Portland State
UNIVERSITY

PSU SRTC COOLING TOWER REPLACEMENT PROJECT

ISSUED FOR BID AND PERMIT

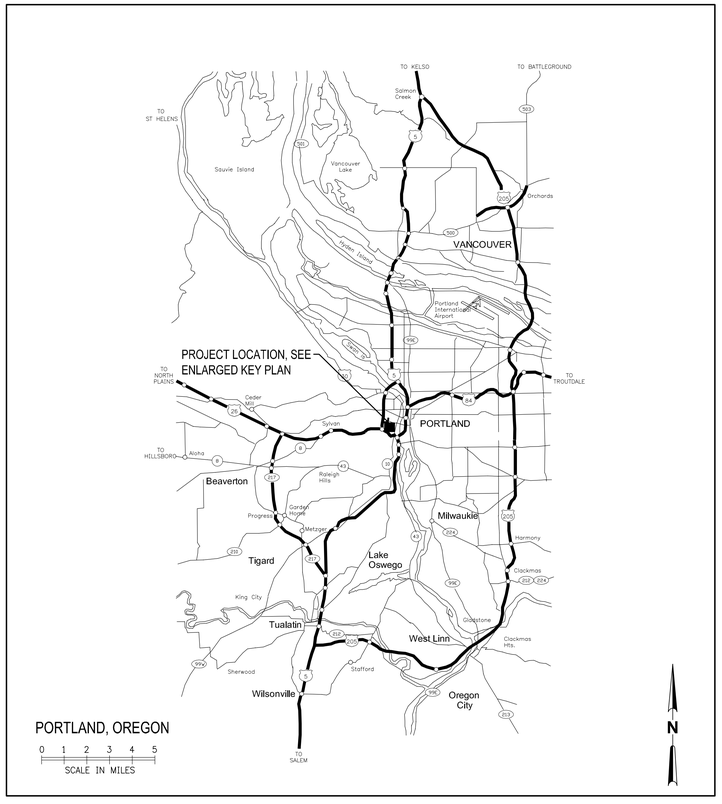
AUGUST, 2012

PROJECT NUMBER: 10909-12003

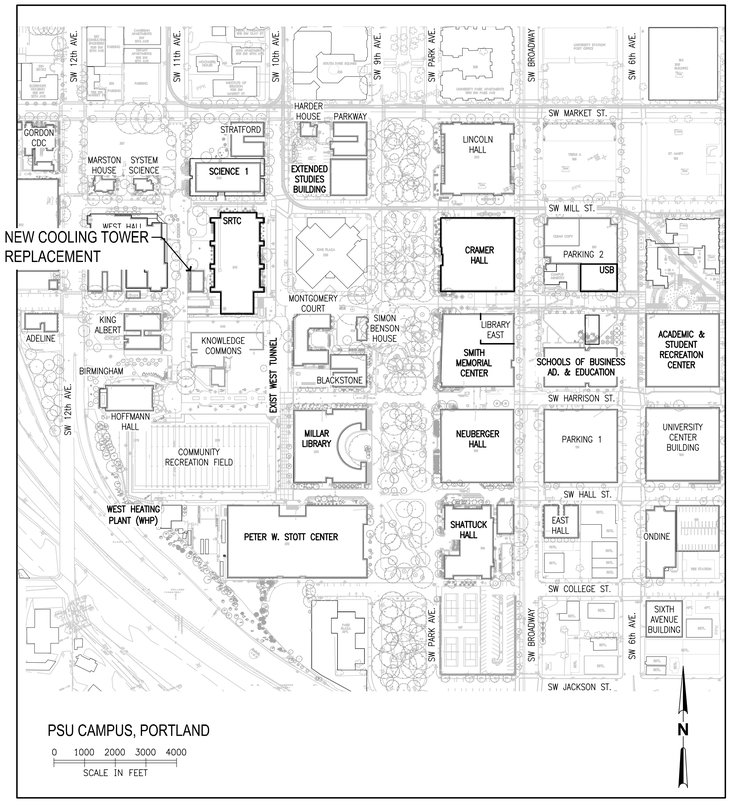
PREPARED BY

GHD

AREA MAP



LOCATION MAP



DRAWING LIST

PSU Facilities & Planning

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DRAWING LIST

CD	#	DWG#	TITLE SHEET /Drawing List
X	01	T1	TITLE SHEET AND DRAWING LIST
X	02	M0.1	MECHANICAL LEGEND, ABBREVIATIONS AND NOTES
X	03	M4.3	SRTC CHILLED WATER P&ID
X	04	M4.3.1	SRTC CHILLED WATER P&ID DEMO
X	05	ME7.10	SRTC COOLING TOWER DEMO & EQUIPMENT PLAN
X	06	ME7.14	SRTC COOLING TOWER EXTERIOR ELEVATION & RENDERING
X	07	MP7.10	SRTC BELOW & ABOVE GRADE PIPING PLAN
X	08	MP7.11	SRTC SUB BASEMENT PIPING PLAN
X	09	S0.1	STRUCTURAL LEGEND, ABBREVIATIONS AND NOTES
X	10	S0.2	STRUCTURAL SCHEDULE OF SPECIAL INSPECTIONS
X	11	S7.10	SRTC COOLING TOWER STRUCTURAL PLAN
X	12	S7.11	SRTC COOLING TOWER STRUCTURAL ELEVATIONS
X	13	S9.0	STRUCTURAL DETAILS
X	14	S9.1	STRUCTURAL DETAILS
X	15	E0.1	ELECTRICAL LEGEND, ABBREVIATIONS AND NOTES
X	16	E0.5	SRTC ELECTRICAL PANEL SCHEDULES
X	17	E7.1	SRTC SUB BASEMENT LV PROCESS POWER PLAN
	17		

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BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

ISSUE	DESCRIPTION	DATE	MARK
0	ISSUED FOR BID AND PERMIT	08/02/12	

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

TITLE SHEET AND DRAWING LIST

PROJ NO: 10909-12002
DRWN: MTC CHKD: GCY

T1

SHEET 01 OF 17

Plot Date: 1 August 2012 - 10:38 AM Plotted By: Matthew Carmichael Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_01_T1-0.dwg

COOLING TOWERS

EQUIPMENT NUMBER	SRTC-CT-01
STATUS	NEW
LOCATION	SRTC (SCIENCE BLDG II)
REF. DWG	M43
SYSTEM SERVED	CHILLED WATER
FLUID	CONDENSER WATER
NORMAL CAPACITY (TONS)	1,900
UNIT CONFIGURATION	
TYPE	OPEN-CIRCUIT
ASHRAE PERFORMANCE (GPM/HP)	
LINE CONNECTION SIZE (IN)	(2) 10
SPEED CONTROL	VFD INTEGRAL WITH CONTROL PANEL
SERVICE CONDITIONS - FLUID SIDE	
FLUID	CONDENSER WATER
FLOW (GPM)	3,800
EWT (F)	95
LWT (F)	80
AMBIENT WBT (F)	67
EVAPORATION FLOW (GPM)	45.6
INLET PRESSURE DROP (PSI)	2.4
SERVICE CONDITIONS - AIR SIDE	
FAN QUANTITY	2
FAN TYPE	PROPELLER
AIR FLOW (CFM)	264,800
MOTOR ENCLOSURE TYPE	TEFC
SPEED (RPM)	VFD INTEGRAL WITH CONTROL PANEL
POWER (HP)	(2) @ 30
VOLTS / PHASE / HERTZ	460 / 3 / 60
SUMP HEATER	
ELECT IMMERSION (Kw)	N/A
VOLTS / PHASE / HERTZ	N/A
CONTROLS	
POWER (KW)	PROVIDED WITHIN VFD
VOLTS / PHASE / HERTZ	460 / 3 / 60
STANDARD OF ACCEPTANCE	
MANUFACTURER	EVAPCO
MODEL	UT-224-518
DESIGN OP WEIGHT (LBS)	43,720
SUMP SWEEPER / SEPARATOR PACKAGED	
FLOW (GPM)	400
PRESSURE (PSI)	44
PUMP (HP)	15
VOLTS / PHASE / HERTZ	460 / 3 / 60
MANUFACTURERE / MODEL	LAKOS TCI-0400-MBV
ACCESSORIES	
LADDER & PLATFORM FOR FAN AND MOTOR ACCESS	YES
MATERIALS FOR BASIN AND AIR INLET LOUVERS	304 SS
DRIFT ELIMINATORS	YES
VIBRATION SWITCH	YES
SEISMIC BASE	YES
BASIN ACCESS	YES
FLUME PLATE	YES
REMARKS	1, 2, 3

REMARKS
1. PROVIDE SUMP SWEEPER SYSTEM. CONTRACTOR TO PROVIDE THE REQUIRED PIPING IN/OUT OF THE CT.
2. CT SHALL BE EVAPCO. PROVIDE WITH SUPER LOW SOUND FAN & NOISE REDUCTION ACCESSORIES.
3. FOR ADDITIONAL INFORMATION, SEE SPECIFICATION 23 65 00.

CHILLER SCHEDULE (FOR REFERENCE ONLY)

EQUIPMENT NUMBER	SB2-CH-02	SB2-CH-03	
STATUS	EXISTING	EXISTING	
OPTION		WELL WATER	
LOCATION	SCIENCE II	SCIENCE II	
REF. DWG			
SYSTEM SERVED	CHILLED WATER	CHILLED WATER	
UNIT CONFIGURATION			
NOMINAL CAPACITY (TONS)	900	1,000	
CHILLER TYPE	CENTRIFUGAL	CETRIFUGAL	
REFRIGERANT/CHARGE	R-134a	HCFC123/1600#	
NUMBER OF STAGES	1	2	
PART LOAD (Kw/Ton @ ARI)		0.38	
FULL LOAD (Kw/Ton @ ARI)	0.619	0.574	
CHILLED WATER			
DISCHARGE SIZE (IN)	8	12	
MAIN SIZE (IN)			
WATER FLOW MIN. (GPM)		480.1	
WATER FLOWDESIGN (GPM)		2000	
PRESSURE DROP (PSI)		13.29	
ENLET WATER TEMP (F)		54.0	
LVG. WATER TEMP (F)		42.0	
CONDENSER WATER			
DISCHARGE SIZE (IN)		12	
MAIN SIZE (IN)			
WATER FLOW MIN. (GPM)		833.4	
WATER FLOWDESIGN (GPM)		1800	
PRESSURE DROP (PSI)		20.72	
ENLET WATER TEMP (F)		80.0	
LVG. WATER TEMP (F)		95.6	
COMPRESSOR MOTOR			
ENCLOSURE TYPE			
SPEED CONTROL (VFD)	N	Y	
ELECTRICAL			
VOLTS / PHASE / HERTZ	4160 / 3 / 60	480 / 3 / 60	
MCA/MOCP		1000 /1600	
STANDARD OF ACCEPTANCE			
MANUFACTURER	MCQUAY	TRANE	
MODEL	PEH-126	CVHF1070	
SERIAL NUMBER	9680759010		
OPERATING WEIGHT (LBS)		38,544	
REMARKS	5	1,2,3,4	

REMARKS
1 CHILLER PREPURCHASE BY OWNER
2 DISASSEMBLY, RIGGING AND REASSEMBLY ON SITE INCLUDED. (OFMI)
3 REMOVABLE NOISE REDUCTION COVER ON COMPRESSOR, CONDENSOR TUBE AND PIPES INCLUDED. (OFCI)
4 DOUBLE NEOPRENE EQUIPMENT SUPPORT PADS INCLUDED. (OFCI)
5 FLOW, HEAD AND TEMPERATURE DATA TAKEN FROM 1964 RECORD DRAWINGS.

CONDENSER WATER PUMP SCHEDULE

EQUIPMENT NUMBER	SB2-P13	SRTC-P13B	
STATUS	EXISTING	NEW	
LOCATION	SRTC (SB2)	SRTC	
REF. DWG		M43	
SERVICE	SB2-CT-01 TO SB2-CH-02	TO SB2-CH-02	
FLUID	CDS/R	CDS/R	
PUMP			
PUMPING TYPE	SPLIT CASE	SPLIT CASE	
SPEED CONTROL (VFD)	Y	Y	
FLOW (GPM)	2,500	2,500	
HEAD (FT)	98'	98'	
ELECTRICAL			
VOLTS / PHASE / HERTZ	480 / 3 / 60	480 / 3 / 60	
HP	75	75	
RPM	1780	1780	
AMPS			
STANDARD OF ACCEPTANCE			
MANUFACTURER	BELL & GOSSET	BELL & GOSSET	
MODEL	HSC3	HSC3	
	8x10x12S	8x10x12S	
WEIGHT (LBS)	1,635	1,635	
SERIAL NUMBER			
REMARKS	1,2,3,4	1,2,3,4, 6	

REMARKS
1 NEW MOTORS, SEE SPEC. 23 05 13.
2 PROVIDE FLEX CONNECTORS WITH FLOW VANE ON INLET AND OUTLET OF PUMP.
3 PROVIDE INERTIA BASE. SEE SPEC. 23 05 48
4 PROVIDE 6" CONCRETE HOUSEKEEPING PAD FOR PUMP.
5 MOTOR SHALL BE ODP. PROVIDE WEATHER PROOF PROTECTION FOR PUMP AND RELATED ACCESSORIES.
6 PROVIDE WITH PUMP SEALS AND ACCESSORIES SUITABLE FOR COOLING TOWER WATER WITH CHEMICAL TREATMENT. VERIFY CHEMICAL COMPATIBILITY FOR ALL SEALS AND GASKETS MATERIAL. SEE SPEC 23 21 23

SYMBOL LEGEND

S – SOLENOID VALVE
– CHECK VALVE
– GATE VALVE
– GATE VALVE (NORMALLY CLOSED)
– GLOBE VALVE
– BUTTERFLY VALVE
– 3 WAY VALVE
– FLANGE
– UNION
– POINT OF CONNECTION
– TURBINE METER
– VORTEX METER
SD – SUCTION DIFFUSER
– PETE'S PLUG
– DOUBLE SPHERE FLEX CONNECTION

ABBREVIATIONS

AFF – ABOVE FINISHED FLOOR
HT – HEAT TRACE
WP – WATER PROOF
(D) – DEMO
(E) – EXISTING
(N) – NEW

FLUID IDENTIFICATION

C – CONDENSER WATER SUPPLY
CR – CONDENSER WATER RETURN
CW – CITY WATER
CWS – CHILLED WATER SUPPLY
CWR – CHILLED WATER RETURN
DRN – DRAIN

PIPE LINE LEGEND

– NEW PIPE
– EXIST PIPE TO BE LINED
– EXIST/FUTURE (LIGHT)
–X–X–X– – HEAT TRACED & INSULATED

UTILITY PIPING AND INSULATION SCHEDULE

SYSTEM ID	SERVICE	LOCATION	SIZE	DESIGN PRESS. PSIG	DESIGN TEMP. F	PIPE SPECIFICATIONS: MAT'L	ASTM STD.	GRADE / PROC. TYPE	WALL THK.	END PREP	FITTING SPECIFICATIONS: FITTING	FLANGES RATING, FACE, STD, TYPE	GASKETS	BOLT / NUT MAT'L	INSULATION TYPE: UTILITY AREA	OUTSIDE / TUNNEL	INSULATION THICKNESS (IN)	INSTALL. CODE	PRESSURE TEST PROCEDURE: TYPE	MEDIUM	TEST PRES.	TEST TEMP (F)	DURATION
		ALL AREAS	2" and LESS	80	50	CS	A53	B	SCH. 40	THREADED	THREADED	150#, RF, A105	EPDM	ZINC PLATED	D	E	3/4	B31.9	H	WATER	120	AMB	4 HRS.
CWS	CHILLED WATER - SUPPLY	ALL AREAS	2 1/2" to 14"	80	50	CS	A53	B	SCH. 40	GROOVED	GROOVED	150#, RF, A105	EPDM	ZINC PLATED	D	E	2	B31.9	H	WATER	120	AMB	4 HRS.
CWR	CHILLED WATER - RETURN	ALL AREAS	16" and LARGER	80	50	CS	A53	B	STD	BEVELED	WELDED	150#, RF, A105	EPDM	ZINC PLATED	D	E	2	B31.9	H	WATER	120	AMB	4 HRS.
CDS	CONDENSER WATER - SUPPLY***	ALL AREAS	2" and LESS	80	50	CS	A53	B	SCH. 40	THREADED	THREADED	150#, RF, A105	EPDM	ZINC PLATED	NONE	NONE	NONE	B31.9	H	WATER	120	AMB	4 HRS.
CDR	CONDENSER WATER - RETURN***	ALL AREAS	2 1/2" to 14"	80	50	CS	A53	B	SCH. 40	GROOVED	GROOVED	150#, RF, A105	EPDM	ZINC PLATED	NONE	NONE	NONE	B31.9	H	WATER	120	AMB	4 HRS.
		ALL AREAS	16" and LARGER	80	50	CS	A53	B	STD	BEVELED	WELDED	150#, RF, A105	EPDM	ZINC PLATED	NONE	NONE	NONE	B31.9	H	WATER	120	AMB	4 HRS.
		UTILITY AREA	1/2" to 3"	80	50	CU	B88	L		SOLDERED	COPPER	150#, RF, ANSI	EPDM	304 SS	D	E	1	OPSC	H	WATER	120	AMB	4 HRS.
CW	CITY WATER																						
		UTILITY AREA*	2" and LESS	80	80	GALV	A53	B	SCH. 40	THREADED	THREADED	150#, RF, A105	EPDM	ZINC PLATED	D	E	3/4	OPSC	H	WATER	120	AMB	4 HRS.
		UTILITY AREA*	2 1/2" and LARGER	80	80	GALV	A53	B	SCH. 40	GROOVED	GROOVED	150#, RF, A105	EPDM	ZINC PLATED	D	E	1	OPSC	H	WATER	120	AMB	4 HRS.

NOTE:
* = WHERE INDICATED
** = ABI (ADDITIVE BID ITEM)
*** = NO PIPING INSULATION REQ'D
**** = HEAT TRACE WHERE INDICATED

ABBREVIATION:
BW - BUTT WELD
CS - CARBON STEEL
ERW - ELECTRIC RESIST. WELDED
FF - FLAT FACE
GALV - GALVANIZED STEEL
GRV - GROOVED
H - HYDRAULIC
CU - COPPER
OMSC - OREGON MECH SPECIALTY CODE
P - PNEUMATIC
PTFE- TEFLON
RF - RAISED FACE
S - SEAMLESS
SCH- STAND. PIPE SCHED.
SCR - SCREWED
SO - SLIP ON
SS - STAINLESS STEEL
SW - SOCKET WELD
THD - THREADED
WI - WHERE INDICATED
WN - WELD NECK
U/G - UNDERGROUND

INSULATIONS:
A = GLASS FIBER / ALUMINUM JACKET (CAL-SIL INSERTS AT SUPPORTS)
B = GLASS FIBER / ALUMINUM CLAD JACKET (CAL-SIL INSERTS AT SUPPORTS)
C* = GLASS FIBER / SS JACKET (CAL-SIL INSERTS AT SUPPORTS)
D = CLOSED CELL / PVC JACKET (HIGH DENSITY CLOSED CELL AT SUPPORTS), (BLUE JACKET COLOR FOR CHILLED WATER)
E = CLOSED CELL / ALUMINUM JACKET (HIGH DENSITY CLOSED CELL AT SUPPORTS) ****
G = CLOSED CELL / PVC JACKET & HEAT TRACED (HIGH DENSITY CLOSED CELL AT SUPPORTS)
H = INORGANIC GRANULAR INSULATION (GILSULATE 500xr)

VALVE SPECIFICATION SCHEDULE

SYSTEM ID	SERVICE	VALVE ID	TYPE	SIZE	VALVE MAX. PRESS. (PSIG)	VALVE OP. TEMP. (F)	MATERIAL OF CONSTRUCTION: BODY	TRIM	BALL / DISC	SEATS	PACKG.	TYPE OF CONSTRUCTION: BODY / CLASS	CONNECTION	OPERATOR	MANUFACTURER	MODEL NO.	ALTERNATE MANUFACTURER / MODEL NO.	ALTERNATE MANUFACTURER / MODEL NO.	COMMENTS
		AAV	AIR VENT	3/4"	150	250	SS	SS	SS	SS			THD	FLOAT	ARMSTRONG	11-AV			With Gooseneck drain tube
CWS	CHILLED WATER - SUPPLY	B2	BALL, 3-PC	1/4" - 3"	150 SAT	390	BRONZE	SS	SS	RPTFE	RPTFE	150#	THD	LEVER	APOLLO	82-140			
CWR	CHILLED WATER - RETURN	BV1	BALANCING VALVE	1/2" - 3"	300 WOG	250	BRONZE	BRASS		TFE	EPDM	125#	THD	KNOB	B&G	CB (A-549 G)			
		BV2	SETTER	2 1/2" - 8"	175 WOG	250	CI	BRASS	BRONZE		EPDM	125#	FLG/GROOVED	KNOB	B&G	CB (A-547 E)			
CDS	CONDENSER WATER - SUPPLY	BV3	AUTO BAL. VALVE	4" - 12"	400	200	CS	SS	SS			150#	FLG/GROOVED		GRISWOLD CONTROLS				Confirm flow rates for sizing
CDR	CONDENSER WATER - RETURN	C1	SWING CHECK	1/2" - 3"	185	200	BRONZE		BRONZE	BRONZE		150#	THD	SWING	CRANE	37			
		C2	SWING CHECK	2" - 12"	190	200	CI	BRONZE	BRONZE CMP	CI		125#	FLG	SWING	CRANE	373			
		C5	CHECK	2" - 10"	200	150	CI	SS	SS	BRONZE		125#	WAFER		HAMMOND	IR9253			
		C6	SILENT CHECK	2" - 20"	150	180	CI	SS	SS	SS	BUNA-N	125#	FLG	DISC/SPRING	FLOMATIC	402BT/BTR			GLOBE STYLE
		F1	BUTTERFLY	2" - 48"	250	200	CS	SS	SS	TFE	TFE	150#	LUG	LEVER	FLOWSEAL	ILA-122TTG-B	FNW	ABZ, ABZOLUTE SERIES 400	Gear operated for 4" and larger
		F2	BUTTERFLY	2" - 12"	300	250	DI	SS	EPDM	DI			GROOVED	LEVER	VICTUALIC	VIC-300			Gear operated for 4 and larger
		F3	BUTTERFLY	2" - 24"	150	275	DI	SS	SS	EPDM	PTFE	150#	WAFER	LEVER	APOLLO	141	FNW - 731		Gear operated for 4" and larger
		S2	STRAINER	2" - 12"	150	560	CS	304SS				150#	FLG		MUELLER	781	METRAFLEX TF		Provide blow off valve
		S3	STRAINER	2" - 12"	150	560	CS	304SS				150#	GROOVED		MUELLER	781 WE			Provide blow off valve
		B2	BALL, 3-PC	1/4" - 3"	150 SAT	390	BRONZE	SS	SS	RPTFE	RPTFE	150#	THD	LEVER	APOLLO	82-140	FNW		
		F2	BUTTERFLY	2" - 12"	300	250	DI	SS	EPDM	DI			GROOVED	LEVER	VICTUALIC	VIC-300			Gear operated for 4 and larger
CW	CITY WATER	RPBA-2	RED. PRESS BFP	2"	175	180	BRONZE	SS		SILICON	NORYL	150#	THD		WILKINS	975XL	FEBCO		With Approval from Local Jurisdiction
		S1	STRAINER	1/2" - 2"	200	150	BRONZE	SS				125#	THD		MUELLER	351M			
		PRV-01	PRESS. RED.	3/4"	300	180	BRONZE	BR/SS					THD		CONBRACO	36-100			

NOTE: PRIOR TO INSTALLATION VERIFY SEAL MATERIAL AND ACCESSORIES FOR COMPATABILTY WITH FLUID SERVICE.

MECHANICAL GENERAL NOTES:

1. THE FOLLOWING NOTES APPLY TO ALL MECHANICAL DRAWINGS. ADDITIONAL GENERAL NOTES AND KEYED NOTES ARE PROVIDED ON INDIVIDUAL DRAWINGS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF THE PHASING AND INSTALLATION OF ALL MECHANICAL WORK WITH THE WORK OF ALL OTHER TRADES. THE CONTRACTOR SHALL BEAR THE TOTAL EXPENSE FOR ANY ADDITIONAL WORK WHICH MAY BE CAUSED BY THE IMPROPER SEQUENCING OF CONSTRUCTION ACTIVITIES.
3. THE DRAWINGS, P&ID, PLAN VIEWS, AND SPECIFICATIONS ARE COMPLEMENTARY. WHAT IS CALLED FOR IN ONE SHALL BE CALLED FOR IN BOTH.
4. CONTRACTOR SHALL INCLUDE ALL INCIDENTAL ITEMS AND WORK NOT SPECIFICALLY SHOWN OR SPECIFIED BUT REQUIRED BY GOOD PRACTICE IN A COMPLETE SYSTEM.
5. THE DRAWINGS ARE DIAGRAMMATIC AND EQUIPMENT HOOK-UP IS BASED ON ONE MANUFACTURER'S EQUIPMENT. THEY SHOULD BE FOLLOWED AS CLOSELY AS POSSIBLE, YET ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION OR ALL THE DETAILS OF THE EQUIPMENT. WHERE REQUIRED BY JOB-SITE CONDITIONS, RELOCATE AND PROVIDE FITTINGS, SUPPORTS, ETC. AS REQUIRED. EXISTING EQUIPMENT AND PIPING SIZES, LOCATIONS AND DIMENSIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO DEMOLITION AND CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY OF ALL DISCREPANCIES AFFECTING THE REMOVAL OF EXISTING EQUIPMENT AND PIPING AND THE INSTALLATION OF NEW EQUIPMENT AND PIPING. ANY DEVIATIONS FROM THE DRAWINGS SHALL BE INCLUDED IN SHOP DRAWINGS APPROVED BY THE OWNER'S REPRESENTATIVE.
6. TO ENHANCE CLARITY OF DRAWINGS AND WHERE NOT NECESSARY TO DESCRIBE THE REQUIRED PIPE SIZES, INDIVIDUAL SEGMENTS OF PIPE BETWEEN CONNECTIONS ARE NOT NECESSARILY SIZED ON PLANS. PIPE SEGMENTS ARE SHOWN ON PLANS WITHOUT A SIZE INDICATED SHALL BE THE SAME SIZE AS THE NEXT UPSTREAM SEGMENT WITH A SIZE INDICATED.
7. COORDINATE ALL MECHANICAL PENETRATIONS, EMBEDS, AND ASSOCIATED END CONNECTORS WITH STRUCTURAL DRAWINGS. NO PENETRATIONS WILL BE ALLOWED THROUGH STRUCTURAL ELEMENTS UNLESS INDICATED ON STRUCTURAL DRAWINGS OR AS APPROVED BY THE STRUCTURAL ENGINEERS. DO NOT CORE DRILL OR DRILL THROUGH BEAMS, COLUMNS, FLOORS, CEILINGS, OR WALLS, UNLESS INDICATED ON STRUCTURAL DRAWINGS OR AS APPROVED BY THE STRUCTURAL ENGINEER. OBTAIN APPROVAL FROM STRUCTURAL ENGINEER FOR ALL MECHANICAL PENETRATIONS.
8. COORDINATE LOCATIONS OF MECHANICAL EQUIPMENT AND PIPING TO PROVIDE ADEQUATE CLEARANCE FOR REMOVAL AND SERVICE ACCESS NECESSARY FOR ALL EQUIPMENT PREVENTATIVE MAINTENANCE AND REPAIR. COORDINATE SERVICE ACCESS FOR EQUIPMENT PROVIDED BY ALL OTHER TRADES, INCLUDING BUT NOT LIMITED TO ELECTRICAL EQUIPMENT, PLUMBING, FIRE PROTECTION, AND LIGHTING.
9. DESIGN AND PROVIDE SUPPORTS AND SEISMIC RESTRAINTS FOR ALL PIPES AND RELATED EQUIPMENT THAT ARE SPECIFIED AND SHOWN ON THE DRAWINGS. PROVIDE ALL REQUIRED SUPPLEMENTARY STRUCTURAL STEEL, SUPPORTS, ATTACHMENTS, AND ANCHORAGES. PROVIDE ANCHOR BOLTS OF SIZE, TYPE, AND LENGTH AS REQUIRED TO SATISFY THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS, SPECIFICATION REQUIREMENTS, AND REQUIREMENTS WHICH MAY BE INDICATED ON THE CONTRACT DRAWINGS. SEE STRUCTURAL DRAWINGS AND SPECS FOR ADDITIONAL REQUIREMENTS.
10. PROVIDE PLUG, CAP OR BLIND FLANGES ON OPEN ENDS OF VALVES, PIPES AND FITTINGS.
11. ALL PIPE SUPPORTS, PIPE SHOES, HANGERS, AND ASSOCIATED METAL WORK IN THE UTILITY AREA, OUTDOORS, UTILITY TUNNELS, AND WET AREAS SHALL BE ALL HOT DIP GALVANIZED OR STAINLESS STEEL.
12. DURING CONSTRUCTION, BUILDING UTILITIES WILL REMAIN OPERATIONAL. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY UTILITIES, CONNECTIONS TO EXISTING SERVICE UTILITIES AND COORDINATION OF SHUTDOWNS WITH THE OWNER.
13. PROTECT ALL EXISTING EQUIPMENT THAT IS TO REMAIN. REPAIR AND/OR REPLACE ALL EXISTING UTILITIES, STRUCTURAL ELEMENTS, EQUIPMENT, PIPING, CONDUIT, DUCTWORK, ETC. THAT IS DAMAGED OR BECOMES INOPERABLE AS A RESULT OF THIS WORK.
14. SEE GENERAL ARRANGEMENT PLANS FOR REMOVAL OF EXISTING COOLING TOWER AND PLACEMENT OF NEW COOLING TOWER
15. SEE STRUCTURAL DRAWING FOR MOUNTING AND SUPPORT OF NEW COOLING TOWER.
16. FOR ADDITIVE BID ITEMS (ABI) SEE SPEC. 01030

DESIGN BASIS FOR MECH EQUIPMENT AND PIPE SUPPORTS

1. CONTRACTOR SHALL PROVIDED MECHANICAL EQUIPMENT AND PIPE SUPPORTS IN ACCORDANCE WITH THE 2010 OREGON STRUCTURAL SPECIALTY CODE THAT INCLUDES THE ICC 2006 INTERNATIONAL BUILDING CODE "IBC 2009" AND THE AMERICAN SOCIETY OF CIVIL ENGINEERS SEI/ASCE 7-05 "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"
2. SUPPORTS SHALL BE DESIGNED FOR SEISMIC LOADS BASED ON THE FOLLOWING PARAMETERS:

   BUILDING CATEGORY = III
   SITE CLASS = D
   MAX. 0.2 SEC. SPECTRAL RESPONSE ACCELERATION, SS = 1.0g
   MAX. 1.0 SEC. SPECTRAL RESPONSE ACCELERATION, S1 = 0.4g

3. SUPPORTS SHALL BE DESIGNED FOR THEIR SELF WEIGHT PLUS THE WEIGHT OF ALL PIPING AND EQUIPMENT TO BE SUPPORTED AND AN ADDITIONAL COLLATERAL DEAD LOAD OF 10% OF THE WEIGHT OF PIPING AND EQUIPMENT TO BE SUPPORTED.
4. SUPPORTS SHALL BE DESIGNED FOR ALL THRUST FORCES PRODUCED BY PIPING AND EQUIPMENT. THRUST FORCES SHALL BE AS REQUIRED BY MECHANICAL DRAWINGS AND SPECIFICATIONS.
5. SUPPORTS SHALL BE DESIGNED TO ALLOW EXPANSION OF ALL PIPES AND EQUIPMENT AS REQUIRED BY MECHANICAL DRAWINGS AND SPECIFICATIONS.
6. THE CONTRACTOR SHALL PROVIDE STEEL PIPE SUPPORT MEMBERS AND ANCHORAGES DESIGNED IN ACCORDANCE WITH THE 2007 OREGON STRUCTURAL SPECIALTY CODE AND SHALL INCLUDE THE FOLLOWING PARAMETERS:
   A. FRAMING SYSTEMS SHALL BE DESIGNED AND DETAILED TO RESIST GRAVITY AND LATERAL LOADS AS REQUIRED BY CODE AND AS REQUIRED ON THE DRAWINGS AND IN THE SPECIFICATIONS.
   B. TOTAL LOAD DEFLECTIONS SHALL BE LIMITED TO 1 / 600 OF THE SPAN.

SUBMITTALS FOR MECH EQUIPMENT AND PIPE SUPPORTS

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT AND PIPING SUPPORTS THAT INDICATE SYSTEM LAYOUT WITH LOCATION INCLUDING CRITICAL DIMENSIONS, SIZES, AND PIPE HANGER AND SUPPORT LOCATIONS AND DETAILS OF TRAPEZE HANGERS.
2. CONTRACTOR SHALL SUBMIT MANUFACTURERS CATALOG DATA INCLUDING LOAD CAPACITY FOR ALL HANGERS, SUPPORTS AND ACCESSORIES.
3. CONTRACTOR SHALL SUBMIT DESIGN DRAWINGS AND CALCULATIONS PREPARED BY AN OREGON REGISTERED STRUCTURAL ENGINEER FOR ALL SUPPORTS AND CONNECTIONS FOR ALL MECHANICAL EQUIPMENT AND PIPING SUPPORTS. THESE DRAWINGS AND CALCULATIONS WILL CONSTITUTE A DEFERRED SUBMITTAL TO THE BUILDING DEPARTMENT. THE SUBMITAL MUST BE REVIEWED BY THE UNIVERSITY'S STRUCTURAL ENGINEER PRIOR TO SUBMISSION TO THE BUILDING DEPARTMENT. PIPE AND EQUIPMENT SUPPORT DESIGNER SHALL RESPOND TO ALL COMMENTS FROM THE BUILDING DEPARTMENT AND UNIVERSITY REPRESENTATIVE AND MAKE REVISIONS AS REQUIRED BY BUILDING DEPARTMENT AND UNIVERSITY REPRESENTATIVE. CONTRACTOR SHALL BUILD TIME FOR MULTIPLE BUILDING DEPARTMENT AND UNIVERSITY REVIEWS INTO THEIR CONSTRUCTION SCHEDULE.
4. CONTRACTOR TO SUBMIT A SCHEDULE OF SPECIAL INSPECTIONS REQUIRED FOR ALL MECHANICAL EQUIPMENT AND PIPING SUPPORTS. SCHEDULE OF SPECIAL INSPECTIONS SHALL BE PREPARED BY THE STRUCTURAL ENGINEER OF RECORD FOR THE DEFERRED SUBMITTAL.

SPECIAL INSPECTIONS AND STRUCTURAL OBSERVATION FOR MECHANICAL EQUIPMENT AND PIPE SUPPORTS

1. CONTRACTOR SHALL BE REQUIRED TO COORDINATE AND EXECUTE ALL REQUIRED SPECIAL INSPECTIONS AT CONTRACTOR'S EXPENSE.
2. PERIODIC STRUCTURAL OBSERVATION SHALL BE REQUIRED FOR ALL PIPING AND MECHANICAL SUPPORTS. CONTRACTOR SHALL BE REQUIRED TO COORDINATE AND EXECUTE STRUCTURAL OBSERVATION BY THE STRUCTURAL ENGINEER OF RECORD FOR DEFERRED SUBMITTAL AT CONTRACTOR'S EXPENSE.

DEFERRED SUBMITTALS

1. THE DESIGN OF THE MECHANICAL EQUIPMENT AND PIPE SUPPORTS WILL CONSTITUTE A DEFERRED SUBMITTAL PER 2010 OREGON STRUCTURAL SPECIALTY CODE SECTION 106.3.4.2. OTHER DEFERRED SUBMITTALS TO BE MINIMIZED OR ELIMINATED.

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REGISTERED PROFESSIONAL ENGINEER
60,388
OREGON
MARCH 15, 1999
DANIEL B. REITER
EXPIRES 12/31/12

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

ISSUE

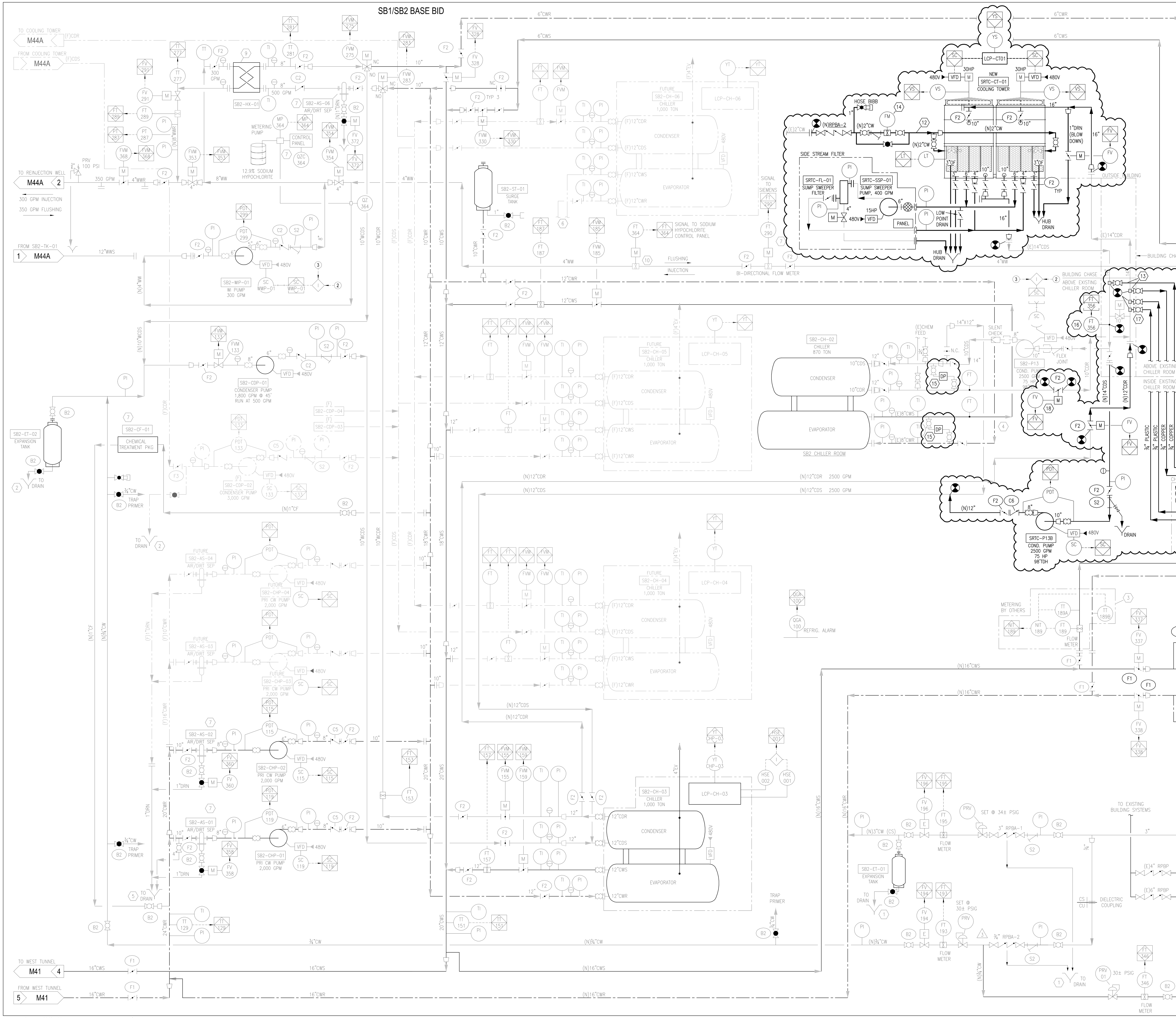
PORTLAND STATE UNIVERSITY SRTC BUILDING (SB2) COOLING TOWER REPLACEMENT

MECHANICAL LEGEND, ABBREVIATIONS AND NOTES

PROJ NO: 10909-12002
DRWN: MTC CHKD:

M0.1

Plot Date: 2 August 2012 - 11:37 AM Plotted By: Matthew Carmichael Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_02_M0.1-0.dwg



KEYED NOTES:

11. LOW LEVEL ALARM TO SHUT OFF ASSOCIATED PUMPS AT LOW WATER LEVEL.
12. INSULATE AND HEAT TRACE PIPING EXPOSED OUTSIDE THE BUILDING
13. PROVIDE ¾" COPPER WELD-O-LET FOR CHEMICAL INJECTOR AND ¾" PLASTIC SCHEDULE 80 LINES. MIN. 36" SPACE BETWEEN INJECTOR PORTS. COORDINATE WITH PSU AND CHEMICAL VENDOR.
14. FLOW METER TO BE SPECIFIED BY PSU.
15. REPLACE EXISTING DP WITH NEW DP
16. USE LOOP NUMBER 356 FROM PREVIOUSLY DEMO FLOW TRANSMITTER (SEE SHEET M43.1). SIEMENS TO PROVIDE SYSTEM INTEGRATION.
17. USE PLASTIC BALL VALVES ON BIOCIDE AND INHIBITOR LINES.
18. COORDINATE LOCATION OF CONTROL VALVE WITH PSU.

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PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

SRTC CHILLED WATER P&ID

PROJ NO:	10909-12002
DRWN: MTC	CHKD: DBR

M43

Plot Date: 2 August 2012 - 11:54 AM Plotted By: Matthew Carmichael Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_03_M43-0.dwg

SB1/SB2 BASE BID

KEYED NOTES:

1. FIELD ROUTE TO DRAINS TO NEAREST FLOOR DRAIN.
2. PROVIDE 2" LOW POINT DRAIN VALVE FOR COMPLETE SYSTEM DRAIN.
3. BTU INSTRUMENTS SUPPLIED AND INSTALLED BY OTHERS. COORDINATE WITH SYSTEMS INTEGRATOR.
4. REPLACE ELECTRIC OPERATOR ON VALVE WITH MANUAL OPERATOR.
5. 4" SYSTEM DRAIN. ALLOW FOR TEMPORARY PUMP CONNECTION FOR FLUSHING.
6. FOR FUTURE CONNECTION TO SYSTEM HEADER.
7. SEE SPEC 23 21 16.
8. SEE SPEC 23 25 00.
9. REMOVE PLATES TO MATCH LOAD
10. PROVIDE 1½" TAP FOR INSERTION FLOW METER

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		ISSUE

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

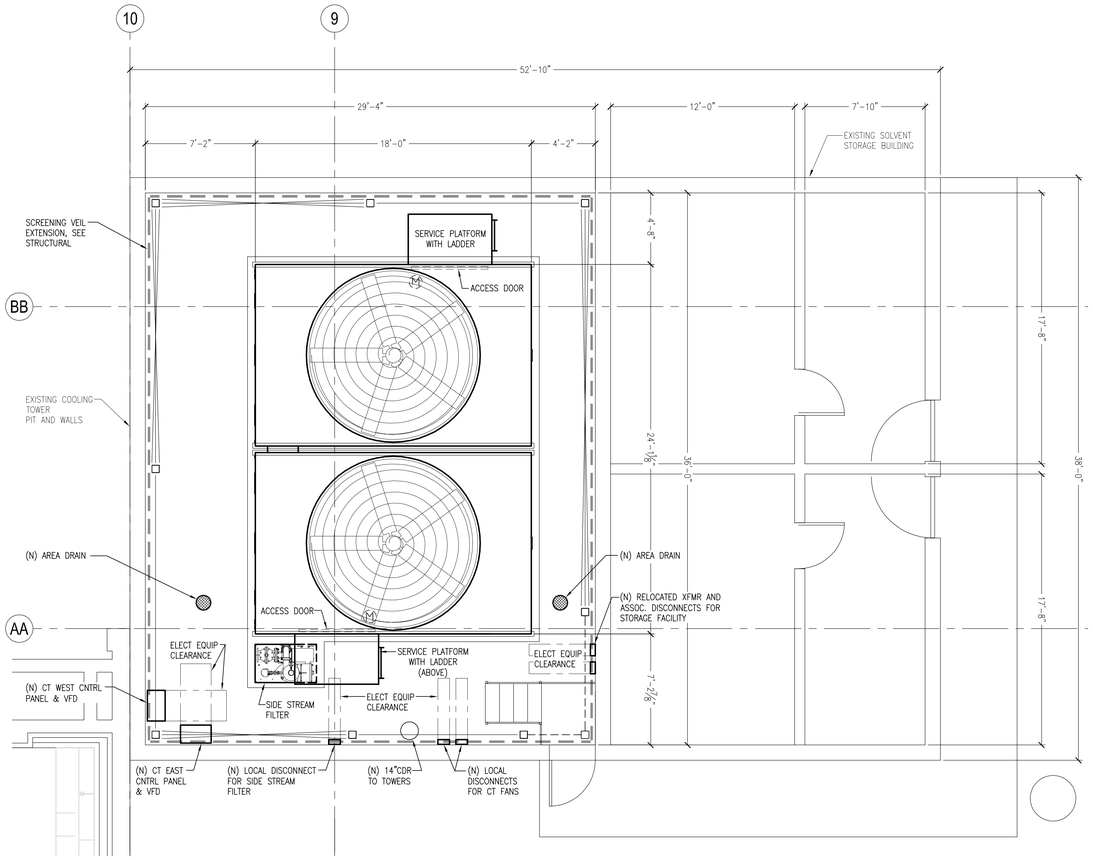
CHILLED WATER P&ID
DEMO

PROJ NO: 10909-12002
DRWN: MTC CHKD: DBR

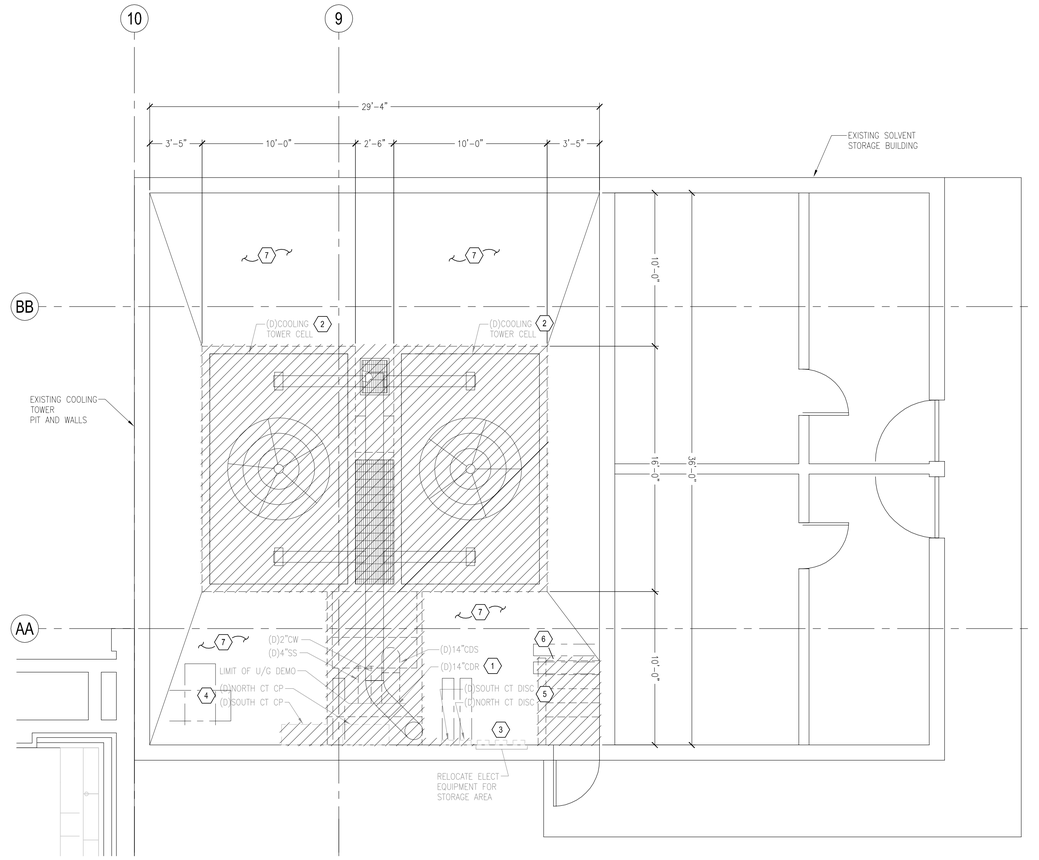
M43.1

SHEET 04 OF 17

Plot Date: 1 August 2012 - 4:21 PM Plotted By: Matthew Carmichael
Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_04_M43.1-0.dwg



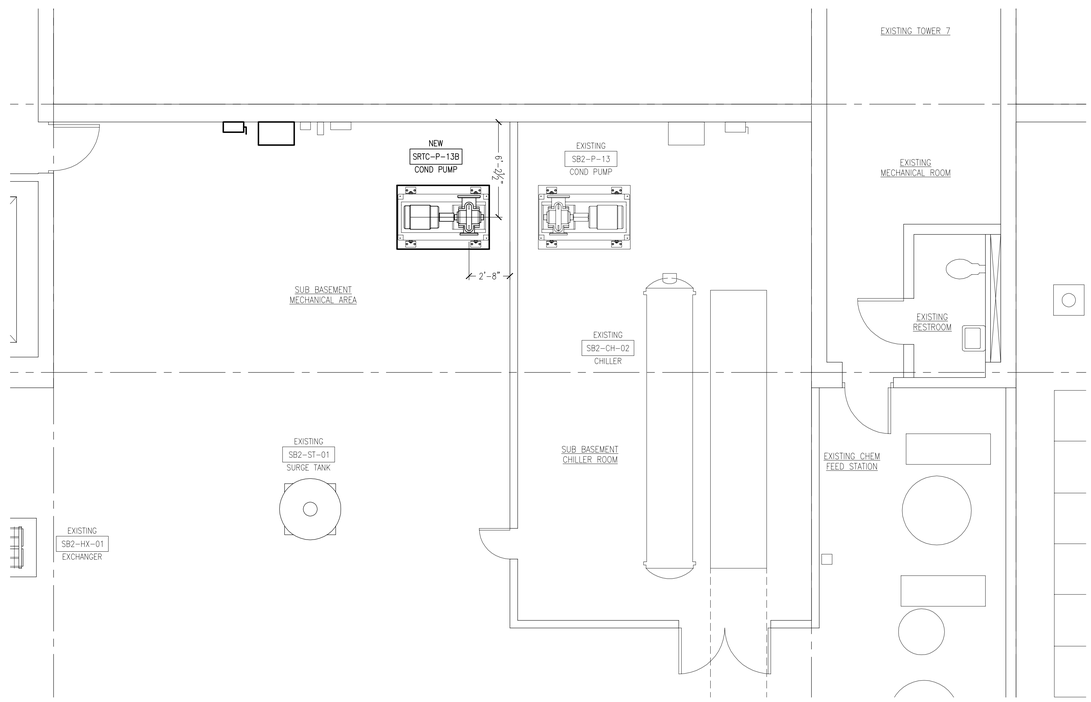
2 ME7.10 COOLING TOWER NEW EQUIPMENT PLAN
SCALE: 1/4" = 1'-0"



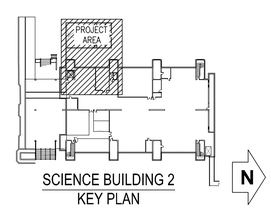
1 ME7.10 COOLING TOWER EXISTING DEMO PLAN
SCALE: 1/4" = 1'-0"

KEYED NOTES:

1. DEMO EXISTING 14"CDR PIPE STARTING AT FIRST VIC FITTING ABOVE SLAB.
2. DEMO EXISTING COOLING TOWER, ASSOCIATED STRUCTURE AND SERVICES.
3. RELOCATED EXISTING ELECTRICAL TRANSFORMER, DISCONNECTS AND EQUIPMENT SERVICING EXISTING STORAGE FACILITY TO LOCATION SHOWN ON NEW EQUIPMENT PLAN. SEE ELECTRICAL DRAWING E0.4 FOR ADDITIONAL INFORMATION.
4. DEMO CONTROL PANELS FOR BOTH EXISTING NORTH AND SOUTH COOLING TOWERS.
5. DEMO EXISTING FAN DISCONNECTS AND ASSOCIATED WIRING.
6. REMOVE EXISTING CONCRETE ENTRANCE STAIRS AND HANDRAILS. PATCH ANY DAMAGE TO EXISTING SURROUNDING WALLS.
7. REMOVE AND DEMOLISH EXISTING COOLING TOWER PIT AREA CONCRETE SLAB, SUMP, TRENCH AND CURBING.



3 ME7.10 SUB BASEMENT NEW EQUIPMENT PLAN
SCALE: 1/4" = 1'-0"



SCIENCE BUILDING 2
KEY PLAN

1/4" = 1'-0" 5' 0 5' 10' 15'

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PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

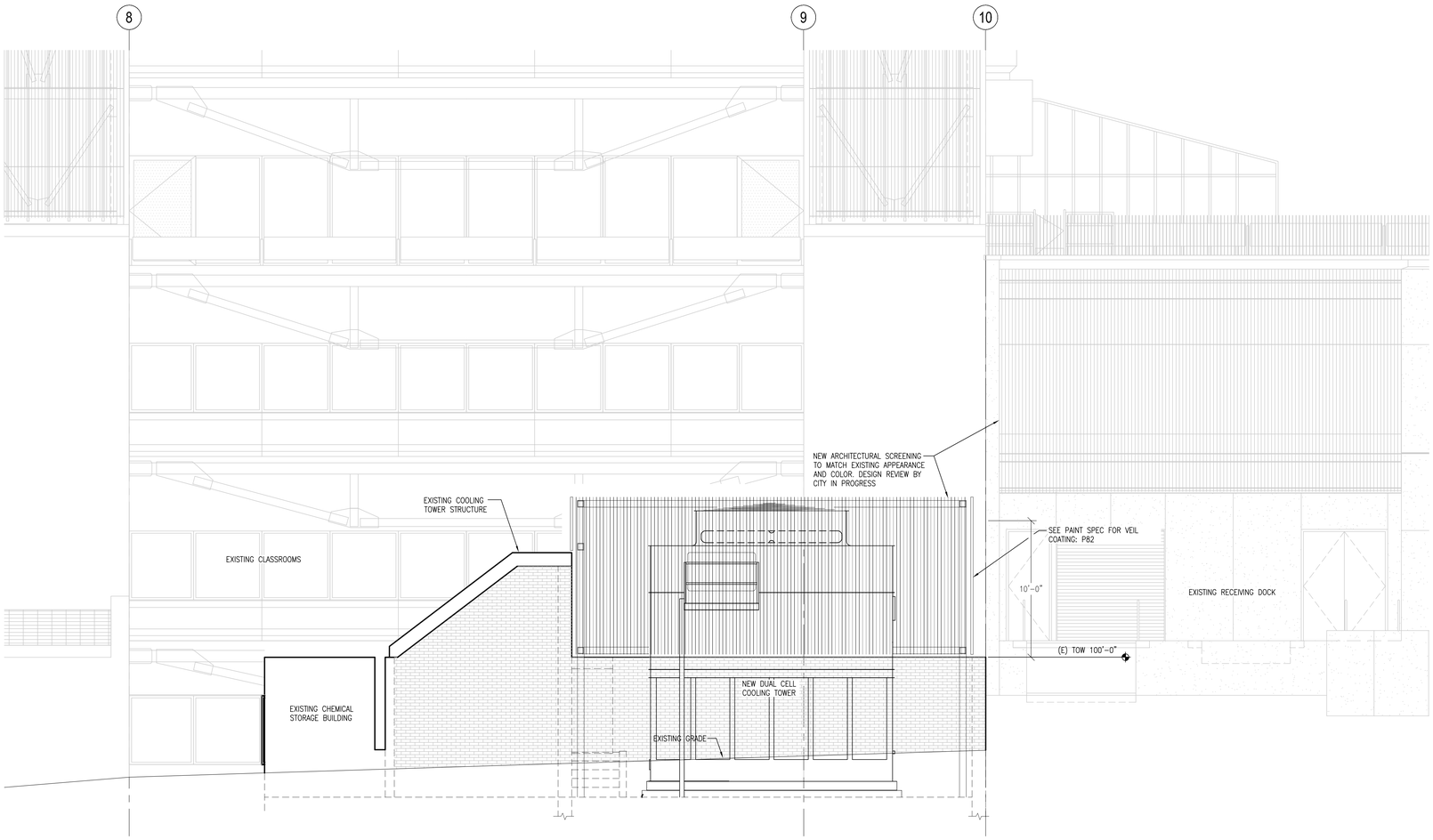
SRTC COOLING TOWER DEMO & EQUIPMENT PLAN

PROJ NO: 10909-12002
DRWN: MTC CHKD: -

ME7.10

SHEET 05 OF 17

Plot Date: 1 August 2012 - 4:24 PM Plotted By: Matthew Carmichael Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_05_ME7.10-0.dwg

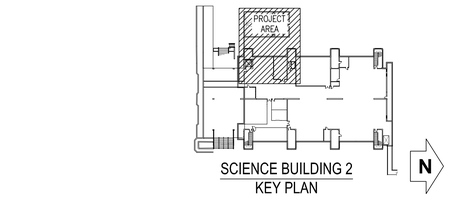


1 ME7.14 EQUIPMENT ELEVATION
SCALE: 1/4" = 1'-0"

N

2 ME7.14 EQUIPMENT RENDERING
SCALE: 1/4" = 1'-0"

N



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PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

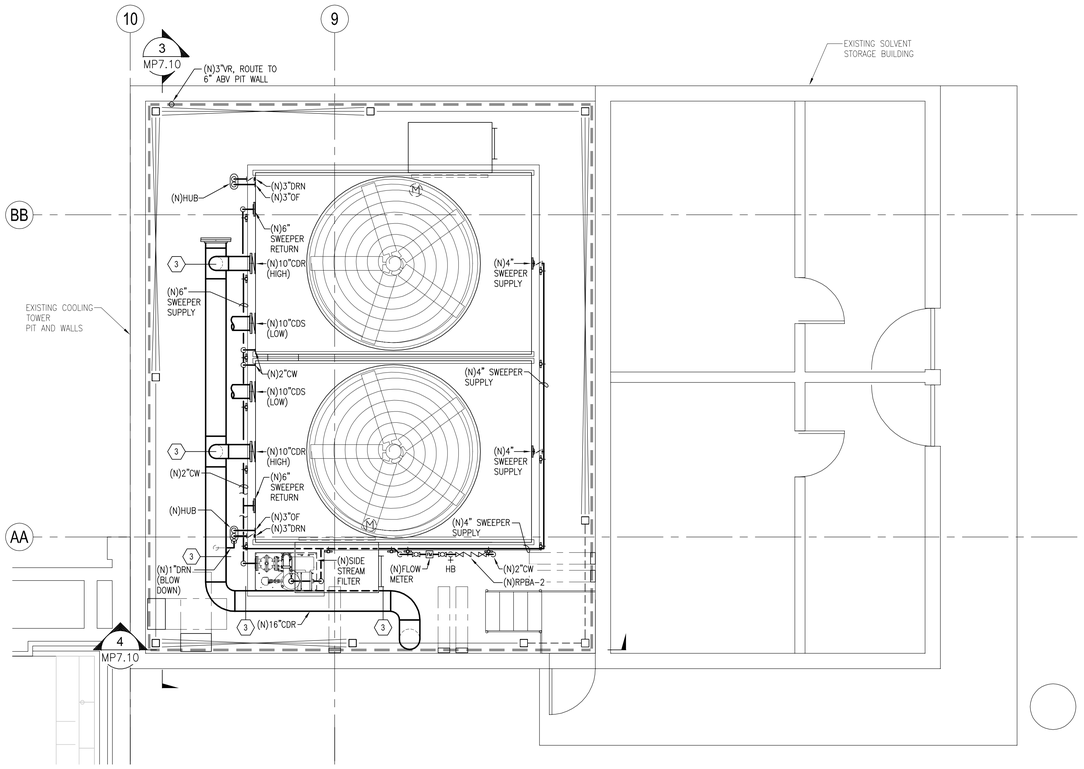
SRTC COOLING TOWER
EXTERIOR ELEVATION & RENDERING

PROJ NO: 10909-12002
DRWN: MTC CHKD: -

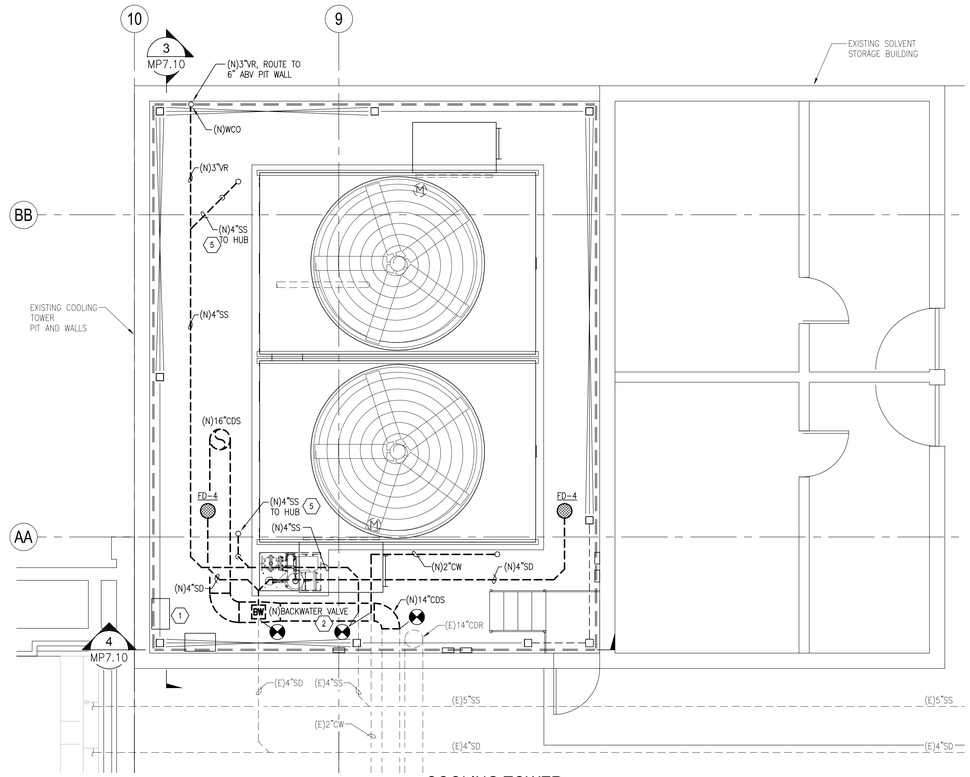
ME7.14

SHEET 06 OF 17

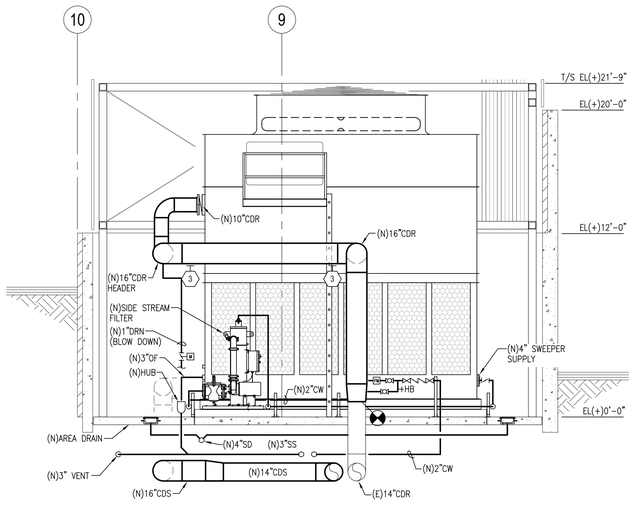
Plot Date: 1 August 2012 - 4:06 PM Plotted By: Matthew Carmichael
Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_06_ME7.14-0.dwg



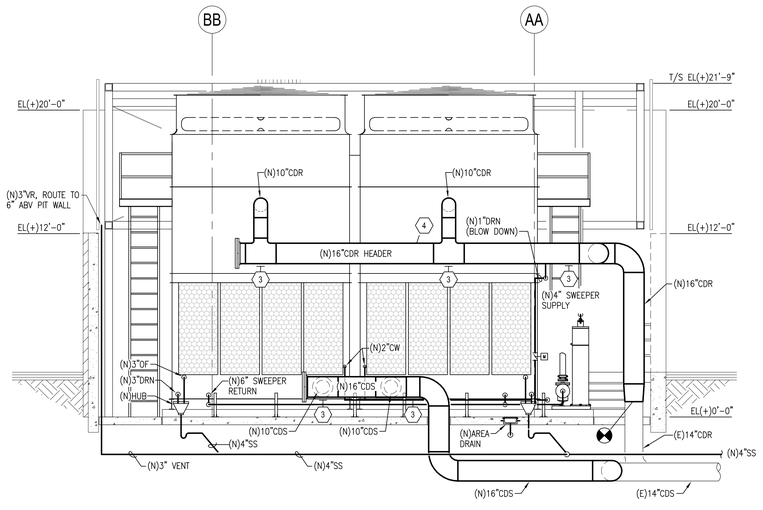
2 MP7.10 COOLING TOWER ABOVE GRADE PIPING PLAN
SCALE: 1/4" = 1'-0"



1 MP7.10 COOLING TOWER BELOW GRADE PIPING PLAN
SCALE: 1/4" = 1'-0"



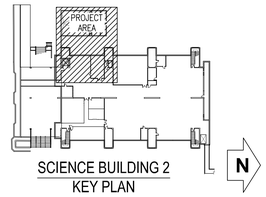
4 MP7.10 COOLING TOWER PIPING ELEVATION
SCALE: 1/4" = 1'-0"



3 MP7.10 COOLING TOWER PIPING ELEVATION
SCALE: 1/4" = 1'-0"

KEYED NOTES:

1. LOCATE EXISTING BACK WATER VALVE AND REPLACE WITH NEW BACK WATER VALVE. PROVIDE FLOOR ACCESS AS REQUIRED BY AUTHORITY HAVING JURISDICTION.
2. FIELD LOCATE EXISTING 4" STORM DRAIN LINE. CONFIRM IE AND MATERIAL, NOTIFY ENGINEER.
3. PIPE SUPPORTS DESIGNED AND PROVIDED BY THE CONTRACTOR SHALL BE HOT DIPPED GALVANIZED STRUCTURAL MEMBERS. UNISTRUT NOT ALLOWED. BASE SHALL BE ELEVATED A MINIMUM OF 1" ABOVE CONCRETE PAD USING NON SHRINK GROUT.
4. EXTERIOR UNINSULATED PIPING TO BE PAINTED WITH EXTERIOR COATING. SEE PAINT SPEC, COLOR TO BE LIGHT GRAY, P51 COATING.
5. PROVIDE TRAP PRIMER.



SCIENCE BUILDING 2
KEY PLAN

1/4" = 1'-0" 5' 0 5' 10' 15'

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PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

SRTC BELOW & ABOVE GRADE PIPING PLAN

PROJ NO: 10909-12002
DRWN: MTC CHKD: -

MP7.10

SHEET 07 OF 17

Plot Date: 2 August 2012 - 11:33 AM Plotted By: Matthew Carmichael
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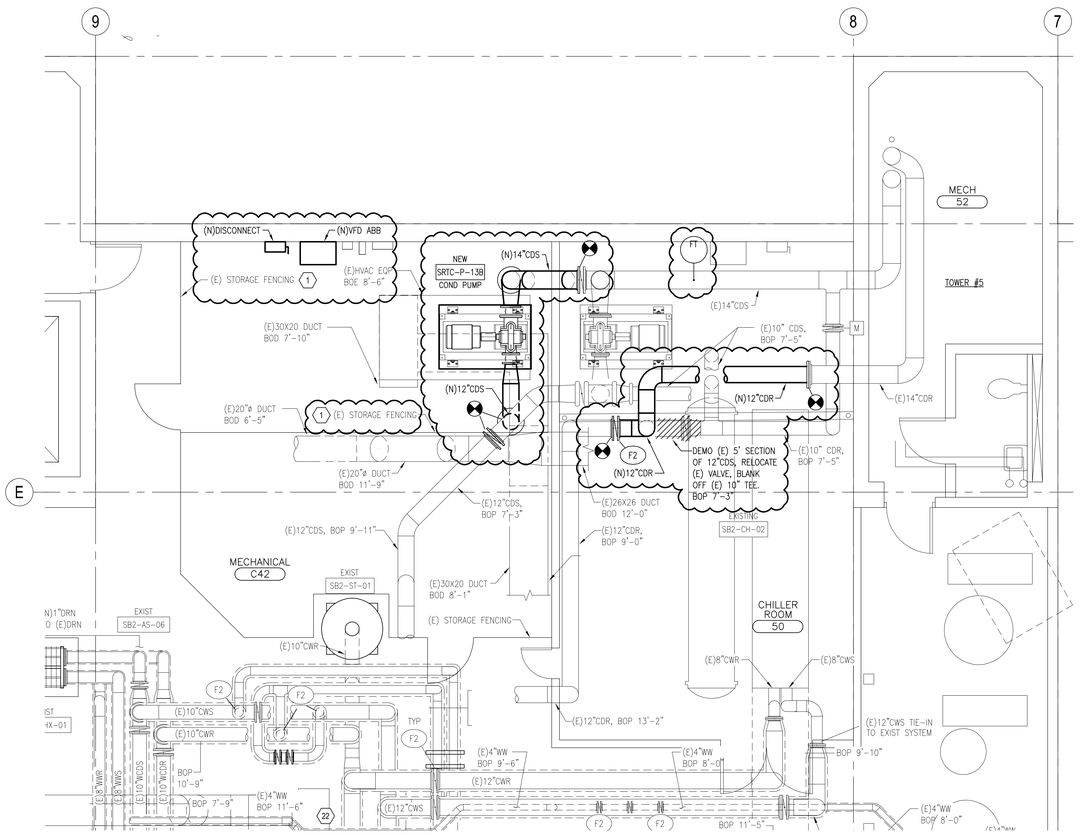


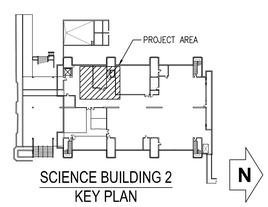
1 MP7.11 SB2 SUB BASEMENT PIPING PLAN SOUTHWEST

SCALE: 1/4" = 1'-0"

N

KEYED NOTES:

1. CONTRACTOR TO PROVIDE EQUIVALENT STORAGE AREA AS DIRECTED BY PSU.
2. PIPE SUPPORTS DESIGNED AND PROVIDED BY CONTRACTOR. DEFFERRED SUBMITTAL REQUIRED.
3. PIPE SUPPORTS TO BE PAINTED PER P53 COATING SYSTEM FOR INTERIOR STEEL.



SCIENCE BUILDING 2
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1/4" = 1'-0" 5' 0 5' 10' 15'

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SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

SRTC SUB BASEMENT PIPING PLAN

PROJ NO: 10909-12002

DRWN: MTC CHKD: -

MP7.11

SHEET 08 OF 17

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STRUCTURAL ABBREVIATIONS

DESIGN BASIS

1. STRUCTURAL ELEMENTS DESIGNED IN ACCORDANCE WITH THE 2010 OREGON STRUCTURAL SPECIALTY CODE (2010 OSSC) THAT INCLUDES THE 2009 INTERNATIONAL BUILDING CODE (IBC 2009) AND THE AMERICAN SOCIETY OF CIVIL ENGINEERS SEI/ASCE 7-05 "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

2. SEISMIC LOADS BASED ON THE FOLLOWING PARAMETERS:

   BUILDING CATEGORY = II
   SITE CLASS = D (ASSUMED)
   MAX. 0.2 SEC. SPECTRAL RESPONSE ACCELERATION, Ss = 0.98G
   MAX. 1.0 SEC. SPECTRAL RESPONSE ACCELERATION, S1 = 0.4G
   IMPORTANCE FACTOR, Ie = 1.0
   SEISMIC DESIGN CATEGORY = D

3. LIVE LOADS:

   FLOOR = 100 PSF
   STAIRS AND EXITWAYS = 100 PSF OR 300 LBS POINT LOAD APPLIED OVER 4 SQ IN OF TREAD.

GENERAL NOTES

1. ALL WORK TO CONFORM TO REQUIREMENTS OF ALL PUBLICATIONS AND NOTES LISTED UNDER "DESIGN BASIS".
2. MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS AND ALL OTHER DRAWINGS AS REQUIRED SHALL BE USED IN CONJUNCTION WITH STRUCTURAL DRAWINGS TO DEVELOP DETAILS AND DIMENSIONS FOR SHOP DRAWINGS, FABRICATION, ERECTION AND CONSTRUCTION. CONTRACTOR IS TO COORDINATE EQUIPMENT, SUPPORT CONDITIONS AND DIMENSIONS FOR SUPPORTING BEAMS, FRAMES AND OPENINGS FOR MECHANICAL EQUIPMENT AND PROVIDE THIS INFORMATION FOR REVIEW.
3. THE CONTRACTOR IS TO VERIFY ALL EXISTING CONDITIONS AND ALL DIMENSIONS IN FIELD PRIOR TO START OF CONSTRUCTION AND PROTECT AND MAINTAIN ALL EXISTING CONSTRUCTION AND ITS CONTENTS IN FULL.
4. SEE MANUFACTURER'S INSTRUCTIONS FOR MOUNTING AND SECURING MECHANICAL EQUIPMENT.
5. THE CONTRACTOR SHALL MAINTAIN A SET OF LATEST REVIEWED SHOP DRAWINGS ON JOB SITE.
6. THE STRUCTURE HAS BEEN DESIGNED TO BE STABLE AND SELF SUPPORTING AFTER THE CONSTRUCTION IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY FOR THE BUILDING'S STABILITY DURING CONSTRUCTION. THIS RESPONSIBILITY ALSO INCLUDES BUT IS NOT LIMITED TO METHOD AND SEQUENCE OF ERECTION, TEMPORARY SHORING AND TEMPORARY BRACING.
7. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO FOLLOW ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.
8. SHOULD ANY INFORMATION ON THE STRUCTURAL DRAWINGS CONFLICT WITH THE SPECIFICATIONS OR ANY OTHER PART OF THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND AN INTERPRETATION WILL BE GIVEN.
9. ALL SECTIONS, DETAILS, NOTES, DIMENSIONS AND CONDITIONS ARE APPLICABLE AT ANY OTHER LOCATION WHERE CONDITIONS AND DETAILS ARE SIMILAR BUT ARE NOT SPECIFICALLY NOTED AS SUCH OR ARE NOT SHOWN.
10. FOR QUALITY CONTROL INSPECTION AND TESTING REQUIREMENTS DURING CONSTRUCTION, SEE SPECIFICATIONS AND "SCHEDULE OF SPECIAL INSPECTIONS".
11. ALL HOLES INTO MASONRY OR CONCRETE WALLS FOR PROPRIETARY ANCHORING SYSTEMS (EXPANSION BOLTS, ADHESIVE ANCHORING SYSTEMS, ETC.) TO BE DRILLED AND CLEANED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
12. PROVIDE DESIGN AND SHOP DRAWINGS FOR ALL PIPE SUPPORT SYSTEMS. ALL SECTIONS, DETAILS, NOTES, DIMENSIONS AND CONDITIONS ARE APPLICABLE AT ANY OTHER LOCATION WHERE CONDITIONS AND DETAILS ARE SIMILAR BUT ARE NOT SPECIFICALLY NOTED AS SUCH OR ARE NOT SHOWN. DEFERRED SUBMITTAL REQUIRED FOR PERMIT BY CONTRACTOR

CONCRETE NOTES

1. ALL WORK TO CONFORM TO THE REQUIREMENTS OF THE FOLLOWING PUBLICATIONS:

   A. ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-05), AND "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" (ACI 315 - LATEST EDITION).
   B. "SPECIFICATION FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT" (LATEST EDITION) BY THE WIRE REINFORCEMENT INSTITUTE, INC.

2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS:

   4000 PSI (NORMAL WEIGHT)

   AIR CONTENT: 5% +/- 1.% (CONCRETE EXPOSED TO FREEZING AND CONCRETE EXPOSED TO DEICER CHEMICALS)

   MAXIMUM SLUMP: 4"

   PRIOR TO PLACING CONCRETE, MIX DESIGNS SHALL BE SUBMITTED FOR REVIEW.

3. PROVIDE WATERSTOPS IN ALL EXPANSION AND CONSTRUCTION JOINTS BELOW EXTERIOR GRADE OR BELOW WATER LEVEL.
4. ALL BAR REINFORCING FOR CONCRETE SHALL CONFORM TO ASTM A 615 GRADE 60 (DEFORMED).
5. ALL ALL DEFORMED WELDED WIRE FABRIC SHALL CONFORM TO ASTM A497/A497M GRADE 60 DEFORMED.
6. UNLESS OTHERWISE SHOWN, LOCATE REINFORCING BARS WITH FOLLOWING CLEAR DIMENSION TO FACE OF CONCRETE:

   A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:
      3" CLEAR.

   B. CONCRETE EXPOSED TO EARTH OR WEATHER:

      2" CLEAR FOR #6 AND GREATER.

      1 1/2" CLEAR FOR #5 AND SMALLER.

   D. INTERIOR SURFACES NOT IN CONTACT WITH GROUND:

      BEAMS AND GIRDERS: 1-1/2" CLEAR.

      SLABS AND WALLS: 3/4" CLEAR.

7. CONCRETE ACCESSORIES MUST BE ADEQUATE TO MAINTAIN REINFORCING ACCURATELY IN PLACE AND BE NON-CORROSIVE, NON-STAINING TYPE.
9. PROVIDE ADDITIONAL REINFORCING AS SHOWN IN DETAILS AROUND ALL OPENINGS IN CONCRETE SLABS AND WALLS AND THROUGH CONSTRUCTION AND CONTROL JOINTS IN WALLS.
10. WELDED WIRE FABRIC REINFORCING TO HAVE MINIMUM SIDE AND END LAPS OF 12".
11. REFERENCE SPECIFICATIONS FOR CONCRETE CURING AND PROTECTION. BEGIN CONCRETE CURING AS SOON AS FINISHING OPERATIONS ARE COMPLETE (WITHIN TWO HOURS).
12. REFER TO ARCHITECTURAL AND MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS FOR ALL DEPRESSIONS, REVEALS, GROOVES, REGLETS, DOVETAILS, CURBS, TREAD INSERTS, SLAB INSERTS, PROJECTIONS, SILLS, PIPE SLEEVES, DUCT OPENINGS, CONDUIT OPENINGS, ETC. THAT ARE TO BE CAST WITH CONCRETE.
13. ALL HOLES INTO EXISTING CONCRETE SHALL BE COORDINATED TO MISS EXISTING REINFORCING. EXISTING REINFORCING SHALL NOT BE CUT, DRILLED OR DAMAGED DURING INSTALLATION. CONTRACTOR SHALL LOCATE ALL REINFORCING IN THE VICINITY OF PROPOSED DRILLED HOLES INTO CONCRETE VIA NON-DESTRUCTIVE METHODS PRIOR TO DRILLING ANY HOLES.
15. EPOXY FOR EMBED INTO CONCRETE TO BE HILTI HIT-RE 500-SD OR APPROVED EQUAL.

STEEL NOTES

1. ALL WORK TO CONFORM TO THE REQUIREMENTS OF THE FOLLOWING PUBLICATIONS:

   A. AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS" (AISC 360-05)

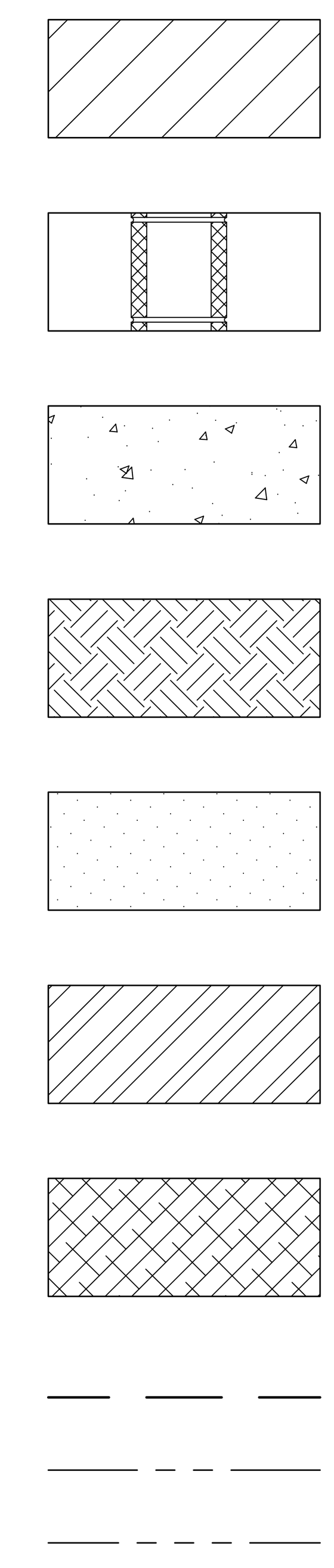
   B. AISC "SEISMIC PROVISIONS FOR STEEL BUILDING" (AISC 341-05)

2. ALL WIDE-FLANGE STRUCTURAL STEEL SHAPES SHALL CONFORM TO ASTM A992 (Fy = 50 KSI). ALL STEEL TUBES, ROUND AND SHAPED, SHALL CONFORM TO ASTM A500, GRADE B. ALL STEEL PIPES SHALL CONFORM TO ASTM A53. ALL OTHER STRUCTURAL STEEL SHAPES, PLATES AND MISCELLANEOUS IRON SHALL CONFORM TO ASTM A36 (EXCEPT AS NOTED).
3. ALL HIGH-STRENGTH BOLTS, NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS" APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC) OF THE ENGINEERING FOUNDATION.
4. ALL BOLTED CONNECTIONS TO USE ASTM A325 HIGH STRENGTH BOLTS. CONTACT SURFACES WITHIN SLIP-CRITICAL JOINTS SHALL BE FREE OF OIL, PAINT, LACQUER OR OTHER COATINGS EXCEPT AS NOTED IN RCSC SPECIFICATION.
5. ALL BOLTS IN BRACED FRAME CONNECTIONS TO BE PRE-TENSIONED HIGH-STRENGTH AND MEET THE REQUIREMENTS FOR SLIP-CRITICAL FAYING SURFACES (CLASS A). ALL OTHER HIGH-STRENGTH BOLTS ARE TO BE INSTALLED TO THE SNUG-TIGHT CONDITION.
6. ALL WELDS TO STRUCTURAL STEEL TO CONFORM TO "STRUCTURAL WELDING CODE - STEEL" (AWS D1.1 - LATEST EDITION).
7. ALL STEEL EXPOSED TO WEATHER TO BE HOT DIPPED GALV. UNLESS SPECIFIED OTHERWISE.
8 VEIL SHALL BE PAINTED TO MATCH EXISTING VEILS ON SRTC AND IN ACCORDANCE WITH SPECIFICATION 09 90 00 - SUBMITTAL REQUIRED FOR APPROVAL.

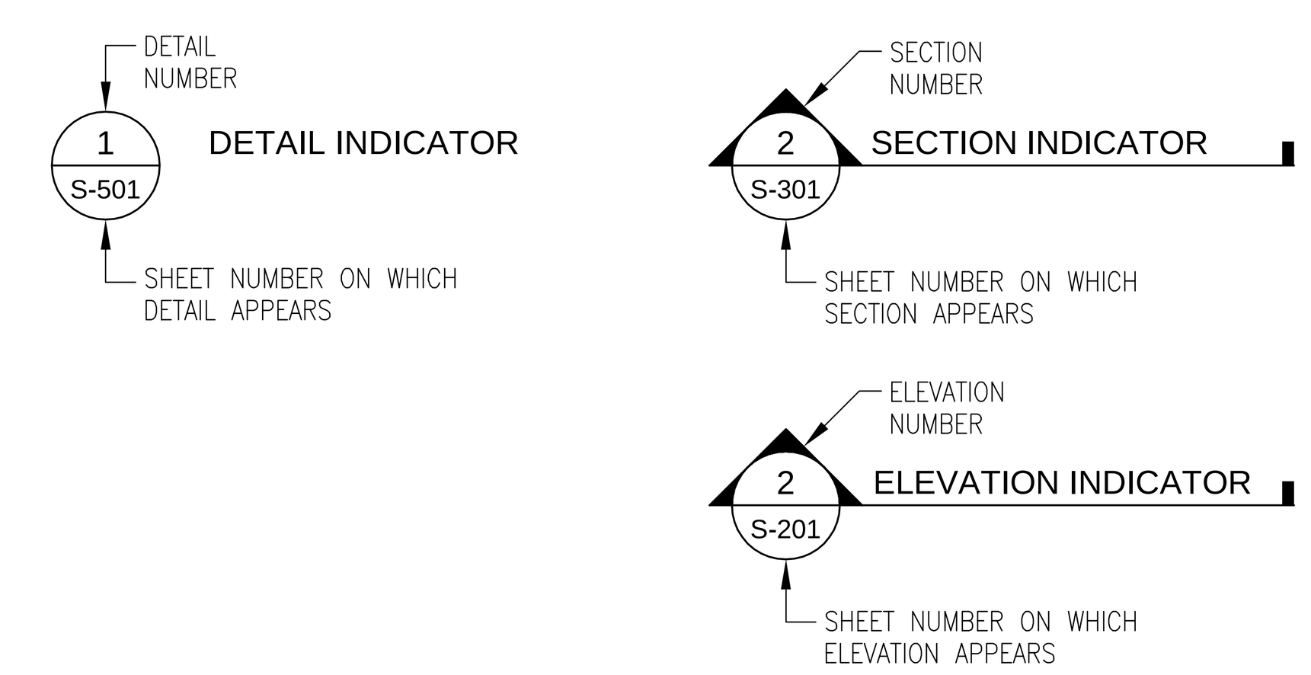
STRUCTURAL ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB	ANCHOR BOLT
ABC	AGGREGATE BASE COURSE
ABV	ABOVE
AC	AGGREGATE COURSE
ACI	AMERICAN CONCRETE INSTITUTE
ADD'L	ADDITIONAL
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	AMERICAN IRON AND STEEL INSTITUTE
AITC	AMERICAN INSTITUTE OF TIMBER CONSTRUCTION
ALT	ALTERNATE
ALUM	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APA	AMERICAN PLYWOOD ASSOCIATION
ARCH	ARCHITECT/ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS	AMERICAN WELDING SOCIETY
B	BOTTOM
B/	BOTTOM OF
BB	BOTTOM BARS
BO	BOND
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BN	BOUNDARY NAIL
BRG	BEARING
BS	BOTH SIDES
BTWN	BETWEEN
C	CHANNEL
C/C	CENTER TO CENTER
CANT	CANTILEVER
CAP	CAPACITY
CBC	CALIFORNIA BUILDING CODE
CF	CUBIC FEET
CHKD	CHECKED
CI	CANTRACTOR INSTALLED
CJ	CONTRACTION/CONTROL JOINT
CL	CENTERLINE
CLR	CLEAR
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
COORD	COORDINATE
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
CTR/CTR'D	CENTER/CENTERED
d	PENNY (NAIL SIZE)
DBL	DOUBLE
DEG	DEGREES
DET	DETAIL
DF	DOUGLAS FIR
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DISCONT	DISCONTINUE
DL	DEAD LOAD
DN	DOWN
Do	DITTO
DP	DEEP
DWG	DRAWING
DWL	DOWEL
(E)	EXISTING
EA	EACH
EF	EACH FACE
EG	FOR EXAMPLE
EL/ELEV	ELEVATION
EMBED	EMBEDMENT
EN	EDGE NAIL
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
ETC	ET CETERA
EW	EACH WAY
EWEF	EACH WAY EACH FACE
(E)/EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FULL HEIGHT
FIN	FINISH
FL	FLOOR
FLG	FLANGE
FN	FACE NAIL
FND	FOUNDATION
FO	FACE OF
FOM	FACE OF MASONRY
FOW	FACE OF WALL
FRMG	FRAMING
FS	FAR SIDE
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GF	GOVERNMENT FURNISHED
GR	GRADE
GRT	GROUT
GSN	GENERAL STRUCTURAL NOTES
GYP	GYPSUM
HAS	HEADED ANCHOR STUDS
HD	HAND
HEF	HORIZONTAL EACH FACE
HIF	HORIZONTAL INSIDE FACE
HK	HOOK
HM	HOLLOW METAL
HOF	HORIZONTAL OUTSIDE FACE
HORIZ	HORIZONTAL
HP	HIGH POINT
HSS	TUBE STEEL
HT	HEIGHT
ID	INSIDE DIAMETER
IE	THAT IS
INFO	INFORMATION
INT	INTERIOR
INTERMED	INTERMEDIATE
INTERSECT	INTERSECTION
INV	INVERT
IBC	INTERNATIONAL BUILDING CODE
JST	JOIST
JT	JOINT
L	ANGLE
LBS	POUNDS
LG	LONG
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LONGIT/LONGL	LONGITUDINAL
LP	LOW POINT
LT	LEFT
LWR	LOWER
MACH	MACHINE
MAINT	MAINTENANCE
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MC	CHANNEL
MCJT	MASONRY CONTROL JOINT
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MHHW	MEAN HIGHER HIGH WATER
MLLW	MEAN LOWER LOW WATER
MNTG	MOUNTING
MO	MASONRY OPENING
MOD	MODIFIED
MTL	METAL
(N)	NEW
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPG	OPENING
OPP	OPPOSITE
PEB	PRE ENGINEERED BUILDING
PEMB	PRE ENGINEERED METAL BLDG
PL	PLATE
PLCS	PLACES
PLYWD	PLYWOOD
PNL	PANEL
PREFAB	PREFABRICATED
PT	POINT, PRESSURE TREATED
PVMT	PAVEMENT
QTY	QUANTITY
R/RAD	RADIUS
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
RF	ROOF
RM	ROOM
SCHED/SCH	SCHEDULE
SEC	SECTION
SF	SQUARE FEET
SHT	SHEET
SIM	SIMILAR
SP	SPACE/SPACES
SPCG	SPACING
SPEC	SPECIFICATIONS
SST	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STRUCT	STRUCTURAL
SYM	SYMMETRICAL
T	TOP
T/	TOP OF
T&B	TOP AND BOTTOM
TB	TOP OF BAR
THK	THICK
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UHMW	ULTRA HIGH MOLECULAR WEIGHT
UNO	UNLESS NOTED OTHERWISE
UON	UNLESS OTHERWISE NOTED
UPR	UPPER
UT	ULTRASONIC TESTING
VEF	VERTICAL EACH FACE
VERT	VERTICAL
VIF	VERTICAL INSIDE FACE
VOF	VERTICAL OUTSIDE FACE
W/	WITH
W OR WF	WIDE FLANGE (BEAM)
WGT	WEIGHT
W/O	WITHOUT
WP	WORK POINT
WS	WATERSTOP
WT	TEE
&	AND
@	AT
°	DEGREE
Ø	DIAMETER
'	FEET
"	INCHES
#	NUMBER
±	PLUS OR MINUS

STRUCTURAL LEGEND



ANNOTATION



GENERAL SHEET NOTES

1. ABBREVIATIONS ON THIS SHEET APPLY ONLY TO THE STRUCTURAL DRAWINGS, REFER TO OTHER DISCIPLINES FOR APPLICABLE SYMBOLS NOT PROVIDED HERE
2. THIS IS A STANDARD ABBREVIATION AND LEGEND SHEET, THEREFORE, SOME ABBREVIATIONS AND LEGEND SYMBOLS MAY APPEAR ON THIS SHEET AND MAY NOT BE UTILIZED ON THIS PROJECT
3. DO NOT SCALE DRAWINGS

INDEX OF STRUCTURAL DRAWINGS

DWG#	DESCRIPTION	CD
S0.1	STRUCTURAL LEGEND, ABBREVIATIONS AND NOTES	X
S0.2	STRUCTURAL SCHEDULE OF SPECIAL INSPECTIONS	X
S7.10	SRTC COOLING TOWER STRUCTURAL PLAN	X
S7.11	SRTC COOLING TOWER STRUCTURAL ELEVATIONS	X
S9.0	STRUCTURAL DETAILS	X
S9.1	STRUCTURAL DETAILS	X

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REGISTERED PROFESSIONAL ENGINEER 80360PE OREGON JAN. 8, 2008 STEPHEN C. BURNS
EXPIRES: 12/31/2013

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	09/02/12	ISSUED FOR BID AND PERMIT

ISSUE

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

STRUCTURAL LEGEND, ABBREVIATIONS, AND NOTES

PROJ NO: 10909-12002
DRWN: SEB CHKD: CC

S0.1

Plot Date: 1 August 2012 - 4:45 PM Plotted By: Susan Brady Cad File No: N:\US\Portland\Projects\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_09_S0.1-0.dwg

STATEMENT OF SPECIAL INSPECTIONS

STATEMENT OF SPECIAL INSPECTIONS

THIS STATEMENT OF SPECIAL INSPECTIONS IS SUBMITTED AS A CONDITION FOR PERMIT ISSUANCE IN ACCORDANCE WITH THE SPECIAL INSPECTION AND STRUCTURAL TESTING REQUIREMENTS OF THE BUILDING CODE SECTIONS 1704 AND 1705.

THIS STATEMENT OF SPECIAL INSPECTIONS ENCOMPASS THE FOLLOWING DISCIPLINES:

- ☒ STRUCTURAL SPECIAL INSPECTIONS PER 1704 AND 1705
- ☒ STRUCTURAL SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE
- ☐ STRUCTURAL SPECIAL INSPECTIONS FOR WIND RESISTANCE

THE SCHEDULE OF SPECIAL INSPECTIONS SUMMARIZES THE SPECIAL INSPECTIONS AND TEST REQUIRED. SPECIAL INSPECTORS WILL REFER TO THE APPROVED PLANS AND SPECIFICATIONS FOR DETAILED SPECIAL INSPECTION REQUIREMENTS. ANY ADDITIONAL TESTS AND INSPECTIONS REQUIRED BY THE APPROVED PLANS AND SPECIFICATIONS WILL ALSO BE PERFORMED.

THE SPECIAL INSPECTIONS IDENTIFIED ARE IN ADDITION TO THOSE REQUIRED BY OTHER SECTIONS OF THE BUILDING CODE. SPECIAL INSPECTION IS NOT A SUBSTITUTE FOR INSPECTION BY THE BUILDING OFFICIAL/CONTRACTING OFFICER HAVING JURISDICTION OR CONTRACTING OFFICER

THE SPECIAL INSPECTION COORDINATOR SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. DISCOVERED DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF SUCH DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL/CONTRACTING OFFICER AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. THE SPECIAL INSPECTION PROGRAM DOES NOT RELIEVE THE CONTRACTOR OF HIS OR HER RESPONSIBILITIES.

INTERIM REPORTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL OR CONTRACTING OFFICER AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 1704.1.2.

A FINAL REPORT OF SPECIAL INSPECTIONS DOCUMENTING COMPLETION OF ALL REQUIRED SPECIAL INSPECTIONS, TESTING AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS SHALL BE SUBMITTED PRIOR TO ISSUANCE OF A CERTIFICATE OF USE AND OCCUPANCY PER SECTION 1704.1.2. THE FINAL REPORT WILL DOCUMENT THE REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF DISCREPANCIES NOTED IN INSPECTIONS.

JOB SITE SAFETY AND MEANS AND METHODS OF CONSTRUCTION ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR IS REQUIRED TO COORDINATE ALL INSPECTIONS. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE AND THE SPECIAL INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO ANY SPECIAL INSPECTIONS THAT ARE REQUIRED. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE AND THE SPECIAL INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO ANY CONCRETE TO BE POURED.

THE INSPECTORS AND TESTING AGENCIES SHALL BE ENGAGED BY THE OWNER OR THE OWNER'S AGENT, AND NOT BY THE CONTRACTOR OR SUBCONTRACTOR WHOSE WORK IS TO BE INSPECTED OR TESTED PER SECTION 1704.1. ANY CONFLICT OF INTEREST MUST BE DISCLOSED TO THE BUILDING OFFICIAL/CONTRACTING OFFICER, PRIOR TO COMMENCING WORK. IF APPROPRIATE AGENTS ARE NOTED AS "TO BE DETERMINED (TBD), THE OWNER IS RESPONSIBLE TO COORDINATE THE ASSEMBLY OF A SPECIAL INSPECTION TEAM. ALL SPECIAL INSPECTORS AND TESTING LABORATORIES SHALL BE SUBMITTED TO GHD AND THE BUILDING OFFICIAL / CONTRACTING OFFICE FOR REVIEW.

SPECIALLY INSPECTED WORK THAT IS INSTALLED OR COVERED WITHOUT THE APPROVAL OF THE BUILDING OFFICIAL/CONTRACTING OFFICER IS SUBJECT TO REMOVAL OR EXPOSURE.

CONTINUOUS INSPECTION IS ALWAYS REQUIRED DURING THE PERFORMANCE OF THE WORK UNLESS OTHERWISE SPECIFIED. WHEN WORK IN MORE THAN ONE CATEGORY OF WORK REQUIRING SPECIAL INSPECTION IS TO BE PERFORMED SIMULTANEOUSLY, OR THE GEOGRAPHIC LOCATION OF THE WORK IS SUCH THAT IT CANNOT BE CONTINUOUSLY OBSERVED, IT IS THE AGENT'S RESPONSIBILITY TO EMPLOY A SUFFICIENT NUMBER OF INSPECTORS TO ASSURE THAT ALL THE WORK IS INSPECTED IN ACCORDANCE WITH THE PROVISIONS OF THE BUILDING CODE.

QUALIFICATIONS OF INSPECTORS AND TESTING TECHNICIANS

THE QUALIFICATIONS OF ALL PERSONNEL PERFORMING SPECIAL INSPECTION AND TESTING ACTIVITIES ARE SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL. THE CREDENTIALS OF ALL INSPECTORS AND TESTING TECHNICIANS SHALL BE PROVIDED IF REQUESTED.

KEY FOR MINIMUM QUALIFICATIONS OF INSPECTION AGENTS:

WHEN THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE DEEMS IT APPROPRIATE THAT THE INDIVIDUAL PERFORMING A STIPULATED TEST OR INSPECTION HAVE A SPECIFIC CERTIFICATION OR LICENSE AS INDICATED BELOW, SUCH DESIGNATION SHALL APPEAR BELOW THE *AGENCY NUMBER* ON THE SCHEDULE.

PE/SE	STRUCTURAL ENGINEER - A LICENSED SE OR PE SPECIALIZING IN THE DESIGN OF BUILDING STRUCTURES
PE/GE	GEOTECHNICAL ENGINEER - A LICENSED GE OR PE SPECIALIZING IN SOIL MECHANICS AND FOUNDATIONS
EIT	ENGINEER-IN-TRAINING - A GRADUATE ENGINEER WHO HAS PASSED THE FUNDAMENTALS OF ENGINEERING EXAMINATION

AMERICAN CONCRETE INSTITUTE (ACI) CERTIFICATION

ACI-CFTT	CONCRETE FIELD TESTING TECHNICIAN - GRADE 1
ACI-CCI	CONCRETE CONSTRUCTION INSPECTOR
ACI-LTT	LABORATORY TESTING TECHNICIAN - GRADE 1&2
ACI-STT	STRENGTH TESTING TECHNICIAN

AMERICAN WELDING SOCIETY (AWS) CERTIFICATION

AWS-CWI	CERTIFIED WELDING INSPECTOR
AWS/AISC-SSI	CERTIFIED STRUCTURAL STEEL INSPECTOR

INTERNATIONAL CODE COUNCIL (ICC) CERTIFICATION

ICC-SMSI	STRUCTURAL MASONRY SPECIAL INSPECTOR
ICC-SWSI	STRUCTURAL STEEL AND WELDING SPECIAL INSPECTOR
ICC-SFSI	SPRAY-APPLIED FIREPROOFING SPECIAL INSPECTOR
ICC-PCSI	PRESTRESSED CONCRETE SPECIAL INSPECTOR
ICC-RCSI	REINFORCED CONCRETE SPECIAL INSPECTOR

SCHEDULE OF INSPECTION AND TESTING AGENCIES

THIS STATEMENT OF SPECIAL INSPECTIONS / QUALITY ASSURANCE PLAN INCLUDES THE FOLLOWING BUILDING SYSTEMS:

☒ SOILS AND FOUNDATIONS	☐ WOOD CONSTRUCTION
☒ CAST-IN-PLACE CONCRETE	☐ MECHANICAL & ELECTRICAL SYSTEMS
☐ PRECAST CONCRETE	☐ ARCHITECTURAL SYSTEMS
☐ MASONRY LEVEL 1	☒ STRUCTURAL STEEL
☐ MASONRY LEVEL 2	☐ COLD-FORMED STEEL FRAMING

SPECIAL INSPECTION AGENCIES	FIRM AND CONTACT INFO.
1. SPECIAL INSPECTION COORDINATOR	TBD
2. INSPECTOR	TBD
3. INSPECTOR	TBD
4. TESTING AGENCY	TBD
5. TESTING AGENCY	TBD
6. OTHER	TBD

TABLE 1704.7 - INSPECTION OF SOILS

Item	Description	Agency # (Qualif.)
ITEM 1:	VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIRED BEARING CAPACITY. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** PE/GE
ITEM 2:	VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** PE/GE
ITEM 3:	PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS. PERFORM SIEVE TESTS (ASTM D422 & D1140); ATTERBERG LIMIT TEST (ASTM D4318) AND MODIFIED PROCTOR TESTS (ASTM D1557) OF EACH SOURCE OF FILL MATERIAL. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** PE/GE
ITEM 4:	VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF CONTROLLED FILL. TEST DENSITY OF EACH LIFT OF FILL BY NUCLEAR METHODS (ASTM D6938) OR SAND CONE (ASTM D1556). VERIFY EXTENT AND SLOPE OF FILL PLACEMENT. VERIFY COMPACTION OF FILL AND BACKFILL MATERIAL TO 95 PERCENT OF ASTM D 1557. TEST EACH LIFT AT RANDOMLY SELECTED LOCATIONS EVERY 1000 SQUARE FEET OF FILL OR 50 LINEAR FOOT OF WALL OR CONTINUOUS FOOTING, WHICHEVER IS GREATER. PERFORM A MINIMUM OF ONE TEST PER ISOLATED FOOTING. PERFORM 3 TEST MINIMUM PER LIFT. ☐ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** PE/GE
ITEM 5:	PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** PE/GE

SEE GENERAL STRUCTURAL NOTES AND/OR BID DOCUMETNS FOR REFERENCE GEOTECHNICAL REPORT.

TABLE 1704.4 - CONCRETE

Item	Description	Agency # (Qualif.)
ITEM 1:	INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS AND PLACEMENT. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 2:	INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1704.3, ITEM 5B. ☒ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** AWS-CWI
ITEM 3:	INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE ☐ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 4:	VERIFYING USE OF REQUIRED DESIGN MIX. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 5:	AT TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE. ☐ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CFTT, ACI-STT
ITEM 6:	INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES. ☐ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 7:	INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 8:	INSPECTION OF PRESTRESSED CONCRETE. SCOPE: A. APPLICATION OF PRESTRESSING FORCES. ☐ PERIODIC ☒ CONTINUOUS B. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE-RESISTING SYSTEM. ☐ PERIODIC ☒ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 9:	ERECTION OF PRECAST CONCRETE MEMBERS. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI
ITEM 10:	VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POSTENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CFTT, ACI-STT
ITEM 11:	INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED. ☒ PERIODIC ☐ CONTINUOUS	**AGENCY # (QUALIF.):** ACI-CCI, ICC-RCSI

SECTION 1704.2, 1704.3 - STEEL

ITEM 1: TABLE 1704.3 - MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS. — **AGENCY # (QUALIF.):** AWS/AISC-SSI, ICC-SWSI

SCOPE:
- A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS. ☒ PERIODIC ☐ CONTINUOUS
- B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED. ☒ PERIODIC ☐ CONTINUOUS

ITEM 2: TABLE 1704.3 - INSPECTION OF HIGH-STRENGTH BOLTING: — **AGENCY # (QUALIF.):** AWS/AISC-SSI, ICC-SWSI

SCOPE:
- A. BEARING-TYPE CONNECTIONS. ☒ PERIODIC ☐ CONTINUOUS
- B. SLIP-CRITICAL CONNECTIONS ☒ PERIODIC ☒ CONTINUOUS

ITEM 3: TABLE 1704.3 - MATERIAL VERIFICATION OF STRUCTURAL STEEL — **AGENCY # (QUALIF.):** PE/SE

SCOPE:
- A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED DOCUMENTS. ☒ PERIODIC ☐ CONTINUOUS
- B. MANUFACTURER'S MILL TEST REPORTS ☒ PERIODIC ☐ CONTINUOUS

ITEM 4: TABLE 1704.3 - MATERIAL VERIFICATION OF WELD FILLER MATERIALS. — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

SCOPE:
- A. IDENTIFICATION MARKINGS TO CONFORM TO AWS DESIGNATION LISTED IN THE WPS. ☒ PERIODIC ☐ CONTINUOUS
- B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED. ☒ PERIODIC ☐ CONTINUOUS

ITEM 5: TABLE 1704.3 - INSPECTION OF WELDING: — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

SCOPE:
- A. STRUCTURAL STEEL
  - 1) COMPLETE AND PARTIAL PENETRATION GROOVE WELDS. ☐ PERIODIC ☒ CONTINUOUS
  - 2) MULTIPASS FILLET WELDS. ☐ PERIODIC ☒ CONTINUOUS
  - 3) SINGLE-PASS FILLET WELDS > 5/16". ☐ PERIODIC ☒ CONTINUOUS
  - 4) SINGLE-PASS FILLET WELDS <= 5/16". ☒ PERIODIC ☐ CONTINUOUS
  - 5) FLOOR AND ROOF DECK WELDS. ☒ PERIODIC ☐ CONTINUOUS
- B. REINFORCING STEEL
  - 1) VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A706. ☒ PERIODIC ☐ CONTINUOUS
  - 2) REINFORCING STEEL-RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL REINFORCED CONCRETE SHEAR WALLS, AND SHEAR REINFORCEMENT. ☐ PERIODIC ☒ CONTINUOUS
  - 3) SHEAR REINFORCEMENT ☐ PERIODIC ☒ CONTINUOUS
  - 4) OTHER REINFORCING STEEL ☒ PERIODIC ☐ CONTINUOUS

ITEM 6: TABLE 1704.3 - INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS: — **AGENCY # (QUALIF.):** PE/SE

SCOPE: INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:
- A) DETAILS SUCH AS BRACING AND STIFFENING. ☒ PERIODIC ☐ CONTINUOUS
- B) MEMBER LOCATIONS. ☒ PERIODIC ☐ CONTINUOUS
- C) APPLICATION OF JOINT DETAILS AT EACH CONNECTION. ☒ PERIODIC ☐ CONTINUOUS

ITEM 7: SECTION 1704.3 WELDED STUDS WHEN USED FOR STRUCTURAL DIAPHRAGMS: ☒ PERIODIC ☐ CONTINUOUS — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

ITEM 8: SECTION 1704.3 - WELDING OF COLD-FORMED SHEET STEEL FRAMING MEMBERS: ☒ PERIODIC ☐ CONTINUOUS — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

ITEM 9: SECTION 1704.3 - WELDING OF STAIRS AND RAILING SYSTEMS: ☒ PERIODIC ☐ CONTINUOUS — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

ITEM 10: SECTION 1704.2.1 - INSPECT FABRICATORS FABRICATION AND QUALITY CONTROL PROCEDURES. ☒ PERIODIC ☐ CONTINUOUS — **AGENCY # (QUALIF.):** AWS-CWI, ASNT

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REGISTERED PROFESSIONAL ENGINEER 80360PE OREGON JAN. 8, 2008 STEPHEN C. BURNS
EXPIRES: 12/31/2013

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT
		ISSUE

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

STRUCTURAL SCHEDULE OF SPECIAL INSPECTIONS

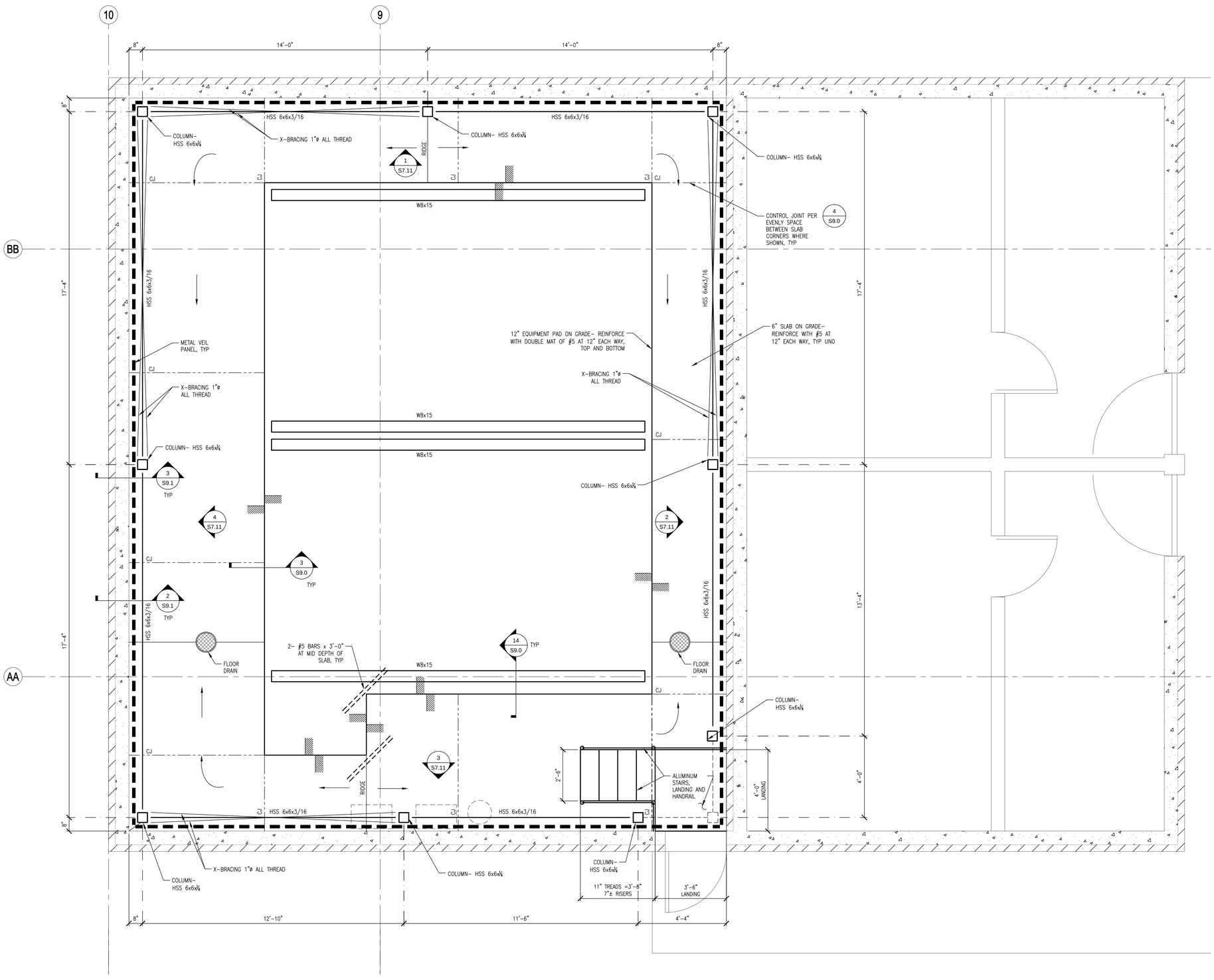
PROJ NO:	10909-12002
DRWN: SEB	CHKD: CC

S0.2

Plot Date: 1 August 2012 - 4:49 PM Plotted By: Susan Brady Cad File No: N:\US\Portland\Projects\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_10_S0.2-0.dwg

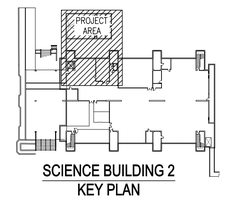
SHEET GENERAL NOTES

1. FIELD VERIFY ALL DIMENSIONS
2. ←— INDICATES SLAB SLOPE, SLOPE SLAB MINIMUM 1% TO FLOOR DRAINS
3. SEE TYPICAL DETAILS DRAWING S9.0



1 S7.10 SB2 B1 LEVEL STRUCTURAL PLAN
SCALE: 1/2" = 1'–0"

N



1/2" = 1'–0" 1' 0 1' 2' 3' 4' 5' 6' 7' 8'

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REGISTERED PROFESSIONAL ENGINEER — OREGON — JANUARY 8, 1988 — MATTHEW C. BARNES
EXPIRES: 12/31/2013

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

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PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

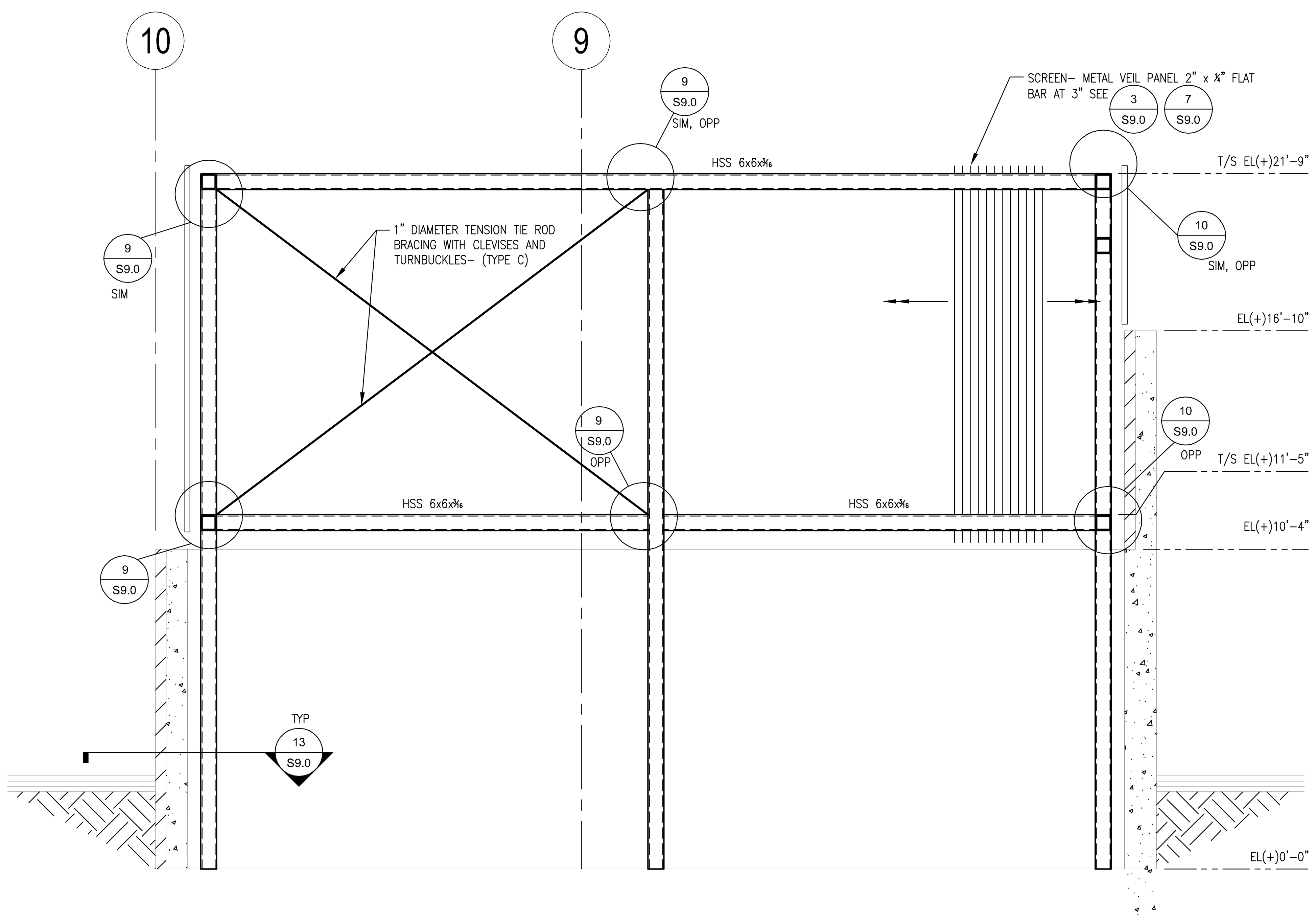
SRTC COOLING TOWER STRUCTURAL PLAN

PROJ NO: 10909-12002
DRWN: SEB CHKD: CC

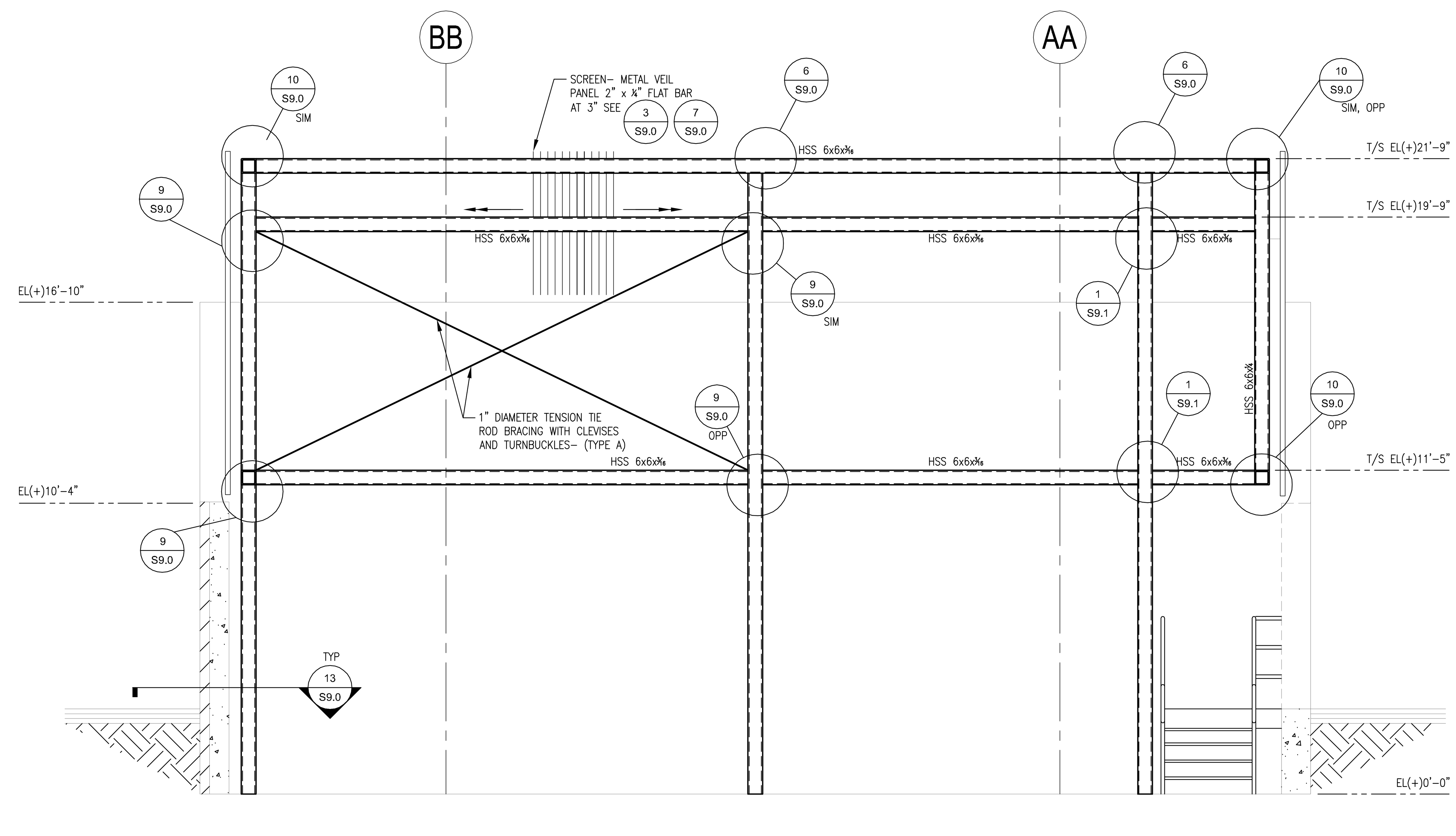
S7.10

SHEET 11 OF 17

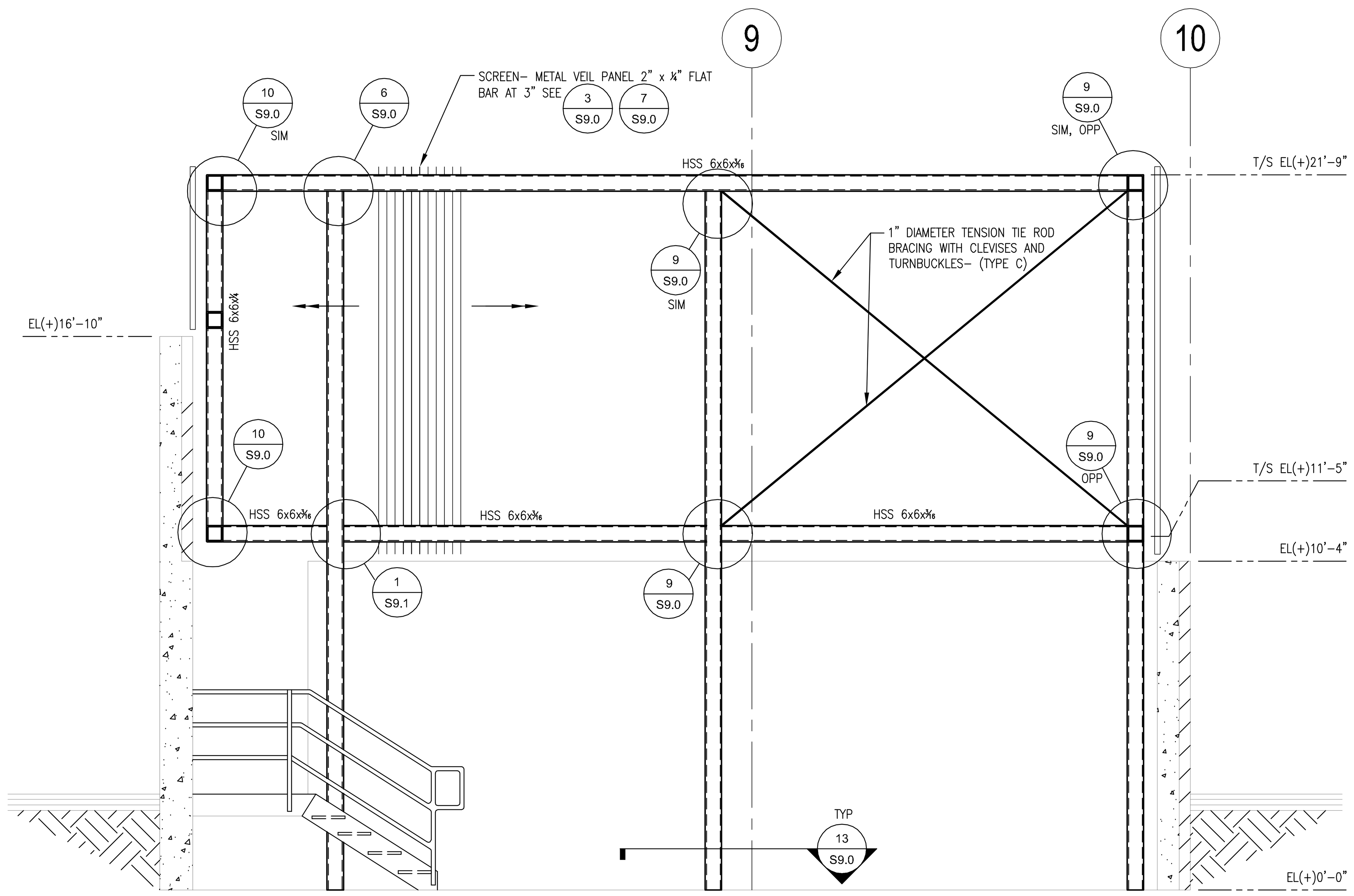
Plot Date: 1 August 2012 - 4:53 PM Plotted By: Susan Brady
Cad File No: N:\US\Portland\Projects\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_11_S7.10-0.dwg



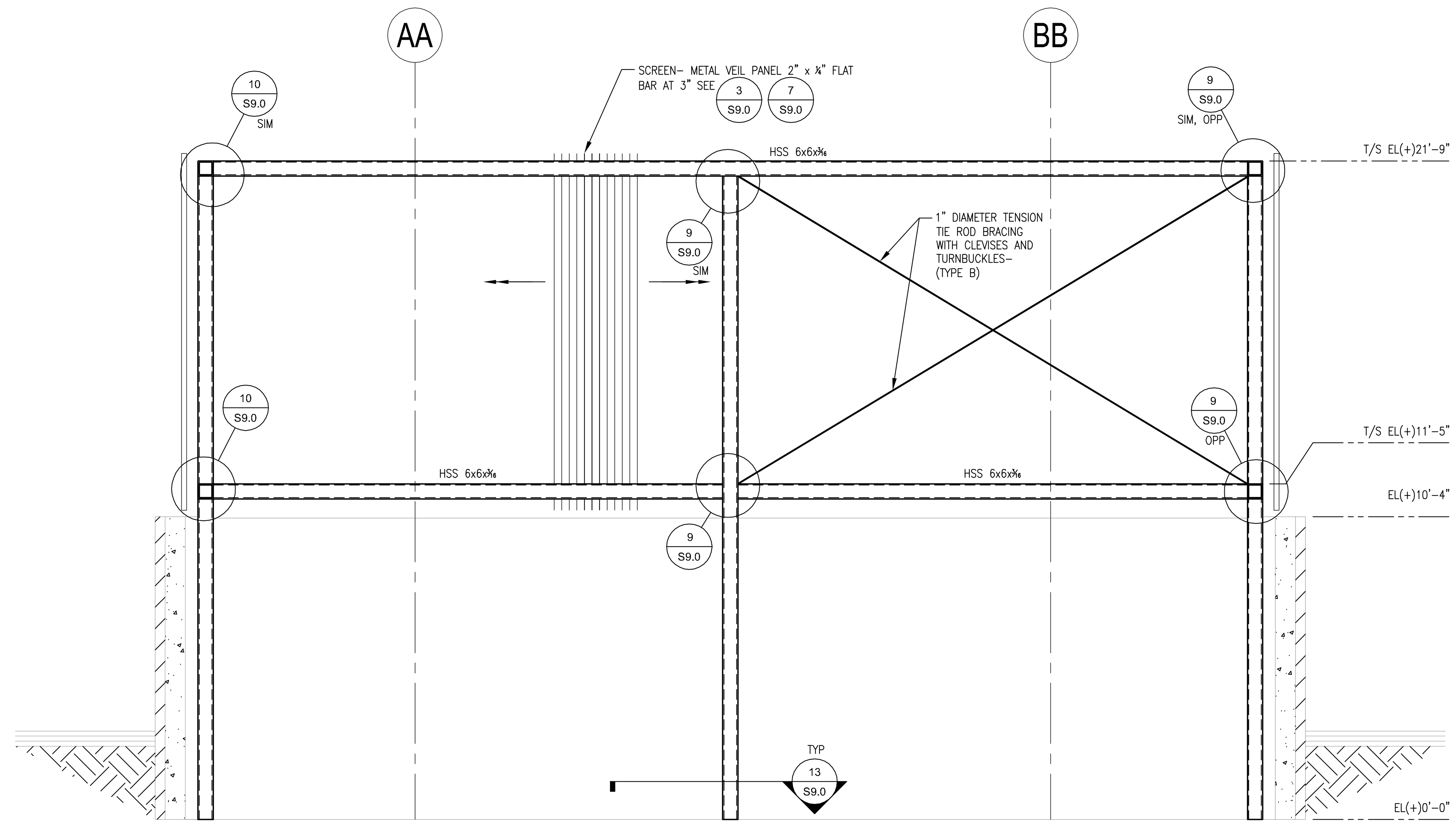
1 WALL ELEVATION
S7.11 SCALE: 3/8" = 1'-0"



2 WALL ELEVATION
S7.11 SCALE: 3/8" = 1'-0"



3 WALL ELEVATION
S7.11 SCALE: 3/8" = 1'-0"



4 WALL ELEVATION
S7.11 SCALE: 3/8" = 1'-0"

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BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

ISSUE

PORTLAND STATE UNIVERSITY SRTC BUILDING (SB2) COOLING TOWER REPLACEMENT

SRTC COOLING TOWER STRUCTURAL ELEVATIONS

PROJ NO: 10909-12002
DRWN: SEB CHKD: CC

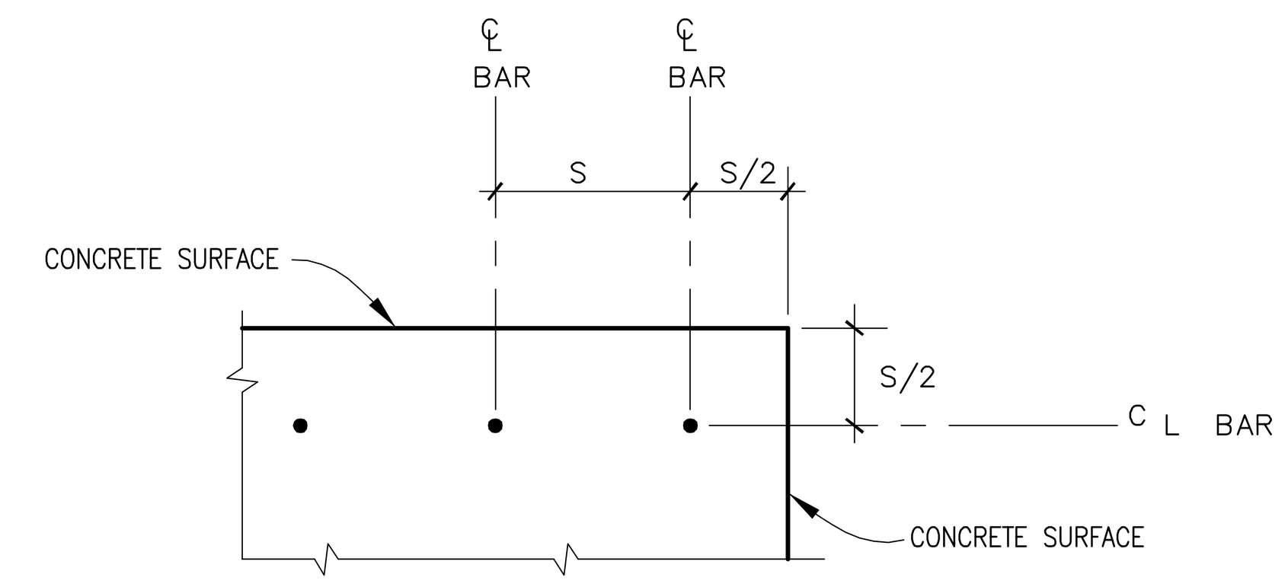
S7.11

SHEET 12 OF 17

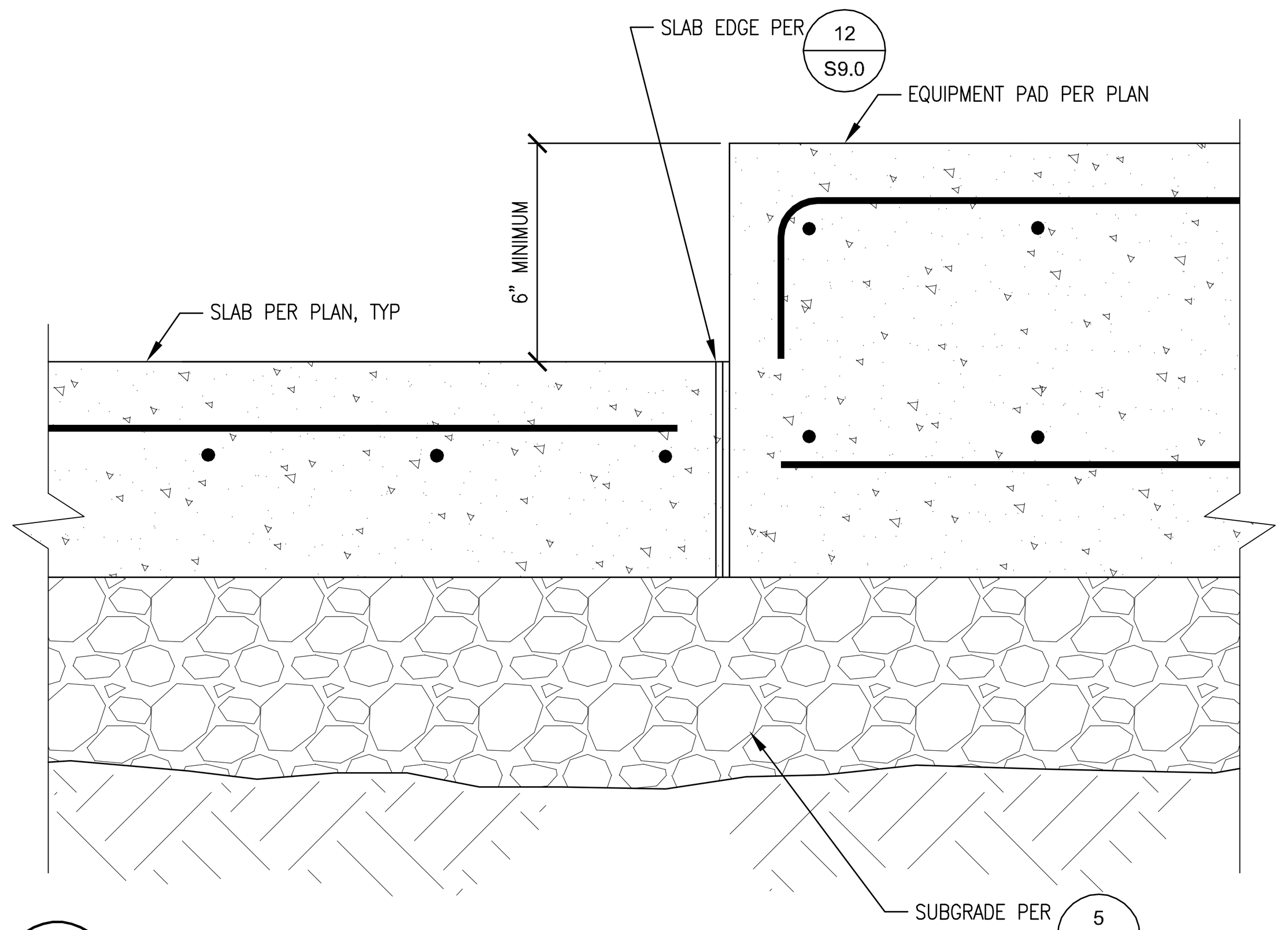
DEVELOPMENT LENGTH (ℓ_d)												
BAR SIZE	3000 PSI CONC (f'c)				4000 PSI CONC (f'c)				5000 PSI CONC (f'c)			
	TOP		OTHER		TOP		OTHER		TOP		OTHER	
	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"
#3	13	22	12	17	12	19	12	15	12	17	12	13
#4	18	29	14	22	15	25	12	19	14	23	12	17
#5	22	36	17	28	19	31	15	24	17	28	13	22
#6	26	43	20	33	23	37	18	29	20	34	16	26
#7	38	63	29	48	33	54	25	42	29	49	23	38
#8	43	72	33	55	37	62	29	48	34	56	26	43
#9	49	81	37	62	42	70	33	54	38	63	29	48
#10	56	89	43	69	49	78	38	60	44	69	34	54
#11	68	98	52	76	59	85	45	66	53	76	41	59
TENSION LAP SPLICE LENGTH (CLASS 'B' SPLICE)												
BAR SIZE	3000 PSI CONC (f'c)				4000 PSI CONC (f'c)				5000 PSI CONC (f'c)			
	TOP		OTHER		TOP		OTHER		TOP		OTHER	
	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"	s ≥ 6"	s < 6"
#3	17	28	16	22	16	25	16	19	16	22	16	17
#4	23	38	18	29	20	33	16	25	18	29	16	23
#5	28	47	22	36	25	41	19	31	22	36	17	28
#6	34	56	26	43	29	49	23	38	26	44	20	34
#7	49	82	38	63	43	71	33	55	38	63	30	49
#8	56	93	43	72	49	81	38	62	44	72	34	56
#9	63	105	49	81	55	91	42	70	49	81	38	63
#10	73	116	56	90	63	101	49	78	57	90	44	70
#11	88	128	68	99	76	111	59	85	68	99	53	76

NOTES:

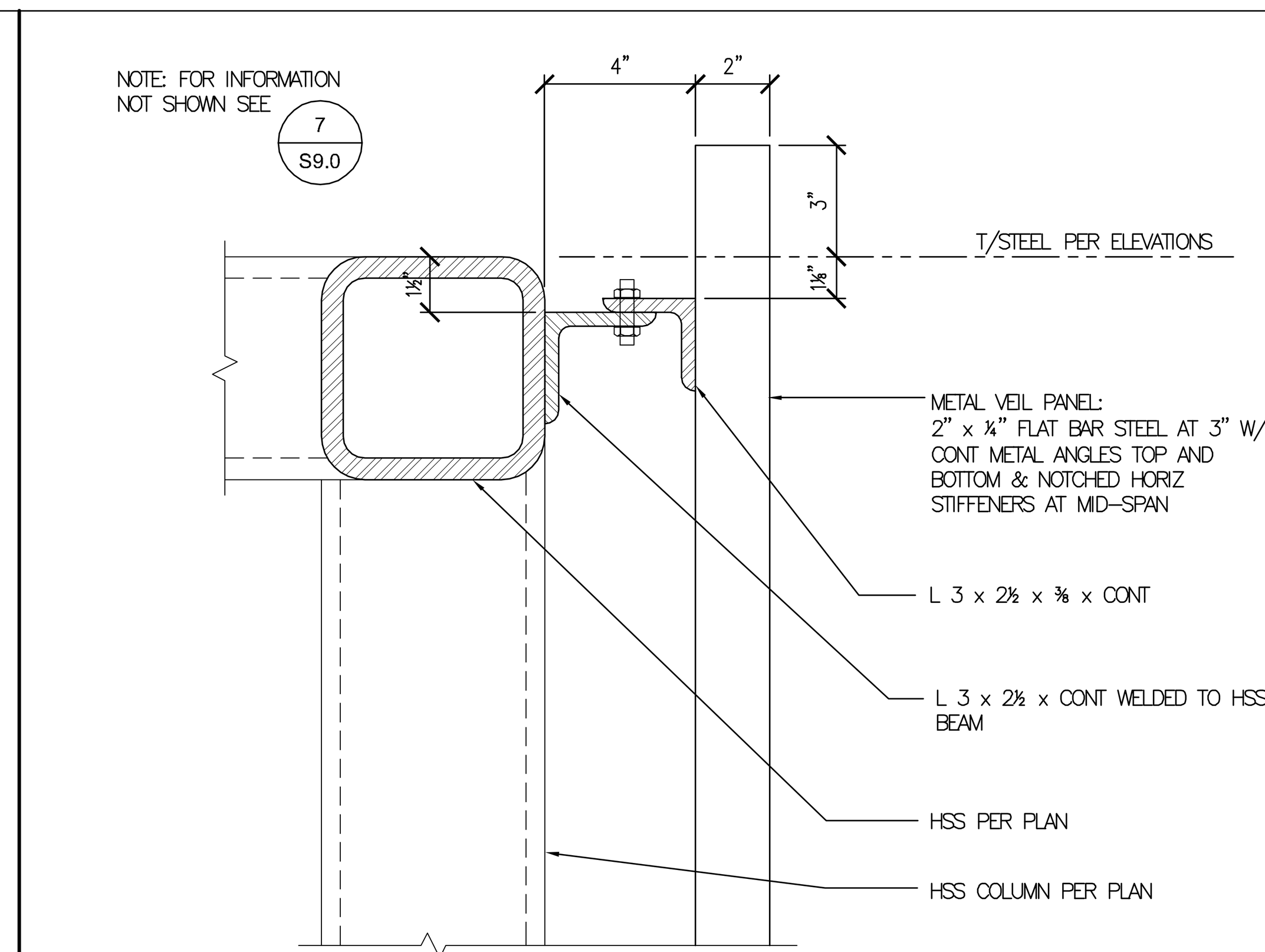
1. LENGTHS SHOWN ARE FOR GRADE 60 UNCOATED BARS.
2. LENGTHS SHOWN ARE IN INCHES.
3. INCREASE LENGTHS 30% FOR LIGHT WEIGHT CONCRETE
4. TOP BARS: HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW THEM.
5. THE QUANTITY 'S' IS DEFINED AS FOLLOWS:



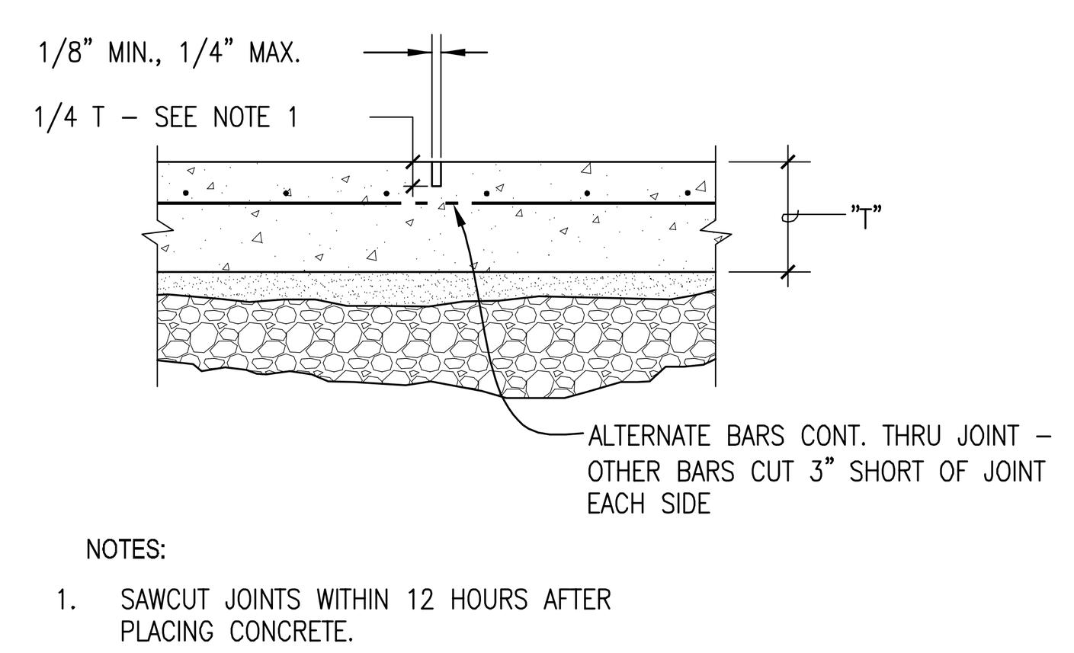
1 / S9.0 TYPICAL BAR DEVELOPMENT LENGTHS AND LAP SPLICE LENGTHS
SCALE: NONE



2 / S9.0 EQUIPMENT PAD SECTION
SCALE: 3"=1'-0"



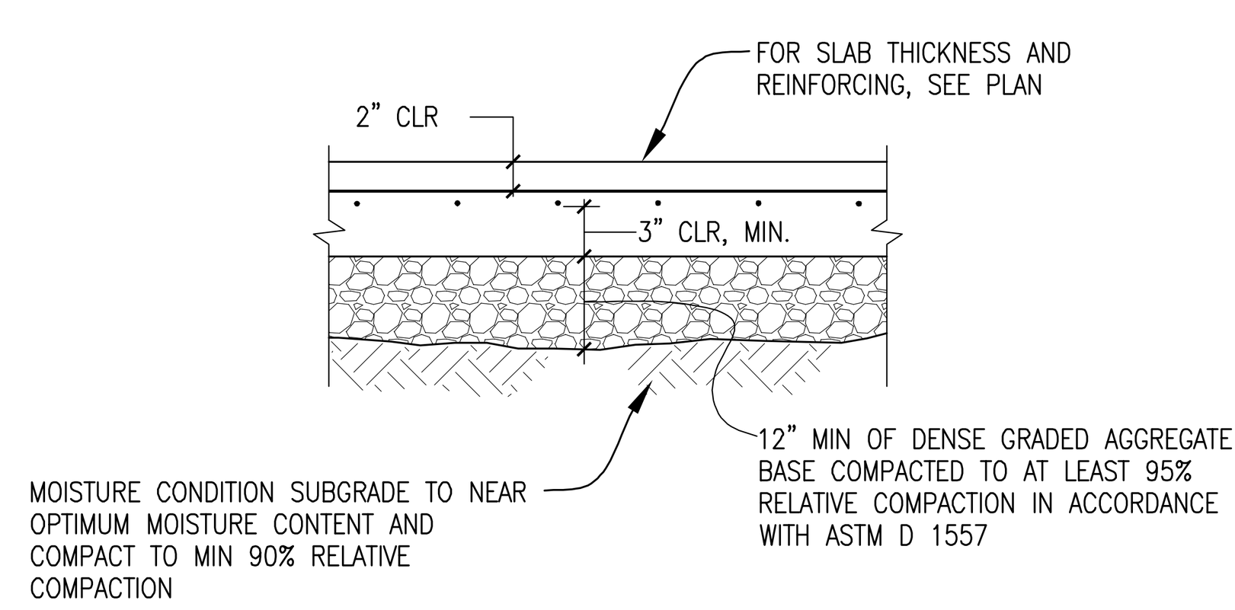
3 / S9.0 VEIL SECTION
SCALE: 3"=1'-0"



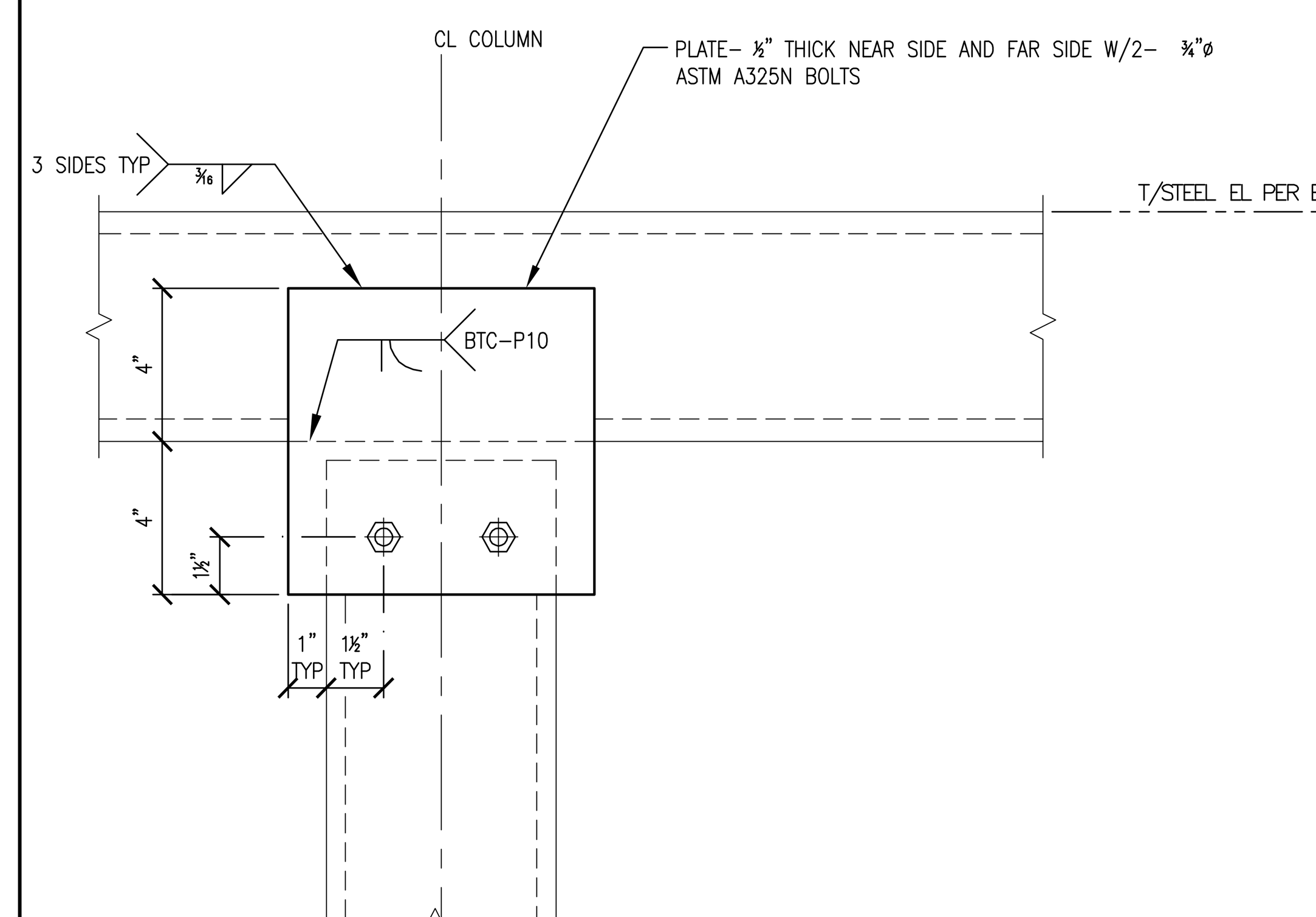
NOTES:

1. SAWCUT JOINTS WITHIN 12 HOURS AFTER PLACING CONCRETE.

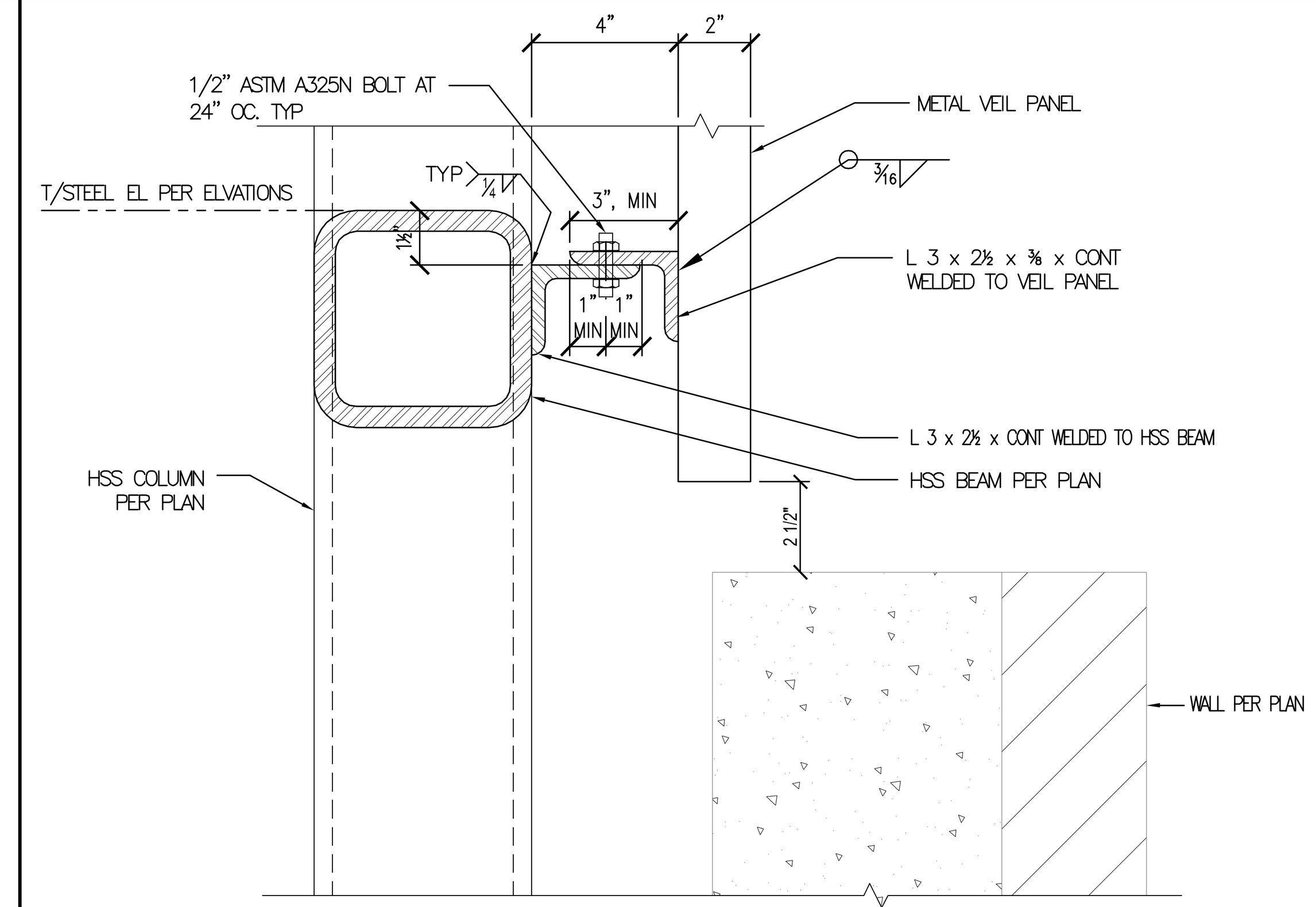
4 / S9.0 TYPICAL SLAB ON GRADE CONTROL JOINT
SCALE: NOT TO SCALE



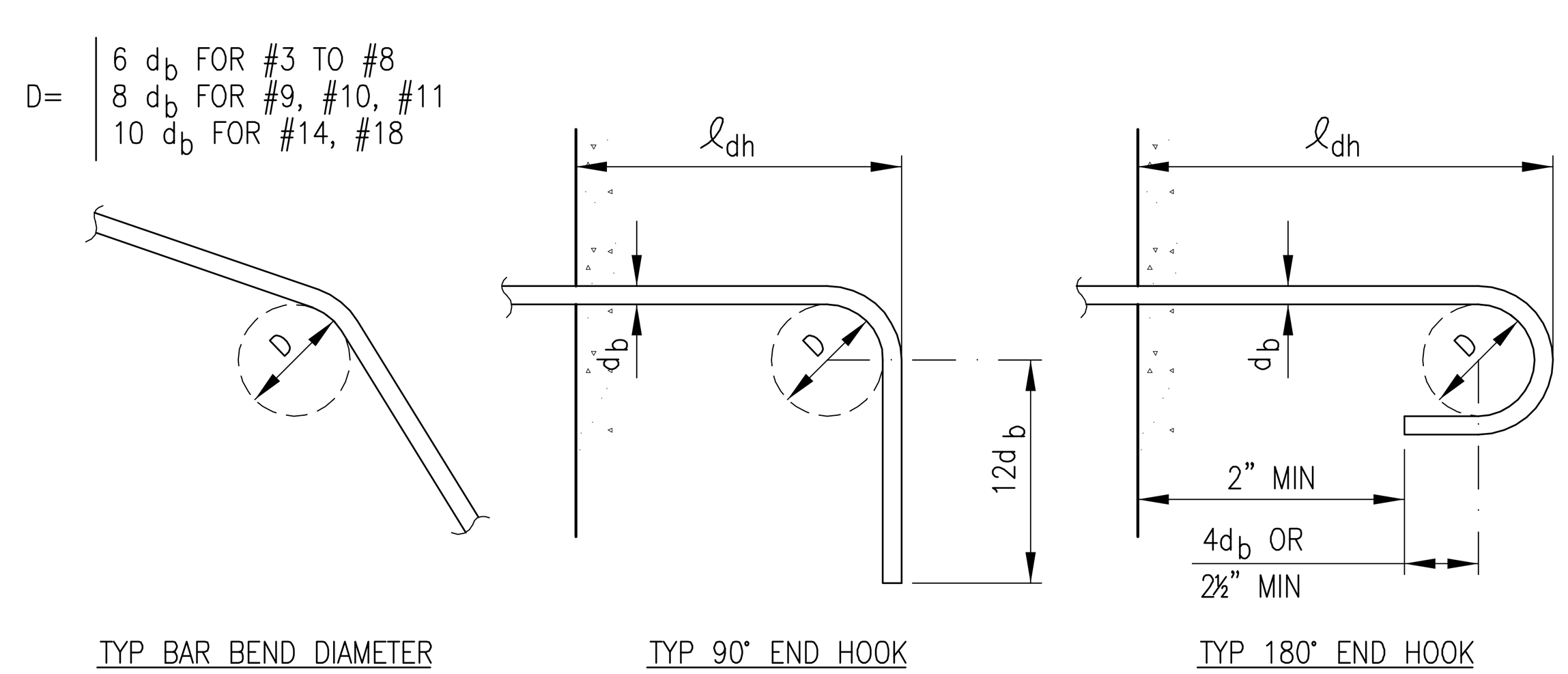
5 / S9.0 TYPICAL EXTERIOR SLAB ON GRADE
SCALE: NOT TO SCALE



6 / S9.0 VEIL SUPPORT DETAIL
SCALE: 3"=1'-0"

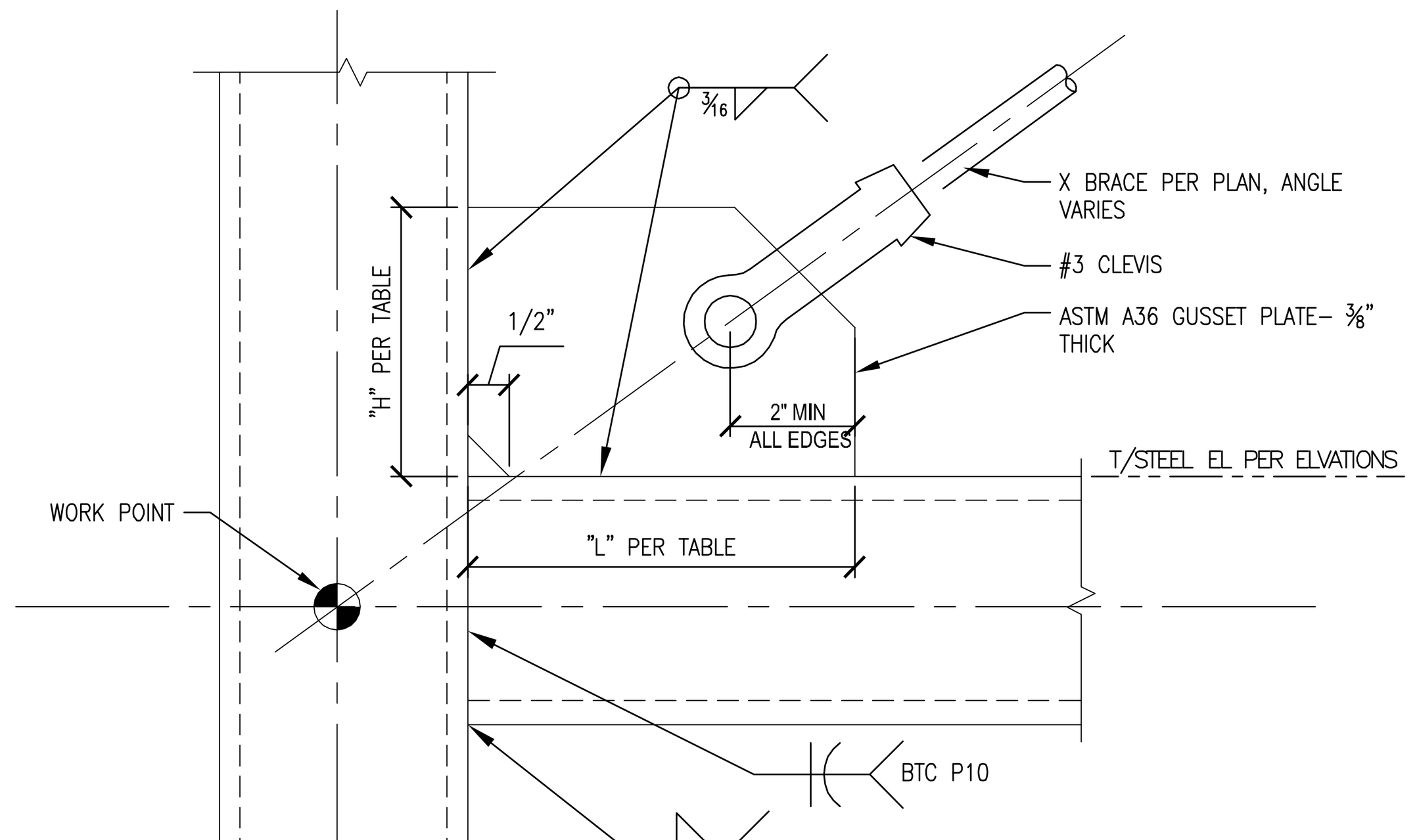


7 / S9.0 VEIL SECTION
SCALE: 3"=1'-0"



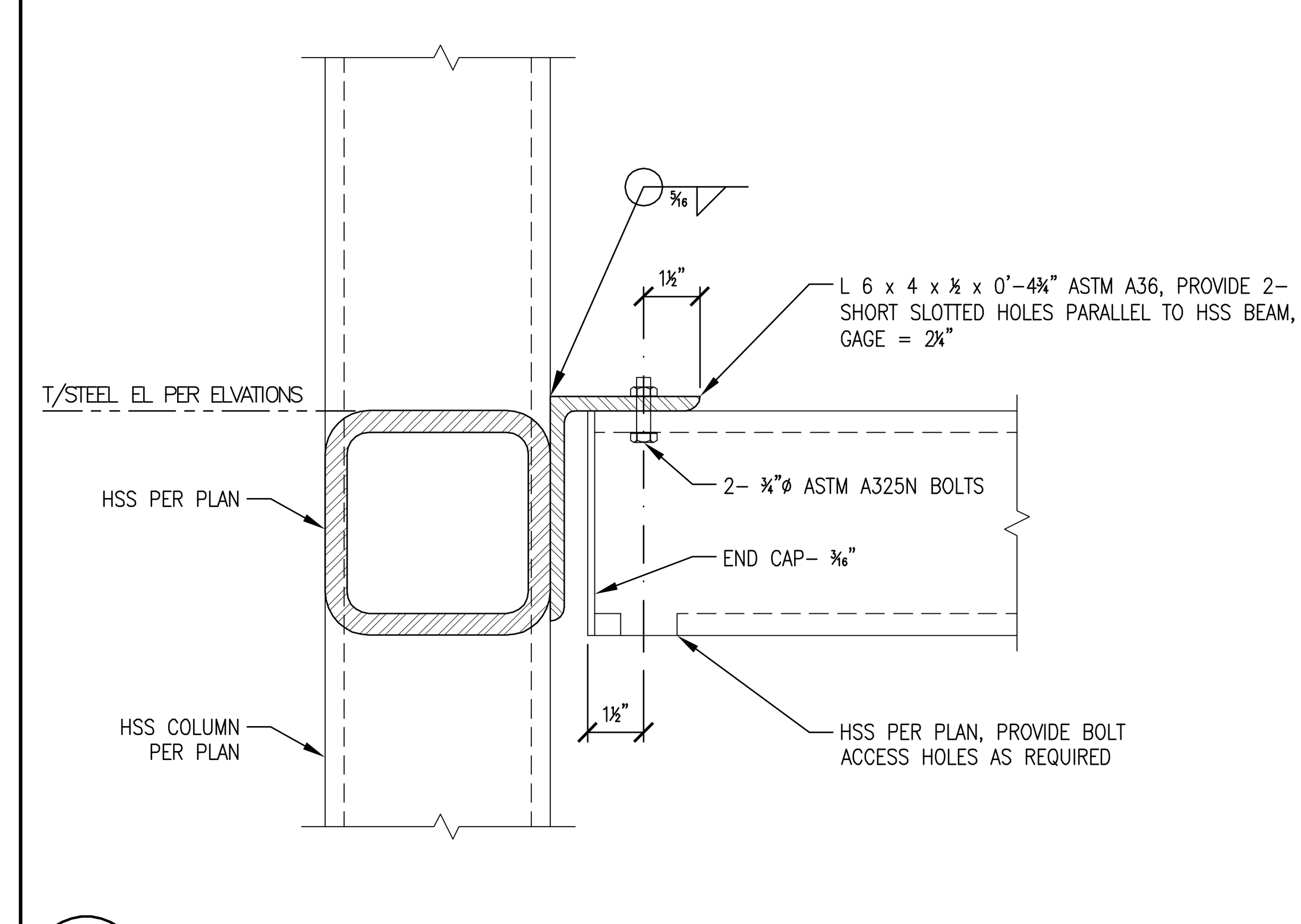
MINIMUM TENSION EMBEDMENT LENGTHS ℓ_{dh} (IN.) FOR STANDARD END HOOKS ON REINFORCING BARS				
BAR SIZE	NORMAL WEIGHT CONCRETE, f'c, PSI			
	3000	4000	5000	6000
#3	6	6	6	6
#4	8	7	6	6
#5	10	9	8	7
#6	12	10	9	9
#7	14	12	11	10
#8	16	14	12	11
#9	18	15	14	13
#10	20	17	16	14
#11	22	19	17	16
#14	38	33	29	27
#18	50	43	39	35

8 / S9.0 TYPICAL REINFORCING BAR BENDS AND STANDARD HOOKS
SCALE: NOT TO SCALE

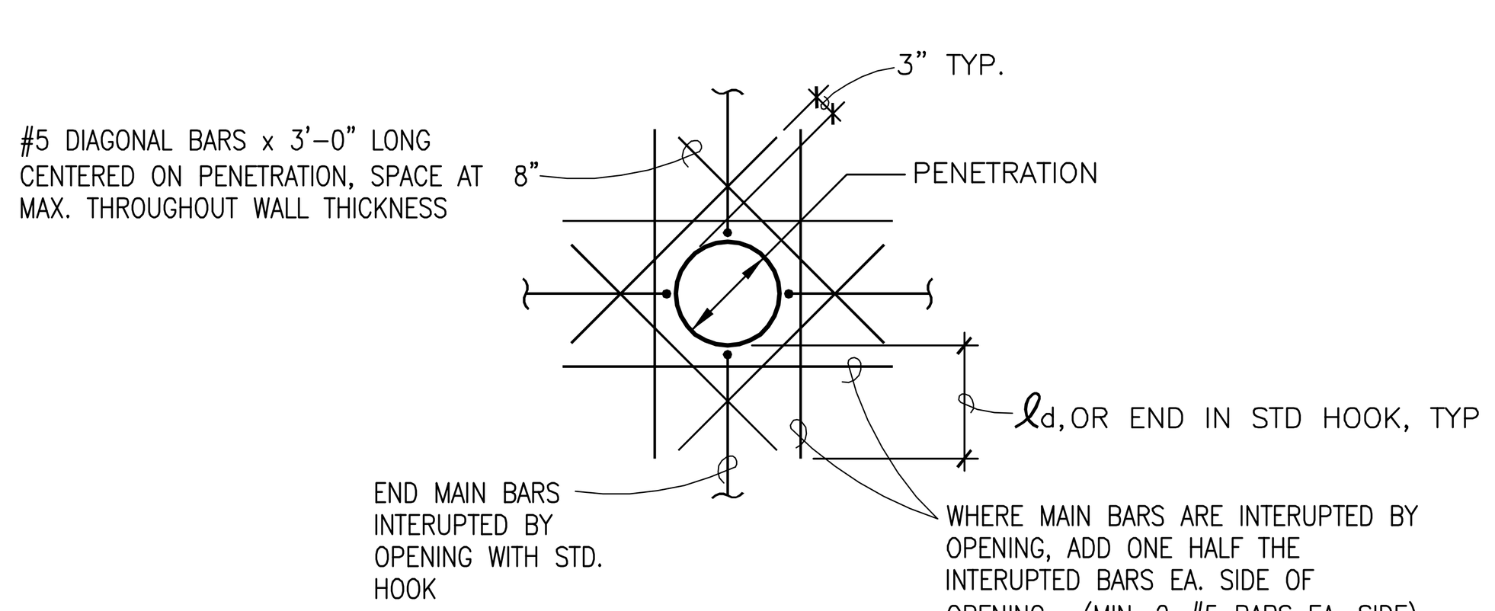


BRACE	L	H
A	15"	4"
B	10 1/4"	4"
C	6"	4"

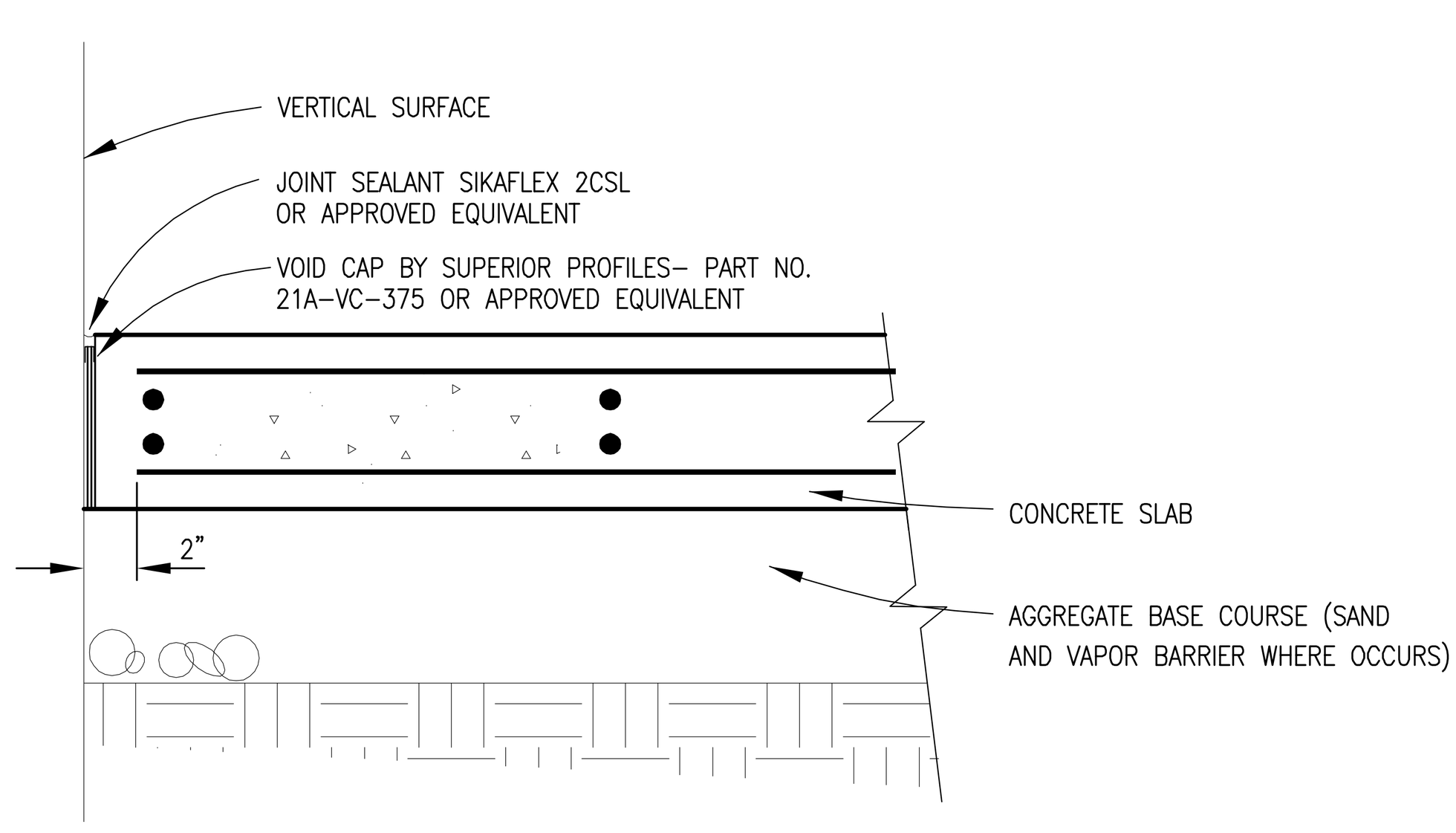
9 / S9.0 VEIL SUPPORT DETAIL
SCALE: 3"=1'-0"



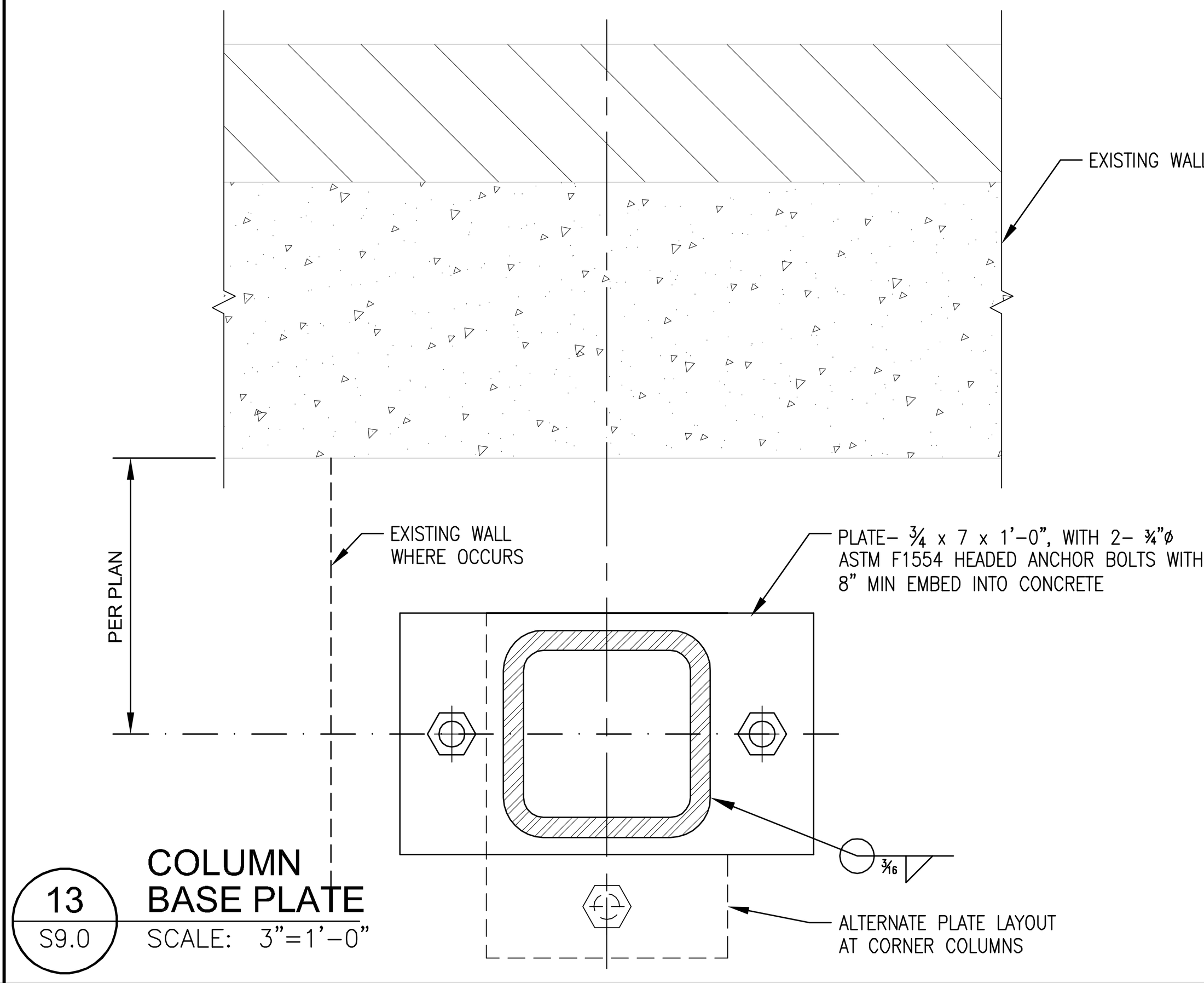
10 / S9.0 VEIL SUPPORT DETAIL
SCALE: 3"=1'-0"



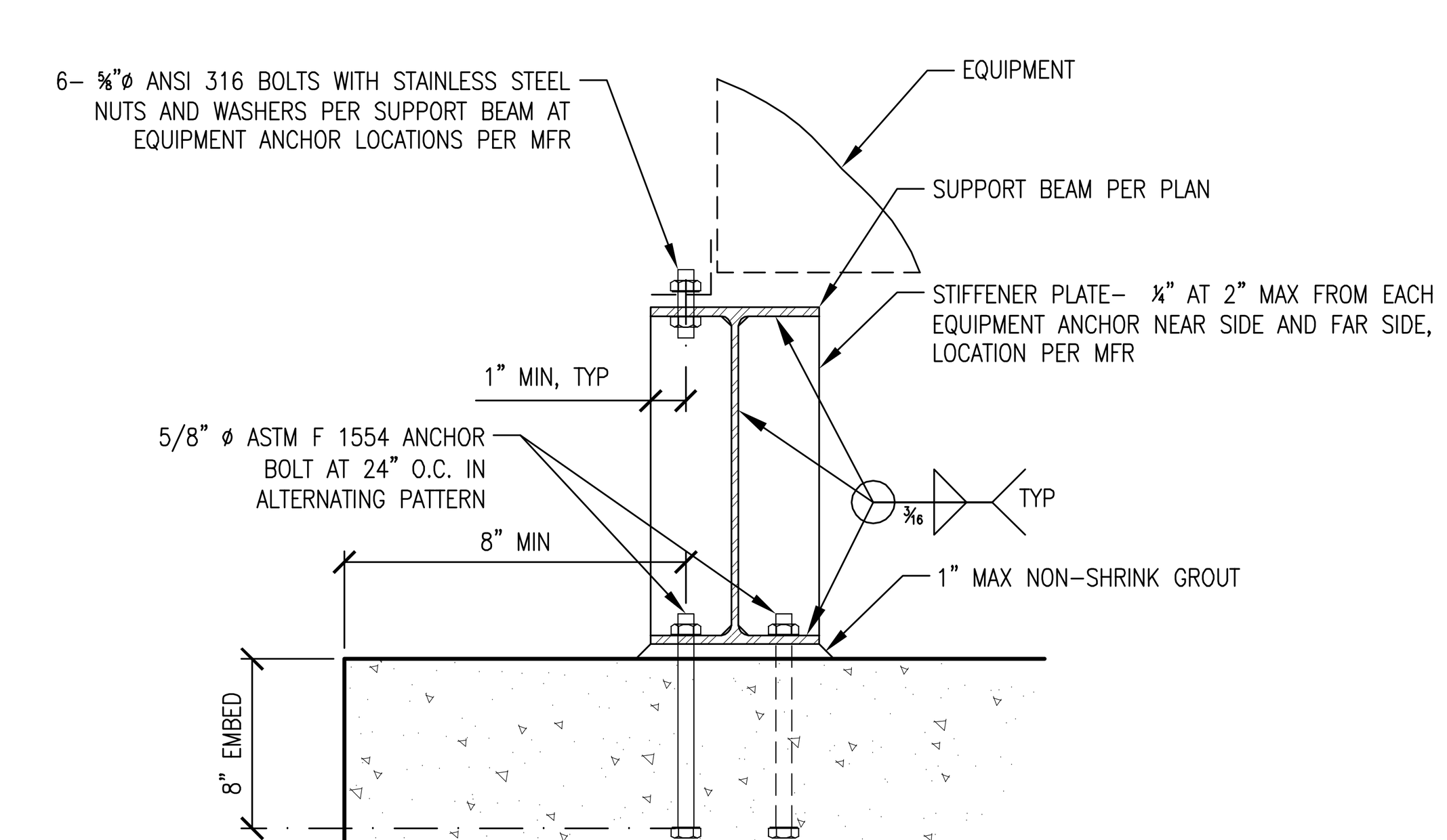
11 / S9.0 TYPICAL PIPE PENETRATION
SCALE: NOT TO SCALE



12 / S9.0 TYPICAL CONCRETE SLAB EDGE
SCALE: NOT TO SCALE



13 / S9.0 COLUMN BASE PLATE
SCALE: 3"=1'-0"



14 / S9.0 EQUIPMENT SUPPORT DETAIL
SCALE: 3"=1'-0"

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0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

ISSUE

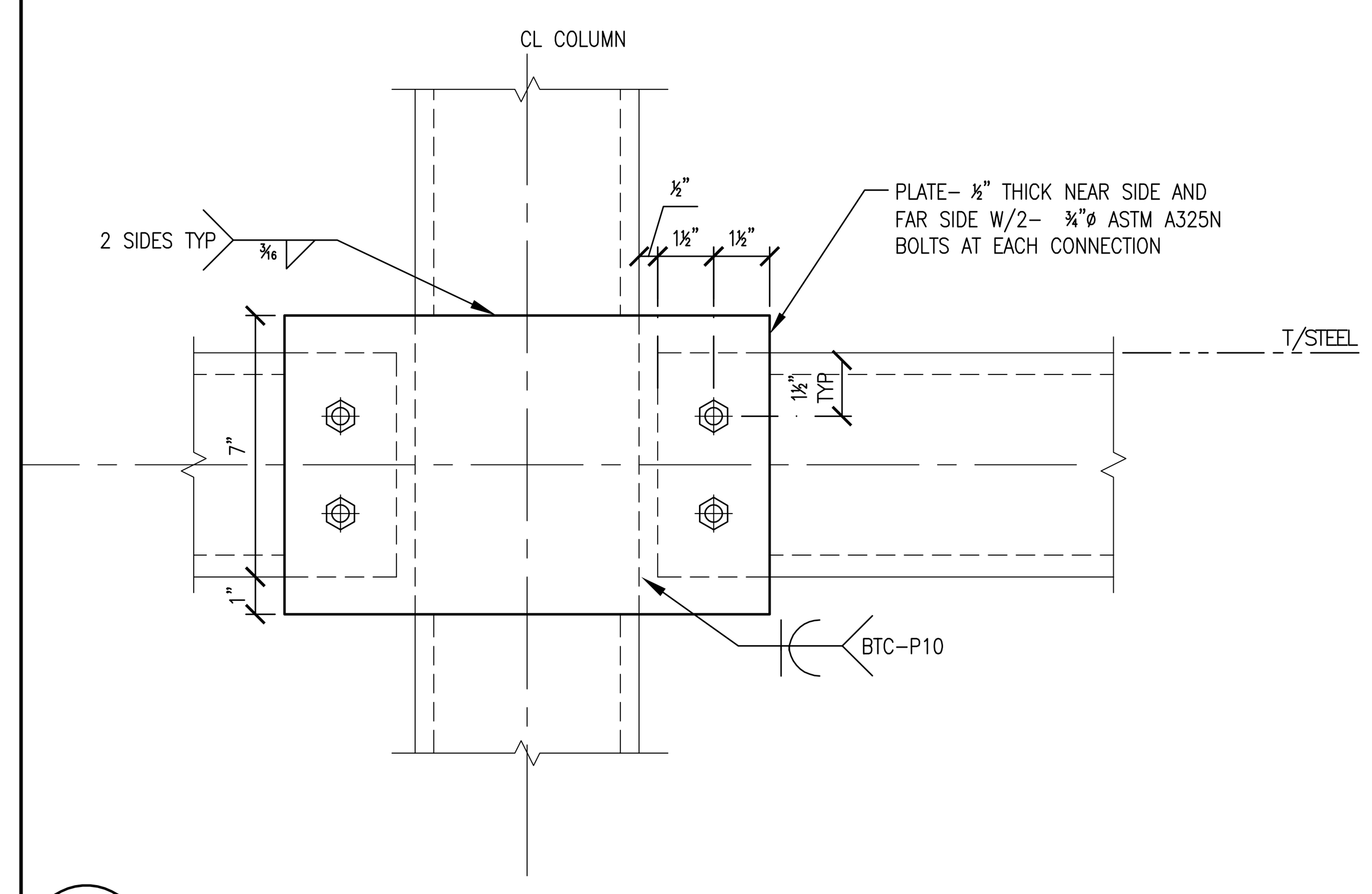
PORTLAND STATE UNIVERSITY SRTC BUILDING (SB2) COOLING TOWER REPLACEMENT

STRUCTURAL DETAILS

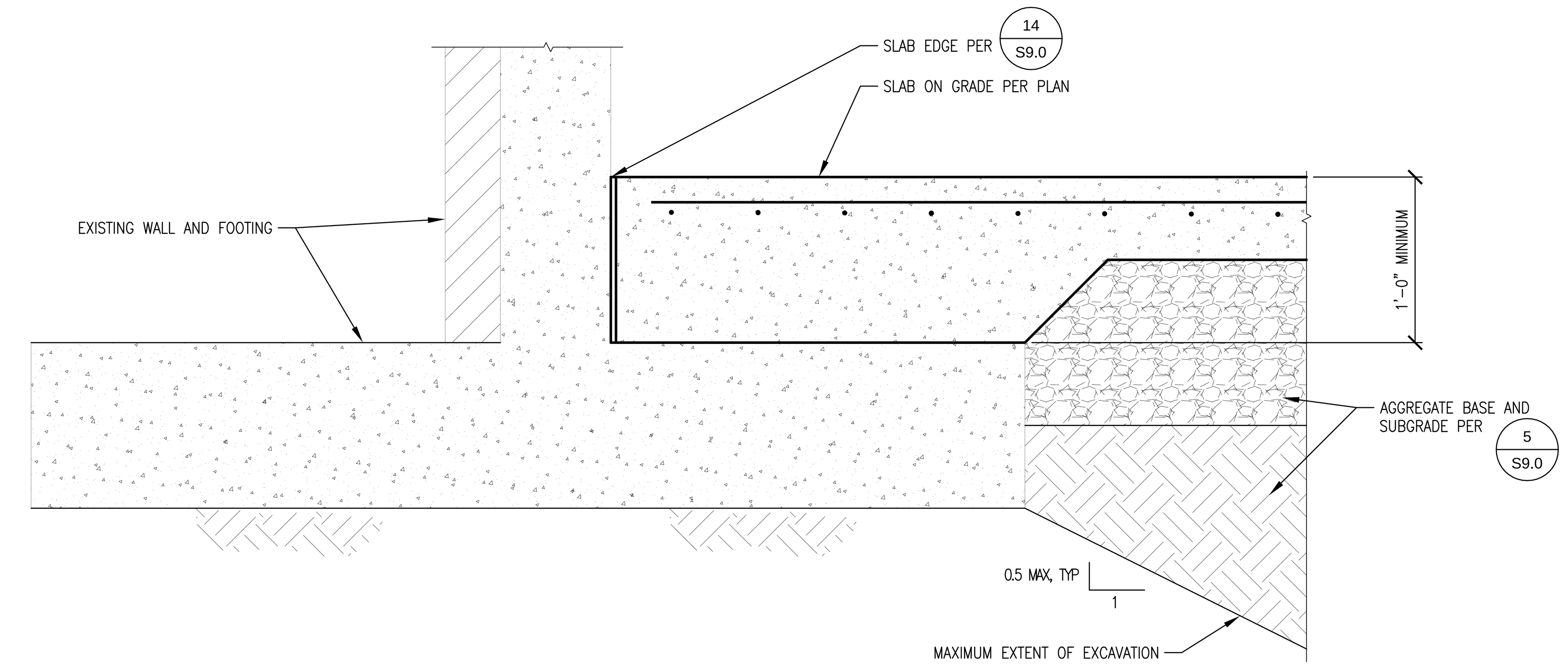
PROJ NO: 10909-12002
DRWN: SEB CHKD: CC

S9.0

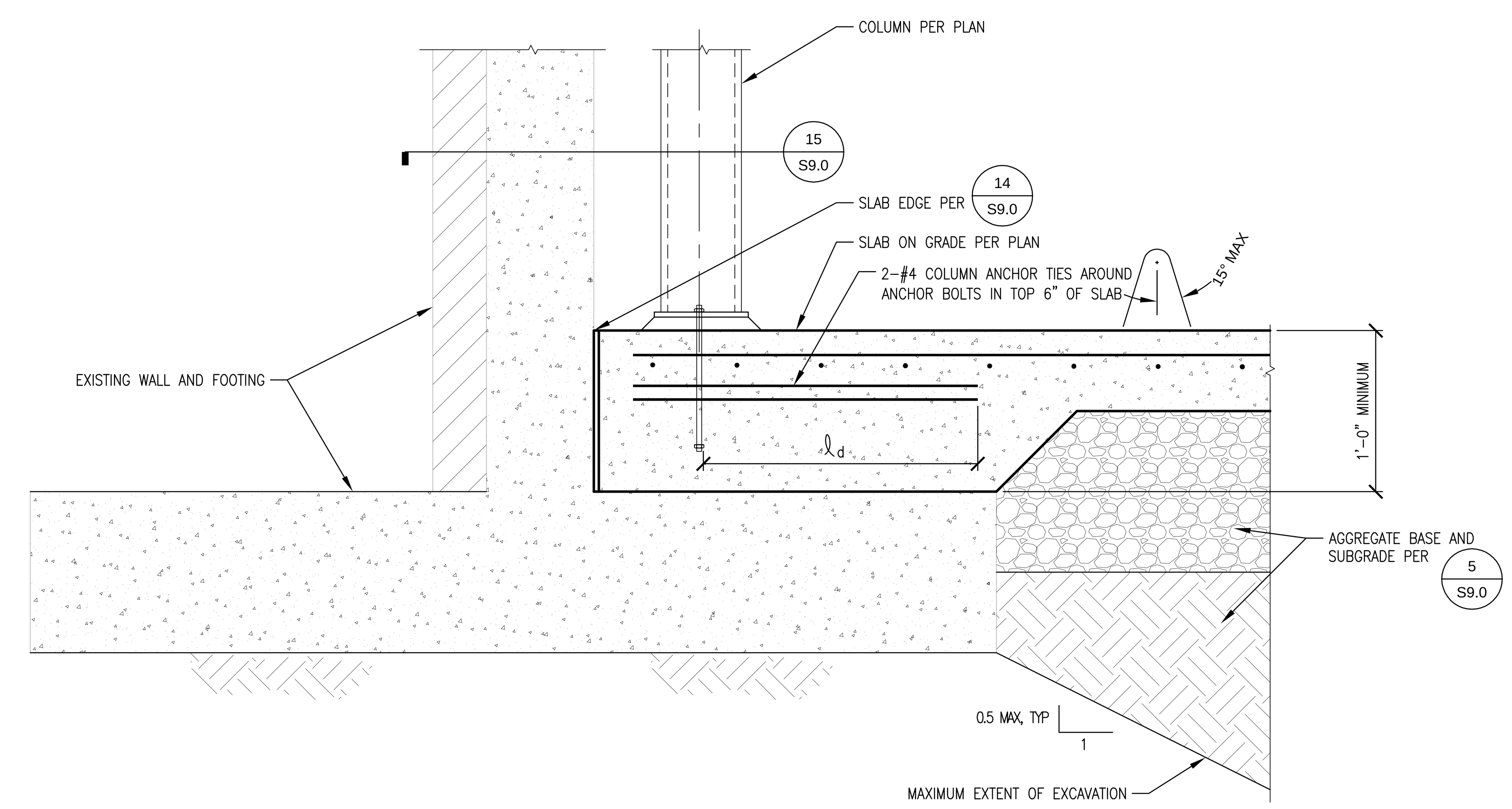
Plot Date: 1 August 2012 - 5:29 PM Plotted By: Matthew Carmichael Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_13_S9.0-0.dwg



1 S9.1 VEIL SUPPORT DETAIL
SCALE: 3"=1'-0"



2 S9.1 CONCRETE SLAB EDGE SECTION
SCALE: 1 1/2"=1'-0"



3 S9.1 CONCRETE SLAB EDGE DETAIL AT COLUMN
SCALE: 1 1/2"=1'-0"

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EXPIRES: 12/31/2013

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0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

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PORTLAND STATE UNIVERSITY SRTC BUILDING (SB2) COOLING TOWER REPLACEMENT

STRUCTURAL DETAILS

PROJ NO: 10909-12002
DRWN: SEB CHKD: CC

S9.1

Plot Date: 1 August 2012 - 5:02 PM Plotted By: Susan Brady Cad File No: N:\US\Portland\Projects\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_14_S9.1-0.dwg

TABLE 2 — RECOMMENDED DISTANCE (in inches) BETWEEN CONDUIT TRADE SIZES

SIZE	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"	6"
1/2"	1-3/8"												
3/4"	1-1/2"	1-5/8"											
1"	1-3/4"	1-7/8"	2"										
1-1/4"	2"	2-1/8"	2-1/4"	2-1/2"									
1-1/2"	2-1/8"	2-1/4'	2-3/8"	2-5/8"	2-3/4"								
2"	2-3/8"	2-1/2"	2-3/4"	3"	3-1/8"	3-3/8"							
2-1/2"	2-5/8"	2-3/4"	3"	3-1/4"	3-1/2"	3-3/4"	4"						
3"	3"	3-1/8"	3-3/8"	3-5/8"	3-3/4"	4"	4-3/8"	4-3/4"					
3-1/2"	3-3/8"	3-1/2"	3-5/8"	3-7/8"	4"	4-3/8"	4-5/8"	5"	5-3/8"				
4"	3-3/4"	3-7/8"	4"	4-1/4"	4-3/8"	4-3/4"	5"	5-3/8"	5-3/4"	6"			
4-1/2"	4"	4-1/8"	4-1/4"	4-1/2"	4-3/4"	5"	5-1/4"	5-5/8"	6"	6-1/4"	6-1/2"		
5"	4-3/8"	4-1/2"	4-5/8"	4-7/8"	5"	5-3/8"	5-5/8"	6"	6-1/4"	6-5/8"	7"	7-1/4"	
6"	5"	5-1/8"	5-1/4"	5-1/2"	5-3/4"	6"	6-1/4"	6-5/8"	7"	7-1/4"	7-5/8"	8"	8-1/2"

TABLE 1 - 460V, MOTOR CONDUIT, CONDUCTOR AND STARTER SCHEDULE

MOTOR HP	FULL LOAD (AMPS) ****	CONDUIT SIZE ** (INCHES)	MTR LEAD SIZE (AWG)	GRD WIRE SIZE	STARTER SIZE	FUSE SWITCH		*CRKT BRKR MCP CONT. RATING***	OVERLOAD HEATER ****	VERTICAL SPACE-IN FVNR
						SW	FUSE*			
1/3	1.0	3/4	12	14	1	30A	1.4	3	1.15	12
1/2	1.1						1.4	3	1.27	
3/4	1.6						1.8	3	1.84	
1	2.1						2.25	3	2.42	
1-1/2	3.0						3.2	7	3.45	
2	3.4						4.5	7	3.91	
3	4.8			14			6.25	7	5.52	
5	7.6			12			10	15	8.74	
7-1/2	11		12	12			15	15	12.65	
10	14		10	10	1		17.5	30	16	
15	21	3/4	10	10	2	30A	25	30	24	
20	27		8	10	2	60A	35	50	31	
25	34	1	8	8	2	60A	40	50	39	12
30	40	1	6	8	3	60A	50	50	46	18
40	52	1	6	6	3	100A	70	70	59	18
50	65	1-1/4	4	6	3	100A	80	100	74	18
60	77	1-1/4	2	6	4	100A	100	100	88	24
75	96	1-1/2	1	2	4	200A	125	150	110	24
100	124	2	2/0	2	4	200A	175	400	142	24
125	156	2	3/0	2	5	400A	225	400	179	42
150	180	2-1/2	4/0	1	5	400A	250	400	207	42
200	240	3	350KCM	1	5	400A	350	400	276	42
250	302	3	500KCM	1	6	400A	350	400	347	72

MCP = MOTOR CIRCUIT PROTECTOR

- * WESTINGHOUSE SERIES C, TYPE HMCP; OR EQUAL.
- ** SIZE BASED ON 3 CONDUCTORS, TYPE THW, AWG/MCM, 600V.
- *** OR AS PER MANUFACTURER'S RECOMMENDATIONS & INSTRUCTIONS.
- **** BASED ON NEC, FIELD VERIFY MOTOR NAMEPLATE VALUES.

TABLE 3 - CIRCUIT/CONDUIT I.D. TABLE

	TYPE I.D.	CIRCUIT		GROUND		CONDUIT SIZE
		QTY	WIRE SIZE	QTY	GND SIZE	
1	– –	...	...			...
2	P 01	3	#12	1	#12	3/4
3	P 02	6	#12	1	#12	3/4
4	P 03	9	#12	1	#12	1
5	P 04	12	#12	2	#12	1.25
6	P 05	15	#12	2	#12	1.25
7	P 06	18	#12	2	#12	1.5
8						
9	P 11	3	#10	1	#12	3/4
10	P 12	6	#10	1	#12	1
11	P 13	9	#10	1	#12	1.25
12	P 14	12	#10	1	#12	1.25
13						
14	P 21	3	#8	1	#10	3/4
15	P 22	6	#8	1	#10	1.25
16	P 23	9	#8	1	#10	1.5
17						
18	P 31	3	#6	1	#8	1
19	P 32	6	#6	1	#8	1.5
20						
21	P 41	3	#4	1	#6	1.25
22	P 42	3	#2	1	#6	1.25
23	P 43	3	#1	1	#6	1.5
24	P 44	3	#1/0	1	#6	2
25	P 45	3	#2/0	1	#6	2
26	P 46	3	#3/0	1	#6	2
27	P 47	3	#4/0	1	#6	2.5
28						
29	P 51	3	250 KCM	1	#6	2.5
30	P 52	3	300 KCM	1	#4	3
31	P 53	3	350 KCM	1	#4	3
32	P 54	3	400 KCM	1	#4	3
33	P 55	3	500 KCM	1	#3	3.5
34	P 56	3	600 KCM	1	#3	3.5
35	P 57	3	750 KCM	1	#2	4
36						
37	P 61	2	#12	1	#12	3/4
38	P 62	4	#12	1	#12	3/4
39	P 63	5	#12	1	#12	3/4
40	P 64	7	#12	1	#12	3/4
41	P 65	8	#12	2	#12	1
42	P 66	10	#12	2	#12	1.25
43						
44	P 71	2	#10	1	#12	3/4
45	P 72	4	#10	2	#12	1
46	P 73	5	#10	1	#12	3/4
47	P 74	6	#10	1	#12	1
48	P 75	7	#10	1	#12	1
49	P 76	8	#10	1	#12	1.25
50	P 77	9	#10	1	#12	1.25
51	P 78	10	#10	1	#12	1.25
52						
53	P 81	2	#8	1	#10	3/4
54	P 82	4	#8	1	#10	1
55	P 83	5	#8	1	#10	1.25
56	P 84	6	#8	1	#10	1.25
57	P 85	7	#8	1	#10	1.25
58						
59	P 91	2	#12	1 1	#12 #12/IG	3/4
60	P 92	4	#12	2 2	#12 #12/IG	1"
61	P 93	6	#12	3 3	#12 #12/IG	1 1/4
62	P 94	8	#12	4 4	#12 #12/IG	1 1/4"
63						
64	C 01	2	#12			3/4
65	C 02	4	#12			3/4
66	C 03	6	#12			3/4
67	C 04	8	#12			3/4
68	C 05	10	#12			1
69	C 06	12	#12			1

ABBREVIATIONS

A – AMP
ABI – ADDITIVE BID ITEM
AC – ASPHALTIC CONCRETE
AF – AMPERE – FRAME
AFF – ABOVE FINISHED FLOOR
AFG – ABOVE FINISHED GRADE
AIC – AMPERE INTERRUPTING CAPACITY
AS – AMMETER SWITCH
AT – AMPERE – TRIP
AUTO – AUTOMATIC
AWG – AMERICAN WIRE GAUGE

B.C. – BARE COPPER
BLDG – BUILDING
BMS – BUILDING MANAGEMENT SYSTEM
BOT – BOTTOM

C. OR CNDT – CONDUIT
C – COMMON
CB – CIRCUIT BREAKER
CCT – CONTROL CIRCUIT XFMR
CFCI – CONTRACTOR FURNISHED CONTRACTOR INSTLD.
CL – CLASS
CNDCT – CONDUCTOR
CNTL – CONTROL
CON – CONTROL, CONTROLLER
C.O. – CONDUIT ONLY
CR – CONTROL RELAY
CRKT – CIRCUIT
CT – CURRENT XFMR

(D) – DEMOLISH OR REMOVE
DF – DRINKING FOUNTAIN
DIN – DEUTSCHE INDUSTRIE NORM
DIST – DISTRIBUTION
DIV – DIVISION
DPDT – DOUBLE POLE DOUBLE THROW
DPLX – DUPLEX
DPST – DOUBLE POLE SINGLE THROW
DR – DOOR
DWG – DRAWING

EPDM – ETHYLENE PROPYLENE DIENE MONOMER
EF – EXHAUST FAN
EMT – ELECTRICAL METALLIC TUBING
EOL – END OF LINE
EP – EXPLOSION PROOF
EPR – ETHYLENE PROPYLENE RUBBER
EPWR – EMERGENCY POWERED
EQP – EQUIPMENT
(E) OR EXST – EXISTING

F/P – FIRE PUMP AUTO XFR SW & CNTLR
FA – FIRE ALARM
FACP – FIRE ALARM CONTROL PANEL
FASP – FIRE ALARM SECURITY PANEL
FCP – FAN CONTROL PANEL
FCR – FAN CONTROL RELAY
FD – FUSED DISCONNECT
FXT – FIXTURE
FLA – FULL LOAD AMPS
FLUOR – FLUORESCENT
FS – FLOW SWITCH
FU – FUSE
FVNR – FULL VOLTAGE NON-REVERSING
FVR – FULL VOLTAGE REVERSING

G – GROUND CONDUCTOR
GB – GROUND BUS BAR
GEN – GENERATOR
GFCI – GROUND FAULT CIRCUIT INTERRUPTER
GFI – GROUND FAULT INTERRUPTER
GND – GROUND
GOVT – GOVERNMENT
GP – GROUP

HH – HANDHOLE
HID – HIGH INTENSITY DISCHARGE
HOA – HAND-OFF-AUTO
HP – HORSE POWER
HPS – HIGH PRESSURE SODIUM
HV – HIGH VOLTAGE

IC – INTERCOM SYSTEM
ICAND – ICANDESCENT
IG – ISOLATED GROUND
IOTC – INSTANT ON TIMED CLOSE

JBOX – JUNCTION BOX (TYP CNDT BODY)

kCM – THOUSAND CIRCULAR MILS
kV – KILO-VOLT
kVA – KILO-VOLT-AMPERE
kVAR – KILO-VOLT-APMERE-REACTIVE
kW – KILOWATT
kWH – KILOWATT HOUR

LAN – LOCAL AREA NETWORK
LCC – LIGHTING CONTROL CONTACTOR
LCP – LIGHTING CONTROL PANEL
L/O – LOCK OUT
LS – LEVEL SWITCH
LT – LONG TIME
LV – LOW VOLTAGE

mA – MILLI-AMPS
MAG – MAGNETIC
MAX – MAXIMUM
MB – MASTERBOX
MCB – MAIN CIRCUIT BREAKER
MCC – MOTOR CONTROL CENTER
MCP – MOTOR CRKT PROTECTOR CB
MDP – MAIN DISTRIBUTION PANEL
MH – MANHOLE
MIN – MININUM
MLO – MAIN LUGS ONLY
MTD – MOUNTED
MTG – MOUNTING

N – NORTH
(N) – NEW
NC – NORMALLY CLOSED
NA – NOT APPLICABLE
NEMA – NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NEUT – NEUTRAL
NFD – NON-FUSED DISCONNECT
NFPA – NATIONAL FIRE PROTECTION ASSOCIATION
NO – NORMALLY OPEN

OC – ON CENTER
OFC – OIL-FUSED CB
OFCI – OWNER FURNISHED CONTRACTOR INSTALLED
OHP – OVERHEAD POWER/COMMUNICATION LINES
OVHD – OVERHEAD
OL – OVERLOAD RELAY (THERMAL)

P – POLE
PA – PUBLIC ADDRESS
PB – PULL BOX
PBS – PUSH BUTTON STATION
PEC – PHOTOELECTRIC CELL PF– POWER FACTOR
PFC – POWER FACTOR CORRECTION
PH, OR ϕ – PHASE
PLCS – PLACES
PMH – POWER MANHOLE
PNL – PANEL
POC – POINT OF CONNECTION
PP – POWER POLE
PS – PRESSURE SWITCH
PVC – POLYVINYL CHLORIDE

QTY – QUANTITY

(R) – EXISTING TO BE REMOVED
RCPT – RECEPTACLE
RGS – RIGID GALVANIZED STEEL
(RL) – EXISTING TO BE RELOCATED
RM – ROOM
(RR) – EXISTING TO BE REMOVED & REPLACED
RS – RAPID START

SHLD – SHIELDED
SCA – SHORT CIRCUIT AMPERES (AVAILABLE)
SECP – SECURITY PANEL
SP – SPARE
SPDT – SINGLE POLE DOUBLE THROW
SPST – SINGLE POLE SINGLE THROW
SV – SOLENOID VALVE
SW – SWITCH
SWBD – SWITCHBOARD
SWGR – SWITCHGEAR
SYM – SYMMETRICAL
TB – TERMINAL BOX
TDR – TIME DELAY RELAY
TEL – TELEPHONE SYSTEM
TMH – TELEPHONE MANHOLE
TSW – TEMPERATURE SWITCH
TSD – TREATMENT, STORAGE, AND DISPOSAL
TVSS – TRANSIENT VOLTAGE SURGE SUPRRESSION
TYP – TYPICAL

UGP – UNDERGROUND POWER CONDUIT OR DUCT
UGT – UNDERGROUND TELEPHONE CONDUIT OR DUCT
U.L. – UNDERWRITER'S LABORATORY
UOS – UNLESS OTHERWISE SPECIFIED

V – VOLT
VA – VOLT-AMPS
VAC – VOLTAGE – ALTERNATING CURRENT
VDC – VOLTAGE – DIRECT CURRENT
VS – VOLTMETER SWITCH

W – WATT, OR WIRE
WH – WATER HEATER
WP – WEATHERPROOF
WW – WARM WHITE

XFMR – TRANSFORMER
XFR – TRANSFER
XLP – CROSS-LINKED POLYETHYLENE

ZS – POSITION SWITCH (LIMIT SWITCH)

NOT ALL ABBREVIATIONS OR SYMBOLS USED THIS PHASE

SYMBOLS

GENERAL

- (A) AMMETER
- AS AMMETER SWITCH
- CIRCUIT BREAKER
- CIRCUIT BREAKER
- OVERLOADS
- DISCONNECT, (FD INDICATES FUSED DISC.)
- OR FUSE
- (A) INDICATING PILOT LIGHT (NOTE: AMBER, BLUE, GREEN, RED, WHITE)
- NON-FUSED DISCONNECT ('FD' INDICATES FUSED DISC.)
- FULL VOLTAGE NON-REVERSING MOTOR STARTER
- VFD FURNISHED VARIABLE FREQUENCY DRIVE WITH INTERNAL DISCONNECT
- S 3 POLE, MOTOR RATED SWITCH
- MOTOR – (480V)
- M MOTOR – (120V)
- DM DAMPER MOTOR
- M MOTOR, VERTICAL (408V)
- ELECTRIC HEATER
- PANEL
- TRANSFORMER
- (V) VOLTMETER
- VS VOLTMETER SWITCH
- KWH KILOWATT-HOUR METER, WITH DEMAND & PEAK DEMAND REGISTER
- LOCAL STOP/START SWITCH
- VOLTAGE SURGE ARRESTOR
- TVSS TRANSIENT VOLTAGE SURGE SUPPRESSOR
- DMU DIGITAL METER UNIT
- SB CURRENT TRANSFORMER SHORTING TERMINAL BLOCK
- DELTA CONNECTION
- GROUND WYE CONNECTION
- GENERATOR
- MH, HH MANHOLE, HANDHOLE
- N E AUTOMATIC TRANSFER SWITCH
- GROUND ROD
- GROUND ROD, TEST WELL

RACEWAY

- CONCEALED OR UNDERGROUND
- EXPOSED
- ROUTED DOWN
- ROUTED UP
- CONDUIT STUBBED OUT AT LOCATION SHOWN. PROVIDE INSULATED BUSHING & PULLROPE
- RACEWAY STUBBED OUT FOR FUTURE CONTINUATION
- FLEX CONDUIT – LIQUIDTITE
- SURFACE MOUNTED DIVIDED METAL RACEWAY
- CONDUIT SEAL FITTING
- J, J JUNCTION BOX – WALL AND FLOOR MOUNTED
- PB PULL BOX
- TB TERMINAL BOX
- 4PP1-1 HOME RUN CRKT – PNL AND CB #
- CONDUCTOR QTY – INCLUDING NEUT. & GND
- #8 NEUTRAL, ISOLATED GND, GND, CIRCUITS; WIRE SIZE (#12 IF NOT SHOWN)
- HEAT TRACING
- AIR TERMINAL

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REGISTERED PROFESSIONAL ENGINEER — OREGON — EXPIRES 6/30/14

BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT

ISSUE

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

ELECTRICAL LEGEND, ABBREVIATIONS & GENERAL NOTES

PROJ NO: 10909-12002
DRWN: MTC CHKD: SNS

E0.1

Plot Date: 1 August 2012 - 2:11 PM Plotted By: Richard George Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_15_E0.1-0.dwg

PANEL LABEL:	LOCATION:					MOUNTING:
SDP1	SRTC BASEMENT (RM 66)				FROM SB-5	SURFACE
PANEL VOLTAGE:	480	PHASE:	3	WIRE:	BUS:	INCOMING CONNECTIONS:
	277	WIRE:	4	SEE 1-LINE	1200	1200A MLO

SERVICE	WATTS	A/P	#	A	B	C	#	A/P	WATTS	SERVICE
CHILLER PRIMARY PUMP	20000		1	A			2		20000	CHILLER PRIMARY PUMP
SB2-CHP-01	20000	200A/3P	3		B		4	200A/3P	20000	SB2-CHP-02
...	20000		5			C	6		20000	
CONDENSER PUMP	10000		7	A			8			
SB2-CDP-01	10000	100A/3P	9		B		10			SPACE
...	10000		11			C	12			
COOLING TOWER PUMP	18650		13	A			14		33333	WELL BACK FLUSH PUMP
SB2-P-13	18650	250A/3P	15		B		16	250A/3P	33333	SB2-WBF-01
75 Hp	18650		17			C	18		33333	
COOLING TOWER EAST	7460		19	A			20		18650	COOLING TOWER PUMP
SRTC-CT-E	7460	100A/3P	21		B		22	250A/3P	18650	SB2-P-13B
	7460		23			C	24		18650	75 Hp
COOLING TOWER WEST	7460		25	A			26			
SRTC-CT-W	7460	100A/3P	27		B		28	250A/3P		SPACE
	7460		29			C	30			
			31	A			32			
SPACE		250A/3P	33		B		34	250A/3P		SPACE
			35			C	36			
			37	A			38			
SPACE		250A/3P	39		B		40	250A/3P		SPACE
			41			C	42			

LOAD SUMMARY	WATTS	AMPS	BALANCE
Ph. A	135553	489.1	0%
Ph. B	135553	489.1	0%
Ph. C	135553	489.1	0%
TOTAL WATTS:	406659	489.1	BUS LOADING: 40.8%
KILOWATTS:	406.7		Printed: 26-Jul-12

GROUND BUS:	YES
ISOLATED GND BUS:	NO
BRACING:	65000 AIC
FEED THRU LUGS:	YES

THIS WORK

THIS WORK

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EXPIRES: 6/30/14

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
		ISSUE
0	08/02/12	ISSUED FOR BID AND PERMIT

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

SRTC ELECTRICAL
PANEL SCHEDULES

PROJ NO: 10909-12002

DRWN: RAG CHKD: SNS

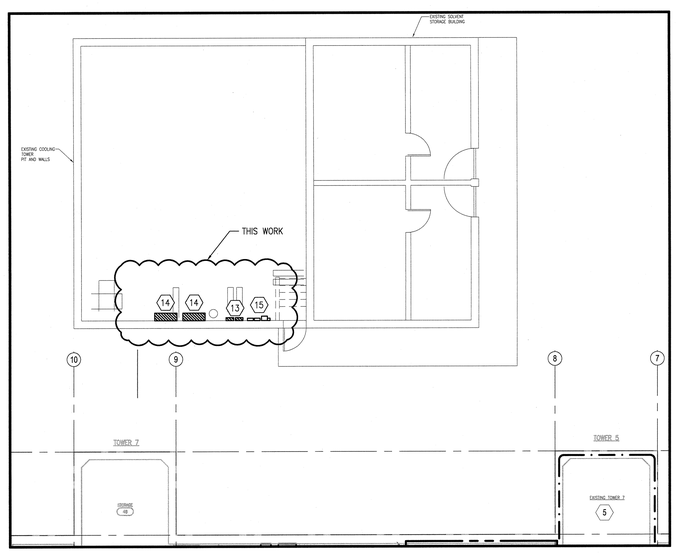
E0.5

SHEET 16 OF 17

Plot Date: 1 August 2012 - 2:11 PM Plotted By: Richard George
Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_16_E0_5-0.dwg

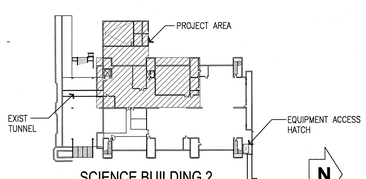
KEYED NOTES

1. FOR CONDUIT SPACING ON RACK SUPPORT, SEE TABLE 2,DWG E0.1.
2. SEE POWER CIRCUIT TABLE, DWG E0.1, TYP.
3. NOT USED.
4. (N) EXHAUST FAN, WITH (N) MOTOR AND (N) VFD SPEED CONTROL. INSTALL (N) FUSED DISCONNECT USING FUSES SUITABLE FOR PROTECTING SOLID STATE ELECTRONICS. INSTALL (N) VARIABLE FREQUENCY DRIVE (VFD) LOCALLY. RECONNECT (E) POWER CONDUCTORS.
5. CANCEL ALL ELECTRICAL SCOPE FOR THIS ROOM.
6. NOT USED.
7. SOLID STATE SOFT START MOTOR CONTROLLER FOR WELL PUMPS, SB2-WWP-01 AND SB2-WWP-02
8. REFER TO ONE-LINE, DWG E0.14, FOR CONDUCTOR SIZING
9. INSTALL RELOCATED DISCONNECTS AND XFMRS FOR SERVICES TO STORAGE BUILDING.
10. INSTALL LOCAL DISCONNECTS FOR NEW COOLING TOWER FANS.
11. EXTEND EXISTING POWER CIRCUIT TO SB2-SSP-01.
12. INSTALL NEW 1" CONDUIT FOR COOLING TOWER CONTROL WIRING FROM EXISTING CHEM FEED STATION.
13. DEMO EXISTING DISCONNECTS TO COOLING TOWERS.
14. DEMO EXISTING COOLING TOWER CONTROL PANELS.
15. REMOVE AND RELOCATE EXISTING DISCONNECTS AND XFMRS FOR STORAGE AREAS. SEE NOTE 9.



2 E7.1 COOLING TOWER DEMOLITION
SCALE: 1/8" = 1'-0"

1 E7.1A SCIENCE BUILDING 2 PROCESS LV ELECTRICAL DISTRIBUTION
SCALE: 1/8" = 1'-0"



SCIENCE BUILDING 2
KEY PLAN

1/8" = 1'-0" 5' 0 5' 10' 15' 20' 25'

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EXPIRES: 6/30/14

BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

MARK	DATE	DESCRIPTION
0	08/02/12	ISSUED FOR BID AND PERMIT
		ISSUE

PORTLAND STATE UNIVERSITY
SRTC BUILDING (SB2)
COOLING TOWER REPLACEMENT

SRTC SUB BASEMENT
LV PROCESS POWER PLAN

PROJ NO: 10909-12002
DRWN: MTC CHKD: SNS

E7.1

SHEET 17 OF 17

Plot Date: 1 August 2012 - 4:40 PM Plotted By: Richard George
Cad File No: G:\10909 - PSU (Portland State University)\10909-12003 PSU SRTC Cooling Tower Replacement\06-CAD\Sheets\10909-12003_17_E7_1-0.dwg