRAWINGS FOR TANK AND APPURTENANCES LAYOUT.
  - D. COORDINATE CONDUIT AND GROUNDING PENETRATION REQUIREMENTS WITH THE ELECTRICAL DRAWINGS.
  - E. REFER TO 33 56 43 - FUEL SYSTEM ABOVEGROUND STORAGE TANKS FOR ADDITIONAL REQUIREMENTS.
- 11. TANK SEISMIC DESIGN PARAMETERS:
  - A. PRIMARY TANK STORAGE PARAMETERS NORTH-SOUTH & EAST-WEST DESIGN:
    - a. EQUIVALENT LATERAL FORCE ANALYSIS
    - b. BASE SHEAR = 3,115 KIPS
  - B. SECONDARY CONTAINMENT TANK STORAGE PARAMETERS NORTH-SOUTH & EAST-WEST DESIGN:
    - a. EQUIVALENT LATERAL FORCE ANALYSIS
    - b. BASE SHEAR = 2,671 KIPS



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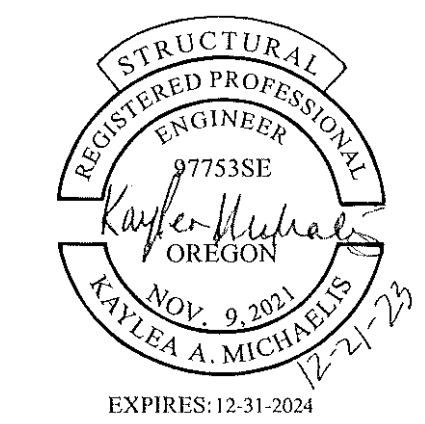
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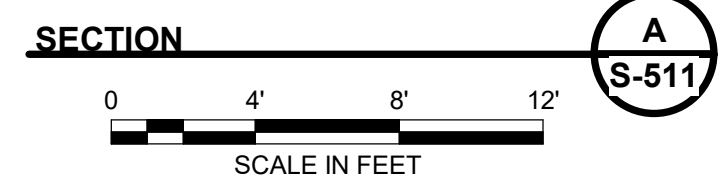
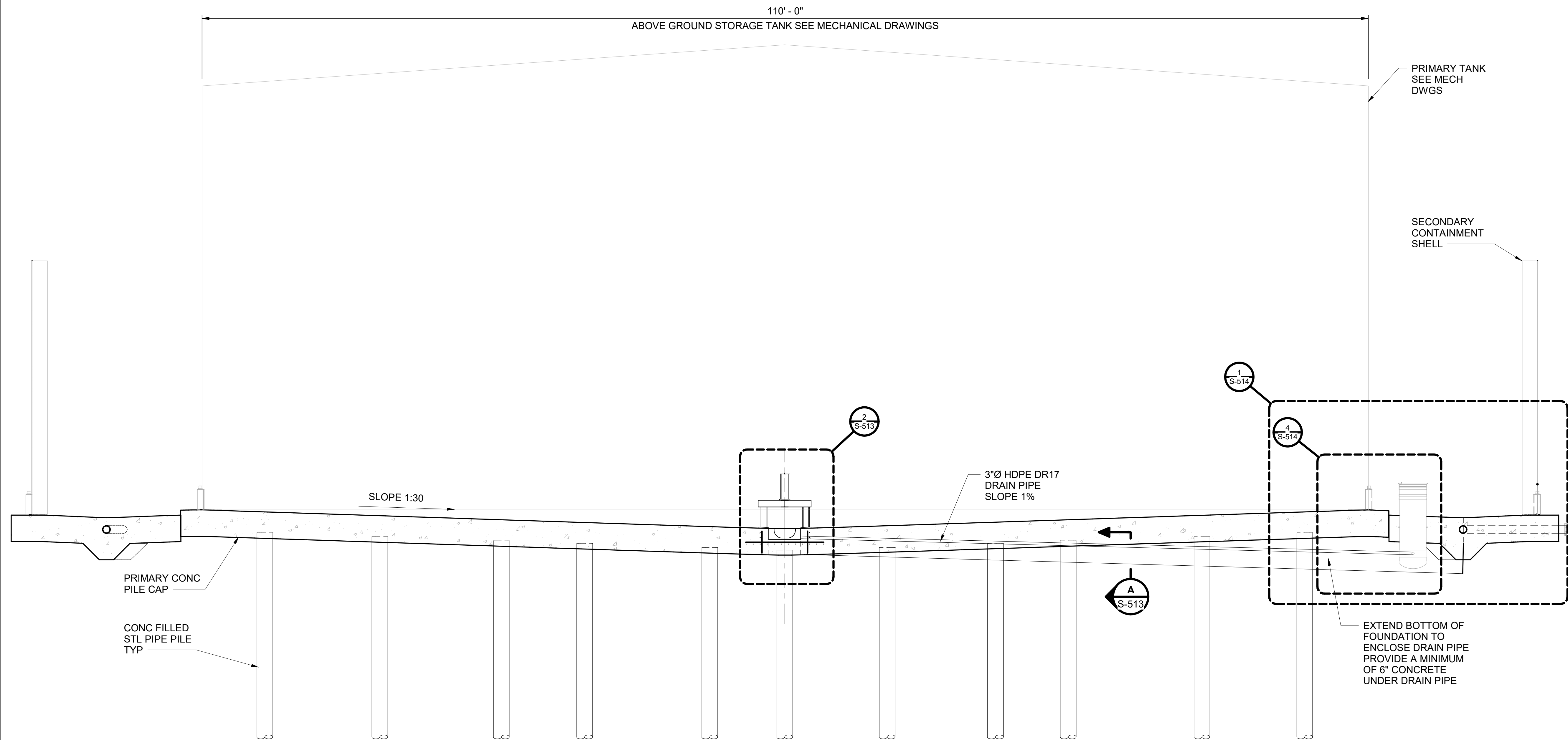
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<b>PDX FACILITY IMPROVEMENTS</b>	
TANK FOUNDATION PLAN	
project	contract
153929	
drawing	rev.
<b>S-511 - A</b>	
file	







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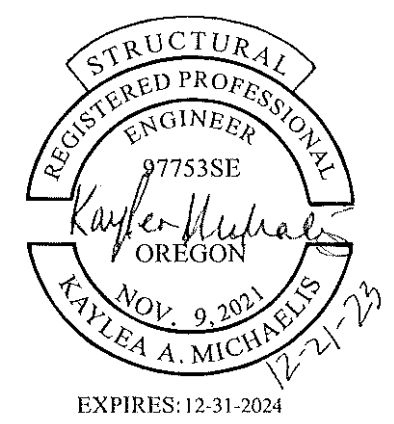
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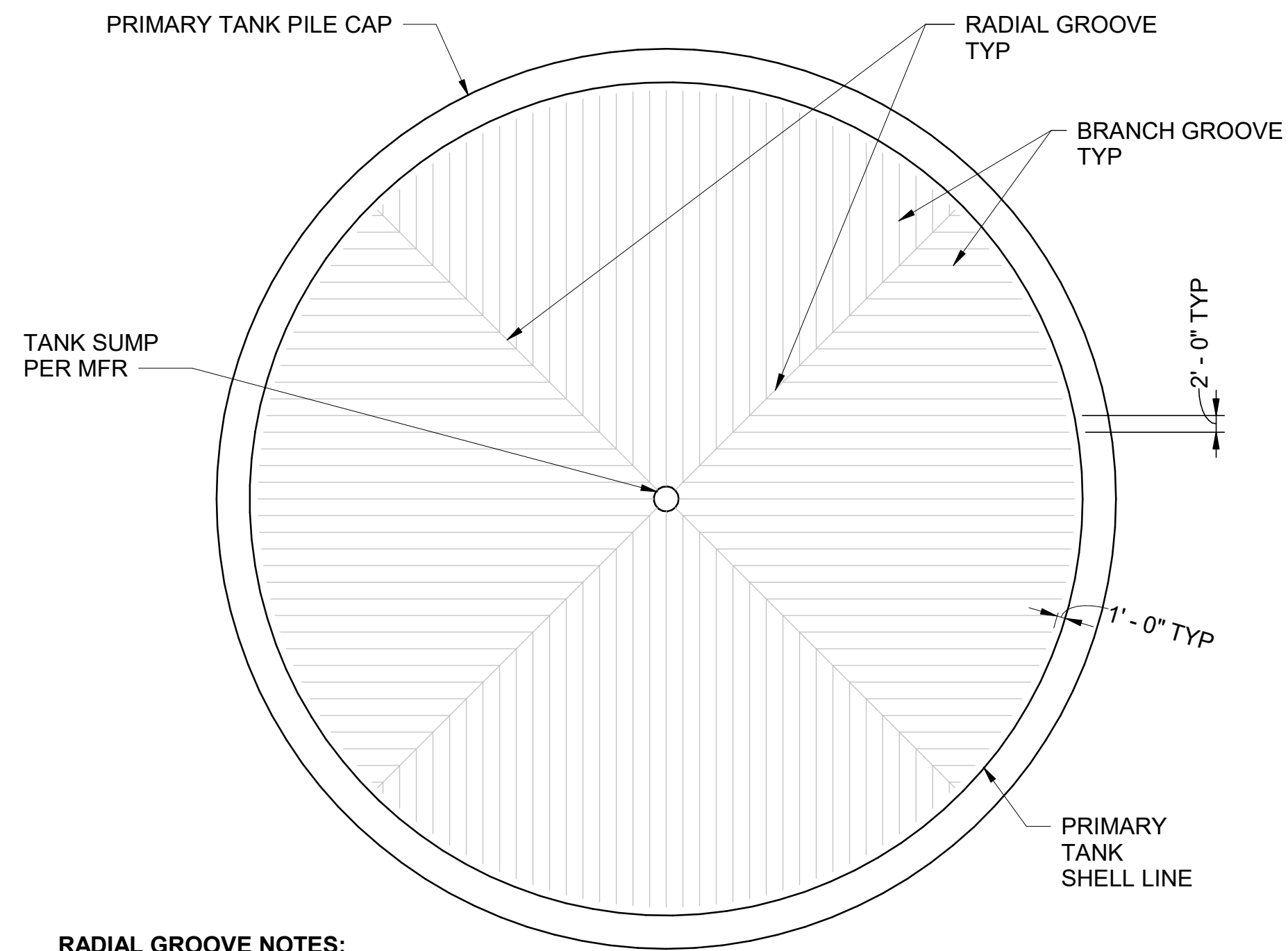
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**PDX FACILITY IMPROVEMENTS**  
TANK FOUNDATION DETAILS

project	153929	contract	
drawing	S-512 - A		
file			



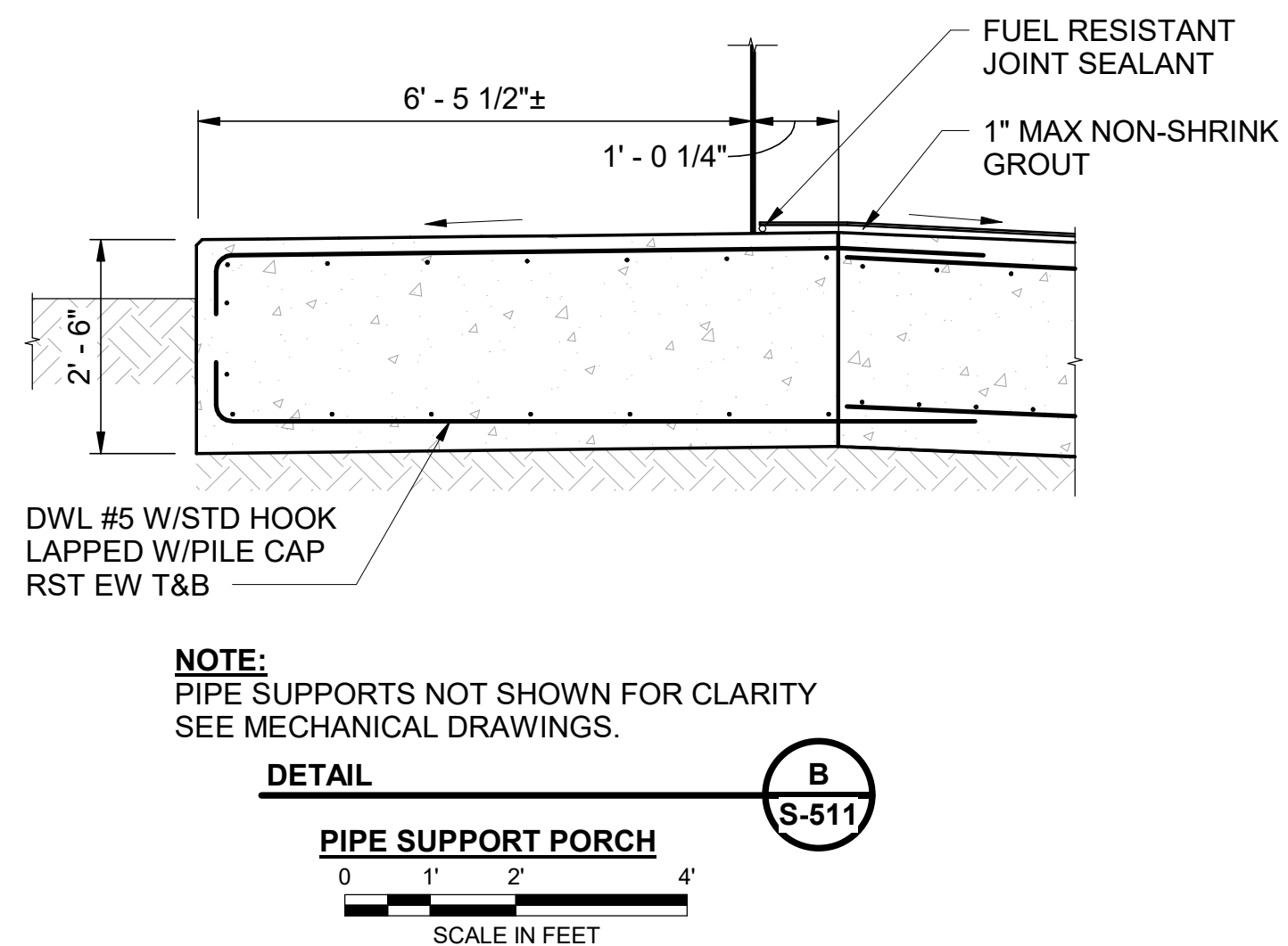
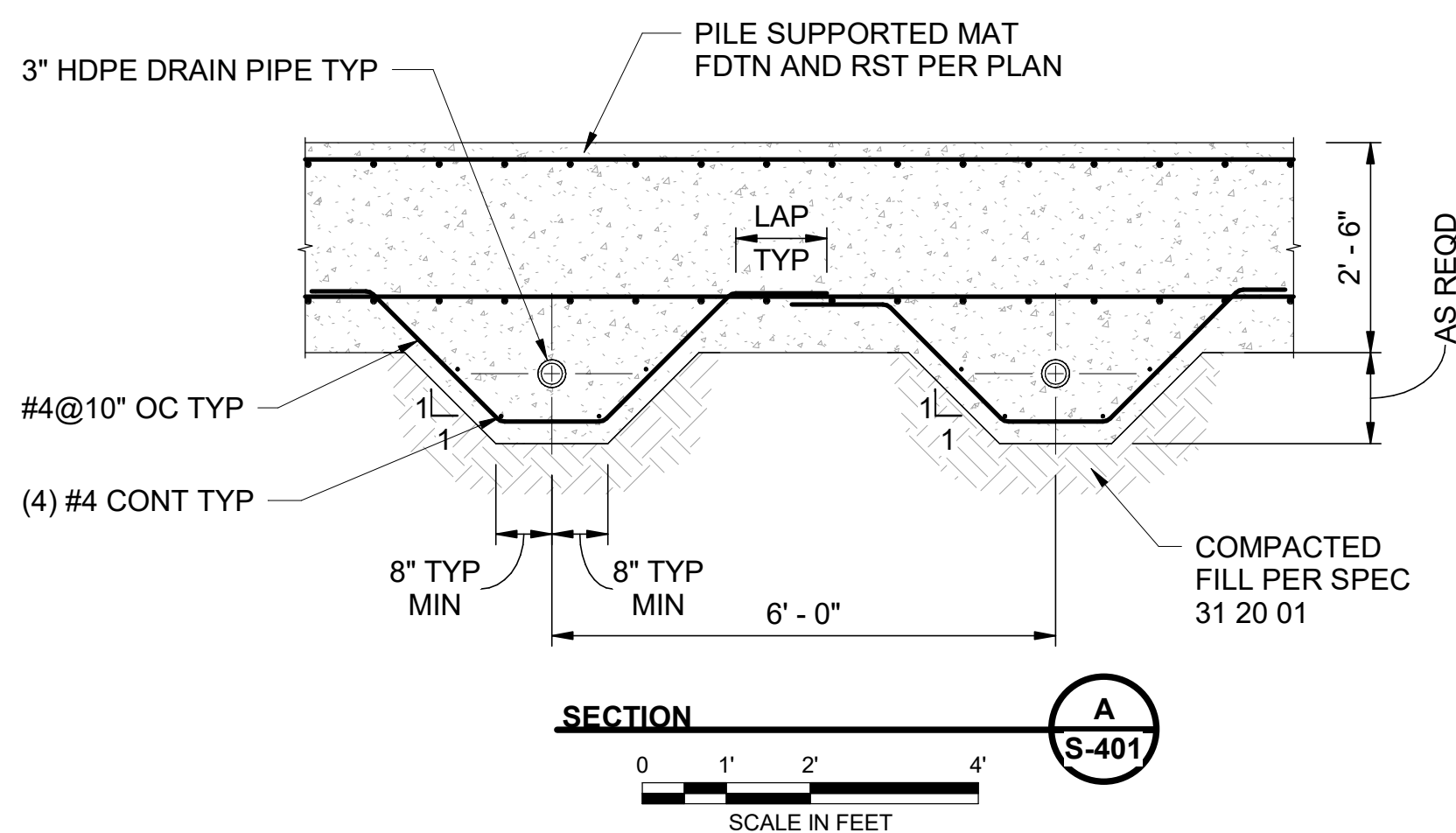
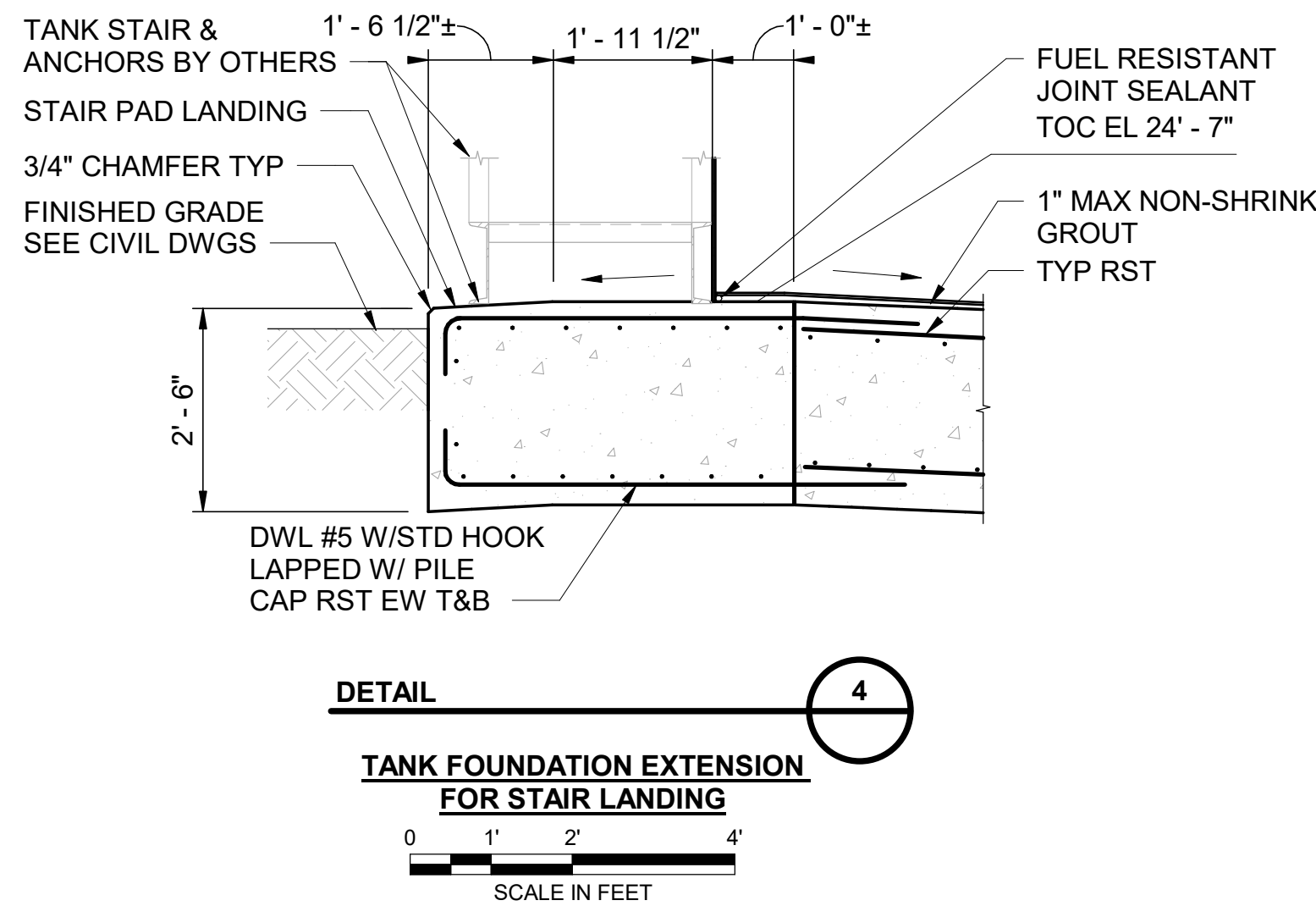
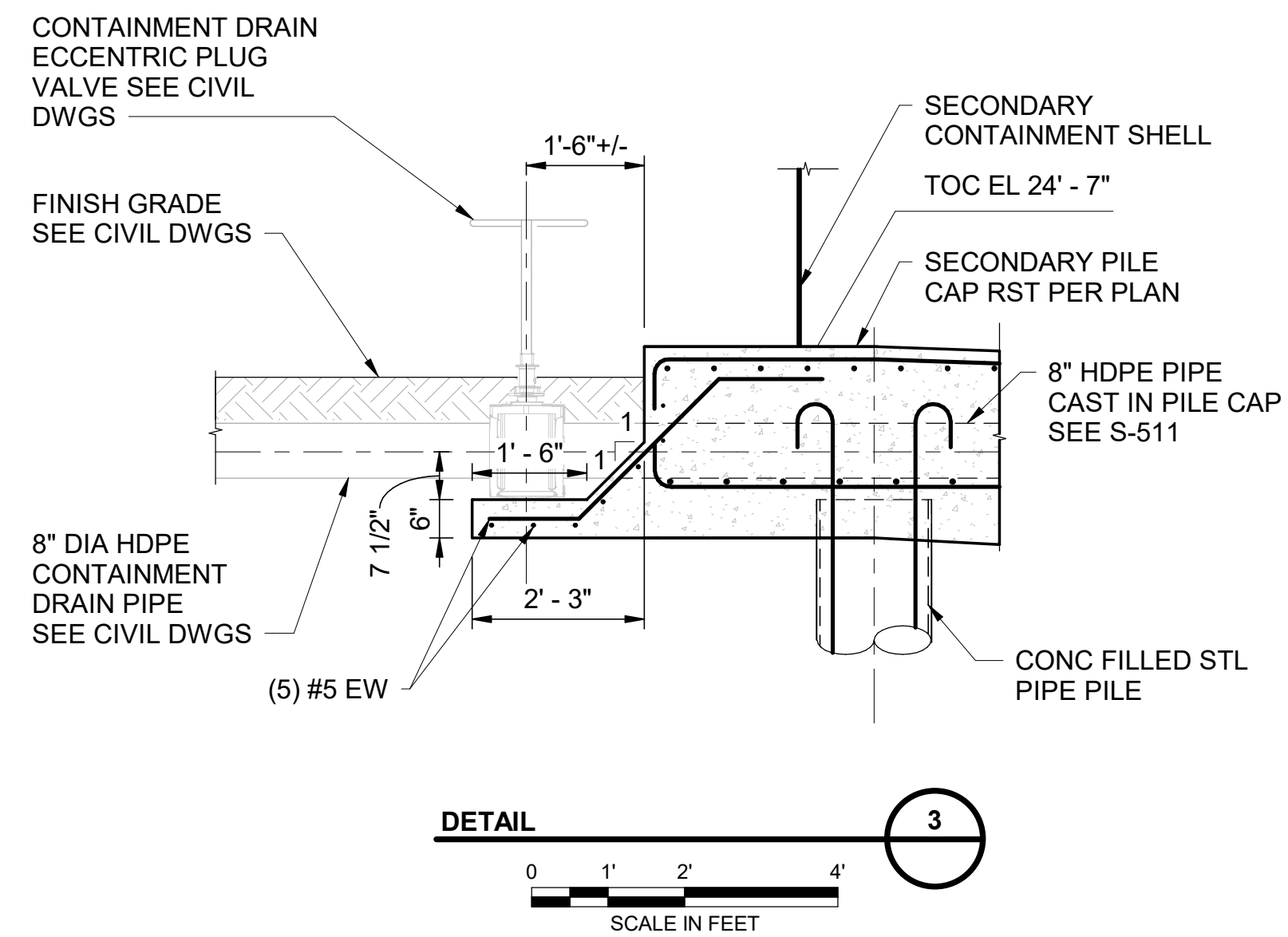
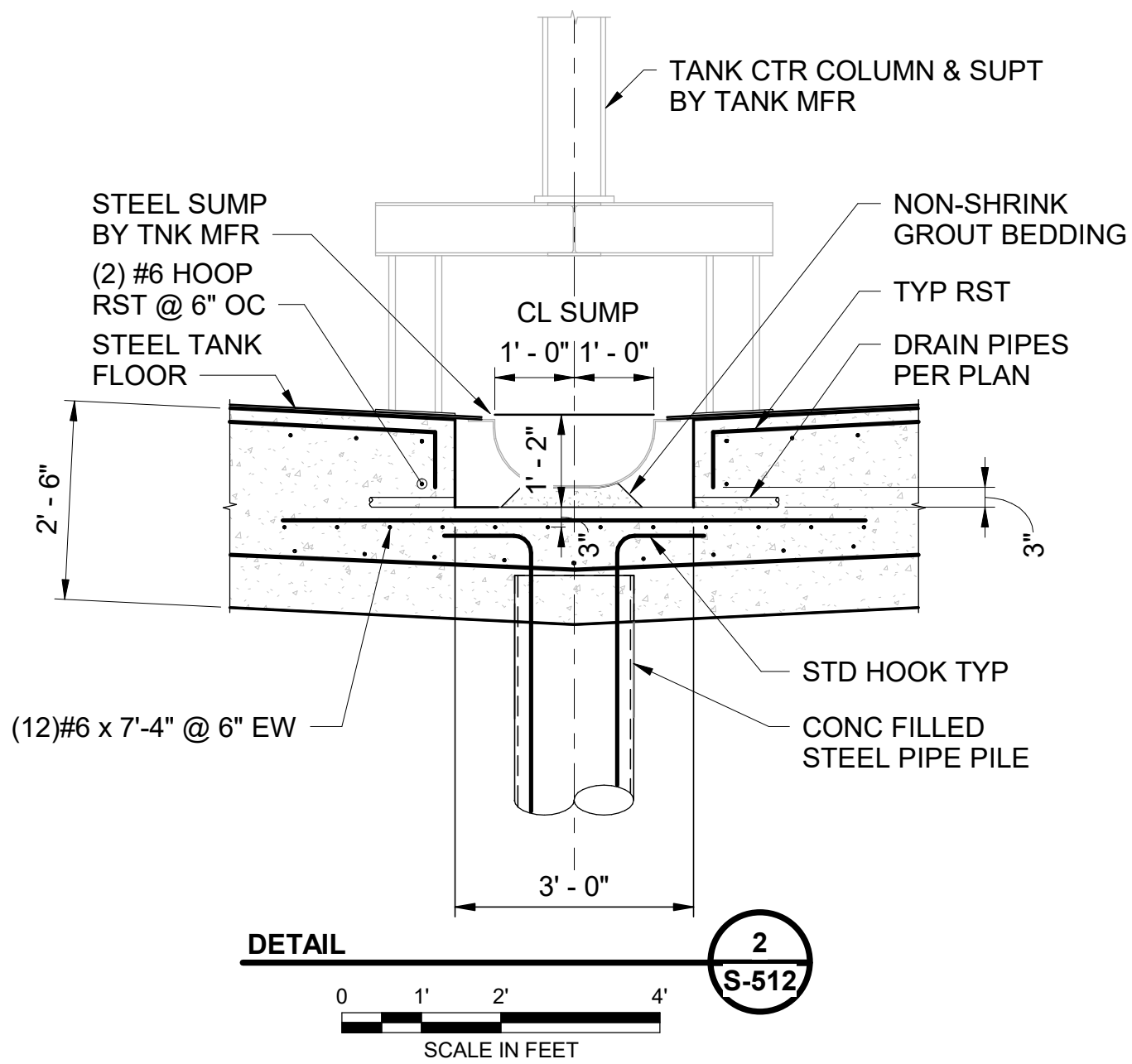


**RADIAL GROOVE NOTES:**

1. RADIAL GROOVES MUST BE SAW-CUT WITH WIDTH OF 3/4" ± 1/8".
2. RADIAL GROOVES MUST BE 3/4" DEEP AND MUST DRAIN INTO SUMP.
3. ALL GROOVES MUST BE KEPT CLEAR OF MUD AND DEBRIS AND CLEANED BY COMPRESSED AIR PRIOR TO INSTALLATION OF THE TANK BOTTOM.
4. ADEQUATE CONCRETE COVER OVER THE REINFORCING BARS MUST BE PROVIDED AT ALL GROOVE LOCATIONS.

**BRANCH GROOVE NOTES:**

- A. BRANCH GROOVES MUST BE SAW-CUT WITH WIDTH OF 1/4" ± 1/8".
- B. BRANCH GROOVES MUST BE 1/2" DEEP AND MUST DRAIN INTO SUMP.
- C. ALL GROOVES MUST BE KEPT CLEAR OF MUD AND DEBRIS AND CLEANED BY COMPRESSED AIR PRIOR TO INSTALLATION OF THE TANK BOTTOM.
- D. ADEQUATE CONCRETE COVER OVER THE REINFORCING BARS MUST BE PROVIDED AT ALL GROOVE LOCATIONS.



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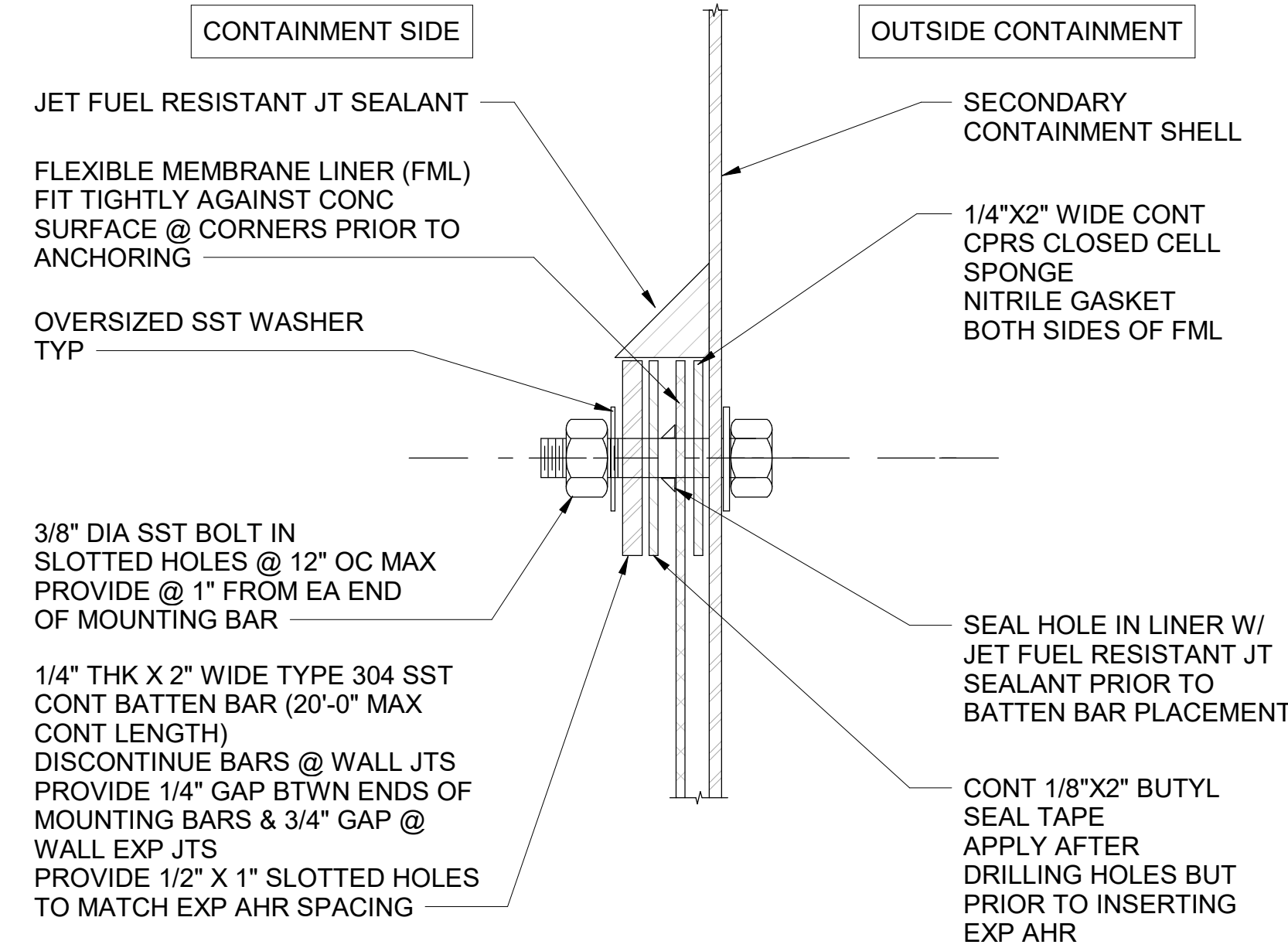
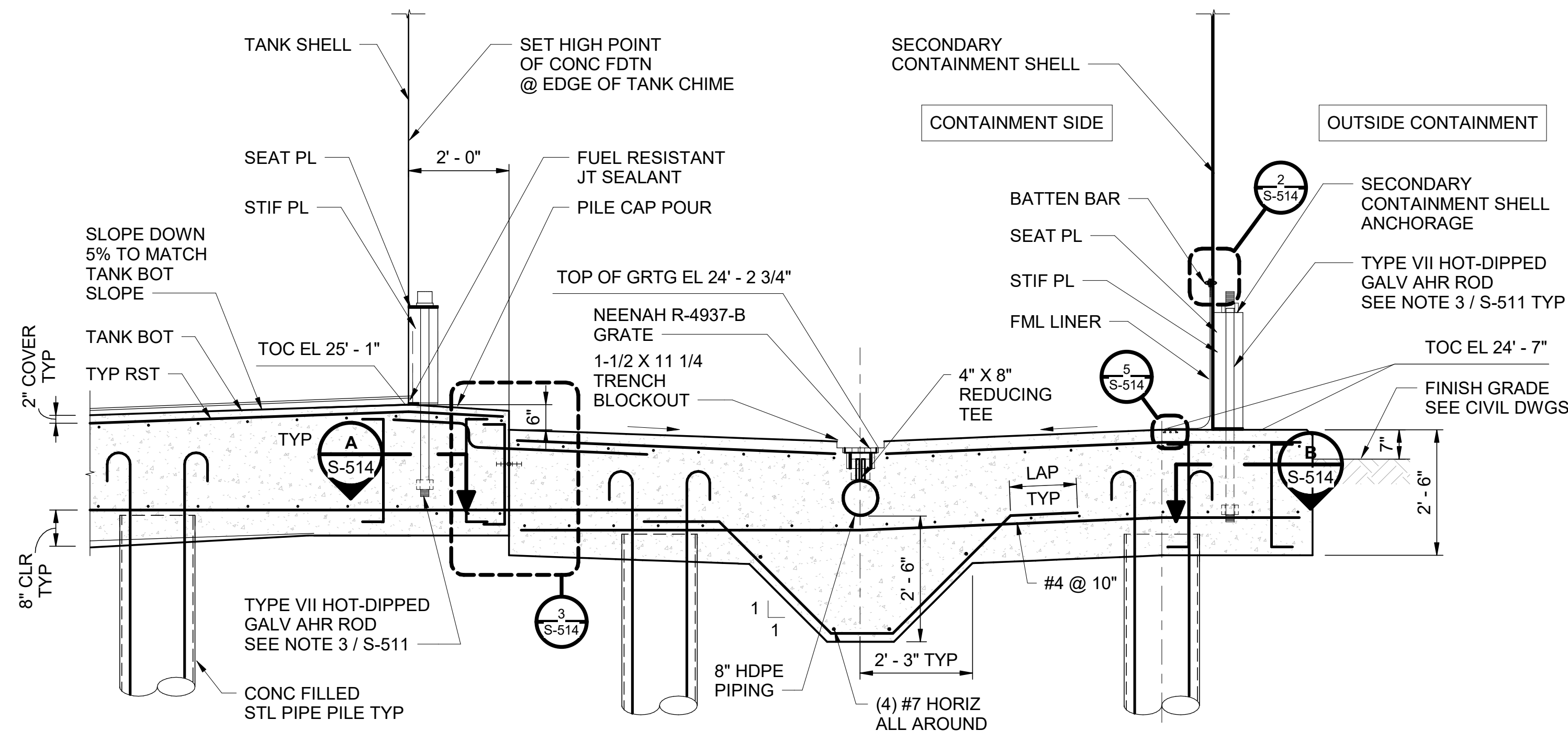
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PDX FACILITY IMPROVEMENTS  
TANK FOUNDATION DETAILS

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S-513 - A

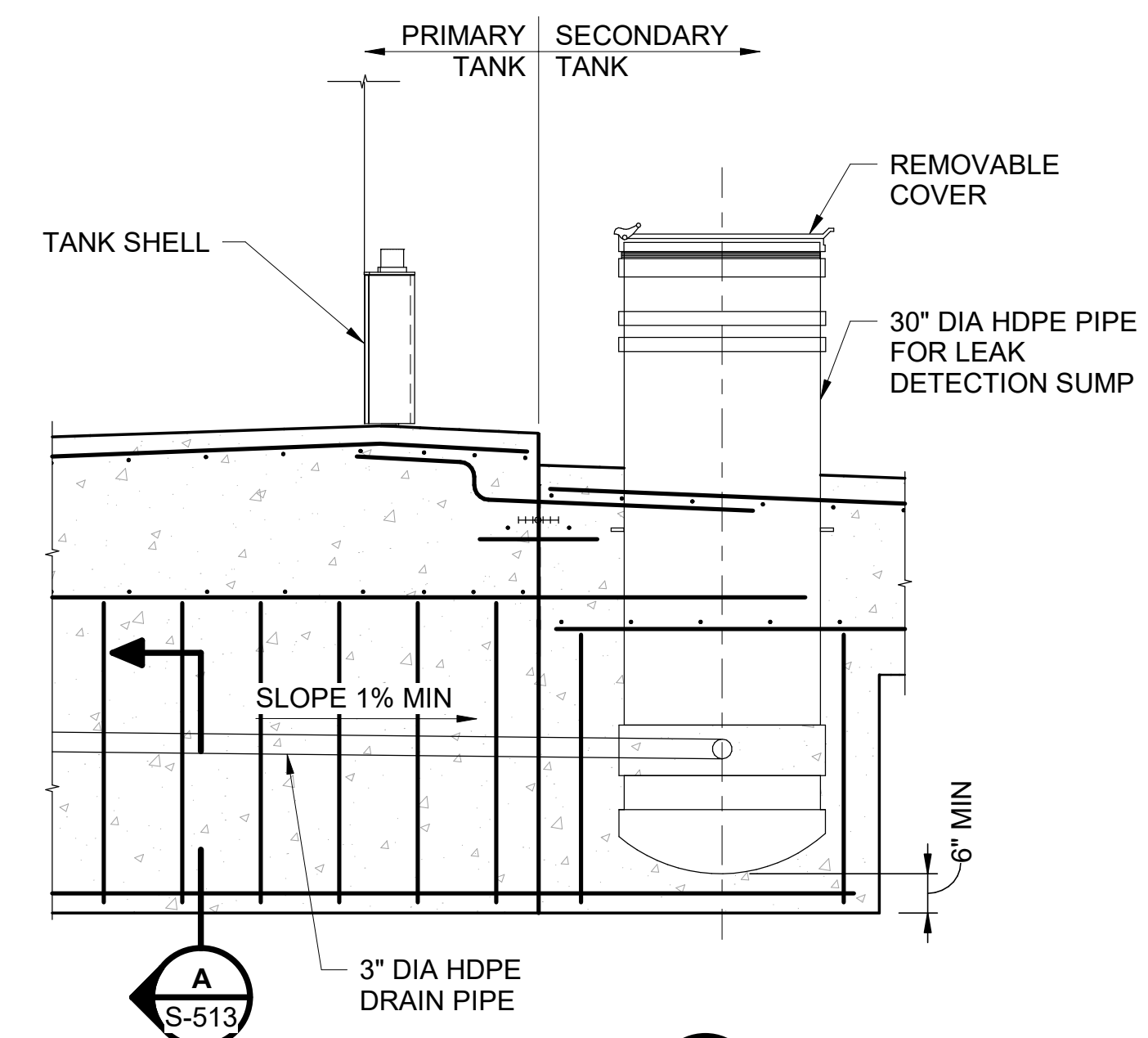
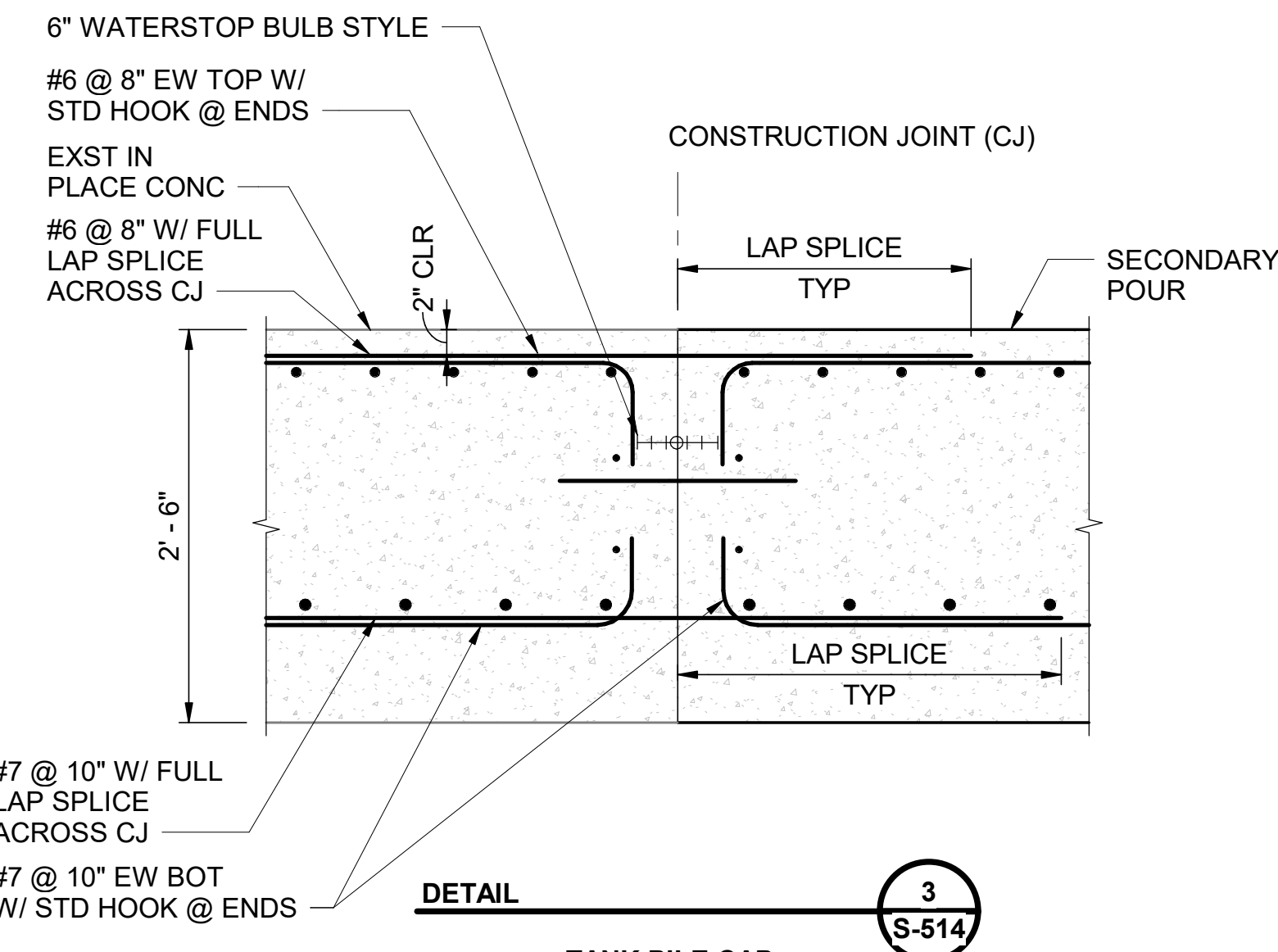




**DETAIL 1**  
 SCALE IN FEET  
 S-512

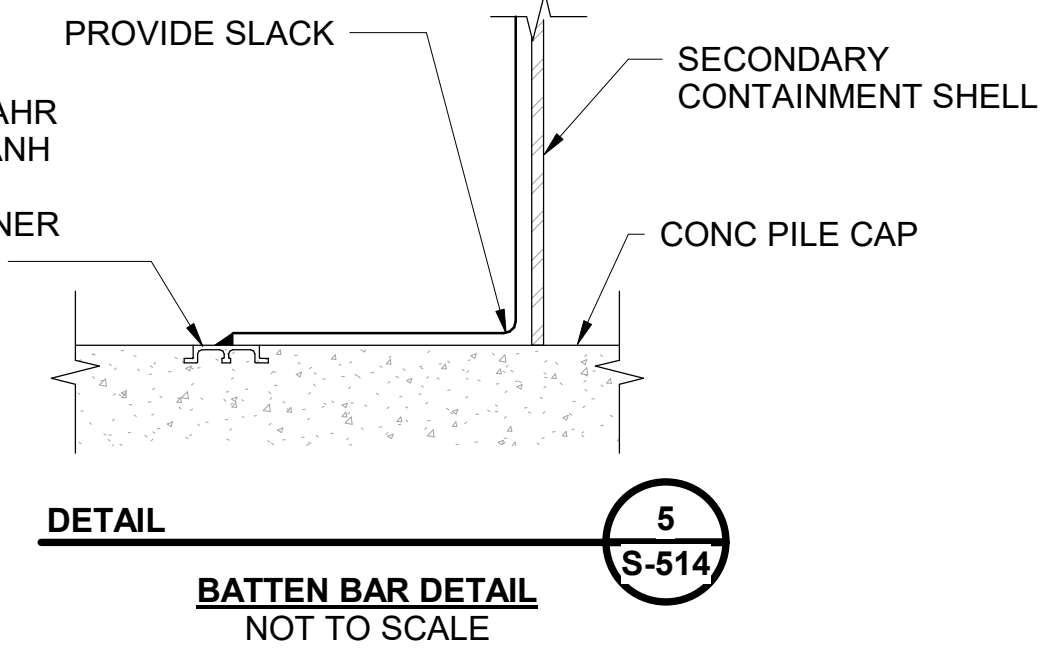
**DETAIL 2**  
 SCALE IN FEET  
 S-514

**NOTE:**  
 INSTALL LINER AND ANCHORAGE SYSTEM AFTER TANK SHELL HAS BEEN PAINTED AND PASSED INSPECTION.

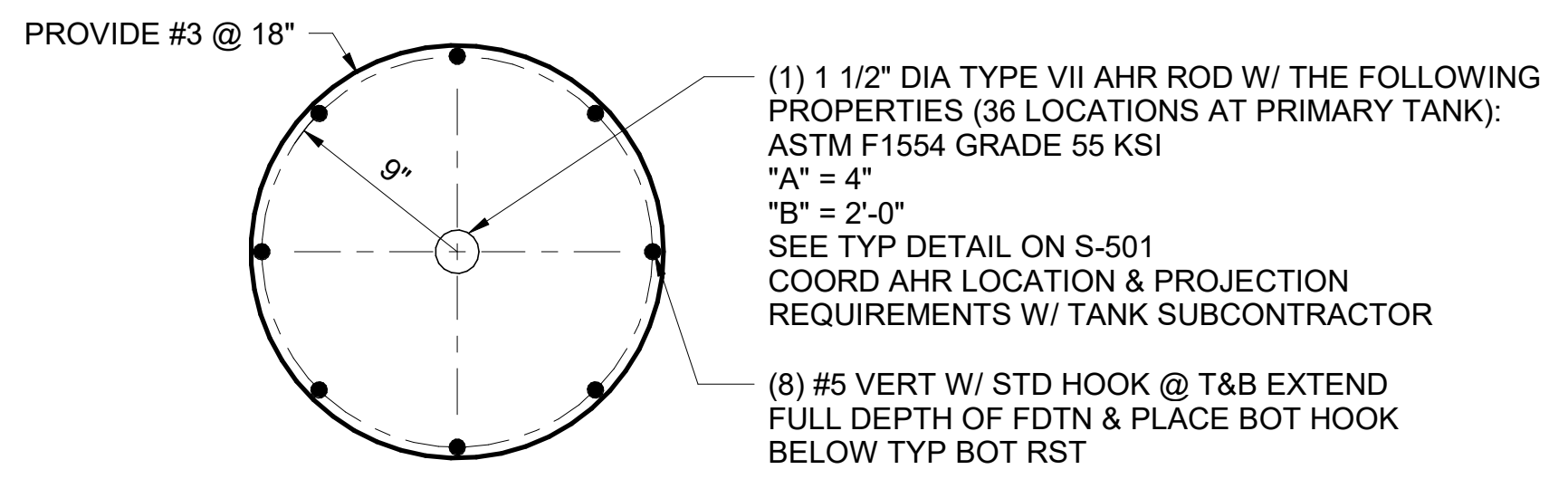


**DETAIL 3**  
 TANK PILE CAP CONSTRUCTION JOINT  
 SCALE IN FEET  
 S-514

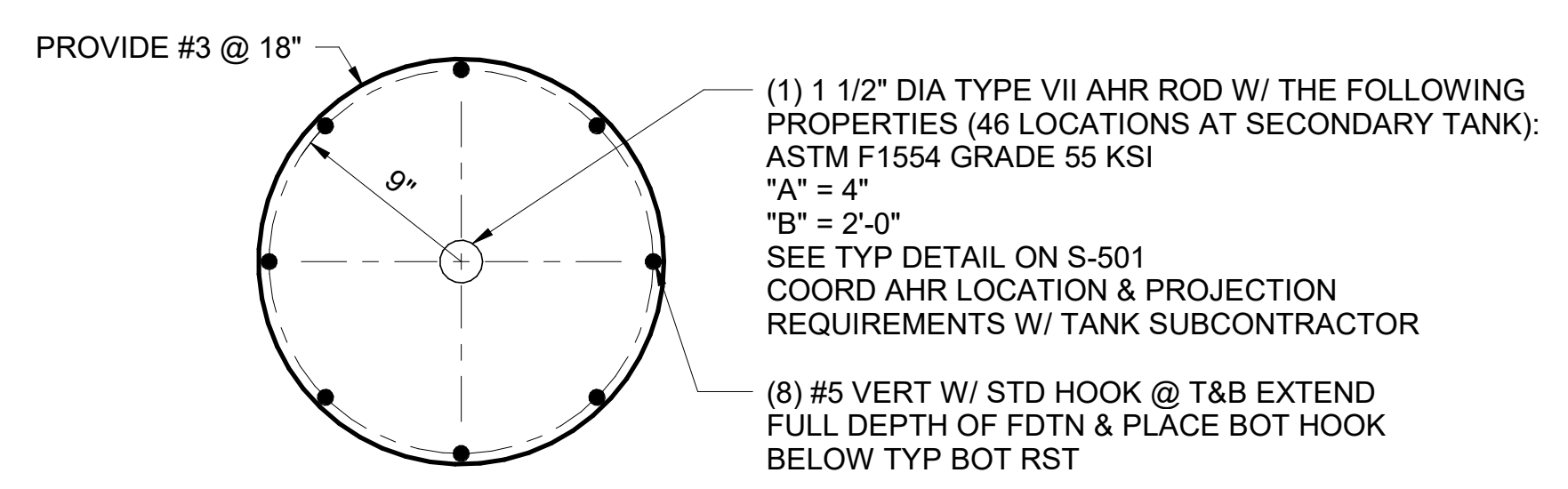
**DETAIL 4**  
 SCALE IN FEET  
 S-512



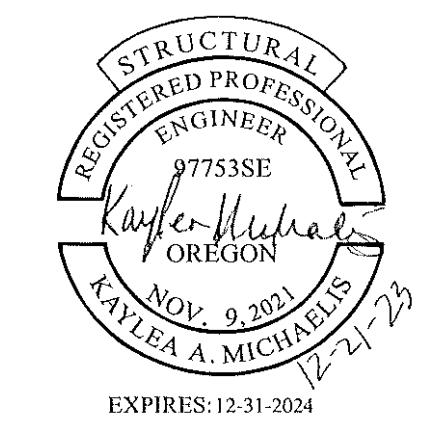
**DETAIL 5**  
 BATTEN BAR DETAIL NOT TO SCALE  
 SCALE IN FEET  
 S-514



**SECTION A**  
 SCALE IN FEET  
 S-514



**SECTION B**  
 SCALE IN FEET  
 S-514



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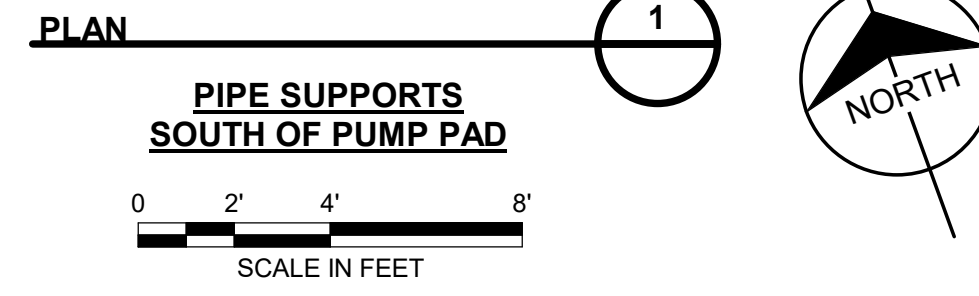
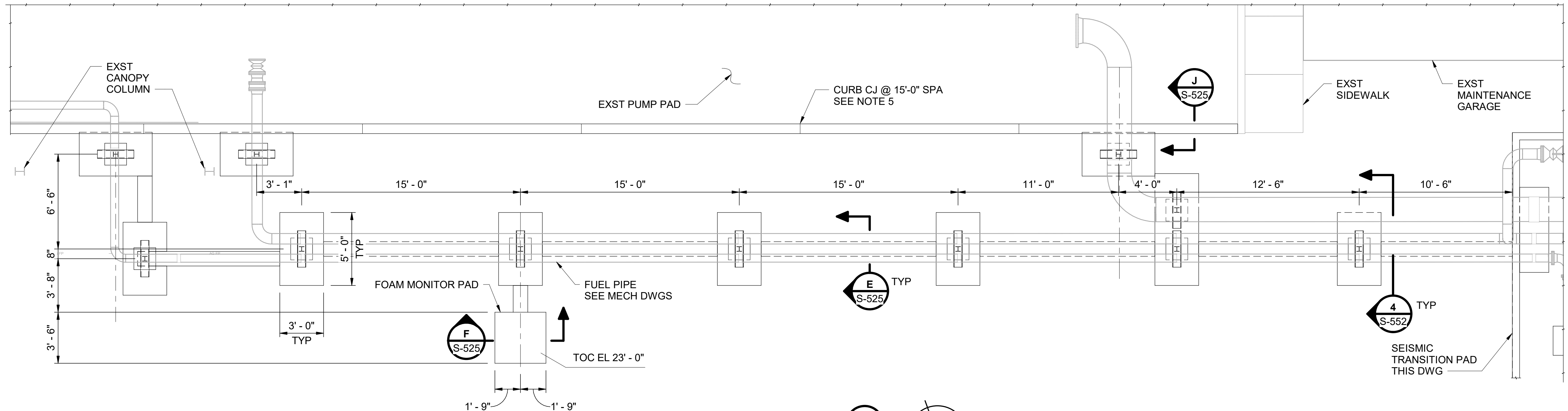
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**PDX FACILITY IMPROVEMENTS**  
 CONTAINMENT AREA DETAILS

project	153929	contract	
drawing		rev.	

**S-514 - A**

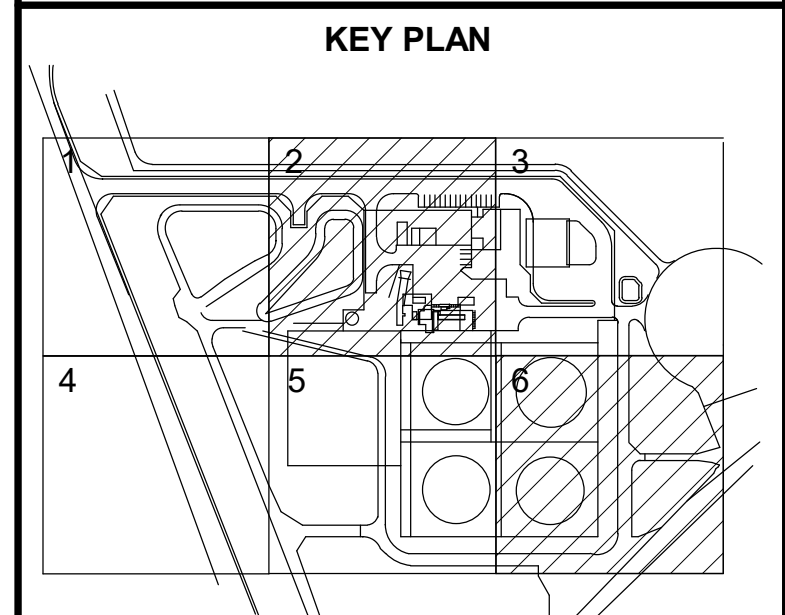
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- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - DISCONTINUE CURB REINFORCEMENT STEEL 3 INCHES BEFORE AND AFTER ALL CURB CONSTRUCTION JOINTS (CJ), DO NOT CONTINUE CURB REINFORCEMENT THROUGH JOINT.
  - SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.
  - COAT ALL EXPOSED CONCRETE SURFACES OF THE SEISMIC TRANSITION PAD WITH FUEL-RESISTANT PENETRATING SEALER/HARDENER, REFER TO 03 30 00 LIQUID FLOOR TREATMENTS.

- KEYED NOTES:**
- GUIDED SUPPORT, SEE MECHANICAL DRAWINGS.
  - LINESTOP SUPPORT, SEE MECHANICAL DRAWINGS.
  - 1'-6" THICK CONCRETE MAT FOUNDATION REINFORCED WITH #5 @ 9" EACH WAY TOP AND BOTTOM.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	11/20/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

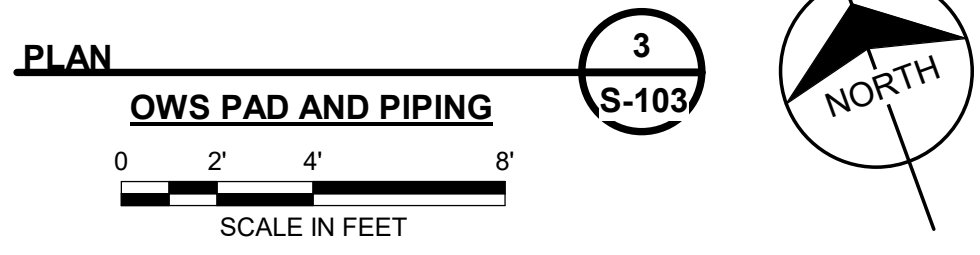
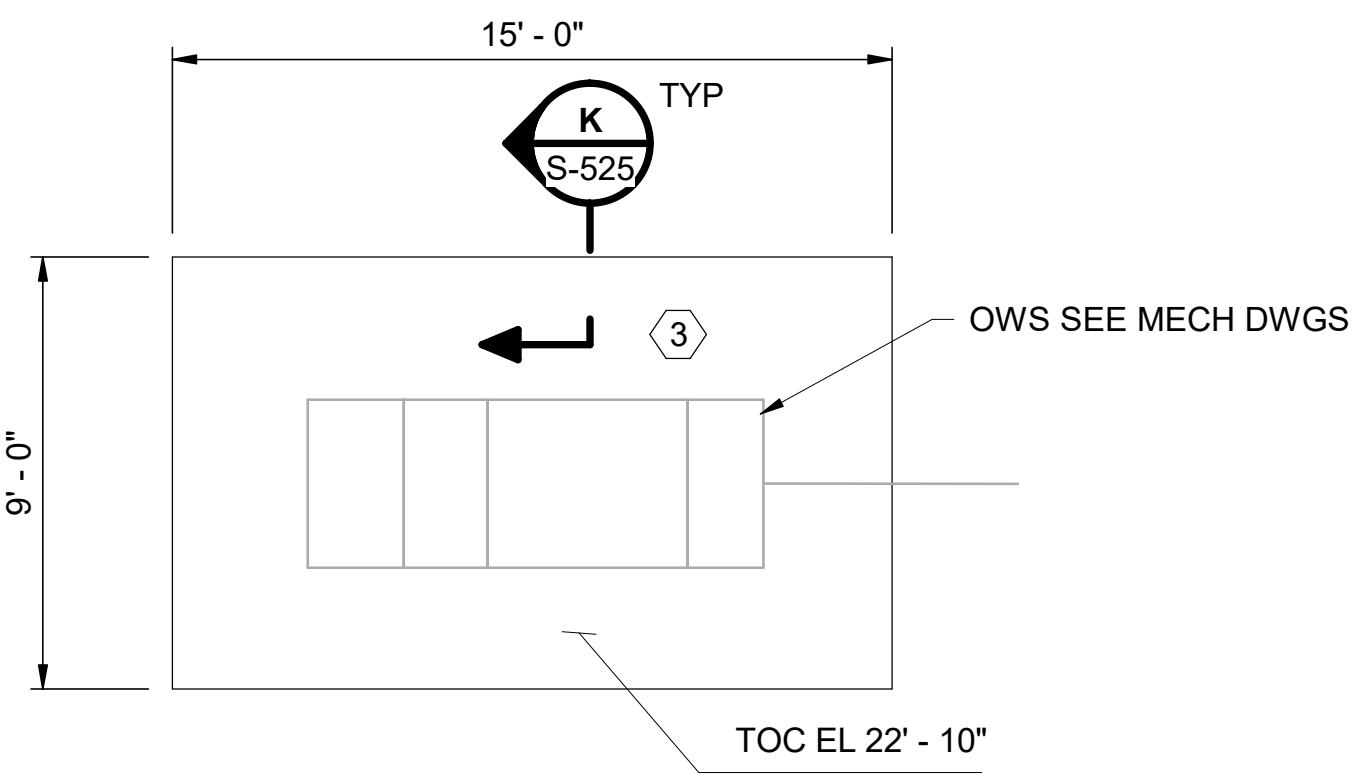
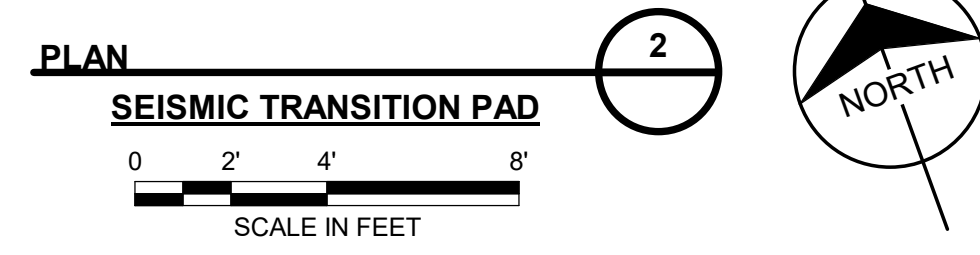
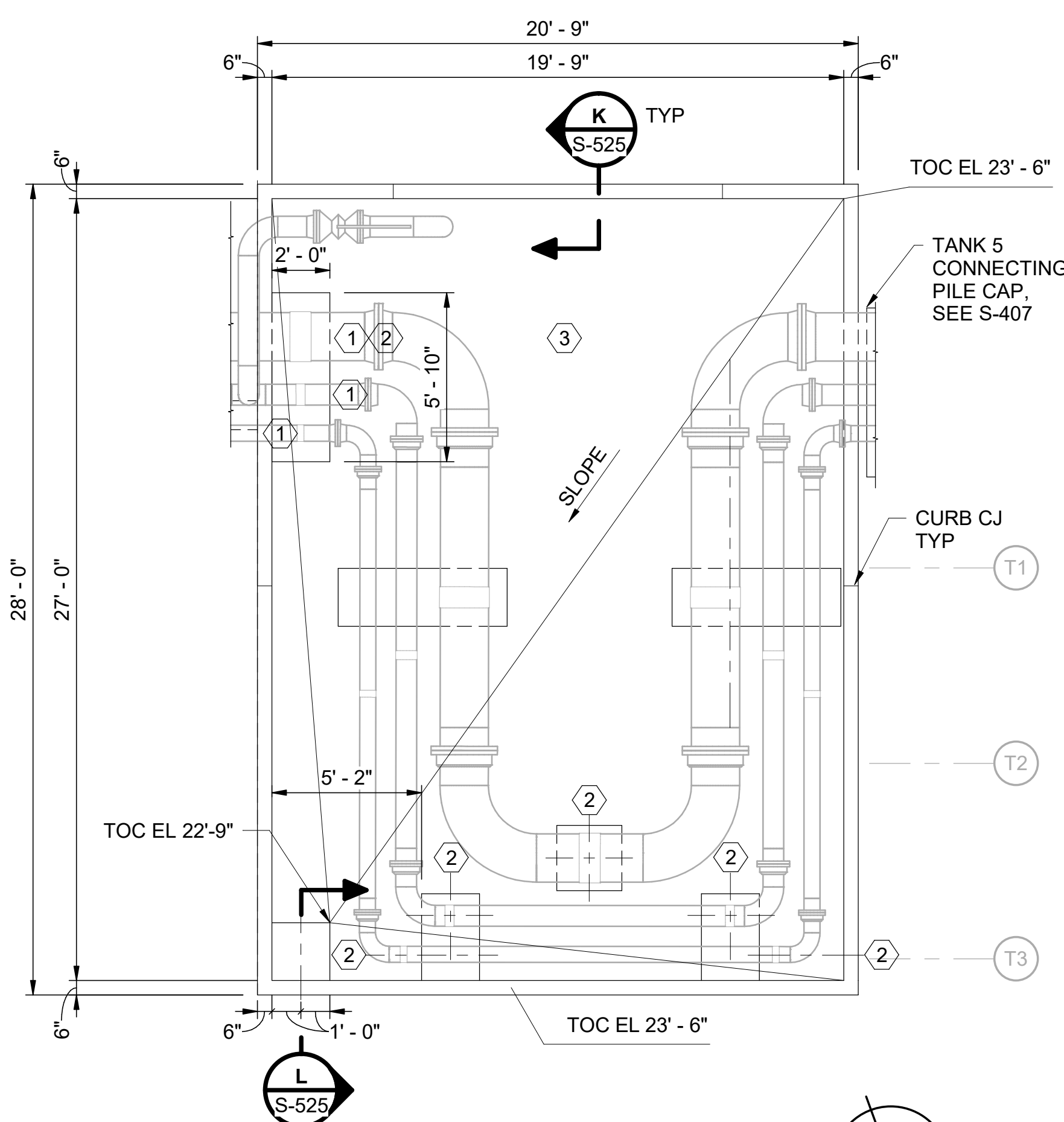
**PDX FUEL COMPANY L.L.C**

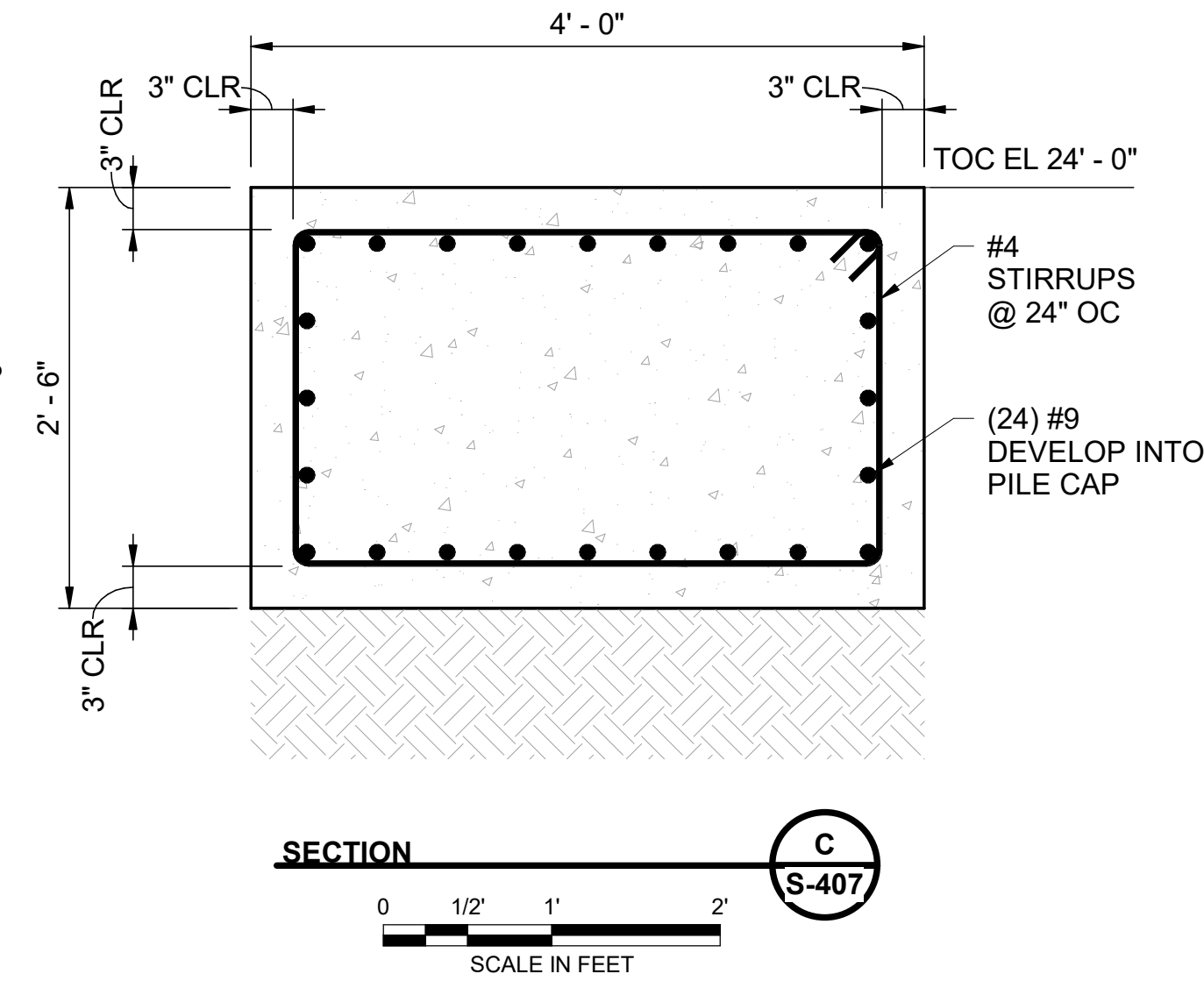
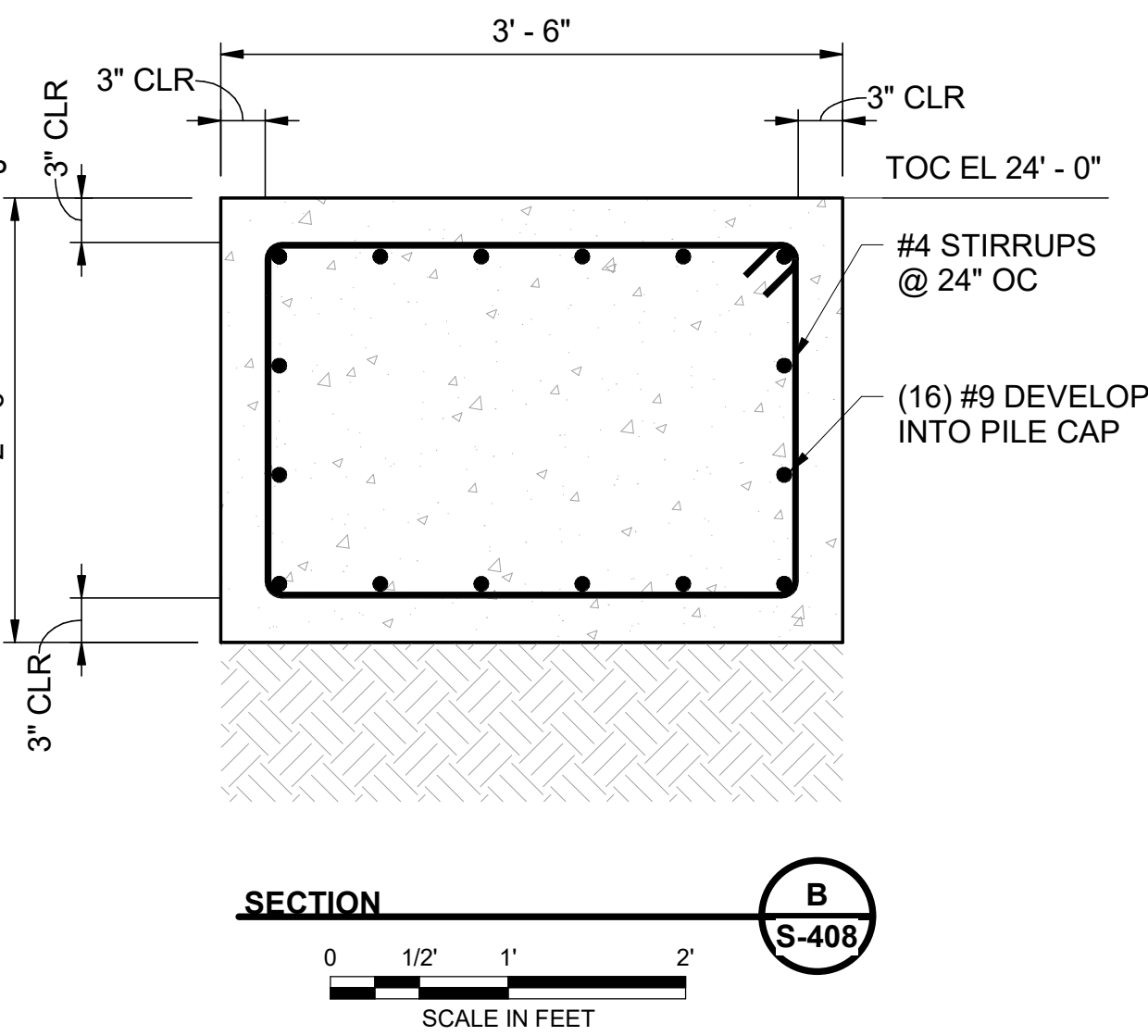
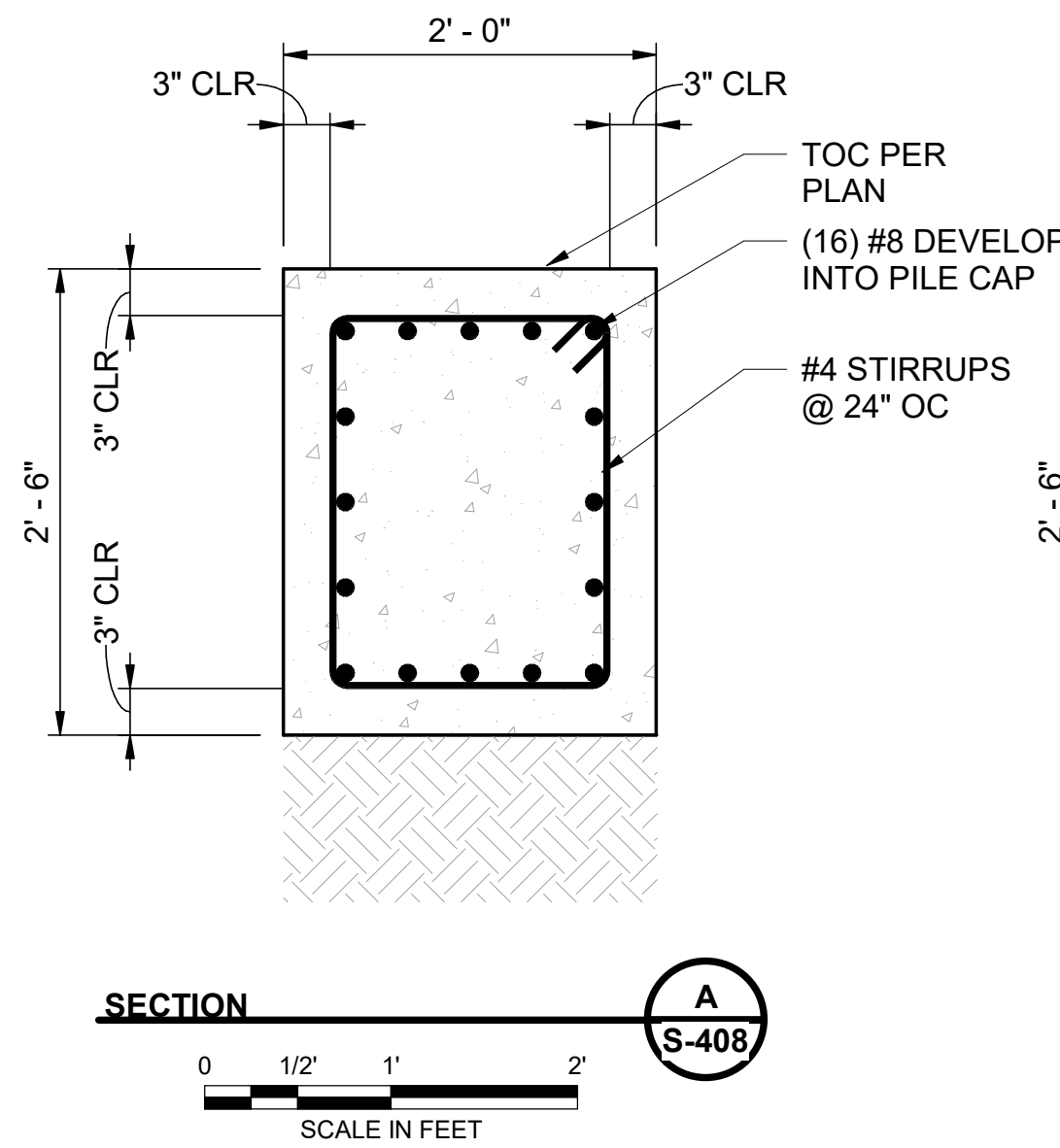
PORTLAND INTERNATIONAL AIRPORT  
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**PDX FACILITY IMPROVEMENTS FOUNDATION PADS**

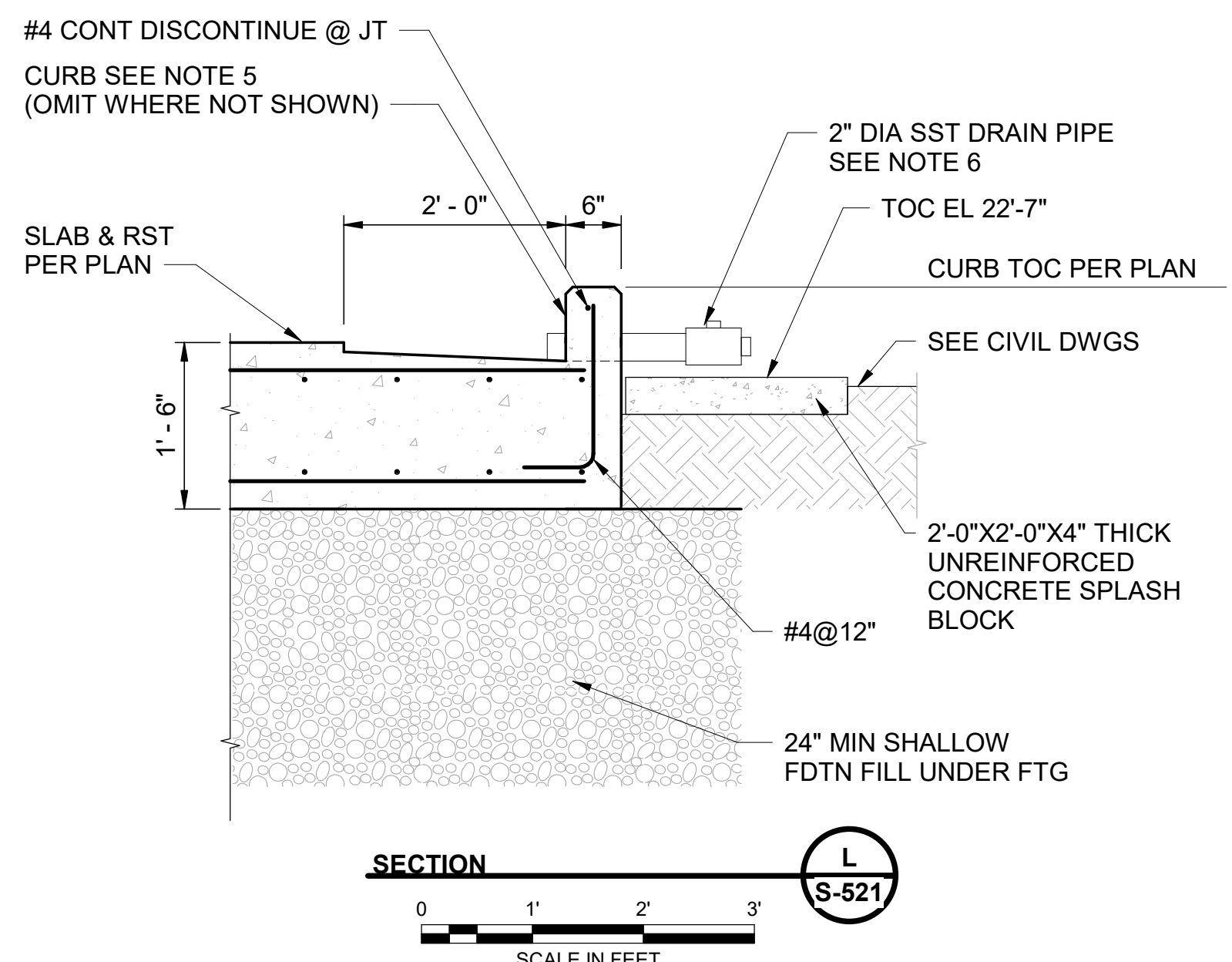
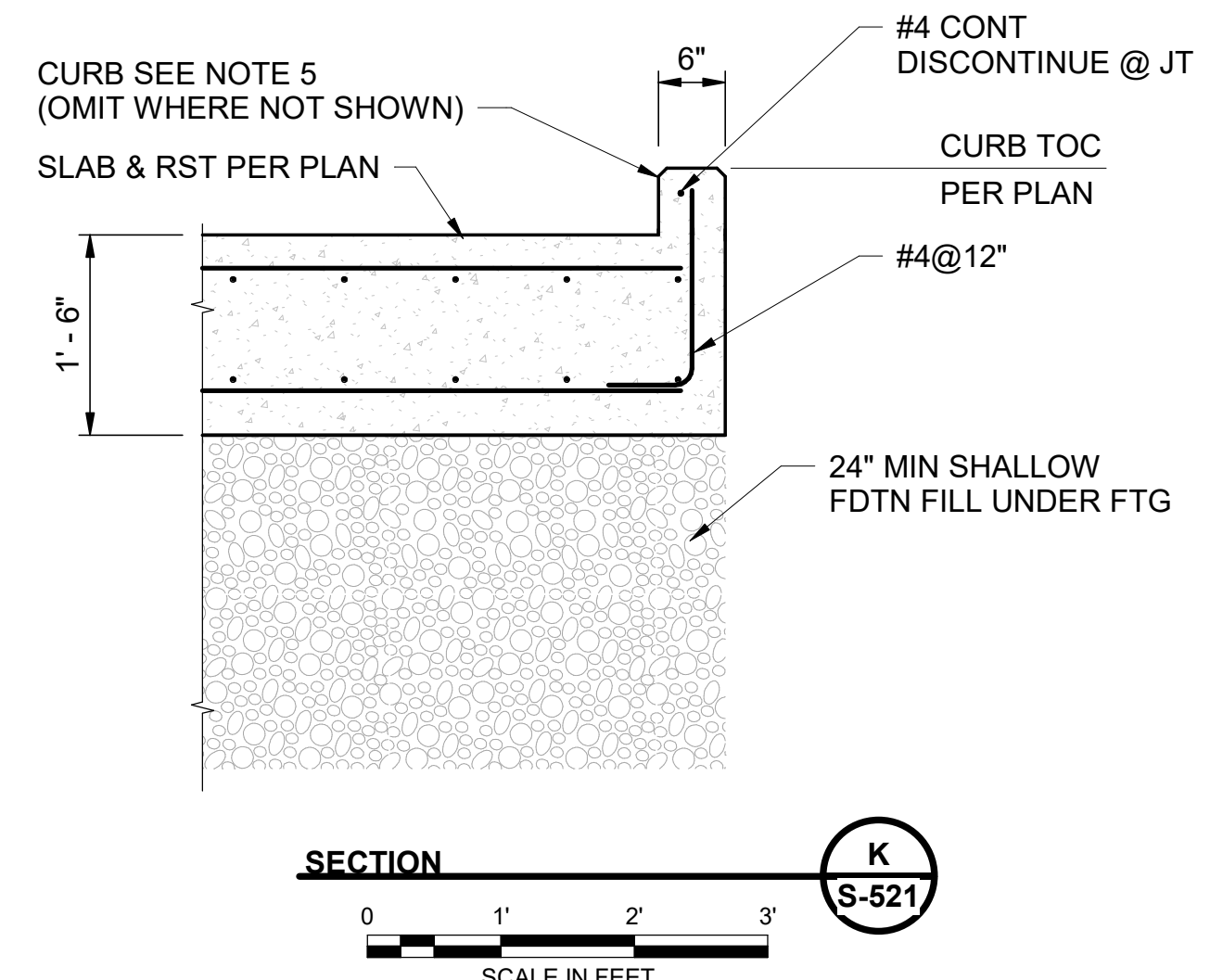
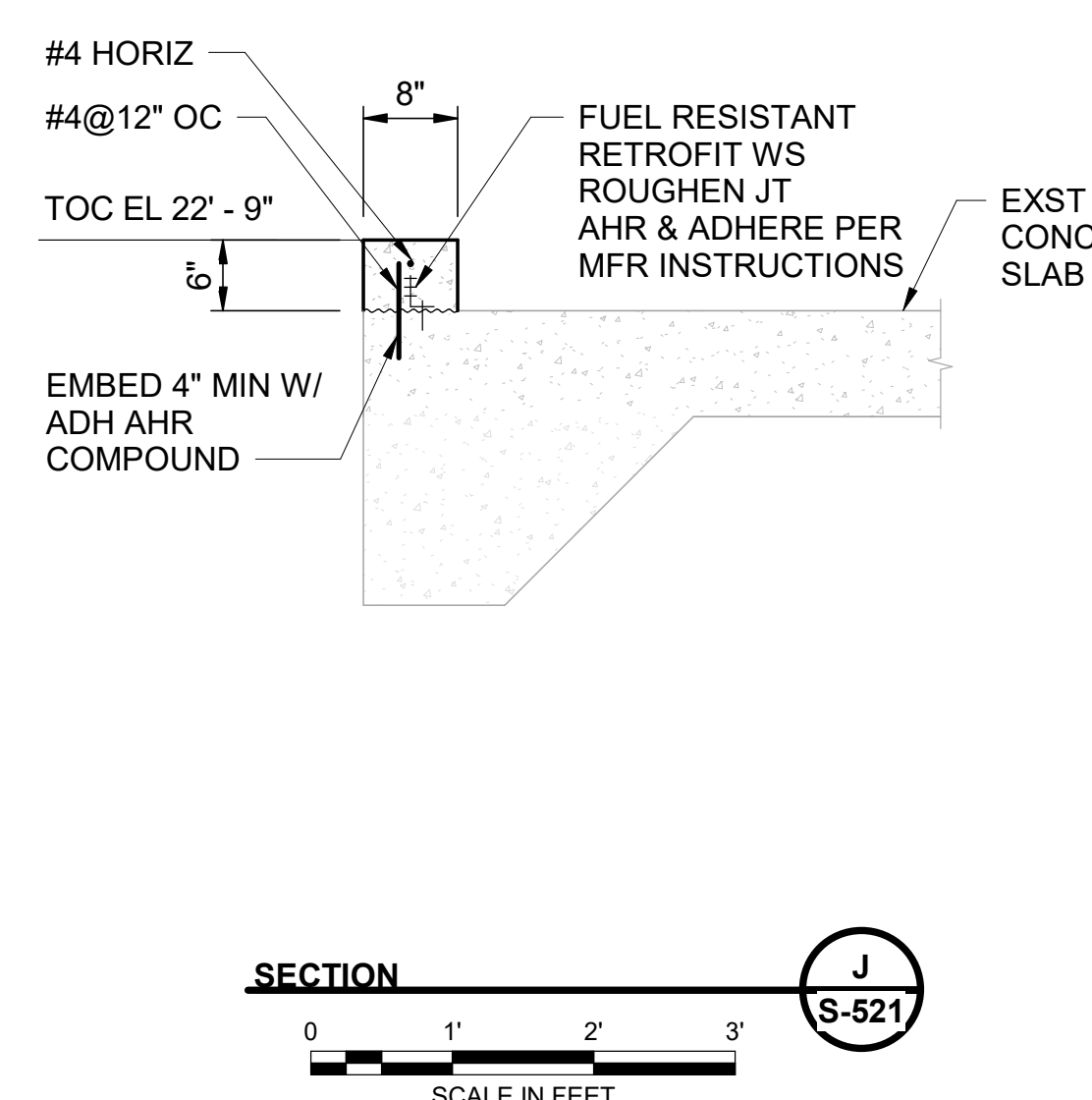
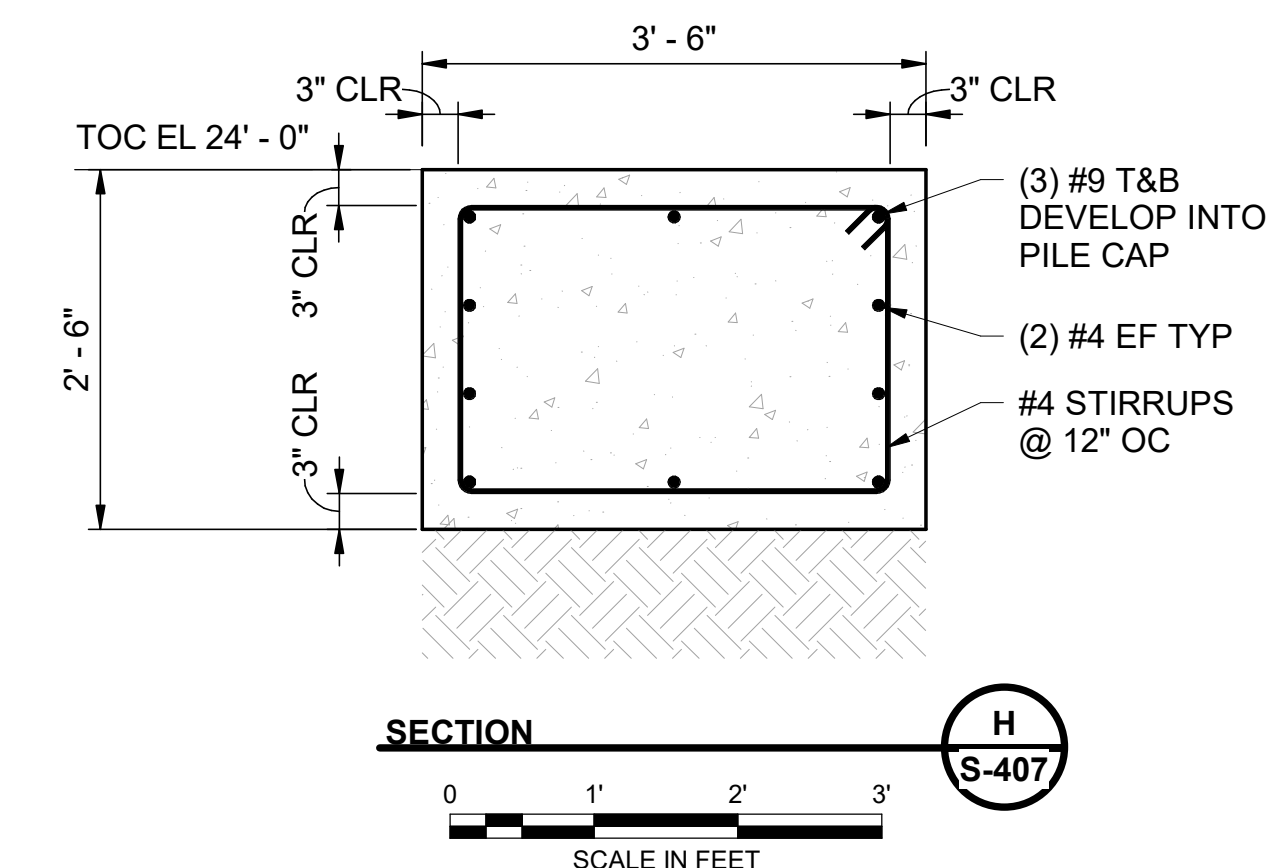
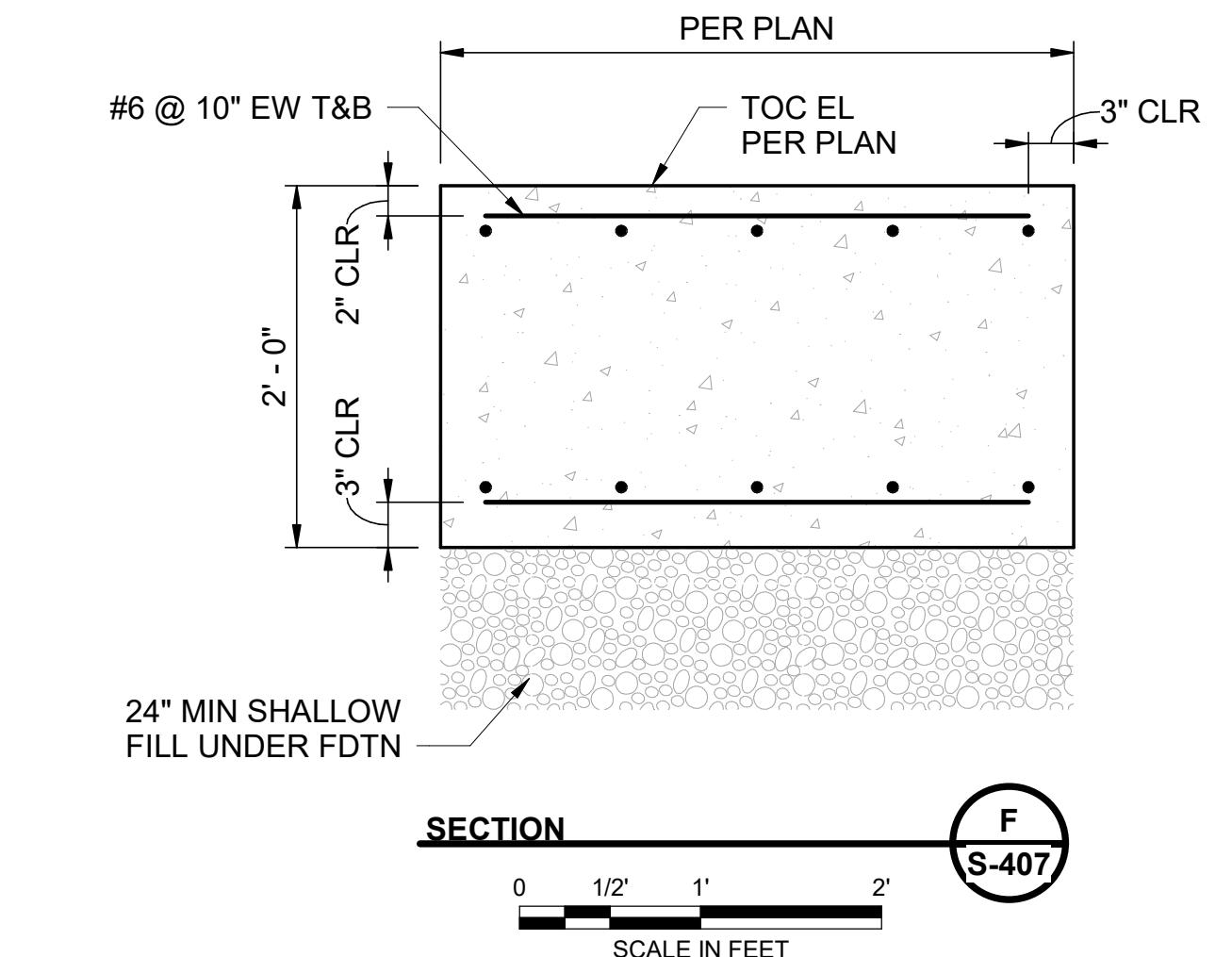
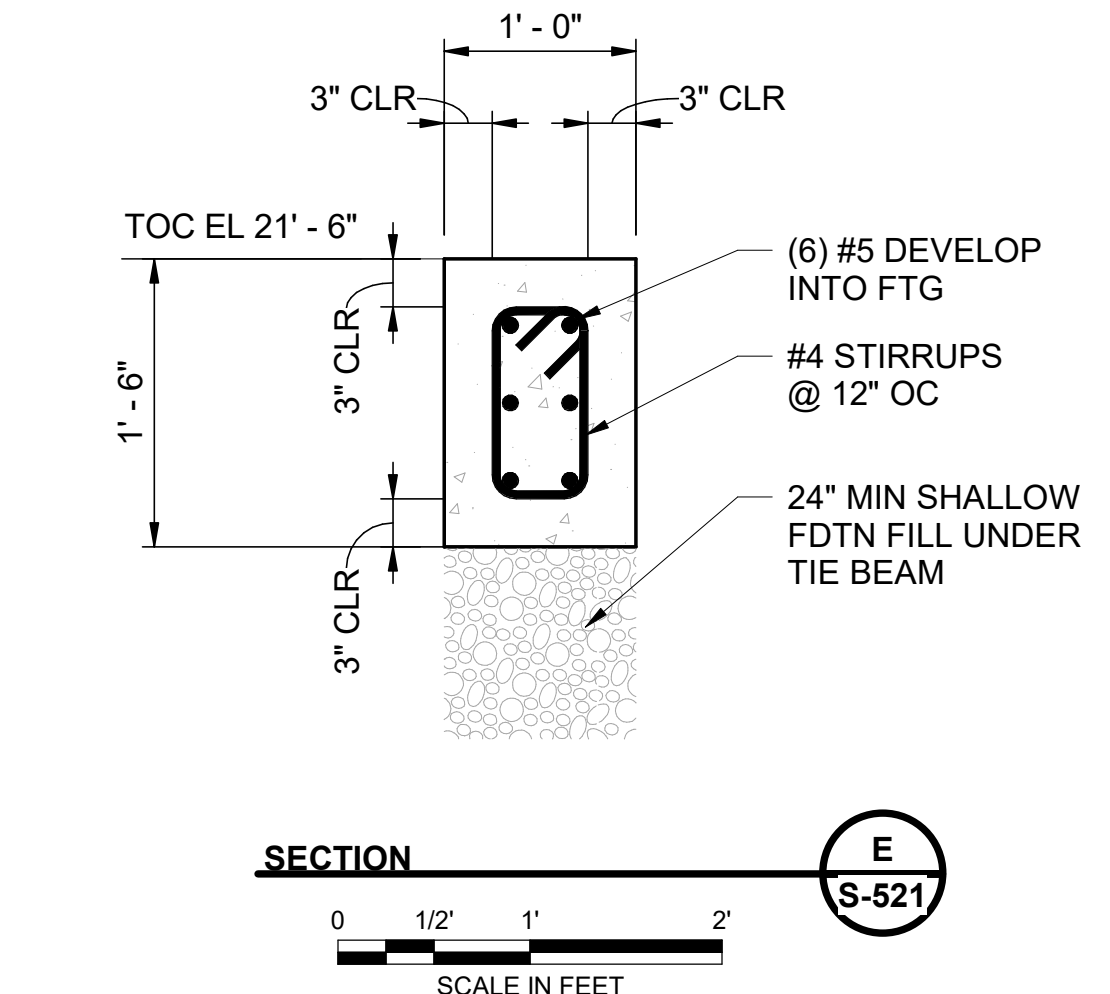
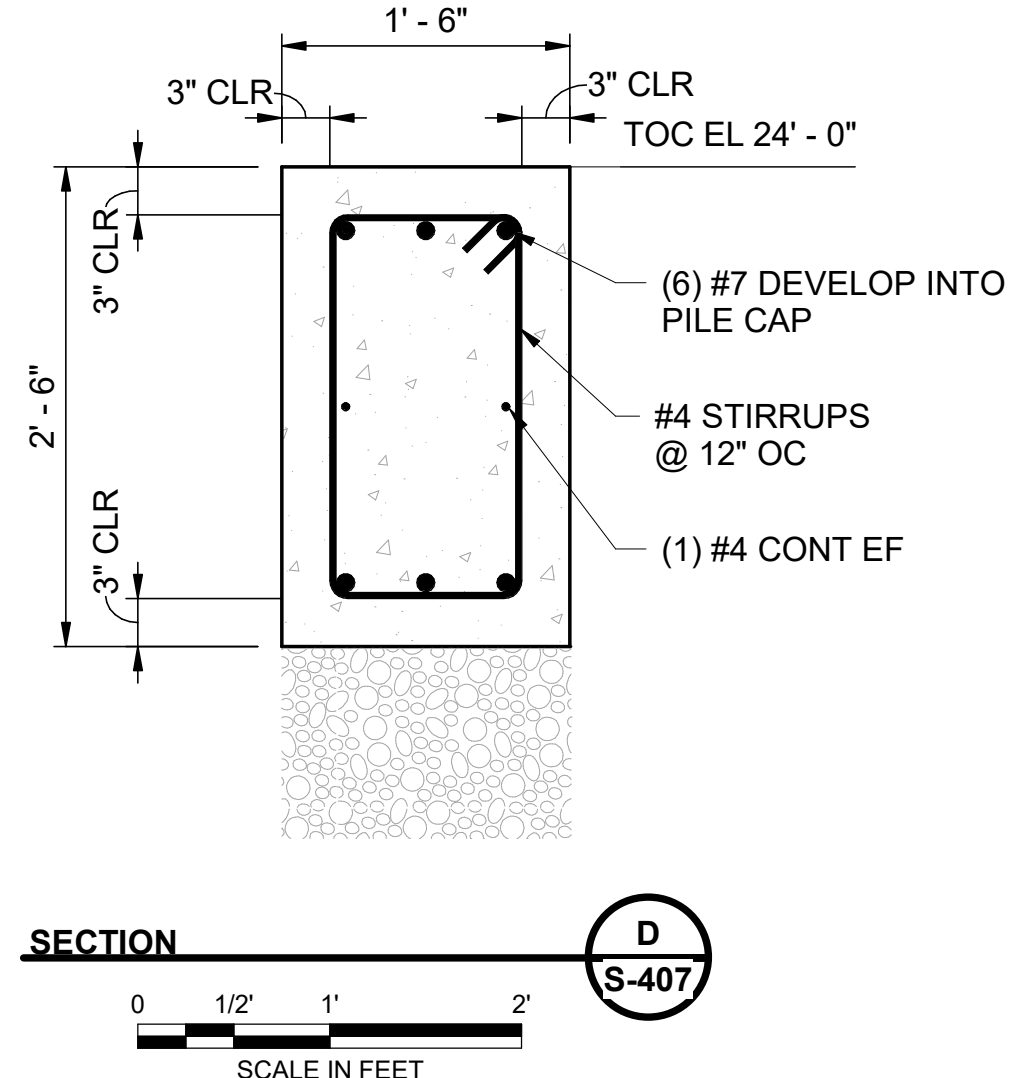
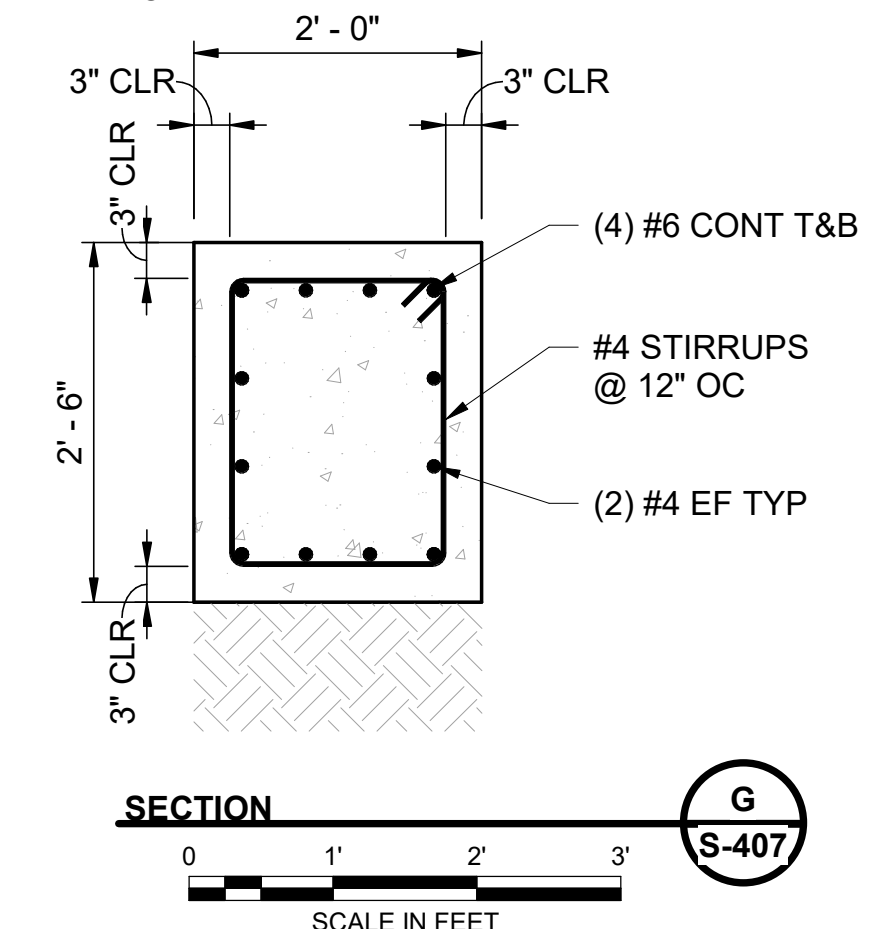
project	153929	contract	
drawing		rev.	
<b>S-521 - A</b>			

file





- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - POUR CURB MONOLITHICALLY WITH SLAB OR PROVIDE ROUGHENED JOINT WITH BONDING AGENT AND FUEL RESISTANT FLEXIBLE WATERSTOP PER 03 30 00 SPECIFICATIONS.
  - PROVIDE 2" DIAMETER STAINLESS STEEL DRAINING PIPE AND LOCKABLE BALL VALVE IN CURB.
    - PROVIDE REMOVABLE STAINLESS STEEL STRAINER ON THE INTERIOR END OF THE PIPE.
    - PROVIDE A STAINLESS STEEL WATERSTOP RING AND/OR APPLY A CONTINUOUS BEAD OF SELF-EXPANDING STRIP WATERSTOP TO THE PIPE SURFACE TO BE EMBEDDED IN CONCRETE TO CREATE WATER-TIGHT PIPE PENETRATION.



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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 KANSAS CITY, MO 64114  
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 Burns & McDonnell Engineering Co, Inc.

date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

PORTLAND INTERNATIONAL AIRPORT  
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 PORTLAND, OREGON 97218

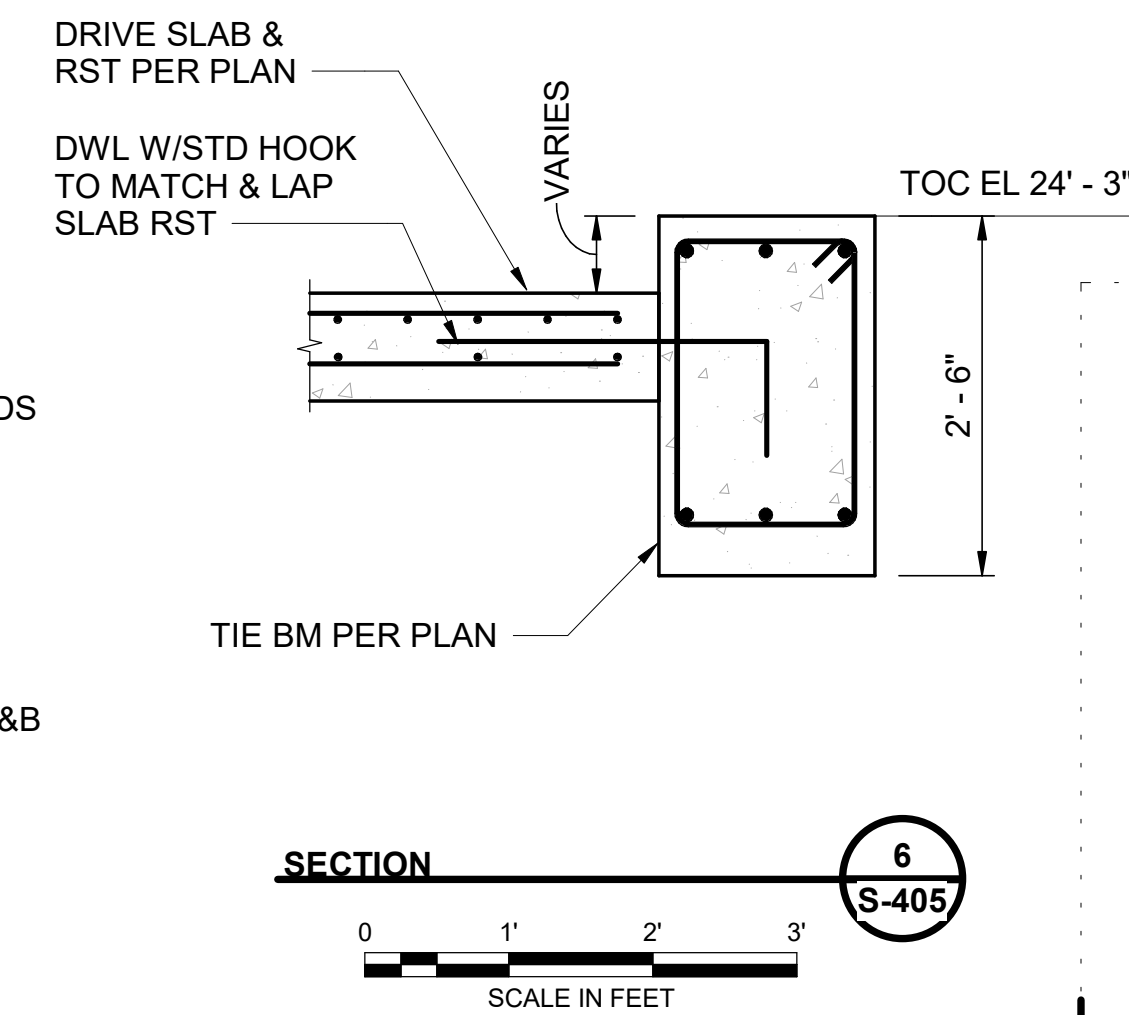
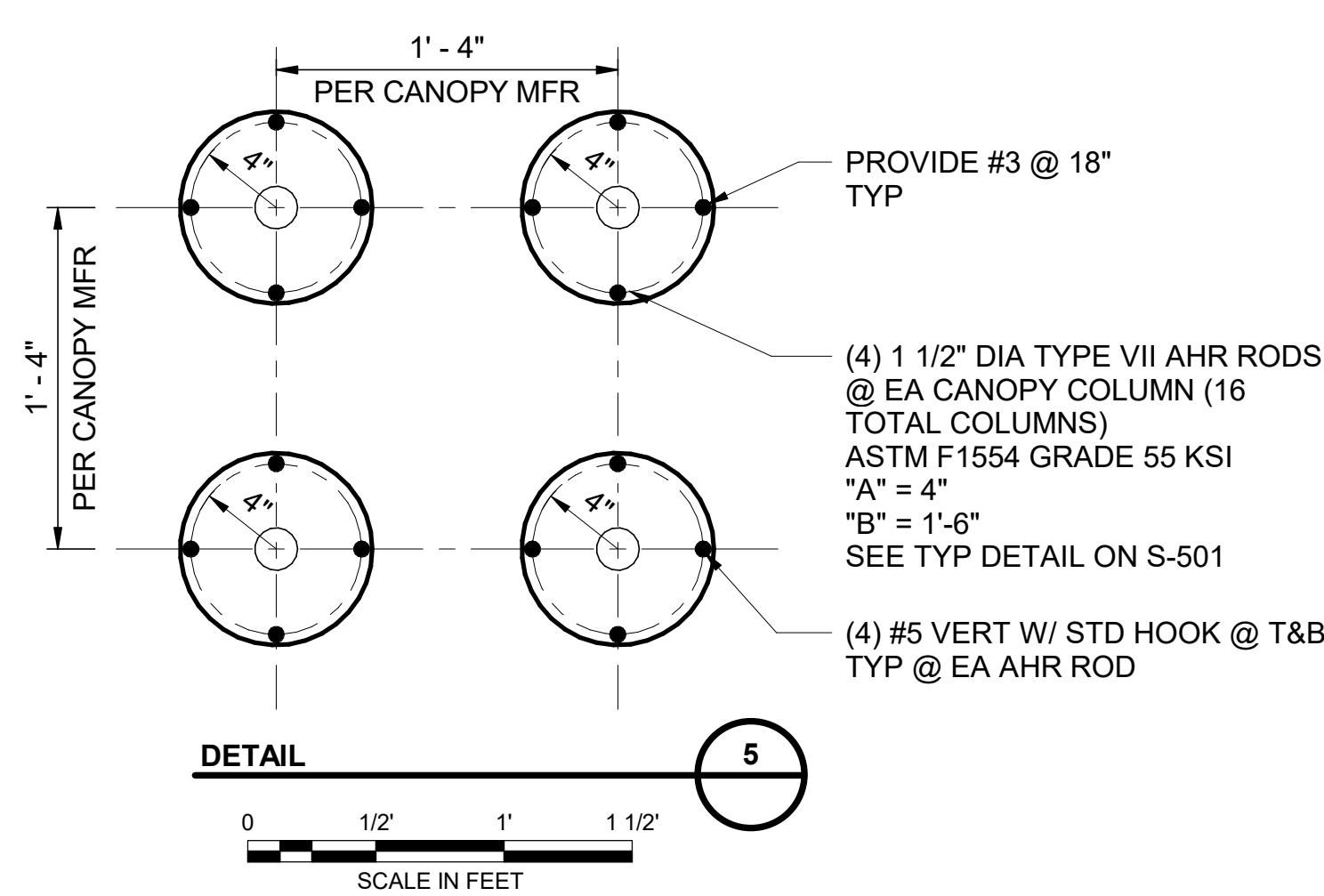
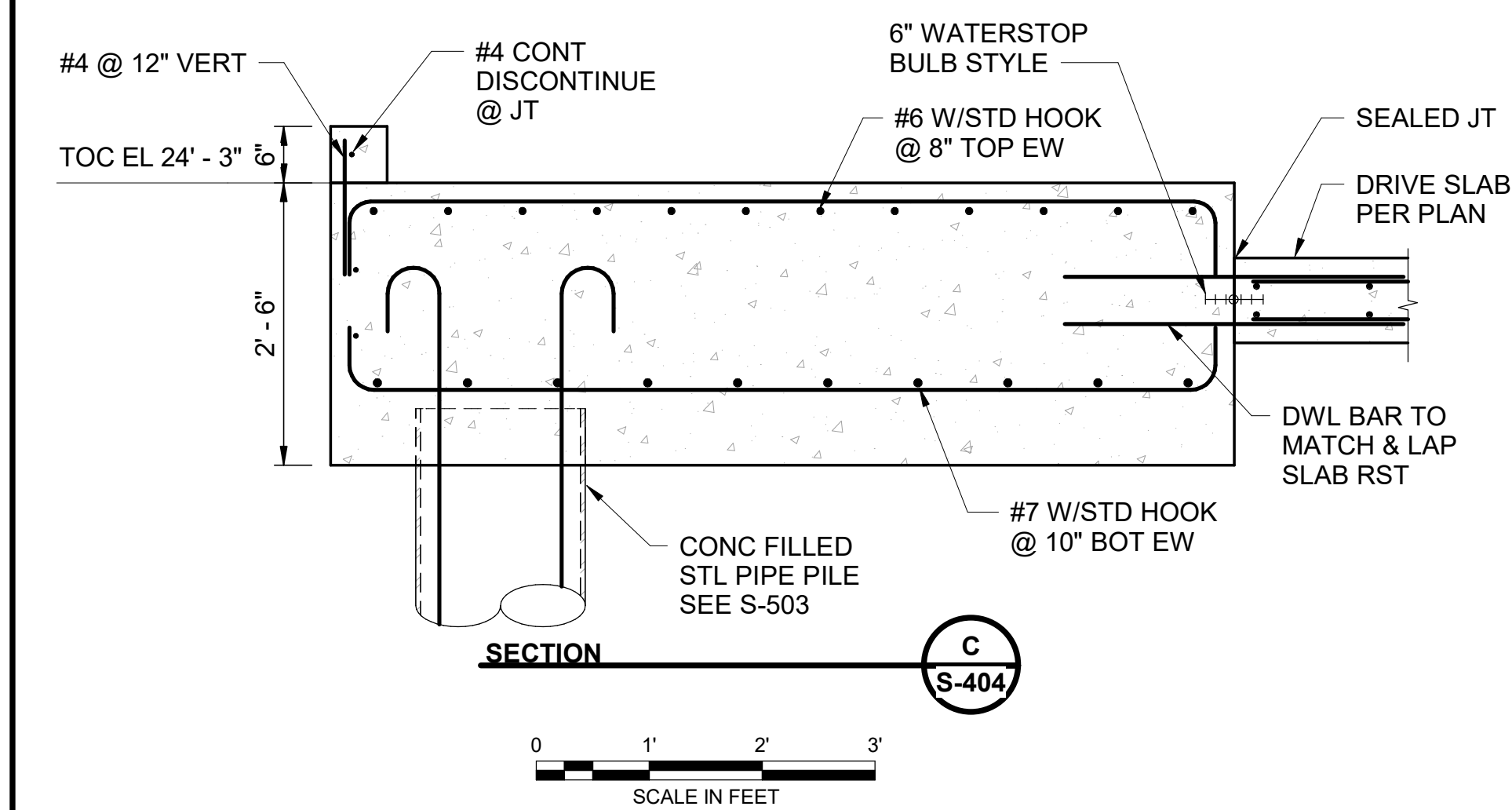
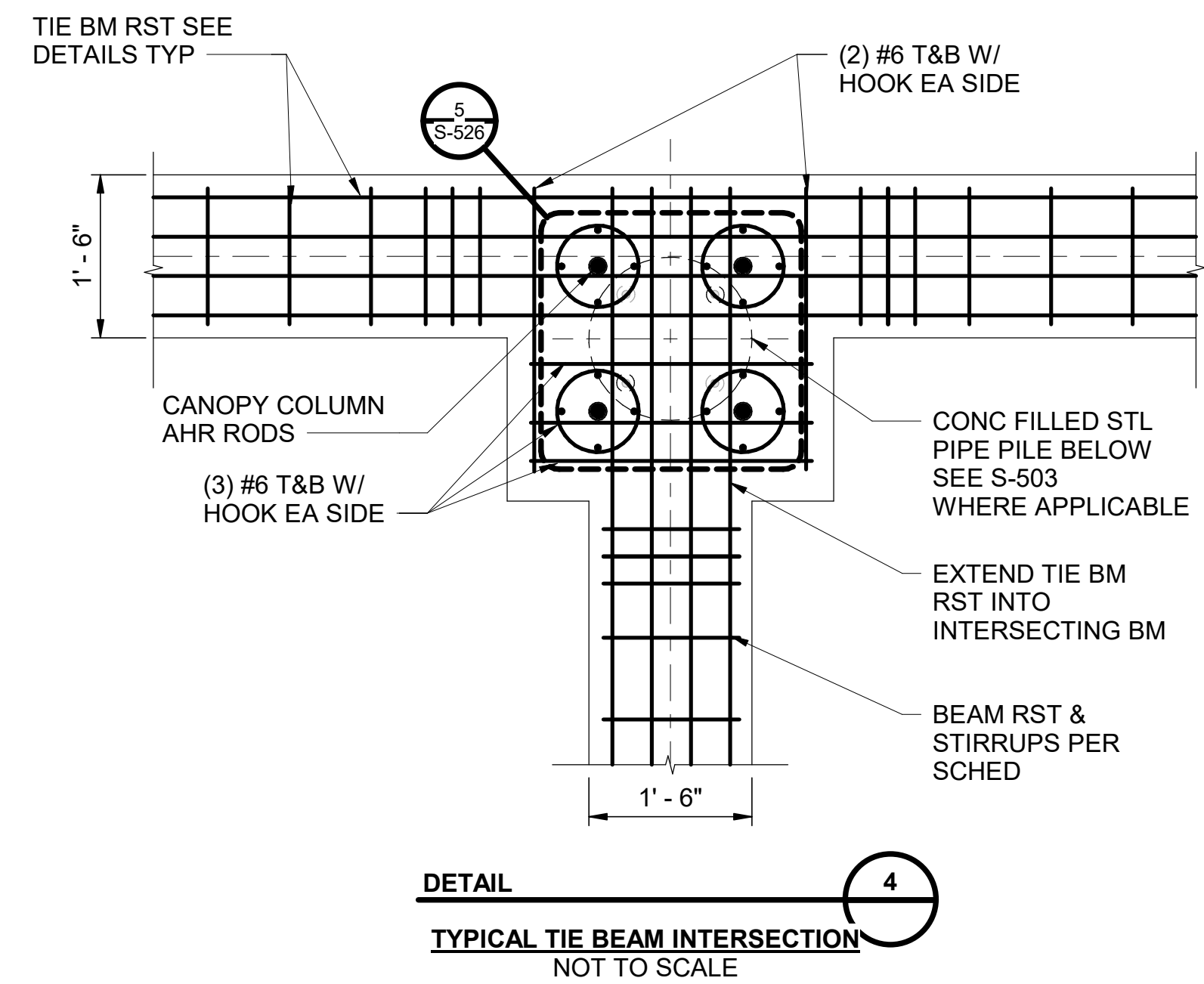
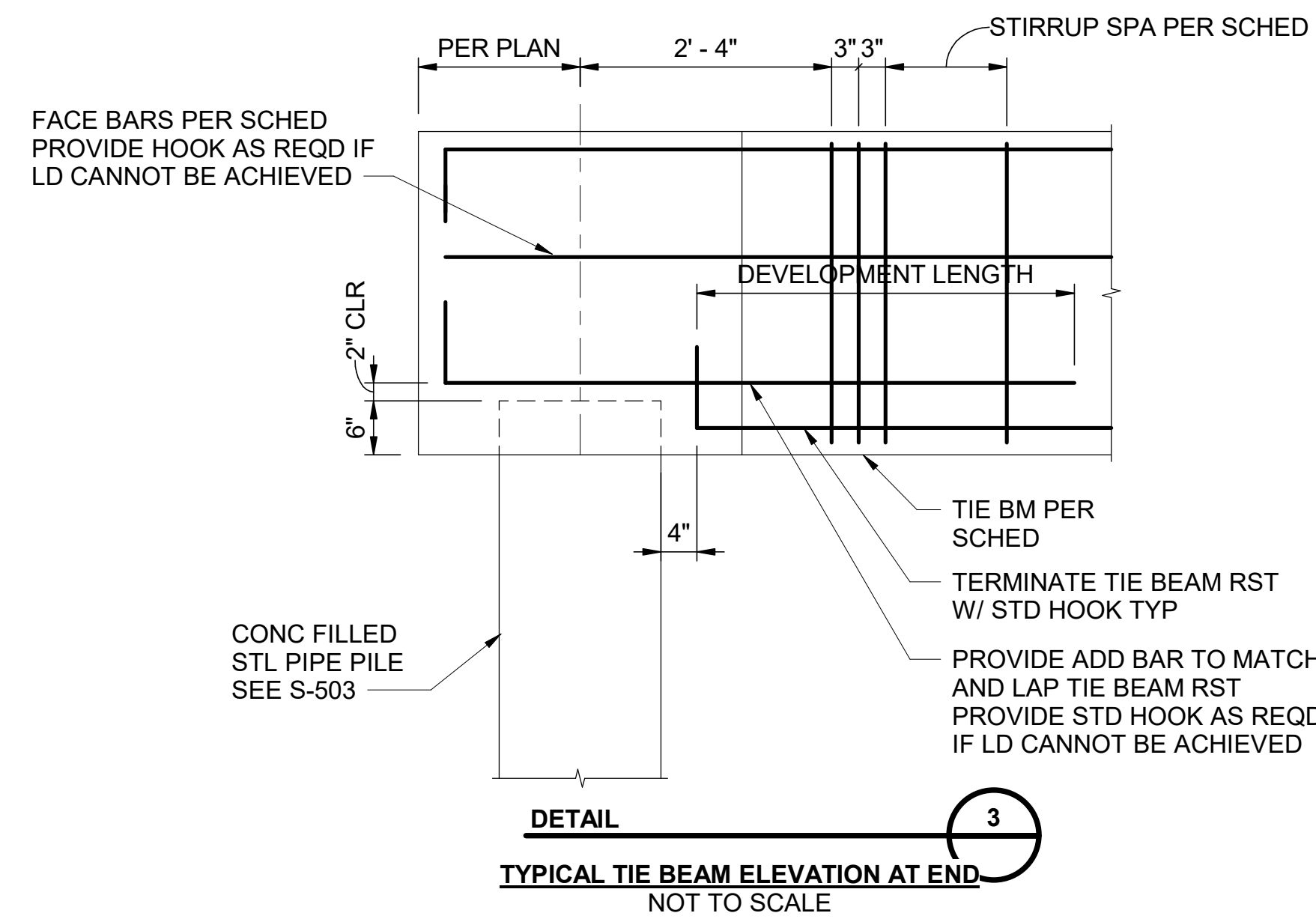
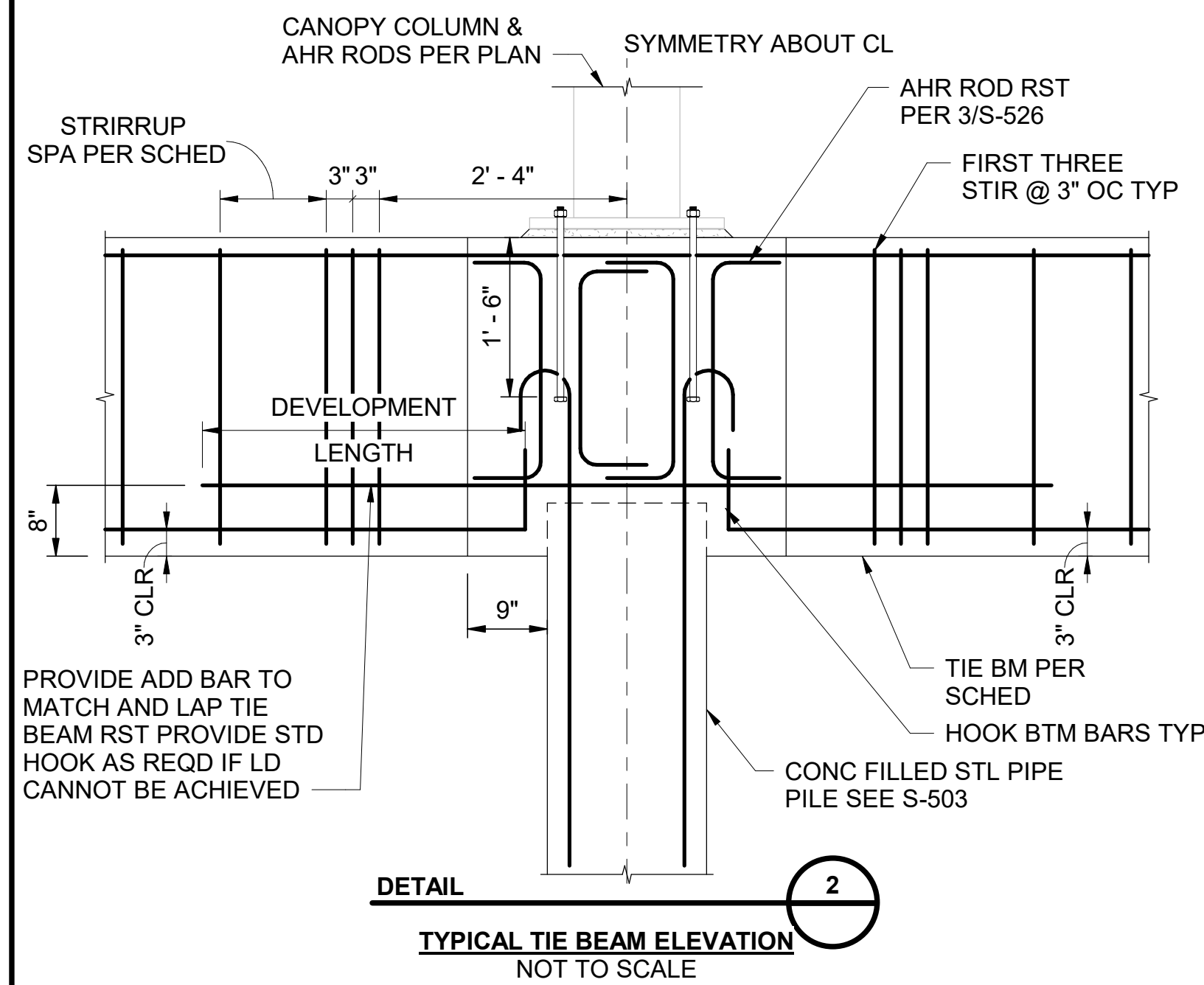
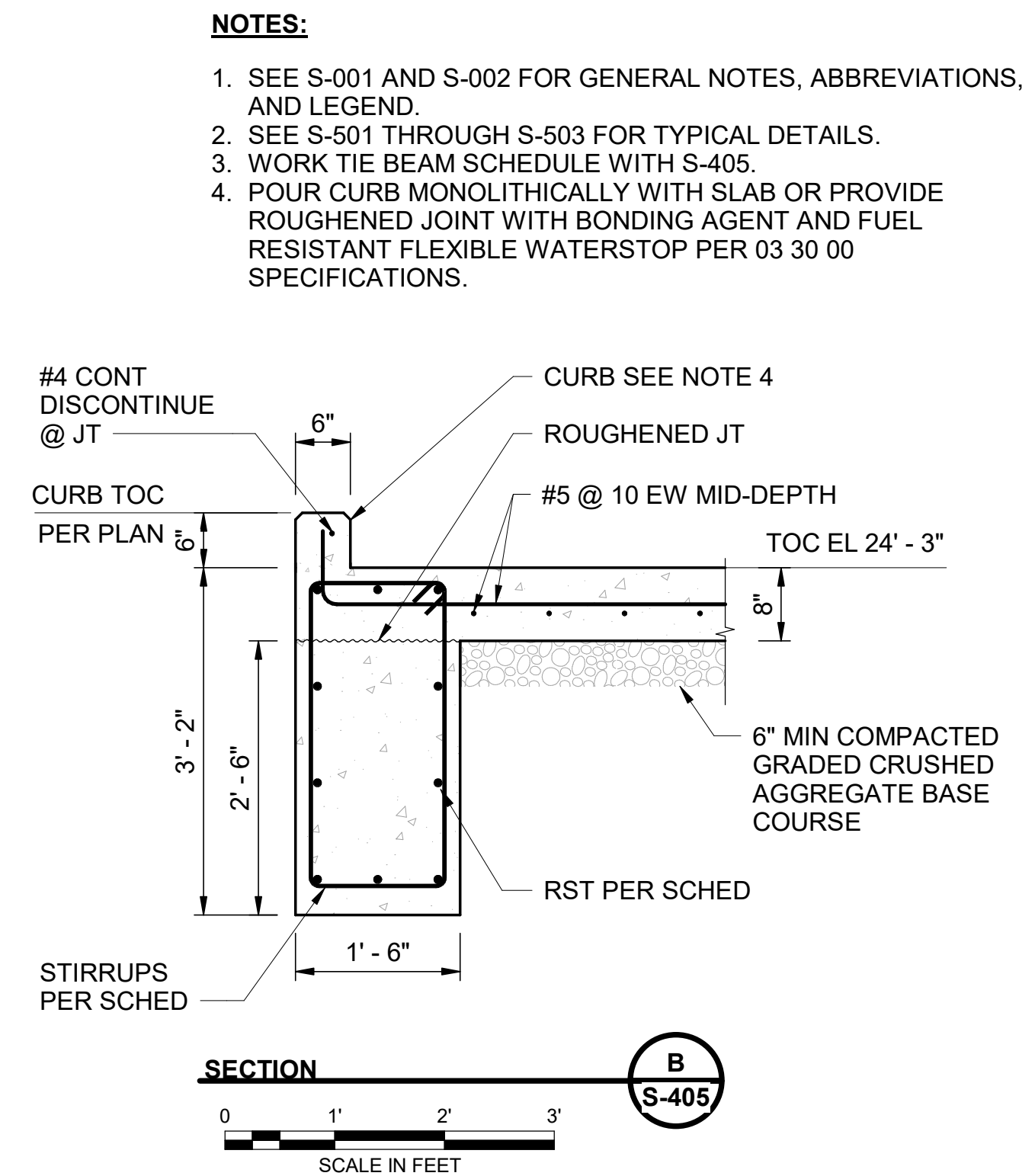
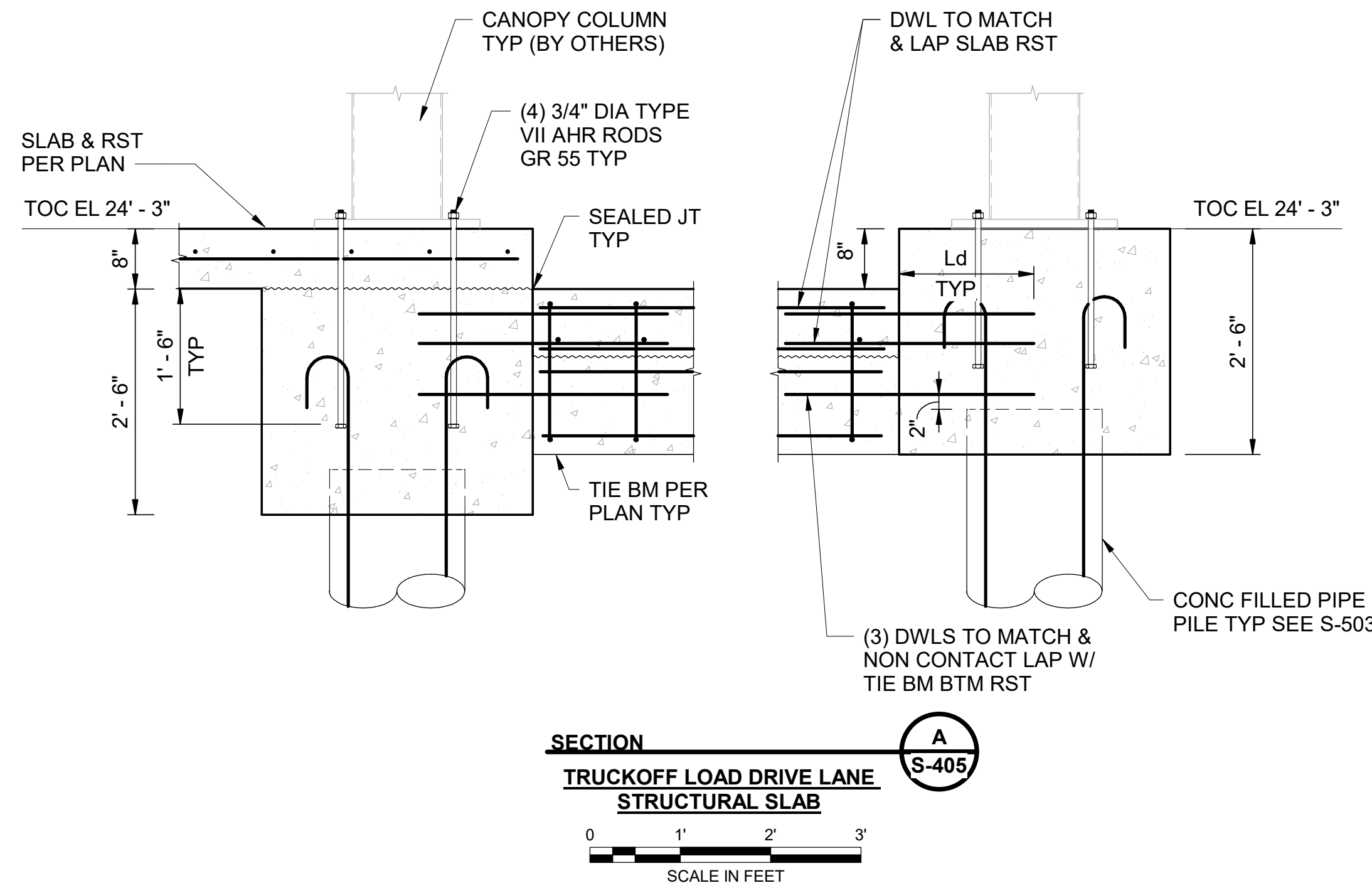
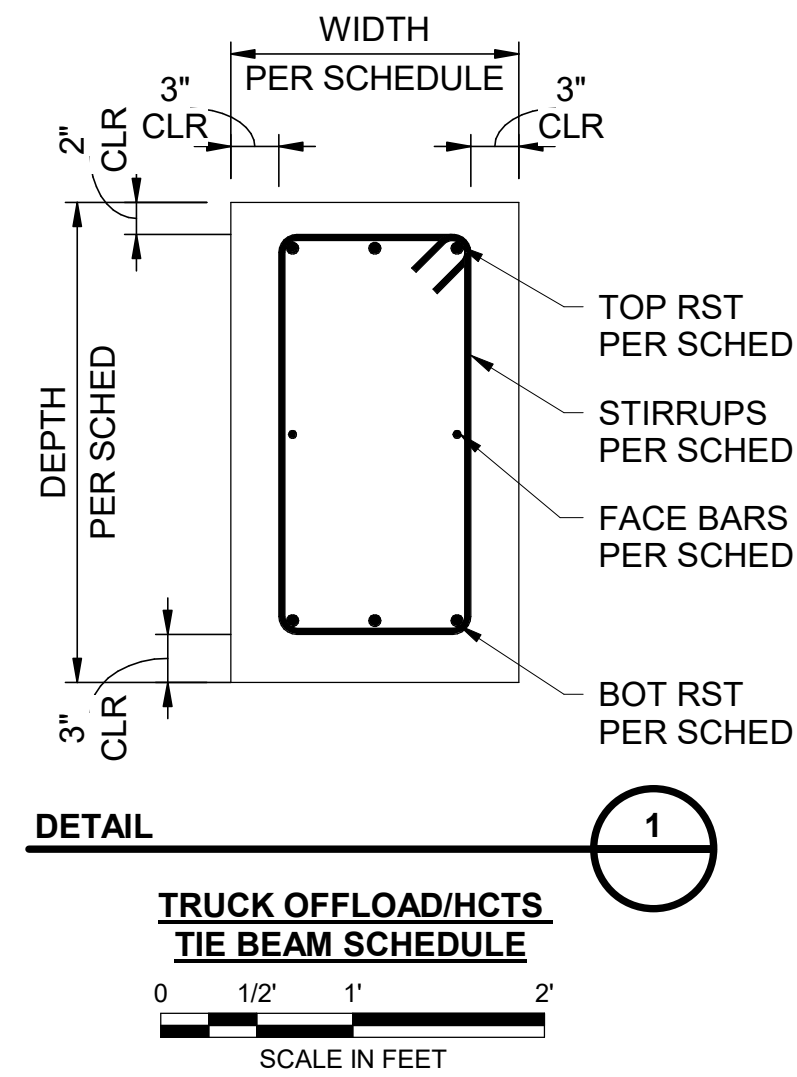
**PDX FACILITY IMPROVEMENTS**  
 CONCRETE DETAILS

project	153929	contract	
drawing		rev.	

**S-525 - A**



TRUCK OFFLOAD / HCTS - TIE BEAM SCHEDULE							
LABEL	WIDTH	DEPTH	TOP RST	BOTTOM RST	FACE BARS PER SIDE	STIRRUPS	TOP OF CONC EL
MAIN-BEAM	1'-6"	2'-6"	(3) #8	(3) #8	(2) #4	#4 @ 12"	24'-3"
ISLAND-BEAM	1'-6"	2'-6"	(3) #8	(5) #8	(2) #4	#4 @ 10"	23'-7"
TIE-BEAM-1	1'-6"	1'-9"	(3) #5	(5) #5	(1) #5	#4 @ 8"	23'-6"
TIE-BEAM-2	1'-6"	1'-11"	(3) #5	(3) #5	-	#4 @ 8"	22'-10"
STRUT	1'-6"	2'-6"	(3) #8	(3) #8	(2) #4	#4 @ 12"	23'-7"



**NOTES:**

- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
- SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
- WORK TIE BEAM SCHEDULE WITH S-405.
- POUR CURB MONOLITHICALLY WITH SLAB OR PROVIDE ROUGHENED JOINT WITH BONDING AGENT AND FUEL RESISTANT FLEXIBLE WATERSTOP PER 03 30 00 SPECIFICATIONS.

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

date	detailed
11/28/23	M. PATEL
designed	checked
A. KRAL	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

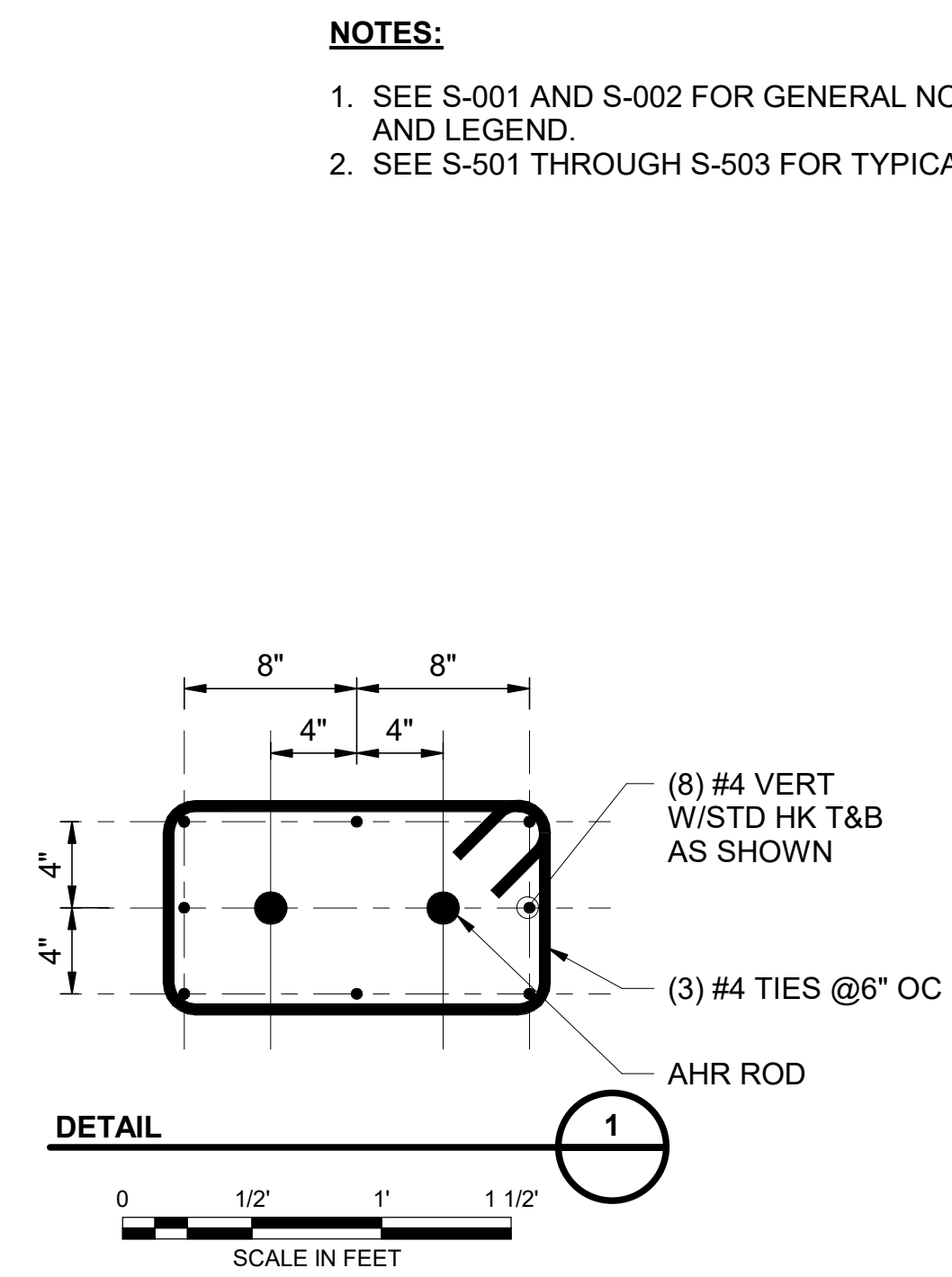
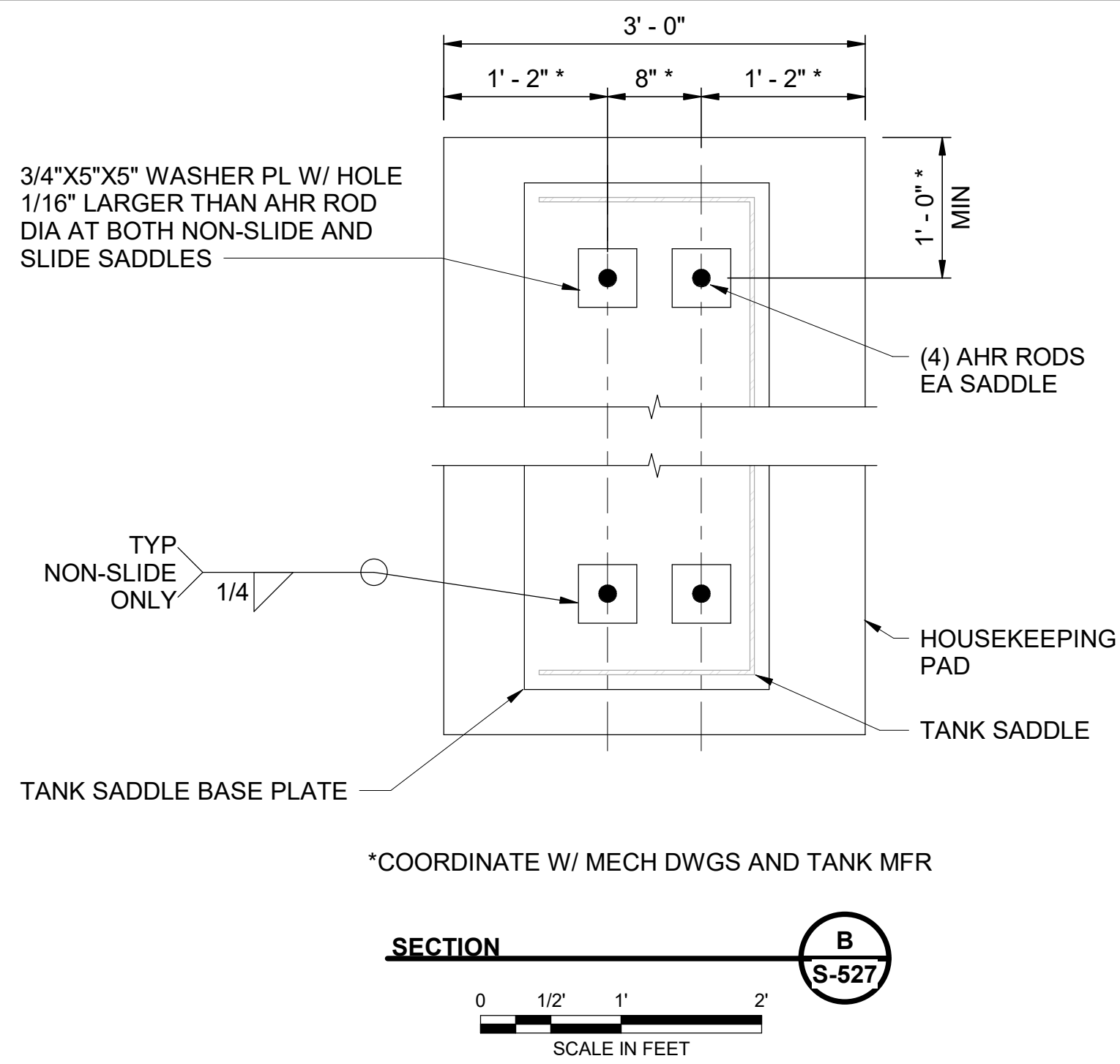
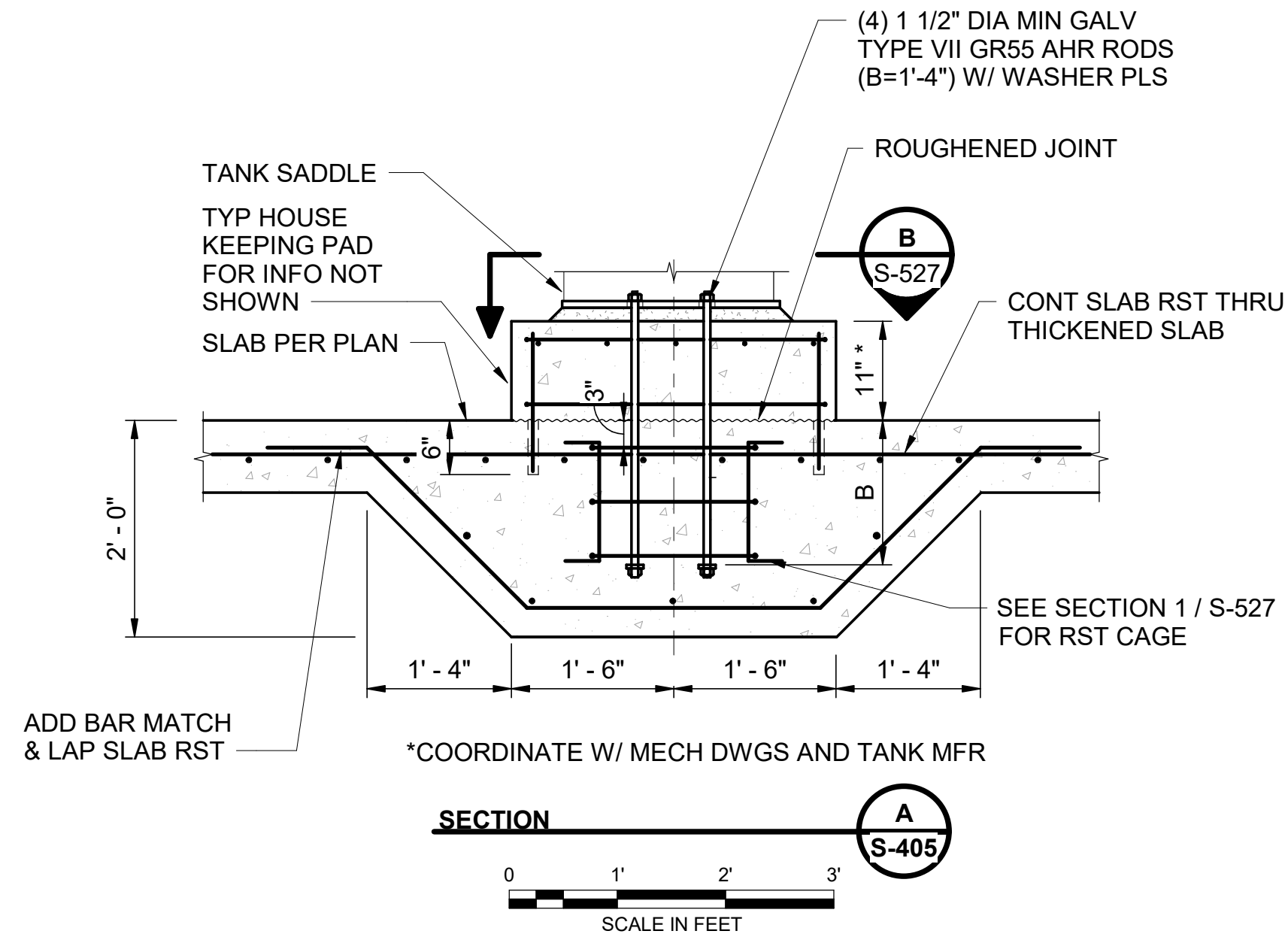
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**PDX FACILITY IMPROVEMENTS**  
TRUCK OFFLOAD / HCTS AREA DETAILS

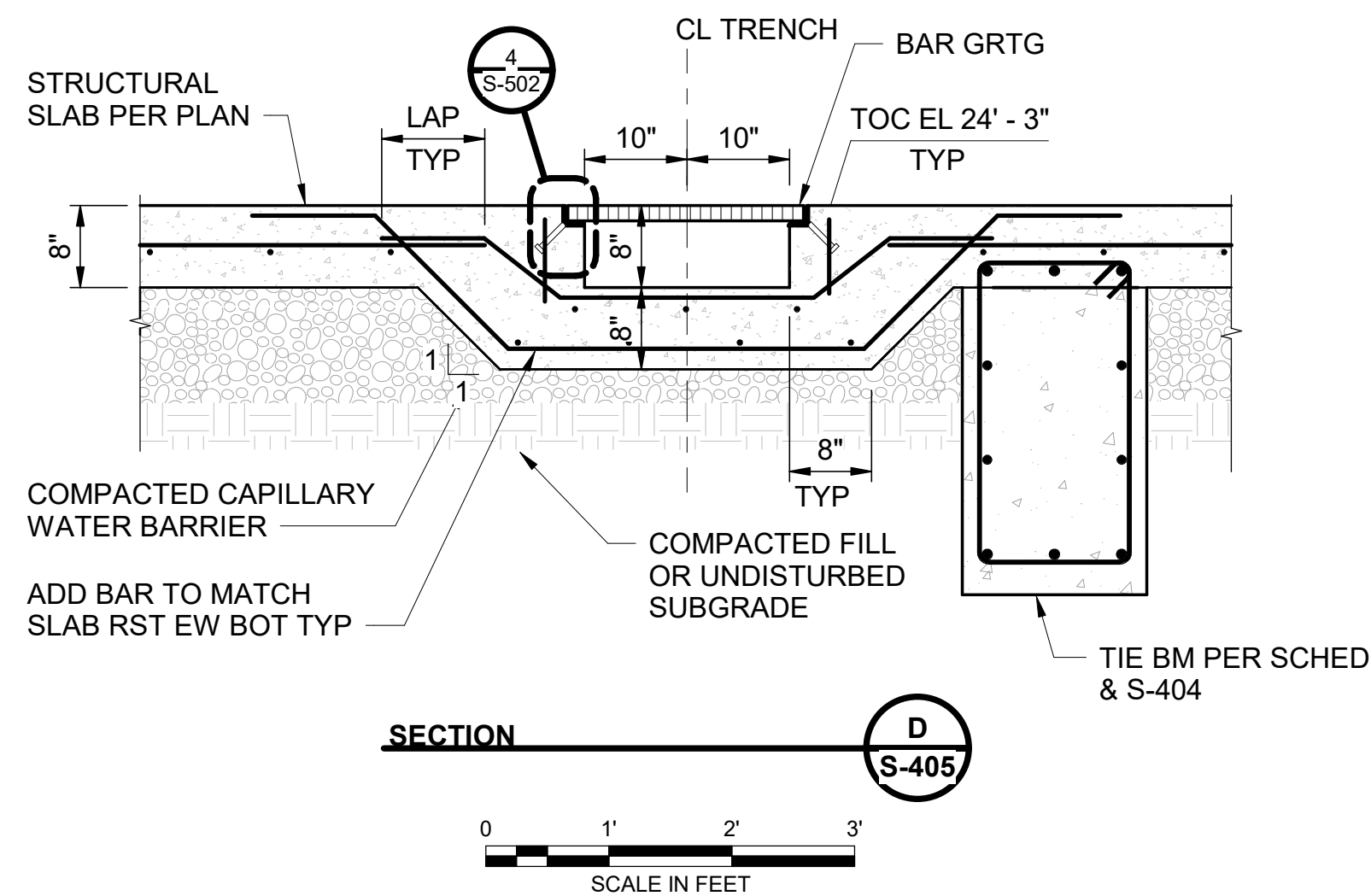
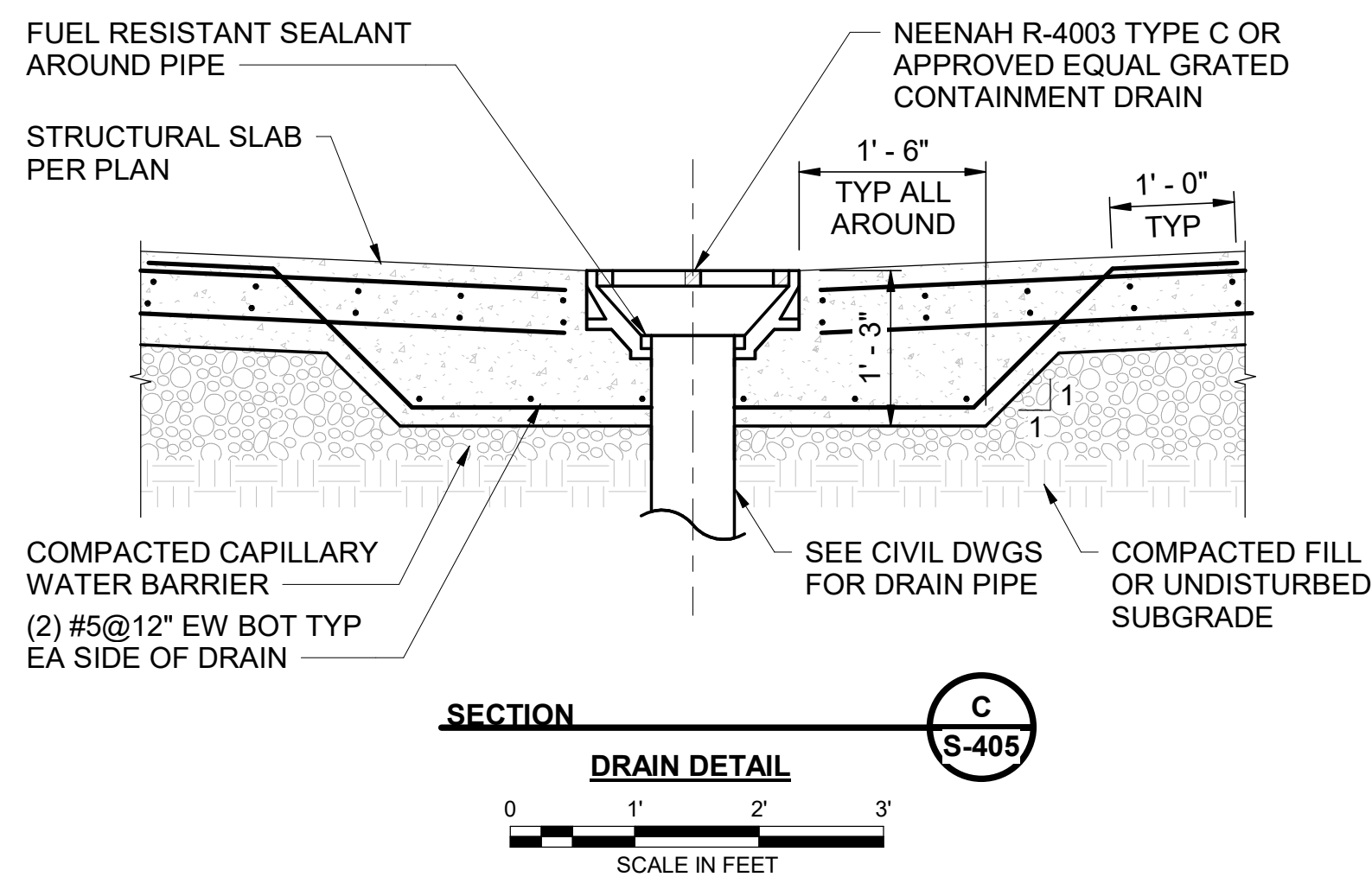
project	contract
153929	
drawing	rev.
<b>S-526 - A</b>	

file





**NOTES:**  
 1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.  
 2. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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 816-333-9400  
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date	11/30/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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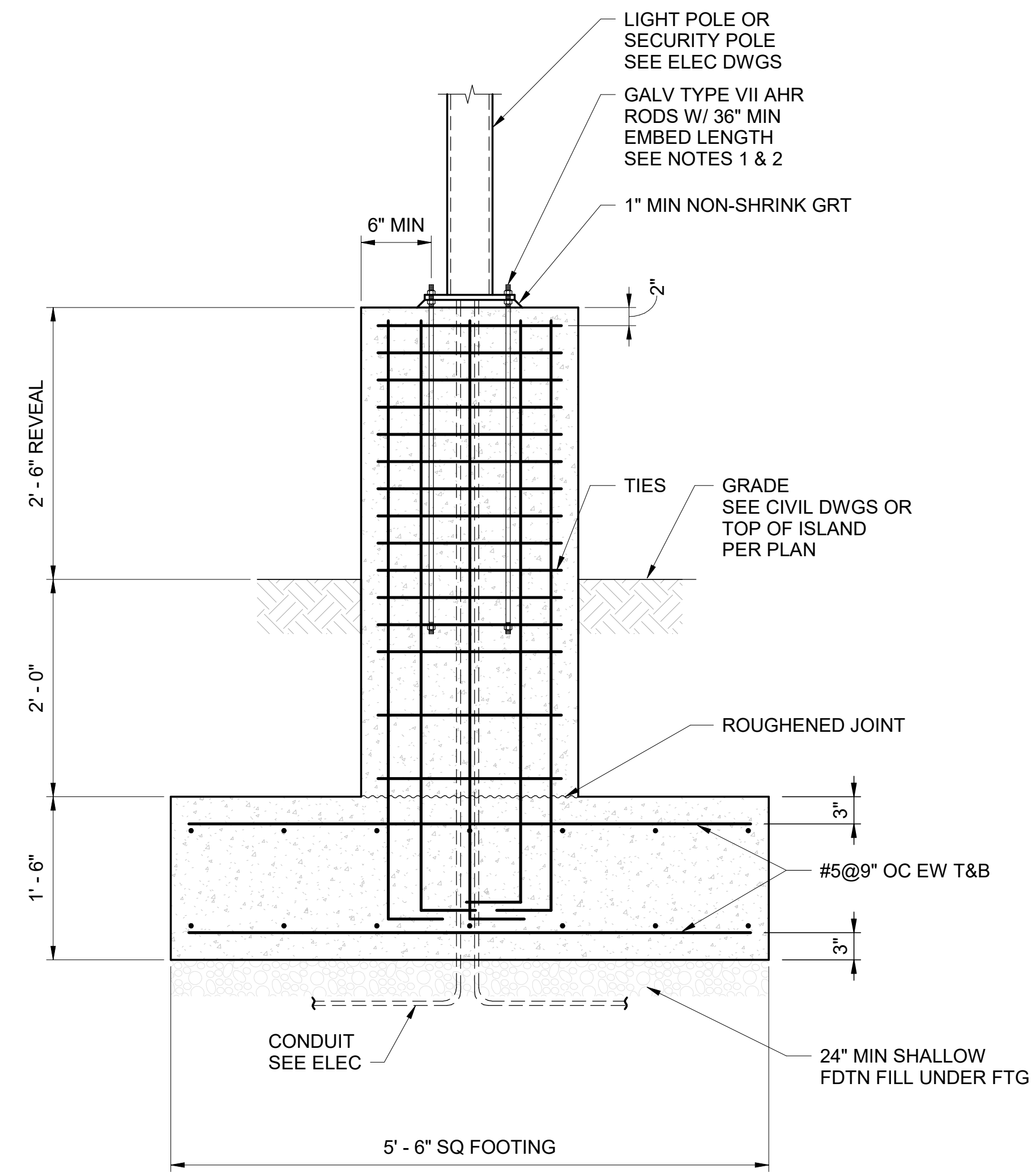
PORTLAND INTERNATIONAL AIRPORT  
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 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 TRUCK OFFLOAD / HCTS AREA DETAILS

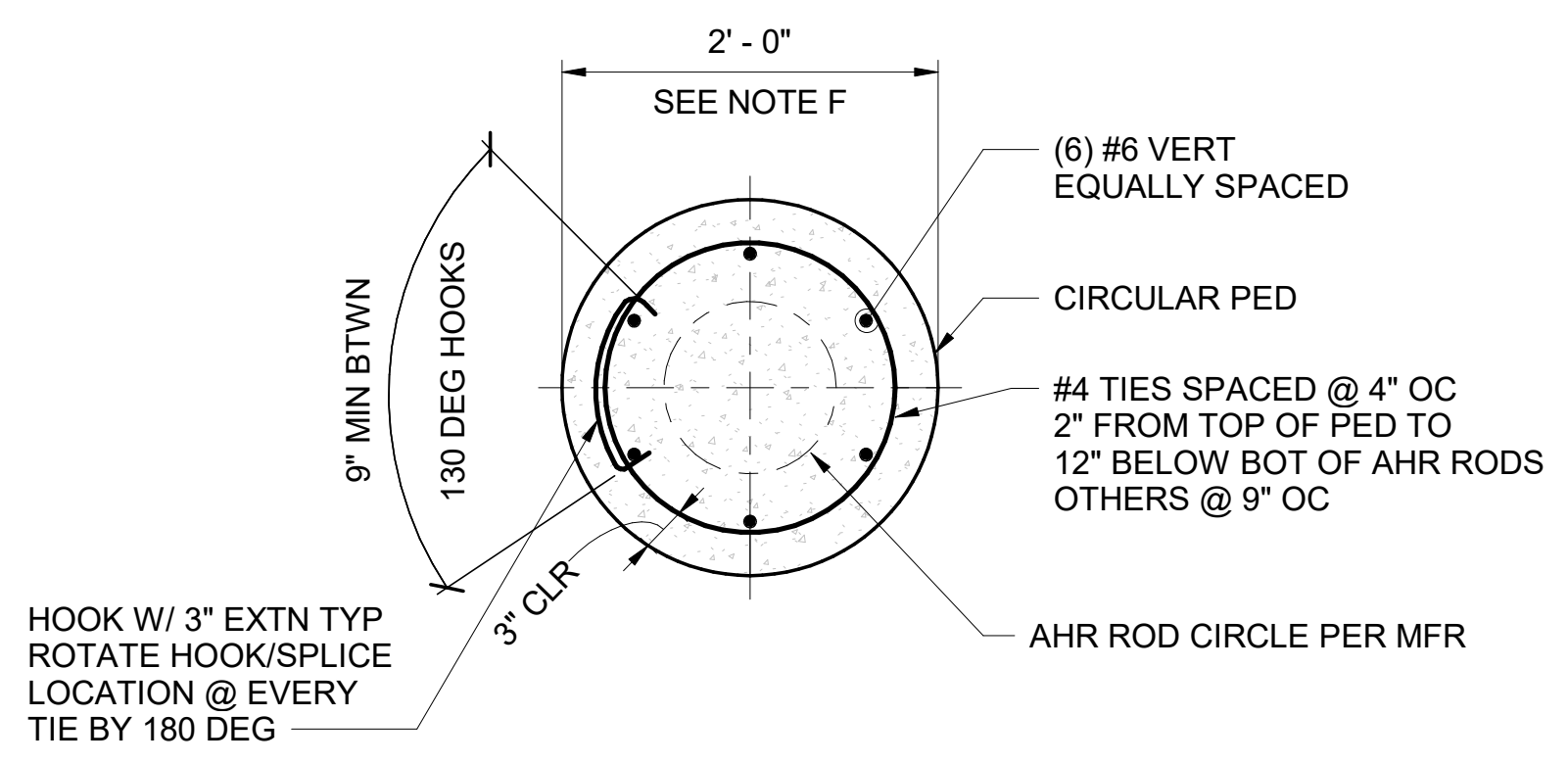
project	153929	contract	
drawing		rev.	

**S-527 - A**

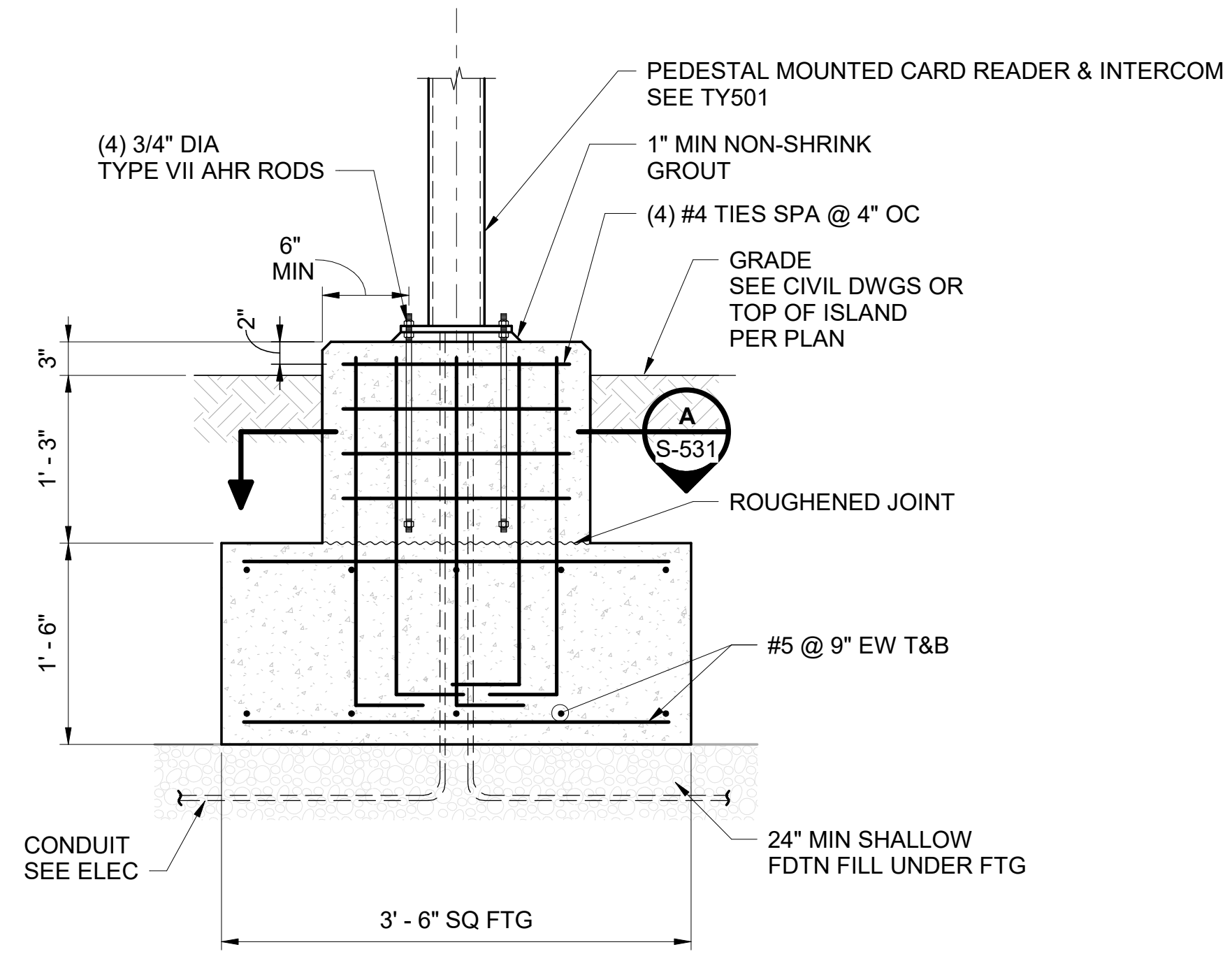




**ELEVATION**  
**DETAIL 1**  
**LIGHT POLE / CAMERA FOUNDATION DETAIL**  
 SCALE IN FEET



**SECTION A**  
**S-531**  
 SCALE IN FEET



**DETAIL 2**  
**PEDESTAL MOUNTED CARD READER & INTERCOM FOUNDATION**  
 SCALE IN FEET

- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - SEE CIVIL AND ELECTRICAL DRAWINGS FOR EXACT LOCATION, COUNT AND OREINATATION OF LIGHTPOLE, SECURITY POLE AND CARD READER LOCATIONS.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

- LIGHT POLE NOTES:**
- COORDINATE ANCHOR ROD REQUIREMENTS WITH POLE SUPPLIED. UNLESS A LONGER BOLT IS REQUIRED BY POLE MANUFACTURER, PROVIDE MINIMUM ANCHOR BOLT LENGTHS AS SHOWN FOR TYPE VII ANCHOR BOLTS ON DRAWING S-501. DO NOT USE J-BOLT OR HOOKED ANCHORAGE.
  - PROVIDE ANCHOR RODS WITH ANCHOR NUTS AND LEVELING NUTS. TORQUE TOP NUTS AS RECOMMENDED BY POLE MANUFACTURER.
  - PROVIDE NON-SHRINK GROUT UNDER BASE PLATES. USE SHORT PIECE OF 1/2" PVC PIPE TO FORM DRAIN HOLE THROUGH GROUT. ARRANGE PIPE TO DRAIN CONDENSATION FROM INTERIOR OF POLE.
  - INSTALL BASE COVER UNLESS INDICATED OTHERWISE.
  - SEE CIVIL DRAWINGS AND ELECTRICAL DRAWINGS FOR LIGHT POLE AND CONDUIT LOCATIONS.
  - COORDINATE SHAFT DIAMETER WITH POLE. ADJUST AS NECESSARY TO MAINTAIN MINIMUM 6" FROM CENTERLINE OF ANCHOR RODS TO EDGE OF CONCRETE.
  - UTILITY SUPPORT STEEL SEISMIC DESIGN PARAMETERS:
    - TELECOMMUNICATION TOWER - STEEL:
      - R = 1.5
      - Q = 1.5
      - Cd = 1.5
      - EQUIVALENT LATERAL FORCE ANALYSIS
      - Cs = 0.59
      - BASE SHEAR = 448 LB
  - REMOVE UNDOCUMENTED FILL TO A MINIMUM OF 2 FEET BELOW BOTTOM OF FOOTING. EXPOSED SUBGRADE TO BE PROOF ROLLED AND OR PROBED TO LOCATE ANY LOOSE OR SOFT ZONES. IF ENCOUNTERED THESE ARE TO BE FURTHER REMOVED. FOLLOWING OVER-EXCAVATION, BUT PRIOR TO STRUCTURAL FILL PLACEMENT, SCARIFY AND RECOMPACT THE UPPER 12 INCHES OF SUBGRADE.
  - THE LIGHT POLE ANCHORAGE HAS BEEN DESIGNED WITH THE FOLLOWING ASSUMPTIONS:
    - ROUND-TAPERED POLE MAX HEIGHT 25'-0".
    - LIGHT POLE WEIGHT = 380 LB
    - LIGHT POLE DIAMETER = 8" AT BASE
    - MAX LIGHT POLE HEIGHT = 30'-0"
    - MAX FIXTURE WEIGHT = 381 LBS
    - ANCHOR ROD CIRCLE = 10"-11"
    - ANCHOR ROD SIZE = 1 1/4" DIA
    - ANCHOR ROD GRADE = ASTM F1554, GR 36 UNO

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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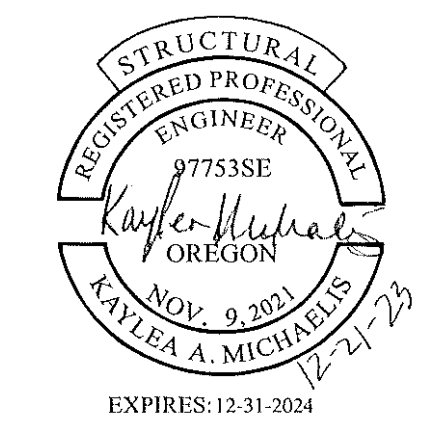
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 LIGHT POLE SECTION AND DETAIL

project	153929	contract	
drawing		rev.	

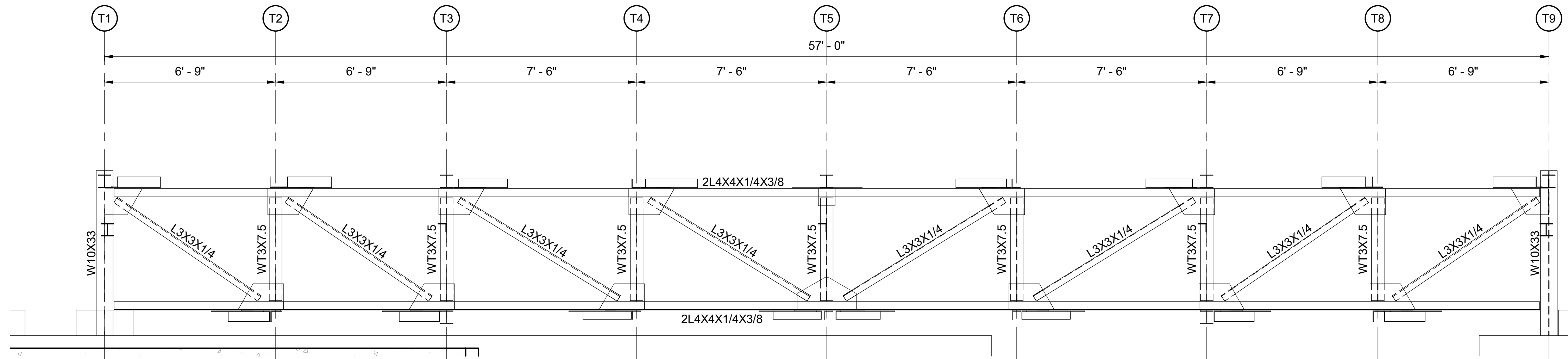
**S-531 - A**





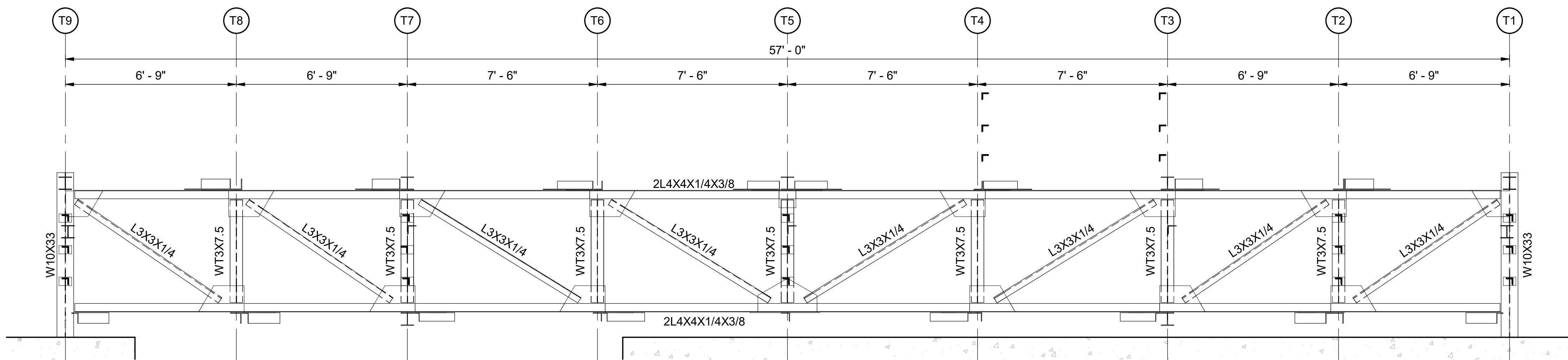
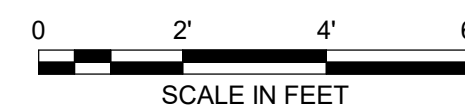
**NOTES:**

1. SEE S-534 THROUGH S-536 FOR TRUSS MODULES DETAILS.
2. REFER TO S-406 FOR MODULE LOCATION AND ORIENTATION.



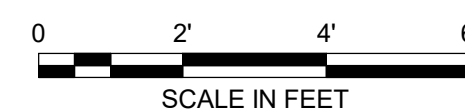
DETAIL 1

TRUSS ELEVATION LOOKING EAST



DETAIL 2

TRUSS ELEVATION LOOKING WEST



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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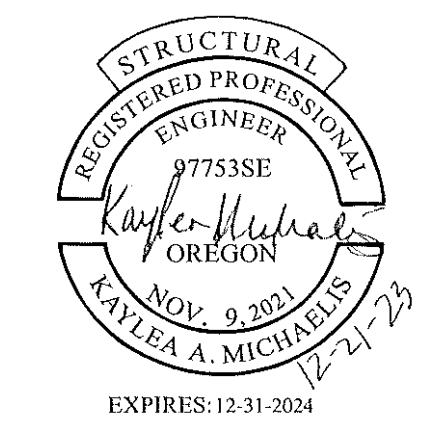
**BURNS MEDONNELL**  
 9400 WARD PARKWAY  
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 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	10/5/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

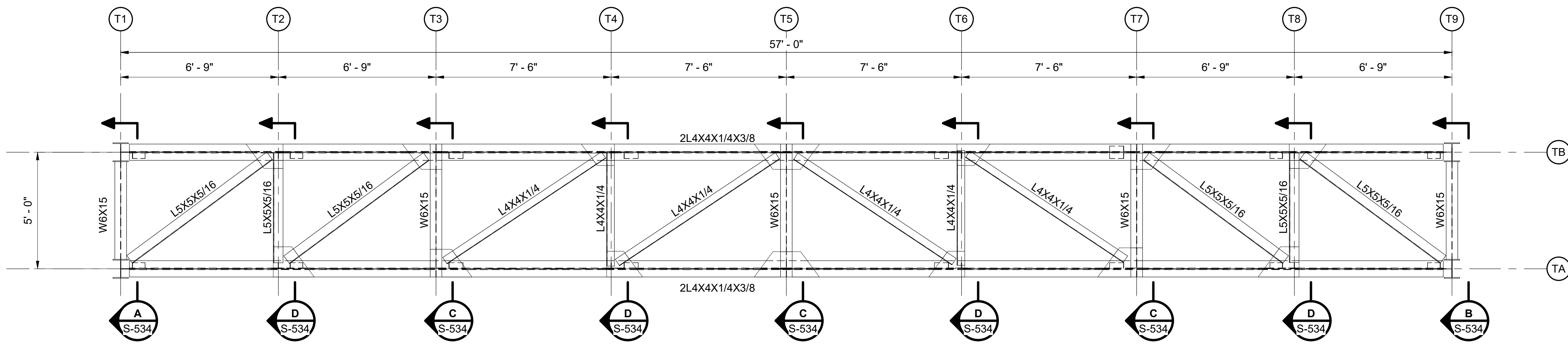
**PDX FUEL COMPANY L.L.C**  
  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 UTILITY TRUSS ELEVATIONS

project	153929	contract	
drawing	S-532 - A		
rev.			



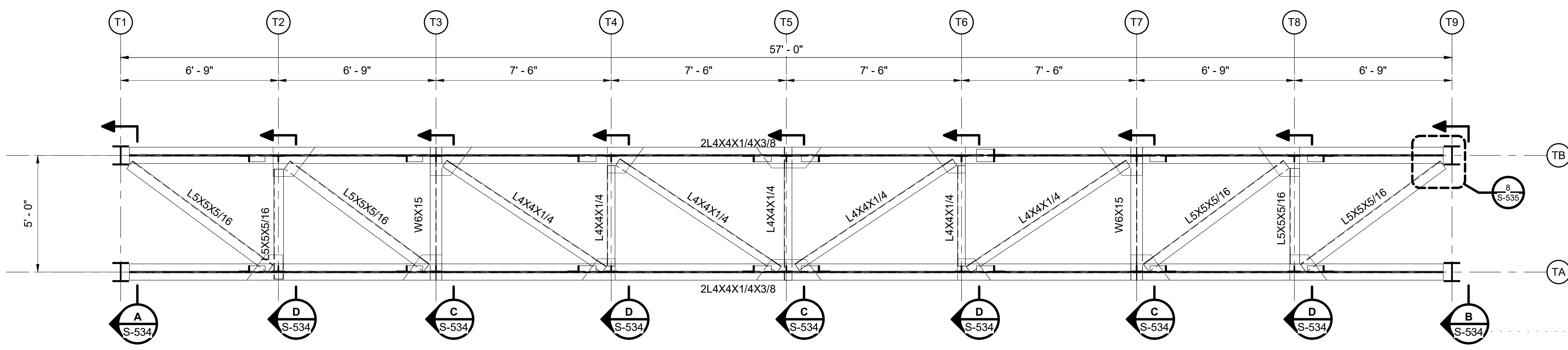
**NOTES:**  
 1. SEE S-534 THROUGH S-536 FOR UTILITY TRUSS DETAILS.  
 2. REFER TO S-406 FOR UTILITY TRUSS MODULE LOCATION AND ORIENTATION.



SECTION ——— A ———

**TRUSS TOP CHORD**

SCALE IN FEET



SECTION ——— B ———

**TRUSS BOTTOM CHORD**

SCALE IN FEET

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	10/5/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**

PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 UTILITY TRUSS TOP CHORD & BOTTOM CHORD

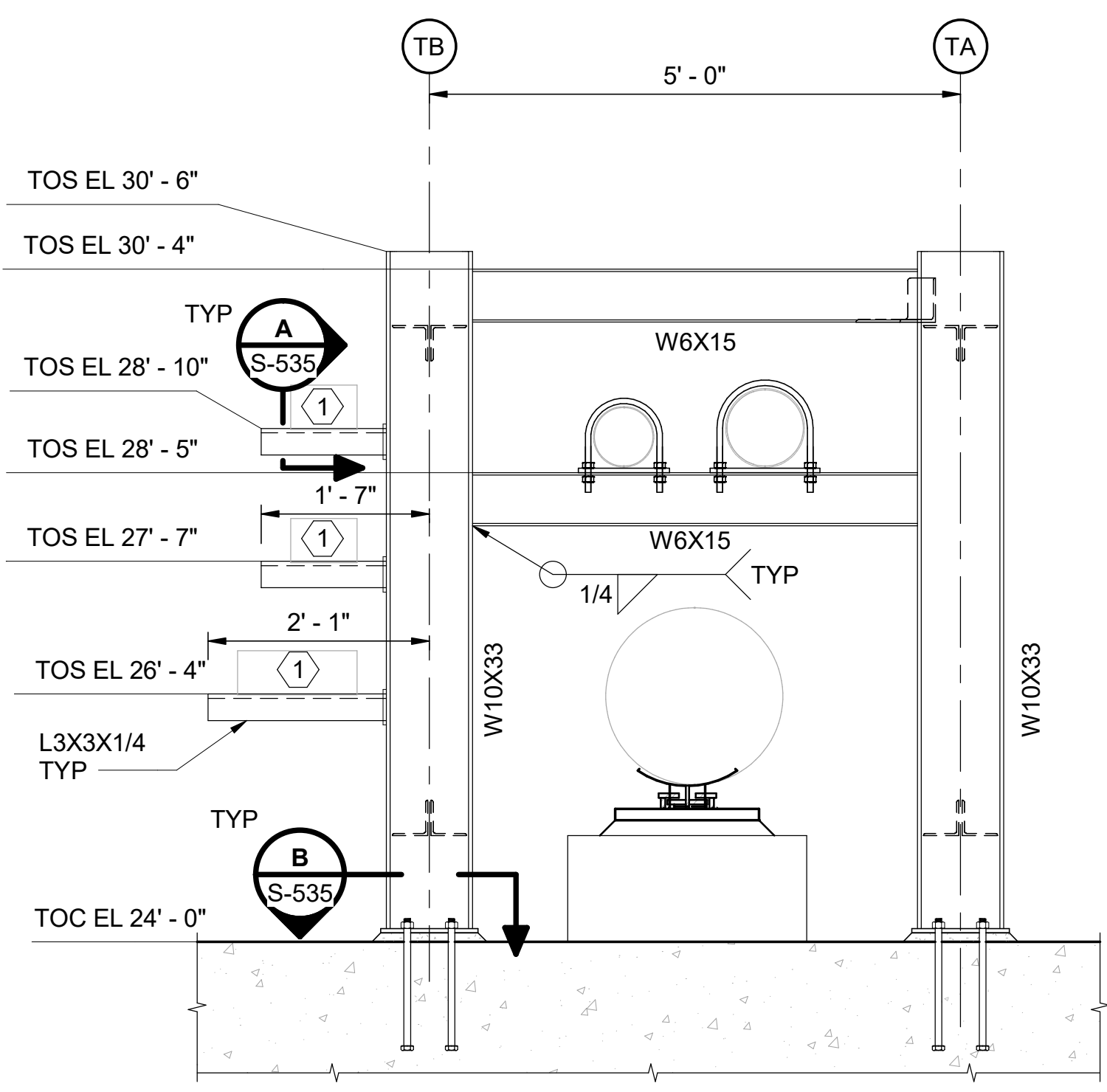
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drawing		rev.	

**S-533 — A**

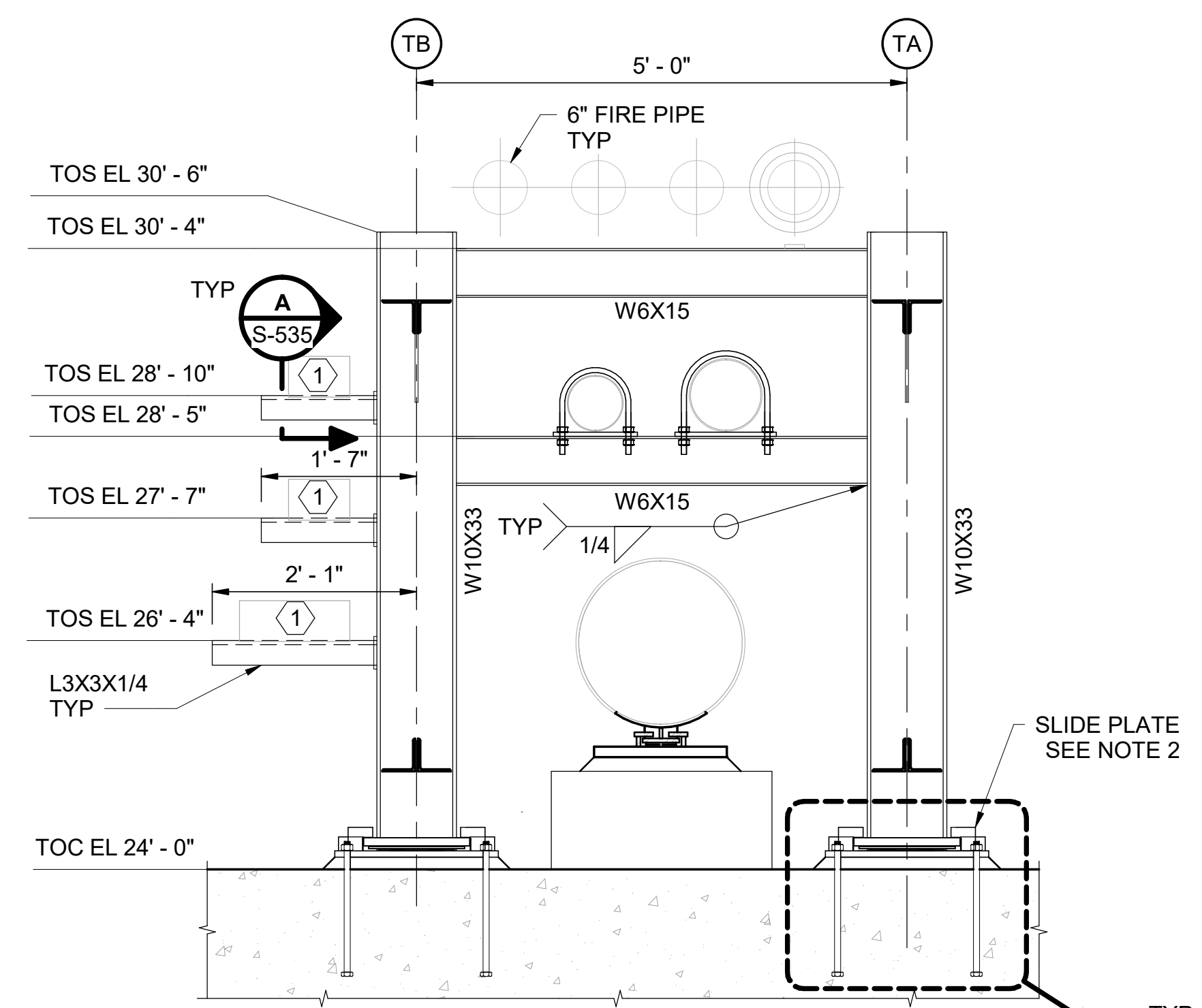


- NOTES:**
- SEE S-406 FOR CABLE TRAY SUPPORT LOCATIONS AT EACH MODULE.
  - SEE S-406 FOR TRUSS MODULE SLIDE PLATE LOCATIONS, REFER TO S-536 FOR DETAILS.
  - SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT TYPES AND LOCATIONS. SEE S-550 SERIES FOR PIPE SUPPORT DETAILS.

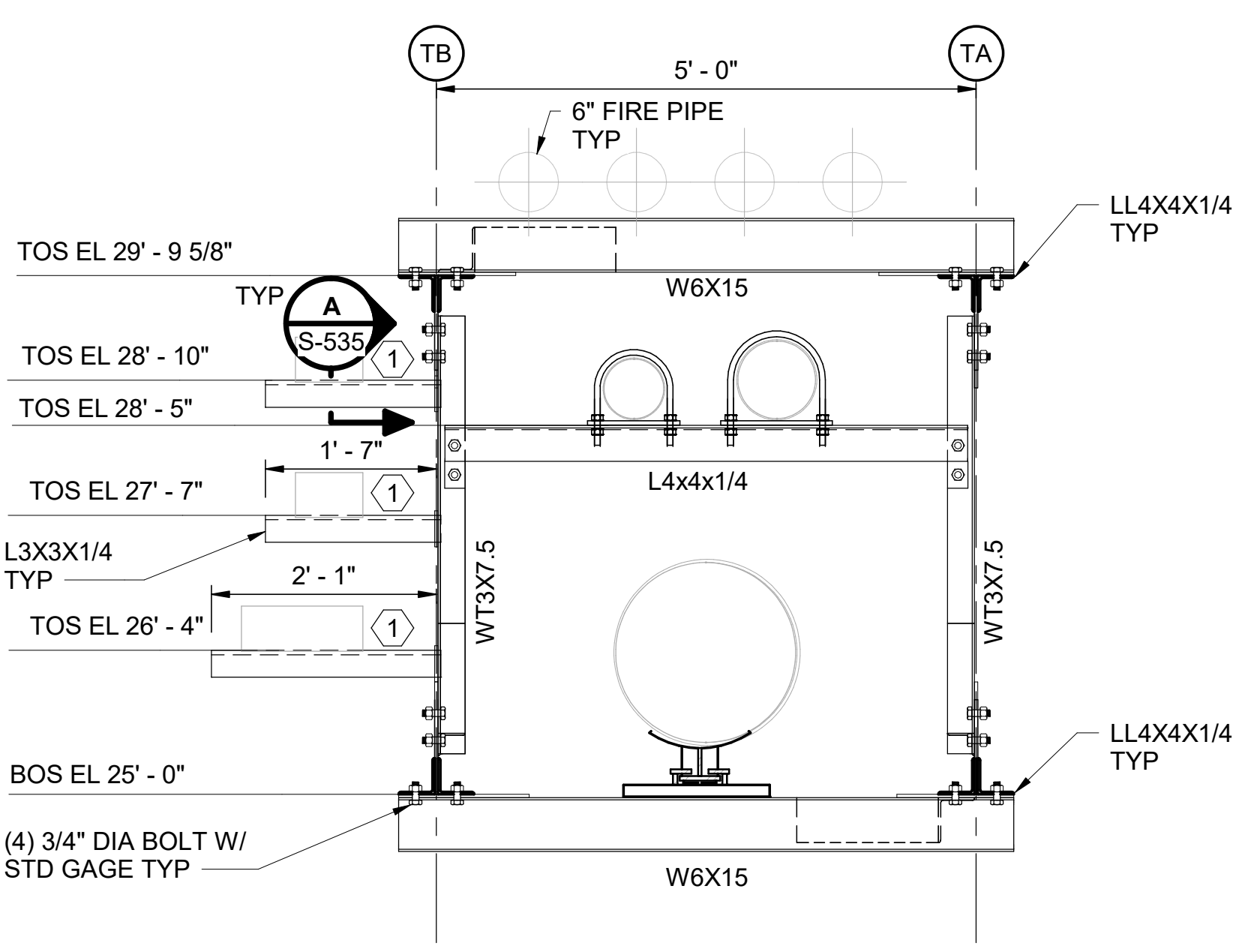
- KEYED NOTES:**
- ① CABLE TRAY SUPPORT, SEE S-406 FOR LOCATIONS AT EACH MODULE. OMIT WHERE NOT REQUIRED.



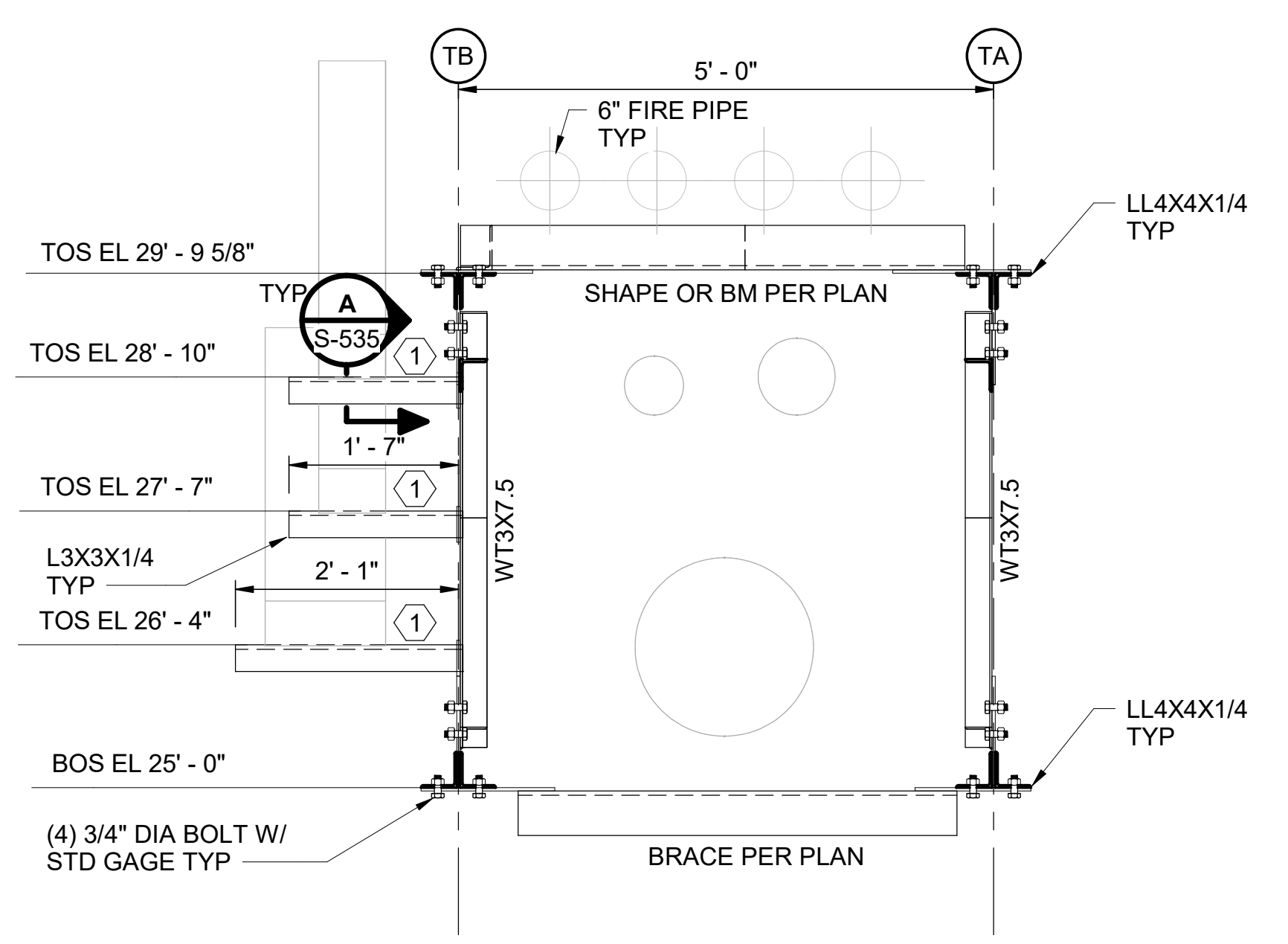
**SECTION A**  
FIXED END  
SCALE IN FEET



**SECTION B**  
SLIDE END  
SCALE IN FEET



**SECTION C**  
SCALE IN FEET



**SECTION D**  
SCALE IN FEET

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

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9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
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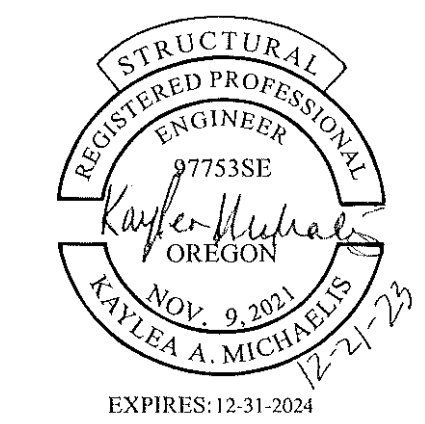
date	10/5/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

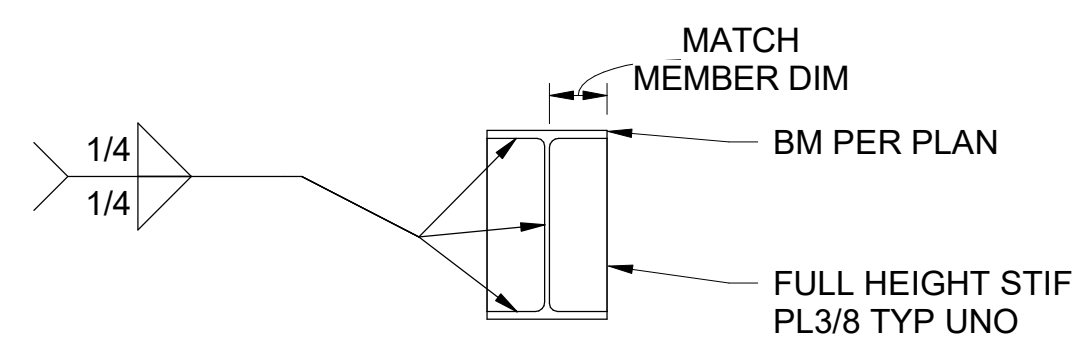
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5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
UTILITY TRUSS SECTIONS

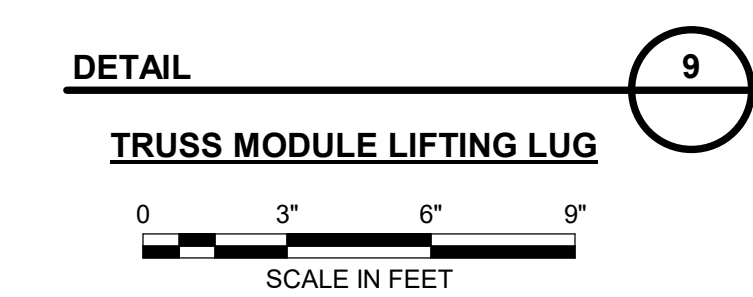
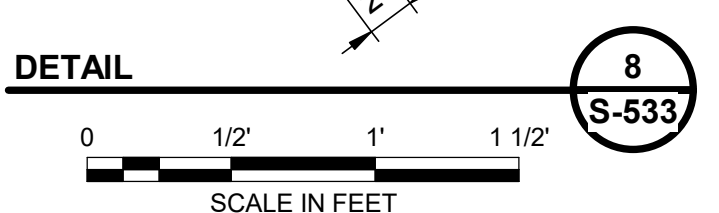
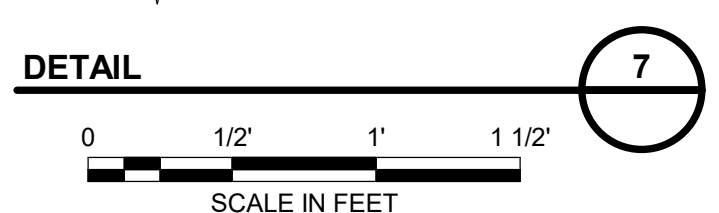
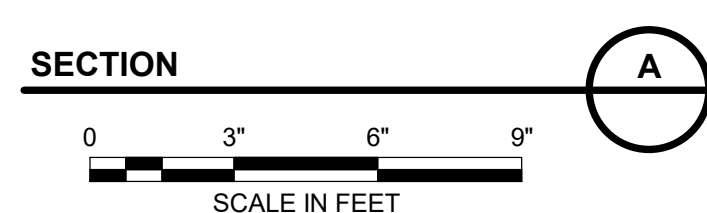
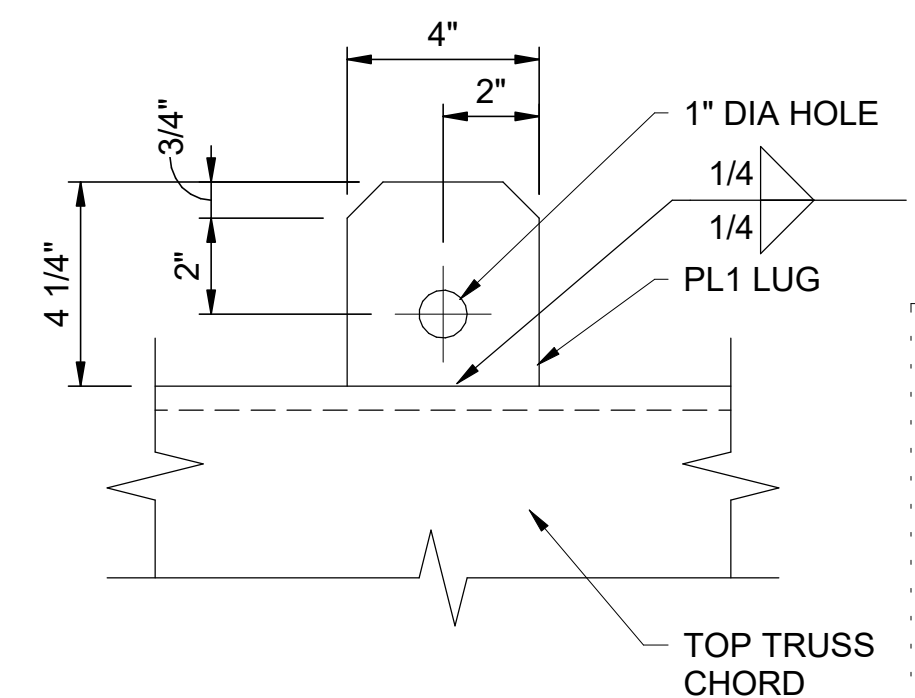
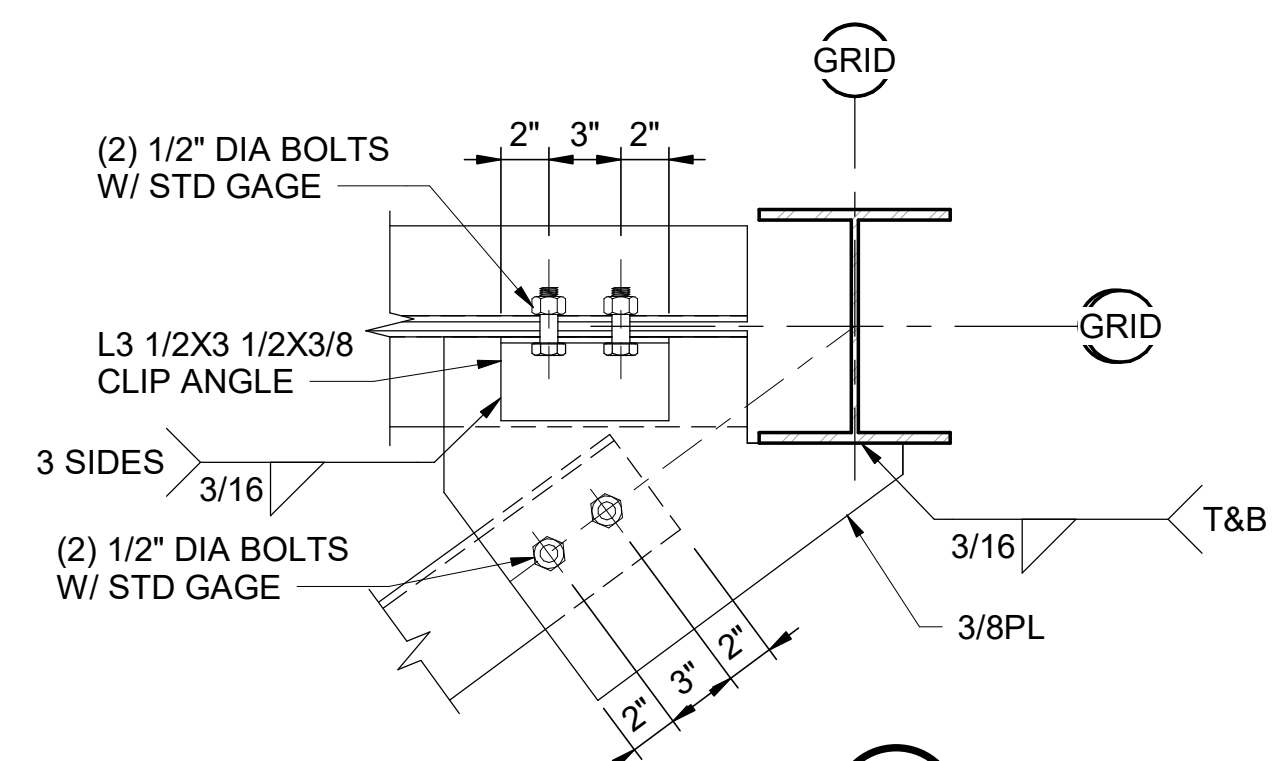
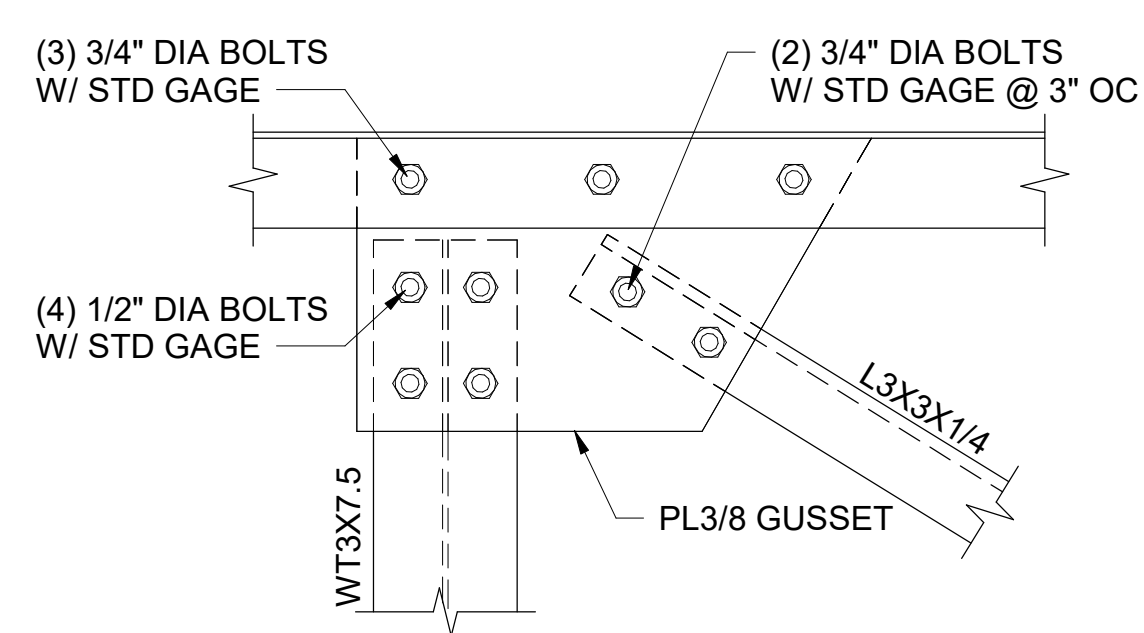
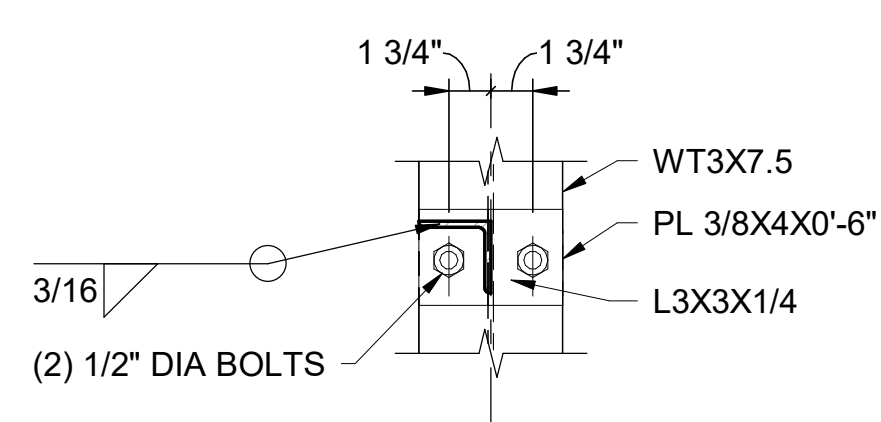
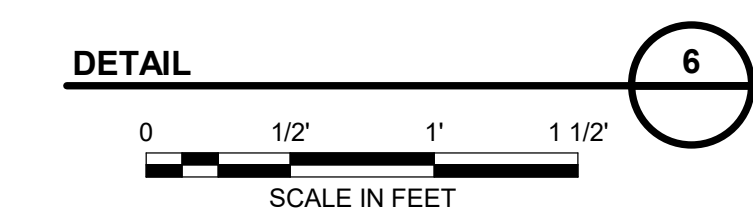
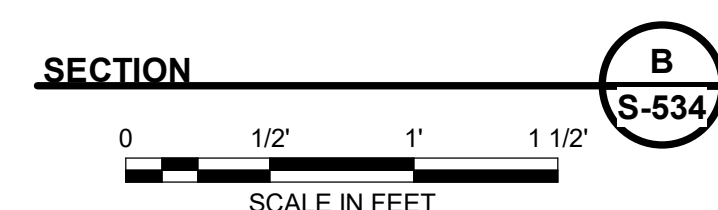
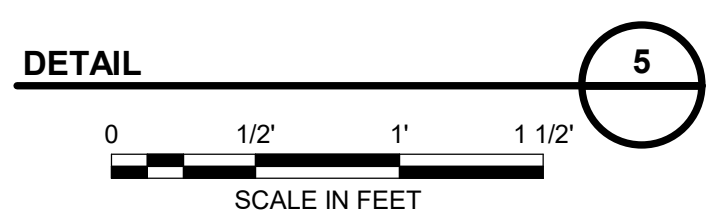
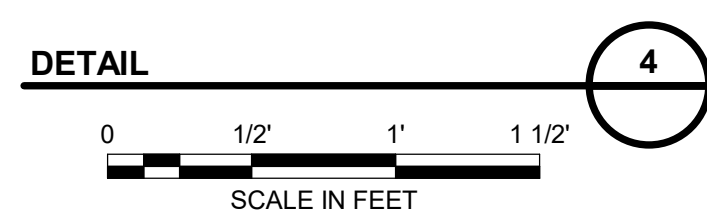
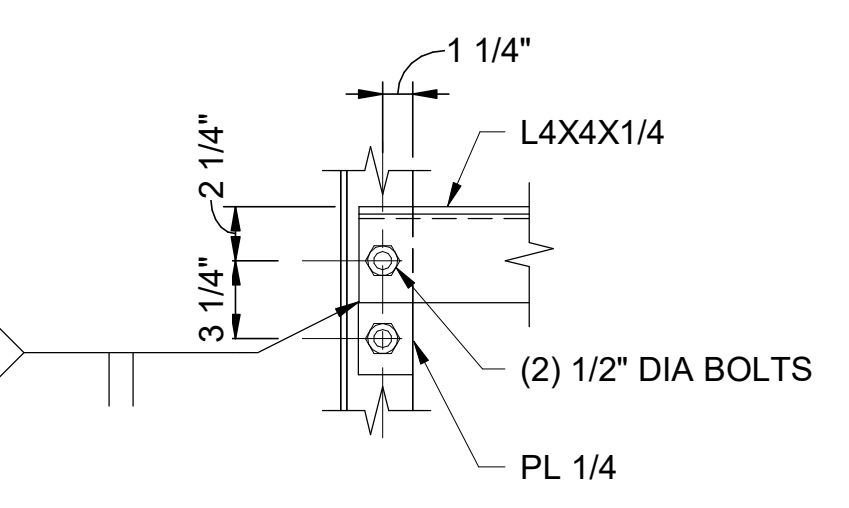
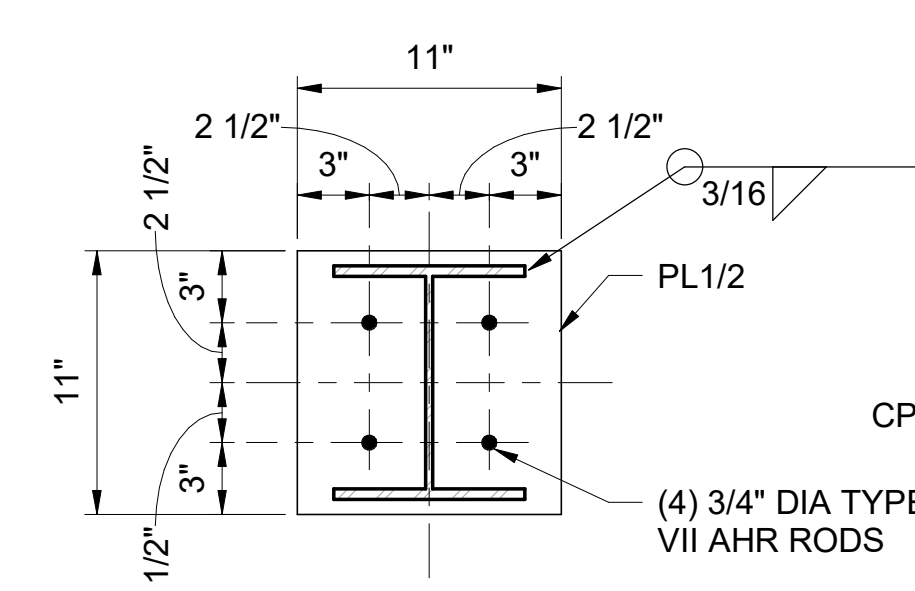
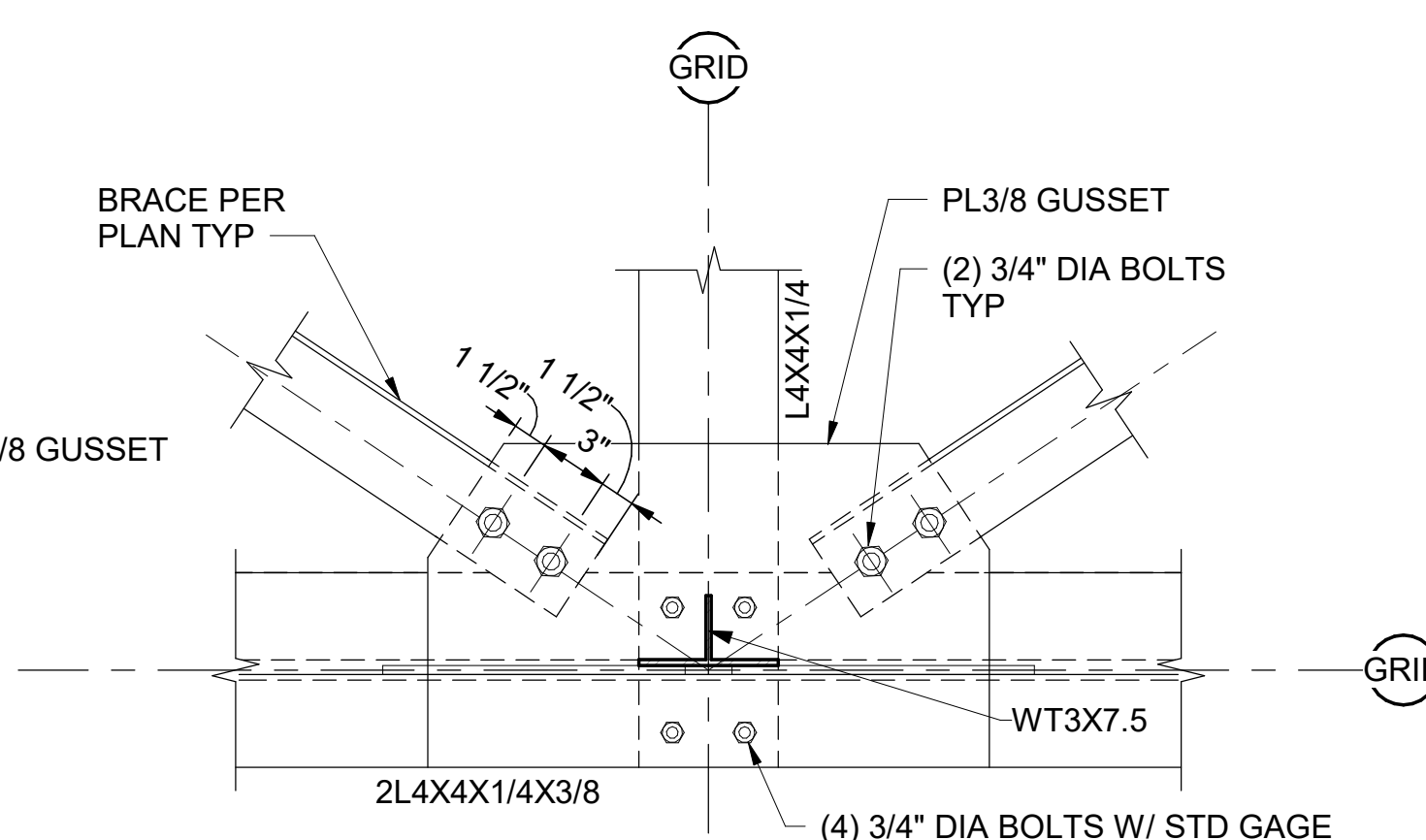
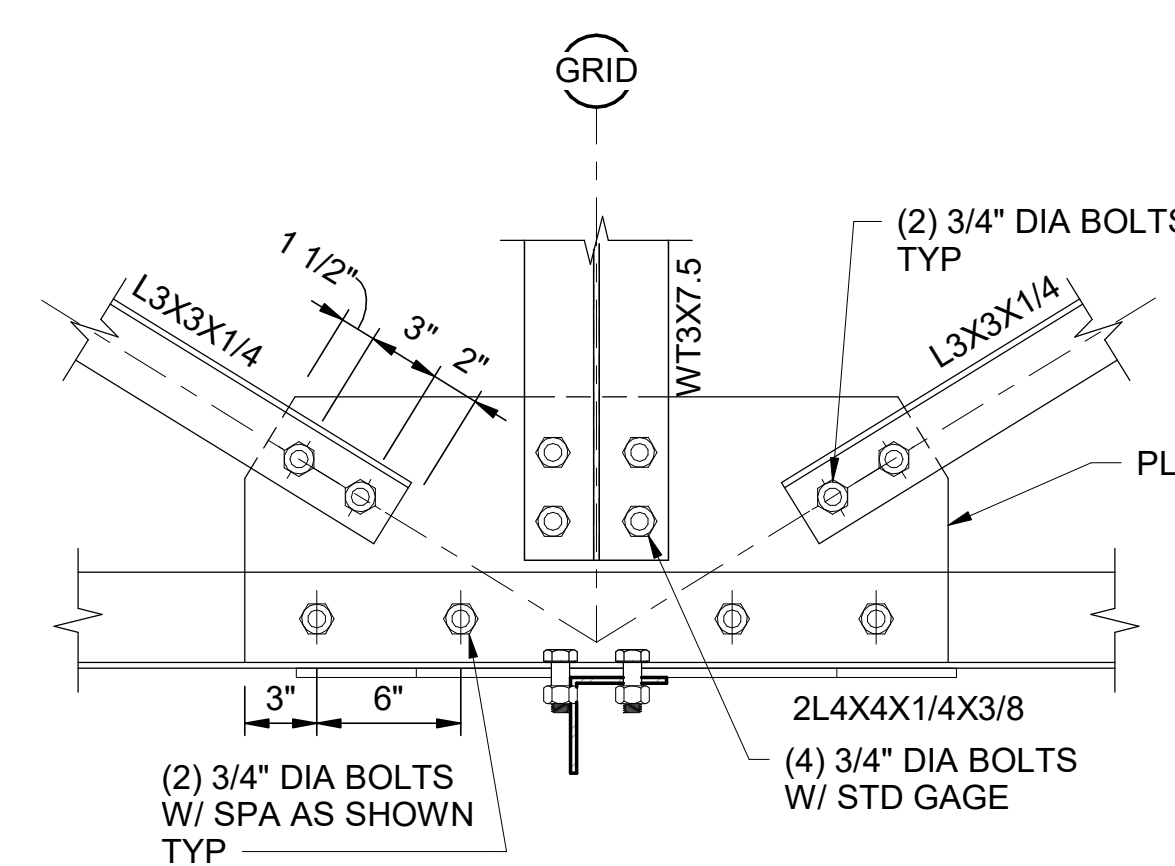
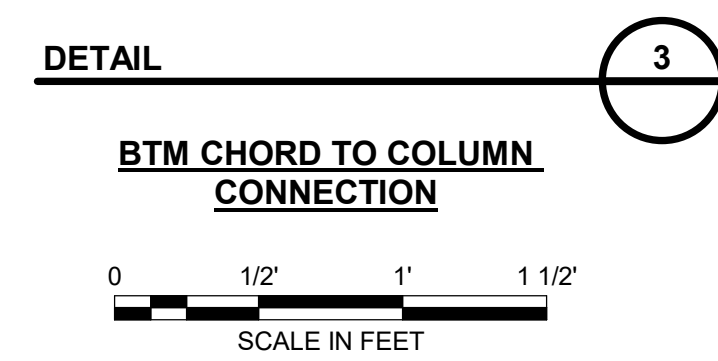
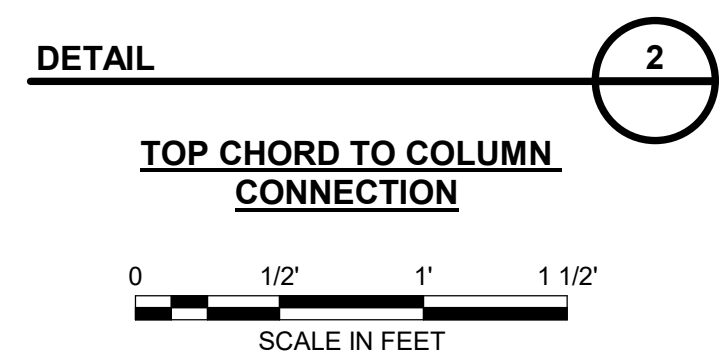
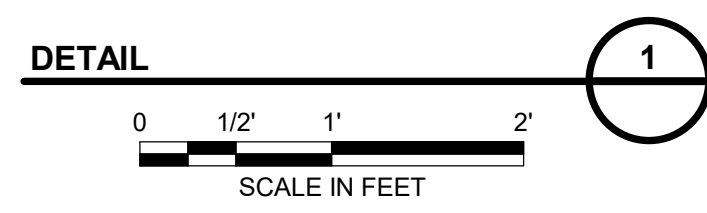
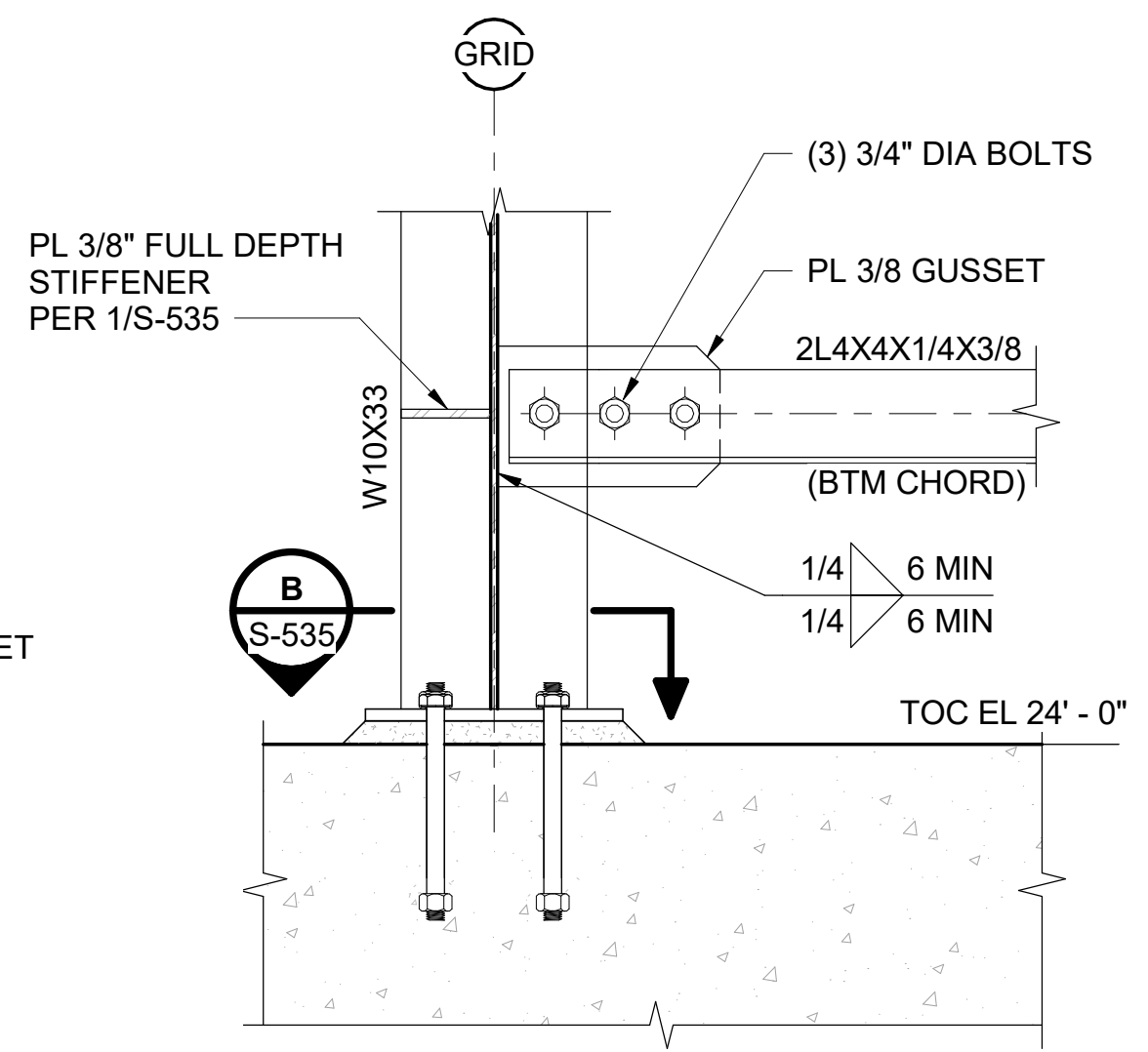
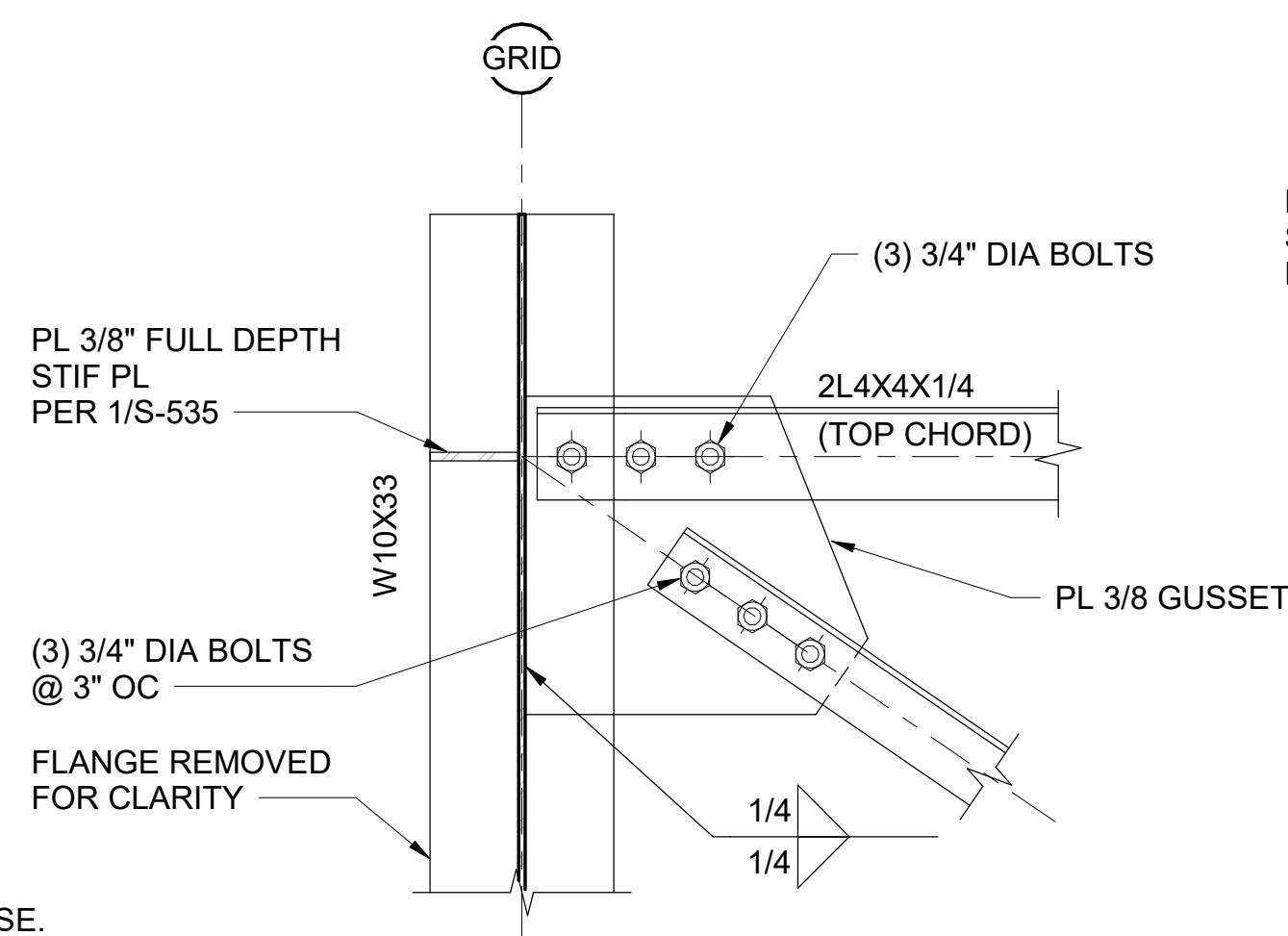
project	153929	contract	
drawing		rev.	

**S-534 - A**





- NOTES:**  
 1. PROVIDE WHEREVER "STIF PL" IS CALLED OUT, UNLESS NOTED OTHERWISE.  
 2. PROVIDE FULL HEIGHT STIFFENER PLATE, UNLESS NOTED OTHERWISE.



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

**ISSUED FOR PERMIT ONLY**

**BURNS MEDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

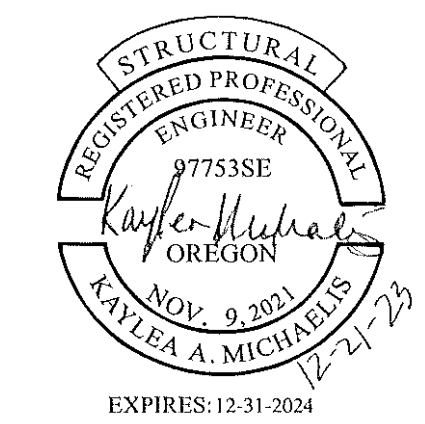
date	10/5/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

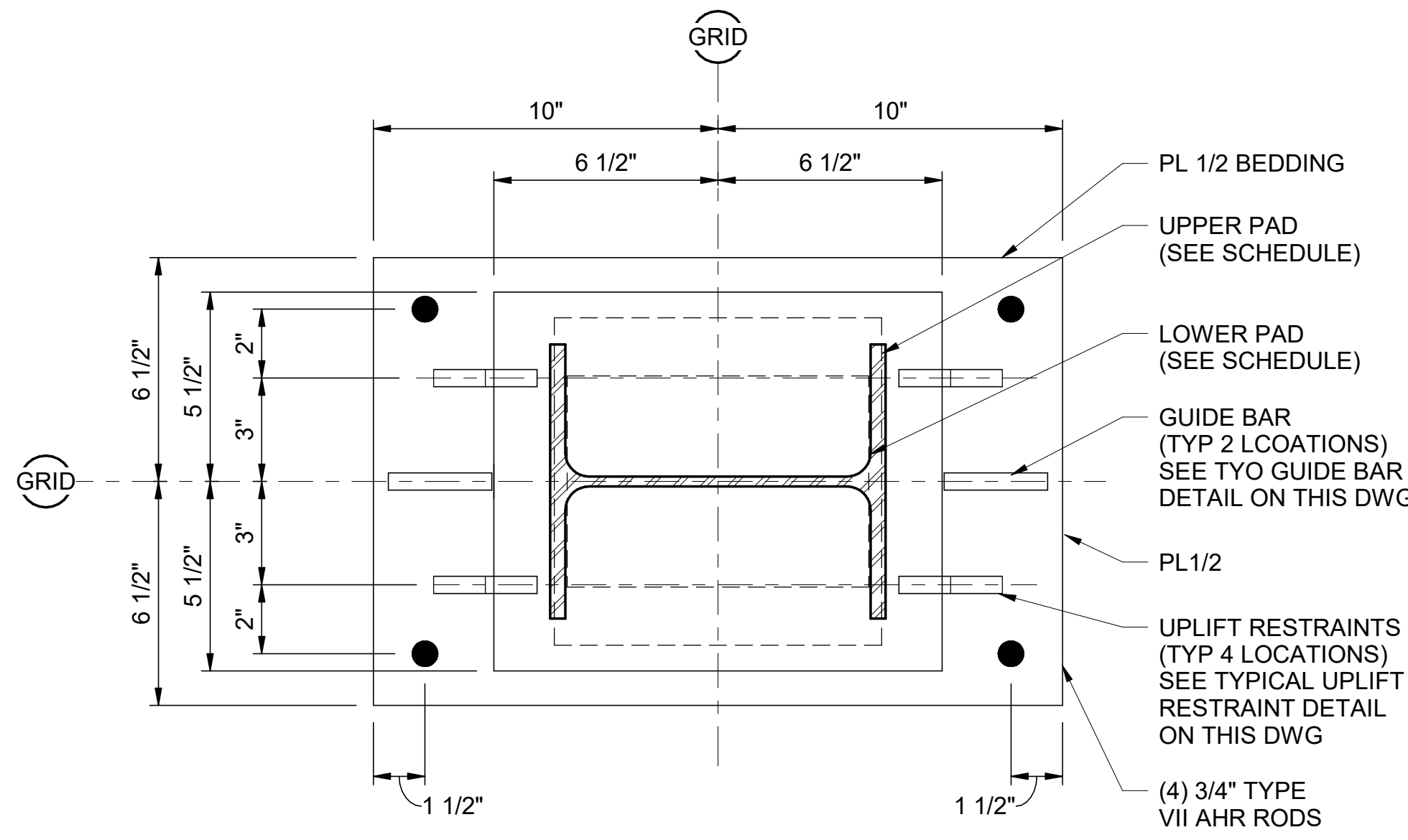
**PDX FUEL COMPANY L.L.C**

PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 UTILITY TRUSS DETAILS

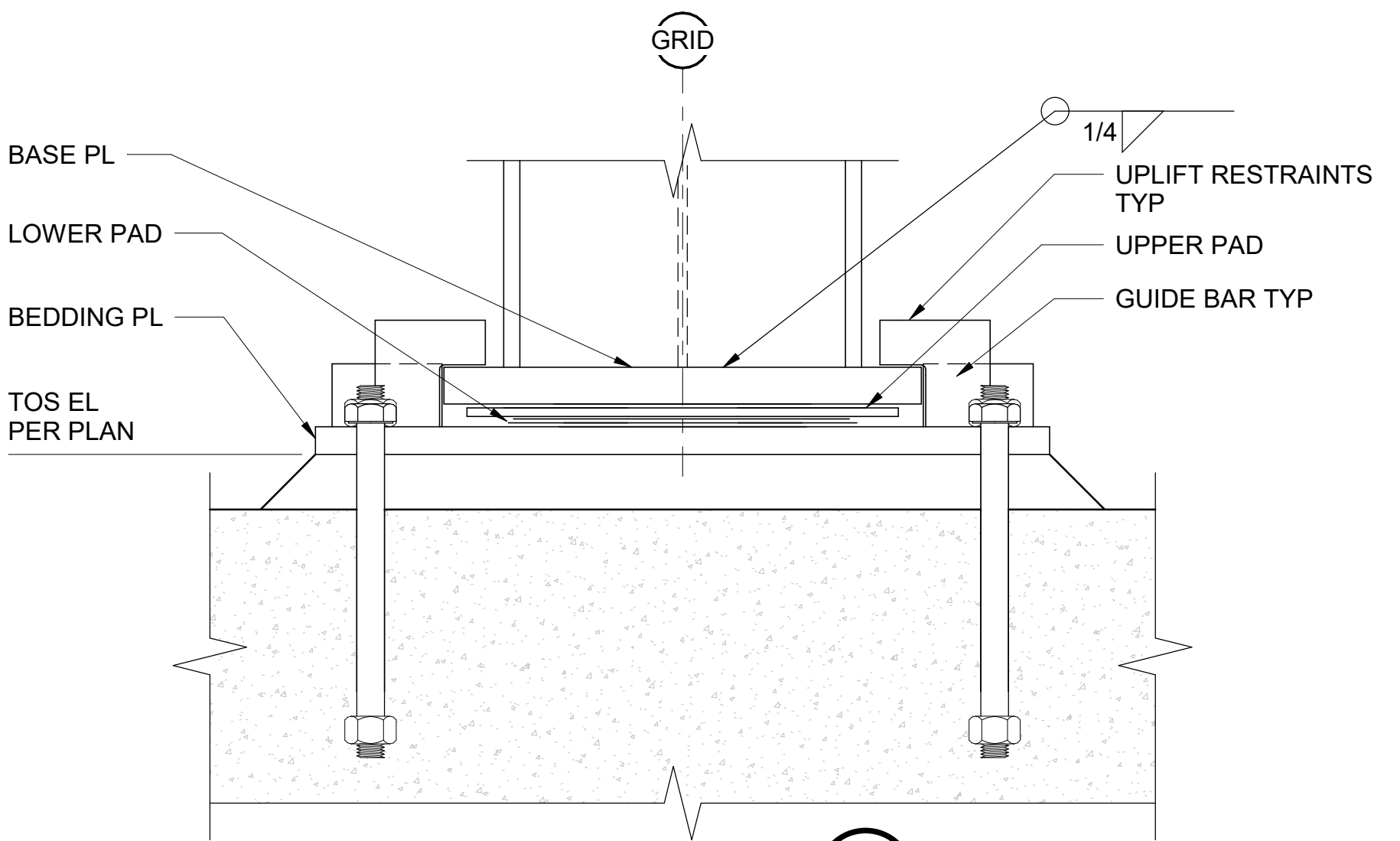
project	153929	contract	
drawing	S-535 - A		





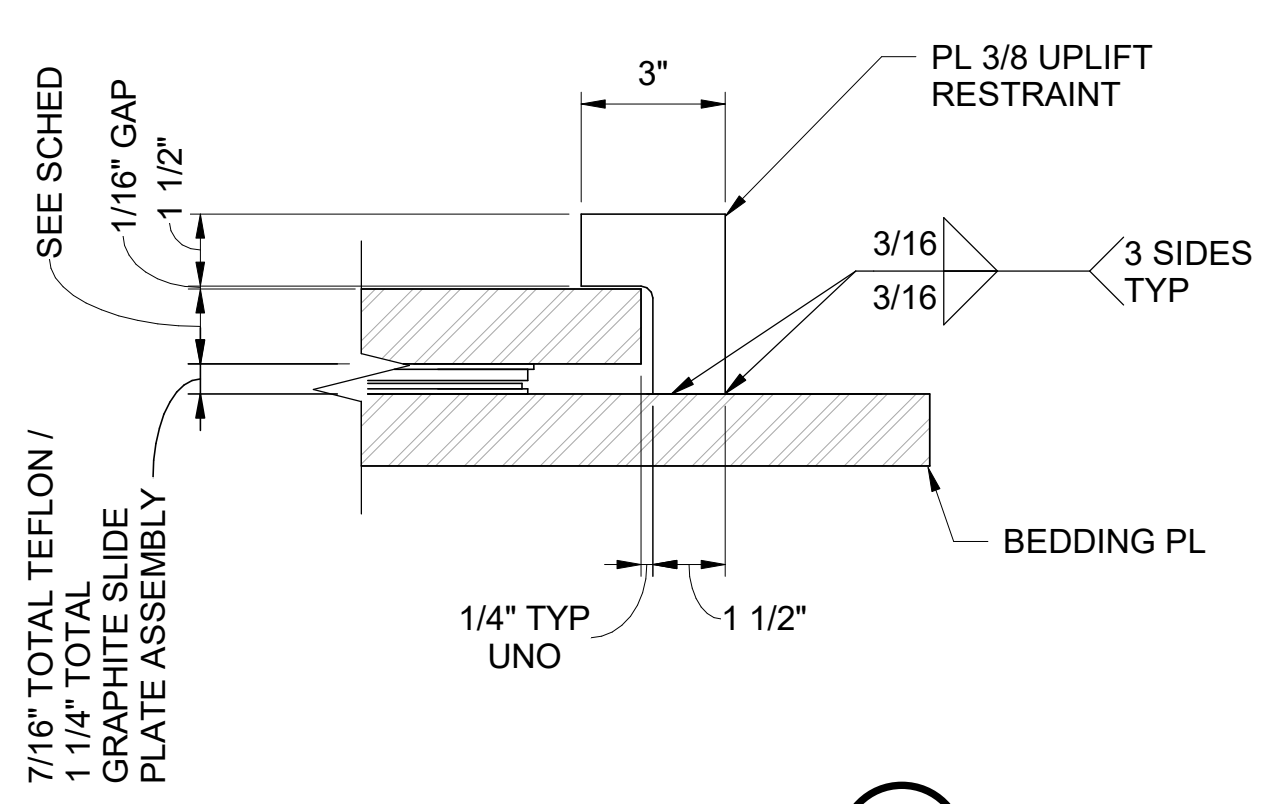
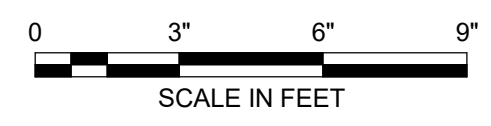
DETAIL 1

TYPICAL GUIDE SUPPORT



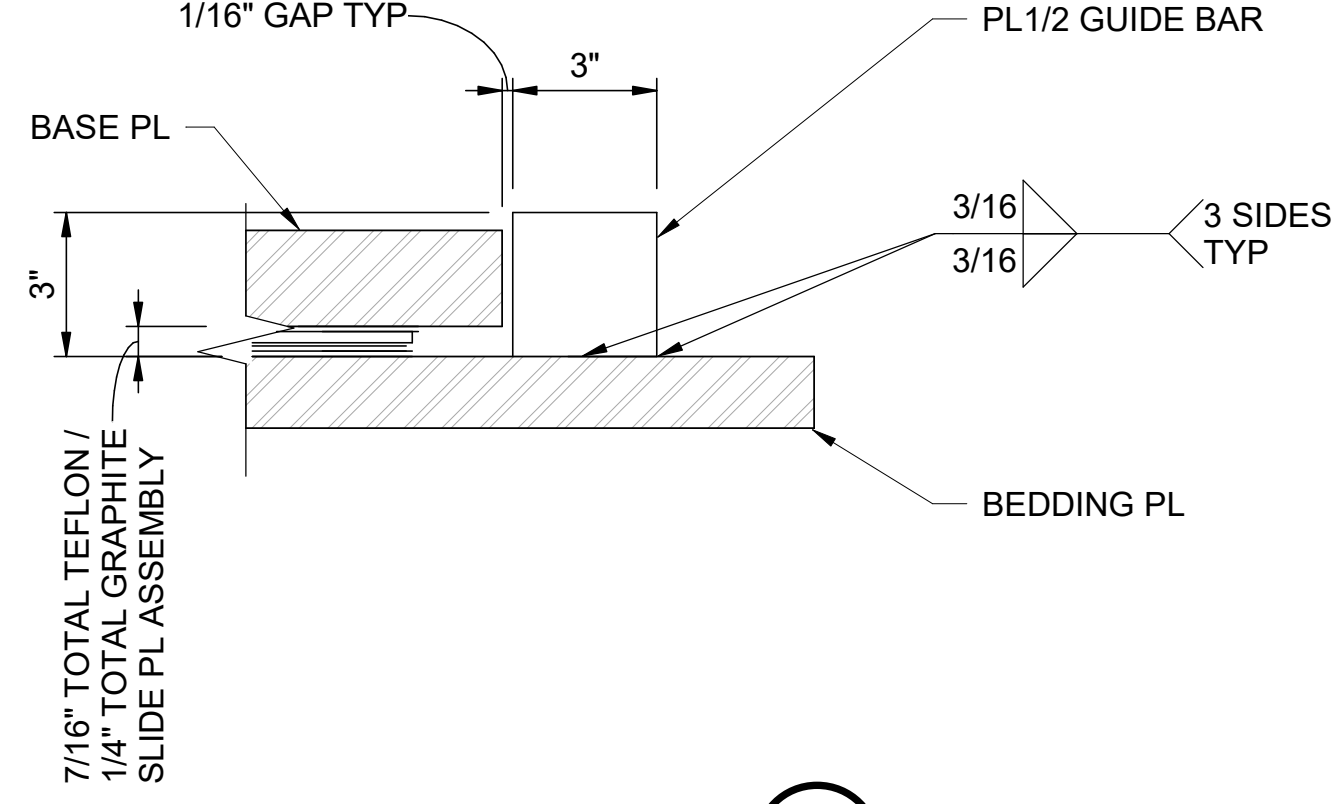
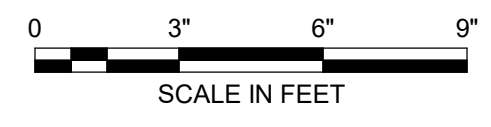
DETAIL 2 S-534

GUIDE SUPPORT - SECTION



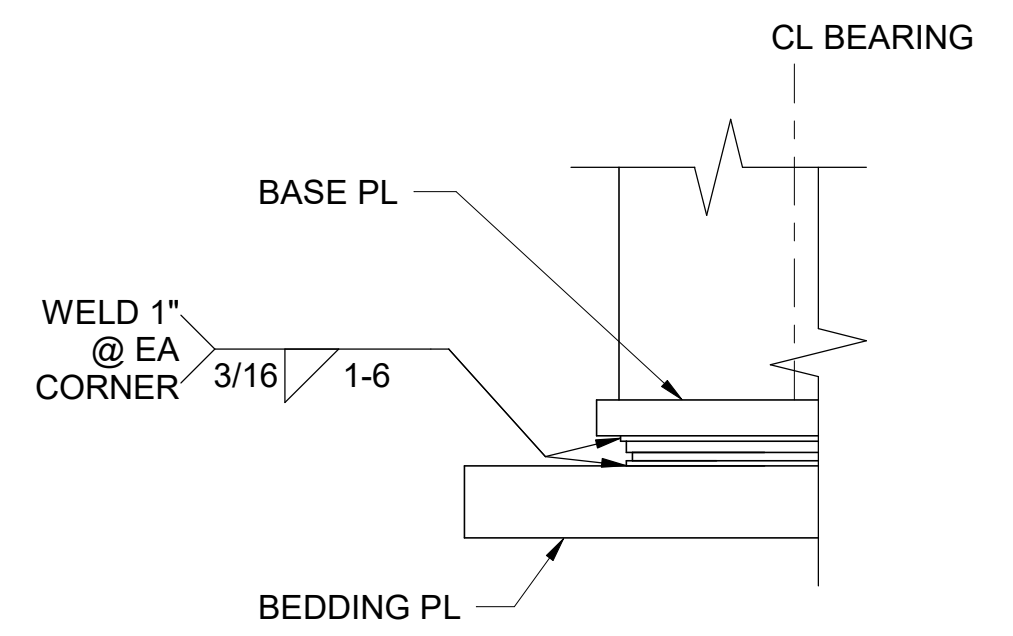
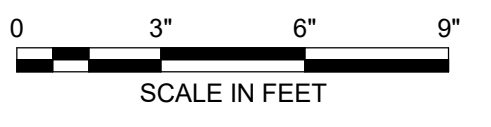
DETAIL 3

GUIDE SUPPORT - UPLIFT RESTRAINT DETAIL



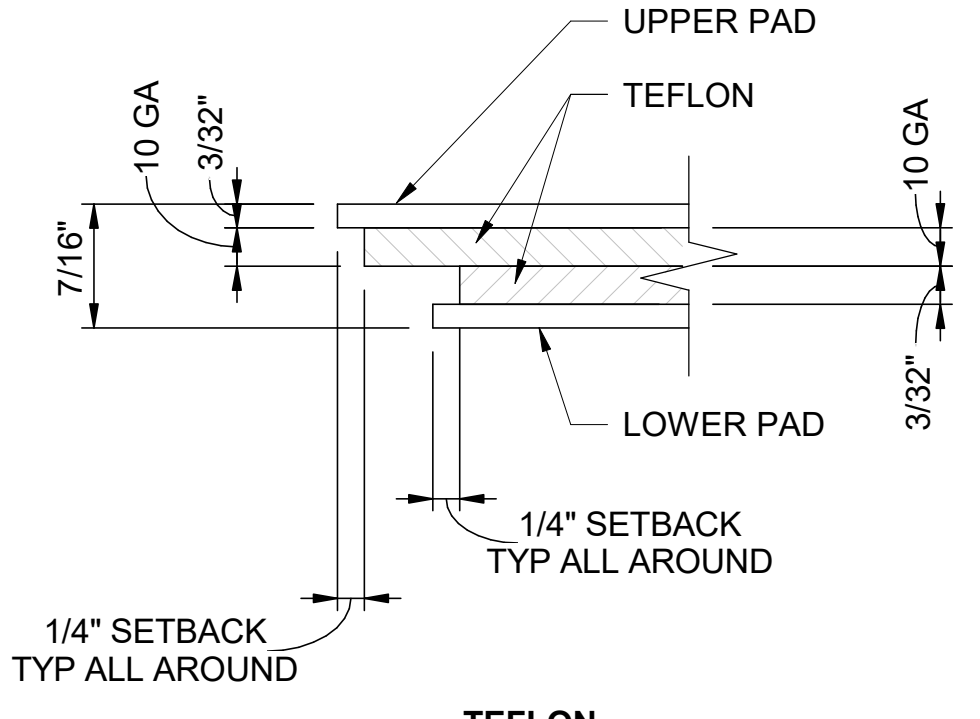
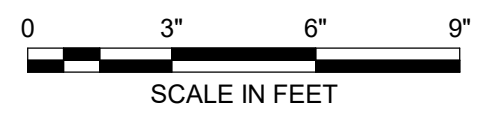
DETAIL 4

GUIDE SUPPORT - GUIDE BAR DETAIL

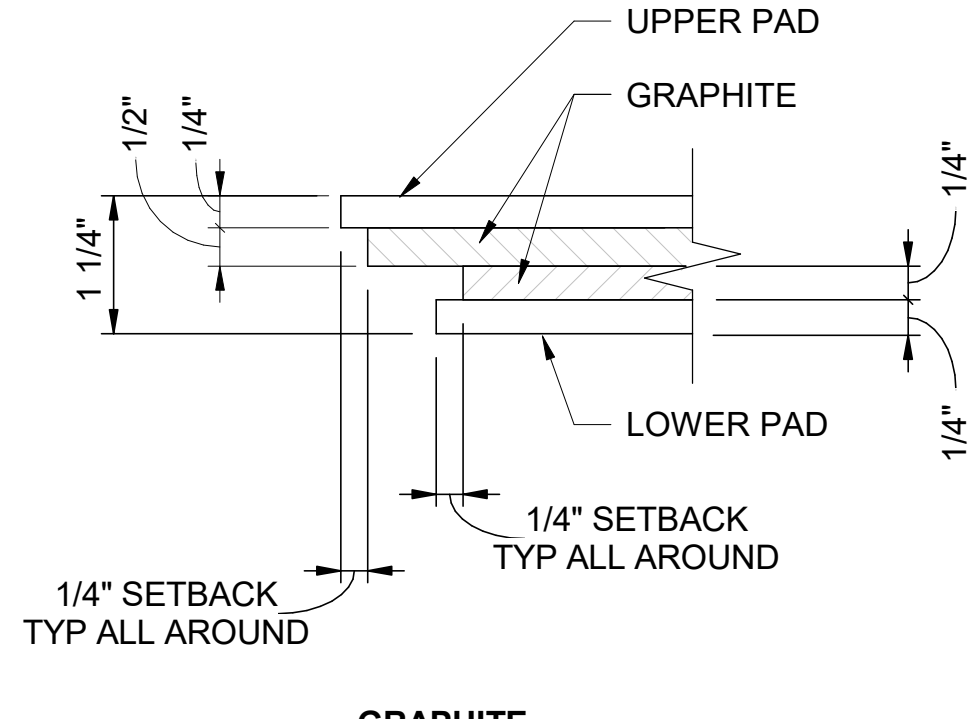


DETAIL 5

GUIDE SUPPORT - PLATE DETAIL



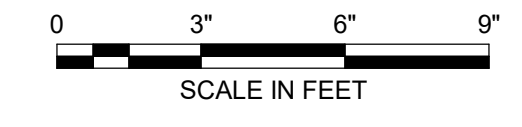
TEFLON



GRAPHITE

DETAIL 6

GUIDE SUPPORT - TEFLON AND GRAPHITE PAD DETAILS



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

ISSUED FOR PERMIT ONLY



9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

date	10/5/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

PDX FUEL COMPANY L.L.C

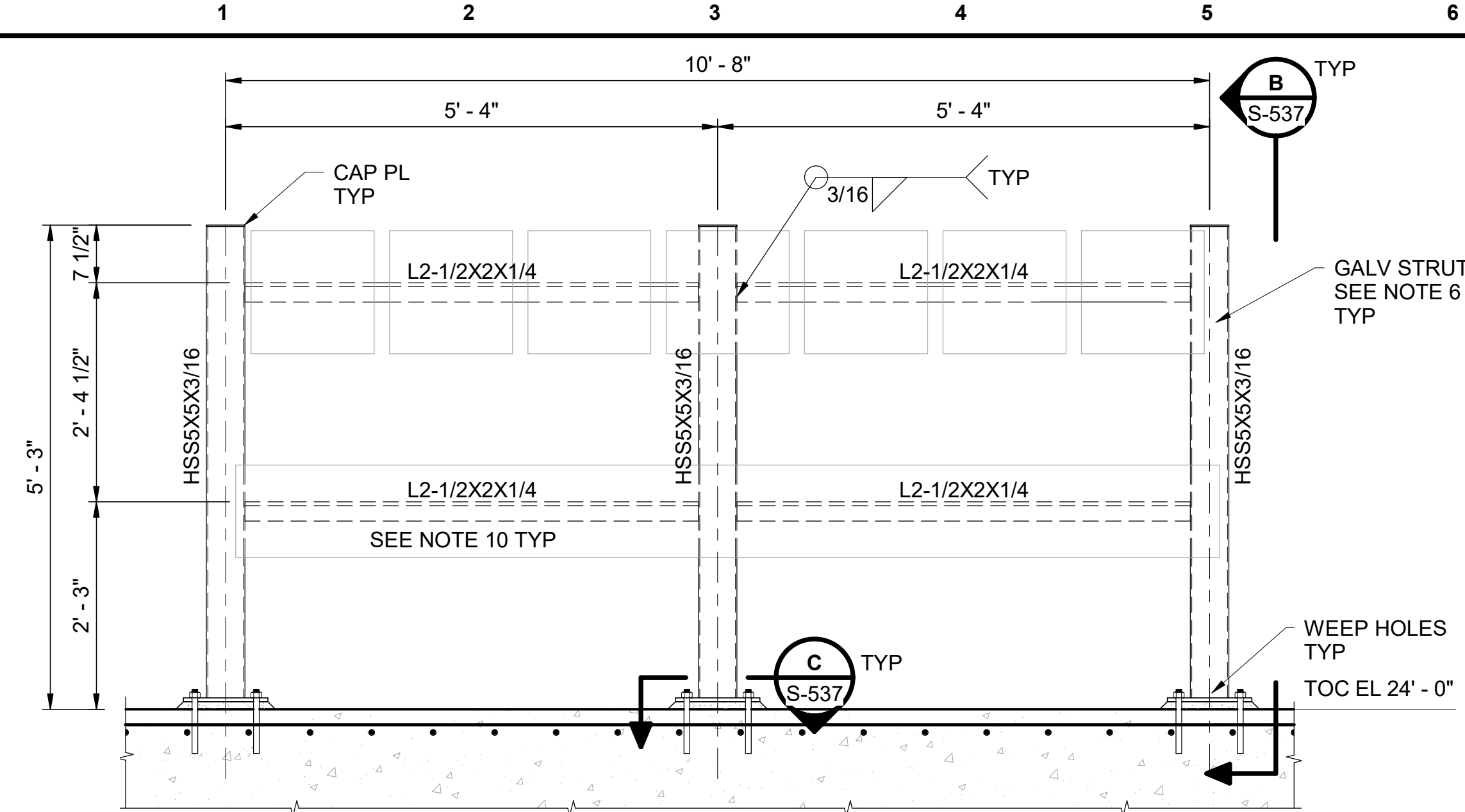
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

PDX FACILITY IMPROVEMENTS  
UTILITY TRUSS SLIDE PLATE DETAILS

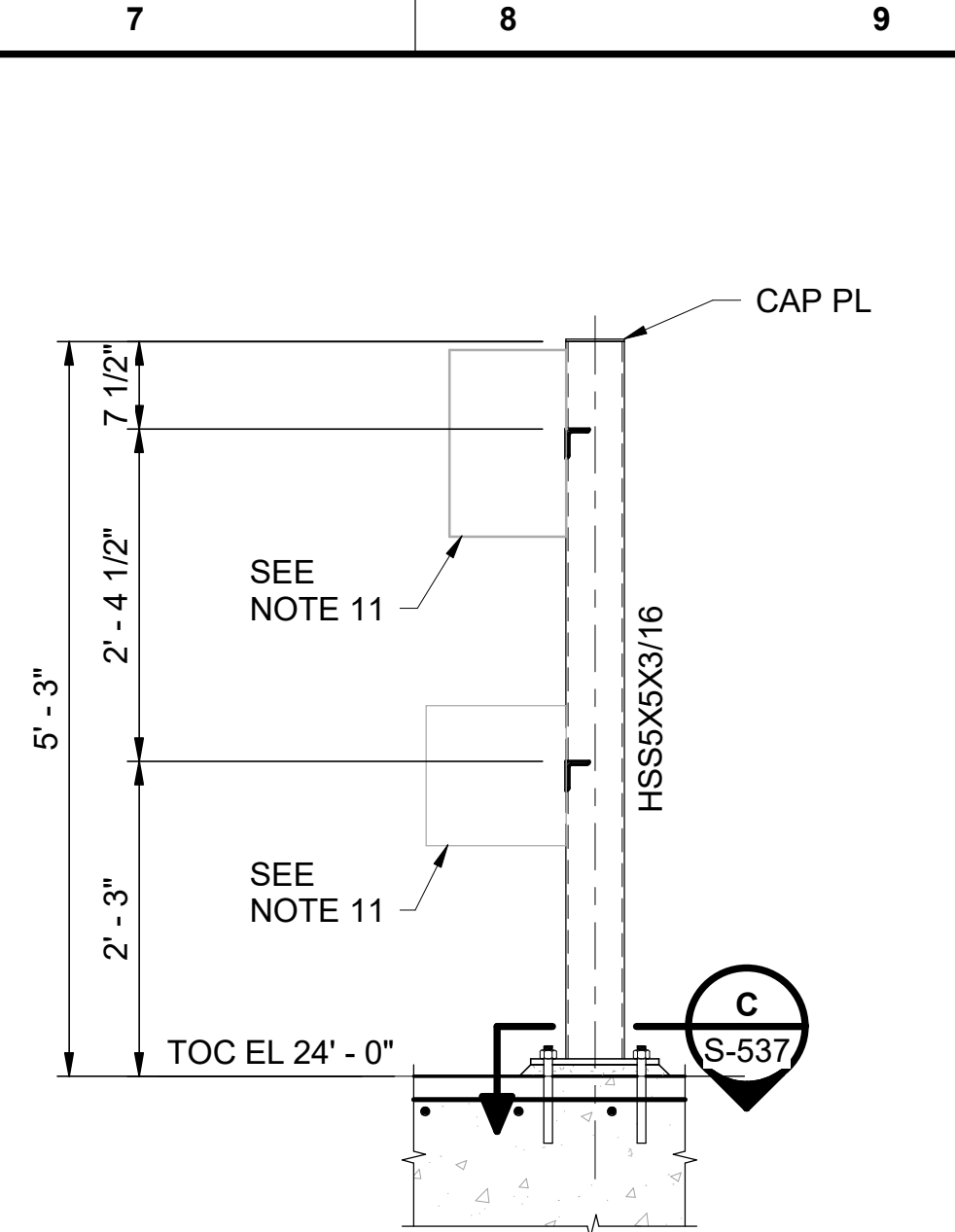
project	153929	contract	
drawing		rev.	

S-536 - A

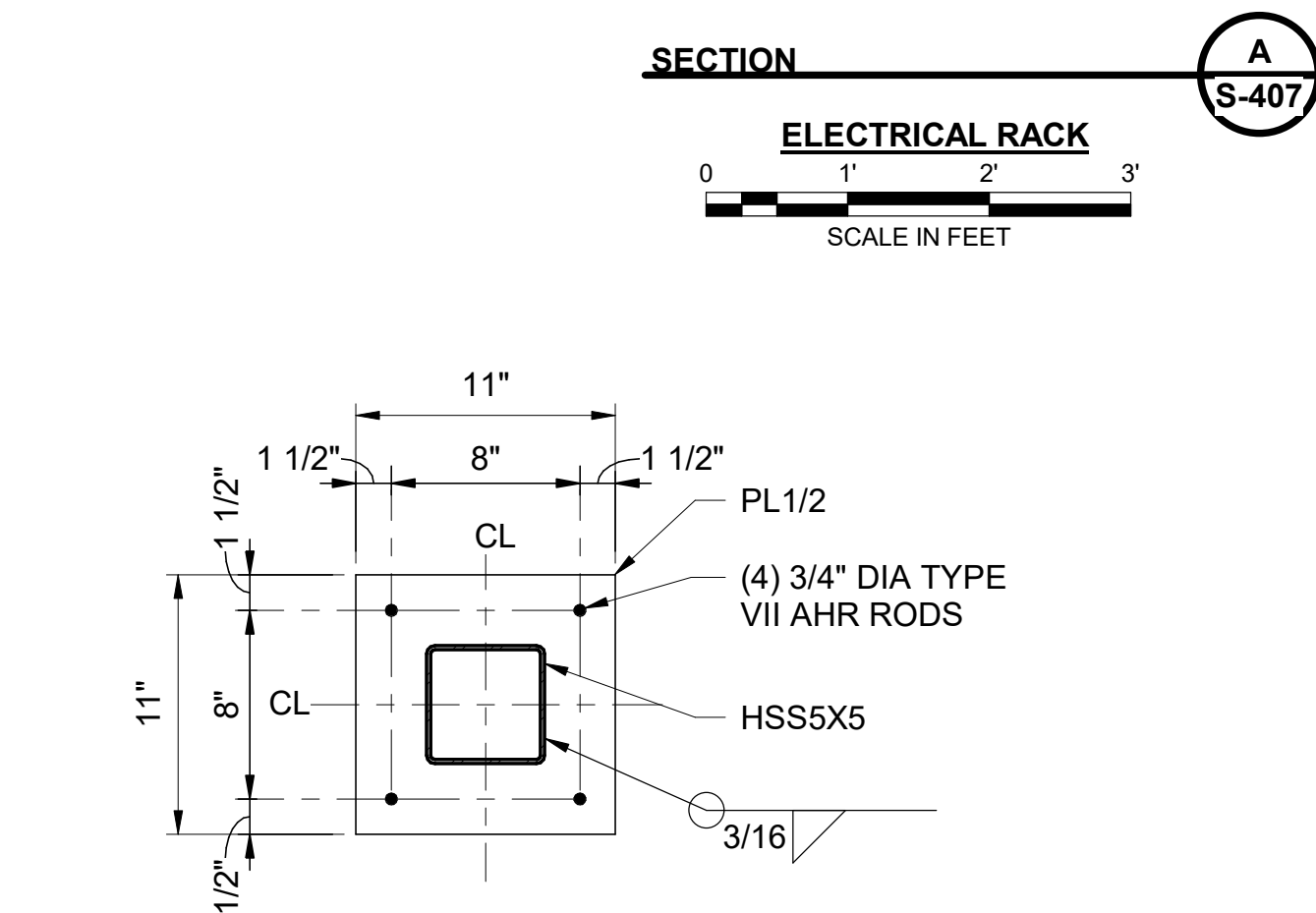




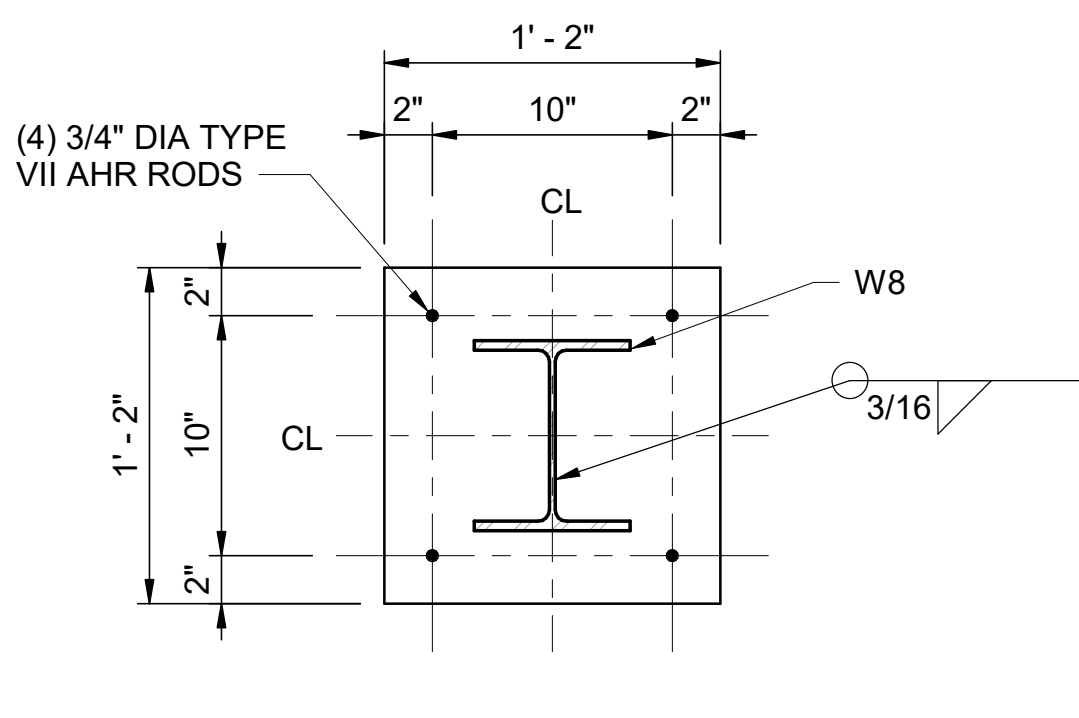
**SECTION A**  
ELECTRICAL RACK  
SCALE IN FEET



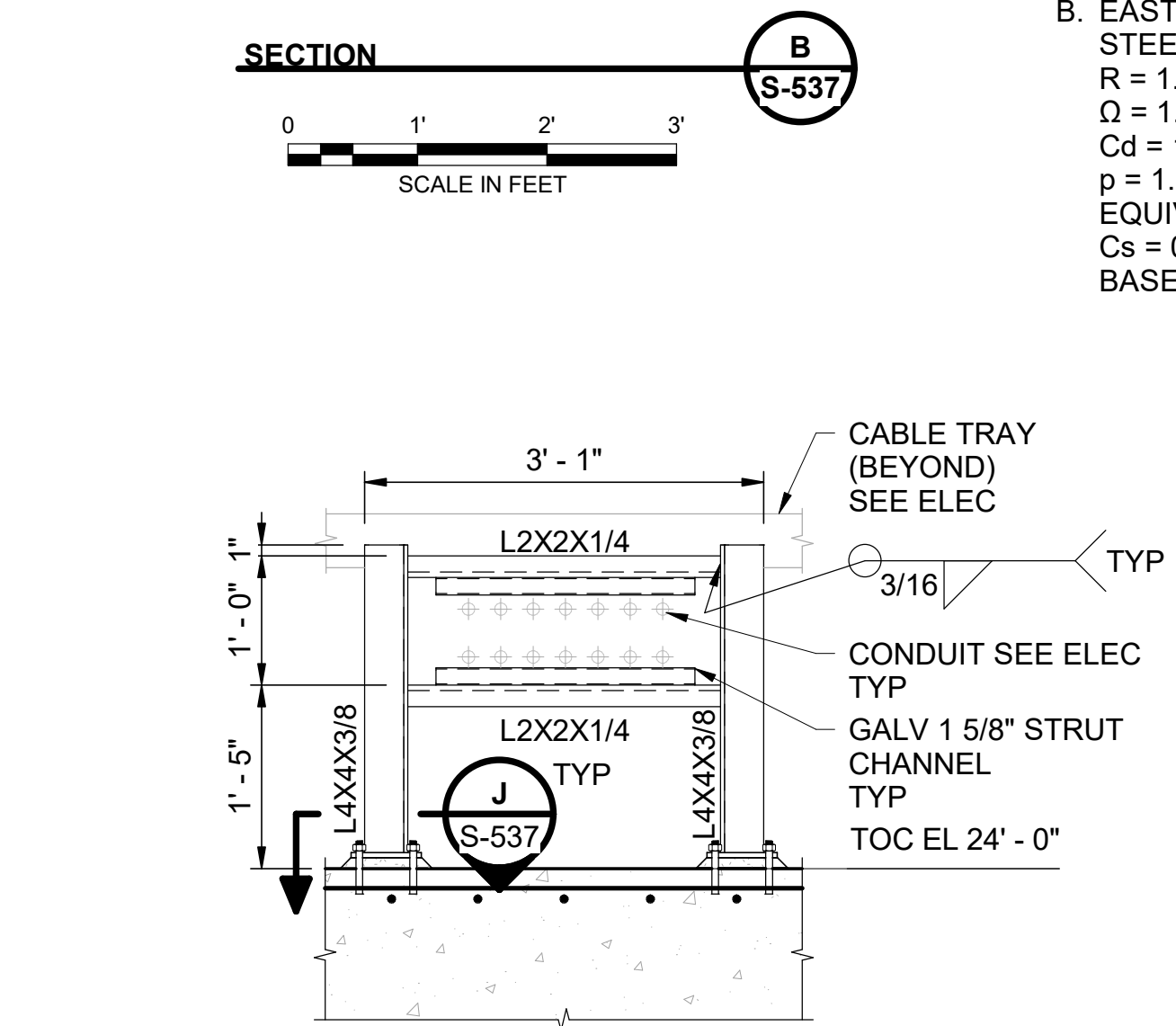
**SECTION B**  
SCALE IN FEET



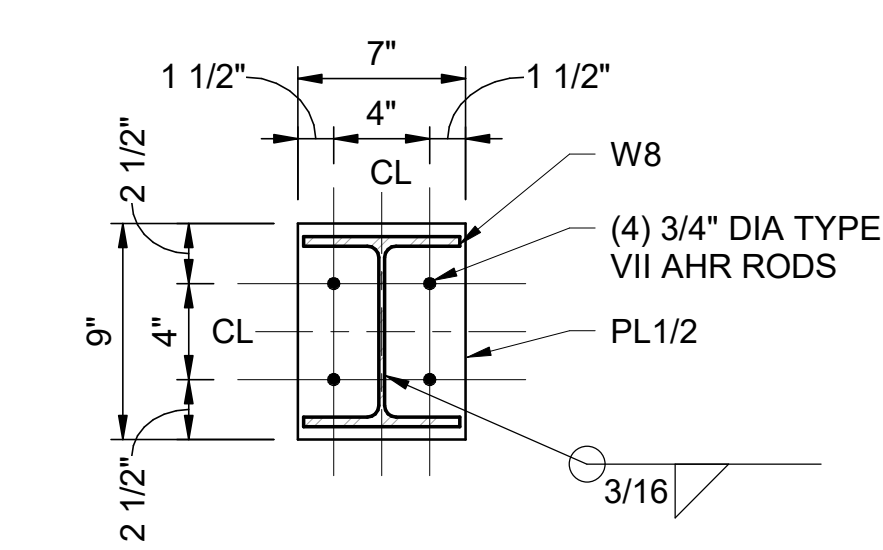
**SECTION C**  
SCALE IN FEET



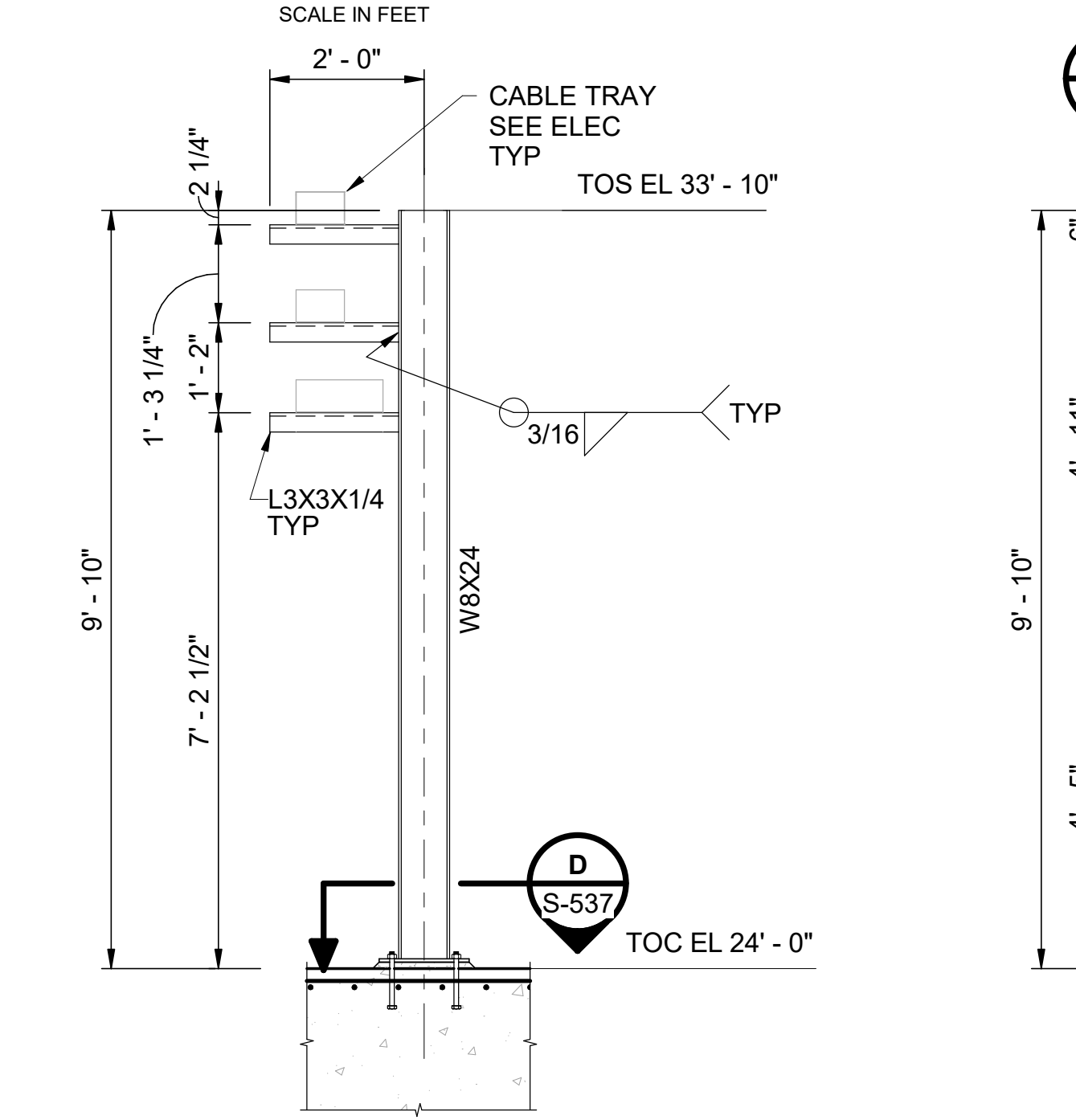
**SECTION D**  
SCALE IN FEET



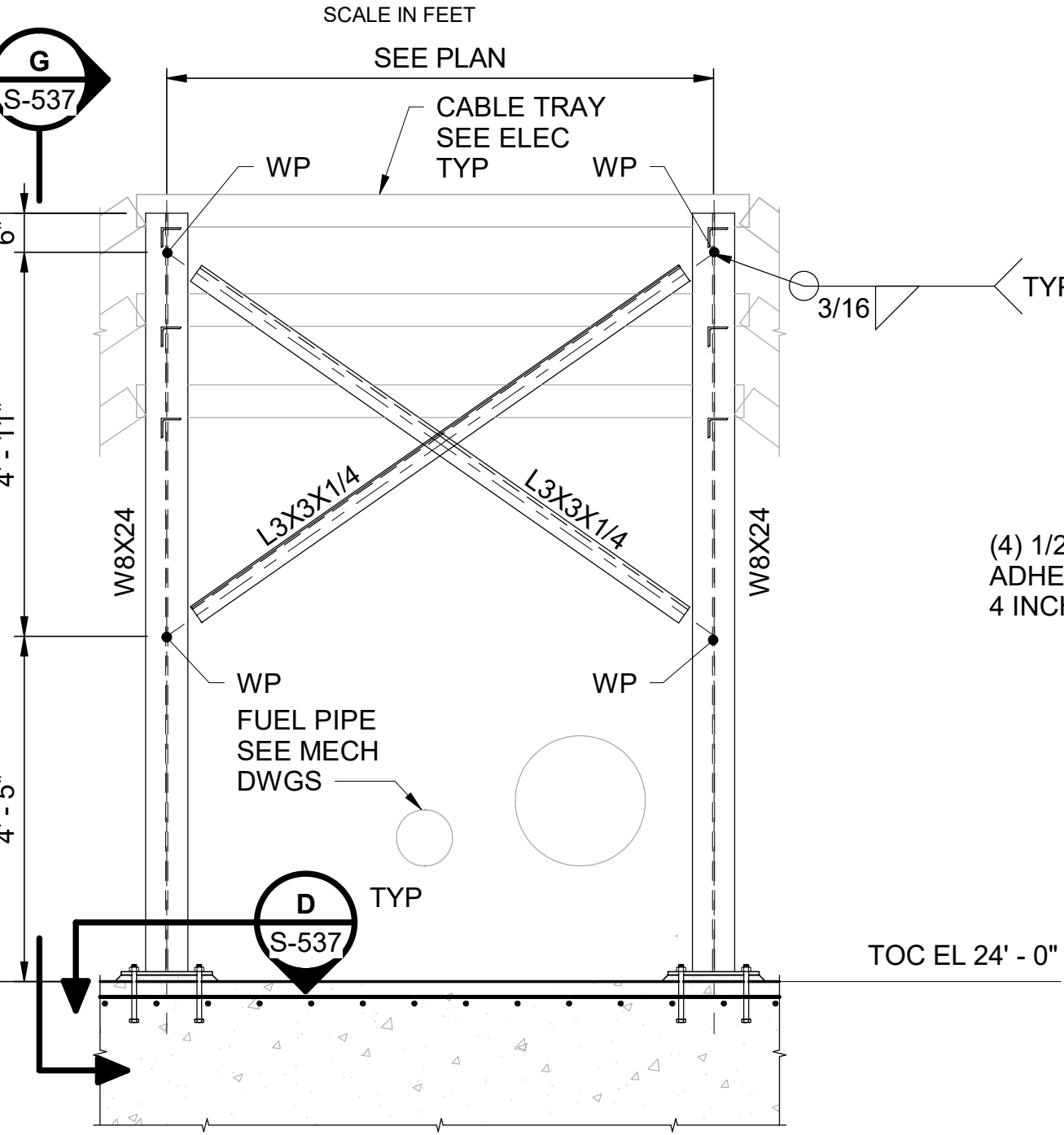
**SECTION E**  
SCALE IN FEET



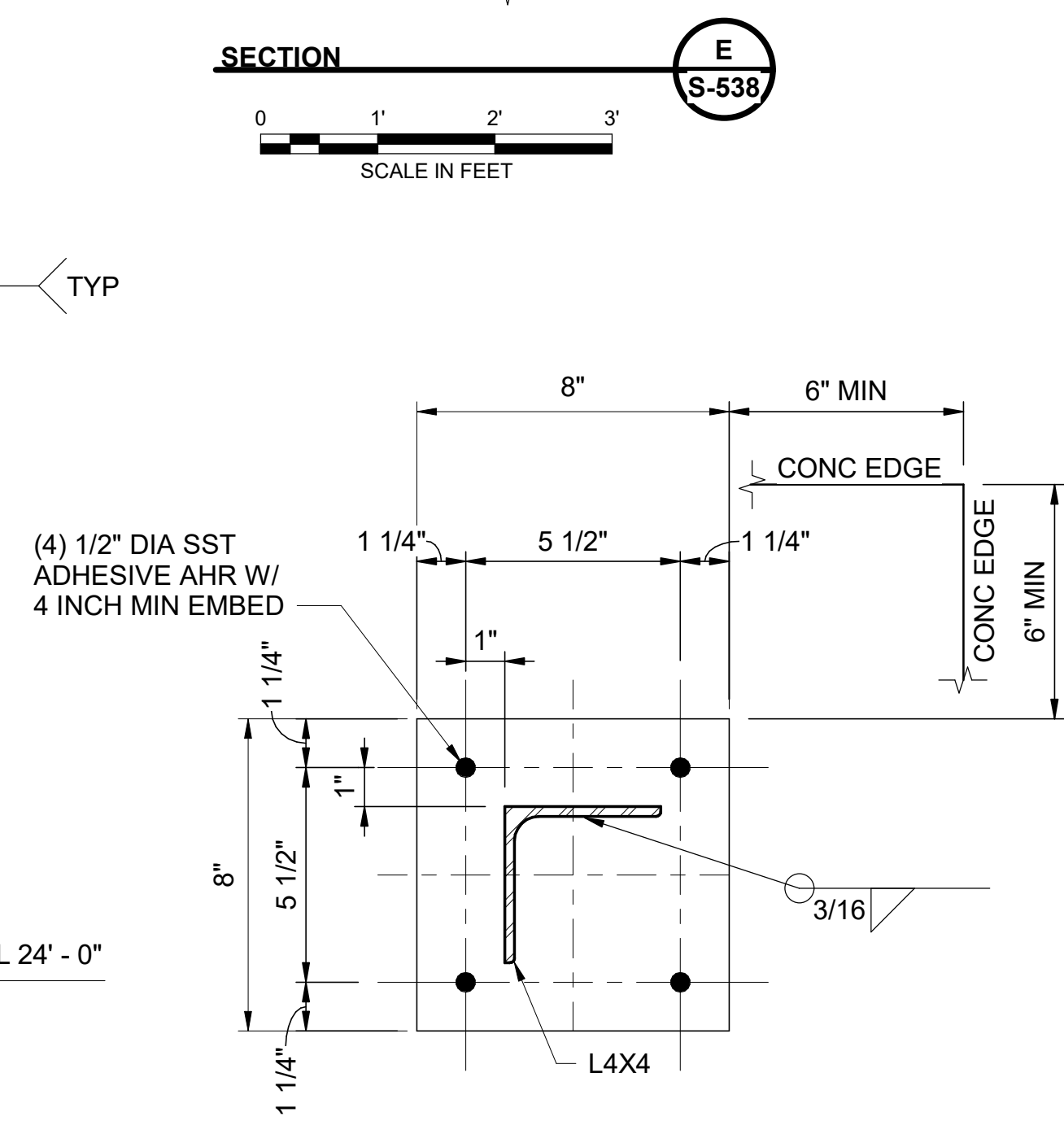
**SECTION F**  
SCALE IN FEET



**SECTION G**  
SCALE IN FEET



**SECTION H**  
SCALE IN FEET



**SECTION J**  
SCALE IN FEET

- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - ALL STRUCTURAL STEEL AND STRUT CHANNEL TO BE HOT-DIPPED GALVANIZED.
  - PROVIDE 1-5/8 INCH STRUT CHANNEL BETWEEN ANGLES AS NEEDED TO SUPPORT EQUIPMENT. COORDINATE LOCATIONS AND LAYOUT OF STRUCTURAL STEEL AND STRUT CHANNEL WITH ELECTRICAL DRAWINGS AND EQUIPMENT REQUIREMENTS.
  - NON-SHRINK GROUT ONLY WHEN NECESSARY FOR LEVELING PURPOSES. UTILIZE MINIMUM 1" OF GROUT.
  - PROVIDE 3/4" DIA WEEP HOLES AT TWO SIDES OF ALL HSS TUBE STEEL.
  - UTILITY SUPPORT STEEL SEISMIC DESIGN PARAMETERS:
    - ORDINARY STEEL MOMENT FRAMES:
      - R = 1.0
      - $\Omega = 1.0$
      - Cd = 1.0
      - p = 1.0
      - EQUIVALENT LATERAL FORCE ANALYSIS
      - Cs = 1.833
      - BASE SHEAR = 2.70 KIPS (MAX)
    - ELECTRICAL RACK ANGLES ARE RATED FOR A UNIFORM LOAD OF 70 LB / FOOT. EQUIPMENT IS TO BE ATTACHED TO BEAMS WITH GALVANIZED UNISTRUT AND FOLLOWING SPECIFICATIONS 26 05 29 AND 06 05 49.
  - CABLE TRAY SUPPORT STEEL SEISMIC DESIGN PARAMETERS:
    - NORTH-SOUTH DIRECTION:
      - STEEL ORDINARY CONCENTRICALLY BRACED FRAME
      - R = 1.0
      - $\Omega = 1.0$
      - Cd = 1.0
      - p = 1.0
      - EQUIVALENT LATERAL FORCE ANALYSIS
      - Cs = 0.885
      - BASE SHEAR = 0.87 KIPS
    - EAST-WEST DIRECTION:
      - STEEL ORDINARY CONCENTRICALLY BRACED FRAME
      - R = 1.5
      - $\Omega = 1.0$
      - Cd = 1.5
      - p = 1.0
      - EQUIVALENT LATERAL FORCE ANALYSIS
      - Cs = 0.59
      - BASE SHEAR = 0.58 KIPS

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT

**ISSUED FOR PERMIT ONLY**

**BURNS MEDONNELL**  
9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

date	11/10/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

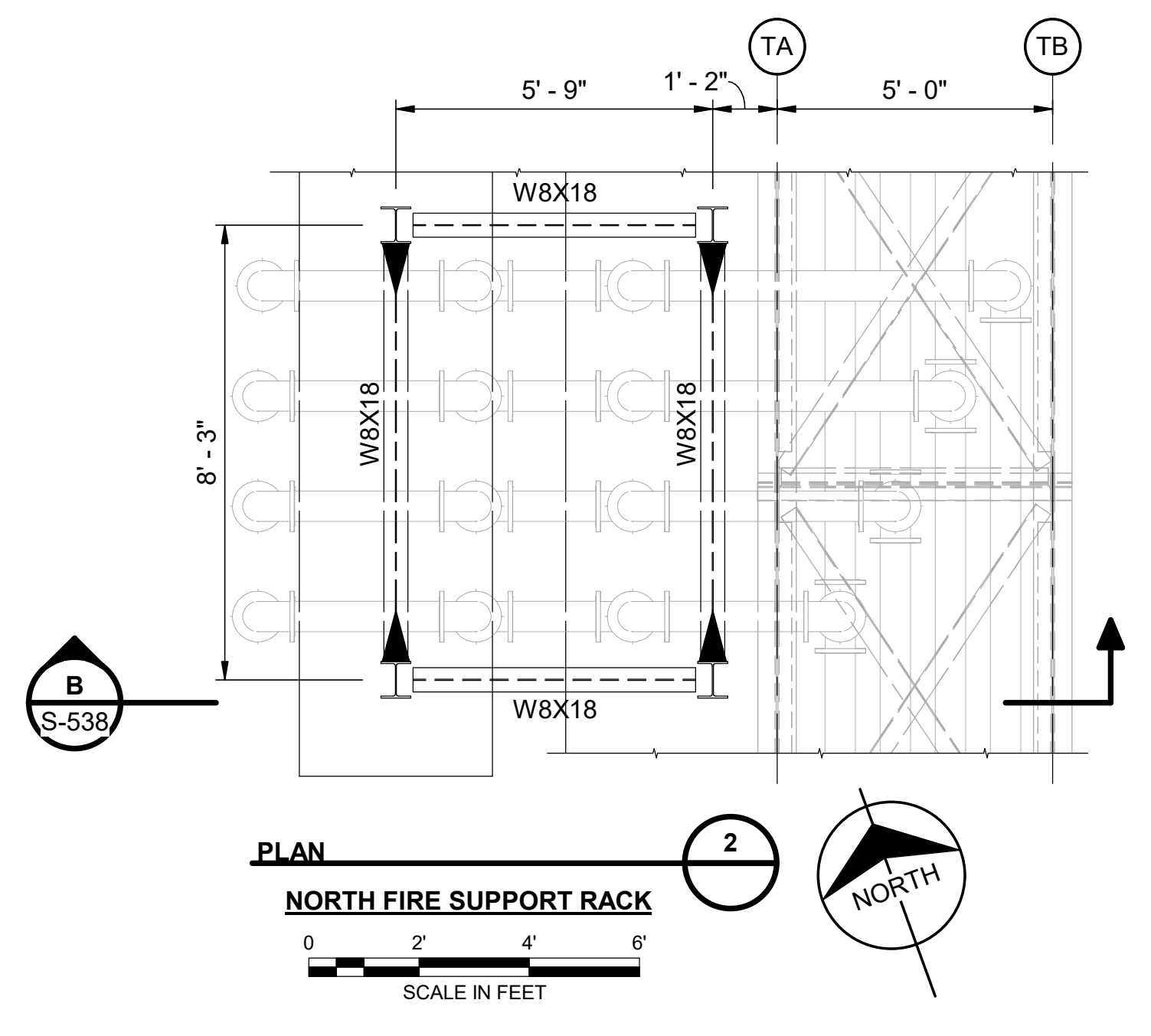
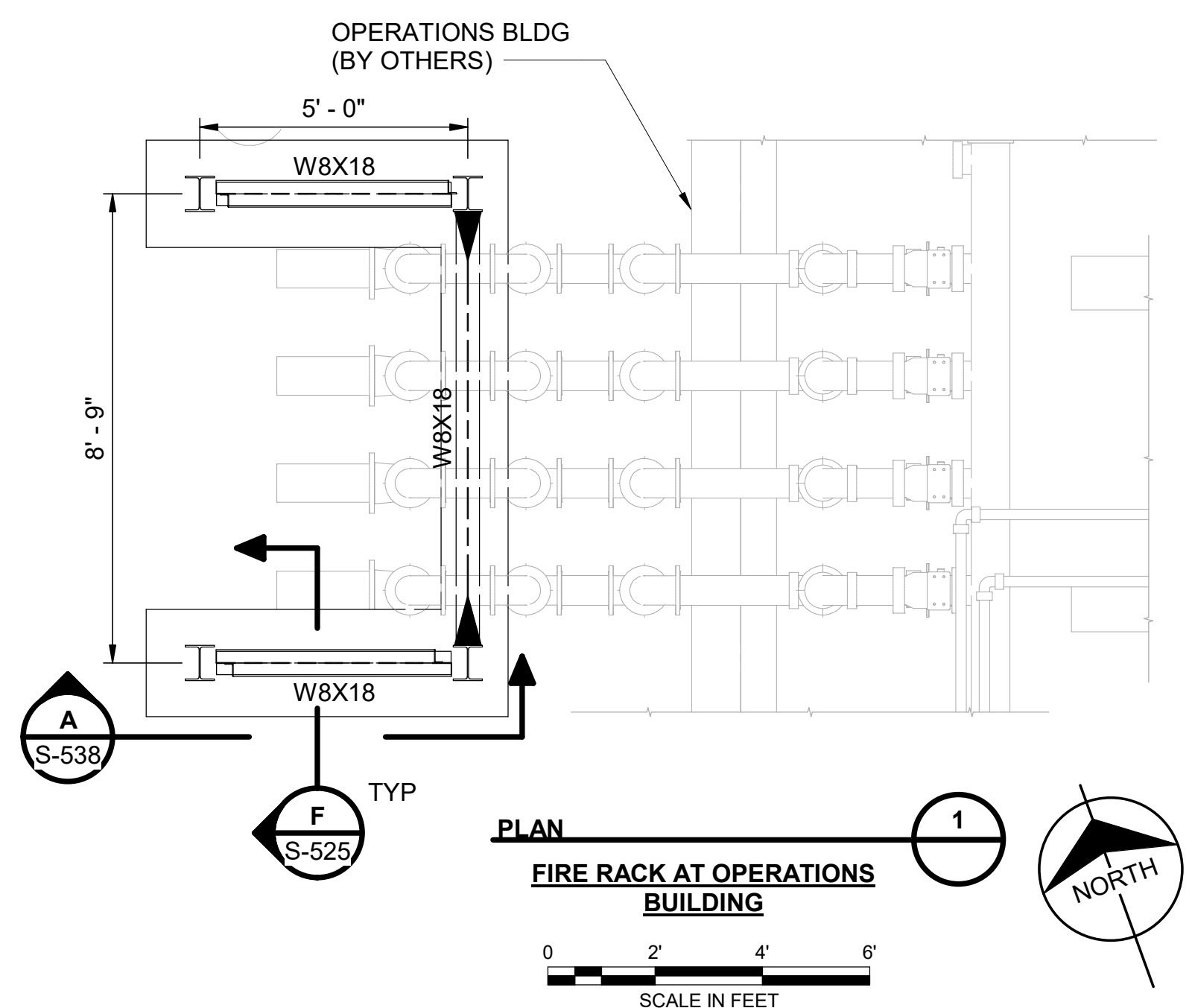
**PDX FUEL COMPANY L.L.C**  
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
ELECTRICAL RACK & CABLE TRAY SUPPORTS

project	153929	contract	
drawing		rev.	
<b>S-537 - A</b>			

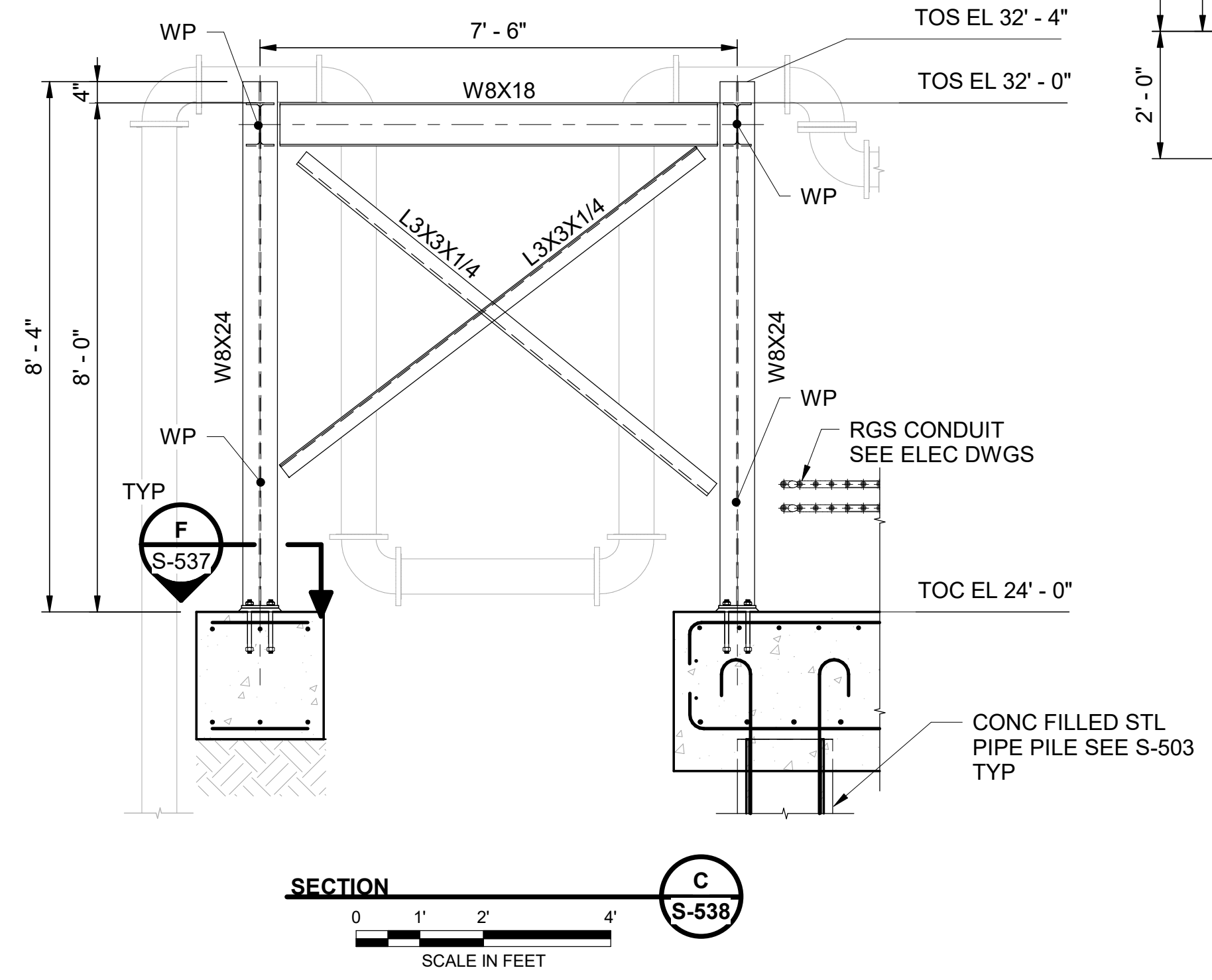
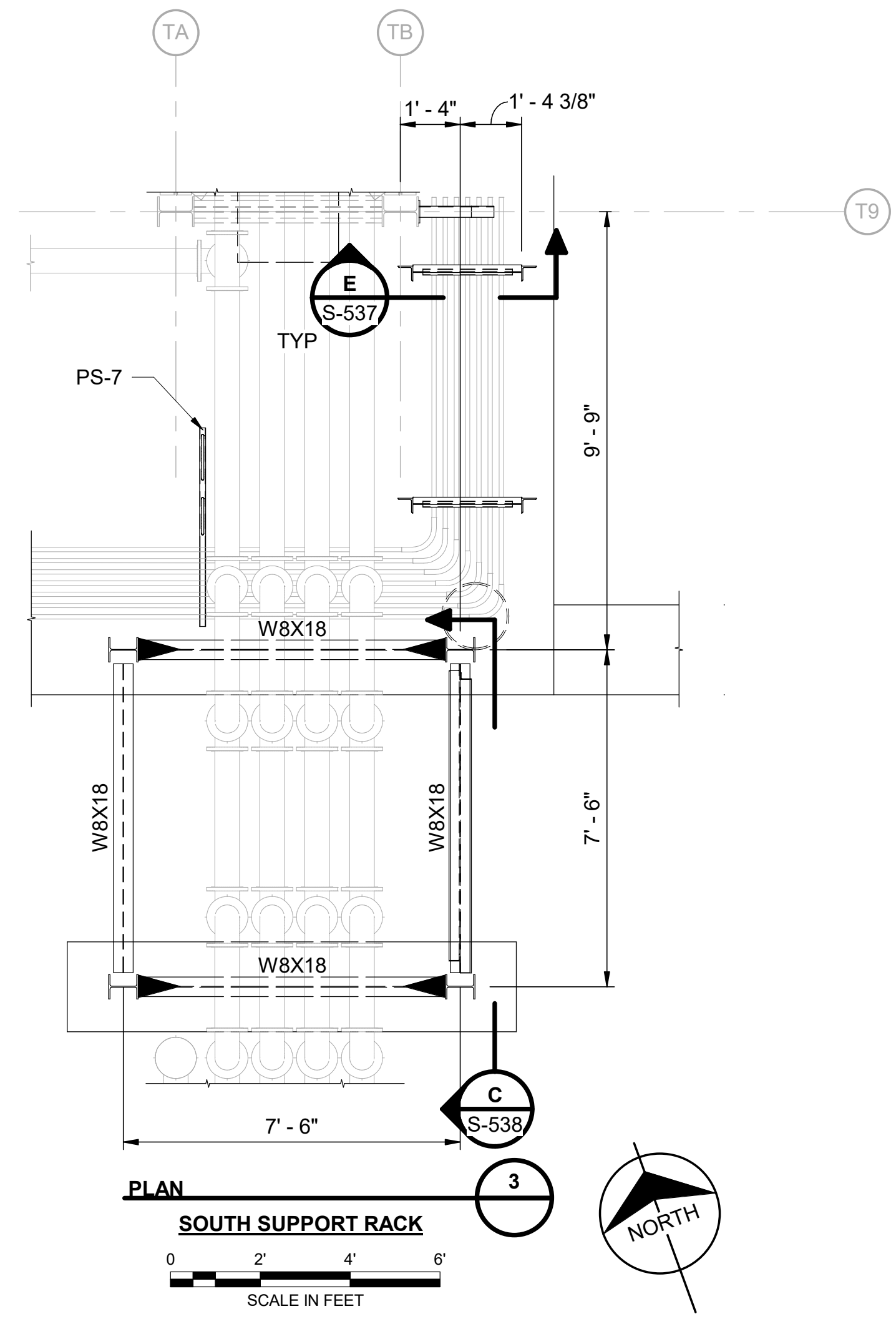
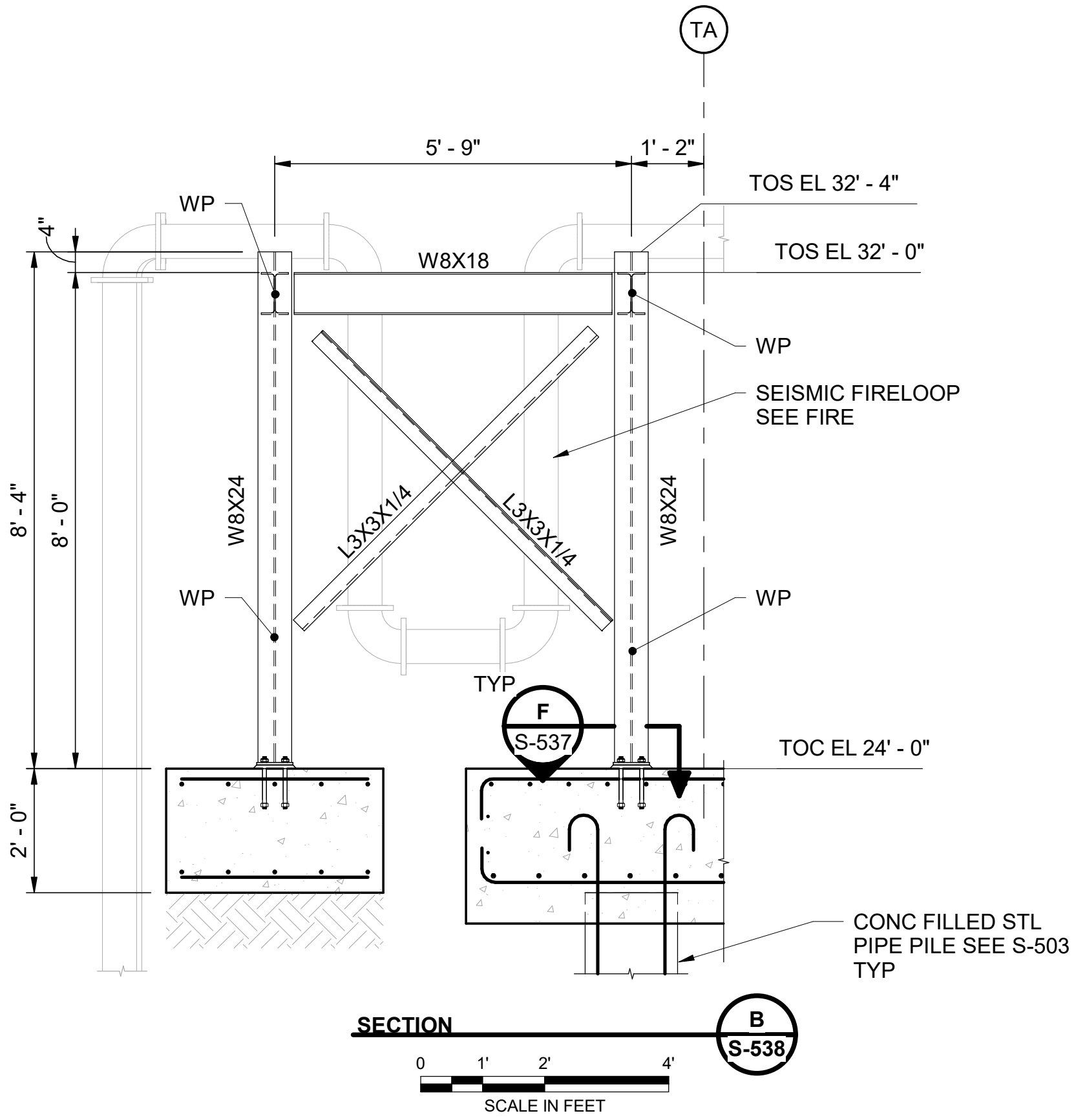
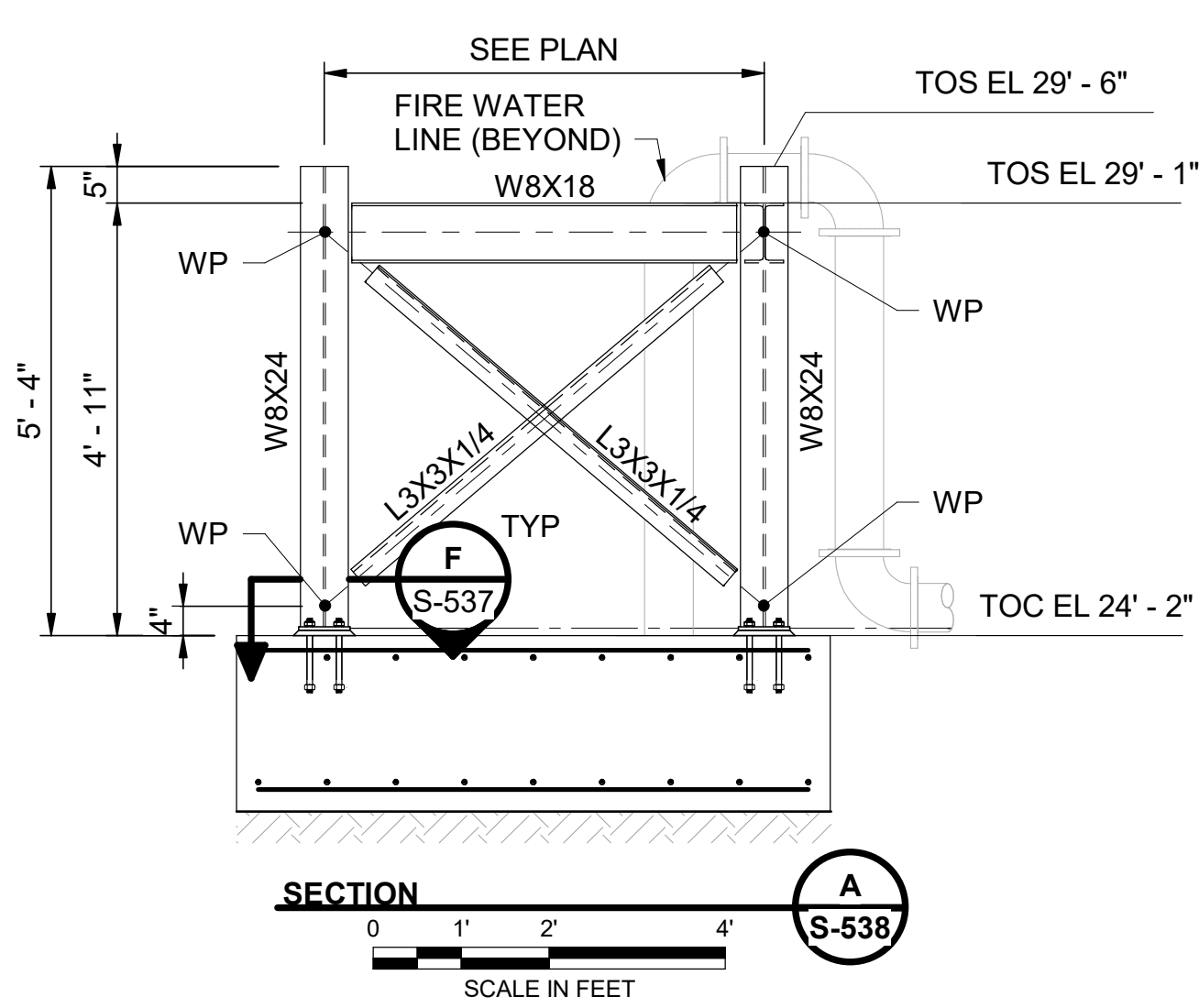


12/20/2023 8:36:37 PM

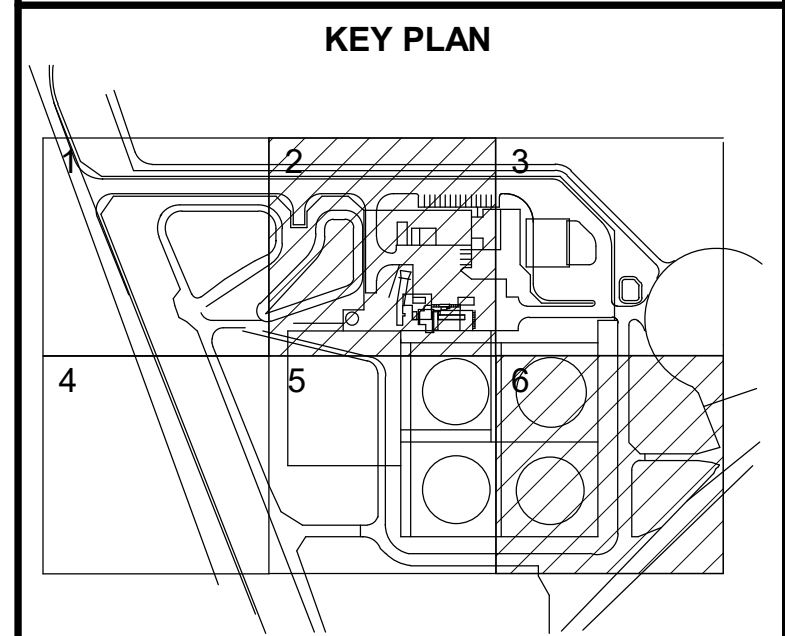


- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.
  - SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.
  - FIRE WATER SUPPORT STEEL SEISMIC DESIGN PARAMETERS:
    - A. BRACED FRAME DIRECTION:  
STEEL ORDINARY CONCENTRICALLY BRACED FRAME  
R = 1.5  
 $\Omega = 1.0$   
Cd = 1.5  
p = 1.3  
EQUIVALENT LATERAL FORCE ANALYSIS  
Cs = 0.590  
BASE SHEAR = 2.71 KIPS
    - B. MOMENT FRAME DIRECTION:  
STEEL ORDINARY MOMENT FRAMES  
R = 1.0  
 $\Omega = 1.0$   
Cd = 1.0  
p = 1.3  
EQUIVALENT LATERAL FORCE ANALYSIS  
Cs = 0.885  
BASE SHEAR = 2.71 KIPS

**LEGEND:**  
MOMENT CONNECTION



no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



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**BURNS MEDONNELL**  
9400 WARD PARKWAY  
KANSAS CITY, MO 64114  
816-333-9400  
Burns & McDonnell Engineering Co, Inc.

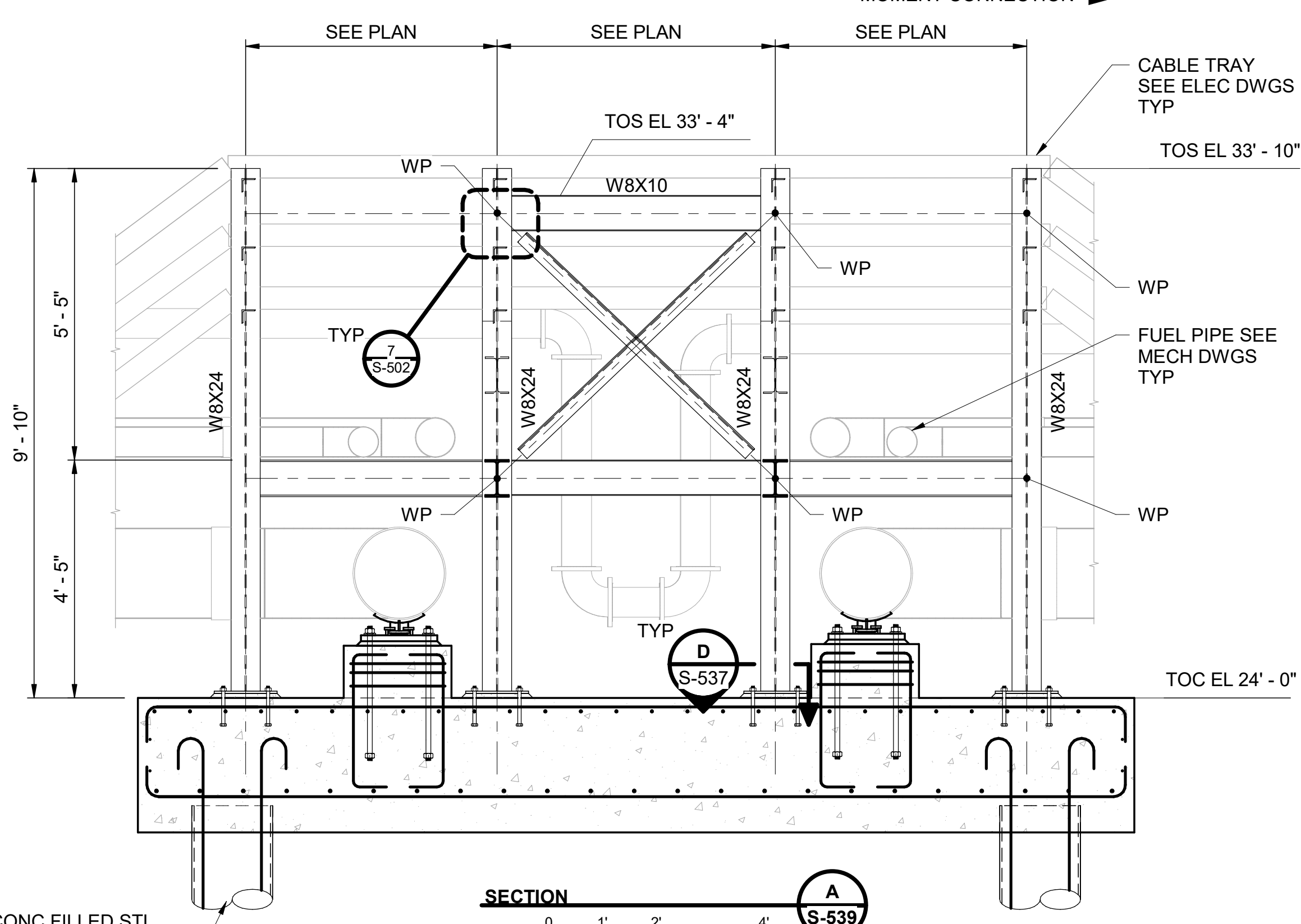
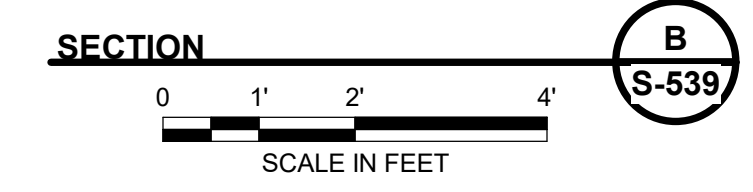
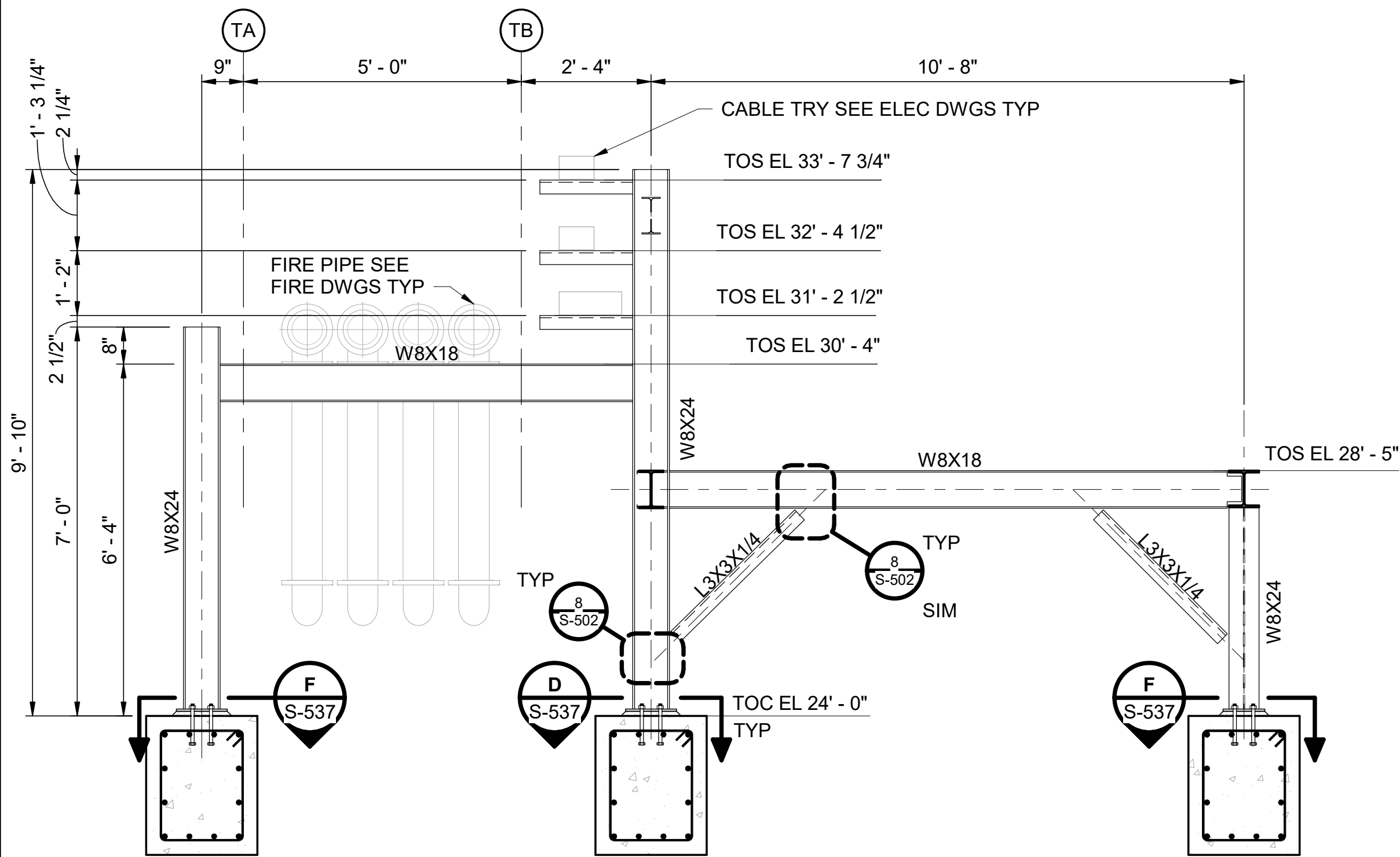
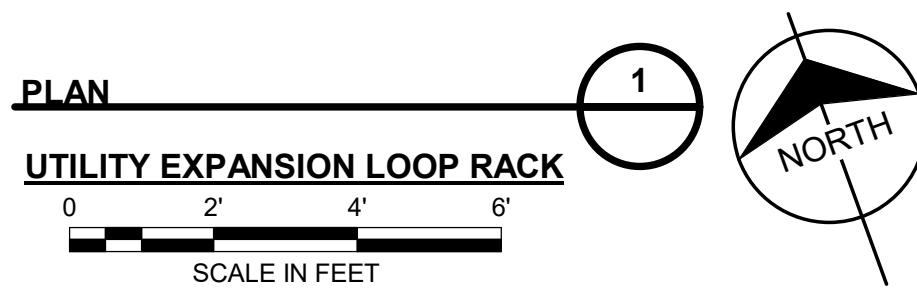
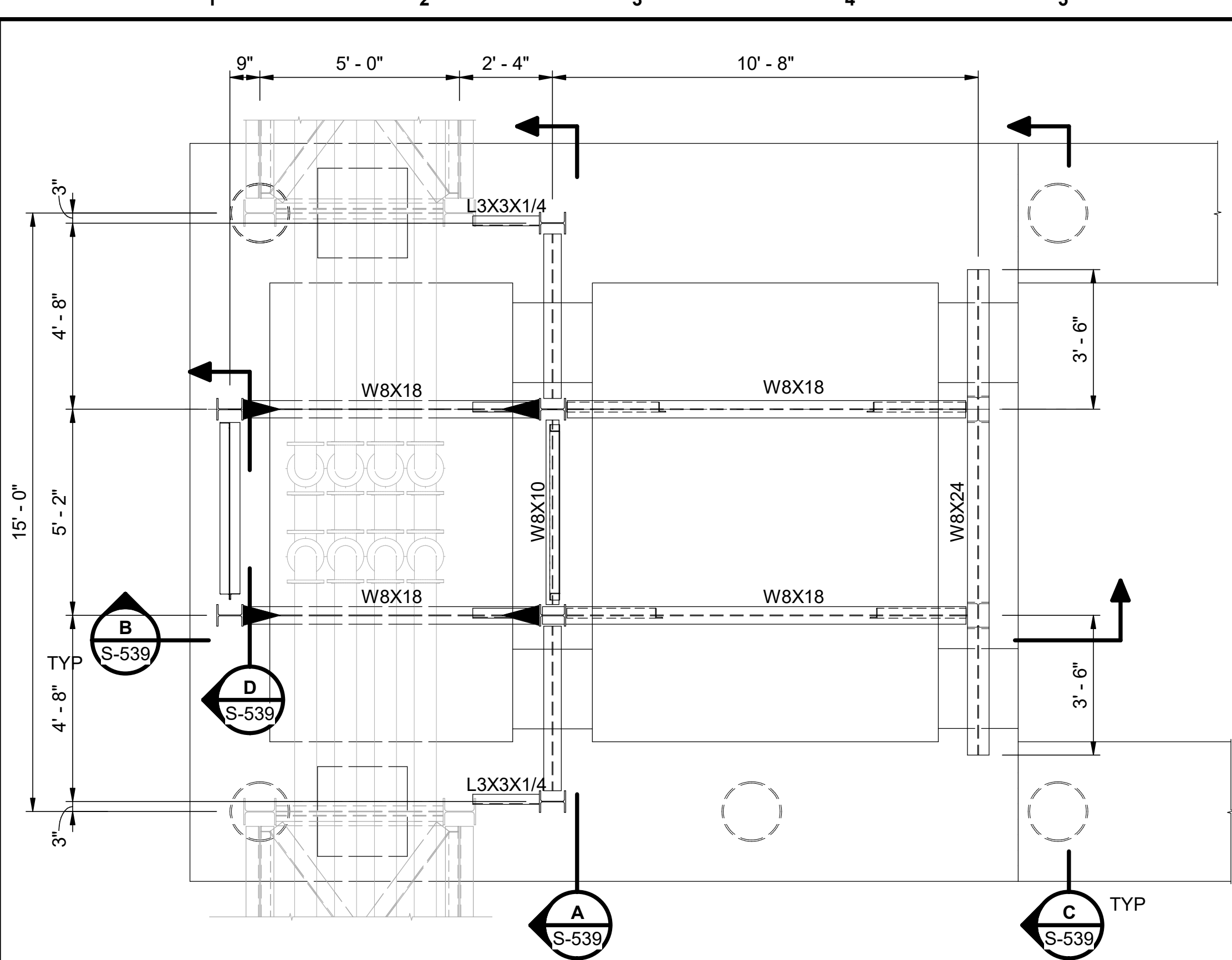
date	11/20/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

**PDX FUEL COMPANY L.L.C**  
PORTLAND INTERNATIONAL AIRPORT  
5000 NE MARINE DR.  
PORTLAND, OREGON 97218

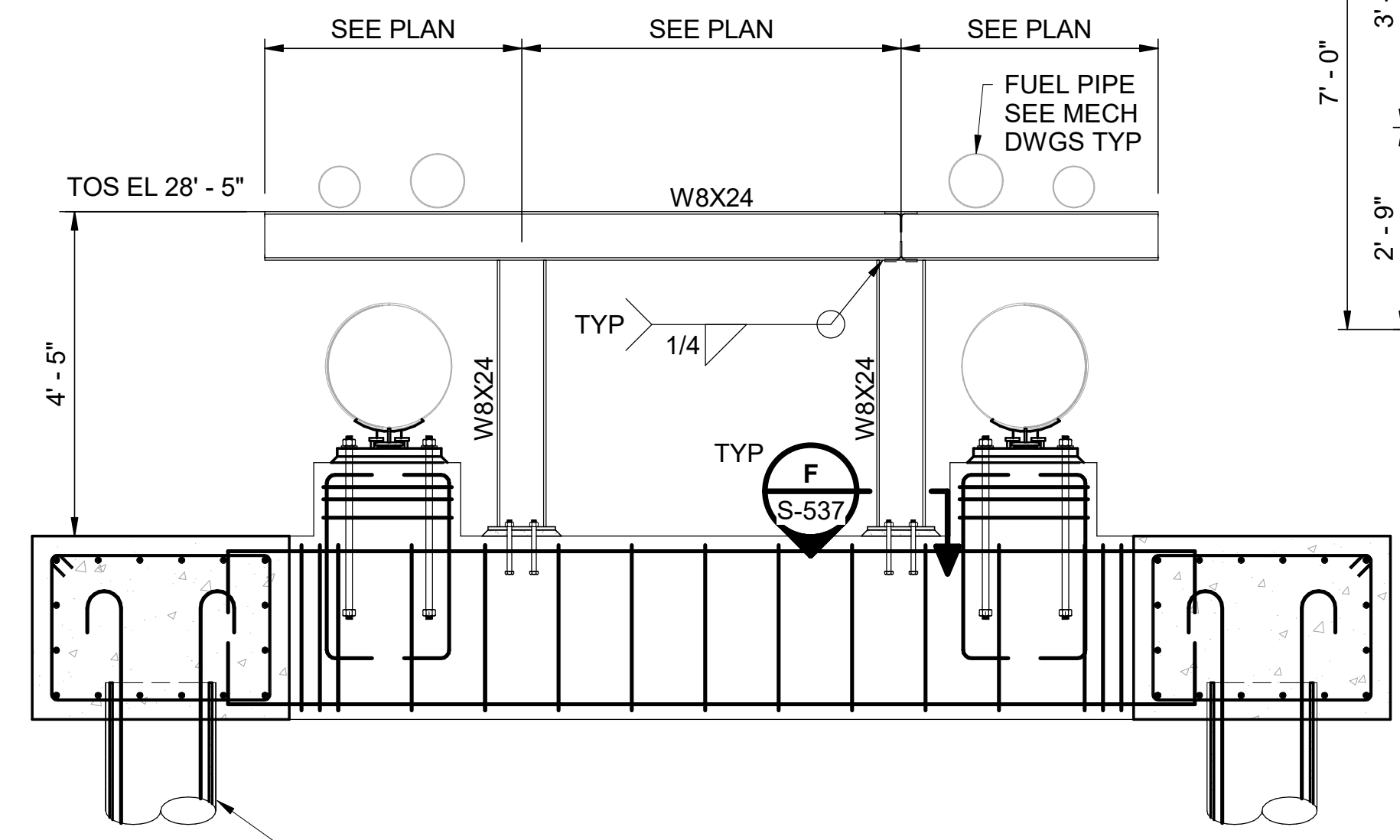
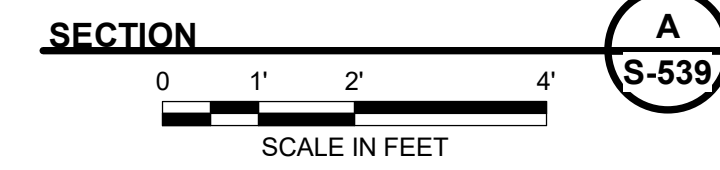
**PDX FACILITY IMPROVEMENTS**  
FIRE WATER STEEL SUPPORTS

project	153929	contract	
drawing		rev.	
<b>S-538 - A</b>			
file			

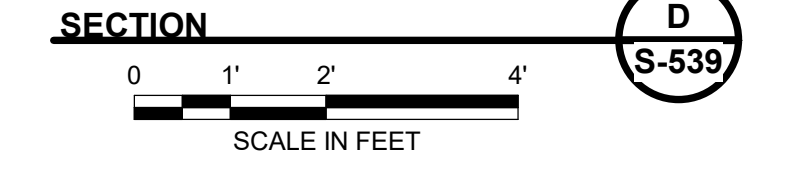
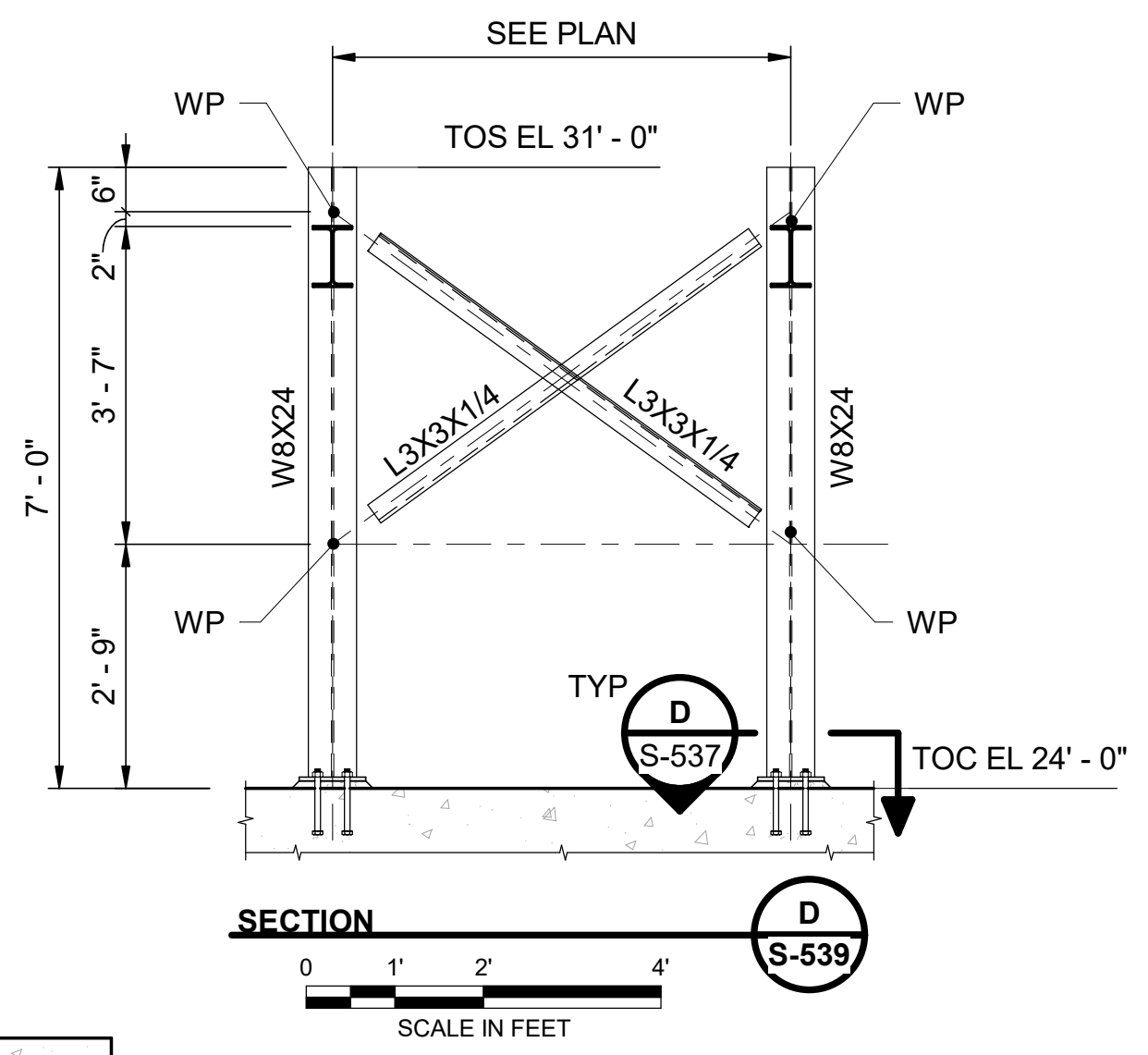
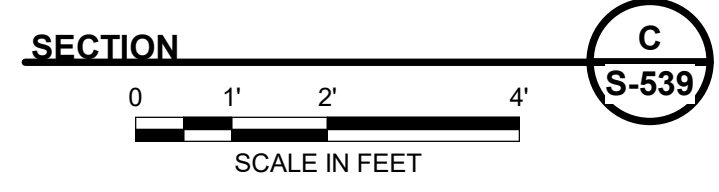




CONC FILLED STL PIPE PILE SEE S-503 TYP



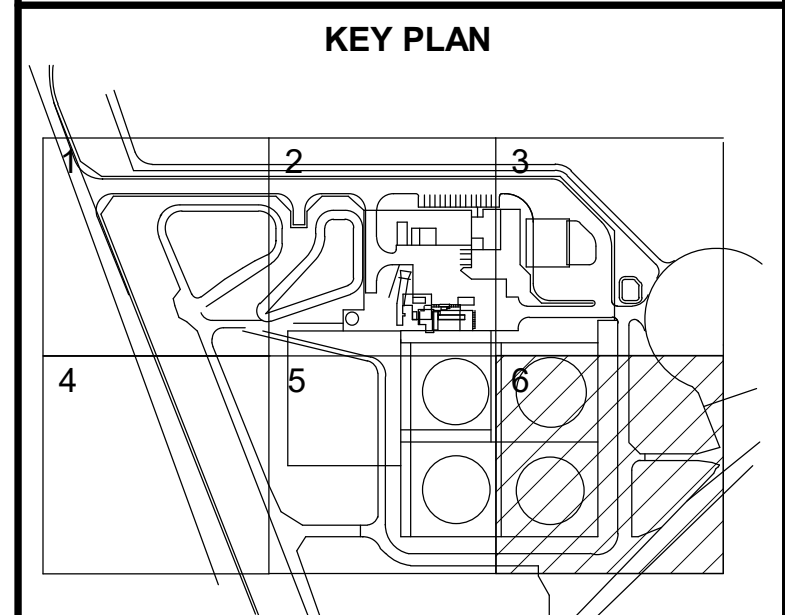
CONC FILLED STL PIPE PILE SEE S-503 TYP



- NOTES:**  
 1. SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.  
 2. ELEVATIONS SHOWN EQUAL DATUM ELEVATION SHOWN ON THE CIVIL DRAWINGS.  
 3. SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STRUCTURES.  
 4. SEE S-501 THROUGH S-503 FOR TYPICAL DETAILS.

**LEGEND:**  
 MOMENT CONNECTION

no.	date	by	ckd	description
A	12/21/23	AJK	KAM	ISSUED FOR PERMIT



ISSUED FOR PERMIT ONLY

**BURNS MEDONNELL**  
 9400 WARD PARKWAY  
 KANSAS CITY, MO 64114  
 816-333-9400  
 Burns & McDonnell Engineering Co, Inc.

date	detailed
11/20/23	M. PATEL
designed	checked
A. KRAL	K. MICHAELIS

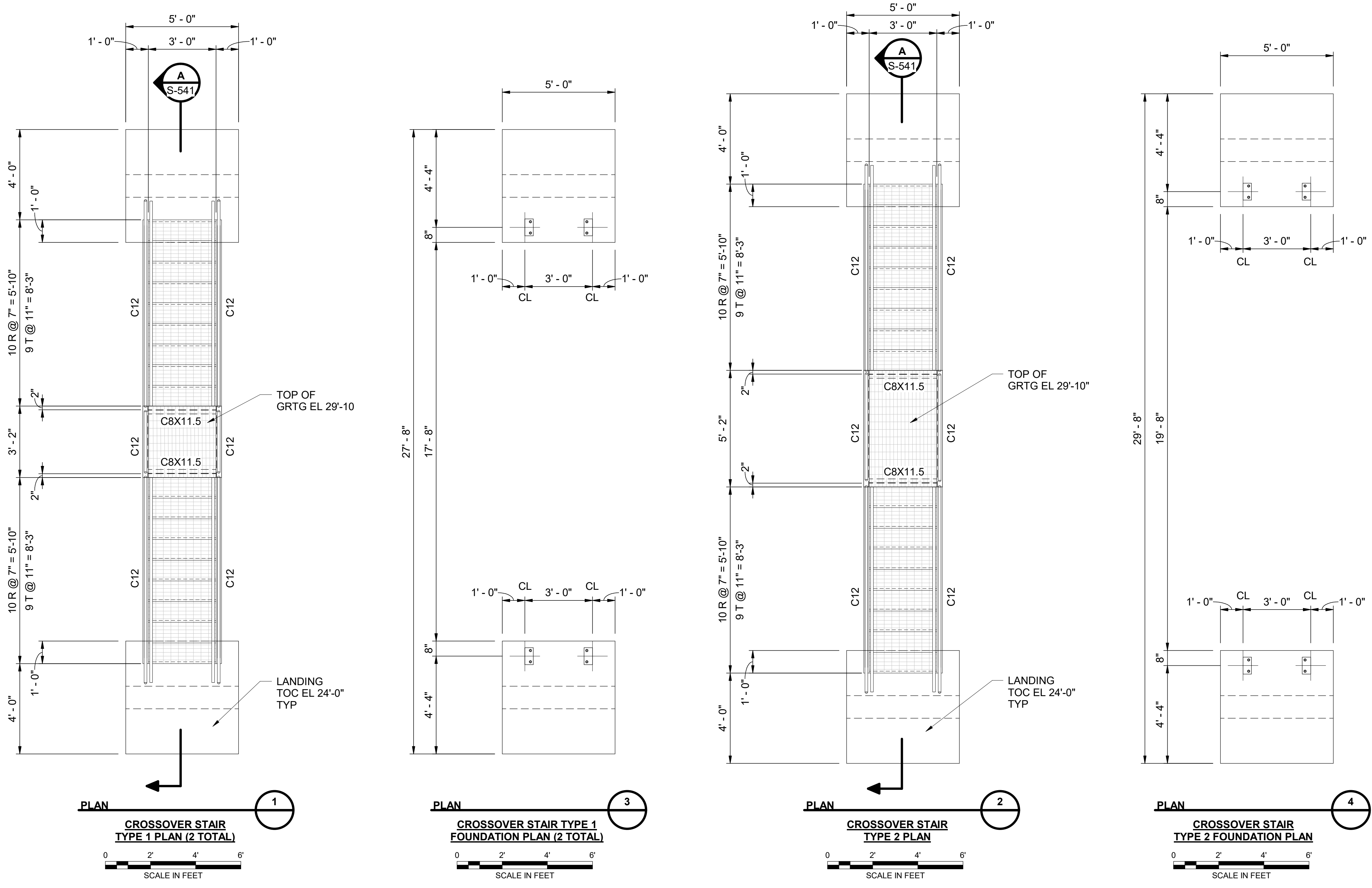
**PDX FUEL COMPANY L.L.C**  
 PORTLAND INTERNATIONAL AIRPORT  
 5000 NE MARINE DR.  
 PORTLAND, OREGON 97218

**PDX FACILITY IMPROVEMENTS**  
 UTILITY EXPANSION LOOP RACK

project	contract
153929	
drawing	rev.
S-539 - A	







- NOTES:**
- SEE S-001 AND S-002 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
  - SEE CIVIL DRAWINGS FOR EXACT LOCATION AND ORIENTATION OF STAIRS.
  - ELEVATION INDICATED EQUAL DATUM ELEVATIONS AS SHOWN ON THE CIVIL DRAWINGS.
  - ALL STRINGERS AND BEAMS ARE C12X20.7 UNLESS NOTED OTHERWISE. PROVIDE BEAM TO BEAM CONNECTION SIMILAR TO DETAIL 2 / S-542.
  - ALL GUARDRAILS, HANDRAILS, STRUCTURAL STEEL, AND COMPONENTS ARE TO BE HOT-DIPPED GALVANIZED.
  - PROVIDE SERRATED-TOP GALVANIZED BAR GRATING TYPE 19-W-4 (1 1/4" X 3/16" BEARING BARS AT 1 3/16" ON CENTER AND CROSS BARS AT 4" ON CENTER). PROVIDE GRATING PANELS OF SIMILAR WIDTHS. BAND ALL ENDS AND OPENINGS. CONSTRUCT STAIR TREADS USING SIMILAR GRATING AND CHECKERED PLATED NOSING.
  - SEE DRAWING S-542 FOR TYPICAL STAIR DETAILS.
  - SEE S-542 FOR GUARDRAIL DETAILS. GUARDRAIL AND / OR POST MAY NOT BE SHOWN IN PLAN FOR CLARITY.
  - PROVIDE 1/2" DIAMETER MINIMUM DRAIN HOLES NEAR BOTTOM OF ALL POSTS. PROVIDE VENT HOLES AS NECESSARY NEAR TOP OF POSTS AND ON UNDERSIDE OF RAILINGS.

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date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

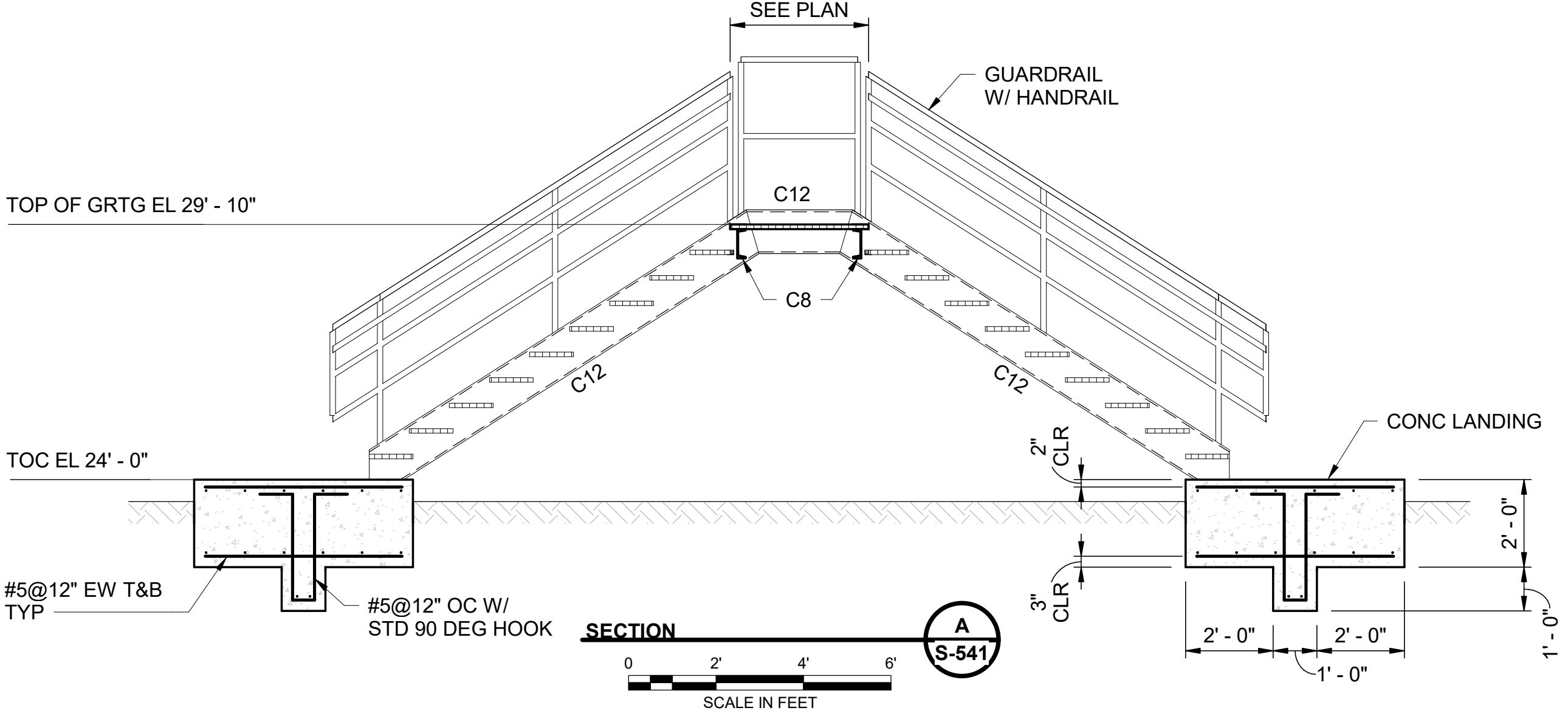
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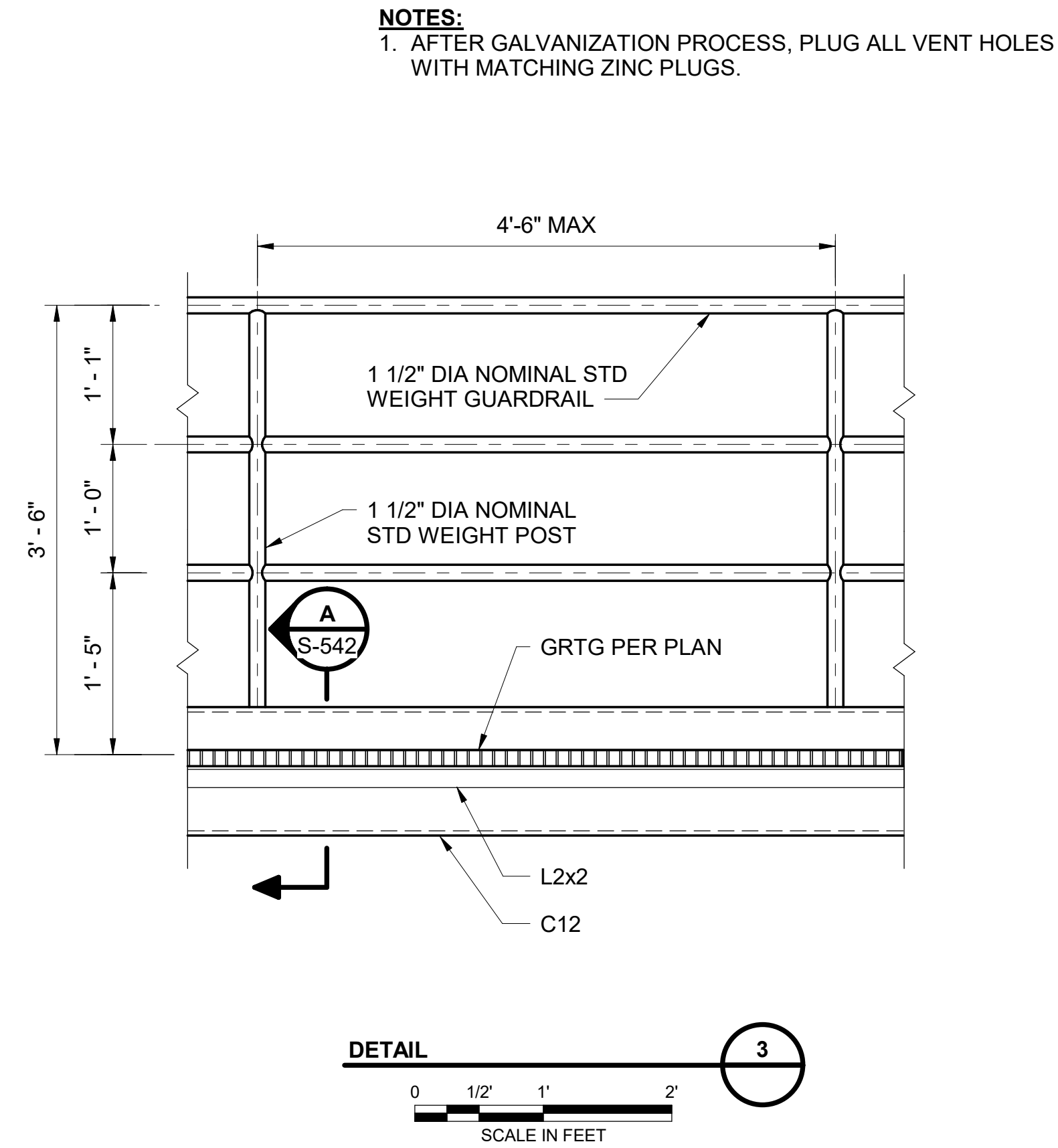
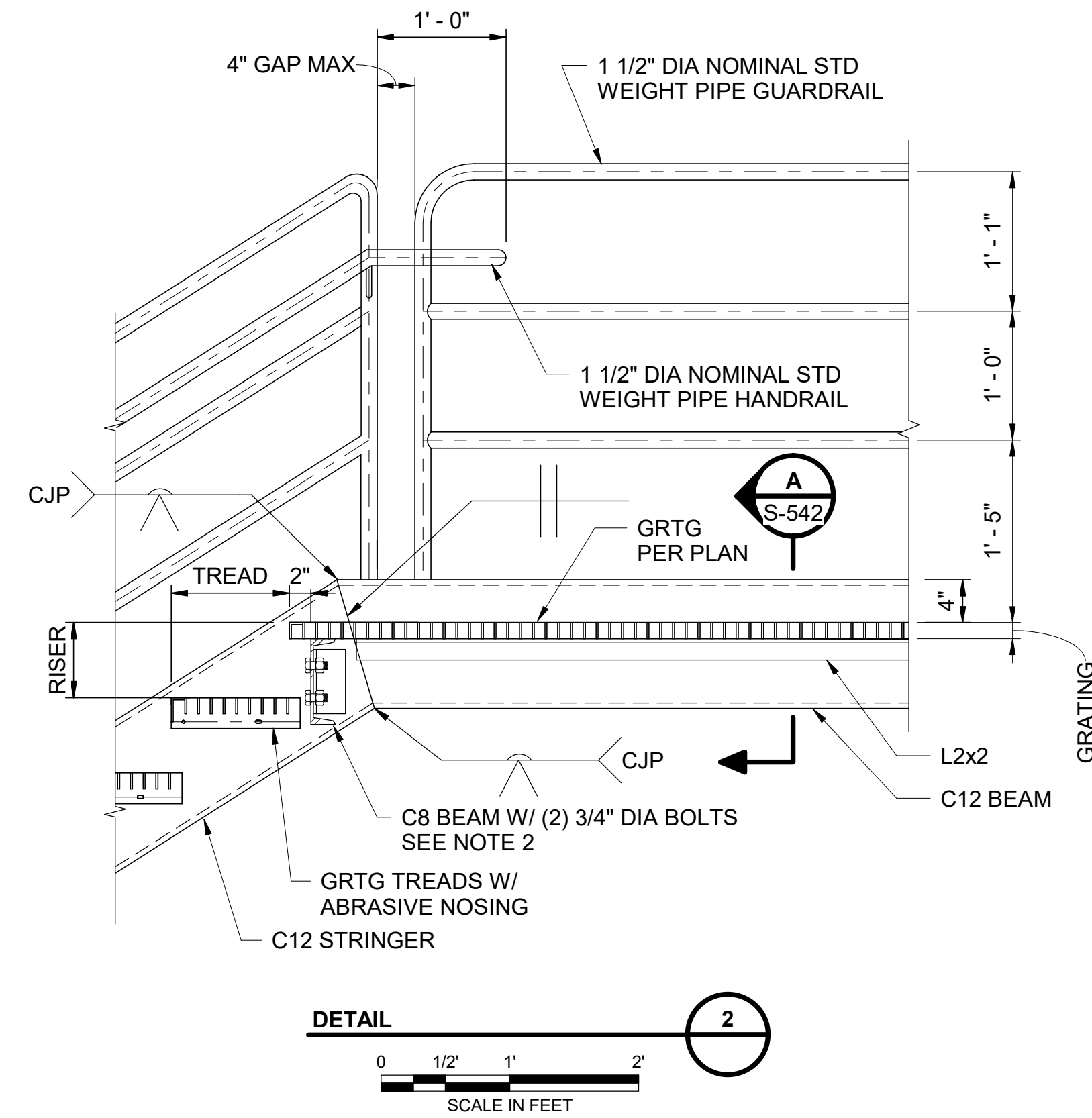
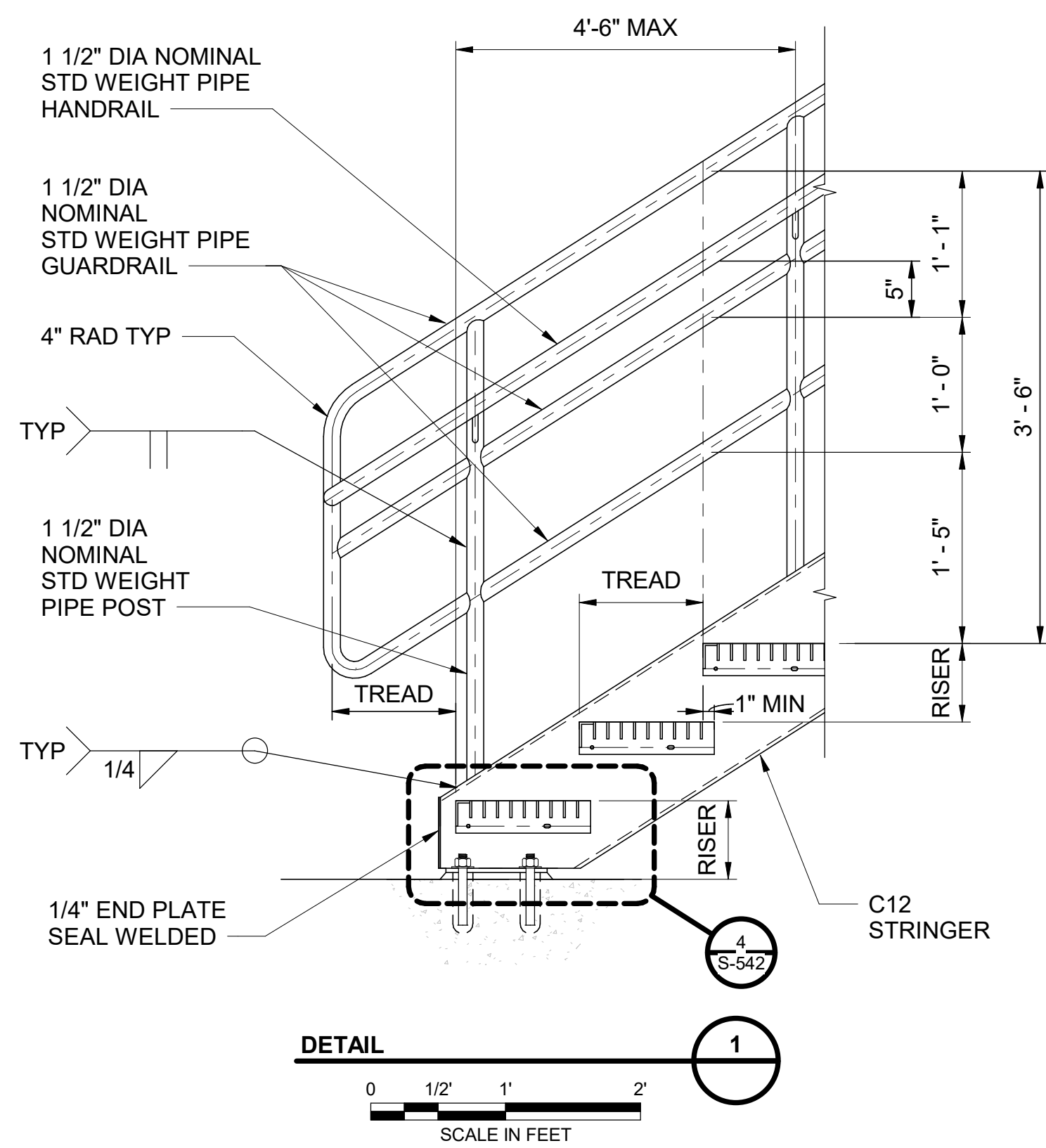
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STAIRS & CROSSOVER - PLAN & SECTIONS

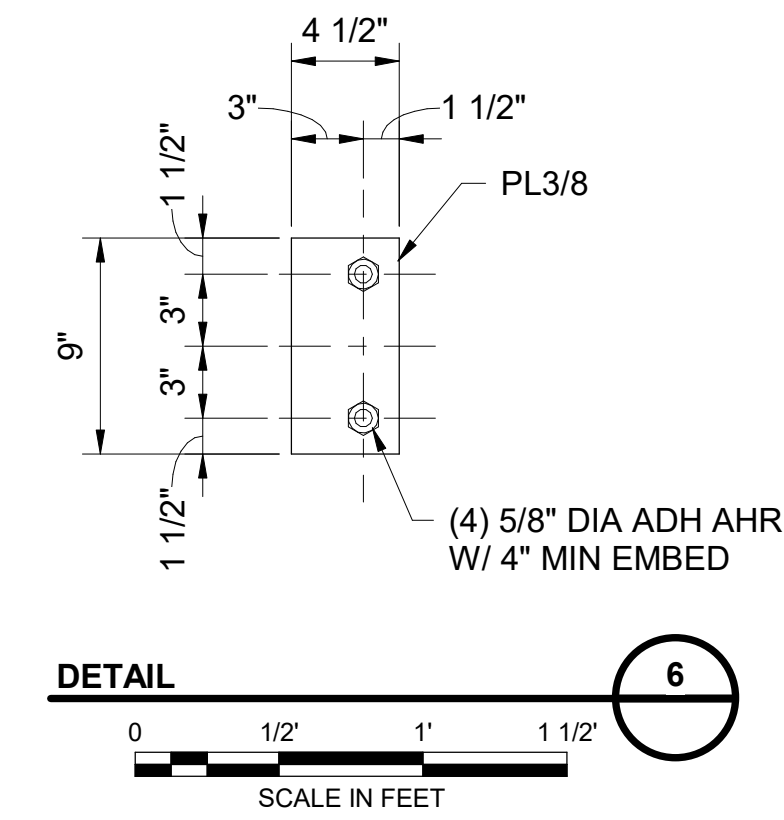
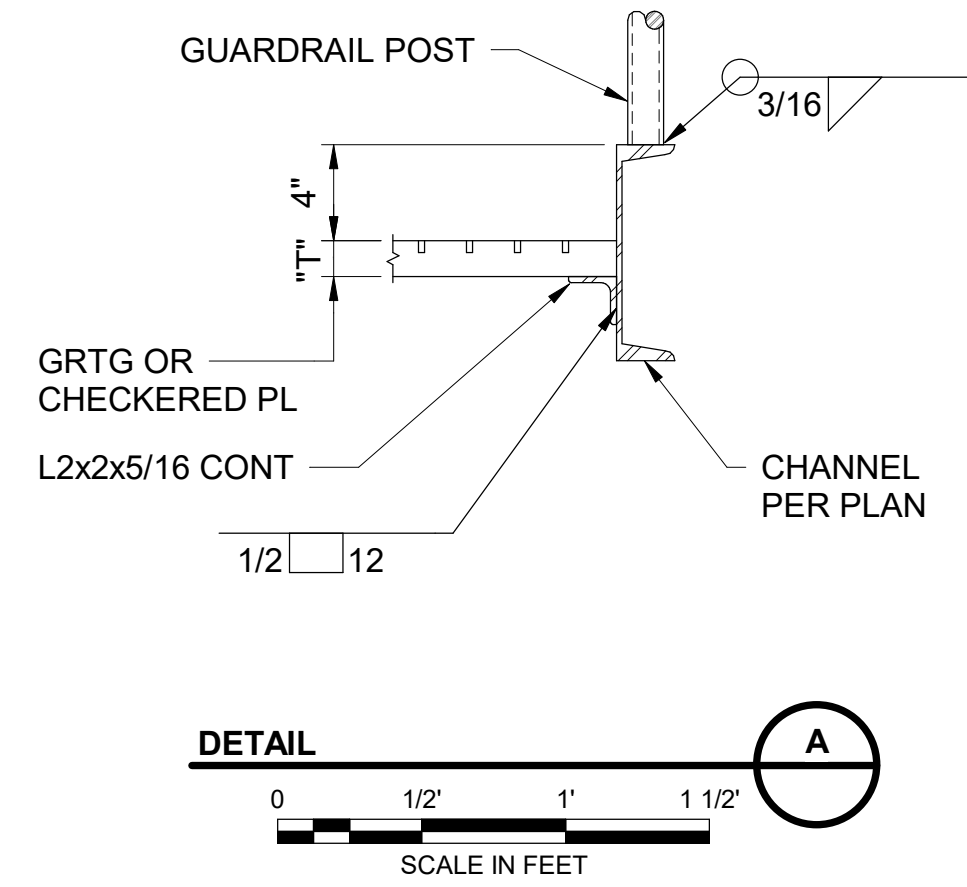
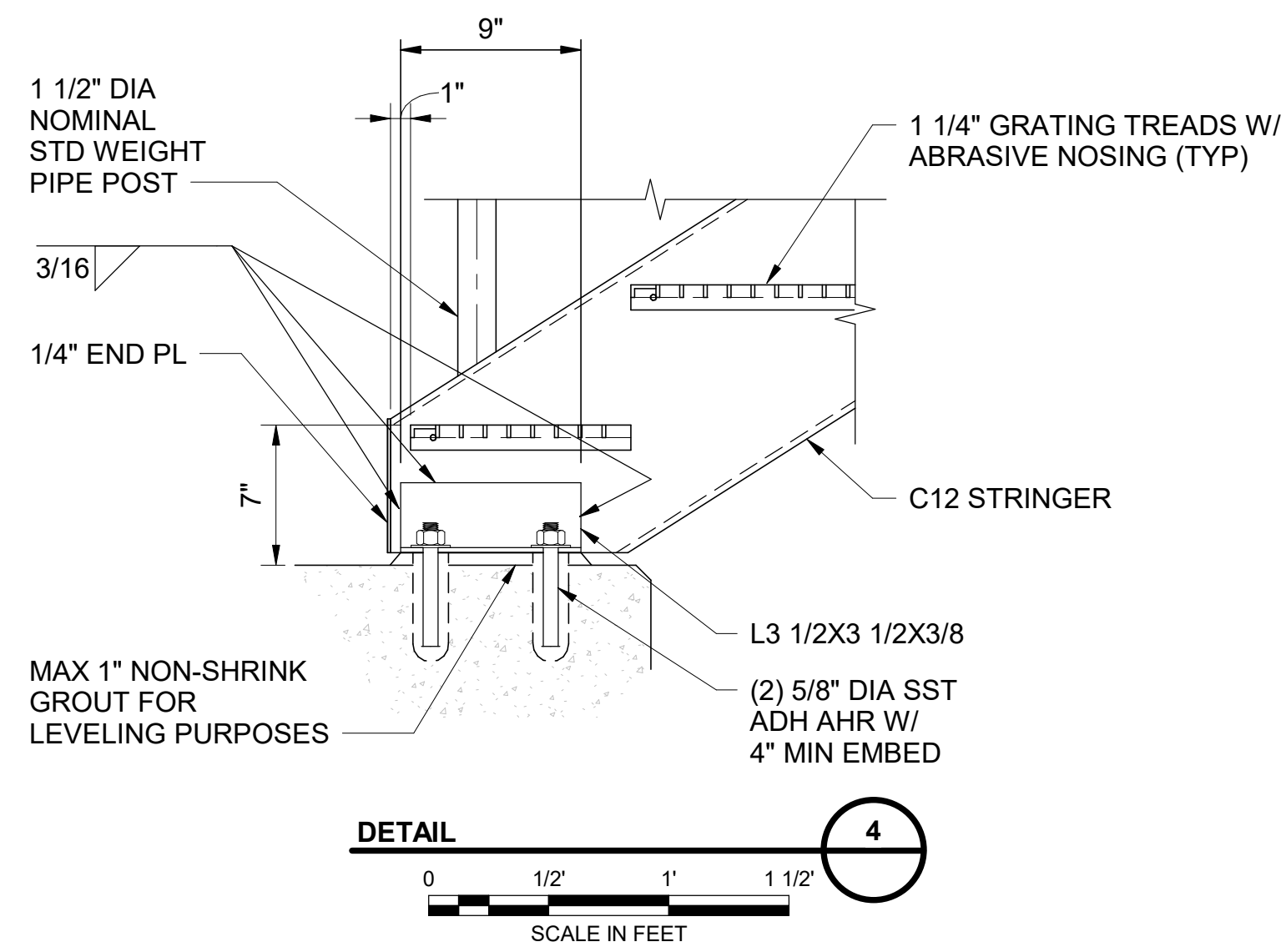
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drawing		rev.	

**S-541 - A**





**NOTES:**  
1. AFTER GALVANIZATION PROCESS, PLUG ALL VENT HOLES WITH MATCHING ZINC PLUGS.



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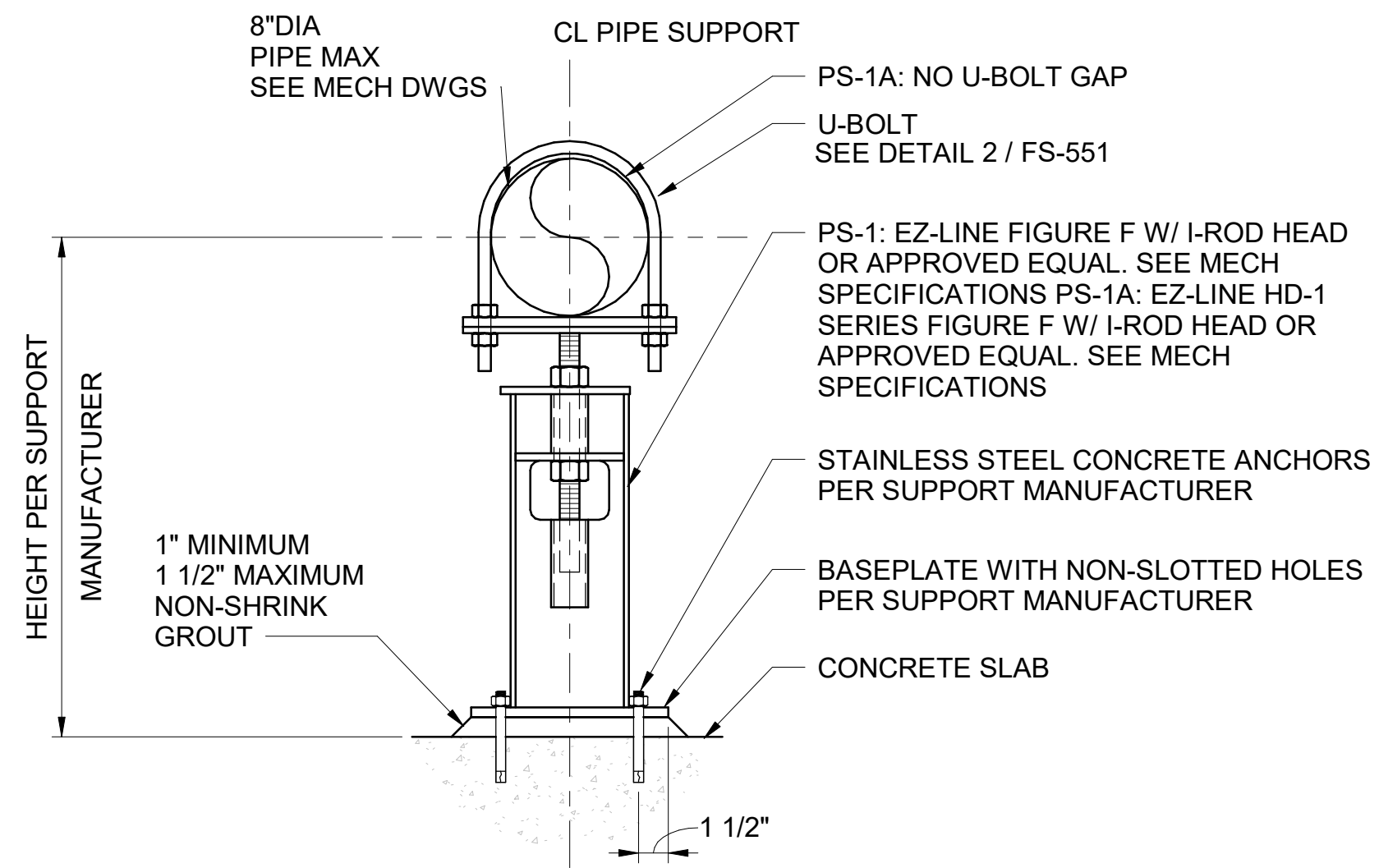
date	6/9/23	detailed	M. PATEL
designed	A. KRAL	checked	K. MICHAELIS

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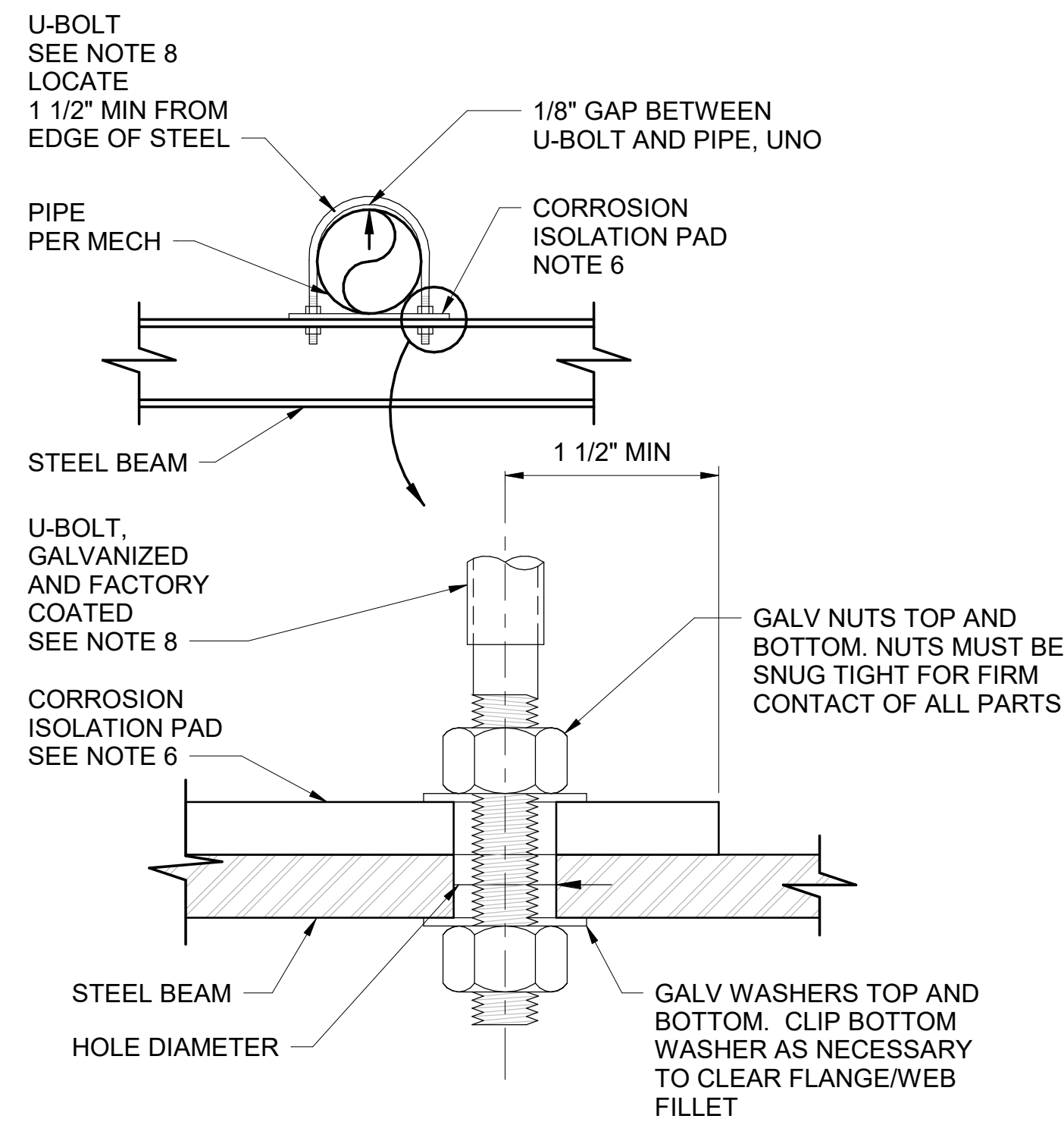
**PDX FACILITY IMPROVEMENTS**  
STAIRS & CROSSOVER - SECTIONS & DETAILS

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<b>S-542 - A</b>			
file			

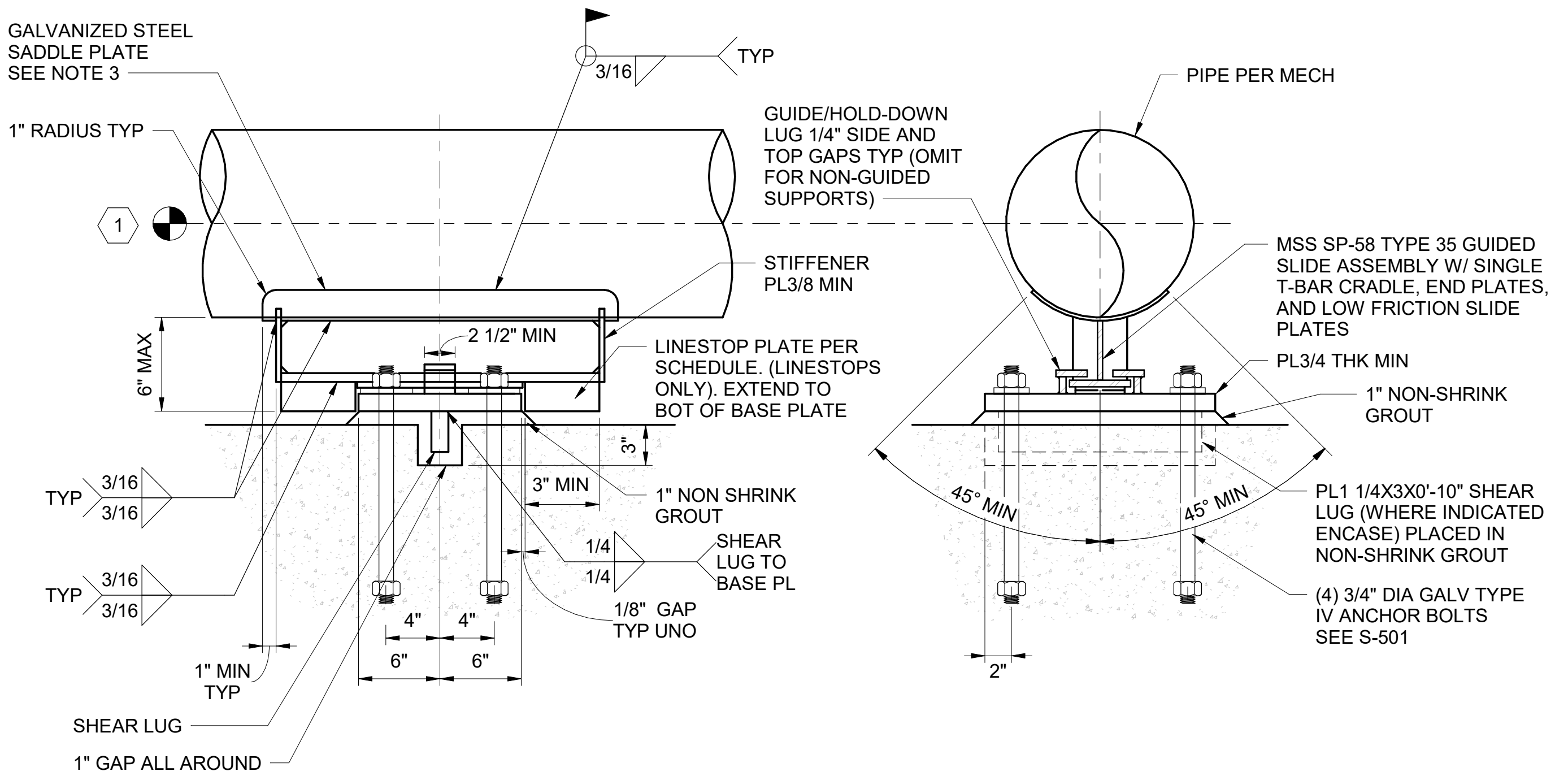




**DETAIL 1**  
**PIPE SUPPORT TYPE PS-1 (V-STOP)**  
**PIPE SUPPORT TYPE PS-1A (GUIDE)**  
 NOT TO SCALE



**DETAIL 2**  
**TYPICAL U-BOLT INSTALLATION**  
 NOT TO SCALE



GUIDED SLIDE/LINESTOP ASSEMBLY				
PIPE SIZE (IN)	LINESTOP PLATE THICKNESS	END PLATE THICKNESS	MIN LATERAL CAPACITY (KIP)	MAX LINESTOP FORCE (KIP)
3 - 4	3/8"	3/8"	1.0	1.0
6 - 10	1/2"	1/2"	2.0	3.0
12 - 18	3/4"	3/4"	3.0	11.0

**DETAIL 3**  
**TYPICAL GUIDED SLIDE / LINESTOP ASSEMBLY ON CONCRETE SUPPORT**  
 NOT TO SCALE

- NOTES:**
- SEE DRAWING S-001 FOR STRUCTURAL GENERAL NOTES.
  - SEE MECHANICAL DRAWINGS FOR PIPE SUPPORT SIZES, SUPPORT TYPES AND LOCATIONS.
  - PROVIDE 1/4" THICK GALVANIZED STEEL SADDLE PLATE AT ALL WELDED SUPPORTS FOR CARBON STEEL PIPES 6" AND LARGER IN DIAMETER. PROVIDE FINISH COAT THE SAME AS THE PIPE COATING. GALVANIZED SURFACES MUST BE PROPERLY PREPARED AND PRIMED TO RECEIVE PAINT COATING. EXTEND PAINT COATING 1" MIN ONTO THE VERTICAL STIFFENER PLATE BELOW PIPES. UNLESS INDICATED OTHERWISE, ALL STRUCTURAL STEEL PIPE SUPPORTS AND ASSEMBLIES MUST BE HOT-DIP GALVANIZED AFTER ASSEMBLY. WHERE SUPPORT STEEL COMPONENTS WILL BE WELDED TO STAINLESS STEEL PIPES, THE COMPONENTS WELDED TO THE PIPES MUST BE OF STAINLESS STEEL MATERIAL. PROVIDE SACRIFICIAL POISON PLATES AS NECESSARY. PROVIDE VENT HOLES AS REQUIRED FOR GALVANIZING. LOCATE VENT HOLES ON THE UNDERSIDE OF HORIZONTAL MEMBERS WHERE POSSIBLE. REPAIR GALVANIZING AROUND FIELD WELDS USING 2 COATS OF GALVANIZING REPAIR PAINT (30 MIL DRY FILM THICKNESS EACH).
  - WHERE WELDED CONSTRUCTION WILL BE USED, WELD SIZE MUST BE ADJUSTED ACCORDINGLY PER AWS D1.1 AND ASME B31.3 AS APPLICABLE TO SUIT THE WALL THICKNESS OF THE PIPES BEING WELDED. ALL WELDS MUST BE CONTINUOUS (SEAL WELDED MINIMUM) FOR CORROSION PROTECTION PURPOSES. CORROSION ISOLATION PADS ARE REQUIRED AT ALL FUEL PIPES TO SUPPORT INTERFACES, UNLESS INDICATED OTHERWISE. CORROSION ISOLATION PADS MUST BE INSTALLED ONLY AFTER PIPES HAVE BEEN COATED (WHERE APPLICABLE).
  - TEFLON (PTFE) IS AN ACCEPTABLE CORROSION ISOLATION MATERIAL. DO NOT USE ALTERNATE LOW FRICTION MATERIALS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
  - NOMINAL PAD THICKNESS MUST BE 1/4" MIN (UNO).
  - UNLESS NOTED OTHERWISE, PAD BEARING LENGTHS MUST BE AT LEAST 4" MINIMUM. PADS DO NOT NEED TO BE WIDER THAN THE BEAM OR CHANNEL FLANGE TO WHICH THEY ARE ATTACHED TO. PADS MUST BE CENTERED (+/- 1") OVER W-SHAPE BEAM CENTERLINES AND FLUSH WITH THE BACK OF C SHAPE CHANNELS, UNLESS INDICATED OR NOTED OTHERWISE.
  - UNLESS INDICATED OTHERWISE, PADS MUST BE ATTACHED TO STEEL SUPPORTS WITH #12 TEK TYPE STAINLESS STEEL SCREWS. USE 2 SCREWS PER PIPE, ONE EACH SIDE, FOR PIPES UP TO AND INCLUDING 8" NOMINAL DIAMETER. USE 4 SCREWS PER PIPE, TWO EACH SIDE, FOR 10" NOMINAL DIAMETER AND LARGER PIPES. PLACE SCREWS AT 1/2 THE PIPE DIAMETER, BUT NOT LESS THAN 3", FROM THE PIPE CENTERLINE. SCREW CENTERLINES MUST BE AT LEAST 3/4" FROM THE PAD EDGES. BOLTS (1/4" DIAMETER SAE GRADE 5) MAY BE USED INSTEAD OF SCREWS. POWDER ACTUATED PINS (I.E. HILTI X-U, OR APPROVED EQUAL) WITH 5/8" WASHERS MAY BE USED INSTEAD OF SCREWS.
  - SCREWS FOR THE CORROSION ISOLATION PADS MAY BE OMITTED IF THE U-BOLTS ARE PLACED THROUGH THE PADS. BOLT HOLES MUST BE AT LEAST 3/4" CLEAR FROM THE PAD EDGES AND THE PADS MUST BE LAPPED OVER W-SHAPE BEAM CENTERLINES AT EAST 1". OVERSIZED CORROSION ISOLATION PADS MAY BE NEEDED TO SATISFY THESE REQUIREMENTS.
  - INDIVIDUAL PADS MAY BE USED FOR EACH PIPE, OR CONTINUOUS STRIPS MAY BE USED FOR MULTIPLE PIPES.
  - SLIDE PLATES MUST BE A TWO-PLATE SYSTEM WITH LOW-FRICTION REINFORCED POLYMER MATERIAL FACTORY BONDED TO BACKING PLATES. STATIC COEFFICIENT OF FRICTION MUST NOT EXCEED 0.06.
  - UNLESS INDICATED OTHERWISE, ALL U-BOLTS MUST CONFORM TO MSS SP-58 TYPE 24, AND THE FOLLOWING:
    - U-BOLT SIZE MUST VARY IN ACCORDANCE WITH THE PIPE SIZE AS INDICATED IN THE TABLE BELOW.
    - ALL U-BOLTS MUST BE DOUBLE-NUTTED AS INDICATED IN THE DETAILS.
    - UNLESS INDICATED OTHERWISE, U-BOLTS MUST BE INSTALLED WITH 1/8" GAP TO THE TOP OF THE PIPES (SNUG ON SIDES).
    - ALL U-BOLTS MUST BE GALVANIZED CARBON STEEL (UNO), THEN FACTORY-COATED WITH 1/16" THICK MINIMUM SEAMLESS NON-METALLIC LOW FRICTION THERMOPLASTIC OR POLYOLEFIN COATING FOR CORROSION ISOLATION.
    - U-BOLTS MAY BE FIELD LOCATED AND THE HOLES FIELD DRILLED. REPAIR GALVANIZING AT FIELD DRILLED HOLES USING 2 COATS OF GALVANIZING REPAIR PAINT.
    - SUBMIT U-BOLT PRODUCT DATA FOR APPROVAL.

U-BOLT SIZE TABLE		
PIPE SIZE (in.)	U-BOLT SIZE (in.)	MAX HOLE DIAMETER (in.)
< 2	3/8	1/2
2 1/2 - 5	1/2	5/8
6 - 8	5/8	13/16
10	3/4	15/16
12 - 16	7/8	1 1/16
≥ 18	1	1 1/4

- WHERE USED, COMPOUND FOR ALL ADHESIVE ANCHORS MUST BE FUEL RESISTANT.
- WHERE GAPS ARE INDICATED, SUBCONTRACTOR MUST VERIFY THAT THE PIPES AND PIPE SUPPORT ASSEMBLIES ARE CONSTRUCTED AND INSTALLED WITH THE PROPER GAPS ON EACH SIDE. ASSUMED INSTALLATION TEMPERATURE (PIPE SURFACE) WAS 75 DEG-F FOR GAP MEASUREMENT PURPOSES. PROVIDE SHIMS AND BLOCKING AS NECESSARY TO MAINTAIN THE REQUIRED GAPS THROUGHOUT CONSTRUCTION.
- PROVIDE ANTI-SEIZE COMPOUND ON ALL MATING SURFACES OF THREADED STAINLESS STEEL FASTENERS.
- SUBMIT PIPE SUPPORT AND ASSEMBLY DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.

**KEYED NOTES:**

① COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR THE LOCATIONS, DIMENSIONS, AND ELEVATIONS OF PIPING AND REQUIRED SUPPORTS.

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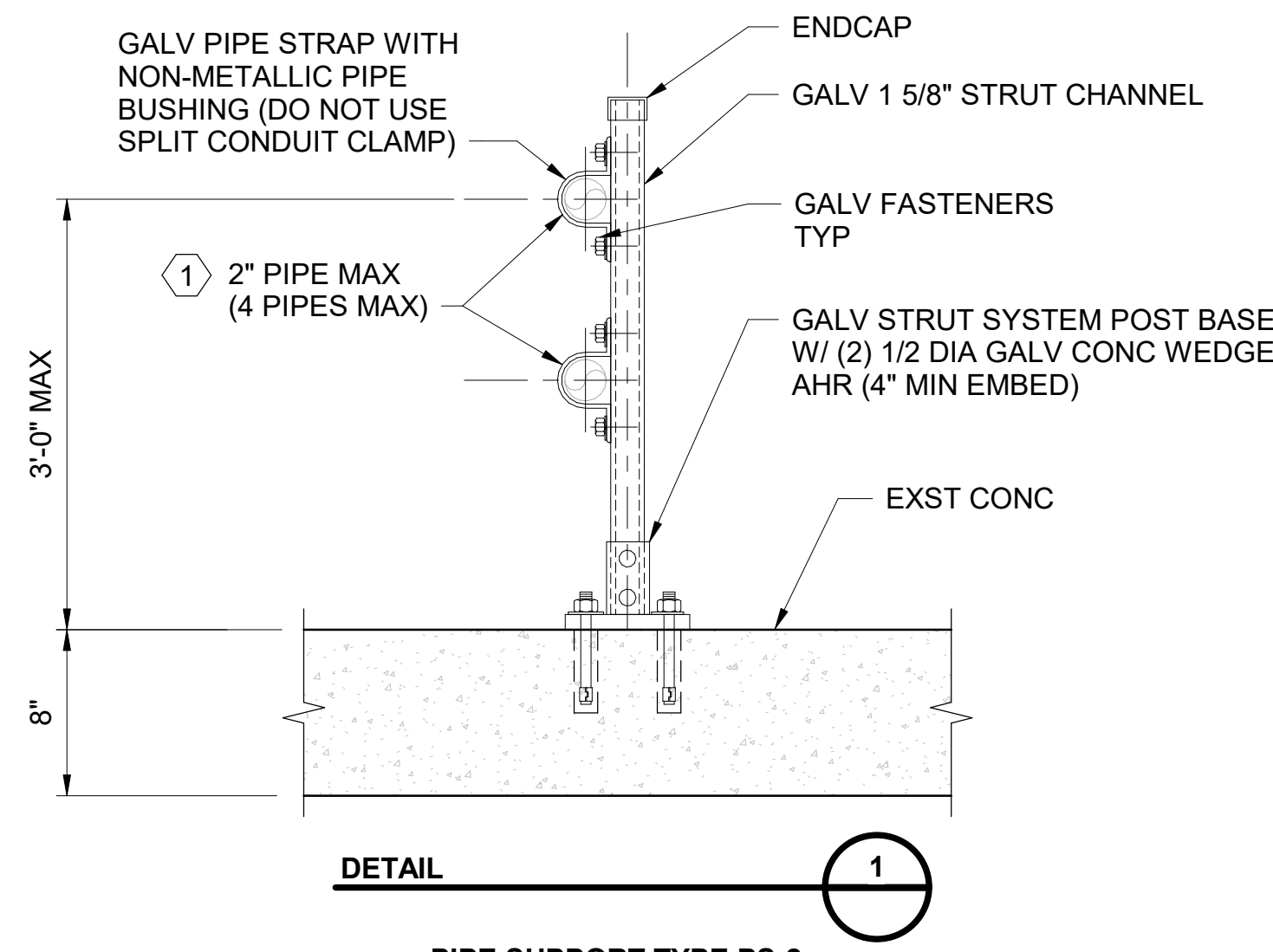
date	6/9/23	detailed	M. PATEL
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**PDX FACILITY IMPROVEMENTS**  
 PIPE SUPPORT DETAILS

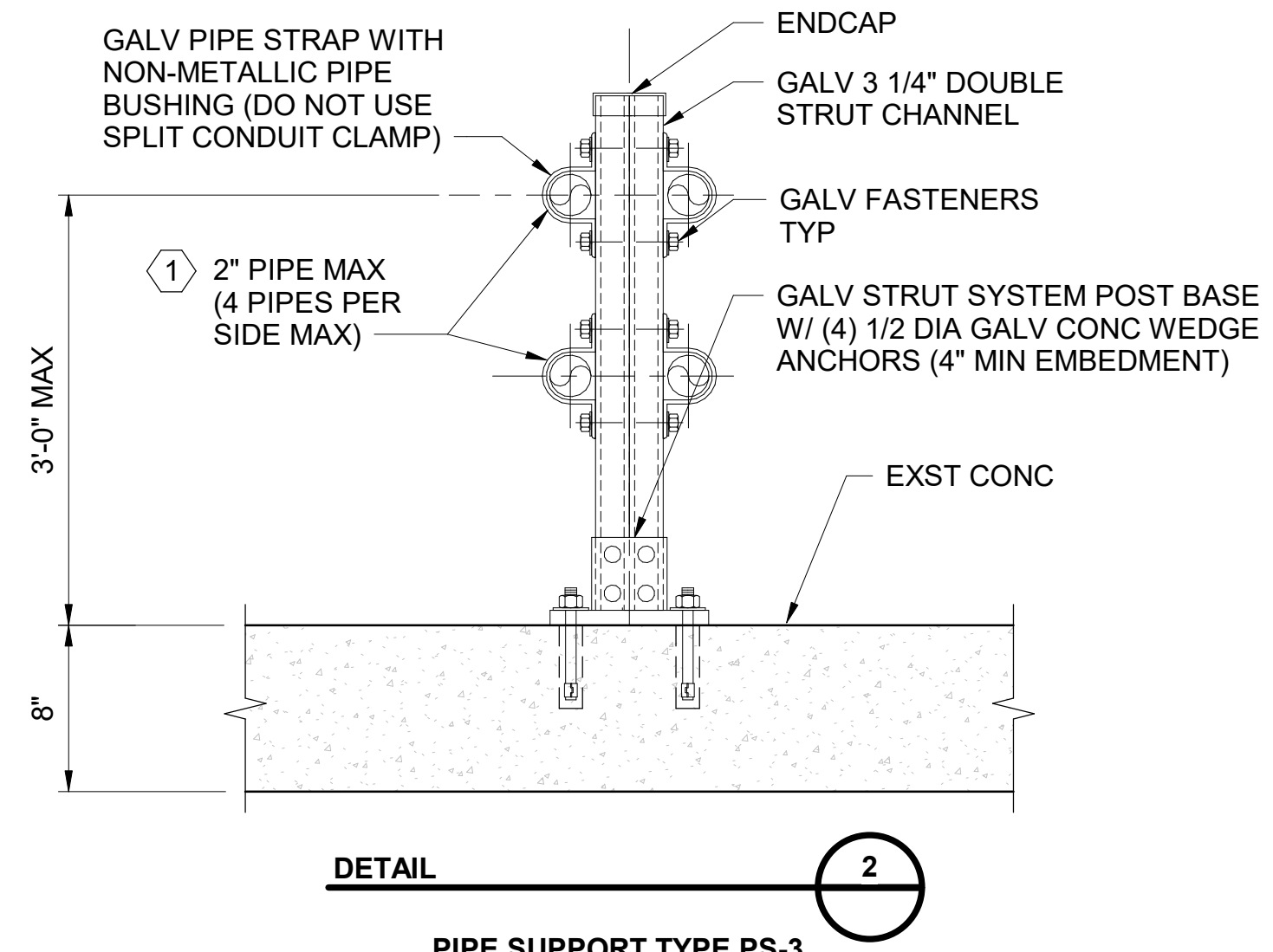
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<b>S-551 - A</b>			





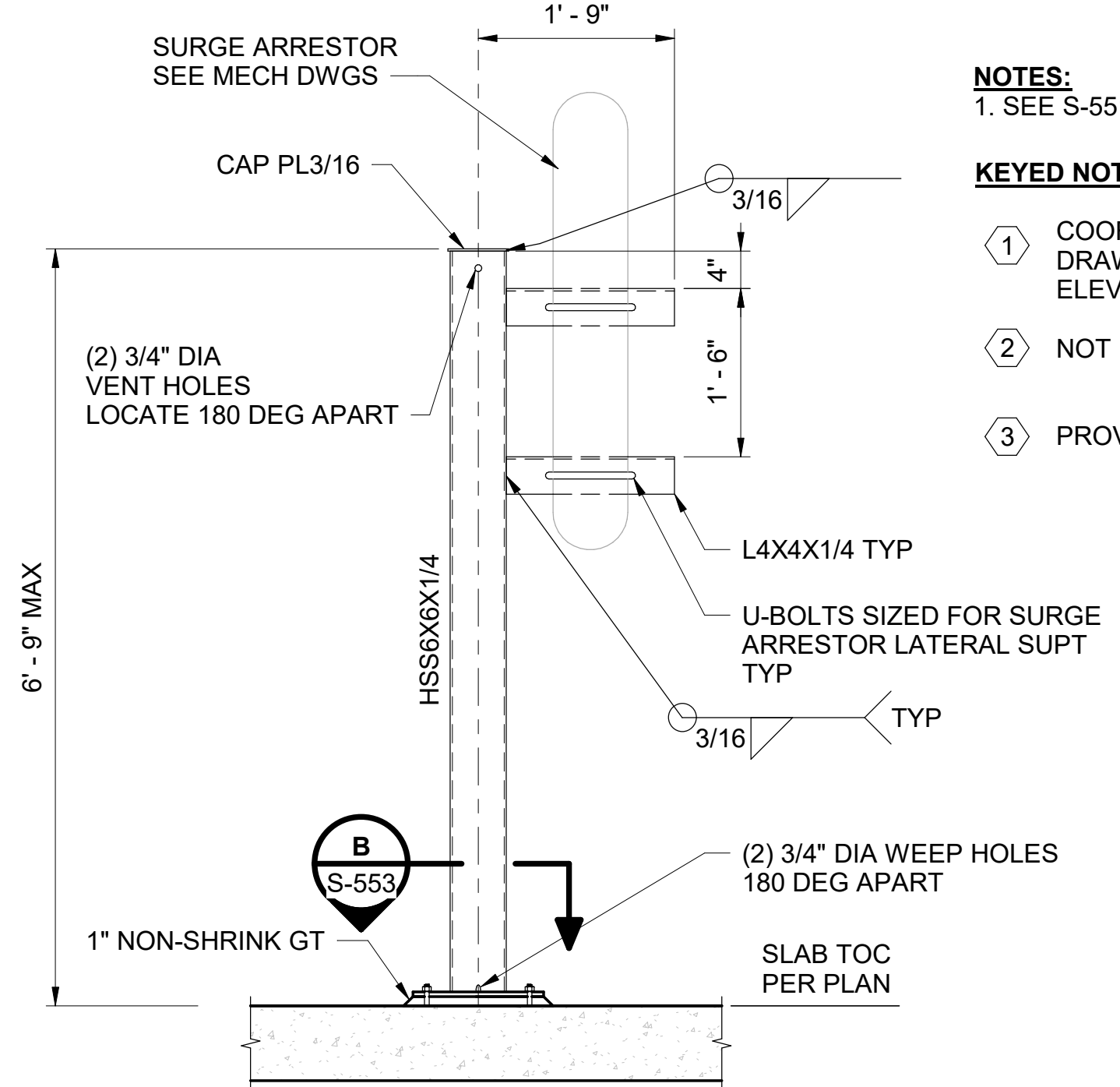
**PIPE SUPPORT TYPE PS-2**

NOT TO SCALE



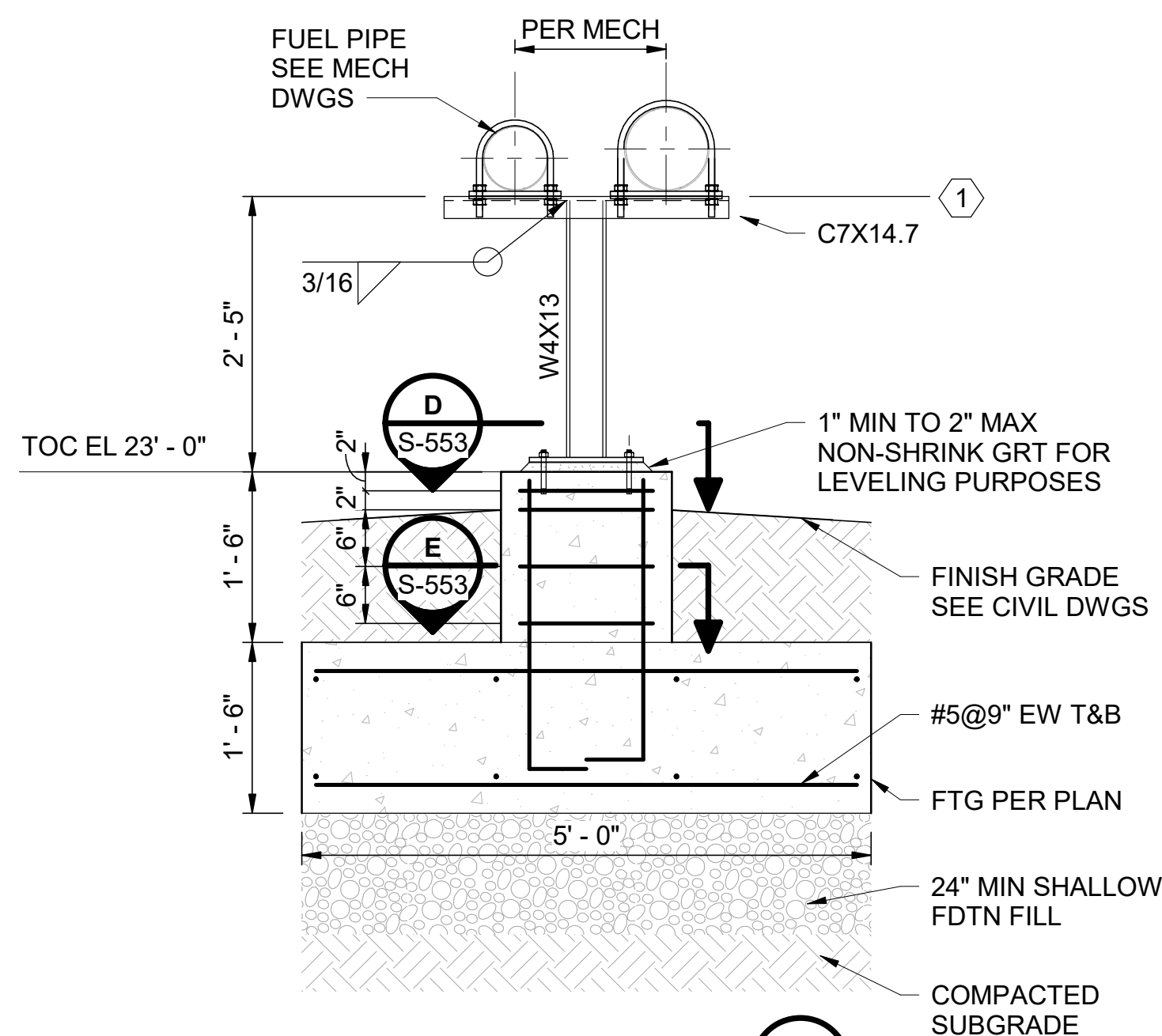
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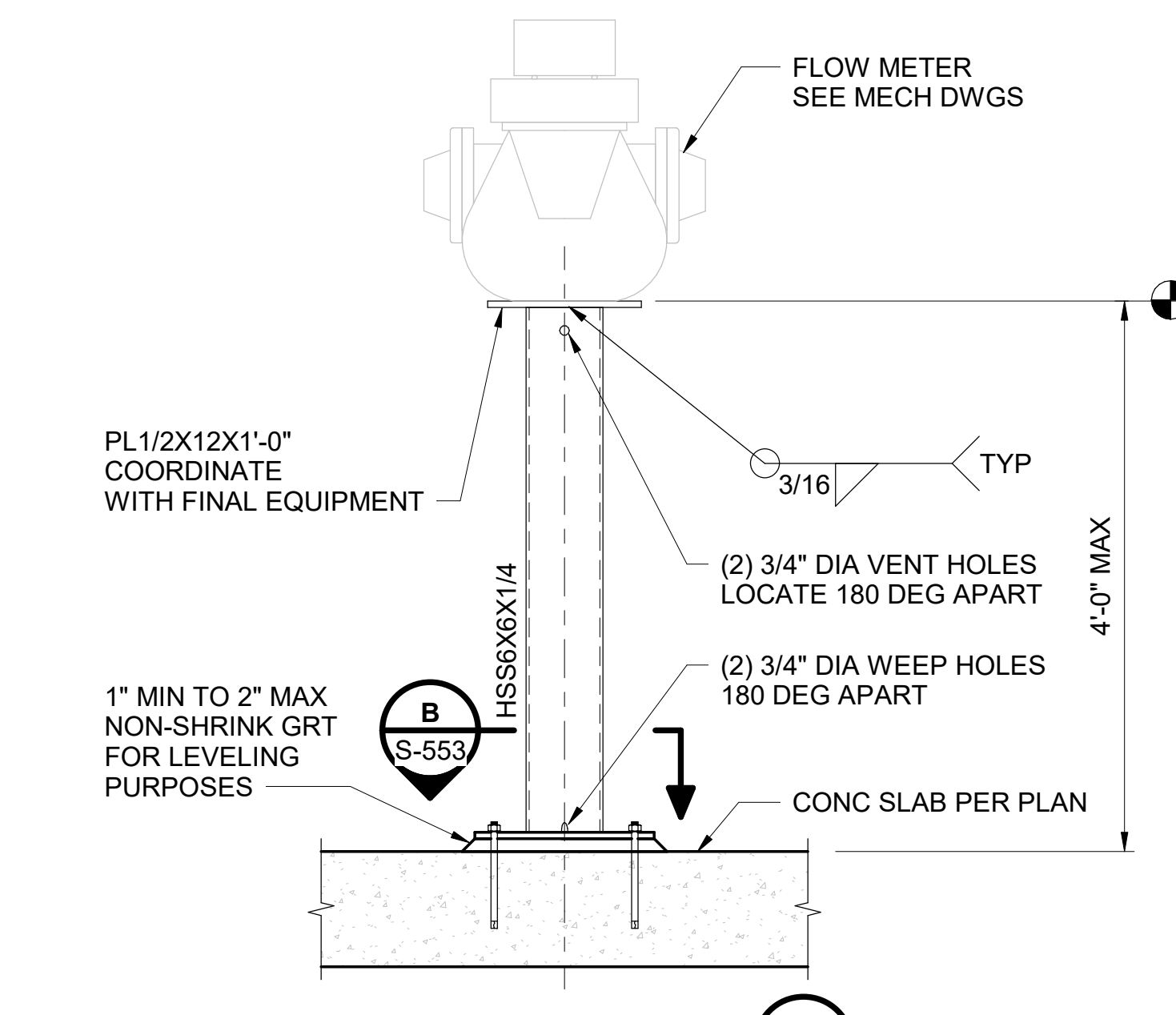
**PIPE SUPPORT TYPE PS-4 (SURGE ARRESTOR)**

NOT TO SCALE



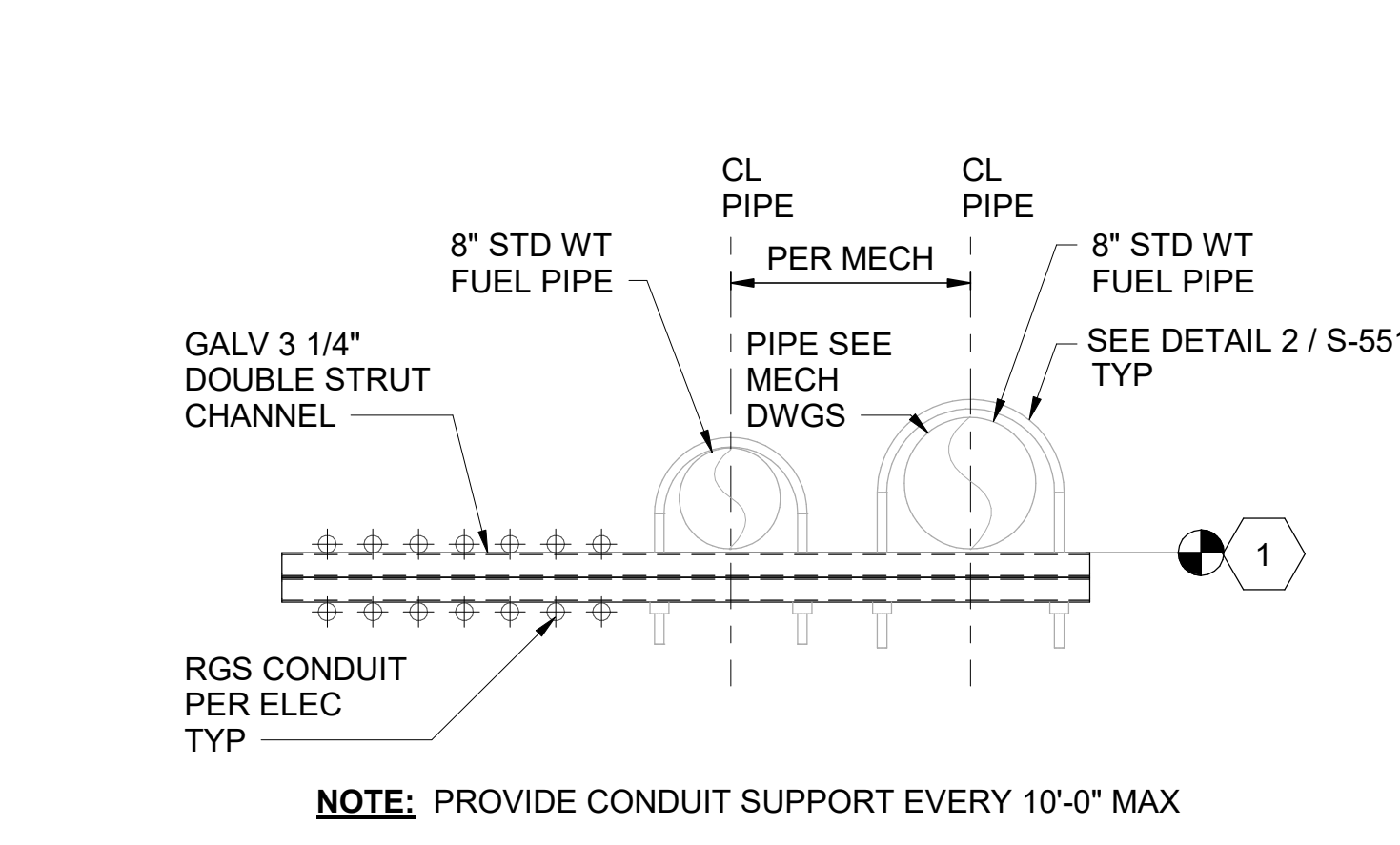
**PIPE SUPPORT TYPE PS-5**

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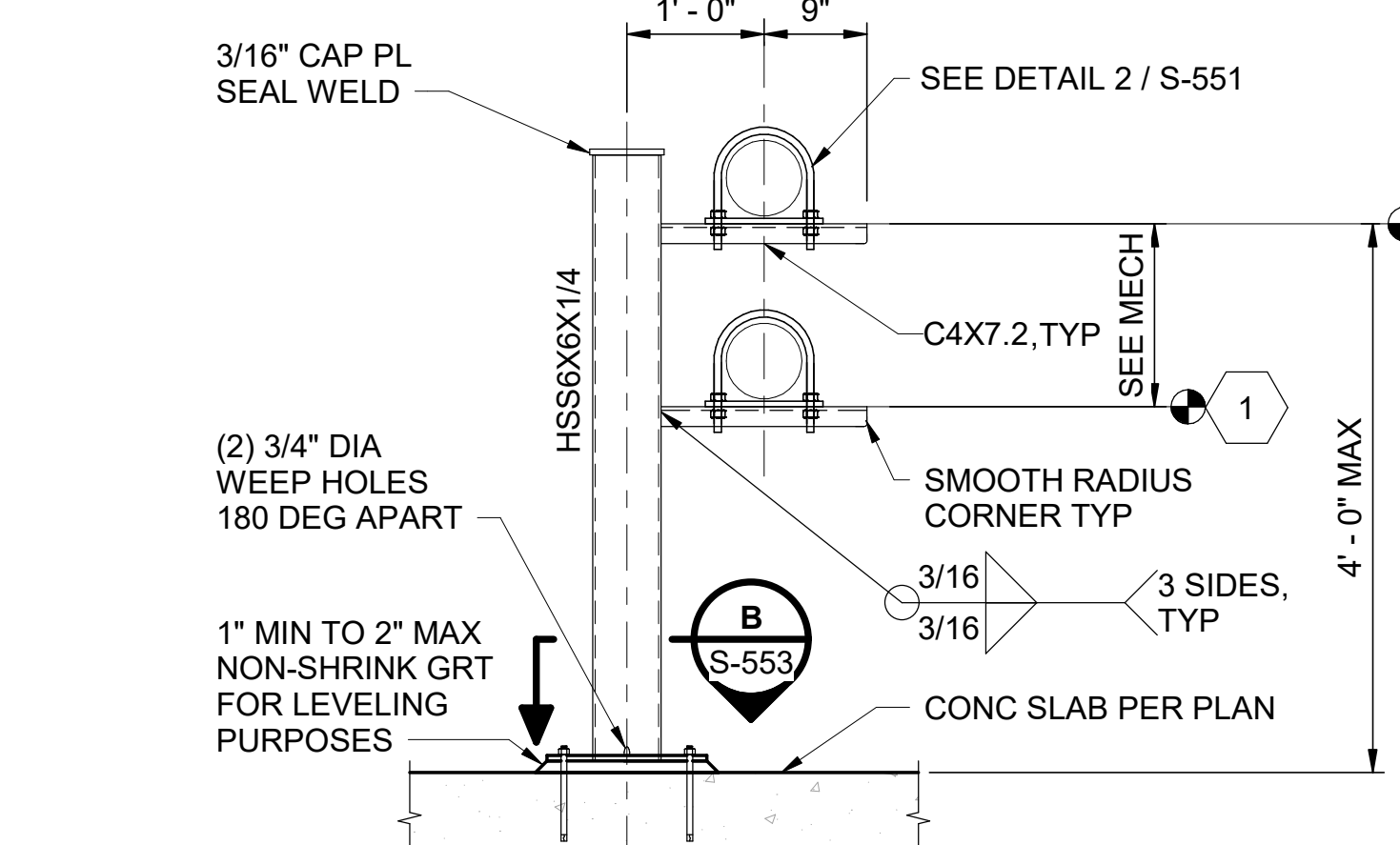
**PIPE SUPPORT TYPE PS-6 (METER SUPPORT)**

NOT TO SCALE



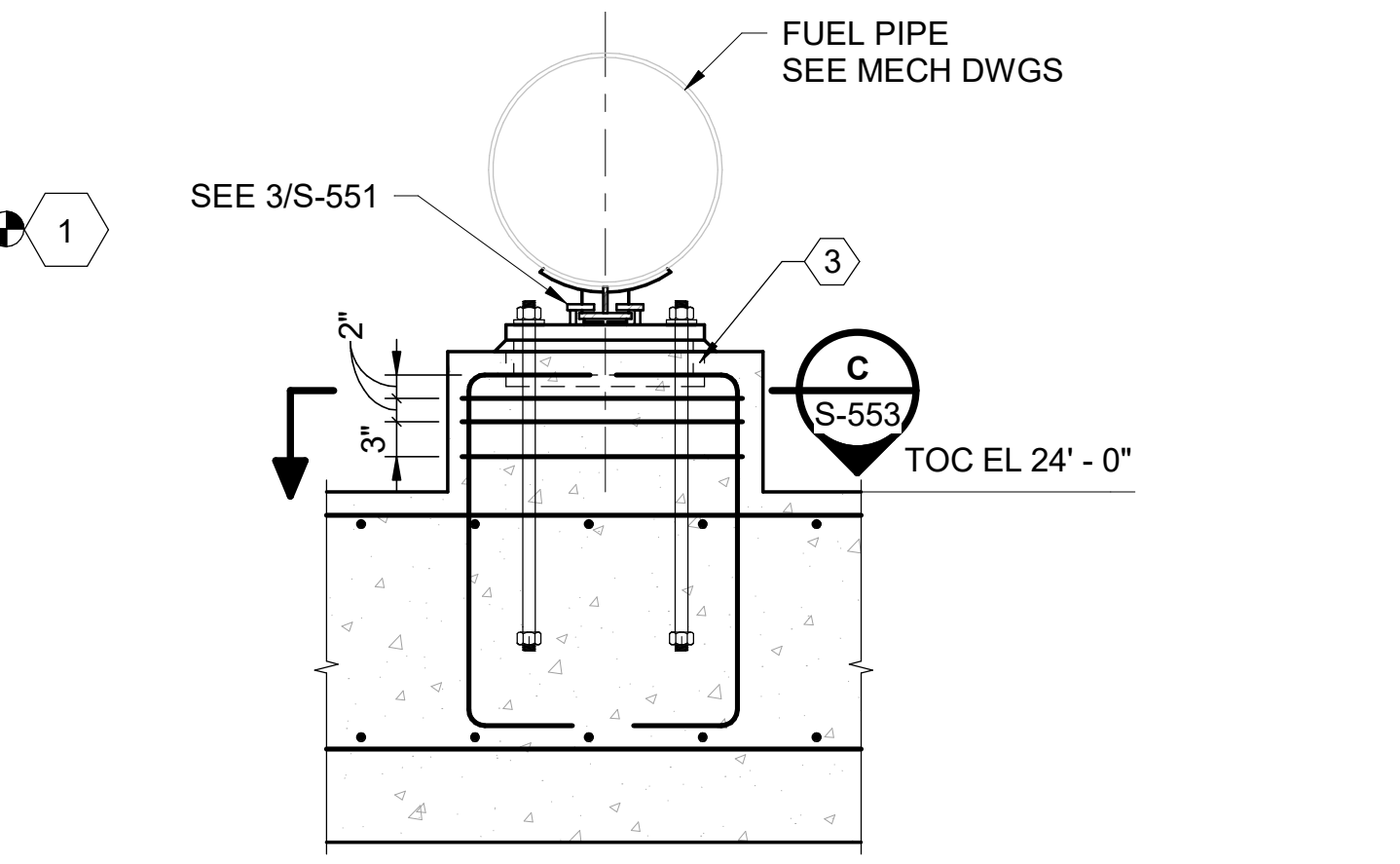
**PIPE SUPPORT TYPE PS-7**

NOT TO SCALE



**PIPE SUPPORT TYPE PS-8**

NOT TO SCALE



**PIPE SUPPORT TYPE PS-9 (LINESTOP)**

NOT TO SCALE

- NOTES:**  
1. SEE S-551 FOR PIPE SUPPORT NOTES AND KEYED NOTES.
- KEYED NOTES:**
- ① COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR THE LOCATIONS, DIMENSIONS, AND ELEVATIONS OF PIPING AND REQUIRED SUPPORTS.
  - ② NOT USED
  - ③ PROVIDE SHEAR LUG PER 3/S-551.

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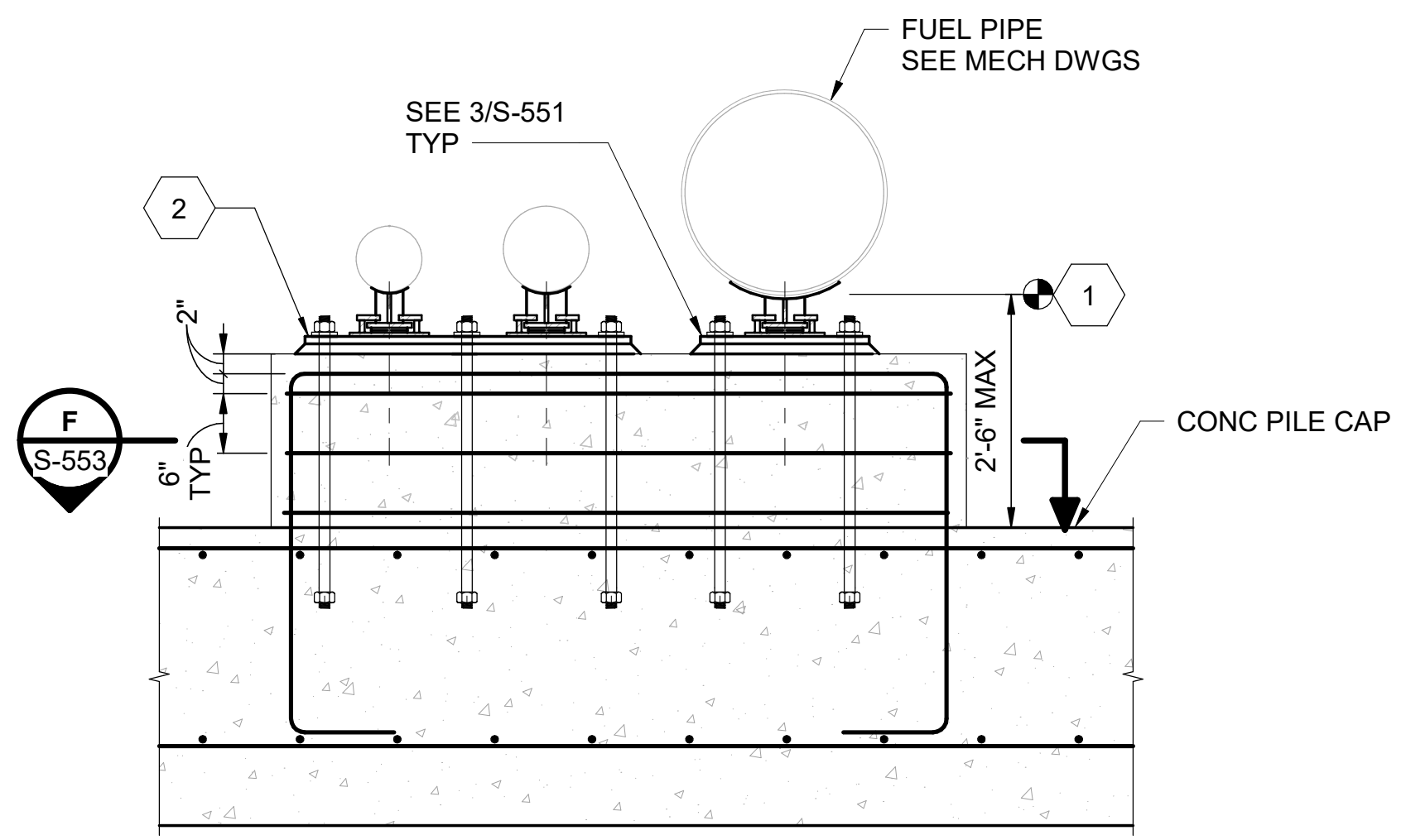
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**PDX FACILITY IMPROVEMENTS**  
 PIPE SUPPORT DETAILS

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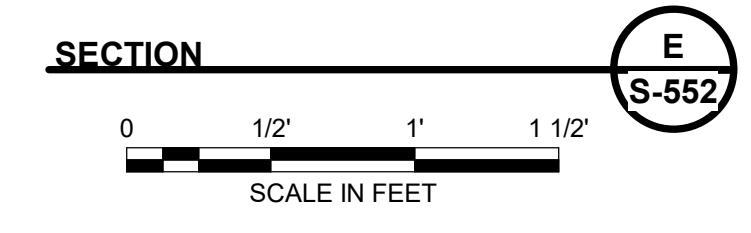
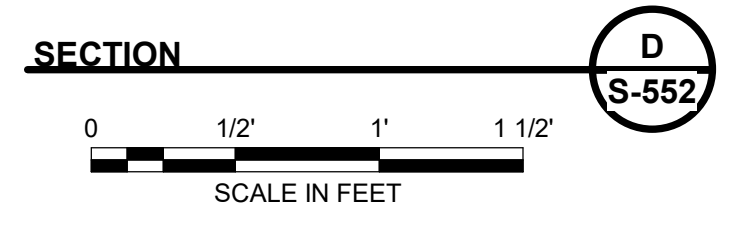
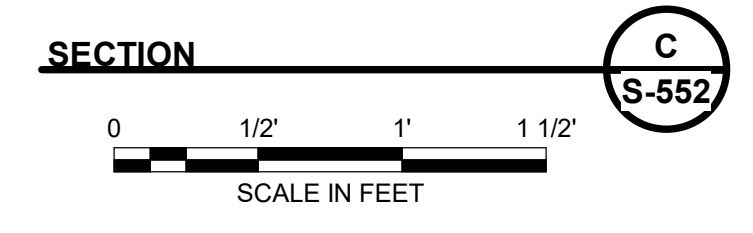
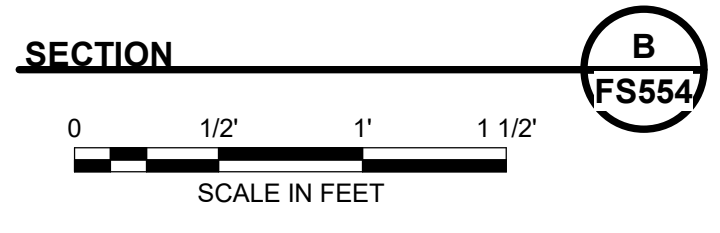
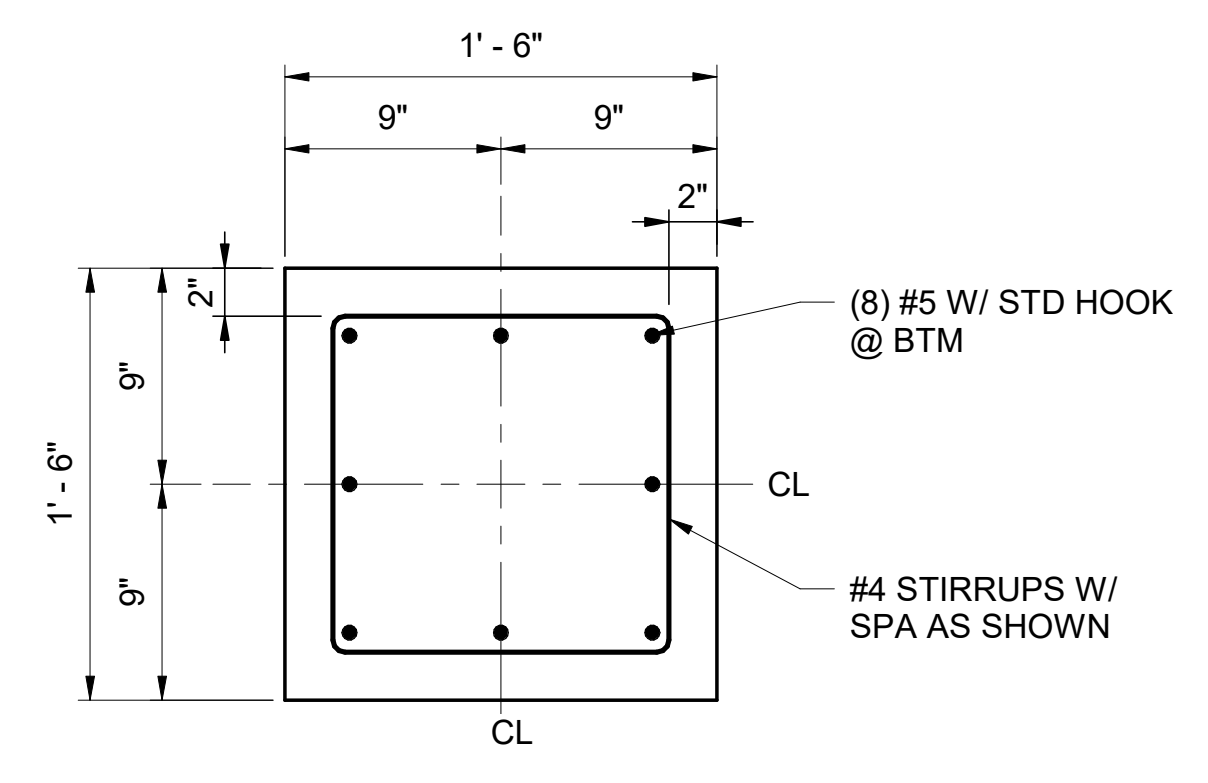
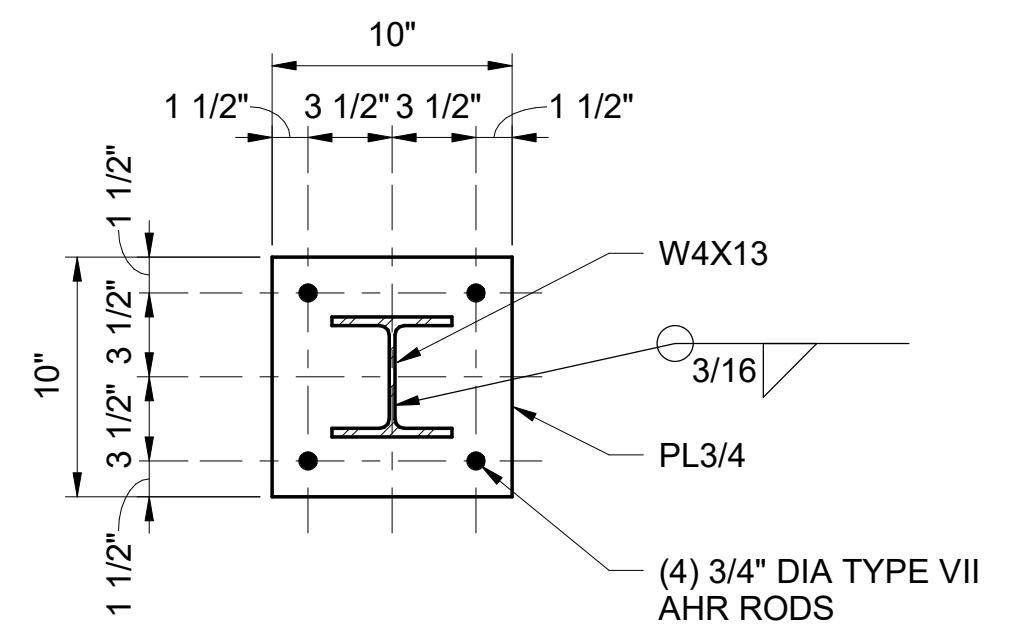
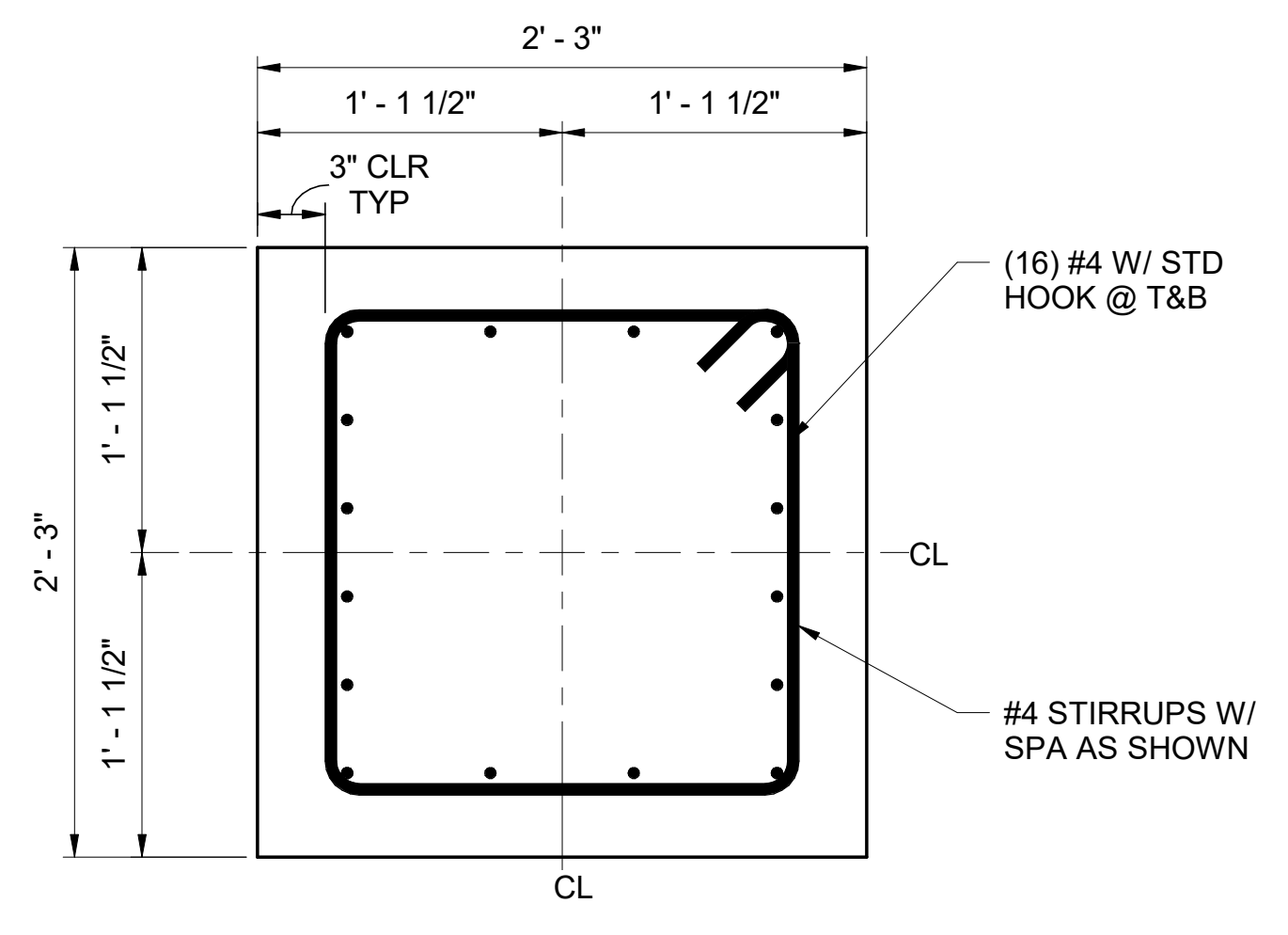
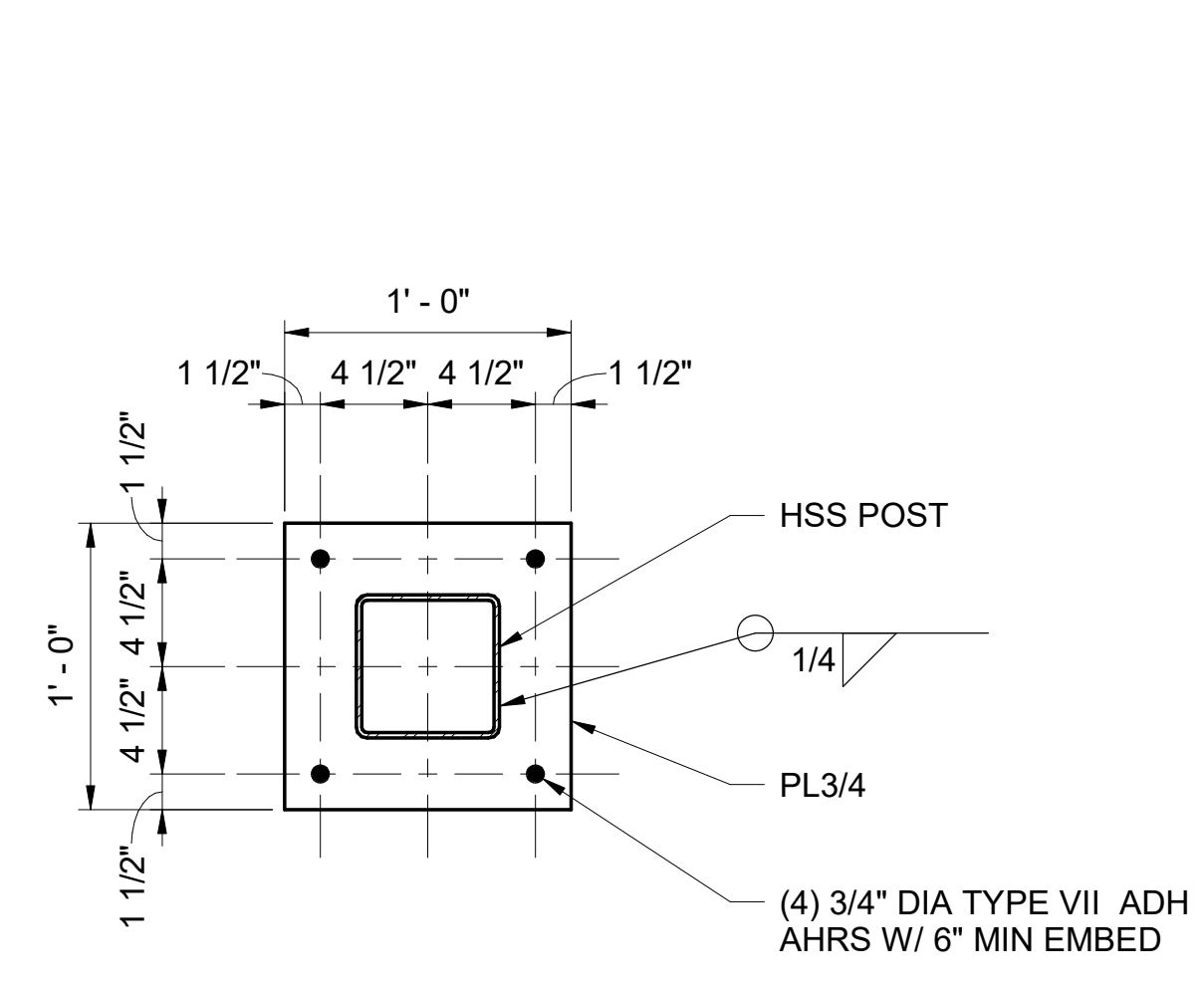
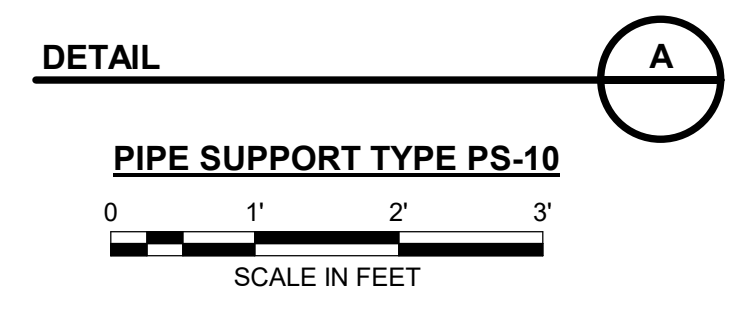
**S-552 - A**





**NOTES:**  
 1. SEE S-551 FOR PIPE SUPPORT NOTES AND KEYED NOTES.

- KEYED NOTES:**
- ① COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR THE LOCATIONS, DIMENSIONS, AND ELEVATIONS OF PIPING AND REQUIRED SUPPORTS.
  - ② COMBINE PIPE SUPPORT BEDDING PLATES WHERE PLATES WOULD OTHERWISE OVERLAP. PROVIDE ADDITIONAL ROW OF TYPE VII ANCHOR ROD BETWEEN PIPE SUPPORTS WHEN BEDDING PLATE IS COMBINED
  - ③ NOT USED



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 PIPE SUPPORT DETAILS

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